

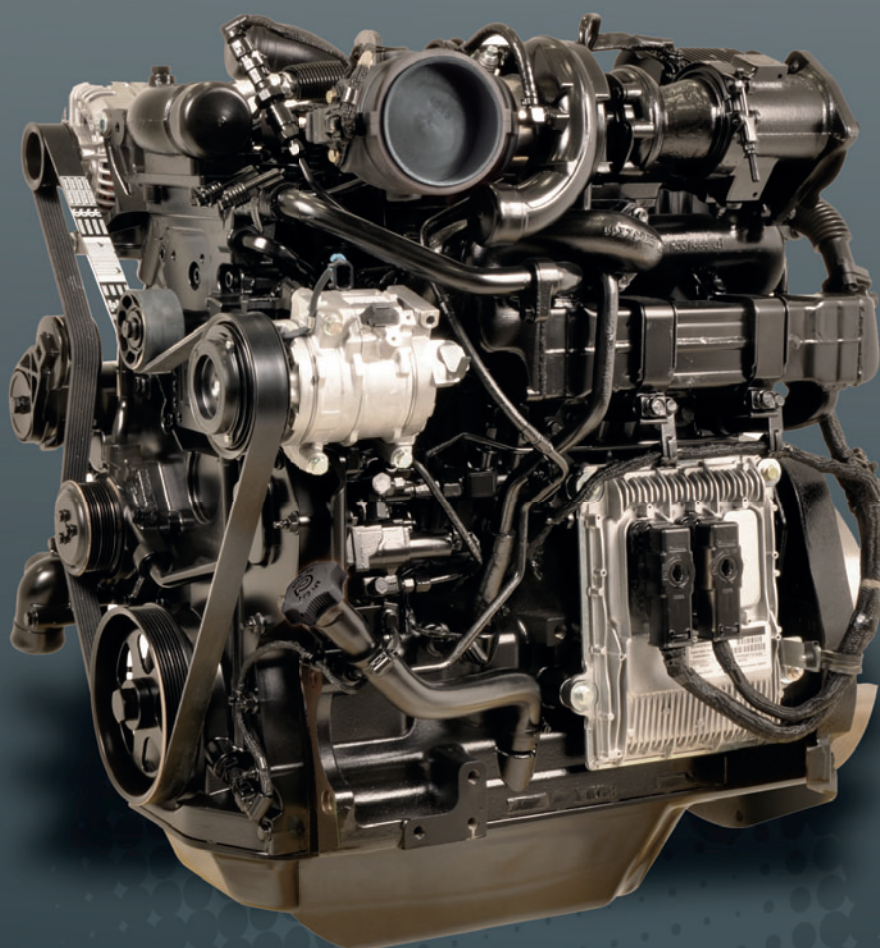
647146EN (21/03/2013)

JOHN DEERE ENGINE

4045 PWX below 130kW

Stage 3B

Repair Manual



DATE OF ISSUE	OBSERVATION
24 / 05 / 2012	- 1 ST ISSUE
21 / 03 / 2013	- UPDATING

THE TEXTS AND PICTURES IN THIS DOCUMENT CANNOT BE REPRODUCED EITHER TOTALLY OR PARTLY.

4045 PowerTech™ OEM Diesel Engines Below 130kW (174 hp) (Interim Tier 4/Stage III B platform)

COMPONENT TECHNICAL MANUAL

4.5 L OEM Diesel Engines Below 130kW (174 hp) — Interim Tier 4/Stage III B platform

CTM114619 16AUG12 (ENGLISH)

For complete service information also see:

OEM Engine Accessories	CTM67
JDPS Master Tool Manual.....	TM111119
Application List.....	CTM106819

John Deere Power Systems
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Introduction

Foreword

This repair manual covers the 4045 <130kW PowerTech™ engines for Interim Tier 4/Stage III B platform.

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual.

Live With Safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

 **CAUTION: This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.**

Information in this manual is organized in sections and sub divided into groups.

Section 01 covers the safety measures to follow while repairing the engine; engine identification features, engine emission and application details, and information about the fuels, lubricants, and coolants.

Section 02 covers the repair and adjustment procedures.

Section 03 explains the theory of operation of each system.

Section 04 is the diagnostics section that provides troubleshooting procedures to find problems.

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Section 05 covers other materials needed to do the job.

Section 06 details all specifications, wear tolerances, torque values, and contains the wiring diagrams.

This manual contains SI Metric units of measure followed immediately by the U.S. customary units of measure. Most hardware on these engines is metric sized.

Read each block of material completely before performing service to check for differences in procedures or specifications. Follow only the procedures that apply to the component you are working on.

Component Technical Manuals are concise service guides for specific components. Component Technical Manuals are written as stand-alone manuals covering multiple machine applications.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

CALIFORNIA PROPOSITION 65 WARNING
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

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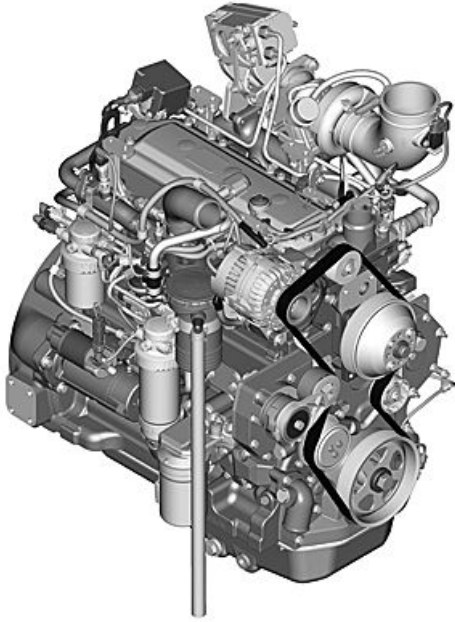
Record of Changes

Section-Group	Group Title	Block Title	Comment
New manual			

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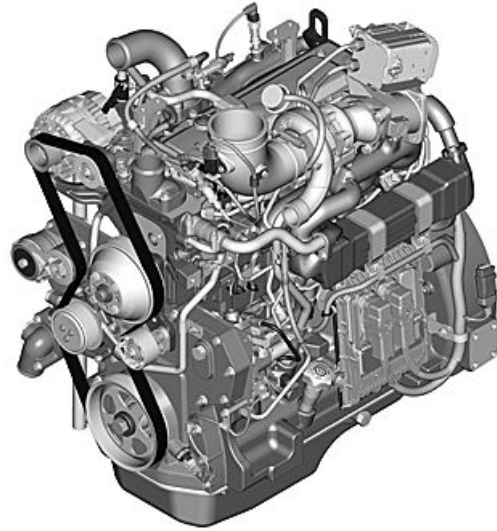
Identification Views

4045 <130kW PowerTech™ PWX Engine—Interim
Tier 4/Stage III B



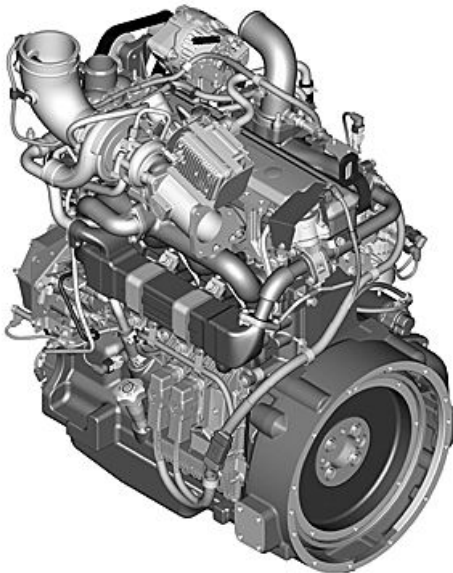
3/4 right front view—4045HFC92 Engine

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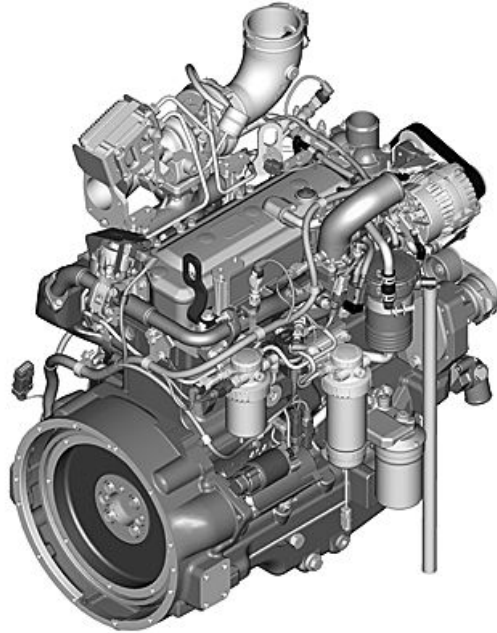
3/4 left front view—4045HFC92 Engine

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3/4 left rear view—4045HFC92 Engine

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3/4 right rear view—4045HFC92 Engine

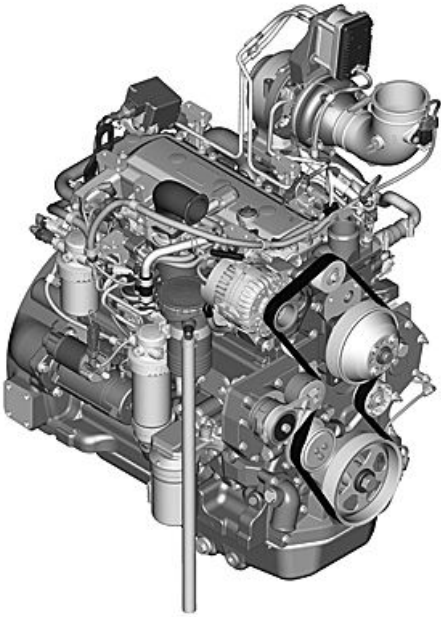
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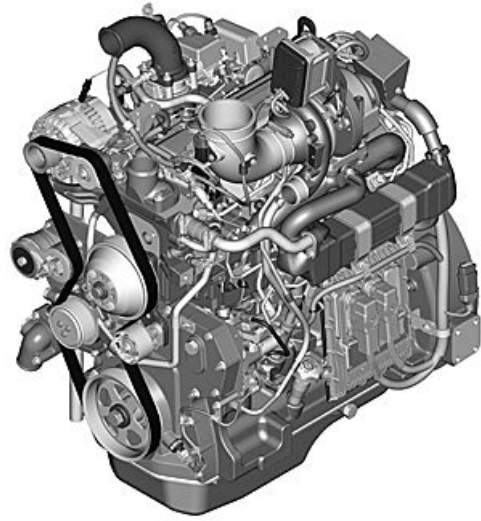
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**4045 <130kW PowerTech™ PVX Engine—Interim
Tier 4/Stage III B**



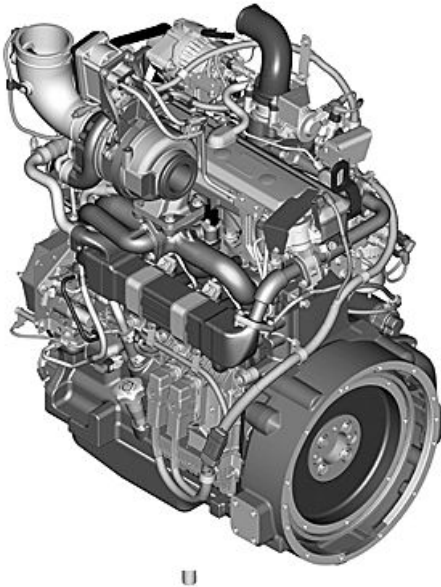
3/4 right front view—4045HFC93 Engine

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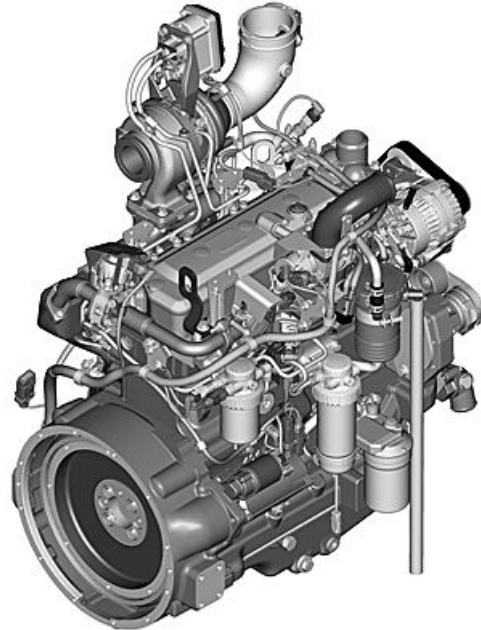
3/4 left front view—4045HFC93 Engine

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3/4 left rear view—4045HFC93 Engine

RG19916 —UN—28JAN11



3/4 right rear view—4045HFC93 Engine

RG19917 —UN—28JAN11

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Related Manuals

Tool Manual

When working through the instructions in this manual, you may require the use of special tools. For a complete listing of John Deere approved essential and dealer fabricated engine tools, please refer to the JDPS Master Tool Manual Technical Manual (TM).

Application List Manual

For more information on which engine manuals should be referred to for a specific machine or engine, please refer to the Application List Manual Component Technical Manual (CTM). This manual provides a listing of machine and engine models, and their appropriate base engine and fuel system manual numbers. For OEM applications, the operators manual number for the engine is also included.

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Training Information

John Deere University offers the following related training for the engine covered in this manual. More

information on each of these courses can be found online on the John Deere University website (example: <https://jdu.deere.com/>).

Course Title
Service ADVISOR Overview
Diesel Engine Systems I
Diesel Engine Systems II
Electrical Systems I
Electrical Systems II
Electrical Methods and Techniques
Hydraulic – Systems I
Hydraulic – Systems II
Hydraulic Methods and Techniques
Service ADVISOR Methods and Techniques
John Deere Custom Performance
Engine - Introduction to Tier 3/Stage III A
Engine - Introduction to Interim Tier 4/Stage III B
Engine - Technical Qualification - PowerTech E and PowerTech Plus 4045 and 6068 / 4.5 L and 6.8 L (Tier 3/Stage III A)
Engine - Adjustments and Diagnostics - PowerTech Plus 4045, 6068, and 6090 / 4.5 L, 6.8 L, and 9.0 L (Tier 3/Stage III A) (ILT)
Engine - Teardown - PowerTech E and Plus 4045/6068 4.5L/6.8L (Tier 3/Stage III A)
Engine - 4.5 L (below 130kW) IT4 Base Engine Overview Qualification
Diesel Fuel Fundamentals
John Deere Plus 50™ II and COOL-GARD™ II
Aftertreatment System Overview

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Definition of Terms

Actuator	A device controlled by the ECU to perform a certain function.
Analog	Signal which has a continuous range of possible voltages, usually 0 V (low) to 24 V (high).
Application	Either a movable or stationary piece of equipment that the engine is placed in. Applications include, Tractors, Harvesters, Loaders, Irrigation Pumps, Generator Sets, and others.
BAP	Barometric Air Pressure. Pressure of the atmosphere (atmospheric pressure).
Boost	Pressurized air in the intake manifold.
CAC	Charge Air Cooler. Cools the compressed air from the turbine before it enters the intake manifold.
CAN	Controller Area Network. The network on applications that allows communication between the engine control unit and some components.
Circuit Power	Power supplied to a device for use by its internal component circuits.
Crankshaft Position Sensor	Used to determine the angular position and velocity of the crankshaft in the 360° field of rotation.
Digital	A signal which consists of only two levels of voltage — usually 0 V (low) to 24 V (high).
DOC	Diesel Oxidation Catalyst. Part of the exhaust filter or aftertreatment device. Used to help reduce emissions.
DPF	Diesel Particulate Filter. Part of the exhaust filter or aftertreatment device. Used to help reduce emissions.
DTC	Diagnostic Trouble Code. A code that is stored in ECU memory when it detects a problem in the electronic control system. There are two types of codes: Active and Stored. These codes are displayed on monitor panels and can be recalled by the service tool.
ECT	Engine Coolant Temperature. The temperature of the engine coolant.
ECU	Engine Control Unit. Computer that controls the fuel, air, and ignition systems on the engine.
EGR	Exhaust Gas Recirculation. Used to help reduce emissions.
EI	An Electronic Injector that is regulated by the ECU to control the proper amount of fuel on High-Pressure Common-Rail fuel systems.
EOL	This is the abbreviation for End of Line which is where the ECU gets programmed at the factory.
EUI	An Electronic Unit Injector that is regulated by the ECU to control the proper amount of fuel on non-High-Pressure Common-Rail fuel systems.
FMI	Failure Mode Identifier. The second part of a two-part code that identifies control system fault codes according to the J1939 standard. This two-digit code identifies the type of failure that has occurred. The first half of the code is the Suspect Parameter Number (SPN).
H-Bridge	Circuits in the ECU set up in an H-configuration. This allows for current to be reversed to drive DC motors forward and reverse.
HPCR	High-Pressure Common-Rail. A device that distributes high-pressure fuel to the injectors.
Input	This identifies a signal as an input to a device or control unit.
J1939	The Society of Automotive Engineers (SAE) standard for communication between the electronic control units on heavy-duty vehicles, both on- and off-highway.

Continued on next page

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JDCP	John Deere Custom Performance Program allows the customer to select software features and feature combinations prior to loading the software into the ECU. It is also one way by which embedded software is managed and updated in control units without removal of the control unit from the machine.
JDPS	John Deere Power Systems.
MAP	Manifold Air Pressure. The pressure of the air in the intake manifold, sometimes referred to as "boost" pressure.
MAT	Manifold Air Temperature. The temperature of the air in the intake manifold.
Meter Zero	This is the value the multimeter reads in the ohm position, when the meter lead tips are held together.
Mis-pin	An incorrect placement of male pins or female sockets within an electrical connector. Also known as an incorrect swapping of wires and terminals.
OOR	Out-of-Range. The signal received by the ECU is out of the expected range of the device.
OORH	Out-of-Range High. Signal sensed by the ECU is higher than the component can produce (outside of acceptable limit). For some circuit types, this could be caused by an open input wire, an open ground wire, or an input wire shorted to a voltage higher than the ECU expects (+ battery).
OORL	Out-of-Range Low. Signal sensed by the ECU is lower than the component can produce (outside of acceptable limits). For some circuit types, this could be caused by an input wire or circuit power wire shorted to ground.
Output	This identifies a signal as an output from a device or control unit.
Pin	A style of terminal that makes the electrical connection to a connector. Also called a male terminal.
PWM	Pulse Width Modulation. A digital electronic signal of a fixed frequency. The on-time of the signal is increased or decreased (modulated) to indicate a change in condition.
RAM	Random Access Memory. The portion of the computer memory within the ECU that is used when the ECU is running. All data in this memory is lost when the ECU is "OFF".
Socket	A style of terminal that makes the electrical connection to a connector. Also called a female terminal or receptacle.
Suction Control Valve	Suction Control Valve regulates the amount of fuel that the high-pressure fuel pump supplies the HPCR.
SDS	Software Delivery System. Used by JDPS to maintain software and programming records.
Sensor	Device used by the ECU to monitor various engine parameters.
SPN	Suspect Parameter Number. The first half of a two-part code that identifies control system fault codes according to the J1939 Standard. The SPN identifies the system or component that has the failure. The second half of the code is the Failure Mode Identifier (FMI).
TDC	Top Dead Center. Point of uppermost piston travel.
Throttle Rate	How quickly the ECU changes the engine fuel rate in response to a throttle signal. Acceleration and deceleration rates are adjustable. Availability of throttle rates may vary, depending on engine model.
Trim Options	Options that can be enabled or disabled in the ECU programming, such as throttle selection, torque adjustment, governor gains, derates, and shutdowns, and others.
TWV	Two-Way Valve. A component in the Electronic Injector (EI).
VGT	Variable Geometry Turbo. Used to reduce emissions.
WIF	Water-In-Fuel. The WIF sensor sends a signal to the ECU when water is detected in the fuel.

BK34394,0000E72 -19-05OCT11-2/2

Contents

Section 01—General Information

- Group 000—Safety
- Group 001—Engine Identification Information
- Group 002—Fuels, Lubricants, and Coolants

Section 02—Repair and Adjustments

- Group 010—Engine Rebuild
- Group 020—Cylinder Head and Valve Repair and Adjustment
- Group 030—Cylinder Block, Liners, Pistons and Rods
- Group 040—Crankshaft, Main Bearings and Flywheel
- Group 050—Camshaft, Balancing Shaft, and Timing Gear Train Repair and Adjustment
- Group 060—Lubrication System
- Group 070—Cooling System
- Group 080—Air Intake and Exhaust System Repair and Adjustment
- Group 090—Electronic Fuel System Repair and Adjustment
- Group 100—OEM Starting and Charging Systems Repair and Adjustment
- Group 110—Electrical Engine Control Repair and Adjustment
- Group 112—Connector Repair and Adjustment
- Group 115—Aftertreatment Devices

Section 03—Theory of Operation

- Group 120—Base Engine Operation
- Group 123—Cooling System
- Group 126—Lubrication System
- Group 130—Electronic Fuel System
- Group 135—Air Intake and Exhaust System
- Group 137—Aftertreatment System
- Group 140—Electronic Control System

Section 04—Diagnostics

- Group 150—Observable Diagnostics and Tests
- Group 155—Checks, Tests, and Procedures
- Group 160—Diagnostic Instructions and Information
- Group 161—Engine Position Diagnostics
- Group 162—Air Intake and Exhaust System Diagnostics
- Group 163—Lubrication and Cooling System Diagnostics
- Group 164—Fuel System Diagnostics
- Group 165—Engine Control Unit (ECU) and Throttle Diagnostics
- Group 166—Air or Exhaust Throttle Actuator, EGR Valve, and VGT Diagnostics
- Group 167—VGT and Fuel Dosing Calculated Values Diagnostics

- Group 168—Fuel Dosing Aftertreatment System Diagnostics
- Group 178—Application Diagnostics
- Group 179—Communication Diagnostics

Section 05—Other Materials

- Group 180—Lubricants, Sealants, and Other Materials

Section 06—Specifications

- Group 200—Repair and General OEM Specifications
- Group 210—Diagnostic Specifications

*Original Instructions. All information, illustrations and specifications in this manual are based on the latest information available at the time of publication.
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Section 01 General Information

Contents

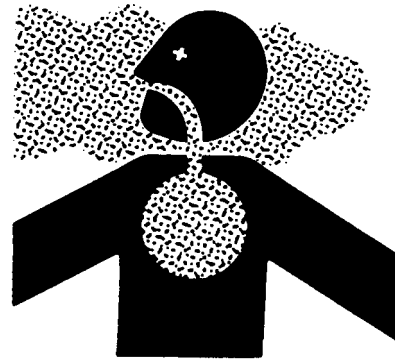
	Page		Page
Group 000—Safety		Commercial Engine Designation	01-001-4
Avoid Harmful Asbestos Dust	01-000-1	Group 002—Fuels, Lubricants, and Coolants	
Avoid Heating Near Pressurized		Diesel Fuel	01-002-1
Fluid Lines	01-000-1	Diesel Fuel Additive Products	01-002-1
Avoid High-Pressure Fluids	01-000-1	Handling and Storing Diesel Fuel	01-002-1
Avoid Hot Exhaust	01-000-2	Lubricity of Diesel Fuel	01-002-2
Construct Dealer-Made Tools		Testing Diesel Fuel	01-002-2
Safely	01-000-2	Biodiesel Fuel	01-002-3
Dispose of Waste Properly	01-000-2	Minimizing the Effect of Cold	
Exhaust Filter Cleaning	01-000-3	Weather on Diesel Engines	01-002-4
Follow Safety Instructions	01-000-3	Diesel Engine Oil	01-002-5
Handle Agricultural Chemicals		John Deere Break-In™ Plus	
Safely	01-000-4	Engine Oil	01-002-5
Handle Chemical Products Safely	01-000-4	Engine Oil and Filter Service	
Handle Fluids Safely—Avoid		Intervals	01-002-6
Fires	01-000-5	Oil Filters	01-002-6
Handle Fuel Safely—Avoid Fires	01-000-5	Grease	01-002-6
Handle Starting Fluid Safely	01-000-5	Lubricant Storage	01-002-6
Handling Batteries Safely	01-000-6	Mixing of Lubricants	01-002-7
Illuminate Work Area Safely	01-000-6	Alternative and Synthetic	
Install All Guards	01-000-7	Lubricants	01-002-7
Live With Safety	01-000-7	Oilscan™ and CoolScan™	01-002-7
Practice Safe Maintenance	01-000-8	Heavy Duty Diesel Engine	
Prepare for Emergencies	01-000-8	Coolant	01-002-8
Prevent Acid Burns	01-000-9	Supplemental Coolant Additives	01-002-8
Prevent Battery Explosions	01-000-9	Operating in Warm Temperature	
Prevent Machine Runaway	01-000-10	Climates	01-002-9
Protect Against High Pressure		Testing Diesel Engine Coolant	01-002-9
Spray	01-000-10	Drain Intervals for Diesel Engine	
Protect Against Noise	01-000-10	Coolant	01-002-10
Recognize Safety Information	01-000-11	John Deere COOL-GARD™ II	
Remove Paint Before Welding or		Coolant Extender	01-002-10
Heating	01-000-11	Additional Information About	
Replace Safety Signs	01-000-11	Diesel Engine Coolants and	
Service Cooling System Safely	01-000-12	John Deere COOL-GARD™ II	
Service Machines Safely	01-000-12	Coolant Extender	01-002-11
Stay Clear of Rotating Drivelines	01-000-12		
Understand Signal Words	01-000-13		
Use Proper Lifting Equipment	01-000-13		
Use Proper Tools	01-000-13		
Wait Before Opening			
High-Pressure Fuel System	01-000-14		
Wear Protective Clothing	01-000-14		
Work in Clean Area	01-000-14		
Work In Ventilated Area	01-000-15		
Group 001—Engine Identification Information			
Engine Identification Plate			
Information	01-001-1		
OEM Engine Option Code Label	01-001-2		
Information Relative to Emissions			
Regulations	01-001-3		
Emissions Control System			
Certification Label	01-001-4		

Avoid Harmful Asbestos Dust

Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

Components in products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing asbestos is not generated.

Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.



Keep bystanders away from the area.

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Avoid Heating Near Pressurized Fluid Lines

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when heat goes beyond the immediate flame area.



DX,TORCH -19-10DEC04-1/1

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Avoid High-Pressure Fluids

Inspect hydraulic hoses periodically – at least once per year – for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid or any other signs of wear or damage.

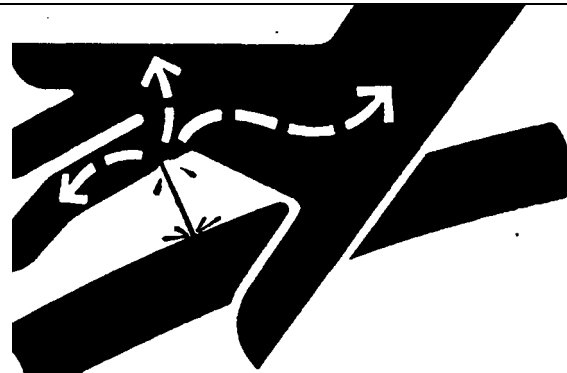
Replace worn or damaged hose assemblies immediately with John Deere approved replacement parts.

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar



with this type of injury should reference a knowledgeable medical source. Such information is available in English from Deere & Company Medical Department in Moline, Illinois, U.S.A., by calling 1-800-822-8262 or +1 309-748-5636.

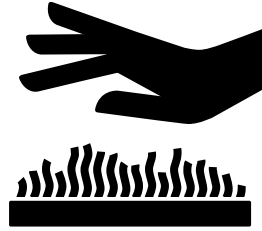
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Avoid Hot Exhaust

Servicing machine or attachments with engine running can result in serious personal injury. Avoid exposure and skin contact with hot exhaust gases and components.

Exhaust parts and streams become very hot during operation. Exhaust gases and components reach temperatures hot enough to burn people, ignite, or melt common materials.



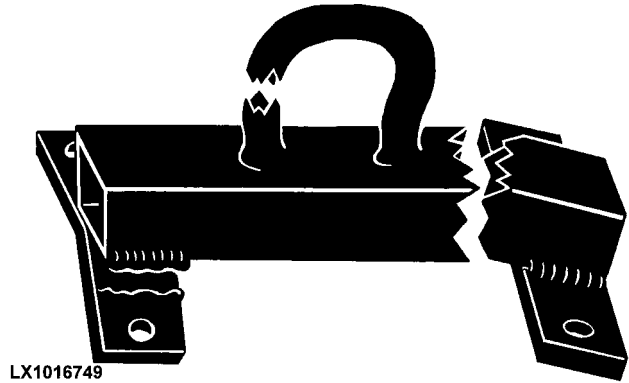
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DX, EXHAUST -19-20AUG09-1/1

Construct Dealer-Made Tools Safely

Faulty or broken tools can result in serious injury. When constructing tools, use proper, quality materials, and good workmanship.

Do not weld tools unless you have the proper equipment and experience to perform the job.



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DX, SAFE, TOOLS -19-10OCT97-1/1

Dispose of Waste Properly

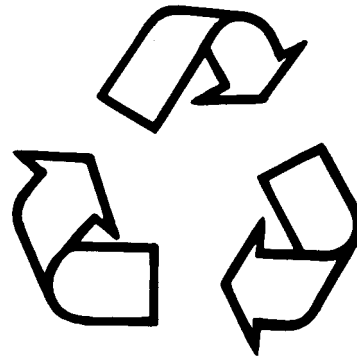
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.



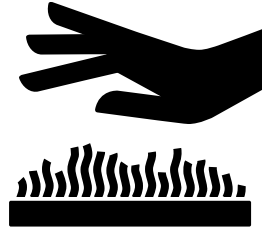
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DX, DRAIN -19-03MAR93-1/1

Exhaust Filter Cleaning

Servicing machine or attachments during exhaust filter cleaning can result in serious personal injury. Avoid exposure and skin contact with hot exhaust gases and components.

During auto or manual/stationary exhaust filter cleaning operations, the engine will run at elevated idle and hot temperatures for an extended period of time. Exhaust gases and exhaust filter components reach temperatures hot enough to burn people, or ignite, or melt common materials.



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DX,FILTER -19-20JAN10-1/1

Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.



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If you do not understand any part of this manual and need assistance, contact your John Deere dealer.

DX,READ -19-16JUN09-1/1

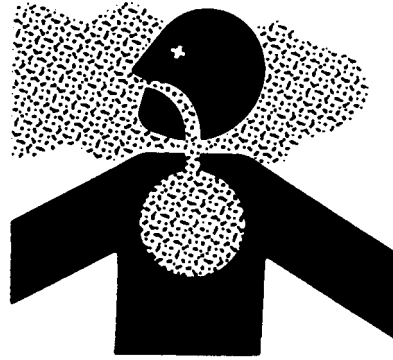
Handle Agricultural Chemicals Safely

Chemicals used in agricultural applications such as fungicides, herbicides, insecticides, pesticides, rodenticides, and fertilizers can be harmful to your health or the environment if not used carefully.

Always follow all label directions for effective, safe, and legal use of agricultural chemicals.

Reduce risk of exposure and injury:

- Wear appropriate personal protective equipment as recommended by the manufacturer. In the absence of manufacturer's instructions, follow these general guidelines:
 - Chemicals labeled **'Danger'**: Most toxic. Generally require use of goggles, respirator, gloves, and skin protection.
 - Chemicals labeled **'Warning'**: Less toxic. Generally require use of goggles, gloves, and skin protections.
 - Chemicals labeled **'Caution'**: Least toxic. Generally require use of gloves and skin protection.
- Avoid inhaling vapor, aerosol or dust.
- Always have soap, water, and towel available when working with chemicals. If chemical contacts skin, hands, or face, wash immediately with soap and water. If chemical gets into eyes, flush immediately with water.
- Wash hands and face after using chemicals and before eating, drinking, smoking, or urination.
- Do not smoke or eat while applying chemicals.
- After handling chemicals, always bathe or shower and change clothes. Wash clothing before wearing again.
- Seek medical attention immediately if illness occurs during or shortly after use of chemicals.
- Keep chemicals in original containers. Do not transfer chemicals to unmarked containers or to containers used for food or drink.



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- Store chemicals in a secure, locked area away from human or livestock food. Keep children away.
- Always dispose of containers properly. Triple rinse empty containers and puncture or crush containers and dispose of properly.

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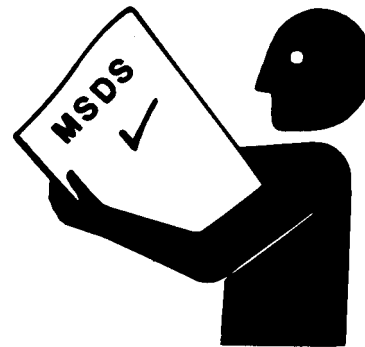
Handle Chemical Products Safely

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)



DX,MSDS,NA -19-03MAR93-1/1

TS1132 —UN—26NOV90

Handle Fluids Safely—Avoid Fires

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



TS227 —UN—23AUG88

DX,FLAME -19-29SEP98-1/1

Handle Fuel Safely—Avoid Fires

Handle fuel with care: it is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks.

Always stop engine before refueling machine. Fill fuel tank outdoors.

Prevent fires by keeping machine clean of accumulated trash, grease, and debris. Always clean up spilled fuel.

Use only an approved fuel container for transporting flammable liquids.

Never fill fuel container in pickup truck with plastic bed liner. Always place fuel container on ground before refueling. Touch fuel container with fuel dispenser nozzle before removing can lid. Keep fuel dispenser nozzle in contact with fuel container inlet when filling.



TS202 —UN—23AUG88

Do not store fuel container where there is an open flame, spark, or pilot light such as within a water heater or other appliance.

DX,FIRE1 -19-12OCT11-1/1

Handle Starting Fluid Safely

Starting fluid is highly flammable.

Keep all sparks and flame away when using it. Keep starting fluid away from batteries and cables.

To prevent accidental discharge when storing the pressurized can, keep the cap on the container, and store in a cool, protected location.

Do not incinerate or puncture a starting fluid container.



TS1356 —UN—18MAR92

DX,FIRE3 -19-16APR92-1/1

Handling Batteries Safely

Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (-) battery clamp first and replace grounded clamp last.

Sulfuric acid in battery electrolyte is poisonous and strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid hazards by:

- Filling batteries in a well-ventilated area
- Wearing eye protection and rubber gloves
- Avoiding use of air pressure to clean batteries
- Avoiding breathing fumes when electrolyte is added
- Avoiding spilling or dripping electrolyte
- Using correct battery booster or charger procedure.

If acid is spilled on skin or in eyes:

1. Flush skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush eyes with water for 15—30 minutes. Get medical attention immediately.

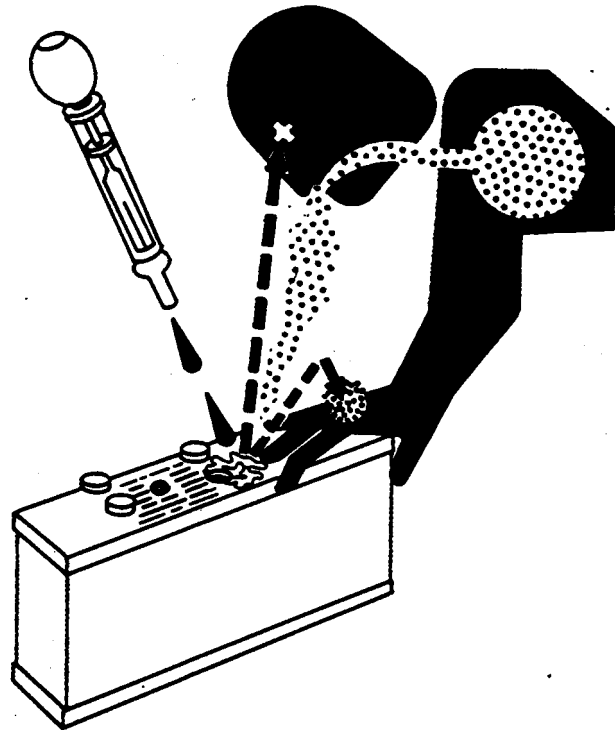
If acid is swallowed:

1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 qt.).
3. Get medical attention immediately.

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**



TS204—UN—23AUG88

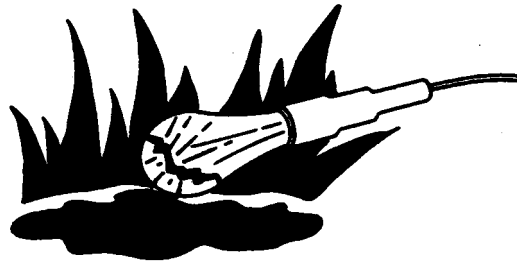


TS203—UN—23AUG88

DX,WW,BATTERIES -19-02DEC10-1/1

Illuminate Work Area Safely

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



TS223—UN—23AUG88

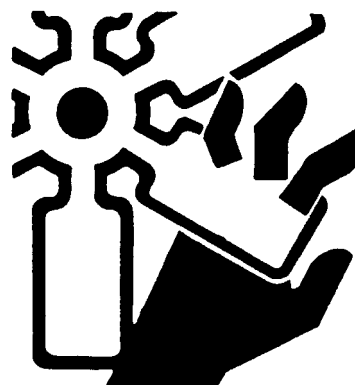
DX,LIGHT -19-04JUN90-1/1

Install All Guards

Rotating cooling system fans, belts, pulleys, and drives can cause serious injury.

Keep all guards in place at all times during engine operation.

Wear close-fitting clothes. Stop the engine and be sure fans, belts, pulleys, and drives are stopped before making adjustments, connections, or cleaning near fans and their drive components.



TS677 —UN—21SEP89

DX, GUARDS -19-18AUG09-1/1

Live With Safety

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.



TS231 —19—07OCT88

DX, LIVE -19-25SEP92-1/1

Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.



TS218 —UN—23AUG88

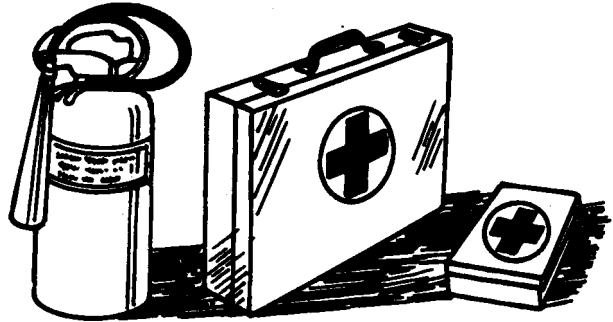
DX,SERV -19-17FEB99-1/1

Prepare for Emergencies

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 —UN—23AUG88

DX,FIRE2 -19-03MAR93-1/1

Prevent Acid Burns

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

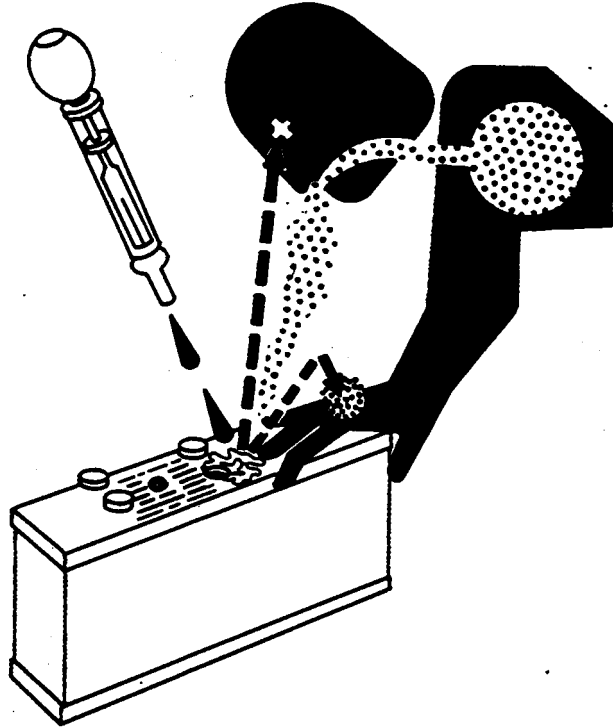
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 15—30 minutes. Get medical attention immediately.

If acid is swallowed:

1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).
3. Get medical attention immediately.



TS203 —UN—23AUG88

DX,POISON -19-21APR93-1/1

Prevent Battery Explosions

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).



TS204 —UN—23AUG88

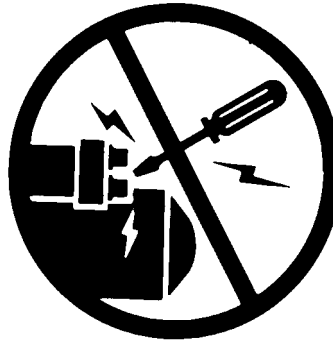
DX,SPARKS -19-03MAR93-1/1

Prevent Machine Runaway

Avoid possible injury or death from machinery runaway.

Do not start engine by shorting across starter terminals. Machine will start in gear if normal circuitry is bypassed.

NEVER start engine while standing on ground. Start engine only from operator's seat, with transmission in neutral or park.



TS177 —UN—11JAN89

DX,BYPAS1 -19-29SEP98-1/1

Protect Against High Pressure Spray

Spray from high pressure nozzles can penetrate the skin and cause serious injury. Keep spray from contacting hands or body.

If an accident occurs, see a doctor immediately. Any high pressure spray injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



TS1343 —UN—18MAR92

DX,SPRAY -19-16APR92-1/1

Protect Against Noise

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



TS207 —UN—23AUG88

DX,NOISE -19-03MAR93-1/1

Recognize Safety Information

This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



T81389 —UN—07DEC88

DX,ALERT -19-29SEP98-1/1

Remove Paint Before Welding or Heating

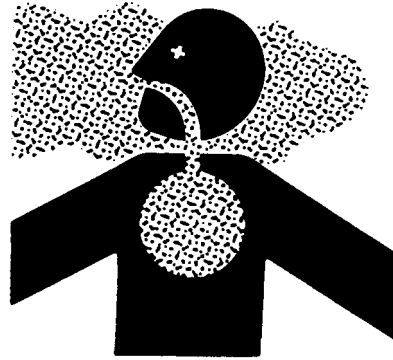
Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

Do not use a chlorinated solvent in areas where welding will take place.



TS220 —UN—23AUG88

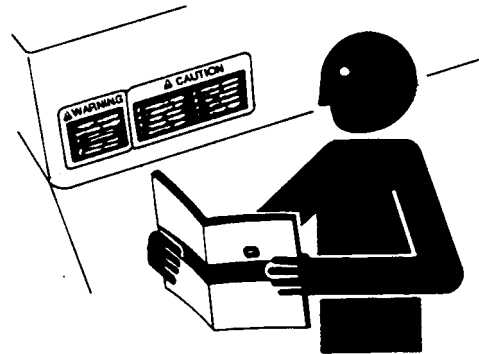
Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.

DX,PAINT -19-24JUL02-1/1

Replace Safety Signs

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



TS201 —UN—23AUG88

DX,SIGNS1 -19-04JUN90-1/1

Service Cooling System Safely

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.



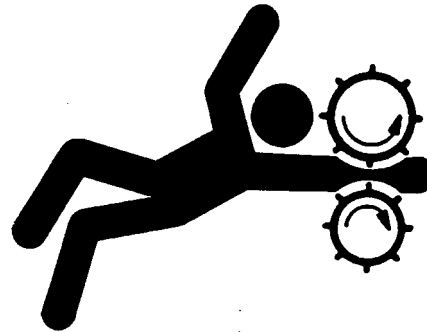
TS281 —UN—23AUG88

DX,RCAP -19-04JUN90-1/1

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



TS228 —UN—23AUG88

DX,LOOSE -19-04JUN90-1/1

Stay Clear of Rotating Drivelines

Entanglement in rotating driveline can cause serious injury or death.

Keep all shields in place at all times. Make sure rotating shields turn freely.

Wear close-fitting clothing. Stop the engine and be sure that all rotating parts and drivelines are stopped before making adjustments, connections, or performing any type of service on engine or machine driven equipment.



TS1644 —UN—22AUG95

DX,ROTATING -19-18AUG09-1/1

Understand Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.





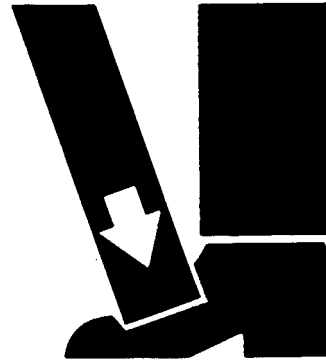
TS187 —19—30SEP88

DX,SIGNAL -19-03MAR93-1/1

Use Proper Lifting Equipment

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.



TS226 —UN—23AUG88

DX,LIFT -19-04JUN90-1/1

Use Proper Tools

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.



TS779 —UN—08NOV89

DX,REPAIR -19-17FEB99-1/1

Wait Before Opening High-Pressure Fuel System

High-pressure fluid remaining in fuel lines can cause serious injury. Only technicians familiar with this type of system should perform repairs. Before disconnecting fuel lines, sensors, or any other components between the high-pressure fuel pump and nozzles on engines with High Pressure Common Rail (HPCR) fuel system, wait a minimum of 15 minutes after engine is stopped.



TS1343 —UN—18MAR92

DX,WW,HPCR2 -19-07.JAN03-1/1

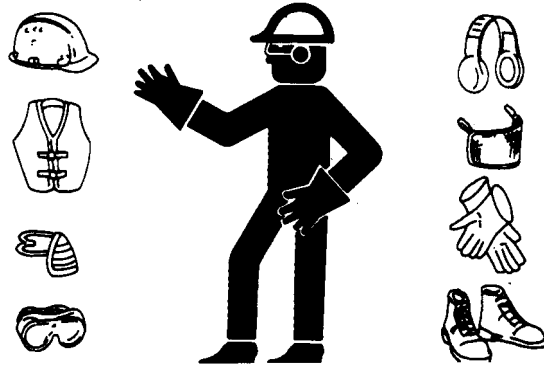
Wear Protective Clothing

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



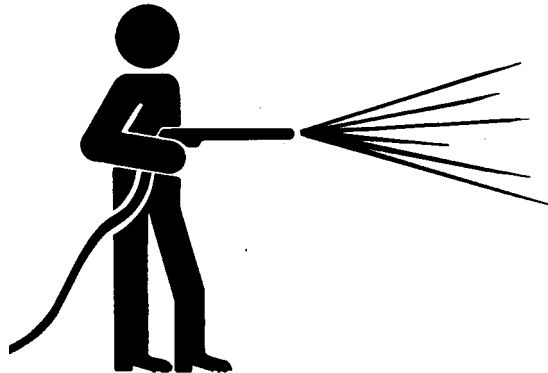
TS206 —UN—23AUG88

DX,WEAR -19-10SEP90-1/1

Work in Clean Area

Before starting a job:

- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



T6642EJ —UN—18OCT88

DX,CLEAN -19-04JUN90-1/1

Work In Ventilated Area

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

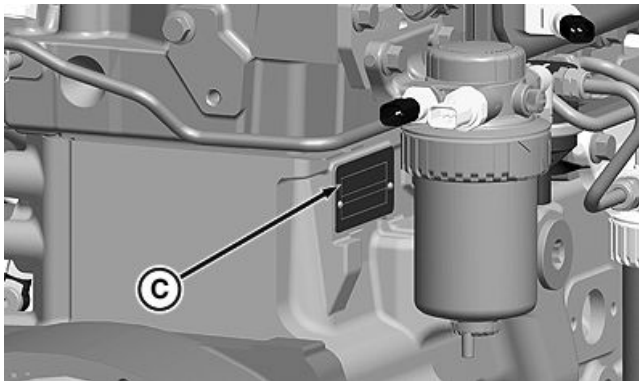
If you do not have an exhaust pipe extension, open the doors and get outside air into the area.



TS220 —UN—23AUG88

DX,AIR -19-17FEB99-1/1

Engine Identification Plate Information



Engine Identification Plate Location



Saran Factory Engine Identification Plate

The engine identification plate (C) is located on the right-hand side of cylinder block behind the fuel filter.

IMPORTANT: The engine identification plate can be easily destroyed. Remove the plate or record the information elsewhere before “hot tank” cleaning the engine.

Engine Serial Number (A)

Each engine has a 13-digit John Deere engine serial number identifying the producing factory, engine model designation, emission certification and a 6-digit sequential number. The following is an example:

CD4045R123456

- CD Factory code producing engine
- CD Saran, France
 - PE Torreon, Mexico
- 4045 Number of Cylinders and Total Displacement
- 4045 4 cylinders, 4.5 liters
- R Emission Certification
- C Tier 1/Stage 1
 - G Tier 2/Stage II
 - L Tier 3/Stage III A
 - R Interim Tier 4/Stage III B
- 123456 Engine serial number



Torreon Factory Engine Identification Plate

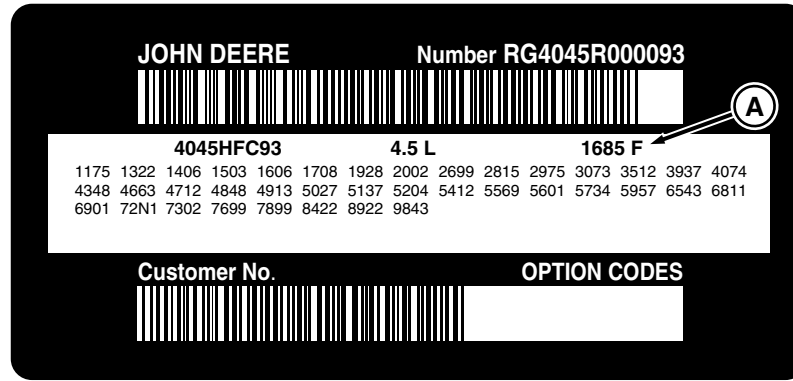
- A—Engine Serial Number** **C—Engine Identification Plate**
B—Engine Model Number

Engine Model Number (B)

- H Engine Aspiration
- D Naturally aspirated
 - T Turbocharged
 - A Turbocharged and aftercooled, air-to-water
 - H Turbocharged and aftercooled, air-to-air
- F User type
- F OEM (John Deere Power Systems)
 - XX Other letters are used to identify John Deere Equipment manufacturing locations
- C Industrial
- G Gen-Set
- 92, 93 New Designations
- 92 PWX (Single Wastegate Turbocharger)
 - 93 PVX (Single VGT Turbocharger)

BK34394,0000E73 -19-04FEB11-1/1

OEM Engine Option Code Label



OEM Engine Option Code Label

A—Engine Base Code (Shown on Engine Option Code Label)

An option code label is secured to the top of the valve cover and identifies the factory installed options on each OEM engine to ensure correct parts acquisition.

When in need of parts or service, furnish your authorized servicing dealer or engine distributor with these numbers.

NOTE: Before “hot tank” cleaning, ensure that option codes are recorded elsewhere.

If an engine is ordered without a particular component, the last two digits of that functional group option code will be 99, 00, or XX.

In the chart below, only the first 2 digits corresponding to the option group are shown. The last 2 digits identify the specific option.

OPTION CODE LIST			
11__	Rocker arm cover	52__	Auxiliary gear drive
12__	Oil filler neck	53__	Fuel heater
13__	Crankshaft pulley	54__	Turbocharger air inlet
14__	Flywheel housing	55__	Shipping stand
15__	Flywheel	56__	Paint option
16__	Fuel injection system	57__	Coolant inlet
17__	Engine air inlet	59__	Oil cooler and filter
19__	Oil pan	60__	Add-on auxiliary drive pulley
20__	Coolant pump	61__	Muffler/Aftertreatment
21__	Thermostat cover	62__	Alternator mounting
22__	Thermostat	63__	Low-pressure fuel line
23__	Fan drive	64__	Exhaust elbow
24__	Fan belt	65__	Turbocharger
25__	Fan	67__	Base engine sensors
26__	Engine coolant heater	69__	Engine serial number plate
28__	Exhaust manifold	72__	ECU Electronic software option
29__	Ventilator system	73__	Dosing system
30__	Starting motor	74__	Air conditioner compressor mounting
31__	Alternator	76__	Oil pressure switch
35__	Fuel filter	78__	Air compressor mounting
36__	Front plate	81__	Primary fuel filter
37__	Mechanical low-pressure fuel pump	83__	Electronic software
39__	Thermostat housing	84__	Electrical wiring harness
40__	Oil dipstick and filler	86__	Fan pulley
41__	Auxiliary drive	87__	Automatic belt tensioner
43__	Starting aid	88__	Oil filter
44__	Timing gear cover	89__	EGR System
46__	Cylinder block	91__	Special equipment (Factory installed)

Continued on next page

BK34394,0000E74 -19-03AUG11-1/2

OPTION CODE LIST

47__	Crankshaft	93__	Emissions label
48__	Connecting rods and pistons	94__	Computer software
49__	Valve actuating mechanisms	95__	Special equipment (Field installed)
50__	Oil pump	98__	Shipping (Not Equipped)
51__	Cylinder head with valves	99__	Service Only Items (Not Equipped)

BK34394,0000E74 -19-03AUG11-2/2

Information Relative to Emissions Regulations

Depending on the final destination, engines can meet the emissions regulations according to the US Environmental Protection Agency (EPA), California Air Resources Board (CARB) and for Europe, the Directive 97/68/EC relating the measures against the emissions of particles and gaseous pollutant from internal combustion engines. Such engines are called "CERTIFIED" and receive an emission label on the engine.

The regulations prohibit tampering with the emission-related components listed below which would

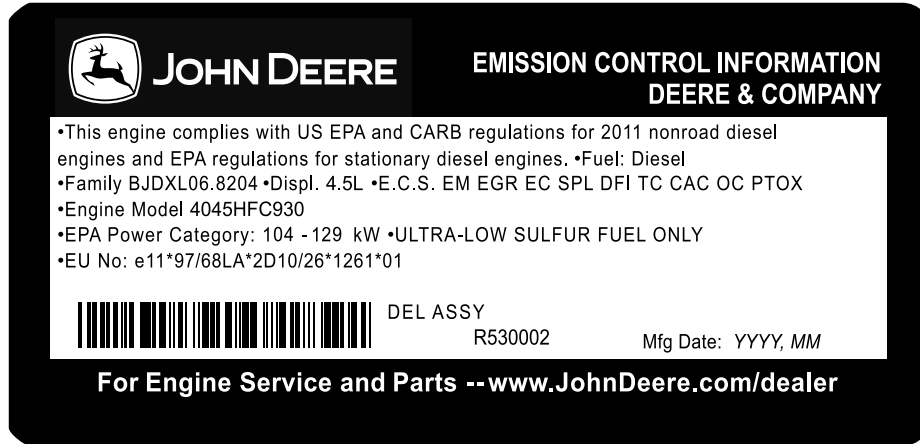
render that component inoperative or to make any adjustment on the engine beyond published specifications. It is also illegal to install a part or component where the principle effect of that component is to bypass, defeat, or render inoperative any engine component or device which would affect the engine's conformance to the emission regulations. **To summarize, it is illegal to do anything except return the engine to its original published specifications.**

List of emission-related components

Air induction system	Fuel metering system	Exhaust gas recirculation
<ul style="list-style-type: none"> Intake manifold Turbocharger Charge air cooler 	<ul style="list-style-type: none"> Fuel injection system 	<ul style="list-style-type: none"> EGR valve
Catalyst or thermal reactor system	Particulate controls	Open crankcase ventilation (OCV) system
<ul style="list-style-type: none"> Catalyst converter Exhaust manifold 	<ul style="list-style-type: none"> Any device used to capture particulate emissions Any device used in the regeneration of the capturing system Enclosures and manifolding Smoke puff limiters 	<ul style="list-style-type: none"> OCV filter/separator Oil filler cap
Advanced Oxides of nitrogen (NOx) controls	Miscellaneous items used in above systems	Emission control labels
<ul style="list-style-type: none"> NOx absorbers and catalysts 	<ul style="list-style-type: none"> Electronic control units, sensors, actuators, wiring harnesses, hoses, connectors, clamps fittings, gasket, mounting hardware 	

AS58880,0000007 -19-22SEP10-1/1

Emissions Control System Certification Label



RG19921 —UN—28JAN11

4.5L Engine Emissions Label

CAUTION: Statutes providing severe penalties for tampering with emissions controls may apply to the user or dealer.

The emissions warranty applies to those engines marketed by John Deere that have been certified by the United States Environmental Protection Agency (EPA) and/or California Air Resources Board (CARB); and used in the United States and Canada in Non-road equipment. The presence of an emissions label like the one shown signifies that the engine has been certified with the EPA and/or CARB. The EPA and CARB warranties only apply to new engines having the certification label affixed to the engine and sold as stated above in the geographic areas. The presence of an EU number in the third line of the label signifies that the engine has been certified with the European Union countries per Directive 97/68/EC.

The EPA and/or CARB emissions warranties do not apply to the EU countries.

Emission Control System(s) Laws

The U.S. EPA and California ARB prohibit the removal or rendering inoperative of any device or element of design installed on or in engines/equipment in compliance with applicable emission regulations prior to or after the sale and delivery of the engines/equipment to the ultimate purchaser.

NOTE: The hp/kW rating on the engine emissions certification label specifies the gross engine hp/kW, which is flywheel power without fan. In most applications this will not be the same rating as the advertised vehicle hp/kW rating.

BK34394,0000E75 -19-01FEB11-1/1

Commercial Engine Designation

Engines complying with Interim Tier 4/Stage III B emission requirements have a new commercial designation to identify the technology applied.

PowerTech PVX 4.5L and PowerTech PWX 4.5L

P..... Technology

• P..... PLUS package (4-valve, EGR, HPCR)

V or W..... Turbocharger

• V..... Variable Geometry Turbocharger (VGT)

• W..... Wastegate

X..... Exhaust Filter

• X..... Diesel Oxidation Catalyst (DOC) and Diesel Particulate Filter (DPF)

BK34394,0000E76 -19-28JAN11-1/1

Diesel Fuel

Consult your local fuel distributor for properties of the diesel fuel available in your area.

In general, diesel fuels are blended to satisfy the low temperature requirements of the geographical area in which they are marketed.

Diesel fuels specified to EN 590 or ASTM D975 are recommended. Renewable diesel fuel produced by hydrotreating animal fats and vegetable oils is basically identical to petroleum diesel fuel. Renewable diesel that meets EN 590 or ASTM D975 is acceptable for use at all percentage mixture levels.

Required Fuel Properties

In all cases, the fuel shall meet the following properties:

Cetane number of 43 minimum. Cetane number greater than 47 is preferred, especially for temperatures below -20°C (-4°F) or elevations above 1500 m (5000 ft.).

Cold Filter Plugging Point (CFPP) should be at least 5°C (9°F) below the expected lowest temperature or **Cloud Point** below the expected lowest ambient temperature.

Fuel lubricity should pass a maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

Diesel fuel quality and sulfur content must comply with all existing emissions regulations for the area in which the engine operates. DO NOT use diesel fuel with sulfur content greater than 10 000 mg/kg (10 000 ppm).

Sulfur content for Interim Tier 4 and Stage III B engines

- Use ONLY ultra low sulfur diesel (ULSD) fuel with a maximum of 15 mg/kg (15 ppm) sulfur content.

Sulfur Content for Tier 3 and Stage III A Engines

- Use of diesel fuel with sulfur content less than 1000 mg/kg (1000 ppm) is RECOMMENDED
- Use of diesel fuel with sulfur content 1000–5000 mg/kg (1000–5000 ppm) REDUCES oil and filter change intervals.
- BEFORE using diesel fuel with sulfur content greater than 5000 mg/kg (5000 ppm), contact your John Deere dealer

Sulfur Content for Tier 2 and Stage II Engines

- Use of diesel fuel with sulfur content less than 500 mg/kg (500 ppm) is RECOMMENDED.
- Use of diesel fuel with sulfur content 500–5000 mg/kg (500–5000 ppm) REDUCES the oil and filter change interval
- BEFORE using diesel fuel with sulfur content greater than 5000 mg/kg (5000 ppm), contact your John Deere dealer

Sulfur Content for Other Engines

- Use of diesel fuel with sulfur content less than 5000 mg/kg (5000 ppm) is recommended.
- Use of diesel fuel with sulfur content greater than 5000 mg/kg (5000 ppm) REDUCES the oil and filter change intervals.

IMPORTANT: Do not mix used diesel engine oil or any other type of lubricating oil with diesel fuel.

IMPORTANT: Improper fuel additive usage may cause damage on fuel injection equipment of diesel engines.

DX,FUEL1 -19-11APR11-1/1

Diesel Fuel Additive Products

John Deere diesel engines with high pressure fuel systems rely on high quality diesel fuel to maintain the performance, reliability, and durability customers demand. A variety of diesel fuel aftermarket products may be used to ensure diesel fuel meets those needs:

- Fuel-Protect Diesel Fuel Conditioner
- Diesel Fuel System Clean-Up

- Fuel-Protect Keep Clean
- Performance Formula Conditioner
- Biodiesel Protect 100
- Fuel Test Kits
- FUELSAVER™

These products are available through John Deere Merchandise.

NOTE: Not all products will be available in all markets.

VN40298,00000F6 -19-14MAY12-1/1

Handling and Storing Diesel Fuel

Reference information in Fuels, Lubricants, and Coolants from Operators Manual for most current information on this engine model.

JR74534,0000448 -19-01AUG11-1/1

Lubricity of Diesel Fuel

Most diesel fuels manufactured in the United States, Canada, and the European Union have adequate lubricity to ensure proper operation and durability of fuel injection system components. However, diesel fuels manufactured in some areas of the world may lack the necessary lubricity.

IMPORTANT: Make sure the diesel fuel used in your machine demonstrates good lubricity characteristics.

Fuel lubricity should pass a maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

If fuel of low or unknown lubricity is used, add John Deere Fuel-Protect Diesel Fuel Conditioner (or equivalent) at the specified concentration.

Lubricity of Biodiesel Fuel

Fuel lubricity can improve significantly with biodiesel blends up to B20 (20% biodiesel). Further increase in lubricity is limited for biodiesel blends greater than B20.

DX,FUEL5 -19-14APR11-1/1

Testing Diesel Fuel

A fuel analysis program can help to monitor the quality of diesel fuel. The fuel analysis can provide critical data such as cetane number, fuel type, sulfur content, water content, appearance, suitability for cold weather

operations, bacteria, cloud point, acid number, particulate contamination, and whether the fuel meets specification.

Contact your John Deere dealer for more information on diesel fuel analysis.

DX,FUEL6 -19-14APR11-1/1

Biodiesel Fuel

Biodiesel is a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats. Biodiesel blends are biodiesel mixed with petroleum diesel fuel on a volume basis.

Biodiesel users in the U.S. are strongly encouraged to purchase biodiesel blends from a BQ-9000 Certified Marketer and sourced from a BQ-9000 Accredited Producer (as certified by the National Biodiesel Board). Certified Marketers and Accredited Producers can be found at the following website: <http://www.bq-9000.org>.

While 5% blends are preferred (B5), biodiesel concentrations up to a 20% blend (B20) in petroleum diesel fuel can be used in all John Deere engines. Biodiesel blends up to B20 can be used ONLY if the biodiesel (100% biodiesel or B100) meets ASTM D6751 (US), EN 14214 (EU), or equivalent specification. Expect a 2% reduction in power and a 3% reduction in fuel economy when using B20.

John Deere approved fuel conditioners containing detergent/dispersant additives are recommended when using lower biodiesel blends, but are required when using blends of B20 or greater.

John Deere engines can also operate on biodiesel blends above B20 (up to 100% biodiesel) ONLY if the biodiesel meets the EN 14214 specification (primarily available in Europe). Engines operating on biodiesel blends above B20 may not fully comply with all applicable emissions regulations. Expect up to a 12% reduction in power and an 18% reduction in fuel economy when using 100% biodiesel. John Deere approved fuel conditioners containing detergent/dispersant additives are required.

The petroleum diesel portion of biodiesel blends must meet the requirements of ASTM D975 (US) or EN 590 (EU) commercial standards.

Biodiesel blends up to B20 must be used within 90 days of the date of biodiesel manufacture. Biodiesel blends from B21 to B100 must be used within 45 days of the date of biodiesel manufacture.

Request a certificate of analysis from your fuel distributor to ensure that the fuel is compliant with the above specifications.

When using biodiesel fuel, the engine oil level must be checked daily. If oil becomes diluted with fuel, shorten oil change intervals. Refer to Diesel Engine Oil and Filter Service Intervals for more details regarding biodiesel and engine oil change intervals.

The following must be considered when using biodiesel blends up to B20:

- Cold weather flow degradation
- Stability and storage issues (moisture absorption, oxidation, microbial growth)
- Possible filter restriction and plugging (usually a problem when first switching to biodiesel on used engines.)
- Possible fuel leakage through seals and hoses
- Possible reduction of service life of engine components

The following must also be considered when using biodiesel blends above B20.

- Possible coking and/or blocked injector nozzles, resulting in power loss and engine misfire if John Deere approved fuel conditioners containing detergent/dispersant additives are not used
- Possible crankcase oil dilution, requiring more frequent oil changes
- Possible corrosion of fuel injection equipment
- Possible lacquering and/or seizure of internal components
- Possible formation of sludge and sediments
- Possible thermal oxidation of fuel at elevated temperatures
- Possible elastomer seal and gasket material degradation (primarily an issue with older engines)
- Possible compatibility issues with other materials (including copper, lead, zinc, tin, brass, and bronze) used in fuel systems and fuel handling equipment
- Possible reduction in water separator efficiency
- Potential high acid levels within fuel system
- Possible damage to paint if exposed to biodiesel

IMPORTANT: Raw pressed vegetable oils are NOT acceptable for use as fuel in any concentration in John Deere engines. Their use could cause engine failure.

DX,FUEL7 -19-20APR11-1/1

Minimizing the Effect of Cold Weather on Diesel Engines

John Deere diesel engines are designed to operate effectively in cold weather.

However, for effective starting and cold weather operation, a little extra care is necessary. The information below outlines steps that can minimize the effect that cold weather may have on starting and operation of your engine. See your John Deere dealer for additional information and local availability of cold weather aids.

Use Winter Grade Fuel

When temperatures fall below 0°C (32°F), winter grade fuel (No. 1-D in North America) is best suited for cold weather operation. Winter grade fuel has a lower cloud point and a lower pour point.

Cloud point is the temperature at which wax will begin to form in the fuel and this wax causes fuel filters to plug.

Pour point is the lowest temperature at which movement of the fuel is observed.

NOTE: On average, winter grade diesel fuel has a lower Btu (heat content) rating. Using winter grade fuel may reduce power and fuel efficiency, but should not cause any other engine performance effects. Check the grade of fuel being used before troubleshooting for low power complaints in cold weather operation.

Air Intake Heater

An air intake heater is an available option for some engines to aid cold weather starting.

Ether

An ether port on the intake is available to aid cold weather starting.

CAUTION: Ether is highly flammable. Do not use ether when starting an engine equipped with glow plugs or an air intake heater.

Coolant Heater

An engine block heater (coolant heater) is an available option to aid cold weather starting.

Seasonal Viscosity Oil and Proper Coolant Concentration

Use seasonal grade viscosity engine oil based on the expected air temperature range between oil changes and a proper concentration of low silicate antifreeze as recommended. (See DIESEL ENGINE OIL and ENGINE COOLANT requirements in this section.)

Diesel Fuel Flow Additive

Use John Deere Fuel-Protect Diesel Fuel Conditioner (winter formula), which contains anti-gel chemistry, or equivalent fuel conditioner to treat non-winter grade fuel (No. 2-D in North America) during the cold weather season. This generally extends operability to about 10°C (18°F) below the fuel cloud point. For operability at even lower temperatures, use winter grade fuel.

IMPORTANT: Treat fuel when outside temperature drops below 0°C (32°F). For best results, use with untreated fuel. Follow all recommended instructions on label.

BioDiesel

When operating with biodiesel blends, wax formation can occur at warmer temperatures. Begin using John Deere Fuel-Protect Diesel Fuel Conditioner (winter formula) at 5°C (41°F) to treat biodiesel fuels during the cold weather season. Use B5 or lower blends at temperatures below 0°C (32°F). Use only winter grade petroleum diesel fuel at temperatures below -10°C (14°F).

Winterfronts

Use of fabric, cardboard, or solid winterfronts is not recommended with any John Deere engine. Their use can result in excessive engine coolant, oil, and charge air temperatures. This can lead to reduced engine life, loss of power and poor fuel economy. Winterfronts may also put abnormal stress on fan and fan drive components potentially causing premature failures.

If winterfronts are used, they should never totally close off the grill frontal area. Approximately 25% area in the center of the grill should remain open at all times. At no time should the air blockage device be applied directly to the radiator core.

Radiator Shutters

If equipped with a thermostatically controlled radiator shutter system, this system should be regulated in such a way that the shutters are completely open by the time the coolant reaches 93°C (200°F) to prevent excessive intake manifold temperatures. Manually controlled systems are not recommended.

If air-to-air aftercooling is used, the shutters must be completely open by the time the intake manifold air temperature reaches the maximum allowable temperature out of the charge air cooler.

For more information, see your John Deere dealer.

DX,FUEL10 -19-20APR11-1/1

Diesel Engine Oil

Use oil viscosity based on the expected air temperature range during the period between oil changes.

John Deere Plus-50™ II is the recommended engine oil.

Extended service intervals may apply when John Deere Plus-50™ II engine oil is used. Refer to the engine oil drain interval table and consult your John Deere dealer for more information.

If John Deere Plus-50™ II engine oil is not available, engine oil meeting one or more of the following may be used:

- API Service Category CJ-4
- ACEA Oil Sequence E9
- ACEA Oil Sequence E6

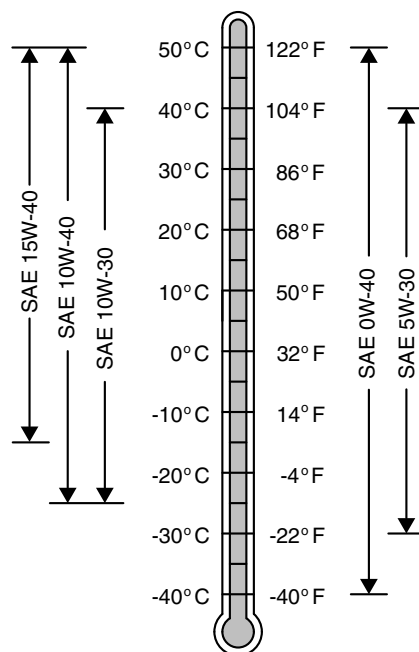
DO NOT use engine oil containing more than 1.0% sulfated ash, 0.12% phosphorus, or 0.4% sulfur.

Multi-viscosity diesel engine oils are preferred.

Diesel fuel quality and fuel sulfur content must comply with all existing emissions regulations for the area in which the engine operates.

IMPORTANT: Use only ultra low sulfur diesel (ULSD) fuel with a maximum sulfur content of 15 mg/kg (15 ppm).

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Oil Viscosities for Air Temperature Ranges

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DX,ENOIL14 -19-14APR11-1/1

John Deere Break-In™ Plus Engine Oil

New engines are filled at the factory with John Deere Break-In Plus™ Engine Oil. During the break-in period, add John Deere Break-In™ Plus Engine Oil, as needed to maintain the specified oil level.

During the initial operation of a new or rebuilt engine, change the oil and filter between a minimum of 100 hours and maximum equal to the interval specified for John Deere Plus-50™ II oil.

Operate the engine under various conditions, particularly heavy loads with minimal idling, to help seat engine components properly.

After engine overhaul, fill the engine with John Deere Break-In™ Plus Engine Oil.

If John Deere Break-In™ Plus Engine Oil is not available, use an SAE 10W-30 viscosity grade diesel engine oil meeting one of the following:

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Plus-50 is a trademark of Deere & Company.

- API Service Category CJ-4
- ACEA Oil Sequence E9
- ACEA Oil Sequence E6

If one of these oils is used during the initial operation of a new or rebuilt engine, change the oil and filter between a minimum of 100 hours and a maximum of 250 hours.

IMPORTANT: Do not use any other engine oils during the initial break-in of a new or rebuilt engine.

John Deere Break-In™ Plus Engine Oil can be used for all John Deere diesel engines at all emission certification levels.

After the break-in period, use John Deere Plus-50™ II or other diesel engine oil as recommended in this manual.

DX,ENOIL16 -19-20APR11-1/1

Engine Oil and Filter Service Intervals

See applicable operator's manual for service intervals.

DM80898,000025E -19-14OCT10-1/1

Oil Filters

Filtration of oils is critical to proper operation and lubrication.

Always change filters regularly as specified in this manual.

Use filters meeting John Deere performance specifications.

DX,FILT -19-18MAR96-1/1

Grease

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

John Deere SD Polyurea Grease is preferred.

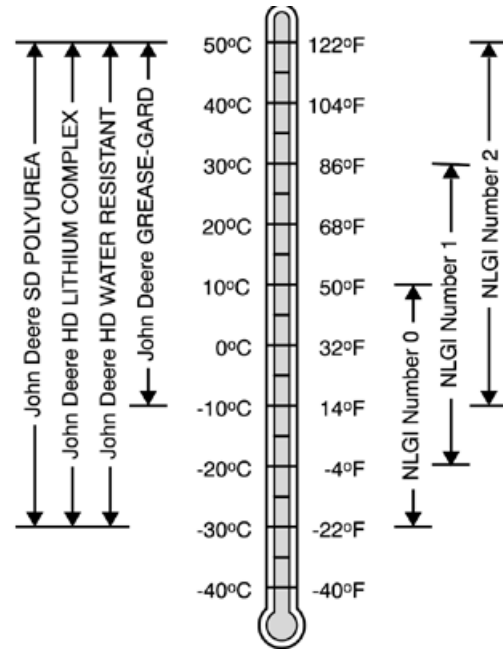
The following greases are also recommended:

- John Deere HD Lithium Complex Grease
- John Deere HD Water Resistant Grease
- John Deere GREASE-GARD™

Other greases may be used if they meet the following:

- NLGI Performance Classification GC-LB

IMPORTANT: Some types of grease thickeners are not compatible with others. Consult your grease supplier before mixing different types of grease.



Greases for Air Temperature Ranges

TS1673—UN—31OCT03

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DX,GRE1 -19-14APR11-1/1

Lubricant Storage

Your equipment can operate at top efficiency only when clean lubricants are used.

Use clean containers to handle all lubricants.

Store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain that all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

DX,LUBST -19-11APR11-1/1

Mixing of Lubricants

In general, avoid mixing different brands or types of oil. Oil manufacturers blend additives in their oils to meet certain specifications and performance requirements.

Mixing different oils can interfere with the proper functioning of these additives and degrade lubricant performance.

Consult your John Deere dealer to obtain specific information and recommendations.

DX,LUBMIX -19-18MAR96-1/1

Alternative and Synthetic Lubricants

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this manual.

Some John Deere brand coolants and lubricants may not be available in your location.

Consult your John Deere dealer to obtain information and recommendations.

Synthetic lubricants may be used if they meet the performance requirements as shown in this manual.

The temperature limits and service intervals shown in this manual apply to both conventional and synthetic lubricants.

Re-refined base stock products may be used if the finished lubricant meets the performance requirements.

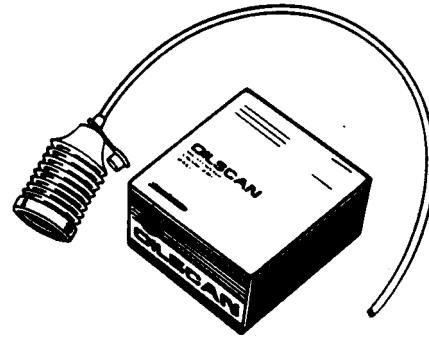
DX,ALTER -19-11APR11-1/1

Oilscan™ and CoolScan™

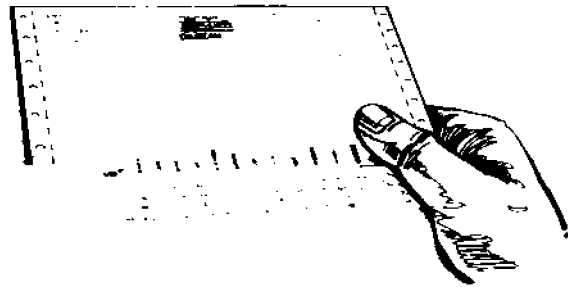
Oilscan™ and CoolScan™ are John Deere sampling programs to help you monitor machine performance and identify potential problems before they cause serious damage.

Oil and coolant samples should be taken from each system before its recommended change interval.

Check with your John Deere dealer for the availability of Oilscan™ and CoolScan™ kits.



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CoolScan is a trademark of Deere & Company

DX,OILSCAN -19-13SEP11-1/1

Heavy Duty Diesel Engine Coolant

The engine cooling system is filled to provide year-round protection against corrosion and cylinder liner pitting, and winter freeze protection to -37°C (-34°F). If protection at lower temperatures is required, consult your John Deere dealer for recommendations.

The following engine coolants are preferred:

- John Deere COOL-GARD™ II Premix
- John Deere COOL-GARD II PG Premix

Use John Deere COOL-GARD II PG Premix when a non-toxic coolant formulation is required.

Additional Recommended Coolants

The following engine coolant is also recommended:

- John Deere COOL-GARD II Concentrate in a 40–60% mixture of concentrate with quality water.

John Deere COOL-GARD II Premix, COOL-GARD II PG Premix, and COOL-GARD II Concentrate coolants do not require use of supplemental coolant additives.

Other Coolants

John Deere COOL-GARD II and COOL-GARD II PG coolants might not be available in the geographical area where service is performed.

If these coolants are unavailable, use a coolant concentrate or prediluted coolant intended for use with heavy duty diesel engines and with a minimum of the following chemical and physical properties:

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- Is formulated with a quality nitrite-free additive package.
- Provides cylinder liner cavitation protection according to either the John Deere Cavitation Test Method or a fleet study run at or above 60% load capacity
- Protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion

The additive package must be part of one of the following coolant mixtures:

- ethylene glycol or propylene glycol base prediluted (40—60%) heavy duty coolant
- ethylene glycol or propylene glycol base heavy duty coolant concentrate in a 40—60% mixture of concentrate with quality water

Water Quality

Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate.

IMPORTANT: Do not use cooling system sealing additives or antifreeze that contains sealing additives.

Do not mix ethylene glycol and propylene glycol base coolants.

Do not use coolants that contain nitrites.

DX,COOL3 -19-14APR11-1/1

Supplemental Coolant Additives

Some coolant additives will gradually deplete during engine operation. For nitrite-containing coolants, replenish coolant additives between drain intervals by adding a supplemental coolant additive as determined necessary by coolant testing.

John Deere Liquid Coolant Conditioner is recommended as a supplemental coolant additive for nitrite-containing coolants.

John Deere Liquid Coolant Conditioner is not designed for use with John Deere COOL-GARD™ II Premix, COOL-GARD II PG Premix, or COOL-GARD II Concentrate.

IMPORTANT: Do not add a supplemental coolant additive when the cooling system is drained and refilled with any of the following:

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- John Deere COOL-GARD II
- John Deere COOL-GARD II PG

If other coolants are used, consult the coolant supplier and follow the manufacturer's recommendation for use of supplemental coolant additives.

The use of non-recommended supplemental coolant additives may result in additive drop-out and gelation of the coolant.

Add the manufacturer's recommended concentration of supplemental coolant additive. DO NOT add more than the recommended amount.

DX,COOL4 -19-14APR11-1/1

Operating in Warm Temperature Climates

John Deere engines are designed to operate using glycol base engine coolants.

Always use a recommended glycol base engine coolant, even when operating in geographical areas where freeze protection is not required.

John Deere COOL-GARD™ II Premix is available in a concentration of 50% ethylene glycol. However, there are situations in warm temperature climates where a coolant with lower glycol concentration (approximately 20% ethylene glycol) has been approved. In these cases, the low glycol formulation has been modified to provide the same level of corrosion inhibitor as John Deere COOL-GARD II Premix (50/50).

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IMPORTANT: Water may be used as coolant in emergency situations only.

Foaming, hot surface aluminum and iron corrosion, scaling, and cavitation will occur when water is used as the coolant, even when coolant conditioners are added.

Drain cooling system and refill with recommended glycol base engine coolant as soon as possible.

DX,COOL6 -19-03NOV08-1/1

Testing Diesel Engine Coolant

Maintaining adequate concentrations of glycol and inhibiting additives in the coolant is critical to protect the engine and cooling system against freezing, corrosion, and cylinder liner erosion and pitting.

Test the coolant solution at intervals of 12 months or less and whenever excessive coolant is lost through leaks or overheating.

Coolant Test Strips

Coolant test strips are available from your John Deere dealer. These test strips provide a simple, effective method to check the freeze point and additive levels of your engine coolant.

When Using John Deere COOL-GARD II

John Deere COOL-GARD II Premix™, COOL-GARD II PG Premix and COOL-GARD II Concentrate are maintenance free coolants for up to six years or 6000 hours of operation, provided that the cooling system is topped off using only John Deere COOL-GARD II Premix or COOL-GARD II PG premix. Test the coolant condition annually with coolant test strips designed for use with John Deere COOL-GARD II coolants. If the test strip chart indicates that additive is required, add John Deere COOL-GARD II Coolant Extender as directed.

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Add only the recommended concentration of John Deere COOL-GARD II Coolant Extender. DO NOT add more than the recommended amount.

When Using Nitrite-Containing Coolants

Compare the test strip results to the supplemental coolant additive (SCA) chart to determine the amount of inhibiting additives in your coolant and whether more John Deere Liquid Coolant Conditioner should be added.

Add only the recommended concentration of John Deere Liquid Coolant Conditioner. DO NOT add more than the recommended amount.

Coolant Analysis

For a more thorough evaluation of your coolant, perform a coolant analysis. The coolant analysis can provide critical data such as freezing point, antifreeze level, pH, alkalinity, nitrite content (cavitation control additive), molybdate content (rust inhibitor additive), silicate content, corrosion metals, and visual assessment.

Contact your John Deere dealer for more information on coolant analysis.

DX,COOL9 -19-11APR11-1/1

Drain Intervals for Diesel Engine Coolant

Drain and flush the cooling system and refill with fresh coolant at the indicated interval, which varies with the coolant used.

John Deere COOL-GARD™ II Premix, COOL-GARD II PG Premix and COOL-GARD II Concentrate are maintenance free coolants for up to six years or 6000 hours of operation, provided that the cooling system is topped off using only John Deere COOL-GARD II Premix or COOL-GARD II PG Premix.

Test the coolant condition annually with Coolant Test Strips designed for use with John Deere COOL-GARD II coolants. If the test strip chart indicates that additive is required, add John Deere COOL-GARD II Coolant Extender as directed.

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If John Deere COOL-GARD™ II Premix, COOL-GARD II PG Premix, or COOL-GARD II Concentrate is used, but the coolant is not tested OR additives are not replenished by adding John Deere COOL-GARD II Coolant Extender, the drain interval is four years or 4000 hours of operation. This drain interval only applies to COOL-GARD II coolants that have been maintained within a 40—60% mixture of concentrate with quality water.

If a coolant other than COOL-GARD II, or COOL-GARD II PG is used, reduce the drain interval to two years or 2000 hours of operation.

DX,COOL11 -19-14APR11-1/1

John Deere COOL-GARD™ II Coolant Extender

Some coolant additives will gradually deplete during engine operation. For John Deere COOL-GARD™ II Premix, COOL-GARD II PG Premix, and COOL-GARD II Concentrate, replenish coolant additives between drain intervals by adding John Deere COOL-GARD II Coolant Extender.

John Deere COOL-GARD II Coolant Extender should not be added unless indicated by coolant testing.

John Deere COOL-GARD II Coolant Extender is a chemically matched additive system for use with all John Deere COOL-GARD II coolants. John Deere COOL-GARD II Coolant Extender is not intended for use with nitrite-containing coolants.

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IMPORTANT: Do not add a supplemental coolant additive when the cooling system is drained and refilled with any of the following:

- John Deere COOL-GARD II
- John Deere COOL-GARD II PG

The use of non-recommended supplemental coolant additives may result in additive drop-out, gelation of the coolant, or corrosion of cooling system components.

Add the recommended concentration of John Deere COOL-GARD II Coolant Extender. DO NOT add more than the recommended amount.

DX,COOL16 -19-20APR11-1/1

Additional Information About Diesel Engine Coolants and John Deere COOL-GARD™ II Coolant Extender

Engine coolants are a combination of three chemical components: ethylene glycol (EG) or propylene glycol (PG) antifreeze, inhibiting coolant additives, and quality water.

Coolant Specifications

John Deere COOL-GARD™ II Premix either EG or PG, are fully formulated coolants that contain all three components in their correct concentrations. DO NOT add an initial charge of John Deere COOL-GARD II Coolant Extender to COOL-GARD II Premix. DO NOT add any other supplemental coolant additive or water to COOL-GARD II Premix.

John Deere COOL-GARD II Concentrate contains both ethylene glycol and inhibiting coolant additives. Mix this product with quality water, but DO NOT add an initial charge of John Deere COOL-GARD II Coolant Extender or any other supplemental coolant additive.

Replenish Coolant Additives

Some coolant additives will gradually deplete during engine operation. Periodic replenishment of inhibitors is required, even when John Deere COOL-GARD II Premix or COOL-GARD II Concentrate is used. Follow the recommendations in this manual for the use of John Deere COOL-GARD II Coolant Extender.

Why use John Deere COOL-GARD II Coolant Extender?

Operating without proper coolant additives will result in increased corrosion, cylinder liner erosion and pitting, and other damage to the engine and cooling system. A simple mixture of ethylene glycol or propylene glycol and water will not give adequate protection.

John Deere COOL-GARD II Coolant Extender is a chemically matched additive system designed to fortify the proprietary additives used in John Deere COOL-GARD II Premix and COOL-GARD II Concentrate and to provide optimum protection for up to six years or 6000 hours of operation.

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Avoid Automotive-type Coolants

Never use automotive-type coolants (such as those meeting ASTM D3306). These coolants do not contain the correct additives to protect heavy-duty diesel engines. Do not treat an automotive engine coolant with supplemental coolant additives because the high concentration of additives can result in additive fallout.

Water Quality

Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate. All water used in the cooling system should meet the following minimum specifications for quality:

Chlorides	<40 mg/L
Sulfates	<100 mg/L
Total dissolved solids	<340 mg/L
Total hardness	<170 mg/L
pH	5.5 to 9.0

Freeze Protection

The relative concentrations of glycol and water in the engine coolant determine its freeze protection limit.

Ethylene Glycol	Freeze Protection Limit
40%	-24°C (-12°F)
50%	-37°C (-34°F)
60%	-52°C (-62°F)
Propylene Glycol	Freeze Protection Limit
40%	-21°C (-6°F)
50%	-33°C (-27°F)
60%	-49°C (-56°F)

DO NOT use a coolant-water mixture greater than 60% ethylene glycol or 60% propylene glycol.

DX,COOL17 -19-20APR11-1/1

Section 02 Repair and Adjustments

Contents

	Page		Page
Group 010—Engine Rebuild			
Check Air Intake System	02-010-1	Rocker Arm Shaft Assembly —	
Check and Service Cooling		Inspect and Assemble	02-020-34
System.....	02-010-1	Rocker Arm Shaft Assembly —	
Check Crankcase Vent System	02-010-2	Tear Down	02-020-37
Check Electrical System	02-010-2	Rocker Arm Shaft Carrier —	
Check Exhaust System	02-010-3	Inspection	02-020-38
Clean Engine	02-010-3	Rocker Arm Shaft Carrier Assembly	
Disconnect Turbocharger Oil		— Installation.....	02-020-38
Supply Line.....	02-010-3	Valve — Assembly Removal	02-020-42
Engine Break-In Guidelines.....	02-010-4	Valve — Cleaning and Inspection.....	02-020-43
Engine Overhaul Guidelines.....	02-010-4	Valve — Clearance Adjustment.....	02-020-44
Engine Repair Stand	02-010-4	Valve — Grinding.....	02-020-47
General Tune-Up Recommenda-		Valve — Lift Check	02-020-47
tions	02-010-5	Valve — Measurement	02-020-50
Install Adapters on Repair Stand.....	02-010-6	Valve — Recess Measurement	02-020-51
Lifting Procedure	02-010-7	Valve Assembly — Reassemble.....	02-020-52
Mount Engine on Repair Stand	02-010-8	Valve Guide — Cleaning	02-020-53
Perform Engine Break-In	02-010-8	Valve Guide — Installation	02-020-54
Safety Precautions	02-010-9	Valve Guide — Measurement.....	02-020-55
		Valve Guide — Removal	02-020-55
		Valve Retainer, Valve Bridges,	
		and Valve Retainer Locks —	
		Inspection	02-020-56
		Valve Seat—Cleaning and	
		Inspection	02-020-56
		Valve Seat — Grinding	02-020-57
		Valve Seat — Measurements	02-020-58
		Valve Seat Inserts — Installation.....	02-020-59
		Valve Seat Inserts — Removal.....	02-020-60
		Valve Spring — Inspection	02-020-61
		Valve Spring — Measurement.....	02-020-61
Group 020—Cylinder Head and Valve Repair and Adjustment			
Cylinder Block Top Deck —			
Cleaning and Inspection	02-020-1		
Cylinder Head — Cleaning and			
Inspection	02-020-1		
Cylinder Head — Flatness Check.....	02-020-1		
Cylinder Head — Installation	02-020-2		
Cylinder Head — Removal	02-020-14		
Cylinder Head — Thickness			
Measurement.....	02-020-19		
Cylinder Head Gasket —			
Inspection	02-020-20		
Fuel Injector Sleeves — Removal.....	02-020-21		
Fuel Injector Sleeves —			
Installation	02-020-22		
Glow Plug — Installation	02-020-23		
Glow Plug — Removal	02-020-25		
Glow Plug Bore — Cleaning and			
Inspection	02-020-25		
Open Crankcase Ventilation			
Pressure Relief Valve —			
Maintenance.....	02-020-26		
Push Rod — Cleaning and			
Inspection	02-020-26		
Rocker Arm Cover — Inspection	02-020-27		
Rocker Arm Cover — Installation	02-020-27		
Rocker Arm Cover — Removal	02-020-31		
Rocker Arm Cover Vent Hose —			
Inspection	02-020-34		
		Group 030—Cylinder Block, Liners, Pistons and Rods	
		Complete Final Assembly.....	02-030-1
		Connecting Rod —	
		Center-to-Center Bore	
		Measurement.....	02-030-2
		Connecting Rod — General	
		Information.....	02-030-3
		Connecting Rod and Cap —	
		Inspection	02-030-4
		Connecting Rod Bearing —	
		Inspection and Measurement	02-030-5
		Connecting Rod Bearing —	
		Inspection and Measurement	
		(Rod and Crankshaft in	
		Engine)	02-030-6
		Connecting Rod Cap Screw —	
		Torque Procedure	02-030-7
		Connecting Rod Pin Bore —	
		Cleaning and Inspection	02-030-7

Continued on next page

Page	Page
Cylinder Block — Cleaning and Inspection 02-030-8	Crankshaft Belt-Driven Auxiliary Drive — Removal 02-040-6
Cylinder Block — Measurement 02-030-12	Crankshaft Front Oil Seal — Removal 02-040-7
Cylinder Block — Tear Down 02-030-13	Crankshaft Front Oil Seal — Installation 02-040-8
Cylinder Block O-ring — Installation 02-030-14	Crankshaft Gear — Installation 02-040-9
Cylinder Block, Piston, and Rod — Troubleshooting Guide 02-030-15	Crankshaft Gear — Removal 02-040-10
Cylinder Liner — Cleaning 02-030-15	Crankshaft Grinding — Guidelines 02-040-10
Cylinder Liner — Installation 02-030-16	Crankshaft Journals and Bearing Assembly — Measurement 02-040-11
Cylinder Liner — Removal 02-030-17	Crankshaft Main Bearing Cap — Installation 02-040-12
Cylinder Liner — Standout Measurement 02-030-19	Crankshaft Main Bearing Cap — Line Bore Specs 02-040-13
Cylinder Liner — Visual Inspection 02-030-20	Crankshaft Main Bearing Cap — Oil Clearance Check 02-040-13
Cylinder Liner Flange — Measurement 02-030-21	Crankshaft Main Bearing Cap — Removal 02-040-14
Cylinder Liner O-ring Bore — Cleaning 02-030-22	Crankshaft Rear Oil Seal — Installation 02-040-14
Cylinder Liner Packing — Installation 02-030-22	Crankshaft Rear Oil Seal — Removal 02-040-16
Piston — Cleaning 02-030-23	Crankshaft Thrust Bearing — Inspection 02-040-17
Piston — Visual Inspection 02-030-23	Crankshaft Timing Wheel — Installation 02-040-18
Piston and Connecting Rod Assembly — Assemble 02-030-24	Crankshaft Timing Wheel — Removal 02-040-18
Piston and Connecting Rod Assembly — Installation 02-030-25	Crankshaft Pulley — Installation 02-040-19
Piston and Connecting Rod Assembly — Removal 02-030-26	Crankshaft Pulley — Removal 02-040-21
Piston and Connecting Rod Assembly — Tear Down 02-030-28	Flywheel — Inspection 02-040-22
Piston Cooling Orifice — Cleaning and Inspection 02-030-28	Flywheel — Installation 02-040-22
Piston Cooling Orifice — Installation 02-030-29	Flywheel — Removal 02-040-23
Piston Cooling Orifice — Removal 02-030-30	Flywheel Face — Flatness Check 02-040-23
Piston Height — Measurement 02-030-30	Flywheel Housing — Installation 02-040-24
Piston Pin and Bore — Inspection 02-030-31	Flywheel Housing — Removal 02-040-26
Piston Pin and Bushing — Inspection 02-030-32	Flywheel Pilot Bearing Bore — Concentricity Check 02-040-26
Piston Pin Bushing — Installation 02-030-33	Flywheel Ring Gear — Installation 02-040-27
Piston Pin Bushing — Removal 02-030-34	Flywheel Ring Gear — Removal 02-040-27
Piston Protrusion — Measurement 02-030-35	Open Crankcase Ventilation System — Inspection 02-040-28
Piston Rings — Installation 02-030-36	Open Crankcase Ventilation System — Installation 02-040-28
Piston Skirt — Measurement 02-030-36	Open Crankcase Ventilation System — Removal 02-040-30
Piston to Liner — Clearance Check 02-030-37	
Group 040—Crankshaft, Main Bearings and Flywheel	Group 050—Camshaft, Balancing Shaft, and Timing Gear Train Repair and Adjustment
Crankshaft — End Play Check 02-040-1	Balancer Shaft — Installation 02-050-1
Crankshaft — Grinding Specs 02-040-1	Balancer Shaft — Measure End Play 02-050-2
Crankshaft — Inspection 02-040-2	Balancer Shaft — Removal 02-050-3
Crankshaft — Installation 02-040-3	Balancer Shaft — Visual Inspection and Measurement 02-050-4
Crankshaft — Removal 02-040-5	
Crankshaft Belt-Driven Auxiliary Drive — Installation 02-040-6	

Continued on next page

Page	Page
Balancer Shaft and Lower Idler Gear — Timing 02-050-5	Oil Pressure Regulating Valve — Removal 02-060-11
Balancer Shaft Bushing — Removal and Installation 02-050-7	Oil Pump and Tubes — Installation 02-060-12
Balancer Shaft Gear — Check and Replace Components 02-050-8	Oil Pump and Tubes — Removal 02-060-14
Balancer Shaft Thrust Plate — Measure Clearance and Thickness 02-050-9	Group 070—Cooling System
Camshaft — Installation 02-050-9	Belt — Wear Check 02-070-1
Camshaft — Removal 02-050-10	Belt Tensioner — Installation 02-070-1
Camshaft — Visual Inspection 02-050-11	Belt Tensioner — Removal 02-070-2
Camshaft and Upper Idler Gear — Timing 02-050-11	Belt Tensioner — Spring Tension Check 02-070-3
Camshaft Bushing — Replacement 02-050-13	Coolant Heater — Servicing 02-070-4
Camshaft Gear — Inspection 02-050-14	Coolant Pump — Visual Inspection 02-070-5
Camshaft Gear-Driven Auxiliary Drive Cover — Installation 02-050-15	Coolant Pump Assembly — Installation 02-070-6
Camshaft Gear-Driven Auxiliary Drive Cover — Removal 02-050-15	Coolant Pump Assembly — Removal 02-070-9
Camshaft Journals — Measurement 02-050-16	Cooling System — Deaeration 02-070-12
Camshaft Lobes — Height Measurement 02-050-17	Fan Assembly — Inspection and Installation 02-070-12
Camshaft Thrust Plate — Measure Clearance and Thickness 02-050-17	Fan Assembly — Removal 02-070-13
Front Plate — Installation 02-050-18	Fan Drive Assembly — Installation 02-070-14
Front Plate — Removal 02-050-19	Fan Drive Assembly — Removal 02-070-20
Idler Gears — Measure End Play 02-050-20	Thermostat — Installation 02-070-22
Lower Idler Gear — Check and Replace Components 02-050-20	Thermostat — Removal 02-070-23
Lower Idler Gear — Installation 02-050-21	Thermostat — Testing 02-070-24
Timing Gear Cover — Installation 02-050-22	Thermostat Housing — Installation 02-070-24
Timing Gear Cover — Removal 02-050-24	Thermostat Housing — Removal 02-070-29
Timing Gears — Check Backlash 02-050-25	
Upper Idler Gear — Check and Replace Components 02-050-26	
Group 060—Lubrication System	Group 080—Air Intake and Exhaust System
Dipstick Tube and Dipstick — Installation 02-060-1	Repair and Adjustment
Dipstick Tube and Dipstick — Removal 02-060-2	Air Throttle Actuator (PVX Engine) — Installation 02-080-1
Oil Cooler and Filter — Installation 02-060-3	Air Throttle Actuator (PVX Engine) — Removal 02-080-2
Oil Cooler and Filter — Removal and Inspection 02-060-4	EGR Cooler Coolant Return Tube — Installation 02-080-3
Oil Fill Adapter — Installation 02-060-7	EGR Cooler Coolant Return Tube — Removal 02-080-3
Oil Fill Adapter — Removal 02-060-7	EGR Cooler — Installation 02-080-4
Oil Filter Bypass Valve — Installation 02-060-8	EGR Cooler — Removal 02-080-5
Oil Filter Bypass Valve — Removal 02-060-8	EGR Cooler Bracket — Installation 02-080-6
Oil Pan — Installation 02-060-9	EGR Cooler Bracket — Removal 02-080-7
Oil Pan — Removal 02-060-10	EGR Cooler Gas Inlet Pipe — Installation 02-080-8
Oil Pressure Regulating Valve — Installation 02-060-11	EGR Cooler Gas Inlet Pipe — Removal 02-080-9
	EGR Flow Sensor (PVX Engine) — Installation 02-080-9
	EGR Flow Sensor (PVX Engine) — Removal 02-080-10
	EGR Flow Venturi Assembly (PVX Engine) — Installation 02-080-11

Continued on next page

Page	Page
EGR Flow Venturi Assembly (PVX Engine) — Removal	02-080-12
EGR Valve — Installation	02-080-13
EGR Valve — Removal	02-080-14
Exhaust Gas Recirculation — Component View	02-080-15
Exhaust Manifold — Installation	02-080-16
Exhaust Manifold — Removal	02-080-18
Exhaust Throttle Assembly with Flat Flange (PWX Engine) — Installation	02-080-19
Exhaust Throttle Assembly with V-Band Clamp (PWX Engine) — Installation	02-080-20
Exhaust Throttle Assembly with Flat Flange (PWX Engine) — Removal	02-080-21
Exhaust Throttle Assembly with V-Band Clamp (PWX Engine) — Removal	02-080-22
Exhaust Throttle Actuator Coolant Return Line — Installation	02-080-23
Exhaust Throttle Actuator Coolant Return Line — Removal	02-080-24
Exhaust Throttle Actuator Coolant Supply Line — Installation	02-080-25
Exhaust Throttle Actuator Coolant Supply Line — Removal	02-080-26
Extending Turbocharger Life	02-080-27
Intake Manifold (PVX Engine) — Installation	02-080-29
Intake Manifold (PVX Engine) — Removal	02-080-30
Intake Manifold (PSX and PWX Engine) — Installation	02-080-31
Intake Manifold (PSX and PWX Engine) — Removal	02-080-32
Reed Valve — Inspection	02-080-33
Turbocharger — Break-In	02-080-33
Turbocharger — Failure Analysis	02-080-34
Turbocharger — Inspection	02-080-36
Turbocharger — Recommendations for Use	02-080-40
VGT Turbocharger Actuator — Installation	02-080-40
VGT Turbocharger Actuator — Removal	02-080-41
VGT Turbocharger Actuator Coolant Return Line — Installation	02-080-42
VGT Turbocharger Actuator Coolant Return Line — Removal	02-080-43
VGT Turbocharger Actuator Coolant Supply Line — Installation	02-080-44
VGT Turbocharger Actuator Coolant Supply Line — Removal	02-080-45
VGT Turbocharger Actuator Linkage — Installation	02-080-46
VGT Turbocharger Actuator Linkage — Removal	02-080-47
VGT Turbocharger Assembly — Installation	02-080-48
VGT Turbocharger Assembly — Removal	02-080-49
VGT Turbocharger Oil Drain Line — Installation	02-080-50
VGT Turbocharger Oil Drain Line — Removal	02-080-51
VGT Turbocharger Oil Supply Line — Installation	02-080-52
VGT Turbocharger Oil Supply Line — Removal	02-080-53
VGT Turbocharger Speed Sensor — Installation	02-080-54
VGT Turbocharger Speed Sensor — Removal	02-080-54
Wastegate Turbocharger Assembly (Flat Flange) — Installation	02-080-55
Wastegate Turbocharger Assembly (V-Band Clamp) — Installation	02-080-57
Wastegate Turbocharger Assembly (Flat Flange) — Removal	02-080-59
Wastegate Turbocharger Assembly (V-Band Clamp) — Removal	02-080-60
Wastegate Turbocharger Oil Drain Line — Installation	02-080-61
Wastegate Turbocharger Oil Drain Line — Removal	02-080-62
Wastegate Turbocharger Oil Supply Line — Installation	02-080-63
Wastegate Turbocharger Oil Supply Line — Removal	02-080-64
Group 090—Electronic Fuel System Repair and Adjustment	
Electronic Injectors — Cleaning (In Engine)	02-090-1
Electronic Injectors — Installation	02-090-2
Electronic Injectors — Removal	02-090-3
Flow Dampers — Installation	02-090-4
Flow Dampers — Removal	02-090-5
Fuel Filters Bracket — Installation	02-090-5
Fuel Filters Bracket — Removal	02-090-6
Fuel Filter Elements — Replace	02-090-7
Fuel System — Components	02-090-8
Fuel System — General Information	02-090-9
Fuel System — Relieve Pressure	02-090-10
High-Pressure Common-Rail (HPCR) — Installation	02-090-10
High-Pressure Common-Rail (HPCR) — Removal	02-090-13
High-Pressure Fuel Pump — Disassembling and Reassembling	02-090-16

Continued on next page

Page	Page
High-Pressure Fuel Pump — Installation 02-090-17	EGR Flow Sensor — Installation 02-110-12
High-Pressure Fuel Pump — Removal 02-090-20	EGR Flow Sensor — Removal 02-110-13
High-Pressure Injection Lines and Feed Tubes — Installation 02-090-21	EGR Temperature Sensor — Installation 02-110-13
High-Pressure Injection Lines and Feed Tubes — Removal 02-090-23	EGR Temperature Sensor — Removal 02-110-14
Injector Wiring Harness — Installation 02-090-24	Engine Control Unit (ECU) — Installation 02-110-15
Injector Wiring Harness — Removal 02-090-25	Engine Control Unit (ECU) — Maintenance 02-110-16
Low-Pressure Fuel Pump — Installation 02-090-25	Engine Control Unit (ECU) — Removal 02-110-17
Low-Pressure Fuel Pump — Removal 02-090-26	Engine Coolant Temperature Sensor — Installation 02-110-18
Pressure Limiter — Installation 02-090-27	Engine Coolant Temperature Sensor — Removal 02-110-18
Pressure Limiter — Removal 02-090-29	Engine Crankcase Pressure Sensor — Installation 02-110-19
Primary Fuel Filter Assembly — Installation 02-090-30	Engine Crankcase Pressure Sensor — Removal 02-110-19
Primary Fuel Filter Assembly — Removal 02-090-31	Engine Oil Pressure Sensor — Installation 02-110-20
Secondary Fuel Filter Assembly — Installation 02-090-32	Engine Oil Pressure Sensor — Removal 02-110-20
Secondary Fuel Filter Assembly — Removal 02-090-34	Exhaust Manifold Pressure Sensor — Installation 02-110-21
Suction Control Valve — Installation 02-090-35	Exhaust Manifold Pressure Sensor — Removal 02-110-21
Suction Control Valve — Removal 02-090-36	Fuel Rail Pressure Sensor — Installation 02-110-22
Group 100—OEM Starting and Charging Systems Repair and Adjustment	Fuel Rail Pressure Sensor — Removal 02-110-23
Alternator—Installation 02-100-1	Fuel Temperature Sensor — Installation 02-110-23
Alternator — Removal 02-100-3	Fuel Temperature Sensor — Removal 02-110-24
Starter Motor—Installation 02-100-4	Intake Air Sensor — Installation 02-110-24
Starter Motor—Removal 02-100-5	Intake Air Sensor — Removal 02-110-25
Group 110—Electrical Engine Control Repair and Adjustment	Intake Manifold Air Pressure (MAP) Sensor — Installation 02-110-25
Wiring Harness — Routing 02-110-1	Intake Manifold Air Pressure (MAP) Sensor — Removal 02-110-26
Component Location Diagram 1 02-110-2	Intake Manifold Air Temperature (MAT) Sensor — Installation 02-110-26
Component Location Diagram 2 02-110-3	Intake Manifold Air Temperature (MAT) Sensor — Removal 02-110-27
Component Location Diagram 3 02-110-5	Low-Pressure Fuel Pressure Sensor — Installation 02-110-27
Component Location Diagram 4 02-110-7	Low-Pressure Fuel Pressure Sensor — Removal 02-110-28
Component Location Diagram 5 02-110-8	Water-In-Fuel (WIF) Sensor — Installation 02-110-28
Camshaft Position Sensor — Installation 02-110-9	Water-In-Fuel (WIF) Sensor — Removal 02-110-29
Camshaft Position Sensor — Removal 02-110-9	Wiring Harness — Installation 02-110-29
Charge Air Cooler Outlet Temperature Sensor — Installation 02-110-10	Wiring Harness — Removal 02-110-39
Charge Air Cooler Outlet Temperature Sensor — Removal 02-110-10	
Crankshaft Position Sensor — Installation 02-110-11	
Crankshaft Position Sensor — Removal 02-110-11	
	Group 112—Connector Repair and Adjustment
	Connectors 02-112-1

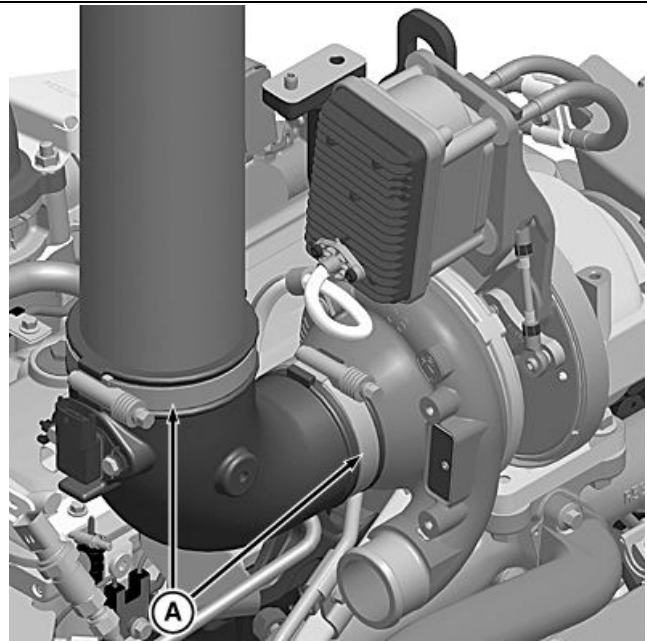
Continued on next page

	Page
Using High-Pressure Washing	02-112-1
Group 115—Aftertreatment Devices	
Diesel Particulate Filter	
Maintenance and Service	02-115-1
Exhaust Filter — Assemble	02-115-2
Exhaust Filter — Diesel Particulate	
Filter Ash Handling and	
Disposal	02-115-3
Exhaust Filter — Handling	02-115-4
Exhaust Filter — Tear Down and	
Inspection	02-115-5
Exhaust Filter — Cleaning	02-115-9
Exhaust Filter — Disposal	02-115-9
Exhaust Filter, Brackets, and	
Piping — Installation	02-115-10
Exhaust Filter, Brackets, and	
Piping — Removal	02-115-16

Check Air Intake System

1. Replace air cleaner primary filter element. (See operator's manual). Replace secondary element if primary element has holes in it.
2. Check condition of air intake hoses and pipes. The Tier 4 engine has an extensive air intake and exhaust system with numerous joints. Replace hoses and/or pipes that are cracked, split, or otherwise in poor condition.
3. Check hose clamps (A) for tightness. Replace clamps that cannot be properly tightened. This will help prevent dust from entering the air intake system which could cause serious engine damage.

A—Hose Clamp



Turbocharger Hose Clamps

RG20760 —UN—26SEP11

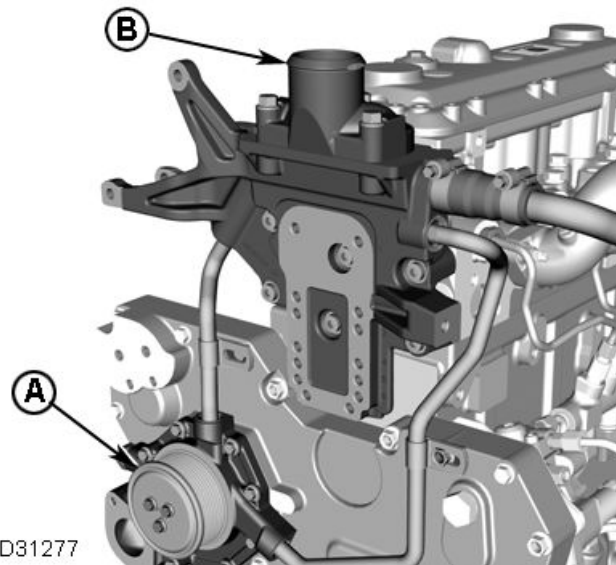
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Check and Service Cooling System

1. Remove debris that has accumulated on or near radiator.
2. Visually inspect entire cooling system and all components for leaks or damage. Repair or replace as necessary.
3. Remove and check thermostat(s). See Thermostat — Testing in Section 02, Group 070.
4. Run engine until it reaches operating temperature. Check entire cooling system for leaks.
5. After engine cools, check coolant level.
6. Check system for holding pressure. See Cooling System Test in Section 04, Group 155.

A—Coolant Pump

B—Thermostat Housing



CD31277

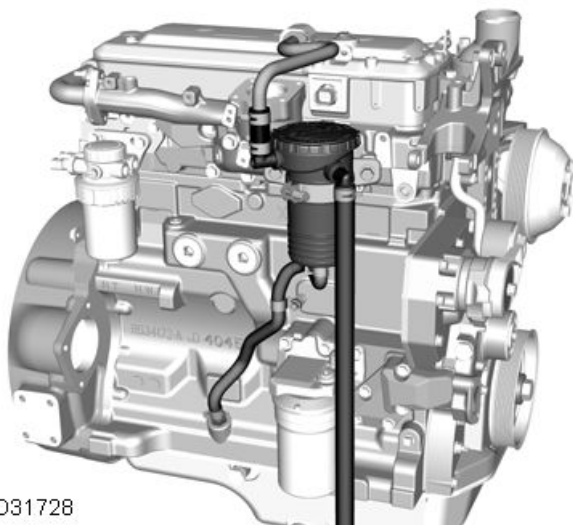
Check Cooling System

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Check Crankcase Vent System

Inspect crankcase ventilation system for restriction. Replace vent filter if necessary. Lack of ventilation causes sludge to form in crankcase. This situation can lead to clogging of oil passages, filters, high crankcase pressure, and screens, resulting in serious engine damage.



CD31728

Crankcase Vent System

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CD31278 —UN—17MAR11

Check Electrical System

CAUTION: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (-) battery clamp first and replace it last.

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**

1. Clean batteries and cables with damp cloth. If corrosion is present, remove it and wash terminals with a solution of ammonia or baking soda in water. Then flush area with clean water.
2. Coat battery terminals and connectors with petroleum jelly mixed with baking soda to retard corrosion.
3. Test batteries. If batteries are not near full charge, try to find out why.
4. On low-maintenance batteries, check level of electrolyte in each cell of each battery. Level should be to bottom of filler neck. If water is needed, use clean, mineral-free water.



Prevent Battery Explosions

If water must be added to batteries more often than every 250 hours, alternator may be overcharging.

NOTE: Water cannot be added to maintenance-free batteries.

5. If batteries appear to be either undercharged or overcharged, check alternator and charging circuit.
6. Check tension of drive belts. See Belt Tensioner — Spring Tension Check in Section 02, Group 070.
7. Check operation of starter motor and instruments.

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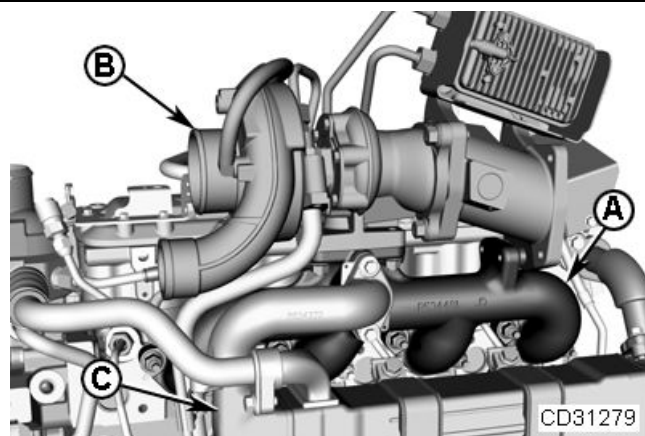
Check Exhaust System

1. Inspect exhaust system for leaks or restrictions. Check manifold for cracks. Repair or replace as necessary.
2. Check that turbocharger-to-exhaust gas recirculator (EGR) cooler, etc. clamps are securely tightened and do not leak.
3. Check exhaust system for evidence of oil leakage past valve stem seals.

Oil in exhaust system may be caused by excessive valve stem-to-guide clearance or excessive light load engine idling.

A—Exhaust Manifold
B—Turbocharger

C—EGR Cooler



Check Exhaust System

CD31279 —UN—17MAR11

CD03523,00002FD -19-17MAR11-1/1

Clean Engine

1. Cap or plug all openings (air intake, exhaust, fuel, coolant, etc.).
2. Remove electrical components (electronic control module-ECM, starter, alternator, etc.). Cover electrical components that are not removed (sensors, wiring harness, ECM connectors, etc.) with plastic and tape securely to prevent moisture damage.

IMPORTANT: Never steam clean or pour cold water on an injection pump while it is still warm. To do so may cause seizure of pump parts. Avoid fuel pumps, injectors, exhaust filter, bearings, belts and hoses, etc.

3. Thoroughly steam clean engine.

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Disconnect Turbocharger Oil Supply Line

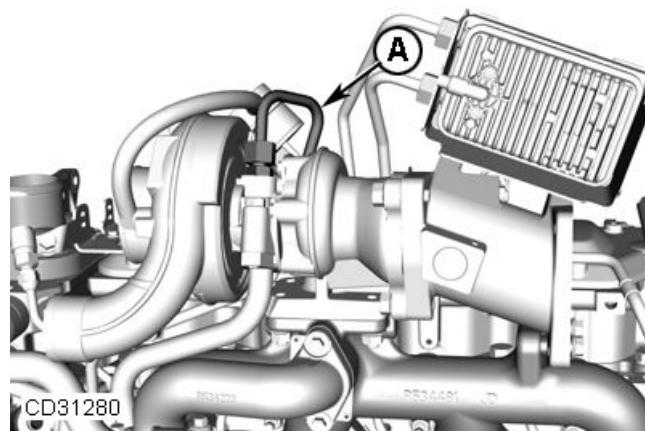
1. Drain all engine oil and coolant, if not previously done.

IMPORTANT: When servicing turbocharged engines on a rollover stand, disconnect turbocharger oil inlet line (A) from oil filter housing or turbocharger before rolling engine over. Failure to do so may cause a hydraulic lock upon starting engine. Hydraulic lock may cause possible engine failure.

Hydraulic lock occurs when trapped oil in the oil filter housing drains through the turbocharger, the exhaust and intake manifolds, and then into the cylinder head.

After starting the engine, the trapped oil in the manifold and head is released into the cylinder(s), filling them with oil, causing hydraulic lock and possible engine failure.

2. Disconnect turbocharger oil inlet line at turbocharger or oil filter housing.



Turbocharger Oil Supply Line

A—Turbocharger Oil Supply Line

CD31280 —UN—17MAR11

CD03523,00002FE -19-17MAR11-1/1

Engine Break-In Guidelines

Engine break-in should be performed after overhaul or when the following repairs have been made:

- Main bearings, rod bearings, crankshaft, or any combination of these parts have been replaced.
- Pistons, rings, or liners have been replaced.

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Engine Overhaul Guidelines

Engine life and performance will vary depending on operating conditions and the level of regular engine maintenance. Engines can be brought back to original performance standards through proper overhaul procedures and replacement of parts with genuine John Deere service parts. Overhauling the engine prior to failure can avoid costly repairs and downtime.

Consider installing a John Deere overhaul kit when:

- The engine begins to experience power loss and there are no known engine component failures.

- The engine is hard to start due to low cranking compression.
- The engine begins to smoke and there are no known engine component failures.
- The engine begins to use oil. Refer to Section 04 for acceptable oil consumption.
- The engine has high usage hours and the owner wants to take preventive measures to avoid high-cost repairs and costly downtime.

Overhaul kits may be available for John Deere engines in your area.

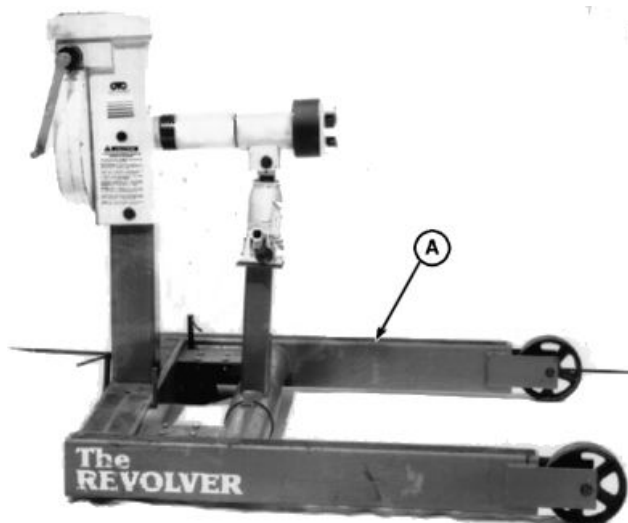
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Engine Repair Stand

NOTE: Only the 2722 kg (6000 lb) heavy duty engine repair stand (A) No. D05223ST manufactured by Owatonna Tool Co., Owatonna, Minnesota, is referenced in this manual. When any other repair stand is used, consult the manufacturer's instructions for mounting the engine.

Refer to machine technical manual for steps to remove engine from machine.

A—D05223ST Engine Repair Stand



Engine Repair Stand

RG4929—UN—05DEC97

PU00210,00000C3 -19-18MAR09-1/1

General Tune-Up Recommendations

As a general rule, an engine tune-up is not necessary if ALL recommended operator's manual hourly service procedures are performed on schedule. If your engine performance is not within the rated application guidelines, the following service procedures are recommended to help restore engine to normal operating efficiency.

that have a diagnostic feature that will display detailed codes to alert operator of specific performance problems. Refer to the **DIAGNOSTICS** Section in this manual for diagnostic code troubleshooting procedures on electronically controlled fuel systems.

IMPORTANT: Engines are equipped with electronically-controlled fuel systems

Operation

Detailed Reference

Change engine oil and filters.	Operator's Manual
Lubricate PTO clutch internal levers and linkage, if equipped.	Operator's Manual
Replace fuel filter.	This Manual/Operator's Manual
Clean crankcase vent tube.	This Manual/Operator's Manual
Check air intake system. Replace air cleaner elements.	This Manual/Operator's Manual
Check exhaust system.	This Manual
Check and service engine cooling system.	This Manual/Operator's Manual
Check and adjust fan and alternator belts.	Operator's Manual
Check electrical system.	This Manual
Check crankshaft vibration damper.	This Manual/Operator's Manual
Check fuel injection system.	This manual
Check engine oil pressure. Correct as necessary.	This manual
Check engine valve clearance. Adjust if necessary.	This manual
Check engine speeds. Correct as necessary.	Authorized Servicing Dealer
Check fuel quality.	Operator's Manual

PU00210,00000D5 -19-11JUL11-1/1

Install Adapters on Repair Stand

Tools:

- No special tools required

Consumables:

- No consumables

1. Attach the D05226ST Special Adapter (B) to mounting hub (A) of the engine repair stand, using SAE Grade 8 socket head cap screws (D), to the following specifications.

Specification

D05226ST Special

Adapter-to-Mounting Hub

SAE Grade 8 Socket

Head Cap Screws.

—Torque..... 600 N·m (443 lb-ft).

2. Attach the 62835 ¹ Engine Adapter (C) to the special adapter, using four M12 Class 10.9 caps screws (E), to the following specifications.

Specification

62835 ¹ Engine

Adapter-to-Special

Adapter M12 Class 10.9

Cap Screws.—Torque..... 135 N·m (100 lb-ft).

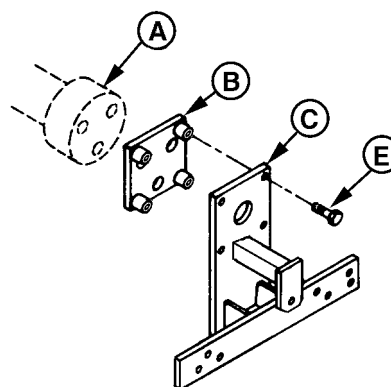
A—Mounting Hub

B—D05226ST Special Adapter

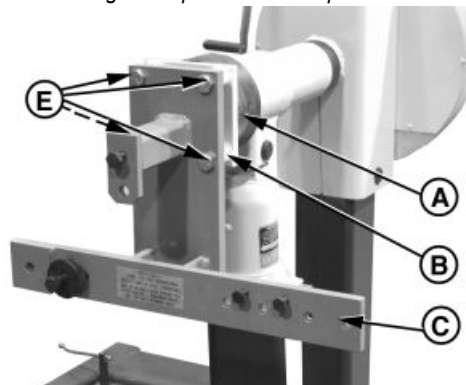
C—62835 Engine Adapter

D—Socket Head Cap Screws

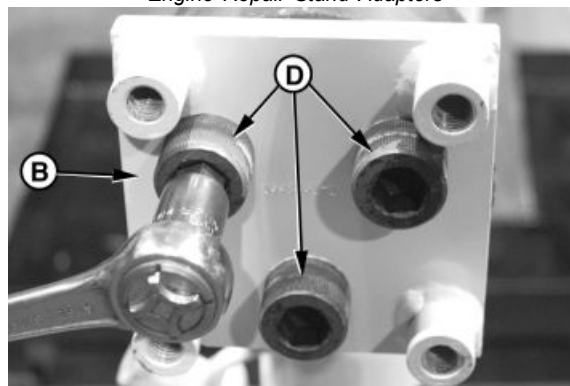
E—Cap Screws



Engine Repair Stand Adapters



Engine Repair Stand Adapters



Engine Repair Stand Adapters

¹Part of JT07268 Engine Repair Stand Adapter Kit

Lifting Procedure

CAUTION: The only recommended method for lifting the engine is with JDG23 Engine Lifting Sling and safety approved lifting straps that come with engine. Use extreme caution when lifting and **NEVER** permit any part of the body to be positioned under an engine being lifted or suspended.

NOTE: If engine lifting straps are misplaced, they can be procured through service parts.

1. Install lifting straps and tighten cap screws to the following specifications.

Specification

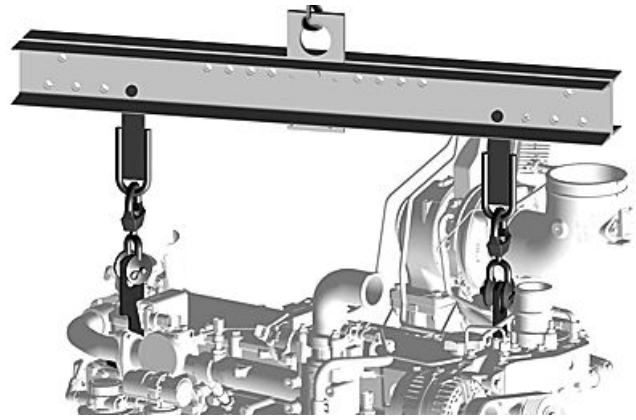
Engine Lifting Strap Cap
Screws—Torque..... 125 N·m (92 lb-ft)

IMPORTANT: Lift engine with longitudinal loading on lifting sling and lifting brackets only. Angular loading greatly reduces lifting capacity of sling and brackets.

Lift spacing on sling is adjustable. Position each lifting point so that engine hangs level when lifted.

2. Attach the JDG23 Engine Lifting Sling to engine lifting straps and overhead hoist or floor crane.

Lifting straps are designed to lift the engine and small accessories, such as hydraulic pumps and



Lifting Engine with Lifting Sling

RG20087—UN—28FEB11

air compressors mounted to the engine auxiliary gear drive, or belt-driven components, such as air conditioning compressors and alternators. If larger components, such as PTOs, transmissions, generators, structural oil pan, or air compressors, are attached to other locations on the engine, the lifting straps provided with the engine are not intended for this purpose. Technician is responsible for providing adequate lifting devices under these situations. See machine technical manual for additional information on removing engine from machine.

NOTE: Use of an engine lifting sling (as shown) is the **ONLY APPROVED** method for lifting engine.

3. Carefully lift engine and slowly lower to desired location.

JR74534,0000447 -19-28JUL11-1/1

Mount Engine on Repair Stand

CAUTION: NEVER remove the overhead lifting equipment until the engine is securely mounted onto the repair stand and all mounting hardware is tightened to specified torque. Always release the overhead lifting equipment slowly.

NOTE: Remove components to get clearance when installing engine onto repair stand. These components can differ depending on the applications.

1. Perform — Install Adapters on Repair Stand.
2. Mount the engine to 62835 Engine Adapter as follows:

Hole (A):

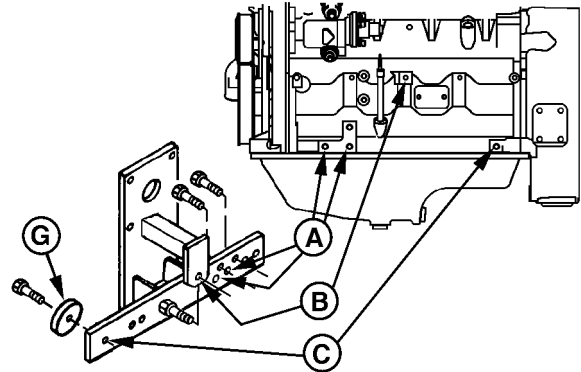
- Two M12 x 1.75 x 35 mm Class 10.9 cap screws.

Hole (B):

- One M14 x 2 x 35 mm Class 10.9 cap screws.

Hole (C):

- One M14 x 2 x 60 mm Class 10.9 cap screws with spacer (G).



Mount Engine on Repair Stand

RG9058—UN—16MAR98

3. Tighten cap screws to specifications.

Specification

Engine Repair Stand M12	
Cap Screws—Torque.....	140 N·m (103 lb-ft)
Engine Repair Stand M14	
Cap Screws—Torque.....	220 N·m (162 lb-ft)

CD03523,00002FF -19-26AUG11-1/1

Perform Engine Break-In

IMPORTANT: If engine has a PTO attached, break-in can be performed at the PTO if it is done as specified below. To prevent possible damage to the PTO gear case, DO NOT apply full load through the PTO for any longer than the specified 10 minutes.

Use a dynamometer to perform the following preliminary break-in procedure. If necessary, preliminary engine break-in can be performed without a dynamometer if under controlled operating conditions.

1. Fill engine crankcase to proper level with John Deere Engine Break-In Plus Oil. See John Deere Break-In Plus Engine Oil in Section 1, Group 002.

IMPORTANT: During preliminary break-in, periodically check engine oil pressure and coolant temperature. Also check for signs of fuel, oil, or coolant leaks.

Do not run engine at full load for more than 10 minutes at one time.

2. Start engine. Run at loads and speeds shown in following chart for time limits given.

PRELIMINARY ENGINE BREAK-IN AFTER MAJOR OVERHAUL

Time	Load	Engine Speed
1 minute	No load	850 rpm
2 minutes	No load	Fast Idle
10 minutes	1/2—3/4 load	2000 rpm to rated speed
10 minutes	Full load	Rated speed

3. After preliminary break-in, run engine 1—2 minutes at 1500 rpm, with no load before shutdown.

4. Check and readjust valve clearance as necessary. Cylinder head retorquing is not required.

NOTE: During the first 20 hours, avoid prolonged periods of engine idling or sustained maximum load operation. If engine idles longer than 5 minutes, stop engine.

Some increase in oil consumption may be expected when low viscosity oils are used. Check oil levels more frequently.

If air temperature is below -10 °C (14 °F), use an engine block heater.

CD03523,0000321 -19-26JUL11-1/1

Safety Precautions

Only qualified service technicians, familiar with this equipment, can use the engine repair stand.

To maintain shear strength specifications, alloy steel Class 10.9 or SAE Grade 8 or higher cap screws must be used to mount adapters and engine to repair stand. Tighten cap screws to specifications given.

For full thread engagement, be certain that tapped holes in adapters and engine blocks are clean and not damaged. A thread length engagement equal to 1-1/2 screw diameters minimum is required to maintain strength requirements.

To avoid structural or personal injury, do not exceed the maximum capacity rating of 2722 kg (6000 lb.). Maximum capacity is determined with the center of the engine located not more than 330 mm (13 in.) from the mounting hub surface of the engine stand.

The center of balance of an engine must be located within 51 mm (2 in.) of the engine stand rotating shaft. Engine

center of balance is located a few millimeters above the crankshaft.

To prevent possible personal injury due to engine slippage, recheck to make sure that engine is solidly mounted before releasing support from engine lifting device.

Do not position any part of the body under a load being lifted or suspended. Accidental slippage can result in personal injury.

Use the lifting jack when it is necessary to lift the engine for rotation. When working on the engine, the jack must be at its lowest position to keep the center of gravity and the possibility of tipping low.

To prevent possible personal injury due to sudden engine movement, lower the engine by operating jack release valve slowly. Do not unscrew release valve knob more than two turns from its closed position.

PU00210,00000C4 -19-02SEP10-1/1

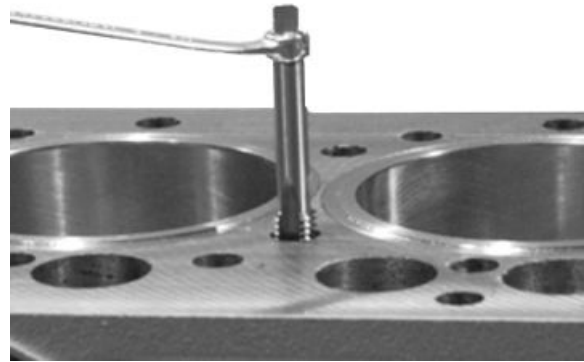
Group 020 Cylinder Head and Valve Repair and Adjustment

Cylinder Block Top Deck — Cleaning and Inspection

Special Tools:

- JDG680 — Tap.

1. Remove gasket material, rust, carbon, and other foreign material from top deck. Gasket surface must be clean.
2. Clean threaded holes in cylinder block using JDG680 tap or any 1/2-13 UNC-2A tap about 76 mm (3.0 in.) long. Use compressed air to remove debris and fluids from the cap screw holes. Replace block if there is evidence of damage.
3. Use compressed air to remove all loose foreign material from cylinders and top deck.



Cleaning Threaded Holes in Cylinder Block

4. Inspect top deck for flatness, see [Cylinder Block — Measurement](#).

MK41968,000005C -19-04OCT11-1/1

RG7444 —UN—23NOV97

Cylinder Head — Cleaning and Inspection

Special Tools:

- None

1. Inspect combustion face for evidence of physical damage, oil or coolant leakage, or gasket failure prior to cleaning the cylinder head. Repair or replace cylinder head if there is evidence of physical damage; such as cracking, abrasion, distortion, or valve seat “torching”. Inspect all cylinder head passages for restrictions.

2. Scrape gasket material, oil, carbon, and rust from head. Use a powered brass or copper wire brush to clean sealing surfaces.

IMPORTANT: Be sure to remove all plugs before cleaning head, as parts can be damaged or destroyed by hot tank solutions.

3. Clean cylinder head in a chemical hot tank, or with solvent and a brush.
4. Dry with compressed air and blow out all passages.

MK41968,000005D -19-11JUL11-1/1

Cylinder Head — Flatness Check

Special Tools:

- D05012ST — Precision Straightedge and Feeler Gauge

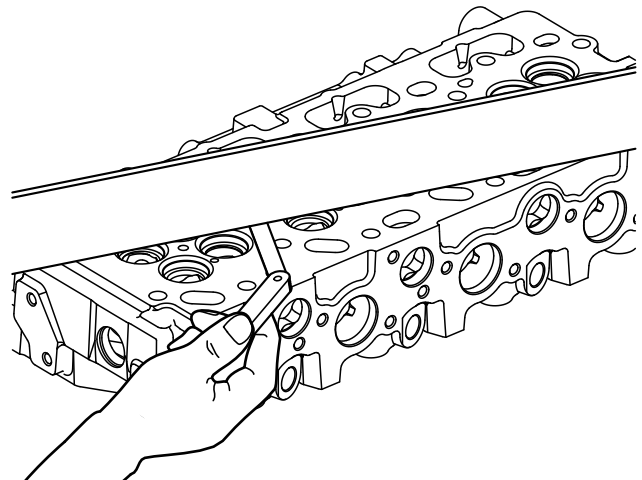
Consumable Material:

- None

Check cylinder head flatness using D05012ST Precision “Bevelled Edge” Straightedge and feeler gauge. Check lengthwise, crosswise, and diagonally in several places.

Specification

Cylinder Head	
Flatness—Maximum	
Acceptable Out-of-Flat	
for Entire Length or Width	
.....	0.08 mm (0.003 in.)
Maximum Acceptable	
Out-of-Flat for Every 150	
mm (5.90 in.)	0.03 mm (0.001 in.)



Cylinder Head Flatness Check

If out-of-flat exceeds specifications, the cylinder head must be reconditioned or replaced. (See [Cylinder Head — Thickness Measurement](#) later in this group.)

MK41968,000005F -19-25JUL11-1/1

RG20665 —UN—08JUL11

Cylinder Head — Installation

For PVX and PWX engines, perform Cylinder Head (PVX and PWX Engine) — Installation.

For PSX engine, perform Cylinder Head (PSX Engine) — Installation.

Cylinder Head (PVX and PWX Engine) — Installation

IMPORTANT: ALWAYS thoroughly inspect new cylinder head gasket for possible manufacturing imperfections. Return any gasket that does not pass inspection.

Using Lint free towel, wipe cylinder block combustion surface to remove residual assembly fluids and other contaminants.

1. Cylinder Head Installation

Tools:

- JD244 — Lift Straps or
- JDG19 — Special Bracket

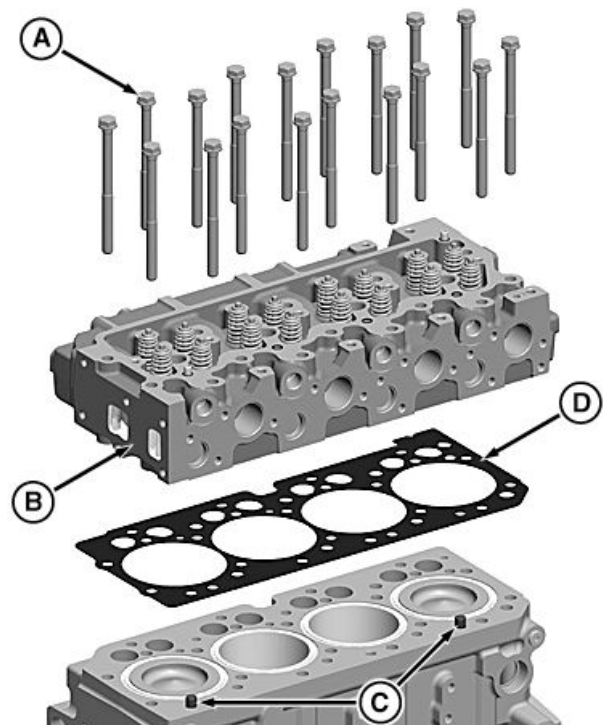
Consumables:

- Head Cap Screws, Head Gasket, SAE30 Diesel Engine Oil, O-rings

- Install two dowels (C) into the cylinder block deck surface.
- Install a new head gasket (D) on cylinder block. Do not use sealant on gasket; install dry.

IMPORTANT: If cylinder head is lowered onto cylinder block and the head is not positioned correctly on locating dowels, remove cylinder head and install a new gasket. DO NOT reposition cylinder head on the same gasket. The fire ring may be damaged.

NOTE: It may be beneficial to use additional guide pins to locate gasket and head to cylinder block combustion surface.



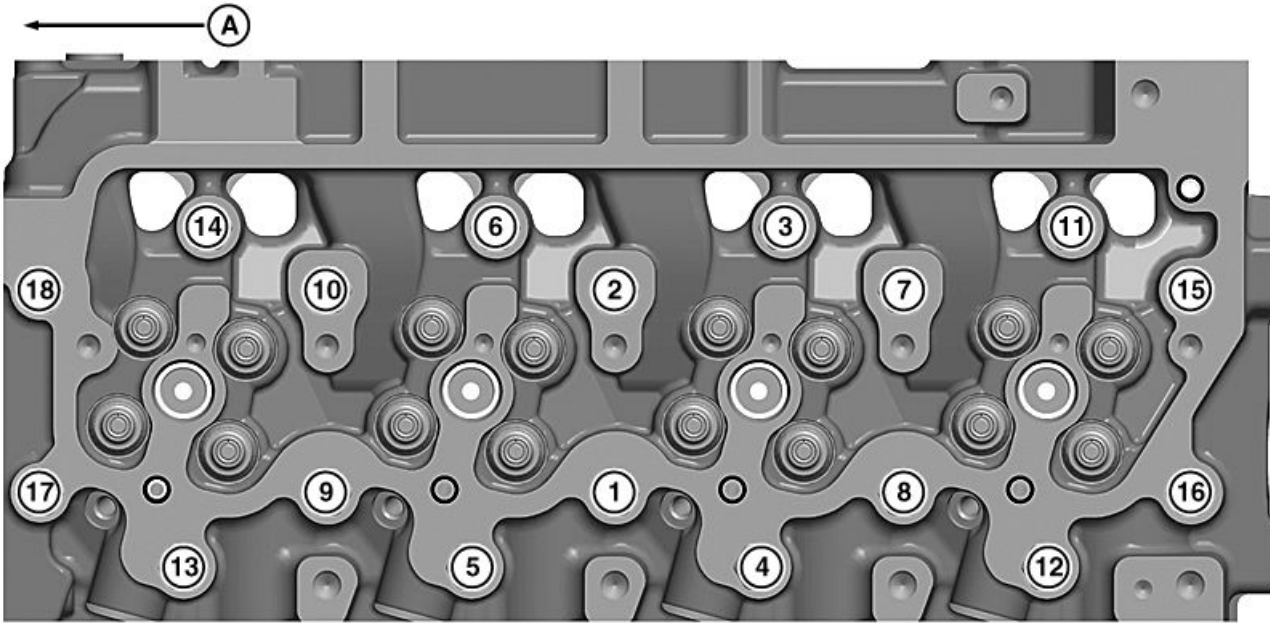
A—Cylinder Head Cap Screw (18)
B—Cylinder Head
C—Dowel (2)
D—Cylinder Head Gasket

- Install cylinder head on gasket on cylinder block, using locating dowels as a guide. Make sure that head is positioned correctly over dowels and sits flat on cylinder block top deck.

Continued on next page

MK41968,000005E -19-18JUN12-1/14

RG20528A —UN—18JUN12



Head Cap Screw Tightening Sequence

RG20500 —UN—20MAY11

A—Front of Engine

- d. Dip entire cap screw in clean SAE30 diesel engine oil. Allow excess oil to drip off cap screws.

IMPORTANT: ALWAYS use NEW cap screws when installing cylinder head. Cap screws may be used only one time.

DO NOT use multi-viscosity oils to lubricate cap screws. SAE30 is recommended.

NOTE: Excess oil will not allow cap screws to reach proper clamp load using torque to yield strategy.

- e. Install 18 special cylinder head cap screws through head and gasket and into block.

NOTE: All head cap screws are the same length.

- f. Tighten cap screws 1 to 18 to the initial torque as per given specification. Follow the cap screw tightening sequence shown in the figure above.

Specification

Cylinder Head Cap
Screws—Initial Torque..... 100 N•m (74 lb -ft)

- g. After initial torque, apply second torque to specification in the same sequence as above.

Specification

Cylinder Head Cap
Screws—Second
Torque..... 150 N•m (110 lb-ft)

- h. Verify all torques (Allow 5 minutes for bolt elongation).

Specification

Cylinder Head Cap
Screws—Verify Torque..... 150 N•m (110 lb-ft)

- i. Using an oil proof pen, pencil, or marker, draw a line parallel to the crankshaft across the entire top of each cap screw. This line will be used as a reference mark.

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MK41968,000005E -19-18JUN12-2/14

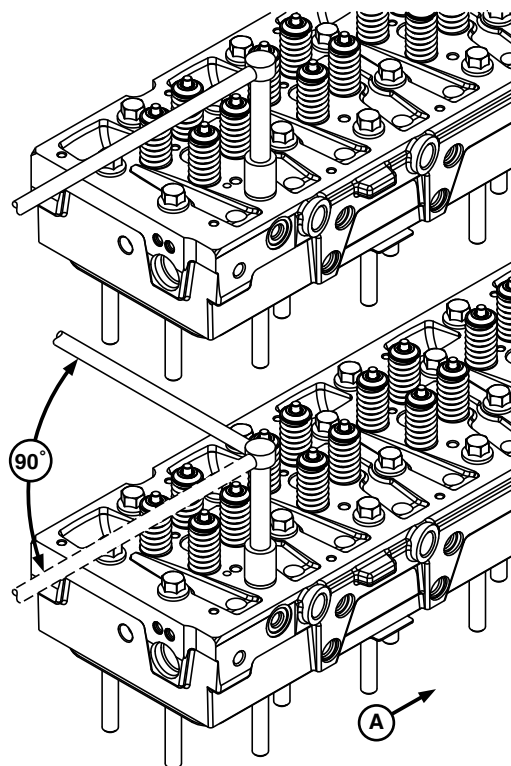
- j. Sequentially (start at cap screw No. 1 and proceed through cap screw No. 18) turn each cap screw 90°. Line on cap screw will be perpendicular to crankshaft.

Specification

Cylinder Head Cap
Screws—Torque Turn..... 90° (+10°/-0°)

NOTE: Double check line position on all 18 cap screws.

A—Front of Engine



Torque-to-Yield Cylinder Head Cap Screws

Continued on next page

MK41968,000005E -19-18JUN12-3/14

RG14067 —UN—29MAR05

2. If removed, perform Electronic Injectors — Installation.

Special Tools:

- None

Consumable Materials:

- Engine Oil or Petroleum Jelly

3. If removed, Perform Glow Plug — Installation

Special Tools:

- None

Consumable Materials:

- None

4. Install push rods.

5. Perform Rocker Arm Shaft Carrier Assembly — Installation.

Special Tools:

- None

Consumable Material:

- Loctite® 242 or Hylomar 760, Loctite® 243, Rocker Arm Shaft Carrier-to-Head Gasket

6. Unlock the flywheel by removing the flywheel timing pin.

7. Reconnect the injector wiring harness (D) to the injectors (E).

8. Reconnect glow plug harness connector (C).

9. Perform Injector Wiring Harness — Installation.

Special Tools:

- None

Consumable Material:

- Gasket, Loctite® 242

10. Perform Rocker Arm Cover — Installation.

Special Tools:

- None

Consumable Material:

- Rocker Arm Cover Gasket, O-ring

11. Install high-pressure injection lines.
See High-Pressure Injection Lines and Feed Tubes — Installation

Special Tools:

- None

Consumable Material:

- Petroleum Jelly, Engine Oil, Injection Lines, Side Feed Tubes

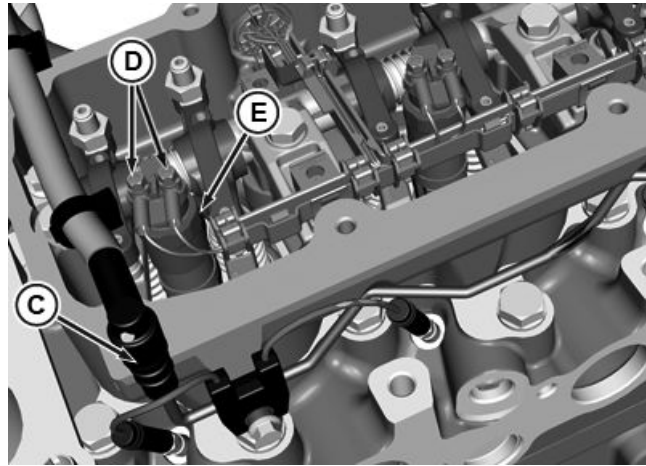
12. Perform Exhaust Manifold — Installation

Special Tools:

- None

Consumable Material:

- Exhaust Manifold Gaskets, Nuts, Studs (if removed)



Glow Plugs and Injectors Wiring Harness

C—Glow Plug Wiring Harness Connector
D—Injectors Wiring Harness
E—Injector (4)

13. Perform Fixed Turbocharger — Installation.

Special Tools:

- None

Consumable Material:

- Turbocharger Gasket

ORPerform VGT Turbocharger Assembly — Installation.

Special Tools:

- None

Consumable Material:

- Turbocharger Gasket

14. Perform Wastegate Turbocharger Oil Drain Line — Installation.

Special Tools:

- None

Consumable Material:

- Oil Drain Line Gasket, Adapter Fitting O-ring

ORPerform VGT Turbocharger Oil Drain Line — Installation.

Special Tools:

- None

Consumable Material:

- Oil Drain Line Gasket, Adapter Fitting O-ring

15. Perform Wastegate Turbocharger Oil Supply Line — Installation.

Special Tools:

- O-rings — Oil supply line

Continued on next page

MK41968,000005E -19-18JUN12-4/14

OR

Perform VGT Turbocharger Oil Supply Line — Installation.

Special Tools:

- None

Consumable Material:

- O-rings — Oil supply line

16. Perform Exhaust Throttle Assembly (PWX Engine) — Installation.

Special Tools:

- None

Consumable Material:

- Gasket — Between Turbocharger and Exhaust Throttle
- O-rings — Coolant Supply and Return Lines

OR

Perform VGT Turbocharger Actuator — Installation.

Special Tools:

- None

Consumable Material:

- None

17. Perform Exhaust Throttle Actuator Coolant Return Line — Installation.

Special Tools:

- None

Consumable Material:

- None

OR

Perform VGT Turbocharger Actuator Coolant Return Line — Installation.

Special Tools:

- None

Consumable Material:

- O-rings — Actuator Coolant Return Line

18. Perform Exhaust Throttle Actuator Coolant Supply Line — Installation.

Special Tools:

- None

Consumable Material:

- None

OR

Perform VGT Turbocharger Actuator Coolant Supply Line — Installation.

Special Tools:

- None

Consumable Material:

- O-rings — Actuator Coolant Return Line

19. Perform EGR Cooler Bracket — Installation.

Special Tools:

- None

Consumables:

- None

20. Perform EGR Cooler Assembly — Installation.

Special Tools:

- None

Consumables:

- None

21. Perform EGR Cooler Coolant Return Tube - Installation.

Special Tools:

- None

Consumable Material:

- None

22. Perform EGR Valve — Installation.

Special Tools:

- None

Consumable Material:

- Gasket (4) - EGR Valve - EGR Pipes

23. Perform EGR Flow Venturi Assembly (PVX Engine) — Installation.

Special Tools:

- None

Consumable Material:

- None

24. Perform Secondary Fuel Filter Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None

25. Perform Intake Manifold (PSX and PWX Engine) — Installation.

Special Tools:

- None

Consumable Material:

- Intake Manifold Gasket, EGR Valve Outlet Pipe Gasket, Air Inlet Pipe Seal

OR

Perform Intake Manifold (PVX Engine) — Installation.

Special Tools:

- None

Continued on next page

MK41968,000005E -19-18JUN12-5/14

Consumable Material:

- Intake Manifold Gasket

26. Perform Open Crankcase Ventilation System — Installation.

Special Tools:

- None

Consumable Material:

- Engine Oil 30W

27. Perform Thermostat Housing — Installation.

Special Tools:

- None

Consumable Material:

- Petroleum Jelly

28. Perform Alternator — Installation.

Special Tools:

- None

Consumable Material:

- None

29. Perform Fan Drive Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None

MK41968,000005E -19-18JUN12-6/14

30. Install pulley (B) and fan pulley belt (A).

31. Perform Fan Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None

32. Perform Wiring Harness — Installation.

Special Tools:

- None

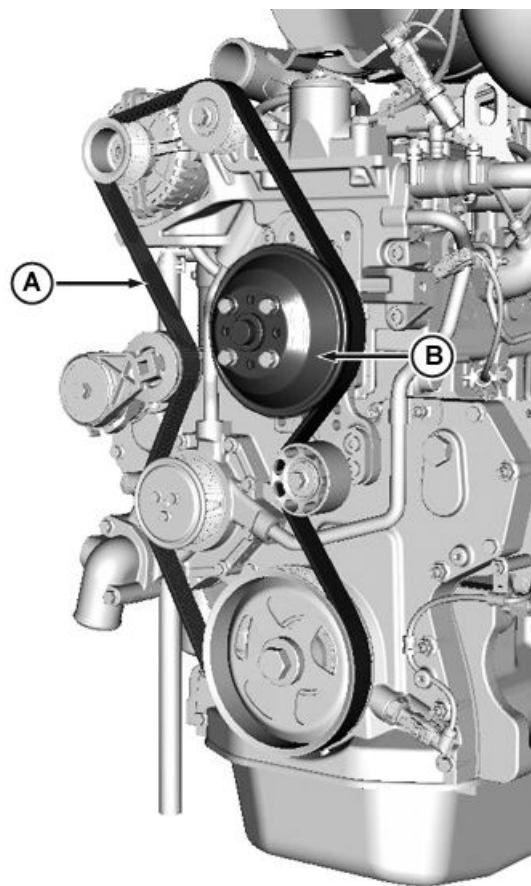
Consumable Material:

- None

33. Re-fill engine coolant.

A—Fan Pulley Belt

B—Pulley



Belt and Pulley

RG20526 —UN—27MAY11

Continued on next page

MK41968,000005E -19-18JUN12-7/14

Cylinder Head (PSX Engine) — Installation

IMPORTANT: ALWAYS thoroughly inspect new cylinder head gasket for possible manufacturing imperfections. Return any gasket that does not pass inspection.

Using Lint free towel, wipe cylinder block combustion surface to remove residual assembly fluids and other contaminants.

1. Cylinder Head Installation

Tools:

- JD244 — Lift Straps or
- JDG19 — Special Bracket

Consumables:

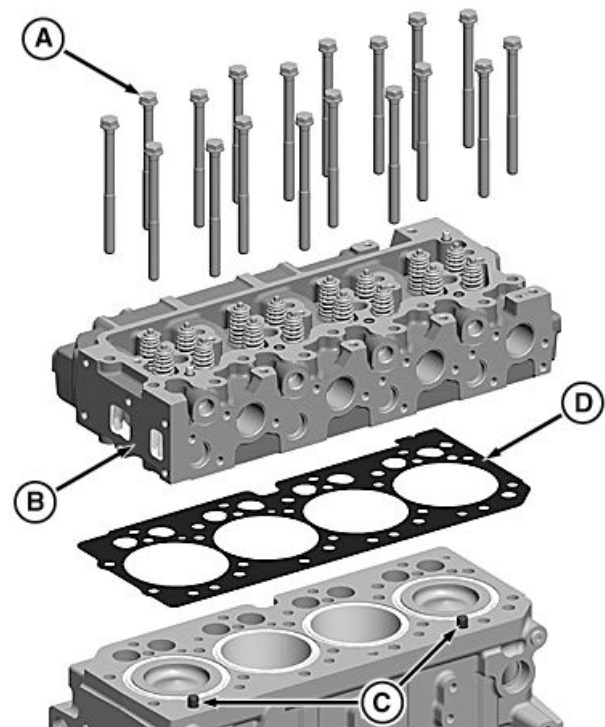
- Head Cap Screws, Head Gasket, SAE30 Diesel Engine Oil, O-rings

- Install two dowels (C) into the cylinder block deck surface.
- Install a new head gasket (D) on cylinder block. Do not use sealant on gasket; install dry.

IMPORTANT: If cylinder head is lowered onto cylinder block and the head is not positioned correctly on locating dowels, remove cylinder head and install a new gasket. **DO NOT** reposition cylinder head on the same gasket. The fire ring may be damaged.

NOTE: It may be beneficial to use additional guide pins to locate gasket and head to cylinder block combustion surface.

- Install cylinder head on gasket on cylinder block, using locating dowels as a guide. Make sure that



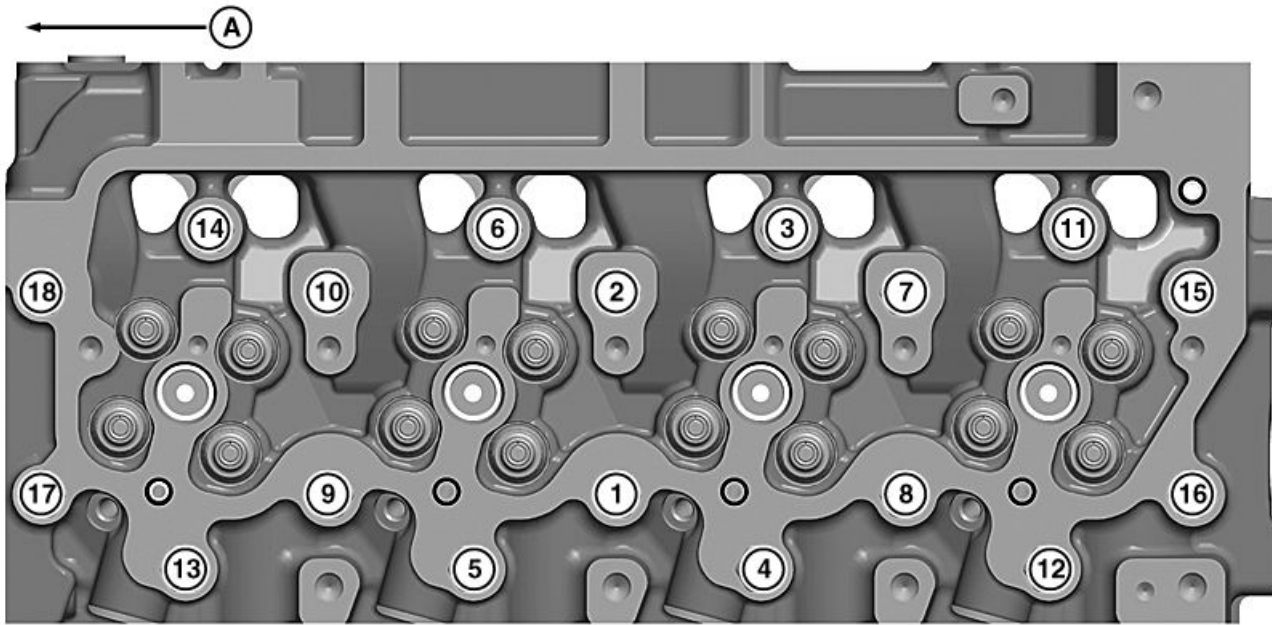
A—Cylinder Head Cap Screw (18)
B—Cylinder Head
C—Dowel (2)
D—Cylinder Head Gasket

head is positioned correctly over dowels and sits flat on cylinder block top deck.

Continued on next page

MK41968,000005E -19-18JUN12-8/14

RG20528A—UN—18JUN12



Head Cap Screw Tightening Sequence

RG20500 —UN—20MAY11

A—Front of Engine

- d. Dip entire cap screw in clean SAE30 diesel engine oil. Allow excess oil to drip off cap screws.

IMPORTANT: ALWAYS use NEW cap screws when installing cylinder head. Cap screws may be used only one time.

DO NOT use multi-viscosity oils to lubricate cap screws. SAE30 is recommended.

NOTE: Excess oil will not allow cap screws to reach proper clamp load using torque to yield strategy.

- e. Install 18 special cylinder head cap screws through head and gasket and into block.

NOTE: All head cap screws are the same length.

- f. Tighten cap screws 1 to 18 to the initial torque as per given specification. Follow the cap screw tightening sequence shown in the figure above.

Specification

Cylinder Head Cap
Screws—Initial Torque..... 100 N•m (74 lb -ft)

- g. After initial torque, apply second torque to specification in the same sequence as above.

Specification

Cylinder Head Cap
Screws—Second
Torque..... 150 N•m (110 lb-ft)

- h. Verify all torques (Allow 5 minutes for bolt elongation).

Specification

Cylinder Head Cap
Screws—Verify Torque..... 150 N•m (110 lb-ft)

- i. Using an oil proof pen, pencil, or marker, draw a line parallel to the crankshaft across the entire top of each cap screw head. This line will be used as a reference mark.

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MK41968,000005E -19-18JUN12-9/14

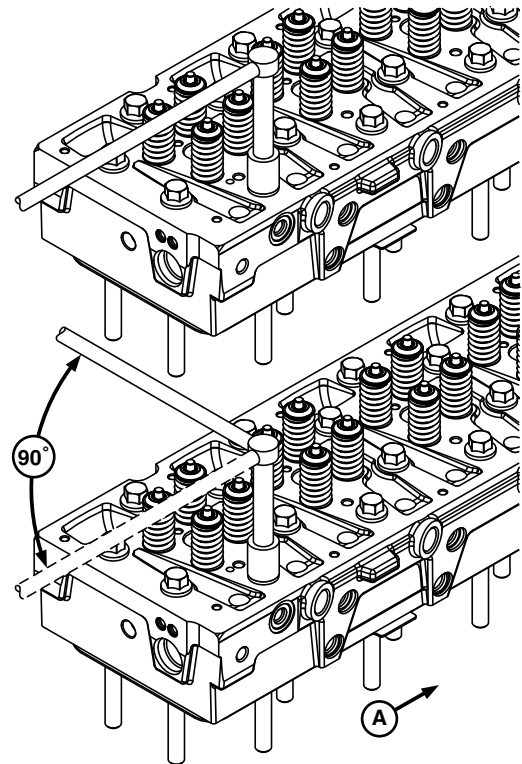
- j. Sequentially (start at cap screw No. 1 and proceed through cap screw No. 18) turn each cap screw 90°. Line on cap screw will be perpendicular to crankshaft.

Specification

Cylinder Head Cap
Screws—Torque Turn..... 90° (+10°/-0°)

NOTE: Double check line position on all 18 cap screws.

A—Front of Engine



Torque-to-Yield Cylinder Head Cap Screws

RG14067 —UN—29MAR05

Continued on next page

MK41968,000005E -19-18JUN12-10/14

2. If removed, perform Electronic Injectors — Installation.

Special Tools:

- None

Consumable Materials:

- Engine Oil or Petroleum Jelly

3. If removed, Perform Glow Plug — Installation

Special Tools:

- None

Consumable Materials:

- None

4. Install push rods.

5. Perform Rocker Arm Shaft Carrier Assembly — Installation.

Special Tools:

- None

Consumable Material:

- Loctite® 242 or Hylomar 760, Loctite® 243, Rocker Arm Shaft Carrier-to-Head Gasket

6. Unlock the flywheel by removing the flywheel timing pin.

7. Reconnect the injector wiring harness (D) to the injectors (E).

8. Reconnect glow plug harness connector (C).

9. Perform Injector Wiring Harness — Installation.

Special Tools:

- None

Consumable Material:

- Gasket, Loctite® 242

10. Perform Rocker Arm Cover — Installation.

Special Tools:

- None

Consumable Material:

- Rocker Arm Cover Gasket, O-ring

11. Install high-pressure injection lines.
See High-Pressure Injection Lines and Feed Tubes — Installation

Special Tools:

- None

Consumable Material:

- Petroleum Jelly, Engine Oil, Injection Lines, Side Feed Tubes

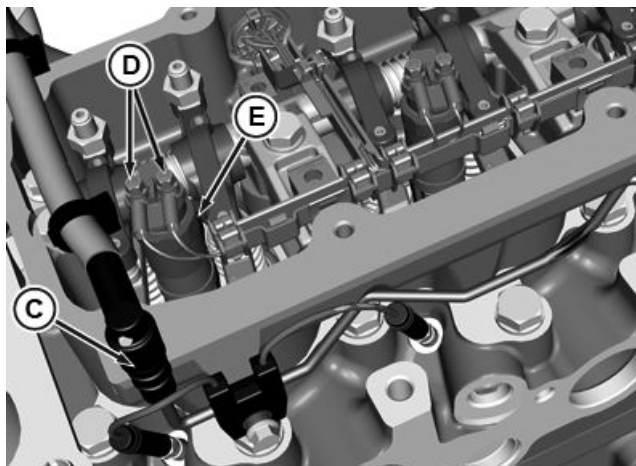
12. Perform Exhaust Manifold — Installation

Special Tools:

- None

Consumable Material:

- Exhaust Manifold Gaskets, Nuts, Studs (if removed)



Glow Plugs and Injectors Wiring Harness

C—Glow Plug Wiring Harness Connector
D—Injectors Wiring Harness
E—Injector (4)

13. Perform EGR Cooler Bracket — Installation.

Special Tools:

- None

Consumables:

- None

14. Perform EGR Cooler Assembly — Installation.

Special Tools:

- None

Consumables:

- None

15. Perform EGR Cooler Coolant Return Tube - Installation.

Special Tools:

- None

Consumable Material:

- None

16. Perform EGR Valve — Installation.

Special Tools:

- None

Consumable Material:

- Gasket (4) - EGR Valve - EGR Pipes

17. Perform Fixed Turbocharger — Installation.

Special Tools:

- None

Consumable Materials:

- Gasket — Between fixed turbocharger and exhaust manifold.

Continued on next page

MK41968,000005E -19-18JUN12-11/14

18. Perform Fixed Turbocharger Oil Drain Line — Installation.

Special Tools:

- None

Consumable Materials:

- O-ring
- Gasket — Between turbocharger and oil drain line

19. Perform Fixed Turbocharger Oil Supply Line — Installation.

Special Tools:

- None

Consumable Materials:

- O-ring
- Washers — Between banjo fitting and oil supply line

20. Perform Wastegate Turbocharger Assembly (PSX Engine) — Installation.

Special Tools:

- None

Consumable Materials:

- None

21. Perform Exhaust Throttle Assembly (PSX Engine) — Installation.

Special Tools:

- None

Consumable Materials:

- Gasket — Between turbocharger and exhaust throttle
- O-rings — Coolant return and supply fittings

22. Perform Exhaust Throttle Actuator Coolant Supply Line (PSX Engine) — Installation

Special Tools:

- None

Consumable Materials:

- O-rings — Coolant supply fittings

23. Perform Exhaust Throttle Actuator Coolant Return Line (PSX Engine) — Installation

Special Tools:

- None

Consumable Materials:

- O-rings — Coolant supply fittings

24. Perform Wastegate Turbocharger Oil Drain Line (PSX Engine) — Installation.

Special Tools:

- None

Consumable Materials:

- Gasket — Between turbocharger and oil drain line

25. Perform Wastegate Turbocharger Oil Supply Line (PSX Engine) — Installation.

Special Tools:

- None

Consumable Materials:

- O-rings — Oil supply line

26. Perform Turbocharger Interstage Air Pipe Assembly — Installation.

Special Tools:

- None

Consumable Materials:

- None

27. Perform Turbocharger Interstage Gas Tube — Installation.

Special Tools:

- None

Consumable Materials:

- Gaskets — Between interstage gas tube and turbochargers

28. Perform Secondary Fuel Filter Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None

29. Perform Intake Manifold (PSX and PWX Engine) — Installation.

Special Tools:

- None

Consumable Material:

- Intake Manifold Gasket, EGR Valve Outlet Pipe Gasket, Air Inlet Pipe Seal

30. Perform Open Crankcase Ventilation System — Installation.

Special Tools:

- None

Consumable Material:

- Engine Oil 30W

31. Perform Thermostat Housing — Installation.

Special Tools:

- None

Consumable Material:

- Petroleum Jelly

32. Perform Alternator — Installation.

Special Tools:

- None

Consumable Material:

- None

33. Perform Fan Drive Assembly — Installation.

Continued on next page

MK41968,000005E -19-18JUN12-12/14

Special Tools:

- None

Consumable Material:

- None

MK41968,000005E -19-18JUN12-13/14

34. Install pulley (B) and fan pulley belt (A).

35. Perform Fan Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None

36. Perform Wiring Harness — Installation.

Special Tools:

- None

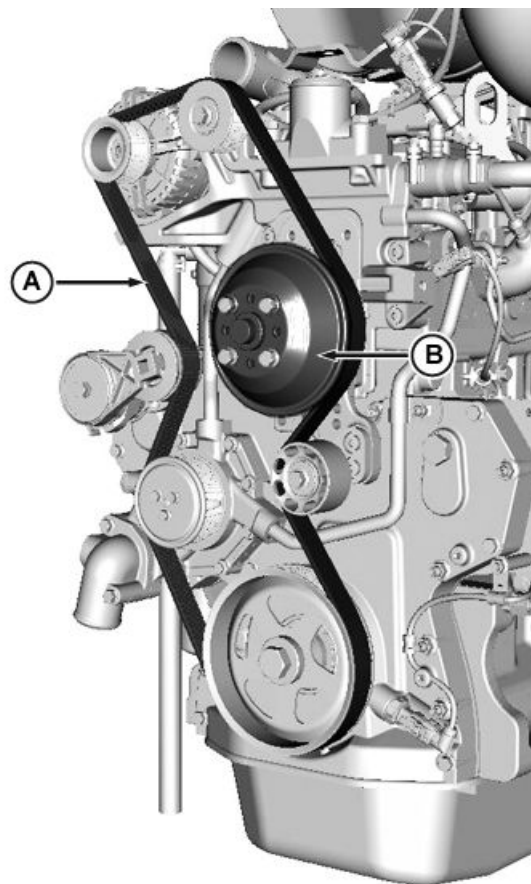
Consumable Material:

- None

37. Re-fill engine coolant.

A—Fan Pulley Belt

B—Pulley



Belt and Pulley

RG20526 —UN—27MAY11

MK41968,000005E -19-18JUN12-14/14

Cylinder Head — Removal

For PVX and PWX engines, perform Cylinder Head (PVX and PWX Engine) — Removal.

For PSX engine, perform Cylinder Head (PSX Engine) — Removal.

Cylinder Head (PVX and PWX Engine) — Removal

NOTE: *It is not necessary to remove engine from machine to service cylinder head on all applications. Refer to your Machine Technical Manual for engine removal procedure, if required.*

1. Drain coolant.
2. Perform Wiring Harness — Removal.
- Special Tools:
 - None
3. Perform Fan Assembly — Removal.
- Special Tools:
 - None
4. Remove fan pulley belt (A). Remove pulley (B).
5. Perform Fan Drive Assembly — Removal.

- Special Tools:
 - None
6. Perform Alternator — Removal, if necessary.
- Special Tools:
 - None
7. Perform Thermostat Housing — Removal.

- Special Tools:
 - None
8. Perform Open Crankcase Ventilation System — Removal.

- Special Tools:
 - None
9. Perform Intake Manifold (PSX and PWX Engine) — Removal.

- Special Tools:
 - None

OR

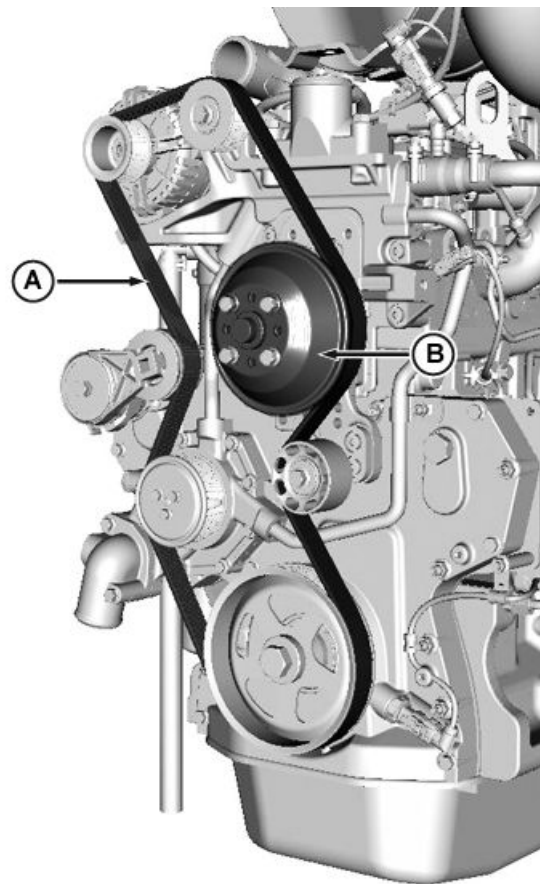
Perform Intake Manifold (PVX Engine) — Removal

- Special Tools:
 - None

10. Perform Secondary Fuel Filter Assembly — Removal.

- Special Tools:
 - None

11. Perform EGR Flow Venturi Assembly (PVX Engine) — Removal.



Belt and Pulley

- Special Tools:
 - None

12. Perform EGR Valve — Removal.

- Special Tools:
 - None

13. If not removed previously, perform EGR Cooler Coolant Return Tube — Removal.

- Special Tools:
 - None

14. Perform EGR Cooler Assembly — Removal.

- Special Tools:
 - None

15. Perform EGR Cooler Bracket — Removal.

- Special Tools:
 - None

16. Perform Exhaust Throttle Actuator Coolant Supply Line — Removal.

- Special Tools:
 - None

OR

Continued on next page

AS58880.0000D1C -19-15JUN12-1/6

Perform VGT Turbocharger Actuator Coolant Supply Line — Removal.

Special Tools:
• None

17. Perform Exhaust Throttle Actuator Coolant Return Line — Removal.

Special Tools:
• None

OR

Perform VGT Turbocharger Actuator Coolant Return Line — Removal.

Special Tools:
• None

18. Perform Exhaust Throttle Assembly (PWX Engine) — Removal.

Special Tools:
• None

19. Perform Wastegate Turbocharger Oil Supply Line — Removal.

Special Tools:
• None

OR

Perform VGT Turbocharger Oil Supply Line — Removal.

Special Tools:
• None

20. Perform Wastegate Turbocharger Oil Return Line — Removal.

Special Tools:
• None

OR

Perform VGT Turbocharger Oil Return Line — Removal.

Special Tools:
• None

21. Perform Wastegate Turbocharger Assembly — Removal.

Special Tools:
• None

OR

Perform VGT Turbocharger Assembly — Removal.

Special Tools:
• None

22. Perform Exhaust Manifold — Removal.

Special Tools:
• None

23. Remove high-pressure injection lines. See High-Pressure Injection Lines and Feed Tubes — Removal.

Special Tools:
• JDG11184—Injection Line Socket
• JDG11185—Side Feed Tube Puller

24. Perform Rocker Arm Cover — Removal.

Special Tools:
• None

25. Perform Injector Wiring Harness — Removal.

Special Tools:
• None

26. Lock flywheel at TDC.

NOTE: Do not disassemble rocker arm shaft from the rocker arm shaft carrier.

27. Remove rocker arm shaft carrier assembly with rocker arm shaft attached with the carrier. See Rocker Arm Shaft Assembly — Tear Down.

Special Tools:
• None

28. Remove push rods.

29. Perform Electronic Injectors - Removal.

Special Tools:
• JDG11186—Injector Removal Tool

Continued on next page

AS58880,0000D1C -19-15JUN12-2/6

30. Cylinder Head Removal

Special Tools:

- JD244 — Lift Straps
- JDG19 — Special Bracket

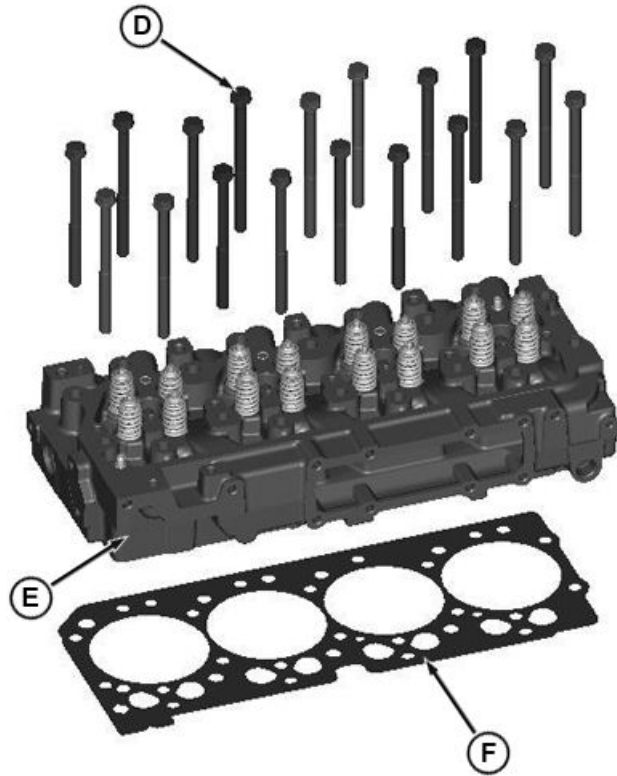
- Remove all cylinder head cap screws (D). Discard cap screws.

IMPORTANT: DO NOT use screwdrivers or pry bars between cylinder block and cylinder head to loosen head-to-block gasket seal.

- Lift cylinder head from block (E). If cylinder head sticks, use soft hammer to tap the cylinder head.
- Remove cylinder head gasket (F). Inspect for possible oil, coolant, or combustion chamber leaks. Also, check for evidence of incorrect or defective head gasket being used. Discard gasket.

NOTE: Do not rotate crankshaft with cylinder head removed unless all cylinder liners are secured with cap screws and large flat washers. See *Piston and Connecting Rod Assembly — Removal*.

D—Cylinder Head Cap Screw F—Cylinder Head Gasket
E—Cylinder Head



Cylinder Head Removal

Continued on next page

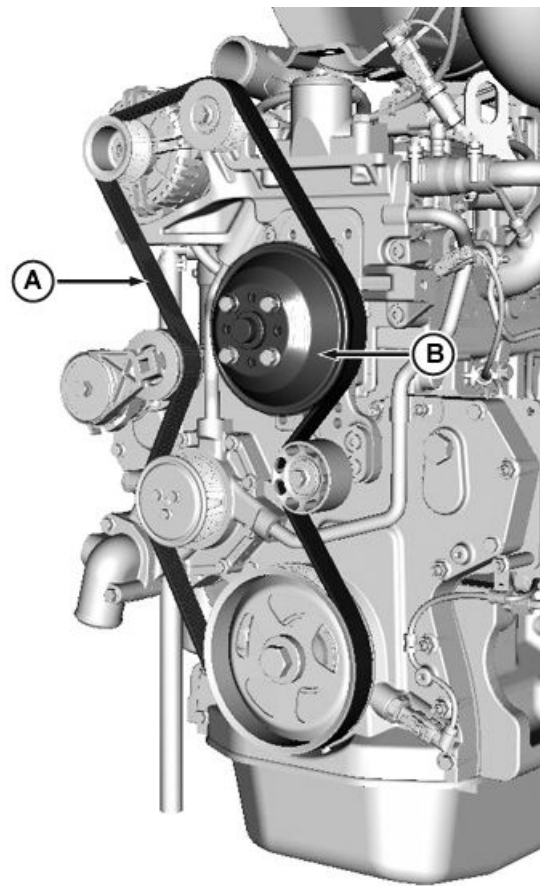
AS58880,0000D1C -19-15JUN12-3/6

RG20527 —UN—27MAY11

Cylinder Head (PSX Engine) — Removal

NOTE: It is not necessary to remove engine from machine to service cylinder head on all applications. Refer to your Machine Technical Manual for engine removal procedure, if required.

1. Drain coolant.
2. Perform Wiring Harness — Removal.
Special Tools:
• None
3. Perform Fan Assembly — Removal.
Special Tools:
• None
4. Remove fan pulley belt (A). Remove pulley (B).
5. Perform Fan Drive Assembly — Removal.
Special Tools:
• None
6. Perform Alternator — Removal, if necessary.
Special Tools:
• None
7. Perform Thermostat Housing — Removal.
Special Tools:
• None
8. Perform Open Crankcase Ventilation System — Removal.
Special Tools:
• None
9. Perform Intake Manifold (PSX and PWX Engine) — Removal.
Special Tools:
• None
10. Perform Secondary Fuel Filter Assembly — Removal.
Special Tools:
• None
11. Perform Turbocharger Interstage Gas Tube — Removal.
Special Tools:
• None
12. Perform Turbocharger Interstage Air Pipe Assembly — Removal.
Special Tools:
• None
13. Perform Wastegate Turbocharger Oil Supply Line (PSX Engine) — Removal.
Special Tools:
• None



Belt and Pulley

RG20526 —UN—27MAY11

14. Perform Wastegate Turbocharger Oil Drain Line (PSX Engine) — Removal.
Special Tools:
• None
15. Perform Exhaust Throttle Actuator Coolant Return Line (PSX Engine) — Removal.
Special Tools:
• None
16. Perform Exhaust Throttle Actuator Coolant Supply Line (PSX Engine) — Removal.
Special Tools:
• None
17. Perform Exhaust Throttle Assembly (PSX Engine) — Removal.
Special Tools:
• None
18. Perform Wastegate Turbocharger Assembly (PSX Engine) — Removal.
Special Tools:
• None
19. Perform Fixed Turbocharger Oil Supply Line — Removal.

Continued on next page

AS58880.0000D1C -19-15JUN12-4/6

Special Tools:

- None

20. Perform Fixed Turbocharger Oil Drain Line — Removal.

Special Tools:

- None

21. Perform Fixed Turbocharger — Removal.

Special Tools:

- None

Consumable Materials:

- Gasket — Between fixed turbocharger and exhaust manifold.

22. Perform EGR Valve — Removal.

Special Tools:

- None

23. If not removed previously, perform EGR Cooler Coolant Return Tube — Removal.

Special Tools:

- None

24. Perform EGR Cooler Assembly — Removal.

Special Tools:

- None

25. Perform EGR Cooler Bracket — Removal.

Special Tools:

- None

26. Perform Exhaust Manifold — Removal.

Special Tools:

- None

27. Remove high-pressure injection lines. See High-Pressure Injection Lines and Feed Tubes — Removal.

Special Tools:

- JDG11184—Injection Line Socket
- JDG11185—Side Feed Tube Puller

28. Perform Rocker Arm Cover — Removal.

Special Tools:

- None

29. Perform Injector Wiring Harness — Removal.

Special Tools:

- None

30. Lock flywheel at TDC.

NOTE: Do not disassemble rocker arm shaft from the rocker arm shaft carrier.

31. Remove rocker arm shaft carrier assembly with rocker arm shaft attached with the carrier. See Rocker Arm Shaft Assembly — Tear Down.

Special Tools:

- None

32. Remove push rods.

33. Perform Electronic Injectors - Removal.

Special Tools:

- JDG11186—Injector Removal Tool

Continued on next page

AS58880,0000D1C -19-15JUN12-5/6

34. Cylinder Head Removal

Special Tools:

- JD244 — Lift Straps
- JDG19 — Special Bracket

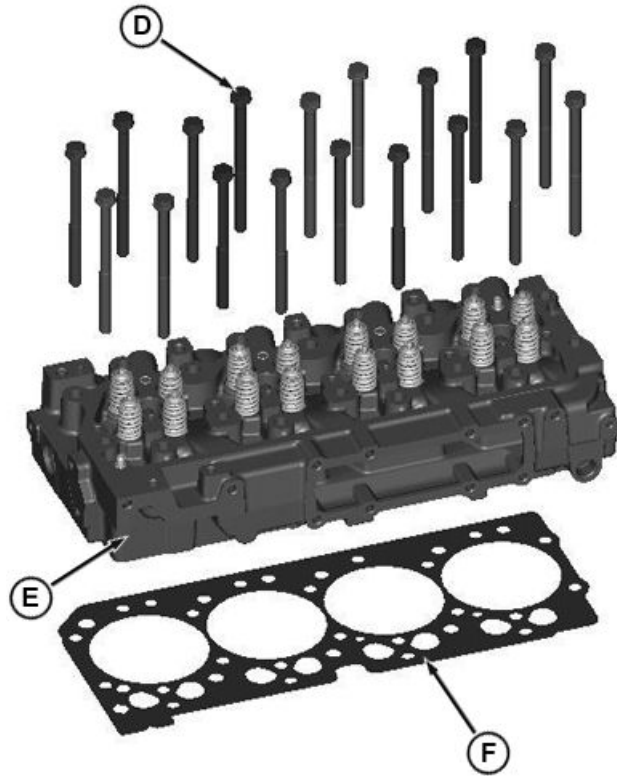
- Remove all cylinder head cap screws (D). Discard cap screws.

IMPORTANT: DO NOT use screwdrivers or pry bars between cylinder block and cylinder head to loosen head-to-block gasket seal.

- Lift cylinder head from block (E). If cylinder head sticks, use soft hammer to tap the cylinder head.
- Remove cylinder head gasket (F). Inspect for possible oil, coolant, or combustion chamber leaks. Also, check for evidence of incorrect or defective head gasket being used. Discard gasket.

NOTE: Do not rotate crankshaft with cylinder head removed unless all cylinder liners are secured with cap screws and large flat washers. See *Piston and Connecting Rod Assembly — Removal*.

D—Cylinder Head Cap Screw F—Cylinder Head Gasket
E—Cylinder Head



Cylinder Head Removal

AS58880,0000D1C -19-15JUN12-6/6

RG20527 —UN—27MAY11

Cylinder Head — Thickness Measurement

Measure head thickness from rocker arm shaft carrier gasket rail-to-combustion face.

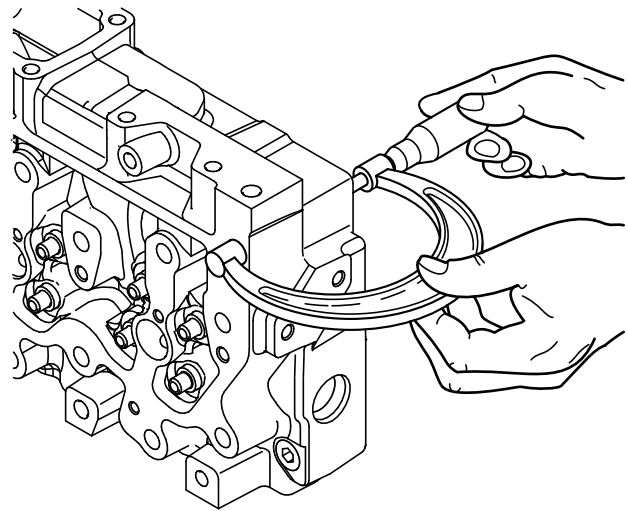
If cylinder head thickness is less than minimum allowable thickness, DO NOT attempt to resurface. Install a new cylinder head.

When resurfacing cylinder head, remove ONLY what is necessary to restore flatness.

Specification

New Cylinder Head—Thickness.....	104.87—105.13 mm (4.129—4.139 in.)
Minimum Acceptable Thickness	104.24 mm (4.104 in.)
Combustion Face Surface Finish (Surface Grind Only) (Ra)	0.7—3.2 micrometers (31—125 micro-in.)
Maximum Wave Depth	0.012 mm (0.0005 in.)
Maximum Material Removal for Resurfacing	0.76 mm (0.030 in.)

IMPORTANT: After resurfacing cylinder head, check for flatness, see *Cylinder Head — Flatness*



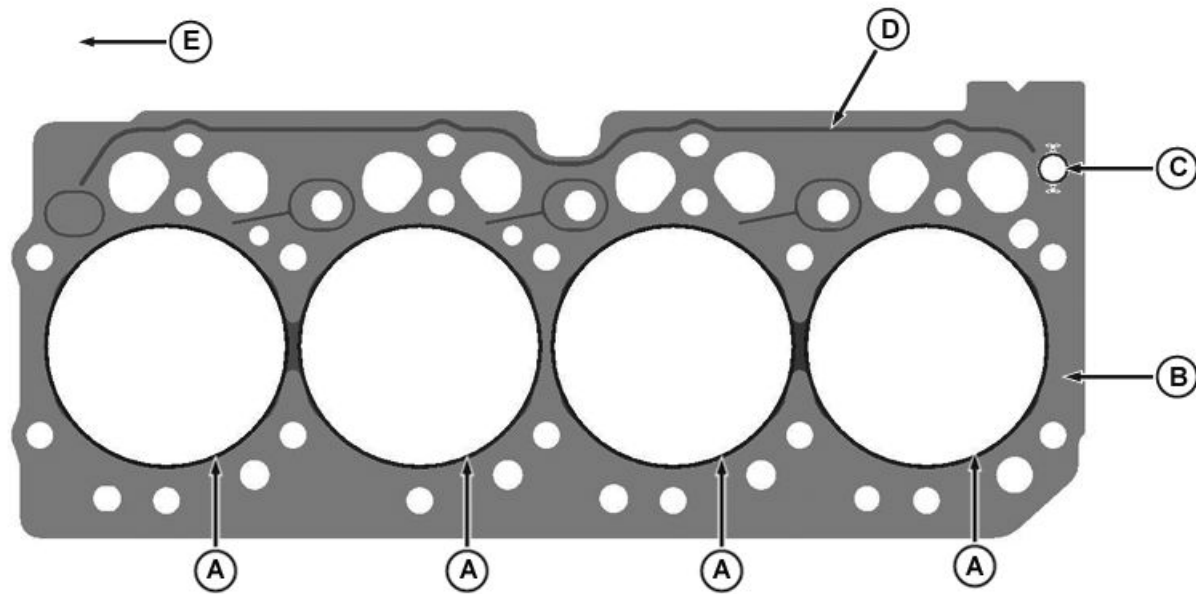
Cylinder Head Thickness Check

Check in this group. Also check surface finish on combustion face of head. Measure and record valve recess in cylinder head. See *Valve — Recess Measurement* in this group.

MK41968,0000061 -19-12JUL11-1/1

RG12377 —UN—11JUN02

Cylinder Head Gasket — Inspection



Head Gasket Inspection

A—Fire Rings
B—Gasket Body

C—Rocker Arm Oil Port
D—Elastomer Beading

E—Front of Engine

The following inspection procedures are recommended whenever a head gasket joint failure occurs, or when joint disassembly takes place.

1. Review historical data relating to machine operation, maintenance and repair, along with diagnostic observations. Note all areas requiring further inspection and analysis.

2. Perform Rocker Arm Cover — Removal.

Special Tools:

- None.

Consumables:

- None

Then check for presence of coolant in the oil.

3. Record head cap screw torques prior to removal. Upon removal, check cap screw length differences.

4. Perform Cylinder Head — Removal

Special Tools:

- JD244 — Lift Straps, or
- JDG19 — Special Bracket

Consumables:

- None

5. Observe surfaces of removed head gasket.

Examine fire rings (A) for the following:

- Fire rings severed/expanded/cracked/deformed.
- Adjacent body area burned/eroded.
- Fire rings pattern eccentric/contains voids.
- Discoloration of fire rings and adjacent body areas.
- Fire rings surfaces rough/abraded/channelled.

Examine gasket body (B) for the following:

- Combustion gas erosion paths or soot deposits originating at combustion seals.
- Extreme discoloration/hardening/embrittlement in localized areas.

NOTE: The O-ring sits in the rocker arm shaft carrier.

- O-ring seal missing/damaged in port area (C).
- Elastomer (D) missing/damaged.
- Oil or coolant paths from port areas.
- Localized areas of low compression.

RG20254 —UN—25APR11

MK41968,0000062 -19-25APR11-1/1

Fuel Injector Sleeves — Removal

IMPORTANT: If removing the sleeve with cylinder head on engine, insure area around the sleeve is clean and free of debris that could enter the fuel system or cylinder. Plug or cap injector bores in head when sleeve has been removed.

Special Tools:

- JDG10631 — Injector Sleeve Puller

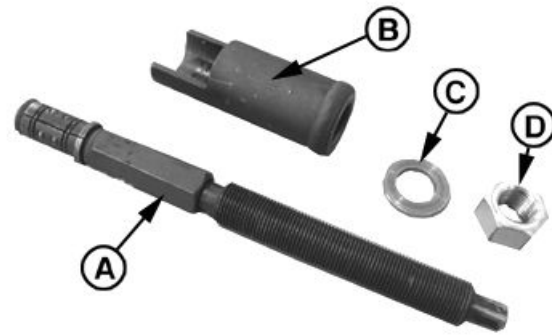
1. Perform Injectors — Removal.

Special Tools:

- JDG11186 — Injector Removal Tool

A—Forcing Screw
B—Spacer

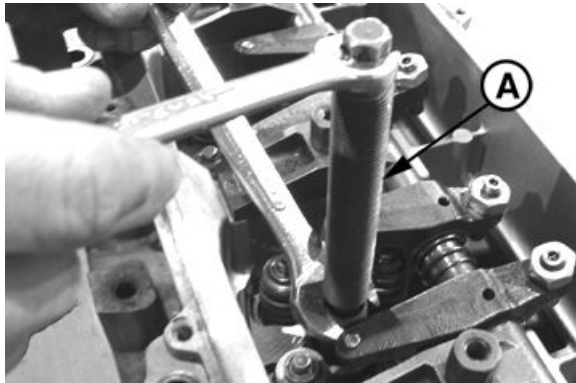
C—Flat Washer
D—Hex Nut



JDG10631 Injector Sleeve Puller

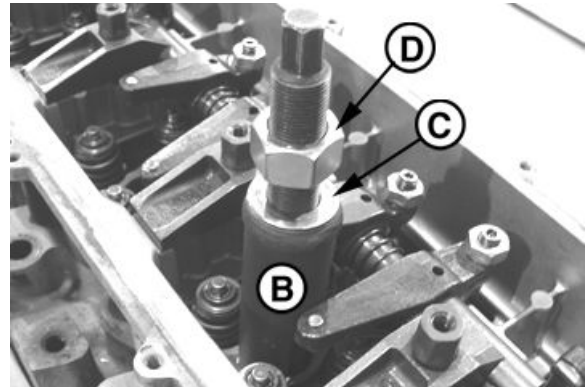
RG15754 —UN—09MAY08

MK41968,0000065 -19-27JUL11-1/2



Forcing Screw Installation

RG15758 —UN—09MAY08

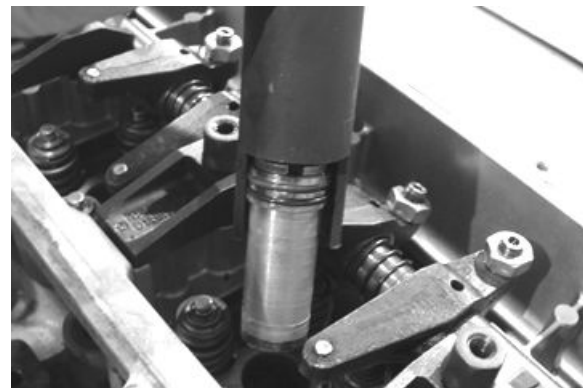


JDG10631 Tool in Position

RG15759 —UN—09MAY08

IMPORTANT: If removing the sleeve with cylinder head on engine, insure area around the sleeve is clean and free of debris that could enter the fuel system or cylinder.

2. Place forcing screw (A) into the injection nozzle sleeve. Insure the expander portion of the tool is installed so that the expander will locate securely on the sleeve inner diameter. Using a backup wrench, tighten the forcing screw.
3. Install spacer (B) on the forcing screw. Position the spacer with the cut-out facing into the cylinder head.
4. Install flat washer (C) and hex nut (D).
Turn hex nut until sleeve is loose.
5. Remove tool with sleeve.



Injector Sleeve Removal

A—Forcing Screw
B—Spacer

C—Flat Washer
D—Hex Nut

RG15760 —UN—09MAY08

MK41968,0000065 -19-27JUL11-2/2

Fuel Injector Sleeves — Installation

Special Tools:

- JDG1649A — Injector Sleeve Installer

Consumables:

- LOCTITE® 620 High Temperature Adhesive

IMPORTANT: If installing a new fuel injector nozzle sleeve when cylinder head is assembled to block, make sure piston is NOT at or near top dead center (TDC). Rotate engine until piston is at bottom dead center (BDC) or piston damage will result.

1. Support cylinder head so that the lower surface of the head is approximately 50 mm (2.0 in.) above work bench.
2. Apply LOCTITE® 620 (TY15941) to the side walls at the bottom of the fuel injector sleeve bore.

IMPORTANT: Do not remove or mix sleeve O-rings. Service sleeve is provided with O-rings installed on it. The upper O-ring is diesel fuel compatible while the lower one is coolant compatible. Both O-rings are identified by a different color and are not available as spare parts.

Do not use any petroleum based products to lubricate fuel injector sleeve O-rings or O-rings will swell.

3. Lubricate O-rings with liquid soap.
4. Position injector sleeve (C) over bore and place JDG1649A injector sleeve installer into sleeve.
5. Using a hammer, carefully strike the sleeve installation tool to drive the sleeve fully into the injector bore.
6. Perform Injectors — Installation.

Special Tools:

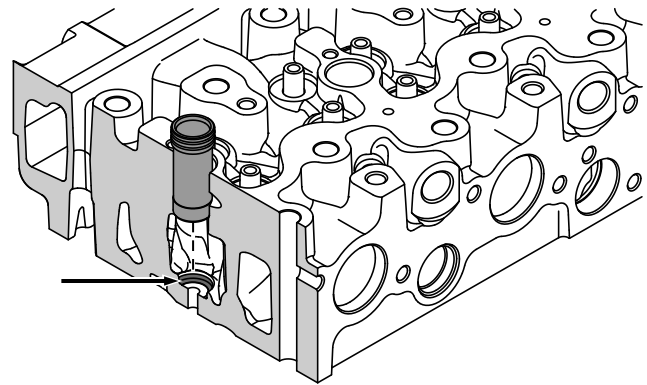
- None

Consumables:

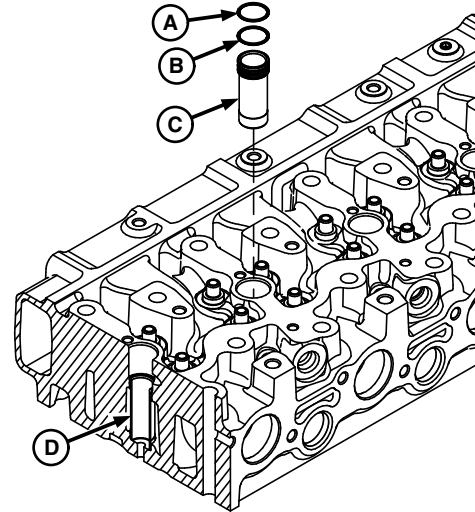
- None

A—Upper Green O-Ring
B—Lower Yellow O-Ring

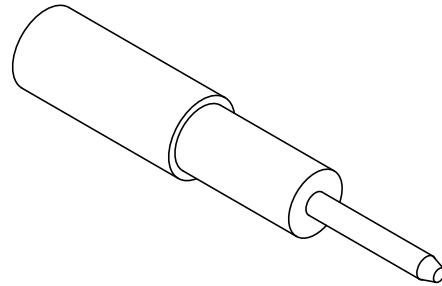
C—Sleeve
D—Installed sleeve



Apply Loctite to the Side Walls of the Bore



Fuel Injector Nozzle Sleeve



JDG1649A Injector Sleeve Installation Tool

LOCTITE is a trademark of Loctite Corp.

RG18716 —UN—09JUL10

RG12406 —UN—18JUN02

RG12411 —UN—19JUN02

MK41968,0000064 -19-25APR11-1/1

Glow Plug — Installation

Special Tools:

- None

Consumable Materials:

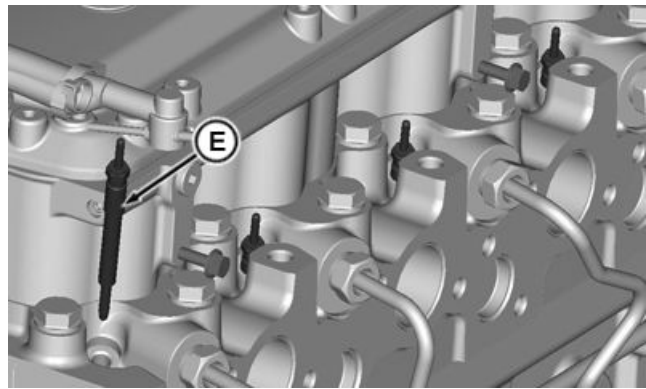
- None

NOTE: For clarity purpose, exhaust manifold and EGR are removed from the pictures.

1. Install 4 glow plugs (E) into the cylinder head. Torque to specification.

Specification

Glow Plugs—Torque..... 15 N•m (11 lb.-ft.)



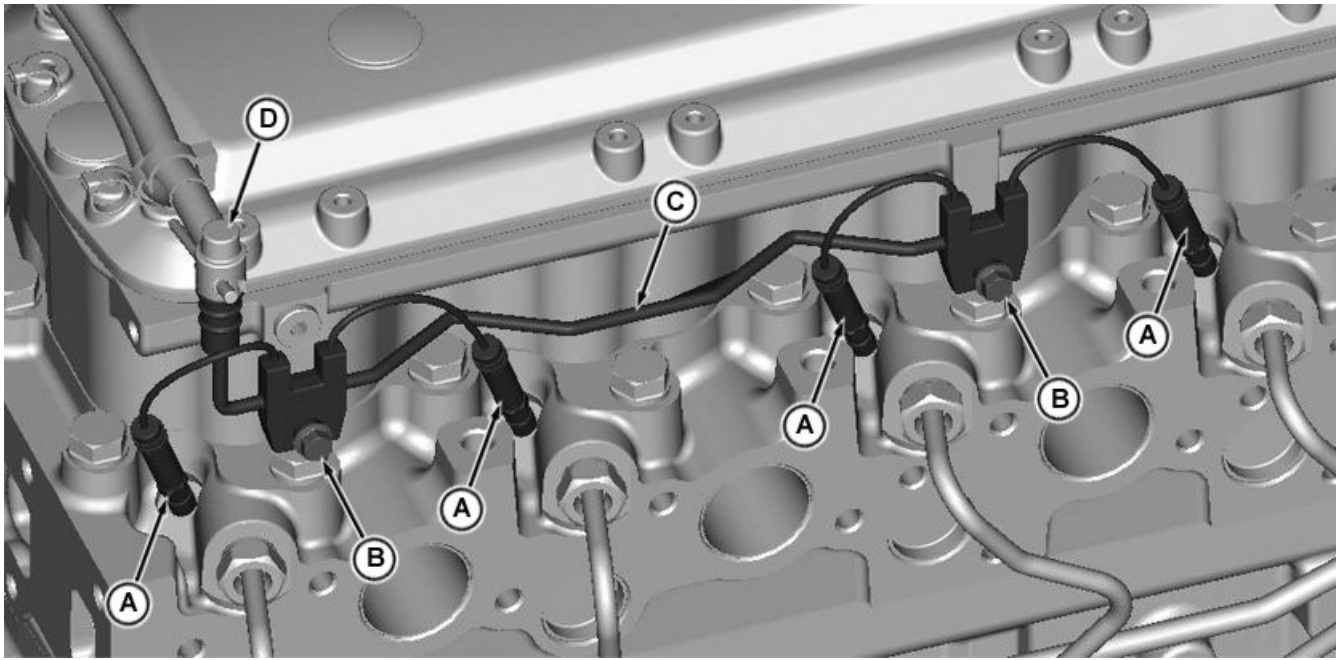
Glow Plugs Installation

E—Glow Plugs (4)

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MK41968,0000066 -19-24AUG11-1/2

RG20257 —UN—25APR11



Glow Plug Connectors Installation

- A—Connectors (4) C—Glow Plug Bus Bar
 B—Glow Plug Bus Bar Mounting D—Engine Wiring Harness
 Screw (2)

CAUTION: Bus bar should not come into contact with any other component.

NOTE: In some applications, only thermostat cover installation would be needed.

2. Assemble the glow plug bus bar (C) along with connectors to the side of the rocker arm carrier. Install the mounting screws (B). Tighten the screws to below specifications.

Specification

Glow Plug Bus
 Bar Mounting
 Screws—Torque..... 15 N•m (11 lb.-ft.)

3. Insert all the bus bar connectors (A) onto the glow plug terminals. Press on until the connector fully seats against the glow plug body.

4. If removed, perform Thermostat Housing — Installation.

Special Tools:
 • None

Consumables:
 • Soapy Water

5. Connect the glow plug bus bar to the engine wiring harness (D).

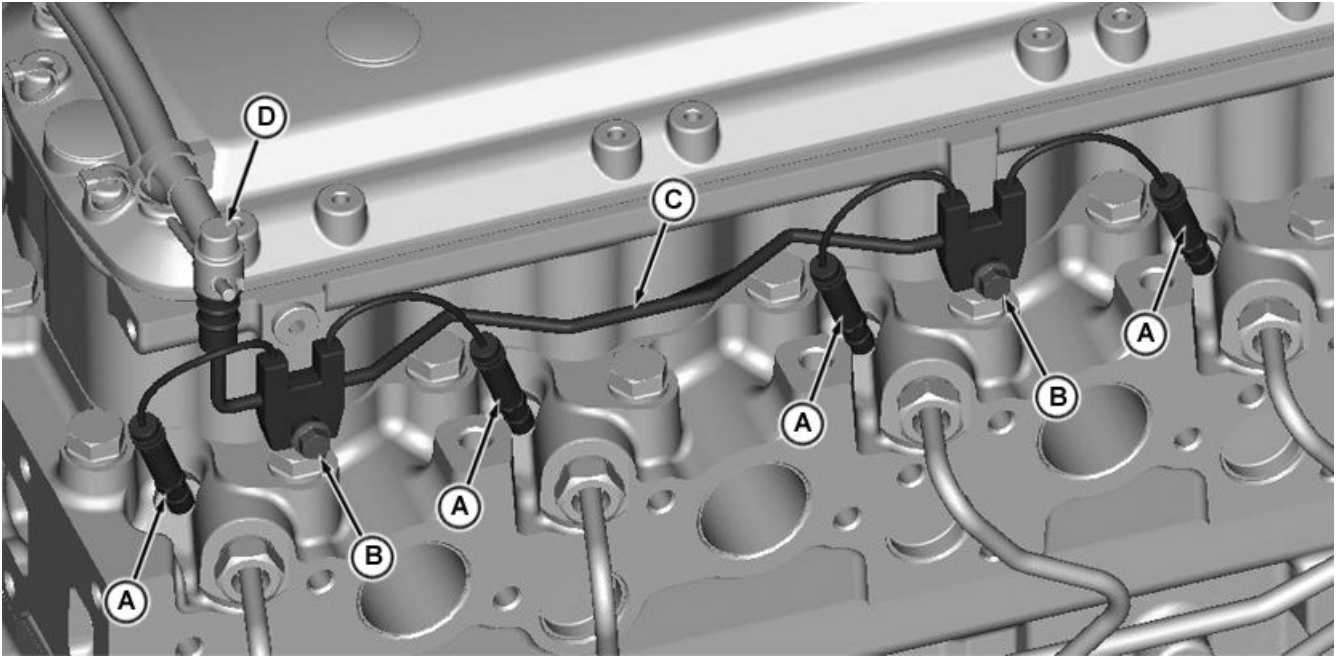
MK41968,0000066 -19-24AUG11-2/2

RG20256 —UN—25APR11

Glow Plug — Removal

• None

Special Tools:



Glow Plugs Connectors Removal

NOTE: For clarity purpose, exhaust manifold and EGR are removed from the pictures.

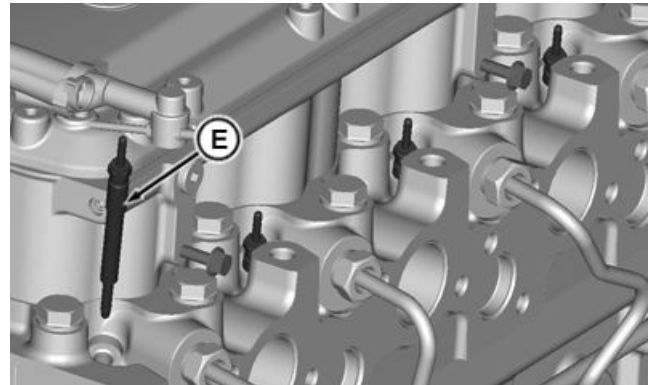
NOTE: Thermostat housing may need to be removed to access the cylinder number 1 glow plug. In some applications, removing only thermostat cover would be sufficient to access the cylinder number 1 glow plug.

1. If necessary, perform Thermostat Housing — Removal.

Special Tools:

• None

2. Disconnect the connectors (A) from the glow plug terminals.
3. Loosen the mounting screws (B) and uninstall the glow plug bus bar (C) from the rocker arm shaft carrier.
4. Disconnect the bus bar from the wiring harness (D).
5. Loosen and remove all glow plugs (E) from cylinder head.



Glow Plugs Removal

A—Connectors (4)
B—Glow Plug Bus Bar
Mounting Screw (2)
C—Glow Plug Bus Bar

D—Wiring Harness
E—Glow Plug (4)

MK41968,0000067 -19-25APR11-1/1

Glow Plug Bore — Cleaning and Inspection

Look for any burr or foreign particles trapped inside the glow plug bore with the help of torch light.

Clean glow plug bores with a plastic brush before repair

NOTE: A few drops of light oil or kerosene will help clean the bores.

MK41968,0000068 -19-10MAR11-1/1

Open Crankcase Ventilation Pressure Relief Valve — Maintenance

Special Tools:

- None

Consumable Material:

- Loctite® 242

1. Remove OCV pressure relief valve (A) from rocker arm cover (B). Clean and check condition of spring (A2) and plunger (A3). Replace the pressure relief valve if any of its part is damaged.
2. Remove duckbill valve (C).
3. Ensure that vent hole (D) is not plugged.
4. Apply a little Loctite® 242 to the plug threads.
5. Install pressure relief valve assembly (A) on the rocker arm cover (B). Tighten it to the specification.

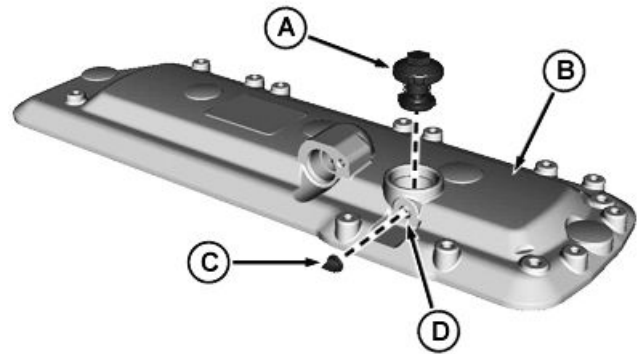
Specification

OCV Pressure Relief

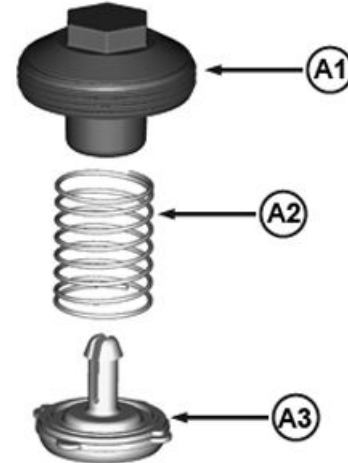
Valve—Torque..... 30 N•m (22 lb.-ft.)

6. Install duckbill valve (C) in the vent hole (D) and push it until it fits into the vent hole.

A—OCV Pressure Relief Valve	A1—Plug
B—Rocker Arm Cover	A2—Spring
C—Duckbill Valve	A3—Plunger
D—Vent Hole	



OCV Pressure Relief Valve



OCV Pressure Relief Valve Assembly

Loctite is a trademark of Henkel Corporation

RG20255 —UN—25APR11

RG18916 —UN—05AUG10

MK41968,0000069 -19-04OCT11-1/1

Push Rod — Cleaning and Inspection

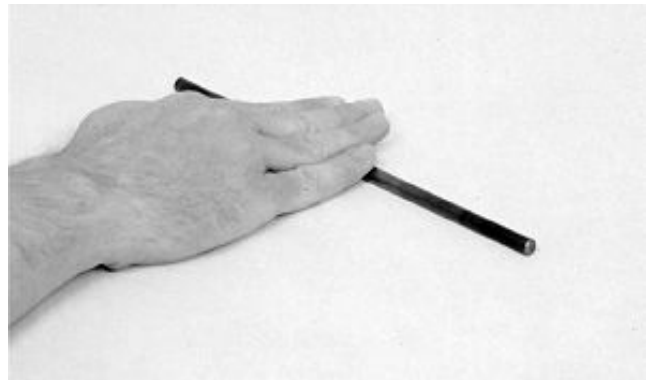
Special Tools:

- None

Consumables:

- None

1. Clean push rods with solvent and compressed air.
2. Check push rods for straightness by rolling on a flat surface.
3. Inspect contact ends for wear and damage.
4. Replace defective push rods.



Checking Valve Push Rods for Straightness

MK41968,000006A -19-10MAR11-1/1

T81233 —UN—01NOV88

Rocker Arm Cover — Inspection

1. Inspect the whole rocker arm cover for excessive wear and damage.
2. Inspect the OCV inlet port for wear and damage. Check the port for any foreign material trapped within it.



Rocker Arm Cover

RG20666 —UN—08JUL11

MK41968,000006C -19-25JUL11-1/1

Rocker Arm Cover — Installation

Special Tools:

- None

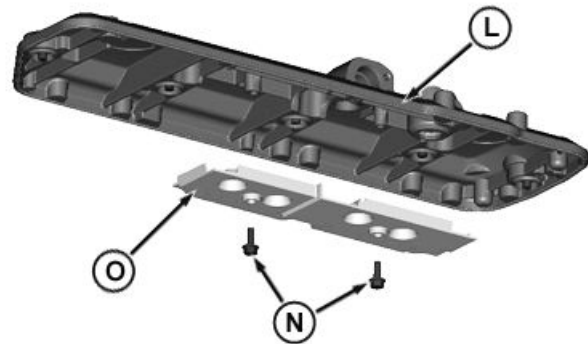
Consumable Material:

- Rocker Arm Cover Gasket, O-Ring

1. If removed, assemble baffle (O) to the bottom face of the rocker arm cover (L). Install cap screws (N) and tighten to the given specifications.

Specification

Baffle-to-Rocker	
Arm Cover Cap	
Screw—Torque.....	10 N•m (89 lb.-in.)



Baffle Installation

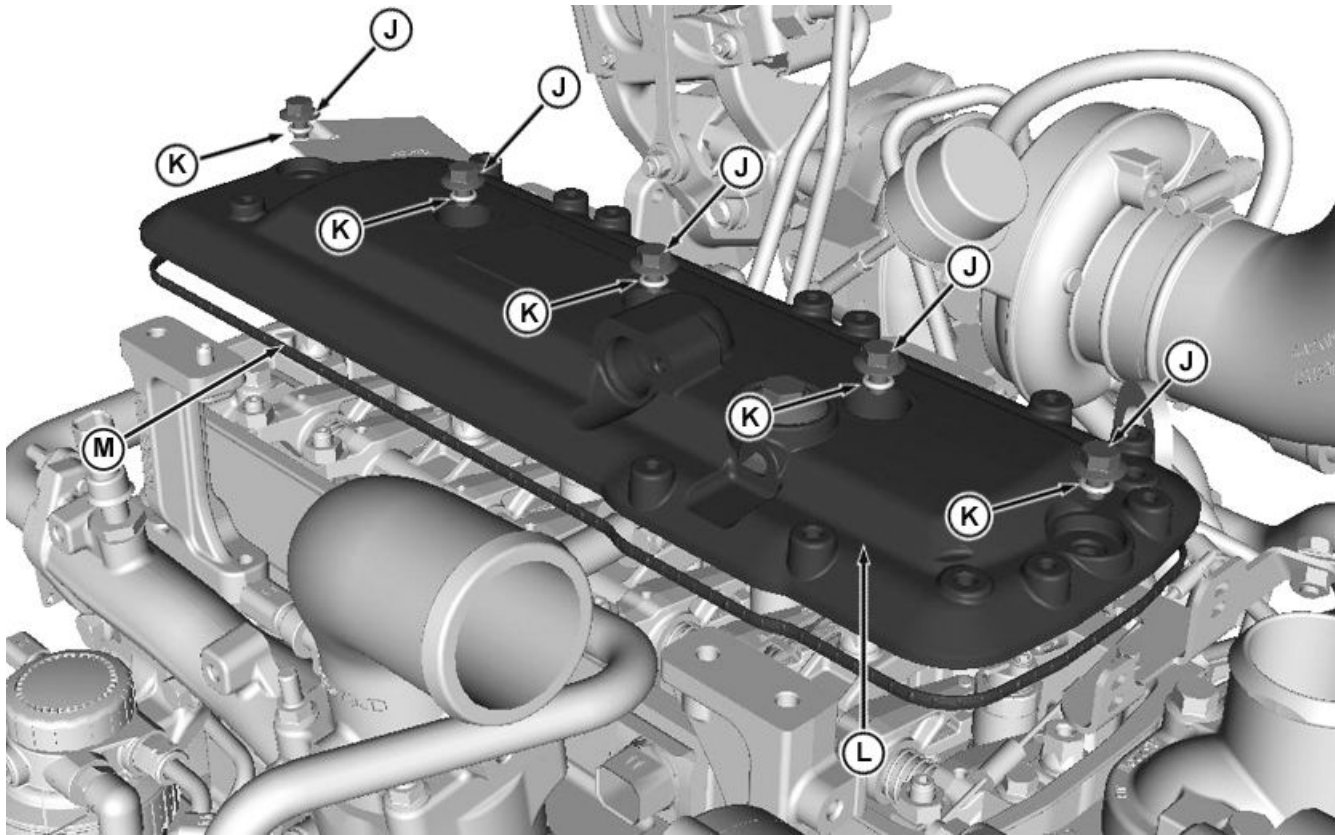
L—Rocker Arm Cover
N—Cap screws (2)

O—Baffle

RG20264 —UN—26APR11

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MK41968,000006D -19-20MAR12-1/7



Rocker Arm Cover Installation

J—Cap screws (5)
K—O-rings (5)
L—Rocker Arm Cover
M—Rocker Arm Cover Gasket

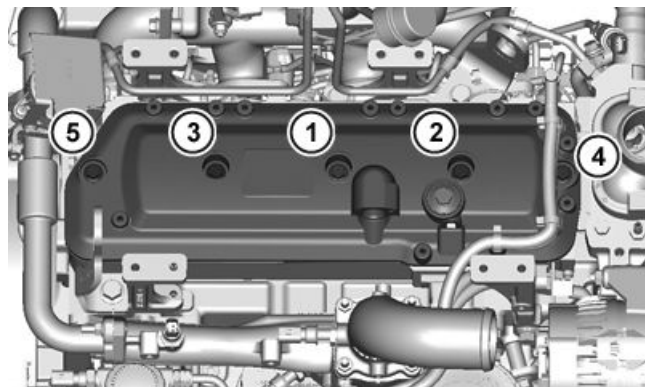
2. Install rocker arm cover (L) with gasket (M) onto the rocker arm carrier (L). Install cap screws (J) along with O-rings (K).

MK41968,000006D -19-20MAR12-2/7

3. Finger start the cap screws (J) through cover and gasket into carrier. Tighten rocker arm cover cap screws (J) to specifications, in the sequence as shown.

Specification

Rocker Arm
Cover-to-Cylinder Head
Cap Screw—Torque..... 11 N•m (97 lb.-in.)

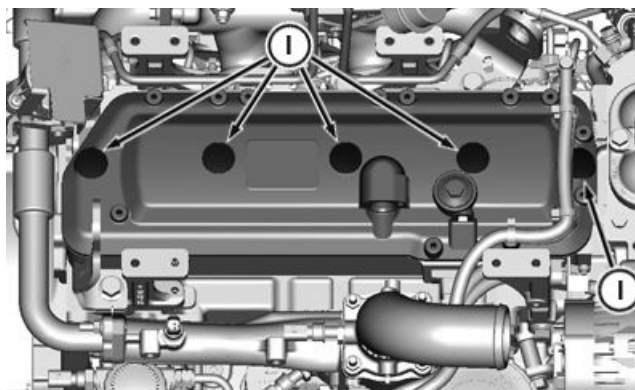


Torque Sequence

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MK41968,000006D -19-20MAR12-3/7

4. Install plugs (I).



Plugs Installation

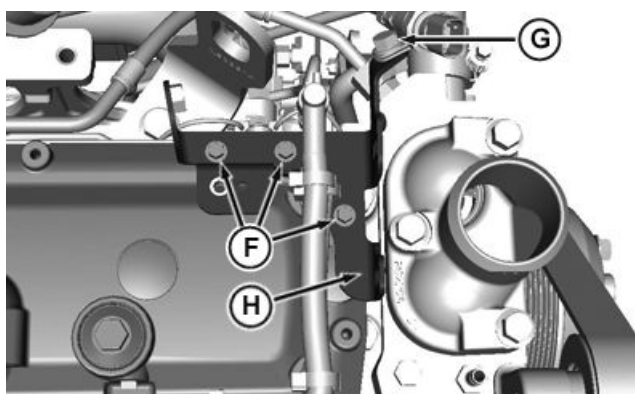
MK41968,000006D -19-20MAR12-4/7

RG20262 —UN—26APR11

5. Install wiring harness bracket (H) & cap screws (F).
Tighten cap screws (F).

F—Cap screws (2)
G—Rocker Arm Cover

H—Wiring Harness Bracket



Wiring Harness Bracket Installation

Continued on next page

MK41968,000006D -19-20MAR12-5/7

RG20261 —UN—26APR11

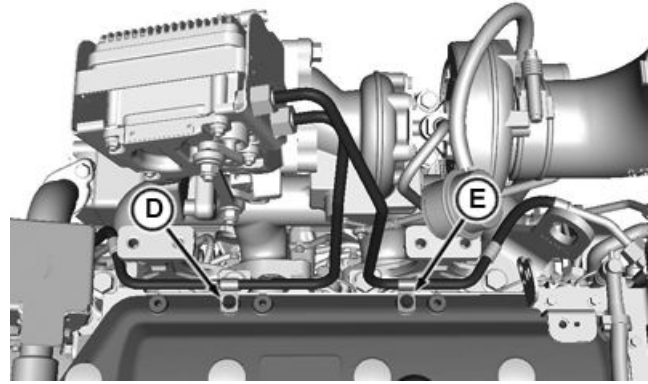
6. For Waste-gate Turbo Engines,
Install cap-screws (D,E) & clamps holding the exhaust
throttle actuator coolant lines.

OR

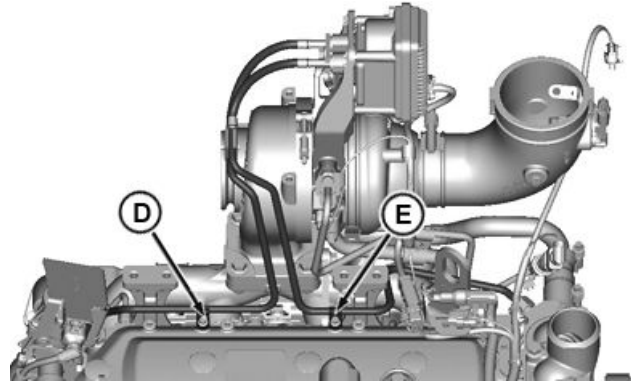
For VGT Engines,
Install cap-screws (D,E) & clamps holding the
turbocharger actuator coolant lines.

D—Cap screw

E—Cap Screw



Clamps Installation (Waste-gate Turbo Engine)



Clamps Installation (VGT Engine)

MK41968,000006D -19-20MAR12-6/7

RG20260 —UN—26APR11

RG20697 —UN—02AUG11

7. Install rocker arm cover-to-OCV filter housing tube (A)
to rocker arm cover using a new o-ring. Install clamps
(C), cap screw (B) and tighten it to specification:

Specification

Inlet Tube Cap
Screw—Torque..... 15 N•m (133 lb.-in.)

8. Install wiring harness.

See in Section 02 Group 110, Wiring Harness —
Routing.

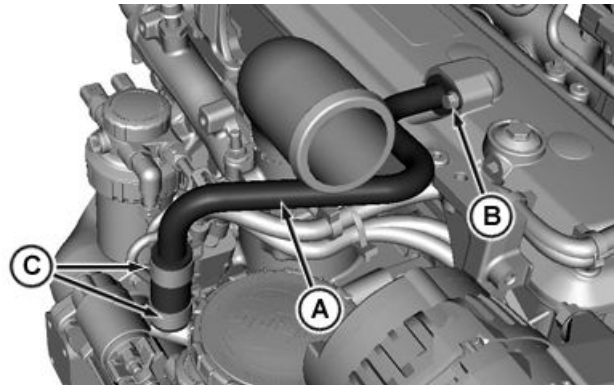
9. If removed, Perform Exhaust Filter, Brackets and
Piping — Installation.

Special Tools:

- None

Consumable Material:

- None



Rocker Arm Cover to OCV Filter Housing Tube

**A—Rocker Arm Cover to OCV
Filter Housing Tube** **C—Clamps**
B—Cap-screw

MK41968,000006D -19-20MAR12-7/7

RG20259 —UN—26APR11

Rocker Arm Cover — Removal

Special Tools:

- None

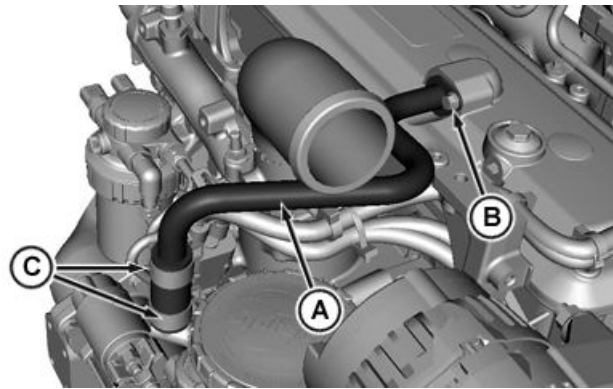
1. Perform Exhaust Filter, Brackets and Piping - Removal.

Special Tools:

- None

2. **Rocker Arm Cover Removal**

- a. Disconnect wiring harness from sensors to allow rocker arm cover removal.
- b. Loosen clamps (C). Remove cap-screw (B) & tube (A).



Rocker Arm Cover to OCV Filter Housing Tube

A—Rocker Arm Cover to OCV Filter Housing Tube
B—Cap-screw
C—Clamps

RG20259 —UN—26APR11

MK41968,000006E -19-20MAR12-1/6

NOTE: Depending upon applications, locations of clamps holding wiring harness or coolant lines may vary.

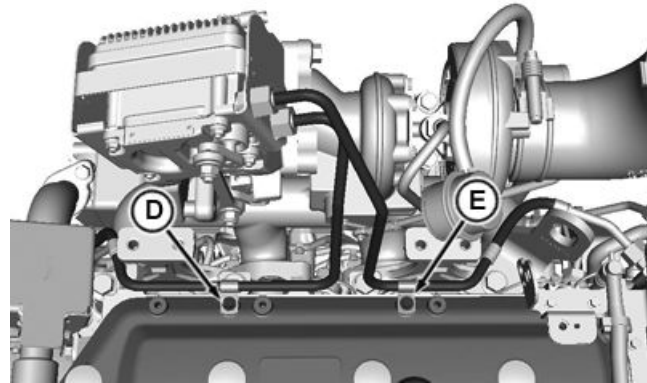
- c. For Waste-gate Turbo Engines, Remove cap-screws (D,E) & clamps holding the exhaust throttle actuator coolant lines.

OR

For VGT Engines, Remove cap-screws (D,E) & clamps holding the turbocharger actuator coolant lines.

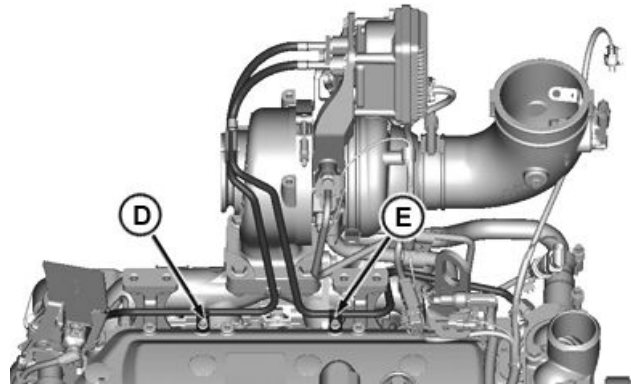
D—Cap screw

E—Cap Screw



Clamps Removal (Waste-gate Turbo Engine)

RG20260 —UN—26APR11



Clamps Removal (VGT Engine)

RG20697 —UN—02AUG11

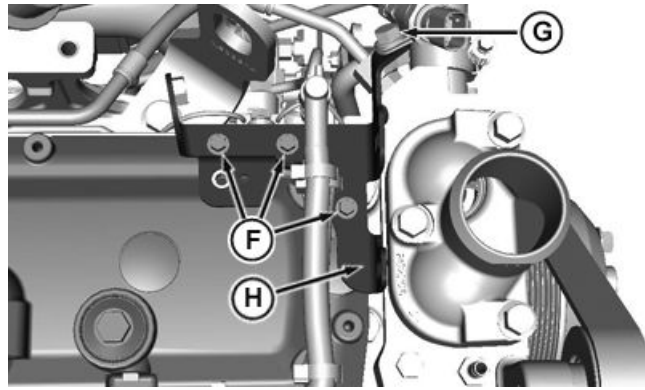
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MK41968,000006E -19-20MAR12-2/6

- d. Remove cap screws (F,G) and wiring harness bracket (H).

F—Cap screws (2)
G—Cap screw

H—Wiring Harness Bracket
Removal

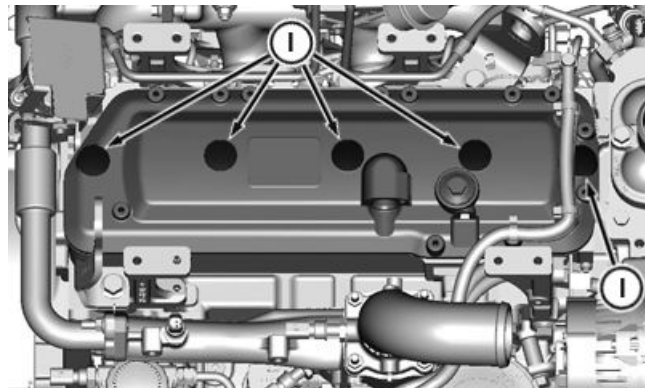


Wiring Harness Bracket Removal

MK41968,000006E -19-20MAR12-3/6

RG20261 —UN—26APR11

- e. Remove plugs (I).

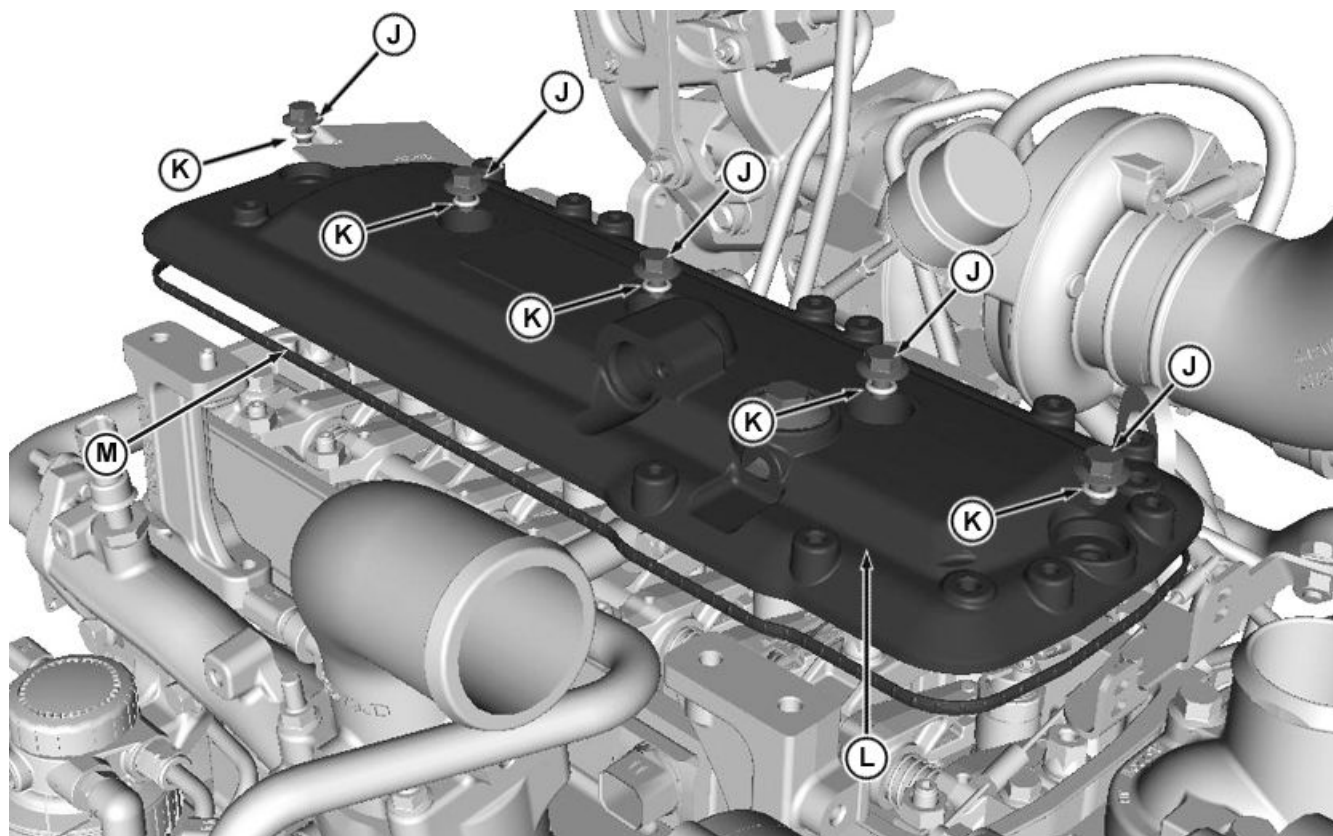


Plugs Removal

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MK41968,000006E -19-20MAR12-4/6

RG20262 —UN—26APR11



Rocker Arm Cover Removal

J—Cap screws (6)
K—O-rings (6)

L—Rocker Arm Cover
M—Rocker Arm Cover Gasket

f. Remove cap screws (J), O-rings (K) and rocker arm cover (L). Discard the rocker arm cover gasket (M).

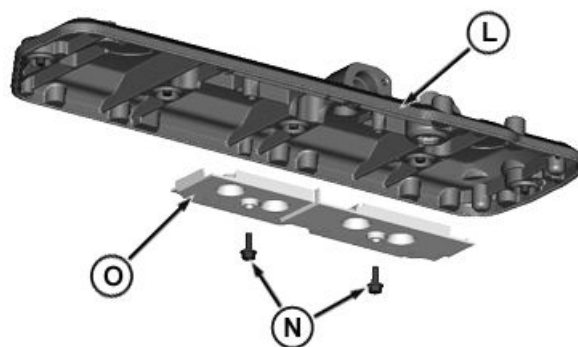
MK41968,000006E -19-20MAR12-5/6

RG20263 —UN—26APR11

g. If necessary, remove two cap screws (N) to disassemble baffle (O) from the rocker arm cover (L).

L—Rocker Arm Cover
N—Cap screws (2)

O—Baffle



Baffle Removal

MK41968,000006E -19-20MAR12-6/6

RG20264 —UN—26APR11

Rocker Arm Cover Vent Hose — Inspection

Tools:

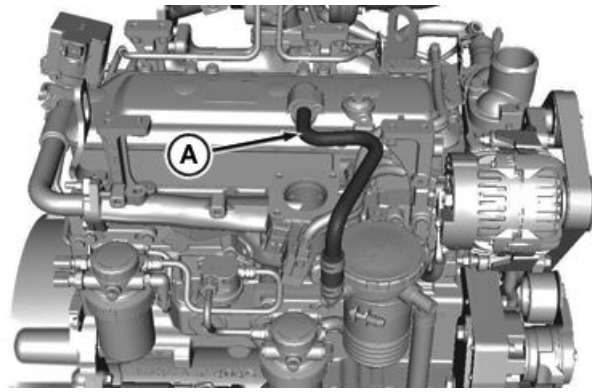
- None

Consumables:

- None

1. Check rocker arm cover vent hose (A) on rocker arm cover for bent, restricted, or damaged condition. Replace if necessary.
2. Clean hose if restricted.

A—Rocker Arm Cover Vent Hose



Rocker Arm Cover Vent Hose

RG20253 —UN—25APR11

MK41968,000006F -19-04OCT11-1/1

Rocker Arm Shaft Assembly — Inspect and Assemble

Special Tools:

- None.

Consumables:

- LOCTITE® 680.

Rocker Arm Shaft Assembly — Inspection

- Inspect all parts for wear or damage. Replace any parts that are damaged or not within specifications.

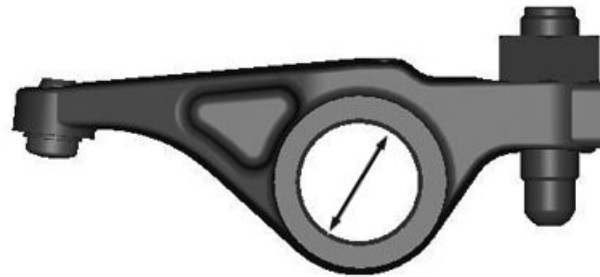
Rocker Arm Assembly—Specification

Spring—Compressed	
Height.....	23 mm @ 18—27 N (0.90 in. @ 4.04—6.07 lb-force)
Shaft—OD.....	19.998—20.038 mm (0.787—0.789 in.)
Wear Limit	19.988 mm (0.787 in.)
Rocker Arm Bore—ID.....	20.065—20.091 mm (0.790—0.793 in.)
Wear Limit	20.098 mm (0.791 in.)



Rocker Arm Shaft OD

RG7418 —UN—23NOV97



Rocker Arm Bore ID

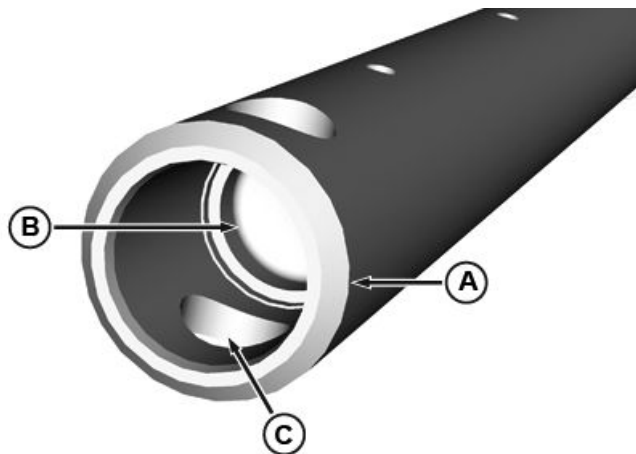
RG20486 —UN—24JUN11

LOCTITE is a trademark of Loctite Corp.

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MK41968,0000071 -19-29JUL11-1/3

Rocker Arm Shaft Assembly — Assemble



Plug Location at Front End

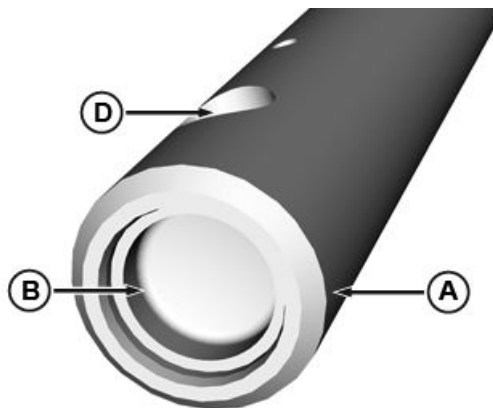
A—Shaft
B—End Plug

C—Front Holding Screw Hole

NOTE: The location of the plug (B) is after the holding screw hole (C) at the front end, and before the hole (D) at the rear end

1. If the end plugs (B) are removed, apply LOCTITE® 680 to the plugs before installing.

LOCTITE is a trademark of Loctite Corp.



Plug Location at Rear End

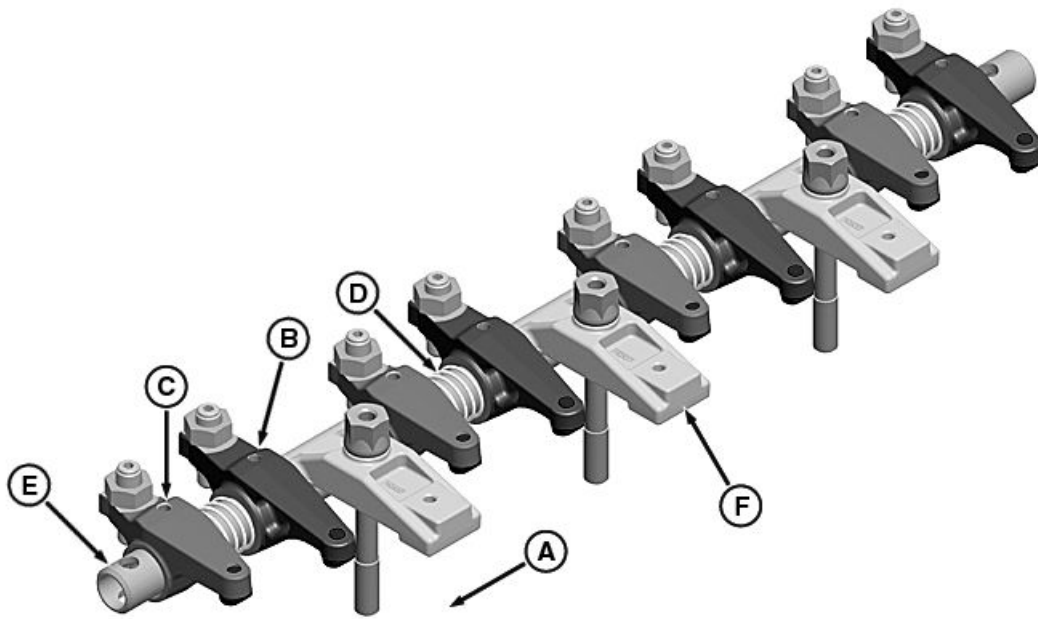
D—Rear Holding Screw Hole

2. Install plugs at both ends of the rocker shaft (A).

NOTE: The plugs will stop when it hits the shoulder inside the shaft.

Continued on next page

MK41968,0000071 -19-29JUL11-2/3



Rocker Arm Shaft Assembly

A—Front of Engine
B—Intake Rocker Arm (4)
C—Exhaust Rocker Arm (4)
D—Spring (4)
E—Rocker Arm Shaft
F—Rocker Arm Shaft Clamp (3)

IMPORTANT: From the front of engine, rocker arm assembly order is repeating; intake first, then exhaust.

3. Install exhaust rocker arm (C) at the most rear side of the engine.
4. Install spring (D) against the exhaust rocker arm.
5. Install intake rocker arm (B) on shaft against the spring.
6. Verify orientation of rocker arm shaft clamp (F); then install it onto the shaft. Slide the rocker arm shaft clamp onto shaft and position it against intake rocker arm.
7. Repeat steps 2 through 5 with next three sets of rocker arms.

MK41968,0000071 -19-29JUL11-3/3

RG20494 —UN—24JUN11

Rocker Arm Shaft Assembly — Tear Down

1. Perform Injector Wiring Harness — Removal.

Special Tools:

- None.

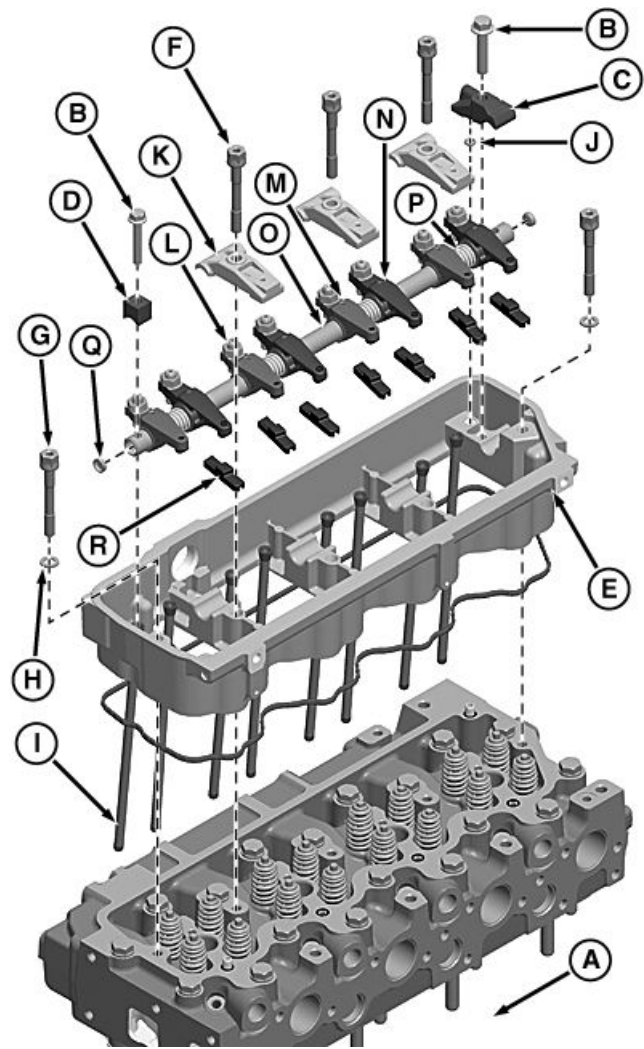
IMPORTANT: Loosen the 3 rocker arm shaft clamp cap screws and 2 other carrier-to-cylinder head cap screws equally and gradually, starting in the middle and working toward both front and rear. Stress on the rocker arm shaft must be relieved gradually across entire length of shaft.

2. Loosen the five cap screws (F and G).
3. Lift the rocker shaft carrier assembly (E) along with the rocker shaft assembly from the cylinder head.
4. Remove eight push rods (I) from cylinder block. Identify push rods to reinstall into same position as removed.
5. Remove the eight valve bridges (R) from top of the valves and set aside.
6. Remove two clamp cap screws (B), rear end clamp (C) and front end clamp (D).
7. Remove the rocker arm shaft clamp (K) along with the cap screws (F).
8. Lift the rocker shaft assembly from carrier (E) and put aside.

IMPORTANT: From front of engine, rocker arm assembly order is repeating; intake first, then exhaust.

IMPORTANT: When handling rocker arm assemblies, use caution to not damage the rocker arm “foot” area, which contacts the valve bridge. The ring securing the flexible foot should not be damaged to the point flexibility of the foot is impaired. Rocker arm foot must spin freely.

9. Loosen the eight rocker arm lock nuts (L).
10. Loosen the eight rocker arm adjusting screws one full turn.
11. Remove rocker arm assembly (M and N) along with the rocker arm retaining spring (P) from front or rear of shaft. Make note of the order of disassembly and orientation of rocker arm assemblies from shaft, depending if starting from front or rear of shaft.



Rocker Arm Shaft Assembly

- | | |
|----------------------------|------------------------------|
| A—Front of Engine | J—O-ring |
| B—Cap Screw (2) | K—Rocker Arm Shaft Clamp (3) |
| C—Rear End Clamp | L—Lock Nut (8) |
| D—Front End Clamp | M—Intake Rocker Arm |
| E—Rocker Arm Shaft Carrier | N—Exhaust Rocker Arm |
| F—Cap Screw (3) | O—Rocker Arm Shaft |
| G—Cap Screw (2) | P—Spring |
| H—Washer | Q—Plug (2) |
| I—Push Rod (8) | R—Valve Bridge (8) |

12. If necessary, remove the plugs (Q) from both ends of the shaft.

MK41968,0000070 -19-04OCT11-1/1

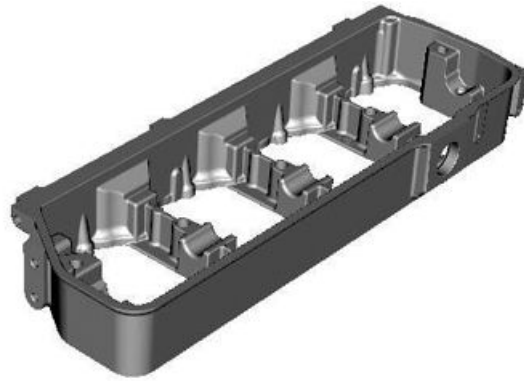
RG20495 —UN—24JUN11

Rocker Arm Shaft Carrier — Inspection

Special Tools:

- None

- Inspect entire rocker arm shaft carrier for cracks or damage.
- Inspect the casting curves for burr or any foreign material.
- Inspect rocker arm shaft carrier cap screws bores for burr or any foreign material.



Rocker Arm Shaft Carrier

MK41968,000006B -19-07OCT11-1/1

RG20251 —UN—22APR11

Rocker Arm Shaft Carrier Assembly — Installation

Rocker Arm Shaft Assembly — Installation (on Carrier)

Special Tools:

- None

Consumable Material:

- Loctite® 242 or Hylomar 760, Loctite® 243, Rocker arm shaft carrier-to-head gasket

NOTE: Rocker arm shaft assembly can be installed with carrier installed on the cylinder head or with carrier removed from cylinder head.

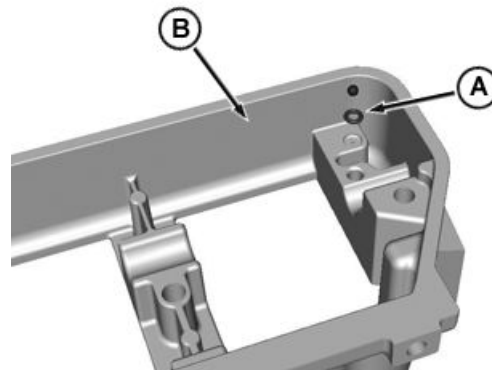
1. If necessary, install a new o-ring (A) on the rocker arm carrier (B) at appropriate location.
2. Install rocker arm shaft assembly (C) onto the carrier.
3. Install the rear end clamp (D) against the exhaust rocker arm on the extreme rear end of the shaft. Similarly, install the front end clamp (E) against the intake rocker arm on the extreme front end of the shaft.
4. Clean off old Loctite and apply new Loctite 243 to the cap screw (G) holding down the front clamp. Install cap screws (F) and (G) on rear and front end clamps respectively and tighten them as per specifications.

Specification

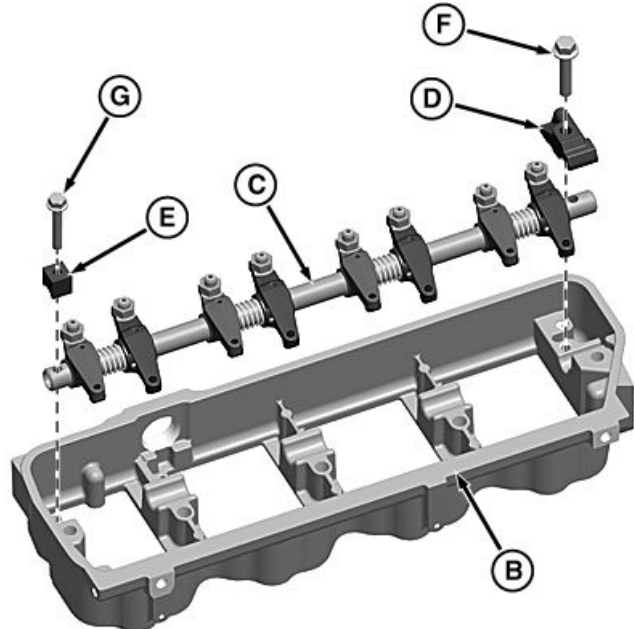
Cap Screw on Front End	
Clamp—Torque.....	30 N•m (22 lb.-ft.)
Cap Screw on Rear End	
Clamp—Torque.....	60 N•m (44 lb.-ft.)

A—O-ring
B—Rocker Arm Carrier
C—Rocker Arm Shaft Assembly
D—Rear End Clamp

E—Front End Clamp
F—Cap Screw
G—Cap Screw



Clamp O-ring Installation



Rocker Arm Shaft Assembly Installation

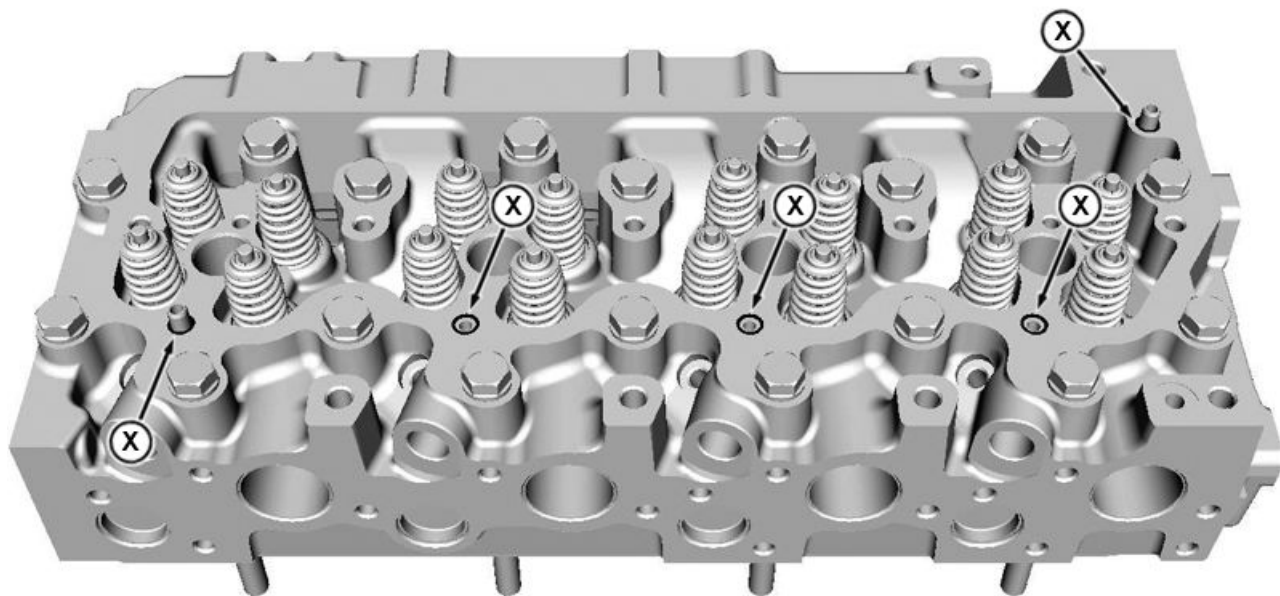
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MK41968,0000072 -19-28OCT11-1/5

RG20501 —UN—23MAY11

RG20496 —UN—24JUN11

Rocker Arm Shaft Carrier Assembly — Installation



RG20707 —UN—03AUG11

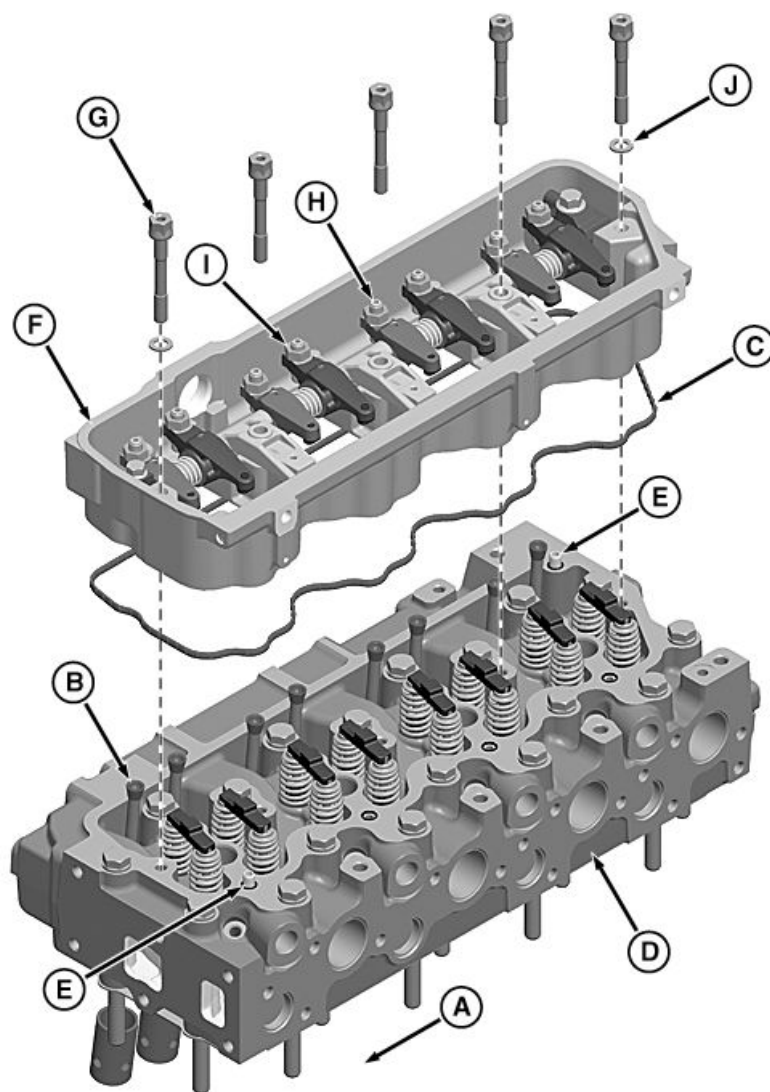
O-rings Installation

IMPORTANT: When applicable, install injectors **PRIOR** to installing rocker arm shaft assembly.

1. Install rocker carrier sealing O-rings (X).

Continued on next page

MK41968,0000072 -19-28OCT11-2/5



Rocker Arm Shaft Carrier Assembly — Installation

A—Front of the Engine
B—Push Rod (8)
C—Gasket

D—Cylinder Head
E—Dowel
F—Rocker Arm Shaft Carrier Assembly

G—Cap Screw (5)
H—Lock Nut (8)
I—Adjusting Screw

J—Washer (2)

2. Install rocker arm shaft carrier-to-head gasket (C) over the dowels (E) into the groove on the bottom of the carrier.
3. Place a push rod (B) into each follower with ball end towards follower.
4. Align carrier assembly (F) onto the hollow dowels in the head. Use rubber mallet to remove gap between the carrier and the head.

NOTE: Make sure old thread sealant is cleaned off from the carrier cap screw before applying the new loctite.

5. Apply Loctite® 242 or Hylomar 760 on the first rocker shaft carrier to cylinder head cap screw at the front of the engine.
6. Install five cap screws (G).

IMPORTANT: Ensure that the push rod sockets are fully engaged into the mating screw.

Continued on next page

MK41968,0000072 -19-28OCT11-3/5

RG20497 —UN—05AUG11

7. Torque the five cap screws to given specification using the sequence shown.

Specification

Rocker Arm Shaft Strap
Cap Screws -5—Torque..... 60 N•m (44 lb.-ft.)

8. Set valve bridges on top of the valves. The part number should be toward the front side of the engine.

NOTE: Verify that the valve bridges are fully seated on the valves before setting lash.

9. Tighten lock nut (I). For adjusting the valve clearance, perform Valve — Clearance Adjustment.

Special Tools:

- None

Consumable Material:

- None

10. Perform Injector Wiring Harness — Installation.

Special Tools:

- None

Consumable Material:

- None

11. Perform Rocker Arm Cover — Installation.

Special Tools:

- None

Consumable Material:

- Mounting Gasket

12. If removed, install lifting brackets on left side of the engine.

13. **For PWX engine:**

Perform Exhaust Throttle Actuator Coolant Supply Line — Installation.

Special Tools:

- None

Consumable Material:

- Adapter Fitting O-rings

14. **For PWX engine:**

Perform Exhaust Throttle Actuator Coolant Return Line — Installation

Special Tools:

- None

Consumable Material:

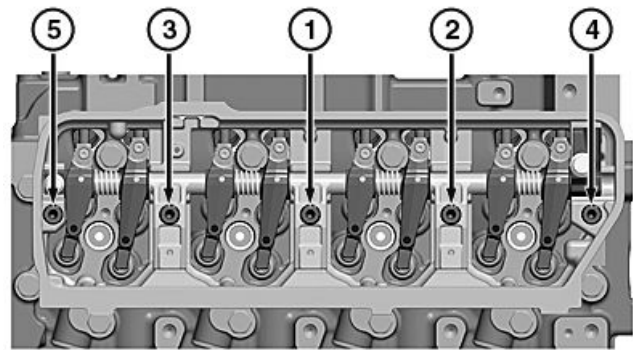
- Adapter Fitting O-rings

15. **For PVX engine:**

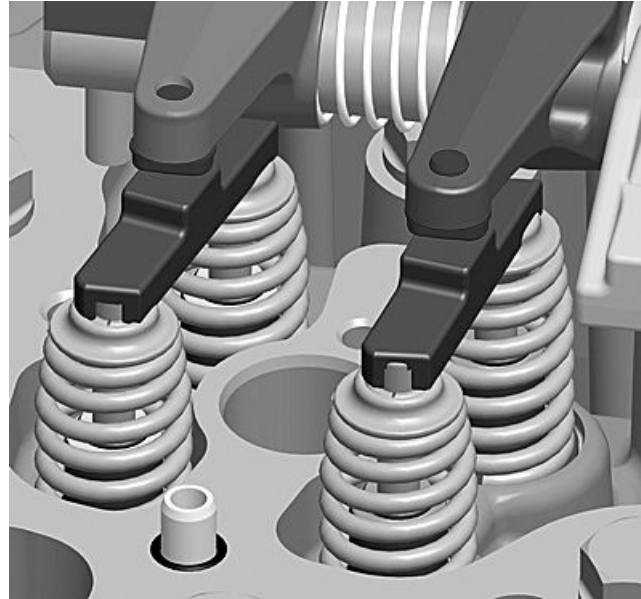
Perform VGT Turbocharger Actuator Coolant Supply Line.

Special Tools:

- None



Rocker Arm Shaft Assembly Torque Sequence



Valve Bridge Orientation

Consumable Material:

- Actuator Port O-ring, Adaptor Fitting O-ring

16. **For PVX engine:**

Perform VGT Turbocharger Actuator Coolant Return Line.

Special Tools:

- None

Consumable Material:

- Actuator Port O-ring, Adaptor Fitting O-ring

17. Perform EGR Valve — Installation

Special Tools:

- None

Consumable Material:

- None

18. Perform Wiring Harness — Installation.

Special Tools:

- None

Continued on next page

MK41968,0000072 -19-28OCT11-4/5

Consumable Material:

• None

MK41968,0000072 -19-28OCT11-5/5

Valve — Assembly Removal

Special Tools:

- JDE138 — Valve Spring Compressor

Consumables:

- None

1. Perform Cylinder Head — Removal.

Special Tools:

- JD244 — Lift Straps
- JDG19 — Special Bracket

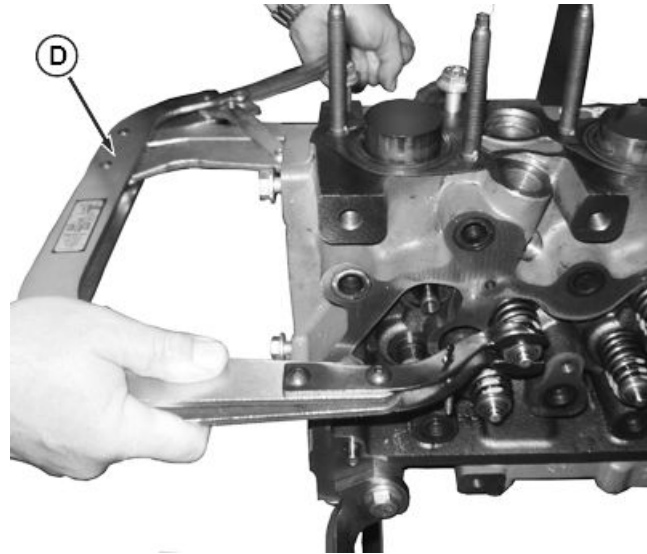
2. **Valve — Assembly Removal**

NOTE: Identify all parts for assembly in same location.
A small magnet may be used to aid removal of valve retainer locks.

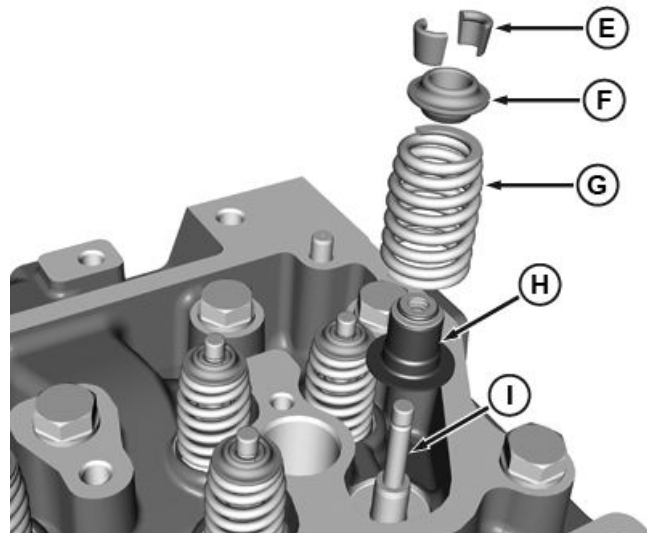
- a. Compress valve spring (G) using JDE138 — valve spring compressor (D) as shown.
- b. With spring compressed, remove keepers (E).
- c. Remove valve spring compressor from the head.
- d. Remove rotator (F) and valve spring (G).
- e. Using a screw driver as a lever, carefully pry seal (H) from cylinder head. Remove valve (I) from the cylinder head.
- f. Repeat procedure on remaining valves.

D—JDE138 Valve Spring
Compressor
E—Keepers
F—Rotator

G—Valve Spring
H—Seal
I— Valve Stem



Valve Assembly — Removal



Valve Assembly

RG18711—UN—22JUN10

RG18322—UN—18JUN10

MK41968,0000073 -19-27JUL11-1/1

Valve — Cleaning and Inspection

Special Tools:

- None

Consumables:

- None

1. Hold each valve firmly against a soft wire wheel on a bench grinder.
2. Make sure all carbon is removed from valve head, face and stem. Polish valve stem with steel wool or crocus cloth to remove scratch marks left by wire brush.

IMPORTANT: Any carbon left on valve stem will affect alignment in refacer if valves need to be refaced.

3. Carefully inspect valves, valve stems, stem tips and keepers groove (A). Replace worn and damaged valves in pairs.

NOTE: Exhaust valves are identified with “E” mark on cast impression on the valve face; intake valves are identified with “I” mark on cast impression on the valve face.



Keepers Groove

A—Keepers Groove

Exhaust valve head is non-magnetic.

RG18725—UN—25JUN10

MK41968,0000074 -19-10MAR11-1/1

Valve — Clearance Adjustment

Tools:

- JDG820, JDG10576 or JDE83—Flywheel Turning Tool
- JDG1571—Flywheel Timing Pin

Consumable Material:

- None

CAUTION: To prevent accidental starting of engine while performing valve adjustments, always disconnect **NEGATIVE (—)** battery terminal.

IMPORTANT: Valve clearance **MUST BE** checked and adjusted with engine **COLD**.

1. Perform Wiring Harness — Removal.

Special Tools:

- None

2. Perform Rocker Arm Cover — Removal along with vent tube.

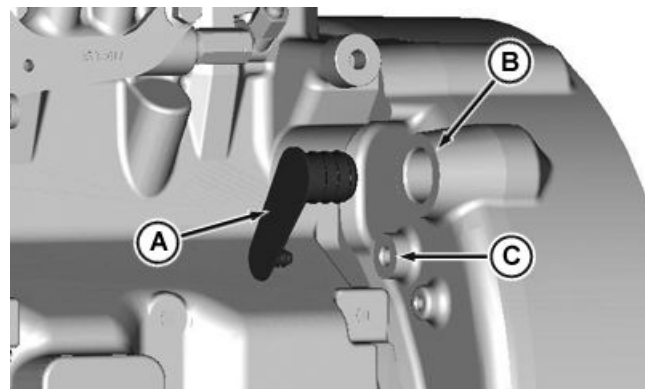
Special Tools:

- None

IMPORTANT: Visually inspect contact surfaces of valve tips, bridges and rocker arm wear pads. Check all parts for excessive wear, breakage, or cracks. Replace parts that show visible damage.

Rocker arms that exhibit excessive valve clearance should be inspected more thoroughly to identify damaged parts.

3. Remove plastic plug (A) from flywheel housing bores and install appropriate flywheel turning tool (JDG820, JDG10576 or JDE83) and JDG1571 locking pin.



Bores to Insert Flywheel Turning Tool and Locking Pin

A—Plastic Plug

B—Flywheel Turning Tool Bore

C—Locking Pin Bore

4. Rotate engine with the flywheel turning tool until locking pin engages timing hole in flywheel.

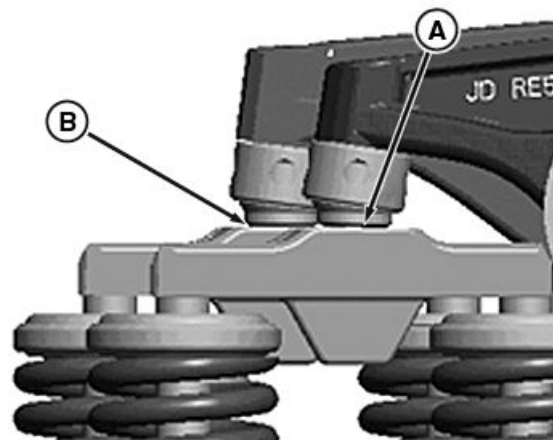
NOTE: If the rocker arms for No. 1 (front) cylinder are loose, the engine is at No. 1 top dead center compression.

NOTE: If the rocker arms for No. 4 (rear) cylinder are loose, the engine is at No. 4 top dead center. Rotate the engine one full revolution (360°) to No. 1 top dead center compression.

5. To assist in adjusting valve clearance, push the rocker arm foot (A) forward for easier feeler gauge access (B).

A—Rocker Arm Foot

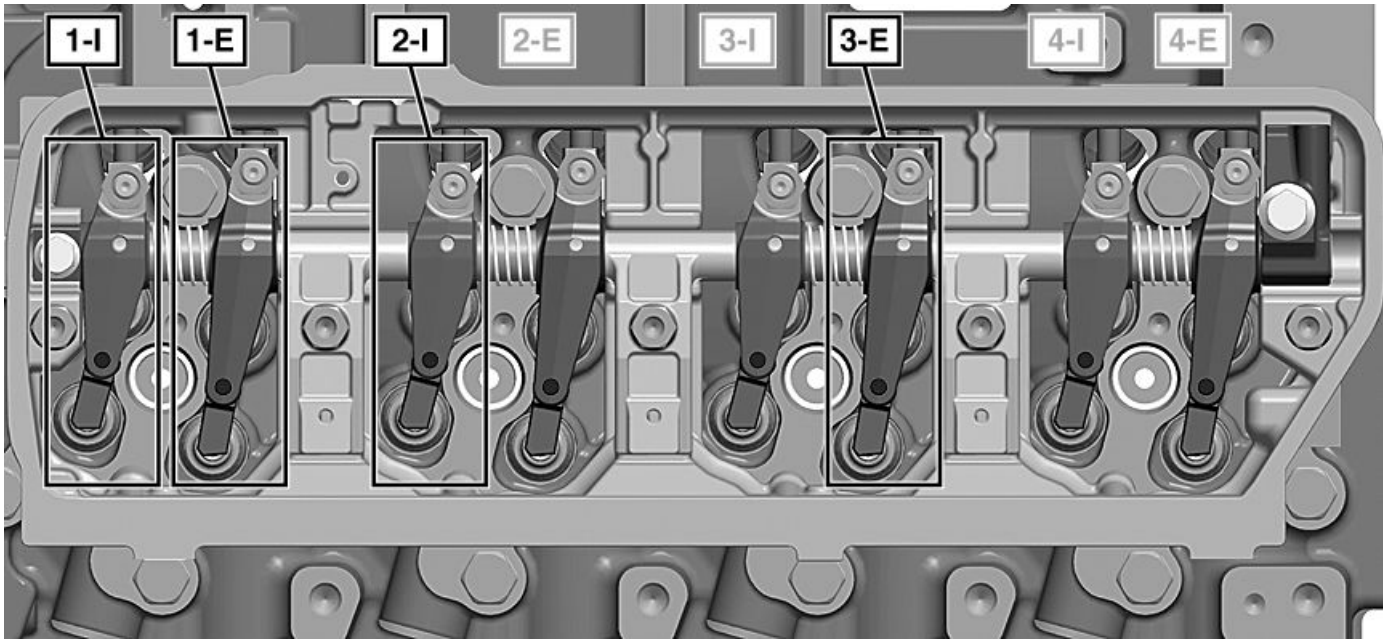
B—Clearance for Feeler Gauge



Rocker Arm Foot Position

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MK41968,0000075 -19-20MAR12-2/4



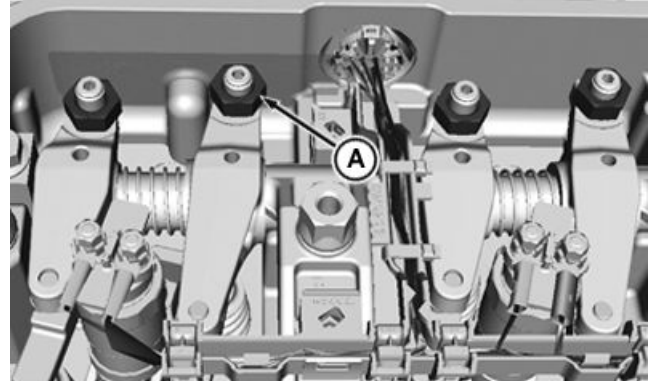
RG20492 —UN—24JUN11

Valve Clearance Adjustment — #1 TDC

6. With engine locked at "TDC" of No. 1 piston's compression stroke, use a bent feeler gauge to check valve clearance on No. 1 and 3 exhaust and No. 1 and 2 intake valves. Loosen lock nut (A) on rocker arm adjusting screw. Turn adjusting screw with a 4 mm allen wrench until feeler gauge slips with a slight drag. Hold the adjusting screw from turning and tighten lock nut to specifications.

Specification

Intake Valve Clearance (Rocker Arm-to-Valve Bridge With Engine Cold)—Clearance.....	0.46 mm (0.018 in.)
Exhaust Valve Clearance (Rocker Arm-to-Valve Bridge With Engine Cold)—Clearance.....	0.53 mm (0.021 in.)
Valve Adjusting Screw Lock Nut—Torque.....	27 N•m (20 lb.-ft.)



Rocker Arm Lock Nut

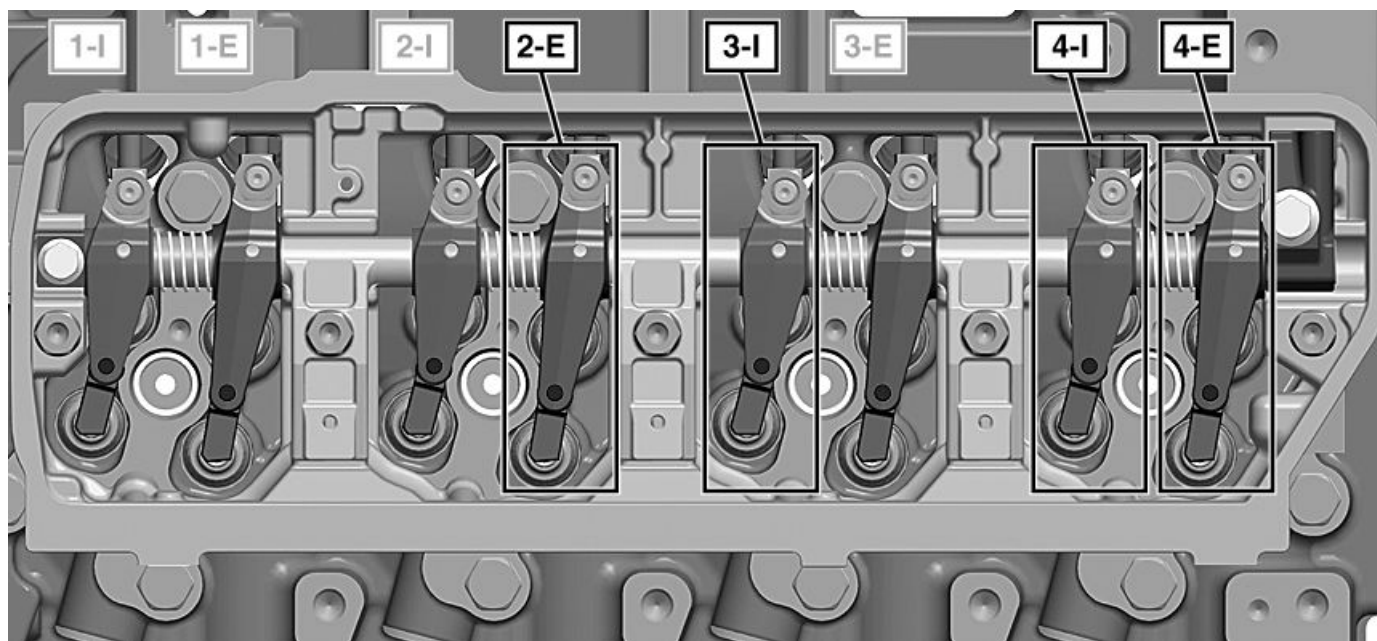
A—Lock Nut

Recheck clearance again after tightening lock nut.
Readjust clearance as necessary.

RG20537 —UN—03JUN11

Continued on next page

MK41968,0000075 -19-20MAR12-3/4



Valve Clearance Adjustment — #4 TDC

7. Rotate flywheel 360° until No. 4 piston is at "TDC" of its compression stroke. Rocker arms for No. 4 piston should be loose.
8. Check and adjust valve clearance to the same specifications on for No. 2 and 4 exhaust and No. 3 and 4 intake valves.

IMPORTANT: When reinstalling rocker arm cover, **DO NOT** reuse gasket. Install cover using a new gasket.

9. Install rocker arm cover gasket.
10. Perform Rocker Arm Cover — Installation.

Special Tools:

- None

Consumable Material:

- Rocker Arm Cover Gasket

11. If removed, perform Exhaust Filter, Brackets and Piping — Installation.

Special Tools:

- None

Consumable Material:

None

12. Perform Wiring Harness — Installation.

Special Tools:

- None

Consumable Material:

- None

MK41968,0000075 -19-20MAR12-4/4

Valve — Grinding

Special Tools:

- None

Consumables:

- None

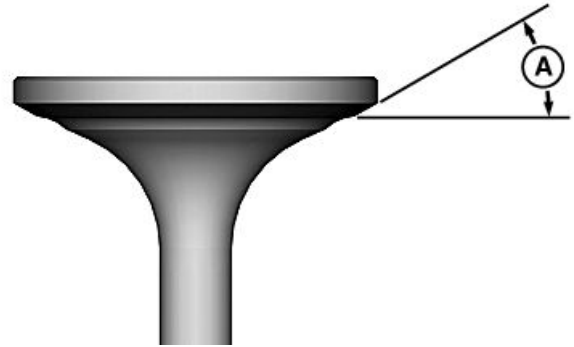
IMPORTANT: Valve grinding should only be done by experienced personnel familiar with equipment and capable of maintaining required specifications.

If necessary to reface valve, grind valve face angle (A) to following specification.

Specification

Valve Face (Intake and Exhaust)—Angle..... $29.5^\circ \pm 0.25^\circ$

IMPORTANT: When valve faces are ground, it is important not to nick valve head-to-stem radius with facing stone. A nick could cause the valve to break.



Valve Face Angle

A—Valve Face Angle

RG17549 —UN—28AUG09

MK41968,0000076 -19-10MAR11-1/1

Valve — Lift Check

Special Tools:

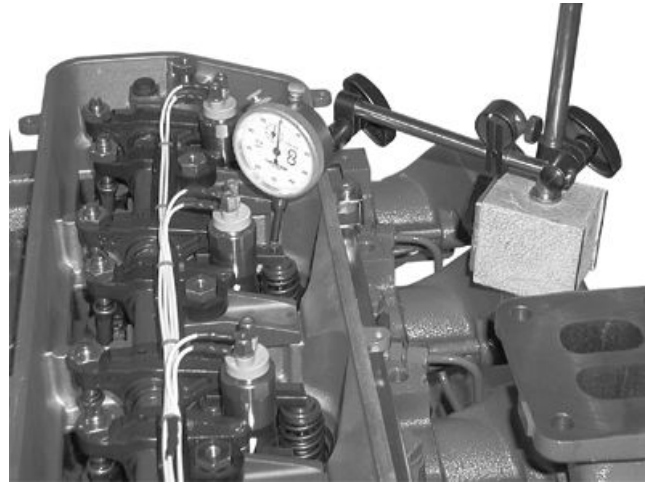
- JDG820 — Flywheel Turning Tool (For 129 Teeth Flywheel) or
- JDG10576 — Flywheel Turning Tool (For 147 Teeth Flywheel)
- JDE83 — Flywheel Turning Tool (For 142 Teeth Flywheel)
- JDG1571 — Flywheel Timing Pin
- D17525CI —Dial Indicators and Magnetic Bases

Consumables:

- None

IMPORTANT: For a more accurate measurement, measure valve lift at 0.00 mm (0.00 in.) rocker arm-to-valve bridge clearance and with engine COLD.

NOTE: Measuring valve lift provides an indication of wear on camshaft lobes and camshaft followers or push rods.

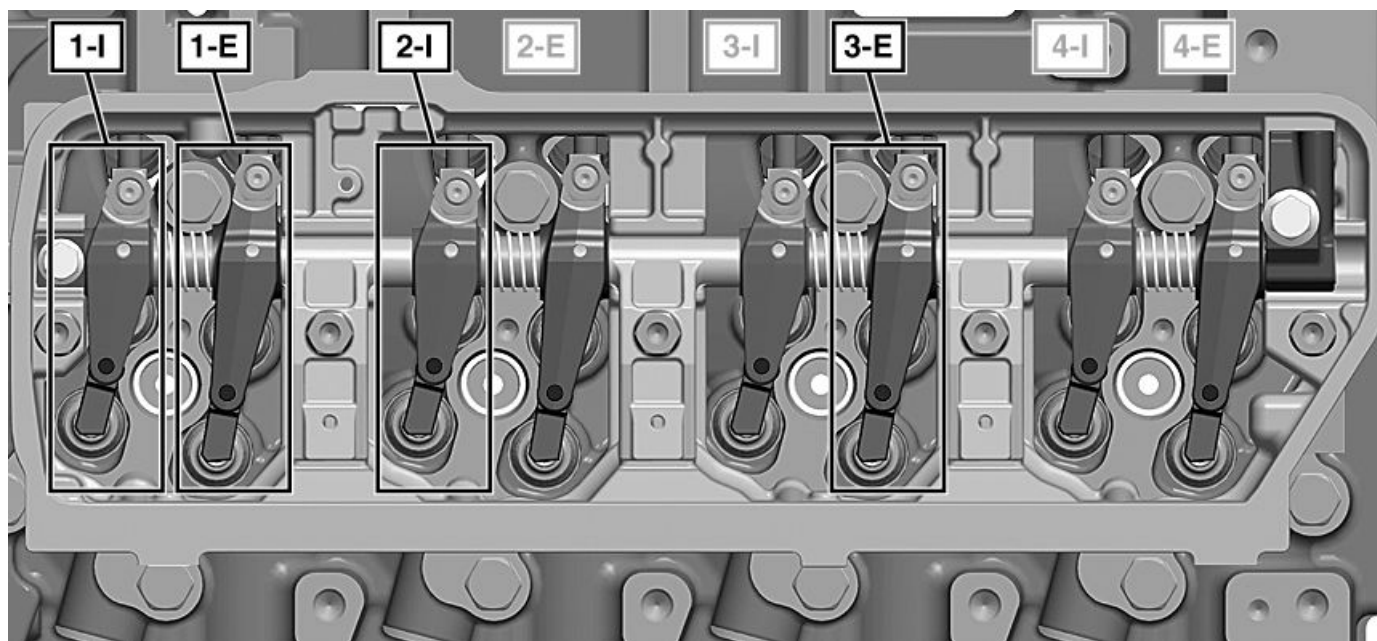


Valve Lift Measurement

RG12165A —UN—03JUL02

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AS58880,0000D1E -19-16AUG11-1/3



RG20492 —UN—24JUN11

Valve Lift Measurement— #1 TDC

1. Perform Rocker Arm Cover — Removal.

Special Tools:

- None

2. Using JDG820 or JDG10576 or JDE83 flywheel turning tool and JDG1571 timing pin inserted in flywheel, lock No. 1 piston at TDC compression stroke.

3. Set rocker arm-to-valve bridge clearance to 0.00 mm (0.00 in.) for No. 1 and 3 exhaust and No. 1 and 2 intake valves on 4-cylinder engines.

4. Place D17525CI dial indicator tip on top of valve bridge. Preload indicator tip and set dial at 0.0 mm (0.0 in.).

5. Remove locking pin from flywheel and manually rotate engine one full revolution (360°) in running direction using appropriate flywheel turning tool.

6. Observe dial indicator reading as valve is moved to full open. Record maximum reading and compare with specifications given below.

Valve Lift—Specification

Intake Valves—Lift.....9.37—9.77 mm (0.369—0.385 in.)

Wear Limit 9.05 mm (0.356 in.)

Exhaust Valves—Lift.....9.78—10.18 mm (0.385—0.401 in.)

Wear Limit 9.46 mm (0.372 in.)

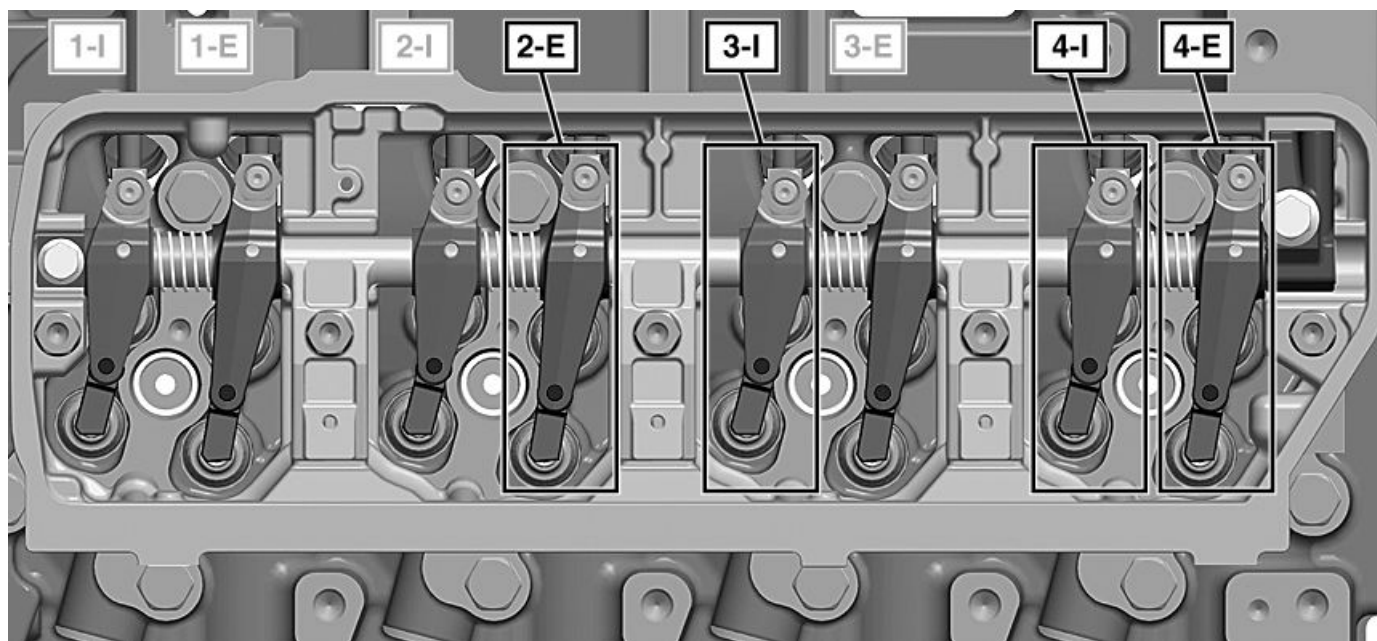
7. Follow same procedure for all remaining valves and record readings.

If valve lift on all valves is within specifications, adjust valve lash to specified clearance. See Valve — Clearance Adjustment.

If valve lift on one or more valves is not within specification, remove and inspect entire valve train and camshaft.

Continued on next page

AS58880,0000D1E -19-16AUG11-2/3



RG20493 —UN—24JUN11

8. Lock engine at TDC No. 4 compression stroke.
9. Set rocker arm-to-valve bridge clearance to 0.0 mm (0.0 in.) for No. 2 and 4 exhaust and No. 3 and 4 intake valves on 4-cylinder engines.
10. Repeat steps 4—7.

AS58880,0000D1E -19-16AUG11-3/3

Valve — Measurement

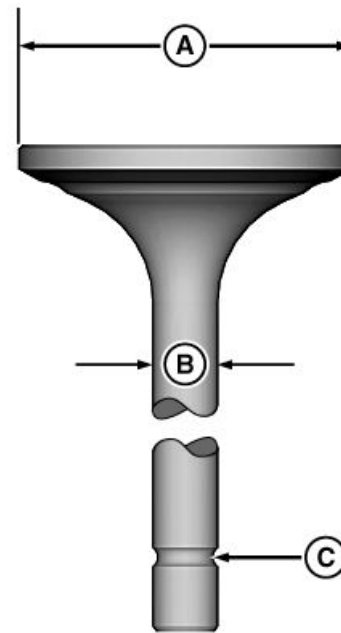
Special Tools:
Valve Inspection Tool

Consumables:
• None

1. Thoroughly clean and inspect valves to help determine if they can be restored to a serviceable condition. Replace valves that are burned, cracked, eroded, or chipped.
2. Inspect valve keeper groove (C) on valve stem for damage. Also inspect stems for signs of scuffing, which may indicate insufficient valve guide-to-valve stem clearance. Replace if defects are evident.
3. Measure valve head diameter (A). Compare valve stem diameter (B) with guide inner diameter to determine clearance, as outlined later in this group.

Specification

Intake Valve	
Stem—Diameter.....	6.987—7.013 mm (0.2750—0.2761 in.)
Exhaust Valve	
Stem—Diameter.....	6.974—7.000 mm (0.2745—0.2756 in.)
Intake Valve	
Head—Diameter.....	36.37—36.63 mm (1.432—1.442 in.)
Exhaust Valve	
Head—Diameter.....	35.37—35.63 mm (1.392—1.402 in.)



Measuring Valves

A—Valve Head Diameter
B—Valve Stem Diameter

C—Valve Keeper Groove

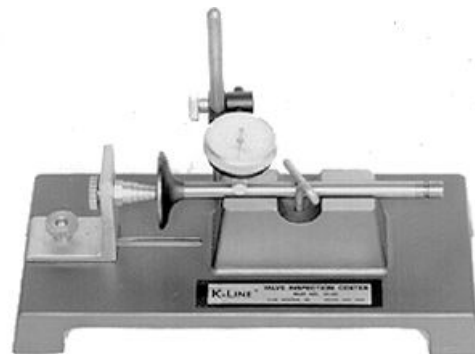
RG17550 —UN—28AUG09

MK41968,0000078 -19-10MAR11-1/2

4. With the help of a general valve inspection tool, determine if valve stem is out of round, bent or warped.

Specification

Valve Stem—Round- ness.....	0.005 mm (0.0002 in.) maximum permissible
--------------------------------	---



Valve Stem Roundness Check

RG4234 —UN—05DEC97

MK41968,0000078 -19-10MAR11-2/2

Valve — Recess Measurement

Special Tools:

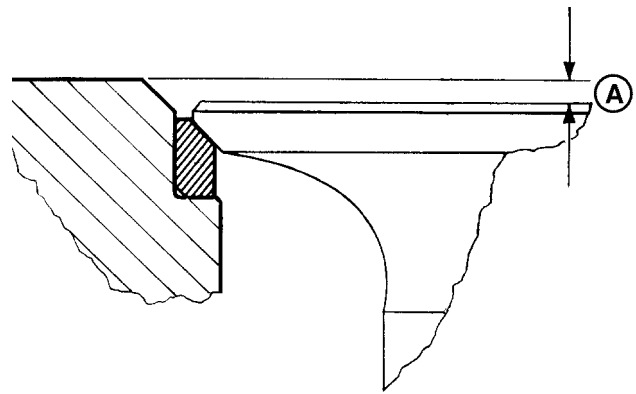
- **D17526CI** or **D17527CI** — Dial Indicator with magnetic base or
- Dial Indicator with **JDG451** — Height Gauge

1. Measure and record valve recess (A) using a depth micrometer, magnetic base dial indicator or a dial indicator with **JDG451** Height Gauge (B). Measurements must be made a maximum of 3.0 mm (0.12 in.) from edge of valve head.
2. Compare measurements between both intake valves for each cylinder and make sure difference is less than maximum variation allowed. Repeat step for both exhaust valves at each cylinder.
3. If the variation for a pair of valves is more than the specified value, check the valve bridge to see if it sits level on the valve tips. If not, then the valve seat or valve will have to be replaced.

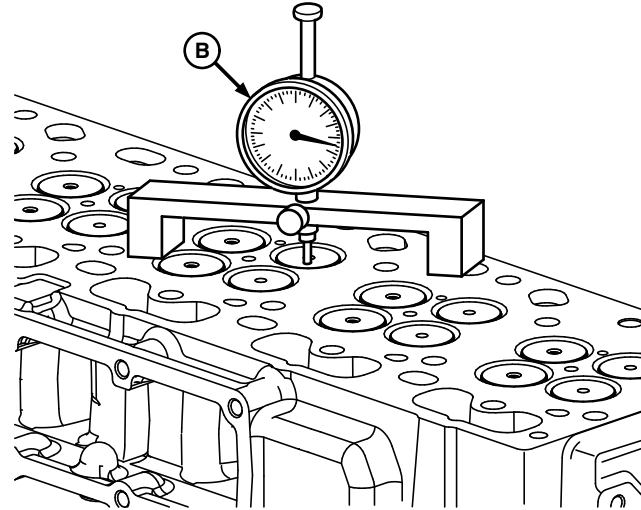
Specification

Intake Valves—Recess in	
Cylinder Head.....	1.02—1.52 mm (0.04—0.06 in.)
Wear Limit	2.02 mm (0.08 in.)
Exhaust Valve—Recess	
in Cylinder Head.....	0.81—1.31 mm (0.032—0.052 in.)
Wear Limit	1.81 mm (0.071 in.)
Intake and Exhaust	
Valves—Maximum	
Variation for a Pair of	
Valves (Per Cylinder).....	0.3 mm (0.01 in.)

NOTE: Service valves and related parts are available only in pairs.



Valve Recess Measurement



Measuring Valve Recess

A—Valve Recess

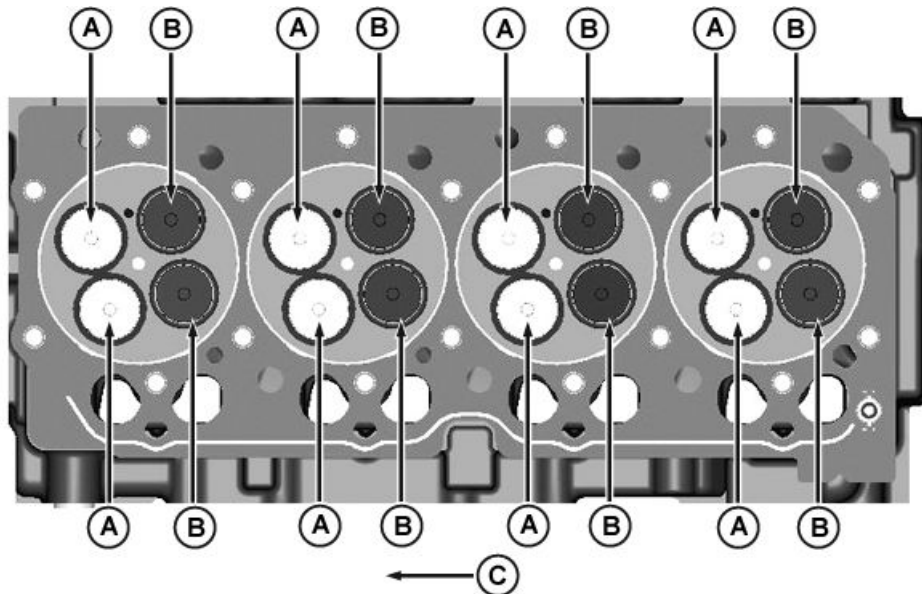
B—Dial Indicator

RG4756 —UN—31OCT97

RG12374 —UN—11JUN02

MK41968,0000079 -19-10MAR11-1/1

Valve Assembly — Reassemble

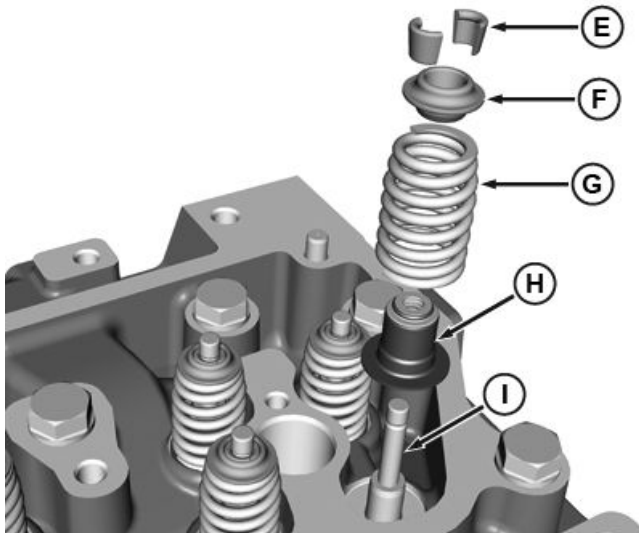


Intake and Exhaust Identification and Position

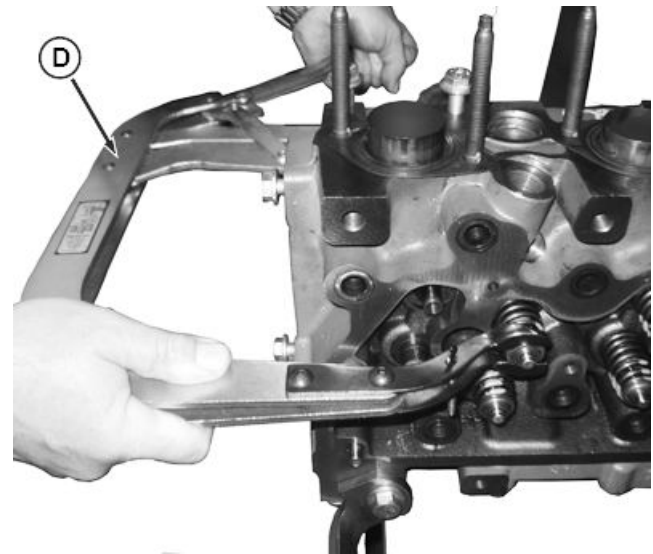
A—Intake Valve
B—Exhaust Valve
C—Front of Engine

D—JDE138 — Valve Spring
Compressor
E—Keepers

F—Rotator
G—Valve Spring
H—Seal
I— Valve



Valve Assembly



Valve Spring Compressor

Tools:

- JDE138 —Valve Spring Compressor

Consumables:

- AR44402 Valve Stem Lubricant or Engine Oil

1. Valve Assembly Installation

- Lubricate valve stems and valve guides with valve stem lubricant or clean engine oil.

NOTE: Exhaust valves are identified with "E" mark on cast impression on the valve face; intake valves are identified with "I" mark on cast impression on the valve face.

NOTE: Valves must move freely in guide and seat properly in head to form an effective seal.

- Insert valves (I) in head through the valve guides (if valves are reused, insert in same location where it was removed from).

NOTE: Intake valve seals are green in color and exhaust valve seals are gray in color.

- Lubricate seals (H) and install one over each valve and onto valve guide insert.

Continued on next page

MK41968,000007A -19-05MAY11-1/2

NOTE: Valve springs *MUST* be installed with small diameter end of spring away from cylinder head.

- d. Install valve springs (G) in appropriate orientation. Using valve spring compressor (D) install rotator (F) and keepers (E) on the valve stem groove.
- e. Tap the end of each valve 3-4 times with a soft mallet (non-metallic) to ensure proper positioning of retainer locks.
- f. Perform Valve Recess — Measurement.
Special Tools:

- D17526CI or D17527CI — Dial Indicator with magnetic base or
- Dial Indicator with JDG451 — Height Gauge.

2. Perform Cylinder Head — Installation.

Tools:

- JD244 — Lift Straps or
- JDG19 — Special Bracket

Consumables

- Head Cap Screws, Head Gasket, SAE30 Diesel Engine Oil, O-rings.

MK41968,000007A -19-05MAY11-2/2

Valve Guide — Cleaning

Special Tools:
None

Consumables:
• None

Use a plastic wire brush to clean valve guides before inspection or repair.

NOTE: A few drops of light oil or kerosene will help to fully clean the guide.



Valve Guide Cleaning

RG14176 —UN—28MAY05

MK41968,000007B -19-02AUG11-1/1

Valve Guide — Installation

Special Tools:

- JDG11204P1 Valve Guide Driver
- JDG11204P2 Valve Guide Installer

Consumables:

- Engine Oil

1. Valve Guides Installation

- Lubricate valve guide using engine oil.

NOTE: Insert valve guide into top side of cylinder head.

- Using JDG11204P1 valve guide driver and JDG11204P2 valve guide installer, insert new valve guide into bore in cylinder head using a hydraulic press until the driver bottoms out on the installer.
- Verify guide protrusion above cylinder head specification.

Specification

Valve Guide

Protrusion—Height..... 15.6—16.6 mm (0.614—0.654 in.)

2. Perform Valve Assembly — Reassemble.

Special Tools:

- JDE138 — Valve Spring Compressor

Consumable:

- AR44402 Valve Stem lubricant

3. Perform Cylinder Head — Installation.

Special Tools:

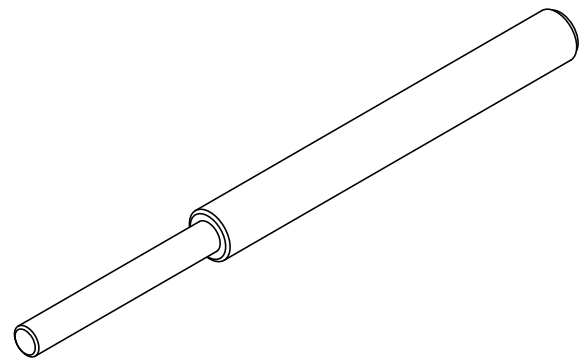
- JD244 — Lift Straps
- JDG19 — Special Bracket

Consumables:

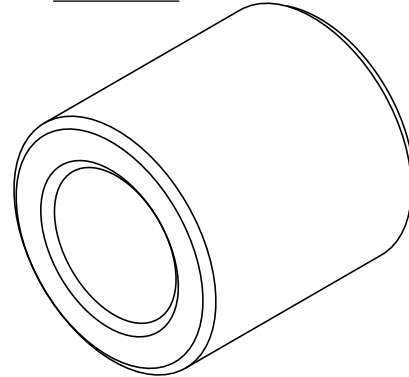
- Head Cap Screws, Head Gasket, SAE30 Diesel Engine Oil, O-rings, Coolant Manifold Cap Screws

A—Valve Guide

B—Valve Guide Protrusion



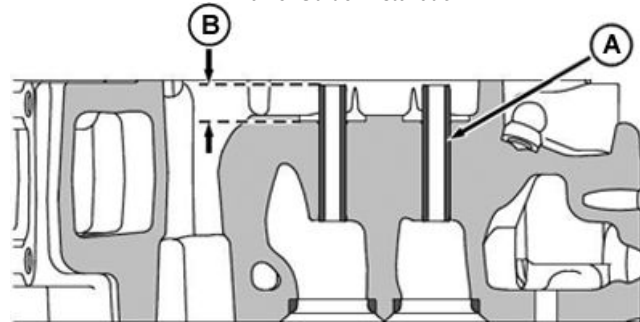
JDG11204P1 Valve Guide Driver



JDG11204P2 Valve Guide Installer



Valve Guide Installation



Valve Guide Protrusion

MK41968,000007C -19-28JUL11-1/1

RG15935 —UN—28AUG09

RG15936 —UN—28AUG09

RG18714 —UN—21JUN10

RG20689 —UN—28JUL11

Valve Guide — Measurement

Special Tools:

- None

Consumables:

- None

Using a telescopic gauge, measure valve guide for wear.

Specification

Valve Guide Bore	
(New)—ID.....	7.028—7.042 mm
	(0.277—0.278 in.)
Intake Valve	
Guide-to-Valve Stem	
(New)—Clearance.....	0.015—0.085 mm
	(0.0006—0.003 in.)
Exhaust Valve	
Guide-to-Valve Stem	
(New)—Clearance.....	0.028—0.068 mm
	(0.001—0.003 in.)
Intake and Exhaust	
Valve Guide-to-Valve	
Stem (Wear	
Limit)—Clearance.....	0.15 mm
	(0.0059 in.)



Valve Guide ID Measurement

NOTE: Service guides will be pre-threaded and machined and will only need to be pressed in place.

MK41968,000007D -19-03AUG11-1/1

RG14177 —UN—28MAY05

Valve Guide — Removal

Special Tools:

- JDG11204P1 — Valve Guide Driver

Consumables:

- None

1. Perform Cylinder Head — Removal.

Special Tools:

- JD244 — Lift Straps
- JDG19 — Special Bracket

2. Perform Valve Assembly — Removal.

Special Tools:

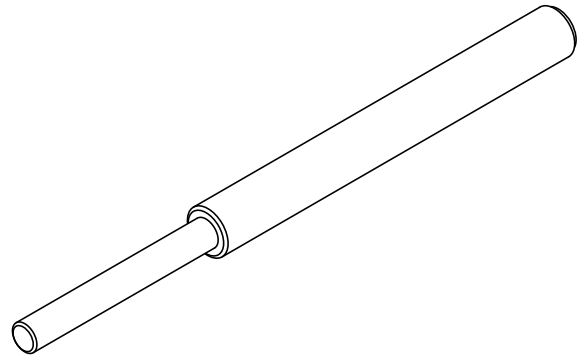
- JDE138 — Valve Spring Compressor

3. **Valve Guide — Removal**

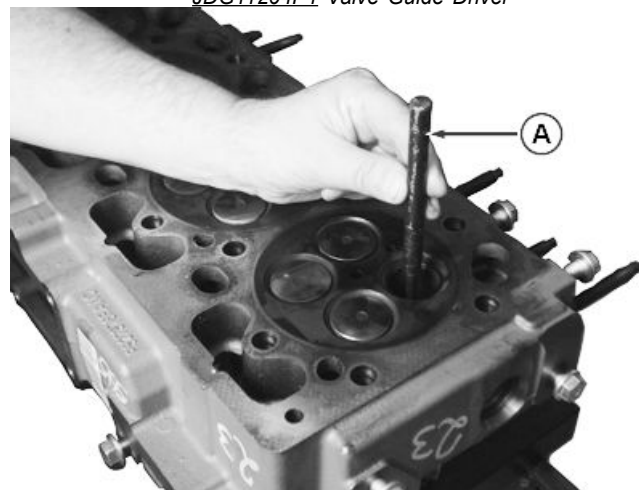
NOTE: Drive valve guide from cylinder head combustion face through top surface of head.

- a. Place the JDG11204P1 valve guide driver through the valve guide from the combustion face of the cylinder head.
- b. With the help of a hydraulic press, push valve guide driver (A), and force valve guide through top surface of cylinder head, as shown.

A—JDG11204P1 — Valve Guide Driver



JDG11204P1 Valve Guide Driver



Valve Guide Removal

MK41968,000007E -19-25APR11-1/1

RG15935 —UN—28AUG09

RG18713 —UN—24JUN10

Valve Retainer, Valve Bridges, and Valve Retainer Locks — Inspection

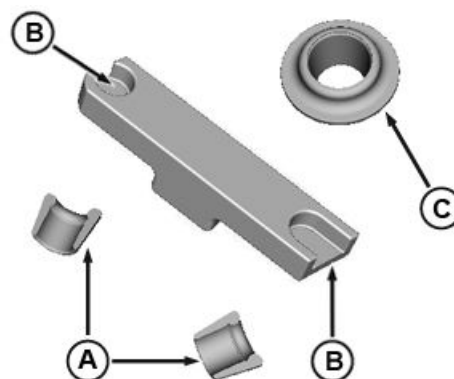
Special Tools:

- None

Consumables:

- None

1. Inspect valve keepers (A) for wear and cracks. Replace as needed.
2. Inspect valve bridges (B) for excessive wear at contact point with valve stem (B). Replace as needed.
3. Inspect valve retainers (C) for excessive wear. Replace if worn or pitted.



Inspecting Valve Components

A—Valve Keeper
B—Valve Bridge

C—Valve Retainer

MK41968,000007F -19-11JUL11-1/1

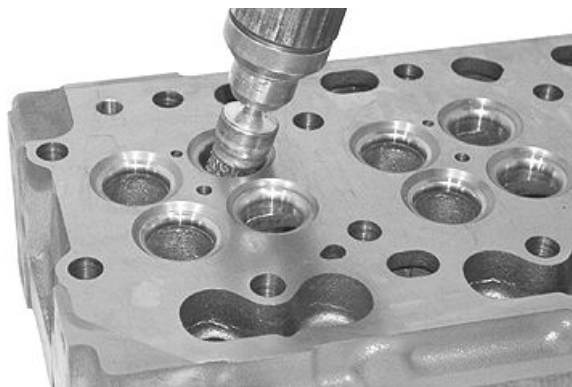
RG20250 —UN—22APR11

Valve Seat—Cleaning and Inspection

Special Tools:

- D17024BR — End Brush

1. Use an electric hand drill with D17024BR End Brush to remove all carbon on valve seats.
2. Inspect seats for excessive wear, cracks, or damage.
3. Check entire combustion face for rust, scoring, pitting, or cracks.



Valve Seat Cleaning and Inspection

MK41968,0000080 -19-10MAR11-1/1

RG12384A —UN—07JUN02

Valve Seat — Grinding

Special Tools:

- JT05893— Valve Seat Grinder Set
- Valve Seat Lapping Tool

Consumables:

- Grinding Paste

IMPORTANT: Valve seat grinding should only be done by experienced personnel familiar with equipment and capable of maintaining required specifications. **ALWAYS** keep work area clean when grinding valve seats.

Using **JT05893 Heavy-Duty Seat Grinder Set**, grind valve seats to obtain correct valve recess in cylinder head.

See **Valve Recess — Measurement**, earlier in this group.

Be sure valve guide bores are clean before grinding valve seats.

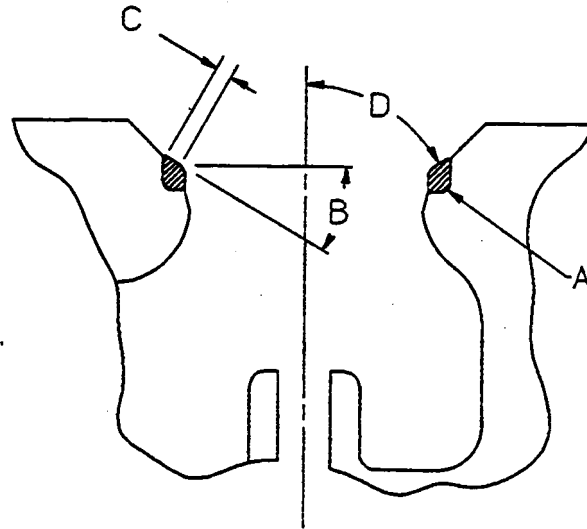
See **Valve Guide — Cleaning**, earlier in this group.

If valve seats need grinding, only a few seconds are required to recondition the average valve seat. Avoid the tendency to grind off too much. Do not use excessive pressure on the grinding stone.

1. Check the seat width (C) and contact pattern between the seat and valve with bluing. Seat width **MUST BE** maintained within specification. Use a vernier caliper or scale to measure seat width. Thoroughly clean seat area after grinding and replace valves and valve seat inserts as necessary.

NOTE: Valve seat width can be reduced with a narrowing stone. This will change the angle (B) at the top of the seat and increase the diameter. If valve seat width is too narrow, valve may burn or erode. Varying the width changes the fine contact between valve face and seat.

2. **ALWAYS** measure valve seat runout after grinding and check recess in cylinder head after grinding. See:



Valve Seat Measurements

A—Valve Seat Insert
B—Valve Seat Angle

C—Valve Seat Width
D—Valve Seat Runout

Valve Seat — Measurement

and

Valve Recess — Measurement.

Specification

Valve Seat—Angle.....	30° ± 0.5° from horizontal
Maximum Seat Circular Runout.....	0.08 mm (0.003 in.)
Valve Seat—Width.....	1.50—2.00 mm (0.059—0.079 in.)

Continued on next page

MK41968,0000081 -19-17AUG11-1/2

RG5248 —UN—06DEC88

3. Using a brand new valve (B) and a lapping tool (A) along with grinding paste, touch up the seat (C) until a regular contact pattern is obtained. Thoroughly clean seat area after touching up the seat.
4. Check the valve seat insert specifications & machine them as necessary.

Specification

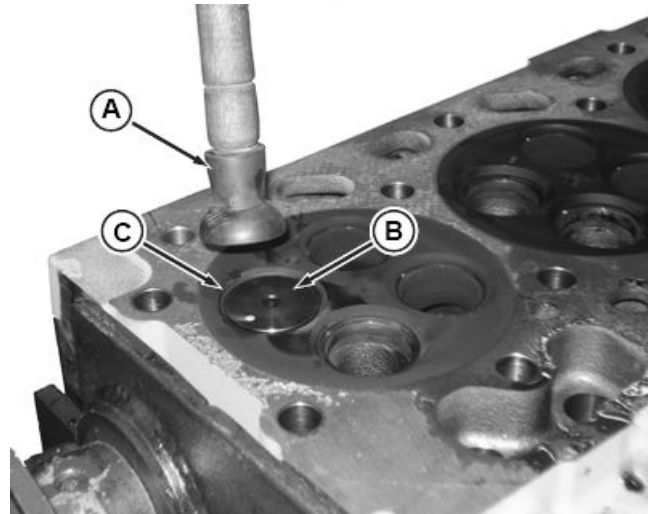
Intake Valve Seat	
Insert—OD.....	37.487—37.513 mm. (1.486—1.477 in.)
Exhaust Valve Seat	
Insert—OD.....	36.487—36.513 mm. (1.436—1.438 in.)
Intake Valve Seat	
Insert—ID.....	30.37—30.63 mm. (1.195—1.204 in.)
Exhaust Valve Seat	
Insert—ID.....	28.37—28.63 mm. (1.116—1.127 in.)

5. Perform Valve — Recess Measurement.

Special Tools:

- D17526CI or D17527CI — Dial Indicator with magnetic base or
- Dial Indicator with JDG451 — Height Gauge.

6. Repeat operation for each valve seat.



Valve Seat Touch-up

A—Valve Seat Lapping Tool
B—Valve

C—Valve Seat

RG18723 —UN—24JUN10

MK41968,0000081 -19-17AUG11-2/2

Valve Seat — Measurements

Special Tools:

- None

Consumables:

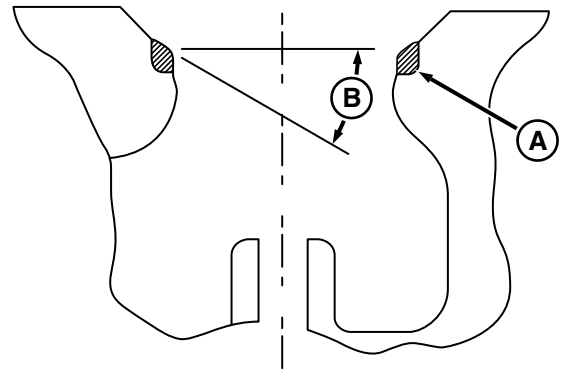
- None

IMPORTANT: Circular runout between valve seat and valve guide can be measured by using a specific measuring device and therefore, only a specialized workshop can perform this measurements.

- In case of replacement of valve seat or in case of low cylinder compression, perform Valve Seat — Grinding to ensure a proper valve seat contact.

Specification

Valve Seat—Angle.....	30° ± 0.5° from horizontal
Maximum Seat Circular	
Runout.....	0.08 mm (0.003 in.)



Measuring Valve Seats

A—Valve Seat Insert

B—Valve Seat Angle

RG18631 —UN—28JUN10

MK41968,0000082 -19-10MAR11-1/1

Valve Seat Inserts — Installation

Special Tools:

- JDG1653-1 — Valve Seat Driver
- JDG1653-2 — Valve Seat Installer

Consumables:

- None

IMPORTANT: Intake valves, exhaust valves, valve seat inserts, springs and retainers must be replaced in pairs to maintain proper valve bridge alignment. Also, replace bridge if any of these parts are replaced.

1. Use JDG1653-1 Valve Seat Driver (A) and JDG1653-2 Valve Seat Installer (B) to install valve seat inserts in cylinder head.

Use one end of JDG1653-2 Valve Seat Installer to install intake valve seat inserts and the other end to install exhaust valve seat inserts.

2. Perform Valve Seat — Grinding.
3. Perform Valve Assembly — Reassemble.

Special Tools:

- JDE138—Valve Spring Compressor

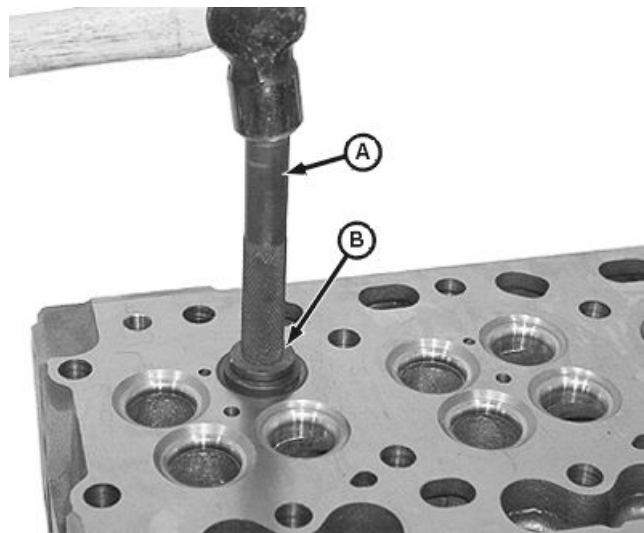
Consumables:

- AR44402 Valve Stem Lubricant

4. Perform Valve — Recess Measurement.

Special Tools:

- D17526CI or D17527CI — Dial Indicator with magnetic base or



Valve Seat Insert in Cylinder Head Installation

A—JDG1653-1 Valve Seat Driver

B—JDG1653-2 Valve Seat Installer

- Dial Indicator with JDG451 — Height Gauge.

5. Perform Cylinder Head — Installation.

Special Tools:

- JD244 — Lift Straps or
- JDG19 — Special Bracket

Consumables:

- Head Cap Screws, Head Gasket, SAE30 Diesel Engine Oil, O-rings, Coolant Manifold Cap Screws

AS58880,0000D1D -19-12AUG11-1/1

RG12381A—UN—07JUN02

Valve Seat Inserts — Removal

Special Tools:

- JDE41296 — Valve Seat Puller

1. Perform Cylinder Head — Removal

Special Tools:

- JD244 — Lift Straps
- JDG19 — Special Bracket

2. Perform Valve Assembly — Removal.

Special Tools:

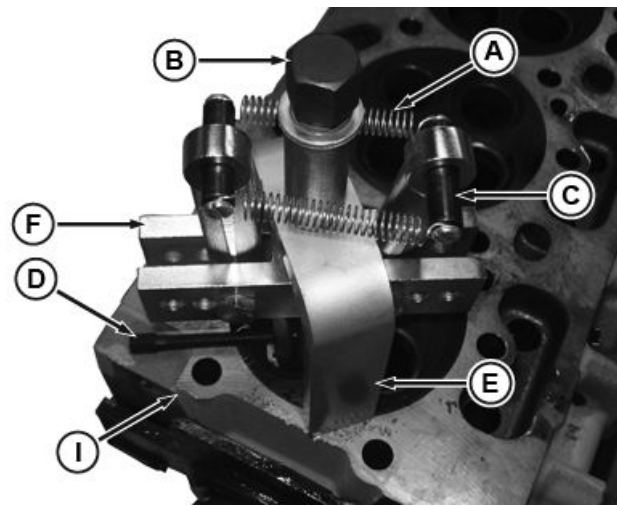
- JDE138 — Valve Spring Compressor

3. Valve Seat Inserts Removal

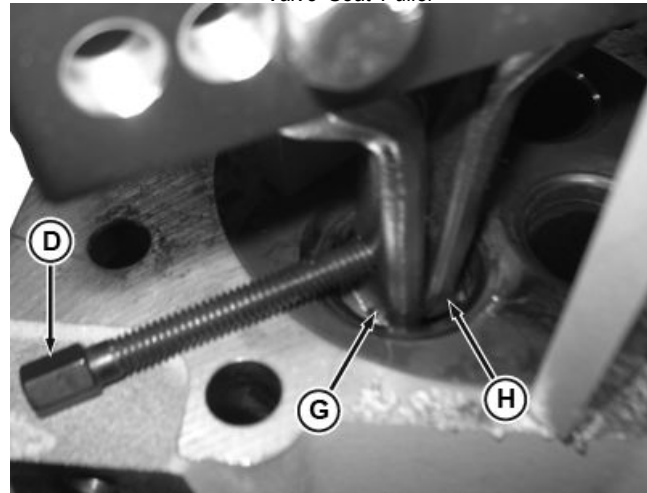
IMPORTANT: Be careful not to damage cylinder head when removing seats.

- Remove valve seat insert with JDE41296 valve seat puller. Tighten the adjusting screw on puller during removal of inserts.

- | | |
|----------------------------------|---------------------|
| A—Spring | F—Bridge |
| B—Socket Placed on Forcing Screw | G—Puller Jaw Tapped |
| C—Spacer | H—Puller Jaw Plain |
| D—Forcing Screw | I—Cylinder Head |
| E—Puller Yoke | |



Valve Seat Puller



Puller Jaws and Forcing Screw

RG18511 —UN—21JUN10

RG18715 —UN—21JUN10

MK41968,0000084 -19-09AUG11-1/2

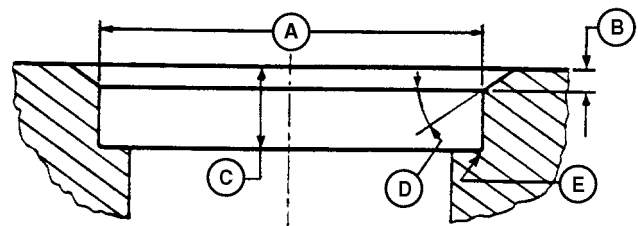
- After removal of inserts, thoroughly clean area around valve seat bore and inspect for damage or cracks.

In some cases the valve seat bore in the cylinder head may become damaged, oversized or are not within specification, machine head to the following specifications. At this time, oversize valve seat inserts ARE NOT available. Replace the cylinder head.

Exhaust Valve Seat Insert Bore Specifications:

A	36.436—36.462 mm (1.4344—1.4355 in.)
B	3.3 mm (0.130 in.) Reference
C	9.465—9.535 mm (0.3716—0.3754 in.)
E	Maximum Radius 0.5 mm (0.019 in.)

Maximum surface finish
of bore "A" 3.2 (micron)



Cylinder Head Valve Seat Bore

Intake Valve Seat Insert Bore Specifications:

A	37.436—37.462 mm (1.4738—1.4748 in.)
B	3.8 mm (0.150 in.) Reference
C	9.965—10.035 mm (0.3923—0.3651 in.)
D	38—42°
E	Maximum Radius 0.5 mm (0.019 in.)

Maximum surface finish
of bore "A" 3.2 (micron)

RG9101 —UN—27MAR98

MK41968,0000084 -19-09AUG11-2/2

Valve Spring — Inspection

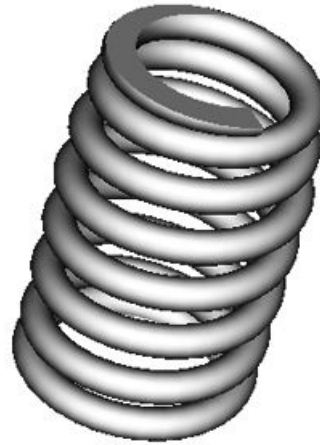
Special Tools:

- None

Consumables:

- None

1. Inspect valve springs for alignment, wear, and damage.
2. Put springs on a flat surface to see that they are square and parallel.



Valve Spring

RG18341 —UN—20APR10

MK41968,0000085 -19-10MAR11-1/1

Valve Spring — Measurement

Special Tools:

- D01168AA — Spring Compression Tester

Consumable Material:

- None

*NOTE: Free spring length of 51.1 mm (2.01 in.)
springs differ slightly, but compressed height
must be the same.*

Check valve spring tension using D01168AA spring compression tester.

Specification

Valve Spring Tension—At

28.1 mm (1.11 in.)

Compressed Height

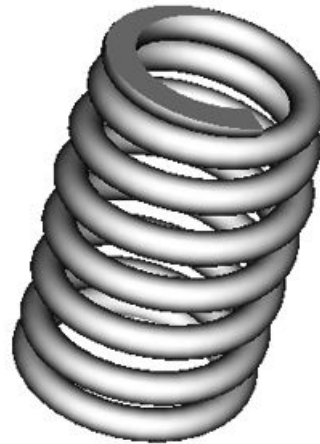
(Valve Open)..... 471 — 519 N (105.88—116.68 lb.-force)

Valve Spring Tension—At

38.3 mm (1.51 in.)

Compressed Height

(Valve Close)..... 248 — 272 N (55.75—61.15 lb.-force)



Valve Spring

RG18341 —UN—20APR10



Checking Valve Spring Tension

T82054 —UN—08NOV88

MK41968,0000086 -19-24AUG11-1/1

Complete Final Assembly

1. Install all pipe plugs, O-ring plugs, and cup plugs. See Cylinder Block -Cleaning and Inspection.

2. Install bypass valve and spring. (See in Section 02 Group 60)

3. Perform Camshaft Bushings — Installation. (Section 02 Group 50)

Special Tools:

- JDG739-4 Bushing Installer Screw
- JDG739-3 Removing/Installing Plate
- JDG739-5B Bushing Installer

Consumables:

- TY6333 HighTemperature Grease

4. Perform Front Plate — Installation. (See in Section 2 Group 50)

Special Tools:

- None

Consumables:

- LOCTITE® 515 Joint Sealing Compound

5. Perform Camshaft — Installation. (Section 02 Group 50)

Special Tools:

- None

Consumables:

- TY6333 High Temperature Grease

6. Perform Oil Cooler and Filter — Installation. (Section 02 Group 60)

Special Tools:

- None

Consumables:

- Engine oil filter

7. Perform Electronic Control Unit (ECU) — Installation. (Section 02 Group 110)

Special Tools:

- None

Consumables:

- None

8. Perform Oil Fill Adapter — Installation. (Section 02 Group 60)

Special Tools:

- None

Consumables:

- None

9. Perform Dipstick Tube and Dipstick — Installation. (Section 02 Group 60)

Special Tools:

- None

Consumables:

- LOCTITE® 609 or Hylomar 760 Retaining Compound

10. Perform High-Pressure Common-Rail (HPCR) — Installation. (Section 02 Group 90)

Special Tools:

- None

Consumables:

- None

11. Perform High-Pressure Injection lines — Installation. (Section 02 Group 90)

Special Tools:

- JDG11184—Injection line socket

Consumables:

- None

12. Perform High-Pressure Fuel Pump — Installation. (Section 02 Group 90)

Special Tools:

- JDG571—Timing Pin

Consumables:

- None

13. Perform Low-Pressure Fuel Pump — Installation. (Section 02 Group 90)

Special Tools:

- None

Consumables:

- None

14. Perform Crankshaft — Installation. (Section 02 Group 40)

Special Tools:

- None

Consumables:

- None

15. Perform Oil Pressure Regulating Valve — Installation. (See in Section 2 Group 60)

Special Tools:

- None

Consumables:

- None

16. Perform Timing Gear Cover — Installation. (Section 02 Group 50)

Special Tools:

- None

Consumables:

- Timing Gear Cover Gasket

Continued on next page

RG19661,000033B -19-20MAR12-1/2

17. Perform Piston and Connecting Rod Assembly Installation. (Section 02 Group 30)

Special Tools:

- None

Consumables:

- None

18. Perform Oil Pump and Tubes — Installation. (Section 02 Group 60)

Special Tools:

- None

Consumables:

- 3 Orings (One on each end of the oil supply tube, one on the pickup tube.)

19. Perform Oil Pan — Installation. (Section 02 Group 60)

Special Tools:

- None

Consumables:

- Oil Pan Gasket, Engine Oil • LOCTITE® 515 Joint Sealing Compound

20. Perform Crankshaft Pulley Installation. (Section 02 Group 40)

Special Tools:

- JDG1571—Timing Pin

Consumables:

- TY16285 Cure Primer, TY15969 Retaining Compound, Engine Oil, Damper Cap Screw

21. Perform Starter — Installation (Section 02 Group 100)

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Special Tools:

- None

Consumables:

- None

22. Install all sensors on the cylinder block components. See in Section 02 Group 90 Electronic Fuel System Repair and Adjustment.

23. Perform Wiring Harness — Installation (Section 02 Group 110)

Special Tools:

- None

Consumables:

- None

24. Perform Flywheel Housing — Installation. (Section 02 Group 40)

Special Tools:

- None

Consumables:

- LOCTITE® 515

25. Perform Flywheel — Installation. (Section 02 Group 40)

Special Tools:

- None

Consumables:

- None

RG19661,000033B -19-20MAR12-2/2

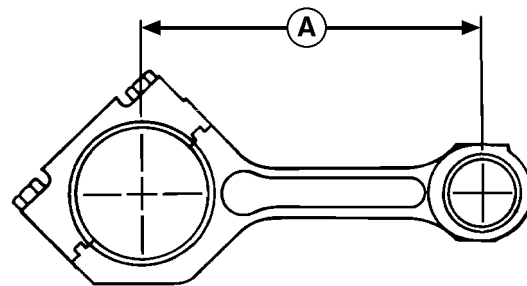
Connecting Rod — Center-to-Center Bore Measurement

Measure rod center-to-center bores (A). Compare to specifications given below. Replace rod if necessary.

Specification

Rod Bearing Bore-to-Piston Pin Bushing Bore (Center-to-Center)	
—Measurement.....	202.95—203.05 mm (7.990—7.994 in.)

A—Center-to-Center Measurement



Center-to-Center Bore Measurement

RG6272 —UN—03NOV97

RG19661,000033C -19-28APR11-1/1

Connecting Rod — General Information

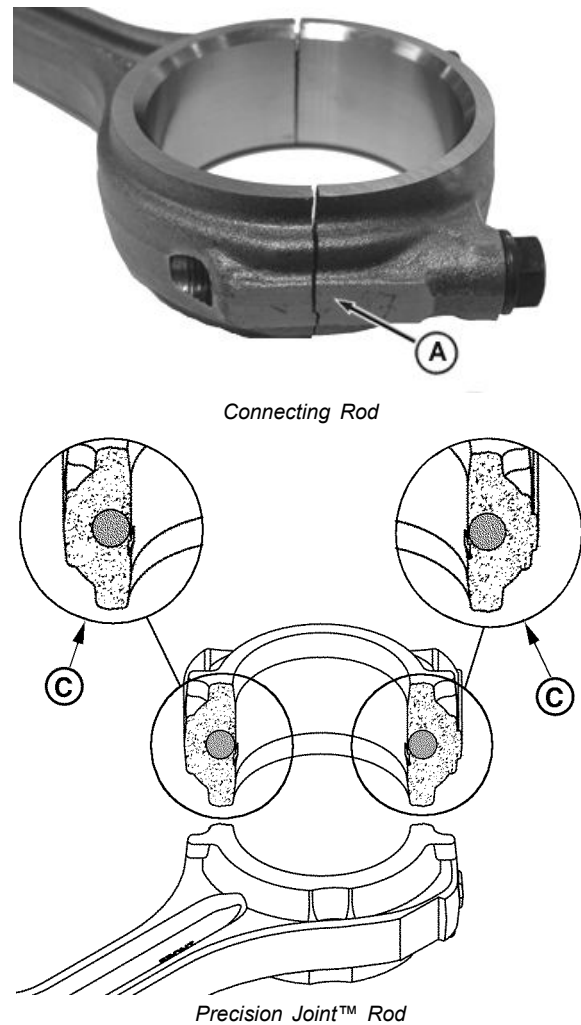
To create the PRECISION JOINT™, the connecting rod is notched with a laser beam. Then a precision mandrel in the rod bore is powered to separate the cap from the body at the joints (A) and (C).

- Care must be exercised when inspecting and handling the precision joint connecting rods. Do not nick the joint surfaces. Never scrape these surfaces with a wire brush or other tool. Cap **MUST BE** kept with the parent rod.
- Due to the machining process, PRECISION JOINT™ rod and cap have two grooves each, while the bearing inserts have a single tang. The extra grooves are not used. Install cap and rod with tangs to same side.
- Never use connecting rod bolts more than once for final engine assembly. Once bolts have been tightened to final torque, they must not be reused.

For more information, see [Connecting Rod and Cap — Inspection](#) and [Piston and Connecting Rod Assembly — Installation](#) later in Section 02, Group 030.

A—PRECISION JOINT™

C—View of Joint



RG17363 —UN—03JUL09

RG16836 —UN—06MAR09

PRECISION JOINT is a trademark of Deere & Company

RG19661,000033D -19-27JUL11-1/1

Connecting Rod and Cap — Inspection

1. Inspect rod and cap for wear or damage, such as chips or nicks in the joint area (A).

IMPORTANT: Do not nick the joint surfaces of the rod and cap. This is very critical on PRECISION JOINT™ rods to ensure proper seating. Never scrape these surfaces (C) with a wire brush or other tool. The interlocking mating surfaces must be preserved.

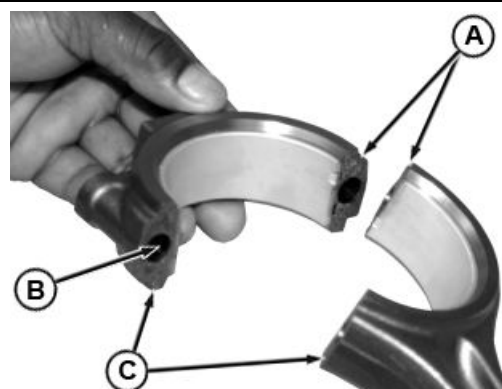
2. Inspect in and around cap screw holes (B) in cap. If any imperfections are found, replace rod and cap.
3. Carefully clamp rod in a soft-jawed vise (cap end upward).

IMPORTANT: Never use new connecting rod cap screws when checking rod bore ID. Use new cap screws only for final assembly of connecting rods.

4. Install cap WITHOUT bearing inserts. Use old cap screws.

IMPORTANT: On connecting rods, make sure cap is properly aligned on rod with interlocking surfaces sealing tightly and edges aligned. Be sure the rod cap is seated correctly on to the rod, then install rod cap bolts. **DO NOT** use the rod bolts to seat the cap to the rod. Mismatch

PRECISION JOINT is a trademark of Deere & Company



PRECISION JOINT™ Rod and Cap

A—Joint Area
B—Cap Holes

C—PRECISION JOINT™
Surfaces

problems can occur. **DO NOT** reverse cap on rod. Match pads on side of rod and cap.

5. Tighten cap screws to specification.

Specification

Connecting Rod Cap
Screws—Torque Turn..... 58 N•m (43 lb.-ft.) plus
additional 90-100° turn clock-wise

See Connecting Rod Cap Screws — Torque Procedure
in Section 020, Group 030.

RG18580 —UN—26MAY10

RG19661,000033E -19-24AUG11-1/2

6. Using an inside micrometer, measure rod bore at center of bore and record measurements as follows:

- At right angle to rod-to-cap joint (A).
- At 45 degrees left of measurement step “A” (B).
- At 45 degrees right of measurement step “A” (C).

7. Compare measurements to specifications.

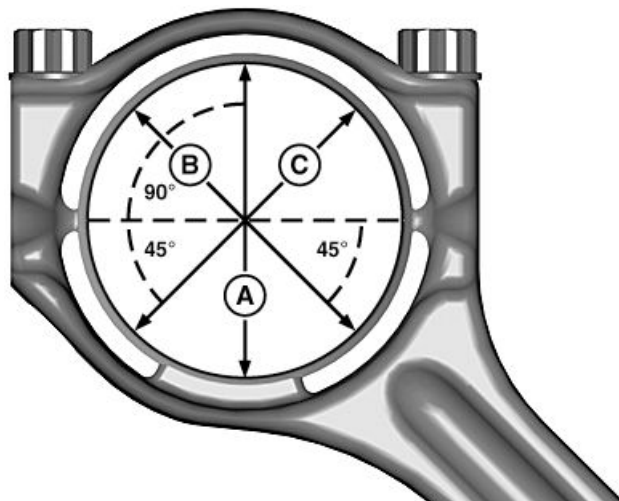
Specification

Connecting Rod Bore
(Without Bearing
Inserts)—ID..... 82.677—82.703 mm
(3.2549—3.2560 in.)

8. If difference between the greatest and least measurement exceeds out-of-round specification, replace connecting rod.

Specification

Connecting Rod
Bore—Maximum
Permissible Out-of-
Round..... 0.01 mm (0.0003 in.)



Rod Bearing ID Measurement

RG17552 —UN—28AUG09

RG19661,000033E -19-24AUG11-2/2

Connecting Rod Bearing — Inspection and Measurement

1. Inspect rod bearings for damage or wear.
2. Measure crankshaft rod journal OD at several points.

Specification

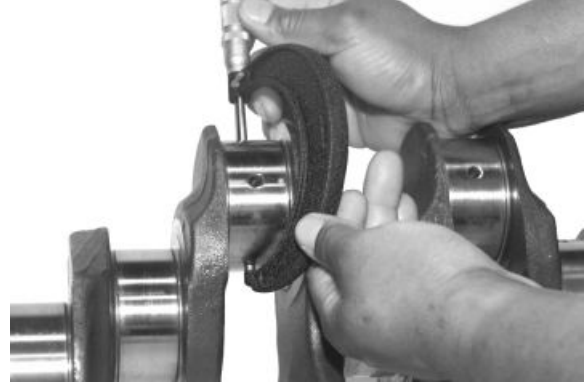
Crankshaft
Journal—OD.....77.800—77.826 mm
(3.0629—3.0640 in.)

3. Assemble connecting rod, cap, and bearings with OLD cap screws. Tighten cap screws to specification.

Specification

Connecting Rod Cap
Screws—Torque..... 58 N•m (43 lb-ft) and 1/4 Turn
(90 — 100°) After Initial Torque

For more information, see Connecting Rod Cap Screw — Torque Procedure in Section 02 Group 030.



Crankshaft Rod Journal Measurement

RG7471 —UN—23NOV97

RG19661,000033F -19-11AUG11-1/2

4. Measure assembled rod bearing ID.

Specification

Assembled Rod
Bearing—ID.....77.876—77.927 mm
(3.0659—3.0679 in.)

5. Subtract crankshaft journal OD from rod bearing ID to determine oil clearance. Replace bearings if oil clearance is out of specification.

Specification

Connecting Rod
Bearing-to-Journal (New
Parts)—Oil Clearance.....0.025 — 0.103 mm
(0.001 — 0.0041 in.)
Wear Limit 0.152 mm (0.0060 in.)



Rod Bearing ID Measurement

RG7472 —UN—23NOV97

RG19661,000033F -19-11AUG11-2/2

Connecting Rod Bearing — Inspection and Measurement (Rod and Crankshaft in Engine)

IMPORTANT: Use hand wrenches. Pneumatic wrenches may cause thread damage.

NOTE: Use PLASTIGAGE® as directed by manufacturer. PLASTIGAGE® will determine oil clearance, but will not indicate condition of either surface.

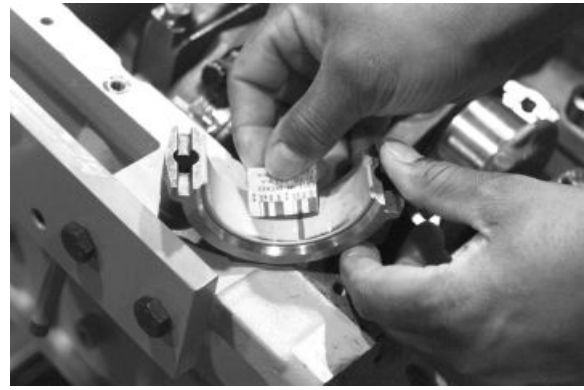
1. Remove rod cap.
Clean and dry the bearing, connecting rod and crankshaft journal.
2. Place a piece of PLASTIGAGE® in center of bearing.
Install rod cap using OLD cap screws.
Tighten cap screws to specification.

Specification

Connecting Rod Cap
Screws—Torque-Turn..... 58 N•m (43 lb.-ft.)
and 1/4 Turn (90 — 100°) After Initial Torque

(See Connecting Rod Cap Screw — Torque Procedure in Section 02, Group 030.)

PLASTIGAGE is a registered trademark of the DANA Corp.



Rod Oil Clearance Measurement

3. Remove rod cap. Compare width of PLASTIGAGE® with scale provided on package to determine clearance. Replace bearings if oil clearance is out of specification.

Specification

Connecting Rod
Bearings—Oil
Clearance..... 0.025 — 0.103 mm (0.001 — 0.0041 in.)

RG7459 —UN—23NOV97

RG19661,0000340 -19-24AUG11-1/1

Connecting Rod Cap Screw — Torque Procedure

Special Tools:

- None

Consumable Material:

- None

IMPORTANT: Always use new connecting rod cap screws.

Using Engine Axis Method to Torque-Turn Connecting Rod Cap Screws

1. Install cap screws and apply initial torque to specification:

Specification

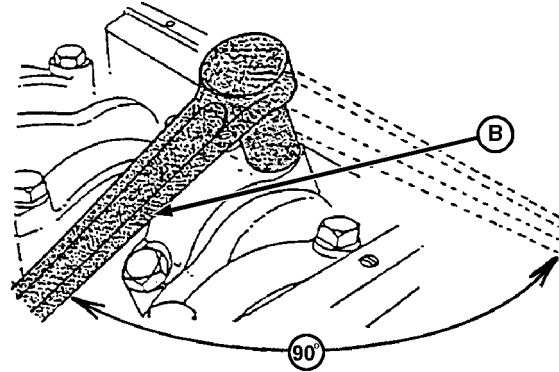
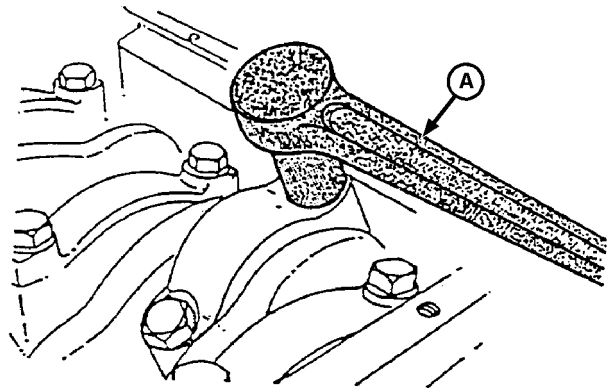
Connecting Rod Cap
Screws—Initial Torque..... 58 N•m (43 lb.-ft.)

NOTE: Using an oil proof pen, pencil, or marker, draw a line parallel to the crankshaft across the entire top of each cap screw head. This line will be used as a reference mark.

2. After tightening cap screws to initial torque values, mark both connecting rod cap screw and ratchet socket.
3. Position handle of wrench parallel to center-line of engine crankshaft axis (A).

NOTE: Sequentially (start at cap screw No. 1 and proceed through cap screw No. 8) turn each cap screw 90°.
Line on cap screw will be perpendicular to crankshaft.

4. Tighten 1/4 turn (90—100°) clockwise until handle of wrench is perpendicular to centerline of engine crankshaft axis (B) as shown.



Connecting Rod Caps Torque-Turn

A—Parallel to Center-line
Crankshaft

B—Perpendicular to
Center-line Crankshaft

Specification

Connecting Rod Cap
Screws—Torque-Turn..... 1/4 Turn (90—100°)
After Initial Torque

NOTE: Double check line position on all 8 cap screws.

RG9102—UN—27MAR98

RG19661,0000341 -19-15AUG11-1/1

Connecting Rod Pin Bore — Cleaning and Inspection

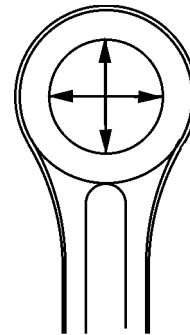
1. Clean bore of rod with medium grit emery cloth.
2. Inspect for cracks or other damage.

IMPORTANT: If bushing has spun in rod, replace connecting rod.

3. Measure bore diameter in two places, 90° apart. Replace rod if not within specification.

Specification

Connecting Rod Large
Pin Bore (Bushing
Removed)—ID..... 46.025—46.051 mm
(1.8120—1.8130 in.)



Connecting Rod Pin Bore

RG7478—UN—23NOV97

RG19661,0000342 -19-28JUL11-1/1

Cylinder Block — Cleaning and Inspection

Special Tools:

- D17015BR—O-ring Bore Cleaning Brush
- JDG782A—Oil Gallery Plug Tool

Consumable Material:

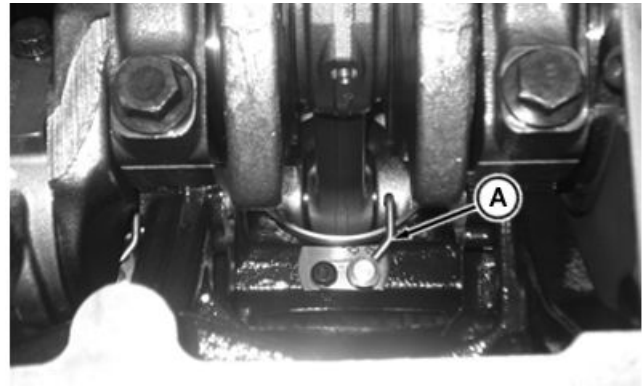
- Loctite™ 277, Hylomar™ 4870 High Strength Thread Locker

Before inspecting and cleaning cylinder block, remove all of the following:

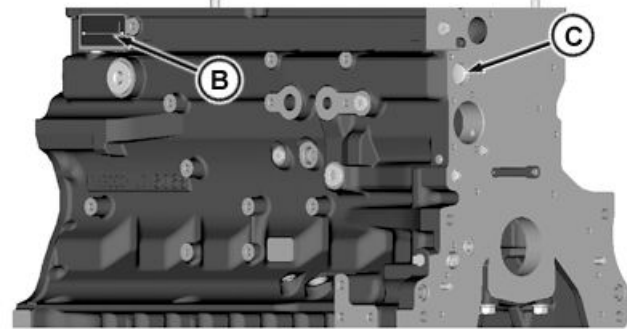
- piston cooling orifices (A)
See Piston Cooling Orifices — Removal Section 2 Group 30.
- plugs (C)
- oil gallery plugs (using JDG782A Oil Gallery Plug Tool)
- all external and internal mounted components (refer to the proper group for removal procedures)

IMPORTANT: If block is cleaned in a hot tank, be sure to remove any aluminum parts such as nameplate (B). Aluminum parts can be damaged or destroyed by hot tank solutions.

1. Clean block thoroughly using cleaning solvent, pressure steam, or a hot tank.
2. All passages and crevices must be clear of sludge, and grease.
3. All coolant passages must be clear of lime deposits and scale.



Cylinder Block Piston Cooling Orifice



Cylinder Block Plug and Nameplate

A—Piston Cooling Orifice
B—Name-plate

C—Plug

Continued on next page

RG19661,0000343 -19-24AUG11-1/5

RG18721 —UN—23JUN10

RG18718 —UN—23JUN10

IMPORTANT: DO NOT file liner support flange excessively. Excess filing can damage liner support flange and allow an improper liner fit. Thoroughly clean all filings from cylinder block.

4. Inspect liner support flange (A) for burrs. If burrs are present, use a small half-moon file and **LIGHTLY** file (in a circular motion) burr off at a 60° angle. **DO NOT** let file hit top of cylinder block while filing.
5. Measure liner flange counterbore depth (A) in block and compare with specification given below.

Specification

Cylinder Block Flange

Counter-bore—Depth.....5.952—5.988 mm (0.2343—0.2357 in.)

6. Carefully inspect block for cracks or damage. If a cracked block is suspected, pressure-test the block. Check for erosion or cracks in the liner O-ring/packing area (B). Replace cracked or damaged blocks.
7. Clean out all threaded holes for cylinder head mounting bolts in top deck of cylinder block, using JDG680 Tap or an equivalent tap. Remove debris or fluid from tapped holes with compressed air.
8. After service of cylinder block, perform Piston Cooling Orifices — Installation.

Special Tools:

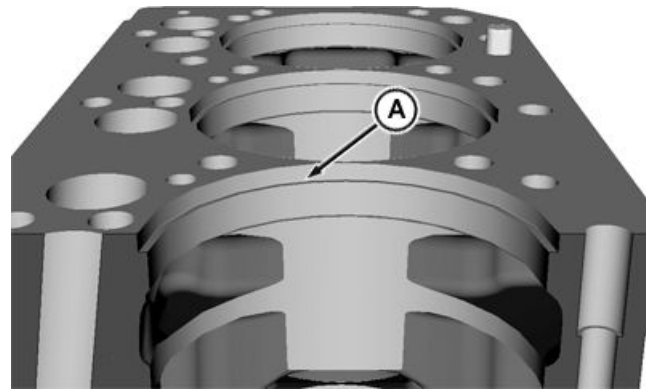
- None

Consumable Material:

- None

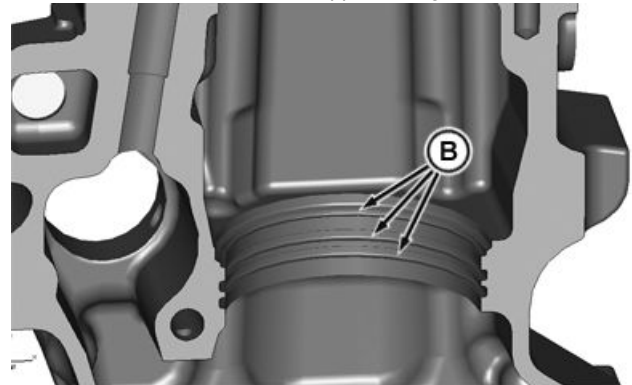
A—Liner Support Flange
B—O-Ring/Packing Area
C—Cylinder Block Liner Counterbore Depth

D—Liner Support Flange
E—Cylinder Block Top Deck Surface



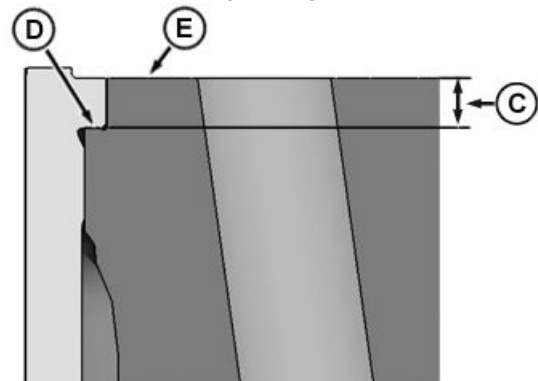
Liner Support Flange

RG18719 —UN—23JUN10



Liner O-Ring/Packing Area

RG18720 —UN—23JUN10

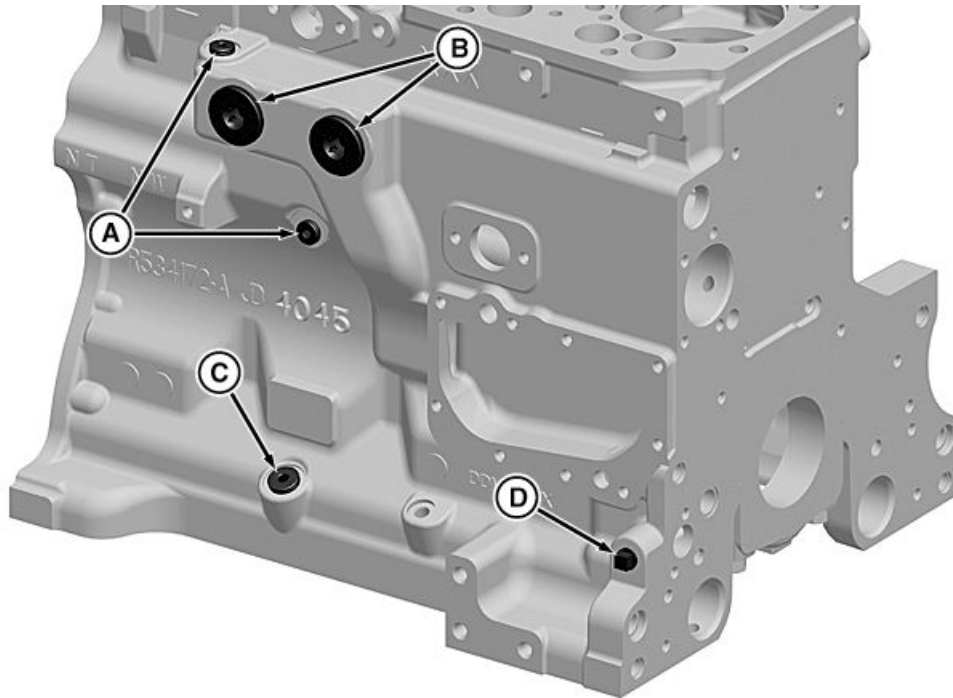


Liner Counter-bore Measurement

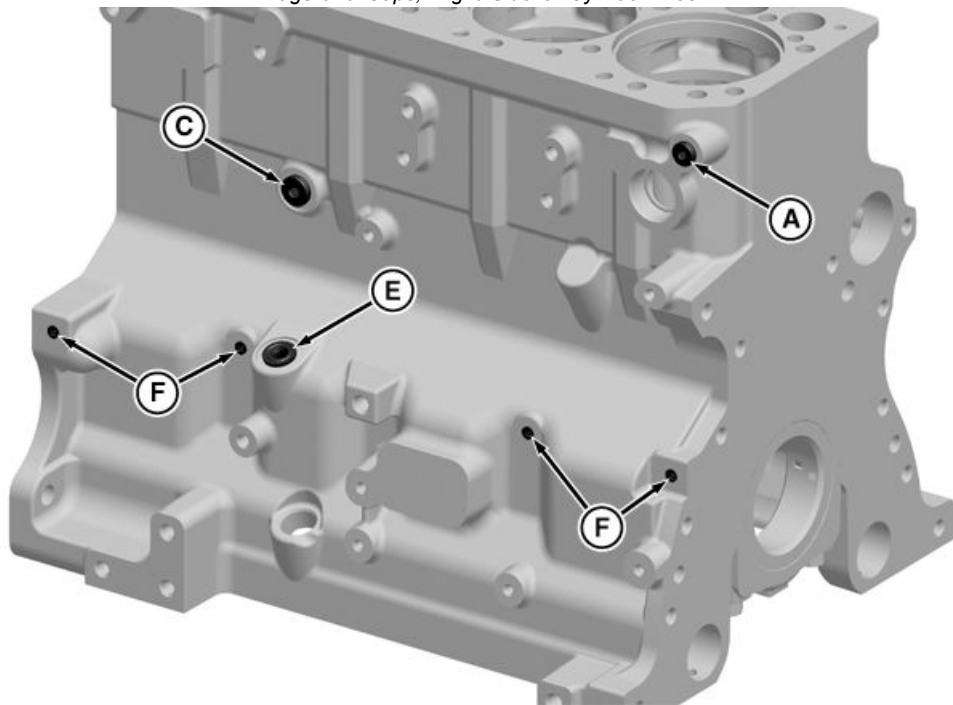
RG18724 —UN—25JUN10

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RG19661,0000343 -19-24AUG11-2/5



Plugs and Caps, Right Side of Cylinder Block



Plugs and Caps, Left Side of Cylinder Block

A—M14 x 1.5 Plug
B—1 5/8" x 12 Plug

C—M18 x 1.5 Plug
D—3/8"-18 Plug

E—M22 x 1.5 Plug
F—1/8" - 27 Plug

9. Coat all pipe plug threads, except for those pipe plugs with a nylon patch, with LOCTITE® 572 or Hylomar™ 5059. Install plugs and tighten to specification.

RG20667 —UN—08JUL11

RG20668 —UN—08JUL11

Continued on next page

RG19661,0000343 -19-24AUG11-3/5

10. Apply hydrite or soapy water to o-ring plugs. Install plugs and tighten to specification.

Cylinder Block Oil and Coolant Gallery Plugs—Specification

M14 X 1.5 Plug—Torque..... 35 N•m (26 lb.-ft.)

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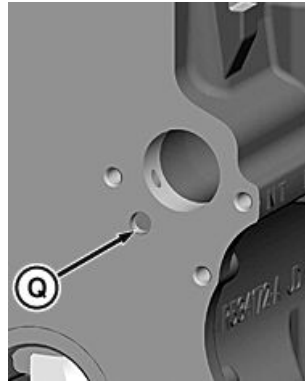
M18 X 1.5 Plug—Torque.....	45 N•m (33 lb.-ft.)
1/8"-27 Plug—Torque.....	20 N•m (15 lb.-ft.)
3/8"-18 Plug—Torque.....	45 N•m (33 lb.-ft.)
1 5/8"-12 Plug—Torque.....	85N•m (63 lb.-ft.)
M22 x 1.5 Plug—Torque.....	67 N•m (49 lb.-ft.)

RG19661,0000343 -19-24AUG11-4/5

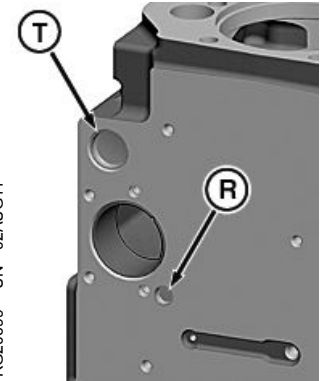
11. Coat cup plugs (Q,R,T) with Loctite™ 277 or Hylomar™ 4870 high strength thread locker and install on the front and rear side.

Q—Cup Plug Rear side
R—Cup Plug Front Side

T—Cup Plug Front Side



Plugs on Rear Side



Plugs on Front Side

RG19661,0000343 -19-24AUG11-5/5

Cylinder Block — Measurement

Special Tools:

- D05012ST—Precision Straightedge

Refer to the appropriate groups for a more detailed description of the features being measured. Compare measurements with specifications given below.

1. Assemble and measure main and thrust bearing caps. Compare measurements with specifications given below:

Specification

Crankshaft Main
Bearing—Bore ID without
Bushing..... 84.455—84.481 mm (3.3250—3.3260 in.)

2. Measure camshaft follower bore diameter at all bore locations.

Specification

Camshaft
Follower—Bore ID in
Block..... 31.70—31.75 mm (1.248—1.250 in.)
Follower OD..... 31.61—31.64 mm (1.245—1.246 in.)
Follower-to-Bore
Clearance 0.06—0.13 mm (0.002—0.005 in.)

If any one camshaft follower bore is not within specification, install a new cylinder block.

3. Measure camshaft bore diameter at all locations and record readings. Compare measurements with specifications given in chart below:

Specification

Camshaft Bore in Block,
Front No. 1 (Without
Bushing)—ID..... 59.961—59.987 mm
(2.3607—2.3617 in.)

Camshaft Bore in Block,
Front No. 1 (With
Bushing)—ID..... 55.961—55.987 mm
(2.2031—2.2042 in.)

Camshaft Bore in Block
(All Except No. 1)—ID..... 55.986—56.012 mm
(2.2042—2.2052 in.)

Camshaft Journal-to-
Bushing (No. 1 Bore
With Bushing)—Oil
Clearance..... 0.050 - 0.128 mm
(0.002—0.005 in.)

Camshaft Journal-to-
Bushing (All Except No.
1)—Oil Clearance..... 0.088—0.140 mm
(0.0035—0.0055 in.)

If camshaft bushing bore diameter in block is more than specified, install a new cylinder block.

4. Measure cylinder block top deck flatness using D05012ST Precision Straightedge and feeler gauge and compare to following specifications. Resurface as required.

Specification

Maximum Acceptable
Out-of-Flat, Entire
Length or Width (Used)
—Measurement..... 0.08 mm (0.003 in.)

Maximum Acceptable
Out-of-Flat (Any 150
mm [5.90 in.] Length)
—Measurement..... 0.025 mm (0.001 in.)

Top Deck (Surface Grind
Only)—Surface Finish..... 0.8—3.2 micrometers
(28—125 micro-in.)

Top Deck Surface
Finish—Maximum Wave
Depth..... 0.012 mm (0.0005 in.)

Main Bearing Bore
Centerline-to-Cylinder
Block Top Deck
—Distance..... 337.896—337.972 mm
(13.3029—13.3059 in.)

RG19661,0000345 -19-04OCT11-1/1

Cylinder Block — Tear Down

If not previously removed, also remove:

- | | |
|--|---|
| <p>1. Perform <u>Flywheel — Removal</u>. (Section 02 Group 40)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>2. Perform <u>Flywheel Housing — Removal</u>. (Section 02 Group 40)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>3. Perform <u>Wiring Harness — Removal</u> (Section 02 Group 110)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>4. Remove all sensors that are connected to cylinder block components. (See Section 02 Group 90)</p> <p>5. Perform <u>Starter — Removal</u> (Section 02 Group 100)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>6. Perform <u>Crankshaft Pulley — Removal</u>. (Section 02 Group 40)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • JDG1571—Timing Pin <p>7. Perform <u>Oil Pan — Removal</u>. (Section 02 Group 60)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>8. Perform <u>Oil Pump and Tubes — Removal</u>. (Section 02 Group 60)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>9. Perform <u>Piston and Connecting Rod Assembly Removal</u>. (Section 02 Group 30)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>10. Perform <u>Timing Gear Cover — Removal</u>. (Section 02 Group 50)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>11. Perform <u>Low-Pressure Fuel Pump — Removal</u>. (Section 02 Group 90)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>12. Perform <u>Camshaft — Removal</u>. (Section 02 Group 50)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None | <p>13. Perform <u>Balancer Shaft — Removal</u>. (Section 02 Group 50)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>14. Perform <u>Oil Pressure Regulating Valve — Removal</u>. (See in Section 2 Group 60)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>15. Perform <u>Front Plate — Removal</u>. (See in Section 2 Group 50)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>16. Perform <u>Crankshaft — Removal</u>. (Section 02 Group 40)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>17. Perform <u>High-Pressure Fuel Pump — Removal</u>. (Section 02 Group 90)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • JDG1571—Timing Pin <p>18. Perform <u>High-Pressure Injection lines — Removal</u>. (Section 02 Group 90)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • JDG11184—Injection line socket <p>19. Perform <u>High-Pressure Common-Rail (HPCR) — Removal</u>. (Section 02 Group 90)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>20. Perform <u>Dipstick Tube and Dipstick — Removal</u>. (Section 02 Group 60)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>21. Perform <u>Oil Fill Adapter — Removal</u>. (Section 02 Group 60)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>22. Perform <u>Electronic Control Unit (ECU) — Removal</u>. (Section 02 Group 100)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None <p>23. Perform <u>Oil Cooler and Filter — Removal</u>. (Section 02 Group 60)</p> <p>Special Tools:</p> <ul style="list-style-type: none"> • None |
|--|---|

Continued on next page

RG19661,0000344 -19-20MAR12-1/2

24. Perform Camshaft Bushings — Removal. (Section 02 Group 50)

Special Tools:

- JDG739-3 Screw Remover
- JDG739-4 Screw Remover
- JDG739-5B Replacer, Bushing

25. Remove by-pass valve and spring. (See in Section 02 Group 60)

26. Perform Cylinder Block — Cleaning and Inspection. (Section 02 Group 30)

RG19661,0000344 -19-20MAR12-2/2

Cylinder Block O-ring — Installation

Special Tools:

- None

Consumables:

- AR54749 Soap Lubricant

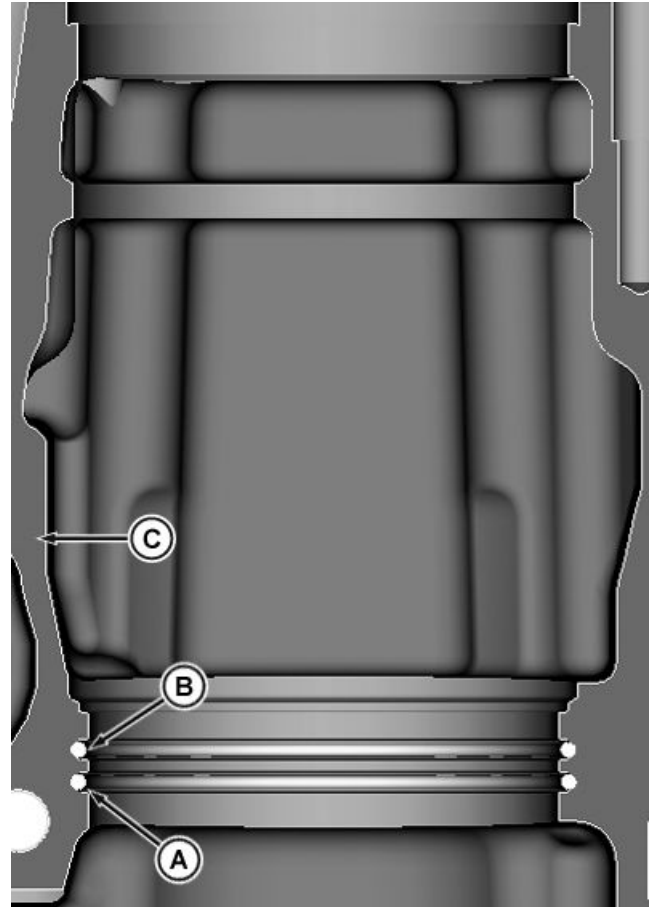
IMPORTANT: DO NOT use oil or hand cleaner soap on O-rings. Petroleum products will cause the red (or white) O-ring to swell, which may result in O-ring damage during liner installation.

1. Pour AR54749 Soap Lubricant into a suitable container.
2. Dip O-rings in AR54749 Soap Lubricant.
3. Install the black O-ring (A) in the lower O-ring groove in the cylinder block (C).
4. Install the red (or white) O-ring (B) in the upper O-ring groove in the cylinder block.

A—Black O-Ring

B—Red or White O-Ring

C—Cylinder Block



Cylinder Block O-Rings

RG18905 —UN—02AUG10

RG19661,0000346 -19-28APR11-1/1

Cylinder Block, Piston, and Rod — Troubleshooting Guide

Scuffed or Scored Pistons:

- Insufficient lubrication.
- Insufficient cooling.
- Improper piston-to-liner clearance.
- Coolant leakage in crankcase.
- Misaligned or bent connecting rod.
- Improperly installed piston.
- Low oil level.
- Improper operation.
- Incorrect connecting rod bearing clearance.
- Carbon build-up in ring groove.
- Improper break-in.
- Worn piston.
- Contaminated oil.
- Distorted cylinder liner.
- Dirty intake air (dusting).
- Worn or broken compression rings.
- Over fueling.
- Broken or clogged spray jet.

Broken Top Piston Ring Land

- Cetane level in fuel.
- Excessive engine lugging.

Piston Pin and Snap Ring Failure:

- Misaligned connecting rod.
- Excessive crankshaft end play.
- Incorrect snap rings.

Worn or Broken Compression Rings:

- Insufficient lubrication.
- Insufficient cooling.
- Improper ring installation.
- Improper combustion.
- Improper timing.
- Abrasives in combustion chamber.
- Worn crosshatching on cylinder liners.

Mottled, Grayish or Pitted Compression Rings:

- Internal coolant leaks.

Dull Satin Finish and Fine Vertical Scratches on Rings:

- Dirt and abrasive in air intake system.

Clogged Oil Control Ring:

- Improper oil.
- Excessive blow-by.
- Contaminated oil.
- Improper periodic service.
- Low operating temperature.

Stuck Rings:

- Improper oil classification.
- Improper periodic service.
- Poor operating conditions.
- Coolant leakage in crankcase.
- Excessive cylinder liner taper.

Broken Connecting Rod:

- Inadequate piston-to-liner clearance.
- Worn connecting rod bearing.
- Distorted cylinder liner.
- Piston pin failure.
- Insufficient Lubrication

Cylinder Liner Wear and Distortion:

- Incorrectly installed compression rings.
- Insufficient lubrication.
- Uneven cooling around liner.
- Improper piston-to-liner clearance.
- Liner bore damage.
- Dirt and abrasive in air intake system.

Warped Cylinder Block:

- Insufficient cooling.

RG19661,0000347 -19-28APR11-1/1

Cylinder Liner — Cleaning

Consumables:

- SAE 10W Oil

1. Use a stiff bristle brush to remove all debris, rust, and scale from OD of liners, under liner flange, and in O-ring packing areas. Make certain there are no nicks or burrs in areas where packings will seat.

IMPORTANT: Do not use gasoline, kerosene or commercial solvents to clean liners. Solvents will not remove all abrasives from liner walls.

2. Swab out liner as often as necessary with clean SAE 10W oil.
3. Clean liner until a clean, white rag shows no discoloration.

RG19661,0000348 -19-28APR11-1/1

Cylinder Liner — Installation

Special Tools:

- JDG1145—Cylinder Liner Service Set

Consumable Material:

- Engine Oil
- Waterless Hand Cleaner

1. Cylinder Liner Installation

IMPORTANT: There are different manufacturers/part numbers for piston and liner sets. These sets are not interchangeable. DO NOT inter-mix piston/liner sets on the same engine. Check parts catalog for correct applications.

IMPORTANT: Install cylinder liners into same cylinder block bore as removed. DO NOT scuff the liner packing across the upper counterbore.

Pitted or eroded liners that meet reuse guidelines should be rotated 90° from their removed position. (See Cylinder Liner — Visual Inspection earlier in this group for re-use guidelines.)

- Install liner in block bore with mark (made during disassembly) toward front of engine, unless liner OD is pitted or eroded.
If liner OD is pitted or eroded, but still within acceptable service limits, rotate liner 90° from its removed position. Pitted sections of the liner should be facing the front or rear of engine.

NOTE: Using JDG1145 Cylinder Liner Service Set is the preferred method for seating cylinder liners.

- A resistance will be felt when cylinder liner is aligned in pilot bore. Finish seating liners using JDG1145 Cylinder Liner Service Set.
A clean, hardwood block and mallet may be used if puller is not available. Gently tap hardwood block over top of cylinder liner with mallet.

NOTE: Cylinder liner will protrude over top of cylinder block more than normal due to uncompressed packings and o-rings.

IMPORTANT: If you suspect a packing may have sheared or been displaced during liner installation, remove and examine the liner and packing assembly. If no damage is found, check packings for proper position. Resoap packings and reinstall liner assembly.

- Hold liners in place with large flat washers and cap screws. Turn cap screws snug but do not tighten.
- Clean cylinder liner bores with waterless hand cleaner after installation. Wipe dry with clean towels.



Cylinder Liner Installation

RG7497 —UN—23NOV97

- Apply clean engine oil to liner bores immediately to prevent corrosion.

2. Perform Piston and Connecting Rod Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None

3. If removed, perform Oil Pump — Installation.

Special Tools:

- None

Consumable Material:

- None

4. If removed, perform Oil Pick-up Tube Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None

5. Perform Oil Pan — Installation.

Special Tools:

- None

Consumable Material:

- None

6. Perform Cylinder Head — Installation.

Tools:

- JD244 — Lift Straps or
- JDG19 — Special Bracket

Consumable Material:

- Head Cap Screws, Head Gasket, SAE30 Diesel Engine Oil, O-rings, Coolant Manifold Cap Screws

RG19661,000034A -19-27JUL11-1/1

Cylinder Liner — Removal

1. Perform Cylinder Head — Removal.

Special Tools:

- JD244—Lift Strap, Front
- JDG19—Lift Strap, Rear

Consumable Material:

- None

2. Clean all foreign material from cylinder block top deck.

IMPORTANT: Cap screws and washers must be tightened to the correct specification to achieve an accurate reading when checking liner standout (height above block), as detailed later in this group.

3. Use short cap screws (A) and 3 mm (1/8 in.) thick washers (B) to bolt down cylinder liners (C). Fasten each liner in two locations. Tighten cap screws to specification. 68 N•m (50 lb-ft).

NOTE: Do not rotate crankshaft with cylinder head removed unless liners are fastened down.

NOTE: Always follow manufacturer's directions provided with ridge reamer.

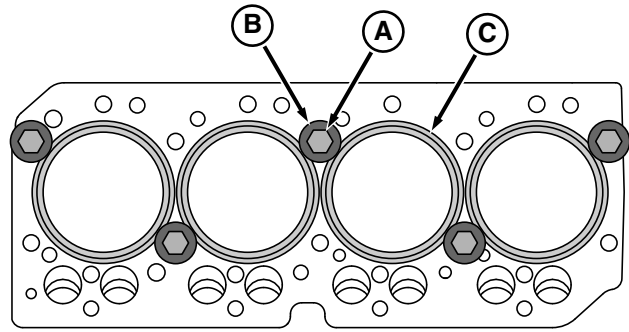
4. Remove carbon from liner bore with a scraper or ridge reamer. Use compressed air to remove loose material from cylinders.

5. Perform Oil Pan — Removal.

Special Tools:

- None

6. If necessary, perform Oil Pick-up Tube Assembly — Removal.



Cylinder Liner Hold-Down

A—Cap Screws
B—Washers

C—Liners

Special Tools:

- None

7. If necessary, perform Oil Pump — Removal.

Special Tools:

- None

8. Perform Piston and Connecting Rod Assembly — Removal.

Special Tools:

- None

9. **Cylinder Liner — Removal**

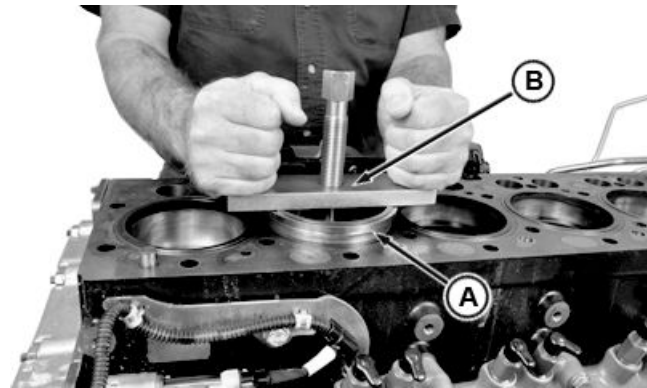
Special Tools:

- D01073AA or JDG1145—Cylinder Liner Puller

- a. Number cylinder liners and mark fronts to assure correct assembly.

IMPORTANT: Keep matched pistons and liners together. Liners must be reinstalled in same cylinder bore.

- b. Use D01073AA or JDG1145 Cylinder Liner Puller (B) to remove cylinder liner (A).



Cylinder Liner Removal

Continued on next page

RG19661,000034B -19-25JUL11-1/3

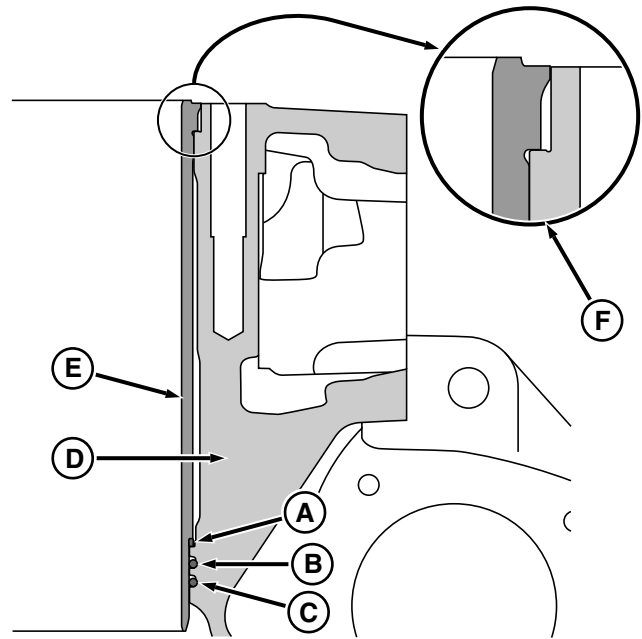
RG19661,000034B -19-25JUL11-2/3

RG18602—UN—27MAY10

- c. Remove the cylinder liner square packing (A) from liner (E).
- d. Remove red o-ring (B) and black o-ring (C) from cylinder block (D).
- e. Perform Cylinder Liner — Visual Inspection.

A—Square Packing
B—Red O-ring
C—Black O-ring

D—Cylinder Block
E—Cylinder Liner
F—Coolant Passage —
Cylinder Liner to Block



Cylinder Liner, O-rings and Packing

RG16872 —UN—23MAR09

RG19661,000034B -19-25JUL11-3/3

Cylinder Liner — Standout Measurement

Special Tools:

- D17015BR—O-ring Groove Cleaning Brush
- JDG451—Height Gauge
- D17526CI or D17527CI—Dial Indicator
- JDG1145—Cylinder Liner Puller

Consumable Material:

- CD15466 Liner Shim and R65833 Liner Shim

NOTE: If a new liner assembly is being installed in a new or used cylinder block, liner height must be checked.

1. Be sure liner bore in cylinder block and top deck of block are clean.

IMPORTANT: Liner should rotate smoothly by hand when installed without O-rings or packing. If not, remove liner and clean block. See in Section 02 Group 30, Cylinder Liner O-Ring Bore — Cleaning, and Cylinder Block — Cleaning and Inspection.

2. Install liner without O-rings and packing. If liner does not rotate smoothly by hand, remove liner and polish lower pilot bore in block with emery cloth or D17015BR O-ring Groove Cleaning Brush. Use a shop towel or other suitable means to collect debris when polishing bore.

Secure liners (C) with cap screws (A) and washers (B, approximately 3 mm [1/8 in.] thick). Fasten each liner in two locations and tighten screws to 68 N•m (50 lb-ft).

3. Using JDG451 Height Gauge and D17526CI or D17527CI Dial Indicator, measure height (A) of liner at 1, 5, 7, and 11 o'clock positions as viewed from flywheel end of engine.

Specification

Cylinder Liner—Height

above Block.....0.030—0.100 mm
(0.001—0.004 in.)

Maximum Permissible

Height Difference at

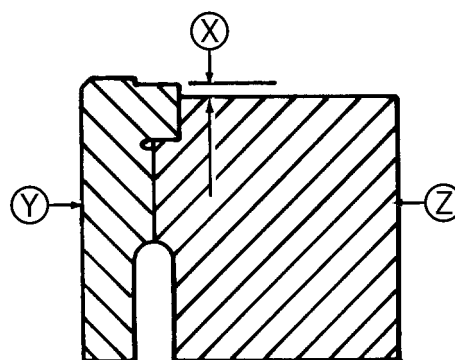
Nearest Point of Two

Adjacent Liners, or Within

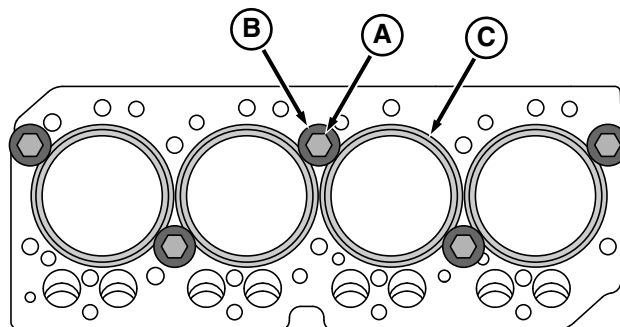
a Single Liner.....0.1 mm (0.004 in.)

4. If liner height is above specification, check cylinder block for burrs on liner support flange or incorrect counterbore depth. If burrs are present, apply lapping compound to liner flange shoulder in the block, then install liner and turn to left and right using JDG1145 Cylinder Liner Puller to rub off enough material to seat liner as necessary.

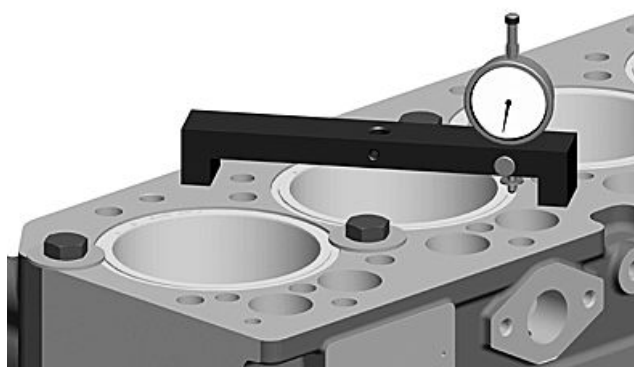
IMPORTANT: ONE LINER SHIM ONLY may be installed under each liner flange. If liner requires more than one shim, install a new liner or cylinder block.



Cylinder Liner Stand-out



Cylinder Liner Hold-Down



Cylinder Liner Standout Measurement

X—Liner Height
Y—Liner
Z—Cylinder Block

A—Cap Screws
B—Washers
C—Cylinder Liner

5. If liner height is no more than 0.02 mm (0.0007 in.) below top deck of block, install one liner shim under liner flange.

NOTE: Two shim sizes are available; 0.05 mm (0.002 in.) liner shim and 0.10 mm (0.004 in.) R65833 liner shim.

RG19061—UN—26AUG10

RG20669—UN—06JUL11

RG20681—UN—12JUL11

RG19661,000034C -19-26JUL11-1/1

Cylinder Liner — Visual Inspection

IMPORTANT: If liner pitting has occurred, check condition of coolant.

NOTE: When installing reusable liners, rotate 90° from original position.

1. Inspect exterior length of liner for pitting (A). Check packing step for erosion (B). If pitting or erosion is observed, measure depth of pits with a fine wire or needle.

Replace piston and liner if:

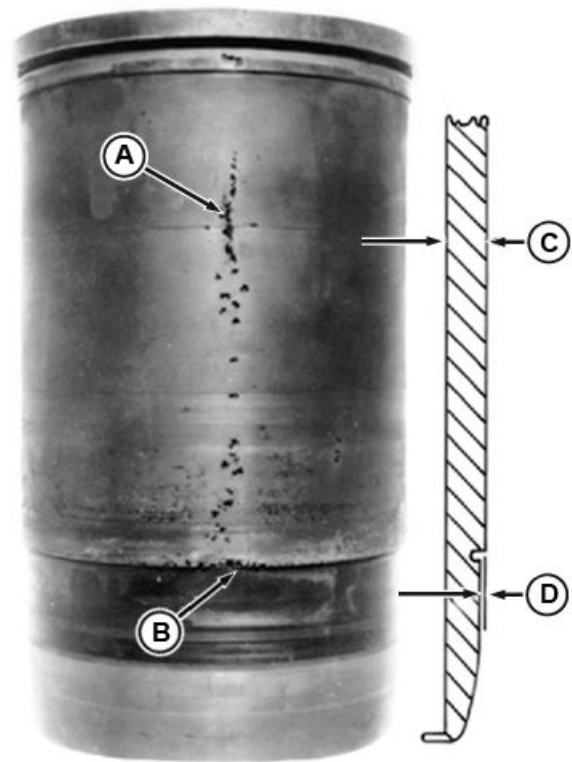
- Depth of any pit is one-half or more of liner thickness (C).
- Depth of erosion is one-half or more of the packing step (D).

Specification

Cylinder Liner—Thickness.....	2.49 - 3.36 mm (0.098—0.132 in.)
Cylinder Liner Packing Step —Dimension.....	7.713 - 8.177 mm (0.303—0.321 in.)

A—Liner Pitting
B—Liner Erosion

C—Liner Thickness
D—Packing Step



Cylinder Liner Inspection

RG19661,000034D -19-28APR11-1/2

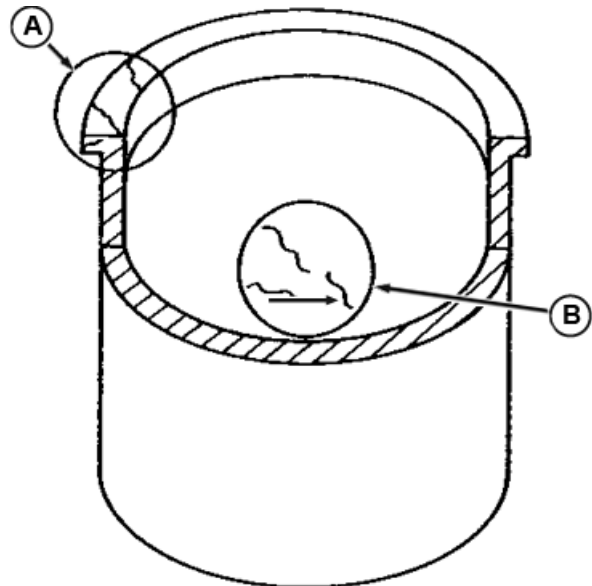
RG18577 —UN—26MAY10

2. Visually inspect liner ID. Replace piston and liner if:
 - The crosshatch honing pattern is not visible.
 - Liners are pitted or contain deep vertical scratches that can be detected by the fingernail.
 - Scoring has occurred.
3. Carefully examine liner for signs of fatigue, such as fine cracks in the flange area (A) and cracks in the ring travel area (B).

NOTE: Inspect block for cracks or erosion in the o-ring packing areas. (See *Cylinder Block — Cleaning and Inspection* in Section 02 Group 30.)

A—Flange Area

B—Piston Ring Travel Area



Cylinder Liner - Exaggerated Defects

RG19661,000034D -19-28APR11-2/2

RG18578 —UN—26MAY10

Cylinder Liner Flange — Measurement

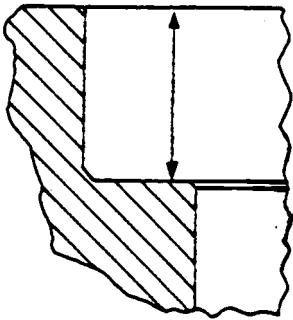
Measure liner flange counter-bore depth in block and compare to specification given below. If depth is not within specification, liner shims are available.

Specification

Cylinder Liner Flange	
Counterbore—Depth in	
Block.....	5.952—5.988 mm
	(0.2343—0.2357 in.)



Liner Flange Counter-bore Depth Measurement



Liner Flange Counter-bore Depth

RG19661,0000349 -19-04OCT11-1/2

RG7490 —UN—23NOV97

RG4726 —UN—13DEC88

Measure cylinder liner flange thickness at several locations. If liner flange is not within specifications, liner shims are available or replace piston and liner set.

Specification

Cylinder Liner	
Flange—Thickness.....	6.022—6.058 mm
	(0.2371—0.2385 in.)



Liner Flange Thickness Measurement

RG19661,0000349 -19-04OCT11-2/2

RG7494 —UN—23NOV97

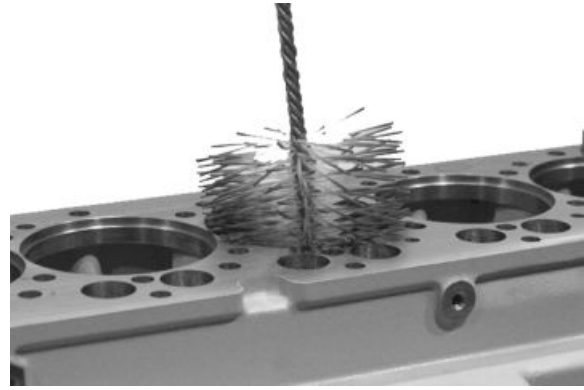
Cylinder Liner O-ring Bore — Cleaning

Special Tools:

- D17015BR—O-ring Groove Cleaning Brush

Use D17015BR O-Ring Groove Cleaning Brush to thoroughly clean lower liner O-ring bore.

NOTE: Use the brush exactly as directed by the manufacturer.



O-Ring Groove Cleaning

RG7486 —UN—23NOV97

RG19661,000034E -19-28APR11-1/1

Cylinder Liner Packing — Installation

Special Tools:

- None

Consumable Material:

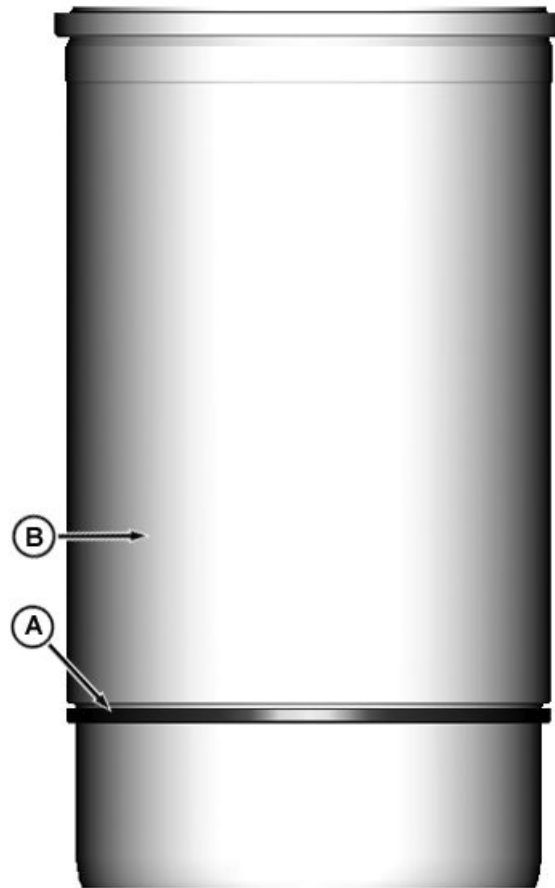
- AR54749 Soap Lubricant

IMPORTANT: DO NOT use oil or hand cleaner soap on cylinder liner packing or O-rings. Petroleum products will cause the red (or white) O-ring to swell, which may result in O-ring damage during liner installation.

1. Pour AR54749 Soap Lubricant into a suitable container.
2. Turn cylinder liner (B) upside-down. Dip square packing (A) in AR54749 soap lubricant and install over outside of liner.
3. Slide packing down firmly against shoulder on liner. Make sure packing is not twisted.
4. Coat the liner packing sealing area of the cylinder liner and block O-rings with soap lubricant.

A—Square Packing

B—Cylinder Liner



Cylinder Liner Packing

RG18906 —UN—03AUG10

RG19661,000034F -19-28JUL11-1/1

Piston — Cleaning

⚠ CAUTION: Always follow manufacturer's instructions and safety steps exactly.

1. Clean piston ring grooves using a piston ring groove cleaning tool.

IMPORTANT: When washing pistons, always use a stiff bristle brush—NOT A WIRE BRUSH—to loosen carbon residue.

DO NOT bead blast ring groove areas.

2. Soak pistons in a 50 percent solution of liquid household detergent and hot water for 30 to 60 minutes.
3. Use a stiff bristle brush—NOT A WIRE BRUSH—to loosen carbon residue.

4. Dry with compressed air.



Piston Ring Grooves Cleaning

RG7465 —UN—23NOV97

RG19661,0000350 -19-28APR11-1/1

Piston — Visual Inspection

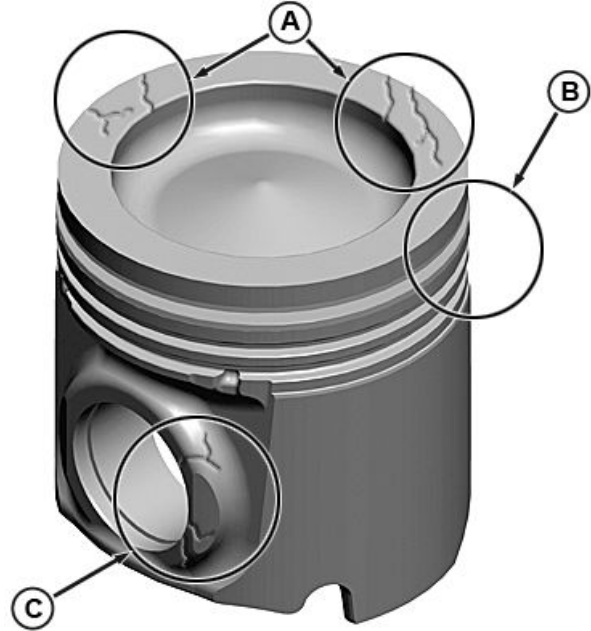
Carefully inspect pistons under magnification. Check for:

- signs of fatigue
- fine cracks in the piston head (A)
- bent or broken ring lands (B)
- cracks at inner and outer ends of piston pin bore (C)
- excessive piston skirt wear (original machining marks must be visible)

If any imperfections are found, replace the piston and liner as a set.

A—Piston Head
B—Ring Lands

C—Piston Pin Bore



Piston (Defects Exaggerated)

RG18732 —UN—29JUN10

RG19661,0000351 -19-28APR11-1/1

Piston and Connecting Rod Assembly — Assemble

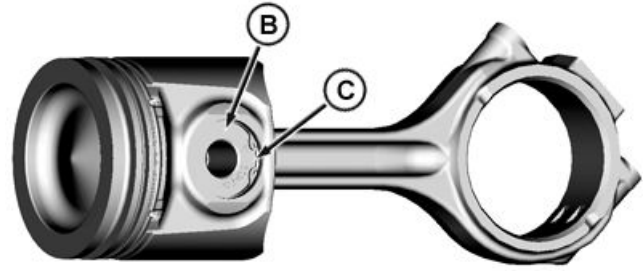
Special Tools:

- None

Consumable Material:

- Engine Oil, Piston Pin Snap-rings

IMPORTANT: There are different manufacturers/part numbers for piston and liner sets. These sets are not interchangeable. DO NOT intermix piston/liner sets on the same engine. Check parts catalog for correct applications.



RG18567 —UN—14JUL10

Piston and Connecting Rod Assembly

1. Perform Piston Pin Bushing — Installation.

Special Tools:

- JDG337—Connecting Rod Bushing Service Set
- JDE98A—Piston Pin Bushing Driver

Consumable Material:

- Engine Oil

2. Piston and Connecting Rod Assembly — Assemble

IMPORTANT: Pistons must be installed on connecting rods from which they were removed, and new piston pin snap rings must be used.

- Assemble pistons and connecting rods, making sure the word 'FRONT' on piston and connecting rod, are facing same direction.
- Lubricate piston pin (B) with clean engine oil. and insert it into piston pin bore.

NOTE: Some piston pin snap rings have sharp edges on both sides. These rings are reversible.

B—Piston Pin

C—Snap Ring Gap

- Install NEW piston pin snap rings with ring gap (C) facing down to the 6 o'clock position at bottom of piston (viewed from rod end) and sharp edge of ring facing away from piston pin. (If snap rings have sharp edges on both sides, direction of installation is not important). Make sure snap rings are seated in grooves of piston pin bore.

d. Perform Piston Rings — Installation.

Special Tools:

- JDE85 or JDE135 — Piston Ring Expander

Consumable Material:

- None

RG19661,0000354 -19-04OCT11-1/1

Piston and Connecting Rod Assembly — Installation

Special Tools:

- JDG11413 — Piston Ring Compressor

Consumable Material:

- Engine Oil, Connecting Rod Cap Screws

1. Piston and Connecting Rod Assembly Installation

- Coat pistons, liners and inside of piston ring compressor with clean engine oil.
- Stagger ring gaps on piston as shown. Position gap of top ring (C) to face the front of the engine (A). Position gap of 2nd ring (D) 120° from gap in top ring. Position gap in oil control ring (E) 120° from 2nd ring, with white stripe on expander ring positioned in gap (F) of oil control ring.

IMPORTANT: Only JDG11413 — Piston Ring Compressor can be used with Interim Tier 4 engines. Using other piston ring compressors can damage or break the piston rings.

- Carefully place JDG11413 — Piston Ring Compressor with piston and rod over liner so the word "FRONT" on side of rod and on the side of piston faces toward the front of the engine.

NOTE: Be sure the word "FRONT" on connecting rod faces toward the front of the engine.

- With piston centered in ring compressor and rings staggered correctly, push piston down until top ring is into liner.
- Apply clean engine oil on connecting rod insert and crankshaft journal. Carefully pull connecting rod and insert against crankshaft journal.
- Apply clean engine oil to bearing insert. Install connecting rod caps.
- Dip NEW connecting rod cap screws in clean engine oil and install. Tighten cap screws, applying initial torque to specification

Specification

Connecting Rod Cap

Screws—Torque..... 58 N•m (43 lb.-ft.) +90° Turn

- Perform Connecting Rod Cap Screw - Torque-Turn.
- Perform Piston Protrusion — Measurement.

2. Perform Oil Pump — Installation.

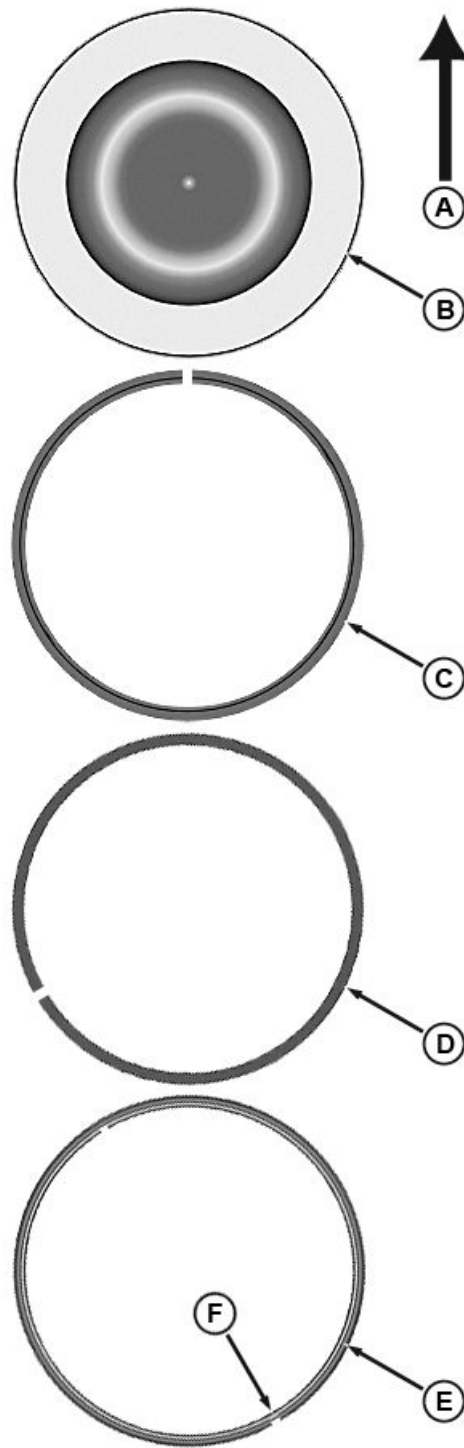
Special Tools:

- None

Consumable Material:

- None

3. Perform Oil Pick up Tube Assembly — Installation.



Position Piston Ring Gaps

A—Front of Engine
B—Top Surface of Piston
C—Top Compression Ring

D—2nd Compression Ring
E—Oil Control Expander Ring
F—Expander Ring White Paint Mark

Special Tools:
• None

RG16907—UN—05MAY09

Continued on next page

RG19661,0000352 -19-24AUG11-1/2

Consumable Material:

- None

4. Perform Oil Pan — Installation.

Special Tools:

- None

Consumable Material:

- None

5. Cylinder Head — Installation.

Tools:

- JD244 — Lift Straps or
- JDG19 — Special Bracket

Consumable Material:

- Head Cap Screws, Head Gasket, SAE30 Diesel Engine Oil, O-rings, Coolant Manifold Cap Screws

RG19661,0000352 -19-24AUG11-2/2

Piston and Connecting Rod Assembly — Removal

NOTE: It is not necessary to remove engine from machine to service cylinder head on all applications. Refer to your Machine Technical Manual for engine removal procedure, if required.

1. Perform Cylinder Head — Removal.

Special Tools:

- JD244—Lift Strap, Front
- JDG19—Lift Strap, Rear

Consumable Material:

- None

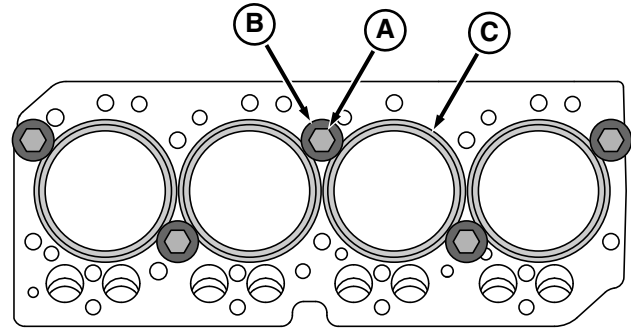
2. Clean all foreign material from cylinder block top deck.

IMPORTANT: Cap screws and washers must be tightened to the correct specification to achieve an accurate reading when checking liner standout (height above block), as detailed later in this group.

3. Use short cap screws (A) and 3 mm (1/8 in.) thick washers (B) to bolt down cylinder liners (C). Fasten each liner in two locations. Tighten cap screws to 68 N•m (50 lb-ft).

NOTE: Do not rotate crankshaft with cylinder head removed unless liners are fastened down.

NOTE: Always follow manufacturer's directions provided with ridge reamer.



RG20669 —UN—08JUL11

Cylinder Liner Hold-Down

A—Cap Screws
B—Washers

C—Liners

4. Remove carbon from liner bore with a scraper or ridge reamer. Use compressed air to remove loose material from cylinders.

5. Perform Oil Pan — Removal.

Special Tools:

- None

6. Perform Oil Pick up Tube Assembly — Removal.

Special Tools:

- None

7. Perform Oil Pump — Removal.

Special Tools:

- None

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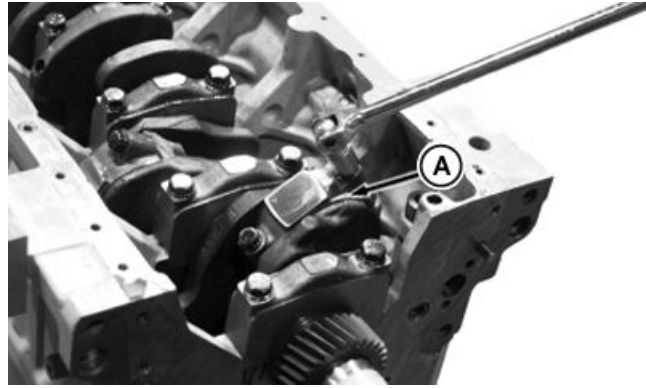
RG19661,0000353 -19-25JUL11-1/3

8. Piston and Connecting Rod Assembly — Removal

- Mark rods, pistons, and caps to ensure correct assembly in same location.

IMPORTANT: Keep inserts with their respective caps for rod and main bearings.

- Remove all rod caps (A) with bearings.



Connecting Rod Bearing and Cap Removal

RG18565 —UN—25MAY10

RG19661,0000353 -19-25JUL11-2/3

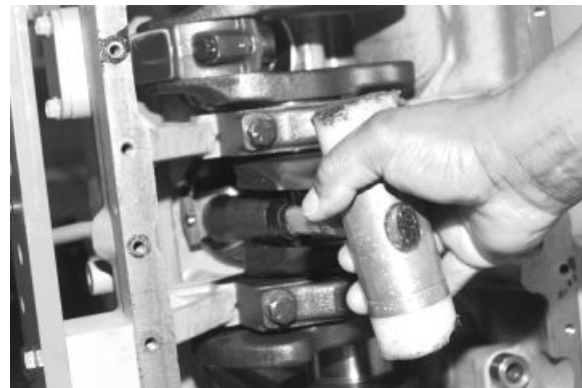
IMPORTANT: Hold onto piston to prevent piston from dropping. Piston will drop once piston rings have cleared cylinder liner.

If liners are to be reused, be extremely careful not to let connecting rod hit liner bore when removing piston and rod assembly.

- Gently tap piston through top of cylinder block from the bottom.
 - Remove pistons and rods from engine.
 - Remove all main bearing caps with bearings. Remove crankshaft from engine.
9. If necessary, Perform Piston and Connecting Rod Assembly — Tear Down.

Special Tools:

- JDE135—Universal Piston Ring Expander (or)
- JDE85—Piston Ring Expander (or)



Tapping Piston

RG7460 —UN—23NOV97

- KJD10140—Piston Ring Expander

If engine is to be removed from the machine, see your machine technical manual.

RG19661,0000353 -19-25JUL11-3/3

Piston and Connecting Rod Assembly — Tear Down

Special Tools:

- JDE135—Universal Piston Ring Expander (or)
- JDE85—Piston Ring Expander (or)
- KJD10140—Piston Ring Expander

IMPORTANT: DO NOT re-use piston rings.

1. Remove piston rings using the JDE135 (shown), JDE85, or KJD10140 Piston Ring Expander.
2. Remove and discard piston pin snap rings.
3. Separate piston and rod. Keep these parts in place with their respective cylinder liner.
4. Perform Piston Pin Bushing — Removal.

Special Tools:

- JDG337—Connecting Rod Bushing Service Set
- JDE98A—Bushing Driver



Piston Ring Removal

RG20124 —UN—22MAR11



Piston Pin Snap Ring Removal

RG20125 —UN—22MAR11

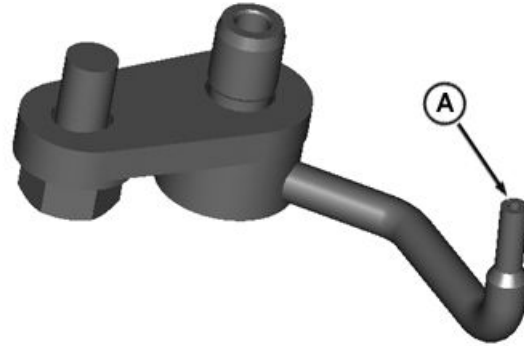
RG19661,0000355 -19-28APR11-1/1

Piston Cooling Orifice — Cleaning and Inspection

IMPORTANT: A piston cooling orifice failure could cause damage to pistons, piston pins, rod pin bushings, and liners. If a piston cooling orifice is left out, low or no oil pressure will result.

PVX Engines

1. Inspect each cooling orifice to make sure it is not plugged or damaged.
2. Use a soft wire and compressed air to clean orifice (A). Replace if condition is questionable.



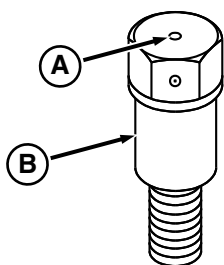
Piston Cooling Orifice

RG18794 —UN—14JUL10

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RG19661,0000355 -19-20MAR12-1/2

PWX Engines

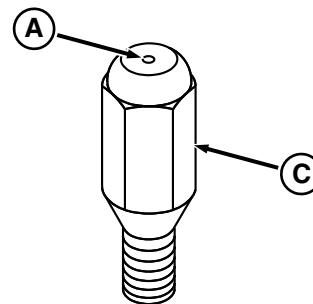


Hex Head Piston Cooling Orifice

A—Orifice Jet

B—Hex Head Piston Cooling Orifice

C—Round Head Piston Cooling Orifice



Round Head Piston Cooling Orifice

1. Inspect each cooling orifice to make sure it is not plugged or damaged.

2. Use a soft wire and compressed air to clean orifice (A). Replace if condition is questionable.

RG19661,0000356 -19-20MAR12-2/2

Piston Cooling Orifice — Installation

1. Piston Cooling Orifice — Installation

Special Tools:

- None

Consumable Material:

- None

- a. Rotate the crankshaft to allow access to the mounting pad for the piston cooling nozzles in the block.
- b. Insert the protruding stem of the piston cooling nozzles (Y) into the mating holes in the block so that the flange is in contact with the mounting pad. Install nozzle cap screws (X) and tighten to specification.

Specification

Piston Cooling Nozzle

Cap Screw—Torque..... 17N•m (12 lb.-ft.)

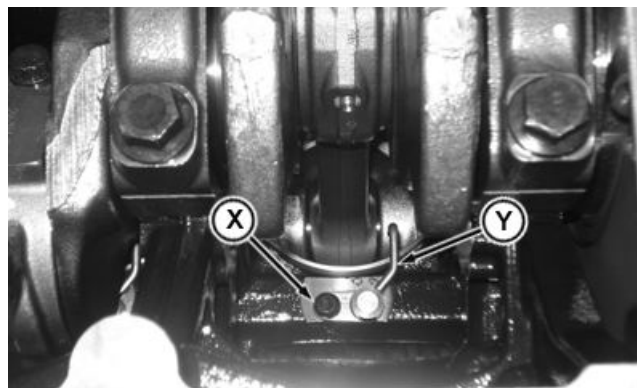
2. Some models use a piston cooling orifice rather than piston cooling nozzle. If the orifice is used, thread orifice into block and tighten to specification.

Specification

Piston Cooling

Orifice—Torque..... 11N•m (8 lb.-ft.)

LOCTITE is a registered trademark of the Loctite Corp.



Piston Cooling Nozzle

X—Mounting Cap Screw

Y—Piston Cooling Nozzle

3. Perform Oil Pan — Installation.

Special Tools:

- None

Consumable Material:

- Oil Pan Gasket, Engine Oil, LOCTITE® 515 Joint Sealing Compound

RG19661,0000357 -19-24AUG11-1/1

Piston Cooling Orifice — Removal

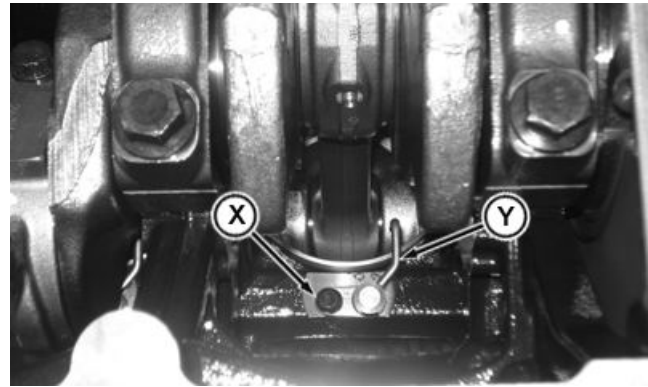
1. Perform Oil Pan — Removal.

Special Tools:

- None

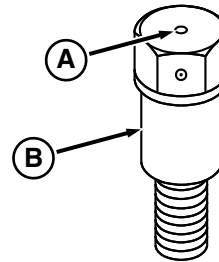
2. **Piston Cooling Orifice Removal**

- Rotate the crankshaft to allow access the piston cooling nozzles or orifice option in the block.
- Remove mounting cap screw (X) and piston cooling nozzle (Y), from within the block. If equipped with orifice option, directly remove orifice with socket.
- Perform Piston Cooling Orifice — Cleaning and Inspection if applicable.

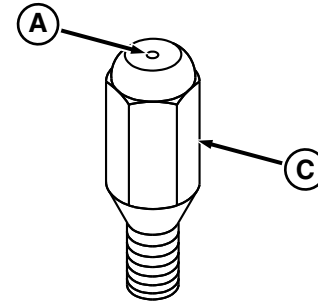


Piston Cooling Nozzle

- | | |
|-------------------------------------|-------------------------|
| A—Orifice Jet | X— Mounting Cap Screw |
| B—Hex Head Piston Cooling Orifice | Y—Piston Cooling Nozzle |
| C—Round Head Piston Cooling Orifice | |



Hex Head Piston Cooling Orifice



Round Head Piston Cooling Orifice

RG19661,0000358 -19-04AUG11-1/1

RG18793 —UN—13JUL10

RG20717 —UN—08AUG11

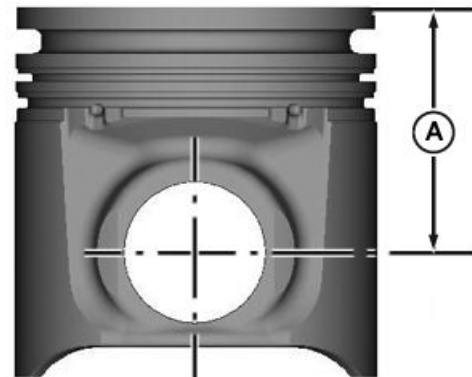
RG20718 —UN—04AUG11

Piston Height — Measurement

Measure piston height from center of piston pin bore-to-top of piston.

Piston Height—Specification

Piston—Height (Measured from Center of Pin Bore to Top of Piston).....	72.175—72.225 mm (2.841—2.843 in.)
---	---------------------------------------



Piston Height Measurement

RG19661,0000359 -19-28APR11-1/1

RG18640 —UN—04JUN10

Piston Pin and Bore — Inspection

NOTE: Pin must be in good condition with no visible wear.

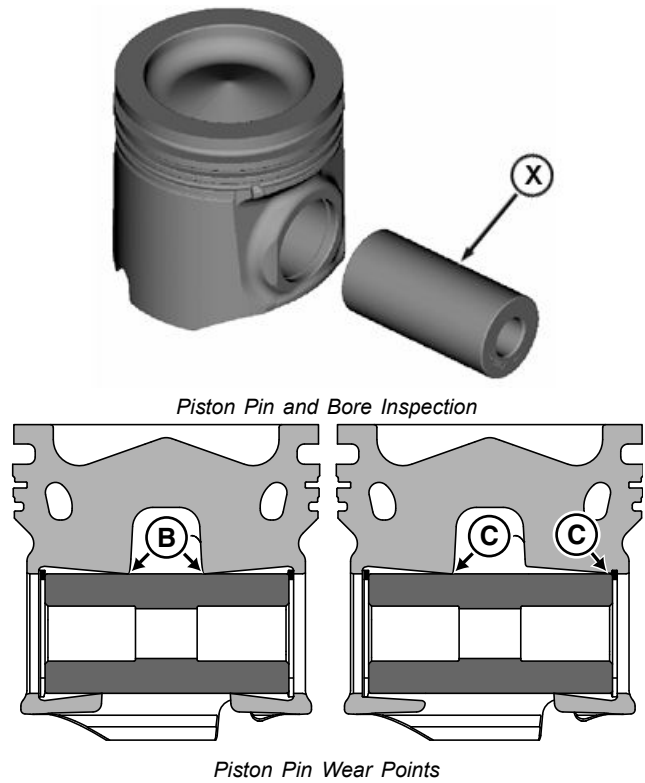
1. Dip piston pin in clean engine oil.
2. Install piston pin (X) through piston. Pin should pass through piston using only light thumb pressure.
3. Insert pin from both sides. If pin enters freely, but binds in the center, the bore could be tapered (B).

Also pin should not “click” or need to be forced into bore on opposite side (C).

4. Measure piston pin O.D. and piston bore I.D. If either are not within specification, replace pin and piston.

Specification

Piston Pin —OD.....	41.271—41.277 mm (1.8610—1.8612 in.)
Piston Pin Bore—ID.....	41.287—41.293 mm (1.6254—1.6257 in.)



RG18641 —UN—07JUN10

RG18646 —UN—11AUG10

RG19661,000035A -19-28APR11-1/1

Piston Pin and Bushing — Inspection

1. Carefully clamp the piston pin—installed in the connecting rod, in a soft-jawed vise.
2. Rotate connecting rod back and forth several times to make sure connecting rod moves freely on piston pin.
3. Remove and re-insert pin from either side of connecting rod bushing.

If pin is free on one end, but tight on the other, the bushing bore could be tapered (A).

If pin enters freely from both sides, but is tight in the center, bushing bore may be bell-mouthed (B).

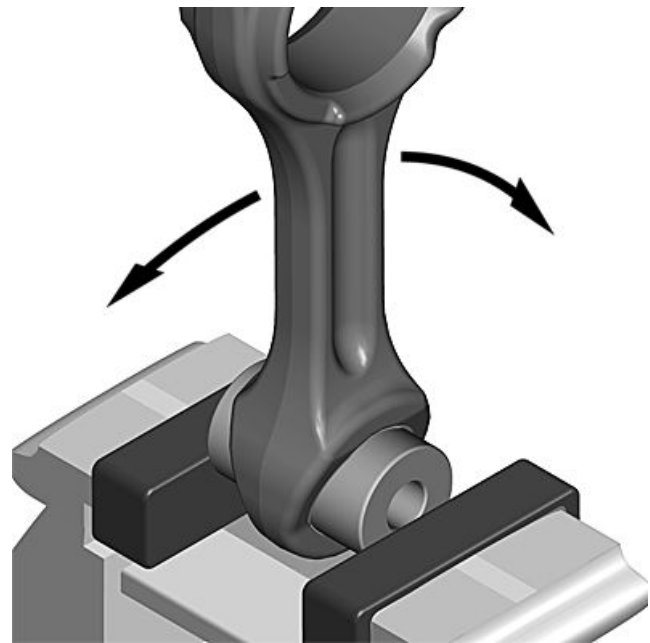
4. Measure I.D. of pin bushing and O.D. of piston pin. Compare measurements with specifications.

Specification

Piston Pin—OD.....	41.271—41.277 mm (1.624—1.625 in.)
Pin Bushing—ID.....	41.3—41.326 mm (1.6259—1.6270 in.)
Connecting Rod	
Pin-to-Bushing—Oil	
Clearance.....	0.016—0.036 mm (0.0006—0.0014 in.)
Bushing Wear Limit	0.050 mm (0.002 in.)

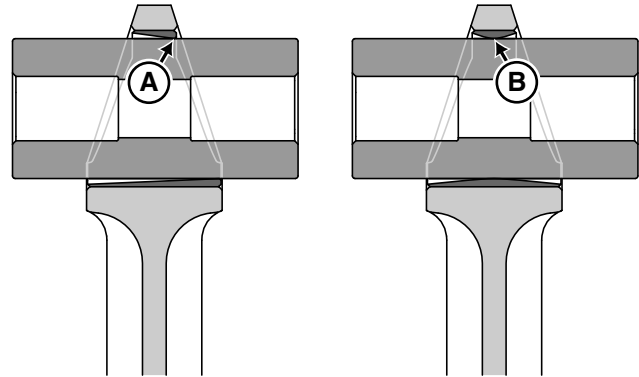
A—Tapered Bore

B—Bell-mouthed Bore



RG16881 —UN—23MAR09

Piston Pin to Rod Fit Check



Bushing Bore Wear Points

RG18647 —UN—11AUG10

RG19661,000035B -19-11AUG11-1/1

Piston Pin Bushing — Installation

Special Tools:

- JD286—Connecting Rod Bushing Tool
- JDG953—Connecting Rod Bushing Service Set

Consumable Material:

- Engine oil

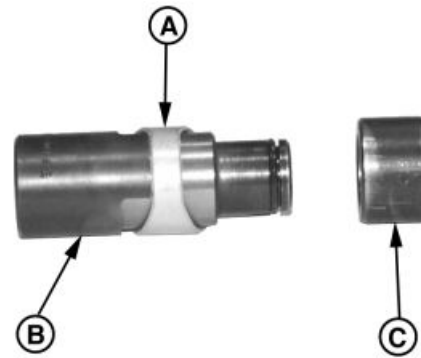
Carefully file a slight chamfer on edge of rod pin bore. Remove any burrs or sharp edges from edge of bushing bore.

NOTE: Tapered pin-end rods do not have a lubrication hole in the rod or bushing.

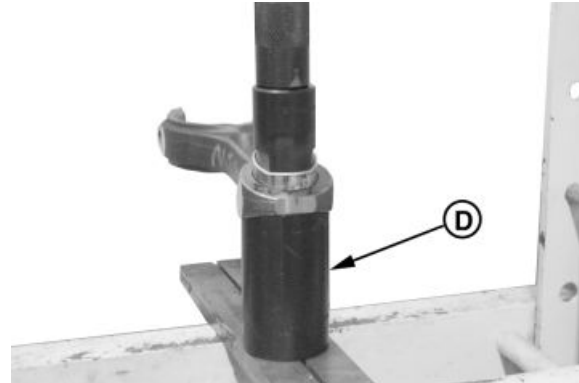
Installing Piston Pin Bushing in Tapered Pin-End Rod

NOTE: JDG953-1, JDG953-2 and JDG738-2 are contained in JDG953 Connecting Rod Bushing Service Set.

1. Slide bushing (A) onto JDG953-1 Driver (B) and install JDG738-2 Installer Pilot (C) onto O-ring end of driver. Apply clean engine oil or grease to OD of new bushing, OD of pilot ring, and ID of rod pin bore.
2. Insert driver into rod pin bore so pilot ring pilots in rod bore, and bushing taper aligns with taper on driver flange.
3. Install JDG953-2 Receiver Cup (D) onto the opposite side of rod.
4. Press bushing into rod bore until edge of bushing is flush or just slightly below rod face.



Piston Pin Bushing in Installation Tool



Receiver Cup on Connecting Rod

A—Piston Pin Bushing
B—JDG953-1 Driver

C—JDG738-2 Installer Pilot
D—JDG953-2 Receiver Cup

RG19661,000035C -19-15AUG11-1/3

5. Measure the bushing on each side of the connecting rod to center the bushing in the connecting rod bore (A).

Specification

Bushing Centering

Inside the Connecting

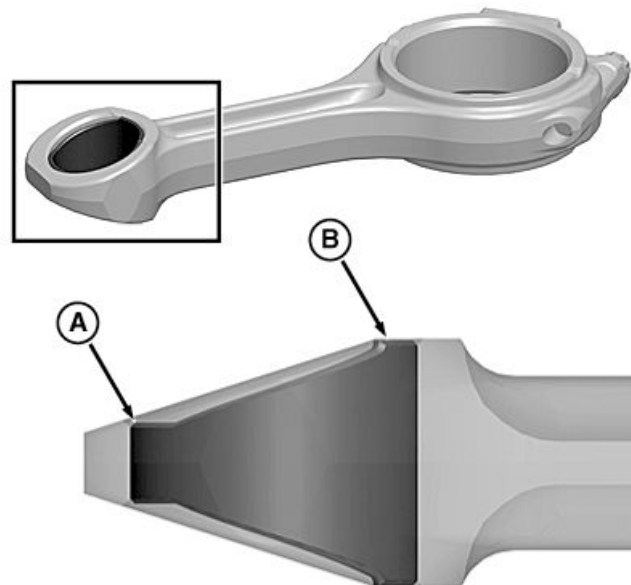
Rod Bore—Maximum

Distance..... 1.5 mm (.06 in.)

IMPORTANT: The bushing must be flush or below the connecting rod surface (B).

A—Piston Pin Bushing
Maximum Distance

B—Connecting Rod Surface



Piston Pin Bushing Position

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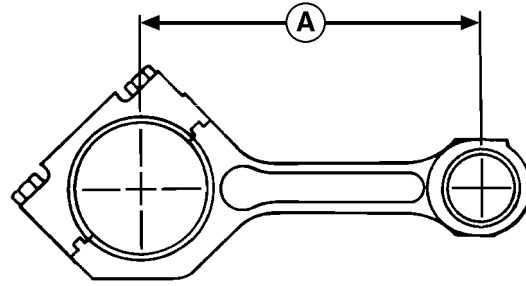
RG19661,000035C -19-15AUG11-2/3

6. Measure the center-to-center bores (A). Compare with the specifications below. Replace connecting rod as necessary.

Specification

Rod Bearing
Bore-to-Piston Pin
Bore (Center-to-Center)—Measurement.....202.95 — 203.05 mm (7.99 — 7.994 in.)

**A—Center-to-Center
Measurement**



Measure Rod Center-to-Center Bores

RG19661,000035C -19-15AUG11-3/3

RG6272 —UN—03NOV97

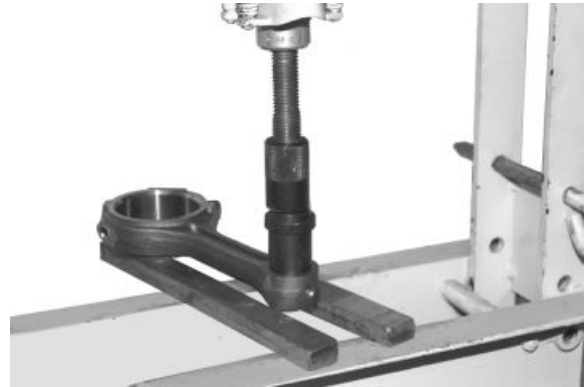
Piston Pin Bushing — Removal

Special Tools:

- JD286—Connecting Rod Bushing Tool
- JDG953—Connecting Rod Bushing Service Set

Removing Piston Pin Bushing on Straight Pin-End Rod

Use JD286 (JD-286)¹ Piston Pin Bushing Remover and Installer to remove bushing.



Straight Pin-End Rod

¹Order JD-286 when tool is ordered from European Parts Distribution Center (EPDC)

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RG19661,000035D -19-28APR11-1/2

RG7476 —UN—23NOV97

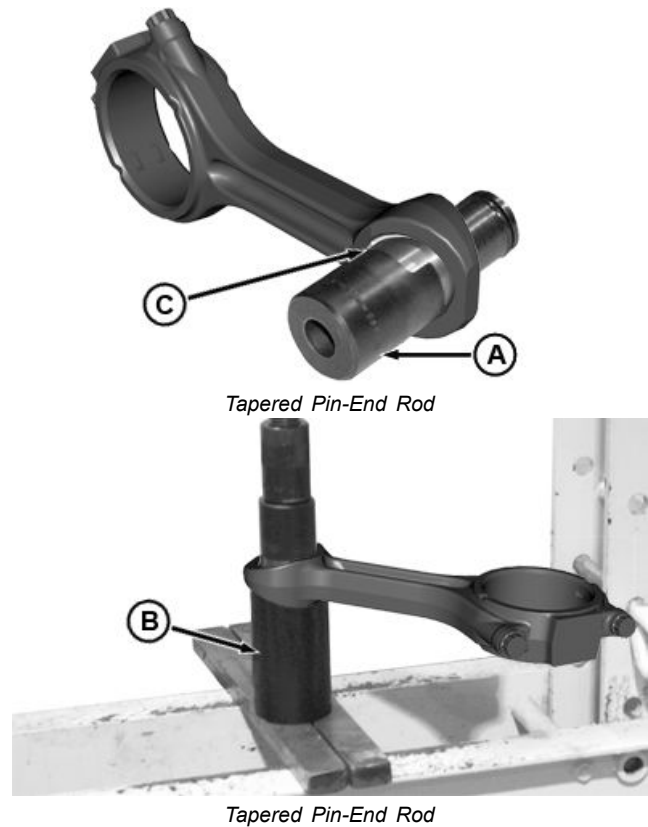
Removing Piston Pin Bushing on Tapered Pin-End Rod

1. Select JDG953-1 Driver (A) and JDG953-2 Receiver Cup (B) from JDG953 Connecting Rod Bushing Service Set to remove bushing (C) from tapered rod.
 2. Slide driver into one side of rod bushing. Turn driver until taper on driver flange matches up with taper on the bushing.
 3. Install receiver cup onto opposite side of rod bushing.
- NOTE:** Stud in cup keeps rod properly located on the cup.

IMPORTANT: If bushing is heavily worn, the driver may contact the ID of the rod bore. Be careful not to damage the rod bore.

4. Using hydraulic press, press bushing out of the rod until driver and bushing fall into receiver cup.
5. Perform Piston Pin and Bushing — Inspection.

A—JDG953-1 Driver C—Bushings
B—JDG953-2 Receiver Cup



RG19063—UN—27AUG10

RG19064—UN—27AUG10

RG19661,000035D -19-28APR11-2/2

Piston Protrusion — Measurement

Special Tools:

- JDG451—Piston-Liner Height Gauge

Consumable Material:

- None

NOTE: If JDG451 are not available, a dial indicator with magnetic base can be used to measure piston protrusion.

1. Use JDG451 Height Gauge (or use a magnetic base dial indicator) to measure piston protrusion. Place gauge on top of cylinder block so dial indicator can be set to 'zero' with top of block.

NOTE: Piston height must be checked at outermost diameter of piston.

2. Position gauge across piston as close to center-line of piston pin as possible. While pressing the piston downward, rotate crankshaft until the piston is at TDC.

Measure piston height at several positions around the outermost diameter of piston.

3. Piston protrusion must be within specifications to prevent piston-to-valve contact.



Piston Protrusion Measurement with JDG451

4. Measure piston protrusion and compare to the following specifications.
If protrusion does not meet specifications, check dimensions of piston, connecting rod, cylinder block, crankshaft, and bearings to determine the cause.

Piston Protrusion—Specification

Piston—Protrusion.....0.57—0.81 mm
(0.022—0.031 in.)

RG18649—UN—08JUN10

RG19661,000035E -19-27JUL11-1/1

Piston Rings — Installation

Special Tools:

- JDE85 or JDE135 — Piston Ring Expander

Consumable Material:

- None

IMPORTANT: The top ring (C) can be identified by a single punch mark. The side of the ring with punch mark faces TOP OF PISTON.

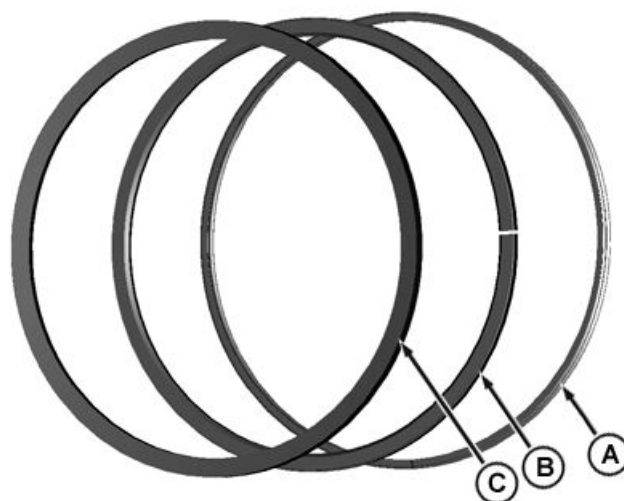
The second ring (B) is identified by double punch marks, and the punch marks must face TOP OF PISTON.

The oil control ring (A) does not have an alignment mark as it is symmetric.

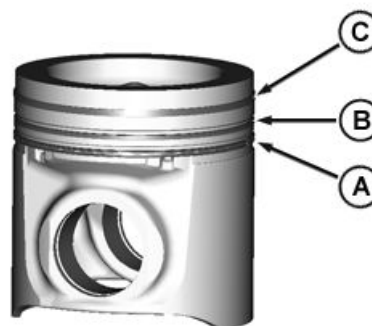
1. Install number 3 oil control expansion ring (A) in bottom groove of piston.
2. Install the number 2 compression ring (B), in the middle piston groove. punch marks facing top of piston.
3. Install the number 1 compression ring (C), the top piston groove, punch mark facing top of piston.
4. Before installing piston to connecting rod, stagger the piston ring gaps at 120° from each other.

For more information, see [Piston and Connecting Rod Assembly — Installation](#), in Section 02, Group 030.

A—Oil Control and Expander Ring
B—Middle (second) Compression Ring
C—Top Compression Ring



Piston Rings



Piston Rings Installation

RG18897—UN—02AUG10

RG18896—UN—02AUG10

RG19661,000035F -19-11AUG11-1/1

Piston Skirt — Measurement

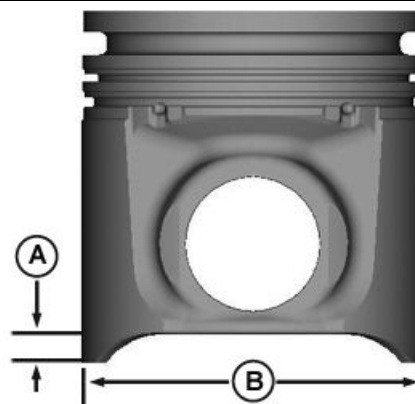
1. Measure piston skirt (B) 90° to piston pin bore and 11 mm (0.433 in.) from bottom of piston (A). Record measurement.

Specification

Piston Skirt, at 11 mm
[0.433 in.] from bottom of
piston—Diameter.....106.381—106.399 mm
(4.188—4.189 in.)

2. Record measurement and compare measurement obtained from matching liner.

NOTE: For measurement values, see [Piston to Liner — Clearance Check](#) in section 02, Group 030.



Piston Skirt Measurement

A—Measurement Height

B—Piston Skirt

RG18895—UN—02AUG10

RG19661,0000360 -19-28JUL11-1/1

Piston to Liner — Clearance Check

1. Perform **Piston Skirt — Measurement**.
Record measurement and compare measurement obtained from matching liner.

Specification

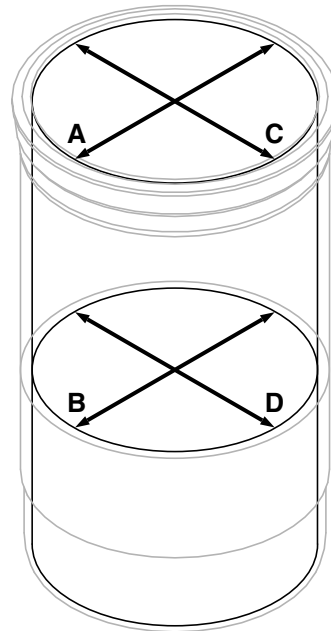
Piston Skirt, at 11 mm
[0.433 in.] from bottom of
piston—Diameter.....106.381—106.399 mm
(4.188—4.189 in.)

IMPORTANT: ALWAYS measure liners at room temperature.

2. Measure liner bore parallel to piston pin at top end of ring travel (A).
3. Measure bore in same position at bottom end of ring travel (B).
4. Measure bore at right angle to piston pin at top end of ring travel (C).
5. Measure bore in same position at bottom end of ring travel (D).
6. Compare measurements A, B, C, and D to determine if liner is tapered or out-of-round.
7. Compare liner ID with matched piston OD. Replace piston and liners (as a set) if they exceed wear specifications given.

Specification

Cylinder Liner—ID.....106.48 - 106.52 mm (4.192 - 4.194 in.)
Cylinder Liner (Top or
Bottom)—Maximum
Out-of-Round.....0.025 mm (0.0009 in.)



Liner ID Measurement

Cylinder Liner—Maximum Taper.....0.1 mm (0.004 in.)
Piston-to-Liner
Clearance (Measured
at Bottom of Piston
Skirt)—Clearance.....0.081—0.139 mm
(0.0031—0.0054 in.)

RG16880 —UN—23MAR09

RG19661,0000361 -19-28APR11-1/1

Crankshaft — End Play Check

Tools:

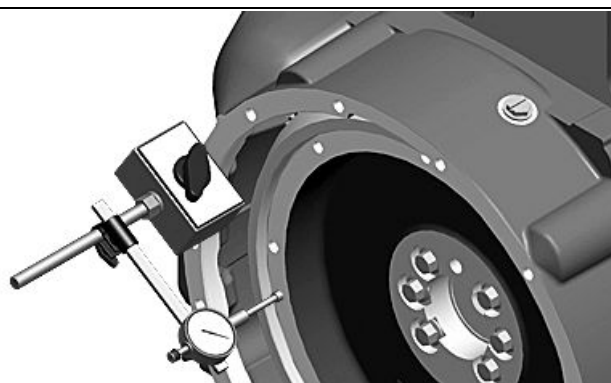
- None

Consumables:

- None

Measure end play prior to removing crankshaft to determine condition of thrust bearings.

1. Position dial indicator on contact face of flywheel, crankshaft nose, damper, or front pulley assembly, if installed.



Check Crankshaft End Play

RG18914—UN—05AUG10

RG19661,0000363 -19-28APR11-1/2

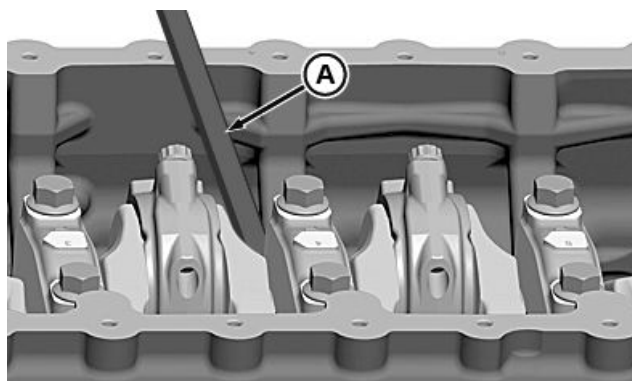
IMPORTANT: Do not apply too much pressure on crankshaft, as this could damage bearings.

2. Using a pry bar (A), gently push crankshaft as far to rear of engine as possible.
3. Zero the dial indicator.
4. Gently pry the crankshaft as far forward as possible. Note indicator reading. If end play is not within specifications, install new thrust bearing.

Specification

Crankshaft—End Play..... 0.03—0.36 mm (0.001—0.014 in.)

A—Pry Bar



Force Crankshaft to Rear of Engine

RG18915—UN—05AUG10

RG19661,0000363 -19-28APR11-2/2

Crankshaft — Grinding Specs

Bearing Size	Crankshaft Main Journal OD	Crankshaft Rod Journal OD
Standard	79.324—79.350 mm (3.1229—3.1240 in.)	77.800—77.826 mm (3.0629—3.0640 in.)
0.25 mm (0.010 in.) Undersize	79.074—79.100 mm (3.1131—3.1141 in.)	77.550—77.576 mm (3.0531—3.0541 in.)
Main and Connecting Rod Journal Surface Finish (AA) Lap 0.20 µm (8 AA)		
Thrust Surface Finish (AA) Lap 0.40 µm (16 AA)		
Thrust Bearing Journal Width 38.952—39.028 mm (1.5335—1.5365 in.)		
Direction of Crankshaft Rotation (viewed from flywheel end):		
Grinding Clockwise		
Lapping Counterclockwise		
Engine Stroke 127 mm (5.00 in.)		
Main Journal Maximum Runout (Concentricity) Relative to No. 1 and No.7 (6.8 L) or No. 1 and No. 5 (4.5 L) Journals..... 0.05 mm (0.0019 in.)		
Main Journal Maximum Runout (Concentricity) Between Adjacent Journals..... 0.025 mm (0.0009 in.)		

RG19661,0000364 -19-28APR11-1/1

Crankshaft — Inspection

1. Thoroughly clean crankshaft. Clear restrictions from all oil passages.

IMPORTANT: Small cracks may not be visible to the eye. Use a method such as the Fluorescent Magnetic Particle Method. This method magnetizes the crank, employing magnetic particles which are fluorescent and glow under "black light". The crankshaft must be de-magnetized after inspection.

2. Inspect crankshaft for signs of load stress, cracks, scoring, or journal scratches. Replace crankshaft if cracks are found.
3. Check each journal for evidence of excessive overheating or discoloration. If either condition exists,

replace crankshaft since heat treatment has probably been compromised.

4. Inspect front crankshaft gear for cracks, chipped teeth, or excess wear. Replace gear as required.
5. Inspect the keyway for evidence of cracks or wear. Replace crankshaft as necessary.
6. Carefully inspect the rear hub of the crankshaft in the area of the rear oil seal contact surface for evidence of a rough or grooved condition. Any imperfections in this area will result in oil leakage. Slight ridges may be cleaned up with emery cloth or crocus cloth.
7. Carefully check the crankshaft for cracks in the area of rod journal holes and at journal fillets. Replace crankshaft if any cracks are found.

RG19661,0000365 -19-27JUL11-1/1

Crankshaft — Installation

Special Tools:

- None

Consumable Material:

- SAE 30W Engine Oil

1. Remove all debris, oil, and film from main bearing bore surfaces in cylinder block and bearing caps.

NOTE: Do not apply oil to outside diameter surface of main or thrust bearings.

2. Install upper half of thrust bearing (F) to rear bearing web in cylinder block.
3. Install lower half of thrust bearing (E) in corresponding thrust bearing cap.
4. Install upper half of 4 main bearings (D) to cylinder block main bearing webs.
5. Install lower half of 4 main bearings (C) in corresponding bearing caps (B).
6. Lubricate ID of main and thrust bearing halves, and OD of crankshaft main bearing journals with clean SAE 30W oil.

CAUTION: Crankshaft is heavy. Plan a proper lifting procedure to avoid injuries.

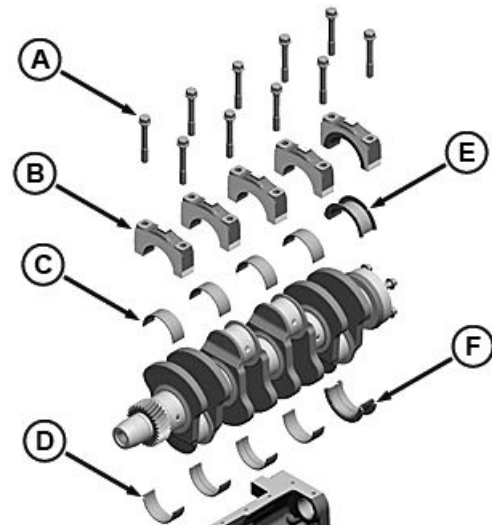
7. Carefully position crankshaft into cylinder block using a hoist and lift sling.

IMPORTANT: Make sure main bearing caps are installed in locations from which they were removed. Arrow on cap must point toward the camshaft side of block.

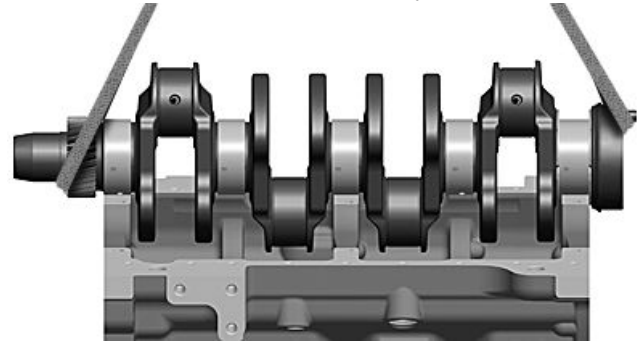
8. Position bearing caps in numbered sequence and correctly oriented direction over the main bearing journals in crankshaft.
9. Dip entire main bearing cap screws (A) in clean engine oil and allow excess oil to drip off.

IMPORTANT: Do not use pneumatic wrench to install main bearing cap screws, as damage may occur to threads.

10. Finger start 10 cap screws through bearing caps into cylinder block.
11. Press caps into block until they contact bearing cap seat in cylinder block.
12. Torque all 8 main bearing cap screws — not thrust bearing — to initial specification.



Crankshaft Assembly



Install Crankshaft to Cylinder Block

- | | |
|--------------------------------------|-------------------------------|
| A—Bearing Cap Screws -10- | D—Main Bearing Half — Upper |
| B—Bearing Caps — 4 Main and 1 Thrust | E—Thrust Bearing Half — Lower |
| C—Main Bearing Half — Lower | F—Thrust Bearing Half — Upper |

Specification

- | | |
|--------------------------|---------------------|
| 8 Cap Screws — Main | |
| Bearing Caps—Torque..... | 20 N•m (15 lb.-ft.) |

Continued on next page

RG19661,0000366 -19-24AUG11-1/2

RG20670 —UN—11JUL11

RG20671 —UN—11JUL11

IMPORTANT: DO NOT pry on thrust washer when forcing crankshaft back and forth to align thrust bearings.

13. Offset the thrust bearing cap to the rear of cylinder block by applying axial force on the front of the crankshaft.
14. Apply axial force forward on the crankshaft to align the surfaces of the upper and lower thrust bearing halves.
15. Torque 2 thrust bearing cap screws to initial specification.

Specification

2 Cap Screws — Thrust
Bearing Cap—Torque.....20 N•m (15 lb.-ft.)

16. Check crankshaft end play to specification.

Specification

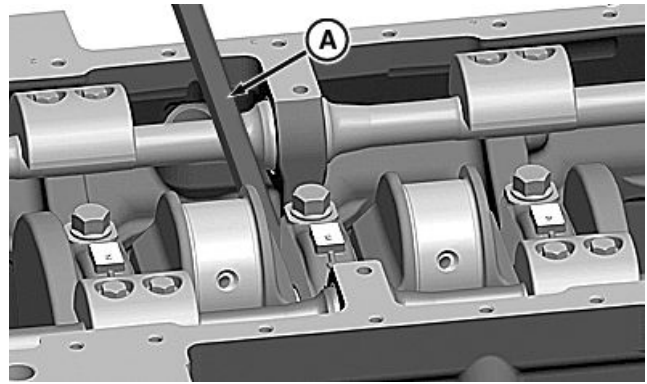
Crankshaft—End Play.....0.03 — 0.36 mm (.001 — .014 in.)

17. Verify crankshaft rotates freely.
18. Torque all cap screws to specification.

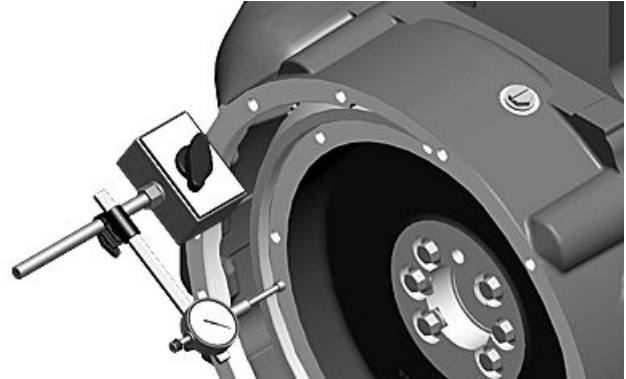
Specification

Main and Thrust
Bearing Cap Screws
-10—Torque Turn.....40 N•m (30 lb.-ft.) plus additional 60° turn.

19. Install connecting rod caps and bearings. Install new cap screws and tighten to specification. See Install Piston and Connecting Rod Assembly in Group 030.



Force Crankshaft to Rear of Engine



Check Crankshaft End Play

A—Pry Bar

RG20729—UN—09AUG11

RG18914—UN—05AUG10

RG19661,0000366 -19-24AUG11-2/2

Crankshaft — Removal

Special Tools:

- None

Consumable Material:

- None

1. Remove engine front plate. See [Cylinder Block Front Plate — Removal](#) in Group 050.
2. Remove flywheel housing and flywheel. See [Flywheel Housing — Removal](#) and [Flywheel — Removal](#) in this group.

NOTE: When removing crankshaft, leave front and rear main bearing caps installed until all connecting rod caps have been removed.

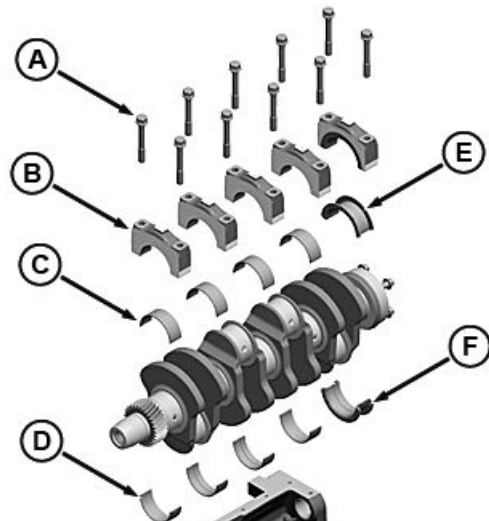
3. Loosen connecting rod bolts and remove connecting rod caps and bearings. Set aside in order they are removed from engine.
4. Loosen bearing cap bolts (A). See [Crankshaft Main Bearings—Removal](#) in this group. Remove main and thrust bearing caps and lower bearing halves.

⚠ CAUTION: Crankshaft is very heavy. Plan a proper handling procedure to avoid injury.

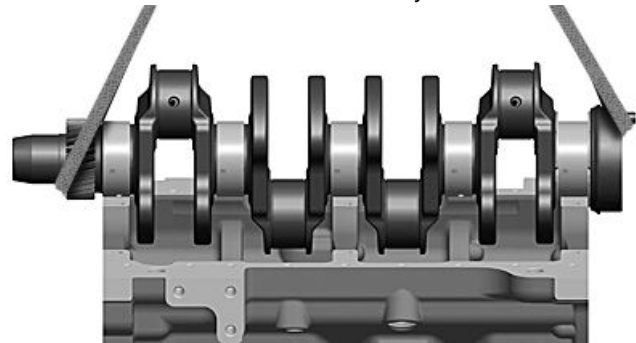
5. Attach a lifting sling to crankshaft. Using proper lifting equipment, carefully raise crankshaft out of cylinder block.
6. Clean crankshaft, especially oil passages, using solvent and compressed air.
7. Place crankshaft on clean V-blocks.
8. If main bearing inserts are to be replaced, remove inserts from cylinder block. Otherwise, leave bearing inserts in block until assembled ID has been measured.

A—Bearing Cap Bolts
B—Bearing Caps
C—Main Bearing Half — Bottom

D—Main Bearing Half — Top
E—Thrust Bearing Half — Bottom
F—Thrust Bearing Half — Top



Crankshaft Assembly



Remove Crankshaft

RG20670 —UN—11JUL11

RG20671 —UN—11JUL11

RG19661,0000367 -19-25JUL11-1/1

Crankshaft Belt-Driven Auxiliary Drive — Installation

Special Tools:

- None.

Consumable Material:

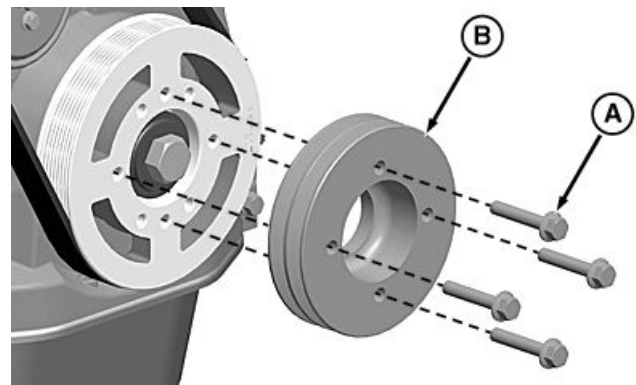
- None.

NOTE: Various auxiliary drive options are available; removal and installation of all options are similar.

1. Install mounting bolts (A) through auxiliary drive pulley (B) into the crankshaft pulley (C)..
2. Tighten bolts to specifications.

Specification

Auxiliary Drive	
Pulley-to-Crankshaft	
Pulley—Torque.....	73 N·m (53.8 lb.-ft.)



Auxiliary Drive

A—Mounting Bolts
B—Auxiliary Drive Pulley

C—Crankshaft Pulley

RG20684—UN—19JUL11

BF67790,0000A04 -19-24AUG11-1/1

Crankshaft Belt-Driven Auxiliary Drive — Removal

Special Tools:

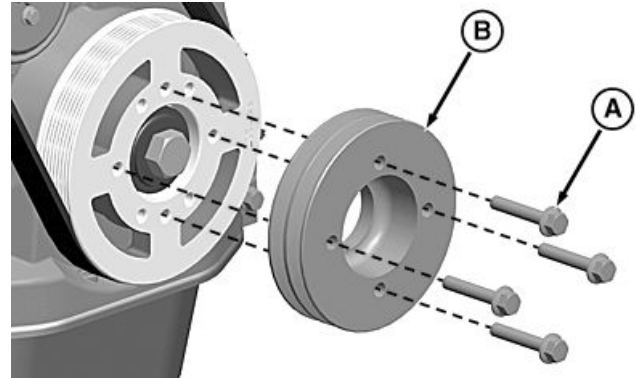
- None.

Consumable Material:

- None.

NOTE: Various auxiliary drive options are available; removal and installation of all options are similar.

1. Remove mounting bolts (A) from the crankshaft pulley (C).
2. Remove auxiliary drive pulley (B).
3. Clean and inspect pulley for cracks or damage. Replace as necessary.



Auxiliary Drive Removal

A—Mounting Bolts
B—Auxiliary Drive Pulley

C—Crankshaft Pulley

RG20684—UN—19JUL11

BF67790,0000A05 -19-09AUG11-1/1

Crankshaft Front Oil Seal — Removal

Tools:

- JDG11206 — Front Seal Puller

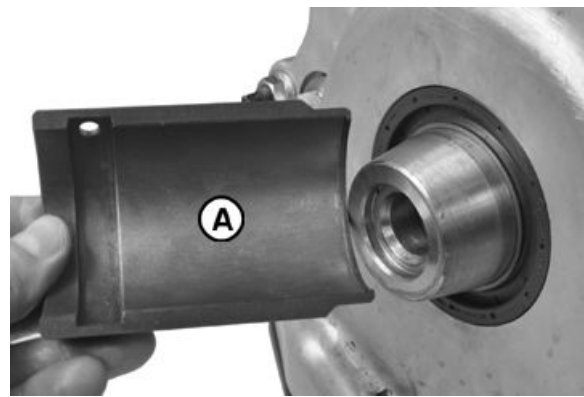
Consumables:

- None

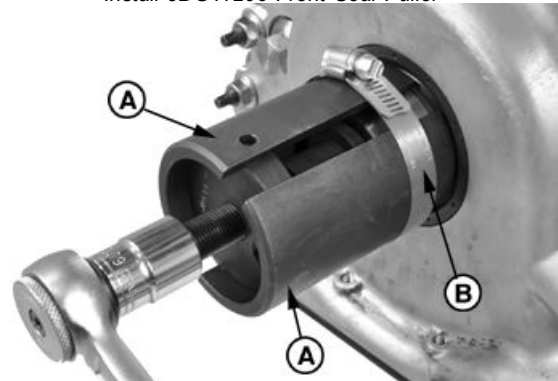
1. Install JDG11206 seal puller collet (A) under front seal wear lip. Install forcing screw assembly and other collet (A).
2. Holding the tool in line with the seal, tighten band clamp (B) finger-tight to hold the collets in place.
3. Turn forcing screw until seal is removed from the crankshaft.

A—Puller Collets

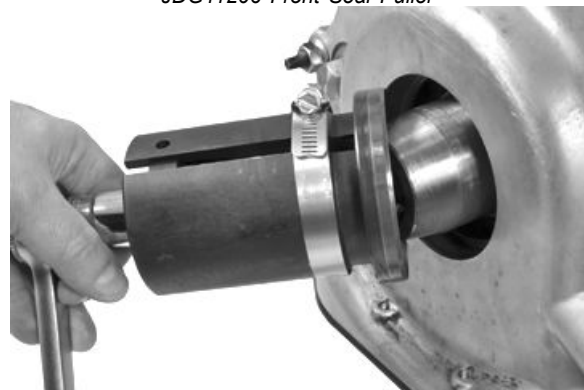
B—Band Clamp



Install JDG11206 Front Seal Puller



JDG11206 Front Seal Puller



Removed Front Seal

RG18467 —UN—19JUL10

RG18466 —UN—19JUL10

RG18468 —UN—19JUL10

RG19661,0000369 -19-28APR11-1/1

Crankshaft Front Oil Seal — Installation

Tools:

- JDG954B Front Seal Installer

Consumables:

- Brake cleaner, ignition cleaner or equivalent
- Medium-grit emery cloth

1. Inspect and clean seal bore in timing gear cover and crankshaft nose. Check for nicks or burrs. Use a medium-grit emery cloth to smooth rough areas. Clean all surfaces with a brake cleaner, ignition cleaner or equivalent and wipe with a clean cloth prior to installing seal.

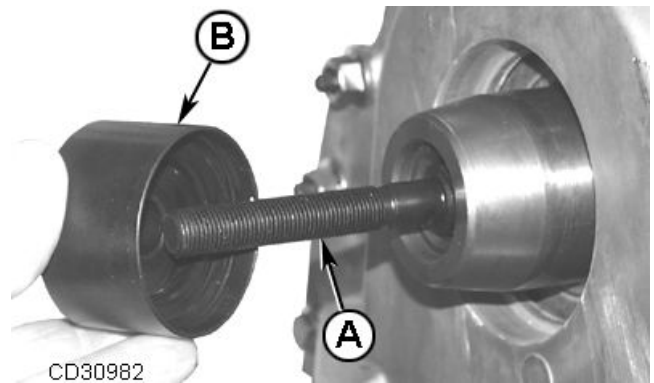
2. Install JDG954-8 Forcing Screw (A) into nose of crankshaft until screw seats in bottom of crankshaft.
3. Place JDG954-7 Adapter (B) on forcing screw and fasten with nut (C).

IMPORTANT: Orientation of the seal is critical. The side of the seal with groove faces outward and is marked "OUTSIDE".

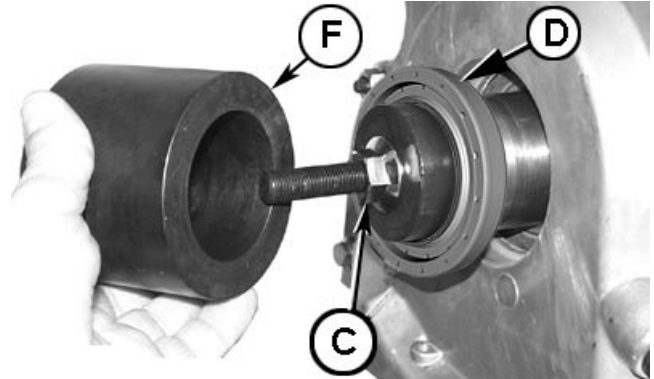
4. Position seal on crankshaft nose.
5. If required, place JDG954-4 Spacer (E) onto adapter.
6. Place JDG954-5 Installer (F) over adapter.
7. Tighten nut until seal (D) is flush with the timing gear cover.
8. Perform Fan Belt — Installation

A—JDG954-8 Forcing Screw
B—JDG954-7 Adapter
C—Nut

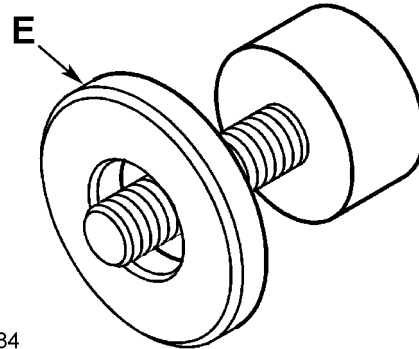
D—Unitized oil seal/wear sleeve
E—JDG954-4 Spacer
F—JDG954-5 Installer



CD30982
Install special screw and adapter on tapered nose crankshaft



Place seal and installer



CD30984

Use of JDG954-4 Spacer



Installed Front Seal

RG19661,0000368 -19-21OCT11-1/1

CD30982 —UN—07SEP07

RG19059 —UN—25AUG10

CD30984 —UN—11SEP07

RG18472 —UN—20JUL10

Crankshaft Gear — Installation

Tools:

- JDG954-8 Adapter
- JDG954-1 Installer

Consumables:

- None

IMPORTANT: If flame heat is used, be sure gear is heated uniformly around circumference. **DO NOT OVERHEAT. SEE CAUTION.** Overheating may also destroy original heat treatment of gear.

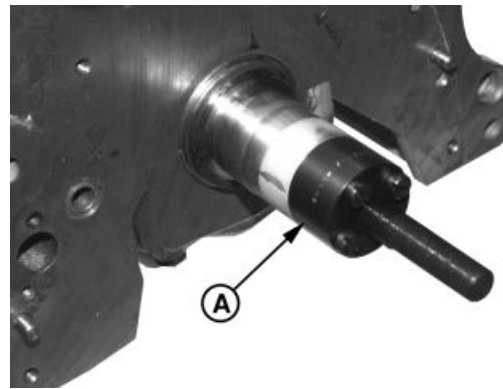
⚠ CAUTION: Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer and do not exceed 182°C (360°F). Do not allow a heating element to be in direct contact with the oil. Heat the oil in a well-ventilated area. Plan a safe handling procedure to avoid burns.

1. Heat crankshaft gear to 148°C (300°F) using either heated oil or oven heat.
2. Install JDG954-8 tool adapter (A) into nose of crankshaft until adapter seats in bottom of crankshaft.

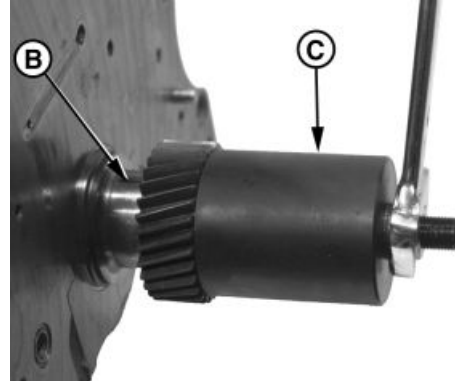
IMPORTANT: When installing gear, do not gouge or nick crankshaft flange.

NOTE: Chamfered side of gear should be installed toward engine.

3. Place gear on crankshaft flange. Be sure Woodruff key (B) on crankshaft is properly aligned with keyway in gear.
4. Install JDG954-1 Installer (C) over adapter.
5. Tighten nut clockwise until gear firmly seats against crankshaft flange. Allow gear to cool before removing installer.



Crankshaft Gear Adapter Tool



Crankshaft Gear Woodruff Key/Installer Tool

A—JDG954-2 Adapter Shown C—JDG954-1 Installer
B—Woodruff Key

6. Refer to appropriate group to complete final assembly of parts removed to access crankshaft gear.

RG19661,000036A -19-28APR11-1/1

RG7533 —UN—05NOV97

RG7534 —UN—05NOV97

Crankshaft Gear — Removal

Tools:

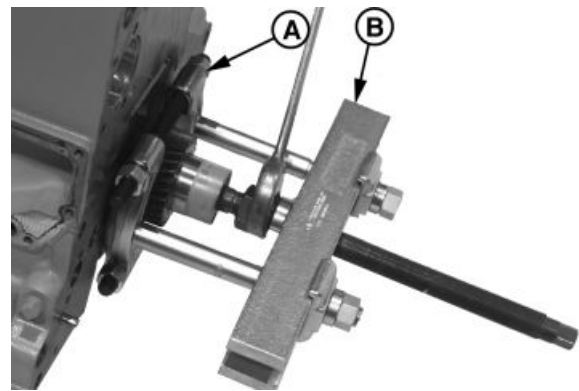
- D01218AA Pulling Attachment
- D01200AA Push Puller

Consumables:

- None

1. Lock engine at No. 1 TDC compression.
2. Perform Timing Gear Cover — Removal in Group 050.
3. Perform Oil Pump — Removal
4. Remove upper idler gear, and lower idler gear and shaft.
5. Remove high-pressure fuel pump gear.
6. Remove cylinder block front plate.

NOTE: Tapered nose crankshafts **MUST** have a thread protector installed in nose before using puller to remove crankshaft gear.



Crankshaft Gear Puller

A—Pulling Attachment

B—Push Puller

7. Install No. 1123 (D01218AA) Pulling Attachment (A) or larger onto crankshaft gear.
8. Install D01200AA Push Puller (B). Remove crankshaft gear.

RG19661,000036B -19-28APR11-1/1

RG7529 —UN—05NOV97

Crankshaft Grinding — Guidelines

IMPORTANT: Crankshaft grinding should be done **ONLY** by experienced personnel on equipment capable of maintaining crankshaft size and finish specifications. Crankshaft journals have undercut and rolled fillets (A). **DO NOT** grind within this undercut area when undersize bearings are used.

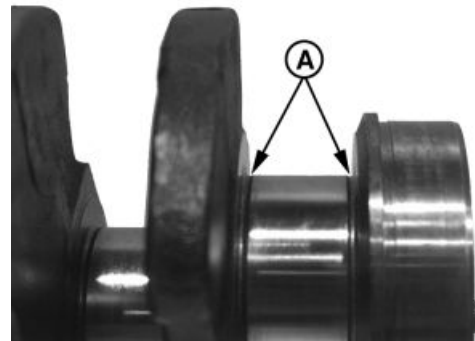
Crankshafts have micro-finished journal surfaces.

IMPORTANT: If undersize bearings are installed, recheck bearing-to-journal clearance. If oil clearance is not within specifications, premature wear of bearings and journals will result.

If the crankshaft is to be reground, use the following recommended guidelines:

1. Compare the crankshaft journal measurements taken during inspection and determine the size which the journals are to be reground.
2. Grind all main journals or all connecting rod journals to the same required size.

IMPORTANT: Care must be taken to avoid localized heating which often produces grinding cracks. Use coolant generously to cool the crankshaft while grinding. **DO NOT** crowd the grinding wheel into the work. Grind crankshaft with journals turning counterclockwise, as viewed from the front end of the crankshaft. Lap or polish journals in opposite direction of grinding.



Crankshaft Main Bearing Journal Fillets

A—Fillets

3. Polish or lap the ground surfaces to the specified finish to prevent excessive wear of the journals.
4. Stone the edge of all oil holes in the journal surfaces smooth to provide a radius of approximately 1.50 mm (0.060 in.).
5. When finished grinding, inspect the crankshaft by the fluorescent magnetic particle method, or other similar method to determine if cracks have originated due to the grinding operation.
6. De-magnetize the crankshaft after inspection.
7. Thoroughly clean the crankshaft and oil passages with solvent. Dry with compressed air.

RG19661,000036C -19-28APR11-1/1

RG7536A —UN—23NOV97

Crankshaft Journals and Bearing Assembly — Measurement

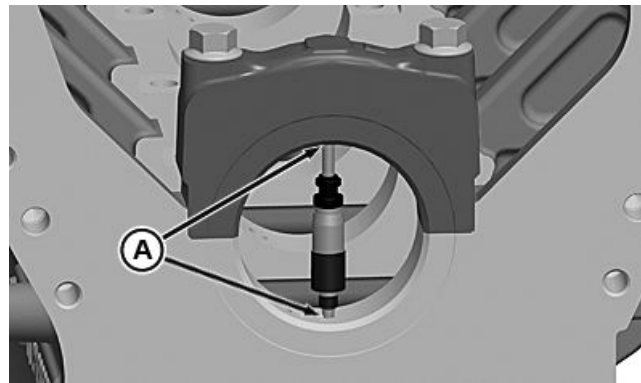
1. With crankshaft removed from engine, assemble main bearing caps with bearing inserts. Be sure that inserts are installed correctly.
2. Tighten main bearing cap screws to 40 N·m (30 lb-ft) plus 60° additional turn.
3. Measure and record main bearing assembled ID (A) at several points with an inside micrometer.
4. Measure and record crankshaft main journal OD (B) and rod journal OD (C) at several points around each journal.
5. Compare measurements with specifications given below.

Specification

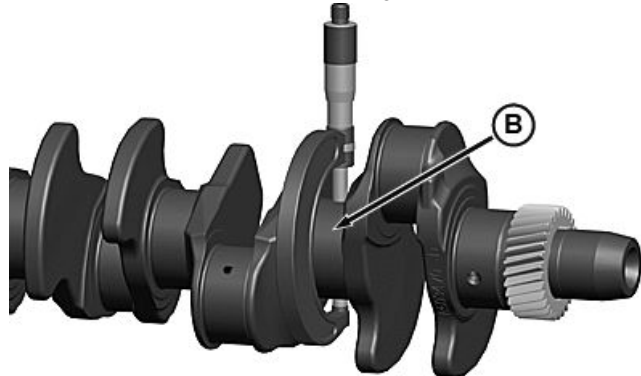
Crankshaft Main Bearing—ID.....	79.391—79.433 mm (3.1256—3.1273 in.)
Crankshaft Main Journal—OD.....	79.324—79.350 mm (3.1229—3.1240 in.)
Crankshaft Rod Journal—OD.....	77.800—77.826 mm (3.0629—3.0640 in.)
Crankshaft Main Bearing-to-Journal—Oil Clearance.....	0.041—0.109 mm (0.0016—0.0043 in.)
Crankshaft Main or Rod Journal—Maximum Taper.....	0.025 mm (0.0010 in.)
Crankshaft Main or Rod Journal—Maximum Out-of-Round.....	0.05 mm (0.0020 in.)

Replace or recondition crankshaft if it does not fall within above specifications.

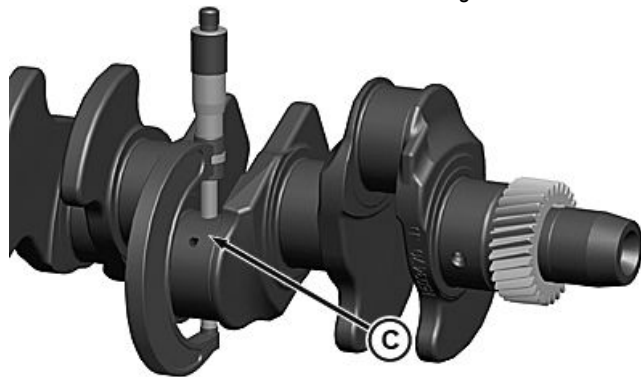
A—Main Bearing Assembled ID C—Rod Journal OD
B—Crankshaft Main Journal OD



Measure Bearing ID



Measure Crankshaft Main Bearing OD



Measure Crankshaft Rod Journal OD

RG18902—UN—03AUG10

RG18903—UN—28APR11

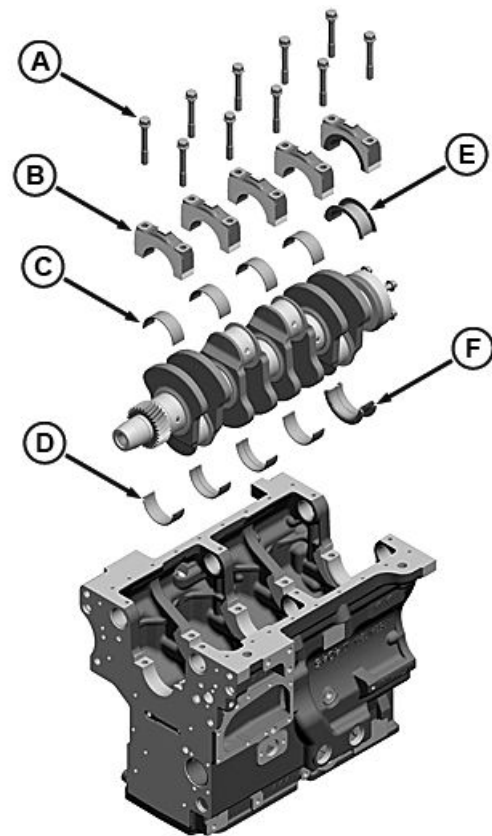
RG18904—UN—28APR11

RG19661,0000381 -19-20OCT11-1/1

Crankshaft Main Bearing Cap — Installation

1. Remove all debris, oil, and film from main bearing bore surfaces in cylinder block and bearing caps.
2. Install main and thrust bearings. See Crankshaft—Installation in this group.
3. Lubricate ID of main and thrust bearing halves, and OD of crankshaft main bearing journals with clean SAE 30W oil.

A—Bearing Cap Screws -10-
B—Bearing Caps — 4 Main and
1 Thrust
C—Main Bearing Half — Lower
D—Main Bearing Half — Upper
E—Thrust Bearing Half —
Lower
F—Thrust Bearing Half —
Upper



Crankshaft Assembly

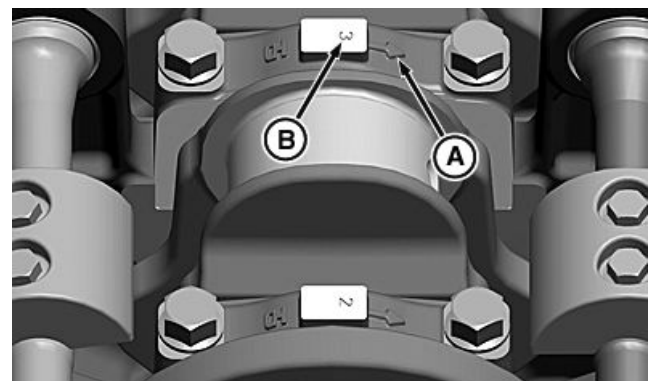
BF67790,0000A0F -19-04OCT11-1/2

RG20670 —UN—11JUL11

IMPORTANT: Make sure main bearing caps are installed in locations from which they were removed. Arrow on cap must point toward the camshaft side of the block.

4. Position bearing caps in numbered sequence and correctly oriented direction over the main bearing journals in crankshaft.
5. Dip entire main bearing cap screws (A) in clean engine oil and allow excess oil to drip off.

IMPORTANT: Do not use pneumatic wrench to install main bearing cap screws, as damage may occur to threads.



Main Bearing Cap Markings

6. Finger start 10 cap screws through bearing caps into cylinder block.
7. Press caps into block until they contact bearing cap seat in cylinder block.
8. Torque turn cap screws to specification and check crankshaft end play. See Crankshaft—Installation in this group.

**A—Directional Arrow
(Camshaft Side of Engine)**

B—Cylinder Number

BF67790.0000A0F -19-04OCT11-2/2

RG20728 —UN—09AUG11

Crankshaft Main Bearing Cap — Line Bore Specs

IMPORTANT: Keep bearing inserts in correct order if they are reused.

1. Remove bearing inserts from bearing caps and cylinder block.
2. Clean and inspect bearing caps for damage. Remove small burrs or nicks from flat surfaces with a file. Use medium grit polishing cloth to clean curved bearing surfaces.
3. Install bearing caps, without bearings, in cylinder block. Torque cap screws to specification.

Specification

Main Bearing Caps —

Torque—Torque..... 40 N·m (30 lb-ft) plus an additional 60° turn.

4. Measure ID of bearing cap bores.

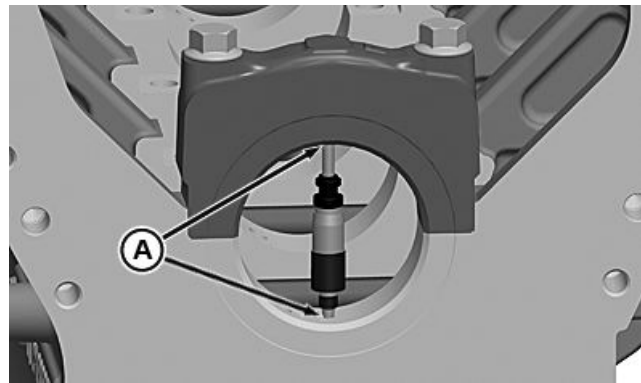
Specification

Crankshaft Main

Bearing Bore — without

bearings—ID..... 84.455 — 84.481 mm (3.325 — 3.326 in.)

IMPORTANT: When cylinder block is line bored, the dimension of main bearing bore to cylinder block top deck will change. If dimension is less than specification, the pistons will



Measure Bearing Cap ID

contact the cylinder head. Main bearing line boring should be done ONLY by experienced machinists on equipment capable of maintaining line bore specifications.

5. If cylinder block main bearing bore has been re-machined, verify centerline of main bearing bore to cylinder block top deck measurement.

Specification

Crankshaft Main Bearing

Bore Centerline to

Cylinder Block Top

Deck—Distance..... 337.896 — 337.972 (13.3029 — 13.3059 in.)

RG19661,000036D -19-11AUG11-1/1

RG18902 —UN—03AUG10

Crankshaft Main Bearing Cap — Oil Clearance Check

NOTE: The use of Plastigage will determine wear (crankshaft-to-bearing oil clearance) but will not determine condition of either bearing or journal surface.

1. Place a strip of Plastigage in the center of the main bearing cap (with insert) about three-fourths of the width of the bearing or on crankshaft journal to measure oil clearance.
2. Use clean (SAE30) oil on Plastigage to prevent smearing.
3. Install cap and tighten cap screws to 135 N·m (100 lb-ft).
4. Remove cap and compare width of Plastigage® with scale provided on wrapper to determine clearance.

Plastigage is a trademark of Perfect Circle Corporation



Check Bearing Oil Clearance

Specification

Crankshaft Main

Bearing-to-Journal—Oil

Clearance..... 0.041—0.109 mm
(0.0016—0.0043 in.)

RG19661,0000362 -19-20OCT11-1/1

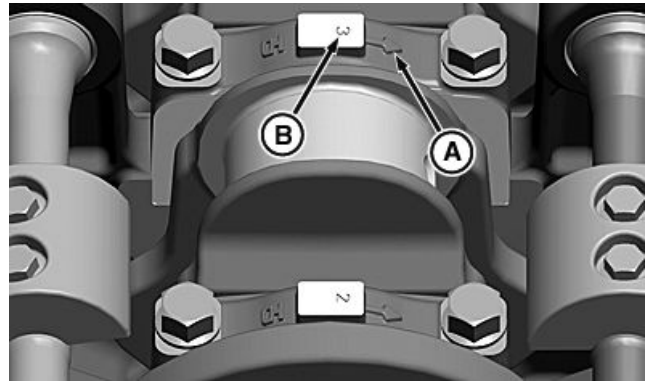
RG18930 —UN—09AUG10

Crankshaft Main Bearing Cap — Removal

1. Drain oil from engine crankcase and remove oil pan.
2. Remove timing gear cover. See [Timing Gear Cover — Removal](#) in Group 050.
3. Remove cylinder block front plate. See [Cylinder Block Front Plate — Removal](#) in Group 050.
4. Remove flywheel housing. See [Flywheel Housing — Removal](#) in this group.
5. Remove connecting rods from crankshaft. See [Pistons and Connecting Rods — Removal](#) in Group 030.

NOTE: When crankshaft is to be removed, leave front and rear bearing caps installed until all connecting rod caps have been removed.

6. Check main bearing caps for arrows cast in main bearing cap, and numbers stamped on cap and oil pan rail. Arrow points to the camshaft side of the engine.



Main Bearing Cap Markings

A—Directional Arrow
(Camshaft Side of Engine)

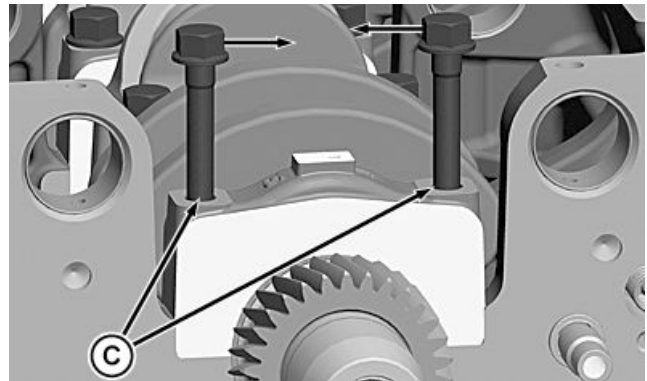
B—Cylinder Number

RG20728 —UN—09AUG11

BF67790,0000A10 -19-04OCT11-1/2

7. Remove bearing caps by extending cap screws (C) and forcing cap screw heads together. Wiggle bearing cap back and forth while applying upward force with cap screws until free from main bearing cap support.

C—Cap Screws



Main Bearing Cap Screws

RG20734 —UN—11AUG11

BF67790,0000A10 -19-04OCT11-1/2

Crankshaft Rear Oil Seal — Installation

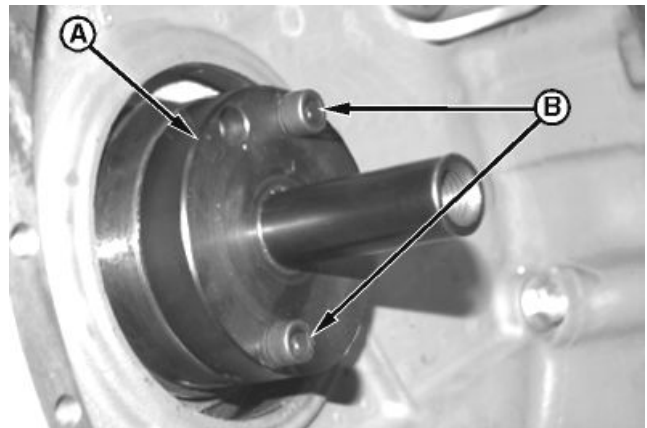
Tools:

- JT30040 Rear Seal Installer

Consumables:

- Brake cleaner, ignition cleaner or equivalent
- Medium-grit emery cloth

1. Install JT30041A Pilot (A) from the JT30040B Seal/Wear Sleeve Installer Set on end of crankshaft using two 38 mm (1-1/2 in.) socket-head cap screws. Tighten both cap screws until they touch base of pilot, then back them off approximately 1/2 turn.
2. Install JT30042 Driver over JT30041A Pilot until driver cross-plate bottoms on pilot. This will properly center pilot with crankshaft flange.
3. Tighten two pilot socket head cap screws (B) securely. Remove driver from pilot.



Rear Oil Seal/Sleeve Pilot Tool

A—Pilot

B—Cap Screws

RG9442 —UN—07JUL98

Continued on next page

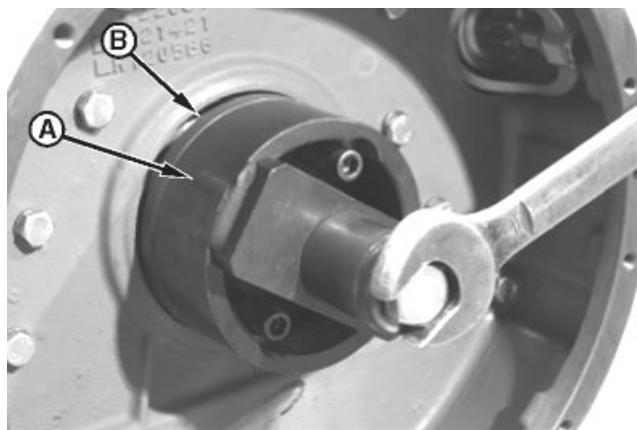
RG19661,000036E -19-28APR11-1/2

**IMPORTANT: Orientation of the seal is critical.
The side of the seal with the groove faces
outward and is marked "OUTSIDE".**

4. Carefully start oil seal (B) over pilot and crankshaft flange.
5. Attach JT30042 Driver (A) and thrust washer to the guide plate with cap screw. Tighten the cap screw until seal is flush with the flywheel housing surface.
6. Remove seal driver and pilot plate.

A—Driver

B—Seal



Rear Oil Seal/Sleeve Driver Tool

RG9443 —UN—07JUL98

RG19661,000036E -19-28APR11-2/2

Crankshaft Rear Oil Seal — Removal

Tools:

- JDG11205 — Rear Seal Puller

Consumables:

- No consumables

1. Perform Flywheel — Removal

Tools:

- No special tools required

Consumables:

- No consumables

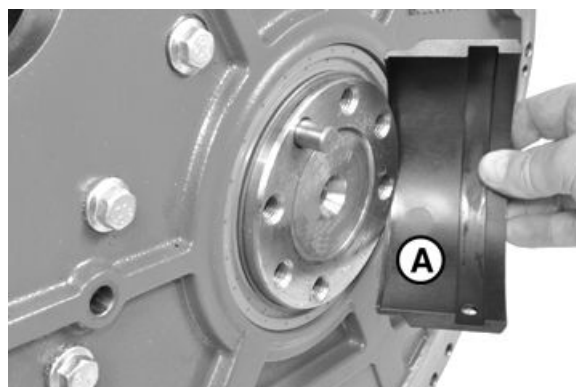
2. Install JDG11205 seal puller collet (A) under rear seal wear lip. Install forcing screw assembly and other collet (A).

3. Holding the tool in line with the seal, tighten band clamp (B) finger-tight to hold the collets in place.

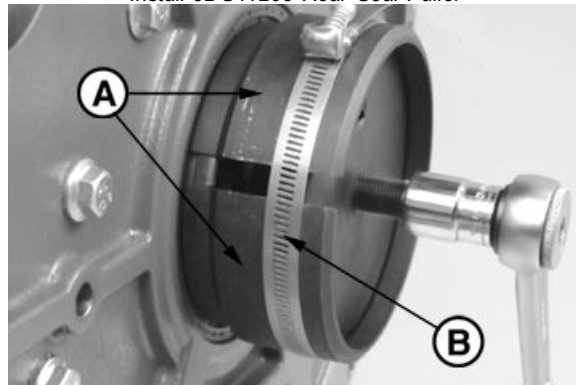
4. Turn forcing screw until seal is removed from the crankshaft.

A—JDG11205 Collet

B—Band Clamp



Install JDG11205 Rear Seal Puller



JDG11205 Rear Seal Puller



Remove Rear Seal

RG18468 —UN—19JUL10

RG18470 —UN—19JUL10

RG18471 —UN—20JUL10

RG19661,000036F -19-28APR11-1/1

Crankshaft Thrust Bearing — Inspection

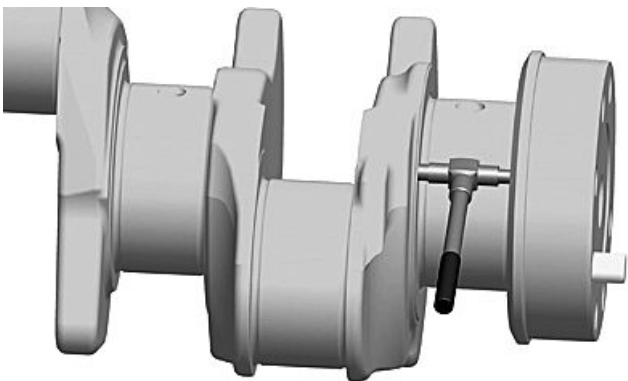
NOTE: If crankshaft has been previously reconditioned, thrust journal width may not be within specifications. However, oil (side) clearance must be within specification.

1. Measure and record crankshaft main thrust journal width.

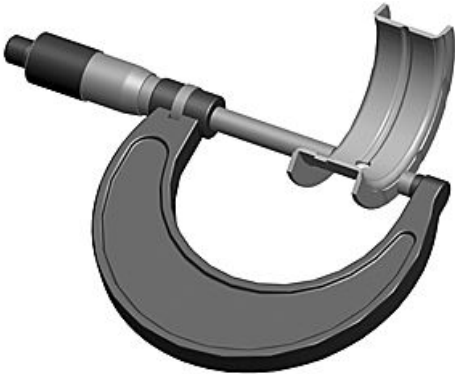
If crankshaft thrust journal width is not within specifications, install a new crankshaft.
2. Measure and record width of main thrust bearing. Oil (side) clearance between thrust bearing and thrust journal must be within specifications.

Specification	
Crankshaft Main Thrust Bearing Journal (New)—Width.....	38.952—39.028 mm (1.5335—1.5365 in.)
Crankshaft Main Thrust Bearing—Overall Width.....	38.79—38.87 mm (1.527—1.530 in.)

Specification	
Crankshaft Thrust Bearing-to-Journal—Oil Clearance.....	0.0889—0.2413 mm (0.0035—0.0095 in.)



Measure Main Bearing Width



Measure Thrust Bearing Width



Assembled Thrust Bearing

RG18927—UN—09AUG10

RG18928—UN—09AUG10

RG18929—UN—09AUG10

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Crankshaft Timing Wheel — Installation

Tools:

- JDG954-8 Adapter
- JDG954-1 Installer

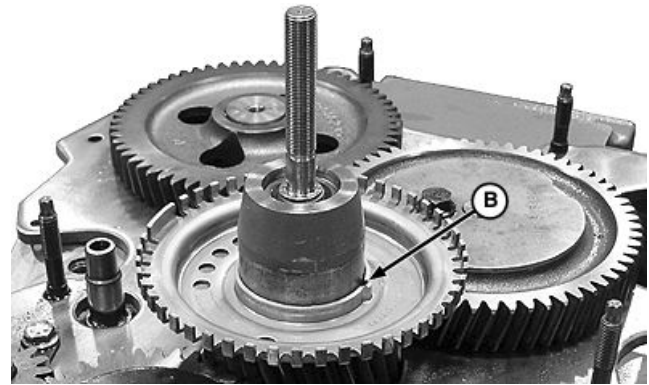
Consumables:

- None

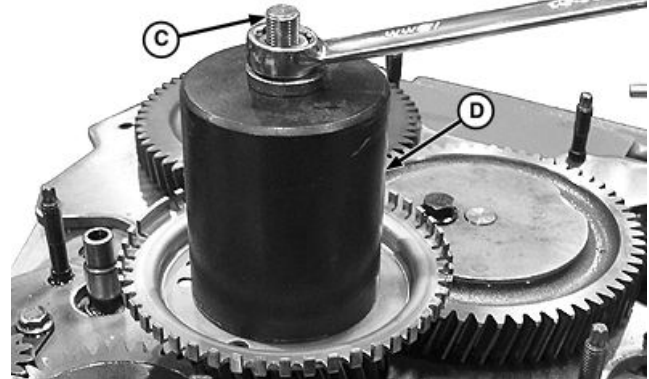
NOTE: All other drive gears and oil pump **MUST** be installed before installing timing wheel.

Ensure that the word "FRONT" (stamped on the face of the timing wheel) is facing out from the engine.

1. Apply LOCTITE® 609 high strength thread lock and sealer to crankshaft nose and timing wheel bore.
2. Slide timing wheel onto crankshaft nose with recess side toward timing gear cover. Be sure keyway (B) in timing wheel is properly aligned with Woodruff key.
3. Install JDG954-8 adapter to tapered nose crankshaft (C).
4. Install JDG954-1 Installer (D) over adapter.
5. Tighten nut until timing wheel firmly seats against gear face.
6. Remove adapter and installer and install timing gear cover. Perform Timing Gear Cover — Installation in Group 050.



Timing Wheel Keyway



Install Timing Wheel

B—Timing Wheel Keyway
C—JDG954-2 Adapter or
JDG954-8 special screw

D—JDG954-1 Installer

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RG19661,0000371 -19-22JUL11-1/1

Crankshaft Timing Wheel — Removal

Tools:

- None

Consumables:

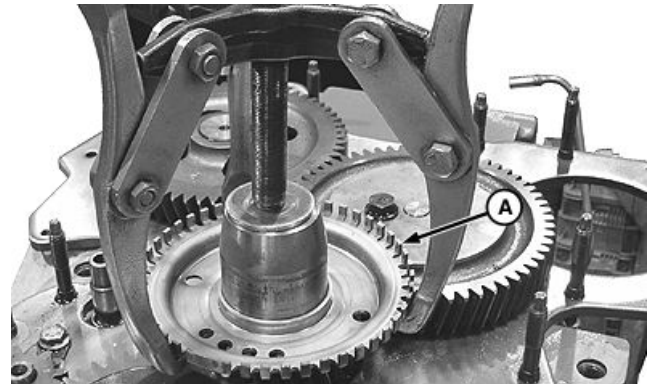
- None

IMPORTANT: Timing wheel is not reusable. If timing wheel is removed from crankshaft, a new timing wheel must be installed.

1. Lock engine at No. 1 TDC.
2. Perform Timing Gear Cover — Removal.
3. Clean crankshaft nose.

NOTE: Tapered nose crankshafts **MUST** have a thread protector installed in nose before using puller to remove timing wheel.

4. Remove timing wheel (A) using standard puller as shown.



Remove Timing Wheel

A—Timing Wheel

RG19661,0000372 -19-28APR11-1/1

Crankshaft Pulley — Installation

Crankshaft Pulley — Installation

Tools:

- JDG1571 Timing Pin

Consumable Materials:

- Crankshaft Pulley Cap Screw

1. Install JDG1571 Timing Pin.

IMPORTANT: Pulley-to-crankshaft cap screw must be Class 12.9 or higher. Always use a new cap screw.

NOTE: The larger diameter face of retaining washer should be facing forward.

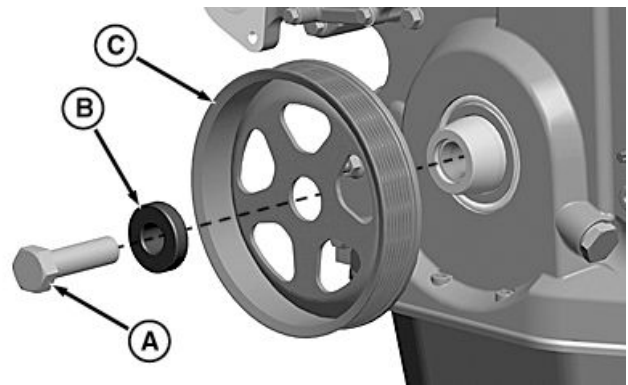
2. Install cap screw (A) through the retaining washer (B), pulley (C) and into threaded hole in crankshaft nose finger tight.
3. Tighten cap screw to specification.

Specification

Cap Screw —
Crankshaft Pulley to
Crankshaft—Torque..... 500 N•m (370 lb.-ft.)

4. Remove JDG1571 Engine Timing Pin.

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Install Crankshaft Pulley

A—Crankshaft Pulley Cap
Screw
B—Retaining Washer

C—Pulley

Crankshaft Pulley — Installation (Add-on Pulley Capable)

Tools:

- JDG1571 Timing Pin

Consumable Materials:

- LoctiteLoctite® 680 (TY15969) or Hylomar 6655 Retaining Compound
- Crankshaft Pulley Cap Screw

Continued on next page

RG19661,0000387 -19-20MAR12-1/2

RG20700—UN—02AUG11

1. Install JDG1571 Timing Pin

NOTE: Tapered crankshaft nose and pulley bore must be free of debris, oil residue, and any rust preventative prior to assembly. If required, clean tapered surface of both parts with a degreasing solution that does not leave a residue.

2. Inspect the tapered crankshaft nose (A) and the tapered mounting surface on the crankshaft pulley. Clean as necessary.
3. Apply a light 2—3 mm (.079—.118 in.) bead of LOCTITE® 680 (TY15969) or Hylomar 6655 retaining compound to either the tapered mounting surface in the pulley bore or the tapered nose of crankshaft (C). It is not necessary to apply retaining compound to both parts.

IMPORTANT: Hold crankshaft pulley firmly in place on crankshaft nose after retaining compound has been applied. If retaining compound cures while pulley is loosely installed, the tapered mounting surfaces will not seat properly.

4. Install pulley on the tapered nose of crankshaft. Rotate pulley on the crankshaft nose to spread retaining compound to ensure even coverage and proper alignment of the pulley to the crankshaft. Hold pulley firmly in place.

IMPORTANT: Pulley-to-crankshaft cap screw must be Class 12.9 or higher. Always use a new cap screw.

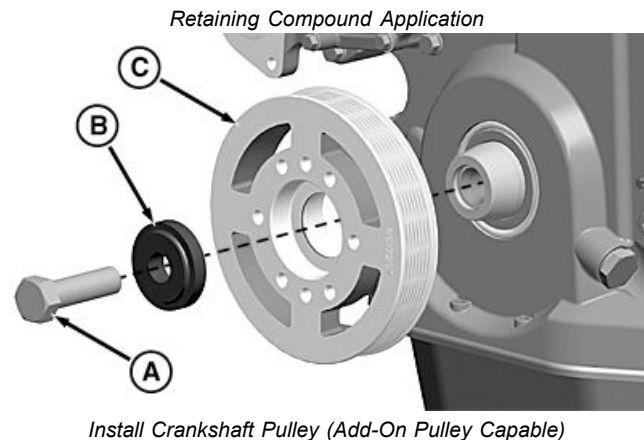
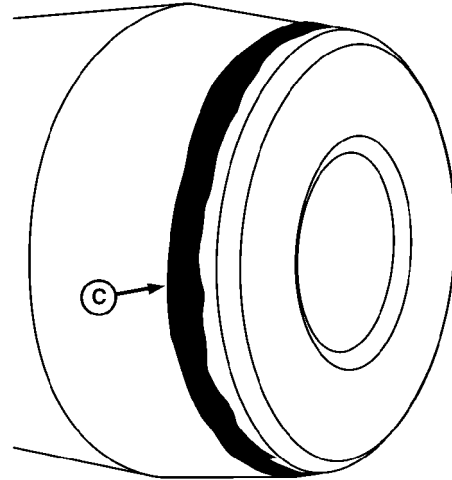
NOTE: The smaller diameter face of retaining washer should be facing forward.

5. Install cap screw through the retaining washer, pulley and into threaded hole in crankshaft nose finger tight.
6. Tighten cap screw to specification.

Specification

Cap Screw —
Crankshaft Pulley to
Crankshaft—Torque..... 500 N•m (370 lb.-ft.)

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A—Crankshaft Pulley Cap
Screw
B—Retaining Washer

C—Pulley (Add-On Pulley
Capable)

7. Remove JDG1571 Engine Timing Pin.

RG12355 —UN—31MAY02

RG20701 —UN—02AUG11

RG19661,0000387 -19-20MAR12-2/2

Crankshaft Pulley — Removal

Crankshaft Pulley

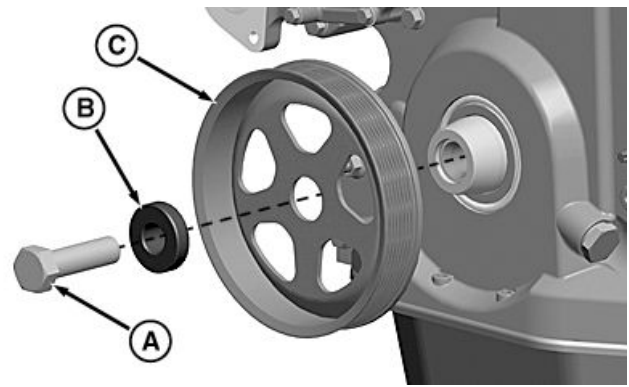
Tools:

- JDG1571 Timing Pin

Consumable Materials:

- None

1. Install JDG1571 Timing Pin.
2. Loosen and remove crankshaft pulley cap screw and washer.
3. Remove crankshaft pulley from crankshaft nose.
4. Clean and inspect crankshaft nose and pulley contact surfaces.
5. Remove JDG1571 Timing Pin.



Remove Crankshaft Pulley

A—Crankshaft Pulley Cap
Screw
B—Retaining Washer

C—Pulley

Crankshaft Pulley (Add-on Pulley Capable)

Tools:

- JDG1571 Timing Pin
- JDG2074 Puller

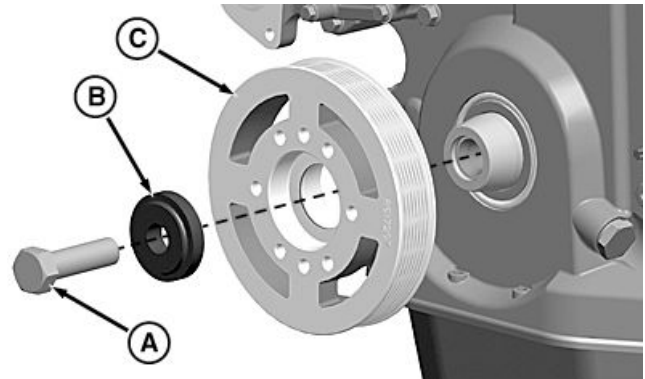
Consumable Materials:

- Loctite® 7649 (TY16285) Primer

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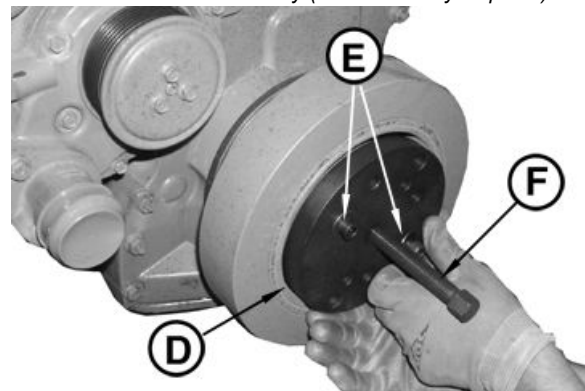
1. Install JDG1571 Timing Pin
2. Loosen and remove crankshaft pulley cap screw (A) and retaining washer (B).
3. Attach JDG2074 Puller Plate (D) to crankshaft pulley with cap screws (E).
4. Turn JDG2074 Forcing Screw (F) to separate pulley from the crankshaft.
5. Clean retaining compound from crankshaft nose and pulley bore with Loctite® 7649 (TY16285) Primer.
6. Remove puller plate from pulley. Remove retaining screw to remove pulley from the engine.
7. Remove JDG1571 Timing Pin.



Remove Crankshaft Pulley (Add-On Pulley Capable)

A—Crankshaft Pulley Cap
Screw
B—Retaining Washer
C—Pulley

D—JDG2074 Puller Plate
E—Cap Screws
F—JDG2074 Forcing Screw



Puller Plate with Forcing Screw

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RG19661,0000386 -19-20MAR12-2/2

Flywheel — Inspection

1. Inspect machined contact surfaces for scoring, overheating, or cracks. Replace or resurface flywheel if defective.
2. Examine flywheel ring gear for worn or broken teeth. Replace ring gear if defective, as described later in this group.

RG19661,0000378 -19-28APR11-1/1

Flywheel — Installation

CAUTION: Flywheel is heavy. Plan a proper handling procedure to avoid injuries.

IMPORTANT: Flywheel **MUST BE** clean and free of any oil, grease or debris.

1. Install 2 guide studs (A) in crankshaft cap screw threaded holes. Place flywheel on studs and slide into position against crankshaft flange.

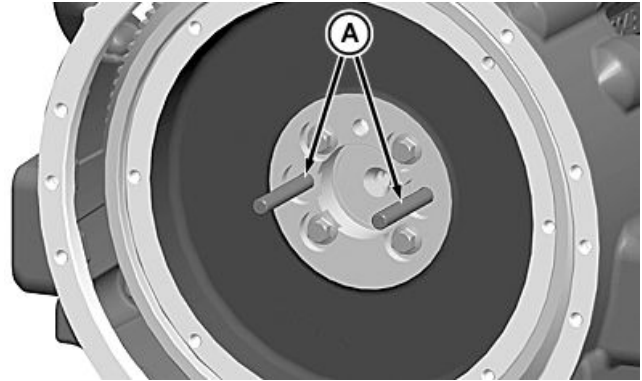
IMPORTANT: **ALWAYS** install new flywheel cap screws when flywheel has been removed.

NOTE: There will be 4 or 6 flywheel cap screws depending on the engine power level.

2. Finger tighten cap screws through flywheel into crankshaft. Do not tighten until guide studs are removed and all cap screws are started.
3. Remove guide studs and finger tighten remaining cap screws through flywheel into crankshaft flange.
4. Tighten all cap screws to specifications.

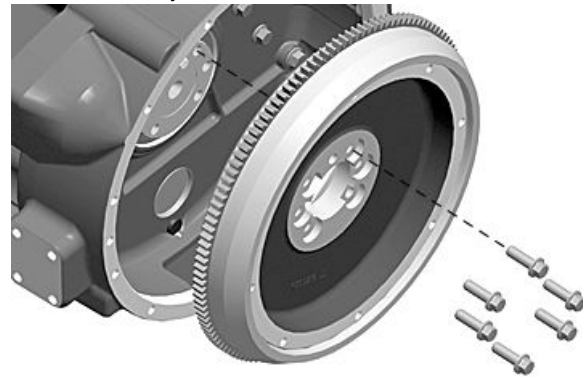
Specification

Flywheel Mounting Cap	
Screws (Dry)—Torque.....	138 N•m (102 lb-ft)
Flywheel Mounting	
Cap Screws	
(Lubricated)—Torque.....	110 N•m (81 lb-ft)



Flywheel Installation — Guide Studs

RG18922 —UN—06AUG10



Install Flywheel

RG18918 —UN—06AUG10

A—Guide Studs -2-

RG19661,0000379 -19-26JUL11-1/1

Flywheel — Removal

Special Tools:

- None

Consumable Material:

- None

CAUTION: Flywheel is heavy. Plan a proper lifting procedure to avoid personal injury.

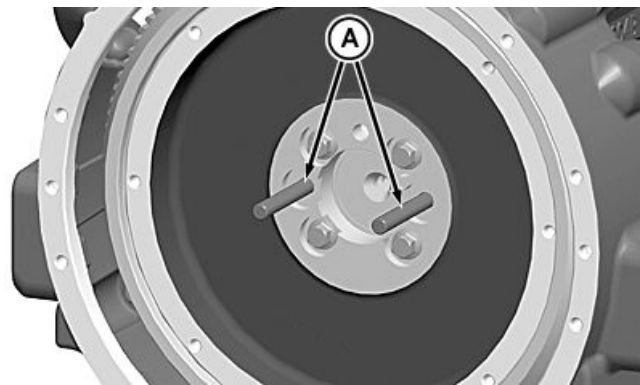
1. Remove two cap screws and install 2 guide studs (A) in their place.
2. Remove remaining 4 cap screws.

NOTE: Some engines will only have 4 total cap screws attaching the flywheel to the crankshaft

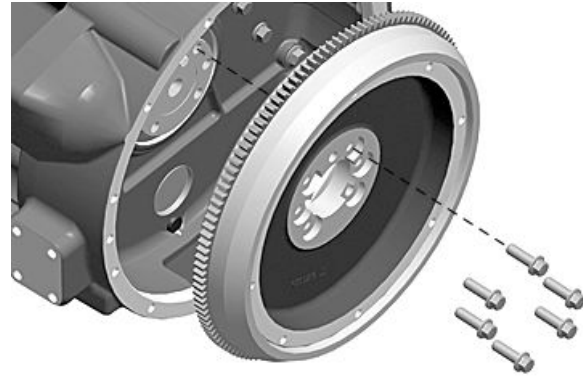
NOTE: If flywheel to housing clearance will not allow use of a pry bar, install a punch through timing pin hole and tap on flywheel face to drive from crankshaft.

3. Carefully pry flywheel off of crankshaft.

A—Guide Studs -2-



Guide Studs -2-



Remove Flywheel

RG19661,000037A -19-27JUL11-1/1

RG18922 —UN—06AUG10

RG18918 —UN—06AUG10

Flywheel Face — Flatness Check

1. Mount dial indicator base on flywheel housing. Position pointer to contact driving ring mounting surface. Do not allow pointer to contact driving ring mounting holes.

IMPORTANT: Maintain constant end pressure on crankshaft to hold shaft against thrust bearing when measuring flywheel face runout.

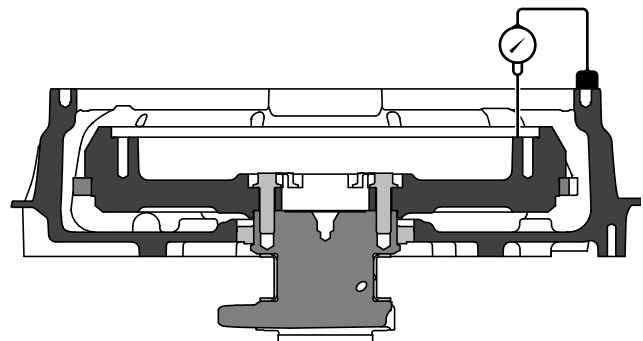
2. Rotate flywheel by turning crankshaft. Read total indicator movement. Resurface flywheel face or replace as required.

Specification

Flywheel Face
Flatness—Maximum
Variation..... 0.23 mm (0.009 in.)

Specification

Flywheel Face
Flatness—Maximum
Variation per 25 mm (1.0
in.) of Travel..... 0.013 mm (0.0005 in.)



Flywheel Face Flatness Check

RG19661,000037B -19-16AUG11-1/1

RG18668 —UN—15JUN10

Flywheel Housing — Installation

1. Inspect and clean cylinder block and flywheel housing mating surfaces using a brass scraper or steam cleaner. Remove any previously applied sealant or gasket material.
2. Rinse well with plain water to remove soap or other residue from gasket surfaces.
3. Lubricate with clean engine oil and install new camshaft O-ring seal (A).

IMPORTANT: Surfaces to be bonded MUST BE free of oil, dirt, or cleaning agents.

IMPORTANT: Temperature of mating parts should be at least 13°C (55°F).

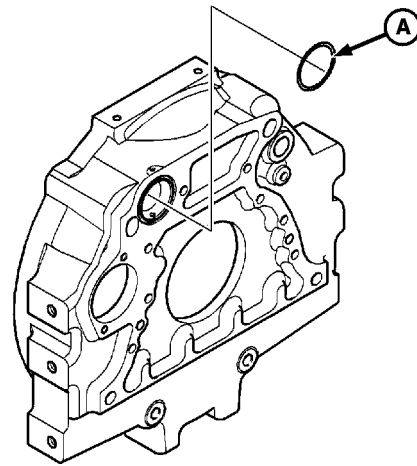
4. Apply LOCTITE® 515 (PM38655) Flexible Form-in-Place Gasket in a continuous 2—4 mm (.080—.157 in.) bead to flywheel housing.

Locate bead in the center of mating surfaces (B) and completely encircle cap screw holes.

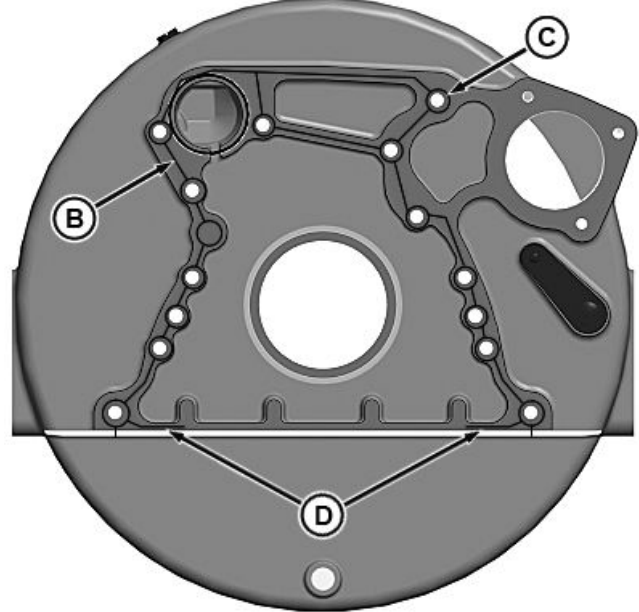
Wrap bead from bottom corners inward (D) to first cast rib.

A—Camshaft Bore O-ring
B—Gasket Bead

C—# 3 Cap Screw Hole
D—Gasket Bead at Bottom Corners



Install Camshaft O-ring



Mounting Face — Sealant Application

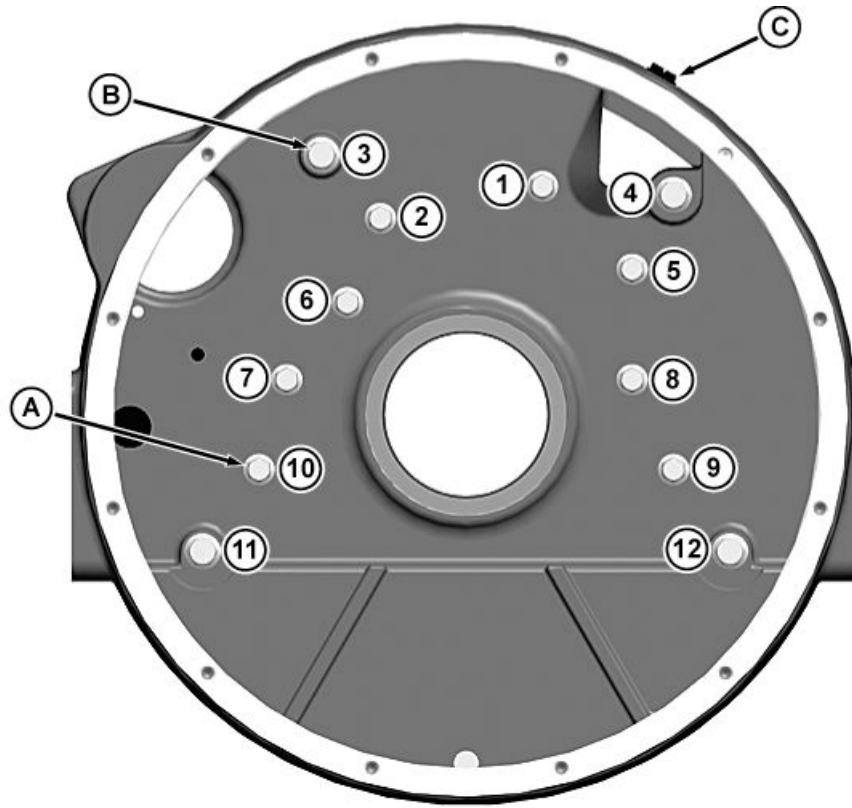
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RG19661,000037C -19-24AUG11-1/3

RG12413 —UN—10JUL02

RG18919 —UN—27AUG10



A—M12 x 38 Cap Screws -8-

B—M12 x 50 Cap Screws -4-

C—Plastic Plug — Mag Pickup Port

5. Install flywheel housing to block over dowel pins by inserting four M12 x 60 cap screws (B) finger tight to outer corners of housing face, and 8 M12 x 38 cap screws (A) through flywheel housing into rear cylinder block face.

NOTE: Tighten cap screws to specification within 10 minutes after sealant application.

6. Tighten all cap screws, in the sequence shown, to specification.

Specification

Flywheel Housing to
Cylinder Block—Torque..... 125 N•m (92 lb.-ft.)

7. Clean OD of crankshaft flange.

8. Install rear crankshaft oil seal. See [Crankshaft Rear Oil Seal — Installation](#) in this group.

9. Install plastic plug (C) in the mag pickup port on OD of flywheel housing. Tighten plug to specification.

Specification

Plastic Plug — Mag

Pickup—Torque..... 20 N•m (15 lb.-ft.)

Continued on next page

RG19661,000037C -19-24AUG11-2/3

RG18921 —UN—06AUG10

10. Install pipe plug (D) in housing drain hole. Tighten plug to specification.

Specification

Pipe Plug — .500
in.NPT—Torque.....45 N•m (33 lb.-ft.)

11. Install single piece plug (E) in flywheel rotation and timing pin hole.



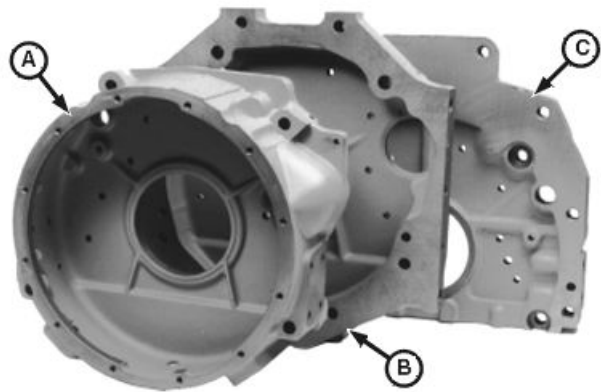
Install Plugs

RG19661,000037C -19-24AUG11-3/3

RG18920—UN—06AUG10

Flywheel Housing — Removal

1. Remove flywheel. See Flywheel — Removal in Section 02, Group 040.
2. Remove starter, if needed. See Starter — Removal in Section 02, Group 100.
3. Remove crankshaft rear oil seal. See Crankshaft Rear Oil Seal — Removal in section 02, Group 040.
4. Remove oil pan. See Oil Pan — Removal in Section 02, Group 060.
5. Loosen and remove cap screws securing flywheel housing to cylinder block.
6. Remove flywheel housing and set aside.



Flywheel Housings

A—SAE 2, 3, 4 Housing
B—Standard Flat Housing

C—Special Flat Housing

RG19661,000037D -19-28APR11-1/1

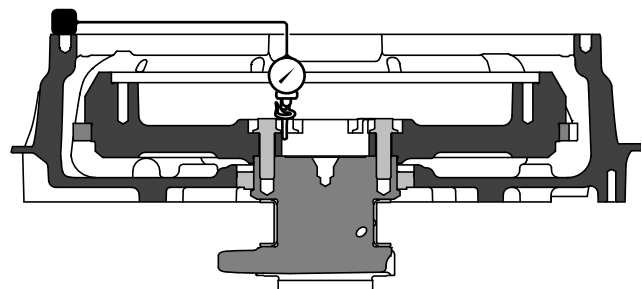
RG10568—UN—10JAN00

Flywheel Pilot Bearing Bore — Concentricity Check

1. Mount dial indicator on flywheel housing face and position pointer to contact ID of pilot bearing bore in flywheel.
2. Rotate flywheel by turning crankshaft. Read total dial indicator movement.

Specification

Flywheel Bearing Bore
Concentricity—Maximum
Variation.....0.127 mm (0.005 in.)



Flywheel Bearing Bore Concentricity

RG19661,000037E -19-28APR11-1/1

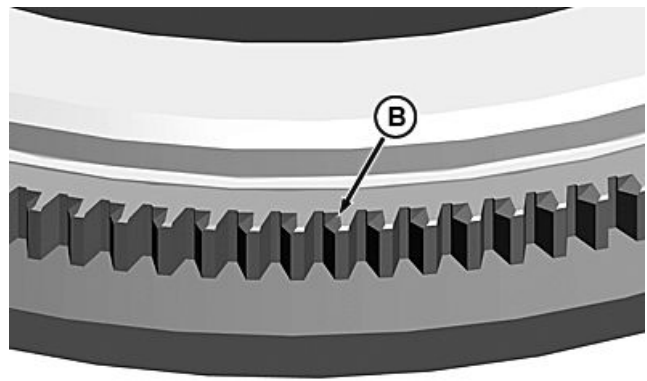
RG18669—UN—15JUN10

Flywheel Ring Gear — Installation

CAUTION: Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer and do not exceed 182°C (360°F). Do not allow a flame or heating element to be in direct contact with the oil. Heat the oil in a well ventilated area. Plan a safe handling procedure to avoid burns.

IMPORTANT: If flame heat is used, be sure gear is heated uniformly around circumference. **DO NOT OVERHEAT. SEE CAUTION.** Overheating may also destroy original heat treatment of gear.

1. Heat new ring gear to 148°C (300°F) using either heated oil, oven heat, or flame heat.
2. Turn gear so side with chamfer (B) is toward engine with flywheel installed.



RG18924 —UN—06AUG10

B—Tooth Chamfer

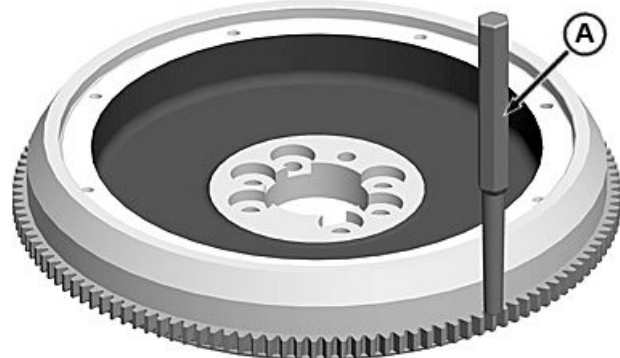
3. Install ring gear against shoulder of flywheel.

RG19661,000037F -19-28APR11-1/1

Flywheel Ring Gear — Removal

1. Place the flywheel on a solid flat surface.
2. Drive ring gear off with a brass drift (A) and hammer.

A—Brass Drift



RG18923 —UN—06AUG10

Remove Flywheel Ring Gear

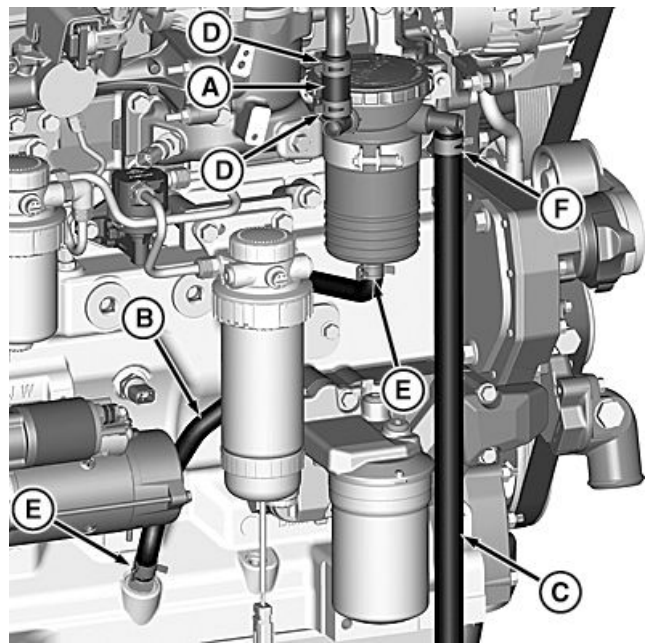
RG19661,0000380 -19-22JUL11-1/1

Open Crankcase Ventilation System — Inspection

1. Check all hoses of OCV system for cracks and damage.
2. Check all constant tension clamps for its appropriate tension on the hoses.
3. Check filter element for excessive wear.
4. Check filter housing and cap for cracks and damage.

A—Inlet Hose
B—Oil Drain Hose
C—Outlet Hose

D—Constant Tension Clamp —
Inlet Hose
E—Constant Tension Clamp —
Oil Drain Hose
F—Constant Tension Clamp —
Outlet Hose



OCV System Hoses and Clamps

RG20672 —UN—11JUL11

RG19661,0000382 -19-04OCT11-1/1

Open Crankcase Ventilation System — Installation

Special Tools:

- None

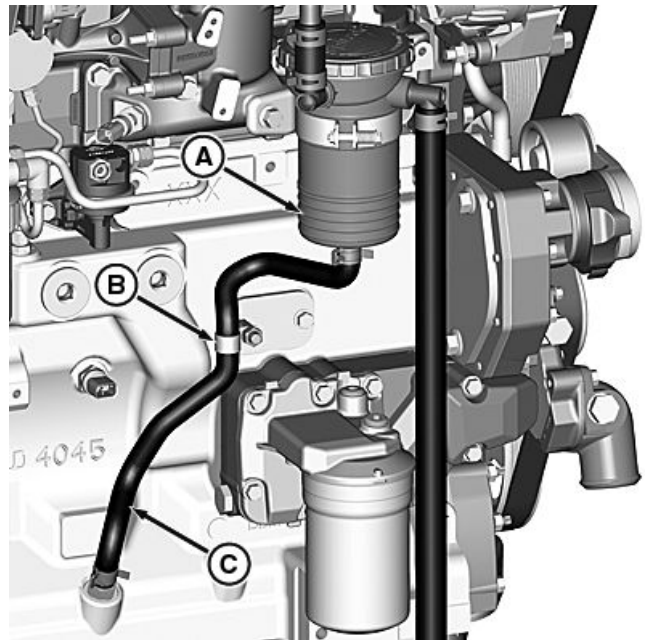
Consumable Material:

- Engine oil 30W

1. Inspect O-ring (A) for damage and replace as necessary.

A—OCV Canister
B—P-clamp

C—Oil Drain Hose



OCV Assembly

RG20673 —UN—11JUL11

Continued on next page

RG19661,0000383 -19-26JUL11-1/4

2. Apply engine oil to O-ring (A) and to the ID of the rubber hose. Install the rocker arm cover to OCV filter housing pipe into the rocker arm cover and on the inlet to the OCV filter housing.

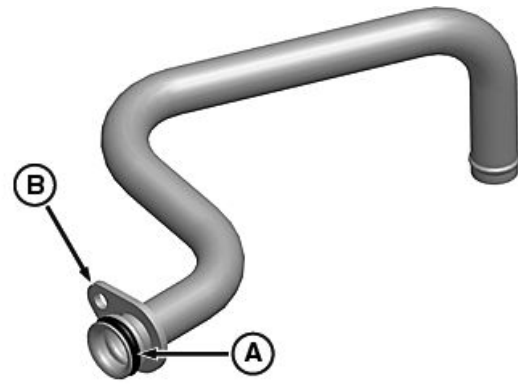
Specification

Tube Mounting
Capscrews—Torque.....15 N·m (11 lb.-ft.)

3. Install OCV filter housing (A) to cylinder head. Tighten cap screws.

Specification

OCV Filter
Housing Mounting
Capscrews—Torque.....70 N·m (52 lb.-ft.)



OCV Filter Inlet Tube

RG20674—UN—11JUL11

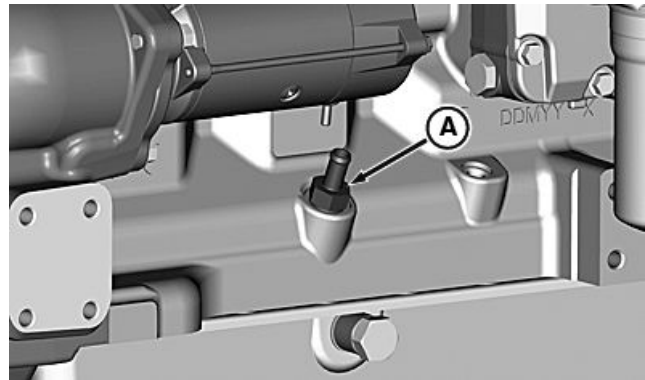
RG19661,0000383 -19-26JUL11-2/4

4. If necessary, install the oil drain check valve in engine block.

Specification

Oil Drain Check
Valve—Torque.....50 N·m (37 lb.-ft.)

A—Check Valve



Oil Drain Check Valve

RG20675—UN—11JUL11

RG19661,0000383 -19-26JUL11-3/4

5. Apply oil to both ends of the ID of OCV filter drain hose (C). Install one end into the oil drain check valve and the other into OCV filter housing (A).
6. Install OCV filter oil drain hose P-clamp (B) and tighten nut.

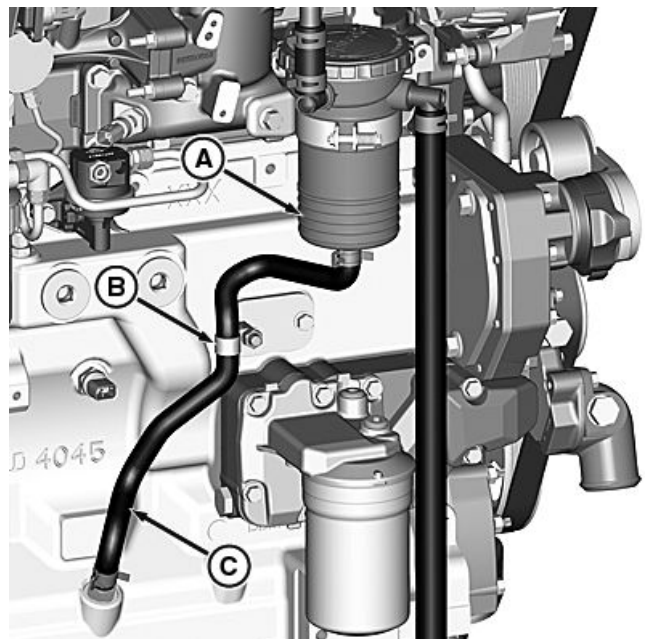
Specification

OCV Filter Oil Drain Hose
P-clamp—Torque.....52 N·m (38 lb.-ft.)

7. If removed, install OCV vent hose to OCV filter housing.

A—OCV Canister
B—P-clamp

C—Drain Hose



OCV Assembly

RG20673—UN—11JUL11

RG19661,0000383 -19-26JUL11-4/4

Open Crankcase Ventilation System — Removal

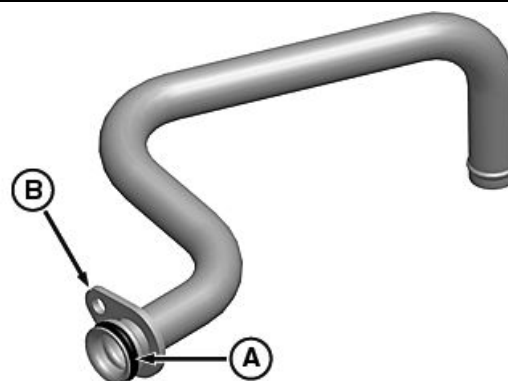
Special Tools:

- None

Consumable Material:

- None

1. Remove capscrew from mounting flange (B) and remove pipe from rocker arm cover. Remove lower hose clamp and remove pipe and hose from Open Crankcase Ventilation (OCV) filter housing, inspect O-ring (A), pipe and hose for damage and set aside.



OCV Filter Inlet Tube

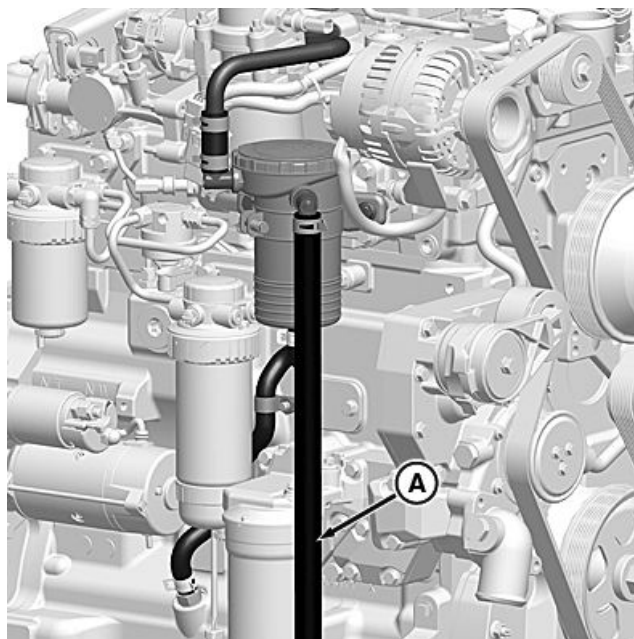
A—O-ring

B—Mounting Flange

RG19661,0000384 -19-26JUL11-1/4

2. If necessary, remove hose clamp from vent hose (A). Remove hose from OCV, inspect for damage.

A—Vent Hose



OCV Vent System

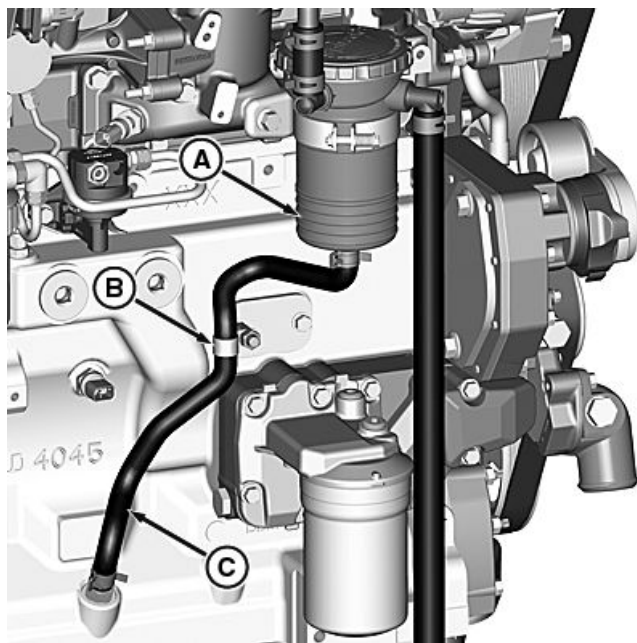
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RG19661,0000384 -19-26JUL11-2/4

3. Loosen and remove cap screw securing P-clamp (B) to lower OCV oil drain hose (C).
4. Remove hose clamps from OCV oil drain hose (C). Remove OCV oil drain tube (C) , inspect for damage.
5. Loosen and remove 2 cap screws from intake manifold and OCV filter housing (A).
6. Remove OCV filter housing and set aside.

A—OCV Filter Housing
B—P-clamp

C—OCV Oil Drain Tube



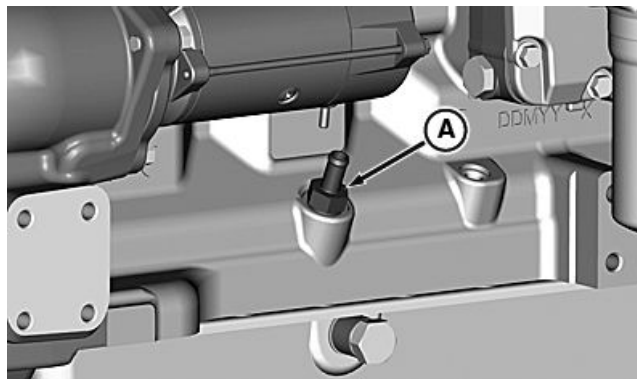
OCV removal

RG20673 —UN—11JUL11

RG19661,0000384 -19-26JUL11-3/4

7. If necessary, loosen and remove oil drain check valve assembly (A) from the block.

A—Check Valve



Remove Oil Drain Check Valve

RG20675 —UN—11JUL11

RG19661,0000384 -19-26JUL11-4/4

Balancer Shaft — Installation

Special Tools:

- JDE83, or JDG820 (formerly JDE811), or JDG10576 Flywheel Turning Tool
- JDG1571 or JDE81-4 Flywheel Locking Pin

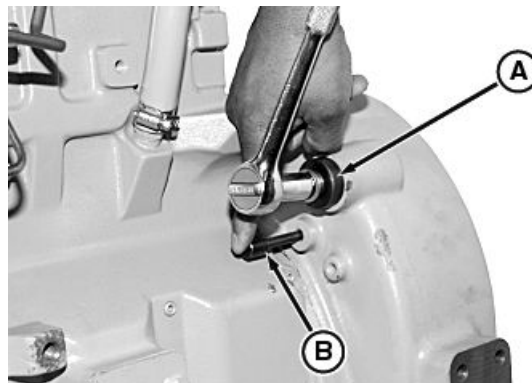
Consumable Material:

- SAE 30 Oil

1. Using JDE83, JDG820 (formerly JDE811) or JDG10576 Flywheel Turning Tool and JDG1571 or JDE814 Timing Pin, lock No. 1 piston at TDC compression stroke.

A—Engine Rotation Tool

B—Timing Pin in Place



Engine Rotation Tool and Timing Pin in Place

RG20235 —UN—18APR11

BF67790,0000A15 -19-04AUG11-1/3

2. Lubricate balancer shaft bushings and journals with clean 30W engine oil.
3. Identify right and left balancer shafts according to the gear timing marks as shown.

IMPORTANT: Balancer shafts can also be identified by stamped letters at rear of shafts.

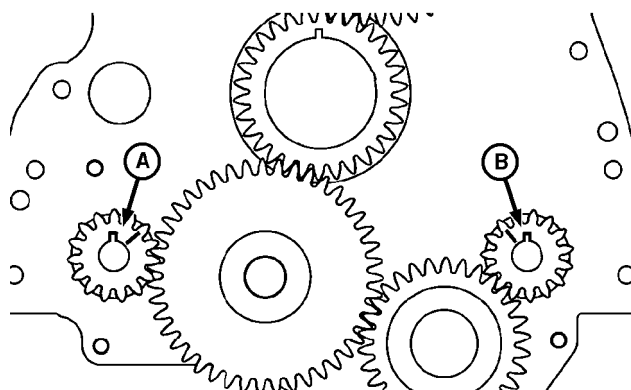
"R" or "RH" for righthand side shaft.

"L" or "LH" for lefthand side shaft.

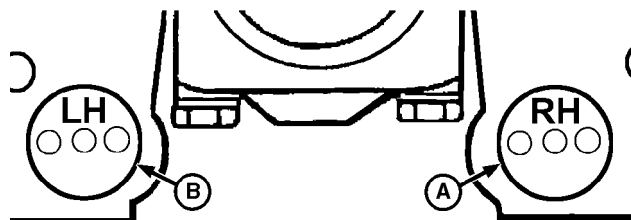
IMPORTANT: Balancer shafts **MUST BE** installed in the location from which removed. Reversing shaft locations could result in excessive bushing and shaft wear. In this case, replace the balancer shaft and bushings.

A—Right-hand Side Shaft
(Camshaft Side)

B—Left-hand Side Shaft
(Injection Pump Side)



Front Face



Rear Face

RG13619 —UN—17MAY04

RG13620 —UN—17MAY04

Continued on next page

BF67790,0000A15 -19-04AUG11-2/3

4. Install balancer shafts and thrust plates (D). Tighten thrust plate cap screws (G) to specifications.

Specification

Balancer Shaft
Thrust Plate Cap
Screws—Torque..... 40 N·m (29.5 lb.-ft.)

5. Tier 4 engines have balancer shafts with removable weights. Install weights to balancer shafts using new cap screws and nuts after front gears are installed. Tighten to specifications.

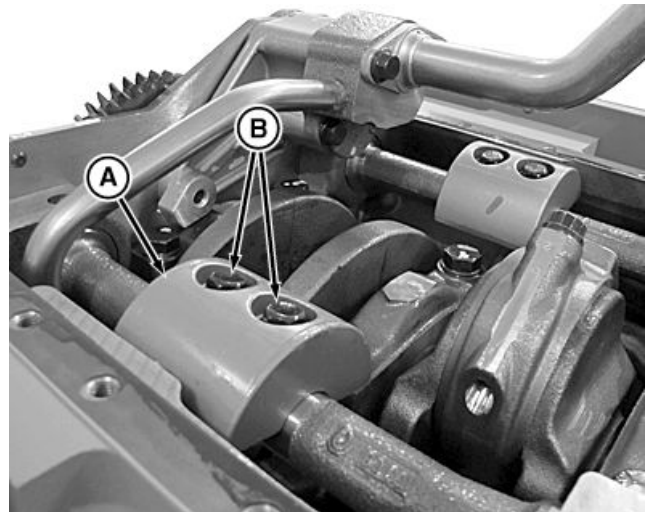
IMPORTANT: Ensure weights are installed to shaft side opposite key (C).

Specification

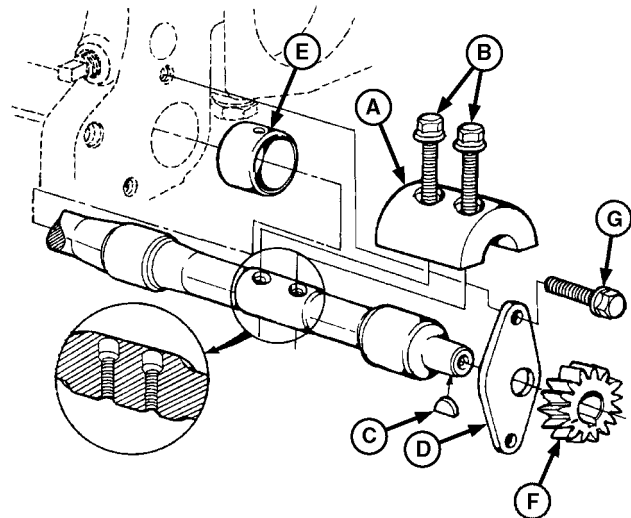
Balancer Shaft
Removable Weights
(Dual Cap Screw
Weights)—Torque..... 40 N·m (29.5 lb.-ft.)

A—Weight
B—Screw
C—Key
D—Thrust Plate

E—Bushing
F—Balancer Shaft Gear
G—Thrust Plate Cap Screw



Balancer Shaft Removable Weights



Dual Cap Screw Weight

BF67790,0000A15 -19-04AUG11-3/3

RG20234 —UN—18APR11

RG20236 —UN—18APR11

Balancer Shaft — Measure End Play

Special Tools:

- None

Consumable Material:

- None

Measure balancer shaft end play.

Specification

Balancer Shaft—End
Play..... 0.05—0.26 mm (0.002—0.010 in.)

If balancer shaft end play exceeds specifications, check thrust plate thickness. (See BALANCER SHAFT THRUST PLATE — MEASURE CLEARANCE AND THICKNESS, later in this group.)



Measuring Balancer Shaft End Play—4-Cylinder

BF67790,0000281 -19-19APR11-1/1

RG7702 —UN—23NOV97

Balancer Shaft — Removal

Special Tools:

- None

Consumable Material:

- None

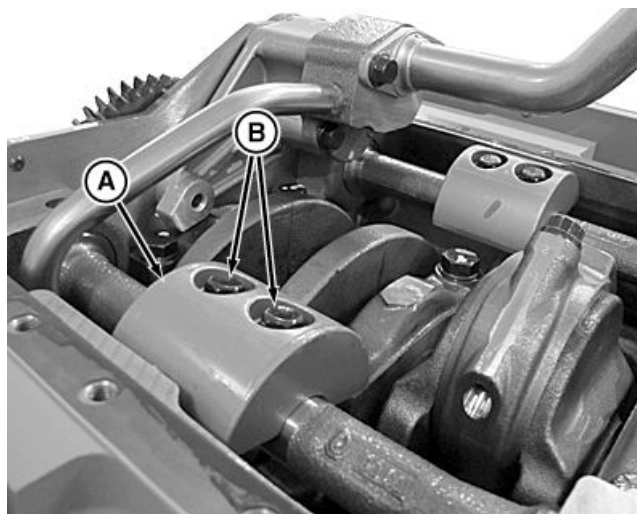
1. Remove timing wheel. See [CRANKSHAFT TIMING WHEEL — REMOVAL](#) in Group 020, Section 040.

NOTE: Balancer shafts are equipped with removable weights attached with two cap screws.

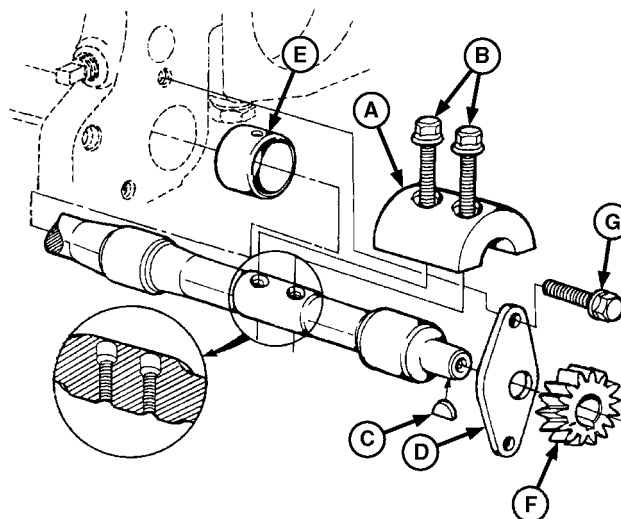
2. Remove lower idler gear and oil pump gear (shown removed).
3. Remove balancer shaft weights (A). Weights must be removed before removing balancer shaft.
4. Remove cap screws from balancer shaft thrust plate as shown.

A—Weight
B—Cap Screws
C—Key
D—Thrust Plate

E—Bushing
F—Balancer Shaft Gear
G—Thrust Plate Cap Screw



Balancer Shaft Weight (Dual Cap Screw Mounted)



Balancer Shaft Weight (Dual Cap Screw Mounted)



Thrust Plate Cap Screw

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BF67790,0000282 -19-08AUG11-1/2

RG20234 —UN—18APR11

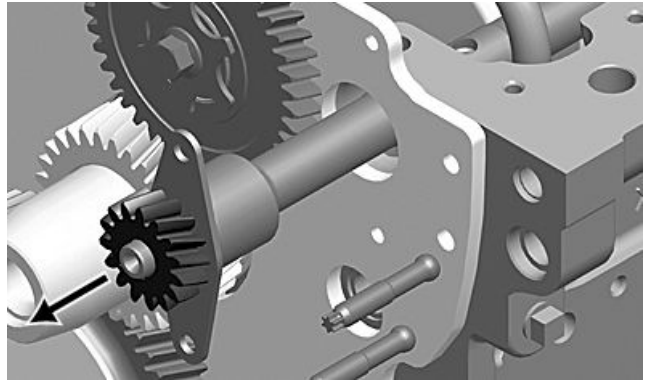
RG20236 —UN—18APR11

RG7704 —UN—23NOV97

IMPORTANT: Identify left and right balancer shafts for correct assembly. Permanently mark a letter "R" or letter "L" on the rear of the shaft for identification, if not already marked on the rear of the shaft. Interchanging shaft locations could cause premature wear of shafts and bushings.

NOTE: When removing balancer shafts, use care so neither the shaft journals nor bushings are damaged in the cylinder block.

5. Remove balancer shafts.



Balancer Shaft Removal

RG20719 —UN—04AUG11

BF67790,0000282 -19-08AUG11-2/2

Balancer Shaft — Visual Inspection and Measurement

Special Tools:

- None

Consumable Material:

- None

1. Inspect, measure and record bushing ID (A) at all locations.
2. Check for cracks and excessive wear. Replace as necessary.
3. Measure balancer shaft journal OD (B) at all locations. Difference between journal OD and bushing ID is oil clearance.

If oil clearance is not within specification, install new bushings and, if necessary, new balancer shaft.

Specification

Balancer Shaft Bushing	
(New)—ID.....	40.177—40.237 mm (1.5818—1.5841 in.)
Balancer Shaft Journal	
—OD.....	40.135—40.161 mm (1.5801—1.5811 in.)
Balancer Shaft	
Journal-to-Bushing —Oil	
Clearance.....	0.016—0.102 mm (0.0006—0.0040 in.)
Cylinder Block Bore	
for Balancer Shaft	
Bushing—ID.....	43.262—43.288 mm (1.7032—1.7042 in.)



Measuring Balancer Shaft Bushing ID



Measuring Balance Shaft Journal OD

A—Bushing ID

B—Journal OD

RG7705A —UN—07NOV97

RG7706 —UN—07NOV97

BF67790,0000283 -19-20MAR12-1/1

Balancer Shaft and Lower Idler Gear — Timing

Special Tools:

- JD254A (JD-254A) Timing Tool

Consumable Material:

- TY6333 High-Temperature Grease

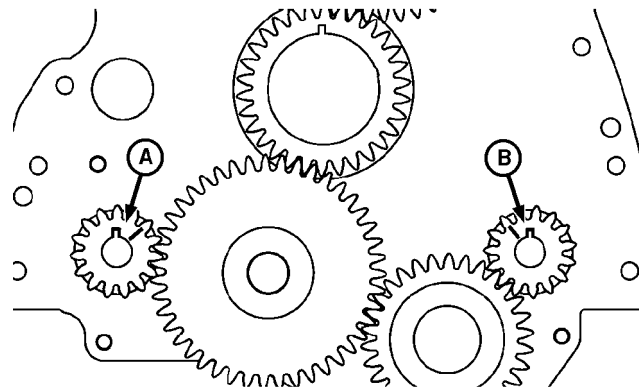
IMPORTANT: Balancer shafts **MUST BE** installed in the location from which removed. Reversing shaft locations could result in excessive bushing and shaft wear. In this case, replace the balancer shaft and bushings.

IMPORTANT: Ensure weights are installed to shaft side opposite key.

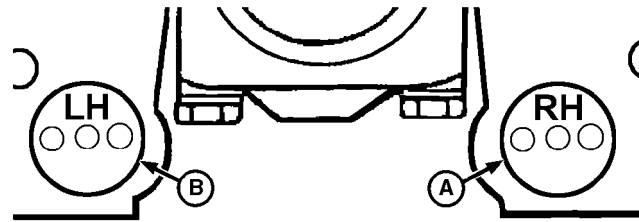
1. Identify right and left balancer shafts according to the gear timing marks as shown.

A—Right-hand Side Shaft
(Camshaft Side)

B—Left-hand Side Shaft
(Injection Pump Side)



Front Face



Rear Face

RG13619—UN—17MAY04

RG13620—UN—17MAY04

BF67790,0000284 -19-04OCT11-1/5

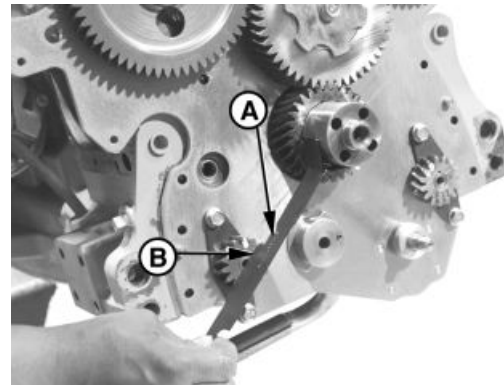
2. Turn right (camshaft side) balancer shaft so timing mark on gear is aligned with JD254A (JD-254A)¹ Timing Tool (A). Timing mark on balancer shaft gear must point to centerline of crankshaft when correctly timed.

IMPORTANT: Keyway (B) in balancer shaft gear will be at 12 o'clock position, when engine is locked at No. 1 TDC compression.

3. Apply TY6333 High-Temperature Grease to idler gear bushing ID and shaft OD. Install lower idler gear without turning balancer shaft.

A—Timing Tool

B—Keyway



Timing Right (Camshaft Side) Balancer Shaft

RG7712—UN—07NOV97

¹Order JD-254A when tool is ordered from European Parts Distribution Center (EPDC)

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BF67790,0000284 -19-04OCT11-2/5

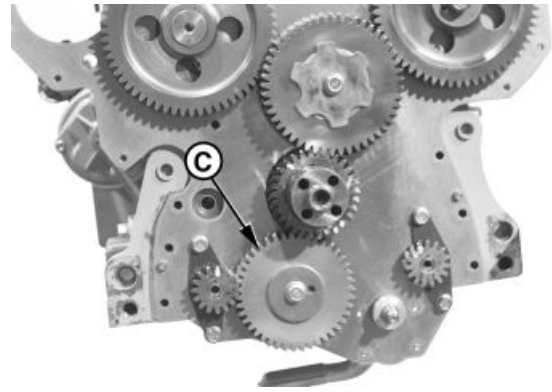
IMPORTANT: DO NOT use zinc coated hardware to retain idler gear. If cap screw is zinc coated, replace with new phosphate coated cap screw. See parts catalog for appropriate part number.

NOTE: Install thrust washer with "X" mark facing away from gear.

4. Install thrust washer over lower idler gear (C) and shaft.

NOTE: Install thrust washer with "X" mark facing away from gear.

5. Lubricate with 30W engine oil and install cap screw through idler shaft into threaded leg of oil pump housing and finger tighten only.



Lower Idler Gear and Thrust Washer

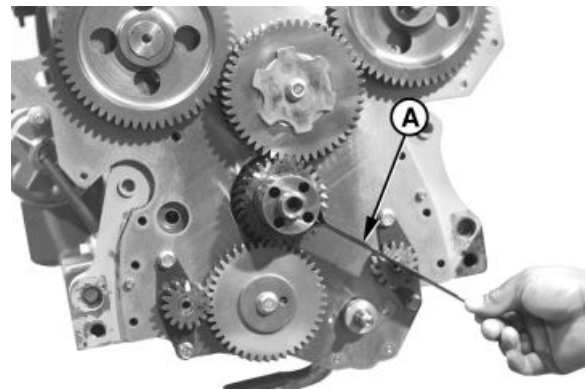
C—Lower Idler Gear

RG7713—UN—07NOV97

BF67790,0000284 -19-04OCT11-3/5

6. Turn left (injection pump side) balancer shaft so timing mark on gear is aligned with JD254A (JD-254A)¹ Timing Tool (A).
7. Install oil pump gear. Finger tighten gear retaining nut.
8. Recheck gear timing for both balancer shafts.

A—Timing Tool



Timing Left (Injection Pump Side) Balancer Shaft

RG7714—UN—07NOV97

¹Order JD-54A when tool is ordered from European Parts Distribution Center (EPDC)

BF67790,0000284 -19-04OCT11-4/5

9. Tighten oil pump drive gear retaining nut to specifications. Stake nut to shaft in three places (B). See Oil Pump and Tubes — Installation in Group 020, Section 060 for oil pump installation.

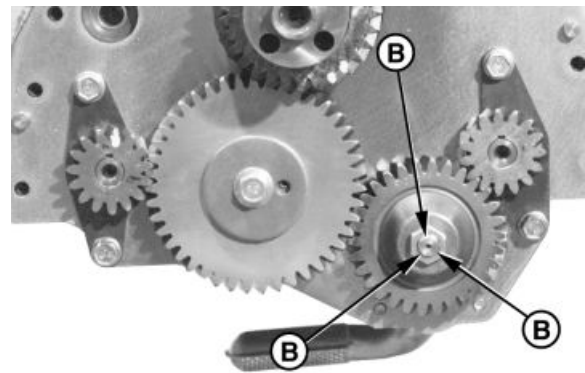
Specification

Oil Pump Drive Gear
Staked Nut—Torque..... 50 N·m (37 lb.-ft.)

10. Tighten lubricated lower idler gear cap screw to specifications.

Specification

Lower Idler Gear Cap
Screw (Lubricated
Threads)—Torque..... 70 N·m (53 lb.-ft.)



Stake Point Locations

B—Stake Points

RG7715—UN—07NOV97

BF67790,0000284 -19-04OCT11-5/5

Balancer Shaft Bushing — Removal and Installation

Special Tools:

- JD249 (JD-249) Balancer Shaft Bushing Driver
- JDG963 Adaptor

Consumable Material:

- 30W New Engine Oil

IMPORTANT: Engines with balancer shafts use balancer shaft bushings.

Cylinder block front plate must be removed in order to replace balancer shaft bushings.

1. Remove front plate. See FRONT PLATE — REMOVAL, later in group 50.
2. Remove bushings from block with JD249 (JD-249)¹ Balancer Shaft Bushing Driver and JDG963 Adaptor. To remove the rear (third) bushing, the flywheel housing must be removed.

IMPORTANT: In balancer shaft bores make sure oil holes in bushing and block are aligned for proper bushing and journal lubrication.

3. Lubricate bushings with clean 30W engine oil and install in block with JD249(JD-249) Balancer Shaft Bushing Driver and JDG963 Adaptor.
4. Insert balancer shafts to check for bushing-to-shaft clearance. If shaft can be rotated by hand with a slight-to-moderate drag, adequate bushing-to-balancer shaft clearance exists. It is not necessary to hone

¹Order JD-249 when tool is ordered from European Parts Distribution Center (EPDC)



Removing Bushing



Installing Bushing

bushings to obtain specified oil clearance. Excessive clearance can result in shaft seizure.

RG7959 —UN—15JAN98

RG7960 —UN—15JAN98

BF67790,0000A14 -19-04OCT11-1/1

Balancer Shaft Gear — Check and Replace Components

Special Tools:

- JD247 (JD-247) Balancer Shaft Holding Tool

Consumable Material:

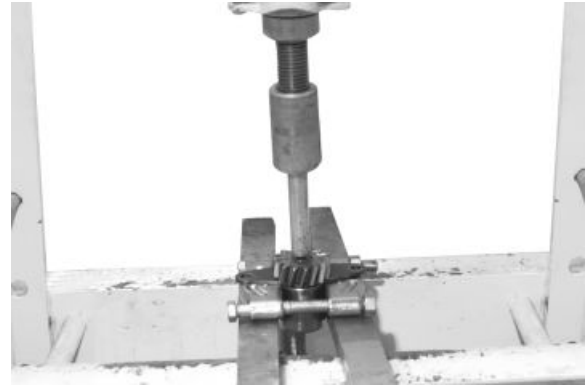
- None

IMPORTANT: DO NOT intermix gears and shafts.

Shafts are finish lapped in different locations; therefore, balancer shafts **MUST BE** installed in the location from which removed. Reversing shaft locations could result in excessive bushing and shaft wear. If in doubt about proper shaft locations, replace the balancer shaft and bushings.

NOTE: Balancer shaft kits provided for service are delivered without gear.

1. Support back side of gear in a press and push on balancer shaft to remove gear.



Remove Balancer Shaft Gear from Shaft

RG7709 —UN—23NOV97

2. Inspect Woodruff key or spring pin (some engines), gear, and thrust plate for cracks and wear. Replace if necessary.

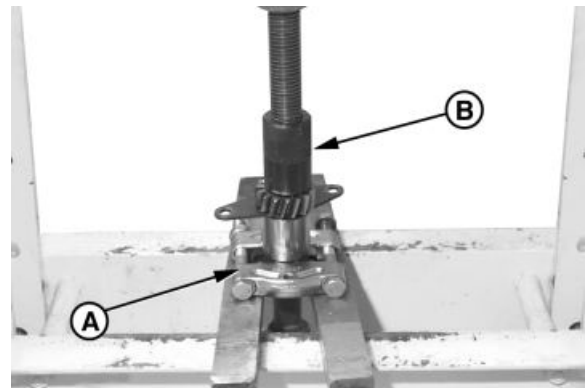
BF67790,0000286 -19-19APR11-1/2

3. Position balancer shaft in JD247 (JD-247)¹ Balancer Shaft Holding Tool or bearing pulling attachment (A).
4. Install thrust plate.
5. Use Woodruff key or spring pin (some engines) to index gear on balancer shaft. Be sure timing mark is on front face of gear.
6. Press gear onto shaft with a tube-type driver (B) until gear is flush with shaft.

Specification

Balancer Shaft
Thrust Plate-to-
Gear—Clearance.....0.05—0.26 mm (0.002—0.010 in.)

A—Balancer Shaft Holding Tool B—Tube-Type Driver



Balancer Shaft Gear to Shaft

RG7710 —UN—07NOV97

¹Order JD-247 when tool is ordered from European Parts Distribution Center (EPDC)

BF67790,0000286 -19-19APR11-2/2

Balancer Shaft Thrust Plate — Measure Clearance and Thickness

Special Tools:

- None

Consumable Material:

- None

Inspect thrust plate (A) for cracks, scoring, or excessive wear. Replace if necessary.

Specification

Balancer Shaft Thrust
Plate (New)—Thickness..... 2.92—3.08 mm (0.114—0.121 in.)

RG7708 —UN—07NOV97



Balancer Shaft Thrust Plate

A—Thrust Plate

BF67790,0000287 -19-19JUL11-1/1

Camshaft — Installation

Consumable Material:

- Timing Gear Cover Gasket, Oil Pan Gasket, Front Crankshaft Oil Seal
- Loctite 242 or Hylomar 760, Loctite 243, Rocker Arm Shaft Carrier Gasket, Rocker Arm Cover Gasket

NOTE: In order to allow the installation and the timing of the camshaft, the upper idler gear (D) needs to be removed.

1. Remove upper idler gear (D).
2. Lubricate camshaft bearing journals and lobes with 30W oil.

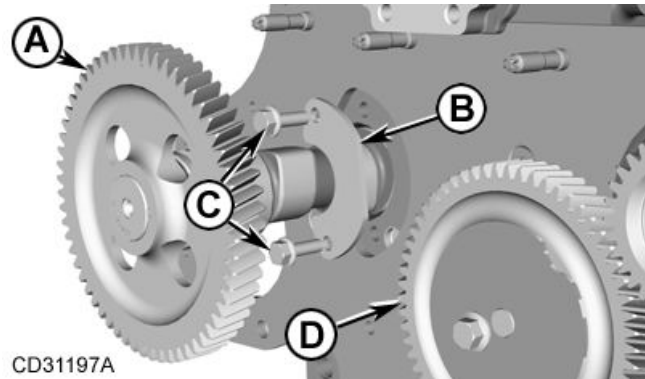
IMPORTANT: DO NOT allow camshaft lobes to drag on camshaft bore or bushing surfaces while installing camshaft. Bearing surfaces can be scratched or scored. Rotate camshaft during installation to avoid obstruction in any bore.

3. Install camshaft (A) and thrust plate (B) in cylinder block. Be careful not to damage bore.
4. Install thrust plate cap screws (C) and tighten to specification.

Specification

Camshaft Thrust Plate
Cap Screws—Torque..... 40 N·m (29 lb.-ft.)

5. Perform: Camshaft and Upper Idler Gear — Timing



CD31197A

Install Camshaft

A—Camshaft
B—Thrust Plate

C—Cap Screw
D—Upper Idler Gear

6. Install cam followers.
7. Perform: Timing Gear Cover — Installation

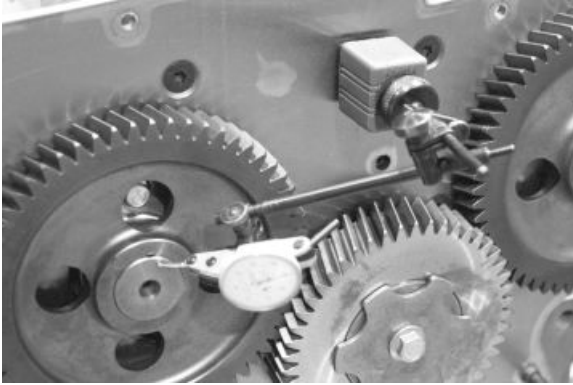
Special Tools:

- JDG954B — Front Crankshaft Oil Seal Installer
8. Reinstall push rods and perform: Valve — Clearance Adjustment
 9. Perform: Rocker Arm Cover — Installation

BK34394,0000E81 -19-25JUL11-1/1

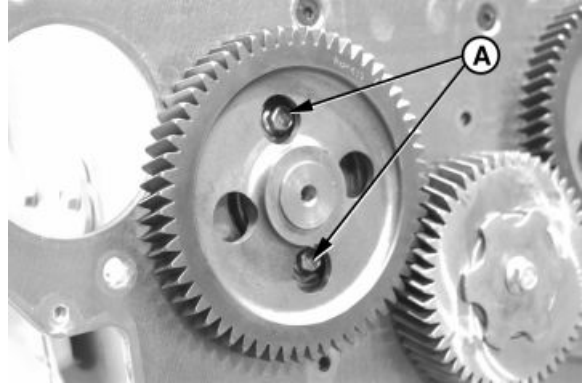
CD31197A —UN—12AUG10

Camshaft — Removal



Measure Camshaft End Play

RG7561 —UN—23NOV97



Remove Camshaft

RG7564 —UN—05NOV97

Special Tools:

- D15001NU — Magnetic Follower Holder Kit

Consumable Material:

- None

1. Perform: Timing Gear Cover — Removal

Special Tools:

- JDG11206 — Front Crankshaft Oil Seal Puller

2. Perform: Rocker Arm Cover — Removal

3. Loosen nut and screw used for valve lash adjustment and remove all push rods.

NOTE: It is not necessary to remove cylinder head from engine for camshaft removal.

4. Measure camshaft end play and the wear limit.

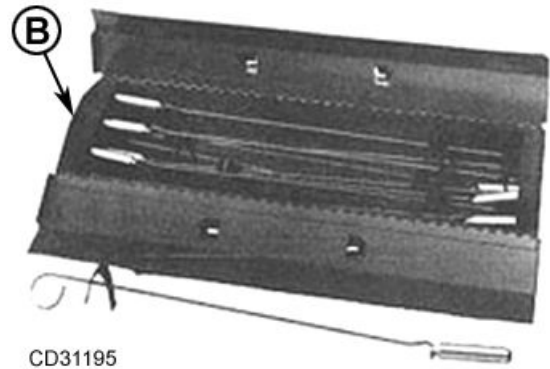
Specification

Camshaft—End Play.....0.09—0.24 mm (0.0035—0.0094 in.)

Wear Limit 0.038 mm (0.015 in.)

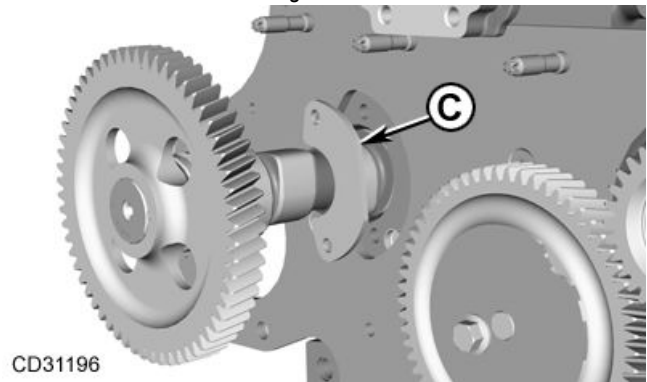
If end play is excessive, check thrust plate thickness when camshaft is removed.

5. Rotate engine gear train until cap screws (A) can be removed.



D15001NU Magnetic Follower Holder Kit

CD31195 —UN—19MAY10



Remove Camshaft Thrust Plate

CD31196 —UN—19MAY10

IMPORTANT: Engine **MUST** remain in a position where camshaft followers rest against cylinder head. Magnetic holders, D15001NU, can be used to prevent followers from falling into engine crankcase. If camshaft followers fall into crankcase, cylinder head removal is required.

6. Revolve engine on repair stand to an angle where camshaft followers fall away from camshaft lobes.

7. Carefully pull camshaft straight up, out of cylinder block.

A—Cap Screws
B—D15001NU Magnetic Follower Holder Kit

C—Camshaft Thrust Plate

8. Remove thrust plate (C) from slot behind camshaft gear.

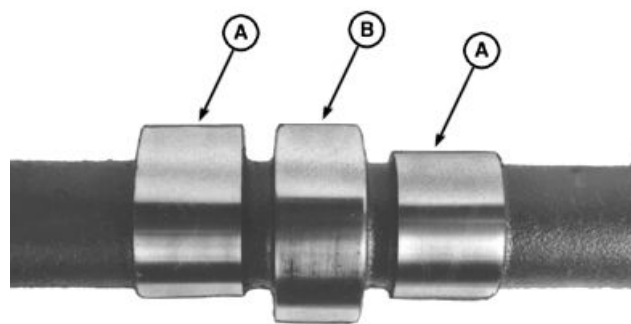
JR74534,0000446 -19-02AUG11-1/1

Camshaft — Visual Inspection

1. Clean camshaft in solvent. Dry with compressed air.
2. Inspect all camshaft lobes (A) and journals (B) for wear or damage. Replace camshaft assembly as necessary.
3. Inspect camshaft for broken, cracked or excessively worn drive gear. Replace camshaft assembly as necessary.

IMPORTANT: New camshaft followers can be used with old camshaft. **DO NOT** reuse old camshaft followers with a new camshaft.

NOTE: Light score marks are acceptable if valve lift is within specification. If pitting or galling exists, replace camshaft.



RG3500

RG3500 —UN—03NOV97

Camshaft Lobe Inspection

A—Lobes

B—Journal

BK34394,0000E7C -19-14JAN11-1/1

Camshaft and Upper Idler Gear — Timing

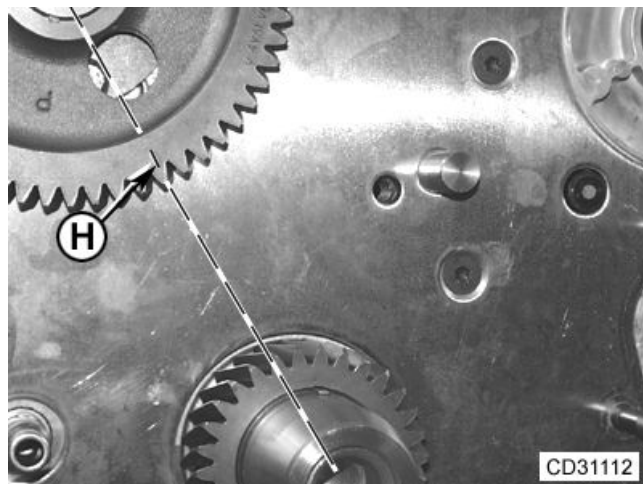
Special Tools:

- JDE83, JDG820, or JDG10576 — Flywheel Turning Tool
- JDG1571 — Timing Pin
- JD254A

Consumable Material:

- TY6333 — High Temperature Grease
- SAE 30W New Engine Oil

1. Using JDE83, JDG820 (formerly JDE81-1) or JDG10576 Flywheel Turning Tool and JDG1571 Timing Pin, lock No. 1 piston at TDC.
2. Using JD254A (JD-254A)¹ Timing Tool, turn camshaft gear until timing mark (H) points towards crankshaft centerline.



CD31112

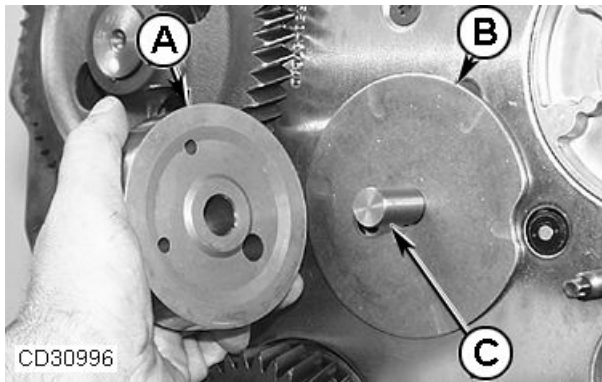
Time camshaft

CD31112 —UN—12JAN10

¹Order JD-254A when tool is ordered from European Parts Distribution Center (EPDC).

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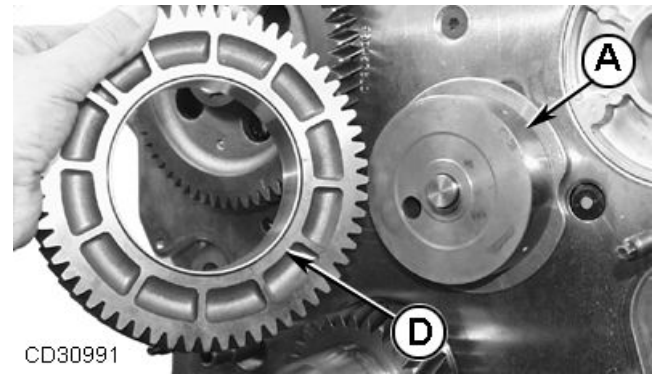
BF67790,0000A26 -19-24AUG11-1/3



Install rear thrust washer and upper idler gear hub

3. Install rear thrust washer (B) onto pin (C) with lubrication grooves facing the idler gear.
4. Install hub (A) with recess face toward rear thrust washer.

CD30996—UN—21SEP07

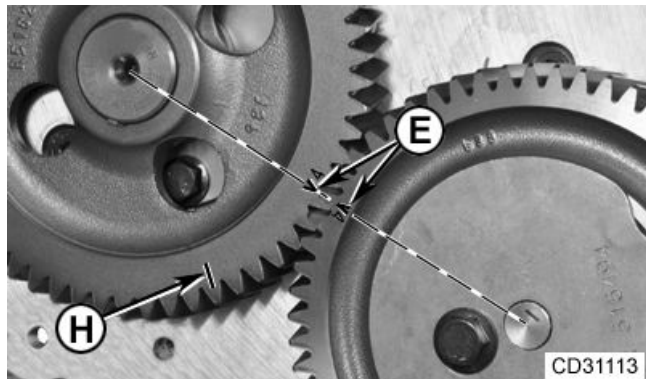


Install upper idler gear

5. Lubricate upper idler gear bore (D) and hub (A) with TY6333 High Temperature Grease.

CD30991—UN—18SEP07

BF67790,0000A26 -19-24AUG11-2/3



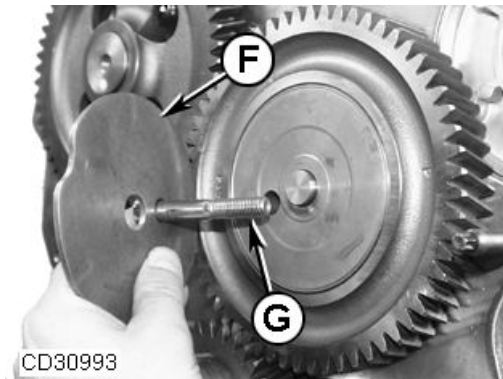
Time upper idler gear

- A—Upper idler gear hub
B—Rear thrust washer
C—Upper idler gear hub pin
D—Upper idler gear
E—"V 4Valve" or "V 4" timing marks
F—Front thrust washer
G—Cap screw
H—Camshaft gear timing mark

6. Install upper idler gear onto hub. Align the "V 4Valve" or "V4" timing marks of both the camshaft and the upper idler gears (E) without turning camshaft. The timing marks must be on the line going by camshaft and upper idler gear centerlines.
7. Using JD254A (JD-254A)¹ Timing Tool, recheck that the camshaft gear timing mark (H) still points towards crankshaft centerline.
8. Install upper idler gear front thrust washer (F) with lubrication grooves facing toward gear.

¹Order JD-254A when tool is ordered from European Parts Distribution Center (EPDC).

CD31113—UN—12JAN10



Install upper front thrust washer and cap screw

- F—Front thrust washer
G—Cap screw
H—Camshaft gear timing mark

IMPORTANT: DO NOT use zinc coated hardware to retain idler gear. If cap screw is zinc coated, replace with new phosphate coated cap screw. See parts catalog for appropriate part number.

9. Lubricate upper idler gear cap screw (G) threads with SAE 30 oil then tighten to specifications.

Specification

Upper Idler Gear Cap
Screw—Torque..... 70 N·m (52 lb.-ft.)

CD30993—UN—18SEP07

BF67790,0000A26 -19-24AUG11-3/3

Camshaft Bushing — Replacement

Special Tools:

- JDG11206 — Front Crankshaft Oil Seal Puller
- JDG954B — Front Crankshaft Oil Seal Installer
- JDG739B — Camshaft Bushing Installer/Puller Tool

Consumable Material:

- Timing Gear Cover Gasket, Oil Pan Gasket, Front Crankshaft Oil Seal
- Loctite 242 or Hylomar 760, Loctite 243, Rocker Arm Shaft Carrier Gasket, Rocker Arm Cover Gasket
- TY6333 — High Temperature Grease

NOTE: A camshaft bushing is installed in front (No. 1) camshaft bore only. The front plate has a chamfered edge allowing camshaft bushing removal and installation with the front plate installed.

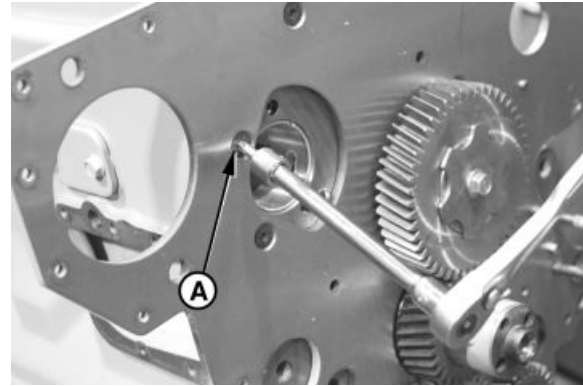
Remove Camshaft Bushing

1. Perform: Camshaft — Removal
2. Remove countersunk TORX® cap screw (A) and install JDG739-7 Metric Threaded Leg with Tapered End (B).

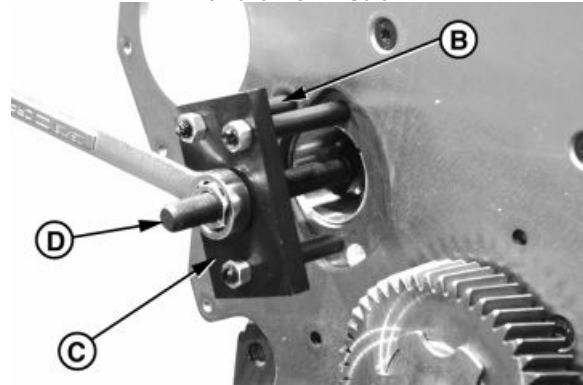
IMPORTANT: Cylinder block must be replaced if camshaft bore is damaged. Be sure that puller is properly piloted before pulling bushing.

3. Insert JDG739-1 Bushing Remover (D) into camshaft bore.
4. Install two JDG739-8 Metric Threaded Leg with Flat End and JDG739-3 Removing/Installing Plate (C) to cylinder block. Plate must be parallel with front plate and centered over camshaft bore. Tighten legs and nuts securely.
5. Install thrust washer and nut then tighten until bushing is free of block bore.

TORX is a registered trademark of Camcar/Textron.



Remove TORX Screw



Remove Camshaft Bushing Using JDG739B Tool

- | | |
|---|--------------------------------------|
| A—TORX Screw | C—JDG739-3 Removing/Installing Plate |
| B—JDG739-7 Metric Threaded Leg with Tapered End | D—JDG739-1 Bushing Remover |

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BK34394,0000E82 -19-25JUL11-1/2

RG7557 —UN—05NOV97

RG7558 —UN—05NOV97

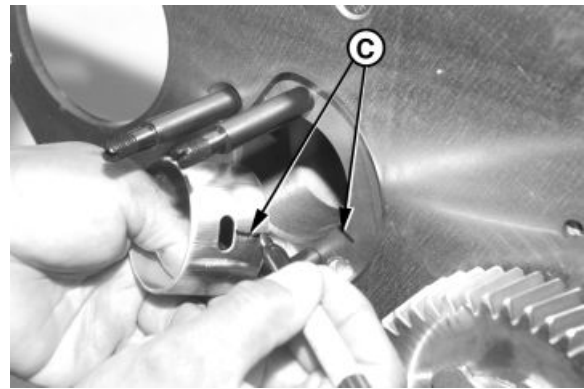
Install Camshaft Bushing

IMPORTANT: Bushings must be installed so oil supply hole in bushing aligns with oil drilling in block bore.

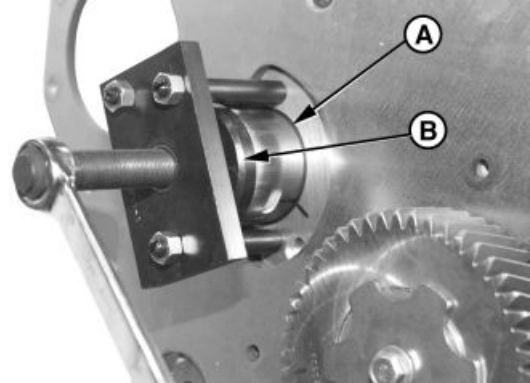
1. Mark orientation of oil supply hole (C) on front face of block and on bushing to help with bushing alignment during installation.
2. Apply TY6333 High-Temperature Grease to inner and outer diameters of new bushing (A), and to inner diameter of cylinder block bore. Slide bushing onto JDG739-5B Bushing Installer (B) so notched end of bushing is toward front end of engine when installed.
3. Thread JDG739-4 Bushing Installer Screw into JDG739-3 Removing/Installing Plate. With bushing started, square in bore and oil hole aligned, tighten forcing screw until flange of bushing driver bottoms against face of block.
4. Remove bushing tool from cylinder block and check oil supply hole for correct alignment. If holes are not aligned, remove and discard bushing. Install a new bushing.
5. Perform: Camshaft — Installation

A—Bushing
B—JDG739-5B Bushing
Installer

C—Oil Supply Hole



Align Camshaft Bushing Oil Hole



Install Camshaft Bushing Using JDG739B Tool

RG7559 —UN—05NOV97

RG7560 —UN—05NOV97

BK34394,0000E82 -19-25JUL11-2/2

Camshaft Gear — Inspection

IMPORTANT: Camshaft must be replaced if dropped or damaged. Camshaft gear and shaft key are no longer available as service parts. If gear is damaged, replace camshaft and gear as an assembly.

1. Clean camshaft and gear in solvent. Dry with compressed air.

2. Inspect camshaft gear for nicks and scratches. Replace camshaft and gear assembly if damage is found.

BK34394,0000E80 -19-14JAN11-1/1

Camshaft Gear-Driven Auxiliary Drive Cover — Installation

Special Tools:

- None

Consumable Material:

- None

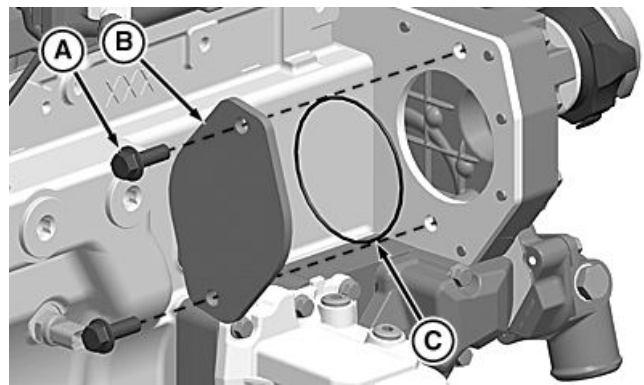
1. Install o-ring (C) into the groove on the gear cover (B).
2. Install mounting bolts (A) through the gear cover (B) and the front plate into the timing gear cover.

NOTE: Auxiliary drive cover can also be equipped with a gasket.

3. Tighten mounting bolts to specifications.

Specification

Auxiliary Drive Cover
Plate—Torque..... 55 N·m (41 lb.-ft.)



Camshaft Gear-Driven Auxiliary Drive Cover Installation

A—Mounting Bolts
B—Gear Cover

C—O-Ring

RG20685—UN—19JUL11

BF67790,0000A01 -19-24AUG11-1/1

Camshaft Gear-Driven Auxiliary Drive Cover — Removal

Special Tools:

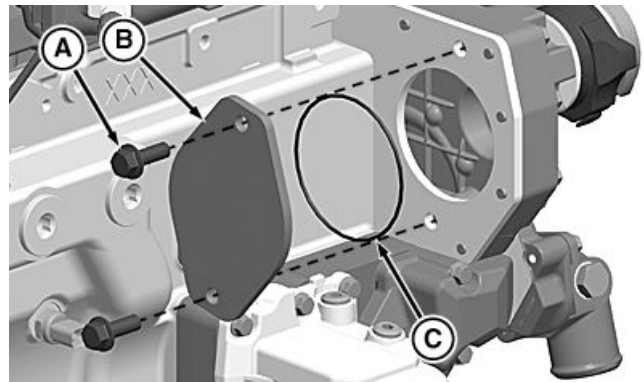
- None

Consumable Material:

- None

1. Remove mounting bolts (A).
2. Remove auxiliary drive cover (B).
3. Clean and inspect cover for cracks or damage. Replace if necessary.
4. Inspect o-ring (C) for damage. Replace if necessary.

NOTE: Some engines are equipped with covers that have gaskets.



Camshaft Gear-Driven Auxiliary Drive Cover Removal

A—Mounting Bolts
B—Gear Cover

C—O-Ring

RG20685—UN—19JUL11

BK34394,0000E8A -19-26JUL11-1/1

Camshaft Journals — Measurement

Special Tools:

- None

Consumable Material:

- None

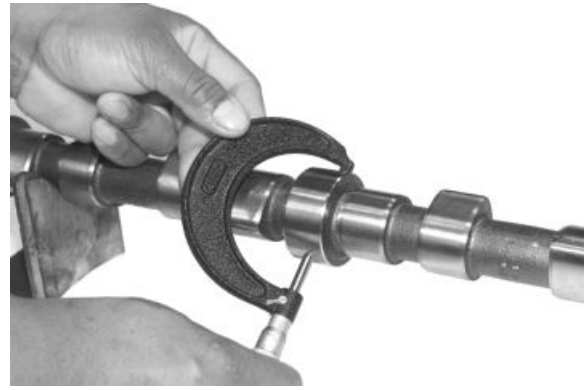
Engines have a (replaceable) bushing installed in No. 1 (front) camshaft bore.

1. Measure camshaft journal diameter. If a camshaft journal is damaged or does not meet specification, install a new camshaft.
2. Measure internal diameter of camshaft bushing or remaining bores in cylinder block. If cylinder block camshaft bore is damaged or is not within specification, replace cylinder block.

If No. 1 camshaft bushing internal diameter does not meet specifications, replace camshaft bushing.

Camshaft Bearing Bores and Journals—Specification

Camshaft	
Journal—Diameter.....	55.872—55.898 mm (2.1997—2.2007 in.)
Cylinder Block	
Bore, Front No. 1	
in Block (Without	
Bushing)—Diameter.....	59.961—59.987 mm (2.3607—2.3617 in.)
Cylinder Block Bore,	
Front No. 1 in Block (With	
Bushing)—Diameter.....	55.948—56.000 mm (2.2026—2.2047 in.)



Measure camshaft journal diameter

Cylinder Block Bore,	
All Except No.	
1—Diameter.....	55.986—56.012 mm (2.2042—2.2052 in.)
Camshaft Journal-to-	
Bushing, No. 1 Bore	
(With Bushing)—Oil	
clearance.....	0.050—0.128 mm (0.0019—0.005 in.)
Camshaft Journal-to-	
Cylinder Block Bore, All	
Except No. 1 Bore—Oil	
clearance.....	0.088—0.140 mm (0.0035—0.0055 in.)

RG7566—UN—23NOV97

JR74534,0000444 -19-26JUL11-1/1

Camshaft Lobes — Height Measurement

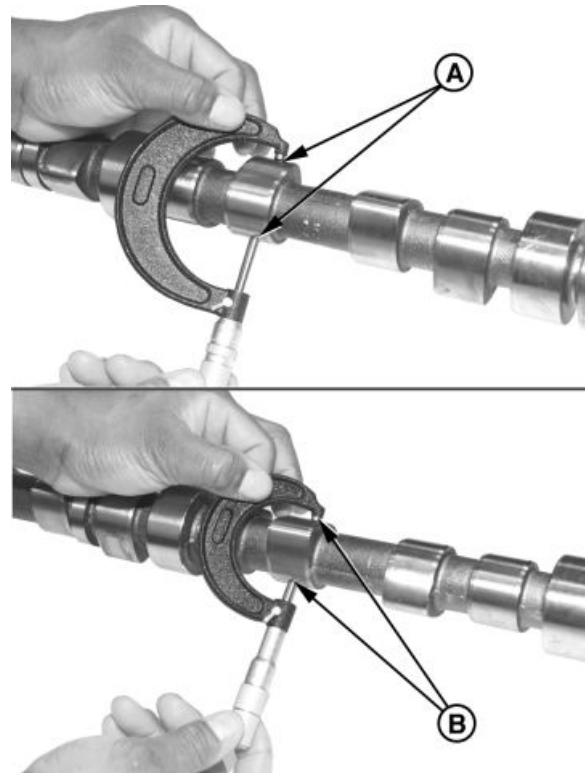
Measure each camshaft lobe at highest point (A) and at narrowest point (B). The difference between these dimensions is camshaft lobe height. If height is not within specification on any lobe, install a new camshaft.

Specification

Camshaft Intake	
Lobe—Height.....	6.07—6.33 mm (0.239—0.249 in.)
Camshaft Exhaust	
Lobe—Height.....	6.13—6.39 mm (0.241—0.252 in.)

A—High Point

B—Narrow Point



Measure Camshaft Lobe Height

RG7567 —UN—05NOV97

BK34394,0000E7F -19-14JAN11-1/1

Camshaft Thrust Plate — Measure Clearance and Thickness

Special Tools:

- None

Consumable Material:

- None

1. Clean camshaft thrust plate and check clearance using a feeler gauge.

Specification

Camshaft Thrust	
Plate—Clearance.....	0.093—0.243 mm (0.0036—0.0095 in.)

NOTE: Thrust plate clearance determines the camshaft end play.

2. Check thrust plate thickness.



Measure Camshaft Thrust Plate

RG7120 —UN—23NOV97

Specification

Camshaft Thrust	
Plate—Thickness.....	3.935—3.985 (0.155—0.157 in.)

BK34394,0000E7D -19-26JUL11-1/1

Front Plate — Installation

Special Tools:

- JDG954B — Front Crankshaft Oil Seal Installer

Consumable Material:

- Loctite 515 Flexible Form-in-Place Gasket
- Timing Gear Cover Gasket, Front Crankshaft Oil Seal, Oil Pan Gasket

IMPORTANT: Be sure that cylinder block and front plate surfaces are free of oil or dirt before applying sealant.

1. Apply Loctite 515 Flexible Form-in-Place Gasket (PM38655) in a continuous 1.5—2.0 mm (0.060—0.079 in.) bead (A) to cylinder block as shown.
2. Install oil bypass valve (B) and spring (C) into cylinder block.

IMPORTANT: Tighten screws to specified torque, using the sequence shown, within 10 minutes after parts are assembled.

3. Install front plate (D) onto cylinder block.
4. Install countersunk TORX screws (E), threaded studs (F) and flat TORX screw (G) then tighten to specification in sequence as shown.

Specification

Front Plate Countersunk

TORX Screws (1 to

5)—Torque..... 25 N·m (18 lb.-ft.)

Front Plate Threaded

Studs (6 to 14)—Torque..... 35 N·m (26 lb.-ft.)

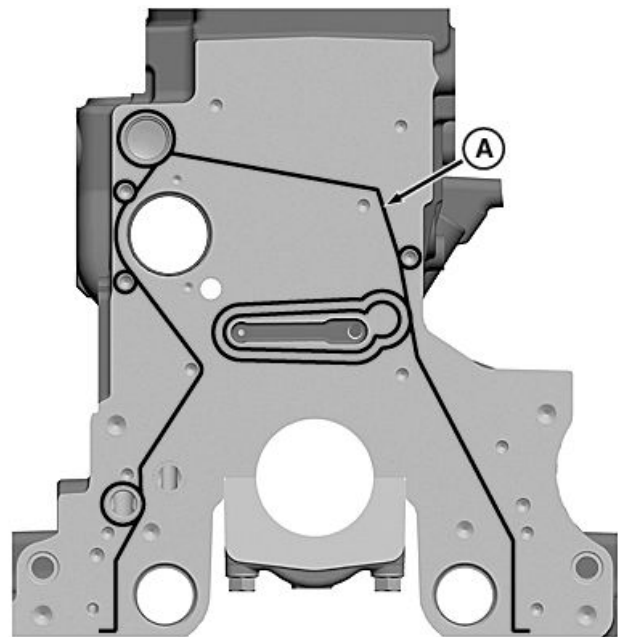
Front Plate Flat TORX

Screw (15)—Torque..... 35 N·m (26 lb.-ft.)

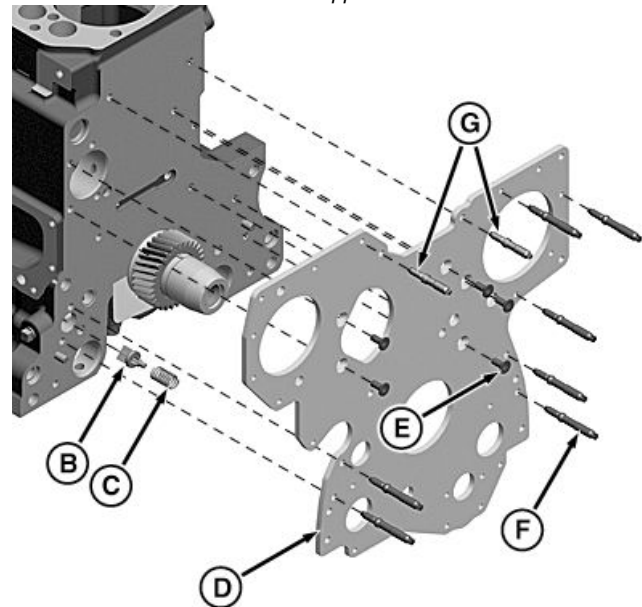
5. Perform: Oil Pump — Installation
6. Perform: Lower Idle Gear — Installation
7. Perform: Camshaft — Installation
8. Perform: Camshaft and Upper Idler Gear — Timing
9. Perform: Timing wheel — Installation
10. Perform: Timing Gear Cover and Front Seal— Installation
11. Perform: High-Pressure Fuel Pump — Installation
12. If removed, perform: Thermostat Housing — Installation
13. Perform: Coolant Pump — Installation

A—Flexible Gasket Pattern
B—Oil Bypass Valve
C—Spring
D—Front Plate

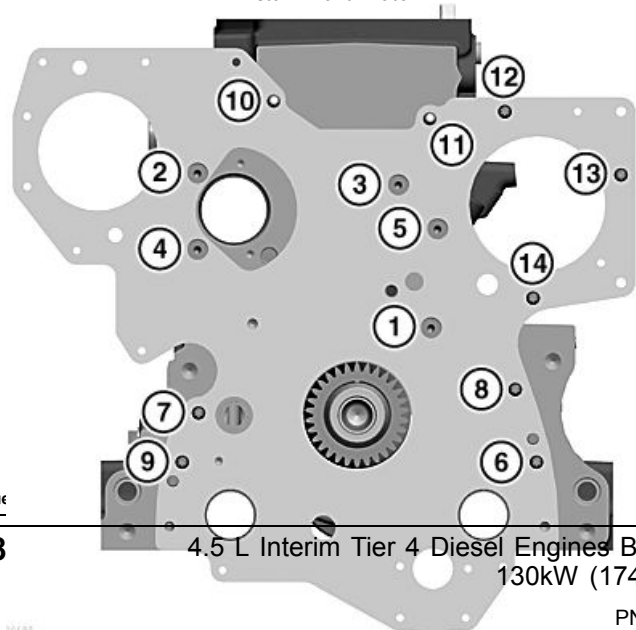
E—Countersunk TORX Screws
F—Threaded Studs
G—Flat TORX Screw



Flexible Gasket Application Pattern



Install Front Plate



RG20694 —UN—01AUG11

RG20695 —UN—01AUG11

Continued

Front Plate — Removal

Special Tools:

- JDG11206 — Front Crankshaft Oil Seal Puller

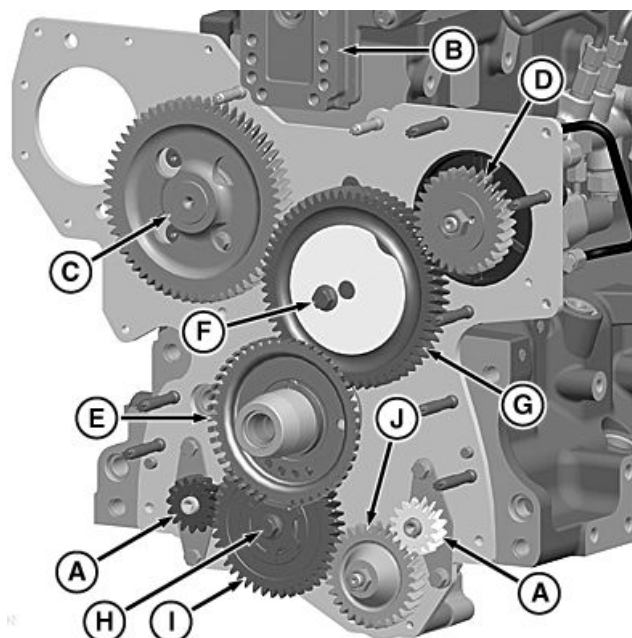
Consumable Material:

- None

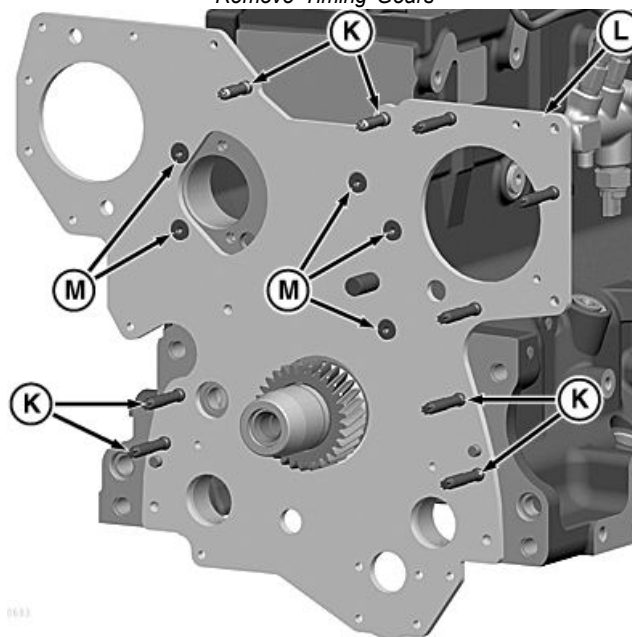
1. Perform: Coolant Pump — Removal
 2. If necessary, perform: Thermostat Housing (B) — Removal
 3. Perform: Camshaft (C) — Removal
- Special tools:
- JDG11206 — Front Crankshaft Oil Seal Puller
4. Perform: High-Pressure Fuel Pump (D) — Removal
 5. Perform: Timing Wheel (E) — Removal
 6. Loosen cap screw (F) and remove upper idler gear (G).
 7. Loosen cap screw (H) and remove lower idler gear (I).
 8. Perform: Oil Pump (J) — Removal
 9. Perform: Balancer Shaft (A) — Removal
 10. Remove threaded studs (K).
 11. Remove countersunk TORX screws (M).
 12. Remove front plate (L) by carefully prying plate from block.

A—Balancer Shaft Gears
B—Thermostat Housing
C—Camshaft
D—High-pressure Fuel pump
E—Timing Wheel
F—Cap Screw
G—Upper Idler Gear

H—Cap Screw
I— Lower Idler Gear
J— Oil Pump
K—Threaded Studs
L—Front Plate
M—Countersunk TORX Screws



Remove Timing Gears



Remove Front Plate

JR74534,000044A -19-09AUG11-1/1

RG20692 —UN—01AUG11

RG20693 —UN—01AUG11

Idler Gears — Measure End Play

1. Perform: Timing Gear Cover — Removal
2. Check end play of upper and lower idler gears and compare with specifications.

Specification

Upper Idler Gear—End

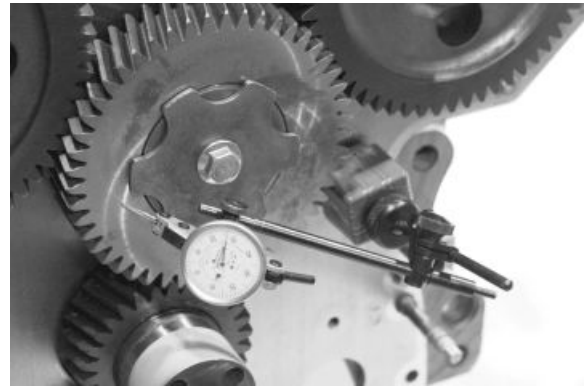
Play.....0.045 — 0.155mm (0.0017 — 0.0060 in.).

Lower Idler Gear—End

Play.....0.07 — 0.33 mm (0.003 — 0.013 in.)

If idler gear end play does not meet specifications, check idler gear, idler shaft, and thrust washers for wear when removing front plate.

3. Perform: Timing Gear Cover — Installation



Measure Idler Gear End Play

RG7562 —UN—23NOV97

BK34394,0000E83 -19-08JUL11-1/1

Lower Idler Gear — Check and Replace Components

Special Tools:

- JDG537 — Driver Handle
- D01045AA — Bushing, Bearing, and Seal Driver Set

Measurement

1. Measure idler gear bushing (A) bore diameter and hub (B) outer diameter to determine oil clearance. If oil clearance exceeds specification, replace parts.

Specification

Lower Idler Gear Bushing

Bore—Diameter.....44.489—44.539 mm (1.7515—1.7535 in.)

Lower Idler Gear

Hub—Diameter.....44.437—44.463 mm (1.7495—1.7505 in.)

Lower Idler

Gear Bushing-to-

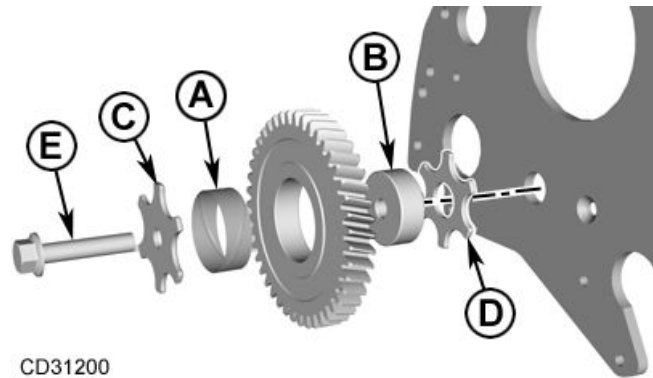
Hub—Clearance.....0.026—0.102 mm (0.0010—0.0040 in.)

2. Measure width of gear bore and hub. Replace parts that are out of specification.

Specification

Lower Idler Gear

Bore—Width.....15.92—16.08 mm (0.6268—0.6331 in.)



Check Lower Idler Gear

CD31200 —UN—26MAY10

A—Lower Idler Gear Bushing

B—Lower Idler Gear Hub

C—Front Thrust Washer

D—Rear Thrust Washer

E—Cap Screw

Lower Idler Hub—Width.....16.15—16.25 mm (0.6358—0.6398)

3. Check front (C) and rear (D) thrust washers for excessive wear. Replace as necessary.

Continued on next page

BK34394,0000E85 -19-13APR11-1/3

Replace Gear Bushing

1. Press worn bushing out of gear using disks from D01045AA Master Driver set and JDG537 handle.
2. Coat inner and outer diameter of the new bushing with TY6333 High Temperature grease.
3. Install bushing into idler gear using disks and driver from D01045AA Master Driver set.



Replace Lower Idler Gear Bushing

RG7576 —UN—23NOV97

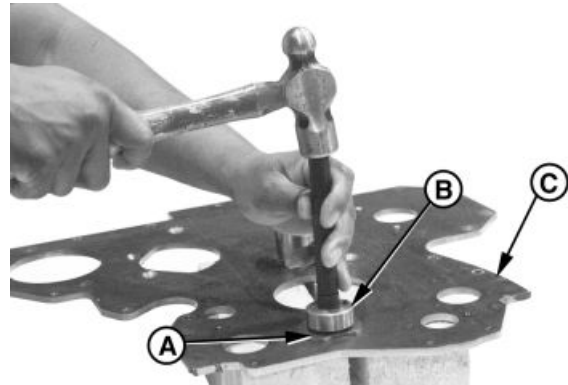
BK34394,0000E85 -19-13APR11-2/3

Install Hub

1. Install rear thrust washer (A), with "X" mark facing front plate, and lower idler hub (B).
2. Drive shaft into front plate (C) until thrust washer is fully seated.

A—Rear Thrust Washer
B—Lower Idler Gear Hub

C—Front Plate



Install Lower Idler Gear Hub

RG7582 —UN—05NOV97

BK34394,0000E85 -19-13APR11-3/3

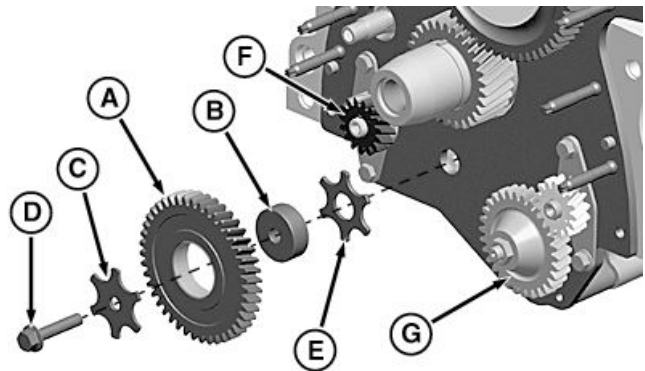
Lower Idler Gear — Installation

1. Install hub, see Lower Idler Gear — Repair and adjustments Components in Section 02, Group 050.
2. Lubricate gear and hub with SAE 30 oil. Install lower idler gear (A) over hub (B).
3. Install front thrust washer (C) with "X" marking facing timing gear cover.
4. Dip cap screw (D) in SAE 30 oil in engine oil then install it. Tighten to specification.

Specification

Lower Idler Gear Cap

Screw—Torque..... 70 N·m (52 lb.-ft.)



Install Lower Idler Gear

A—Lower Idler Gear
B—Lower Idler Gear Hub
C—Front Thrust Washer
D—Cap Screw

E—Rear Thrust Washer
F—Balancer Shaft Gear
G—Oil Pump Gear

RG20704 —UN—02AUG11

JR74534,000044E -19-04AUG11-1/1

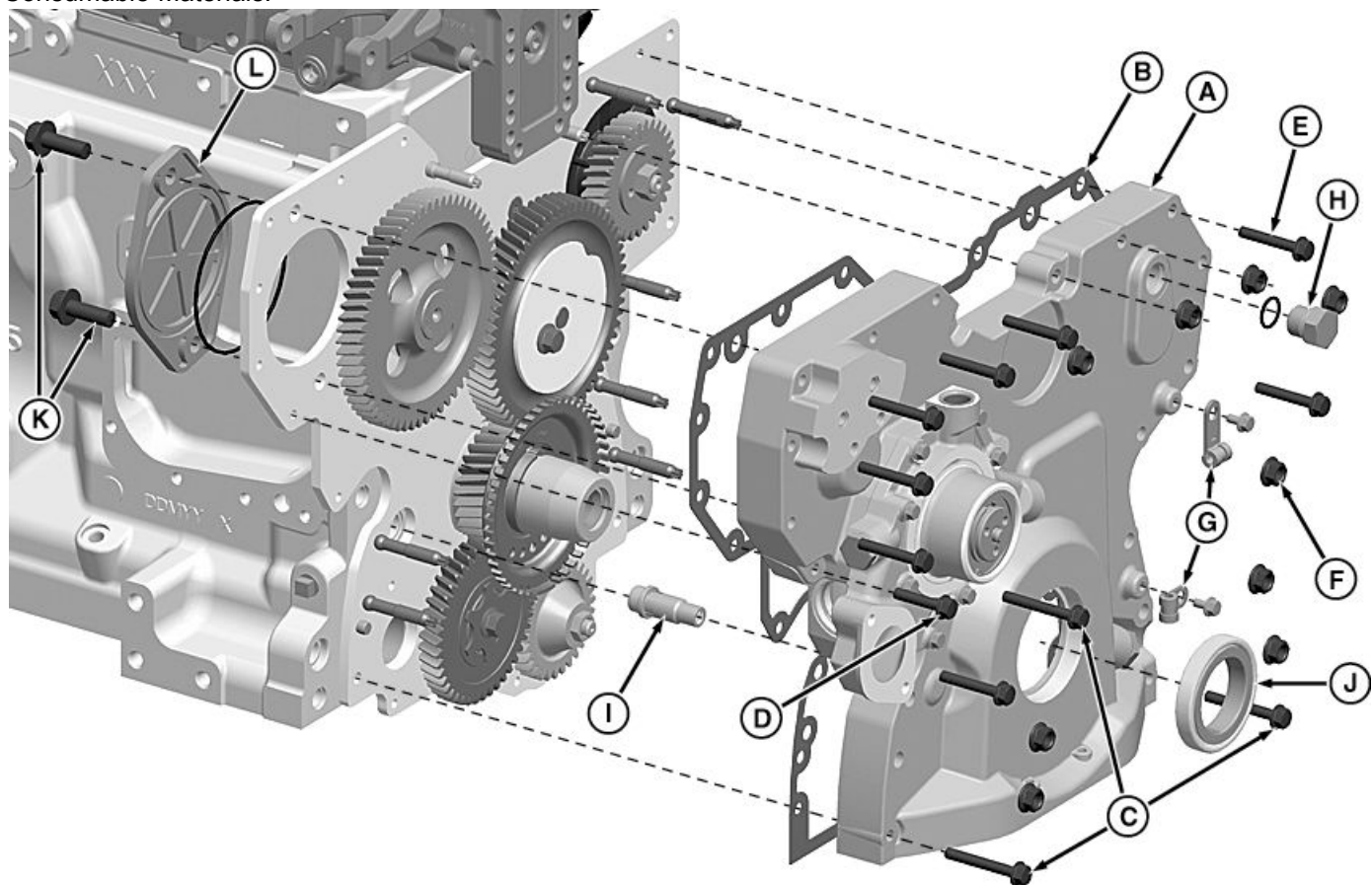
Timing Gear Cover — Installation

Special Tools:

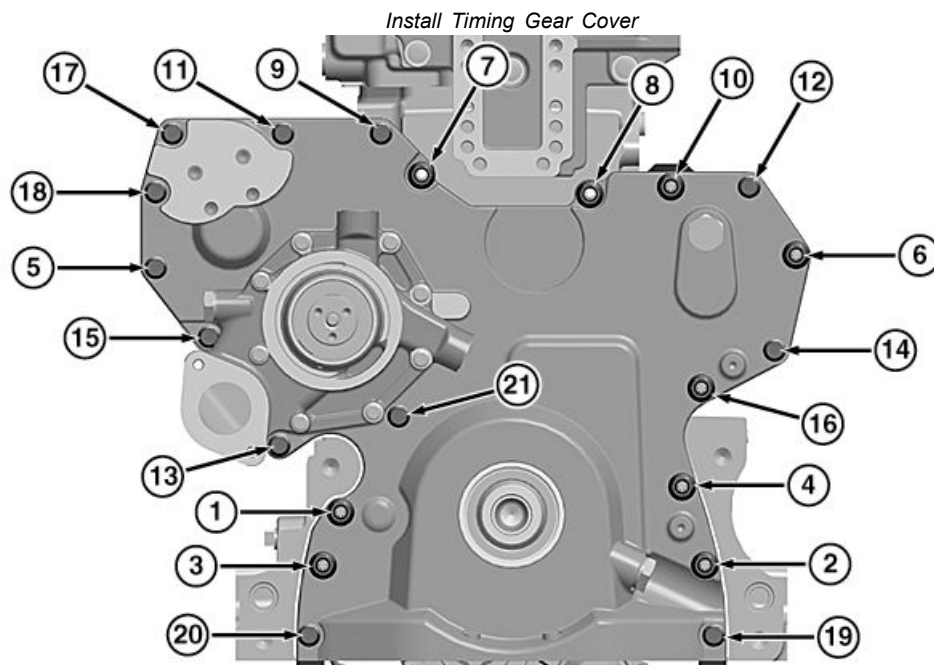
- JDG954B — Front Crankshaft Oil Seal Installer

Consumable Materials:

- Timing Gear Cover Gasket
- Oil Pan Gasket
- Front Crankshaft Oil Seal



RG20703 —UN—02AUG11



Install Timing Gear Cover

Tightening Sequence

Continued on next page

RG20712 —UN—05AUG11

A—Timing Gear Cover
B—Timing Gear Cover Gasket
C—Cap Screws -3-
D—Cap Screw -1-

E—Cap Screws -8-
F—Nuts -9-
G—Wiring Harness Clamps
H—Plug to Access Gear of
High-pressure Pump

I— Oil Pressure Regulating Valve L—Auxiliary Gear Drive Cover
J— Front Crankshaft Oil Seal Plate
K—Cap Screws -2-

1. Perform: Oil Pressure Regulating Valve (I) — Installation
2. Install timing gear cover (A) with a new gasket (B) onto engine front plate.
3. Install cap screws (C, E) and nuts (D) then tighten to specification according to sequence shown.

Specification

Timing Gear
Cover-to-Engine Front
Plate—Torque..... 35 N·m (26 lb.-ft.)

4. On engine with auxiliary drive option, replace O-ring then install cap screws (K). Tighten to specification.

Specification

Auxiliary Gear Drive
Cover Plate-to-Timing
Gear Cover—Torque..... 55 N·m (41 lb.-ft.)

5. Install wiring harness clamps (G). Tighten cap screws to specification.

Specification
Wiring Harness
Clamps-to-Timing Gear
Cover—Torque..... 15 N·m (13 lb.-ft.)

6. If removed, install plug (H) with a new O-ring then tighten to specification.

Specification

Plug to Access
High-Pressure Pump
Gear-to-Timing Gear
Cover—Torque..... 60 N·m (44 lb.-ft.)

7. Perform: Crankshaft Position Sensor — Installation
8. Perform: Oil Pan — Installation
9. Perform: Coolant Pump — Installation
10. Perform: Fan belt Tensioner — Installation
11. Perform: Fan Pulley Bracket — Installation
12. Perform: Front Crankshaft Oil Seal (J) — Installation

JR74534,000044C -19-08AUG11-2/2

Timing Gear Cover — Removal

Special Tools:

- JDG11206 — Front Crankshaft Oil Seal Puller

Consumable Material:

- None

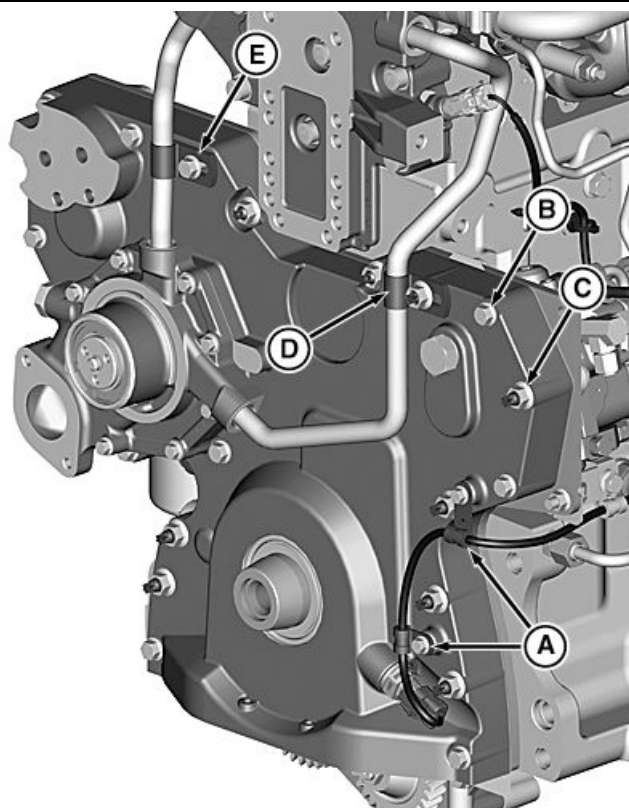
1. Perform: Front Crankshaft Oil Seal — Removal.
2. If necessary, perform: Fan Pulley Bracket — Removal.
3. Perform: Fan Belt Tensioner — Removal.
4. Perform: Coolant pump — Removal.
5. Perform: Crankshaft Position Sensor — Removal.
6. Perform: Oil Pressure Regulating Valve — Removal.
7. Perform: Oil Pan — Removal.

NOTE: Mark and identify location of timing gear cover hardware before removal to help in reassembly.

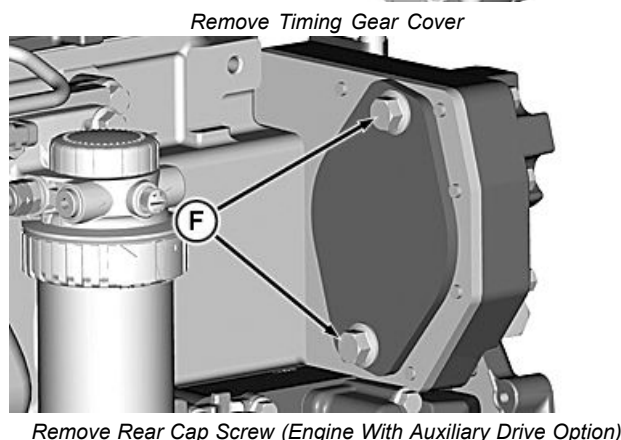
8. Remove cap screws holding wiring harness clamps (A).
9. Remove cap screws (B) and nuts (C) bordering timing gear cover.
10. On engines with auxiliary drive option, remove cap screws (F) on back of engine front plate.
11. Remove timing gear cover.

A—Wiring Harness Clamps
B—Timing Gear Cover Cap Screws
C—Timing Gear Cover Nuts

D—Coolant By-Pass Tube P-Clamp
E—Coolant By-Pass Tube Cap Screw
F—Rear Cap Screws (Engine With Auxiliary Drive Option)



RG20710 —UN—03AUG11



RG20711 —UN—03AUG11

BF67790,0000A12 -19-03AUG11-1/1

Timing Gears — Check Backlash

Special Tools:

- JDG11206 — Front Crankshaft Oil Seal Puller
- JDG954B — Front Crankshaft Oil Seal Installer

Consumable Materials:

- Timing Gear Cover Gasket
- Oil Pan Gasket
- Front Crankshaft Oil Seal

1. Perform: Timing Gear Cover — Removal
2. Using a magnetic base dial indicator, measure timing gear backlash. Compare against the following specifications.

Timing Gear Backlash Specifications—Specification

Camshaft Gear-to-Upper

Idler Gear (A)

—Backlash.....0.03—0.64 mm (0.001—0.025 in.)

High-Pressure Pump

Gear-to-Upper Idler Gear

(B)—Backlash.....0.09—0.55 mm (0.003—0.022 in.)

Upper Idler Gear-to-

Crankshaft Gear (C)

—Backlash.....0.09—0.55 mm (0.003—0.022 in.)

Crankshaft Gear-

to-Lower Idler Gear

(D)—Backlash.....0.07—0.60 mm (0.003—0.024 in.)

Oil Pump Gear-to-

Lower Idler Gear

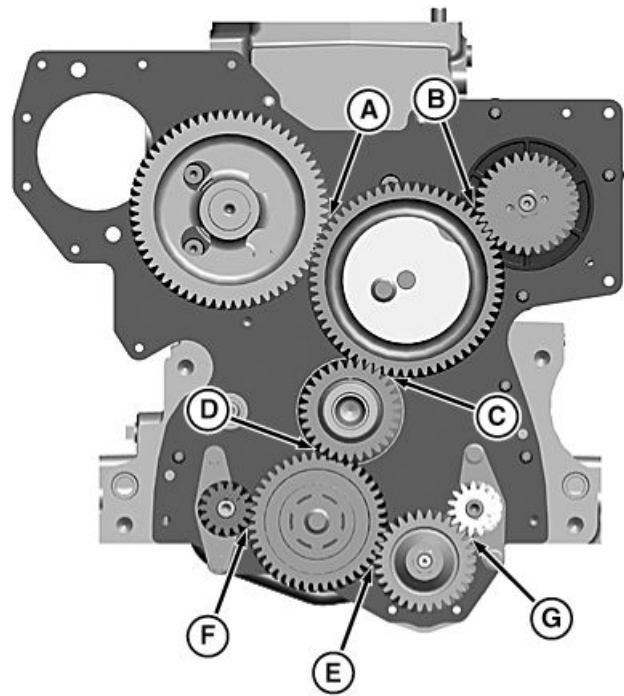
(E)—Backlash.....0.08—0.60 mm (0.003—0.024 in.)

Camshaft-to-

Auxiliary Drive (Not

Shown)—Backlash.....0.05—0.68 mm (0.002—0.027 in.)

3. Replace gears if backlash exceeds specification.



Check Timing Gear Backlash

A—Camshaft Gear-to-Upper Idler Gear

B—High-pressure Pump Gear-to-Upper Idler Gear

C—Upper Idler Gear-to-Crankshaft Gear

D—Crankshaft Gear-to-Lower Idler Gear

E—Oil Pump Gear-to-Lower Idler Gear

F—Lower Idler Gear-to-Balancer Shaft

G—Oil Pump Gear-to-Balancer Shaft

4. Perform: Timing Gear Cover — Installation

RG20705 —UN—02AUG11

JR74534,000044D -19-03AUG11-1/1

Upper Idler Gear — Check and Replace Components

Measurement

1. Measure idler gear (A) bore diameter and hub (B) outer diameter to determine oil clearance. If oil clearance exceeds specification, replace parts.

Specification

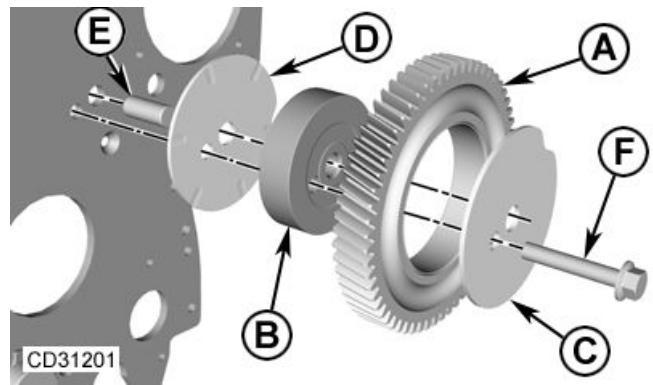
Upper Idler Gear	
Bore—Diameter.....	92.732—92.762 mm (3.6509—3.6520 in.)
Upper Idler Gear	
Hub—Diameter.....	92.687—92.707 mm (3.6491—3.6499 in.)
—Oil Clearance.....	0.025—0.075 mm (0.001—0.003)

NOTE: *Bushing in upper idler gear is not replaceable. Replace the complete gear assembly.*

2. Measure width of gear and hub. Replace parts that are out of specification.

Specification

Upper Idler	
Gear—Width.....	23.975—24.025 mm (0.9439—0.9459 in.)
Upper Idler Gear	
Hub—Width.....	24.11 — 24.13 mm (0.9492 — 0.9499 in.).



A—Upper Idler Gear
B—Upper Idler Gear Hub
C—Front Thrust Washer

D—Rear Thrust Washer
E—Upper Idler Gear Hub Pin
F—Cap Screw

3. Check front (C) and rear (D) thrust washers for excessive wear, replace parts as necessary.

BK34394,0000E87 -19-08JUL11-1/2

Install Hub Pin

Press pin (A) into front plate until flush and perpendicular with the rear surface. Make sure that pin does not protrude.

A—Upper Idler Gear Hub Pin



Install Upper Idler Gear Hub Pin

BK34394,0000E87 -19-08JUL11-2/2

Dipstick Tube and Dipstick — Installation

Special Tools:

- JDG965 Dipstick tube driver

Consumable Material:

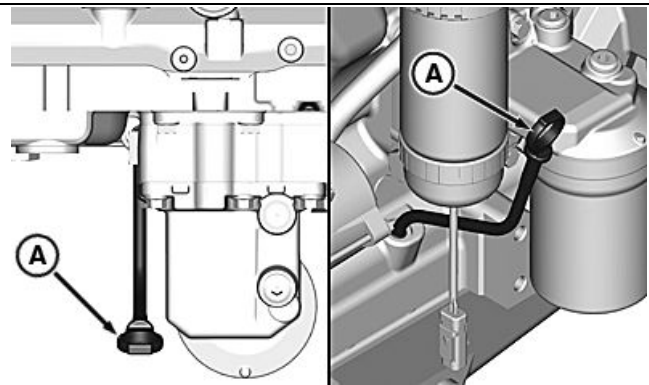
- LOCTITE® 609 or Hylomar 760 retaining compound

1. Coat the bottom outside diameter of the dipstick tube with LOCTITE® 609 or Hylomar 760 retaining compound.

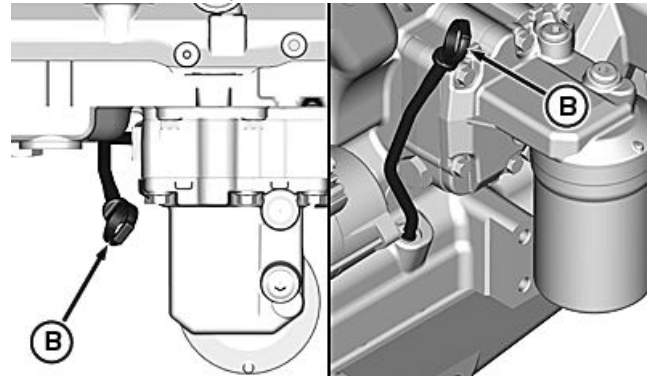
IMPORTANT: Do not reuse dipstick tube if damaged during disassembly.

2. Depending on the option code, install the dipstick tube into the right side of the cylinder block with the first bend oriented at either the 6:00 position (A) or the 9:00 position (B) (as seen from above on the right side of the engine) until the shoulder of the tube bottoms out on the spot-face of the cylinder block. Wipe off any excess retaining compound.

3. Install the dipstick into the dipstick tube.



Dipstick Tube Position 1



Dipstick Tube Position 2

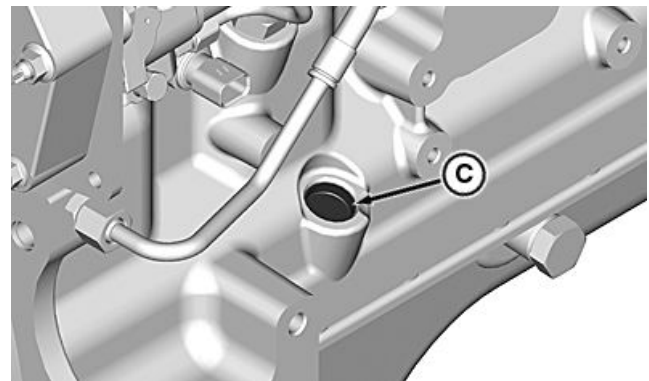
RG20165 —UN—30MAR11

RG20167 —UN—30MAR11

LOCTITE is a registered trademark of the Loctite Corp.

JR74534,000034A -19-20JUL11-1/3

4. If required, coat new cup plug (C) with LOCTITE® 609 or Hylomar 760 retaining compound.
5. Install cup plug into oil fill port on left side of block so the top of cup plug is 1 mm below the chamfer of hole. Wipe off any excess retaining compound.



Cup Plug

RG20166 —UN—30MAR11

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Continued on next page

JR74534,000034A -19-20JUL11-2/3

6. Some applications use a filler tube with dipstick (D). Coat the bottom outside diameter of the dipstick tube with LOCTITE® 609 or Hylomar 760 retaining compound.

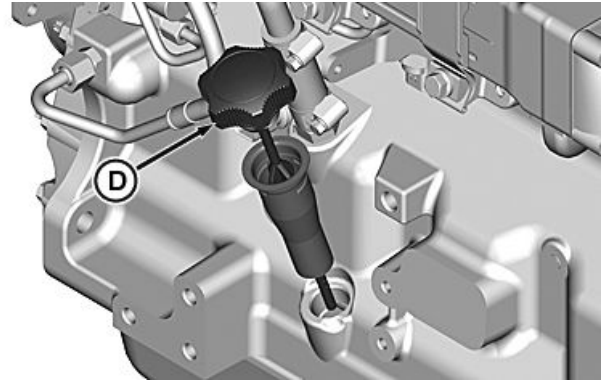
IMPORTANT: Do not directly strike surface of oil fill adapter tube with any object. Place a flat block of wood on top of oil fill adapter and strike block with a hammer to drive tube into bore.

7. Drive filler tube into the counter bore until the tube bottoms out. Wipe off any excess retaining compound.

IMPORTANT: Proper installation depth is necessary to provide accurate oil level readings on dipstick.

8. Coat O-ring under dipstick cap with clean engine oil and install hand tight.

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Filler Tube and Dipstick

RG20168 —UN—30MAR11

JR74534,000034A -19-20JUL11-3/3

Dipstick Tube and Dipstick — Removal

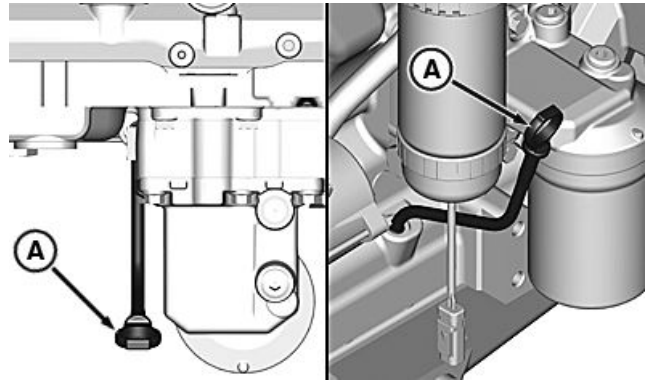
Special Tools:

- None

1. Remove dipstick from tube.

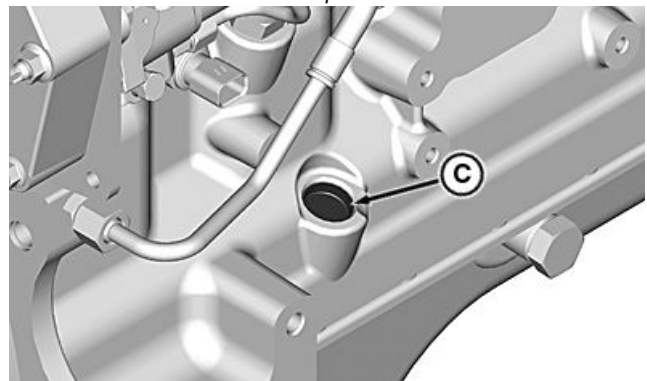
IMPORTANT: Be careful not to gall the dipstick tube port in the cylinder block during removal.

2. Remove dipstick tube (A) from engine block. Do not reuse dipstick tube or filler tube if damaged. Do not reuse cup plugs (C). Removal may require use of a slide hammer, vice-grip pliers, or a hammer and punch.



Remove Dipstick Tube

RG20165 —UN—30MAR11



Remove Cup Plug

RG20166 —UN—30MAR11

JR74534,000034B -19-17JUL12-1/1

Oil Cooler and Filter — Installation

Special Tools:

- None

Consumable Material:

- Engine Coolant
- Engine Oil
- Engine Oil Filter
- Loctite 242
- O-rings

Install Oil Cooler Assembly

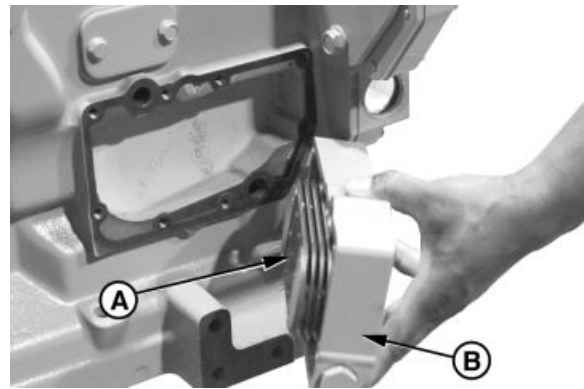
1. Lubricate new O-rings with clean engine oil.
2. Install oil cooler (A) in oil cooler housing (B).
3. Apply LOCTITE® 242 Thread Lock and Sealer (Medium Strength) to six Allen head cap screws and install oil cooler in housing. Tighten all cap screws by hand, then tighten to the following specifications in sequence shown.

Specification

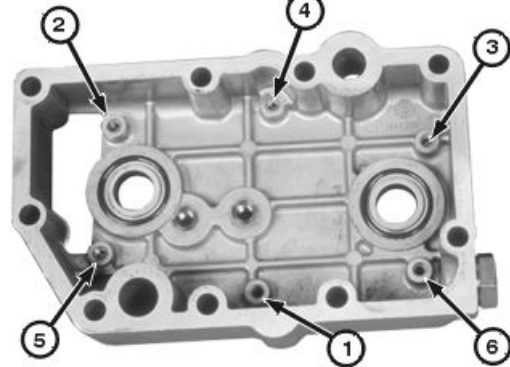
Oil Cooler-to-Housing	
Allen Head Cap	
Screws—Torque.....	12 N·m (106 lb.-in.)

A—Oil Cooler

B—Oil Cooler Housing



Oil Cooler and Housing



Oil Cooler Torque Sequence

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JR74534,000034C -19-04OCT11-1/3

4. Use new gaskets and install oil cooler assembly. Be sure gasket is properly aligned with cap screw holes.
5. Install gasket (B), O-ring (C), and elbow adapter (A). Install cap screws (D, E, F) to attach adapter to engine. Tighten all cap screws to specification.

Specification

Oil Cooler Elbow Adapter	
Cap Screws—Torque.....	35 N·m (26 lb.-ft.)

A—Elbow Adapter

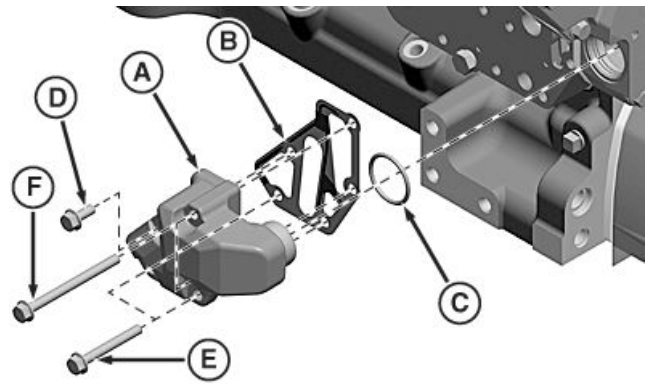
B—Gasket

C—O-Ring

D—Cap Screw

E—Cap Screw -2-

F—Cap Screw -2-



Adapter

Continued on next page

JR74534,000034C -19-04OCT11-2/3

6. Using Loctite 242 on cap screws (E), install gasket (C) and filter header (A). Tighten cap screws to specification.

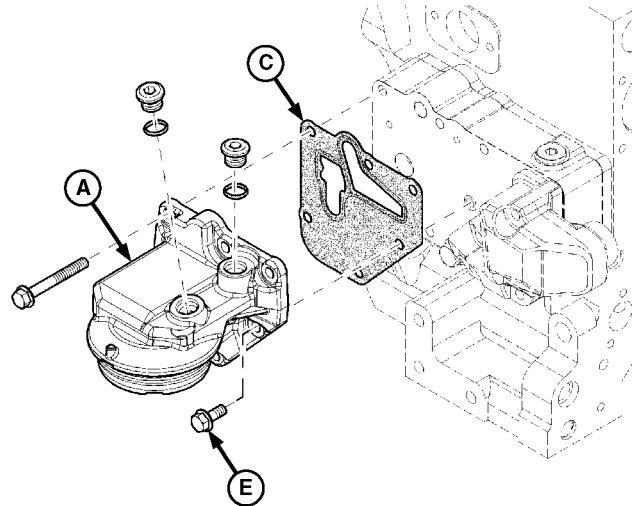
Specification

Oil Cooler Cover Cap
Screws—Torque..... 35 N·m (26 lb.-ft.)

7. Install new oil filter with dust ring until tight and then hand turn one half to three quarters revolution.

A—Oil Filter Header
C—Oil Filter Header Gasket

E—Cap Screws



Oil Filter Base and Oil Cooler Cover Installation

RG13378 —UN—12DEC03

JR74534,000034C -19-04OCT11-3/3

Oil Cooler and Filter — Removal and Inspection

Special Tools:

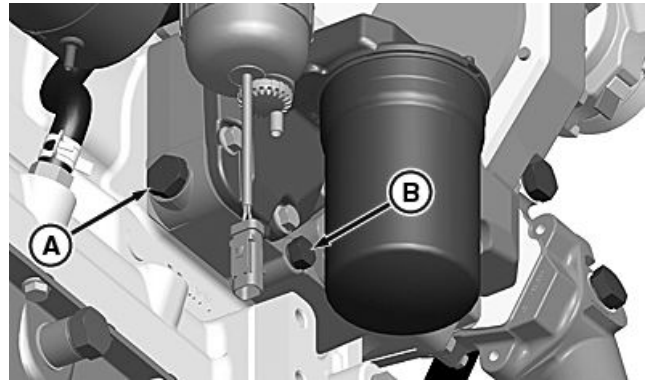
- None

Remove Oil Cooler Assembly

1. Remove oil cooler drain plug (B) and drain coolant.

A—Coolant Access Port

B—Coolant Drain Plug



Oil Filter Assembly

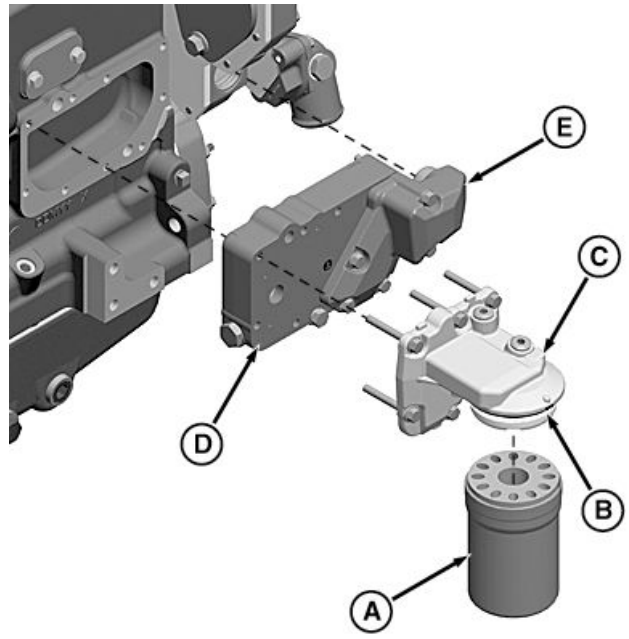
RG20147 —UN—28MAR11

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JR74534,000034D -19-04OCT11-1/5

2. Remove oil filter (A), header (C), and adapter (E)..

A—Oil Filter
B—Oil Filter Dust Cover
C—Oil Filter Header
D—Oil Cooler Housing
E—Oil Cooler Adapter



Oil Filter Header Removal

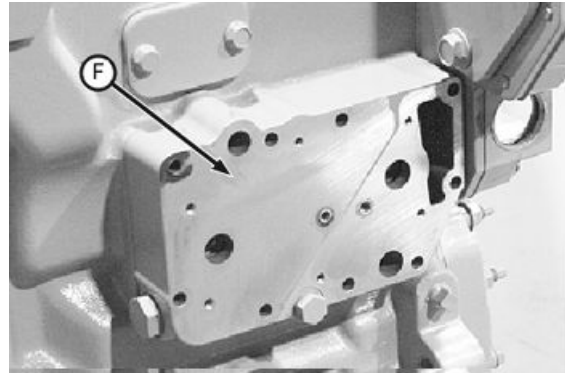
RG20182—UN—04APR11

JR74534,000034D -19-04OCT11-2/5

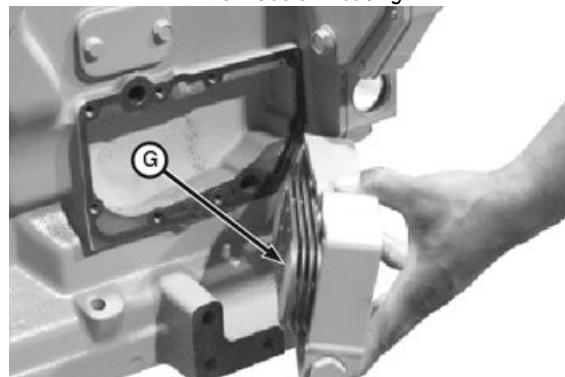
3. Remove housing (F).

4. Remove oil cooler (G).

F—Oil Cooler Housing
G—Oil Cooler



Oil Cooler Housing



Oil Cooler

RG10362—UN—04OCT99

RG10363—UN—04OCT99

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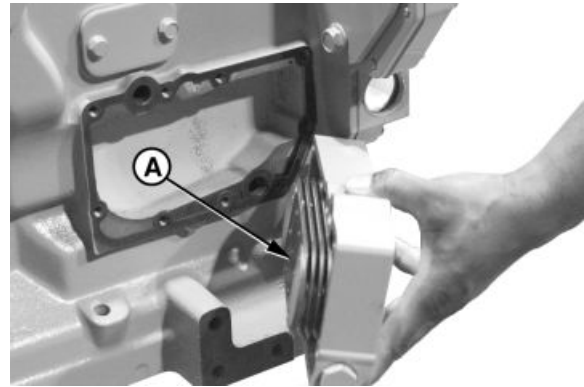
JR74534,000034D -19-04OCT11-3/5

Inspect Oil Cooler Assembly

1. Inspect oil cooler (A) (shown installed in housing) for physical damage, plugging, or leakage which may allow mixing of oil and coolant.
2. Back flush oil cooler to clean all debris from core.
3. Pressure test oil cooler in liquid and compressed air if mixing of oil and coolant is suspected.

Oil cooler should show no leakage when 140—170 kPa (1.4—1.7 bar) (20—25 psi) air pressure is applied for a minimum of 30 seconds.

A—Oil Cooler



Oil Cooler

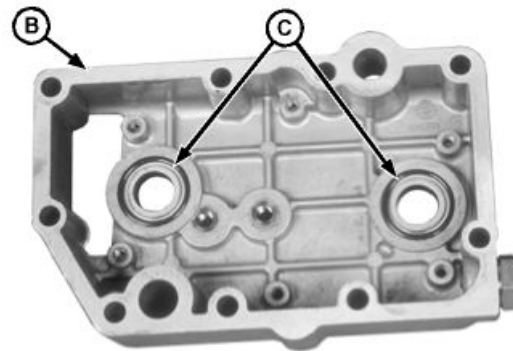
RG7592B —UN—05JAN98

JR74534,000034D -19-04OCT11-4/5

4. Inspect oil cooler housing (B).
5. Remove O-rings (C) and inspect surface finish of O-ring grooves. If there are ridges discernible with a fingernail, replace oil cooler housing. Additionally, if there is porosity in grooves larger than 0.5 mm (0.20 in.), replace housing.
6. Replace parts as needed. DO NOT attempt to repair oil cooler.

B—Oil Cooler Housing

C—O-Rings



Oil Cooler Housing

RG9085 —UN—16MAR98

JR74534,000034D -19-04OCT11-5/5

Oil Fill Adapter — Installation

Special Tools:

- None

Consumable Material:

- Gasket
- Capscrews
- Engine Oil

Install fill adapter tube (A) with gasket (B) into block using two capscrews (C). Torque capscrews to specification.

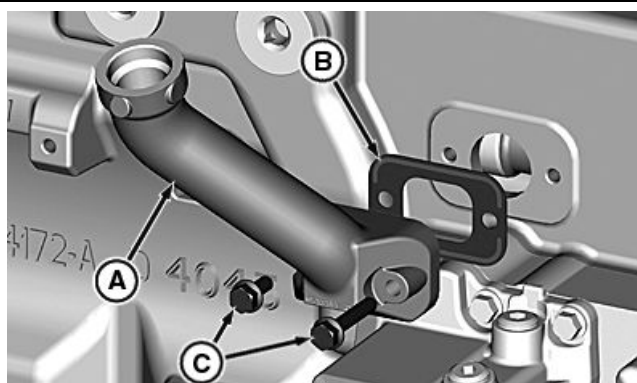
Specification

Oil Fill Adapter Cap

Screws—Torque..... 35 N·m (26 lb.-ft.)

Apply clean engine oil to O-ring under cap (D) and hand tighten in tube.

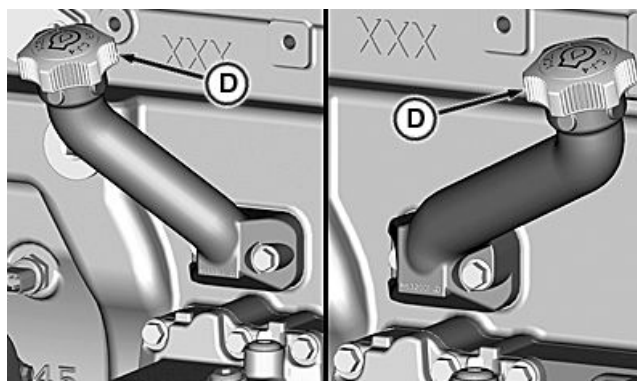
D—Cap



Install Oil Fill Adapter

A—Filler Tube
B—Gasket

C—Cap Screws



Oil Fill Adapter Service Options

JR74534,000034E -19-30MAR11-1/1

Oil Fill Adapter — Removal

Special Tools:

- None

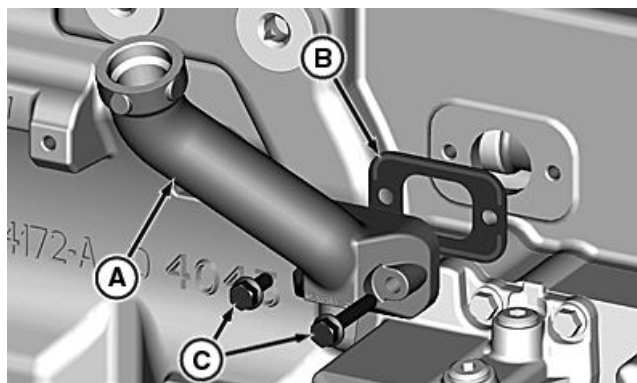
Consumable Material:

- None

1. Remove dipstick from tube.
2. Remove 2 capscrews (C) from oil filler tube (A). Remove and dispose gasket (B).

A—Oil Filler Tube
B—Oil Filler Gasket

C—Cap Screws



Remove Oil Fill Adapter

JR74534,000034F -19-30MAR11-1/1

Oil Filter Bypass Valve — Installation

Special Tools:

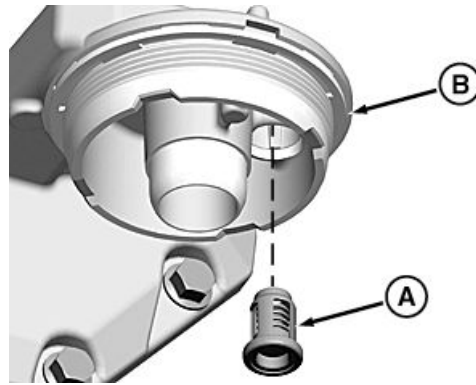
- D01061AA — Blind-Hole Puller Set

Consumable Material:

- Oil Filter Bypass Valve

IMPORTANT: Be sure to clean the oil filter header and flush all oil passages to remove any debris.

1. Using the appropriate arbor from D01061AA — Blind-Hole Puller Set, press NEW oil filter bypass valve (A) into the oil filter header (B) until seated.
2. Remove any material that resulted from pressing in the oil filter bypass valve.



Install Oil Filter Bypass Valve

A—Oil Filter Bypass Valve

B—Oil Filter Header

BF67790,0000B92 -19-23JUL12-1/1

RG21685 —UN—25JUN12

Oil Filter Bypass Valve — Removal

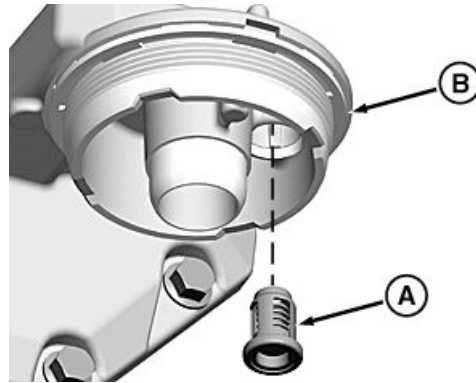
Special Tools:

- D01061AA — Blind-Hole Puller Set

1. If necessary, perform Oil Cooler and Filter — Removal and Inspection in Section 02, Group 060.
2. Remove the oil filter from the oil filter header (B).

NOTE: Valve plunger will need to be slightly compressed to insert puller.

3. Using D01061AA — Blind-Hole Puller Set, remove the oil filter bypass valve (A) from the oil filter header (B). Discard the used oil filter bypass valve.
4. Check the oil filter header (B) for any damage to the oil filter bypass valve hole. Replace the oil filter header (B) if any damage is found.



Remove Oil Filter Bypass Valve

A—Oil Filter Bypass Valve

B—Oil Filter Header

BF67790,0000B93 -19-23JUL12-1/1

RG21685 —UN—25JUN12

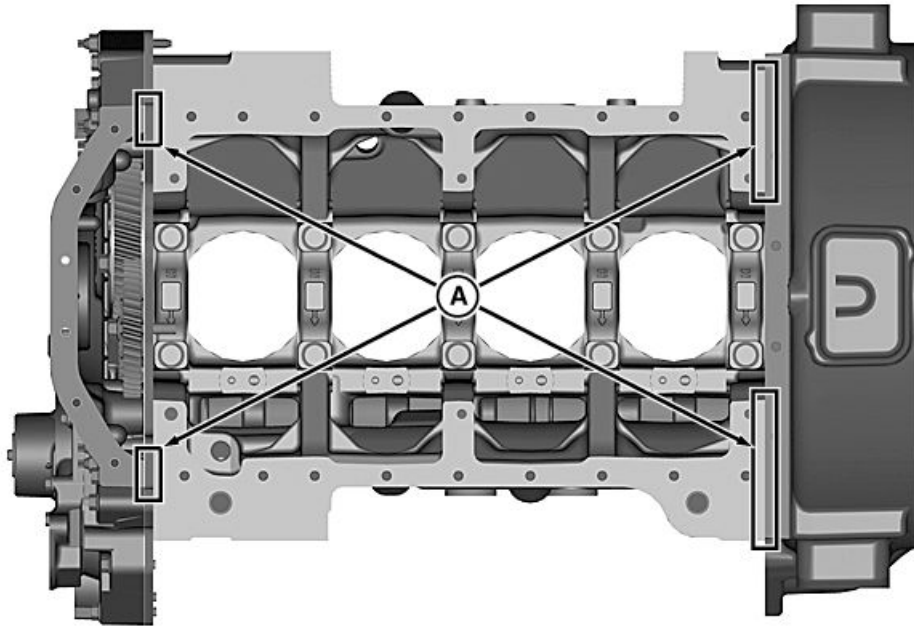
Oil Pan — Installation

Special Tools:

- None

Consumable Material:

- Oil pan gasket, Cap Screws (6)
- Engine oil
- LOCTITE® 515 joint sealing compound



Apply Joint Compound

A—T-joint

1. Clean T-joint (A) from any oil residue and apply LOCTITE® 515 joint sealing compound to the T-joints.
2. Install oil pan and oil pan gasket using guide pins.

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JR74534,0000350 -19-17OCT11-1/2

RG20171 —UN—30MAR11

3. Finger start and tighten oil pan cap screws (B and C) installing six longer cap screws (B) into timing gear cover. Remove guide pins and torque to specification.

Specification

Oil Pan Cap
Screws—Torque..... 35 N·m (26 lb.-ft.)

4. If necessary, install drain valve in bottom drain port. Orient toward right side of engine, perpendicular to crankshaft.

Specification

Oil Pan Drain Valve
(Stamped Steel
Pan)—Torque..... 50 N·m (37 lb.-ft.)

Specification

Oil Pan Drain Valve (Cast
Pan)—Torque..... 50 N·m (37 lb.-ft.)

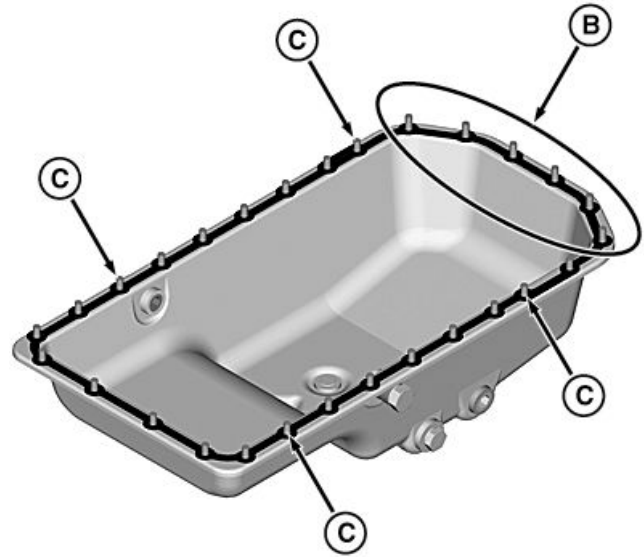
5. If necessary, install drain plugs (C).

Specification

Oil Pan Drain Plugs
(Stamped Steel
Pan)—Torque..... 40 N·m (30 lb.-ft.)

Specification

Oil Pan Drain Plugs (Cast
Pan)—Torque..... 48 N·m (35 lb.-ft.)



Install Oil Pan

B—Cap screws - long

C—Cap screws - short

6. Refill engine with clean oil. Use proper quantity and approved specification oil.

JR74534,0000350 -19-17OCT11-2/2

RG20172 —UN—30MAR11

Oil Pan — Removal

Special Tools:

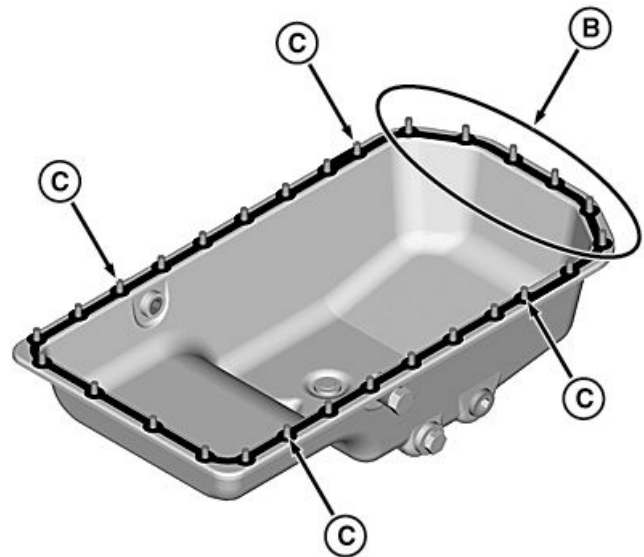
- None

1. Drain engine oil into an appropriate container.
2. Remove oil pan cap screws (B and C).
3. Remove oil pan and oil pan gasket.

NOTE: Oil pan may have tightly bonded to cylinder block. It may be necessary to lightly tap on lower edges of oil pan with a rubber mallet.

B—Cap screws - long

C—Cap screws - short



Oil Pan Removal

JR74534,0000351 -19-30MAR11-1/1

RG20172 —UN—30MAR11

Oil Pressure Regulating Valve — Installation

Special Tools:

- Valve Insertion Tool - JDG1517

Consumable Material:

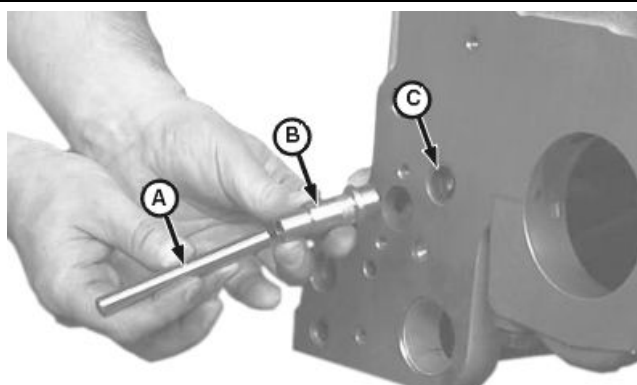
- Valve

NOTE: It is recommended to replace cartridge style valves only after engine front plate is installed. Front plate mounting studs will help protect valve from damage.

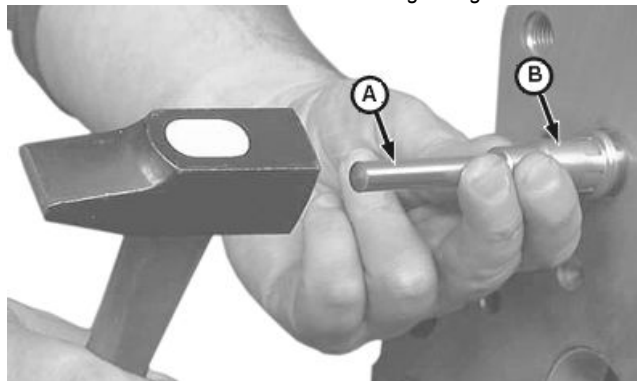
To install the oil pressure regulating valve, insert valve insertion tool (A) (part of JDG1517 Pressure Regulating Valve Installer and Remover Tool Set) into oil pressure regulating valve (B). Use a hammer to drive the valve into bore (C) of engine block until fully seated.

A—Valve Insertion Tool
B—Oil Pressure Regulating Valve

C—Hole in Engine Block



Valve Insertion Tool and Oil Regulating Valve



Install Oil Pressure Regulating Valve

JR74534,0000352 -19-22MAR11-1/1

RG11780 —UN—24SEP01

RG11781 —UN—24SEP01

Oil Pressure Regulating Valve — Removal

Special Tools:

- Slide Hammer - 1156 (Formerly D01299AA)
- Regulating Valve Installer and Remover - JDG1517
- Collet - JT01724
- Actuator Pin - JT01720

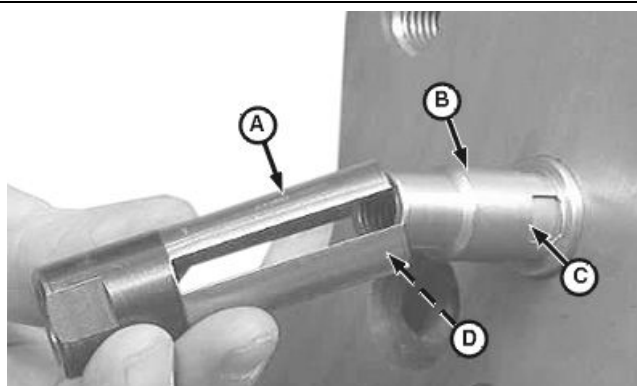
Consumable Material:

- None

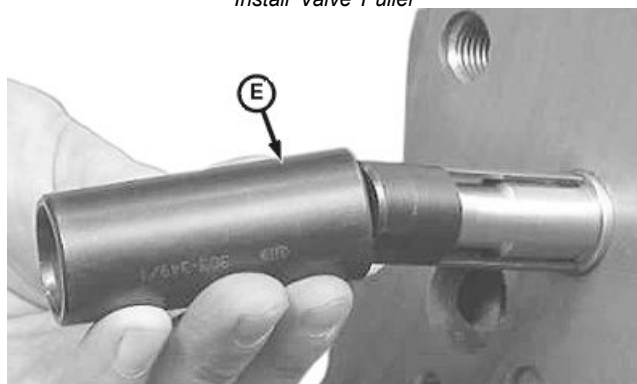
1. Remove timing gear cover. (See REMOVE TIMING GEAR COVER in Group 050.)
2. Install valve puller (A) (part of JDG1517 Pressure Regulating Valve Installer and Remover Tool Set) on oil regulating valve (B). Make sure barbs (D) lock into slots (C) of valve.
3. Slide sleeve (E) (part of JDG1517 Pressure Regulating Valve Installer and Remover Tool Set) completely over valve puller.

A—Valve Puller
B—Oil Regulating Valve
C—Slot

D—Barb (One on Each Leg of Puller)
E—Sleeve



Install Valve Puller



Install Sleeve

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JR74534,0000353 -19-20JUL11-1/2

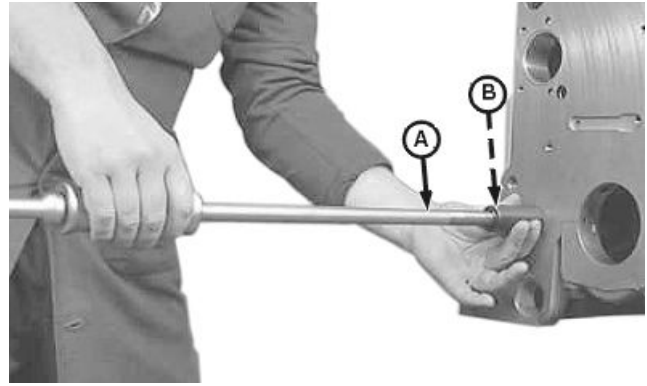
RG11783 —UN—24SEP01

RG11784 —UN—24SEP01

4. Install JT01718 Slide Hammer (A) into threaded end of valve puller (B) and remove the valve from the engine block.
5. To remove the valve puller from the oil regulating valve, first remove the sleeve and slightly rotate the puller on the valve. This will cause the puller to come out of the valve slots so it can be removed. (There is a chamfer on the inside of each leg, allowing the valve puller to be easily rotated.)

A—Slide Hammer

B—Valve Puller



Remove Oil Pressure Regulating Valve

RG11785 —UN—27SEP01

JR74534,0000353 -19-20JUL11-2/2

Oil Pump and Tubes — Installation

Special Tools:

- None

Consumable Material:

- 3 O-rings, if necessary (One on each end of the oil supply tube, one on the oil pick-up tube.)

1. Begin with engine locked at No. 1 piston at TDC compression stroke and paint marks from balancer shafts (previously made during removal) lining up.
2. Install new O-rings in cylinder block and oil pump cover (for outlet tube). Install tube into cover and block.
3. Installing oil pump housing (A) with gears onto front plate.
4. Wedge a hardened round punch between the drive gear and idler gear.
5. Install oil pump drive gear so that it meshes with lower idler gear and balancer shaft gear without altering gear train timing.
6. Install new retaining nut and tighten to specifications.

Specification

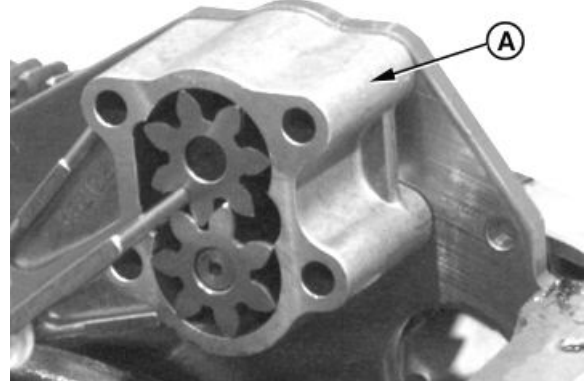
Oil Pump Drive Gear

"Staked" Nut—Torque..... 50 N·m (37 lb.-ft.)

7. Stake oil pump drive gear nut by applying three center punch marks near ID of shaft.
8. Swing (position) oil pump cover onto pump housing and install two lower cap screws finger tight.

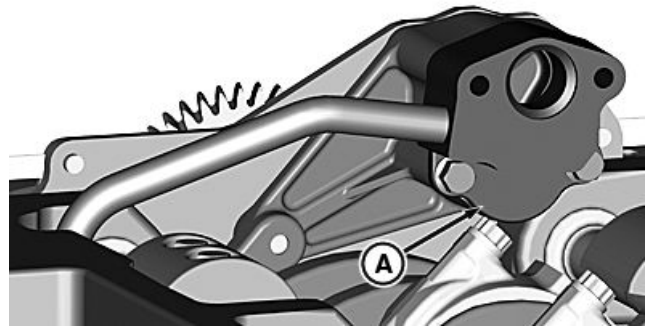
A—Oil Pump Housing

B—Oil Pump Gear Nut



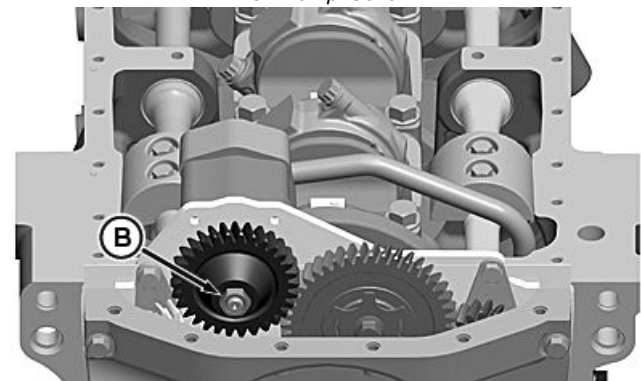
Oil Pump Housing Assembly

RG9141 —UN—19MAY98



Oil Pump Cover

RG20687 —UN—21JUL11



Oil Pump, Gear and Lower Idler Gear

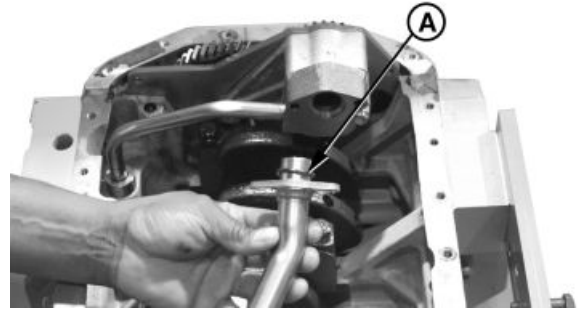
RG20678 —UN—11JUL11

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JR74534,0000354 -19-04OCT11-1/3

9. Install new O-ring (A) on neck of pick-up tube. Install pick-up tube.

A—O-Ring



O-Ring on Pick-Up Tube Neck

JR74534,0000354 -19-04OCT11-2/3

RG7599 —UN—06NOV97

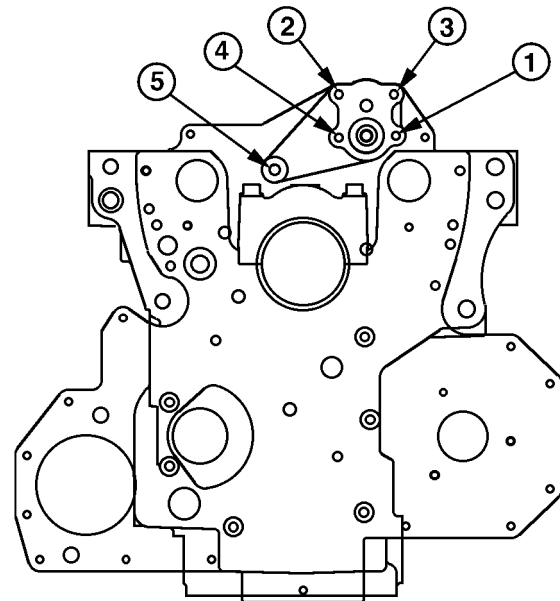
NOTE: Idler gear cap screw threads (5) must be lubricated.

10. Tighten cap screws to specified torque according to sequence shown.

Specification

Oil Pump-to-Front Plate and Oil Pump Pick-Up Tube Cap Screws	
—Torque.....	35 N·m (26 lb.-ft.)
Oil Pump Lower Idler Gear Cap Screw (Lubricated Threads)	
—Torque.....	70 N·m (53 lb.-ft.)

11. Reinstall turbocharger oil supply tube to turbocharger.



Viewed from Rear of Engine

JR74534,0000354 -19-04OCT11-3/3

RG8090 —UN—05JAN98

Oil Pump and Tubes — Removal

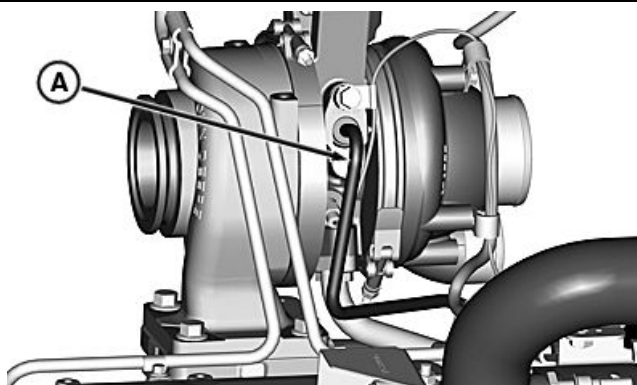
Special Tools:

- Flywheel Turning Tool - JDG10576
- Flywheel Locking Pin - JDG1571

Consumable Material:

- Paint Pen

1. Drain engine oil. If rotating engine on a stand, first disconnect turbocharger oil inlet line (A) at the turbocharger to prevent hydraulic lock.
2. Rotate engine on stand.
3. Remove oil pan.
4. Remove gasket from oil pan and oil pan rail.



Turbocharger Oil Inlet Line

A—Oil Inlet Line

RG20686—UN—21JUL11

JR74534,0000355 -19-04OCT11-1/3

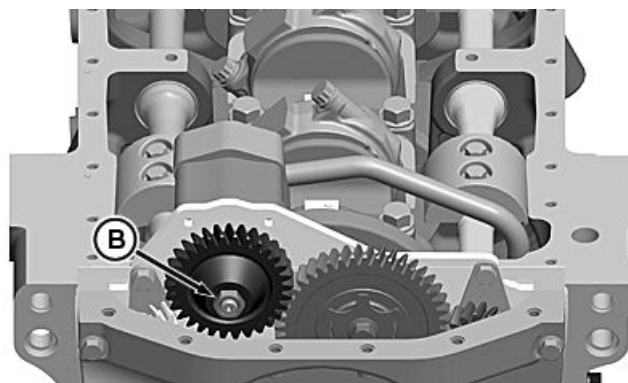
5. Lock crankshaft at TDC using JDG10576 flywheel turning tool and lock with JDG1571 timing pin. With a paint pen, mark a tooth from each balancer shaft gear and the front plate where the gear is located at TDC. Then lock the balancer shaft (injection pump side) using a lock-grip pliers so that balancer shaft cannot turn while oil pump gear is being removed.

IMPORTANT: When removing nut and gear from tapered oil pump drive shaft, take care not to damage fine threads on end of shaft.

6. Remove nut (B) and pull gear from tapered oil pump drive shaft.

To remove oil pump gear, loosen nut several turns and apply force between the front plate and gear on two sides of gear with pry bars.

If above method does not work, loosen oil pump housing cap screws and strike the nut on end of shaft with a small **lead** hammer while applying force to gear until gear is free of tapered shaft.



Oil Pump, Gear and Nut

B—Gear Retaining Nut

RG20678—UN—11JUL11

7. Remove oil pump pick-up tube.

Continued on next page

JR74534,0000355 -19-04OCT11-2/3

8. Remove upper two cap screws and remove cover (A).

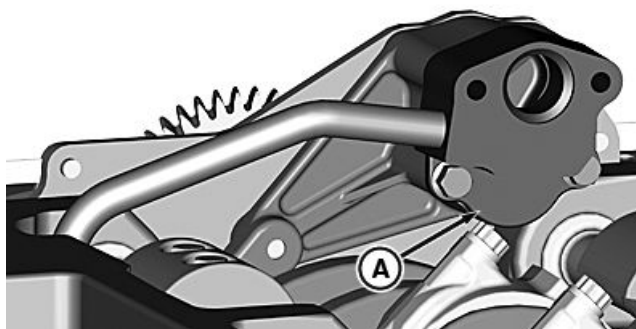
NOTE: The lower idler gear cap screw has to be removed to remove the oil pump housing.

9. Loosen idler cap screw .

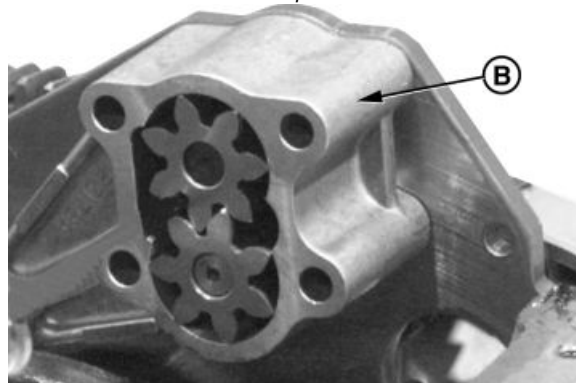
10. Remove lower oil pump housing cap screws and turn idler cap screw out while removing oil pump housing assembly (B).

A—Cover

B—Oil Pump Housing



Oil Pump Cover



Oil Pump Housing Assembly

RG20687 —UN—21JUL11

RG7967B —UN—14NOV97

JR74534,0000355 -19-04OCT11-3/3

Belt — Wear Check

1. Check belt for cracks, fraying, or stretched-out areas. Replace if necessary.
2. Reset belt tension as necessary.
See Belt Tensioner — Spring Tension Check in this group.
3. Visually inspect belt tensioner assembly.

4. Verify that correct spacer is installed between tensioner mount and timing gear cover, to ensure there is no abnormal side wear of belt.
5. Check mounting brackets, alternator, belt tensioner, idler pulley, etc. and the belt length. Replace belt as needed. For more information, refer operator's manual.

MK41968,0000087 -19-11MAR11-1/1

Belt Tensioner — Installation

Special Tools:

- None

Consumable Material:

- None

Engines with Auxiliary

1. Belt Tensioner Installation

Install belt tensioner (A) with spacer (B), and cap-screw (C) with washer (D).

Tighten cap screw to specification:

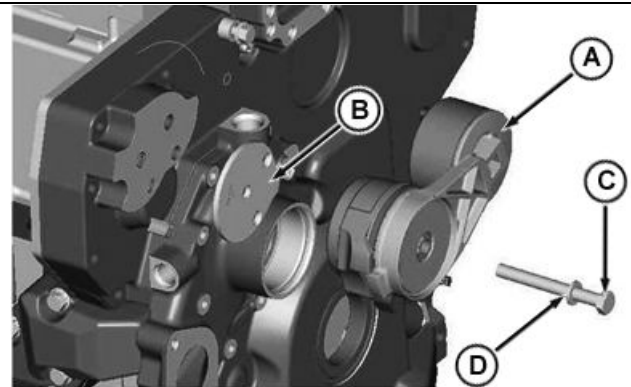
Specification

Belt Tensioner Cap
Screw—Torque..... 50 N•m (37 lb.-ft.)

2. Install fan belt.
3. Perform Fan Assembly — Installation.

Special Tools:

- None



Belt Tensioner Removal

A—Belt Tensioner
B—Spacer

C—Cap Screw
D—Washer

Consumable Material:
• None

RG20123 —UN—22MAR11

Continued on next page

MK41968,0000088 -19-20MAR12-1/2

Non-Auxiliary Engines**1. Belt Tensioner Installation**

- a. Install tensioner support (E) and cap screws (F, I).
Tighten cap screws (F, I) to specification.

Specification

Belt Tensioner Support	
Cap Screw (F)—Torque.....	35 N•m (26 lb.-ft.)
Belt Tensioner Support	
Cap Screw (I)—Torque.....	73 N•m (59 lb.-ft.)

- b. Install belt tensioner (A) with spacer (B). Install cap screw (C) and tighten to specification.

Specification

Belt Tensioner Cap	
Screw—Torque.....	50 N•m (37 lb.-ft.)

2. Install fan belt.

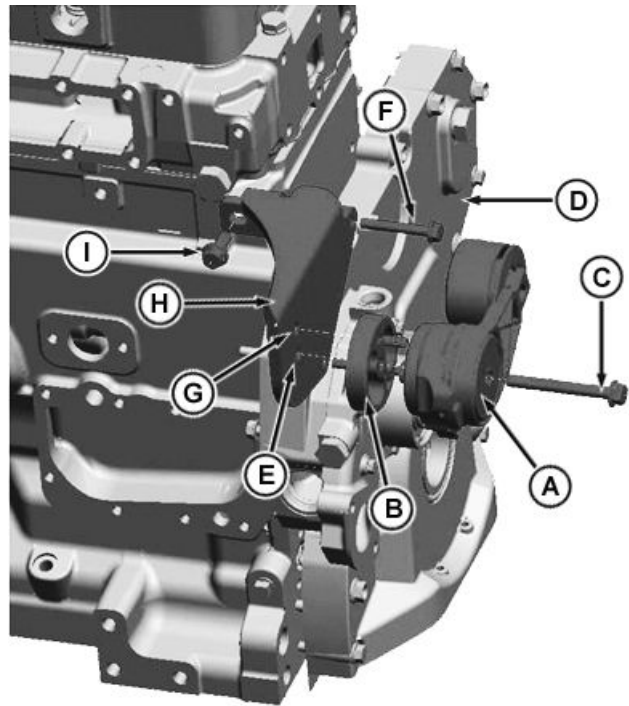
3. Perform Fan Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None



Belt Tensioner Removal

A—Belt Tensioner
B—Spacer
C—Tensioner Cap Screw
D—Timing Gear Cover
E—Mounting Hole

F—Long Cap-screw
G—Locating Hole
H—Tensioner Support
I— Small Cap-screw

RG20122 —UN—07APR11

MK41968,0000088 -19-20MAR12-2/2

Belt Tensioner — Removal

Special Tools:

- None

Engines with Auxiliary

1. If necessary, perform Fan Assembly — Removal.

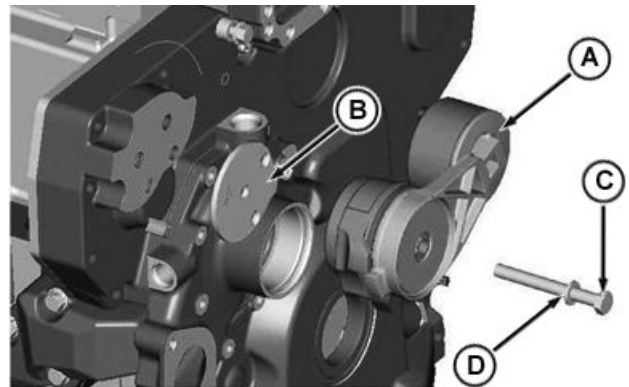
Special Tools:

- None

2. Remove fan belt.

3. Belt Tensioner Removal

- a. Remove cap screw (C) with washer (D).
b. Remove Belt Tensioner (A) along with spacer (B).



Belt Tensioner Removal

A—Belt Tensioner
B—Spacer

C—Cap Screw
D—Washer

RG20123 —UN—22MAR11

Continued on next page

MK41968,0000089 -19-20MAR12-1/2

Non-Auxiliary Engines

1. If necessary, perform Fan Assembly — Removal.

Special Tools:

- None

2. Remove fan belt.

3. Belt Tensioner Removal

- a. Remove cap screw (C), belt tensioner (A) with spacer (B).
- b. Remove cap screws (F, G) and tensioner support (E) — if necessary.

A—Belt Tensioner

B—Spacer

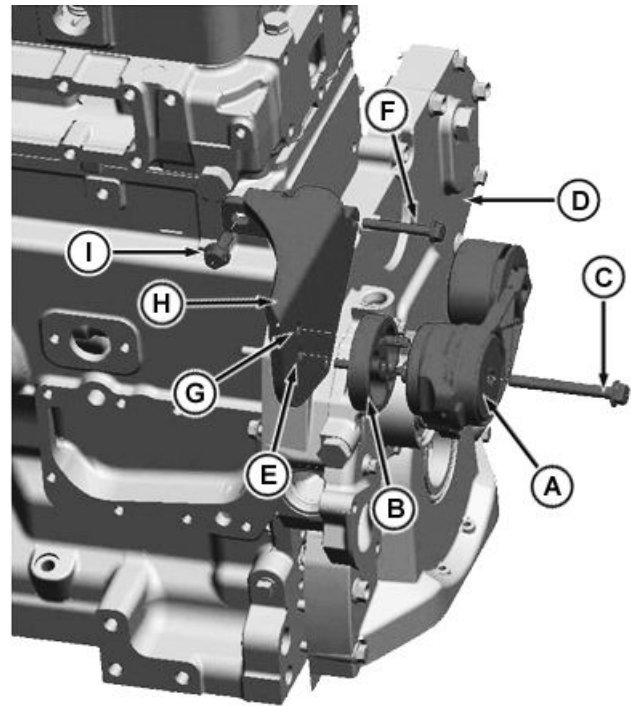
C—Tensioner Cap Screw

D—Timing Gear Cover

E—Tensioner Support

F—Long Cap-screws

G—Small Cap Screw



Belt Tensioner Removal

RG20122 —UN—07APR11

MK41968,0000089 -19-20MAR12-2/2

Belt Tensioner — Spring Tension Check

Belt drive systems equipped with automatic (spring) belt tensioners cannot be adjusted or repaired. The automatic belt tensioner is designed to maintain proper belt tension over the life of the belt. If tensioner spring tension is not within specification, replace tensioner assembly

NOTE: While belt is loosened, inspect pulleys and bearings. Rotate and feel for any unusual sounds, looseness, or hard turning. Replace as necessary.

A belt tension gauge will not give an accurate measure of the belt tension when automatic belt tensioner is used. Measure the tensioners spring tension using a torque wrench and procedure outlined below:

1. Release tension on belt using a long handle 1/2in. breaker bar in the tension arm. Remove belt from pulleys.
2. Release tension on tension arm and remove breaker bar.
3. Using a torque wrench, rotate tensioner arm to check arm travel to specification.
4. Measure spring torque by reading torque wrench measurement while rotating tensioner arm and compare with specification below. Replace tensioner assembly as required.

Specification

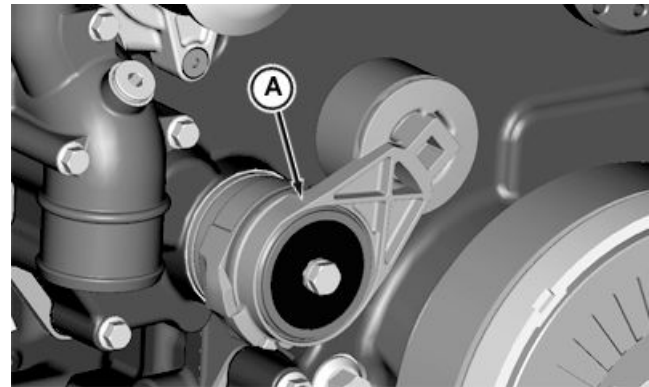
Belt Tensioner—Spring

Tension..... 18.3—22.3 N•m (162—198 lb.-in.) at 30° from free arm position

Specification

Belt Tensioner — Arm

Travel—Turn..... 71° minimum



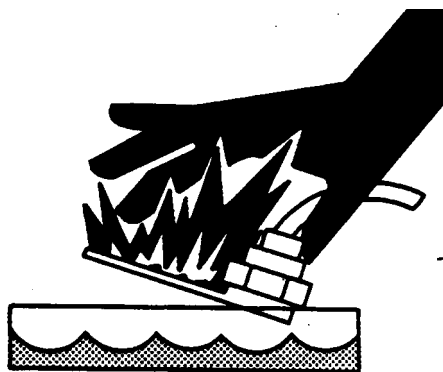
Belt Tensioner

RG18854 —UN—26JUL10

MK41968,000008A -19-29JUL11-1/1

Coolant Heater — Servicing

CAUTION: To avoid shock or hazardous operation, always use a three-wire heavy-duty electrical cord equipped with three-wire connectors. If a two-to-three contact adapter is used at the wall receptacle, always connect green wire to a good ground. Keep electrical connectors clean to prevent arcing. Only plug coolant heater into electrical power if heating element is immersed in coolant. Sheath could burst and result in personal injury.



Electrical Shock Safety

1. Unplug heater from electrical power source.
2. Drain cooling system.
3. Disconnect cord (A) from heater assembly.
4. Loosen retaining nut (C) and remove adapter (D) and heater element from block.
5. Inspect and replace parts as necessary.

NOTE: The heater element (G) cannot be repaired. Replace if defective.

6. Install a new gasket (E). Apply liquid soap to new O-ring (F) and install.
7. Install heater element through adapter (D) and install nut (C) loosely.
8. Install heater into cylinder block with element pointing to the rear.
9. Tighten adapter (D).
10. Turn element clockwise and then counterclockwise until element contacts casting. Move element midway between contact points.
11. Hold element with a wrench and tighten retaining nut (C) to specifications.

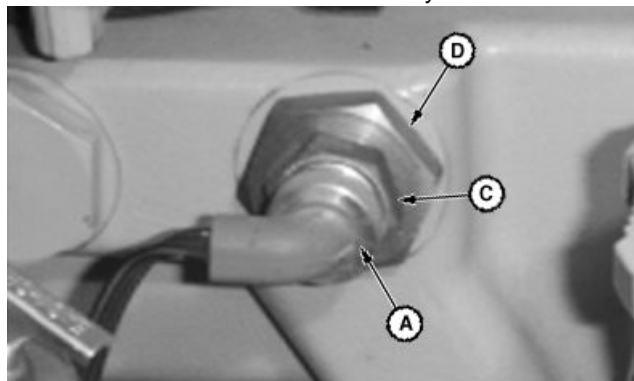
Specification

Coolant Heater Lock
Nut—Torque..... 35 N•m (26 lb.-ft.)

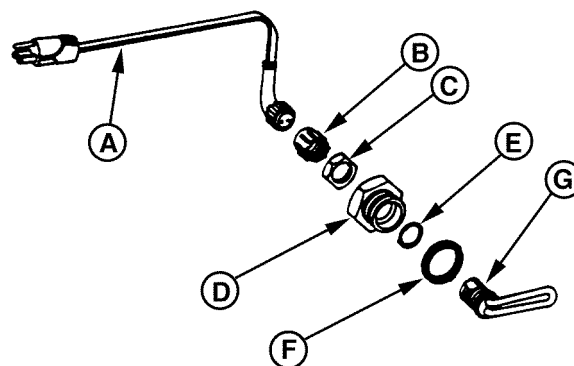
NOTE: If heater has been ordered as an attachment only, it will include a dust cover (B). The cover is used to protect the electrical connectors when cord assembly (A) has been removed.

12. Install cord.

13. Service engine with coolant.



Coolant Heater



Coolant Heater

A—Cord
B—Dust Cover
C—Retaining Nut
D—Adapter

E—Gasket
F—O-Ring
G—Heater Element

TS210 —UN—23AUG88

RG9082 —UN—12MAR88

RG5619 —UN—31OCT97

MK41968,00000BC -19-24AUG11-1/1

Coolant Pump — Visual Inspection

Weep Hole Inspection

Clean any debris or obstruction from the weep hole area of coolant pump being careful not to damage the pulley.

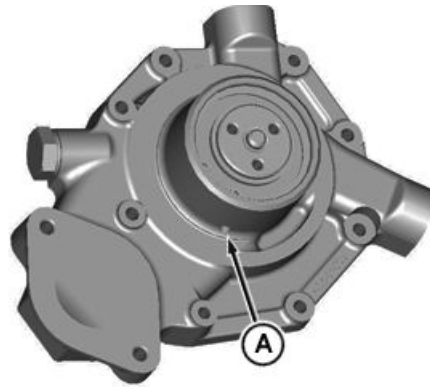
Inspect coolant pump weep hole (A) for coolant leakage. If no leakage of coolant is observed during normal operating conditions, the coolant pump should not be replaced.

Chemical streak trails, coolant “weeping”, or “seeping” are normal. “Weeping” can be defined as a passing of liquid across a sealed surface of about 1-5 drops per day of use. “Seepage” is defined as a coolant loss equal to more than 5 drops per day of use. A “leak” is defined as a near constant dripping of coolant.

Coolant loss out the weep hole dictates coolant pump repair. Individual repair parts are not available, so a complete coolant pump assembly replacement is necessary.

Rotating Assembly Inspection

NOTE: Coolant pump is not repairable. Do not disassemble the pump.



Weep Hole Inspection

A—Weep Hole

1. Rotate the shaft to detect contact between impeller and housing.
2. Move shaft axially back and forth then radially up and down.

Replace coolant pump assembly if evidence of worn ball bearing or if impeller contact is detected.

MK41968,000008C -19-27JUL11-1/1

RG20215 —UN—13APR11

Coolant Pump Assembly — Installation

Special Tools:

- None

Consumable Material:

- Silicone Sealant, Coolant Pump Gasket

1. Coolant Pump Assembly Installation:

IMPORTANT: On engines without coolant pump inserts, a coolant pump insert must be installed before installing coolant pump. Instructions for installation of insert on early timing gear covers are supplied with inserts.

NOTE: If installing a new coolant pump and insert kit, proper sealant is supplied with kit.

Coolant pump hardware will pull/squeeze the insert onto the timing gear cover.

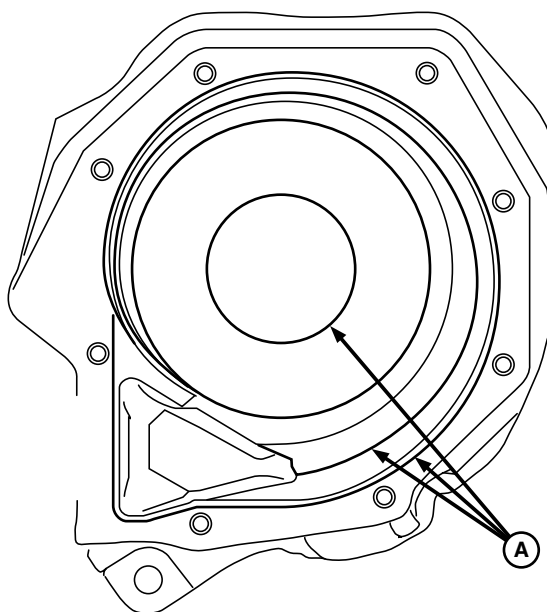
- Insure that all mating surfaces are clean. Apply three 2.0—4.0 mm (0.080—0.157 in.) beads PM710XX280 Silicone Sealant to coolant pump cavity in timing gear cover
Using new gasket install coolant-pump (I), along with the by-pass tube (J). Install cap-screws (H) and tighten to specification in clock-wise direction.

Specification

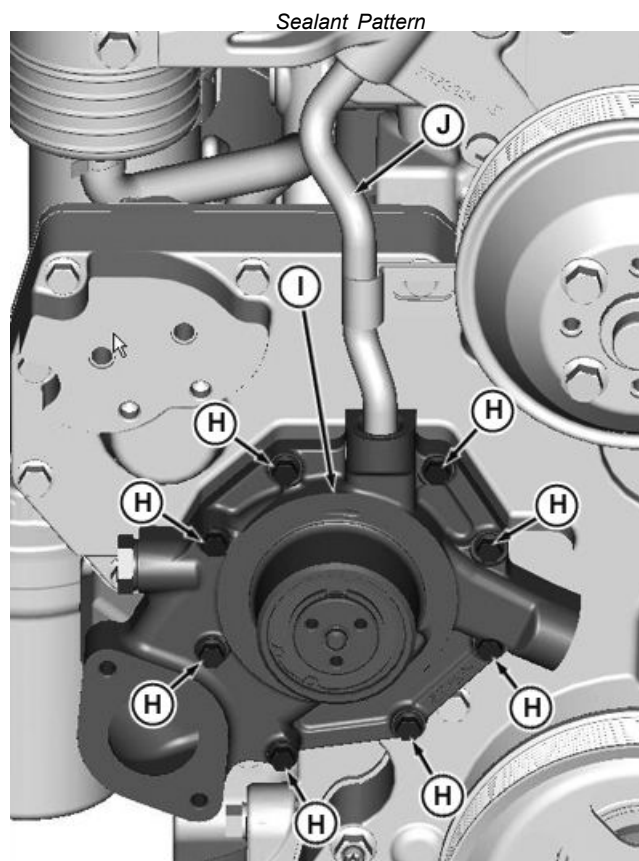
Coolant Pump-to-
Timing Cover Cap
Screws—Torque..... 16 N•m (142 lb.-in.)

A—Sealant Pattern
H—Cap-screw (8)

I— Coolant Pump
J— Bby-pass Tube



RG11782 —UN—28SEP01



Coolant Pump Installation

RG20214 —UN—12APR11

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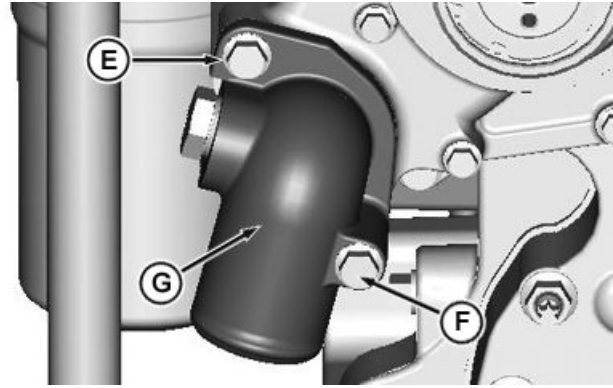
MK41968,00000BA -19-09AUG11-1/4

- b. Install inlet elbow (G) and cap-screws (E,F). Tighten cap-screws to specification.

Specification

Coolant Pump Inlet Elbow

Cap Screws—Torque..... 35 N•m (26 lb.-ft.)



Inlet Elbow Installation

MK41968,00000BA -19-09AUG11-2/4

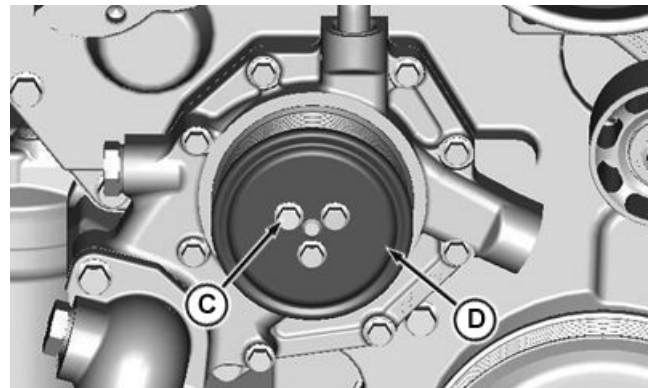
RG20213 —UN—12APR11

- c. Install coolant pump pulley (D) and three cap-screws (C). Tighten cap-screws to specification.

Specification

Coolant Pump Pulley Cap

Screws—Torque..... 15 N•m (133 lb.-in.)



Coolant Pump Pulley Installation

Continued on next page

MK41968,00000BA -19-09AUG11-3/4

RG20212 —UN—12APR11

d. Install by-pass tube (B) with P-clamp and nut (A). Tighten nut to specification.

2. Perform Belt Tensioner — Installation.

Special Tools:

- None

Consumable Material:

- None

3. Install fan belt.

4. Perform Fan Assembly — Installation.

Special Tools:

- None

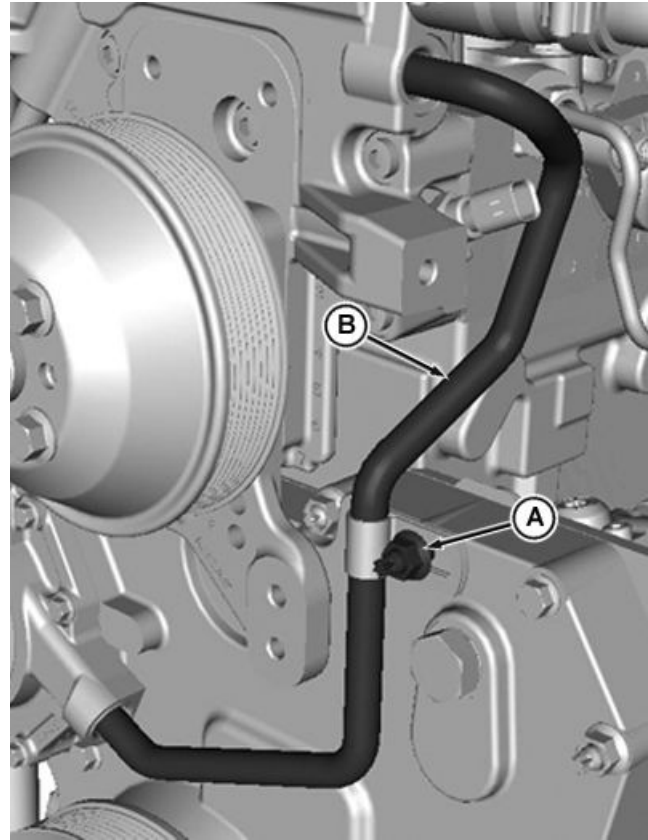
Consumable Material:

- None

IMPORTANT: Engine must sit for 24 hours at 60°F-120°F after repairs are completed to allow sealant to set properly before coolant is added.

5. Re-fill engine coolant.

IMPORTANT: Air must be expelled from cooling system when refilled. Loosen temperature sending unit fitting at rear of cylinder head or plug in thermostat housing to allow air to escape when filling system. Tighten fitting or plug when all the air has been expelled.



By-pass Tube Installation

RG20211—UN—12APR11

MK41968,00000BA -19-09AUG11-4/4

Coolant Pump Assembly — Removal

Special Tools:

- None

CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns. Do not drain coolant until the coolant temperature is below operating temperature. Always loosen cooling system filler cap, radiator cap, or drain valve slowly to relieve pressure.

IMPORTANT: Whenever the aluminum timing gear cover or coolant pump is replaced, the cooling system must be flushed and serviced, regardless of time/hours since last coolant change. See **FLUSH AND SERVICE COOLING SYSTEM** in Section 01, Group 002. Ensure system, including radiator, is completely drained.

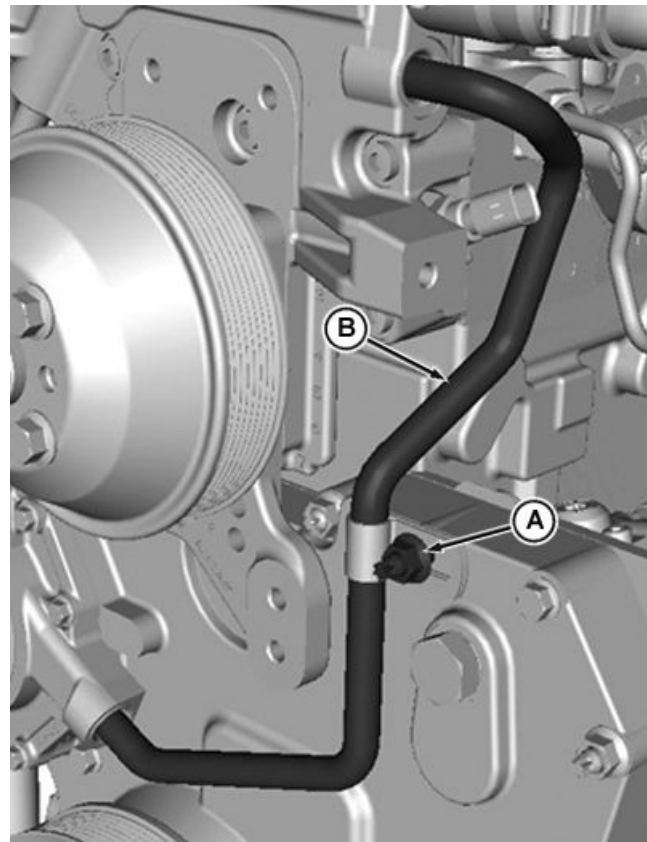
On engines without coolant pump inserts, a coolant pump insert must be installed before installing coolant pump.

NOTE: Weeping or seepage of coolant, creating chemical streak trails from the weep hole of the pump, is normal.

“Weeping” is defined as a passing of liquid across a sealed surface of about 1-5 drops per day's usage.

“Seeping” describes an amount of liquid equal to or greater than 5 drops per day's usage.

“Leaking” is defined as a near constant dripping of coolant.



By-pass Tube Removal

1. Drain coolant.
2. If necessary, perform [Fan Assembly – Removal](#).

Special Tools:

- None

3. Remove fan belt.
4. Perform [Belt Tensioner — Removal](#).

Special Tools:

- None

5. Coolant Pump Assembly — Removal

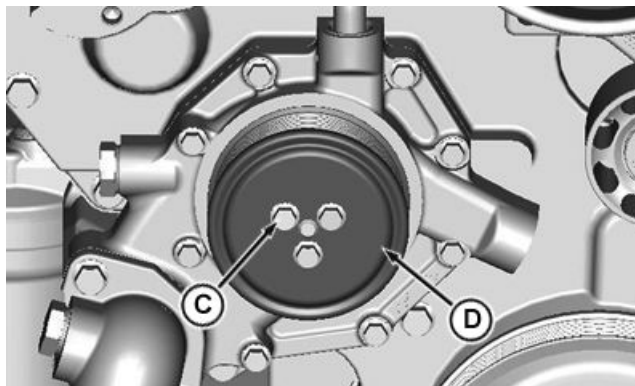
- a. Remove nut (A) along with the P-clamp; and by-pass tube (B).

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MK41968,00000BB -19-27JUL11-1/4

RG20211 —UN—12APR11

- b. Remove three cap-screws (C) and coolant pump pulley (D).

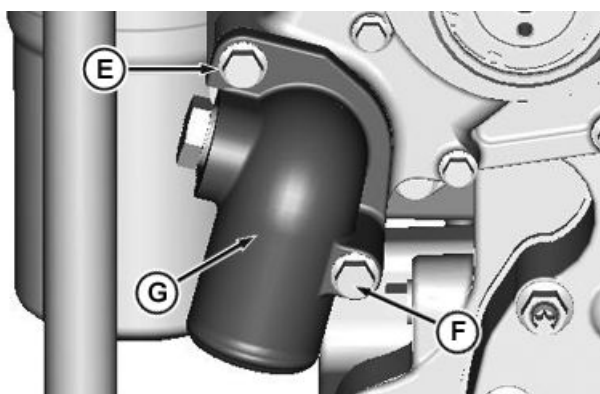


Coolant Pump Pulley Removal

MK41968,00000BB -19-27JUL11-2/4

RG20212—UN—12APR11

- c. Remove cap-screws (E,F) and inlet elbow (G).



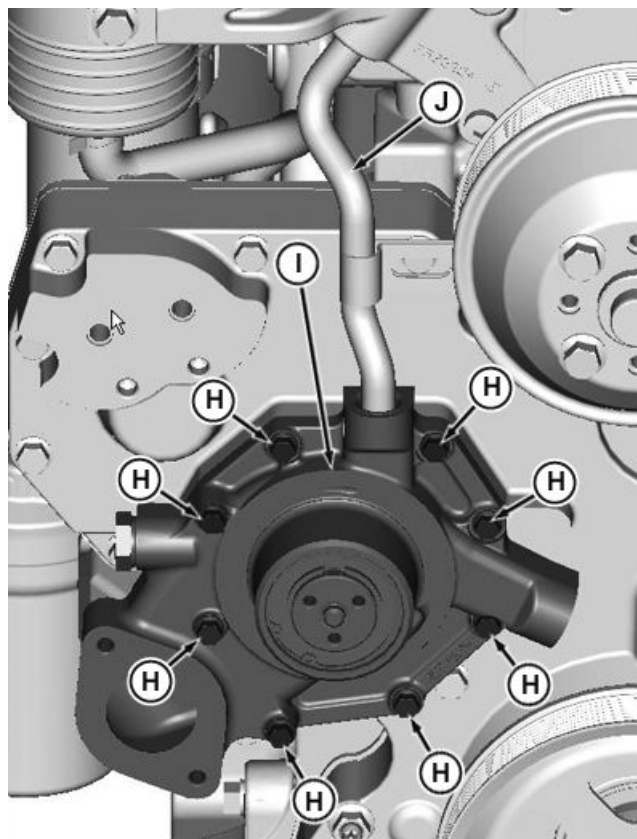
Inlet Elbow Removal

Continued on next page

MK41968,00000BB -19-27JUL11-3/4

RG20213—UN—12APR11

- d. Remove seven cap-screws (H), coolant-pump (I) along with the by-pass tube (J). Discard coolant pump gasket.
- e. Perform Coolant Pump — Visual Inspection.



Coolant Pump Removal

RG20214 —UN—12APR11

MK41968,00000BB -19-27JUL11-4/4

Cooling System — Deaeration

CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

IMPORTANT: Use coolant as specified in Fuel, Lubricants and Coolant section.

1. Remove pressure cap slowly to relieve any remaining system pressure.
2. Completely drain the cooling system by opening the drain cock of the radiator and the drain cock or plug in the side of the cylinder block or oil cooler housing.
3. Reinstall any loosened drains or plugs.
4. Fill coolant to the MAX COLD line on the expansion or top tank.
5. Install pressure cap and start engine. Run at application low idle for 5 minutes.

IMPORTANT: While the engine is running, be sure coolant level remains above the MIN COLD line and that there are no coolant leaks. Stop engine immediately if any problems are discovered.

6. If no problems are found, increase engine speed and apply some load to bring the engine up to operating temperature. Continue to watch for leaks or low coolant levels.
7. Return engine to application low idle, unloaded for five minutes.
8. Shut down engine and allow to cool.
9. After engine is cool, add coolant if needed to bring the level to between the MIN and MAX COLD lines.

NOTE: Always check coolant level prior to start-up each day.



TS281 —UN—23AUG88

MK41968,000008F -19-23AUG11-1/1

Fan Assembly — Inspection and Installation

Several fan drive ratios are available, allowing a closer matching of fan speed to application.

1. Inspect fan blades for bent or damaged condition. Bent blades reduce cooling system efficiency and throw the fan out of balance. Replace fan if blades are bent or damaged.

NOTE: Engines may be equipped with either suction-type fan or a blower-type fan, depending on application.

2. Install fan on pulley or pulley spacer hub. Tighten cap screws (with lock washers) to specifications.

Specification

Fan-to-Fan
Hub/Pulley—Torque.....47 N•m (35 lb.-ft.)



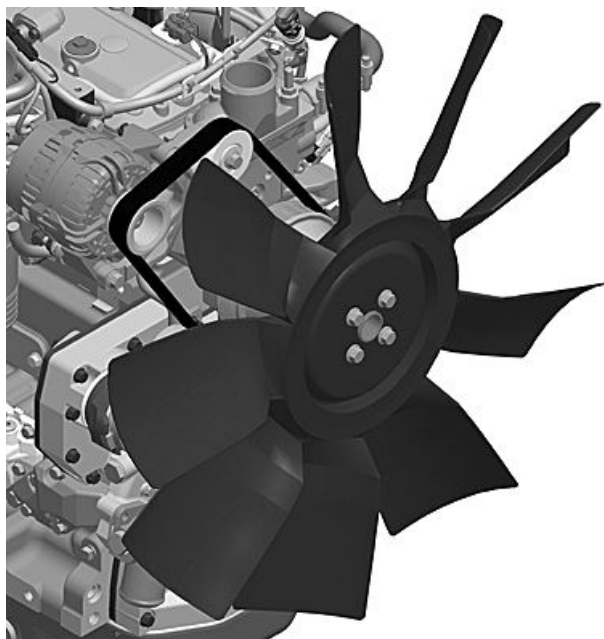
Fan Assembly

RG20727 —UN—08AUG11

MK41968,0000090 -19-24AUG11-1/1

Fan Assembly — Removal

1. Engines may be equipped with either suction-type fan or a blower-type fan, depending on application
2. Loosen and remove four cap screws from the fan and pulley or pulley spacer hub.



Fan Assembly

RG20706—UN—02AUG11

MK41968,0000091 -19-03AUG11-1/1

Fan Drive Assembly — Installation

Special Tools:

- None

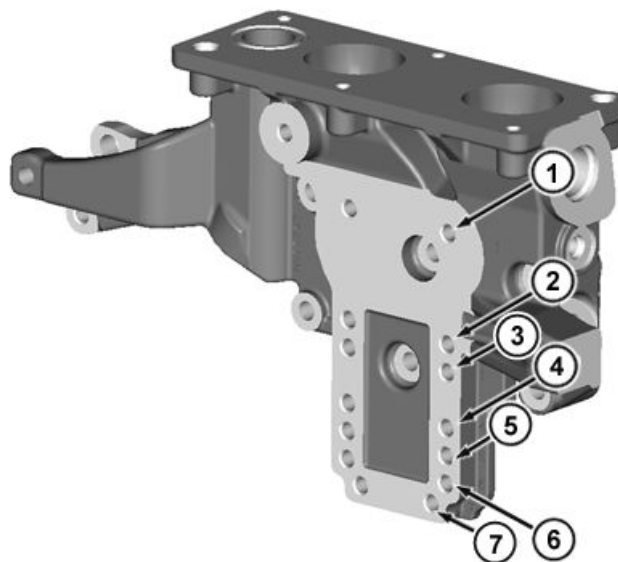
Consumable Material:

- None

Each pair of holes in the thermostat housing are numbered 1 through 7.

Each hole in the fan bracket is identified by a letter.

The fan bracket location (fan height) is determined by aligning lettered holes with numbered holes



RG18883 —UN—29JUL10

Numbered Holes in Thermostat Housing



RG18884 —UN—29JUL10

Lettered Holes in Fan Bracket

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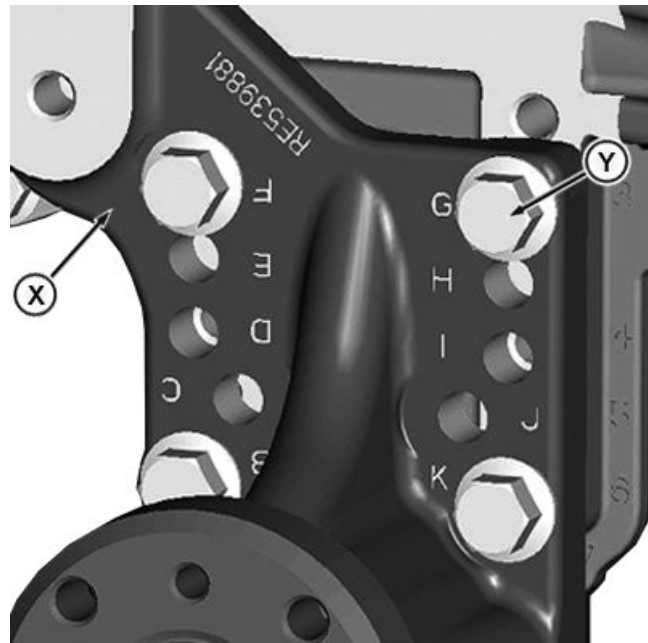
MK41968,0000092 -19-27JUL11-1/9

Option 2349 (258 mm fan height)

1. Orient idler pulley (X) arm pointing up
2. Align fan bracket holes G and F with thermostat housing hole 3.
3. Align fan bracket holes K and B with thermostat housing hole 6.
4. Install four M10 x 30 flange head cap screws (Y) in holes G, F, K, B.
5. Tighten cap screws to specification.

Specification

Fan Drive Cap
Screw—Torque..... 70 N•m (52 lb.-ft.)

X—Idler Pulley Arm**Y—4 Cap Screws (M10 x 30)***Option 2349 (258 mm fan height)*

RG18874 —UN—29JUL10

MK41968,0000092 -19-27JUL11-2/9

Option 2356 (290 mm Fan Height)

1. Orient idler pulley arm (X) pointing up.
2. Align fan bracket holes H and E with thermostat housing hole 2.
3. Align fan bracket holes K and B with thermostat housing hole 4.
4. Install four M10 x 30 flange head cap screws (Y) in holes H, E, K, B.
5. Tighten cap screws to specification.

Specification

Fan Drive Cap
Screw—Torque..... 70 N•m (52 lb.-ft.)

X—Idler Pulley Arm**Y—4 Cap Screws (M10 x 30)***Option 2356 (290 mm Fan Height)*

RG18879 —UN—29JUL10

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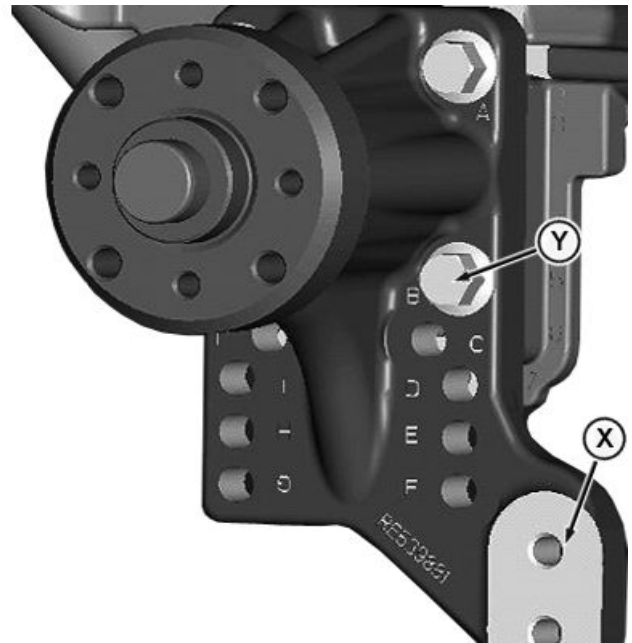
MK41968,0000092 -19-27JUL11-3/9

Option 2357 (338 mm Fan Height)

1. Orient idler pulley arm (X) pointing down.
2. Align fan bracket holes A and L with thermostat housing hole 2.
3. Align fan bracket holes B and K with thermostat housing hole 5.
4. Install four M10 x 30 flange head cap screws (Y) in holes A, L, B, K.
5. Tighten cap screws to specification.

Specification

Fan Drive Cap
Screw—Torque..... 70 N•m (52 lb.-ft.)

X—Idler Pulley Arm**Y—4 Cap Screws (M10 x 30)***Option 2357 (338 mm Fan Height)*

RG18880 —UN—29JUL10

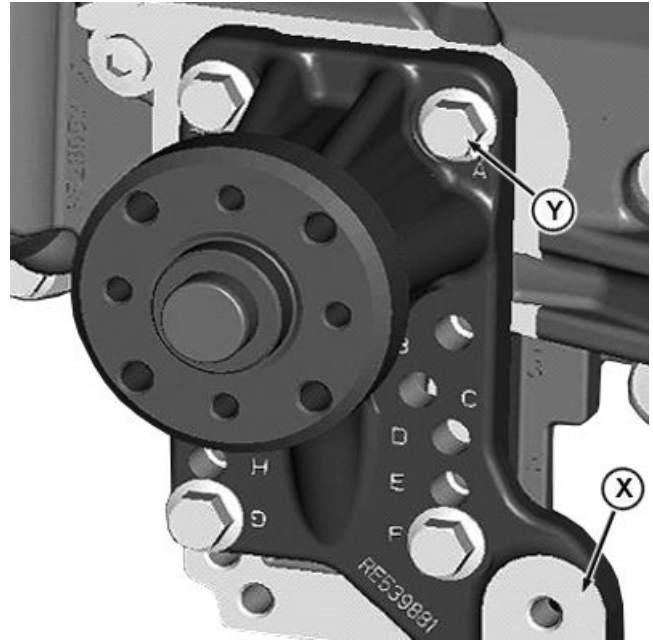
MK41968,0000092 -19-27JUL11-4/9

Option 2358 (402 mm Fan Height)

1. Orient idler pulley arm (X) pointing down.
2. Align fan bracket holes A and L with thermostat housing hole 1.
3. Align fan bracket holes F and G with thermostat housing hole 5.
4. Install four M10 x 30 flange head cap screws (Y) in holes A, L, F, G.
5. Tighten cap screws to specification.

Specification

Fan Drive Cap
Screw—Torque..... 70 N•m (52 lb.-ft.)

X—Idler Pulley Arm**Y—4 Cap Screws (M10 x 30)***Option 2358 (402 mm Fan Height)*

RG18881 —UN—29JUL10

Continued on next page

MK41968,0000092 -19-27JUL11-5/9

Option 2350 (258 mm Fan Height)

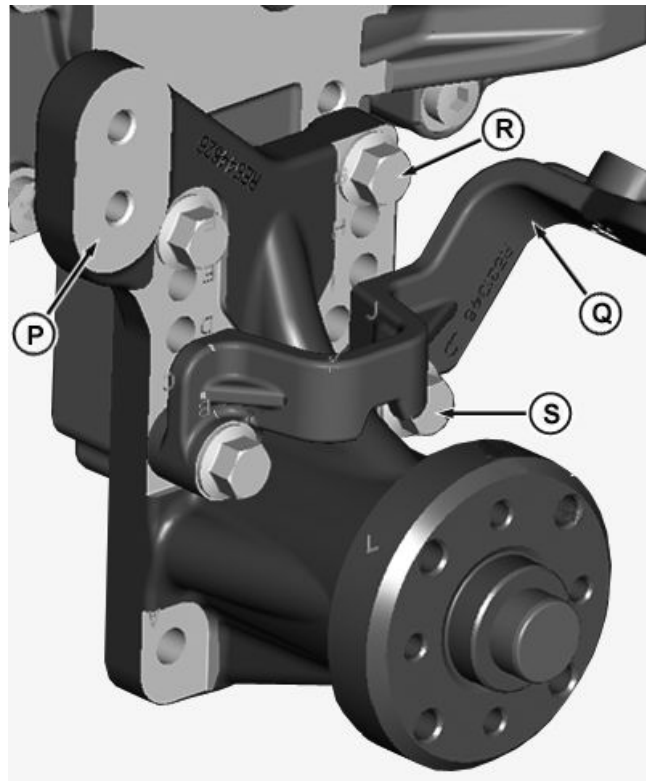
1. Orient idler pulley arm (P) pointing up.
2. Orient the anti-rotation strap bracket (Q) so the arm is pointing up.
3. Align fan bracket holes G and F with thermostat housing hole 3.
4. Align fan bracket holes K and B with thermostat housing hole 6.
5. Install two M10 x 30 flange head cap screws (R) in holes G and F.
6. Install two M10 x 50 flange head cap screws (S) through the holes in the anti-rotation strap bracket and into holes K and B.
7. Tighten cap screws to specification.

Specification

Fan Drive Cap

Screw—Torque..... 70 N•m (52 lb.-ft.)

P—Idler Pulley Arm R—2 Cap Screws (M10 x 30)
 Q—Anti-Rotation Strap Bracket S—2 Cap Screws (M10 x 50)



Option 2350 (258 mm Fan Height)

MK41968,0000092 -19-27JUL11-6/9

RG18875—UN—29JUL10

Option 2351 (290 mm Fan Height)

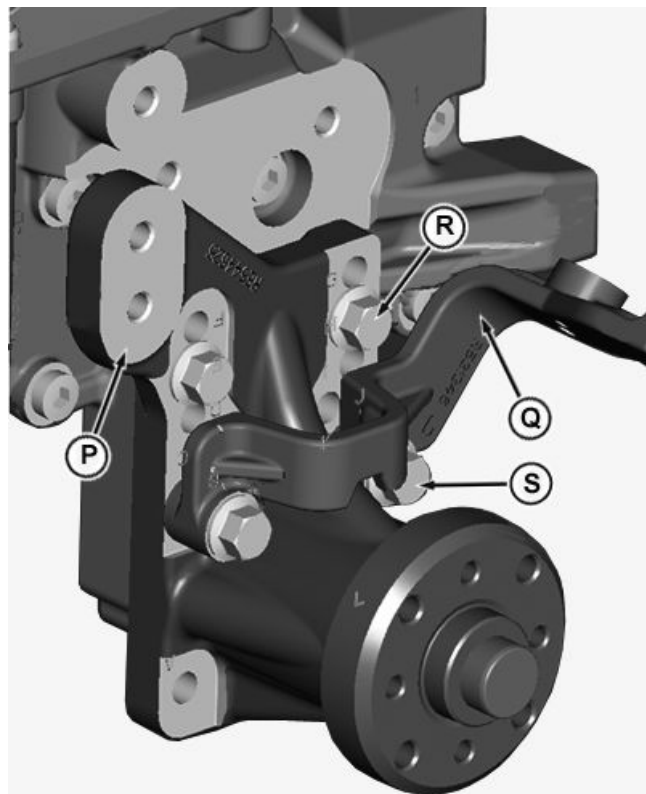
1. Orient idler pulley arm (P) pointing up.
2. Orient the anti-rotation strap bracket (Q) so the arm is pointing up.
3. Align fan bracket holes H and E with thermostat housing hole 2.
4. Align fan bracket holes K and B with thermostat housing hole 4.
5. Install two M10 x 30 flange head cap screws (R) in holes H, and E.
6. Install two M10 x 50 flange head cap screws (S) through the holes in the anti-rotation strap bracket and into holes K and B.
7. Tighten cap screws to specification.

Specification

Fan Drive Cap

Screw—Torque..... 70 N•m (52 lb.-ft.)

P—Idler Pulley Arm R—2 Cap Screws (M10 x 30)
 Q—Anti-Rotation Strap Bracket S—2 Cap Screws (M10 x 50)



Option 2351 (290 mm Fan Height)

MK41968,0000092 -19-27JUL11-7/9

RG18876—UN—02SEP10

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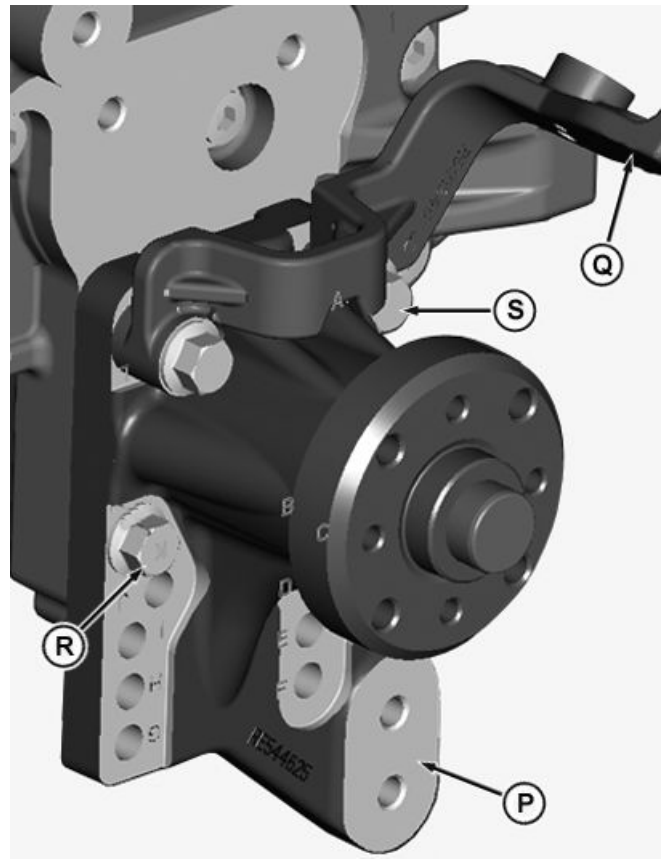
Option 2352 (338 mm Fan Height)

1. Orient idler pulley arm (P) pointing down.
2. Orient the anti-rotation strap bracket (Q) so the arm is pointing up.
3. Align fan bracket holes A and L with thermostat housing hole 2.
4. Align fan bracket holes B and K with thermostat housing hole 5.
5. Install two M10 x 30 flange head cap screws (R) in holes B and K.
6. Install two M10 x 50 flange head cap screws (S) through the holes in the anti-rotation strap bracket and into holes A and L.
7. Tighten cap screws to specification.

Specification

Fan Drive Cap

Screw—Torque..... 70 N•m (52 lb.-ft.)

P—Idler Pulley Arm**R—2 Cap Screws (M10 x 30)****Q—Anti-Rotation Strap Bracket****S—2 Cap Screws (M10 x 50)**

Option 2352 (338 mm Fan Height)

RG18877 —UN—02SEP10

Continued on next page

MK41968,0000092 -19-27JUL11-8/9

Option 2353 (402 mm Fan Height)

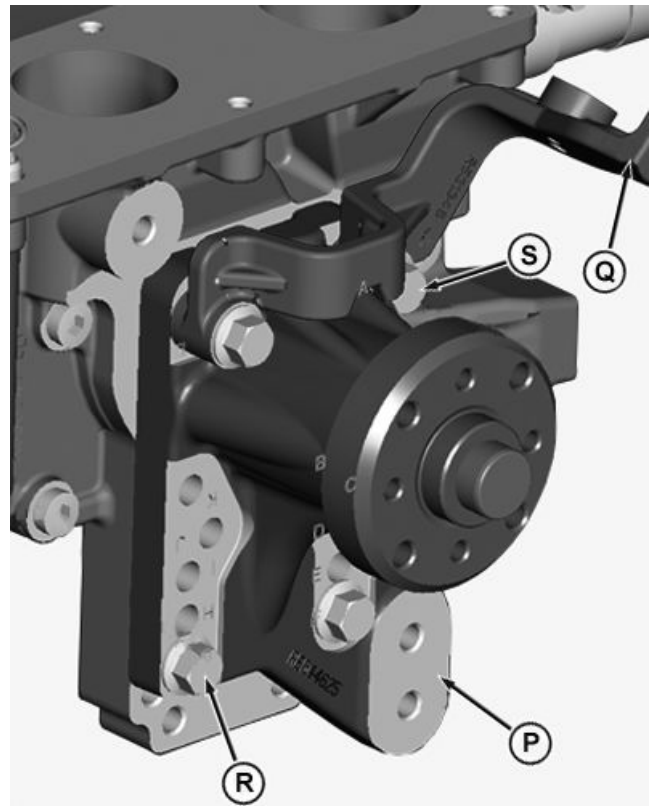
1. Orient idler pulley arm (P) pointing down.
2. Orient the anti-rotation strap bracket (Q) so the arm is pointing up.
3. Align fan bracket holes A and L with thermostat housing hole 1.
4. Align fan bracket holes F and G with thermostat housing hole 5.
5. Install two M10 x 30 flange head cap screws (R) in holes F and G.
6. Install two M10 x 50 flange head cap screws (S) through the holes in the anti-rotation strap bracket into holes A and L.
7. Tighten cap screws to specification.

Specification

Fan Drive Cap

Screw—Torque..... 70 N•m (52 lb.-ft.)

P—Idler Pulley Arm R—2 Cap Screws (M10 x 30)
 Q—Anti-Rotation Strap Bracket S—2 Cap Screws (M10 x 50)



Option 2353 (402 mm Fan Height)

RG18878 —UN—02SEP10

MK41968,0000092 -19-27JUL11-9/9

Fan Drive Assembly — Removal

Special Tools:

- None

1. Perform Fan Assembly — Removal.

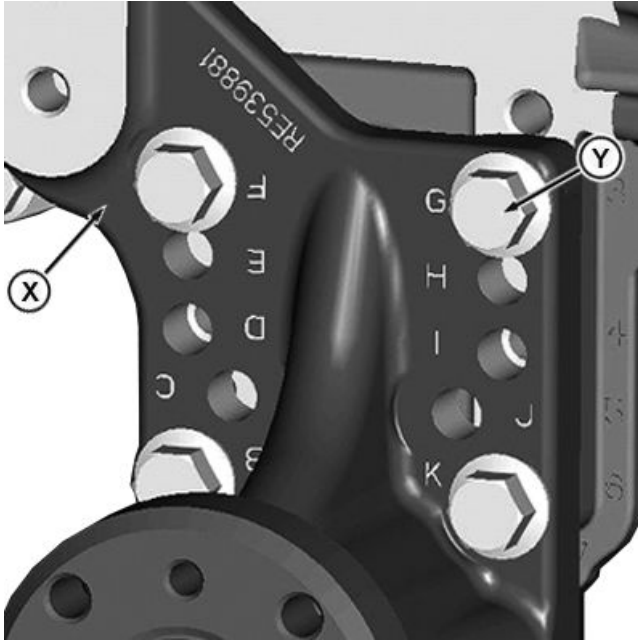
Special Tools:

- None

2. Remove fan belt, if not removed.

3. Remove the four cap screws and the fan drive assembly.

NOTE: Depending on option or application, the configuration might look different.



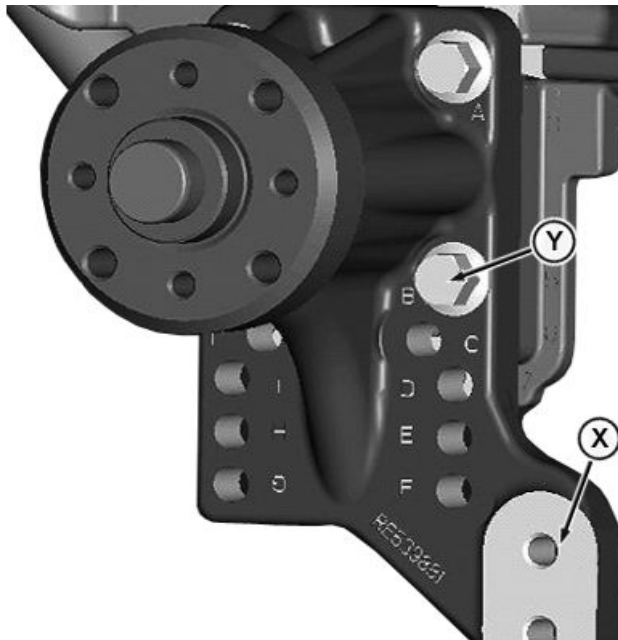
RG18874 —UN—29JUL10

Option 2349 (258 mm fan height)



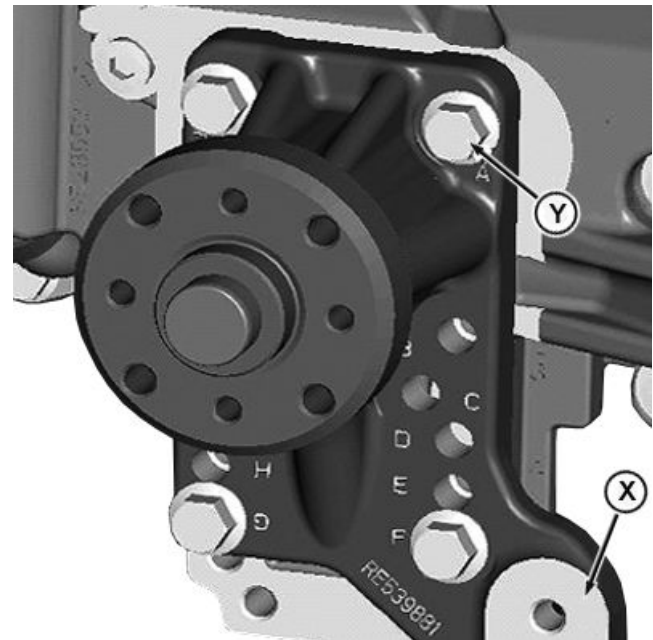
RG18879 —UN—29JUL10

Option 2356 (290 mm Fan Height)



RG18880 —UN—29JUL10

Option 2357 (338 mm Fan Height)



RG18881 —UN—29JUL10

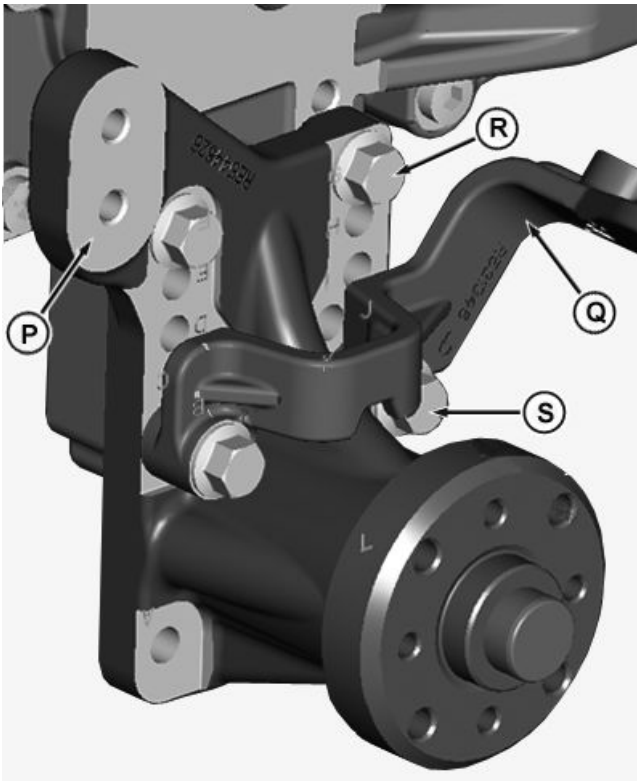
Option 2358 (402 mm Fan Height)

X—Idler Pulley Arm

Y—4 Cap Screws (M10 x 30)

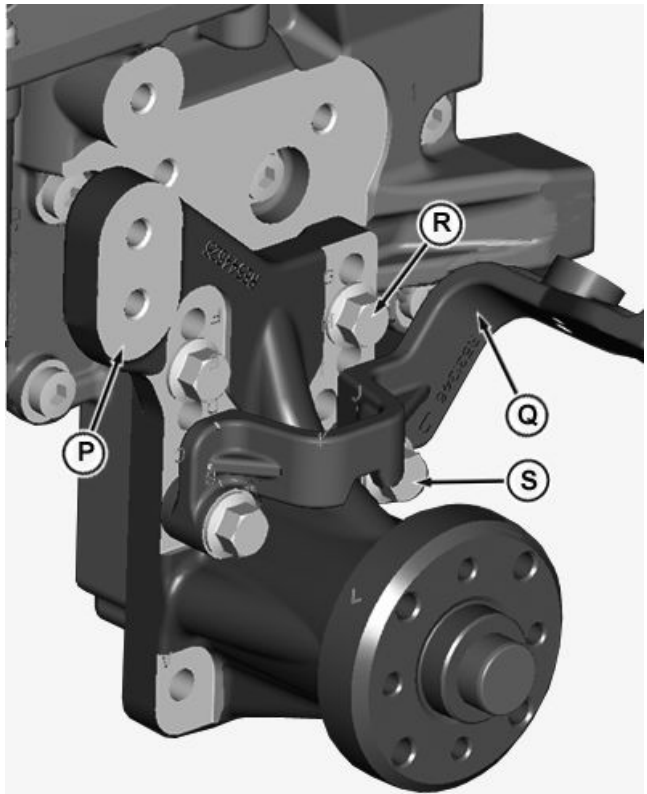
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MK41968,0000093 -19-11MAR11-1/3



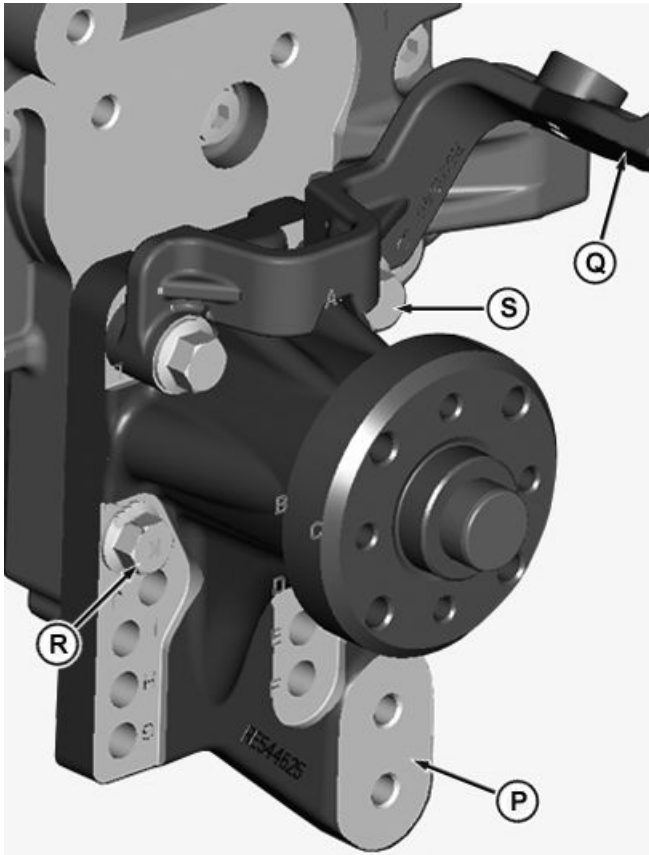
RG18875 —UN—29JUL10

Option 2350 (258 mm Fan Height)



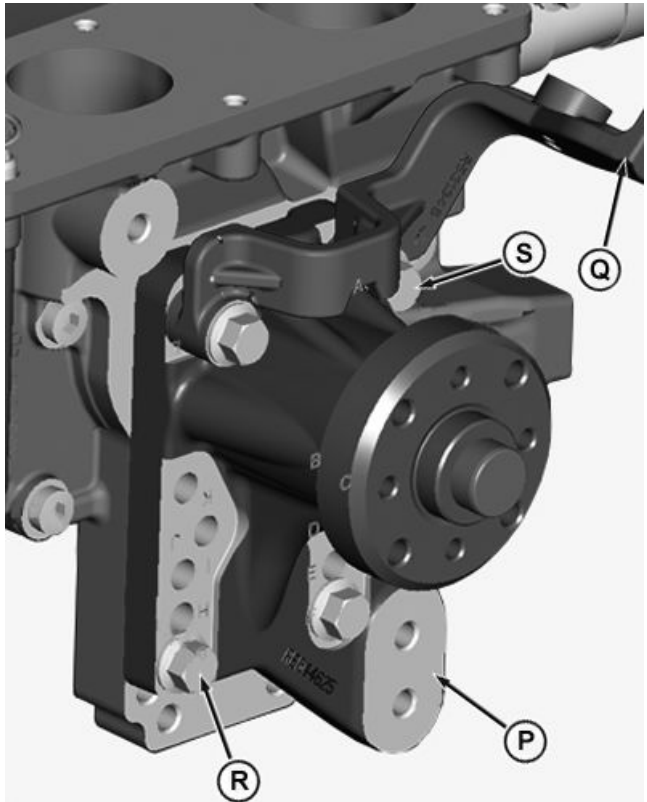
RG18876 —UN—02SEP10

Option 2351 (290 mm Fan Height)



RG18877 —UN—02SEP10

Option 2352 (338 mm Fan Height)



RG18878 —UN—02SEP10

Option 2353 (402 mm Fan Height)

Continued on next page

MK41968,0000093 -19-11MAR11-2/3

P—Idler Pulley Arm
Q—Anti-Rotation Strap Bracket

R—2 Cap Screws (M10 x 30)

S—2 Cap Screws (M10 x 50)

MK41968,0000093 -19-11MAR11-3/3

Thermostat — Installation

Special Tools:

- None

Consumable Material:

- None

NOTE: If required use the non petroleum lubricants to hold the thermostat seal in place; petroleum based lubricants are not acceptable and will cause premature failures if used.

1. Install two thermostats (A) in the thermostat housing.
2. Install the thermostat cover (B) and three cap screws (C) on thermostat housing.
3. Tighten the three cap screws (C) to specification:

Specification

Cap Screws (C)

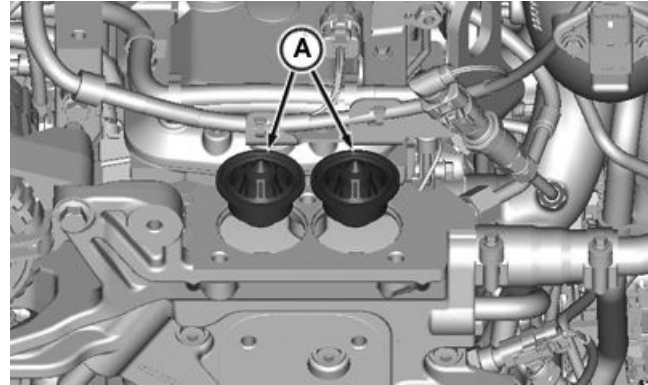
—Torque..... 70 N•m (52 lb.-ft.)

4. Re-fill engine coolant.

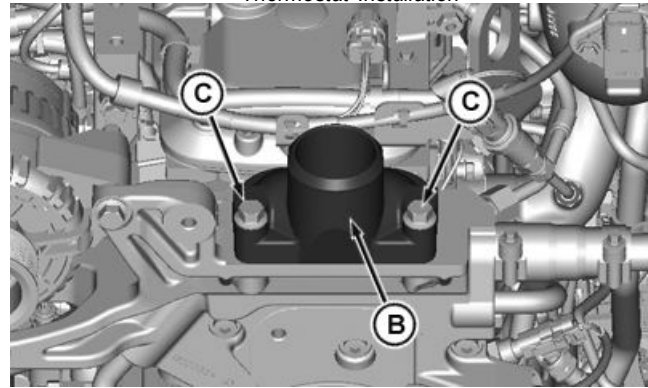
A—Thermostats

B—Thermostat Cover

C—Cap Screws (3)



Thermostat Installation



Thermostat Cover Installation

RG20112 —UN—18MAR11

RG20113 —UN—18MAR11

MK41968,0000094 -19-27JUL11-1/1

Thermostat — Removal

Special Tools:

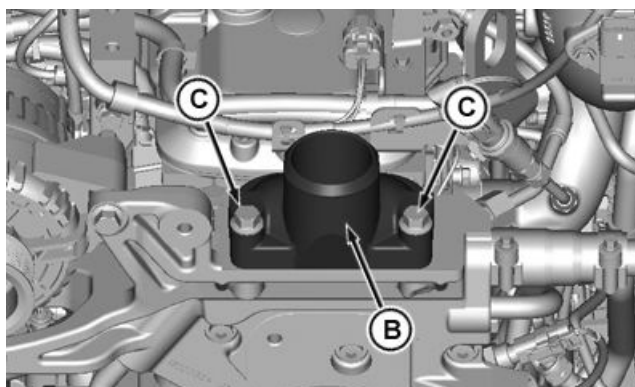
- None

1. Drain coolant from the system.
2. Remove three cap-screws (C) & thermostat cover (B).
3. Remove thermostats (A) and perform Thermostat — Testing.

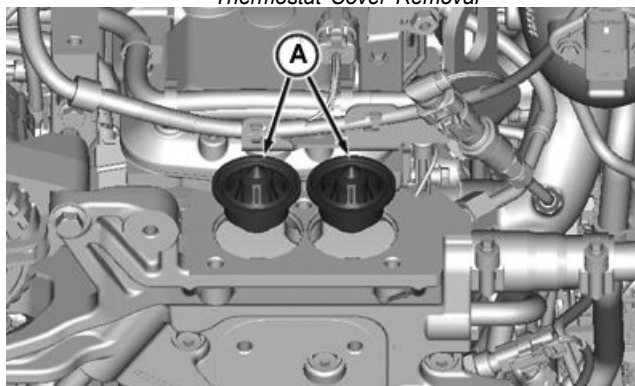
A—Thermostats

B—Thermostat Cover

C—Cap Screws (3)



Thermostat Cover Removal



Thermostats Removal

MK41968,0000095 -19-27JUL11-1/1

RG20113 —UN—18MAR11

RG20112 —UN—18MAR11

Thermostat — Testing

Inspect thermostats for debris or damage, and test each thermostat using an approved testing procedure.

Thermostats should start to open within the range specified below.

Specification

Thermostat—Opening
Temperature — Nominal..... 85° C (185° F)

Specification

Engine Coolant Temperature — Normal Operating
Conditions—Temperature..... 83.5° — 95° C (183° — 203° F)

If thermostat fails to open within this range, replace thermostat.

Thermostat Testing Procedure

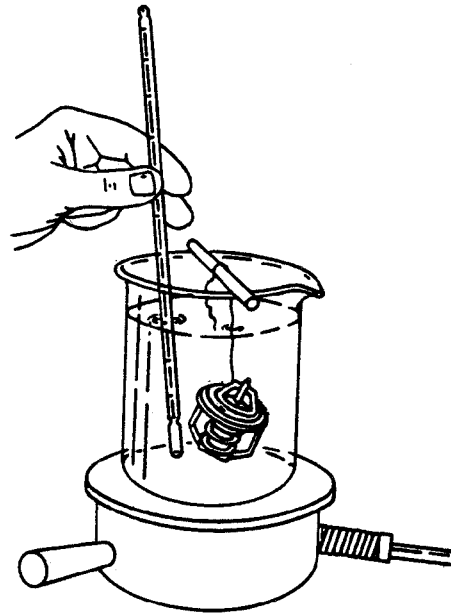
Visually inspect thermostat for corrosion or damage. Replace as necessary.

Test thermostat as follows:

1. Perform Thermostats — Removal. (See in Section 02, Group 070.)
2. Heat water in a container.

CAUTION: DO NOT allow thermostat or thermometer to rest against the side or bottom of container when heating water. Either may rupture if overheated.

3. Suspend thermostat and a thermometer in the container of water.
4. Stir the water as it heats. Observe opening action of thermostat and compare temperature with specification.



Thermostat Opening Temperature Test

Specification

Engine Coolant—Temperature — Fully Open
Nominal..... 97° C (207° F)

5. Remove thermostat and observe its closing action as it cools. In ambient air the thermostat should close completely. Closing action should be smooth and slow.
6. If any thermostat is defective, replace all thermostats.

RG5971 —UN—23NOV97

MK41968,0000096 -19-27JUL11-1/1

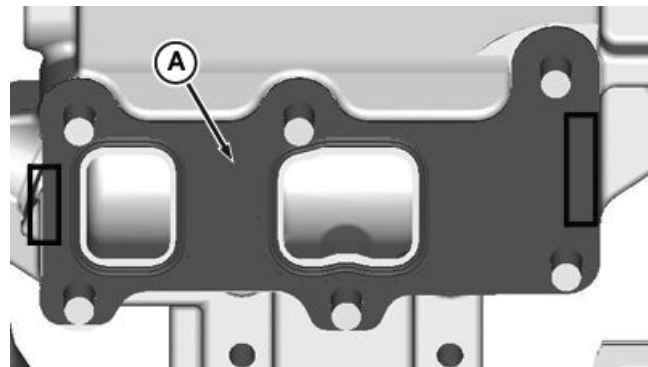
Thermostat Housing — Installation

Special Tools:
• None

Consumable Material:
• Hydrite or Soapy Water, Petroleum Jelly

NOTE: If necessary, petroleum jelly at highlighted area can be used to hold the gasket in place. Cap screws can also be installed in the thermostat housing to hold the gasket in place.

1. Install the thermostat housing gasket (A) on thermostat housing.



Thermostat Housing Gasket

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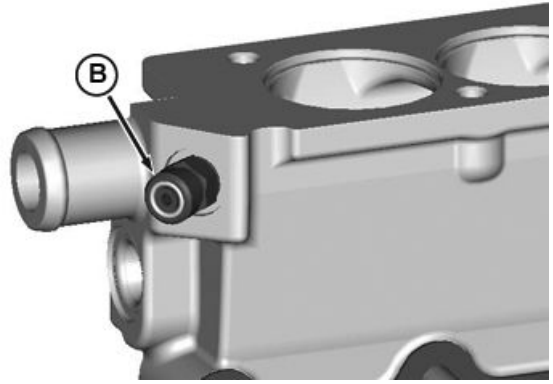
MK41968,0000097 -19-20MAR12-1/8

RG20101 —UN—16MAR11

2. Apply soapy water or hydrite and install the M12 fitting (B) with O-ring in the turbocharger actuator coolant return port in thermostat housing. Tighten fitting to specification:

Specification

M12 fitting with
O-ring—Torque..... 21 N•m (15 lb.-ft.)



M12 fitting with O-ring

RG20102 —UN—16MAR11

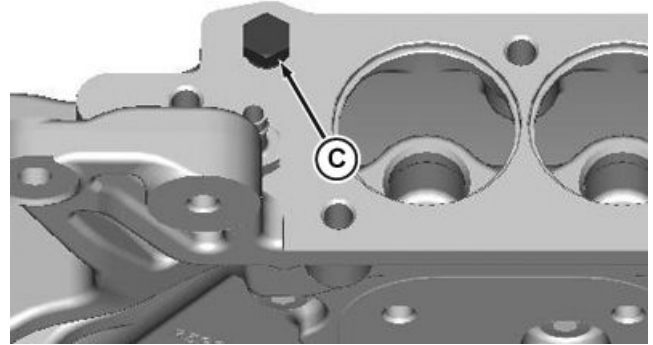
MK41968,0000097 -19-20MAR12-2/8

3. Apply soapy water or hydrite and install the M10 plug (C) with O ring in the venturi coolant return port. Tighten plug to specification:

Specification

M10 fitting with
O-ring—Torque..... 21 N•m (15 lb.-ft.)

NOTE: This plug will be removed for Variable Geometry Turbo Engines to connect the venturi coolant return line along with its fitting while the plug will be as it is for WasteGate Turbo Engines.



M10 plug with O-ring

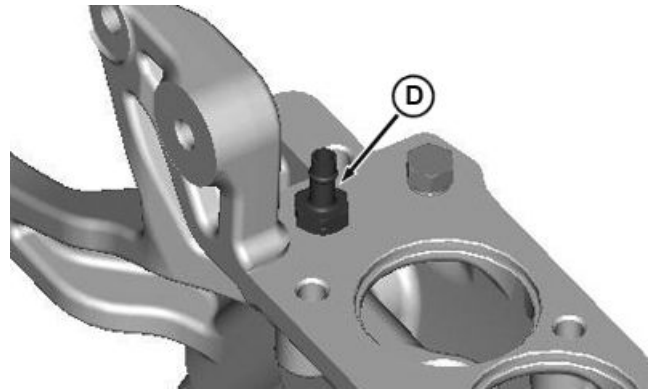
RG20103 —UN—16MAR11

MK41968,0000097 -19-20MAR12-3/8

4. Install the vent fitting (D) and tighten to specification:

Specification

Vent Fitting—Torque..... 20 N•m (15 lb.-ft.)

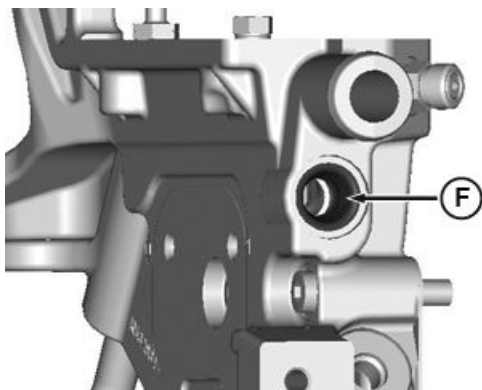


Vent Fitting

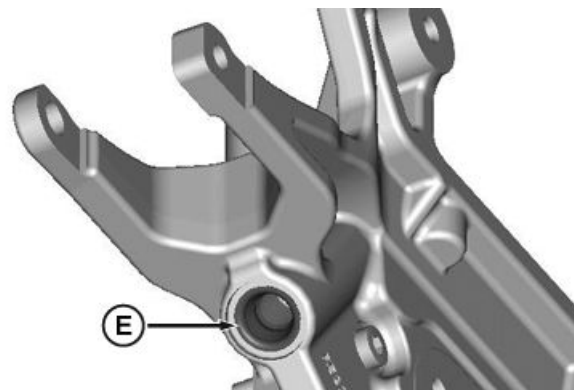
RG20104 —UN—16MAR11

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MK41968,0000097 -19-20MAR12-4/8



Tube Seal



Tube Seal

5. Install the tube seals (E, F) in both the bypass passages in the thermostat housing.

RG20111 —UN—17MAR11

RG20105 —UN—16MAR11

Continued on next page

MK41968,0000097 -19-20MAR12-5/8

6. Install thermostat housing with gasket on front face of cylinder head with six M10 socket cap-screws. Do not tighten.
Install the two by-pass tubes (A,B) and clamps (C,D) in the corresponding bypass ports/tube seals in thermostat housing and water pump.
Tighten the thermostat housing with sequence as shown:

Specification

Thermostat Housing

Socket Cap-screws

(6)—Torque..... 70 N•m (52 lb.-ft.)

Install nut (E), spacer (F), cap screw (G), and tighten.

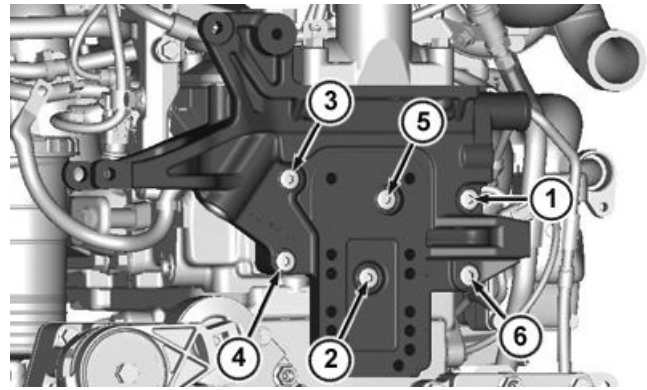
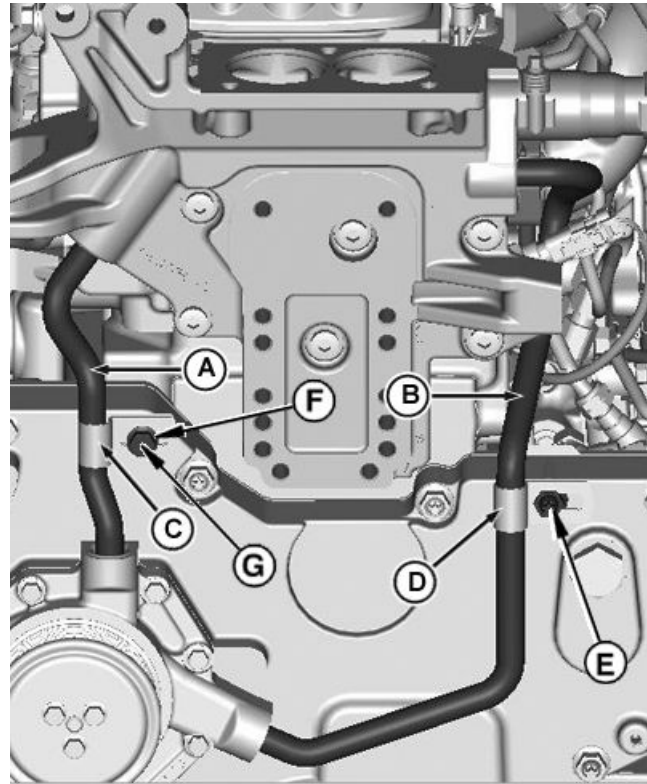
Specification

By-pass Tube

Clamps—Torque..... 35 N•m (26 lb.-ft.)

A—By-pass Tube
B—By-pass Tube
C—Clamp
D—Clamp

E—Nut
F—Spacer
G—Cap Screw

*Thermostat Housing Installation**By-pass Tubes*

MK41968,0000097 -19-20MAR12-6/8

RG20106 —UN—23SEP11

RG20110 —UN—08AUG11

7. Install one end of venturi coolant return line (B) on thermostat housing (A) and other end on venturi (D).
Tighten the line Cap Screws to specification:

Specification

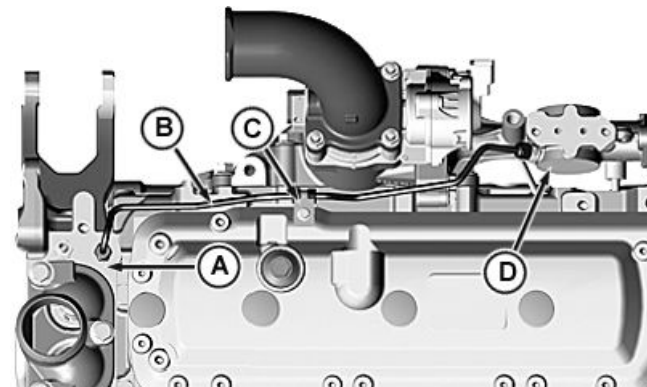
Venturi Coolant

Return Line Cap

Screw—Torque..... 25 N•m (18 lb.-ft.)

IMPORTANT: This is applicable only for Variable Geometry Turbo engines.

A—Thermostat Housing C—P-clamp
B—Venturi Coolant Return Line D—Venturi

*Venturi Coolant Return Line*

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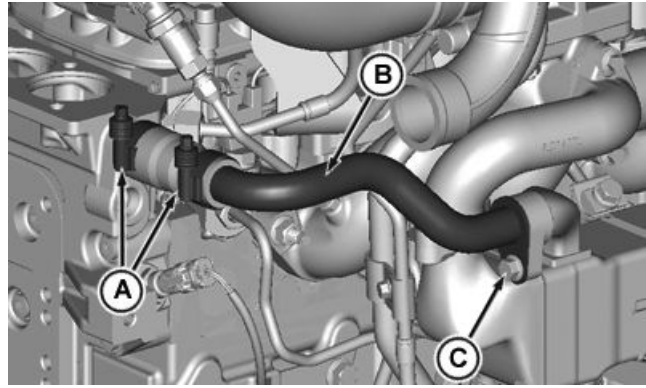
MK41968,0000097 -19-20MAR12-7/8

RG20119 —UN—22MAR11

8. If necessary, use soapy water or hydrite to install the EGR cooler coolant return tube (B) with O-ring and Cap Screw (C) on EGR line and fitting. Slide the EGR cooler coolant return hose onto the thermostat housing until it is flush to the housing face and then install clamps (A). Tighten first the Cap Screw (C) and the clamps (A) to specification:

Specification

EGR Cooler Coolant	
Return Tube Cap	
Screw—Torque.....	25 N•m (18 lb.-ft.)
EGR Cooler Coolant	
Return Hose	
Clamps—Torque.....	11 N•m (8 lb.-ft.)

*EGR Cooler Coolant Return Tube Installation*

A—Clamps
B—EGR Cooler Coolant Return Tube
C—Cap Screw

9. Perform Thermostat — Installation.

Special Tools:

- None

Consumable Material:

- Hydrite or Soapy Water, Petroleum Jelly

10. Perform Alternator — Installation.

Special Tools:

- None

Consumable Material:

- None

11. Perform Fan Drive Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None

12. Perform Fan Belt — Installation.

Special Tools:

- None

Consumable Material:

- None

13. Perform Fan Assembly — Installation.

Special Tools:

- None

Consumable Material:

- None

RG20109 —UN—16MAR11

MK41968,0000097 -19-20MAR12-8/8

Thermostat Housing — Removal

Special Tools:

- None

Consumable Material:

- None

1. Remove fan belt.
2. Perform Fan Assembly — Removal.

Special Tools:

- None

Consumable Material:

- None

3. Perform Fan Drive Assembly — Removal.

Special Tools:

- None

Consumable Material:

- None

4. Perform Alternator — Removal.

Special Tools:

- None

Consumable Material:

- None

5. Perform Thermostat — Removal.

Special Tools:

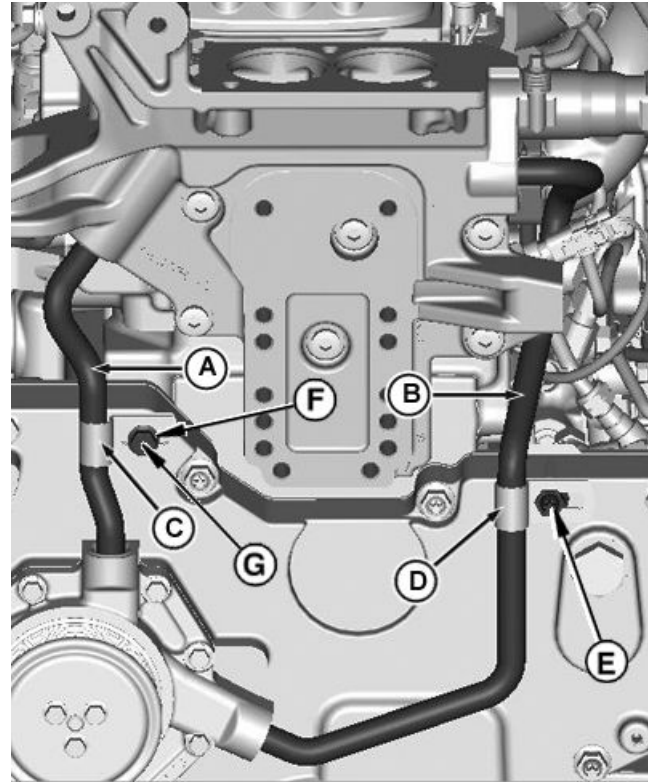
- None

Consumable Material:

- None

6. **Thermostat Housing Removal**

- a. Remove clamps (C,D) and the two by-pass tubes (A,B) with thermostat housing.



By-pass Tubes Removal

A—By-pass Tube
B—By-pass Tube

C—Clamp
D—Clamp

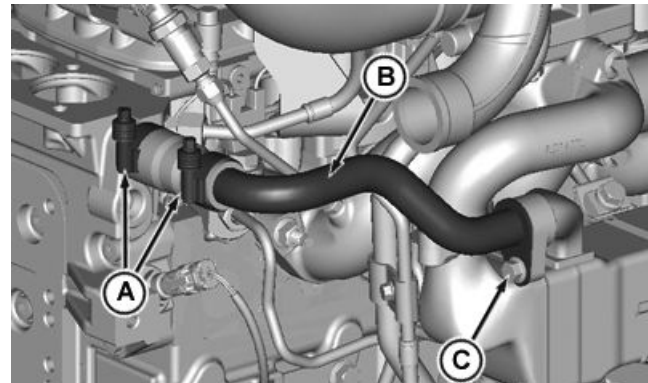
RG20110 —UN—08AUG11

MK41968,0000098 -19-02AUG11-1/3

- b. Loosen clamps (A). Remove nut (C) and the EGR cooler outlet hose (B).

A—Clamps
B—EGR Cooler Outlet Tube

C—Nut



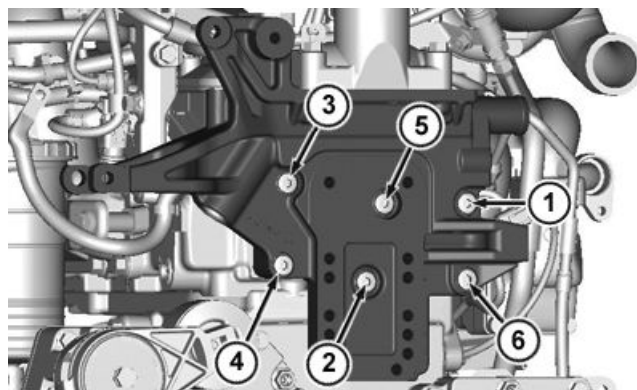
EGR Cooler Outlet Tube Removal

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MK41968,0000098 -19-02AUG11-2/3

RG20109 —UN—16MAR11

- c. Remove the six cap screws & thermostat housing along with the gasket.

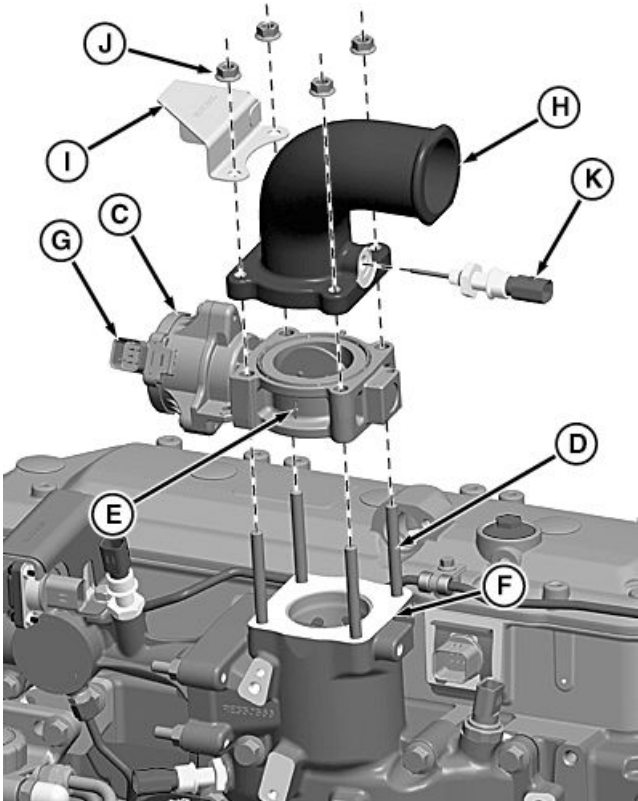
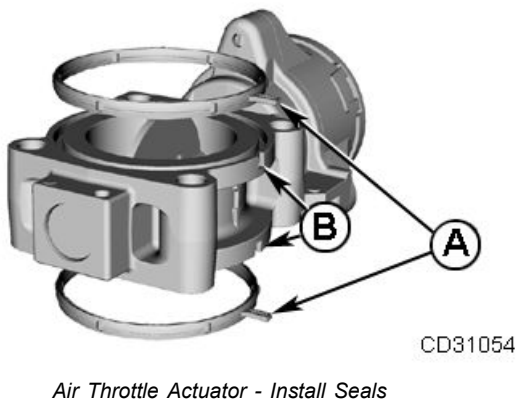


Thermostat Housing Removal

RG20106 —UN—23SEP11

MK41968,0000098 -19-02AUG11-3/3

Air Throttle Actuator (PVX Engine) — Installation



- A—Seal Tongue
B—Slot
C—Air Throttle Actuator
D—Stud
- E—Arrow Mark
F—Intake Manifold
G—Air Throttle Actuator
Connector

- H—Air Inlet Pipe
I— Heat Shield
J— Nut
K—Charge Air Cooler Outlet
Temperature Sensor

1. Install seals into grooves with tongues (A) in slots (B).
2. Remove intake manifold orifice cover
3. Slide throttle actuator (C) onto studs (D) with arrow mark (E) pointing towards intake manifold (F) and connector (G) oriented outward.
4. Install air inlet pipe (H) in proper direction and heat shield (I). Tighten nuts (J) to specification in a cross pattern.

5. Reinstall harness bracket if removed.

Specification	
Air Inlet Pipe/Throttle Actuator-to-Intake Manifold—Torque.....	25 N.m (18 lb.-ft.)

Specification	
Wiring Harness Bracket Cap Screw—Torque.....	25 N.m (18 lb.-ft.)
6. Reconnect wiring harness to air throttle actuator connector (G) and charge air cooler outlet temperature sensor (K).	

IMPORTANT: If replaced, re-calibrate the air throttle actuator using Service ADVISOR. See Air Throttle Actuator Learn Value Reset Test Instruction in Section 04, Group 160.

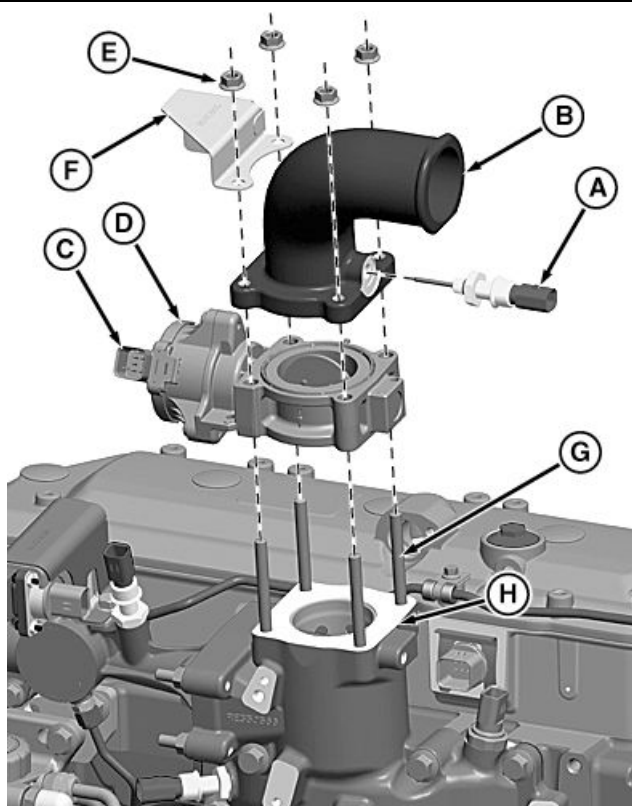
Air Throttle Actuator (PVX Engine) — Removal

NOTE: Depending on application, remove wiring harness brackets as necessary.

1. Remove the wiring harness connector from the temperature sensor (A).
2. Remove the temperature sensor (A) from air inlet pipe (B).
3. Remove the wiring harness connector from air throttle actuator connector (C).
4. Remove the four nuts (E).
5. Remove heat shield (F).
6. By pulling up on the air inlet pipe (B), remove the throttle actuator (D) from the intake manifold (H).

IMPORTANT: After removing the air throttle actuator, cover the intake manifold orifice.

- | | |
|---|-------------------|
| A—Charge Air Cooler Outlet Temperature Sensor | E—Nut |
| B—Air Inlet Pipe | F—Heat Shield |
| C—Air Throttle Actuator Connector | G—Studs |
| D—Air Throttle Actuator Assembly | H—Intake Manifold |

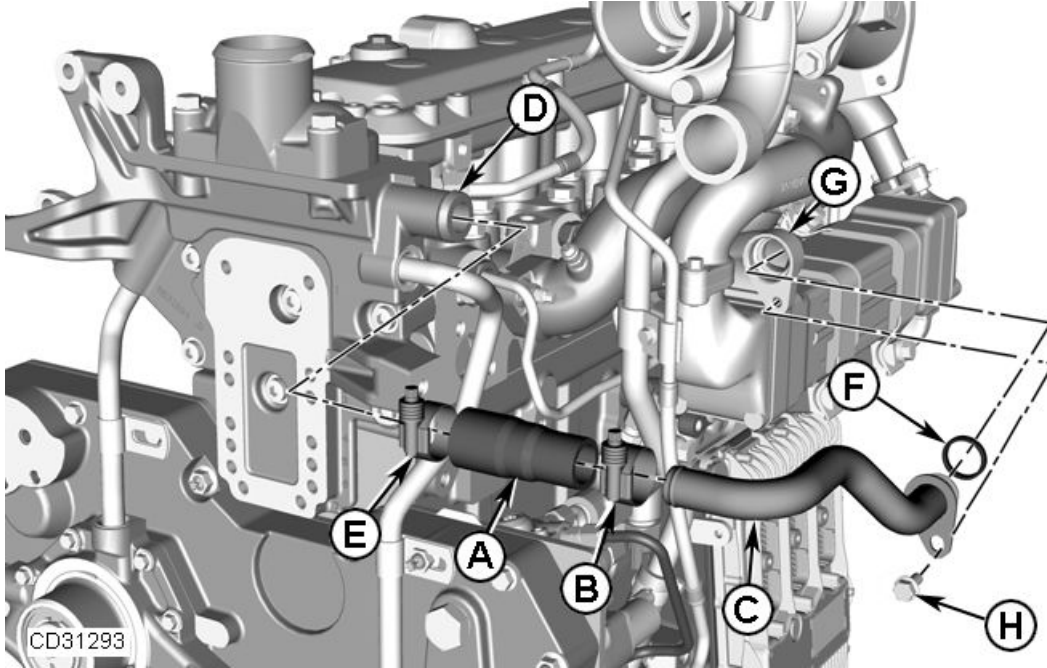


Remove Air Throttle Actuator

RG20679 —UN—11JUL11

CD03523,0000300 -19-03AUG11-1/1

EGR Cooler Coolant Return Tube — Installation



Install EGR coolant return line

- | | | |
|----------------------------------|----------------------|--------------|
| A—Hose | D—Thermostat Housing | F—O-ring |
| B—Clamp | E—Clamp | G—EGR Cooler |
| C—EGR Cooler Coolant Return Tube | | H—Cap Screw |

1. Install hose (A) with clamp (B) on the EGR Cooler Coolant Return Tube (C). Do not tighten clamp at this stage.
2. Install tube and hose onto thermostat housing (D) with clamp (E). Do not tighten clamp at this stage.
3. Using soapy water, install O-ring (F) onto tube, then install tube into EGR cooler (G).
4. Install cap screw (H) and tighten to specification.
5. Tighten both clamps (B) and (E) to specification.

Specification

Hose-to-Thermostat
Housing—Torque.....11 N·m (8 lb.-ft.)

6. Refill engine with coolant then bleed the cooling system.

Specification

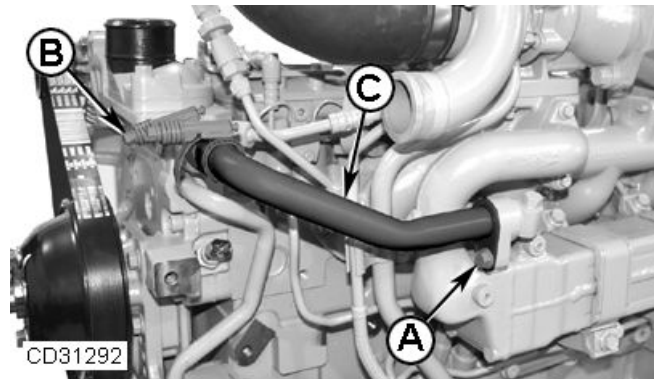
EGR Cooler Coolant
Return Tube—Torque.....25 N·m (18 lb.-ft.)

CD03523,000030A -19-26AUG11-1/1

EGR Cooler Coolant Return Tube — Removal

1. Let engine to cool down then drain coolant.
2. Remove the retaining cap screw (A) then remove tube (C) from cooler.
3. Loosen clamp (B) then remove tube from thermostat housing.

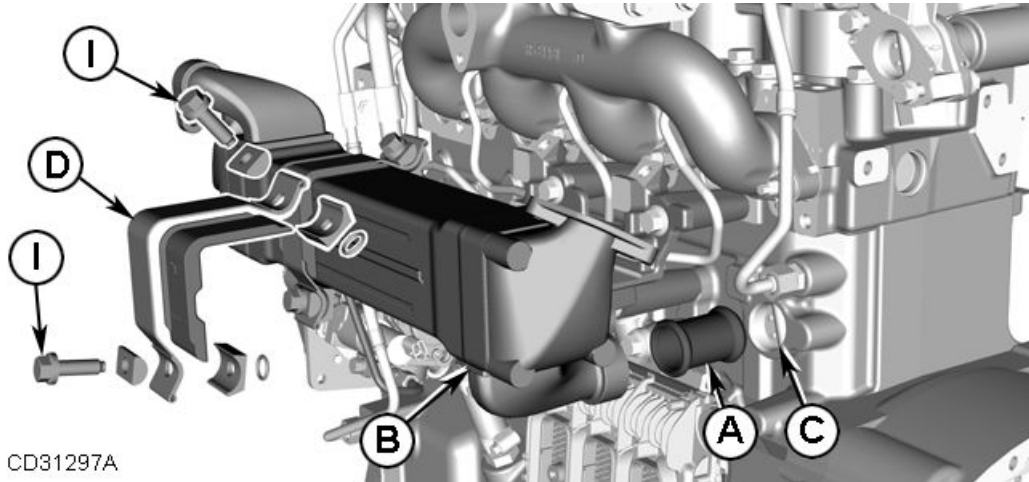
- | | |
|-------------|----------------------------------|
| A—Cap Screw | C—EGR Cooler Coolant Return Tube |
| B—Clamp (2) | |



Remove EGR Coolant Return Tube

CD03523,0000309 -19-09AUG11-1/1

EGR Cooler — Installation



CD31297A

Install EGR Cooler

Consumable Material:

- EGR Clamp Assembly (2)
- Cap Screws (4) — EGR Cooler Gas Inlet Pipe
- Seals

1. Install EGR cooler coolant inlet seal tube (A) into EGR cooler (B) using soap as lubricant.
2. Place EGR cooler (B) onto bracket and insert coolant supply hose into cylinder block orifice (C).

IMPORTANT: Orient clamps over the top of compression pads with arrows pointing upward

3. Install new clamp assemblies (D) over EGR cooler. Do not tighten at this stage.
4. Verify orientation of clamps.
5. Connect EGR cooler outlet tube (E) with new seals (F) between EGR cooler and EGR valve. Tighten cap screws (G) and (H) to specification.

Specification

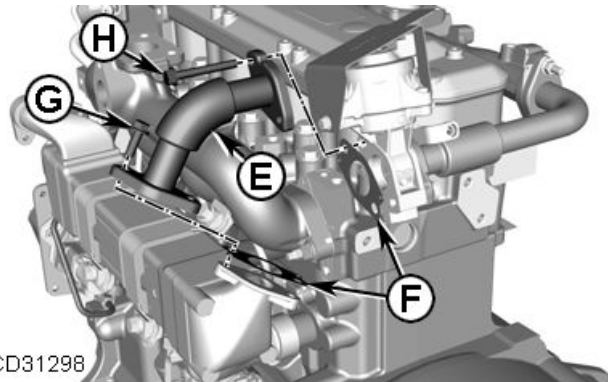
EGR Cooler Outlet Tube—Torque..... 35 N•m (26 lb.-ft.)

6. Tighten clamp cap screws (I) to specification.

Specification

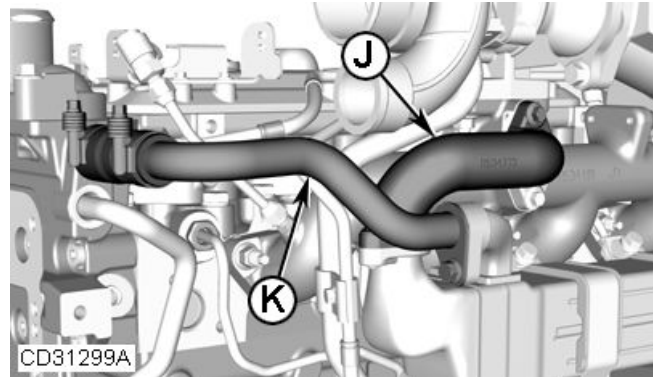
EGR Cooler Clamp Assembly—Torque..... 40 N•m (30 lb.-ft.)

7. Perform: EGR Cooler Gas Inlet Pipe (J) — Installation.
8. Perform: EGR Cooler Coolant Return Tube (K) — Installation.
9. Reconnect wiring harness.
10. Refill engine with coolant then bleed the cooling system.



CD31298

Install EGR Cooler Outlet Tube



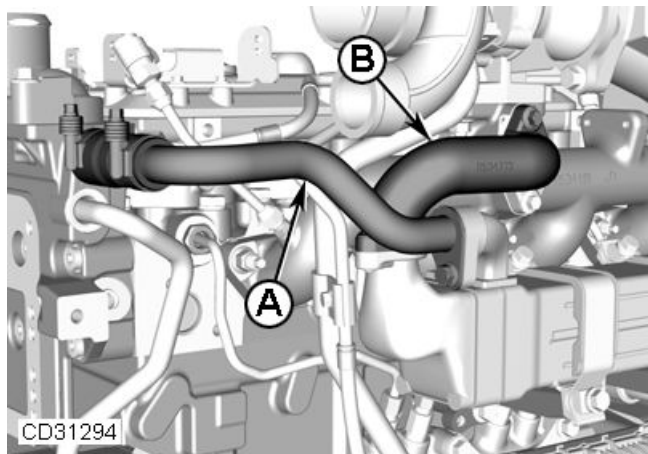
CD31299A

Install Coolant Return Tube and Gas Inlet Pipe

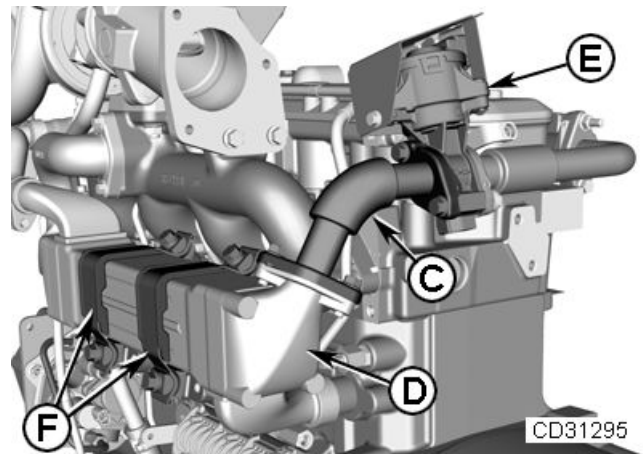
- | | |
|--------------------------------------|----------------------------------|
| A—EGR Cooler Coolant Inlet Seal Tube | G—Cap Screws |
| B—EGR Cooler | H—Cap Screws |
| C—Cylinder Block Orifice | I—Cap Screws |
| D—EGR Cooler Clamp Assembly (2) | J—EGR Cooler Gas Inlet Pipe |
| E—EGR Cooler Outlet Tube | K—EGR Cooler Coolant Return Tube |
| F—Seals | |

CD03523,000030C -19-09AUG11-1/1

EGR Cooler — Removal

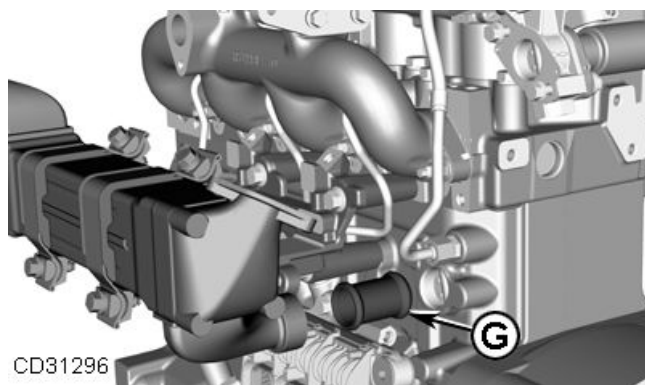


Remove Coolant Line and Gas Inlet Pipe



Remove Gas Outlet Pipe and Clamps

1. Let engine to cool down then drain coolant.
2. Disconnect wiring harness portion as needed.
3. Perform: EGR Cooler Coolant Return Tube (A) — Removal.
4. Perform: EGR Cooler Gas Inlet Pipe (B) — Removal.
5. Remove EGR cooler outlet tube (C) between EGR cooler (D) and EGR valve (E).
6. Remove EGR cooler clamps (F).
7. Remove EGR cooler from engine. Ensure EGR Cooler Coolant Inlet Seal Tube (G) comes with EGR cooler.

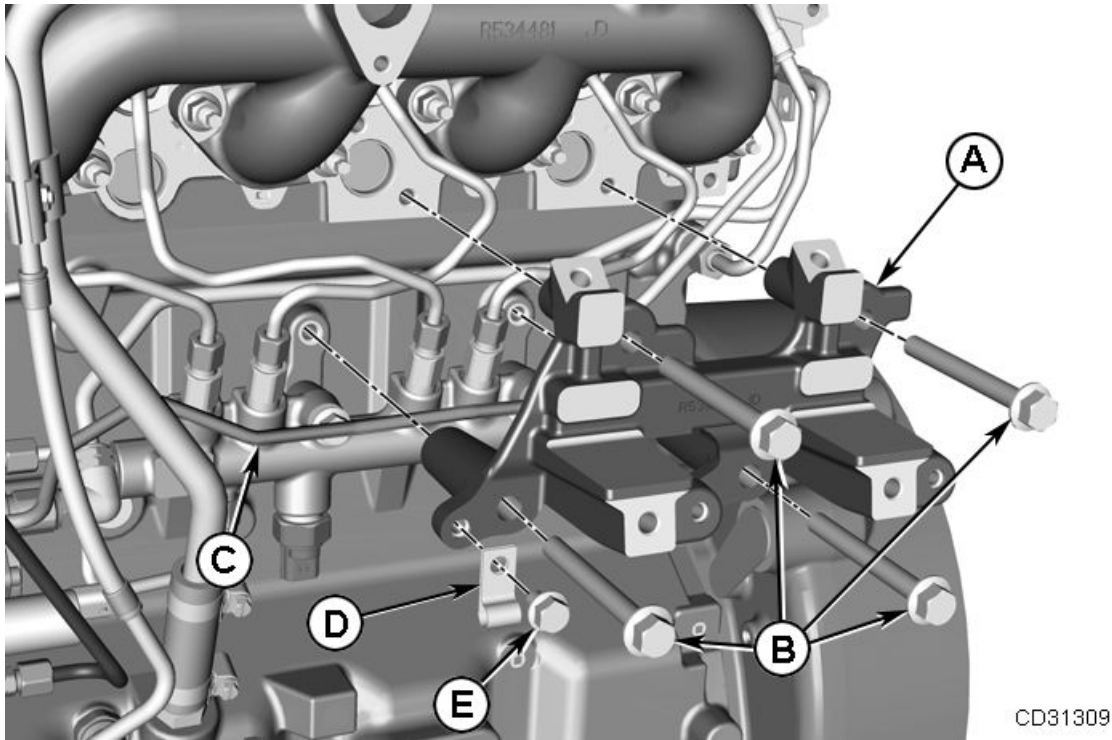


Remove EGR Cooler

A—EGR Cooler Coolant Return Tube
 B—EGR Cooler Gas Inlet Pipe
 C—EGR Cooler Outlet Tube
 D—EGR Cooler
 E—EGR Valve
 F—EGR Cooler Clamps
 G—EGR Cooler Coolant Inlet Seal Tube

CD03523,000030B -19-09AUG11-1/1

EGR Cooler Bracket — Installation



EGR Cooler Bracket Installation

A—EGR Cooler Bracket

B—Cap Screws

D—Clamp

C—Fuel Supply Line

E—Cap Screw

1. Install EGR cooler bracket (A) onto engine. Tighten cap screws (B) to specification.

Specification

EGR Cooler Bracket-to-Engine—Torque..... 73 N·m (54 lb.-ft.)

2. Attach fuel supply line (C) to EGR cooler bracket using clamp (D). Tighten cap screw (E) to specification.

Specification

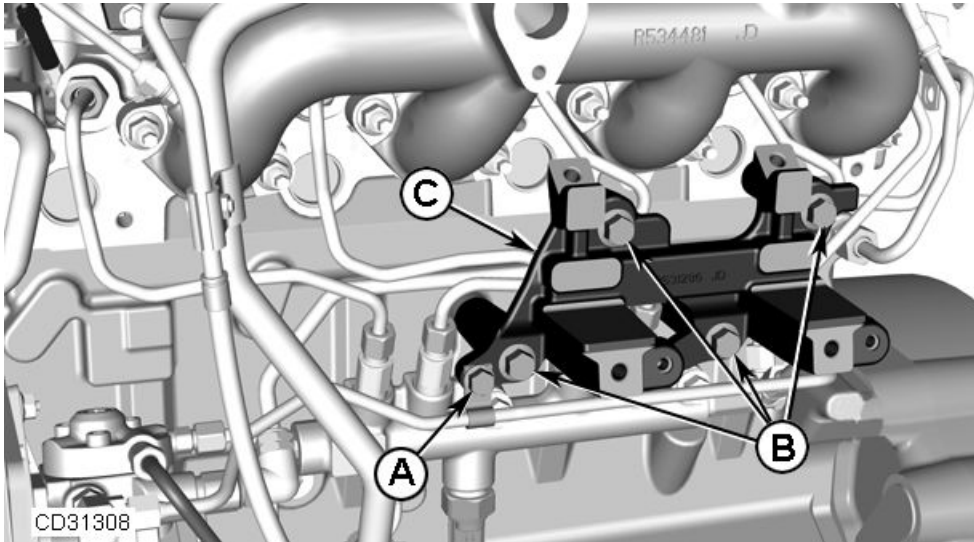
Fuel Supply Line Clamp-to-EGR Cooler Bracket—Torque..... 37 N·m (27 lb.-ft.)

3. Perform: EGR Cooler — Installation.
4. Reconnect wiring harness.
5. Refill engine with coolant then bleed the cooling system.

CD03523,000030E -19-07APR11-1/1

CD31309 —UN—08APR11

EGR Cooler Bracket — Removal



Remove EGR Cooler Bracket

A—Clamp
B—Cap Screw

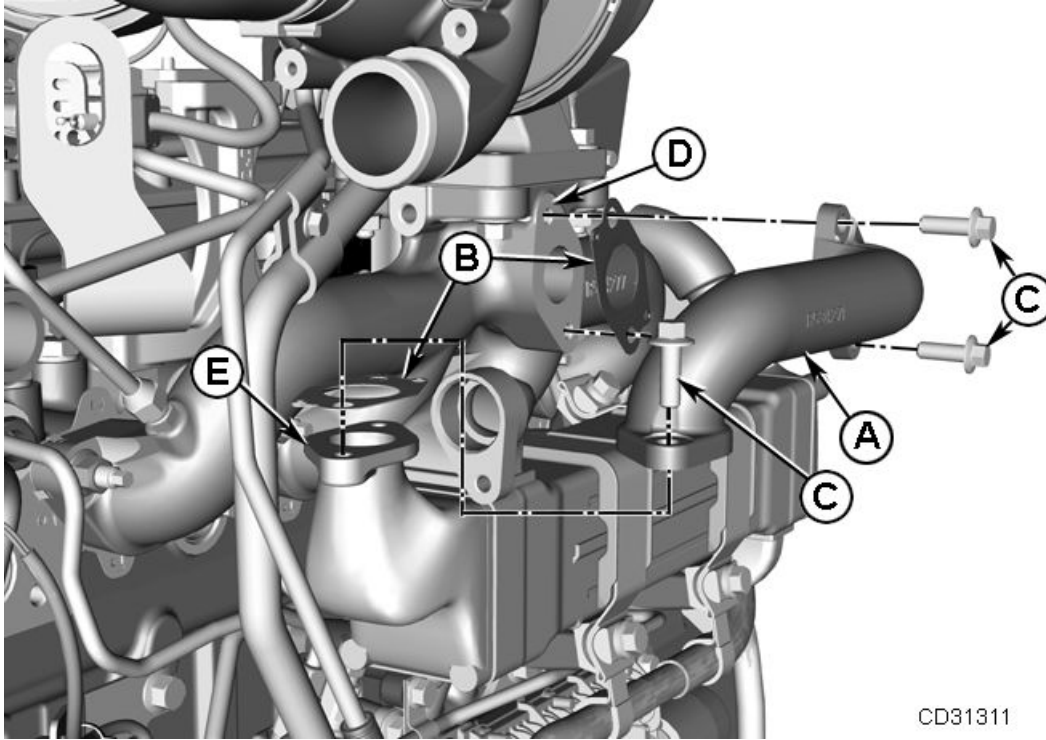
C—EGR Cooler Bracket

1. Let engine to cool down then drain coolant.
2. Disconnect wiring harness portion as needed.
3. Perform: EGR Cooler — Removal.
4. Remove clamp (A) holding the fuel supply line.
5. Remove the four cap screws (B) holding the EGR cooler bracket (C) to engine.

CD03523,000030F -19-07APR11-1/1

CD31308 —UN—08APR11

EGR Cooler Gas Inlet Pipe — Installation



CD31311

Install EGR Cooler Gas Inlet Pipe

- A**—EGR Cooler Gas Inlet Pipe **B**—Gaskets **D**—Exhaust Manifold
C—Cap Screws (4) **E**—EGR Cooler

Consumable Material:

- Gaskets (2) — EGR Cooler Gas Inlet Pipe
- Cap Screws (4) — EGR Cooler Gas Inlet Pipe to exhaust manifold and EGR cooler

NOTE: For a clarity purpose, some components, like the EGR Cooler Coolant Return Tube, are not shown on the picture.

1. Install EGR cooler gas inlet pipe (A) with new gaskets (B) and new cap screws (C) between exhaust manifold (D) and EGR cooler (E).

2. Tighten cap screws to specification at both ends.

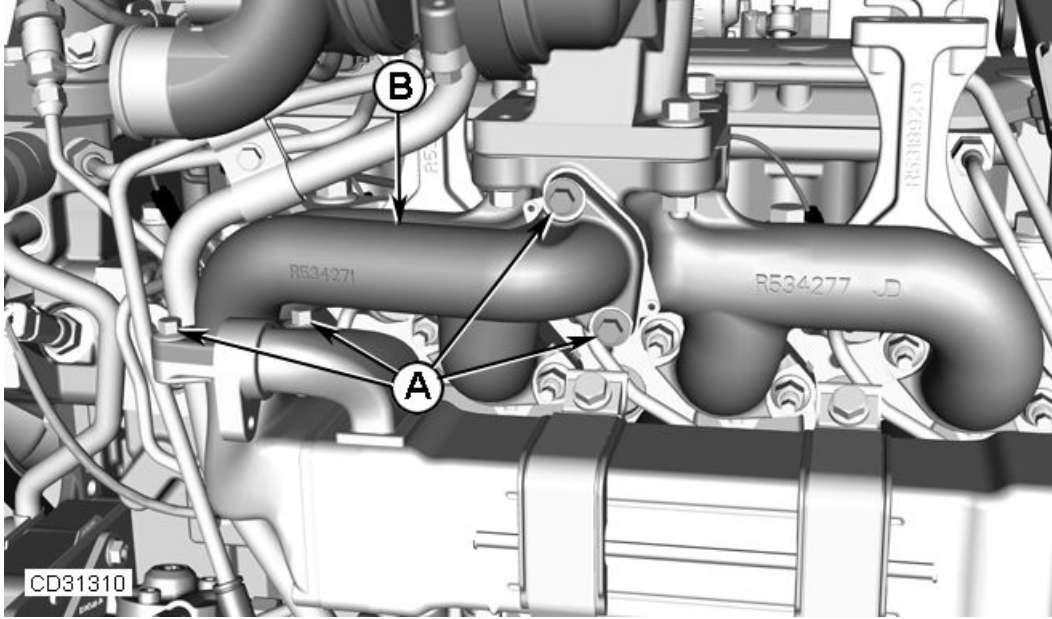
Specification

EGR Cooler Gas Inlet Pipe (Both Ends)—Torque..... 20 N·m (15 lb.-ft.)

CD03523,0000311 -19-08AUG11-1/1

CD31311—UN—11APR11

EGR Cooler Gas Inlet Pipe — Removal



Remove EGR Cooler Gas Inlet Pipe

A—Cap Screws (4)

B—EGR Cooler Gas Inlet Pipe

NOTE: For a clarity purpose, some components, like the EGR Coolant Return Line, are not shown on the picture.

1. Remove retaining cap screws (A) at both ends of EGR cooler gas inlet pipe (B).

2. Remove pipe and discard gaskets and cap screws.

CD03523,0000310 -19-09AUG11-1/1

EGR Flow Sensor (PVX Engine) — Installation

Consumable Material:

- EGR flow sensor Square-rings (2)
- Loctite 242 Thread Lock and Sealer (Medium Strength)

1. Install new square-rings (A) onto the EGR flow sensor (B).
2. Place sensor on venturi sealing surface (C).
3. Install heat shield (D) over the sensor.
4. Apply Loctite 242 on threads of cap screws (E).
5. Install cap screws and tighten to specification.

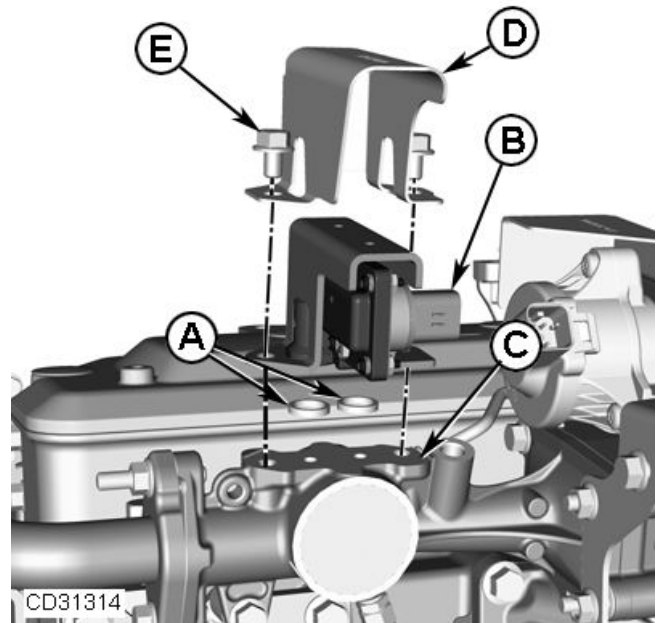
Specification

EGR Flow Sensor-to-Venturi—Torque..... 25 N·m (18 lb.-ft).

6. Reconnect wiring harness.

A—Square-rings (2)
B—EGR Flow Sensor
C—Venturi

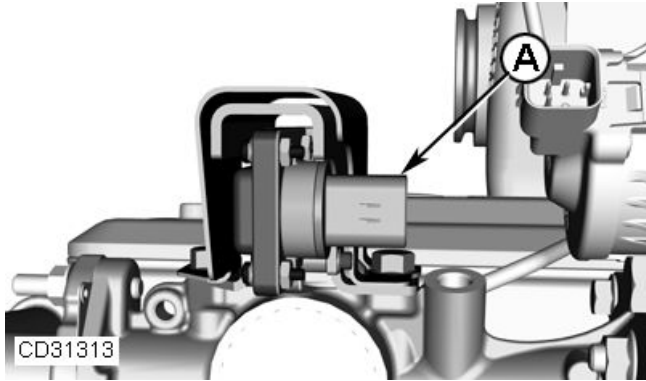
D—Heat Shield
E—Cap Screws (2)



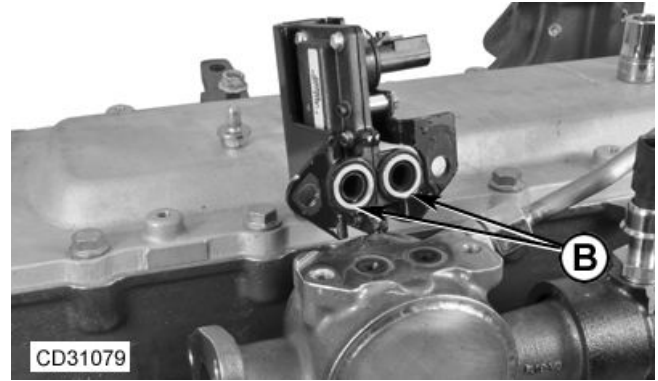
Install EGR Flow Sensor

CD03523,0000313 -19-12APR11-1/1

EGR Flow Sensor (PVX Engine) — Removal



Remove EGR Flow Sensor



Discard Square-rings

A—EGR Flow Sensor **B—Square-rings**

1. Disconnect wiring harness from EGR flow (A).
2. Remove the sensor.
3. Discard square-rings (B).

CD03523,0000312 -19-12APR11-1/1

EGR Flow Venturi Assembly (PVX Engine) — Installation

NOTE: For a clarity purpose, some components, like the air throttle actuator, are not shown on the picture.

1. Using soapy water, install the reed valve (A) into intake manifold housing.
2. Install venturi assembly (B) onto intake manifold. Install cap screws and studs (C), do not tighten at this stage.
3. Install spacer (D) and cap screw (E). Tighten to specification.

Specification

EGR Flow Venturi-to-Fuel
Filter Bracket—Torque..... 35 N·m (26 lb.-ft.)

4. Tighten cap screws and studs (C) to specification.

Specification

EGR Flow
Venturi-to-Intake
Manifold—Torque..... 35 N·m (26 lb.-ft.)

5. Install the EGR valve outlet tube (F) with new gasket (G). Tighten cap screw and stud (H) to specification.

Specification

Venturi Inlet Pipe (Both
Ends)—Torque..... 35 N·m (26 lb.-ft.)

6. If removed, install coolant supply line fitting (I) with new O-ring. Tighten to specification.

Specification

Coolant Supply
Line Fitting-to-
Venturi—Torque..... 15 N·m (11 lb.-ft.)

7. Reconnect the coolant supply line (J). Tighten to specification.

Specification

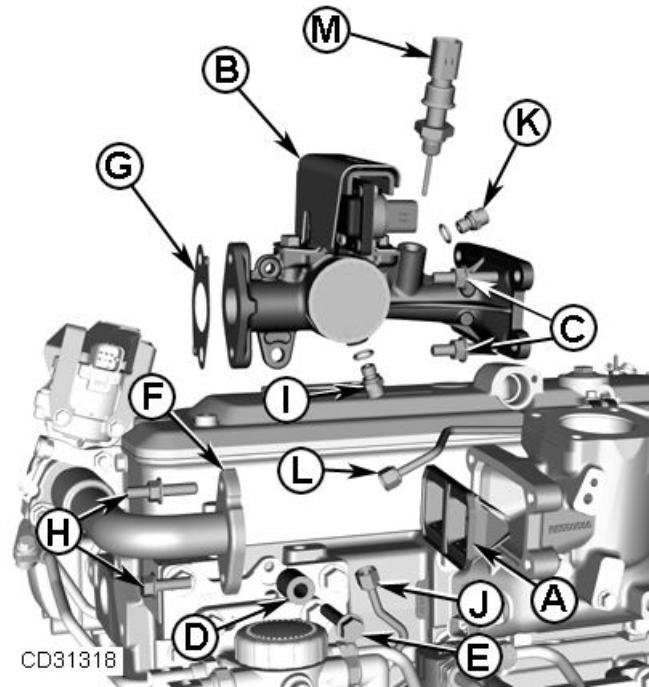
Coolant Supply Line
(Both Ends)—Torque..... 13 N·m (10 lb.-ft.)

8. If removed, install coolant return line fitting (K) with new O-ring. Tighten to specification.

Specification

Coolant Return
Line Fitting-to-
Venturi—Torque..... 15 N·m (11 lb.-ft.)

9. Reconnect the coolant return line (L). Tighten to specification.



Install EGR flow venturi

- | | |
|-----------------------------|-------------------------------|
| A—Reed Valve | H—Cap Screw and Stud |
| B—EGR Flow Venturi Assembly | I—Coolant Supply Line Fitting |
| C—Cap Screws and Studs | J—Coolant Supply Line |
| D—Spacer | K—Coolant Return Line Fitting |
| E—Cap Screw | L—Coolant Return Line |
| F—EGR Valve Outlet Tube | M—EGR Temperature Sensor |
| G—Gasket | |

Specification

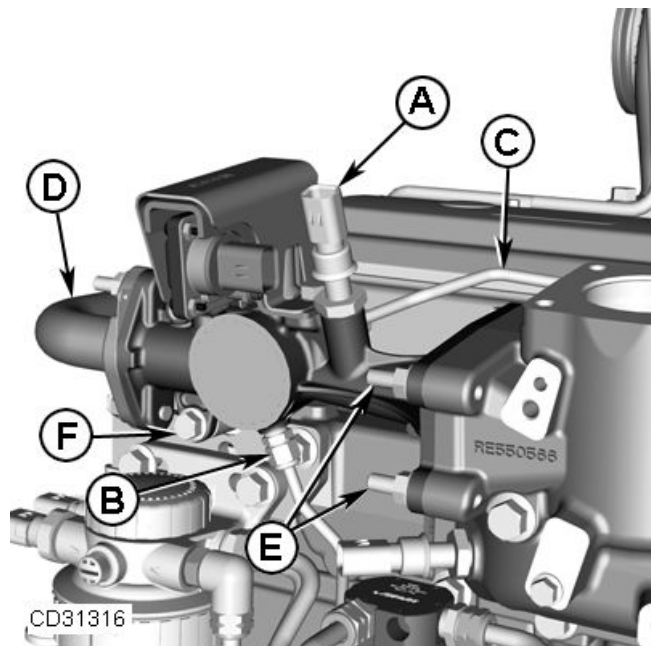
Coolant Return Line
(Both Ends)—Torque..... 13 N·m (10 lb.-ft.)

10. Perform: EGR Temperature Sensor (M) — Installation.

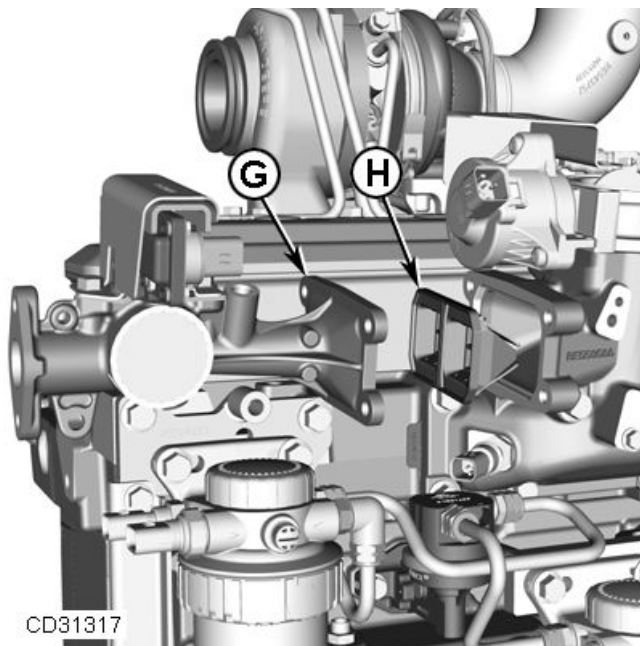
11. Reconnect wiring harness.

12. Refill engine with coolant then bleed the cooling system.

CD03523,0000315 -19-09AUG11-1/1

EGR Flow Venturi Assembly (PVX Engine) — Removal

Remove EGR Flow Venturi



Remove Reed Valve

A—EGR Temperature Sensor
B—Coolant Supply Line
C—Coolant Return Line
D—EGR Valve Outlet Tube

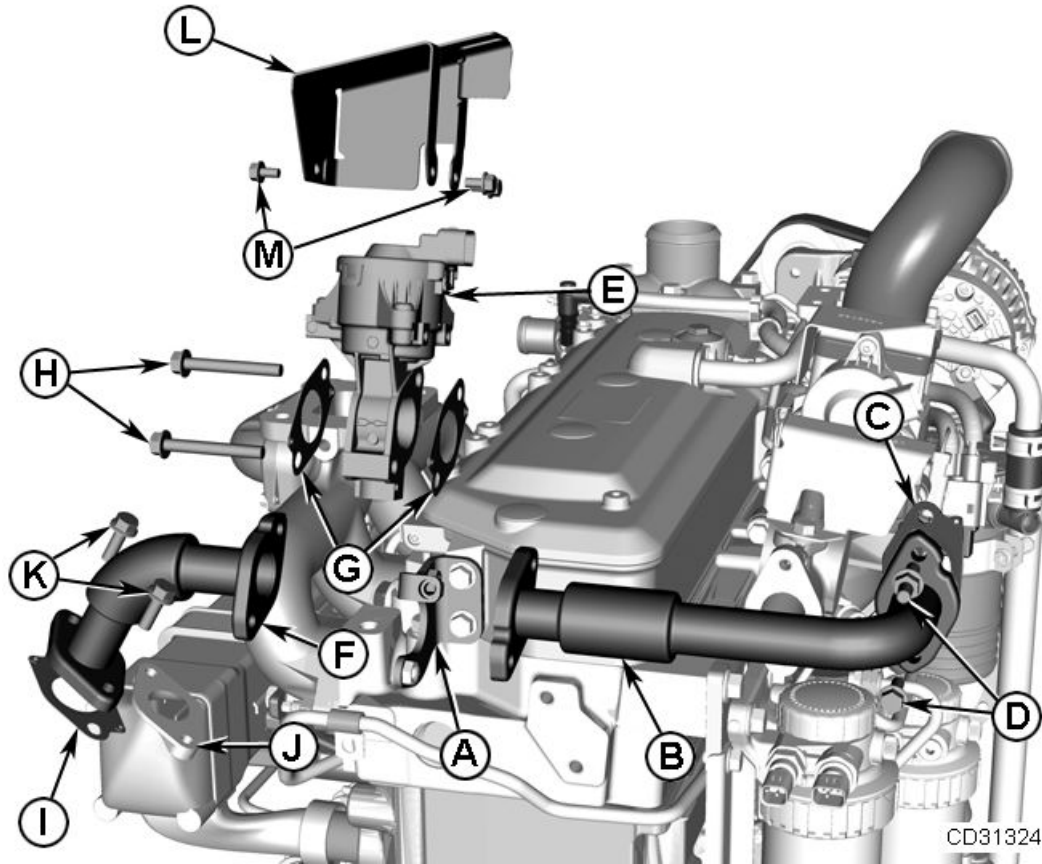
E—Cap Screw or Stud
F—Cap Screw
G—EGR Flow Venturi Assembly
H—Reed Valve

NOTE: For a clarity purpose, some components, like the air throttle actuator, are not shown on the picture.

1. Let engine to cool down then drain coolant.
2. Disconnect wiring harness portion as needed.
3. Perform: EGR Temperature Sensor (A) — Removal.
4. Remove coolant supply line (B).
5. Remove coolant return line (C).
6. Remove EGR valve outlet tube (D).
7. Remove cap screws or studs (E) holding venturi to intake manifold.
8. Remove cap screw (F) holding venturi to fuel filter bracket.
9. Separate EGR flow venturi assembly (G) from intake manifold.
10. Remove the reed valve (H) from intake manifold.
11. Perform: Reed Valve — Inspection.

CD03523,0000314 -19-09AUG11-1/1

EGR Valve — Installation



EGR Valve Installation

A—EGR Valve Bracket
B—Venturi Inlet Pipe
C—Gasket

D—Cap screw and stud
E—EGR Valve
F—EGR Pipe
G—Gaskets

H—Cap Screw
I—Gasket
J—EGR Cooler
K—Cap Screws

L—Heat Shield
M—Cap Screws (3)

Consumable Material:

- Gasket (4) - EGR Valve - EGR Pipes

NOTE: For a clarity purpose, some components, like the turbocharger, are not shown on the picture.

1. If removed, install the EGR valve bracket (A). Tighten cap screws to specification.

Specification

EGR Valve Bracket-to-Engine—Torque..... 35 N·m (26 lb.-ft.)

2. If removed, install the venturi inlet pipe (B) with a new gasket (C). Install cap screw and stud (D). Do not tighten at this stage.
3. Assemble EGR valve (E) and EGR pipe (F) to bracket, using two new gaskets (G). Install cap screws (H). Do not tighten at this stage.
4. Install new gasket (I) between EGR pipe and EGR cooler (J). Tighten cap screws (K) to specification.

Specification

EGR Pipe-to-EGR Cooler—Torque..... 35 N·m (26 lb.-ft.)

5. Tighten cap screw and stud (D) to specification.

Specification

Venturi Inlet Pipe-to-Venturi—Torque..... 35 N·m (26 lb.-ft.)

6. Tighten cap screws (H) to specification.

Specification

EGR Valve-to-Bracket—Torque..... 35 N·m (26 lb.-ft.)

7. Install heat shield (L) over the EGR valve. Tighten cap screws (M) to specification.

Specification

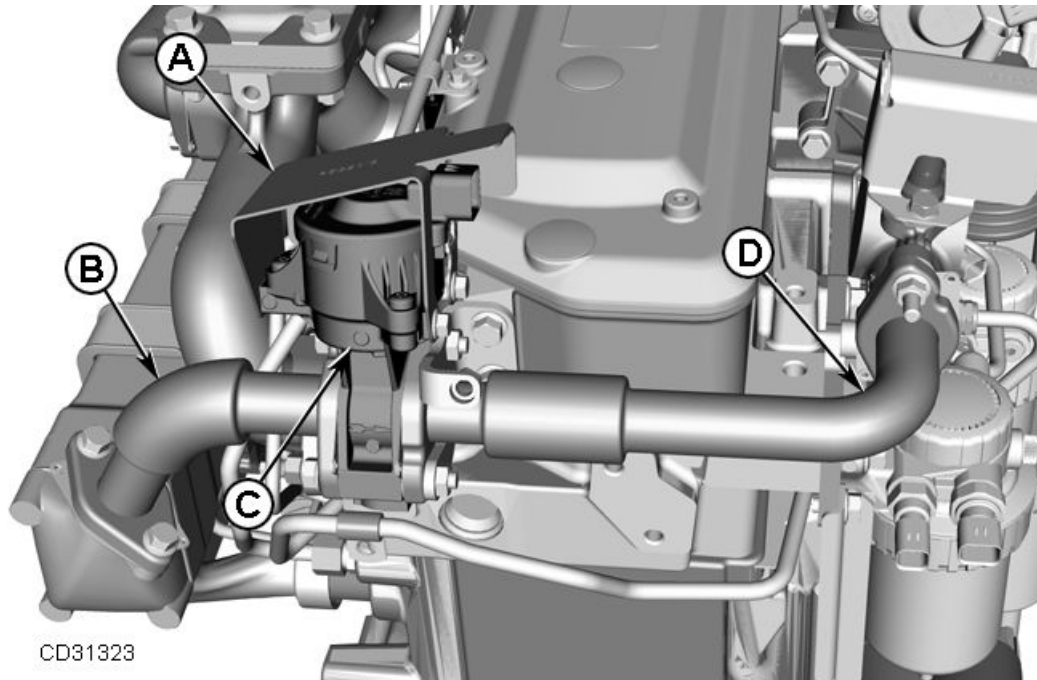
Heat Shield-to-EGR Valve—Torque..... 15 N·m (11 lb.-ft.).

8. Reconnect wiring harness.

IMPORTANT: After installation of new EGR valve only, calibrate the EGR valve using **Service ADVISOR**.

CD03523,0000317 -19-18APR11-1/1

EGR Valve — Removal



Remove EGR Valve

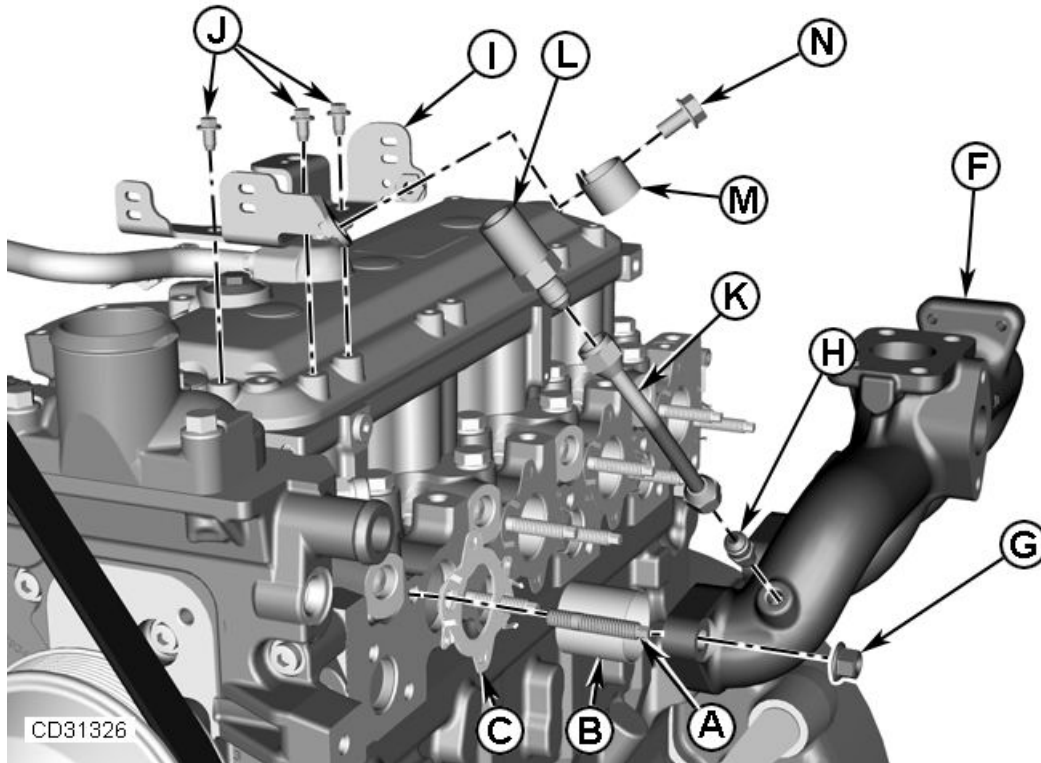
A—Heat Shield
B—EGR Cooler to EGR Valve Pipe
C—EGR Valve
D—EGR Valve to Venturi Pipe

1. Disconnect wiring harness portion as needed.
2. Remove heat shield (A).
3. Remove pipe (B) between EGR cooler and EGR valve.
4. Remove EGR valve (C).
5. If necessary, remove pipe (D) between EGR valve and venturi or air intake housing.

CD03523,0000316 -19-15APR11-1/1

CD31323 —UN—18APR11

Exhaust Manifold — Installation



Install Exhaust Manifold

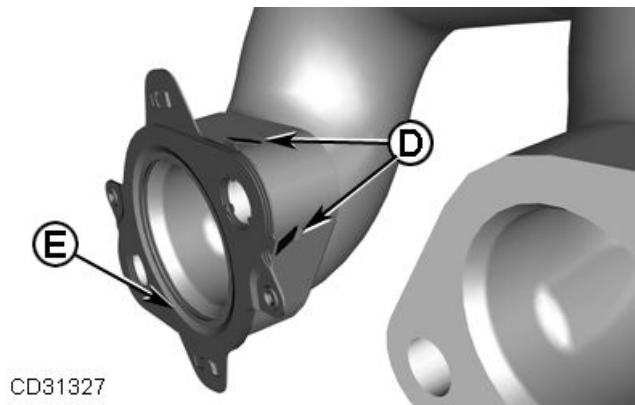
- | | | | |
|------------------------|-------------------|------------------------------|--------------|
| A— Stud | G— Nut | K— Exhaust Manifold Pressure | M— Clamp |
| B— Exhaust Port Sleeve | H— Fitting | Sensor Line | N— Cap screw |
| C— Gasket | I— Sensor Bracket | L— Sensor | |
| F— Exhaust Manifold | J— Cap screws | | |

BL90236,0000284 -19-16JUL12-1/3

CD31326 —UN—20APR11

D— Gasket Tabs

E— Gasket Dimpled Side



CD31327

Install Exhaust Manifold Gaskets

Continued on next page

BL90236,0000284 -19-16JUL12-2/3

CD31327 —UN—20APR11

NOTE: For a clarity purpose, some unrelated components are not shown on the picture.

Consumable Material:

- Exhaust manifold gaskets
- Nuts
- Studs (if removed)

NOTE: Studs are moly-disulfide coated. Additional use of anti-seize is not required.

1. If studs (A) have been removed, install new studs then tighten to specification.

Specification

Exhaust Manifold
Studs-to-Cylinder
Head—Torque..... 25 N·m (18 lb.-ft.)

2. Install exhaust port sleeve (B) and new gaskets (C) as shown.

NOTE: For gaskets without tabs (D), install gasket with the dimpled side (E) towards cylinder head.

3. Install exhaust manifold (F) on studs.

NOTE: Insure exhaust manifold is evenly contacting the cylinder head. Support the exhaust manifold while performing initial torque on nuts 1,2,3 and 4. Failure to support exhaust manifold during initial torque will result in under torquing.

NOTE: Nuts are moly-disulfide coated. Additional use of anti-seize is not required.

4. Install new nuts (G) then tighten two times to specification in sequence shown.

Specification

Exhaust Manifold-to-
Cylinder Head (First
Pass)—Torque..... 15 N·m (11 lb.-ft.)
Exhaust Manifold-to-
Cylinder Head (Second
Pass)—Torque..... 50 N·m (37 lb.-ft.)

5. Install fitting (H) into exhaust manifold then tighten to specification.



CD31328

Tightening Sequence (2X)

Specification

Exhaust Gas Pressure
Sensor Fitting-to-Exhaust
Manifold—Torque..... 25 N·m (18 lb.-ft.)

6. If removed, install sensor bracket (I) on rocker arm cover. Tighten cap screws (J) to specification.

Specification

Sensor Bracket-
to-Rocker Arm
Cover—Torque..... 15 N·m (11 lb.-ft.)

7. Install exhaust manifold pressure sensor line (K), sensor (L), and clamp (M).
8. Install cap screw (N) holding sensor line to bracket. Tighten to specification.

Specification

Sensor Line-to-
Bracket—Torque..... 25 N·m (18 lb.-ft.)

9. Tighten both ends of sensor line (K) to specification.

Specification

Sensor Line (Both
Ends)—Torque..... 20 N·m (15 lb.-ft.)

10. Depending on application, perform either: VGT Turbocharger Assembly — Installation, or Wastegate Turbocharger Assembly — Installation.
11. On PWX engine, perform: Exhaust Throttle Assembly — Installation.
12. Perform: EGR Cooler — Installation.

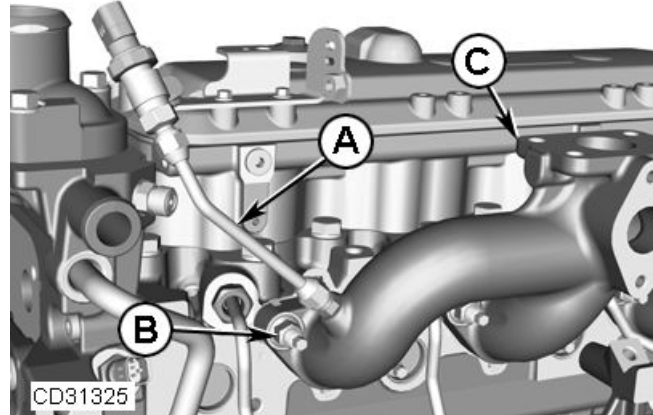
BL90236,0000284 -19-16JUL12-3/3

CD31328 —UN—20APR11

Exhaust Manifold — Removal

NOTE: For a clarity purpose, some unrelated components are not shown on the picture.

1. Let engine to cool down, then drain coolant.
2. Disconnect wiring harness portion as needed.
3. Perform: EGR Cooler — Removal.
4. On PWX engine, perform: Exhaust Throttle Assembly — Removal.
5. Depending on application, perform either: VGT Turbocharger Assembly — Removal; or Wastegate Turbocharger Assembly — Removal.
6. Remove exhaust manifold pressure sensor line (A).
7. Remove nuts (B).
8. Remove exhaust manifold (C).



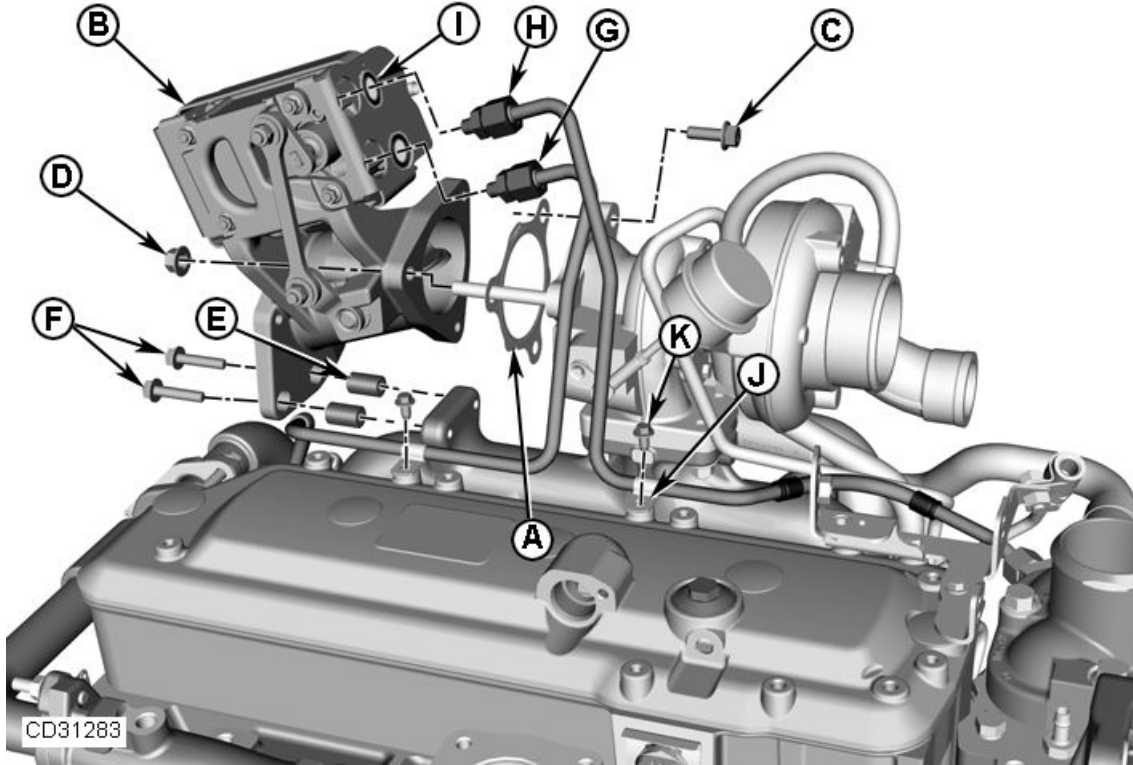
Remove Exhaust Manifold

A—Exhaust Manifold Pressure Sensor Line C—Exhaust Manifold
B—Nut

CD31325 —UN—20APR11

BL90236,0000285 -19-04MAY12-1/1

Exhaust Throttle Assembly with Flat Flange (PWX Engine) — Installation



Exhaust Throttle Assembly Installation

- | | | | |
|-----------------------------|-----------------------|-----------------------|-------------|
| A—Gasket | D—Nut | H—Coolant Return Line | K—Cap Screw |
| B—Exhaust Throttle Assembly | E—Bushings | I—O-rings | |
| C—Cap Screws | F—Cap Screws | J—Clamp | |
| | G—Coolant Supply Line | | |

Consumable Material:

- Gasket — Between turbocharger and exhaust throttle
- O-rings — Coolant supply and return lines

1. Place a new gasket (A) over the turbocharger stud, then install the exhaust throttle assembly (B) with cap screws (C) and nut (D).

2. Install bushings (E) through exhaust throttle flange. Install cap screws (F) then tighten to specification.

Specification

Exhaust Throttle Flange
Cap Screws-to-Exhaust
Manifold—Torque..... 37 N·m (27 lb.-ft.)

3. Tighten cap screws (C) and nut (D). Torque to specification.

Specification

Exhaust Throttle-to-
Turbocharger—Torque..... 70 N·m (52 lb.-ft.)

4. Install coolant supply (G) and return (H) lines with new O-rings (I). Tighten coolant line nuts to specification.

Specification

Coolant Line
Nuts-to-Exhaust Throttle
Actuator—Torque..... 23 N·m (17 lb.-ft.)

5. Attach coolant supply and return lines to rocker arm cover with clamps (J). Tighten cap screws (K) to specification.

Specification

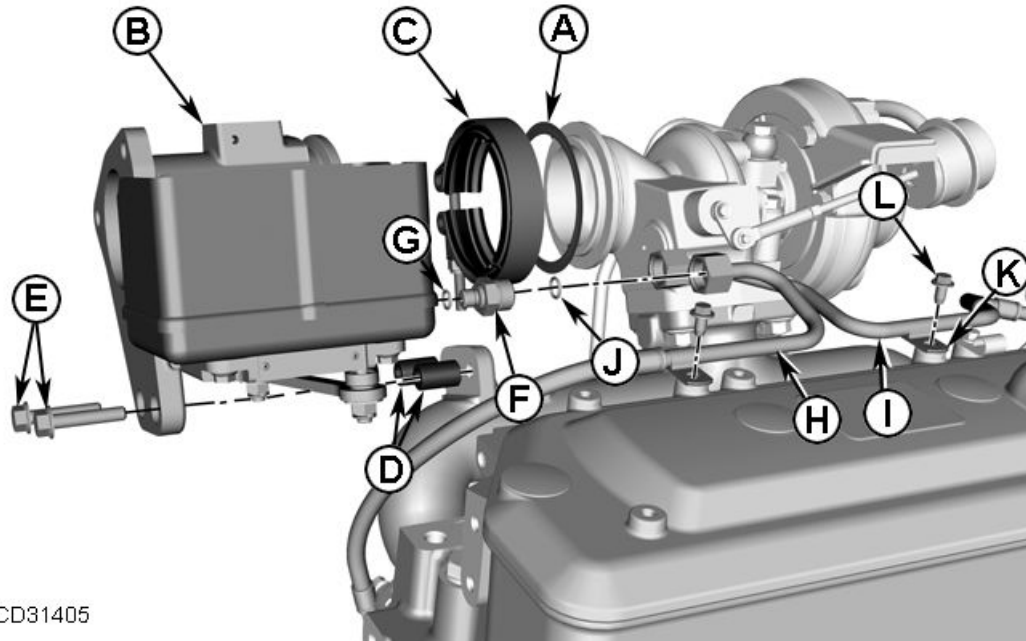
Coolant Line
Clamps-to-Rocker Arm
Cover—Torque..... 15 N·m (11 lb.-ft.)

6. Refill engine with coolant and bleed the cooling system.

CAUTION: When power to the actuator is “on”, **BE CERTAIN to keep fingers clear of linkage when performing diagnostic checks. The linkage actuates quickly and fingers can be pinched.**

7. Only perform if actuator, linkage, or exhaust throttle have been replaced.
Reconnect wiring harness then reset exhaust throttle actuator using Service ADVISOR. In Service ADVISOR, Perform VGT or Exhaust throttle learned value reset. See [VGT or Exhaust Throttle — Learn Value Reset Instructions](#)

Exhaust Throttle Assembly with V-Band Clamp (PWX Engine) — Installation



CD31405

Exhaust Throttle Assembly Installation (with V-Band Clamp)

A—Gasket	D—Bushings	G—O-rings	J— O-rings
B—Exhaust Throttle Assembly	E—Cap Screws	H—Coolant Supply Line	K—Clamp
C—V-Band Clamp	F—Coolant Line Fittings	I— Coolant Return Line	L— Cap Screw

Consumable Material:

- Gasket — Between turbocharger and exhaust throttle
- O-rings — Coolant supply and return lines
- V-band clamp

1. Place a new gasket (A) over the pilot boss on turbocharger, regardless the orientation.
2. Install the exhaust throttle assembly (B). Attach a new V-band clamp (C) and pre-tighten the nut to specification.

Specification

Exhaust Throttle
Assembly-to-
Turbocharger, V-band
clamp—Pre-Torque..... 5 N·m (44 lb.-in.)

3. Orient exhaust throttle assembly and install bushings (D) and cap screws (E). Tighten to specification.

Specification

Exhaust Throttle
Assembly-to-Exhaust
Manifold—Torque..... 37 N·m (27 lb.-ft.)

4. Tighten the clamp nut to final torque.

Specification

Exhaust Throttle
Assembly-to-
Turbocharger, V-band
clamp—Final Torque..... 20 N·m (15 lb.-ft.)

5. Install coolant and return line fittings (F) with new O-rings (G). Tighten to specification.

Specification

Coolant Supply and
Return line Fittings-
to-Exhaust Throttle
Actuator—Torque..... 24 N·m (18 lb.-ft.)

6. Install coolant supply (H) and return (I) lines with new O-rings (J). Tighten coolant line nuts to specification.

Specification

Coolant Line Nuts-to-
Exhaust Throttle Actuator
Fittings—Torque..... 23 N·m (17 lb.-ft.)

7. Attach coolant supply and return lines to rocker arm cover with clamps (K). Tighten cap screws (L) to specification.

Specification

Coolant Line
Clamps-to-Rocker Arm
Cover—Torque..... 15 N·m (11 lb.-ft.)

8. Refill engine with coolant and bleed the cooling system.

CAUTION: When power to the actuator is “on”, **BE CERTAIN** to keep fingers clear of linkage when performing diagnostic checks. The linkage actuates quickly and fingers can be pinched.

Continued on next page

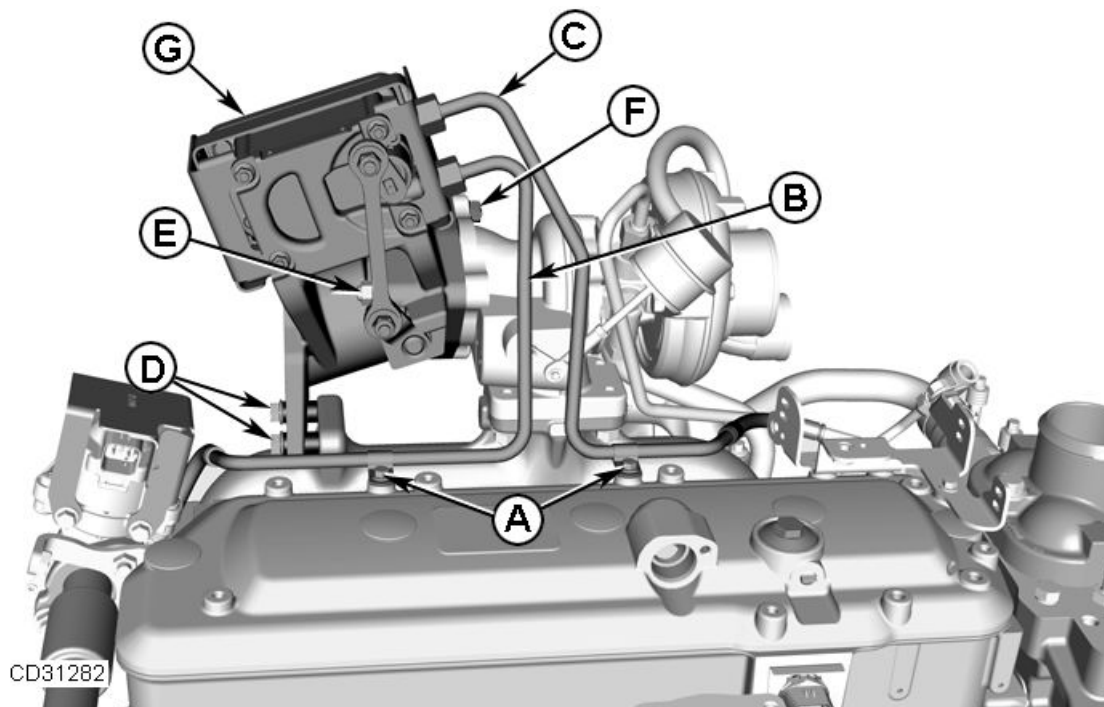
CD03523.000037F -19-09AUG12-1/2

9. Only perform if actuator, linkage, or exhaust throttle have been replaced.
Reconnect wiring harness then reset exhaust throttle actuator using Service ADVISOR. In Service

ADVISOR, Perform VGT or Exhaust throttle learned value reset. See [VGT](#) or [Exhaust Throttle — Learn Value Reset Instructions](#)

CD03523,000037F -19-09AUG12-2/2

Exhaust Throttle Assembly with Flat Flange (PWX Engine) — Removal



Remove Exhaust Throttle Assembly

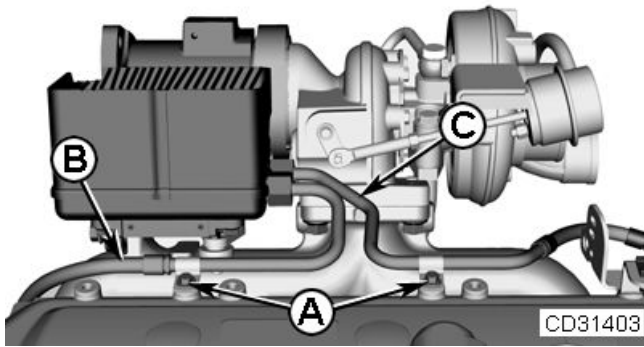
- | | | |
|-----------------------|---------------------------|-----------------------------|
| A—Cap Screws | C—Coolant Return Line | E—Nut |
| B—Coolant Supply Line | D—Cap screws and Bushings | F—Cap Screw |
| | | G—Exhaust Throttle Assembly |

CAUTION: Disconnect the actuator wiring harness before performing any work. Linkage can move quickly when accidentally activated.

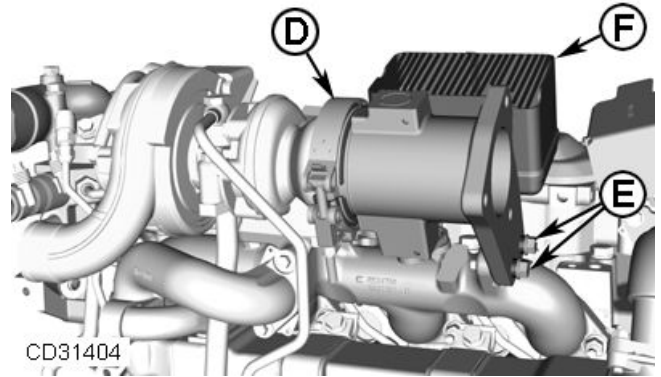
- Let engine to cool down then drain coolant.
- Disconnect wiring harness portion as needed.
- Remove cap screws (A) holding coolant lines on rocker arm cover.
- Disconnect coolant supply line (B) using back-up wrench.
- Disconnect coolant return line (C) using back-up wrench.
- Remove cap screws and bushings (D).
- Remove nut (E) and cap screws (F).
- Remove the exhaust throttle assembly (G).

BL90236,0000303 -19-06AUG12-1/1

Exhaust Throttle Assembly with V-Band Clamp (PWX Engine) — Removal



Remove Exhaust Throttle Assembly (V-Band Clamp)



A—Cap Screws
B—Coolant Supply Line

C—Coolant Return Line
D—V-Band Clamp

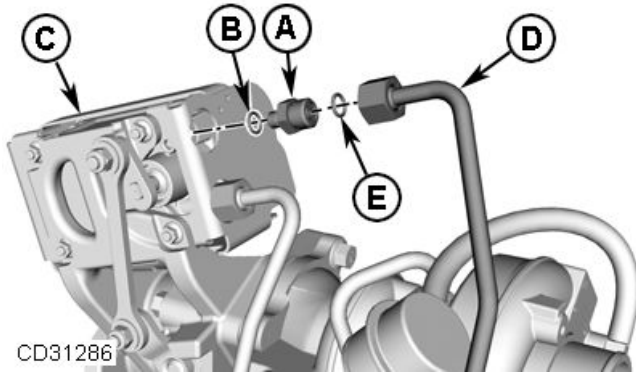
E—Cap Screws and Bushings
F—Exhaust Throttle Assembly

CAUTION: Disconnect the actuator wiring harness before performing any work. Linkage can move quickly when accidentally activated.

1. Let engine to cool down then drain coolant.
2. Disconnect wiring harness portion as needed.
3. Remove cap screws (A) holding coolant lines on rocker arm cover.
4. Disconnect coolant supply line (B) using back-up wrench.
5. Disconnect coolant return line (C) using back-up wrench.
6. Remove V-band clamp (D).
7. Remove cap screws and bushings (E).
8. Remove the exhaust throttle assembly (F).

CD03523,000037E -19-06AUG12-1/1

Exhaust Throttle Actuator Coolant Return Line — Installation



Connect Coolant Return Line to Actuator

- A—Adapter Fitting** **D—Coolant Return Line**
B—O-ring **E—O-ring**
C—Exhaust Throttle Actuator **F—Adapter Fitting**

1. Install adapter fitting (A) with new O-ring (B) into exhaust throttle actuator (C). Tighten to specification.

Specification

Adapter Fitting-to-
 Actuator—Torque..... 20 N·m (15 lb.-ft.)

2. Connect coolant return line (D) with the new O-ring (E). Use a thin back-up wrench on the actuator adapter fitting (A) to hold in place while tightening the coolant return line (D). Tighten to specification.

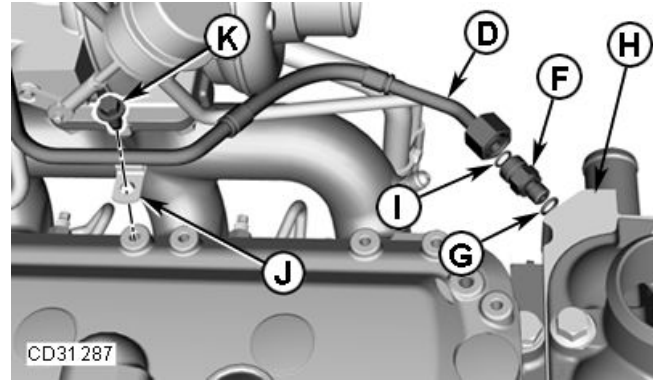
Specification

Coolant Return
 Line-to-Adapter
 Fitting—Torque..... 23 N·m (17 lb.-ft.)

3. Install adapter fitting (F) with new O-ring (G) into thermostat housing (H). Tighten to specification.

Specification

Adapter Fitting-
 to-Thermostat
 Housing—Torque..... 20 N·m (15 lb.-ft.)



Connect Coolant Return Line to Thermostat Housing

- G—O-ring** **K—Cap Screw**
H—Thermostat Housing
I—O-ring
J—Clamp

4. Connect coolant return line (D) with new O-ring (I). Tighten to specification.

Specification

Coolant Return
 Line-to-Adapter
 Fitting—Torque..... 23 N·m (17 lb.-ft.)

5. Attach coolant return line to rocker arm cover with clamp (J) and cap screw (K). Tighten to specification.

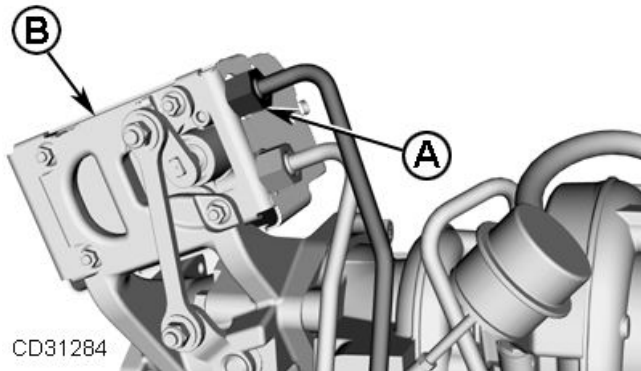
Specification

Coolant Return Line
 Clamp-to-Rocker Arm
 Cover—Torque..... 15 N·m (11 lb.-ft.)

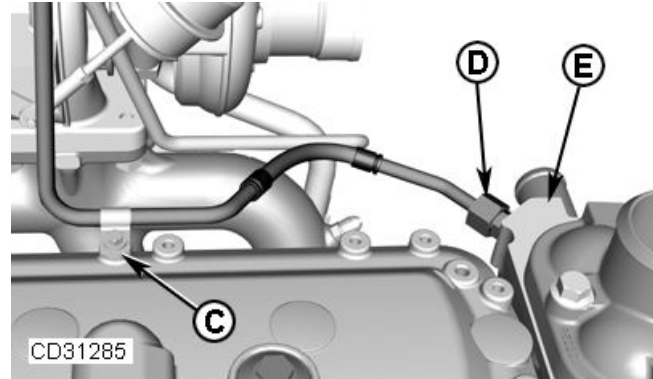
6. Refill engine with coolant then bleed the cooling system.

BL90236,0000304 -19-08MAY12-1/1

Exhaust Throttle Actuator Coolant Return Line — Removal



Remove Coolant Return Line from Actuator



Remove Coolant Return Line from Thermostat Housing

A—Coolant Return Line Nut
B—Exhaust Throttle Actuator
C—Clamp
D—Coolant Return Line Nut

E—Thermostat Housing

1. Let engine to cool down then drain coolant.
2. Loosen nut (A) and disconnect coolant return line from actuator. Use a thin back-up wrench on the actuator fitting to allow removal of nut (A).
3. Remove clamp (C) holding coolant line to rocker arm cover.
4. Loosen nut (D) and disconnect the coolant return line from the thermostat housing (E).

BL90236,0000305 -19-08MAY12-1/1

Exhaust Throttle Actuator Coolant Supply Line — Installation

NOTE: For a clarity purpose, some components, like EGR System, are not shown on the pictures.

1. Install adapter fitting (A) with new O-ring (B) into exhaust throttle actuator (C). Tighten to specification.

Specification

Adapter fitting-to-
Actuator—Torque..... 20 N·m (15 lb.-ft.)

2. Connect coolant supply line (D) with new O-ring (E). Tighten to specification.

Specification

Coolant Supply
Line-to-Adapter
Fitting—Torque..... 23 N·m (17 lb.-ft.)

3. Install adapter fitting (F) with new O-ring (G) into cylinder block orifice. Tighten to specification.

Specification

Adapter Fitting-to-
Cylinder Block—Torque..... 20 N·m (15 lb.-ft.)

4. Connect coolant supply line (D) with new O-ring (H). Tighten to specification.

Specification

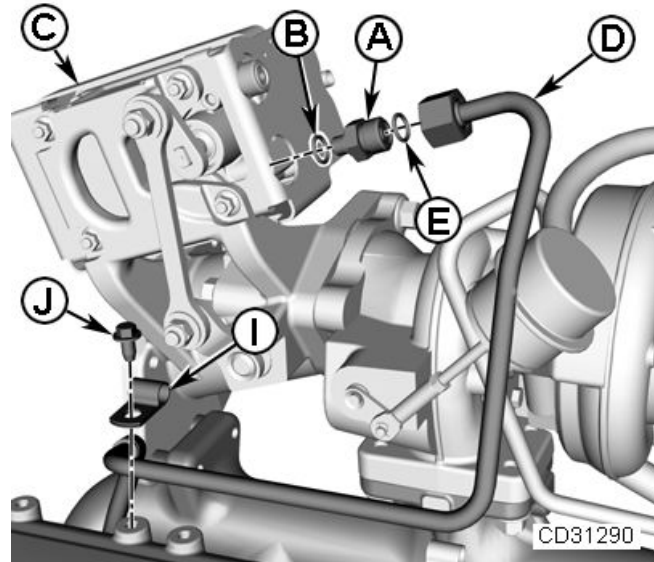
Coolant Supply
Line-to-Adapter
Fitting—Torque..... 23 N·m (17 lb.-ft.)

5. Attach coolant supply line to rocker arm cover with clamp (I) and cap screw (J). Tighten to specification.

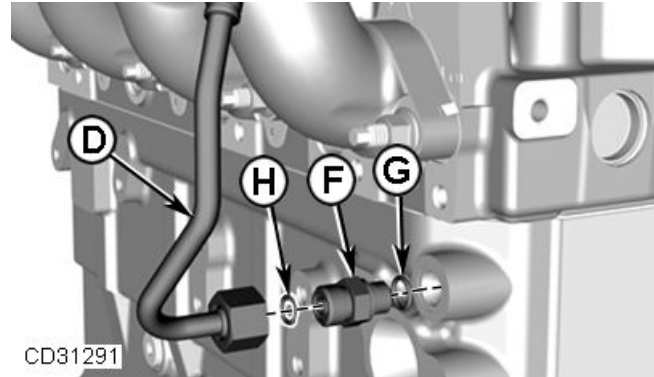
Specification

Coolant Supply Line
Clamp-to-Rocker Arm
Cover—Torque..... 15 N·m (11 lb.-ft.)

6. Refill engine with coolant then bleed the cooling system.



Connect Coolant Supply Line to Actuator



Connect Coolant Supply Line to Cylinder Block

A—Adapter Fitting
B—O-ring
C—Exhaust Throttle Actuator
D—Coolant Supply Line
E—O-ring

F—Adapter Fitting
G—O-ring
H—O-ring
I— Clamp
J— Cap Screw

BL90236,0000306 -19-08MAY12-1/1

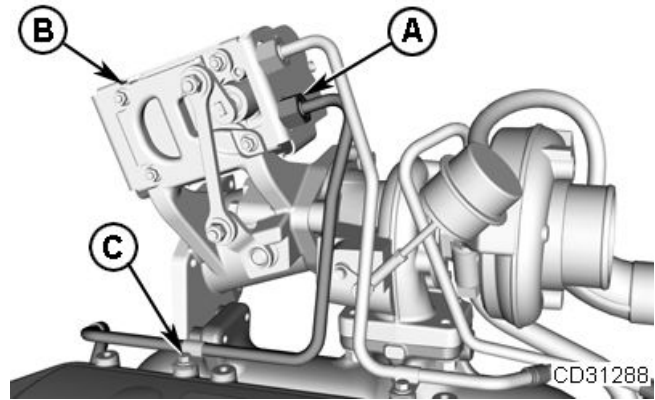
Exhaust Throttle Actuator Coolant Supply Line — Removal

NOTE: For a clarity purpose, some components, like EGR System, are not shown on the pictures.

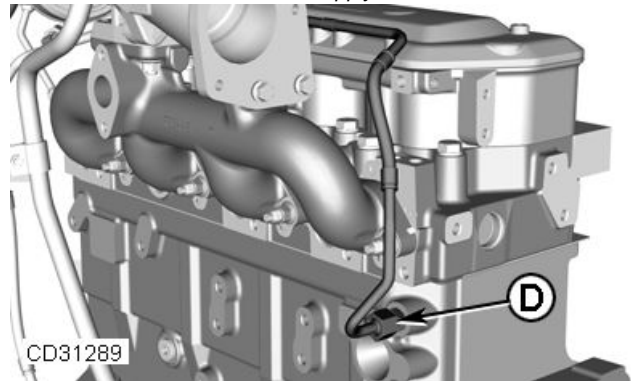
1. Let engine to cool down then drain coolant.
2. Loosen nut (A) and disconnect coolant supply line from actuator (B).
3. Remove clamp (C) holding coolant line to rocker arm cover.
4. Loosen nut (D) and disconnect coolant supply line from cylinder block.

A—Coolant Supply Line Nut
B—Exhaust Throttle Actuator

C—Clamp
D—Coolant Supply Line Nut



Remove Coolant Supply Line from Actuator



Remove Coolant Supply Line from Cylinder Block

BL90236,0000307 -19-08MAY12-1/1

CD31288 —UN—28MAR11

CD31289 —UN—28MAR11

Extending Turbocharger Life

IMPORTANT: In the event of a turbocharger failure, be certain to check the air intake system (including the charge air cooler and piping) for residual oil and, if oil is present, clean thoroughly. If this step is not done, the engine will burn the residual oil following turbocharger replacement. This will result in major engine failure.

The major causes of turbocharger failures are:

- Lack of Lube Oil (Quick Starts and Hot Shutdowns)
- Oil Contamination
- Ingestion of Foreign Objects
- Restricted Oil Drainage
- Low Oil Level
- Operation on Excessive Side Slopes
- Abnormally High Exhaust Temperatures
- Oil in charge air cooler

Lack of Lube Oil

Oil not only lubricates the turbocharger's spinning shaft and bearings, it also carries away heat. When oil flow stops or is reduced, heat is immediately transferred from the hot turbine wheel to the bearings, which are also heating up because of the increased friction due to the lack of oil. This combination causes the turbocharger shaft temperature to increase rapidly.

If oil flow does not increase and the process continues, bearings will fail. Once the bearings fail (which can happen in just seconds) seals, shaft, turbine and compressor wheels can also be damaged.

The principle causes of turbocharger bearing lubrication problems are low oil pressure, a bent, plugged or undersized oil lube supply line, plugged or restricted oil galleries in the turbocharger, or improper machine start-up and shutdown procedure.

Oil levels and pressure should always be closely monitored and all worn hoses and lines should be replaced. The turbocharger oil supply line should be checked frequently to make sure it is not kinked or bent and it should always be replaced with a line of equal size, length and strength.

The easiest way to damage a turbocharger is through improper start-up and shutdown procedures. Always idle the engine for at least 30 seconds (no load) after start-up and before shutdown. Warming the engine up before applying a load allows oil pressure to build up and lines to fill with oil.

Idling the engine before shutdown allows the engine and turbocharger to cool. "Hot" shutdowns can cause the turbocharger to fail because after high-speed operation the turbocharger will continue to rotate long after the engine has been shut off and oil pressure has dropped to zero. This will cause heat to build up and possibly damage bearings. It can also cause carbon and varnish deposits to form.

Oil Contamination

Oil contamination can be caused by a worn or damaged oil filter or not changing the lube oil at recommended intervals. Expecting the oil filter to remove dirt, sand, metal chips, etc. from the oil before they reach the engine or turbocharger can be a costly mistake because contaminated oil may completely bypass the engine oil filter if the oil filter or oil cooler is clogged, if the filter element is improperly installed, or if the oil is thick during cold weather.

Four good ways of avoiding oil contamination are:

- Always inspect the engine thoroughly during major overhaul. Look especially for any sludge or debris left in lube oil galleries.
- Change lube oil at recommended intervals. Analysis of oil samples at filter change periods can help identify potentially harmful contaminants in the oil.
- Clean the area around the oil fill cap before adding oil.
- Use a clean container when adding oil.

Ingestion of Foreign Objects

Foreign particles can be ingested and cause damage to the turbocharger on both compressor and turbine sides. This is easy to avoid.

On the compressor side, foreign objects usually take the form of dust, sand, or shreds of air cleaner element that enter through improperly installed air cleaner elements. Leaky air inlet piping (loose clamps or torn rubber joints) or torn pleats in dry-type air cleaner elements also create problems.

The result is erosion of compressor blades that can cause the delicately balanced wheel to wobble.

IMPORTANT: Whenever an internal engine failure (valve, valve seat, piston) occurs, a thorough inspection of the turbocharger MUST BE performed before returning engine to service.

Restricted Oil Drainage

The lubricating oil carries away heat generated by friction of the bearings and from the hot exhaust gases. If drainage back to the sump is impeded, the bearings will overheat with damage that will ultimately lead to failure.

There are two primary reasons for restricted drainage. A blocked drain tube, due to either damage or a buildup of sludged oil, or high crankcase pressure, which can be due to restricted crankcase breather or excessive engine blow-by.

Abnormally High Exhaust Temperatures

Elevated exhaust temperatures cause coking of oil which can lead to bearing failure. Extreme over-temperature operation can cause wheel burst.

There are two basic causes of over-temperature. The first is restricted air flow and the second is overpowering the engine. In either case the engine has more fuel than available air for proper combustion; this over fueled condition leads to elevated exhaust temperatures.

Causes of restricted air flow can include damaged inlet piping, clogged air filters, excessive exhaust restriction, or operation at extreme altitudes. Overpowering generally is due to improper fuel delivery or injection timing. If over temperature operation has been identified, an inspection of the air inlet and exhaust systems should be performed. Also, check the fuel delivery and timing.

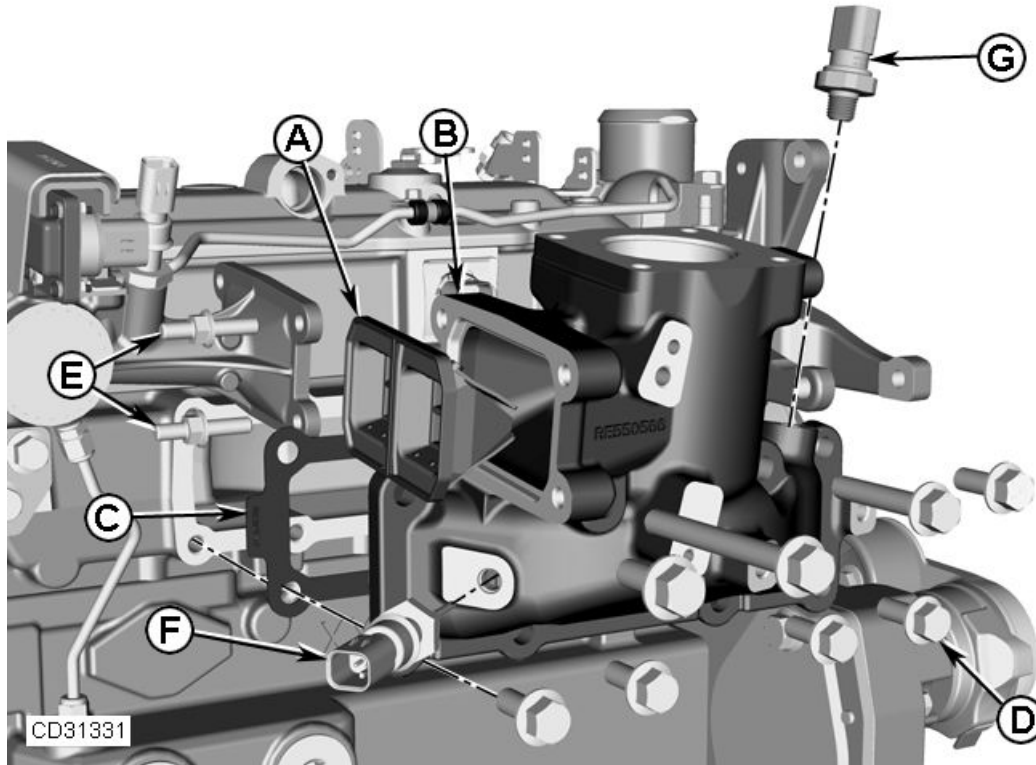
Oil in Charge Air Cooler

A failed turbocharger can allow oil to enter the charge air cooler. If the charge air cooler is not cleaned out and the

engine is restarted, this oil that has collected within will be ingested into the engine causing an over speed situation which will result in engine damage. Because of the proven possibility of such an over speed situation, anytime there has been a turbocharger failure, it is necessary to make certain that the charge air cooler lines or hoses have been thoroughly cleaned out. For cleaning the charge air cooler use John Deere coolant system cleaner PMCC2638 or equivalent, as per the instructions. After cleaning the charge air cooler use compressed air to completely dry the inside of the charge air cooler.

BL90236,0000286 -19-04MAY12-2/2

Intake Manifold (PVX Engine) — Installation



Install Intake Manifold

A—Reed Valve
B—Intake Manifold
C—Gasket

D—Cap Screws (8)
E—Cap Screws and Studs

F—Manifold Air Temperature (MAT) Sensor
G—Manifold Air Pressure (MAP) Sensor

Consumable Material:

- Intake Manifold Gasket

NOTE: For a clarity purpose, some unrelated components are not shown on the picture.

- Using soapy water, install the reed valve (A) into intake manifold housing (B).
- Install intake manifold with a new gasket (C).
- install the eight cap screws (D). Do not tighten at this stage.
- Install cap screws and studs (E) holding the venturi to intake manifold. Tighten to specification.

Specification

Venturi-to-Intake
Manifold—Torque..... 35 N·m (26 lb.-ft.)

- Tighten cap screws (D) to specification.

Specification

Intake Manifold-to-
Engine—Torque..... 73 N·m (54 lb.-ft.)

- If removed, install manifold air temperature sensor (F). Tighten to specification.

Specification

Manifold Air Temperature
Sensor—Torque..... 17 N·m (12 lb.-ft.)

- If removed, install manifold air pressure sensor (G). Tighten to specification.

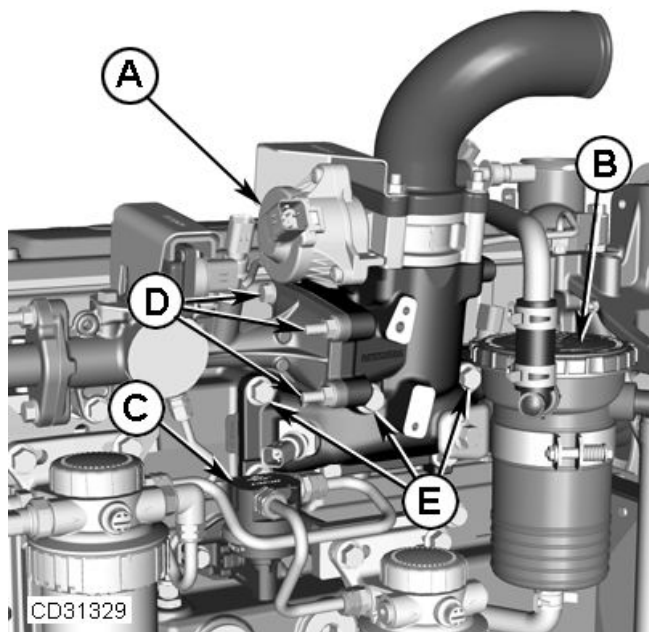
Specification

Manifold Air Pressure
Sensor—Torque..... 18 N·m (13 lb.-ft.)

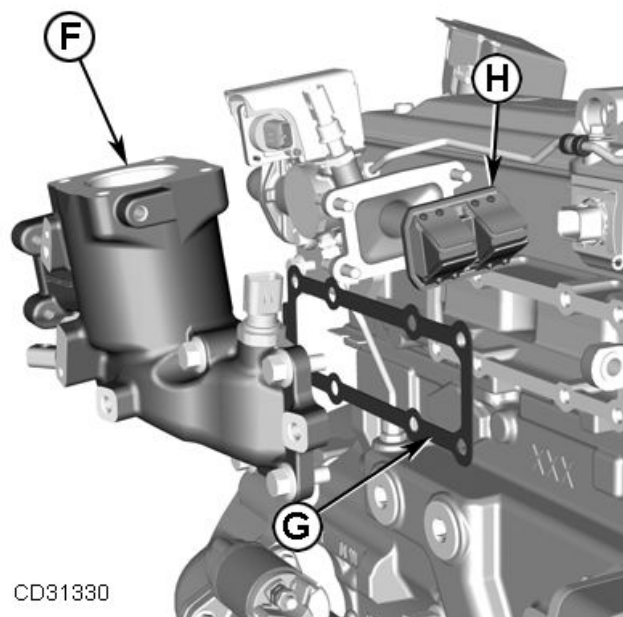
- If needed, perform: Low-Pressure Fuel Pump — Installation.
- Perform: Open Crankcase Vent System — Installation.
- Perform: Air Throttle Actuator — Installation
- Reconnect wiring harness.
- Bleed the fuel system. See Group 155 Fuel System Bleeding.

CD05019,0000016 -19-09AUG11-1/1

Intake Manifold (PVX Engine) — Removal



Remove Intake Manifold



Remove Intake Manifold

A—Air Throttle Actuator
B—Open Crankcase Vent System
C—Low-Pressure Fuel Pump
D—Cap screws and Studs

E—Cap screws (8)
F—Intake Manifold
G—Gasket

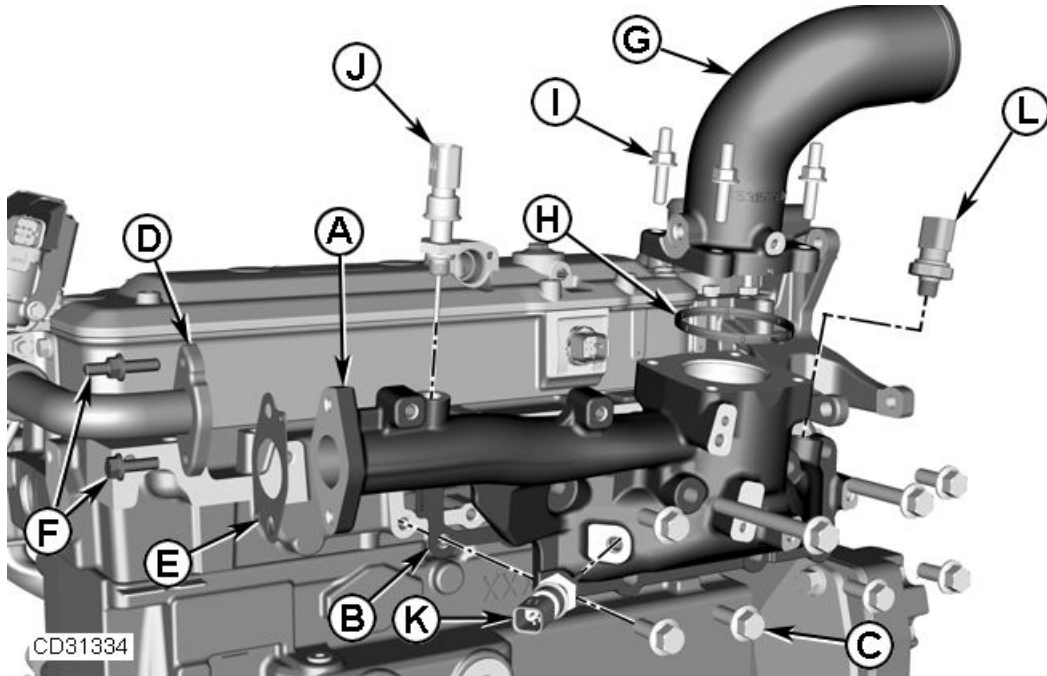
H—Reed Valve

NOTE: For a clarity purpose, some unrelated components are not shown on the picture.

1. Disconnect wiring harness portion as needed.
2. Perform: Air Throttle Actuator (A) — Removal.
3. Perform: Open Crankcase Vent System (B) — Removal.
4. If needed, perform: Low-Pressure Fuel Pump (C) — Removal.
5. Remove cap screws and studs (D) holding the venturi to intake manifold.
6. Remove the eight cap screws (E), then remove the intake manifold (F) from engine and discard the gasket (G).
7. Remove the reed valve (H) from intake manifold.
8. Perform: Reed Valve — Inspection.

CD05019,0000015 -19-09AUG11-1/1

Intake Manifold (PSX and PWX Engine) — Installation



Install Intake Manifold

A—Intake Manifold	E—Gasket	I— Stud and Nut	L— Manifold Air Pressure (MAP) Sensor
B—Gasket	F—Cap Screw and Stud	J— EGR Temperature Sensor	
C—Cap Screws (8)	G—Air Inlet Pipe	K—Manifold Air Temperature (MAT) Sensor	
D—EGR Valve Outlet Tube	H—Seal With Tab		

Consumable Material:

- Intake manifold gasket
- EGR valve outlet tube gasket
- Air inlet pipe seal

NOTE: For clarity, some components are not shown in picture.

1. Install intake manifold (A) with a new gasket (B). Tighten the eight cap screws (C) to specification.

Specification

Intake Manifold-to-Engine—Torque..... 73 N·m (54 lb.-ft.)

2. Connect the EGR valve outlet tube (D) using a new gasket (E). Tighten cap screw and stud (F) to specification.

Specification

EGR Valve Outlet Pipe-to-Intake Manifold—Torque..... 35 N·m (26 lb.-ft.)

3. Install air inlet pipe (G) using a new seal with tab (H). Tighten studs with nut (I) to specification.

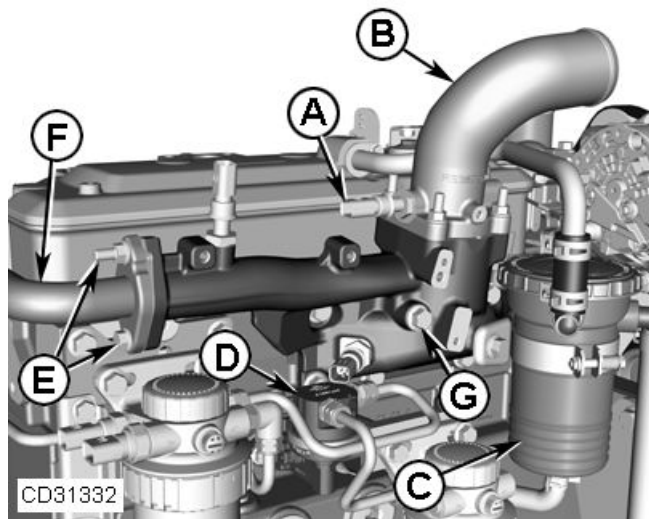
Specification

Air Inlet Pipe-to-Intake Manifold—Torque..... 25 N·m (18 lb.-ft.)

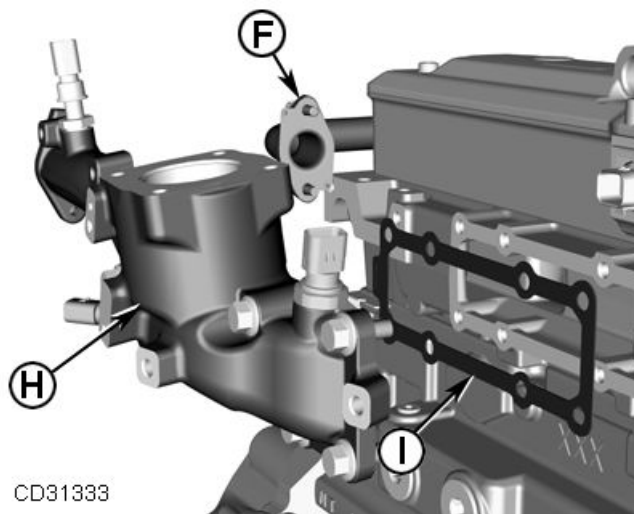
4. If removed, perform: EGR Temperature Sensor (J) — Installation.
5. If removed, perform: Manifold Air Temperature Sensor (K) — Installation.
6. If removed, perform: Manifold Air Pressure Sensor (L) — Installation.
7. If mechanical low-pressure fuel pump is used, Perform: Low-Pressure Fuel Pump — Installation.
8. Perform: Open Crankcase Vent System — Installation.
9. Reconnect wiring harness.
10. Prime the fuel system. See Group 155 Fuel System Bleeding.

CD03523,000031A -19-13JUN12-1/1

Intake Manifold (PSX and PWX Engine) — Removal



Remove Intake Manifold



Remove Intake Manifold

A—Charge Air Cooler Outlet
Temperature Sensor
B—Air Inlet Pipe

C—Open Crankcase Vent System
D—Low-Pressure Fuel Pump

E—Cap screw and Stud
F—EGR Valve Outlet Tube
G—Cap Screws (8)

H—Intake Manifold
I—Gasket

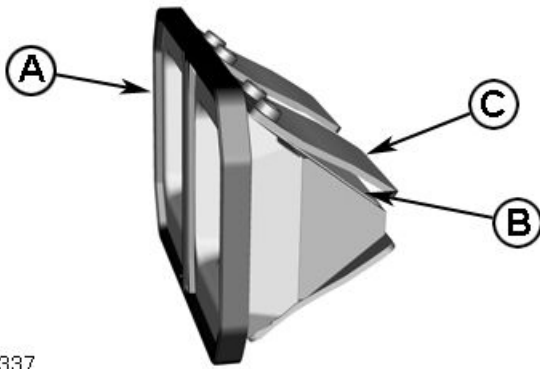
NOTE: For a clarity purpose, some unrelated components are not shown on the picture.

1. Disconnect wiring harness portion as needed.
2. Perform: Charge Air Cooler Outlet Temperature Sensor (A) — Removal.
3. Perform: Air Inlet Pipe (B) — Removal.
4. Perform: Open Crankcase Vent System (C) — Removal.

5. Perform: Low-Pressure Fuel Pump (D) — Removal.
6. Remove cap screw and stud (E) holding the EGR valve outlet tube (F) to intake manifold.
7. Remove the eight cap screws (G) holding the intake manifold to engine.
8. Remove the intake manifold (H) and discard gasket (I).

CD03523,0000319 -19-13JUN12-1/1

Reed Valve — Inspection

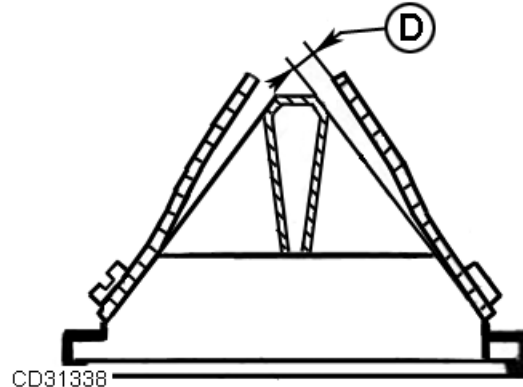


CD31337

Reed Valve

A—Rubber Seal

B—Reed
C—Reed Stop



CD31337 —JUN—28APR11

CD31338

Check Reed Stop Gap

D—Read Stop Gap

CD31338 —JUN—28APR11

NOTE: The reed valve can be accessed by removing either the EGR flow venturi or the intake manifold.

1. Depending on situation, either perform: EGR Flow Venturi Assembly (PVX Engine) — Removal; or perform: Intake Manifold (PVX Engine) — Removal.
2. Clean reed valve with a nylon or plastic brush and a solvent (for example: diesel fuel).
3. Remove debris and dry with compressed air regulated to 210 kPa (2.1 bar) (30 psi).
4. Check the rubber seal (A) for cuts, tears, or any other bad conditions.

5. Check gap (D) between reed stop (C) and housing. Compare with specification.

Specification

Reed Stop—Gap.....2.4—3.2 mm (0.094—0.126 in.)

6. Replace the reed valve if seal is damaged or if stop gap is out of specification.
7. Depending on situation, either perform: EGR Flow Venturi Assembly (PVX Engine) — Installation; or perform: Intake Manifold (PVX Engine) — Installation.

BL90236,000028B -19-29MAY12-1/1

Turbocharger — Break-In

IMPORTANT: A new or repaired turbocharger **DOES NOT** have an adequate oil supply for immediate start-up of engine. Perform the following steps to prevent damage to turbocharger bearings.

1. Remove the ECU fuse to prevent engine from starting up.

2. Crank engine over with starter for 10 seconds to allow oil to lubricate turbocharger bearings.
3. Start and run engine at slow idle while checking oil inlet and air piping connections for leaks.

CD03523,000031D -19-21JUL11-1/1

Turbocharger — Failure Analysis

The following is a guide for diagnosing the cause of turbocharger failures after removal from the engine.

NOTE: After turbocharger shaft/bearing failure has occurred it is recommended to perform:

- Engine oil and oil filter change
- Inspect the used oil for debris from the failure.
- Remove and inspect turbocharger oil drain line to ensure that debris is not lodged in the line.
- Clean the intake system (intake manifold and charge air cooler circuit).

Problem	Possible Cause	Suggested Remedy
COMPRESSOR HOUSING INLET DEFECTS		
Foreign Object Damage	Objects left in intake system.	Disassemble and inspect intake system for foreign objects. Inspect engine for internal damage.
	Leaking or defective intake system.	Inspect air intake system connections including air filter; repair as required. Inspect air intake related engine components.
Compressor Wheel Rub	Bearing failure.	Determine if engine or operator contributed to lack of lubrication, contaminated lubrication, excessive temperature, or debris generating engine failure in progress. Correct as required.
	Manufacturing defects.	Correct as required.
COMPRESSOR HOUSING OUTLET DEFECTS		
Oil or Dirt in Housing	Restricted air intake system.	Inspect and clean air cleaner.
	Prolonged periods of low rpm engine idling.	Check with operator to confirm conditions. (See Operator's Manual.)
	Defective oil seal ring.	Repair as required.
	Restricted oil drain line.	Inspect and clear oil drain line as required.
TURBINE HOUSING INLET DEFECTS		
Oil in Housing	Internal engine failure.	Inspect and repair engine as required.
	Oil leaking from compressor housing seal.	Verify that oil is in compressor housing and refer to "Compressor Housing Outlet Defects" as listed earlier in this chart.
Center Wall Deteriorated	Excessive operating temperature.	Check for restricted air intake. Check engine for overfueling. Check injection pump timing.
TURBINE HOUSING OUTLET DEFECTS		
Turbine Wheel Rub	Bearing failure.	Determine if engine or operator contributed to lack of lubrication, contaminated lubrication, excessive temperature, or debris generating engine failure in progress. Correct as required.
	Manufacturing defect.	Correct as required.
Foreign Object Damage	Internal engine failure.	Inspect and repair engine as required.
	Objects left in intake system.	Disassemble and inspect air intake system.
	Leaking air intake system.	Correct as required (this group).
Oil and/or Excessive Carbon	Internal engine failure.	Verified by oil in turbine housing. Correct as required.

Continued on next page

CD03523,00001EF -19-20JUN12-1/2

TURBINE HOUSING OUTLET DEFECTS

Turbine seal failure.	Inspect for excessive heat from overfueling or restricted air intake.
Prolonged periods of low rpm engine idling.	Ask operator to run engine under load or at a higher rpm (see Operator's Manual).
Restricted oil drain line.	Inspect and clear oil drain line as required.

EXTERNAL CENTER HOUSING AND JOINT DEFECTS

Leaks from Casting	Defective casting.	Replace turbocharger.
	Defective gasket.	Verify if leaks are occurring at gasket joints.
Leaks from Joints	Loose attaching screws.	Tighten to specifications..
	Defective gasket.	Inspect and repair as required.

INTERNAL CENTER HOUSING DEFECTS

Excessive Carbon Build-Up in Housing or on Shaft	Hot engine shutdown.	Review proper operation with operator as shown in operator's manual.
	Excessive operating temperature.	Restricted air intake; overfueling or mistimed engine.
	Restricted oil drain line.	Inspect and clean oil drain lines as required.
	Operating engine at high speeds and loads immediately after start-up.	Idle engine for a few minutes to allow oil to reach bearings before applying heavy loads.

VGT ACTUATOR DEFECTS

VGT actuator linkage does not move freely.	Defective VGT actuator.	Replace VGT actuator.
	Defective linkage.	Replace linkage.
	Defective variable geometry mechanism.	Replace turbocharger.

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Turbocharger — Inspection

NOTE: These diagnostic procedures allow you to determine the condition of the turbocharger. If the turbocharger has failed, determine the specific engine area by referring to your inspection notes. See Turbocharger Failure Analysis in Section 02, Group 080. It is not unusual to find that a turbocharger has not failed. If your turbocharger passes all the inspections, the problem lies somewhere else.

The following inspection procedure is recommended for systematic failure analysis of a suspected failed turbocharger. This procedure helps to identify when a turbocharger has failed, and why it has failed, so the primary cause of the failure can be corrected.

Proper diagnosis of a non-failed turbocharger is important for two reasons. First, identification of a non-failed turbocharger leads to further investigation and repair of the cause of a performance complaint.

Second, proper diagnosis eliminates the unnecessary expense incurred when a non-failed turbocharger is replaced.

The recommended inspection steps, which are explained in detail on following pages, are:

- Compressor Housing Inlet and Compressor Wheel.
- Compressor Housing Outlet.
- Turbine Housing Inlet.
- Turbine Housing Outlet and Turbine Wheel.
- External Center Housing and Joints.
- Perform Axial Bearing End Play Test
- VGT Actuator Mechanism

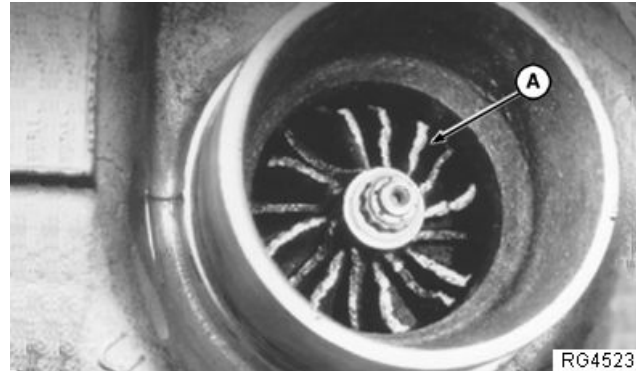
NOTE: To enhance the turbocharger inspection, use an inspection sheet (Form No. DF-2280 available from Distribution Service Center—English only). This sheet lists the inspection steps in the proper order and shows potential failure modes for each step. Check off each step as you complete the inspection and record any details or problems obtained during inspection. Refer to this list with the work order for future reference.

Compressor Housing Inlet and Compressor Wheel

1. Check compressor inlet and compressor wheel (A) for damage.

NOTE: Foreign object damage can be extensive or minor. In either case, the source of the foreign object must be found and corrected to eliminate further damage.

2. Mark findings on your checklist and continue the inspection.



Checking Inlet and Compressor Wheel

A—Compressor Wheel

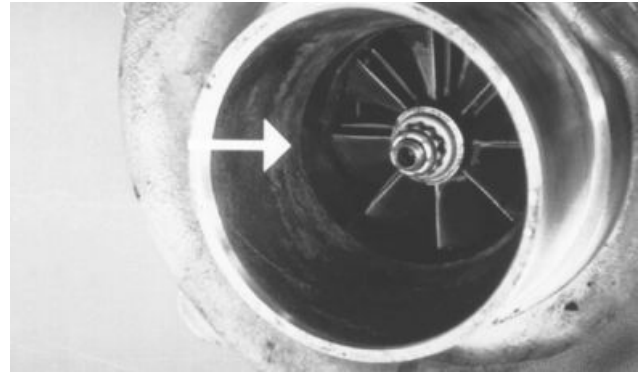
RG4523 —UN—03NOV97

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NOTE: You need a good light source for this check.

3. Check compressor inlet for wheel rub on the housing (arrow). Look closely for any score marks on the housing itself and check the tips of the compressor wheel blades for damage.



Checking Compressor Inlet

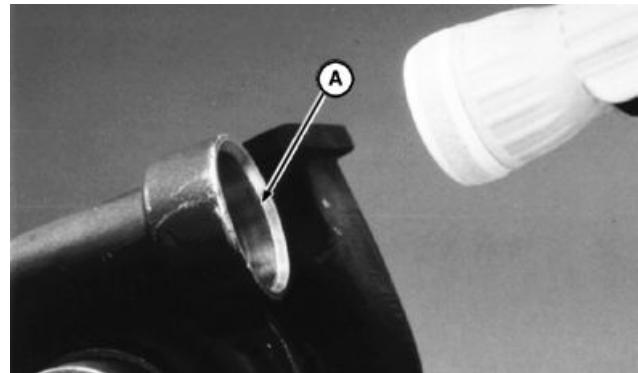
RG4524 —UN—05DEC97

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Compressor Housing Outlet

1. Check compressor housing outlet (A). The outlet must be clean and free of dirt or oil.
2. Mark it on your checklist if dirt or oil is found and continue the inspection.

A—Compressor Housing Outlet



Checking Compressor Outlet

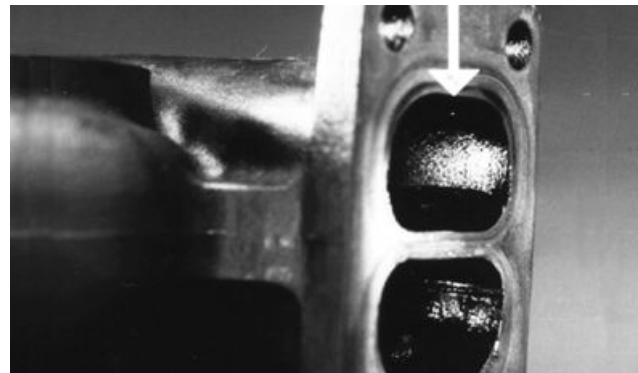
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Turbine Housing Inlet

Check the turbine housing inlet ports (arrow) for oil in housing, excessive carbon deposit, or erosion of center walls.

NOTE: If the inlet is wet with oil, or has excessive carbon deposits, an engine problem is likely. Center wall erosion (cracking or missing pieces), indicates excessive exhaust temperature.



Checking Turbine Housing Inlet Ports

RG4526 —UN—05DEC97

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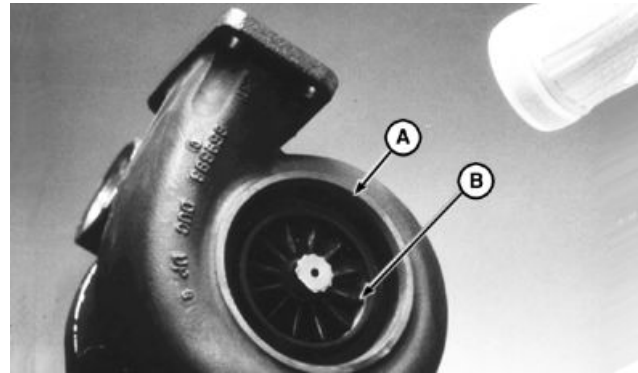
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Turbine Housing Outlet and Turbine Wheel

1. Use a flashlight to look up inside the turbine housing outlet (A) and check blades (B) for foreign object damage.
2. Inspect the wheel blades and housing for evidence of wheel rub. Wheel rub can bend the tips of the blades with the housing showing wear or damage.

A—Turbine Housing Outlet

B—Blades



Checking Turbine Wheel and Outlet

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RG4527—UN—05DEC97

3. Rotate the shaft, using both hands, to check rotation and clearance. The shaft must turn freely; however, a slight amount of drag is acceptable.



Checking Shaft Rotation and Clearance

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RG4532—UN—05DEC97

IMPORTANT: Use only moderate hand force (13—17 N) or (3—4 pounds) on each end of shaft.

4. Next, pull up on the compressor end of the shaft and press down on the turbine end while rotating shaft. The compressor wheel or the turbine wheel must not contact the housing at any point.

NOTE: There is some “play” because the bearings inside the center housing are free floating.



Checking for Contact of Compressor and Turbine Wheels

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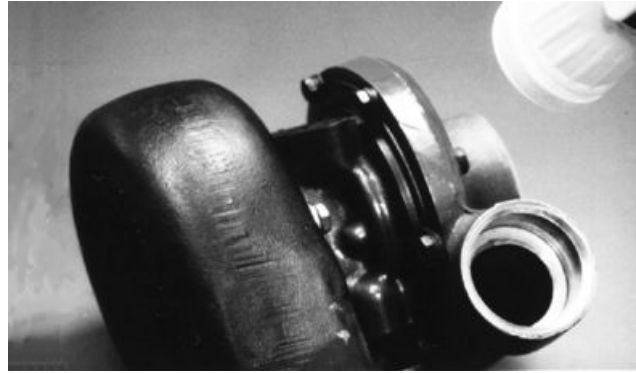
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External Center Housing and Joints

Visually check the outside of the center housing, all connections to the compressor, and turbine housing for oil.

NOTE: If oil is present, make sure that it is not coming from a leak at the oil supply or return line.

IMPORTANT: Before to conclude to a turbocharger failure, check radial bearing clearance and axial bearing end play. These procedures are not required when a failure mode has already been identified.



Checking Center Housing

RG4529 —UN—05DEC97

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Perform Axial Bearing End Play Test

This test gives an indication of the condition of the axial bearing within the center housing and rotating assembly.

1. Mount magnetic base dial indicator so that indicator tip rests on end of shaft. Preload indicator tip and zero dial on indicator.
2. Move shaft axially back and forth by hand.
3. Observe and record total dial indicator movement.

Specification

Turbocharger

shaft—Axial bearing end

play..... 0.064—0.114 mm (0.0025—0.0045 in.)

If bearing end play is not within specification, replace turbocharger.

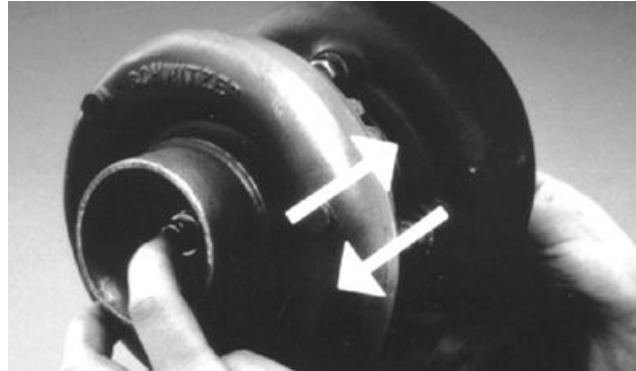


Axial Bearing and End Play Test

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4. Next, check shaft end play by moving the shaft back and forth (white arrows) while rotating. There is some end play but not to the extent that the wheels contact the housings.



Checking Shaft End Play

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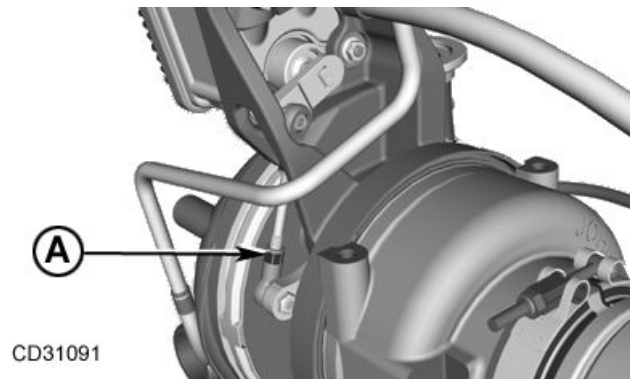
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Check VGT Actuator Mechanism

Verify that the linkage (A) is free through the full range of motion and returns to the minimum stop freely.

If binding is found, perform checks as outlined in the Turbocharger Failure Analysis in Section 02, Group 080.

A—VGT actuator linkage



Check VGT actuator mechanism

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CD31091 —UN—15DEC09

Turbocharger — Recommendations for Use

IMPORTANT: Should the engine stall when operating under load, **IMMEDIATELY** restart the engine to prevent overheating of turbocharger parts.

the engine for at least 30 seconds (no load) after start-up and before shutdown.

In most cases, turbocharger damage is caused by improper start-up and shutdown procedures. Always idle

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VGT Turbocharger Actuator — Installation

1. Install actuator (A) onto bracket.
2. Install nuts (B) and tighten to specification.

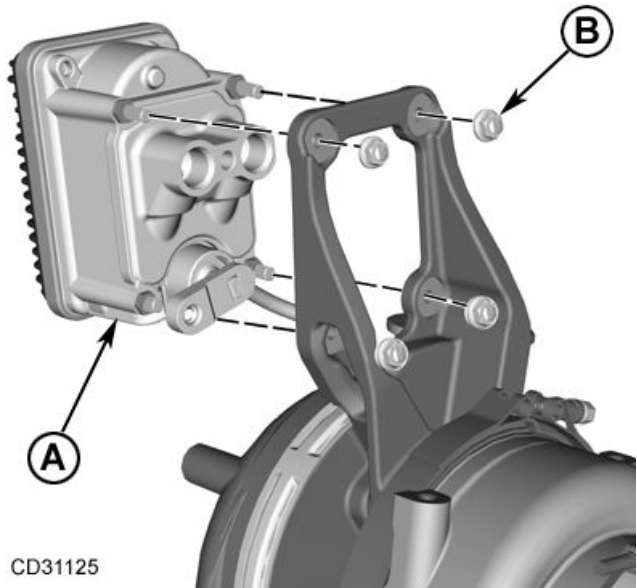
Specification

Actuator Nut—Torque..... 13.5 N·m (10 lb.-ft.)

3. Perform : **VGT Turbocharger Actuator Coolant Supply Line — Installation**
4. Perform : **VGT Turbocharger Actuator Coolant Return Line — Installation**
5. Perform : **VGT Turbocharger Actuator Linkage — Installation**
6. Reconnect wiring harness.

CAUTION: When power to the actuator is “on”, **BE CERTAIN** to keep fingers clear of linkage when performing diagnostic checks. The linkage actuates quickly and fingers can be pinched.

7. In case of actuator replacement, connect Service ADVISOR to engine and perform VGT or Exhaust Throttle Learn Value Reset Test.



Install Actuator

A—Actuator

B—Actuator Mounting Nut

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CD31125 —UN—15FEB10

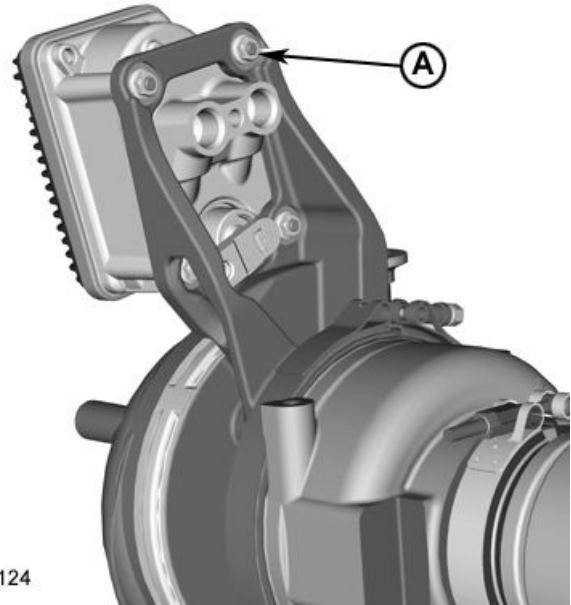
VGT Turbocharger Actuator — Removal

⚠ CAUTION: Disconnect the actuator wiring harness before performing any work. Linkage can move quickly when accidentally activated.

1. Perform: **VGT Turbocharger Actuator Linkage — Removal**
2. Perform: **VGT Turbocharger Actuator Coolant Return Line — Removal**
3. Perform: **VGT Turbocharger Actuator Coolant Supply Line — Removal**
4. Remove actuator mounting nuts (A).

A—Actuator Mounting Nut

CD31124



CD31124—UN—15FEB10

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VGT Turbocharger Actuator Coolant Return Line — Installation

Consumable Material:

- O-rings — Actuator coolant return line.

1. Install coolant return line (A) with new O-ring (B) into actuator port.
2. Install clamp (G) onto coolant return line. Tighten cap screw (H) to specification.

Specification

Coolant Return Line
Clamp-to-Rocker Arm
Cover—Torque..... 6 N·m (4 lb.-ft.)

3. Install clamp (C) and cap screw (D) then tighten to specification.

Specification

Coolant Return
Line Clamp-to-
Actuator—Torque..... 25 N·m (18 lb.-ft.)

4. Install the 2-piece clamp (E) on actuator coolant lines. Install cap screw (F) and tighten to specification.

Specification

2-Piece Clamp-to-
Actuator Coolant
Lines—Torque..... 15 N·m (11 lb.-ft.)

5. Install adapter fitting (I) with new O-ring (K). Tighten to specification.

Specification

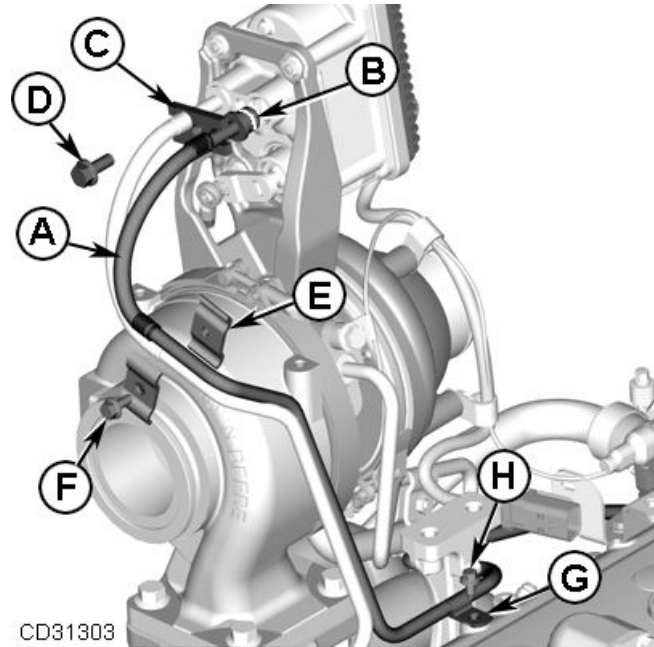
Coolant Return Line
Fitting-to-Thermostat
Housing—Torque..... 25 N·m (18 lb.-ft.)

6. Connect coolant return line with new O-ring (J). Tighten nut (L) to specification.

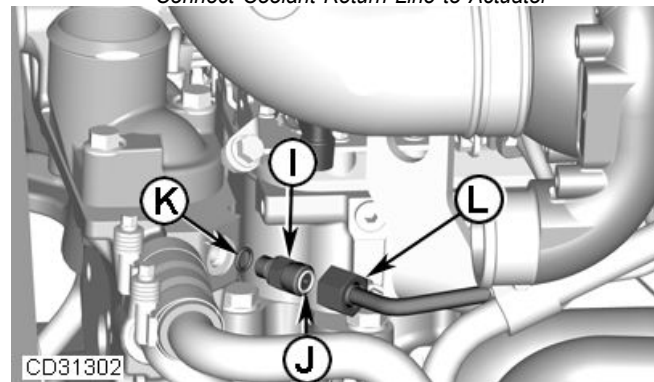
Specification

Coolant Return
Line-to-Thermostat
Housing Fitting—Torque..... 25 N·m (18 lb.-ft.)

7. Refill engine with coolant then bleed the cooling system.



Connect Coolant Return Line to Actuator



Connect Coolant Return Line to Thermostat Housing

A—Actuator Coolant Return
Line
B—O-ring
C—Clamp
D—Cap Screw
E—2-piece Clamp
F—Screw

G—Clamp
H—Screw
I—Adapter Fitting
J—O-ring
K—O-ring
L—Actuator Coolant Return
Line Nut

CD31303 —UN—05APR11

CD31302 —UN—05APR11

CD05019,0000006 -19-20MAR12-1/1

VGT Turbocharger Actuator Coolant Return Line — Removal

1. Let engine to cool down then drain coolant.
2. Remove cap screw (A) and clamp (B) holding the coolant return line (C) to actuator (D).
3. Remove clamps (F) and (G) holding the actuator coolant line.
4. Disconnect coolant return line (C) from thermostat housing (E).

A—Cap Screw

B—Clamp

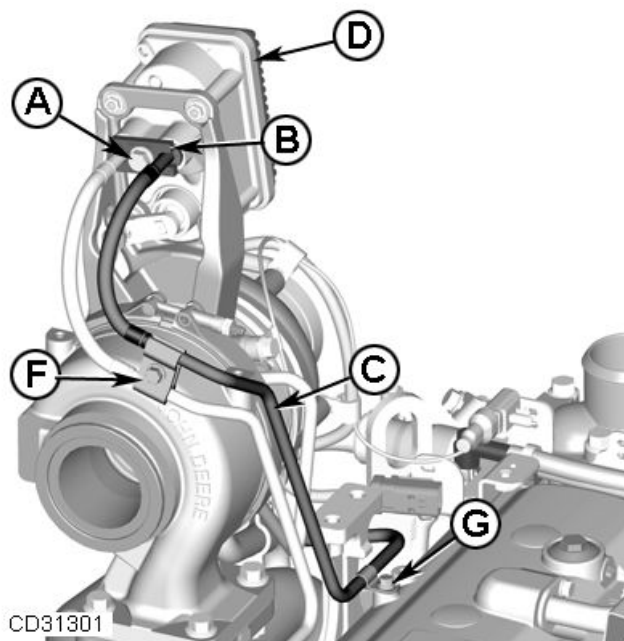
C—Coolant Return Line

D—Actuator

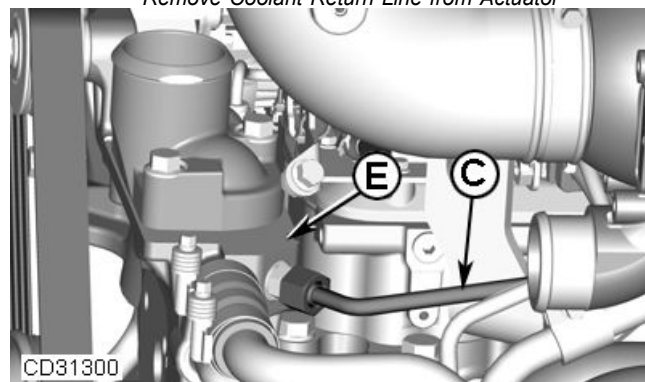
E—Thermostat Housing

F—2-Piece Clamp

G—Clamp



Remove Coolant Return Line from Actuator



Remove Coolant Return Line from Thermostat Housing

CD31301 —UN—05APR11

CD31300 —UN—01APR11

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VGT Turbocharger Actuator Coolant Supply Line — Installation

Consumable Material:

- O-rings — Actuator coolant supply line.

1. Install coolant supply line (A) with new O-ring (B) into actuator port.
2. Install clamp (C) and cap screw (D) then tighten to specification.

Specification

Coolant Supply
Line Clamp-to-
Actuator—Torque..... 25 N·m (18 lb.-ft.)

3. Install the 2-piece clamp (E) on actuator coolant lines. Install cap screw (F) and tighten to specification.

Specification

2-Piece Clamp-to-
Actuator Coolant
Lines—Torque..... 15 N·m (11 lb.-ft.)

4. Install the clamp (G) on actuator coolant supply line. Install cap screw (H) and tighten to specification.

Specification

Coolant Return Line
Clamp-to-Rocker Arm
Cover—Torque..... 6 N·m (4 lb.-ft.)

5. Install adapter fitting (K) with new O-ring (L) into cylinder block (M). Tighten to specification.

Specification

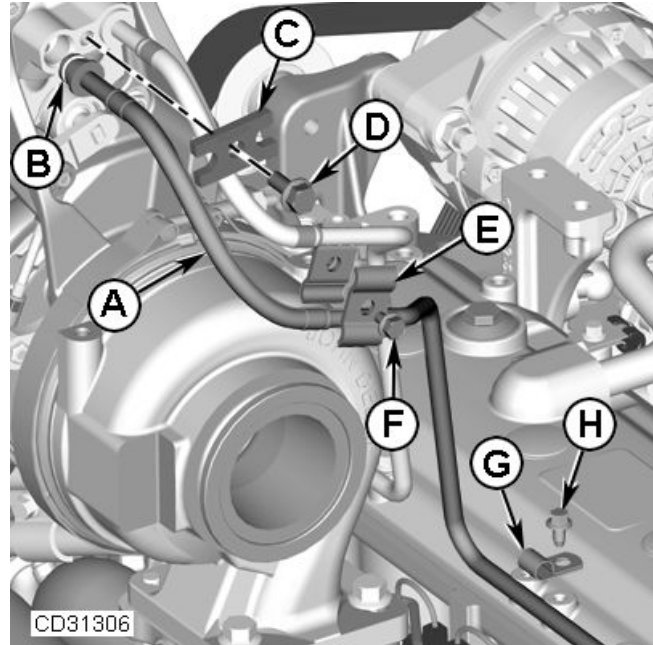
Actuator Coolant Supply
Line Fitting-to-Cylinder
Block—Torque..... 30 N·m (22 lb.-ft.)

6. Install new O-ring (J) on adapter fitting (K). Connect coolant supply line to adapter fitting (K) and tighten nut (I) to specification.

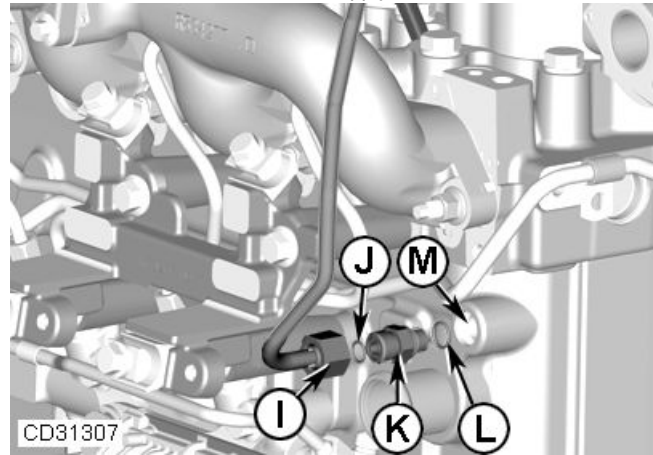
Specification

Actuator Coolant
Supply Line-to-Adapter
Fitting—Torque..... 25 N·m (18 lb.-ft.)

7. Refill engine with coolant then bleed the cooling system.



Connect Coolant Supply line to Actuator



Connect Coolant Supply Line to Cylinder Block

A—Actuator Coolant Supply
Line
B—O-ring
C—Clamp
D—Cap Screw
E—2-piece Clamp
F—Cap Screw
G—Clamp

H—Cap Screw
I—Actuator Coolant Supply
Line Nut
J—O-ring
K—Adapter Fitting
L—O-ring
M—Cylinder Block

CD31306 —UN—08APR11

CD31307 —UN—08APR11

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VGT Turbocharger Actuator Coolant Supply Line — Removal

1. Let engine to cool down then drain coolant.
2. Remove cap screw (A) and clamp (B) holding the coolant supply line (C) to actuator (D).
3. Remove clamps (E) and (F) holding actuator coolant line.
4. Loosen nut (G) and disconnect coolant supply line (C) from cylinder block.

A—Cap Screw

B—Clamp

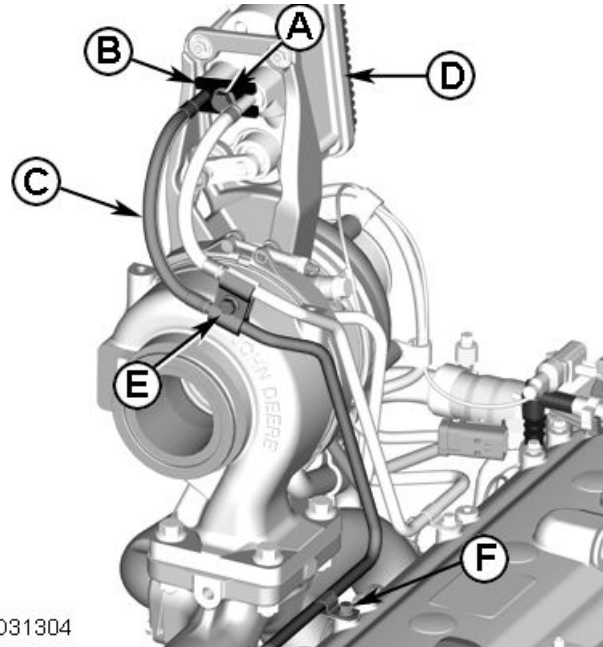
C—Coolant Supply Line

D—Actuator

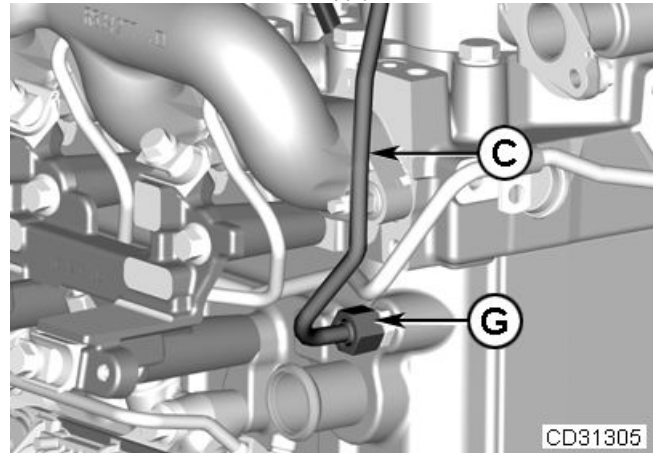
E—Two-Piece Clamp

F—Clamp

G—Actuator Coolant Supply
Line Nut



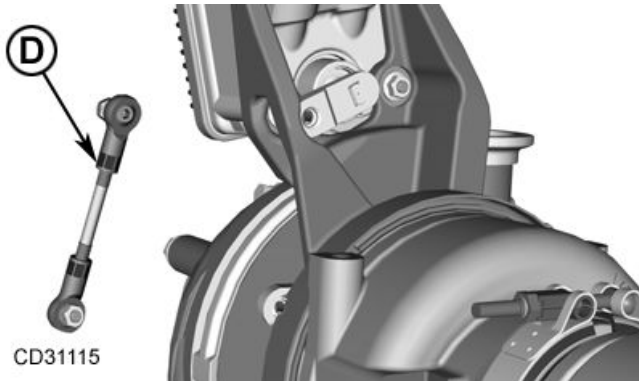
Remove Coolant Supply Line from Actuator



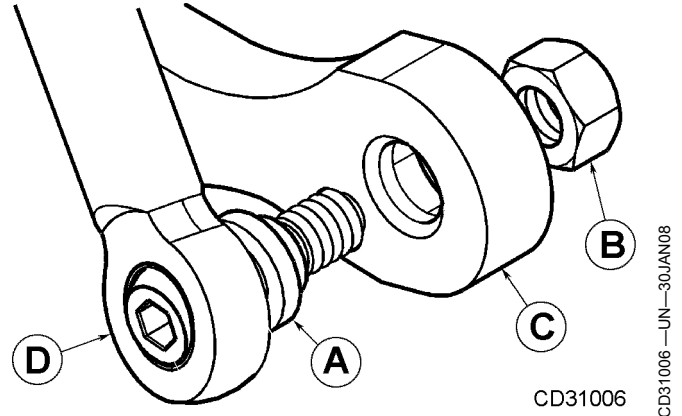
Remove Coolant Supply Line from Cylinder Block

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VGT Turbocharger Actuator Linkage — Installation



Install Actuator Linkage



Install Linkage onto Arm

A—Threaded Ball-Joint

B—Nut
C—Arm

D—Actuator Linkage

IMPORTANT: The linkage (D) is adjusted by the manufacturer then endpoints are crimped in place. **DO NOT** attempt to adjust the length of the linkage.

1. Install the nut (B) into the turbocharger arm cavity (C).
2. Install the threaded ball-joint (A) on the turbocharger arm then tighten to specification.

Specification

Actuator Linkage-to-Turbocharger	
Arm—Torque.....	8.5 N·m (75 lb.-in.)

3. Similarly, install nut into the actuator arm cavity then install the threaded ball-joint on the actuator arm. Tighten to specification.

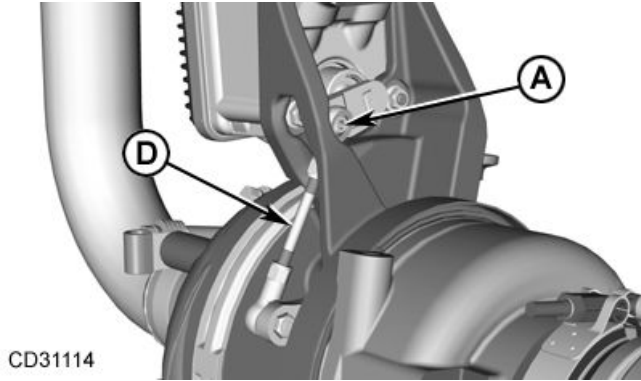
Specification

Actuator Linkage-to-Actuator Arm—Torque.....	10.5 N·m (93 lb.-in.)
--	-----------------------

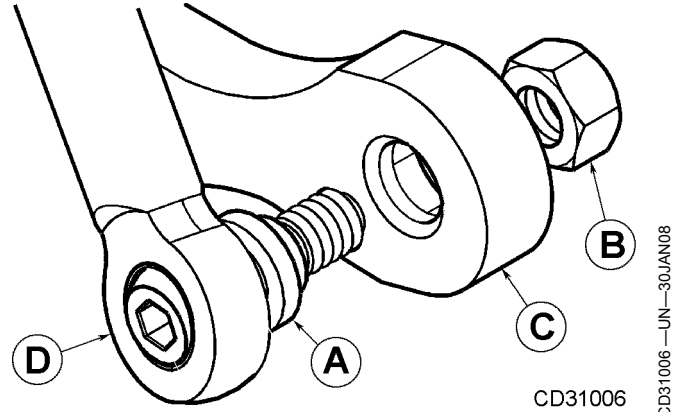
4. Check linkage (D) for free travel and to be sure there is no binding. The linkage should travel freely through its entire range of travel and return to the original position when tested manually.
5. Reconnect wiring harness.

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VGT Turbocharger Actuator Linkage — Removal



Remove Actuator Linkage



Remove Linkage from Arm

A—Threaded Ball-Joint

B—Nut
C—Arm

D—Actuator Linkage

CAUTION: Disconnect the actuator wiring harness before performing any work. Linkage can move quickly when accidentally activated.

1. Using an Allen wrench, loosen the threaded ball-joint (A) at the actuator arm connection.

2. Remove nut (B) from the arm cavity (C).
3. Repeat this operation for turbocharger arm, then remove the actuator linkage (D).

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VGT Turbocharger Assembly — Installation

Consumable Material:
• Turbocharger Gasket

IMPORTANT: If turbocharger failed because of foreign material entering the air intake system, examine the system and clean as required to prevent a repeat failure

1. Prelube turbocharge rotating assembly with clean engine oil.
2. Position turbocharger (C) with new gasket (E) onto exhaust manifold.
3. Install cap screws (D) and nuts (F).
4. Tighten cap screws (D) and nuts (F) to specification.

Specification

Turbocharger
(VGT)-to-Exhaust
Manifold—Torque..... 70 N·m (52 lb-ft.)

5. Perform VGT Turbocharger Oil Supply Line — Installation

Consumable Material:
• O-rings — Oil supply line

6. Perform VGT Turbocharger Oil Drain Line — Installation

Consumable Material:
• Oil drain line gasket

7. Perform VGT Turbocharger Actuator Coolant Return Line — Installation

Consumable Material:
• Adapter fitting O-ring

8. Perform VGT Turbocharger Actuator Coolant Supply Line — Installation

Consumable Material:
• Adapter fitting O-ring

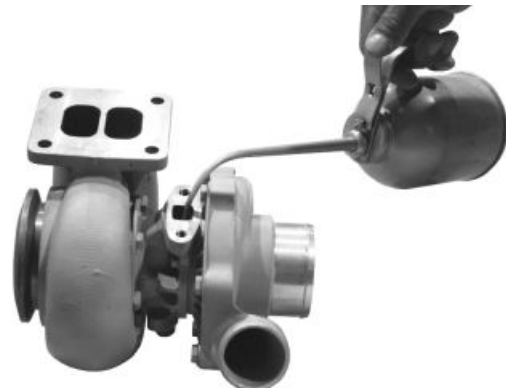
9. If removed, perform: EGR Cooler Gas Inlet Pipe — Installation

Consumable Material:
• Gasket

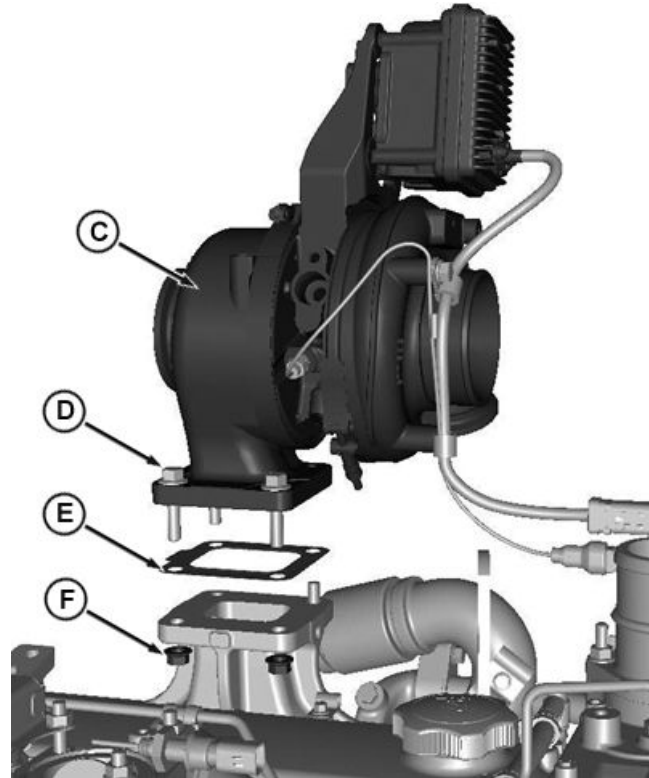
10. If removed, perform: EGR Cooler Coolant Return Tube — Installation.

Then refill engine with coolant and bleed the cooling system.

11. Reconnect wiring harness and air hoses.



Turbocharger Prelube



Turbocharger (VGT) Installation

C—Turbocharger
D—Cap Screws

E—Gasket
F—Nuts

IMPORTANT: Before starting engine after servicing turbocharger, the turbocharger setting must be reset by performing “VGT Learn Valve Reset Calibration” in Service ADVISOR.

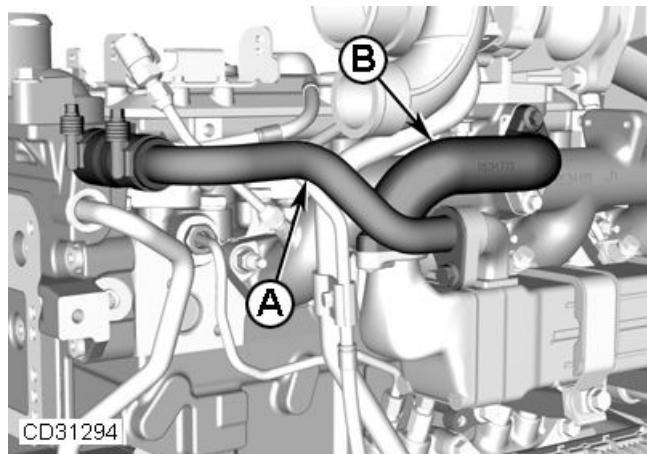
12. Perform: Turbocharger — Break-in.

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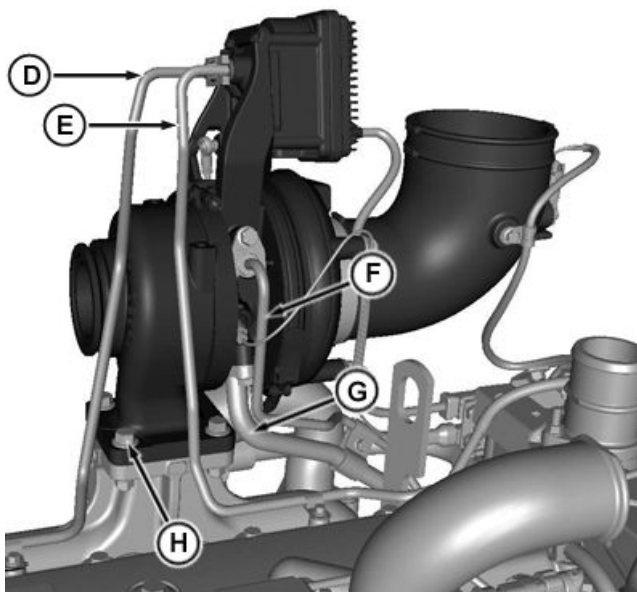
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VGT Turbocharger Assembly — Removal



EGR Cooler Coolant Return Tube and EGR Cooler Gas Inlet Pipe Removal

CD31294 —UN—01APR11



Turbocharger (VGT) Removal

RG19835 —UN—28DEC10

- | | | |
|----------------------------------|------------------------------------|-------------------|
| A—EGR Cooler Coolant Return Tube | D—VGT Actuator Coolant Supply Line | F—Oil Supply Line |
| B—EGR Cooler Gas Inlet Pipe | E—VGT Actuator Coolant Return Line | G—Oil Drain Line |
| | H—Cap Screws and Nuts | |

CAUTION: After operating engine, allow exhaust system to cool before removing turbocharger.

IMPORTANT: When cleaning turbocharger, do not spray directly into compressor cover or turbine housing. If turbocharger inspection is required, do not clean exterior before removal. Doing so can wash evidence of a potential failure mode.

1. After inspection, thoroughly clean exterior of turbocharger and surrounding area to prevent entry of dirt into the air intake system during removal.
2. Disconnect air hoses and wiring harness as necessary.
3. If necessary, drain coolant then perform EGR Cooler Coolant Return Tube — Removal.
4. If necessary, perform EGR Cooler Gas Inlet Pipe — Removal.
5. Disconnect VGT actuator coolant supply line (D).
6. Disconnect VGT actuator coolant return line (E).
7. Disconnect oil supply line (F).
8. Disconnect oil drain line (G).
9. Remove cap screws and nuts (H) holding turbocharger to exhaust manifold.
10. Perform Turbocharger — Inspection.

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VGT Turbocharger Oil Drain Line — Installation

Consumable Material:

- Oil drain line gasket
- Adapter fitting O-ring

1. If removed, install adapter fitting (A) with new O-ring (B) into the cylinder block. Tighten to specification.

Specification

Oil Drain Line Adapter

Fitting-to-Cylinder

Block—Torque..... 67 N·m (49 lb.-ft)

2. Lubricate drain hose (I) inner diameter with engine oil or petroleum jelly and install drain hose (I) on oil drain line (C) and adapter fitting (A)
3. Place oil drain line (C) with gasket (D) onto turbocharger.
4. Install cap screws (E) and tighten to specification.

Specification

Oil Drain Line-to-

Turbocharger —Torque..... 25 N·m (18 lb.-ft.)

5. Install the 2-piece clamp (G) on turbocharger oil supply and oil drain lines. Install cap screw (H) and tighten to specification.

Specification

2-Piece Clamp-to-

Turbocharger Oil

Supply and Oil Drain

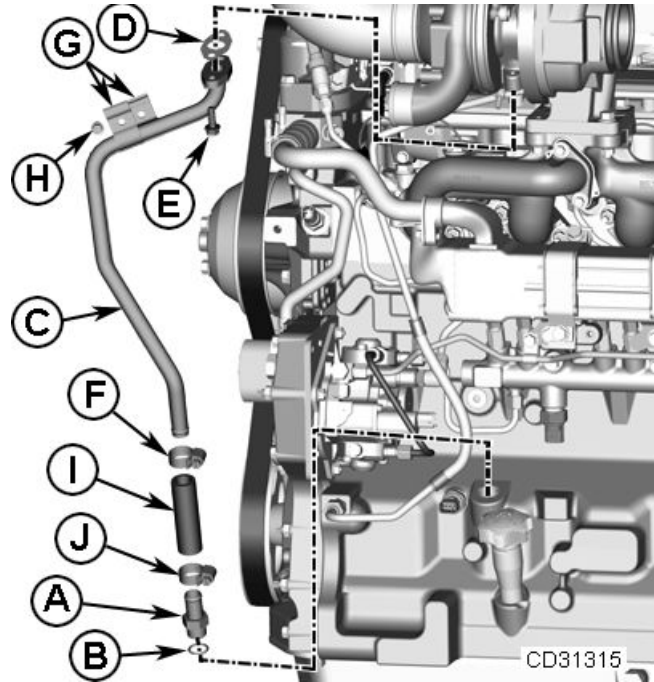
Lines—Torque..... 15 N·m (11 lb.-ft)

6. Install clamps (F) and (J) on the hose (I). Tighten to specification.

Specification

Clamps on Drain

Hose—Torque..... 6 N·m (4 lb.-ft.)



Install Oil Drain Line on VGT Turbocharger

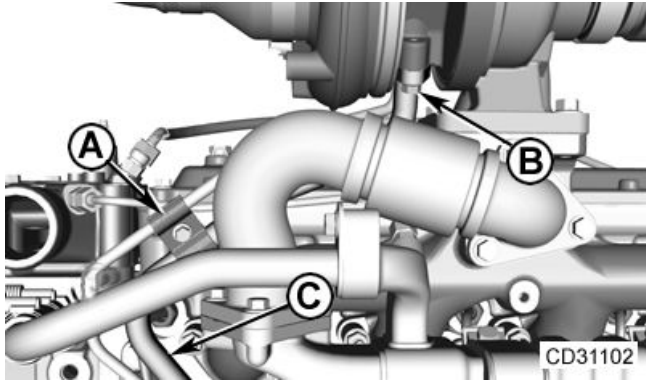
A—Adapter Fitting
B—O-ring
C—Oil Drain Line
D—Gasket
E—Cap Screws (2)

F—Clamp
G—2-piece Clamp
H—Cap Screw
I—Hose
J—Clamp

CD31315—UN—13APR11

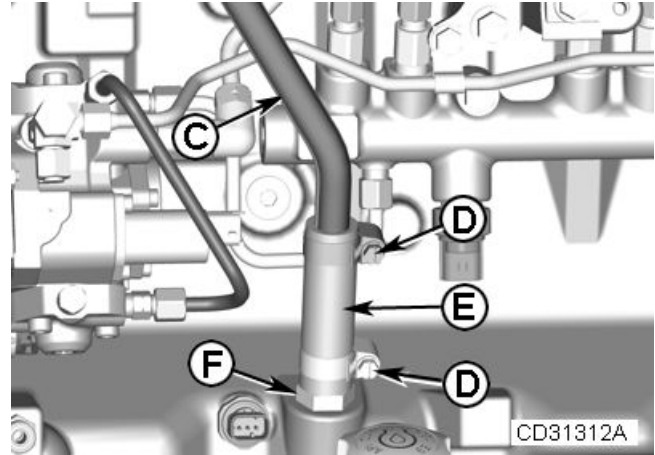
CD05019,000000E -19-25JUL11-1/1

VGT Turbocharger Oil Drain Line — Removal



Remove Oil Drain Line from Turbocharger

CD31102 —UN—22DEC09



Remove Oil Drain Line from Cylinder Block

CD31312A —UN—22JUL11

A—2-piece Clamp
B—Cap Screws (2)

C—Oil Drain Line
D—Clamps

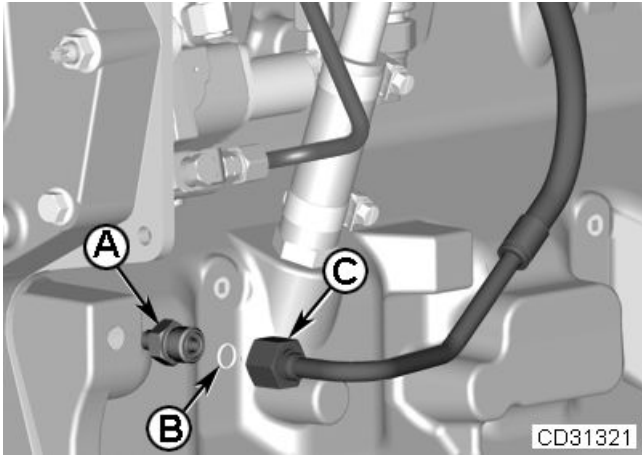
E—Hose
F—Fitting

1. Remove the 2-piece clamp (A) holding oil drain and oil supply lines together.
2. Remove cap screws (B) holding oil drain line (C) to turbocharger.

3. Loosen clamps (D) at hose (E) and remove the VGT turbocharger oil drain line (C).
4. Remove fitting (F) if needed.

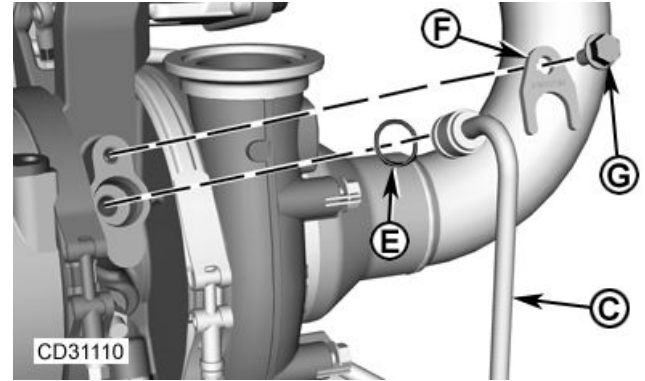
CD05019,000000D -19-22JUL11-1/1

VGT Turbocharger Oil Supply Line — Installation



Connect Oil Supply Line to Cylinder Block

CD31321 —UN—15APR11



Connect Oil Supply Line to Turbocharger

CD31110 —UN—14JAN10

Consumable Material:

- O-rings — Oil supply line

1. If removed, install adapter fitting (A) into cylinder block. Tighten to specification.

Specification

Oil Supply Line Adapter
Fitting-to-Cylinder
Block—Torque..... 20N·m (15 lb.-ft.)

2. Install new O-ring (E) onto oil supply line then install oil supply line and clamp (F) into turbocharger oil supply port. Tighten cap screw (G) to specification.

Specification

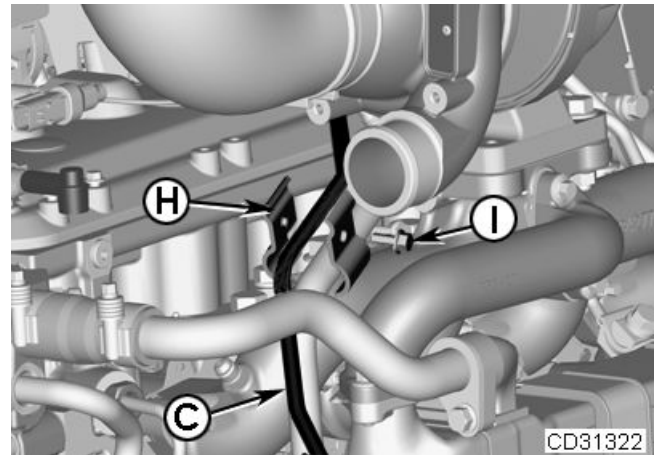
Oil Supply Line-to-
Turbocharger—Torque..... 25 N·m (18 lb.-ft.)

3. Install oil supply line (C) on adapter fitting with new O-ring (B). Tighten oil supply line nut to specification.

Specification

Oil Supply Line-to-
Cylinder Block Adapter
Fitting—Torque..... 24 N·m (18 lb.-ft.)

4. Install the 2-piece clamp (H) on turbocharger oil supply and oil drain lines. Install cap screw (I) and tighten to specification.



Install 2-piece Clamp

CD31322 —UN—15APR11

A—Adapter Fitting
B—O-ring
C—Oil Supply Line
E—O-ring

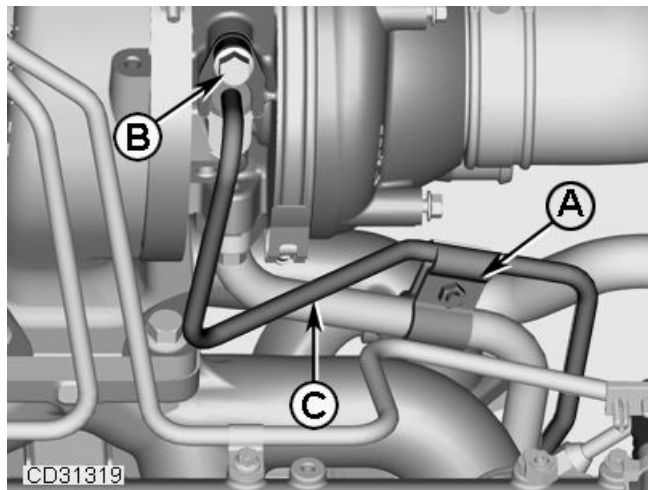
F—Clamp
G—Cap Screw
H—2-piece Clamp
I— Cap Screw

Specification

2-Piece Clamp-to-
Turbocharger Oil
Supply and Oil Drain
Lines—Torque..... 15 N·m (11 lb.-ft.)

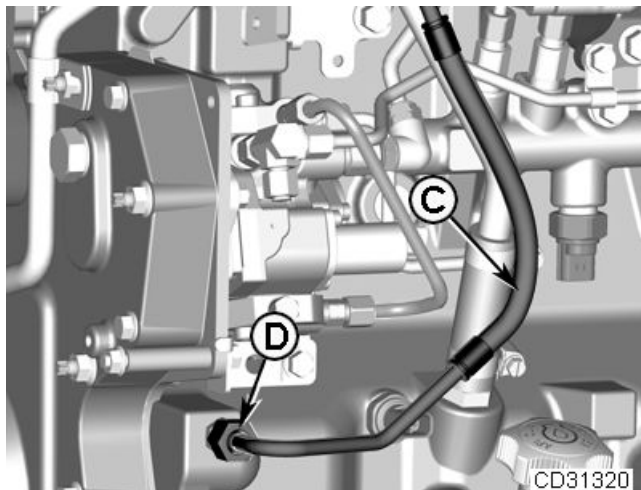
CD05019,0000010 -19-20MAR12-1/1

VGT Turbocharger Oil Supply Line — Removal



Remove Oil Supply Line from Turbocharger

CD31319 —UN—14APR11



Remove Oil Supply Line from Cylinder Block

CD31320 —UN—14APR11

A—2-piece Clamp
B—Cap Screw

C—Oil Supply Line

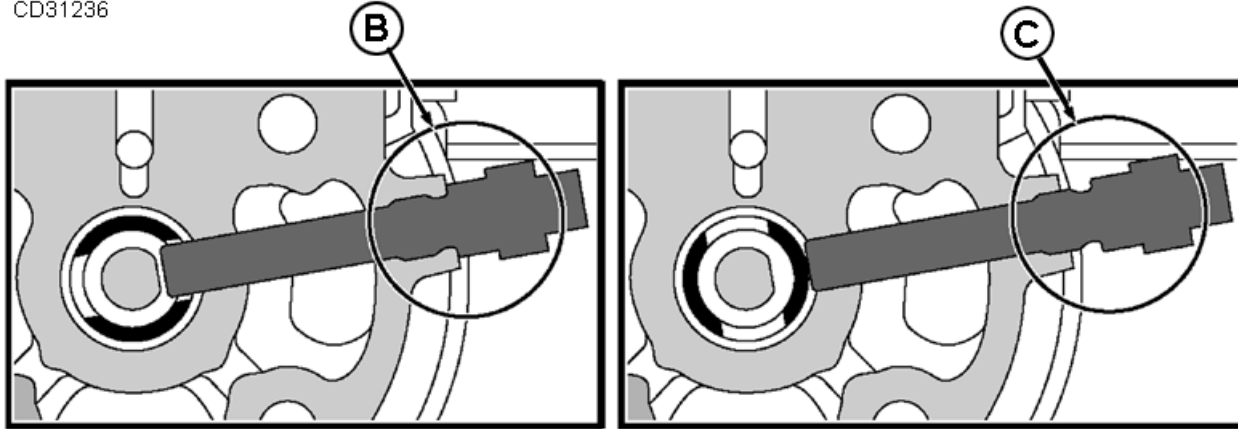
D—Oil Supply Line Nut

1. Remove the 2-piece clamp (A) holding oil supply and oil drain lines together.
2. Remove cap screw (B) holding oil supply line (C) to turbocharger.
3. Loosen nut (D) at cylinder block connection and remove the VGT turbocharger oil supply line.

CD05019,000000F -19-14APR11-1/1

VGT Turbocharger Speed Sensor — Installation

CD31236



Turbocharger Speed Sensor Installation

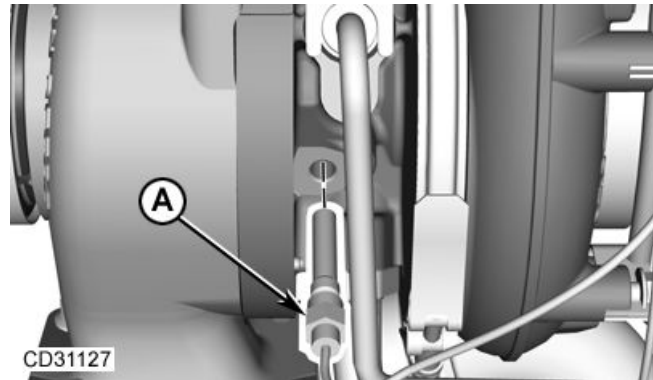
IMPORTANT: When installing the speed sensor verify that it is properly located and seated in the turbocharger center housing before torquing. The tip of the sensor must fit in a hole in the bearing spacer. The spacer can turn on the shaft, so there is risk the hole is not aligned with the turbocharger housing. If the sensor is properly located, the shoulder of the sensor seats against the turbocharger housing (see B). If the sensor does not seat (see C), use a flashlight and a pick to turn the spacer until the hole is visible.

1. Install speed sensor (A) into turbocharger port. Tighten to specification.

Specification

Speed Sensor-to-Turbocharger —Torque..... 14 N·m (10 lb.-ft.)

2. Reconnect wiring harness.



Install Turbocharger Speed Sensor

A—Turbocharger Speed Sensor
B—Sensor Properly Seated in Turbocharger Housing

C—Sensor Not Seated in Turbocharger Housing

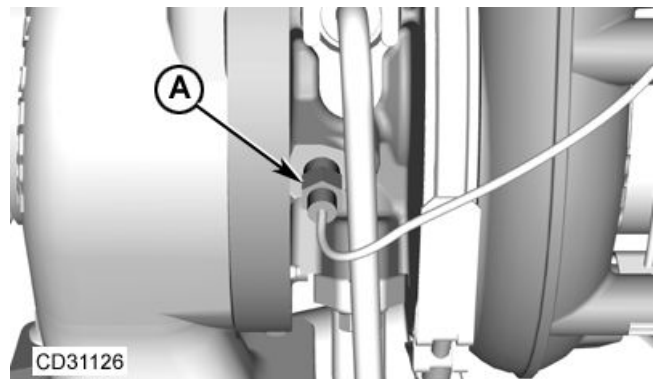
CD05019,0000012 -19-30MAR11-1/1

VGT Turbocharger Speed Sensor — Removal

1. Disconnect speed sensor wiring from main wiring harness.

IMPORTANT: When removing VGT speed sensor, do not turn or spin compressor or turbine wheels. The speed sensor aligns with a slot in a spacer on the bearing shaft. If this slot is moved out of alignment with the sensor, the risk of turbocharger and sensor failure increases. See VGT Speed Sensor — Installation for a cutaway view of the sensor to turbocharger assembly.

2. Remove speed sensor (A) from turbocharger.



Remove Turbocharger Speed Sensor

A—Turbocharger Speed Sensor

CD05019,0000011 -19-30MAR11-1/1

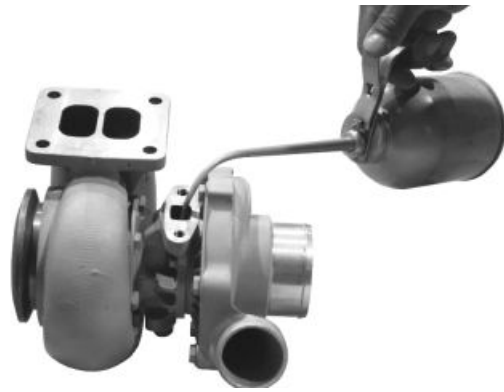
Wastegate Turbocharger Assembly (Flat Flange) — Installation

Consumable Material:

- Turbocharger Gasket

IMPORTANT: If turbocharger failed because of foreign material entering the air intake system, examine the system and clean as required to prevent a repeat failure

1. Prelube turbocharge rotating assembly with clean engine oil.

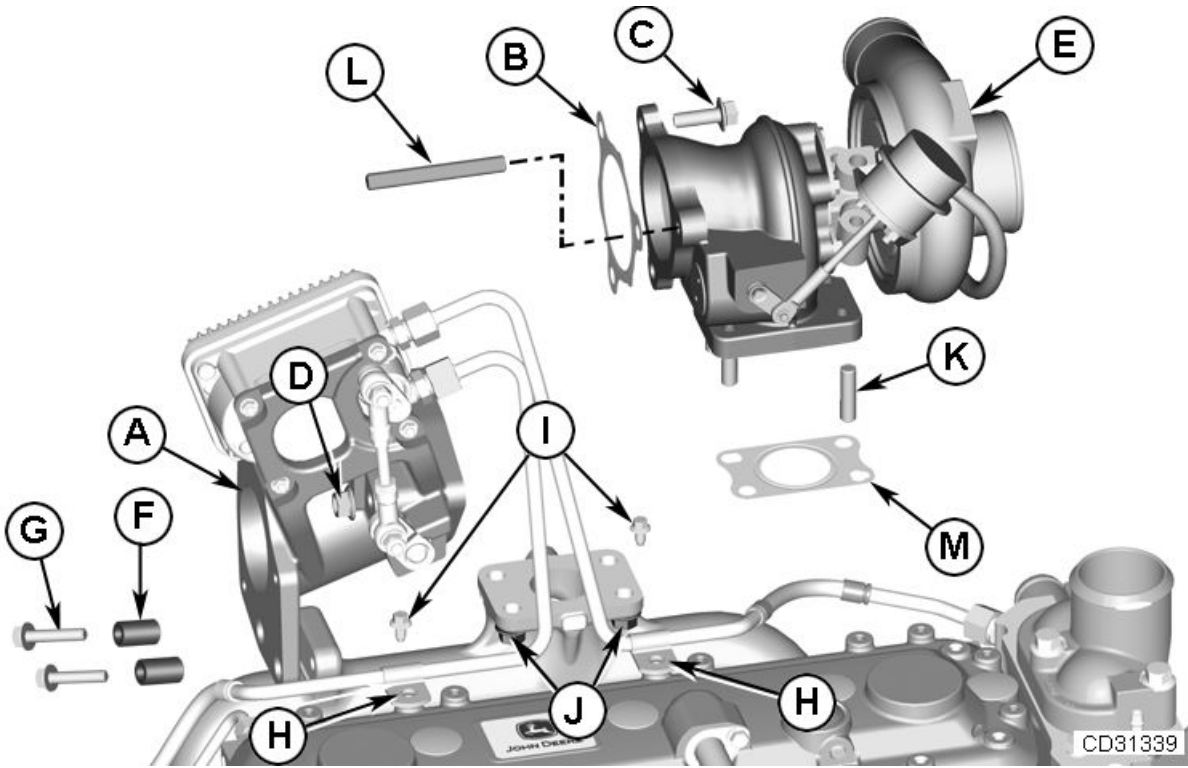


Turbocharger Prelube

Continued on next page

BL90236,00002A0 -19-07AUG12-1/3

RG7624 —UN—23NOV97



Turbocharger (Wastegate) Installation

A—Exhaust Throttle Actuator
B—Gasket
C—Cap Screws

D—Nut
E—Turbocharger
F—Spacers
G—Cap Screws

H—Clamp
I—Cap Screws
J—Nuts
K—Stud

L—Stud
M—Gasket

2. If removed, install studs (K) into turbocharger foot until specified length is obtained.

Specification

Stud Length—Length..... 23 mm (0.90 in.)

3. If removed, install stud (L) into turbocharger exhaust outlet until specified length is obtained.

Specification

Stud Length—Length..... 72 mm (2.83 in.)

4. Position exhaust throttle actuator (A) with new gasket (B) against turbocharger (E).

5. Install cap screws (C) and nut (D). Do not tighten at this stage.

6. Position the assembly turbocharger and exhaust throttle actuator (A) with new gasket (M) onto exhaust manifold

7. Install cap screws (G) and spacers (F) on exhaust manifold. Do not tighten at this stage

8. Install nuts (J) and tighten to specification.

Specification

Turbocharger
(Wastegate) to Exhaust
Manifold—Torque..... 70 N·m (52 lb.-ft.)

9. Tighten cap screws (C) and nut (D) to specification.

Specification

Turbocharger
(Wastegate) to
Exhaust Throttle
Actuator—Torque..... 70 N·m (52 lb.-ft.)

10. Tighten cap screws (G) to specification

Specification

Exhaust Throttle
Actuator to Exhaust
Manifold—Torque..... 35 N·m (27 lb.-ft.)

11. Perform Exhaust Throttle Actuator Coolant Supply Line — Installation and Exhaust Throttle Actuator Coolant Return Line — Installation.

12. Position clamps (H) holding actuator coolant lines to rocker arms cover.

13. Install cap screws (I) and tighten to specification.

Specification

Actuator Coolant
Lines to Rocker Arms
Cover—Torque..... 15 N·m (11 lb.-ft.)

14. Perform Wastegate Turbocharger Oil Supply Line — Installation

Consumable Material:
• Oil supply line - O-ring

Continued on next page

BL90236,00002A0 -19-07AUG12-2/3

15. Perform Wastegate Turbocharger Oil Drain Line — Installation

Consumable Material:
• Oil drain line gasket

16. Reconnect wiring harness and air hoses.

17. Perform: Turbocharger — Break-in.

BL90236,00002A0 -19-07AUG12-3/3

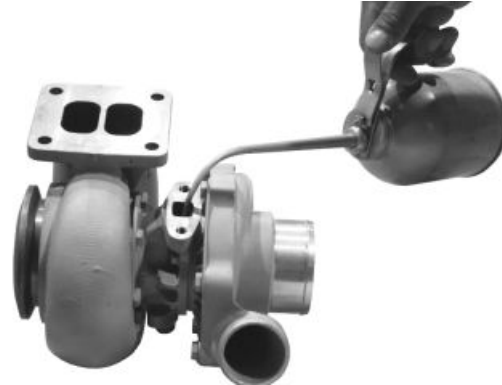
Wastegate Turbocharger Assembly (V-Band Clamp) — Installation

Consumable Material:

- Gasket — Between turbocharger and exhaust throttle
- Gasket — Between turbocharger and exhaust manifold
- Gasket — Oil return line
- O-rings or Banjo seals — Oil supply line
- V-band clamp — Between turbocharger and exhaust throttle

IMPORTANT: If turbocharger failed because of foreign material entering the air intake system, examine the system and clean as required to prevent a repeat failure

1. Prelube turbocharge rotating assembly with clean engine oil.

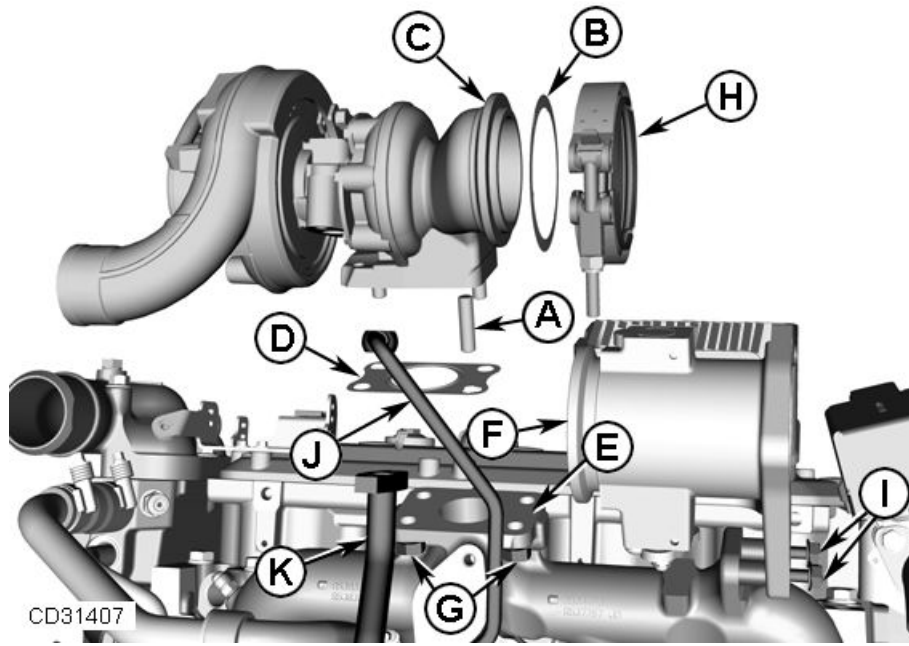


Turbocharger Prelube

RG7624 —UN—23NOV97

Continued on next page

CD03523,0000381 -19-09AUG12-1/2



Wastegate Turbocharger Installation (V-Band Clamp)

A—Stud
B—Gasket
C—Turbocharger
D—Gasket

E—Exhaust Manifold Flange
F—Exhaust Throttle Flange

G—Nut
H—V-Band Clamp
I—Cap Screws
J—Oil Supply Line

K—Oil Return line

2. If removed, install studs (A) into turbocharger foot until specified length is obtained.

Specification

Stud Length—Length..... 23 mm (0.90 in.)

3. Place a new gasket (B) over the pilot boss on turbocharger, regardless the orientation.
4. Using a new gasket (D), position the turbocharger onto exhaust manifold flange (E) and against the exhaust throttle flange (F).
5. Install nuts (G) onto turbocharger studs. Do not tighten at this stage.
6. Attach V-band clamp (H). Tighten to specification.

Specification

Wastegate Turbocharger-
to-Exhaust Throttle,
V-Band Clamp—Torque..... 20 N·m (15 lb.-ft.)

7. Tighten turbocharger nuts (G) to specification.

Specification

Wastegate
Turbocharger-to-Exhaust
Manifold—Torque..... 70 N·m (52 lb.-ft.)

8. If loosened, retighten the exhaust throttle cap screws (I) to specification.

Specification

Exhaust Throttle
Actuator-to-Exhaust
Manifold—Torque..... 37 N·m (27 lb.-ft.)

9. Perform Wastegate Turbocharger Oil Supply Line (J) — Installation
10. Perform Wastegate Turbocharger Oil Drain Line (K) — Installation
11. Reconnect wiring harness and air hoses.
12. Perform: Turbocharger — Break-in.

CD03523,0000381 -19-09AUG12-2/2

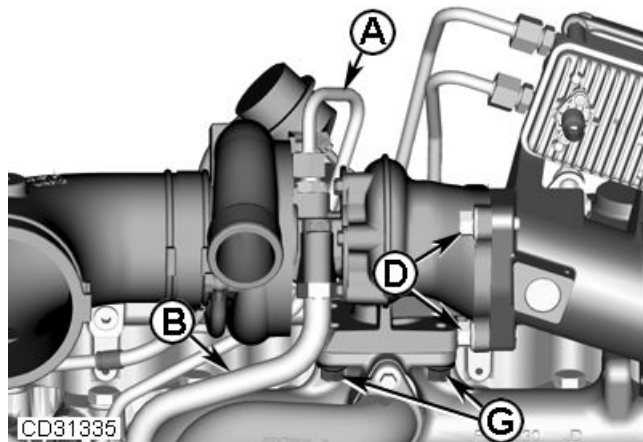
CD31407 —UN—08AUG12

Wastegate Turbocharger Assembly (Flat Flange) — Removal

CAUTION: After operating engine, allow exhaust system to cool before removing turbocharger.

IMPORTANT: When cleaning turbocharger, do not spray directly into compressor cover or turbine housing. If turbocharger inspection is required, do not clean exterior before removal. Doing so can wash evidence of a potential failure mode.

1. After inspection, thoroughly clean exterior of turbocharger and surrounding area to prevent entry of dirt into the air intake system during removal.
2. Disconnect air hoses and wiring harness as necessary.
3. Perform Exhaust Throttle Assembly (PWX Engine) — Removal.
4. Disconnect oil supply line (A).
5. Disconnect oil drain line (B).
6. Remove nuts (G) holding turbocharger to exhaust manifold.
7. Lift the assembly turbocharger from the exhaust manifold.



Wastegate Turbocharger Removal

A—Oil Supply Line
B—Oil Drain Line

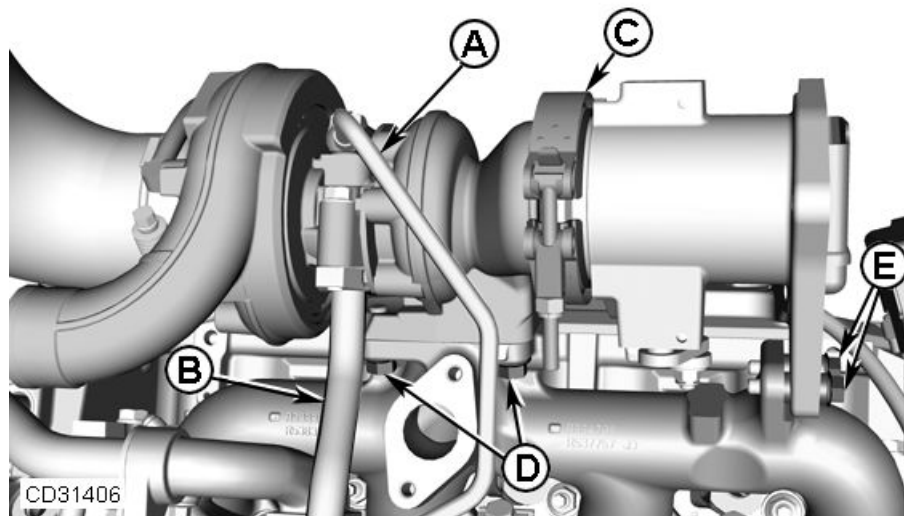
D—Cap Screws
G—Nuts

8. Perform Turbocharger - Inspection.
9. Perform Wastegate Turbocharger Actuator - Adjust.

BL90236,00002A1 -19-09AUG12-1/1

CD31335 —UN—27APR11

Wastegate Turbocharger Assembly (V-Band Clamp) — Removal



Wastegate Turbocharger Removal

A—Oil Supply Line

B—Oil Drain Line

C—V-Band Clamp

D—Nuts

CAUTION: After operating engine, allow exhaust system to cool before removing turbocharger.

IMPORTANT: When cleaning turbocharger, do not spray directly into compressor cover or turbine housing. If turbocharger inspection is required, do not clean exterior before removal. Doing so can wash evidence of a potential failure mode.

1. After inspection, thoroughly clean exterior of turbocharger and surrounding area to prevent entry of dirt into the air intake system during removal.
2. Disconnect air hoses and wiring harness as necessary.
3. Disconnect oil supply line (A).
4. Disconnect oil drain line (B).
5. Remove V-band clamp (C).
6. Remove nuts (D) holding turbocharger to exhaust manifold
7. Lift turbocharger assembly from the exhaust manifold. If necessary, loosen cap screws (E) to get more clearance.
8. Perform Turbocharger - Inspection.
9. Perform Wastegate Turbocharger Actuator - Adjust.

CD03523,0000380 -19-09AUG12-1/1

CD31406 —UN—08AUG12

Wastegate Turbocharger Oil Drain Line — Installation

Consumable Material:

- Oil drain line gasket
- Adapter fitting O-ring

1. If removed, install adapter fitting (A) with new O-ring (B) into the cylinder block. Tighten to specification.

Specification

Oil Drain Line Adapter

Fitting-to-Cylinder

Block—Torque..... 67 N·m (49 lb.-ft)

2. Lubricate drain hose (I) inner diameter with engine oil or petroleum jelly and install drain hose (I) on oil drain line (C) and adapter fitting (A)

3. Place oil drain line (C) with gasket (D) onto turbocharger.

4. Install cap screws (E) and tighten to specification.

Specification

Oil Drain Line-to-

Turbocharger —Torque..... 25 N·m (18 lb.-ft.)

5. Install the 2-piece clamp (G) on turbocharger oil supply and oil drain lines. Install cap screw (H) and tighten to specification.

Specification

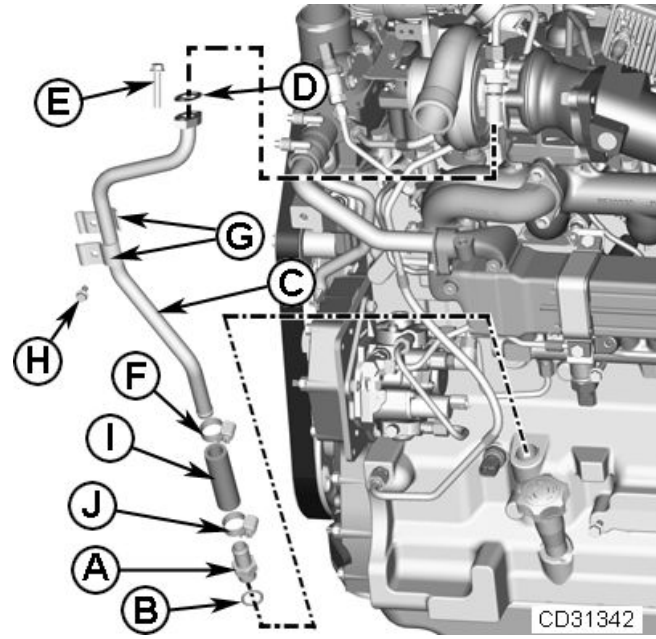
2-Piece Clamp-to-

Turbocharger Oil

Supply and Oil Drain

Lines—Torque..... 15 N·m (11 lb.-ft)

6. Install clamps (F) and (J) on the hose (I). Tighten to specification.



Install Oil Drain Line on Wastegate Turbocharger

A—Adapter Fitting
B—O-ring
C—Oil Drain Line
D—Gasket
E—Cap Screws (2)

F—Clamp
G—2-piece Clamp
H—Cap Screw
I—Hose
J—Clamp

Specification

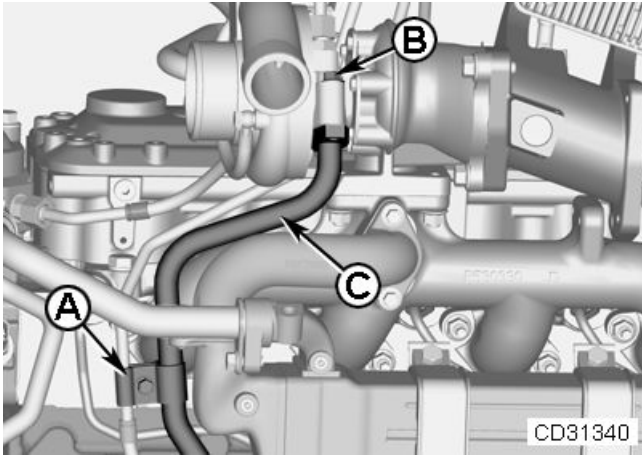
Clamps on Drain

Hose—Torque..... 6 N·m (4 lb.-ft.)

CD05019,000001B -19-27JUL11-1/1

CD31342 —UN—03MAY11

Wastegate Turbocharger Oil Drain Line — Removal

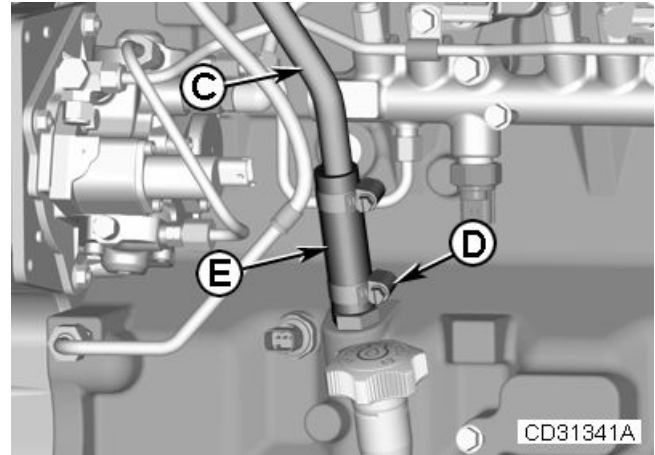


Remove Oil Drain Line from Turbocharger (Wastegate)

A—2-piece Clamp
B—Cap Screws (2)

C—Oil Drain Line

1. Remove the 2-piece clamp (A) holding oil drain and oil supply lines together.
2. Remove cap screws (B) holding oil drain line (C) to turbocharger.



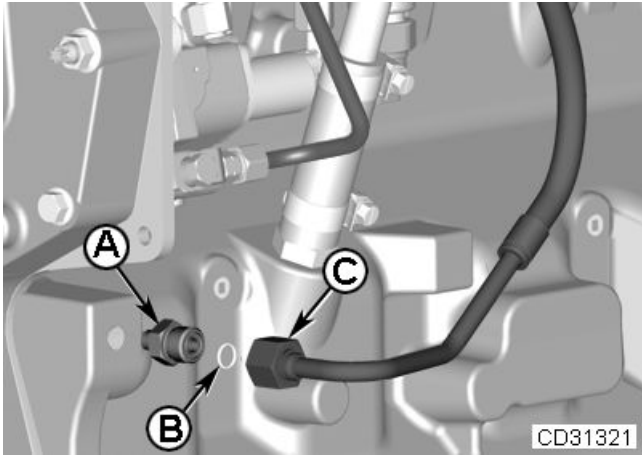
Remove Oil Drain Line from Cylinder Block

D—Clamp
E—Hose

3. Loosen clamp (D) at hose (E) and remove the Wastegate turbocharger oil drain line (C).

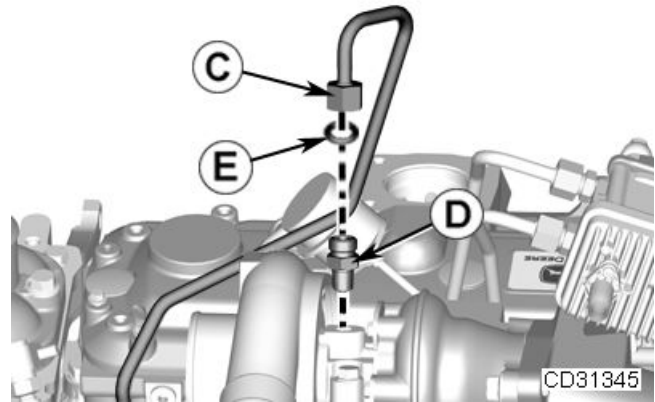
CD05019,000001A -19-27JUL11-1/1

Wastegate Turbocharger Oil Supply Line — Installation



Connect Oil Supply Line to Cylinder Block

CD31321 —UN—15APR11



Connect Oil Supply Line to Turbocharger (Banjo or Adapter Fitting)

CD31345 —UN—06MAY11

Consumable Material:

- O-rings or Banjo seals — Oil supply line

1. Install adapter fitting (A) into cylinder block. Tighten to specification.

Specification

Oil Supply Line Adapter
Fitting-to-Cylinder
Block—Torque..... 20N·m (15 lb.-ft.)

2. Install oil supply line (C) on adapter fitting with new O-ring (B). Tighten oil supply line nut to specification.

Specification

Oil Supply Line-to-
Cylinder Block Adapter
Fitting—Torque..... 23 N·m (17 lb.-ft.)

3. Install adapter fitting (D) into Wastegate turbocharger oil supply port. Tighten to specification

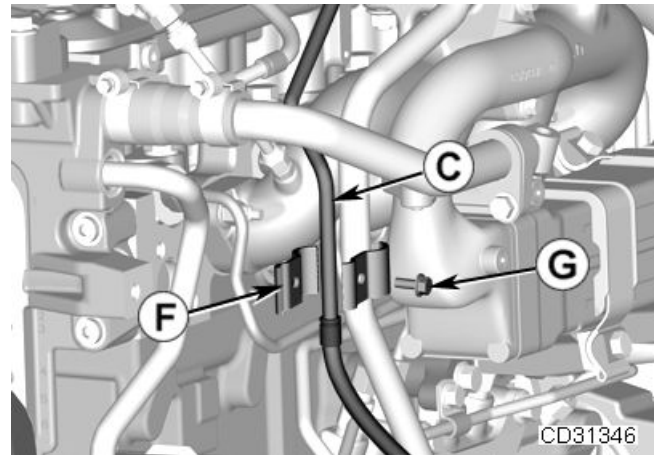
Specification

Oil Supply Line
Adapter Fitting-to-
Turbocharger—Torque..... 25 N·m (18 lb.-ft.)

4. Install oil supply line (C) on adapter fitting (D) with new O-ring (E). Tighten oil supply line nut to specification

Specification

Oil Supply Line-to-
Turbocharger—Torque..... 23 N·m (17 lb.-ft.)



Install 2-piece Clamp

CD31346 —UN—06MAY11

A—Adapter Fitting
B—O-ring
C—Oil Supply Line
D—Adapter Fitting

E—O-ring
F—2-piece Clamp
G—Cap Screw

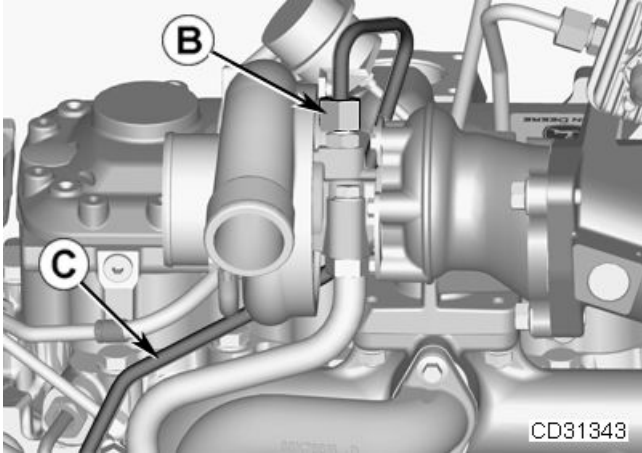
5. Install the 2-piece clamp (F) on turbocharger oil supply and oil drain lines. Install cap screw (G) and tighten to specification.

Specification

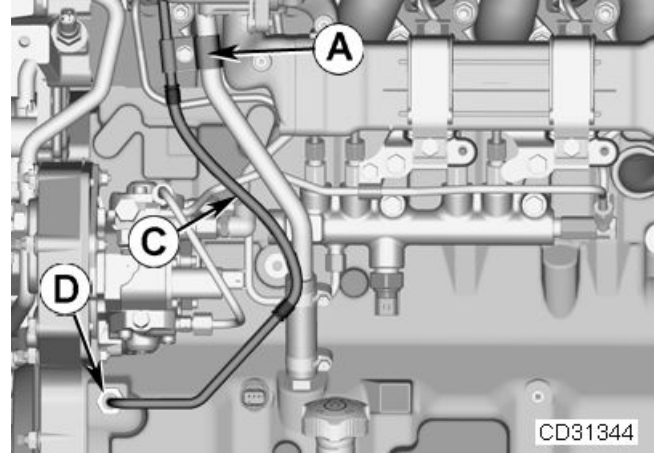
2-Piece Clamp-to-
Turbocharger Oil
Supply and Oil Drain
Lines—Torque..... 15 N·m (11 lb.-ft.)

CD05019,000001D -19-09AUG12-1/1

Wastegate Turbocharger Oil Supply Line — Removal



Remove Oil Supply Line from Turbocharger



Remove Oil Supply Line from Cylinder Block

A—2-piece Clamp
B—Oil Supply Line Nut
C—Oil Supply Line
D—Oil Supply Line Nut

1. Loosen nut (B) holding oil supply line (C) to Wastegate turbocharger.
2. Remove the 2-piece clamp (A) holding oil supply and oil drain lines together.
3. Loosen nut (D) at cylinder block connection and remove the Wastegate turbocharger oil supply line.

CD05019,000001C -19-04MAY11-1/1

Electronic Injectors — Cleaning (In Engine)

1. Inhibit Exhaust Filter Cleaning prior to the following steps.
2. Change engine primary and secondary fuel filters.
3. Prime fuel system and start engine.
4. Run engine until normal operating temperature is reached.
5. Disconnect the fuel supply to the primary fuel filter.

Connect the 2 meter (6 ft.) red hose (supply) to the primary fuel filter using the appropriate adapter in the SW10015JD Fuel Injector Flush Kit.

Connect the other end of the red hose to the bottom fitting of the kit reservoir tank.
6. Disconnect fuel return-to-fuel tank. This location will vary for each application.

Connect the 2 meter (6 ft.) black hose (return) to the tank line using the appropriate adapter in the SW10015JD Fuel Injector Flush Kit.

Connect the other end of the black hose to the top side of the kit reservoir tank so the return fuel flows through the flush kit filter.
7. Fill the reservoir tank with the full contents of John Deere Diesel Fuel Clean-Up solution. Open valve on the reservoir tank.
8. Key-on engine to check for leaks and verify return fuel is flowing back to the reservoir. If the fluid level drops

quickly, shut-off engine and check to make sure all of the return fuel is getting back to the tool reservoir.

9. Start engine and run at 1100 rpm.

While system is flushing, rapidly increase and decrease throttle position three times within 3 to 5 seconds. Perform this throttle activity at 5, 10 and 15 minute time intervals during the flush process.

Allow engine to run for 20-40 minutes. Watch for fuel to get to the bottom of the warning decal. **Do not let the engine run out of fuel.**

Shut-off engine.

10. Remove and inspect the kit return filter element (SW10967P1) for debris. If badly contaminated, repeat Steps 6-9 to insure fuel system is fully clean.
11. Close valve on reservoir tank. Disconnect kit hoses and adapters. Reconnect fuel supply and fuel return lines.
12. Start engine and check for fuel leaks. Allow engine to run for 10-15 minutes to completely purge the cleaner solution from the fuel system.
13. Enable Exhaust Filter Cleaning.

Additional Information

1. Replacement red and black flush hoses - SW00889
2. Replacement flush tool seal kit - SW00890

RE42287,000059E -19-27FEB12-1/1

Electronic Injectors — Installation

Special Tools:

- None

Consumable Material:

- Petroleum Jelly

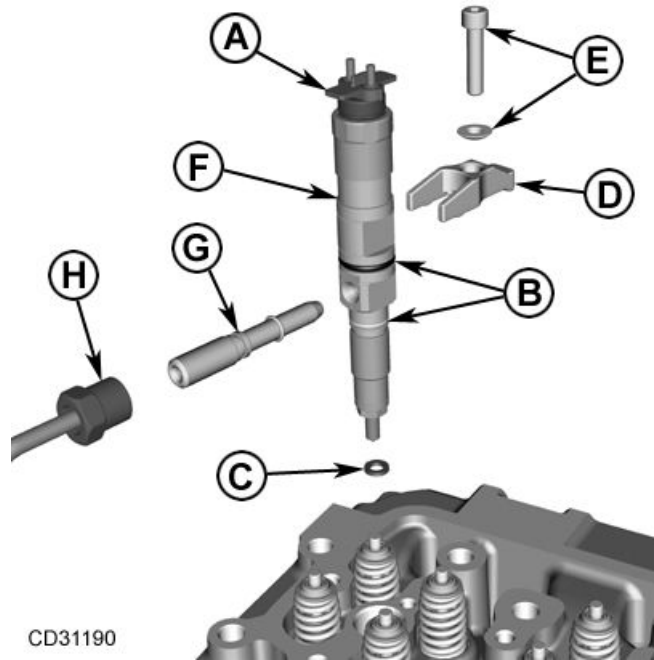
NOTE: When servicing injectors, it is important to complete the electronic injector calibration procedure using Service ADVISOR. Each injector has a specific calibration and this information can be obtained by scanning the bar code on the sheet supplied with the electronic injector and downloading the injector payload information from the John Deere Custom Performance™ website.

An alternative for obtaining the fuel calibration data from Custom Performance is to use the part number and injector serial number stamped on the injector. ECU can also be directly loaded with the 30 digits code of the identification tag (A).

The other way is to manually type the injector information into Custom Performance to get the injector payload.

The last way to calibrate an injector is to manually type the injector information into Service ADVISOR injector calibration.

If the ECU is not programmed with the correct information for each injector and the correct cylinder that it is in then engine performance and emissions will be affected.



CD31190

Injector Installation

CD31190 —UN—07MAY10

- | | |
|-------------------------------|--------------------------------|
| A—Injector Identification Tag | E—Screw and Spherical Washer |
| B—O-rings | F—Injector |
| C—Combustion Sealing Washer | G—Feed Tube |
| D—Injector Clamp | H—High-Pressure Injection Line |

1. Install injector O-rings (B) and lubricate with petroleum jelly.

IMPORTANT: Use a new combustion sealing washer anytime that an injector is to be installed.

2. Ensure that the used combustion sealing washer (C) has been removed from cylinder head bore then install a new one on injector. Apply petroleum jelly to hold washer in place.

IMPORTANT: During installation, do not twist the top of the injector. This will cause the calibration to be changed.

3. Position injector clamp (D) with screw and spherical washer (E) on injector (F). Then install injector into cylinder head bore.

IMPORTANT: Ensure that the fuel feed hole on the side of injector is positioned toward the side feed tube (G).

4. Tighten injector clamp screw (E) to specification.

Specification

Injector Clamp
Screw—Torque..... 10 N·m (89 lb-in.)

Then loosen the screw 60 degrees.

5. Perform: [High-Pressure Injection Lines — Installation](#)
6. Tighten injector clamp screw (E) to final torque specification.

Specification

Injector Clamp
Screw—Torque..... 37 N·m (27 lb-ft)

NOTE: Do not remove the identification tag (A) from injector. The information contained on this tag may help diagnose engine performance problem.

7. Perform: [Injector Wiring Harness — Installation](#).

Special Tools:

- None

Consumable Material:

- Gasket, LOCTITE® 242

8. Using Service ADVISOR, calibrate the ECU for proper electronic injector fueling.

Continued on next page

MK41968,00000B9 -19-17APR12-1/2

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MK41968,00000B9 -19-17APR12-2/2

Electronic Injectors — Removal

Special Tools:

- JDG11186—Injector Removal Tool

NOTE: Injectors have an identification tag (A) containing the injector and the performance data to program the ECU at the factory. Injectors and engine cylinders are matched in the ECU database. If a new injector is installed or injector is swapped with another one, the ECU must be updated with the new information using Service ADVISOR.

1. Perform High-Pressure Injection Lines — Removal.

Special Tools:

- None

2. Perform Injector Wiring Harness — Removal.

Special Tools:

- None

NOTE: Injectors can be removed with the rocker arm shaft carrier (B) installed or removed.

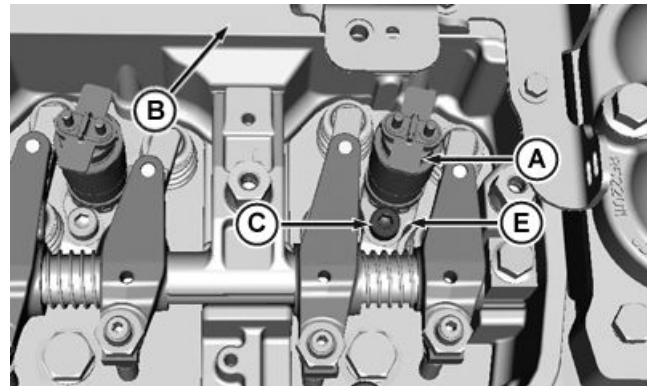
3. Remove injector clamp screw (C).

IMPORTANT: When removing the injector, do not twist the top of the injector. This will cause the calibration to be changed. Immediately cover injector bore to prevent dirt from entering the fuel system.

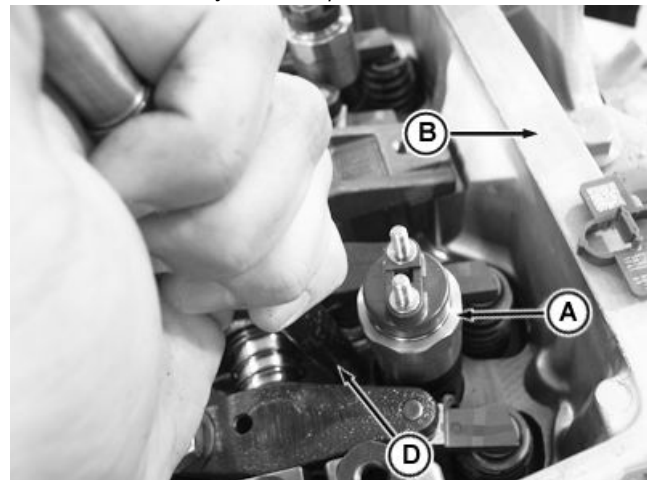
Store injector in a clean location.

4. Insert JDG11186 tool (D) into injector clamp (E) hole then pry the injector (A) up.
5. Verify the injector is identified from which cylinder it was removed.
Remove the combustion sealing washer using a magnet and discard it.

NOTE: Electronic injector cannot be serviced nor tested for opening pressure as it is controlled



Injector Clamp Screw Removal



Injector Removal

A—Electronic Injector
B—Rocker Arm Shaft Carrier
C—Injector Clamp Screw

D—JDG11186 Injector Removal Tool
E—Injector Clamp

electronically. If any component of the injector fails, the entire injector must be replaced.

MK41968,00000B8 -19-26SEP11-1/1

RG20331 —UN—28JUL11

RG20332 —UN—03MAY11

Flow Dampers — Installation

Special Tools:

- None

Consumable Material:

- Flow Damper

1. Install new flow damper on fuel rail. Tighten flow damper to initial specification.

Specification

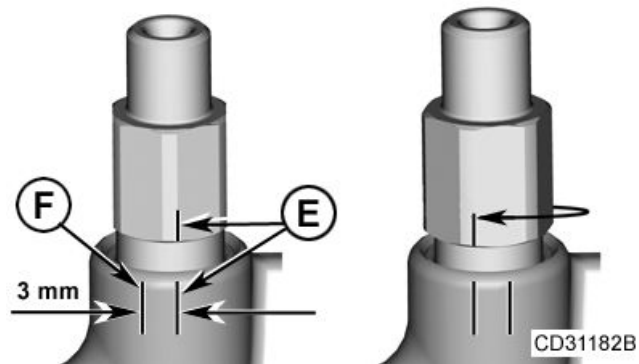
Flow damper-to-Fuel rail—Initial Torque..... 30 N·m (22 lb.-ft.)

2. Draw alignment lines (E) on flow damper and fuel rail using the hex edges of the flow damper as a guide.
3. Draw a parallel line (F) 3 mm (0.118 in.) in clockwise direction from original line on fuel rail.
4. Set torque wrench to 140 N·m (104 lb.-ft.). Tighten flow damper until the line on flow damper aligns with or slightly passes second line on fuel rail. If no click is heard, the flow damper is properly tightened. If torque wrench clicks before marks are in alignment, complete step 5.

NOTE: Following step 5, if torque wrench still clicks before marks are in alignment, replace flow damper. If a replacement flow damper cannot be properly tightened, change fuel rail assembly.

5. Set torque wrench to 160 N·m (118 lb.-ft.). Again tighten flow damper until the line on flow damper aligns with or slightly passes second line on fuel rail.
6. Repeat the procedure for the remaining cylinders
7. Perform: High-Pressure Injection Lines — Installation.

Special Tools:



E—Flow Damper and Fuel Rail Alignment Lines F—Fuel Rail Parallel Line Alignment Lines

JDG11084—Injection Line Socket

Consumable Material:

- None

CAUTION: Fuel will be under high-pressure when checking for leaks. Use a piece of cardboard or wood as a protective shield when first starting engine. Keep hands or body away when checking for leaks.

NOTE: To prime the fuel system see in Section 04, Group 155, Fuel System Bleeding.

8. After flow damper replacement, start engine and run up to high idle then check for leaks.

MK41968,00000B3 -19-11JUL11-1/1

CD31182B —UN—03MAY10

Flow Dampers — Removal

Special Tools:

- None

1. Perform: High-Pressure Injection Lines — Removal.

Special Tools:

- JDG11184—Injection line socket
- JDG11185—Side Feed Tube Puller

IMPORTANT: Flow dampers are not reusable.

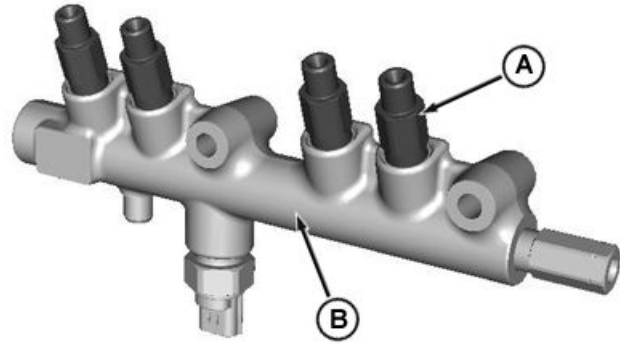
2. Remove flow damper (A) from fuel rail (B), and discard it.
3. Immediately install a new flow damper to prevent foreign material contamination. See Flow Dampers — Installation.

Special Tools:

- None

Consumable Material:

- None



Flow Damper Removal

A—Flow Damper

B—High-Pressure
Common-Rail

4. Repeat the procedure for the remaining cylinders.

MK41968,00000B2 -19-05OCT11-1/1

RG20314—UN—28APR11

Fuel Filters Bracket — Installation

Special Tools:

- None

Consumable Material:

- None

1. Place brackets (A) onto engine. Engage cap screws (B) and (C).
2. Slide wiring harness bracket (D) over cap screw (E). Then install the assembly onto fuel filters bracket.
3. Tighten cap screws (B), (C), and (E) to specification.

Specification

Fuel Filters Bracket-to-Engine—Torque..... 50 N·m (37 lb.-ft.).

4. If needed, install caged nuts (F) on wiring harness bracket.
5. If needed, perform: Final Fuel Filter Assembly — Installation.

Special Tools:

- None

Consumable Material:

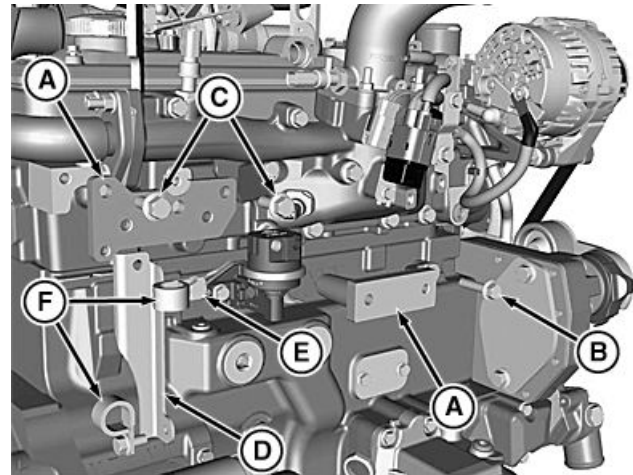
- None

6. If needed, perform: Primary Fuel Filter Assembly — Installation.

Special Tools:

- None

Consumable Material:



Install Fuel Filters Bracket

A—Fuel Filter Brackets
B—Cap Screw
C—Cap Screw

D—Wiring Harness Bracket
E—Cap Screw
F—Caged Nuts

- None

7. Reinstall wiring harness clamp onto bracket (D) and tighten to specification.

Specification

Wiring Harness Clamp-to-Bracket—Torque..... 20 N·m (15 lb.-ft.)

NOTE: Bleed fuel system. See Fuel System Bleeding in Section 04, Group 150 in this manual.

MK41968,00000A2 -19-11JAN12-1/1

RG21057—UN—24OCT11

Fuel Filters Bracket — Removal

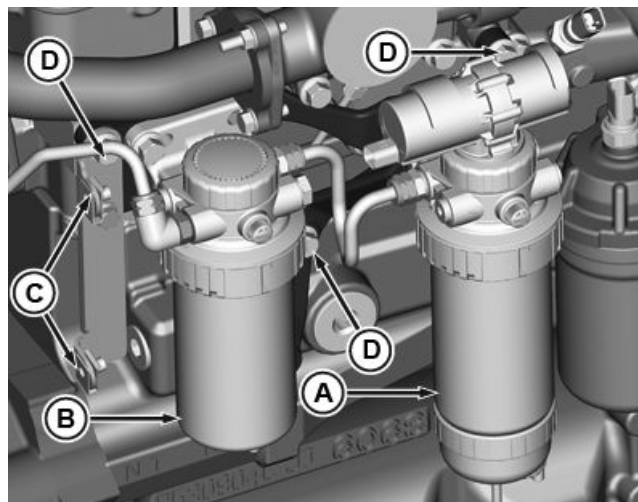
Special Tools:

- None

1. Disconnect all the fuel lines from the primary and secondary fuel filter header.
2. Disconnect wiring harness lead from the low-pressure fuel pump on fuel filter header
3. Disconnect water-in-fuel sensor connector.
4. Remove cap screws holding wiring harness at locations (C).
5. Remove cap screws (D) and the fuel filters bracket.

A—Primary Fuel Filter Assembly
B—Secondary Fuel Filter Assembly

C—Locations for Wiring Harness Holding Clamps
D—Cap Screws

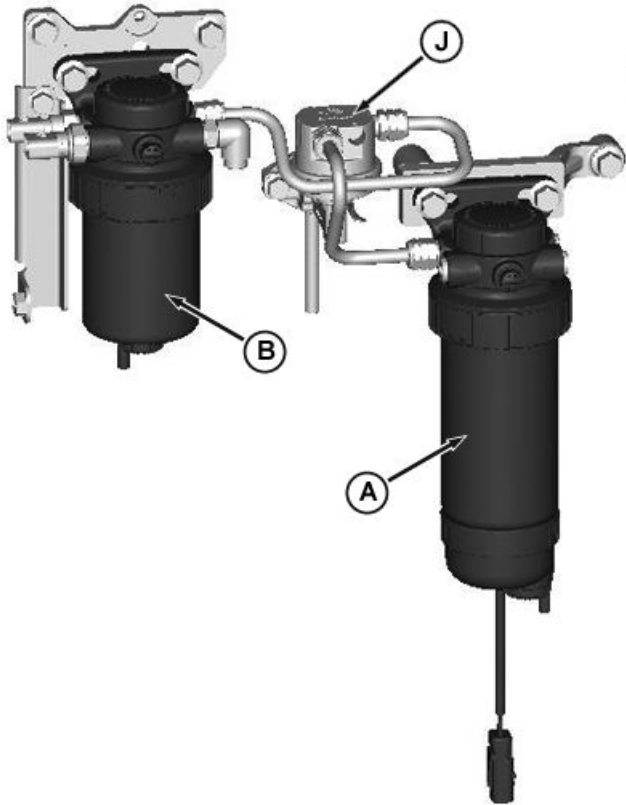


Fuel Filters Bracket Removal

RG19826 —UN—28DEC10

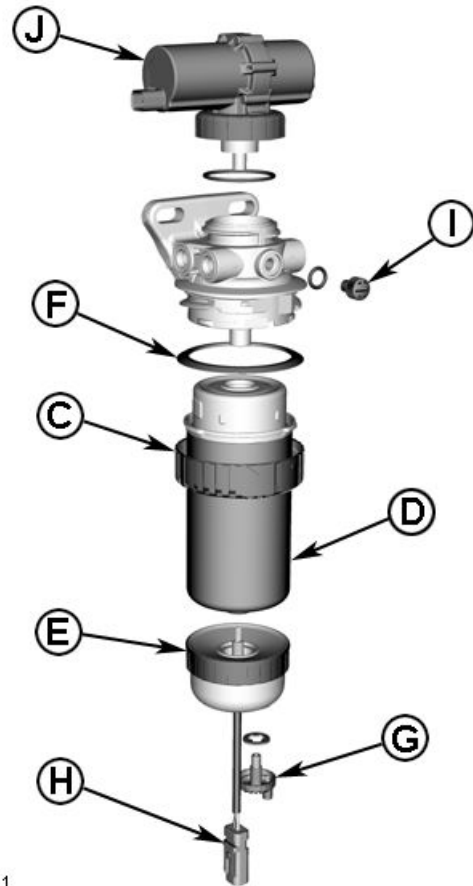
MK41968,00000A1 -19-11MAR11-1/1

Fuel Filter Elements — Replace



Fuel Filter Typical Location

RG20340 —UN—04MAY11



CD31271

Replace Fuel Filter Element - Exploded View

CD31271 —UN—25JAN11

NOTE: Before opening system, thoroughly clean filter header and surrounding area to prevent contamination into the fuel system.

NOTE: Refer to operator's manual for proper servicing and (hourly) replacement intervals.

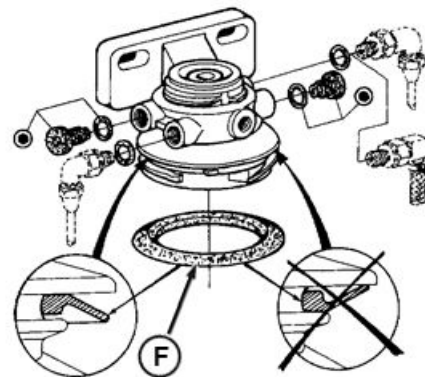
1. When applicable, disconnect water-in-fuel sensor connector (H).
2. Loosen retaining ring (C) by turning, and remove filter element (D).

NOTE: To avoid spilling of fuel, seal old filter element using plug from new element.

3. If equipped, remove sediment glass bowl (E) from previous filter element and reinstall it onto the new element.

IMPORTANT: Install fuel filter element dry. Do not prefill new fuel filters as it could contaminate fuel system with unfiltered fuel.

4. Install dust seal (F) as shown.



Replace Fuel Filter Element - Dust Seal

RG20412 —UN—04MAY11

A—Primary Fuel Filter with Water Separator
B—Secondary Fuel Filter
C—Retaining Ring
D—Filter Element
E—Sediment Bowl

F—Dust Seal
G—Drain Screw
H—Water-in-Fuel Sensor Connector
I—Bleed Screw
J—Low-Pressure Fuel Pump

5. Position the new filter element in proper location inside the mounting base then tighten retaining ring about 1/3 turn until ring fits into the detent. DO NOT overtighten.

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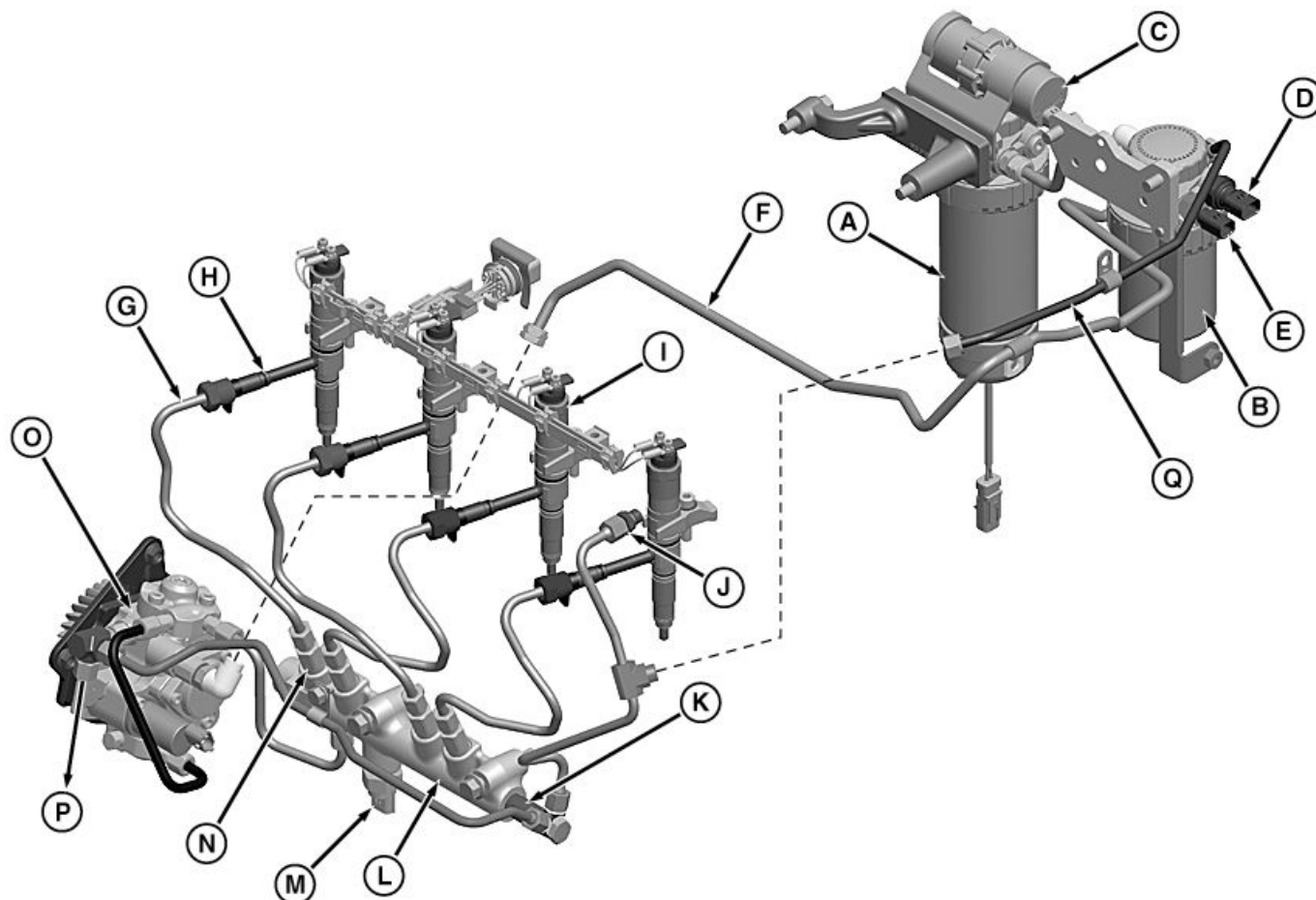
MK41968,000009C -19-26JUL11-1/2

6. If applicable, connect water-in-fuel sensor connector (H).

NOTE: To prime the fuel system see in Section 04 group 155, Fuel System Bleeding.

MK41968,000009C -19-26JUL11-2/2

Fuel System — Components



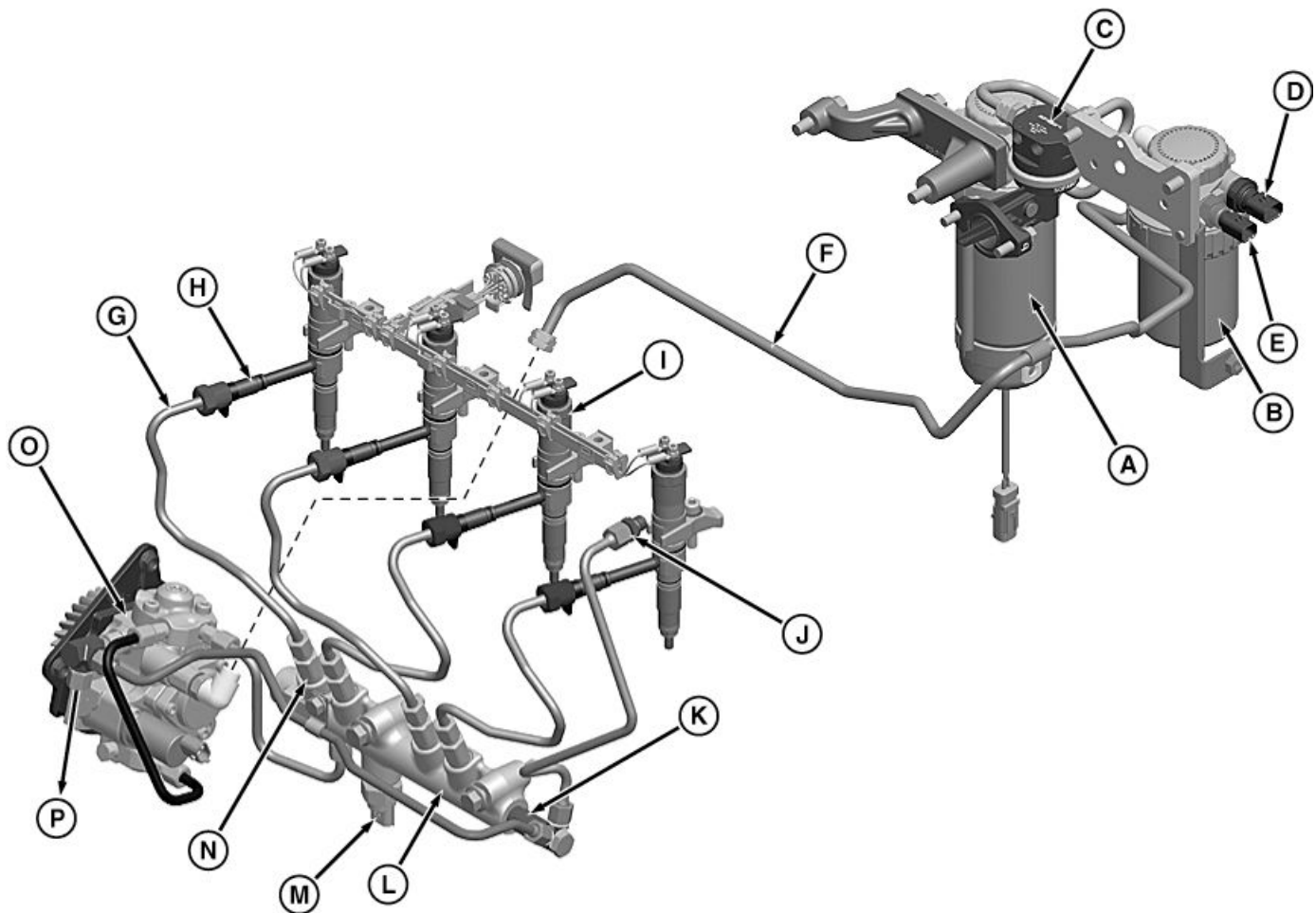
With Electrical Transfer Pump

- | | | | |
|---|--|---------------------------------------|----------------------|
| A—Secondary Fuel Filter | G—High-pressure Injection Line | K—Pressure Limiter | Q—Fuel Leak-Off Line |
| B—Primary Fuel Filter | H—Injector Feed Tube | L—High Pressure Common Rail (HPCR) | |
| C—Electronic Transfer Pump | I—Electronic Injector | M—Fuel Rail Pressure Sensor | |
| D—Low Pressure Fuel Pressure Sensor | J—Electronic Injector Fuel Return Line (From Injector via Rocker Arm Shaft Carrier Fuel Gallery) | N—Flow Damper | |
| E—Fuel Temperature Sensor | | O—High Pressure Fuel Pump | |
| F—Fuel Flow from Secondary Fuel Filter to High Pressure Fuel Pump | | P—High Pressure Fuel Pump Return Line | |

Continued on next page

MK41968,000009A -19-21NOV11-1/2

RG20691 —UN—01AUG11



With Mechanical Transfer Pump

- | | | | |
|-------------------------------------|---|--|---------------------------------------|
| A—Secondary Fuel Filter | F—Fuel Flow from Secondary Fuel Filter to High Pressure Fuel Pump | J—Electronic Injector Fuel Return Line (From Injector via Rocker Arm Shaft Carrier Fuel Gallery) | M—Fuel Rail Pressure Sensor |
| B—Primary Fuel Filter | G—High-pressure Injection Line | K—Pressure Limiter | N—Flow Damper |
| C—Mechanical Transfer Pump | H—Injector Feed Tube | L—High Pressure Common Rail (HPCR) | O—High Pressure Fuel Pump |
| D—Low Pressure Fuel Pressure Sensor | I—Electronic Injector | | P—High Pressure Fuel Pump Return Line |
| E—Fuel Temperature Sensor | | | |

MK41968,000009A -19-21NOV11-2/2

RG20690—UN—01AUG11

Fuel System — General Information

The Level 23 Engine Control Unit (ECU) is used to control both the engine fuel system and the After-treatment dosing system. The engine fuel system includes the high-pressure fuel pump, high-pressure common-rail, electronic wiring harness and injectors.

The electronic injectors can not be serviced. If any part of the component fails, the entire injector must be replaced.

Electronic injectors cannot be tested for opening pressure because they are controlled electronically.

High-pressure injection lines are a one time use item.

When servicing injectors it is important to complete the electronic injector calibration procedure. Each injector has

a specific calibration and this information can be obtained by scanning the bar code on the service sheet supplied with the electronic injector and downloading the injector information from the John Deere Custom Performance™ web site.

An alternative is to enter the injector serial number, part number, and QR code listed on the injector, into Custom Performance to get the injector payload.

The last way to calibrate an injector is to manually type the injector information into Service ADVISOR injector calibration.

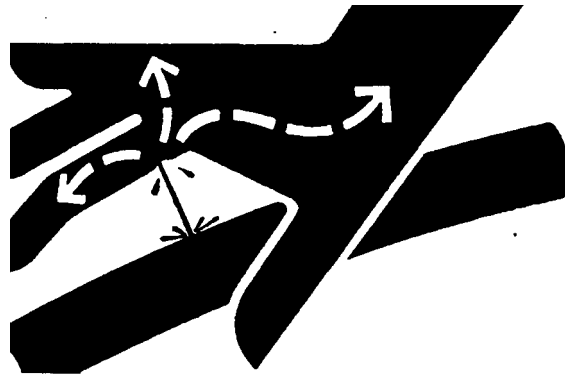
If the ECU is not programmed with the correct information for each injector and the correct cylinder that it is in then engine performance and emissions will be affected.

MK41968,0000099 -19-05OCT11-1/1

Fuel System — Relieve Pressure

⚠ CAUTION: Escaping diesel fuel under pressure can have sufficient force to penetrate the skin, causing serious injury. Before disconnecting lines, be sure to relieve pressure. Before applying pressure to the system, be sure ALL connections are tight and lines, pipes and hoses are not damaged. Keep hands and body away from pin holes and nozzles which eject fluid under pressure. Use a piece of cardboard or wood, rather than hands, to search for suspected leaks.

If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.



High-pressure fluids

X9811 —UN—23AUG88

MK41968,000009B -19-11MAR11-1/1

High-Pressure Common-Rail (HPCR) — Installation

Special Tools:

- None

Consumable Material:

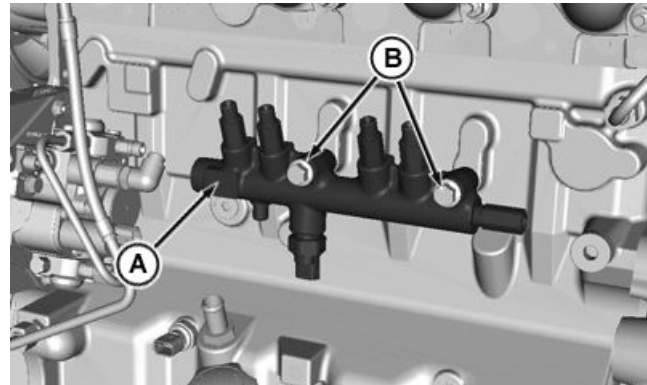
- High Pressure Line (Pump to HPCR), High Pressure Lines (HPCR to injectors), Fuel Leak-off Line (HPCR to Pump)

1. Without Engine Mount ECU:

Align the high pressure common-rail to the cylinder block mounting holes. Install the flanged hex head screws by hand.

Specification

HPCR Flanged Hex Head
Screws—Torque..... 63 N•m (46 lb.-ft.)



High-Pressure Common-Rail Installation

A—High-Pressure
Common-Rail

B—Cap Screws or Studs

RG20327 —UN—03MAY11

MK41968,00000B1 -19-20JUN12-1/7

2. With Engine Mount ECU:

Align the ECU mounting bracket, high pressure common-rail (rail), and cylinder block (block) mounting holes. Install the flanged hex head screws by hand.

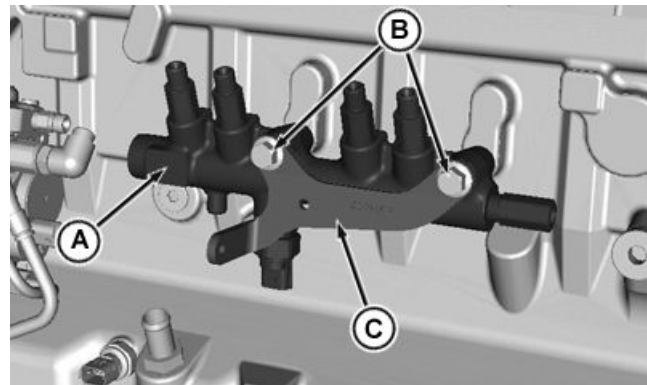
Specification

HPCR Flanged Hex Head
Screws—Torque..... 63 N•m (46 lb.-ft.)

A—High-Pressure
Common-Rail

C—ECU Mounting Bracket

B—Cap Screws or Studs



High-Pressure Common-Rail Installation

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MK41968,00000B1 -19-20JUN12-2/7

RG20326 —UN—03MAY11

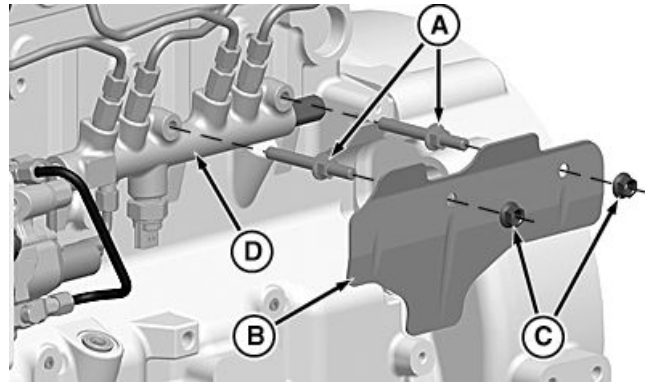
3. **With High-Pressure Common-Rail Heat Shield:**
Align the high pressure common-rail (D) to the cylinder block mounting holes. Install the studs (A). Torque to specifications.

Specification

HPCR Studs—Torque..... 63 N•m (46 lb.-ft.)

A—Studs
B—Heat Shield

C—Nuts
D—High-Pressure Common-Rail



High-Pressure Common-Rail Installation

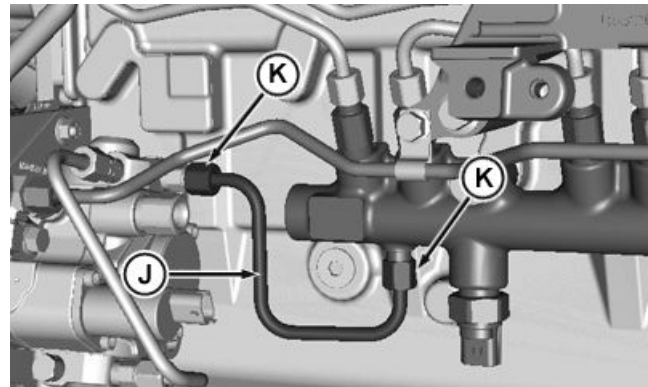
RG21615—UN—18JUN12

MK41968,00000B1 -19-20JUN12-3/7

4. Install new pump-to-rail high pressure fuel line (J). Tighten nuts (K) to specification at both ends.

Specification

Pump-To-Rail High Pressure Fuel Line—Torque..... 23 N•m (17 lb.-ft.)
Torque Turn 60°



Pump-To-Rail High Pressure Fuel Line

RG20328—UN—03MAY11

MK41968,00000B1 -19-20JUN12-4/7

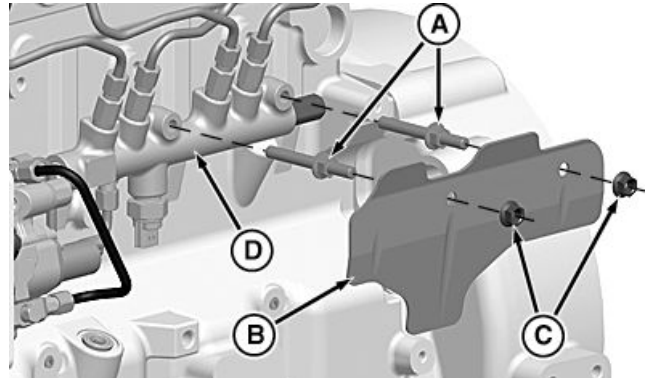
5. Install heat shield (B) with nuts (C). Torque to specifications.

Specification

Heat Shield Nuts—Torque..... 63 N•m (45 lb.-ft.)

A—Studs
B—Heat Shield

C—Nuts
D—High-Pressure Common-Rail



High-Pressure Common-Rail Heat Shield

RG21615—UN—18JUN12

Continued on next page

MK41968,00000B1 -19-20JUN12-5/7

6. Install new leak-off line (G) between the dual banjo fitting and injection pump fitting using a P-clamp (F) attached to the EGR cooler bracket using an M8 cap screw. Tighten the M8 cap screw to specification.

Specification

P-Clamp Cap
Screw—Torque..... 37 N•m (27 lb.-ft.)

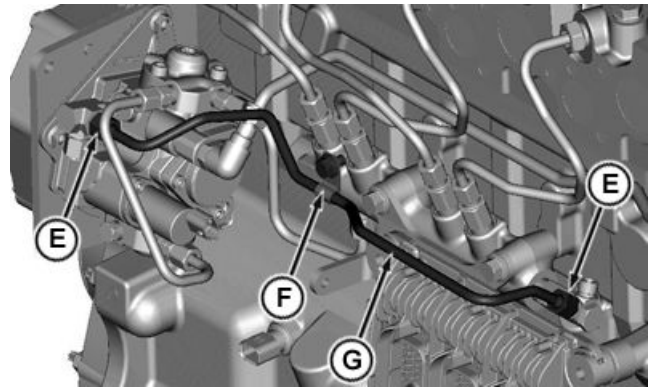
7. Tighten nuts to specification at both ends.

Specification

Leak-off Line
Nuts—Torque..... 16 N•m (12 lb.-ft.)

E—Line Nuts
F—P-clamp

G—Leak-off Line



Leak-off Line Installation

MK41968,00000B1 -19-20JUN12-6/7

RG20324 —UN—03MAY11

8. Install the leak off line (I) between the carrier fitting and dual banjo fitting. Tighten nuts (H) to specification.

Specification

Leak-off Line
Nuts—Torque..... 16 N•m (12 lb.-ft.)

9. Perform: High-Pressure Injection Lines — Installation.

Special Tools:

- JDG11184—Injection Line Socket

Consumable Material:

- Feed Tubes, Petroleum Jelly, Engine Oil

10. Perform ECU Installation.

Special Tools:

- None

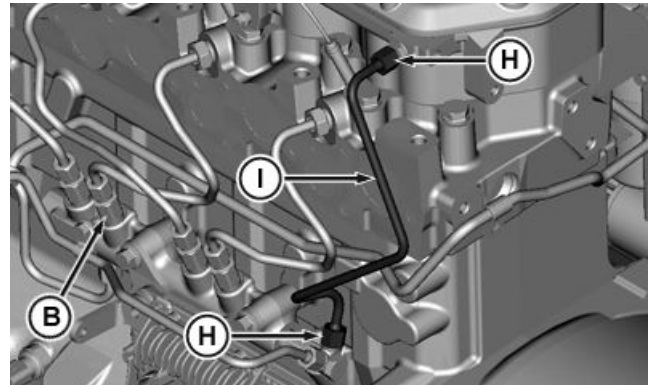
Consumable Material:

- None

11. Perform EGR Cooler Installation.

Special Tools:

- None



Leak-off Line Installation

H—Line Nuts

I— Leak-off Line

Consumable Material:

- Cap Screws (4) — EGR Cooler Gas Inlet Pipe
- EGR Clamp Assembly (2)

12. Install wiring harness. See Wiring Harness Routing.

MK41968,00000B1 -19-20JUN12-7/7

RG20325 —UN—28JUL11

High-Pressure Common-Rail (HPCR) — Removal

Special Tools:

- None

1. Remove wiring harness.
2. Perform ECU — Removal (with engine mount ECU only).

Special Tools:

- None

3. Perform EGR Cooler Removal.

Special Tools:

- None

4. Perform: High-Pressure Injection Lines — Removal.

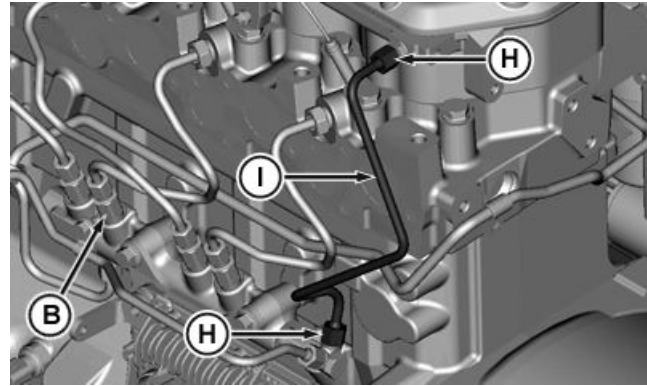
Special Tools:

- JDG11184—Injection Line Socket
- JDG11185—Side Feed Tube Puller

NOTE: When removing the high-pressure injection lines, do not remove the flow dampers (B).

5. **High-Pressure Common-Rail (HPCR) — Removal**

- a. Remove line nuts (H) and leak-off line (I).



Leak-off Line Removal

B—Flow Dampers (4)
H—Line Nuts

I— Leak-off Line

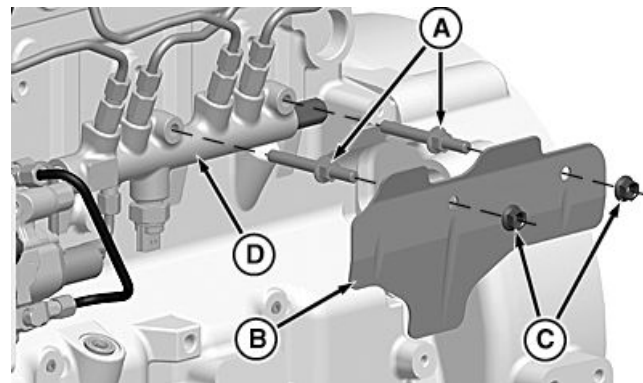
RG20325 —UN—28JUL11

MK41968,00000B0 -19-20JUN12-1/7

- b. Remove nuts (C) and heat shield (B).

A—Studs
B—Heat Shield

C—Nuts
D—High-Pressure
Common-Rail



Heat Shield Removal

RG21615 —UN—18JUN12

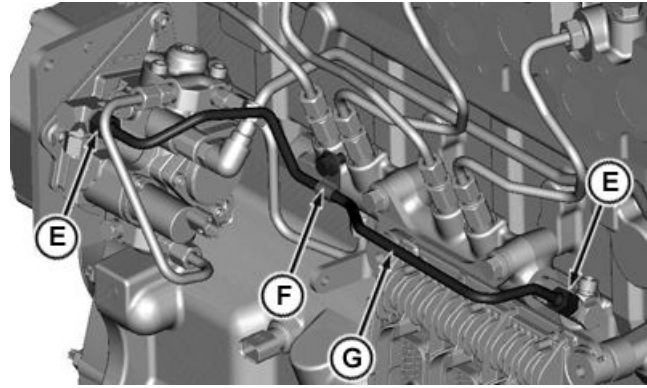
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MK41968,00000B0 -19-20JUN12-2/7

- c. Remove P-clamp (F), line nuts (E) and leak-off line (G)

E—Line Nuts
F—P-clamp

G—Leak-off Line



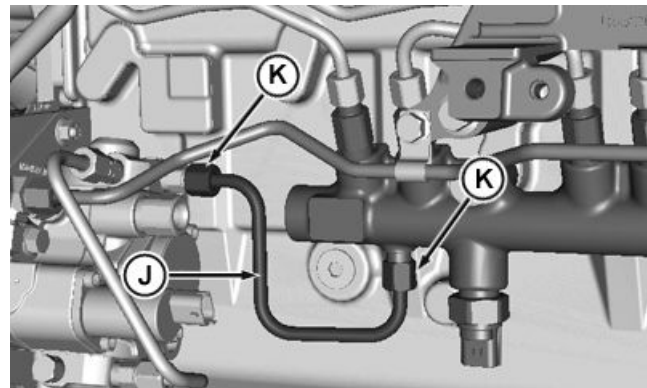
Leak-off Line Removal

MK41968,00000B0 -19-20JUN12-3/7

RG20324 —UN—03MAY11

- d. Remove nuts (K) and pump-to-rail high pressure fuel line (J).

NOTE: Do not reuse the line that goes between the high pressure common rail and high pressure fuel pump.



Pump-To-Rail High Pressure Fuel Line

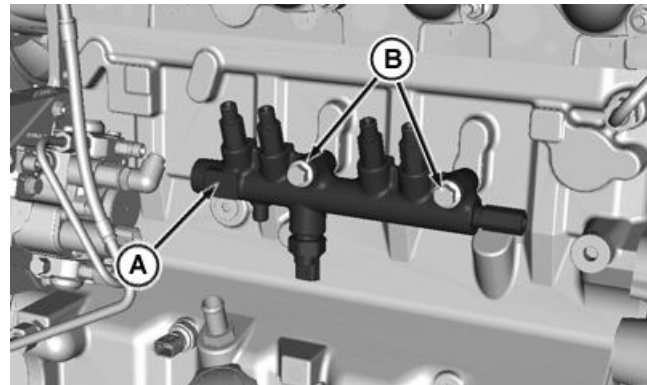
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RG20328 —UN—03MAY11

- e. **Without Engine Mount ECU:**
Remove cap screws (B) along with the high pressure common-rail (A).

A—High-Pressure
Common-Rail

B—Cap Screws or Studs



High-Pressure Common-Rail Removal

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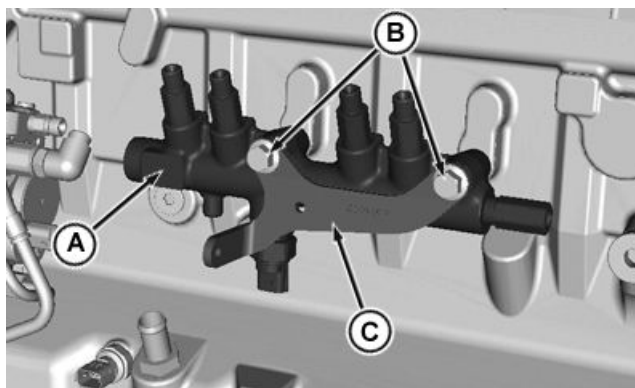
RG20327 —UN—03MAY11

f. With Engine Mount ECU:

Remove cap screws (B) and ECU mounting bracket (C) along with the high pressure common-rail (A).

A—High-Pressure
Common-Rail
B—Cap Screws or Studs

C—ECU Mounting Bracket



High-Pressure Common-Rail Removal

MK41968,00000B0 -19-20JUN12-6/7

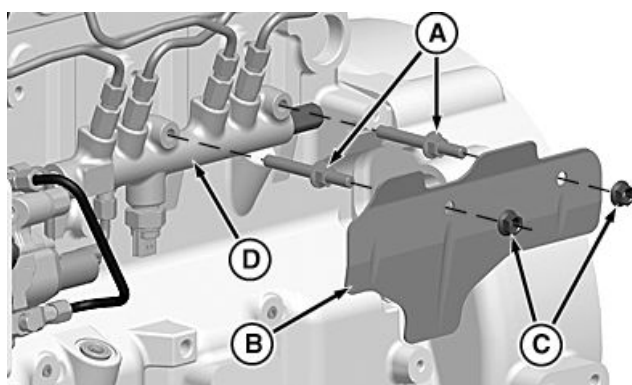
RG20326—UN—03MAY11

g. With High-Pressure Common-Rail Heat Shield:

Remove studs (A) along with the high pressure common-rail (D).

A—Studs
B—Heat Shield

C—Nuts

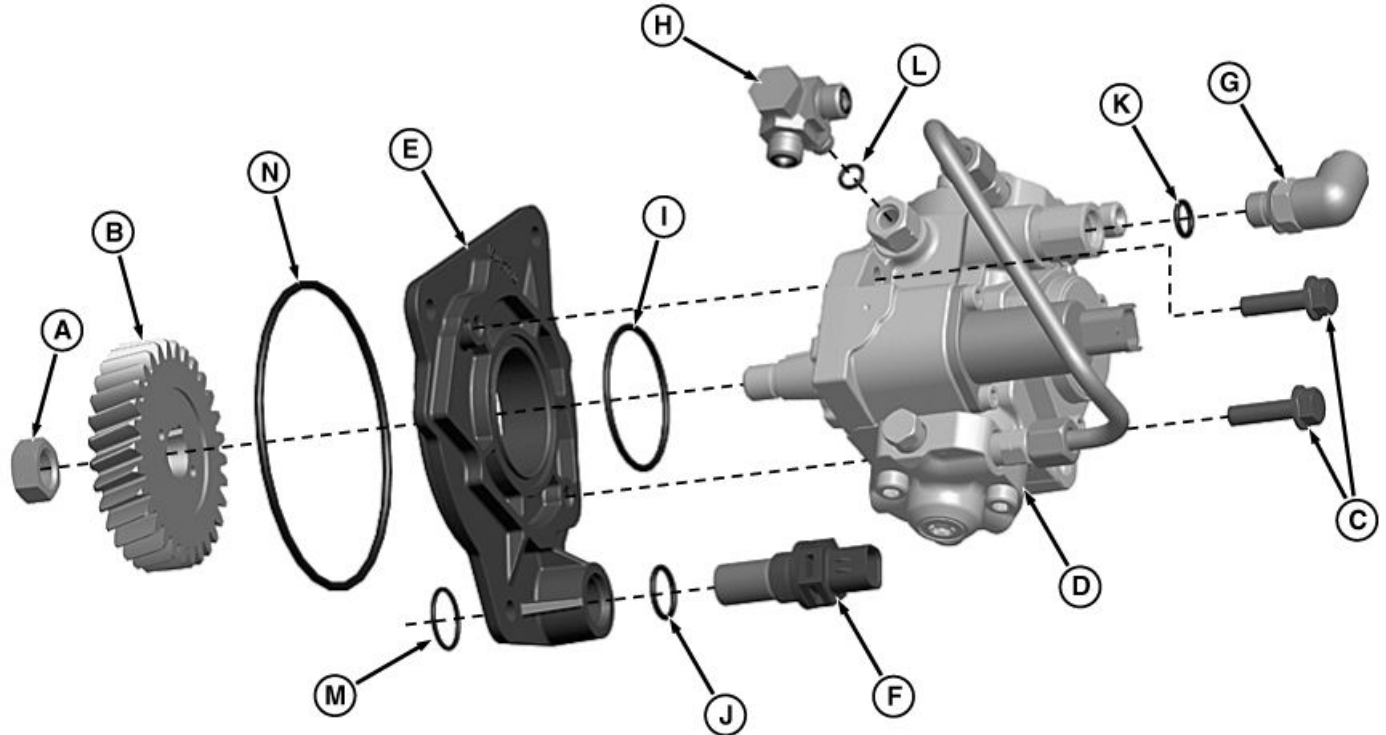


Heat Shield Removal

MK41968,00000B0 -19-20JUN12-7/7

RG21615—UN—18JUN12

High-Pressure Fuel Pump — Disassembling and Reassembling



High-pressure Fuel Pump Exploded View

A—Drive Gear Nut
B—Drive Gear
C—Cap Screws
D—High-pressure Fuel Pump
E—Adapter Plate

F—Camshaft Position Sensor
G—Fuel Supply Line Fitting
H—Fuel Return Line Fitting

I—O-ring
J—O-ring
K—O-ring
L—O-ring
M—O-ring (Between Adapter Plate And Engine Front Plate)

N—O-ring (Between Adapter Plate And Engine Front Plate)

Special Tools:

- JDG1560—Drive Gear Puller Plate

Consumable Material:

- Engine Oil or Petroleum Jelly

Disassembling

NOTE: Do not remove or disturb the fuel pump cross-over lines. These are not the service parts.

1. Remove nut (A). Use a vise with claws to block the gear (B) when loosening nut.
2. Remove gear (B) using JDG1560 tool.
3. Remove the two cap screws (C) and separate high-pressure pump (D) from adapter plate (E).
4. If needed, remove camshaft position sensor (F), fuel supply line fitting (G) and fuel return line fitting (H).

Reassembling

1. Apply engine oil or petroleum jelly to O-ring (I). Install high-pressure pump (D) on adapter plate (E) with a new O-ring (I). Tighten the two cap screws (C) to specification.

Specification

High-Pressure
Pump-to-Adapter
Plate—Torque..... 35 N•m (26 lb.-ft.)

IMPORTANT: The pump shaft and gear must be clean and dry before installation.

2. Install gear (B) on pump shaft then tighten nut (A) to specification. Use a vise with claws to block the gear when tightening nut.

Specification

High-Pressure Pump
Gear Nut—Torque..... 105 N•m (78 lb.-ft.)

3. Install camshaft position sensor (G) with new O-ring (J) onto adapter plate then tighten to specification.

Specification

Camshaft Position
Sensor-to-Adapter
Plate—Torque..... 14 N•m (10 lb.-ft.)

4. Install fuel supply line fitting (G) with new O-ring (K). Do not tighten at this stage.
5. Install fuel return line fitting (H) with new O-ring (L). Do not tighten at this stage.

AS58880,00011B0 -19-21FEB12-1/1

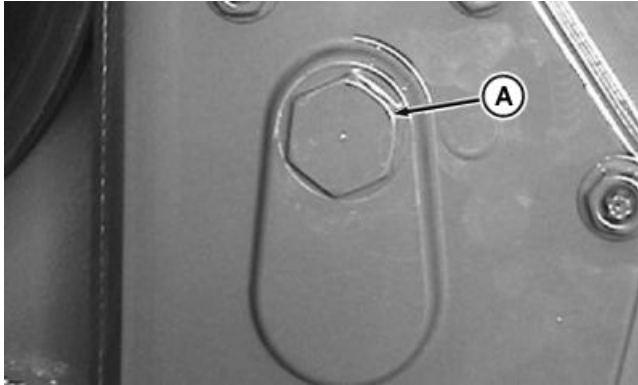
High-Pressure Fuel Pump — Installation

Special Tools:

- JDG1571—Timing Pin

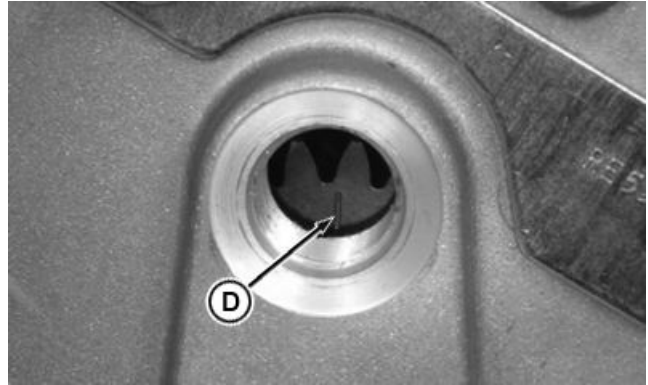
Consumable Material:

- Fuel line, High Pressure (Pump to HPCR), Fuel Leak-off Line (between pump and HPCR), Adapter Plate O-rings, LOCTITE® 242, Petroleum Jelly, Engine Oil, Soapy Water or Hydrite



Plug Removal to Access Gear Timing Mark

RG20483 —UN—24JUN11



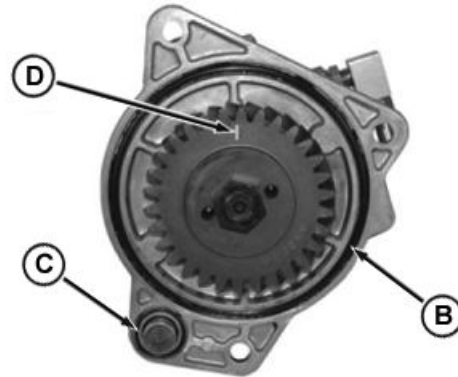
Gear Timing Mark

RG20484 —UN—24JUN11

NOTE: Timing mark (D) should be visible, as shown, when a cylinder is at top dead center.

NOTE: Do not remove or disturb the fuel pump cross-over lines. These are not the service parts.

1. Rotate engine to Top Dead Center (TDC) of a cylinder and install JDG1571 timing pin in flywheel.
2. Remove plug (A) to access gear timing mark.
3. Apply petroleum jelly, engine oil, soapy water, or hydrite to the o-rings (B and C) and install on adapter plate, then install high-pressure pump so that timing mark (D) can be seen through the timing gear cover opening as shown.



Installation of O-rings on Adapter Plate

RG20485 —UN—24JUN11

A—Plug To Access Gear Timing Mark
B—O-ring

C—O-ring
D—Timing Mark

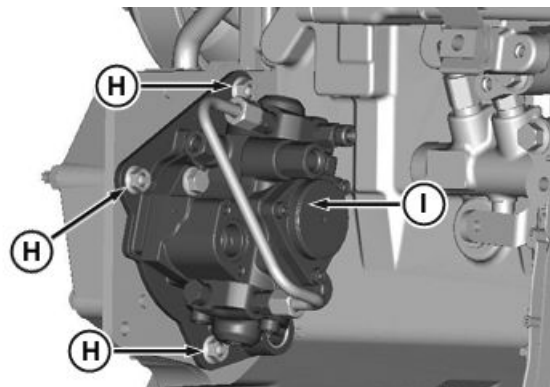
LOCTITE is a trademark of Loctite Corp.

AS58880,00011B1 -19-21FEB12-1/5

4. Apply LOCTITE® 242 on cap screws, then install pump with adapter plate. Tighten nuts (H) only finger tight, do not torque nuts at this time.

H—Cap Screws & Nut

I— High-pressure Fuel Pump



High-pressure Fuel Pump Installation

RG20338 —UN—04MAY11

Continued on next page

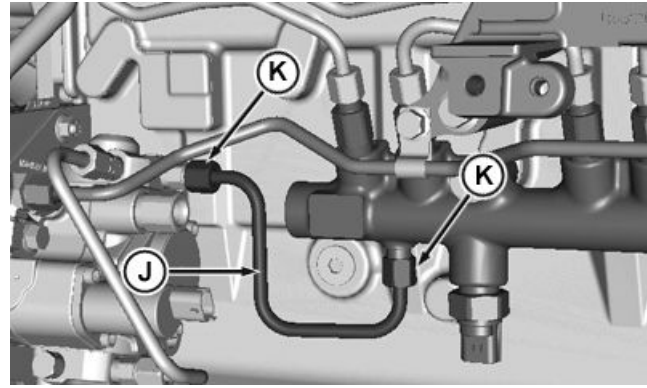
AS58880,00011B1 -19-21FEB12-2/5

NOTE: High pressure line between the pump and common rail is one time use. Do not reuse a previously torqued high pressure line.

5. Install new pump-to-rail high pressure fuel line (J). Tighten nuts (K) to specification at both ends.

Specification

Pump-To-Rail High Pressure Fuel Line—Torque.....	23 N•m (17 lb.-ft.)
Torque Turn	60°



Pump-To-Rail High Pressure Fuel Line

AS58880,00011B1 -19-21FEB12-3/5

RG20328 —UN—03MAY11

NOTE: Leak-off line is one time use. Do not reuse a previously torqued leak-off line.

6. If removed, install three-way fitting (X) onto pump and tighten to specification.

Specification

Three-Way Fitting—Torque.....	25 N•m (19 lb.-ft.)
-------------------------------	---------------------

Install new leak-off line (G) between the dual banjo fitting and injection pump fitting using a P-clamp (F) attached to the EGR cooler bracket using an M8 cap screw. Tighten the M8 cap screw to specification.

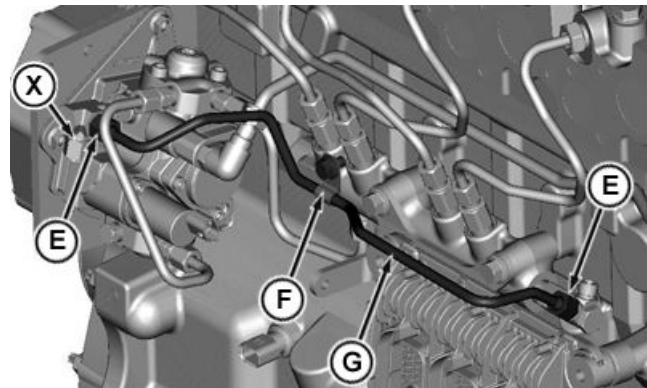
Specification

P-Clamp Cap Screw—Torque.....	37 N•m (27 lb.-ft.)
-------------------------------	---------------------

7. Tighten nuts to specification at both ends.

Specification

Leak-off Line Nuts—Torque.....	16 N•m (12 lb.-ft.)
--------------------------------	---------------------



Leak-off Line Installation

E—Line Nuts
F—P-clamp

G—Leak-off Line
X—Three-way Fitting

Continued on next page

AS58880,00011B1 -19-21FEB12-4/5

RG20716 —UN—04AUG11

8. Tighten high pressure fuel pump adapter nuts (H) to specification.

Specification

Adapter Plate-to-Engine
Front Plate—Torque..... 35 N•m (26 lb.-ft.)

9. If removed, install elbow fitting (I) onto the pump and tighten to specification.

Specification

Elbow Fitting—Torque..... 25 N•m (19 lb.-ft.)

Install fuel supply line (J) and tighten line nut to specification.

Specification

Supply Line
Nut—Torque..... 16 N•m (12 lb.-ft.)

10. Reconnect wiring harnesses.

11. Reinstall plug (A). Tighten to specification.

Specification

Plug to Access Gear
Timing Mark—Torque..... 60 N•m (44 lb.-ft.)

12. Install Turbocharger Oil Supply Line.
See in Section 02 Group 080,
VGT Turbocharger Oil Supply Line — Installation.

Special Tools:
• None

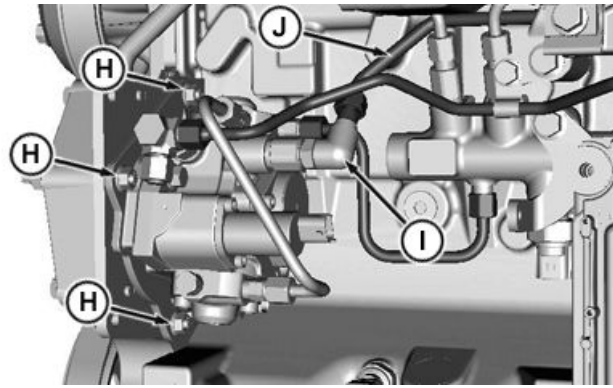
Consumable Material:
• O-rings (Oil Supply Line)

OR

Wastegate Turbocharger Oil Supply Line — Installation

Special Tools:
• None

Consumable Material:
• Oil drain line gasket



High-pressure Fuel Pump Installation

H—Cap Screws & Nut
I— Elbow Fitting

J— Fuel Supply Line to High Pressure Pump

- Adapter fitting Oring

13. Perform: VGT Turbocharger Oil Drain Line — Installation.

Special Tools:
• None

Consumable Material:
• Oil Drain Line Gasket

OR

Wastegate Turbocharger Oil Drain Line — Installation.

Special Tools:
• None

Consumable Material:
• Turbocharger Gasket

NOTE: To prime the fuel system, see in Section 04 Group 155, Fuel System Bleeding.

RG20715 —UN—04AUG11

AS58880,00011B1 -19-21FEB12-5/5

High-Pressure Fuel Pump — Removal

Special Tools:

- None

CAUTION: High-pressure fluid remaining in fuel lines can cause serious injury. Before disconnecting fuel lines, sensors, or any other components between the high-pressure fuel pump and injectors on engines with High-Pressure Common-Rail (HPCR) fuel system, wait a minimum of 15 minutes after engine is stopped.

1. Remove wiring harness.
2. Remove Turbocharger Oil Drain Line. See: Wastegate Turbocharger Oil Drain Line — Removal.

Special Tools:

- None

OR

VGT Turbocharger Oil Drain Line — Removal.

Special Tools:

- None

3. Remove Turbocharger Oil Supply Line. See: Wastegate Turbocharger Oil Supply Line — Removal.

Special Tools:

- None

OR

VGT Turbocharger Oil Supply Line — Removal.

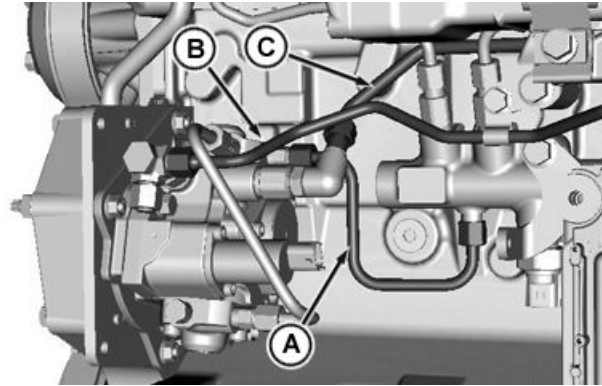
Special Tools:

- None

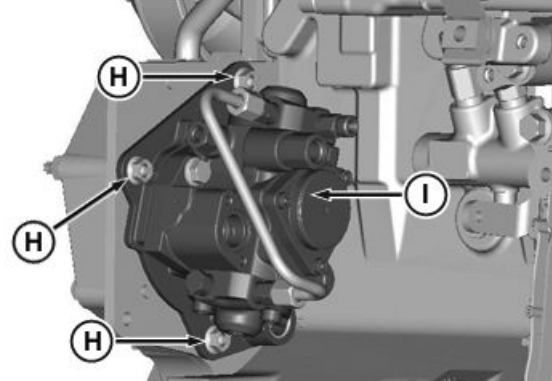
NOTE: Do not remove or disturb the fuel pump cross-over lines. These are not the service parts.

4. Disconnect fuel supply lines (A,B,C).

NOTE: Do not reuse the line that goes between the high pressure common rail and high pressure fuel pump.



Fuel Lines Removal



High-Pressure Fuel Pump Removal

A—Supply Line to HPCR
B—Leak-off Line
C—Fuel Supply Line to HP Pump

H—Nuts
I— High-pressure Fuel Pump

5. Remove cap screw (G) and nuts (H).
6. Remove high-pressure fuel pump (I) from engine.

AS58880,00011B2 -19-21FEB12-1/1

RG20336 —UN—04MAY11

RG20338 —UN—04MAY11

High-Pressure Injection Lines and Feed Tubes — Installation

Special Tools:

- JDG11184—Injection Line Socket

Consumable Material:

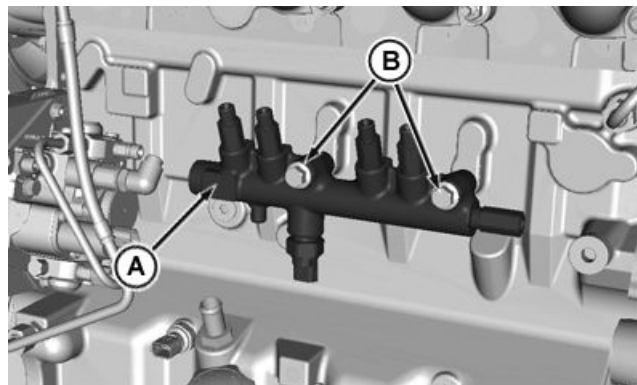
- Petroleum Jelly, Engine Oil, Injection Lines, Side Feed Tubes

IMPORTANT: Injection lines and side feed tubes are one time use only. When removed, discard and install new parts.

1. Loosen the common-rail cap screws (B).

A—HPCR

B—Mounting Cap Screws



HPCR

Continued on next page

MK41968,00000AF -19-05OCT11-1/2

RG20327 —UN—03MAY11

2. Lubricate side feed tube O-ring with petroleum jelly, engine oil, then insert it into cylinder head bore (B).
3. Install injection line (C) from rail to cylinder head. Hand tighten nuts at both ends.

IMPORTANT: After the line nuts are hand tight, verify the high pressure lines are centered in the line nuts.

4. Using JDG11184 Injection line socket (D), tighten nut to specification at cylinder head connection.

Specification

Injection Line	
Nut-to-Cylinder	
Head—Torque.....	30 N•m (23 lb.-ft.)
Torque Turn	60°

5. Tighten injection line nut to specification at fuel rail connection (E).

Specification

Injection Line Nut-to-Fuel	
Rail—Torque.....	30 N•m (23 lb.-ft.)
Torque Turn	60°

6. Repeat the procedure for the remaining cylinders.
7. Tighten the common-rail cap screws to specification.

Specification

HPCR Flanged Hex Head	
Screws—Torque.....	63 N•m (46 lb.-ft.)

See [High-Pressure Common-Rail \(HPCR\) — Installation](#)

Special Tools:

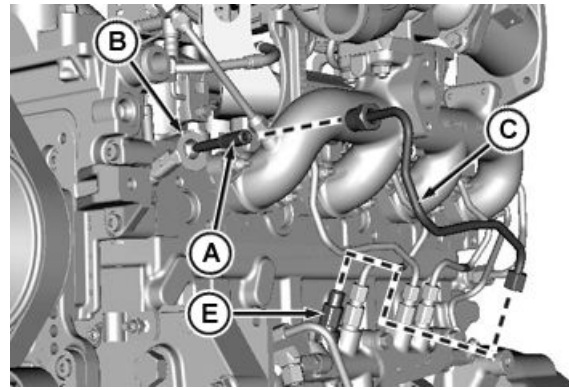
- None

Consumable Material:

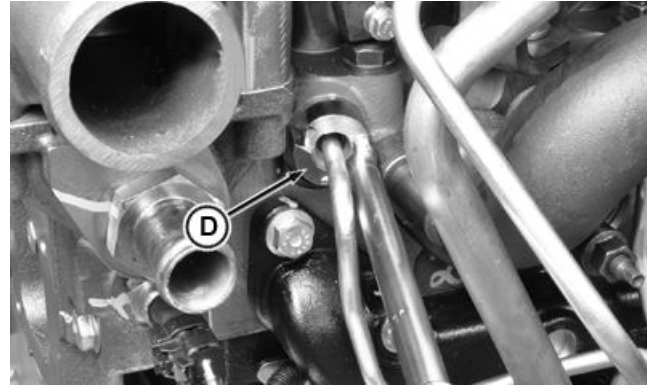
- High Pressure Line (Pump to HPCR), High-Pressure Lines (HPCR to injectors), Fuel Leak-off Line (HPCR to Pump)

8. Perform: [EGR Cooler Assembly — Installation](#).

Special Tools:



High-Pressure Injection Lines Installation



Tighten injection line nut using JDG11184

A—Injector Feed Tube
B—Injector Feed Tube Bore
C—High-Pressure Injection Line

D—JDG11184 Injection Line Socket
E—Flow Damper

- None

Consumable Material:

- EGR Clamp Assembly (2)
- Cap Screws (4) — EGR Cooler Gas Inlet Pipe

NOTE: To prime the fuel system see in [Section 04 Group 155, Fuel System Bleeding](#).

MK41968,00000AF -19-05OCT11-2/2

RG20329 —UN—04MAY11

RG19159 —UN—21SEP10

High-Pressure Injection Lines and Feed Tubes — Removal

Special Tools:

- JDG11184—Injection Line Socket
- JDG11185—Side Feed Tube Puller

⚠ CAUTION: High-pressure fluid remaining in fuel lines can cause serious injury. Before disconnecting fuel lines, sensors, or any other components between the high-pressure fuel pump and injectors on engines with High-Pressure Common-Rail (HPCR) fuel system, wait a minimum of 15 minutes after engine is stopped.

1. Perform: EGR Cooler Assembly — Removal.

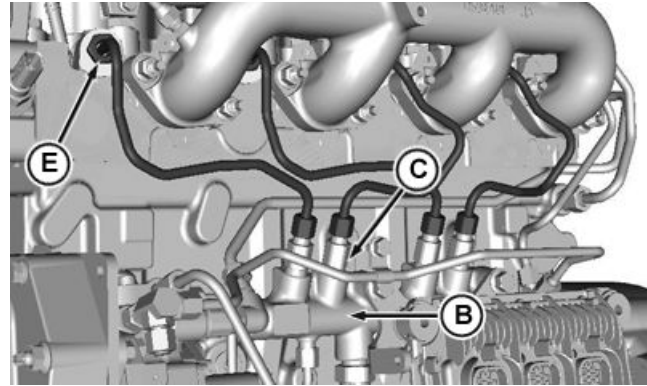
Special Tools:

- None

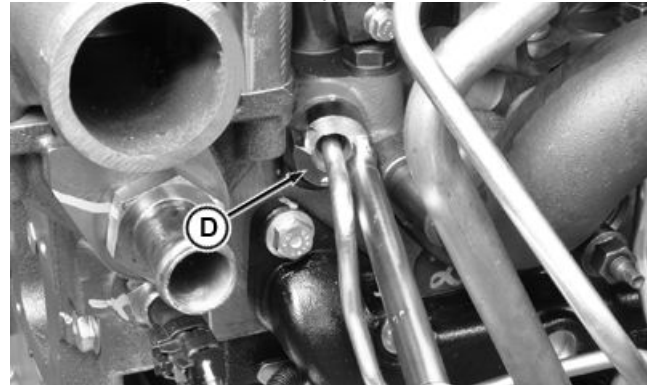
2. Disconnect fuel injection line at fuel rail connection (B).

NOTE: Do not remove the flow damper (C).

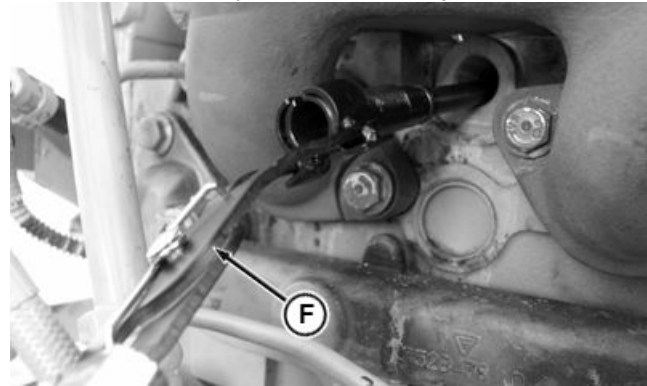
3. Using JDG11184 Injection line socket (D), loosen nut (E) at cylinder head connection and remove fuel line.
4. Using JDG11185 side feed tube puller (F), remove the side feed tube.
5. Repeat the procedure for the remaining cylinders.
6. Discard the fuel lines and feed tubes.



High-Pressure Injection Lines Removal



Loosen Injection Line Nut Using JDG11184



Side Feed Tube Removal using JDG11185

B—High-Pressure
Common-Rail
C—Flow Damper
D—JDG11184 Injection Line
Socket

E—Injection Line Nut (at
Cylinder Head Connection)
F—JDG11185 Side Feed Tube
Puller

RG20330 —UN—04MAY11

RG19159 —UN—21SEP10

RG19158 —UN—23SEP10

MK41968,00000AE -19-05OCT11-1/1

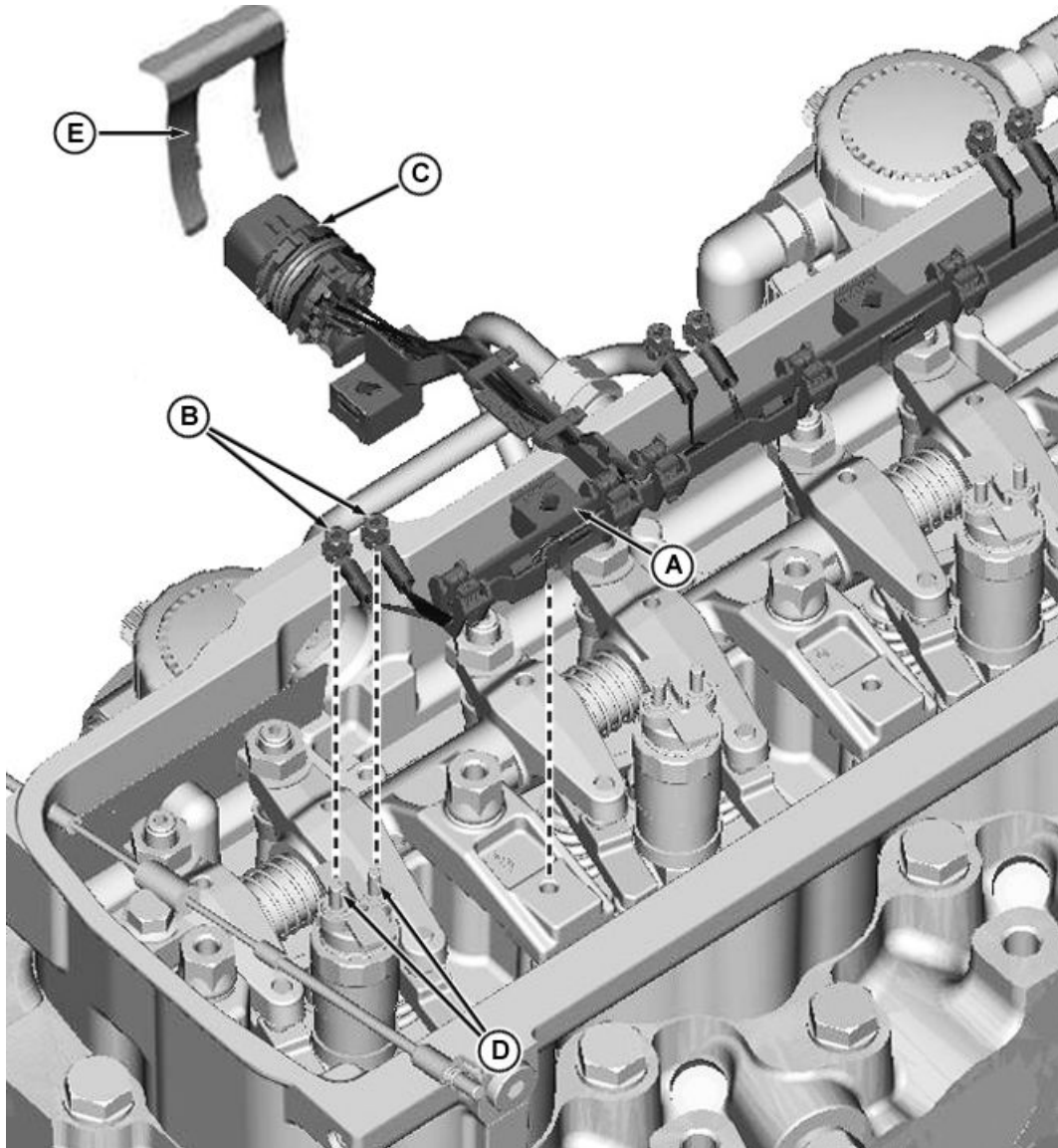
Injector Wiring Harness — Installation

Special Tools:

- None

Consumable Material:

- Gasket, LOCTITE® 242 or 222



Injector Wiring Harness Installation

**A—Wiring Harness Captured
Screws (4 Locations)**

**B—Wire Eyelets with Captured
Nuts**
C—Wiring Harness Connector

D—Injector Terminal Studs
E—Retaining Clip

1. Insert the wiring harness connector (C) with a new gasket, through the hole in the rocker arm shaft carrier.
2. Install retaining clip (E).
3. Lay the wiring harness on the rocker arm shaft carrier. Tighten the captured screws (A) to specification.

Specification

Injector Wiring Har-
ness Carrier-to-Rocker
Arm Shaft Clamps/Car-
rier—Torque..... 12 N•m (106 lb.-in.)

4. Apply LOCTITE 242 or 222 to injector terminal nut (B) threads . Install wire eyelets with captured nuts (B) to each injector. Tighten the captured nuts (B) to specification.

Specification

Injector Wiring Harness-
to-Injector—Torque..... 2 N•m (18 lb.-in.)

5. Perform: Rocker Arm Cover — Installation.

Special Tools:

- None

RG20335 —UN—04MAY11

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MK41968,00000B7 -19-29JUL11-1/2

Consumable Material:

LOCTITE is a trademark of Loctite Corp.

- Rocker Arm Cover Gasket, O-ring

MK41968,00000B7 -19-29JUL11-2/2

Injector Wiring Harness — Removal

Special Tools:

- None

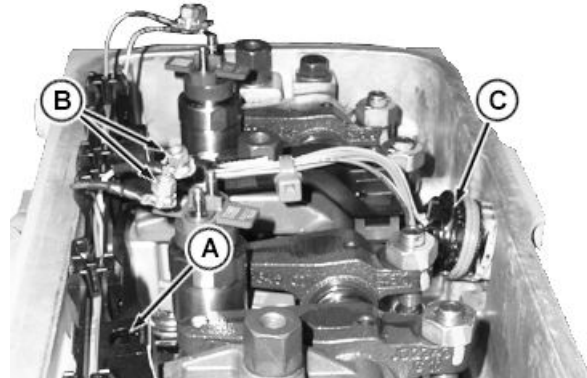
1. Perform: Rocker Arm Cover — Removal.

Special Tools:

- None

2. **Injector Wiring Harness Removal**

- a. Loosen captured screws (A) that secure the wiring harness carrier at 4 locations.
- b. Loosen captured nuts (B) on injector terminal studs.
- c. Remove connector retaining clip.
- d. Push the wiring harness connector (C) into the carrier and remove the injector wiring harness from rocker arm shaft carrier.



Injector Wiring Harness Removal

A—Wiring Harness Carrier
Captured Screw (6
Locations)
B—Injector Terminal Nuts

C—Wiring Harness Connector

RG20334 —UN—04MAY11

MK41968,00000B6 -19-27JUL11-1/1

Low-Pressure Fuel Pump — Installation

Special Tools:

- None

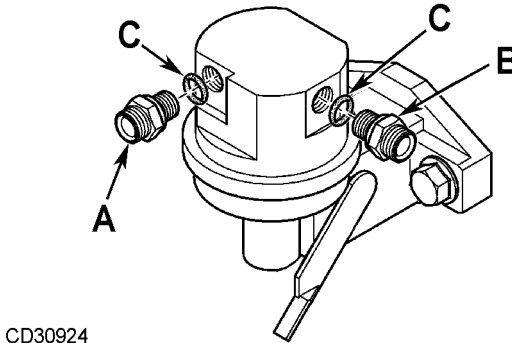
Consumable Material:

- O-rings

1. Remove and retain inlet (A) and outlet (B) fittings from old pump. Discard O-rings (C).
2. Install new O-rings and fittings into new transfer pump. Tighten fittings to specification.

Specification

Inlet and Outlet
Fitting-to-Fuel Transfer
Pump—Torque..... 10 N•m (7 lb.-ft.)



CD30924

Low-Pressure Fuel Pump

A—Inlet Fitting
B—Outlet Fitting

C—O-ring

CD30924 —UN—18OCT06

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MK41968,00000A4 -19-20MAR12-1/2

3. Install low-pressure fuel pump (D) and cap screws (C).
Tighten cap screws to specification.

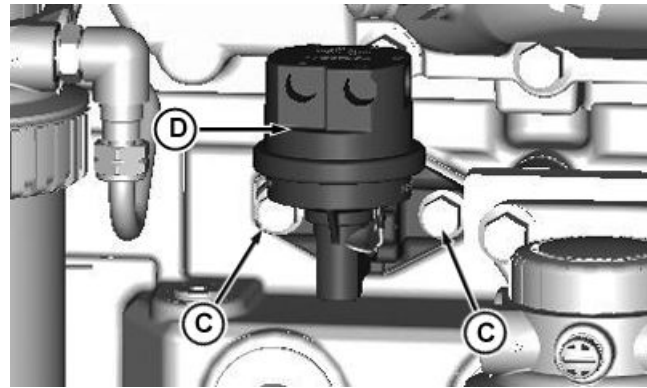
Specification

Transfer Pump Cap

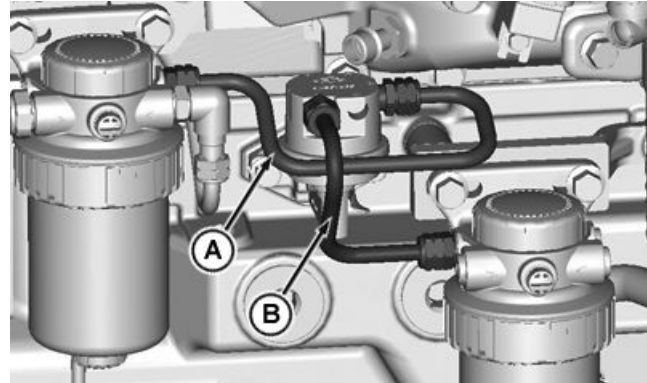
Screw—Torque..... 30 N•m (22 lb.-ft.)

4. Install fuel lines (A,B)
5. Bleed the fuel system. See Fuel System Bleeding in Section 04, Group 150 in this manual.

A—Fuel Line — Primary Fuel Filter-to-Low Pressure Fuel Pump
B—Fuel Line — Low Pressure Fuel Pump-to-Secondary Fuel Filter
C—Cap Screws (2)
D—Low-Pressure Fuel Pump



Low-Pressure Fuel Pump Installation



Fuel Lines Installation

MK41968,00000A4 -19-20MAR12-2/2

RG20313 —UN—28APR11

RG20312 —UN—28APR11

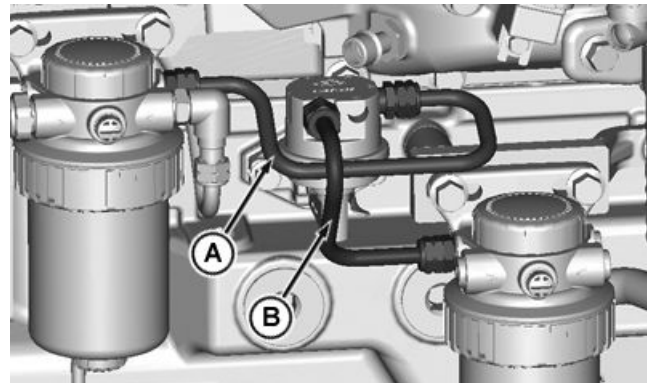
Low-Pressure Fuel Pump — Removal

Special Tools:

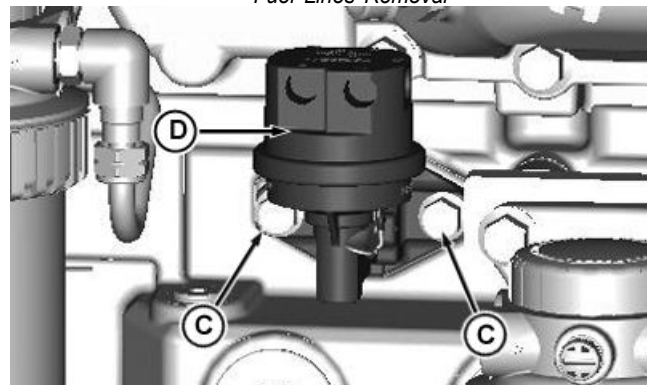
- None

1. Remove fuel lines (A,B)
2. Remove cap screws (C) and the low-pressure fuel pump (D).

A—Fuel Line — Primary Fuel Filter-to-Low Pressure Fuel Pump
B—Fuel Line — Low Pressure Fuel Pump-to-Secondary Fuel Filter
C—Cap Screws (2)
D—Low-Pressure Fuel Pump



Fuel Lines Removal



Low-Pressure Fuel Pump Removal

MK41968,00000A3 -19-21JUL11-1/1

RG20312 —UN—28APR11

RG20313 —UN—28APR11

Pressure Limiter — Installation

Special Tools:

- None

Consumable Material:

- Fuel Line Fitting O-rings

IMPORTANT: When replacing pressure limiter, **DO NOT** use sealant or any Loctite. The seal is metal to metal.

IMPORTANT: **DO NOT** remove and reinstall the same pressure limiter, a leak may result. A new pressure limiter must be installed.

1. Install pressure limiter (A) into high-pressure common-rail. Tighten to initial specification.

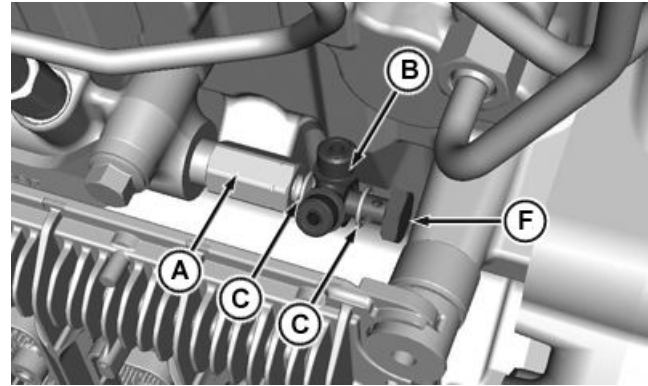
Specification

Pressure Limiter-to-Fuel Rail—Initial Torque..... 30 N•m (22 lb.-ft.)

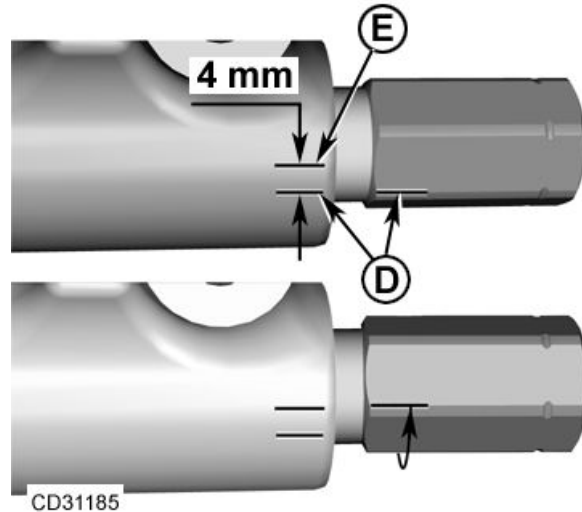
2. Draw alignment lines (D) on pressure limiter and fuel rail using the hex edges of the pressure limiter as a guide.
3. Draw a parallel line (E) 4 mm (0.157 in.) in clockwise direction from original line on fuel rail.
4. Set torque wrench to 172 N•m (127 lb.-ft.). Tighten pressure limiter until the line on pressure limiter aligns with or slightly passes second line on fuel rail. If no click is heard, the limiter is properly tightened. If torque wrench clicks before marks are in alignment, complete step 5.

NOTE: If torque wrench still clicks prior to marks being aligned after completing step 5, replace pressure limiter. If a replacement pressure limiter cannot be properly tightened, change fuel rail assembly.

5. Set torque wrench to 190 N•m (141 lb.-ft.). Tighten pressure limiter until the line on pressure limiter aligns with or slightly passes second line on fuel rail.



Pressure Limiter Installation



Tighten pressure limiter

A—Pressure Limiter
B—Fitting
C—O-rings

D—Alignment Lines
E—Parallel Line on Fuel Rail
F—Dual Banjo Screw

6. Install fuel return line fitting (B). Replace O-rings (C) if needed. Install banjo screw (F). Do not tighten at this stage.

Continued on next page

MK41968,00000B5 -19-05OCT11-1/3

RG20323 —UN—03MAY11

CD31185 —UN—03MAY10

7. Install the leak-off line (G) between the dual banjo fitting and injection pump fitting using a P-clamp (F) attached to the EGR cooler bracket using an M8 cap screw. Tighten the M8 cap screw to specification.

Specification

P-Clamp Cap
Screw—Torque..... 37 N•m (28 lb.-ft.)

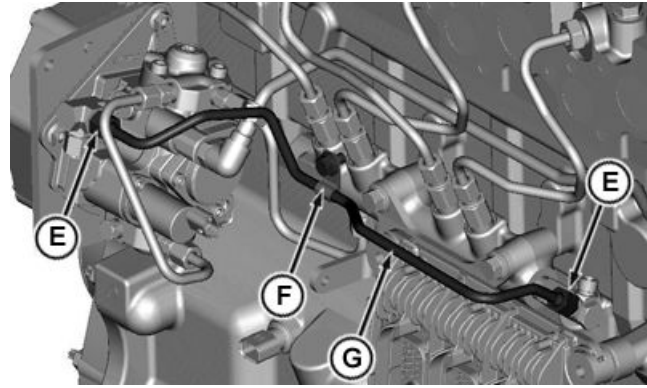
8. Tighten nuts to specification at both ends.

Specification

Leak-off Line
Nuts—Torque..... 16 N•m (12 lb.-ft.)

E—Line Nuts
F—P-clamp

G—Leak-off Line



Leak-off Line Installation

MK41968,00000B5 -19-05OCT11-2/3

RG20324 —UN—03MAY11

9. Install the leak off line (I) between the carrier fitting and dual banjo fitting. Tighten nuts (H) to specification.

Specification

Leak-off Line
Nuts—Torque..... 16 N•m (12 lb.-ft.)

CAUTION: Fuel will be under high-pressure when checking for leaks. Use a piece of cardboard or wood as a protective shield when first starting engine. Keep hands or body away when checking for leaks.

10. After pressure limiter replacement, start engine and run up to high idle then check for leaks.

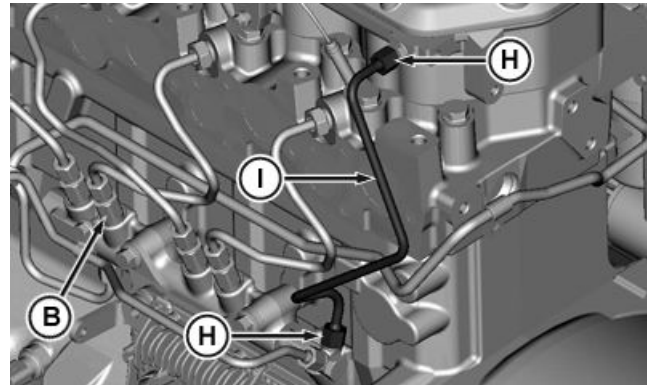
11. Perform EGR Cooler — Installation.

Special Tools:

- None

Consumable Material:

- EGR Clamp Assembly (2)
- Cap Screws (4) — EGR Cooler Gas Inlet Pipe



Leak-off Line Installation

H—Line Nuts

I— Leak-off Line

NOTE: To prime the fuel system see in Section 04 Group 155, Fuel System Bleeding.

MK41968,00000B5 -19-05OCT11-3/3

RG20325 —UN—28JUL11

Pressure Limiter — Removal

Special Tools:

- None

CAUTION: High-pressure fluid remaining in fuel lines can cause serious injury. Before disconnecting fuel lines, sensors, or any other components between the high-pressure fuel pump and injectors on engines with High-Pressure Common-Rail (HPCR) fuel system, wait a minimum of 15 minutes after engine is stopped.

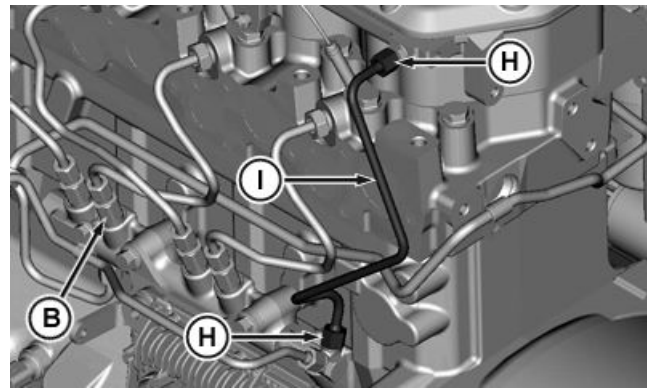
1. Perform EGR Cooler — Removal

Special Tools:

- None

2. Pressure Limiter — Removal

- Thoroughly clean fuel line, fitting, component and chamfered area around the pressure limiter.
- Remove line nuts (H) and leak-off line (I).



Leak-off Line Removal

H—Line Nuts

I—Leak-off Line

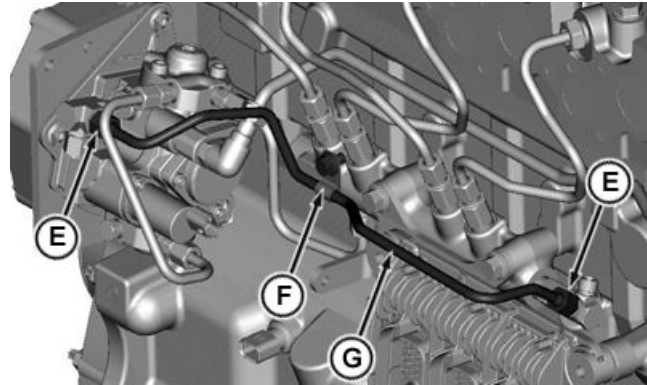
RG20325 —UN—28JUL11

MK41968,00000B4 -19-05OCT11-1/3

- Remove P-clamp (F), line nuts (E) and leak-off line (G)

E—Line Nuts
F—P-clamp

G—Leak-off Line



Leak-off Line Removal

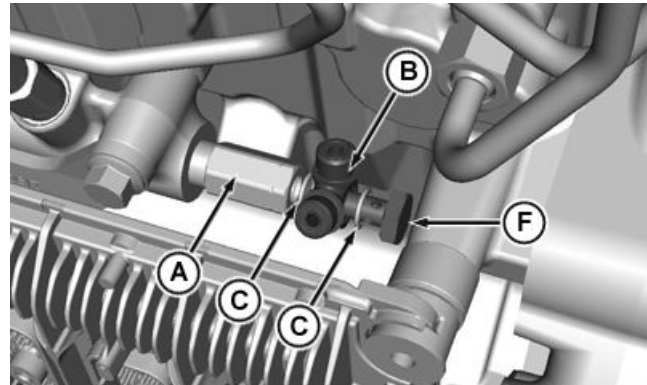
MK41968,00000B4 -19-05OCT11-2/3

RG20324 —UN—03MAY11

- Remove banjo screw (F), fitting (B), pressure limiter (A), and o-rings (C). The pressure limiter comes as an assembly. Due to the torque during installation, the crimp on the end of the assembly can come loose. When removing the pressure limiter check to see if the entire assembly is together. If not, use a clean magnet to remove the loose components from the bore.

A—Pressure Limiter
B—Fitting

C—O-rings
F—Dual Banjo Screw



Pressure Limiter Removal

MK41968,00000B4 -19-05OCT11-3/3

RG20323 —UN—03MAY11

Primary Fuel Filter Assembly — Installation

Special Tools:

- None

Consumable Material:

- None

1. Install primary fuel filter (F) using caps screws (C,D,E).

Tighten cap screws to specification.

Specification

Primary Fuel Filter

Assembly Cap

Screws—Torque..... 50 N•m (37 lb.-ft.)

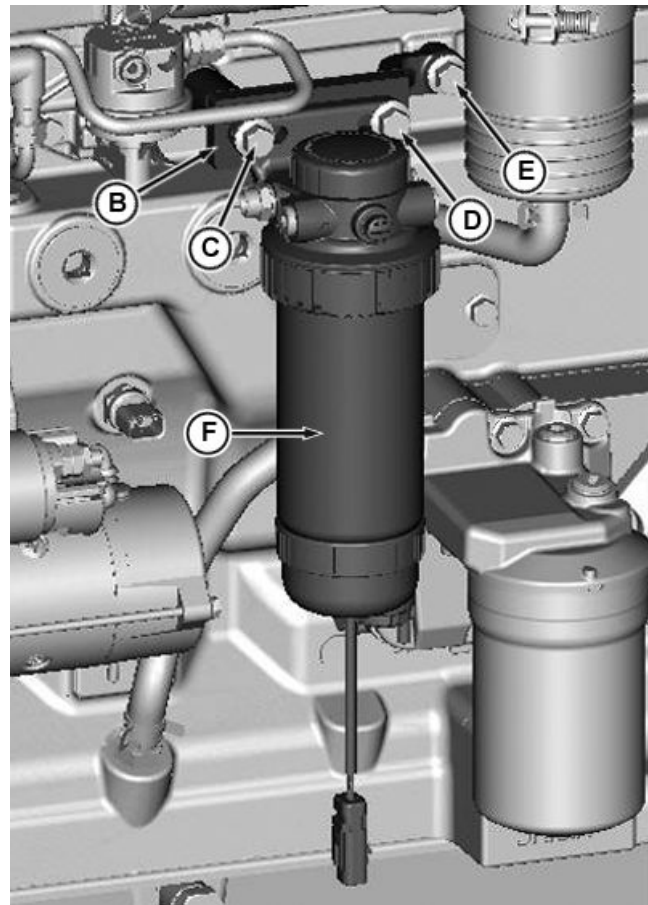
2. Install fuel line (A) between primary fuel filter and low pressure fuel pump.

NOTE: To prime the fuel system with electric transfer pump, before starting engine, turn ignition key to ON for 60 seconds.

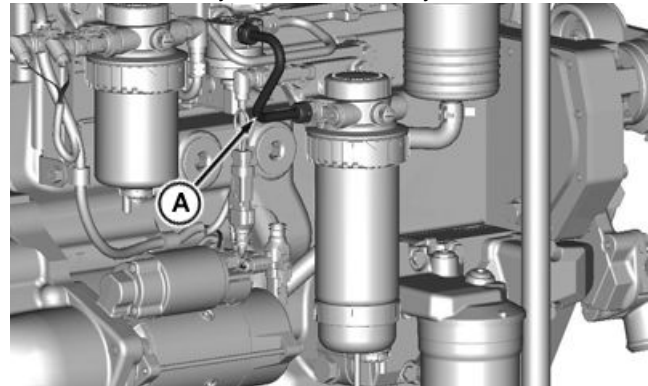
NOTE: To prime the fuel system with mechanical transfer pump, before starting engine, crack the highest fuel line and manually pump until air is expelled and fuel flows from the cracked line. Reconnect line and turn ignition key.

A — Fuel Line — Primary Fuel
Filter-to-Low Pressure
Fuel Pump
B—Filter Bracket
C—Cap Screw (M10 x 25)

D—Cap Screw (M10 x 40)
E—Cap Screw (M10 x 100)
F—Primary Fuel Filter
Assembly



Primary Fuel Filter Assembly Installation



Fuel Line Installation

RG20311—UN—29APR11

RG20310—UN—28APR11

MK41968,000009E -19-20MAR12-1/1

Primary Fuel Filter Assembly — Removal

Special Tools:

- None

1. Remove fuel line (A) between primary fuel filter and low pressure fuel pump.
2. Disconnect wiring harness from water in fuel sensor.
3. Remove cap screws (C,D) and the primary fuel filter (F).

A — Fuel Line — Primary Fuel Filter-to-Low Pressure Fuel Pump

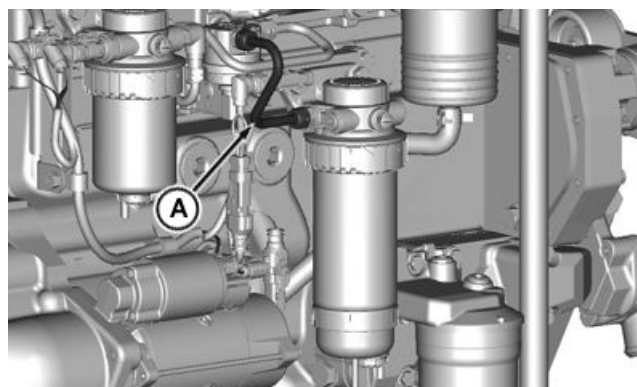
B—Filter Bracket

C—Cap Screw (M10 x 25)

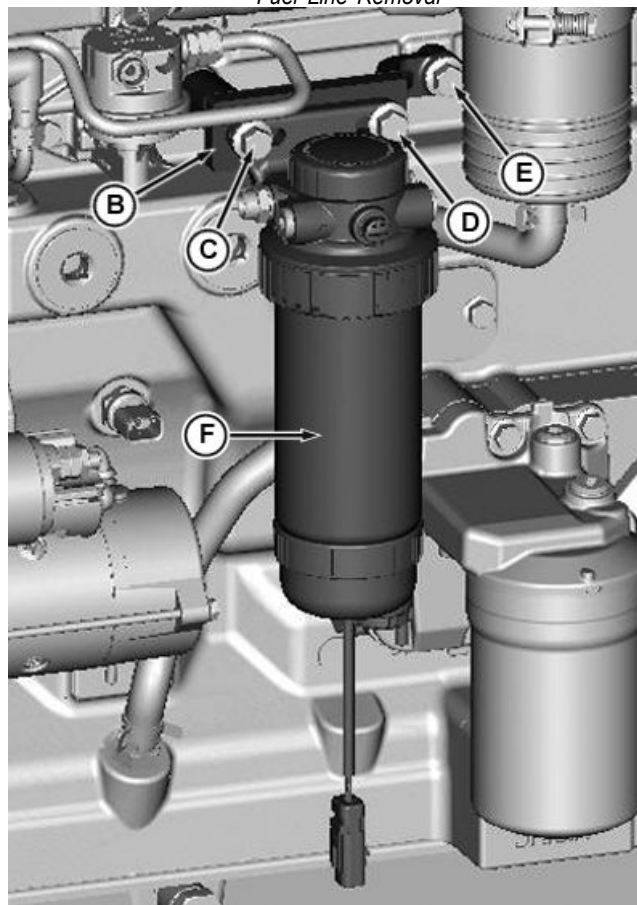
D—Cap Screw (M10 x 40)

E—Cap Screw (M10 x 100)

F—Primary Fuel Filter Assembly



Fuel Line Removal



Primary Fuel Filter Assembly Removal

RG20310 —UN—28APR11

RG20311 —UN—29APR11

MK41968,000009D -19-21JUL11-1/1

Secondary Fuel Filter Assembly — Installation

Special Tools:

- None

Consumable Material:

- None

1. If removed, install bracket (K), and cap screws (Z).

Tighten cap screws (Z) to specification.

Specification

Secondary Fuel	
Filter to Bracket Cap	
Screws—Torque.....	35 N•m (26 lb.-ft.)

K—Bracket

L—Secondary Fuel Filter

**Z— -2- Cap Screws—Fuel Filter
to Bracket**



Bracket Assembly

RG20322 —UN—03MAY11

MK41968,00000A0 -19-20MAR12-1/5

2. Install secondary fuel filter (L) with bracket (K) and cap screws (J).

Tighten cap screws (J) to specification.

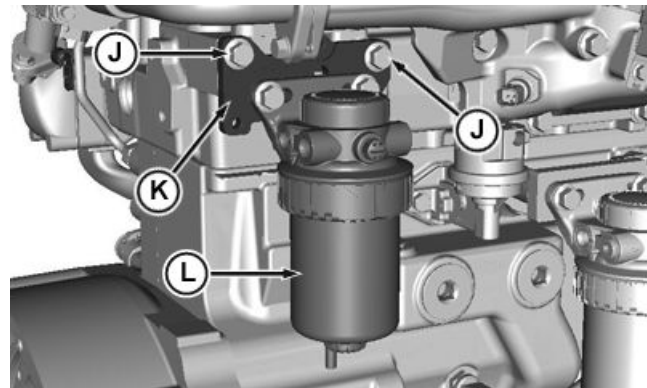
Specification

Secondary Fuel Filter-to-	
Bracket—Torque.....	50 N•m (37 lb.-ft.)

**J— -2- Cap Screws—Fuel Filter
Assembly to Cylinder Block**

L—Secondary Fuel Filter

K—Bracket



Secondary Fuel Filter Assembly Installation

RG20309 —UN—03MAY11

Continued on next page

MK41968,00000A0 -19-20MAR12-2/5

3. Install adapters (P,Q) and elbow (R). Tighten fuel line nut to specification

Specification

M12 Adapter on the Secondary Filter—Torque..... 16 N•m (12 lb.-ft.)

Specification

M14 Elbow on the Secondary Filter—Torque..... 16 N•m (12 lb.-ft.)

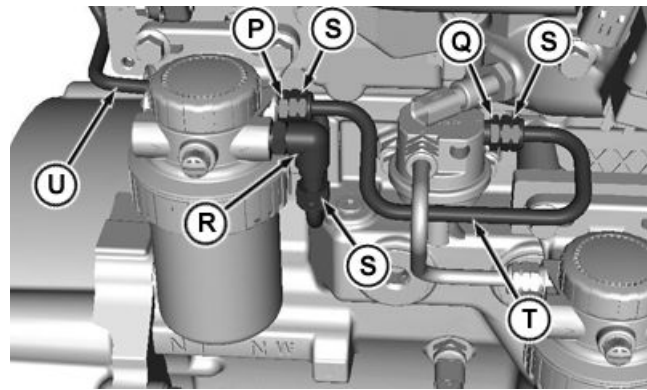
Specification

M10 Adapter on the Low Pressure Fuel Pump—Torque..... 10 N•m (7 lb.-ft.)

Tighten fuel line nuts to specification.

Specification

Supply Line Nuts—Torque..... 8 N•m (6 lb.-ft.) — for Dry Sleeves
Torque 13 N•m (10 lb.-ft.) — for Wet Sleeves



Fuel Lines Installation

P—M12 Adapter on the Secondary Filter
Q—M10 Adapter on the Low Pressure Fuel Pump
R—M14 Elbow on the Secondary Filter

S—Line Nuts
T—Supply Line — Transfer Pump to Final Fuel Filter
U—Supply Line — Final Fuel Filter to High Pressure Fuel Pump

MK41968,00000A0 -19-20MAR12-3/5

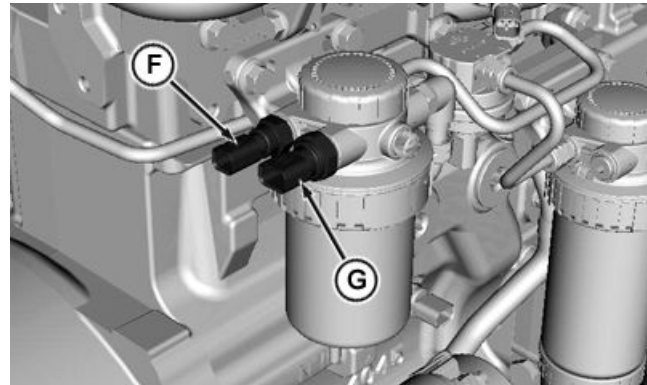
RG20333 —UN—04MAY11

4. Install temperature sensor (F) and pressure sensor (G) to the secondary filter. Torque sensors to specification.

Specification

Fuel Temperature Sensor to Secondary Fuel Filter Header—Torque..... 17 N•m (13 lb.-ft.)
Fuel Pressure Sensor to Fuel Filter Header—Torque..... 25 N•m (19 lb.-ft.)

F—Fuel Temperature Sensor G—Fuel Pressure Sensor



Sensors Installation

MK41968,00000A0 -19-20MAR12-4/5

RG20307 —UN—03MAY11

5. If necessary, install wiring harness bracket (Y) using one cap screw (X). Tighten cap screw to specification.

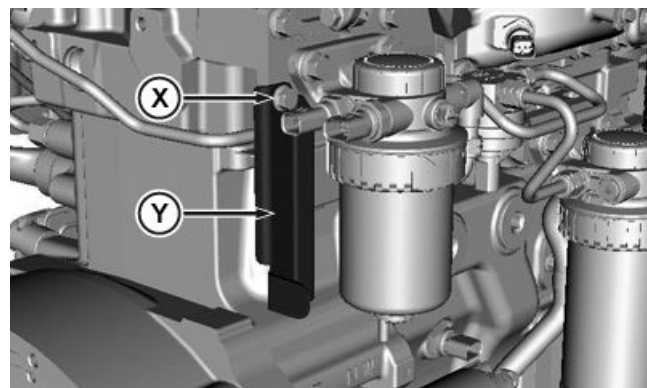
Specification

Cap Screw—Wiring Harness Bracket—Torque..... 25 N•m (19 lb.-ft.)

6. Connect wiring harness connectors to the secondary fuel filter.

7. Bleed air from fuel system. See Fuel System Bleeding in Group 155.

X—1- Cap Screw Y—Bracket, Wiring Harness



Wiring Harness Bracket Installation

MK41968,00000A0 -19-20MAR12-5/5

RG20306 —UN—03MAY11

Secondary Fuel Filter Assembly — Removal

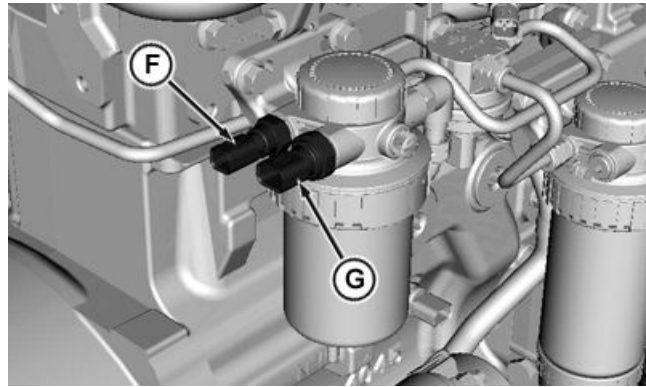
Special Tools:

- None

Consumable Material:

- None

1. Disconnect wiring harness connectors from the secondary fuel filter.
2. Remove temperature sensor (F) and pressure sensor (G) from the secondary filter if replacing fuel filter header.

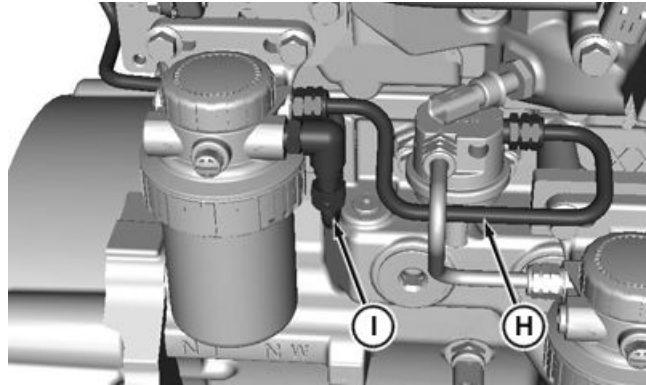


Sensors Removal

MK41968,000009F -19-02AUG11-1/4

RG20307 —UN—03MAY11

3. Remove fuel lines (H, I).

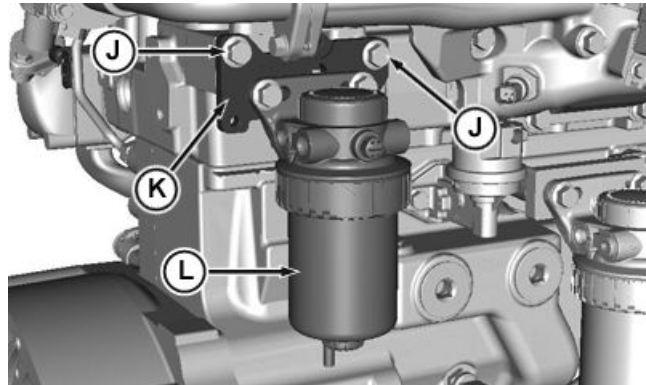


Fuel Line Removal

MK41968,000009F -19-02AUG11-2/4

RG20308 —UN—03MAY11

4. Remove cap screws (J) and the secondary fuel filter (L) with bracket (K).



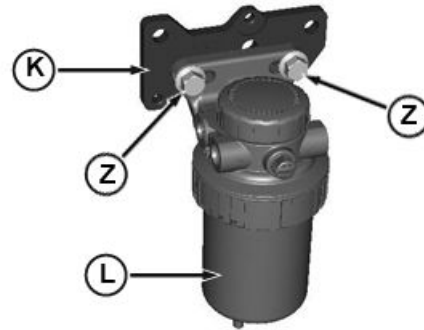
Secondary Fuel Filter Assembly Removal

Continued on next page

MK41968,000009F -19-02AUG11-3/4

RG20309 —UN—03MAY11

5. Remove cap screws (Z) and bracket (K), if needed.



Bracket Disassembly

MK41968,000009F -19-02AUG11-4/4

RG20322 —UN—03MAY11

Suction Control Valve — Installation

Special Tools:

- None

Consumable Material:

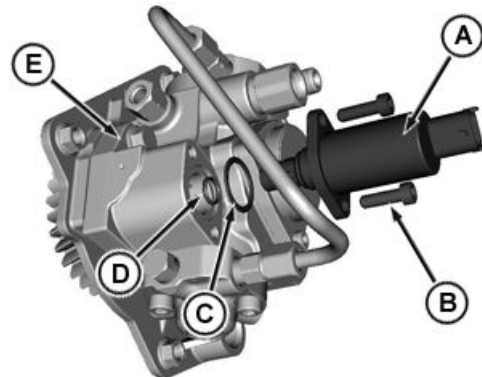
- Diesel Fuel

1. Lubricate large and small O-rings with a small amount of diesel fuel.
2. Install the O-rings (C, D) into groove in pump housing.
3. Install the new suction control valve (A) into the pump housing.
4. Install the two allen screws (B) then tighten to specification.

Specification

Suction Control	
Valve-to-Pump	
Housing—Torque.....	9 N•m (80 lb.-in.)

5. Reconnect wiring harness to valve connector.
6. Perform the identical diagnostic procedure, as when troubleshooting, to verify proper operation of the replacement suction control valve.



Suction Control Valve Installation

A—Suction Control Valve
B—Allen Screws (2)
C—Large O-ring

D—Small O-ring
E—High Pressure Fuel Pump

MK41968,00000AD -19-28JUL11-1/1

RG20305 —UN—28APR11

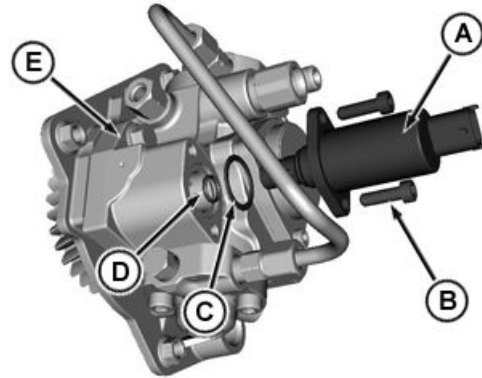
Suction Control Valve — Removal

Special Tools:

- None

IMPORTANT: Before removing the suction control valve, ensure that the diagnostic procedure concludes to the replacement of this valve.

IMPORTANT: The high-pressure fuel pump doesn't necessarily have to be removed from the engine to change the suction control valve. However, if the engine compartment is heavily contaminated, it is recommended that the pump be removed completely, cleaned, and have the service work completed off the engine. Cleanliness is very important. Once the suction control valve is replaced, install pump back to engine and reassemble fuel system.



Suction Control Valve Removal

A—Suction Control Valve
B—Allen Screws (2)
C—Large O-ring

D—Small O-ring
E—High Pressure Fuel Pump

1. Thoroughly, clean suction control valve and surrounding area.
2. Disconnect wiring harness from suction control valve connector.
3. Loosen the two allen screws (B).
4. Remove the suction control valve (A) from the pump body by hand, pulling straight out from pump (E). DO NOT twist the valve or pry with any tool.

MK41968,00000AC -19-28APR11-1/1

RG20305 —UN—28APR11

OEM Starting and Charging Systems Repair and Adjustment

Alternator—Installation

Special Tools:

- None

Consumable Materials:

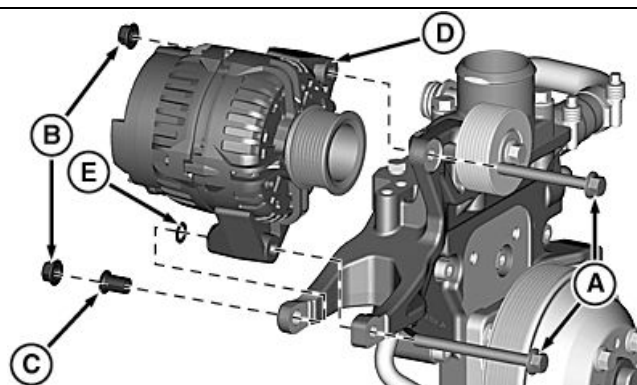
- None

1. Insert bushing (C) from rear of timing gear cover, if removed.
2. Lift alternator (D) into position and insert alternator mounting screws (A) from front of timing gear cover and through the washer (E) and bushing (C).
3. Finger tight nut (B) to alternator mounting screw. Tighten the lower mounting screw first, followed by the upper mounting screw. Tighten hardware to following specification.

Specification

Alternator Mounting

Screw—Torque..... 50 N•m (36.8 lb.-ft.)



Alternator Mountings

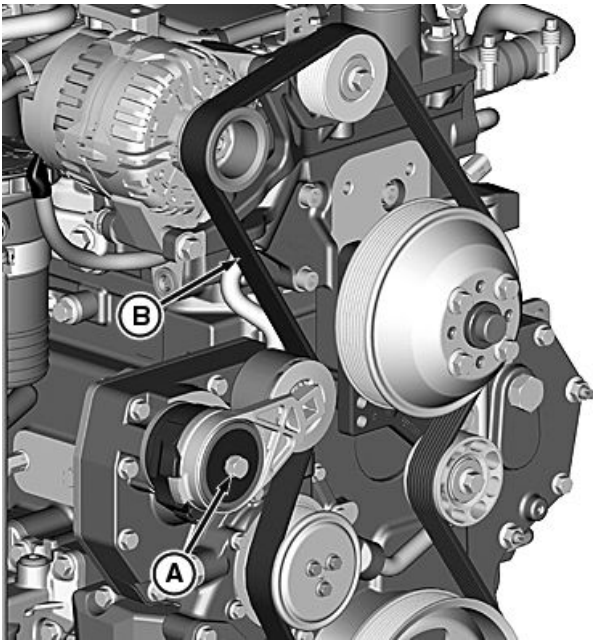
A—Mounting Screw (2)
B—Nut (2)
C—Bushing

D—Alternator
E—Washer

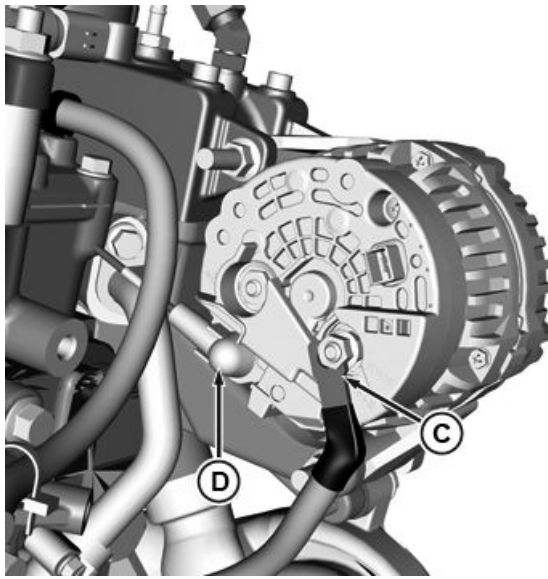
RG20663—UN—07JUL11

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BK34394,0000E8C -19-08JUL11-1/2



Alternator Belt



Alternator Connections

RG20664—UN—08JUL11

RG18576—UN—26MAY10

A—Automatic Belt Tensioner **B—Belt**
C—Positive Wire

D—Alternator Excitation Wire

4. Install the positive wire to the positive (+) terminal (C) of alternator. Torque nut to following specification.

Specification

Positive Terminal
Nut—Torque..... 12.5 N•m (9.22 lb.-ft.)

5. Tighten excitation wire to alternator stud (D) to specification.

Specification

Ring Terminal
Stud—Torque..... 4 N•m (3 lb.-ft.)

6. Plug loose end of alternator wiring harness into the Alternator Excitation Connector (X5009) on main engine wiring harness.
7. Seat rubber boot of excitation wire over nut and stud.
8. Install alternator belt (B) using 1/2 in. drive ratchet on automatic belt tensioner.
9. Connect battery ground (—) cable.

BK34394,0000E8C -19-08JUL11-2/2

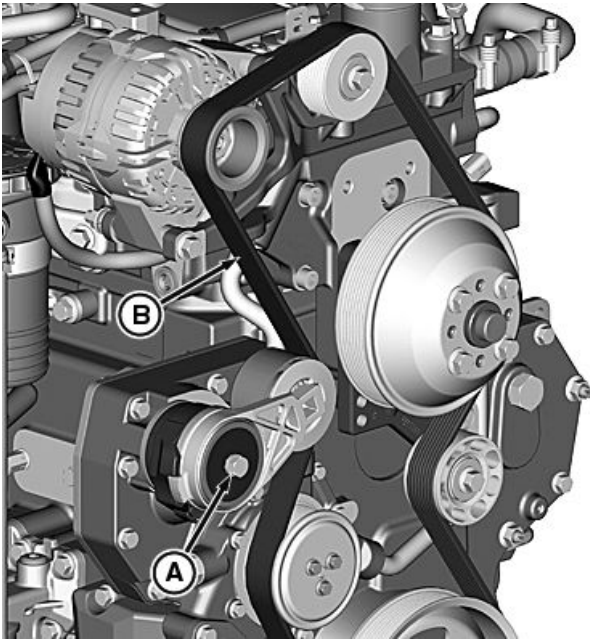
Alternator — Removal

Special Tools:

- None

Consumable Materials:

- None

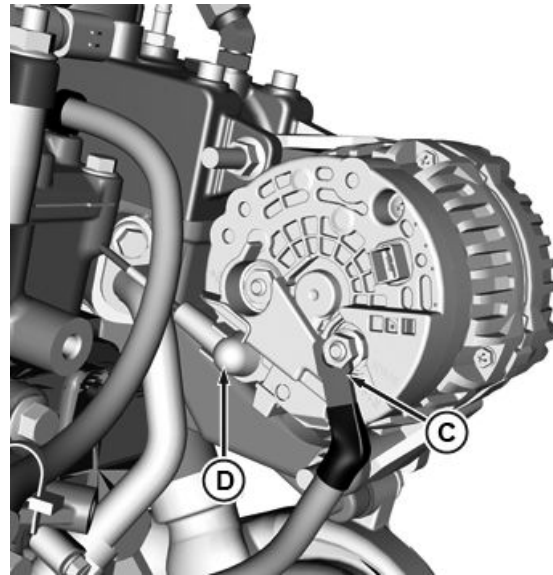


Alternator Belt

- A—Automatic Belt Tensioner B—Belt
C—Positive Wire

IMPORTANT: Always disconnect battery negative (—) cable before removing alternator or a short circuit could result.

1. Disconnect battery ground (—) cable.



Alternator Connections

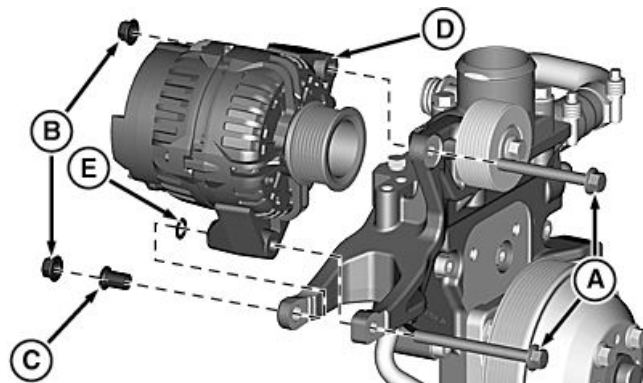
- D—Alternator Excitation Wire

2. Disconnect positive (+) wire (C) and ring terminal (D).
3. Using 1/2 in. drive ratchet, pull the automatic belt tensioner (A) to release the tension over the belt. Remove alternator belt (B).

BK34394,0000E8B -19-08JUL11-1/2

4. Remove nuts (B), mounting bolts (A), and washer (E).
5. Remove alternator (C).

- A—Mounting Bolt (2) D—Alternator
B—Nut (2) E—Washer
C—Bushings



Alternator Mountings

BK34394,0000E8B -19-08JUL11-2/2

Starter Motor—Installation

Special Tools:

- None

Consumable Materials:

- None

1. Locate starter motor (A) on flywheel housing (C) with solenoid pointing upward.
2. Rotate starter motor to align holes with holes in flywheel housing.
3. Install 3 cap screws (B) through starter motor flange into flywheel housing. Tighten the cap screws to following specification:

Specification

Starter Motor Cap

Screws—Torque..... 50 N•m (37 lb.-ft.)

4. Connect starter wiring and ground strap.

IMPORTANT: If jump start protection cover is cracked or damaged, it must be replaced.

5. If removed, install jump start protection cover (D) onto the starter motor. Install hex nut (E) on the integrated stud on the starter motor and tighten it to the specification:

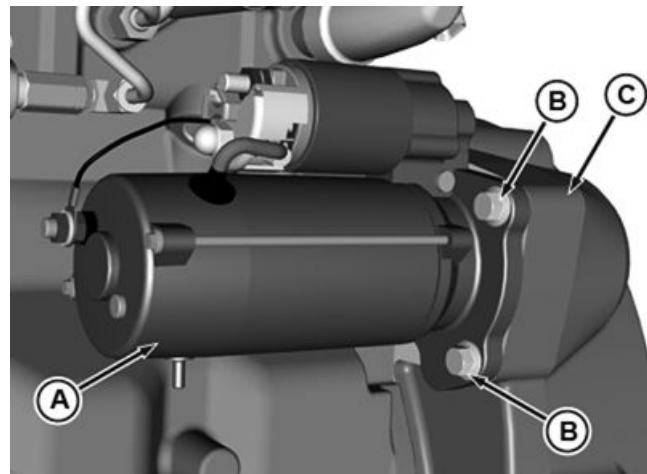
Specification

Jump Start Protection

Cover Nut—Torque..... 12 N•m (9 lb.-ft.)

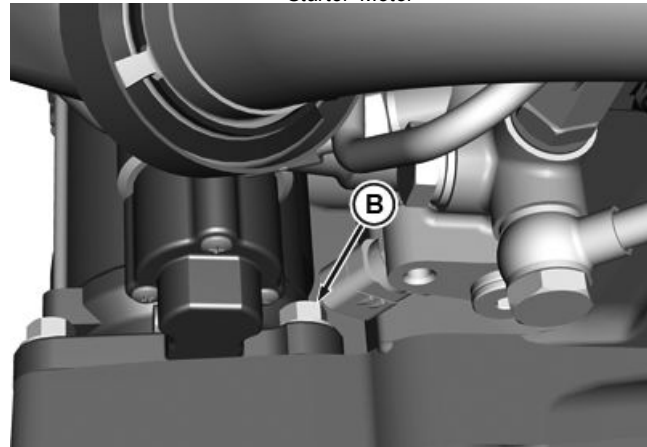
A—Starter Motor
B—Cap Screw (3)
C—Flywheel Housing

D—Jump Start Protection
Cover
E—Hex Nut



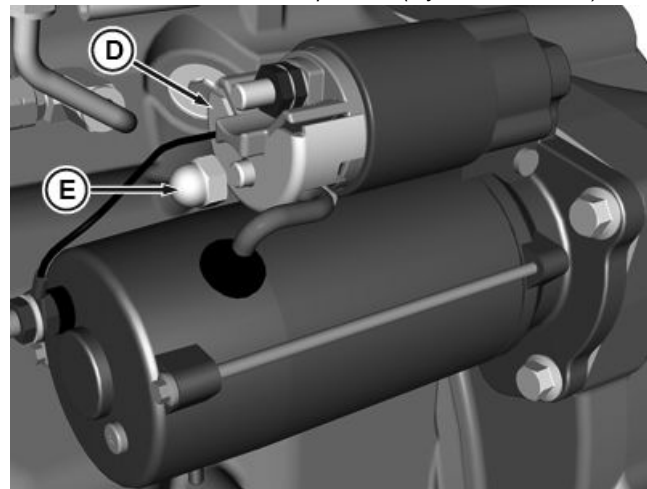
Starter Motor

RG18782 —UN—13JUL10



Starter Motor Third Cap Screw (Flywheel side View)

RG18597 —UN—27MAY10



Jump Start Protection Cover

RG18615 —UN—31MAY10

BK34394,0000E8E -19-14JAN11-1/1

Starter Motor—Removal

Special Tools:

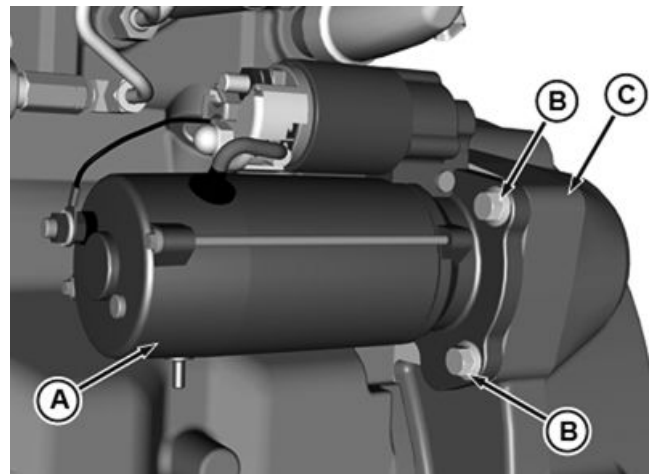
- None

⚠ CAUTION: Disconnect battery ground strap or serious injury could result if tools ground electrical system.

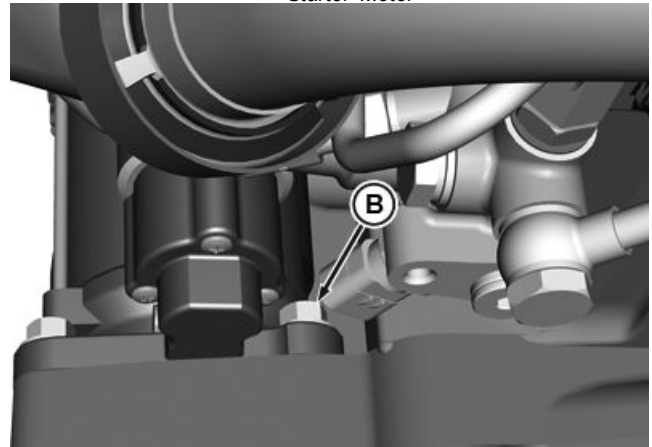
1. Disconnect ground strap from battery.
2. Disconnect all cables and wires from starter solenoid.
3. Loosen three cap screws (B) on the motor.
4. Remove starter motor (A).

A—Starter Motor
B—Cap Screw (3)

C—Flywheel Housing



Starter Motor



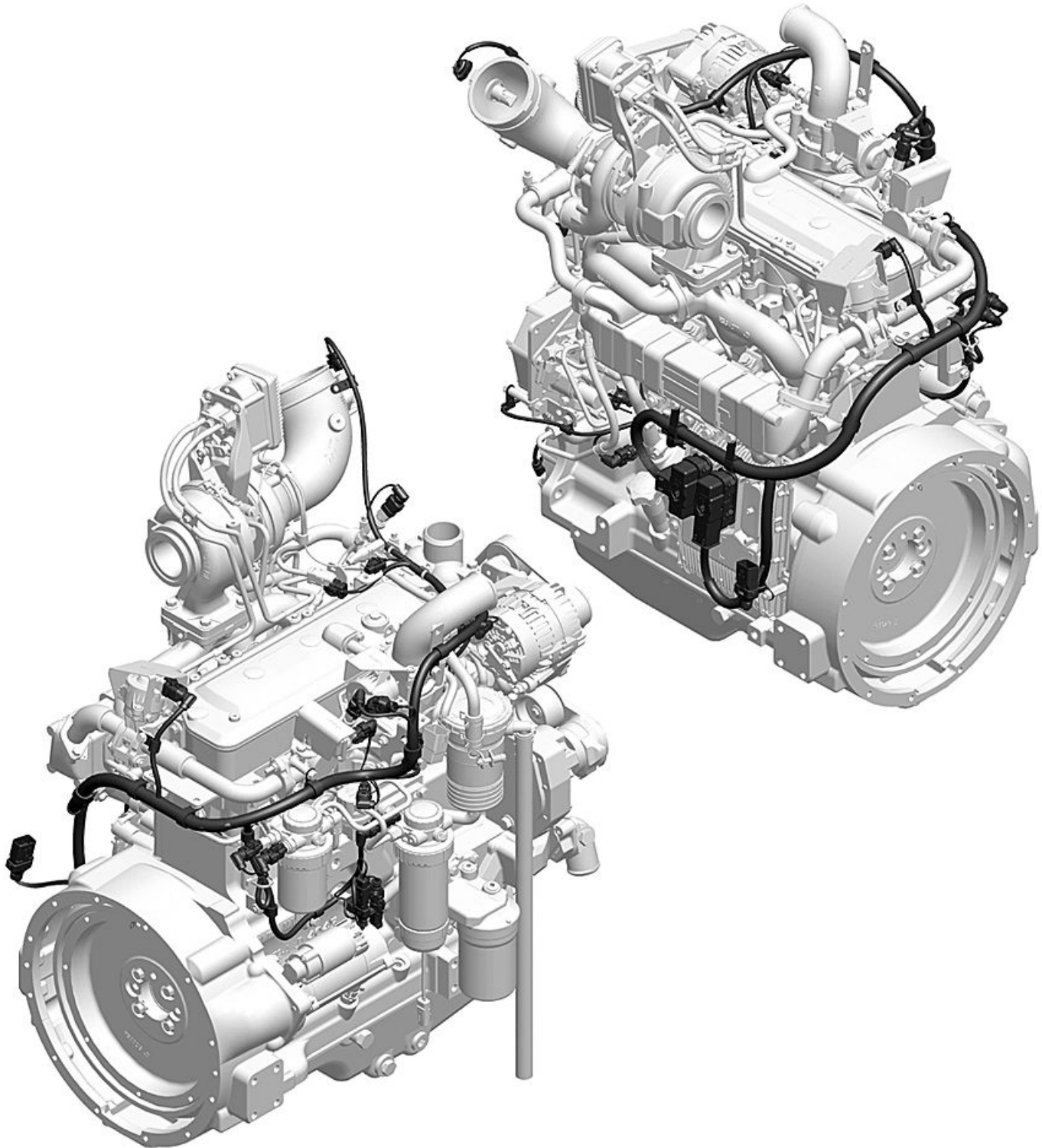
Starter Motor Third Cap Screw (Flywheel side View)

RG18782 —UN—13JUL10

RG18597 —UN—27MAY10

BK34394,0000E8D -19-14JAN11-1/1

Wiring Harness — Routing

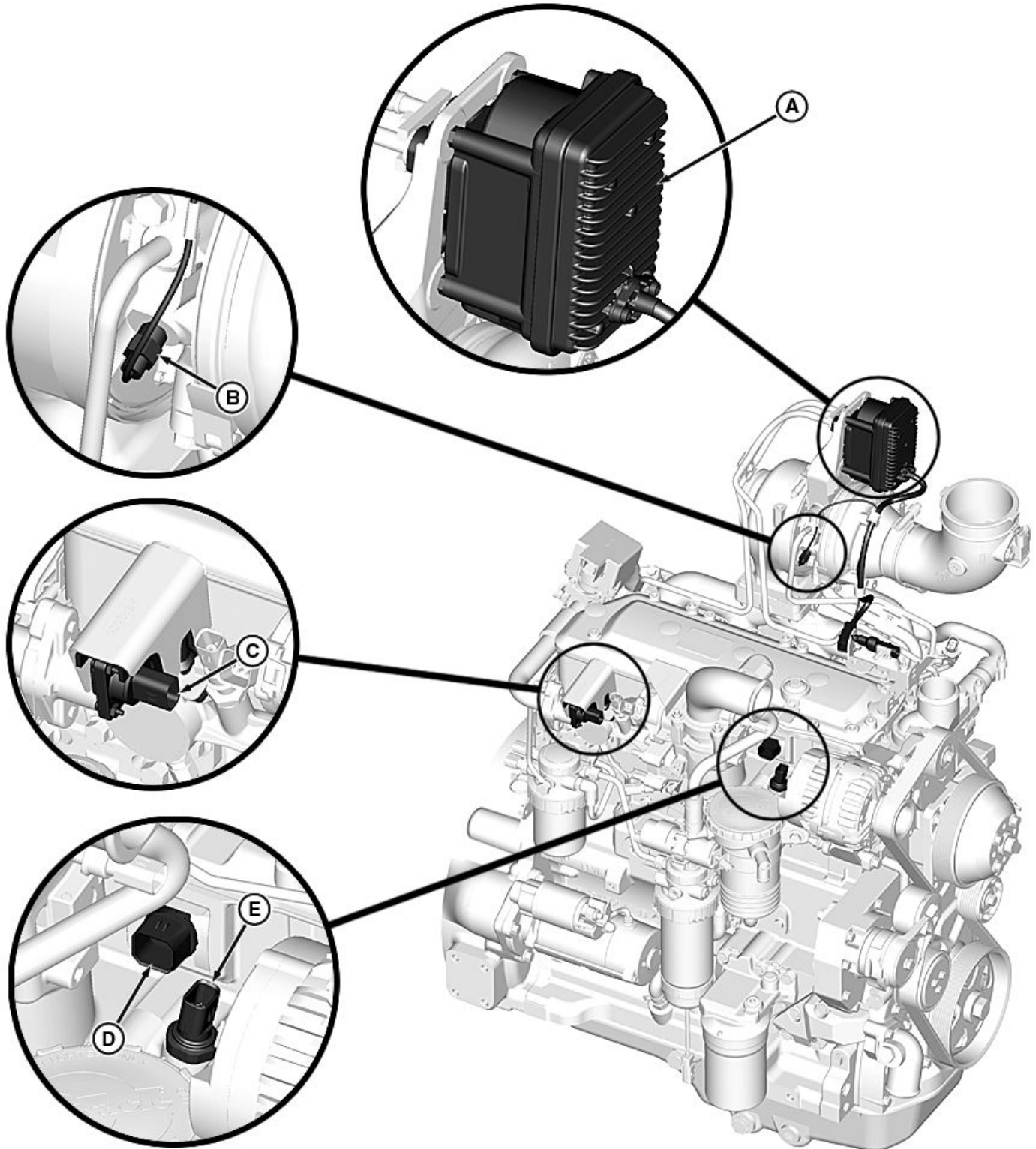


PVX Engine Wiring Harness Routing

RG20152 —UN—29MAR11

BF67790,0000289 -19-18JUL11-1/1

Component Location Diagram 1



Component Location Diagram 1

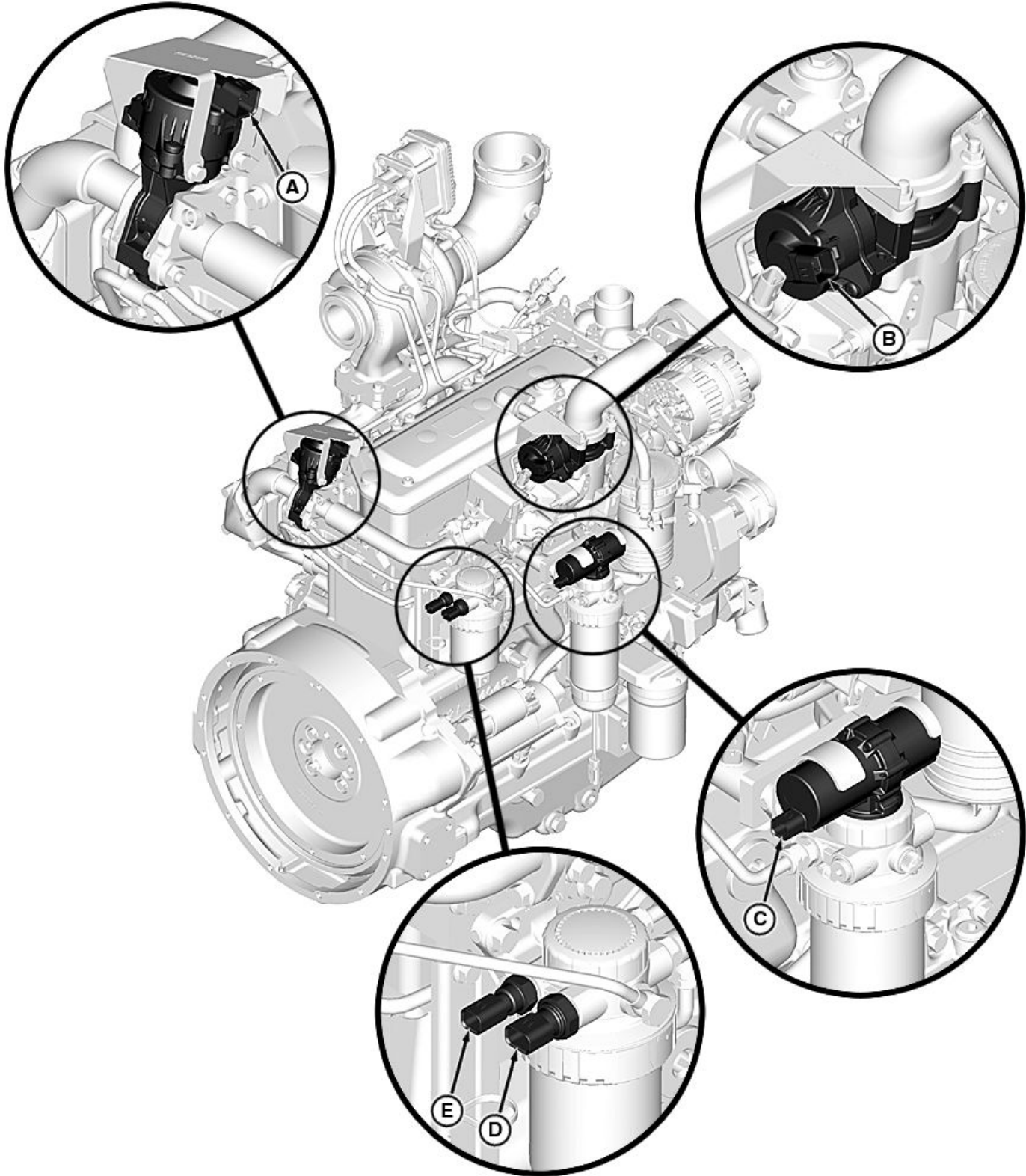
- | | | |
|-----------------------------|---|-------------------------------------|
| A—VGT Actuator | C—EGR (Exhaust Gas Recirculation) Flow Sensor | D—Injector Wiring Harness Connector |
| B—Turbocharger Speed Sensor | | E—Manifold Air Pressure Sensor |

NOTE: Location of some sensors may change depending upon the application.

RG20153 —UN—29MAR11

BF67790,000028A -19-28APR11-1/1

Component Location Diagram 2



Component Location Diagram 2

- | | | |
|---------------------------------------|--------------------------|---------------------------|
| A—EGR Valve | C—Low-Pressure Fuel Pump | E—Fuel Temperature Sensor |
| B—Air Throttle Actuator (PVX Engines) | D—Fuel Pressure Sensor | |

NOTE: Location of some sensors may change depending upon the application.

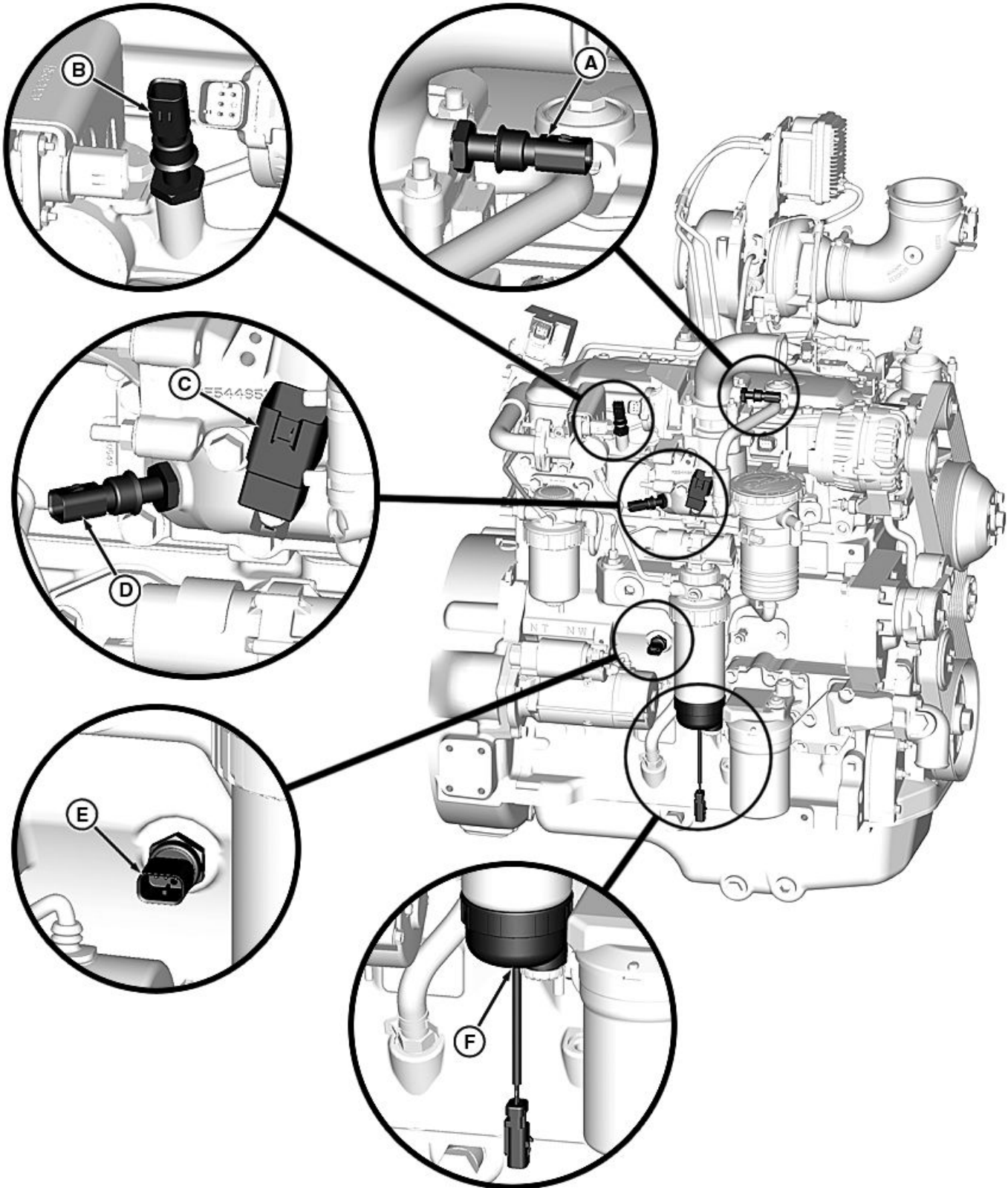
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BF67790,000028B -19-09AUG11-1/2

NOTE: Depending on application, some engines are equipped with a mechanical fuel transfer pump.

BF67790,000028B -19-09AUG11-2/2

Component Location Diagram 3



Component Location Diagram 3

A—Charge Air Cooler Outlet
Temperature Sensor
B—EGR Temperature Sensor

C—Cold Start Aid Relay
D—Manifold Air Temperature
Sensor

E—Engine Crankcase Pressure
Sensor
F—Water-In-Fuel Sensor

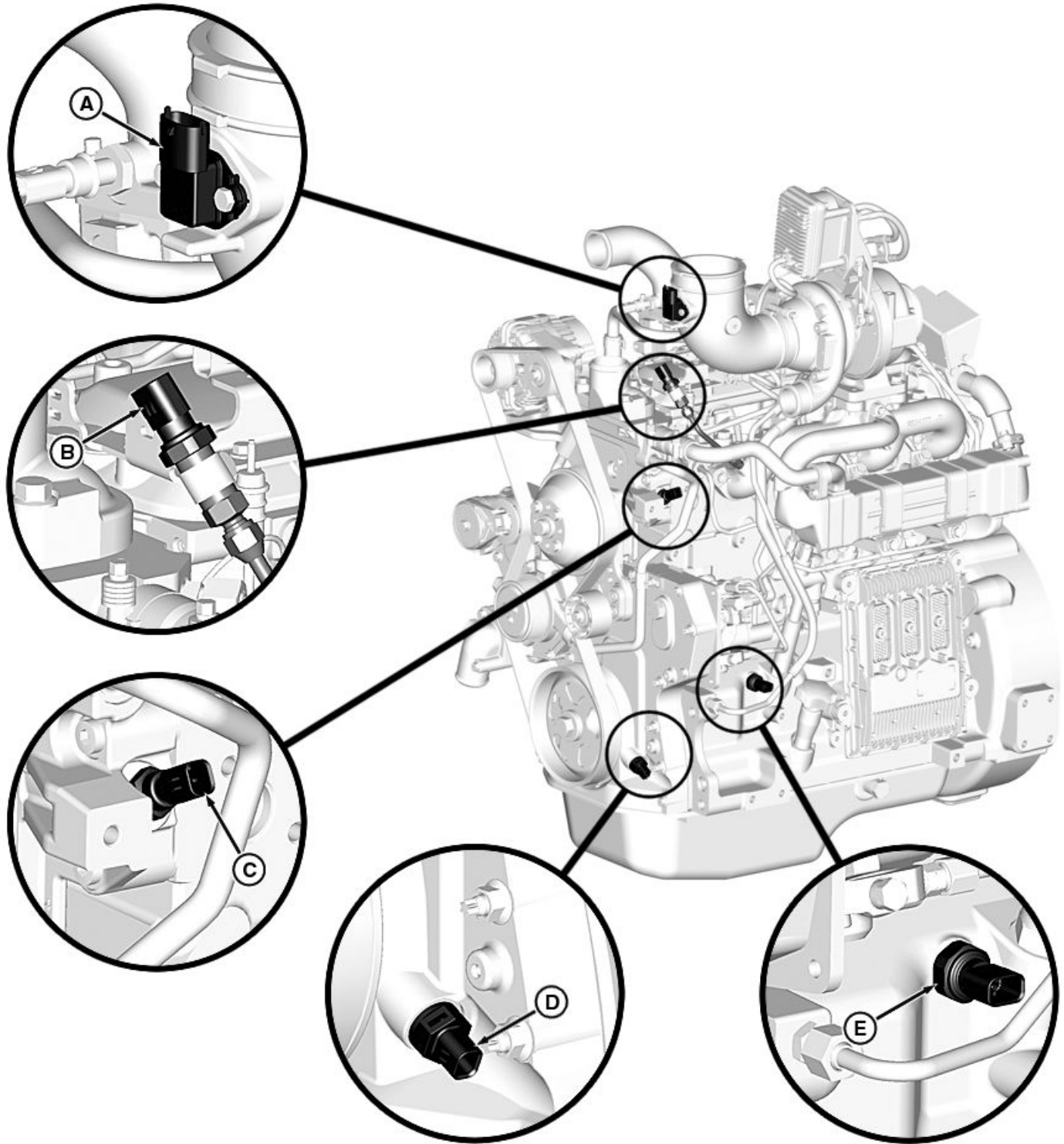
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BF67790,000028C -19-28APR11-1/2

*NOTE: Location of some sensors may change
depending upon the application.*

BF67790,000028C -19-28APR11-2/2

Component Location Diagram 4



Component Location Diagram 4

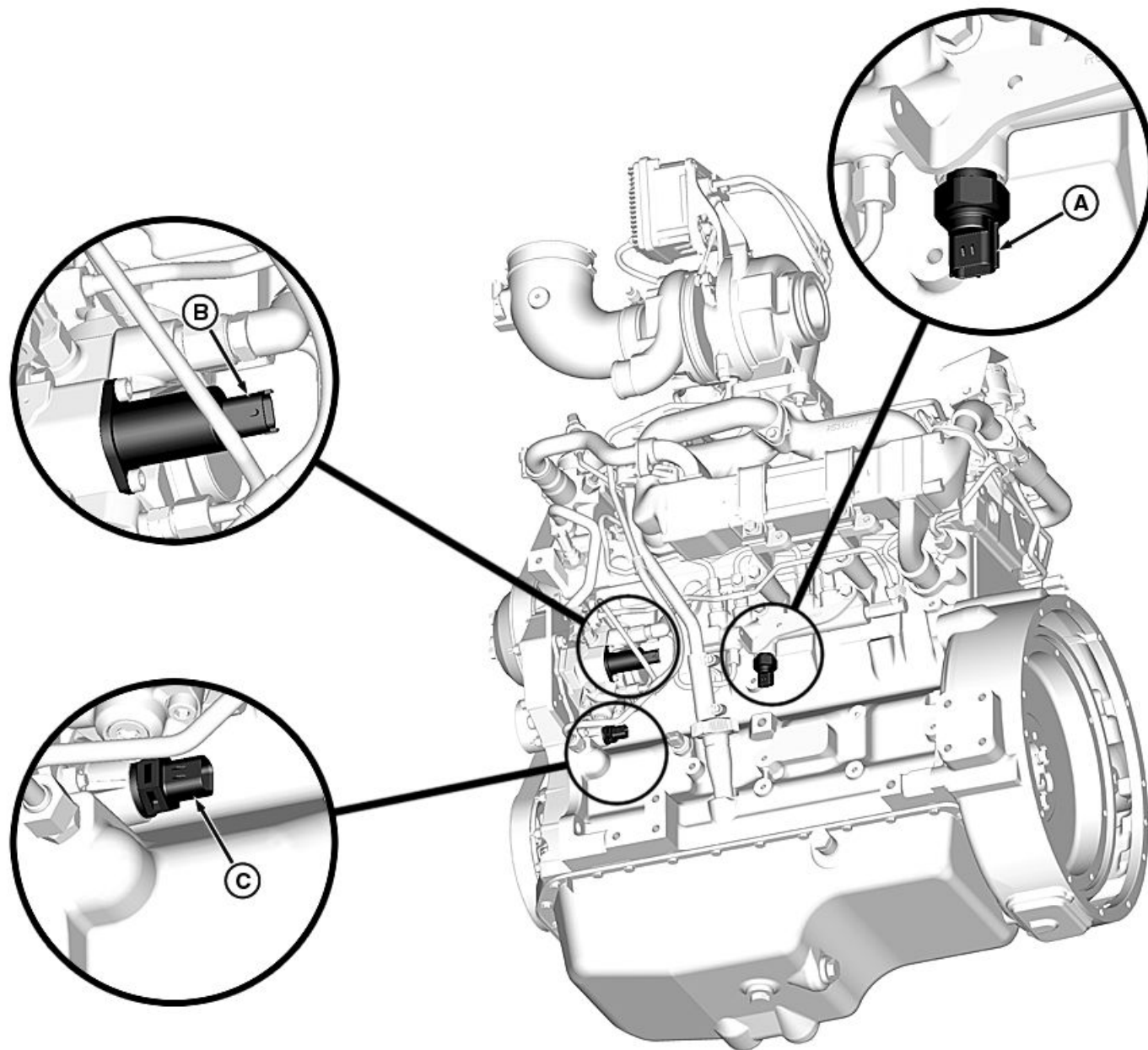
- | | | |
|------------------------------------|-------------------------------------|------------------------------|
| A—Intake Air Sensor | C—Engine Coolant Temperature Sensor | E—Engine Oil Pressure Sensor |
| B—Exhaust Manifold Pressure Sensor | D—Crankshaft Position Sensor | |

NOTE: Location of some sensors may change depending upon the application.

RG20156 —UN—29MAR11

BF67790,000028D -19-28APR11-1/1

Component Location Diagram 5



Component Location Diagram 5

A—Fuel Rail Pressure Sensor

B—Suction Control Valve

C—Camshaft Position Sensor

NOTE: Location of some sensors may change depending upon the application.

RG20157—UN—29MAR11

BF67790,000028E -19-28APR11-1/1

Camshaft Position Sensor — Installation

Special Tools:

- None

Consumable Material:

- None

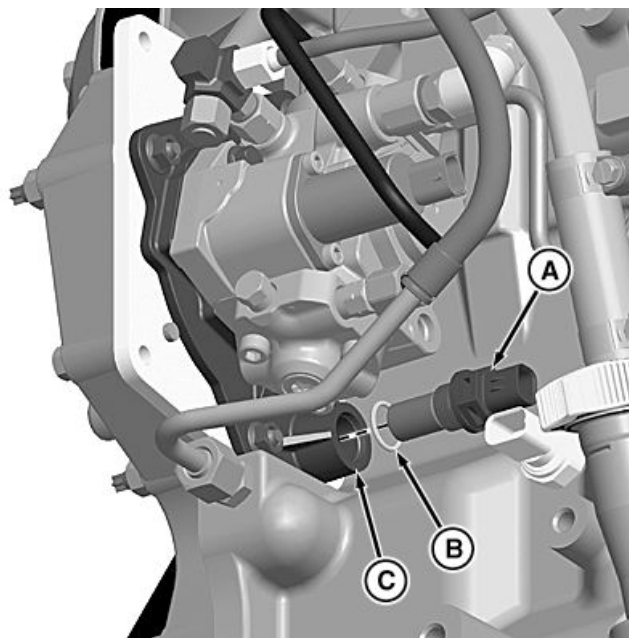
1. If camshaft position sensor (A) is reused, check O-ring (B) for good condition. If damaged, replace it.
2. Install sensor on high-pressure fuel pump mounting plate (C). Tighten sensor to specification.

Specification

Camshaft Position
Sensor-to-Mounting
Plate—Torque..... 14 N·m (10 lb.-ft.)

3. If removed, perform: **High-Pressure Fuel Pump — Installation**
4. Reconnect wiring harness connector to the sensor.

A—Camshaft Position Sensor C—High-pressure Fuel Pump
B—O-ring Mounting Plate



Install Camshaft Position Sensor

RG20289 —UN—26APR11

BF67790,000028F -19-28APR11-1/1

Camshaft Position Sensor — Removal

Special Tools:

- None

Consumable Material:

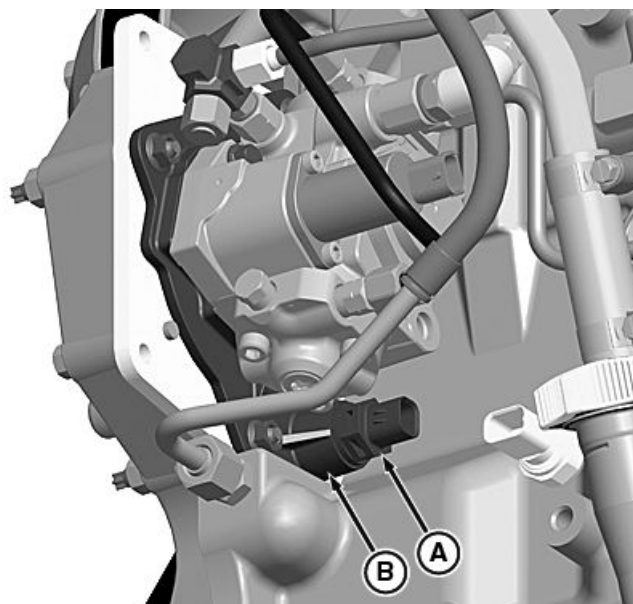
- None

NOTE: For more information on this sensor, see B5302 - Camshaft Position Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from camshaft position sensor (A).

NOTE: Camshaft position sensor is located between high-pressure fuel pump and engine block with a limited access area. Therefore it may be necessary to remove the high-pressure fuel pump to gain access around the sensor.

2. If necessary, perform: **High-Pressure Fuel Pump — Removal**
3. Remove camshaft position sensor from the high-pressure fuel pump mounting plate (B).



Remove Camshaft Position Sensor

A—Camshaft Position Sensor B—High-pressure Fuel Pump
Mounting Plate

RG20288 —UN—26APR11

BF67790,0000290 -19-28APR11-1/1

Charge Air Cooler Outlet Temperature Sensor — Installation

Special Tools:

- None

Consumable Material:

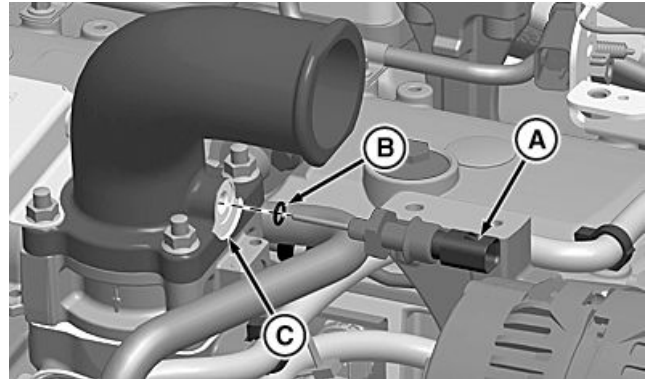
- None

1. If charge air cooler outlet temperature sensor (A) is reused, check O-ring (B) for good condition. If damaged, replace it.
2. Install sensor on air inlet pipe (C). Tighten sensor to specification.

Specification

Charge Air Cooler
Outlet Temperature
Sensor-to-Air Inlet
Pipe—Torque..... 17 N·m (12 lb.-ft.)

3. Reconnect wiring harness connector to the sensor.



Install Charge Air Cooler Outlet Temperature Sensor

A—Charge Air Cooler Outlet Temperature Sensor
B—O-ring
C—Air Inlet Pipe

BF67790,0000291 -19-28APR11-1/1

RG20275—UN—26APR11

Charge Air Cooler Outlet Temperature Sensor — Removal

Special Tools:

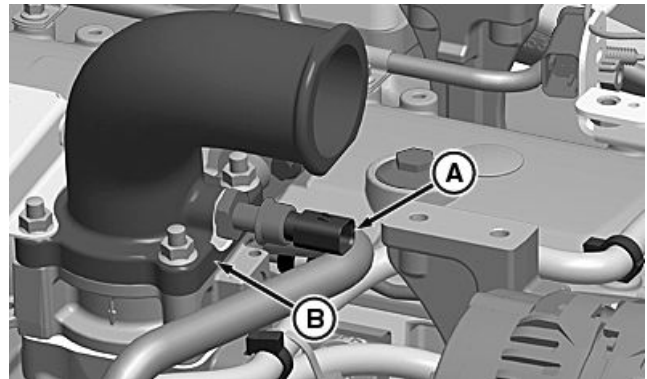
- None

Consumable Material:

- None

NOTE: For more information on this sensor, see B5205 - Charge Air Cooler Outlet Temperature Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from the charge air cooler outlet temperature sensor (A).
2. Remove the charge air outlet temperature sensor from air inlet pipe (B).



Remove Charge Air Cooler Outlet Temperature Sensor

A—Charge Air Cooler Outlet Temperature Sensor
B—Air Inlet Pipe

BF67790,0000292 -19-28APR11-1/1

RG20274—UN—26APR11

Crankshaft Position Sensor — Installation

Special Tools:

- None

Consumable Material:

- None

1. If crankshaft position sensor (A) is reused, check O-ring (B) for good condition. If damaged, replace it.
2. Install sensor on timing gear cover (C), then tighten to specification.

Specification

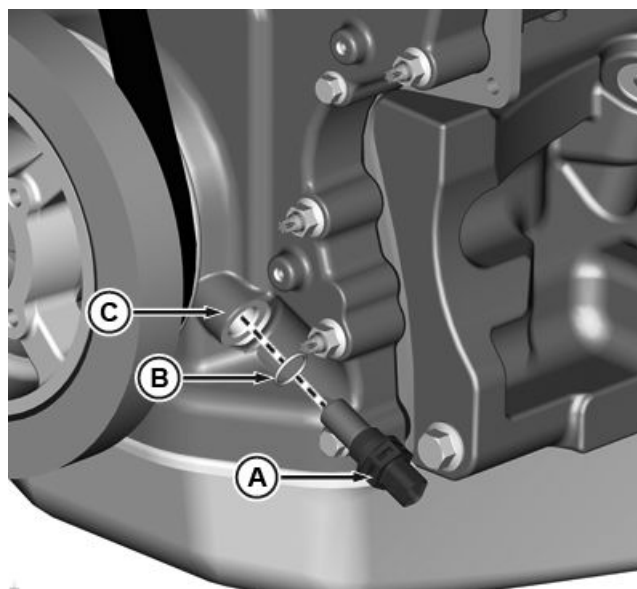
Crankshaft Position

Sensor-to-Timing Gear

Cover—Torque..... 14 N·m (10 lb.-ft.)

3. Reconnect wiring harness connector to sensor.

A—Crankshaft Position Sensor C—Timing Gear Cover
B—O-ring



Install Crankshaft Position Sensor

RG19685 —UN—25NOV10

BF67790,00002BA -19-13JUL11-1/1

Crankshaft Position Sensor — Removal

Special Tools:

- None

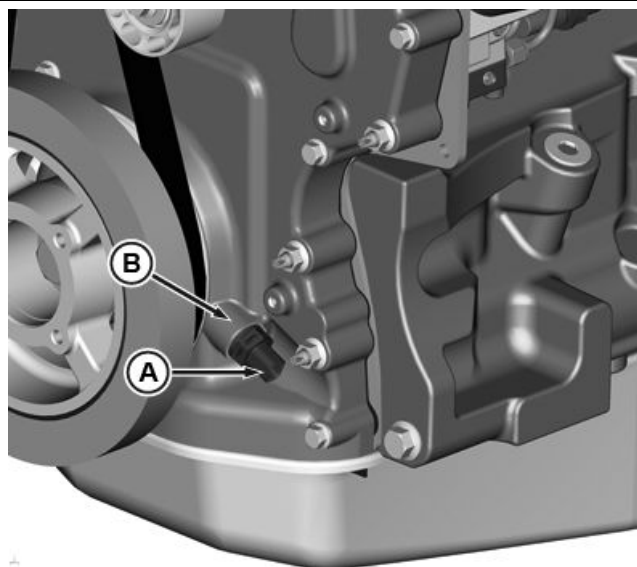
Consumable Material:

- None

NOTE: For more information on this sensor, see B5301 - Crankshaft Position Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from crankshaft position sensor (A).
2. Remove crankshaft position sensor from timing gear cover (B).

A—Crankshaft Position Sensor B—Timing Gear Cover



Remove Crankshaft Position Sensor

RG19684 —UN—25NOV10

BF67790,00002BB -19-29APR11-1/1

EGR Flow Sensor — Installation

Special Tools:

- None

Consumable Material:

- LOCTITE® 242

NOTE: Some engines are not equipped with the EGR Flow Sensor.

1. If EGR flow sensor (D) is reused, check o-rings (F) for good condition. If damaged, replace them.
2. Install sensor assembly onto the EGR flow venturi (E). Install the heat shield (A).
3. Apply LOCTITE® 242 to the threads of cap screws (C).
4. Install cap screws (C). Tighten them to specification.

Specification

EGR Flow Sensor Cap

Screws—Torque..... 25 N•m (18 lb.-ft.)

5. Reconnect wiring harness connector (B) to the sensor.

A—Heat Shield

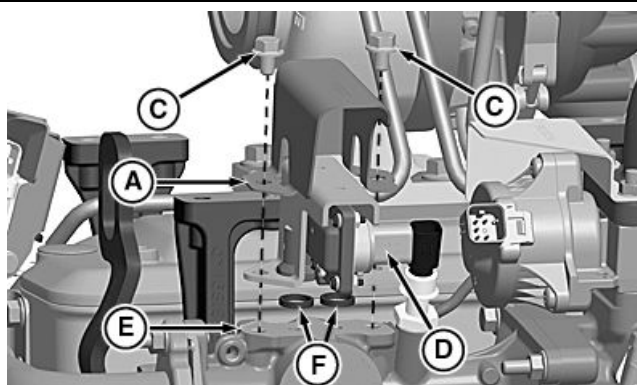
B—Wiring Harness Connector

C—Cap Screw (2)

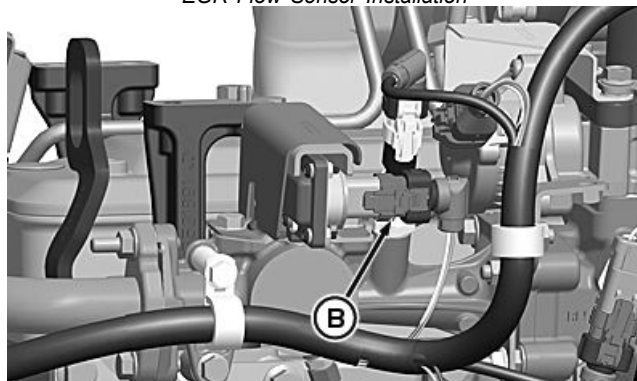
D—EGR Flow Sensor Assembly

E—EGR Flow Venturi

F—O-Ring (2)



EGR Flow Sensor Installation



Wiring Harness Connector Installation

LOCTITE is a trademark of Loctite Corp.

RG20258—UN—26APR11

RG20249—UN—26APR11

BF67790,0000293 -19-26JUN12-1/1

EGR Flow Sensor — Removal

Special Tools:

- None

Consumable Material:

- None

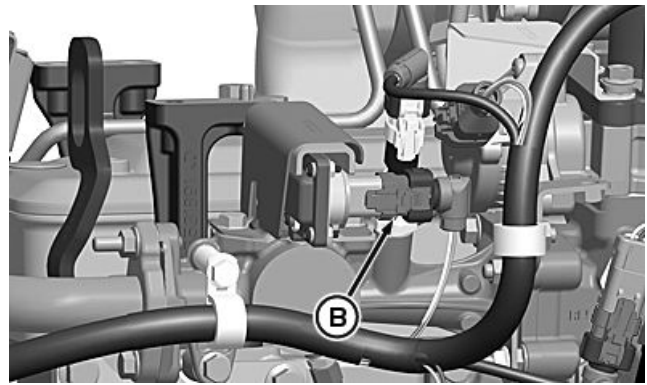
NOTE: For more information on this sensor, see *B5103 - EGR Flow Sensor* in Section 03, Group 140.

NOTE: Some engines are not equipped with the EGR Flow Sensor.

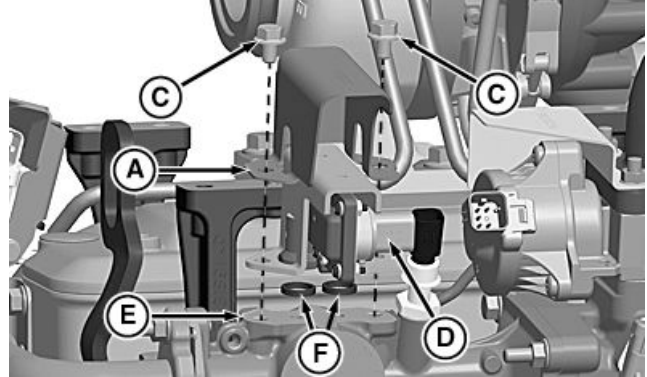
1. Disconnect wiring harness connector (B) from the EGR Flow Sensor (D).
2. Remove cap screws (C) and then remove heat shield (A). Remove EGR flow sensor assembly (D) from the EGR flow venturi (E).

A—Heat Shield
B—Wiring Harness Connector
C—Cap Screw (2)

D—EGR Flow Sensor Assembly
E—EGR Flow Venturi
F—O-Ring (2)



Disconnect Wiring Harness



Remove EGR Flow Sensor

BF67790,0000294 -19-29APR11-1/1

RG20249—UN—26APR11

RG20258—UN—26APR11

EGR Temperature Sensor — Installation

Special Tools:

- None

Consumable Material:

- None

1. If EGR temperature sensor (A) is reused, check copper washer for good condition. If damaged, replace sensor.

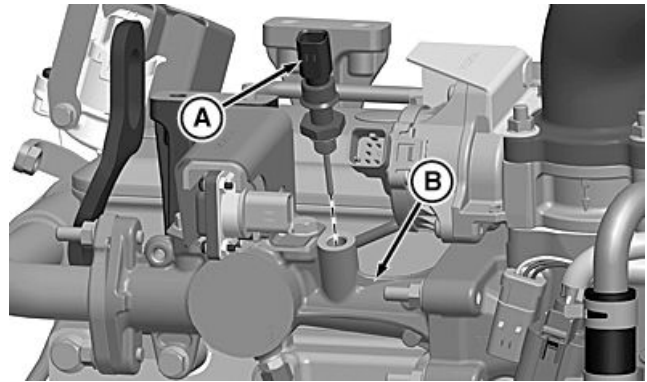
IMPORTANT: Torque tool must engage fully on the hexagonal steel body of the sensor to avoid damage of the plastic connector.

NOTE: On engines without a venturi, the EGR Temperature Sensor will be located on the intake manifold.

2. Install sensor on venturi (B) and tighten it to specification:

Specification

EGR Temperature
Sensor—Torque..... 30 N•m (22 lb.-ft.)



EGR Temperature Sensor Installation

A—EGR Temperature Sensor B—Venturi

3. Reconnect wiring harness connector to sensor.

BF67790,0000295 -19-13JUL11-1/1

RG20267—UN—26APR11

EGR Temperature Sensor — Removal

Special Tools:

- None

Consumable Material:

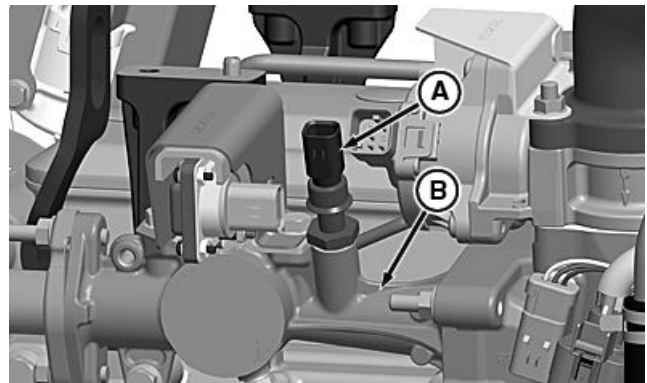
- None

NOTE: For more information on this sensor, see B5207 - EGR Temperature Sensor in Section 03, Group 140.

NOTE: On engines without a venturi, the EGR Temperature Sensor will be located on the intake manifold.

1. Disconnect wiring harness connector from EGR temperature sensor (A).

IMPORTANT: Torque tool must engage fully on the hexagonal steel body of the sensor to avoid damage of the plastic connector.



EGR Temperature Sensor Removal

A—EGR Temperature Sensor B—Venturi

2. Remove EGR temperature sensor from venturi (B).

BF67790,0000296 -19-13JUL11-1/1

RG20266—UN—26APR11

Engine Control Unit (ECU) — Installation

Special Tools:

- None

Consumable Material:

- None

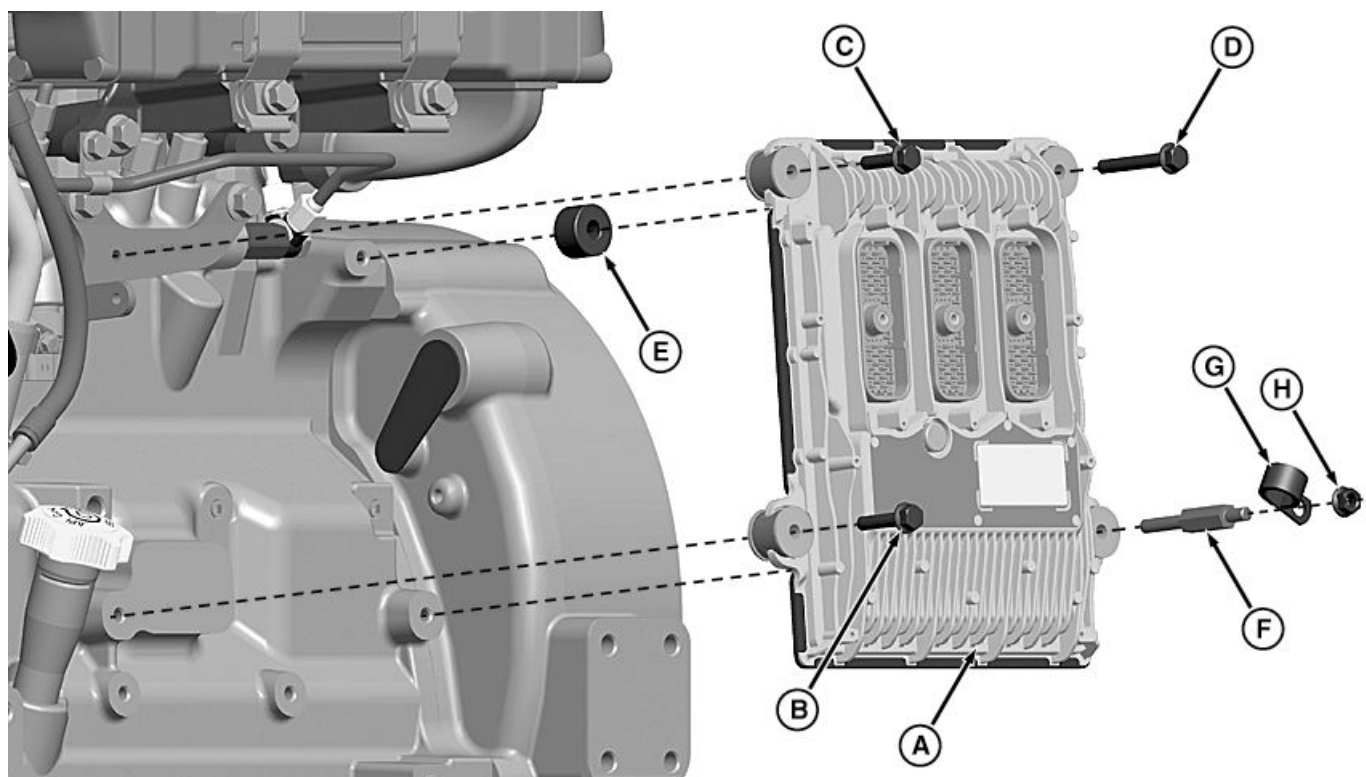
IMPORTANT: If a new ECU is not programmed identically to the original (failed) ECU, misleading diagnostic messages, poor performance; or engine damage can occur.

The new ECU has to be programmed, using Service ADVISOR, for its specific application. If data from the old ECU cannot be retrieved during programming, using Service ADVISOR, perform a Service Regeneration and an Engine Hourmeter

calibration after successfully reprogramming the new ECU. See, Engine Control Unit (ECU) – Reprogramming Instructions in Section 04, Group 160. See, Service Regeneration Instructions in Section 04, Group 160.

Do not force connectors when connecting wiring harness to the ECU.

NOTE: Normal mounting location for the ECU is to the engine block. The mounting hardware supplied with the ECU provides the required ground connection to the engine block. Depending on application, the ECU can have another location using additional brackets or can be installed on the vehicle.



Install Engine Control Unit

RG20280 —UN—26APR11

1. Install ECU (A) onto engine block with the three cap screws (B), (C), and (D) and the stud (F) along with the wiring harness clamp (G) and the nut (H). Tighten all cap screws and nut to specification.

Specification

ECU-to-Engine
Block—Torque..... 35 N·m (26 lb.-ft.)

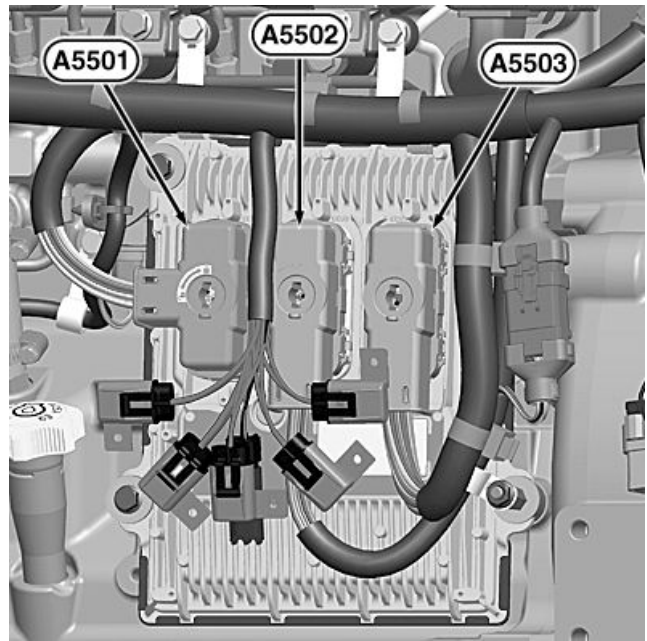
2. Reconnect engine (A5501 and A5502) and vehicle (A5503) harness connectors. Tighten all screws to specification.

Specification

Engine and Vehicle
Harness Connector-to-
ECU—Torque..... 7 N·m (62 lb.-in.)

3. Reconnect battery terminals.
4. Using Service ADVISOR, program the ECU.

A—Engine Control Unit	G—Wiring Harness Clamp
B—Cap Screw	H—Nut
C—Cap Screw	A5501—ECU Connector 1
D—Cap Screw	A5502—ECU Connector 2
E—ECU Bushing Isolator	A5503—ECU Vehicle
F—Special Stud	Connector



Connect ECU Wiring Harness

RG20281—UN—26APR11

BF67790,0000297 -19-26JUL11-2/2

Engine Control Unit (ECU) — Maintenance

- Thoroughly clean ECU and surrounding area. Remove any buildup of debris between the cooling fins.
- The ECU is not repairable. If it is found to be defective, replace ECU.
- Before replacing the ECU, make sure that it is isolated and identified as the defective component by following the appropriate DTC procedures. See Diagnostic Instructions and Information in Section 04, Group 160.
- For theory of operation information on the ECU, see Engine Control Unit (ECU) System Operation in Section 03, Group 140.
- The wiring connectors for the ECU are repairable.



CD31204

Engine Control Unit, Level 23

CD31204—UN—03JUN10

BF67790,0000A06 -19-18JUL11-1/1

Engine Control Unit (ECU) — Removal

Special Tools:

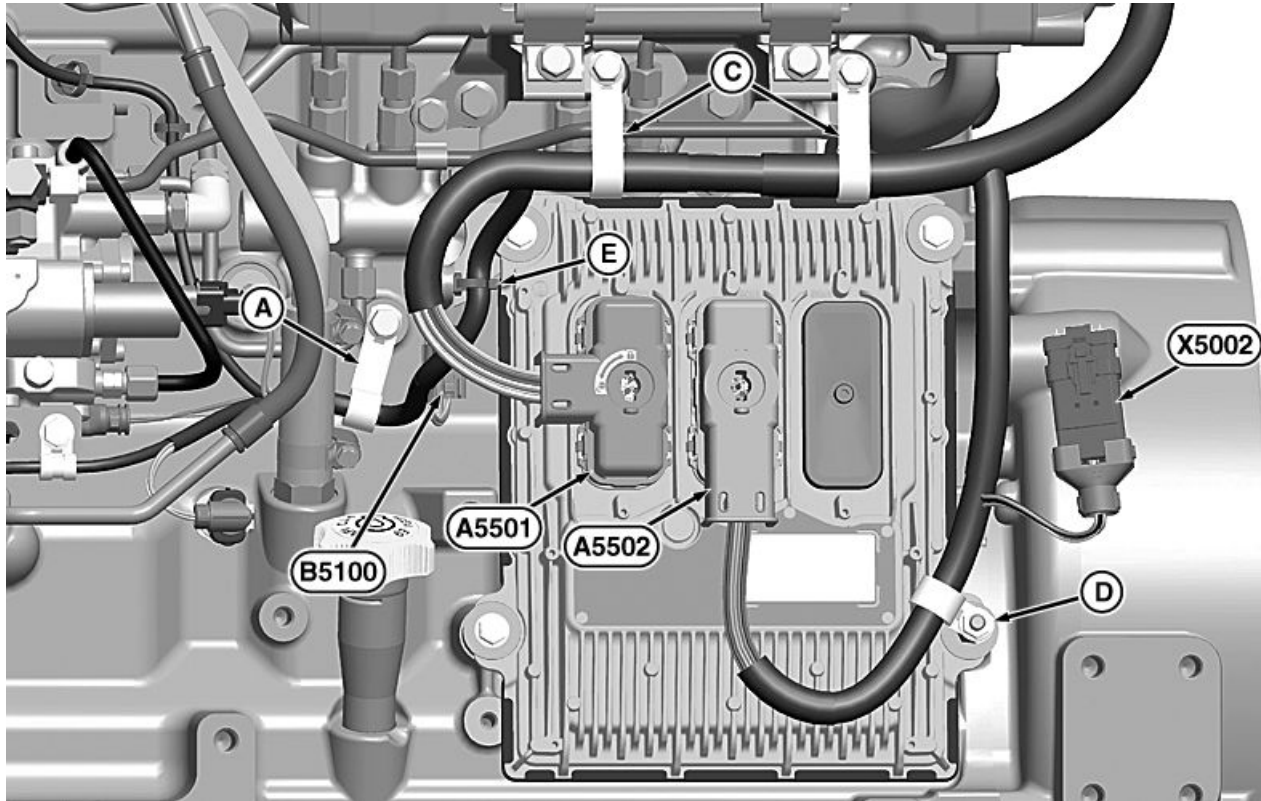
- None

Consumable Material:

- None

NOTE: Depending on application, the ECU can be installed directly on engine block, or with additional brackets, or on the vehicle.

IMPORTANT: Do not force connectors when disconnecting wiring harness from the ECU.



Remove Engine Control Unit

A—Long P-Clamp
C—P-Clamp
D—Short P-Clamp

E—Fir-Tree Clip
A5501—ECU Connector 1
A5502—ECU Connector 2

B5100—Fuel Rail Pressure Sensor
X5002—Auxillary Harness Connector

1. Disconnect battery terminals.
2. Disconnect ECU connector A5501 (A) from ECU.
3. Disconnect ECU connector A5502 (B) from ECU.
4. Disconnect ECU connector A5503 (not shown) from ECU.
5. Remove cap screw (C) holding wiring harness to engine block.
6. Remove remaining cap screws (D) holding ECU to engine block or bracket.

BF67790,0000A11 -19-03AUG11-1/1

RG20247 —UN—03AUG11

Engine Coolant Temperature Sensor — Installation

Special Tools:

- None

Consumable Material:

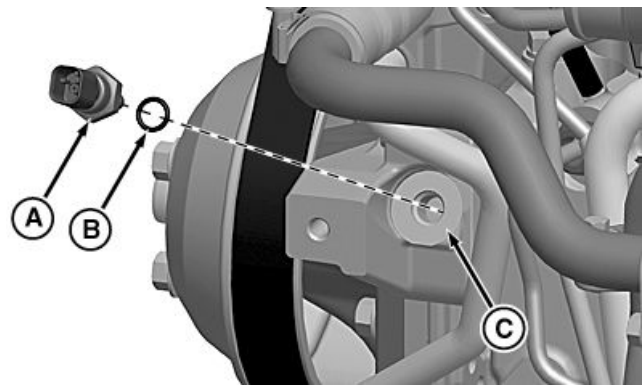
- None

1. If engine coolant temperature sensor (A) is reused, check O-ring (B) for good condition. If damaged, replace it.
2. Install sensor on thermostat housing (C) then tighten to specification.

Specification

Engine Coolant Temperature Sensor-to-Thermostat Housing—Torque..... 25 N·m (18 lb.-ft.)

3. Reconnect wiring harness connector to sensor.
4. Refill engine with coolant.



Install Engine Coolant Temperature Sensor

A—Engine Coolant Temperature Sensor
B—O-ring

C—Thermostat Housing

RG20277—UN—26APR11

5. Bleed the cooling system.

BF67790,0000298 -19-28APR11-1/1

Engine Coolant Temperature Sensor — Removal

Special Tools:

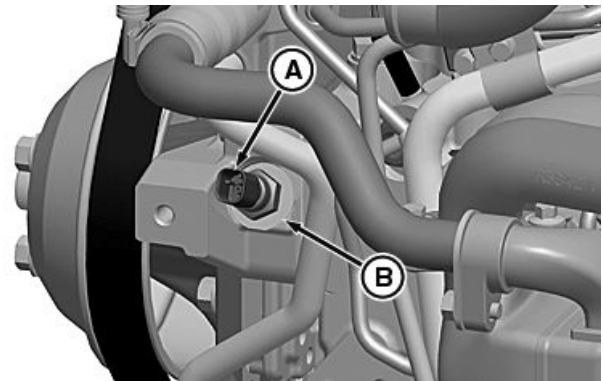
- None

Consumable Material:

- None

NOTE: For more information on this sensor, see B5208 - Coolant Temperature Sensor in Section 03, Group 140.

1. Let engine cool down then drain coolant.
2. Disconnect wiring harness connector from engine coolant temperature sensor (A).
3. Remove engine coolant temperature sensor from thermostat housing (B).



Remove Engine Coolant Temperature Sensor

A—Engine Coolant Temperature Sensor

B—Thermostat Housing

RG20276—UN—26APR11

BF67790,0000299 -19-28APR11-1/1

Engine Crankcase Pressure Sensor — Installation

Special Tools:

- None

Consumable Material:

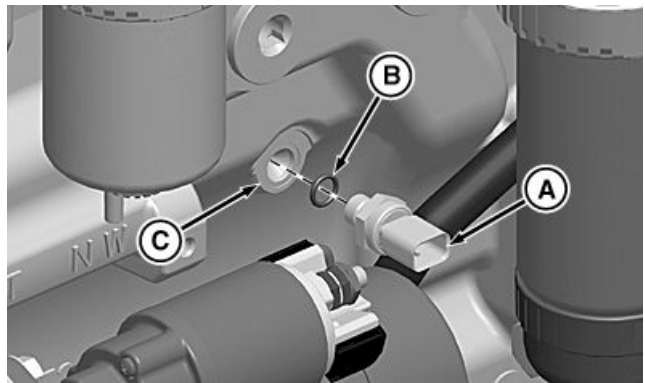
- None

1. If engine crankcase pressure sensor (A) is reused, check O-ring (B) for good condition. If damaged, replaced it.
2. Install sensor on cylinder block (C), then tighten to specification.

Specification

Engine Crankcase Pressure Sensor-to-Cylinder Block—Torque..... 25 N·m (18 lb.-ft.)

3. Reconnect wiring harness connector to sensor.



Install Engine Crankcase Pressure Sensor

A—Engine Crankcase Pressure Sensor
B—O-ring
C—Cylinder Block

RG20291—UN—26APR11

BF67790,000029A -19-28APR11-1/1

Engine Crankcase Pressure Sensor — Removal

Special Tools:

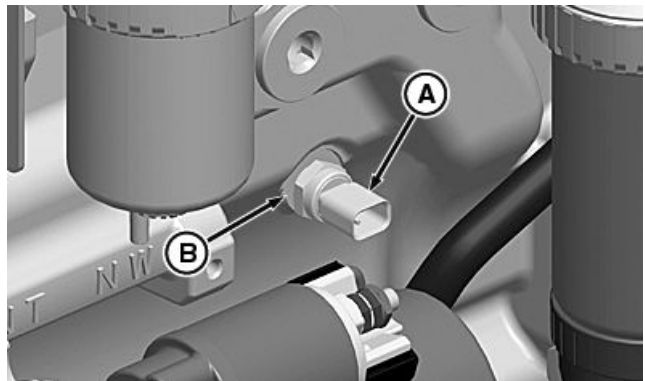
- None

Consumable Material:

- None

NOTE: For more information on this sensor, see B5105 - Engine Crankcase Pressure Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from engine crankshaft pressure sensor (A).
2. Remove engine crankcase pressure sensor from cylinder block (B).



Remove Engine Crankcase Pressure Sensor

A—Engine Crankcase Pressure Sensor
B—Cylinder Block

RG20290—UN—26APR11

BF67790,000029B -19-28APR11-1/1

Engine Oil Pressure Sensor — Installation

Special Tools:

- None

Consumable Material:

- LOCTITE® 592— Thread Sealer (PM37397)

1. If engine oil pressure sensor (A) is reused, please apply LOCTITE® 592 — Thread Sealer (PM37397). If sensor is damaged, replace it.

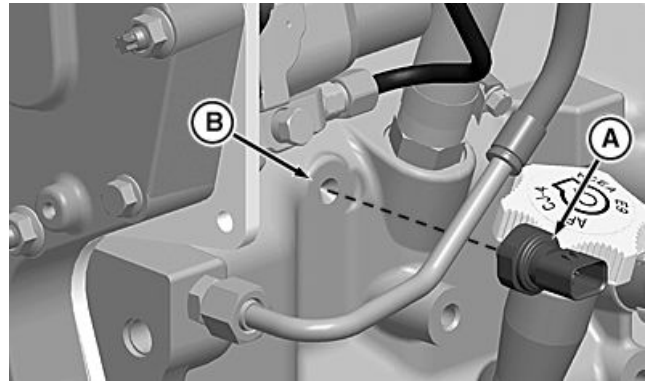
NOTE: When applying sealant make sure the first thread does not have any sealant on it. Apply the sealant with a minimum of two complete threads covered.

2. Install sensor in cylinder block (B), then tighten to specification.

Specification

Engine Oil Pressure
Sensor-to-Cylinder
Block—Torque..... 7 N·m (62 lb.-in.)

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Install Engine Oil Pressure Sensor

A—Engine Oil Pressure Sensor B—Cylinder Block

3. Reconnect wiring harness to sensor.

RG20293 —UN—26APR11

BF67790,000029C -19-25JUL11-1/1

Engine Oil Pressure Sensor — Removal

Special Tools:

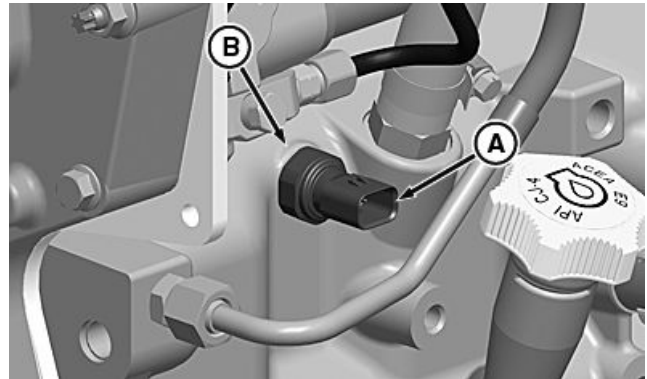
- None

Consumable Material:

- None

NOTE: For more information on this sensor, see B5101 - Engine Oil Pressure Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from engine oil pressure sensor (A).
2. Remove sensor from the engine cylinder block (B).



Remove Engine Oil Pressure Sensor

A—Engine Oil Pressure Sensor B—Cylinder Block

RG20292 —UN—26APR11

BF67790,000029D -19-11JUL11-1/1

Exhaust Manifold Pressure Sensor — Installation

Special Tools:

- None

Consumable Material:

- LOCTITE® 592— Thread Sealer (PM37397)

1. If exhaust manifold pressure sensor (A) is reused, please check the sealant on the threads. If new sealant needs to be applied, please use LOCTITE® 592 — Thread Sealer (PM37397). If sensor is damaged, replace it.

NOTE: When applying sealant make sure the first thread does not have any sealant on it. Apply the sealant with a minimum of two complete threads covered.

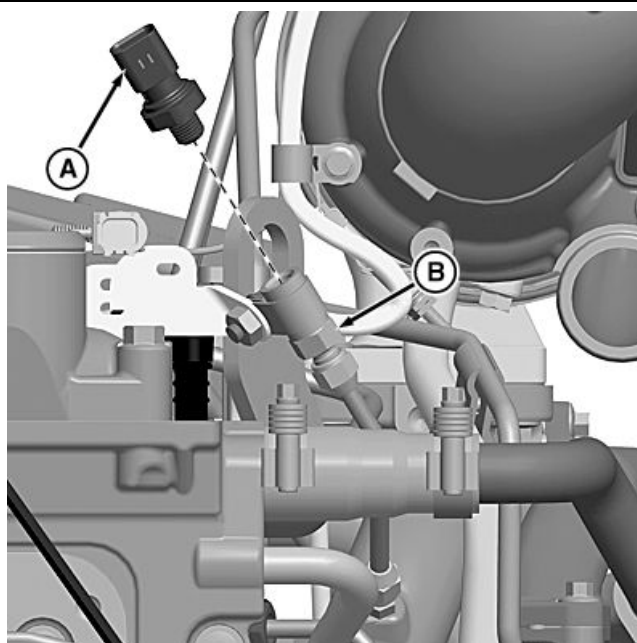
IMPORTANT: Torque tool must engage fully on the hexagonal steel body of the sensor to avoid damage of the plastic connector. When tightening sensor, use another wrench on the sensor adaptor to prevent damage to the sensor line or bracket.

2. Install sensor on adapter fitting (B) and then tighten it to specification:

Specification

Exhaust Manifold Pressure Sensor—Torque.....	18 N•m (13 lb.-ft.)
--	---------------------

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Exhaust Manifold Pressure Sensor Installation

A—Exhaust Manifold Pressure Sensor B—Adapter Fitting

3. Reconnect wiring harness connector to the sensor.

RG20279 —UN—26APR11

BF67790,000029E -19-24AUG11-1/1

Exhaust Manifold Pressure Sensor — Removal

Special Tools:

- None

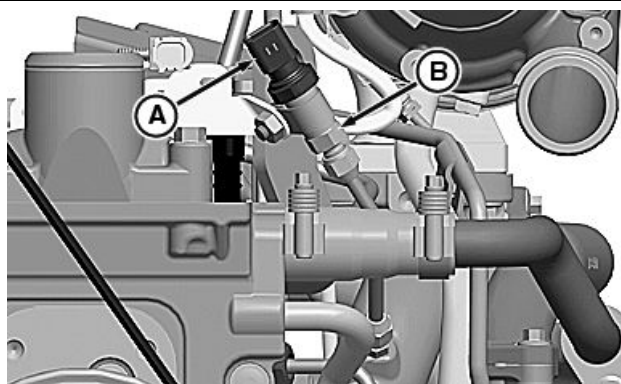
Consumable Material:

- None

NOTE: For more information on this sensor, see B5102 - Exhaust Manifold Pressure Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from exhaust manifold pressure sensor (A).

IMPORTANT: Torque tool must engage fully on the hexagonal steel body of the sensor to avoid damage of the plastic connector. When removing the sensor, use another wrench on the sensor adaptor to prevent damage to the sensor line or bracket.



Exhaust Manifold Pressure Sensor — Removal

A—Exhaust Manifold Pressure Sensor B—Adapter Fitting

2. Using a back up wrench on the adapter fitting, remove exhaust manifold pressure sensor from the adapter fitting (B).

RG20278 —UN—26APR11

BF67790,000029F -19-02AUG11-1/1

Fuel Rail Pressure Sensor — Installation

Special Tools:

- None

Consumable Material:

- High Temperature Grease.

IMPORTANT: Do not reuse sensor once it has been removed from the fuel rail.

1. Verify that threads and seats on new pressure sensor are free from debris or other contamination.
2. Apply high temperature grease to threads and seats of sensor.
3. Install sensor by turning into fuel rail finger tight.
4. Using a 30 mm deep socket, tighten sensor to specification.

Specification

Fuel Rail Pressure	
Sensor-to-Fuel	
Rail—Initial Torque.....	15 N·m (11 lb.-ft.)
Torque Turn	38°

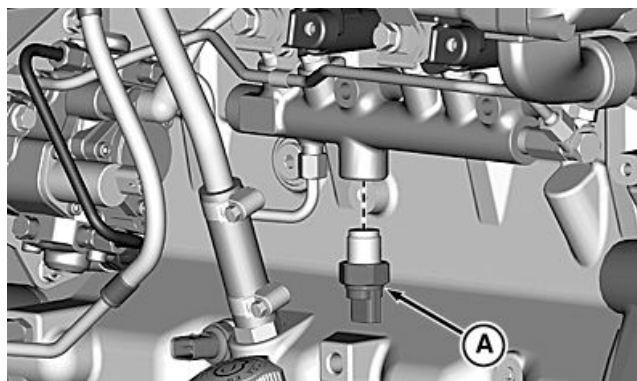
NOTE: Apply the following procedure if the tightening angle cannot be applied. Otherwise go directly to step 9.

5. Draw alignment lines (B) on sensor and fuel rail using the hex edges of the sensor as a guide.
6. Draw a parallel line (C) 5 mm (0.197 in.) in tightening direction from original line on fuel rail.
7. Set torque wrench to 140 N·m (104 lb.-ft.). Tighten sensor until the line on sensor aligns with or slightly passes second line on fuel rail. If no click is heard, the sensor is properly tightened. If torque wrench clicks before marks are in alignment, complete step 8.

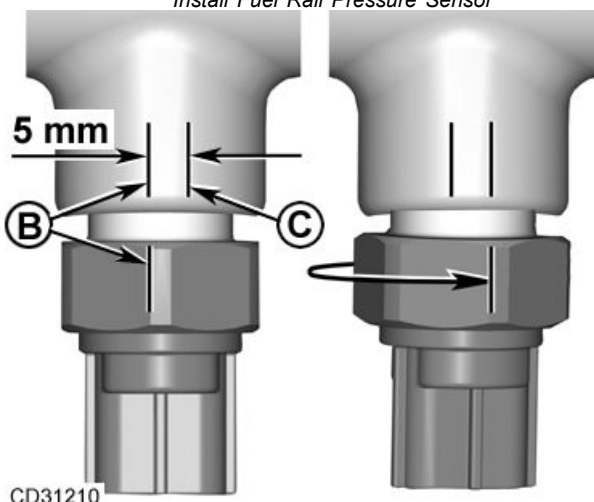
NOTE: Following step 8, if torque wrench still clicks before marks are in alignment, replace sensor. If a replacement sensor cannot be properly tightened, change fuel rail assembly.

8. Set torque wrench to 160 N·m (118 lb.-ft.). Again tighten sensor until the line on sensor aligns with or slightly passes second line on fuel rail.
9. Reconnect sensor wiring connection.

NOTE: To prime the fuel system before starting engine, please See Section 155: Fuel Bleeding.



Install Fuel Rail Pressure Sensor



Tighten Fuel Rail Pressure Sensor

A— Fuel Rail Pressure Sensor C— Parallel Line on Fuel Rail
B— Alignment Lines on Pressure Sensor and Fuel Rail

CAUTION: Fuel will be under high pressure when checking for leaks. Use a piece of cardboard or wood as a protective shield when first starting engine. Keep hands or body away when checking for leaks.

10. After sensor replacement, start engine and run up to high idle then check for leaks.
11. Perform Exhaust Condition Check

BF67790,00002A2 -19-12JUL11-1/1

Fuel Rail Pressure Sensor — Removal

Special Tools:

- None

Consumable Material:

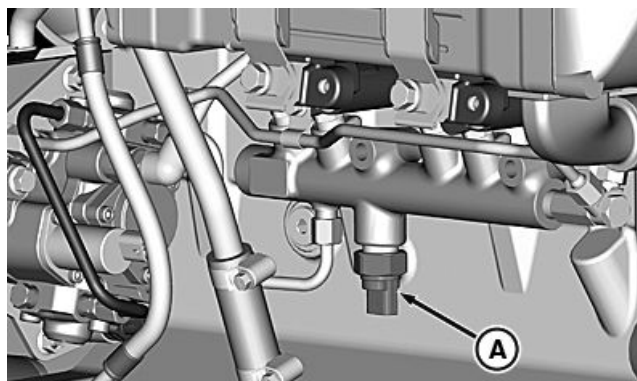
- None

CAUTION: Wait a minimum 15 minutes after engine is stopped before removing the fuel rail pressure sensor.

IMPORTANT: Perform the following steps in a clean environment. Keep work area clean so no dirt or debris enters the fuel system which may cause injector failure.

NOTE: For more information on this sensor, see B5100 - Fuel Rail Pressure Sensor in Section 03, Group 140.

1. Disconnect fuel rail pressure sensor (A) wiring connection.
2. Using a 30 mm deep socket, remove sensor.



Remove Fuel Rail Pressure Sensor

A—Fuel Rail Pressure Sensor

RG20237 —UN—26APR11

BF67790,00002A3 -19-12JUL11-1/1

Fuel Temperature Sensor — Installation

Special Tools:

- None

Consumable Material:

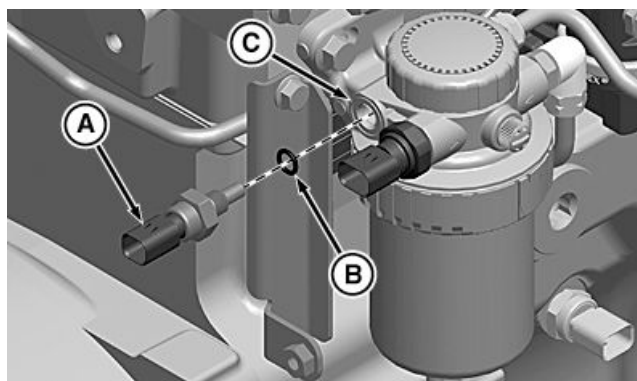
- None

1. If fuel temperature sensor (A) is reused, check O-ring (B) for good condition. If damaged, replace it.
2. Install sensor on fuel manifold (C), then tighten to specification.

Specification

Fuel Temperature	
Sensor-to-Fuel	
Manifold—Torque.....	17 N·m (12 lb.-ft.)

3. Reconnect wiring harness connector to sensor.



Install Fuel Temperature Sensor

A—Fuel Temperature Sensor C—Fuel Manifold
B—O-ring

RG20285 —UN—26APR11

BF67790,00002A4 -19-28APR11-1/1

Fuel Temperature Sensor — Removal

Special Tools:

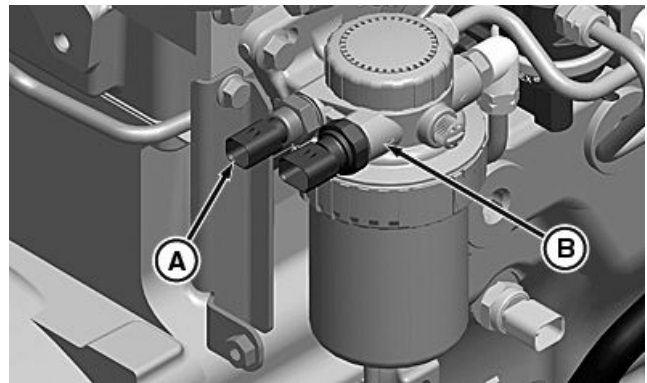
- None

Consumable Material:

- None

NOTE: For more information on this sensor, see B5209 - Fuel Temperature Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from fuel temperature sensor (A).
2. Remove sensor from fuel manifold (B).



Remove Fuel Temperature Sensor

A—Fuel Temperature Sensor B—Fuel Manifold

RG20284—UN—26APR11

BF67790,00002A5 -19-28APR11-1/1

Intake Air Sensor — Installation

Special Tools:

- None

Consumable Material:

- Soapy Water for O-Ring (if needed).

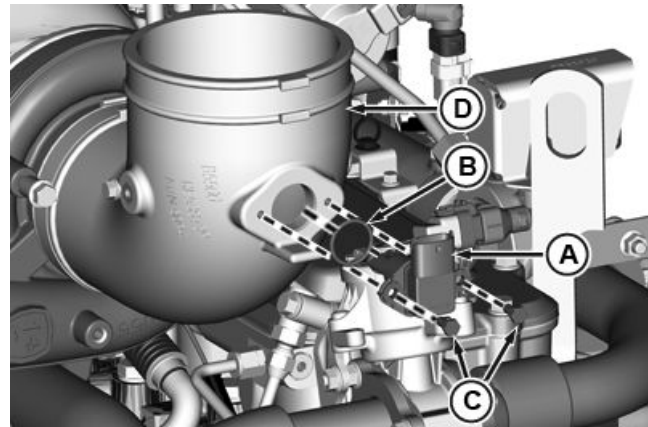
1. If intake air sensor (A) is reused, check O-ring (B) for good condition. If damaged, replace it.
2. Apply soapy water to the O-ring.
3. Install sensor along with the cap screws (C) on the air inlet hose (D). Tighten cap screws to specification:

Specification

Intake Air Sensor Cap
Screws—Torque..... 10 N•m (7 lb.-ft.)

NOTE: When installing the sensor, make sure the connector is facing up.

4. Reconnect wiring harness connector to air intake sensor.



Intake Air Sensor Installation

A—Intake Air Sensor C—Cap Screw (2)
B—O-Ring D—Air Inlet Hose

RG18834—UN—21JUL10

BF67790,00002A6 -19-12JUL11-1/1

Intake Air Sensor — Removal

Special Tools:

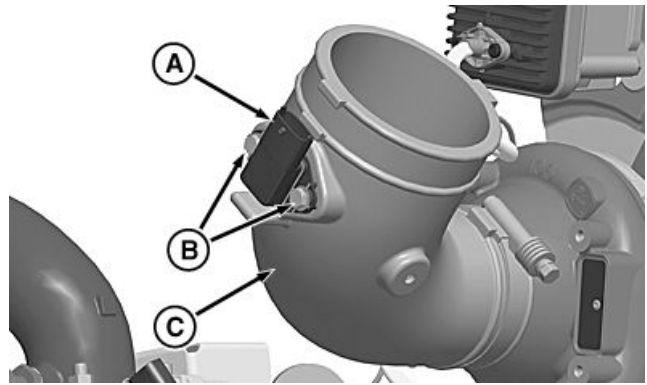
- None

Consumable Material:

- None

NOTE: For more information on this sensor, see *B5500 - Intake Air Sensor* in Section 03, Group 140.

1. Disconnect wiring harness connector from intake air sensor (A).
2. Remove cap screws (B). Remove sensor from the air inlet hose (C).



Intake Air Sensor Removal

A—Intake Air Sensor
B—Cap Screw (2)

C—Air Inlet Hose

RG20294 —UN—26APR11

BF67790,00002A7 -19-12JUL11-1/1

Intake Manifold Air Pressure (MAP) Sensor — Installation

Special Tools:

- None

Consumable Material:

- LOCTITE® 592 — Thread Sealer (PM37397).

NOTE: For clarity purpose, rocker arm cover to OCV filter tube is removed from the picture.

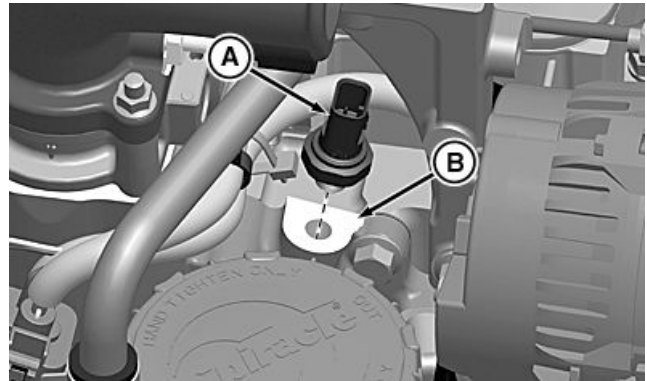
IMPORTANT: Torque tool must engage fully on the hexagonal steel body of the sensor to avoid damage of the plastic connector.

1. Apply LOCTITE® 592 — Thread Sealer (PM37397) to the threads and install manifold air pressure sensor (A) onto the intake manifold (B). Tighten it to specification:

Specification

Manifold Air Pressure
Sensor—Torque..... 18 N•m (13 lb.-ft.)

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Manifold Air Pressure Sensor Installation

A—Manifold Air Pressure
Sensor

B—Intake Manifold

2. Reconnect the wiring harness connector to sensor.

RG20269 —UN—26APR11

BF67790,00002A9 -19-12JUL11-1/1

Intake Manifold Air Pressure (MAP) Sensor — Removal

Special Tools:

- None

Consumable Material:

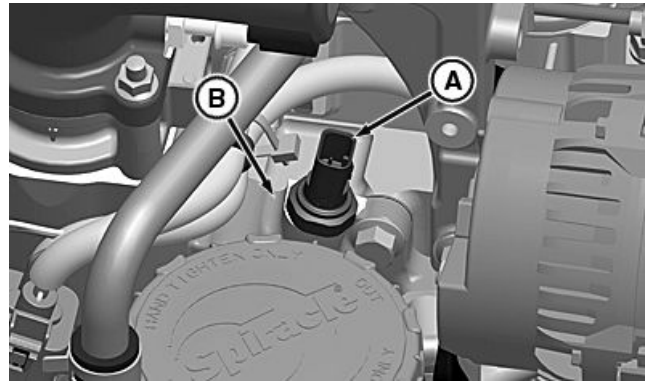
- None

NOTE: For more information on this sensor, see B5104 - MAP Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from manifold air pressure sensor (A).

IMPORTANT: Torque tool must engage fully on the hexagonal steel body of the sensor to avoid damage of the plastic connector.

2. Remove sensor from intake manifold (B).



Manifold Air Pressure Sensor Removal

A—Manifold Air Pressure Sensor

B—Intake Manifold

RG20268—UN—26APR11

BF67790,00002B2 -19-29APR11-1/1

Intake Manifold Air Temperature (MAT) Sensor — Installation

Special Tools:

- None

Consumable Material:

- None

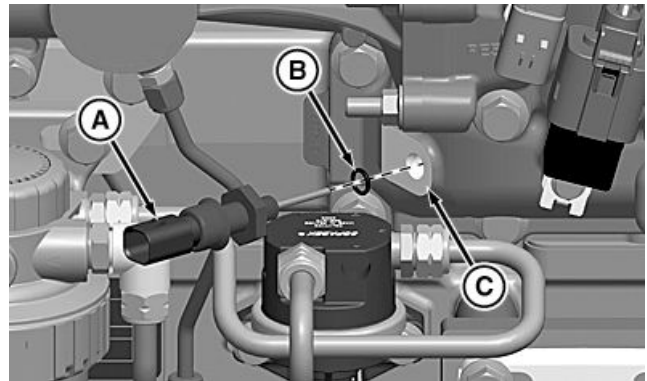
1. If the manifold air temperature sensor (A) is reused, check O-ring (B) for good condition. If damaged, replace it.

IMPORTANT: Torque tool must engage fully on the hexagonal steel body of the sensor to avoid damage of the plastic connector.

2. Install sensor onto the intake manifold (C). Tighten it to specification:

Specification

Manifold Air Temperature
Sensor—Torque..... 17 N•m (12 lb.-ft.)



Manifold Air Temperature Sensor Installation

A—Manifold Air Temperature Sensor

C—Intake Manifold

B—O-Ring

RG20271—UN—26APR11

3. Reconnect wiring harness connector to sensor.

BF67790,00002AB -19-29APR11-1/1

Intake Manifold Air Temperature (MAT) Sensor — Removal

Special Tools:

- None

Consumable Material:

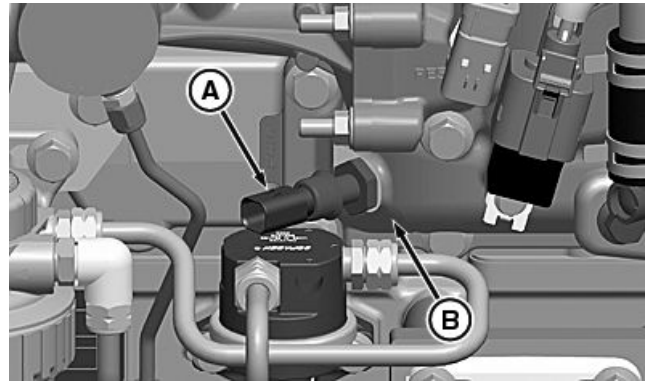
- None

NOTE: For more information on this sensor, see B5206 - MAT Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from manifold air temperature sensor (A).

IMPORTANT: Torque tool must engage fully on the hexagonal steel body of the sensor to avoid damage of the plastic connector.

2. Remove sensor from the intake manifold (B).



Manifold Air Temperature Sensor Removal

A—Manifold Air Temperature Sensor

B—Intake Manifold

BF67790,00002AA -19-29APR11-1/1

RG20270—UN—26APR11

Low-Pressure Fuel Pressure Sensor — Installation

Special Tools:

- None

Consumable Material:

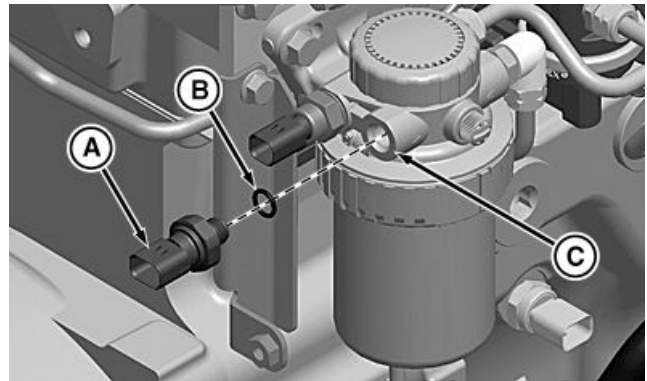
- None

1. If low-pressure fuel sensor (A) is reused, check O-ring (B) for good condition. If damaged, replace it.
2. Install sensor on fuel filter header (C), then tighten to specification.

Specification

Low-Pressure Fuel Pressure Sensor-to-Fuel Manifold—Torque.....	25 N·m (18 lb.-ft.)
--	---------------------

3. Reconnect wiring harness connector to sensor.



Install Low-Pressure Fuel Pressure Sensor

A—Low-Pressure Fuel Pressure Sensor
B—O-ring

C—Fuel Filter Header

BF67790,00002AC -19-12JUL11-1/1

RG20283—UN—26APR11

Low-Pressure Fuel Pressure Sensor — Removal

Special Tools:

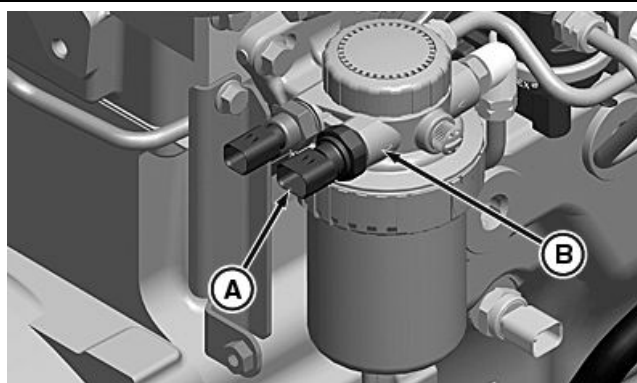
- None

Consumable Material:

- None

NOTE: For more information on this sensor, see B5107 - Low-Pressure Fuel Temperature Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from low-pressure fuel pressure sensor (A).
2. Remove sensor from fuel filter header (B).



Remove Low-Pressure Fuel Pressure Sensor

A—Low-Pressure Fuel Pressure Sensor

B—Fuel Filter Header

RG20282 —UN—26APR11

BF67790,00002AD -19-12JUL11-1/1

Water-In-Fuel (WIF) Sensor — Installation

Special Tools:

- None

Consumable Material:

- None

1. If water-in-fuel sensor (B) is reused, check sealing surface for good condition. If damaged, replace it.
2. Install sensor on primary fuel filter (C), then tighten to specification.

Specification

Water-in-Fuel

Sensor-to-Primary Fuel

Filter—Torque..... 8.2 N·m (6 lb.-ft.)

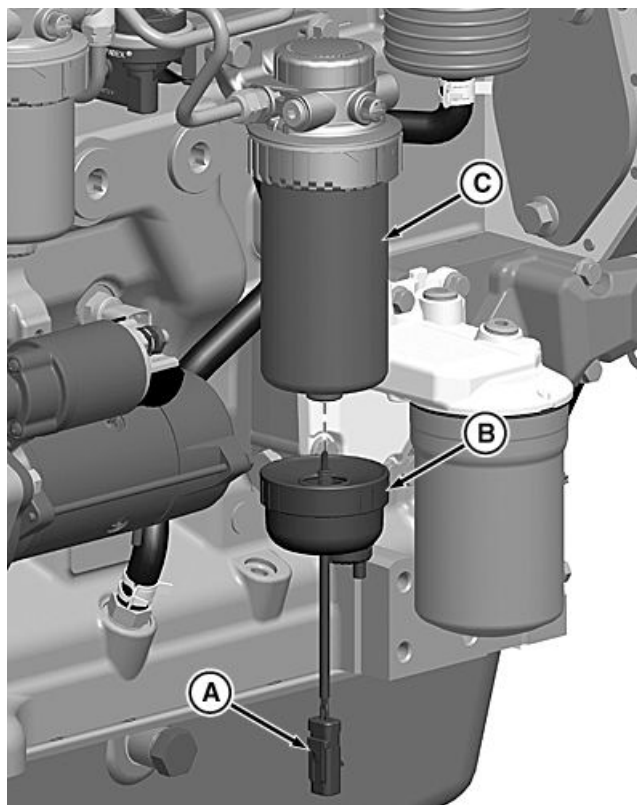
3. Reconnect wiring harness to sensor.

NOTE: For priming the fuel system see Fuel System Bleeding in Section 04, Group 155.

A—Water-in-fuel Sensor Connector

C—Primary Fuel Filter

B—Water-in-fuel Sensor Bowl



Install Water-in-fuel Sensor

RG20287 —UN—26APR11

BF67790,00002AE -19-05OCT11-1/1

Water-In-Fuel (WIF) Sensor — Removal

Special Tools:

- None

Consumable Material:

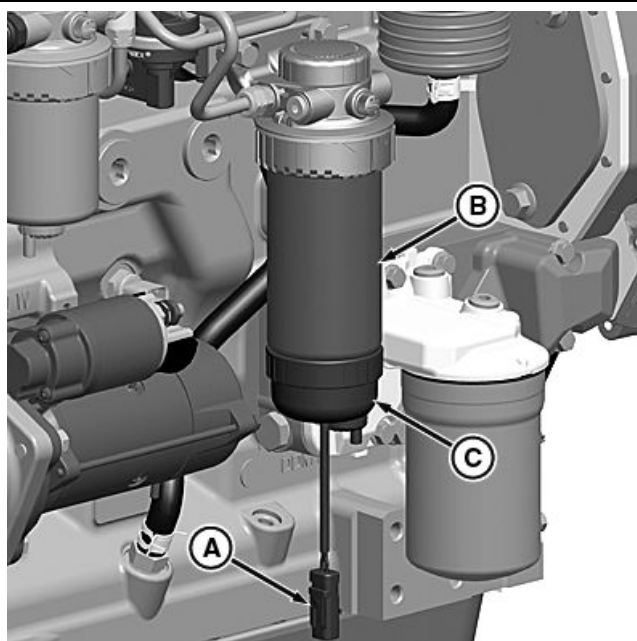
- None

NOTE: For more information on this sensor, see B5600 - Water-in-Fuel Sensor in Section 03, Group 140.

1. Disconnect wiring harness connector from water-in-fuel sensor connector (A).
2. Drain fuel from primary fuel filter canister (B).
3. Remove water-in-fuel sensor (C) from primary fuel filter (B).

A—Water-in-Fuel Sensor
Connector
B—Primary Fuel Filter

C—Water-in-Fuel Sensor



Remove Water-in-Fuel Sensor

RG20286—UN—19JUL11

BF67790,00002AF -19-05OCT11-1/1

Wiring Harness — Installation

Special Tools:

- None

Consumable Material:

- None

Wiring Harness Mounting Brackets — Installation

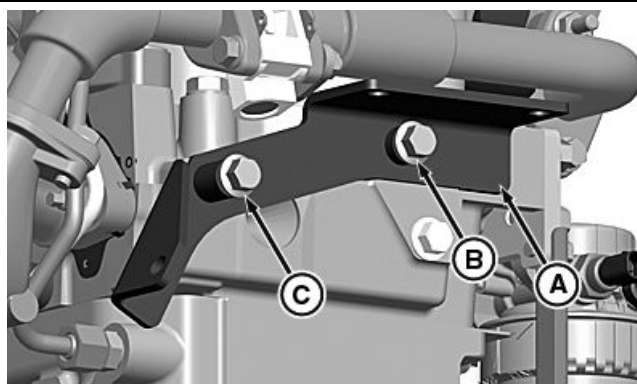
1. If removed, install bracket (A) to the rear side of the engine block. Install cap screws (B) and (C). Torque to specification:

Specification

Wiring Harness Mounting

Bracket Cap Screws

(B) and (C)—Torque.....40 N•m (30 lb.-ft.)



Wiring Harness Mounting Brackets Installation

A—Bracket
B—Cap Screw

C—Cap Screw

RG20296—UN—26APR11

Continued on next page

BF67790,00002B3 -19-20MAR12-1/11

2. If removed, install bracket (A) to the left-hand side of the engine block. Install cap screw (B). Torque to specification:

Specification

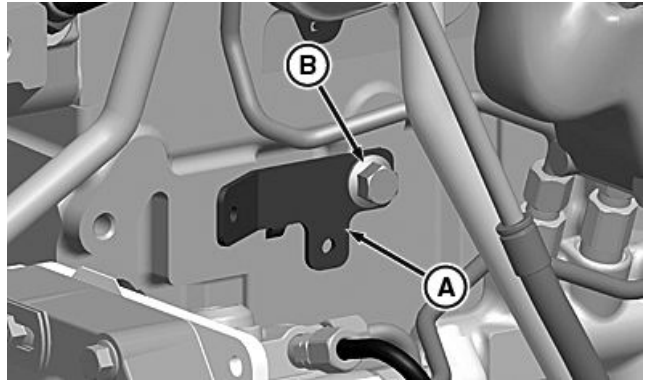
Wiring Harness
 Mounting Bracket
 Capscrew—Torque..... 40 N•m (30 lb.-ft.)

3. If removed, install crank sensor harness bracket (G) near the fuel pump using cap screw (C), spacer (D), and nut (E). Torque nut to specification:

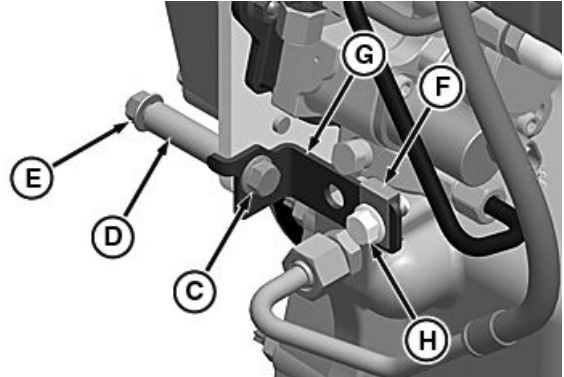
Specification

Wiring Harness Mounting
 Bracket Nut—Torque..... 20 N•m (15 lb.-ft.)

A—Bracket	E—Nut
B—Cap Screw	F—Clip
C—Cap Screw	G—Bracket
D—Spacer	H—Cap Screw



Wiring Harness Mounting Brackets Installation



Wiring Harness Mounting Brackets Installation

Continued on next page

BF67790,00002B3 -19-20MAR12-2/11

RG20297 —UN—26APR11

RG20298 —UN—11MAY11

4. If removed, install bracket (A) to the venturi mounting studs using nuts (B). Torque to specification:

Specification

Wiring Harness Mounting

Bracket Nut—Torque..... 20 N•m (15 lb.-ft.)

5. If removed, install bracket (D) to the air intake using nuts (B). Insert washer (C) on the right hand side stud to get a balance plane with the air throttle valve heat shield. Torque to specification:

Specification

Wiring Harness Mounting

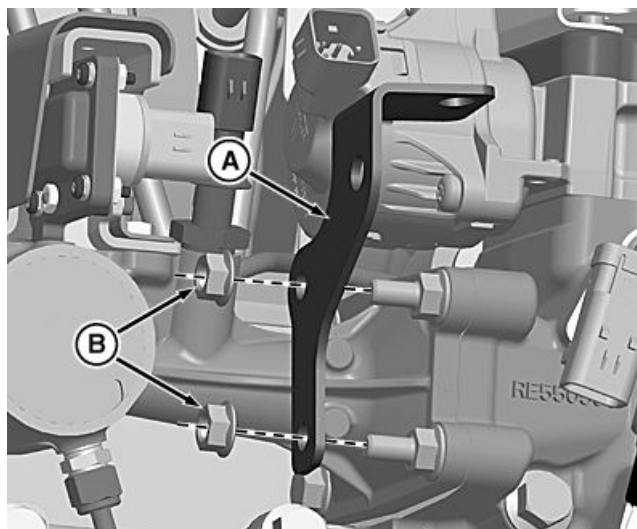
Bracket Nut—Torque..... 20 N•m (15 lb.-ft.)

A—Bracket

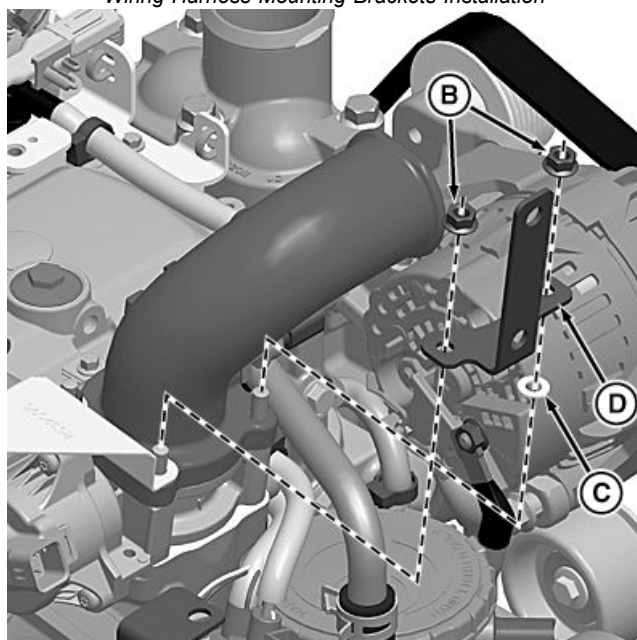
B—Nut

C—Washer

D—Bracket



Wiring Harness Mounting Brackets Installation



Wiring Harness Mounting Brackets Installation

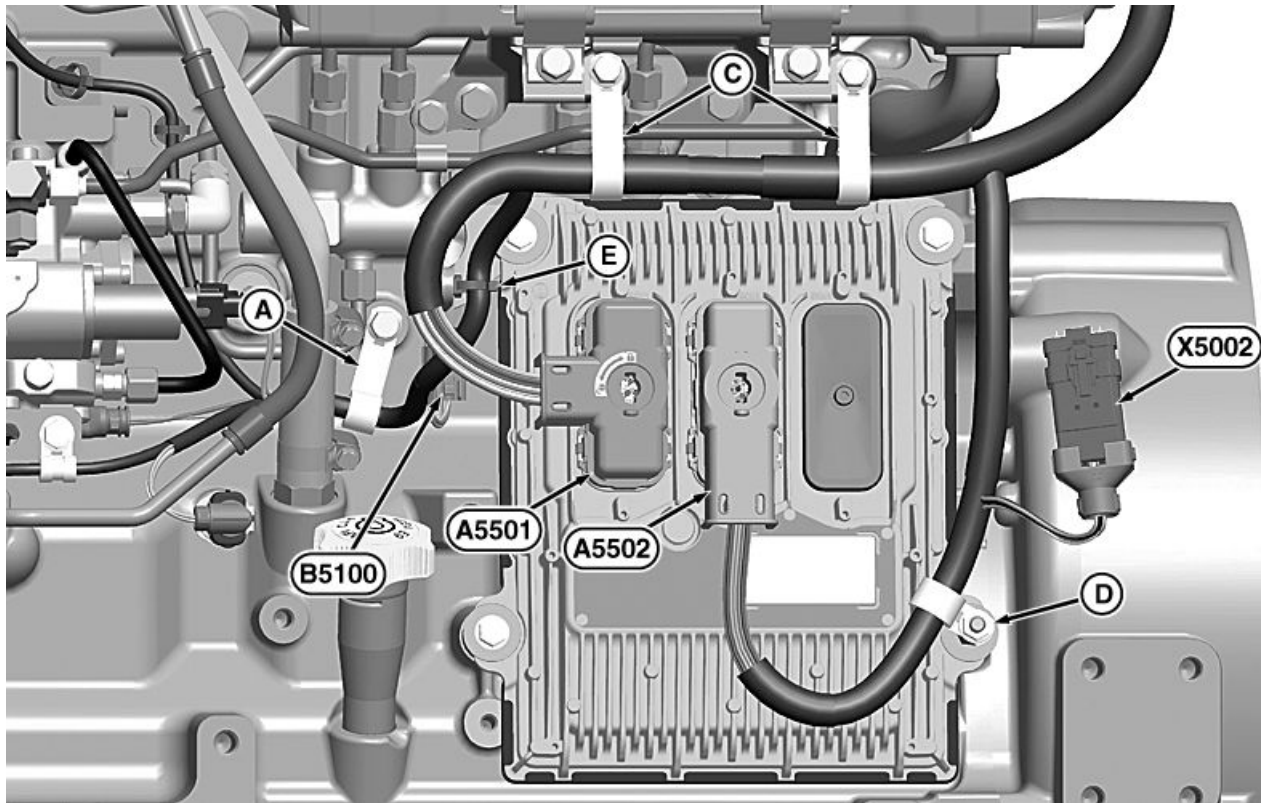
RG20299 —UN—26APR11

RG20300 —UN—11MAY11

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BF67790,00002B3 -19-20MAR12-3/11

Main Engine Wiring Harness — Installation



Install Engine Wiring Harness

A—P-Clamp
C—Longer P-Clamp
D—P-Clamp
E—Fir-Tree Clip

A5501—ECU Connector 1
A5502—ECU Connector 2

B5100—Fuel Rail Pressure
Sensor
X5002—Auxiliary Harness
Interconnect

1. Install the main engine wiring harness to EGR cooler bracket holes using (2) pre-attached longer P-Clamps (C) and cap screws. Torque to specification:

Specification

Wiring Harness P-Clamp
Cap Screw—Torque..... 20 N•m (15 lb.-ft.)

2. Install the pre-attached fir-tree clip (E) of the wiring harness to the ECU bracket.
3. Attach rail pressure sensor connector (B5100) on harness to the rail pressure sensor.
4. Install the pre-attached P-clamp (A) on harness to the boss of the cylinder block near the fuel rail using cap screw. Torque to specification:

Specification

Wiring Harness P-Clamp
Cap Screw—Torque..... 20 N•m (15 lb.-ft.)

5. Install the pre-attached P-clamp (D) of the harness to the ECU mount. Torque to specification:

Specification

Wiring Harness P-Clamp
Nut—Torque..... 20 N•m (15 lb.-ft.)

6. Plug in the ECU connectors (A5501) and (A5502). Tighten to specifications:

Specification

ECU Connector—Torque..... 7 N•m (62 lb.-in.)

7. Secure auxiliary power connector (X5002) to ECU bundle with a tie-strap.

IMPORTANT: Make sure the connector (X5002) stays tie-strapped to the main harness if not in use.

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BF67790,00002B3 -19-20MAR12-4/11

RG20247 —UN—03AUG11

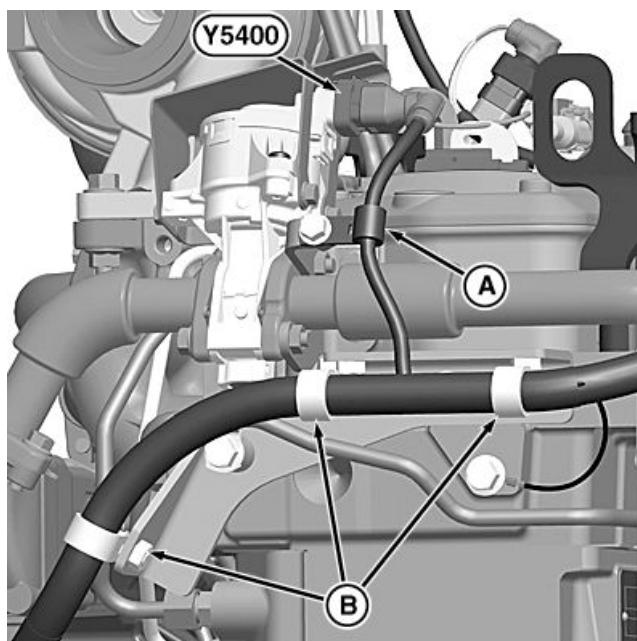
8. Install the pre-attached P-Clamps (A) and (B) of the wiring harness to the bracket using cap screws and nuts. Torque to specifications:

Specification

Wiring Harness P-Clamp
Cap Screw—Torque..... 20 N•m (15 lb.-ft.)

9. Attach connector (Y5400) to EGR Valve.

A—Longer P-Clamp **Y5400—EGR Valve**
B—P-Clamp



Install Engine Wiring Harness

BF67790,00002B3 -19-20MAR12-5/11

RG20248 —UN—26APR11

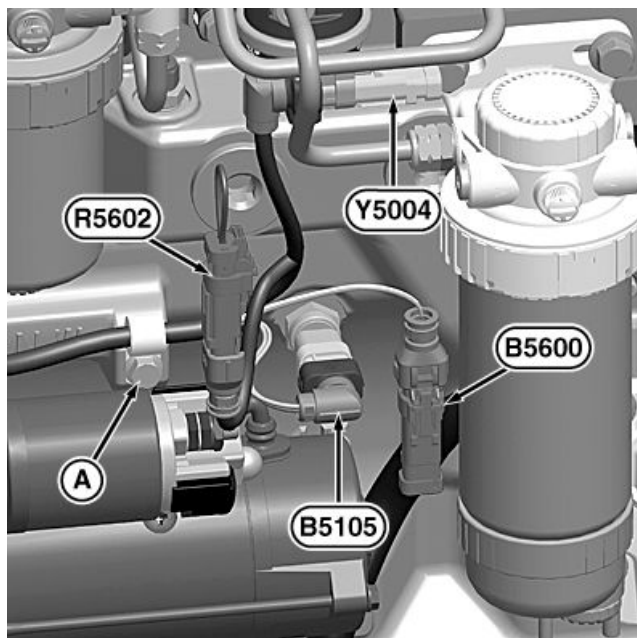
10. Install pre-attached P-clamps (A) to the boss on the cylinder block using cap screw. Torque to specification:

Specification

Wiring Harness P-Clamp
Cap Screw—Torque..... 20 N•m (15 lb.-ft.)

11. Attach connector (B5600) to water-in-fuel sensor.
12. Attach connector (B5105) to engine crankcase pressure sensor.
13. Attach connector (R5602) to Low-Pressure Fuel Pump Resistor (if equipped).
14. If equipped, attach connector (Y5004) to low-pressure fuel transfer pump.

A—P-Clamp **R5602—Low-Pressure Fuel**
B5105—Engine Crankcase **Pump Resistor**
Pressure Sensor **Y5004—Low-Pressure Fuel**
B5600—Water-In-Fuel Sensor **Pump**



Install Engine Wiring Harness

Continued on next page

BF67790,00002B3 -19-20MAR12-6/11

RG20242 —UN—26APR11

15. Install pre-attached P-clamps on the bracket mounted during the Secondary Fuel Filter Assembly Installation using cap screw (A). Torque to specification:

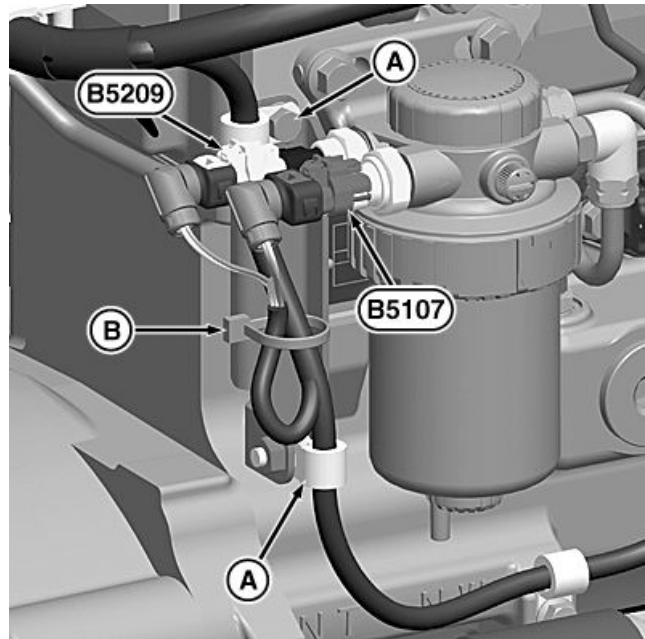
Specification

Wiring Harness P-Clamp
Cap Screw—Torque..... 20 N•m (15 lb.-ft.)

16. Install Tie-Strap (B) around the harness.
17. Attach connector (B5107) to low-pressure fuel sensor.
18. Attach connector (B5209) to fuel temperature sensor.

A—Cap Screw
B—Tie-Strap

**B5107—Low-Pressure Fuel
Sensor**
**B5209—Fuel Temperature
Sensor**

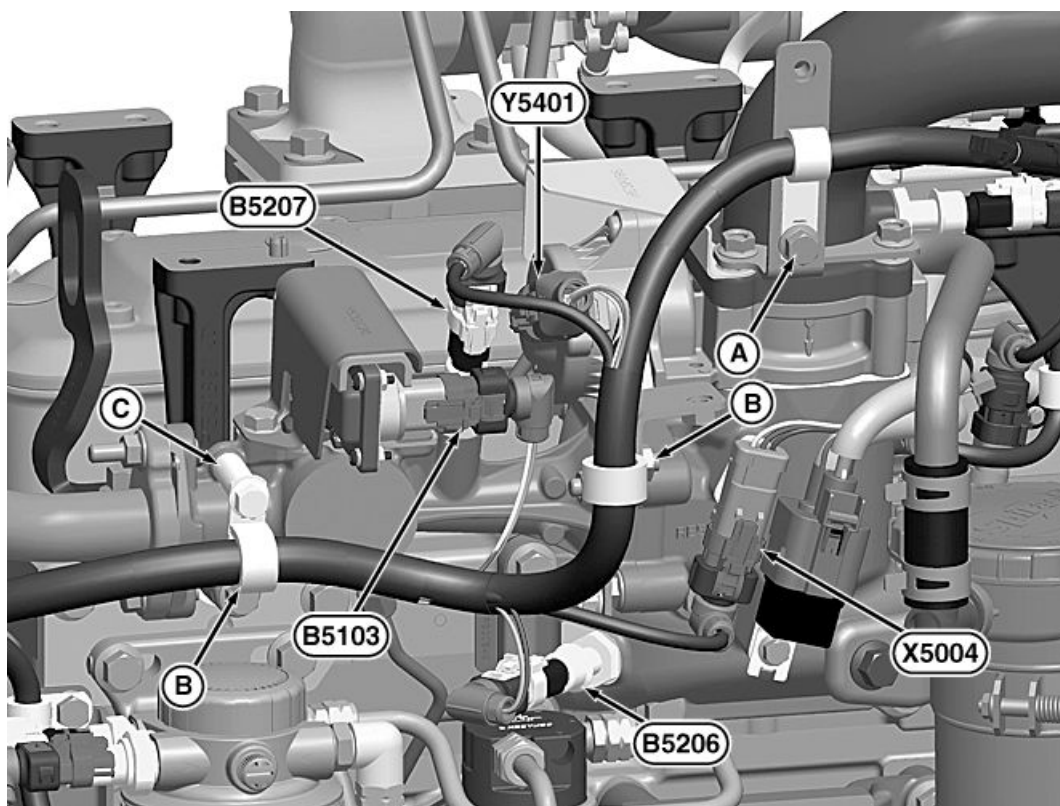


Install Engine Wiring Harness

RG20243 —UN—11MAY11

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BF67790,00002B3 -19-20MAR12-7/11



Install Engine Wiring Harness

A—Longer P-Clamp
 B—P-Clamp
 C—Spacer
 B5103—EGR Flow Sensor
 B5206—Manifold Air Temperature (MAT) Sensor
 B5207—EGR Temperature Sensor
 Y5401—Air Throttle Actuator
 X5004—Cold Start Aid Interface Connector

19. Install pre-attached longer P-clamp (A) and P-clamps (B) to brackets previously installed using cap screws. Be sure to include the spacer (C) when installing P-clamp (B) to the venturi. Torque to specification:

Specification

Wiring Harness P-Clamp
 Cap Screw—Torque..... 20 N•m (15 lb.-ft.)

20. Attach connector (B5103) to the EGR flow sensor.

21. Attach connector (B5206) to the manifold air temperature sensor.

22. Attach connector (B5207) to the EGR temperature sensor.

23. Attach connector (X5004) to the cold start aid interface connector.

24. Attach connector (Y5401) to the air throttle actuator.

Continued on next page

BF67790,00002B3 -19-20MAR12-8/11

RG20241 —UN—19JUL11

25. Install pre-attached P-clamp (A) of the wiring harness to the after-treatment casting boss using cap screw. Torque to specification:

Specification

Install Engine Wiring

Harness—Torque..... 20 N•m (15 lb.-ft.)

26. Attach connector (B5104) to the manifold air pressure sensor.
27. Attach connector (B5205) to the charge air cooler outlet temperature sensor.
28. Attach connector (X5000) to the fuel injector harness connector.
29. Attach connector (X5009) to the alternator excitation.

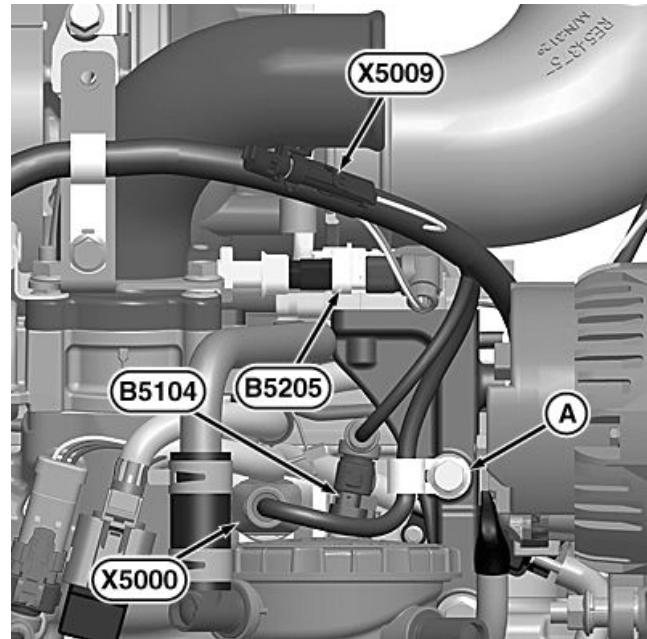
A—P-Clamp

B5104—Manifold Air Pressure (MAP) Sensor

B5205—Charge Air Cooler Outlet Temperature Sensor

X5000—Fuel Injector Harness Connector

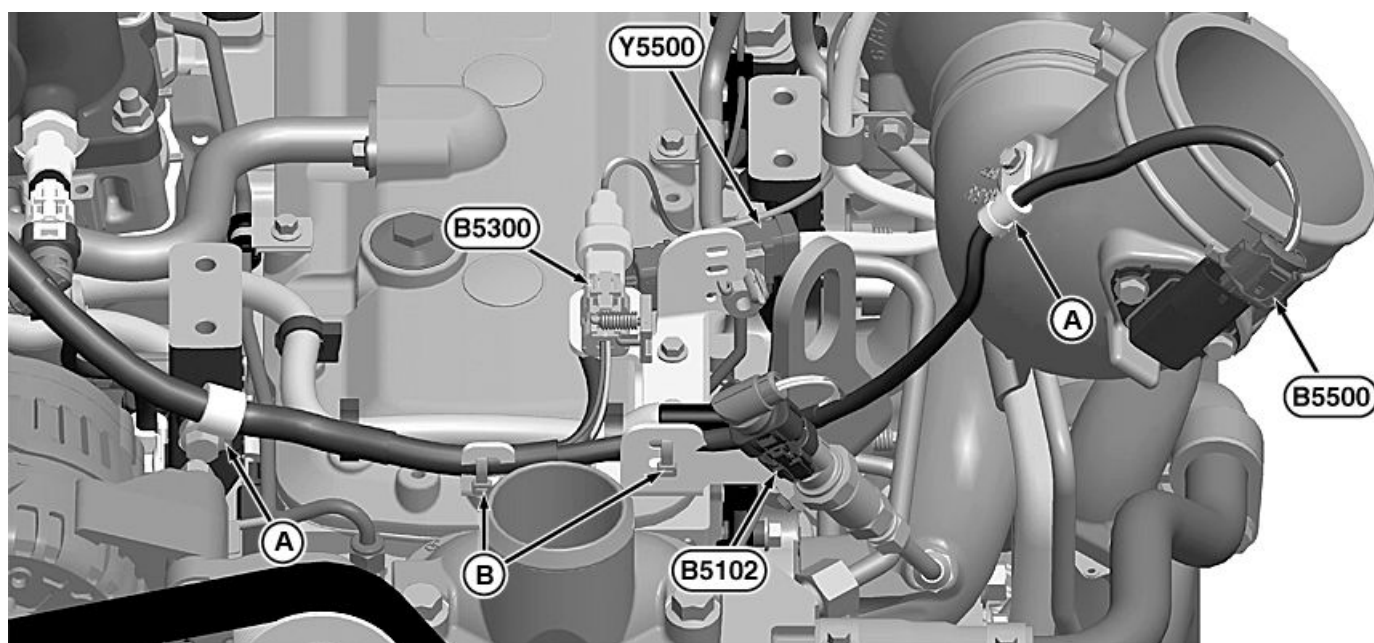
X5009—Alternator Excitation



RG20240—UN—03AUG11

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BF67790,00002B3 -19-20MAR12-9/11



RG20239 —UN—11MAY11

A—P-Clamp**B—Tie-Strap****B5102—Exhaust Manifold
Pressure Sensor****B5300—Turbocharger Speed
Sensor****B5500—Intake Air Sensor****Y5500—VGT Actuator Connector**

30. Install the wiring harness to the exhaust pressure sensor bracket using the (2) tie-straps (B) as shown.

31. Install pre-attached P-clamp (A) of the wiring harness to the front boss of the after-treatment support using cap screw. Torque to specification:

Specification

Install Engine Wiring

Harness—Torque..... 20 N•m (15 lb.-ft.)

32. Install pre-attached P-clamps (A) of the wiring harness to the boss on the turbo intake boot using cap screw. Torque to specification:

Specification

Install Engine Wiring

Harness—Torque..... 20 N•m (15 lb.-ft.)

33. Attach connector (B5102) to the exhaust manifold pressure sensor.

34. Attach connector (B5300) to the turbocharger speed sensor.

35. Attach connector (B5500) to the intake air sensor.

36. Attach connector (Y5500) to the VGT actuator connector.

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BF67790,00002B3 -19-20MAR12-10/11

Suction Control Valve, Crank and Cam Jumper Wiring Harness — Installation

1. Install pre-attached fir-tree clips (C) on coolant temperature lead bracket that was previously installed.
2. Attach connector (B5208) to the engine coolant temperature sensor.
3. Attach connector (B5101) to the engine oil pressure sensor
4. Attach connector (Y5002) to the solenoid on the suction control valve.
5. Attach connector (B5302) to the camshaft position sensor located below the high-pressure fuel pump.
6. Install pre-attached P-clamps (A), (B), and (C) to:
1. The bracket previously installed. 2. The spacer previously installed. 3. The stud on the left front plate. Torque to specifications

Specification

Bracket—Torque..... 20 N•m (15 lb.-ft.)

Specification

Spacer—Torque..... 20 N•m (15 lb.-ft.)

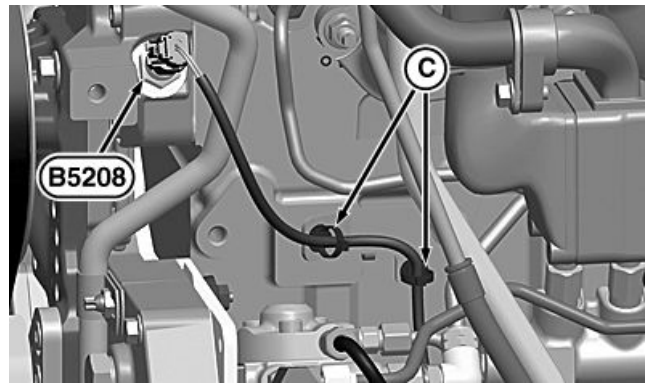
Specification

Front Plate—Torque..... 63 N•m (47 lb.-ft.)

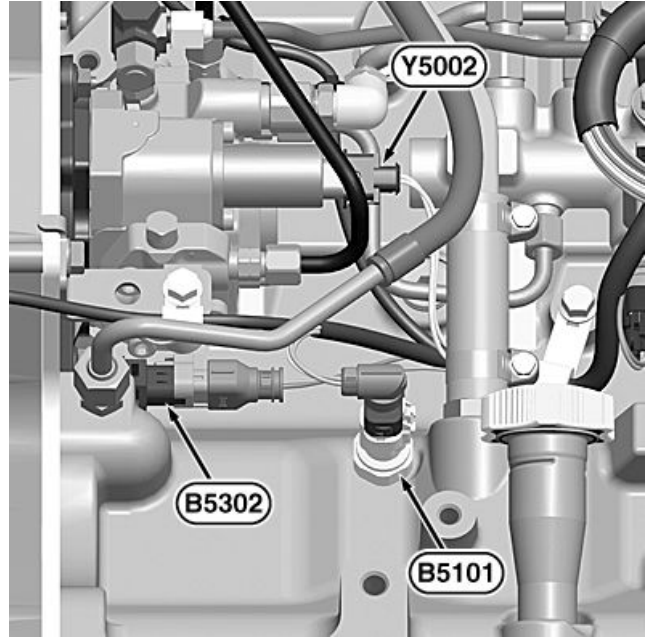
:

A—P-Clamp
B—Longer P-Clamp
C—Fir-Tree Clip
B5101—Engine Oil Pressure Sensor

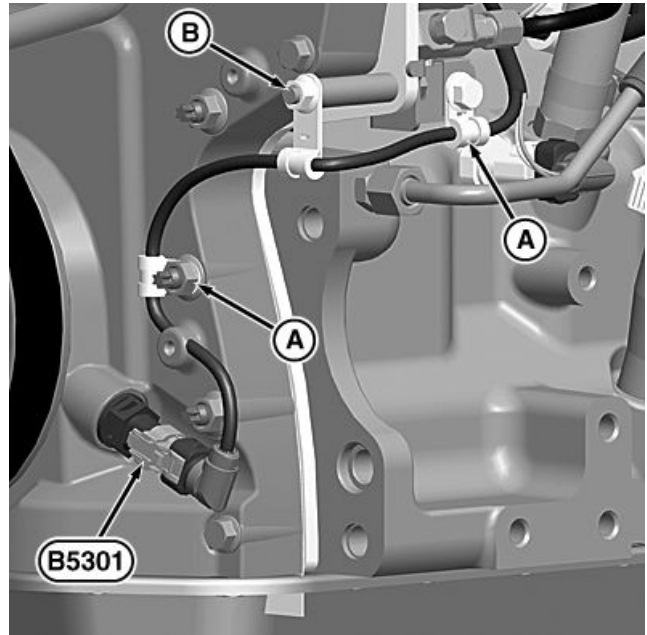
B5208—Engine Coolant Temperature Sensor
B5301—Crankshaft Position Sensor
B5302—Camshaft Position Sensor
Y5002—Suction Control Valve



RG20246—UN—11MAY11



RG20245—UN—26APR11



RG20244—UN—11MAY11

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Wiring Harness — Removal

Special Tools:

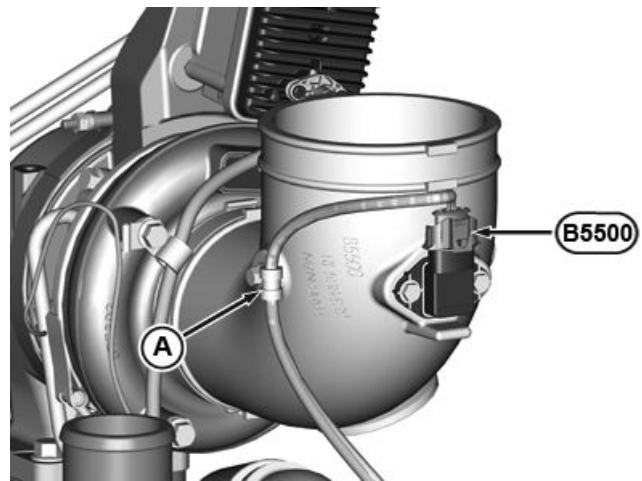
- None

Consumable Material:

- None

NOTE: When access to locking mechanism of connector is difficult, slightly loosen the sensor and use a thin screwdriver to push back the tab. Then tighten the sensor back to specification.

NOTE: The exact location of sensors and some components will vary from different engine models.



Remove Connector and Clamp

Main Engine Wiring Harness — Removal

1. Disconnect harness from (B5500) connector.
2. Remove P-clamp (A).

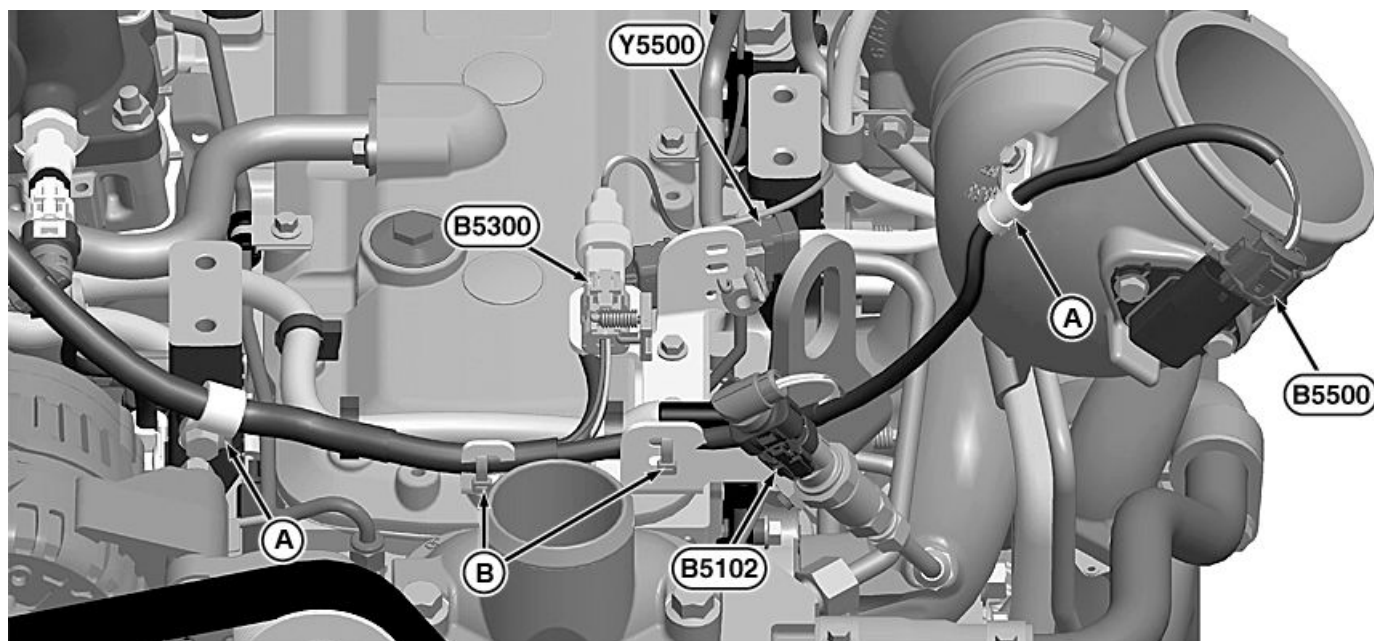
A—P-Clamp

B5500—Intake Air Sensor

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BF67790,00002B4 -19-21JUL11-1/9

RG19670—UN—22NOV10



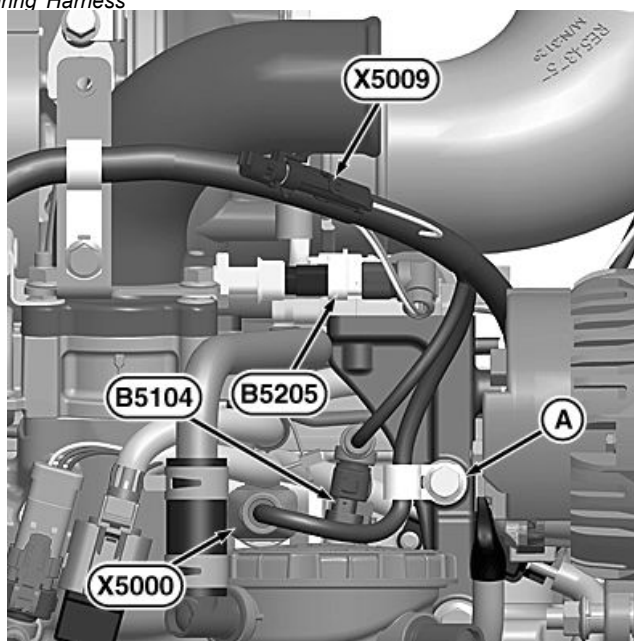
RG20239 —UN—11MAY11

Remove Engine Wiring Harness

3. Disconnect harness from (B5300) connector.
4. Disconnect harness from (Y5500) connector.
5. Disconnect harness from (B5102) connector.
6. Remove Tie-Straps (B).
7. Remove P-clamp (A). Remove harness.
8. Disconnect harness from (B5104) connector.
9. Disconnect harness from (X5000) connector.
10. Disconnect harness from (X5009) connector.
11. Disconnect harness from (B5205) connector.
12. Remove P-clamp (A). Remove harness.

A—P-Clamp
 B—Tie-Straps
 B5102—Exhaust Manifold
 Pressure Sensor
 B5104—Manifold Air Pressure
 Sensor
 B5205—Charge Air Cooler
 Outlet Temperature
 Sensor

B5300—VGT Speed Sensor
 B5500—Intake Air Sensor
 X5000—Fuel Injector Harness
 Connector
 X5009—Alternator Excitation
 Y5500—VGT Actuator
 Connector

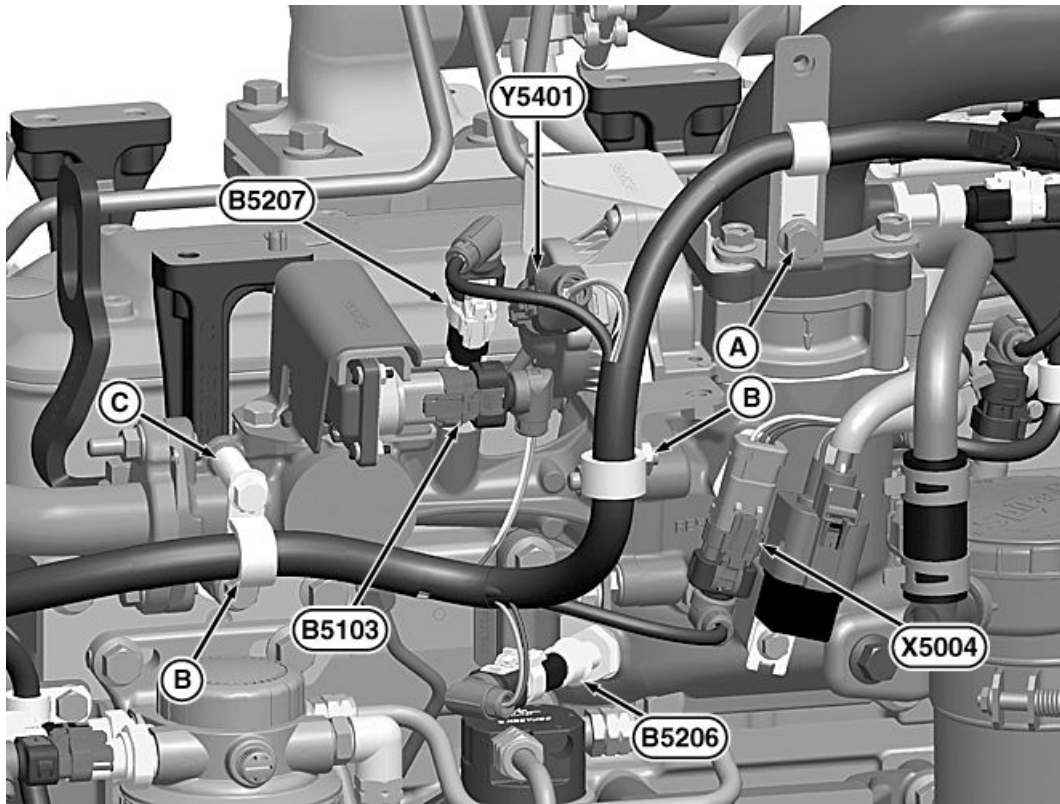


RG20240 —UN—03AUG11

Remove Engine Wiring Harness

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BF67790,00002B4 -19-21JUL11-2/9



Remove Engine Wiring Harness

A—Longer P-Clamp
 B—P-Clamp
 C—Spacer
 B5103—EGR Flow Sensor
 B5206—Manifold Air Temperature (MAT) Sensor
 B5207—EGR Temperature Sensor
 Y5401—Air Throttle Actuator
 X5004—Cold Start Aid Interface Connector

13. Remove P-Clamps (B).
14. Disconnect harness from (X5004) glow plug connector bracket.
15. Disconnect harness from (B5206) connector.
16. Disconnect harness from (B5207) connector.
17. Disconnect harness from (Y5401) connector.
18. Disconnect harness from (B5103) connector.
19. Remove P-Clamp (A). Remove harness.

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BF67790,00002B4 -19-21JUL11-3/9

RG20241 —UN—19JUL11

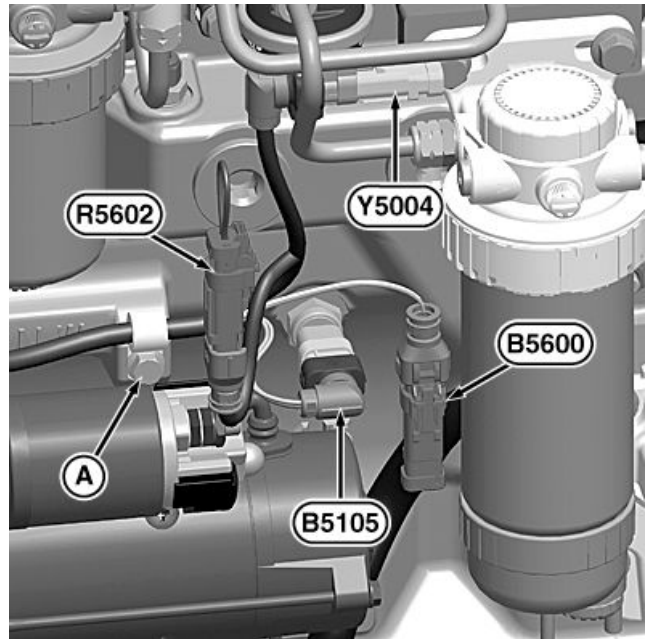
20. Disconnect harness from (Y5004) connector.
Disconnect harness from (R5602) connector if necessary.

NOTE: Engines can be equipped with either a mechanical or electrical fuel transfer pump.

21. Disconnect harness from (B5600) connector.
22. Disconnect harness from (B5105) connector.
23. Remove any clips from the harness and release it from the brackets over the venturi (if equipped) and the rocker arm cover.
24. Remove P-clamp (A). Remove harness.

A—P-Clamp
B5105—Engine Crankcase
 Pressure Sensor
B5600—Water-In-Fuel Sensor

R5602—24V Low-Pressure Fuel
 Pump Resistor
Y5004—Low-Pressure Fuel
 Pump

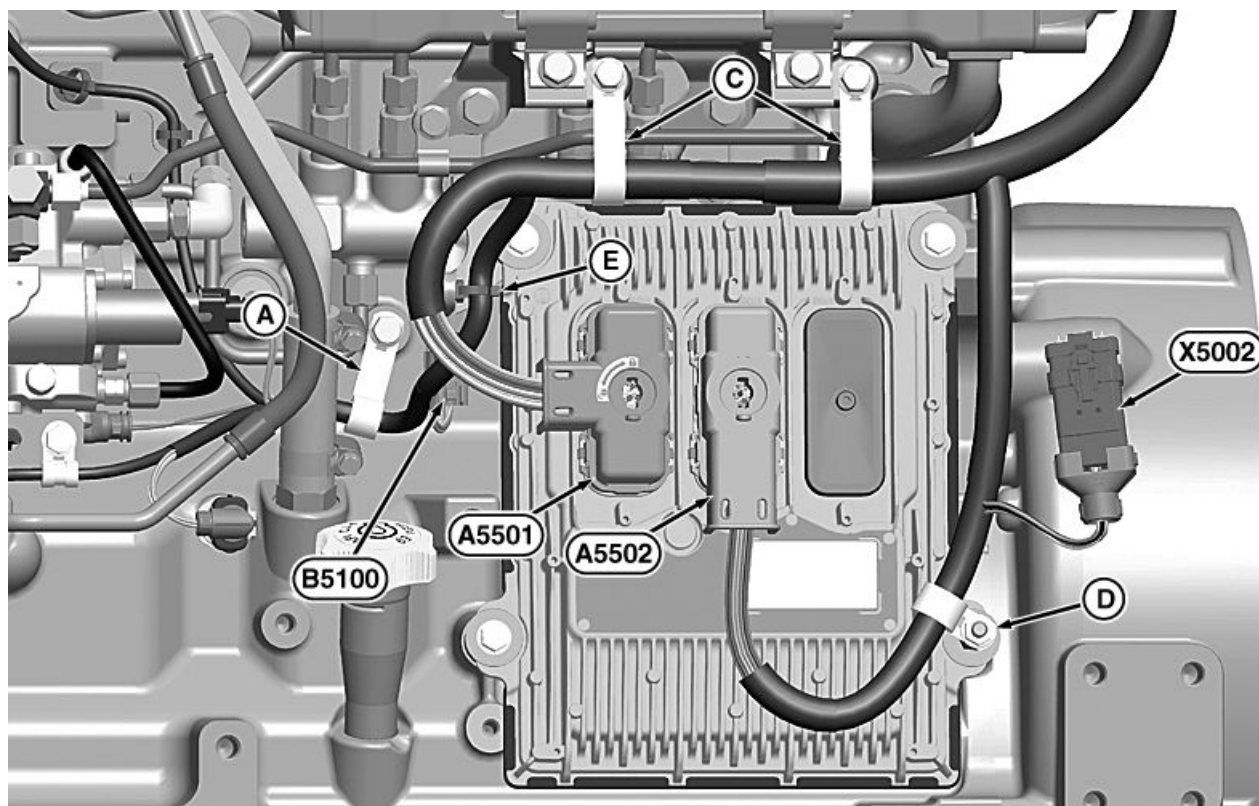


RG20242 —UN—26APR11

Remove Engine Wiring Harness

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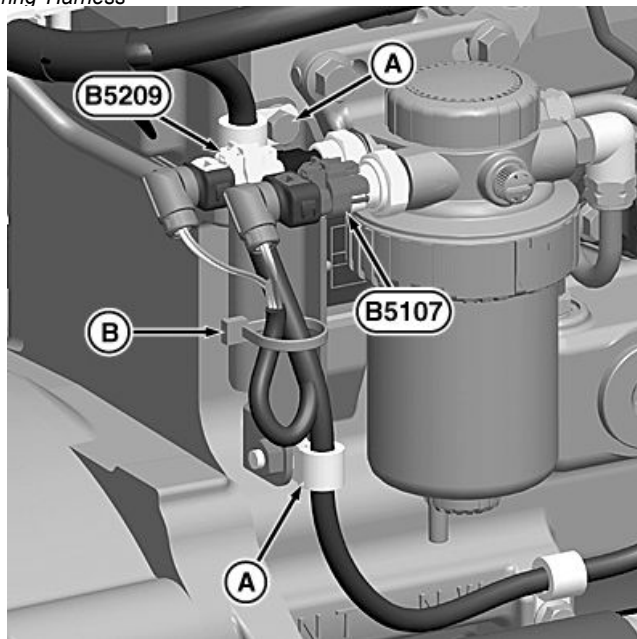
BF67790,00002B4 -19-21JUL11-4/9



Remove Engine Wiring Harness

A—P-Clamp
B—Tie-Strap
C—Longer P-Clamp
D—P-Clamp
E—Fir-Tree Clip
A5501—ECU Connector 1

A5502—ECU Connector 2
B5100—Fuel Rail Pressure Sensor
B5107—Low-Pressure Fuel Pressure Sensor
B5109—Fuel Temperature Sensor
X5002—Auxiliary Harness Interconnect



Remove Engine Wiring Harness

25. Disconnect harness from (B5107) connector.
26. Disconnect harness from (B5209) connector.
27. Remove P-clamps (A). Remove Tie-Strap (B). Remove harness.
28. Unplug the auxiliary power plug from (X5002) connector.
29. Unplug ECU connectors (A5501) and (A5502).
30. Disconnect harness from (B5100) connector.
31. Remove P-clamp (D)
32. Remove P-clamp (A), longer P-clamps (C), and Fir-Tree Clip (E) to release the rail pressure sensor connector harness from the bracket. Remove harness.

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BF67790,00002B4 -19-21JUL11-5/9

RG20247 —UN—03AUG11

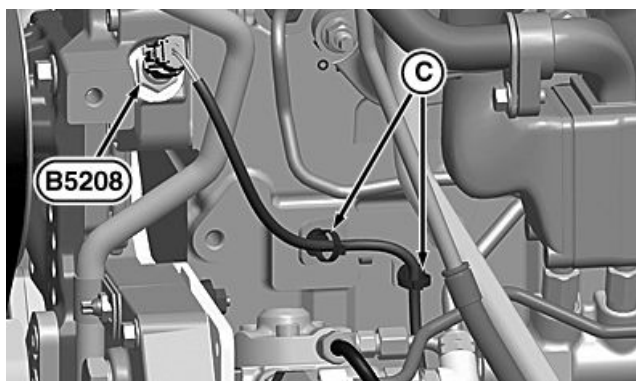
RG20243 —UN—11MAY11

SCV, Crank and Cam Jumper Wiring Harness — Removal

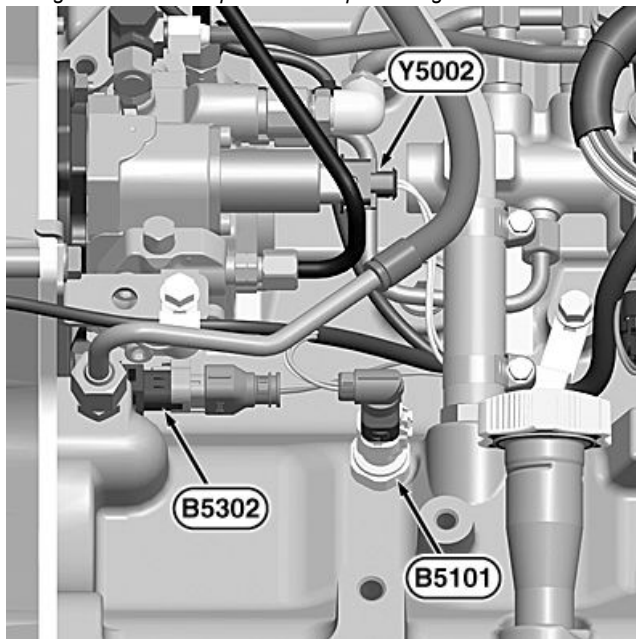
1. Disconnect harness from (B5208) connector.
2. Disconnect harness from (Y5002) connector.
3. Disconnect harness from (B5302) connector.
4. Disconnect harness from (B5101) connector.
5. Disconnect harness from (B5301) connector.
6. Remove P-Clamps (A) and longer P-Clamp (B) holding crank position sensor harness.
7. Remove Fir-Tree Clips (2) (C) and release the sub harness assembly. Remove harness.

A—P-Clamp
B—Longer P-Clamp
C—Fir-Tree Clip
B5101—Engine Oil Pressure
Sensor

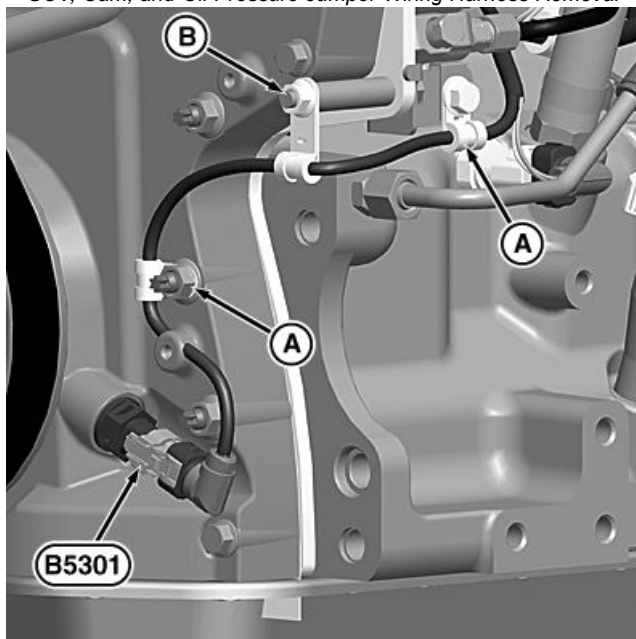
B5208—Engine Coolant
Temperature Sensor
B5301—Crankshaft Position
Sensor
B5302—Camshaft Position
Sensor
Y5002—Suction Control Valve



Engine Coolant Temperature Jumper Wiring Harness Removal



SCV, Cam, and Oil Pressure Jumper Wiring Harness Removal



Crank Jumper Wiring Harness Removal

Continued on next page

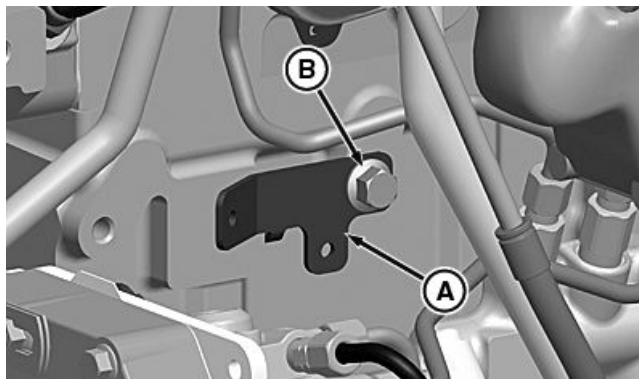
BF67790,00002B4 -19-21JUL11-6/9

RG20246—UN—11MAY11

RG20245—UN—26APR11

RG20244—UN—11MAY11

Wiring Harness Mounting Brackets — Removal

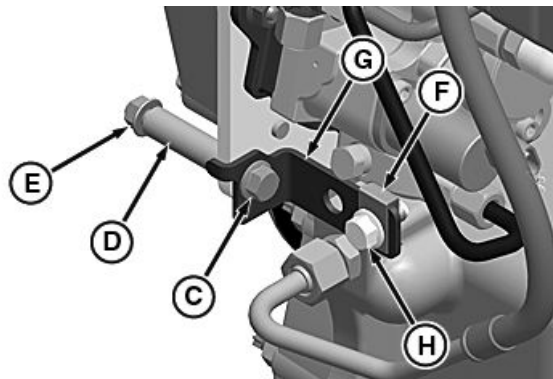


Wiring Harness Mounting Brackets Removal

A—Bracket
B—Cap Screw

C—Cap Screw
D—Spacer
E—Mounting Nut

1. If necessary, remove bracket (A) by removing cap screw (B).

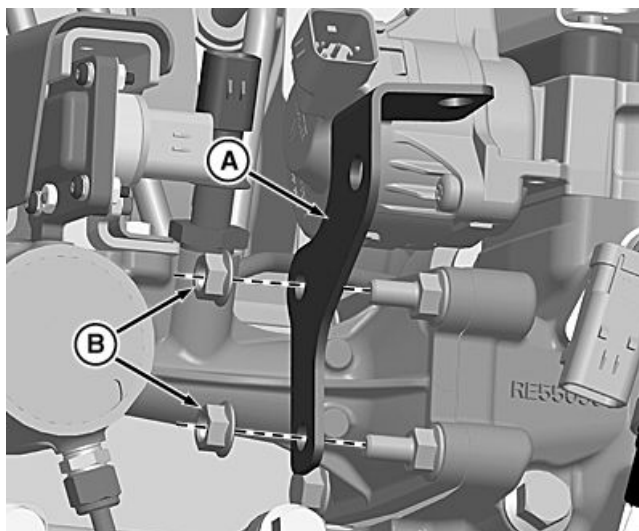


Wiring Harness Mounting Brackets Removal

F—Clip
G—Bracket
H—Cap Screw

2. If necessary, remove bracket (G) by removing nut (E) and cap screw (C).

BF67790,00002B4 -19-21JUL11-7/9

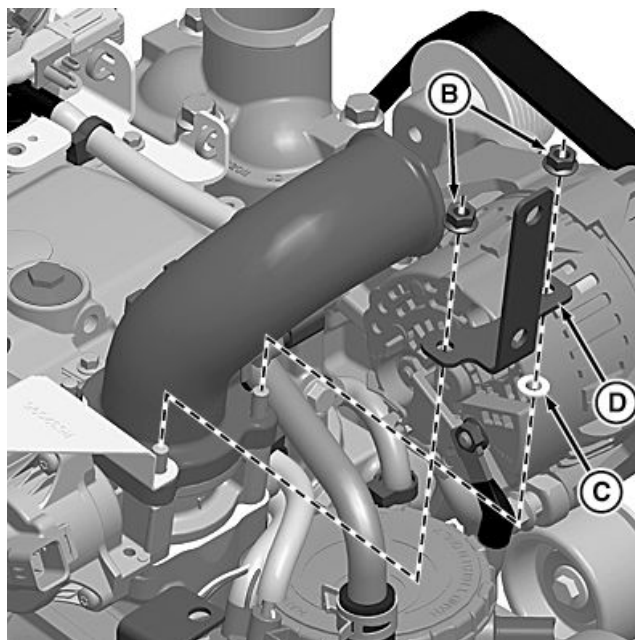


Wiring Harness Mounting Brackets Removal

A—Bracket
B—Mounting Nut

C—Washer
D—Bracket

3. If necessary, remove bracket (A) by removing mounting nuts (2) (B).



Wiring Harness Mounting Brackets Removal

4. If necessary, remove bracket (D) by removing mounting nuts (2) (B) and washer (C).

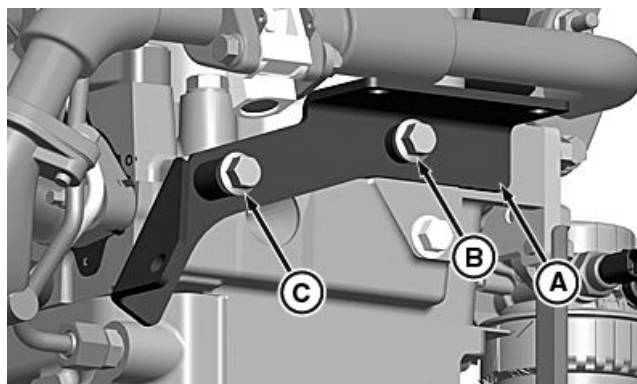
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BF67790,00002B4 -19-21JUL11-8/9

5. If necessary, remove bracket (A) by removing cap screws (B) and (C).

A—Bracket
B—Cap Screw

C—Cap Screw



RG20296—UN—26APR11

Wiring Harness Mounting Brackets Removal

BF67790,00002B4 -19-21JUL11-9/9

Connectors

Connectors provide electrical conductivity between two devices. Connectors typically consist of an outer shell, terminals, and perhaps a seal and locking device. Connectors come in many shapes and sizes. The differences being the number and type of terminals, voltage and current ratings, and environmental characteristics. Connectors join together as pairs, one called the receptacle and the other called the plug.

For a connector to function properly, the terminals have to be kept clean and free of any foreign debris. Over time, moisture, dirt, and other contaminants can cause the terminals of the connector to erode and not make a good electrical connection. It is important that the seals around the connector pairs are functional when reconnecting the connector.

Certain precautions are required when working with connectors.

- Do not pull on wires to disconnect a connector.
- Observe the locking mechanism of the connector when disconnecting and reconnecting a connector.
- Do not force connectors into each other when reconnecting.
- Make sure the connector is free of dirt or grease.
- Make sure the connector is dry of any moisture before reconnecting.
- Do not probe through the wire insulation or through the back of the connector to make measurements.

- Look for bent or damaged terminals before reconnecting connectors.
- If corrosion exists on any terminals, replace the terminal and mating terminal.
- Always use Flex Probe Kit, JDG10466 when making measurements on a connector terminal.

NOTE: For more information on terminals, see Terminal Test in Section 04, Group 155.

NOTE: For connector and sensor locations, see the applicable component location diagram in Electrical Engine Control Repair and Adjustment Section 02, Group 110.

NOTE: For wiring diagrams of connectors and harnesses, see the applicable wiring diagram in Diagnostic Specifications in Section 06, Group 210.

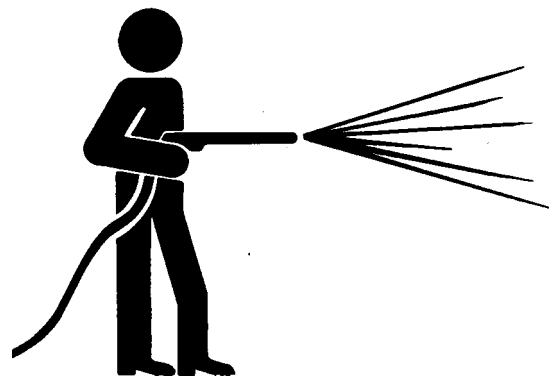
IMPORTANT: Do not use items such as paper clips or wires for inserting into connector terminals when making measurements. Damage can occur to the connector or terminal.

IMPORTANT: If a connector is not being used, apply the proper dust cap to protect it from foreign debris.

DM59778,00000EE -19-26OCT10-1/1

Using High-Pressure Washing

IMPORTANT: Reduce pressure when directing pressurized water at electronic or electrical components and connectors as this may cause the components to malfunction. Always reduce pressure and spray at 45 degree angle. Avoid spraying directly into connectors.



Using High-Pressure Washer

T6642EJ —UN—18OCT88

RG40854,00000D0 -19-11APR12-1/1

Diesel Particulate Filter Maintenance and Service

The Exhaust Filter includes the Diesel Oxidation Catalyst and Diesel Particulate Filter (DPF). The DPF is designed to retain residual ash, which is a noncombustible result of additives used in crankcase lubrication oils and the fuel. The DPF provides many hours of maintenance free operation. At some point the DPF will require professional service to remove the accumulated ash. The exact number of hours of operation before service is required will vary depending upon the engine's power category, duty cycle and operating conditions, engine oil ash content, and fuel quality. Adhering to John Deere's recommended oil and fuel specifications will maximize the hours of operation before professional DPF service is required.

As the engine owner, you are responsible for performing the required maintenance described in your Operator's manual. The exhaust filter's dash lamp indicator or the diagnostic codes will indicate when the DPF needs ash

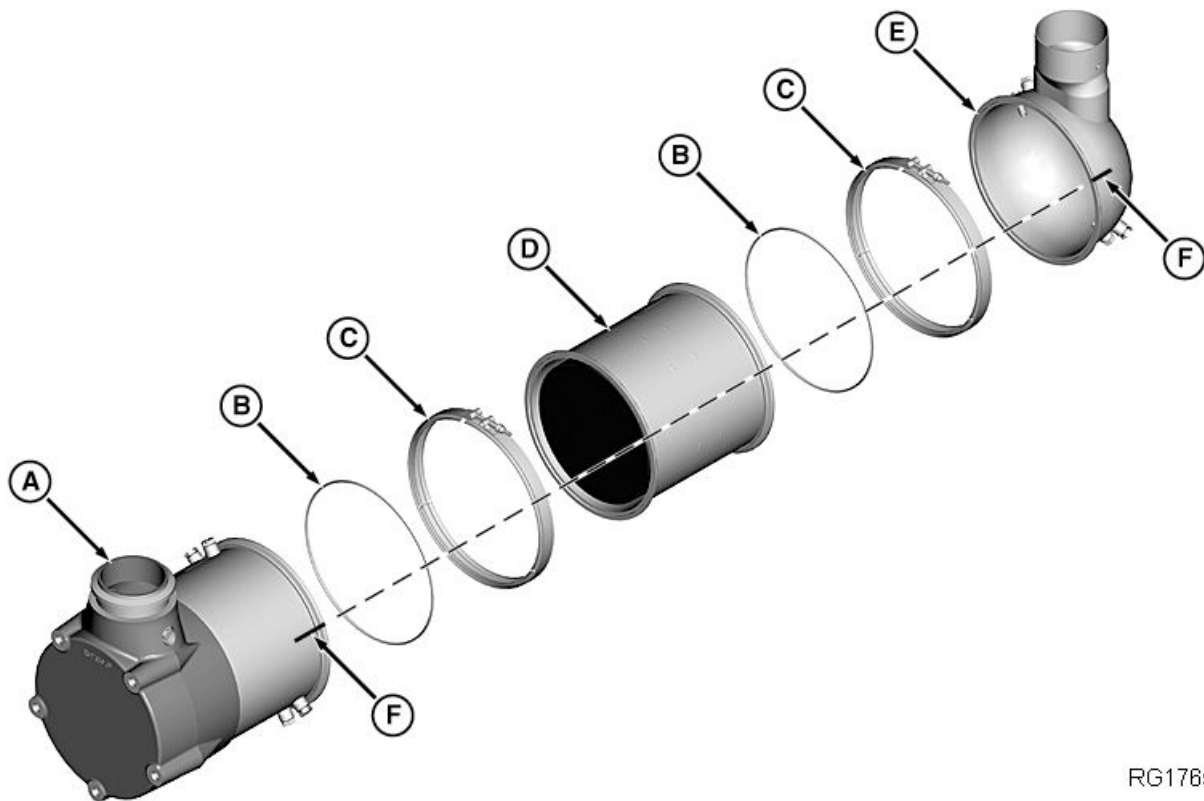
removal service. The ash removal service interval for engines below 175 hp/130kW will be at least 3,000 hours while engines at or above 175 hp/130 kW will be at least 4,500 hours.

The removal of DPF ash must be done by removing the DPF from the machine and placing it into specialized equipment. Do not remove ash by using water or other chemicals. Removing ash by these methods may damage the material securing the DPF in its canister, resulting in the loosening of the DPF element in the canister and subjecting it to damage from vibration.

Failure to follow the approved ash removal methods may violate U.S. federal, state and local hazardous waste laws, along with damage to the DPF resulting in potential denial of the Diesel Exhaust Filter emissions warranty. It is strongly recommended you take the DPF to an authorized John Deere service location or other qualified service provider for servicing.

RG41061,0000007 -19-22JUN12-1/1

Exhaust Filter — Assemble



RG17655C

RG17655C —UN—22JUN12

Exhaust Filter Components

A—Exhaust Inlet and Diesel Oxidation Catalyst (DOC)

B—Gaskets

C—Clamps

D—Diesel Particulate Filter (DPF)

E—Outlet Cone

F— Orientation Marks

IMPORTANT: Check components for burrs, sharp edges, or contamination.

IMPORTANT: Replace sealing gaskets each time filter is disassembled. Inspect clamp for thread damage and replace as needed.

IMPORTANT: Handle the diesel oxidation catalyst (DOC) and diesel particulate filter (DPF) with care and do not drop.

IMPORTANT: It is preferred to assemble the DPF (D) and outlet cone (E) to DOC assembly when the unit is oriented vertically to visually ensure joint alignment.

IMPORTANT: Do not use pneumatic power tools when loosening or tightening clamps. Tool rpm greater than 160 rpm can damage clamps.

NOTE: While orientating end covers, do not rotate them on the new gaskets. Damage to the new gaskets will occur. Use orientation marks for proper alignment.

1. Install gasket (B) on V-band sealing face of DOC assembly (A).
2. Using orientation marks for proper alignment, carefully install DPF (D) to DOC assembly (A).

IMPORTANT: Inspect clamps for damage including dents, cracks, and corrosion and replace as needed.

3. Apply anti-seize lubricant to clamp stud threads.
4. Install clamp (C) to filter joint and tighten to specification.

Specification

Clamp Joint—Torque..... 20 N•m (15 lb.-ft.)

5. Install second gasket (B) to V-band sealing face of DPF.
6. Using orientation marks for proper alignment, carefully install outlet cone (E) on DPF (D).
7. Apply anti-seize lubricant to clamp stud threads.
8. Install clamp (C) to joint and tighten to specification.

Specification

Clamp Joint—Torque..... 20 N•m (15 lb.-ft.)

9. Use a rubber mallet to gently tap both clamp joints at several points around joint circumference to be sure clamp is seated.
10. Verify the 20 N•m (15 lb-ft) torque on clamps.


Continued on next page

BK53208,000002C -19-17JUL12-1/2

11. Repeat Steps 9 and 10.

BK53208,000002C -19-17JUL12-2/2

Exhaust Filter — Diesel Particulate Filter Ash Handling and Disposal

 **CAUTION:** Under federal, state, and/or local laws or regulations, Diesel Particulate Filter ash may be classified as a hazardous waste. Hazardous wastes must be disposed of in accordance with all applicable federal, state and local laws or regulations governing hazardous waste disposal.

Only a qualified service provider should remove ash from the DPF. Personal protective equipment and clothing, maintained in a sanitary and reliable condition, should be used when handling and cleaning a DPF. See your John Deere dealer or qualified service provider for assistance.

RG41061,0000008 -19-22JUN12-1/1

Exhaust Filter — Handling

Special Tools:

- JDG11005 — Handling Tool

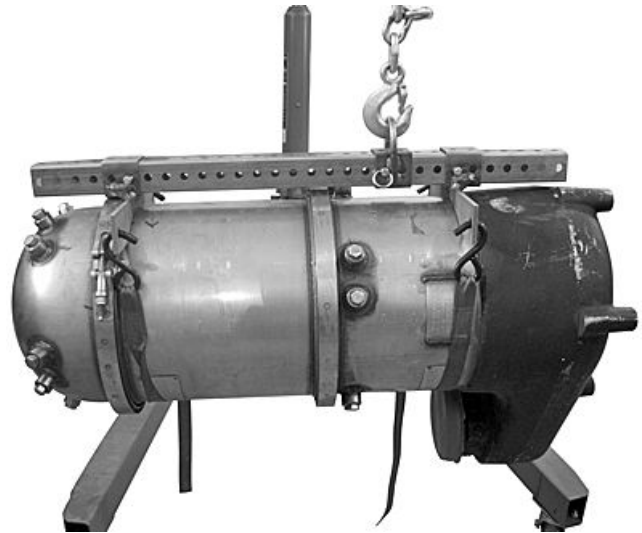
Consumables:

- None

The exhaust filter is heavy and clumsy to handle. Additionally, internal components can be damaged if the filter is dropped or mishandled.

JDG11005 — Handling Tool is versatile enough to be used to remove and replace exhaust filters on applications where the filter is mounted horizontally or vertically.

Always check tool, straps and hoist condition for worn or damaged components. Replace as necessary.



JDG11005 — Handling Tool — Horizontal Mounting

RG18240 —UN—16MAR10



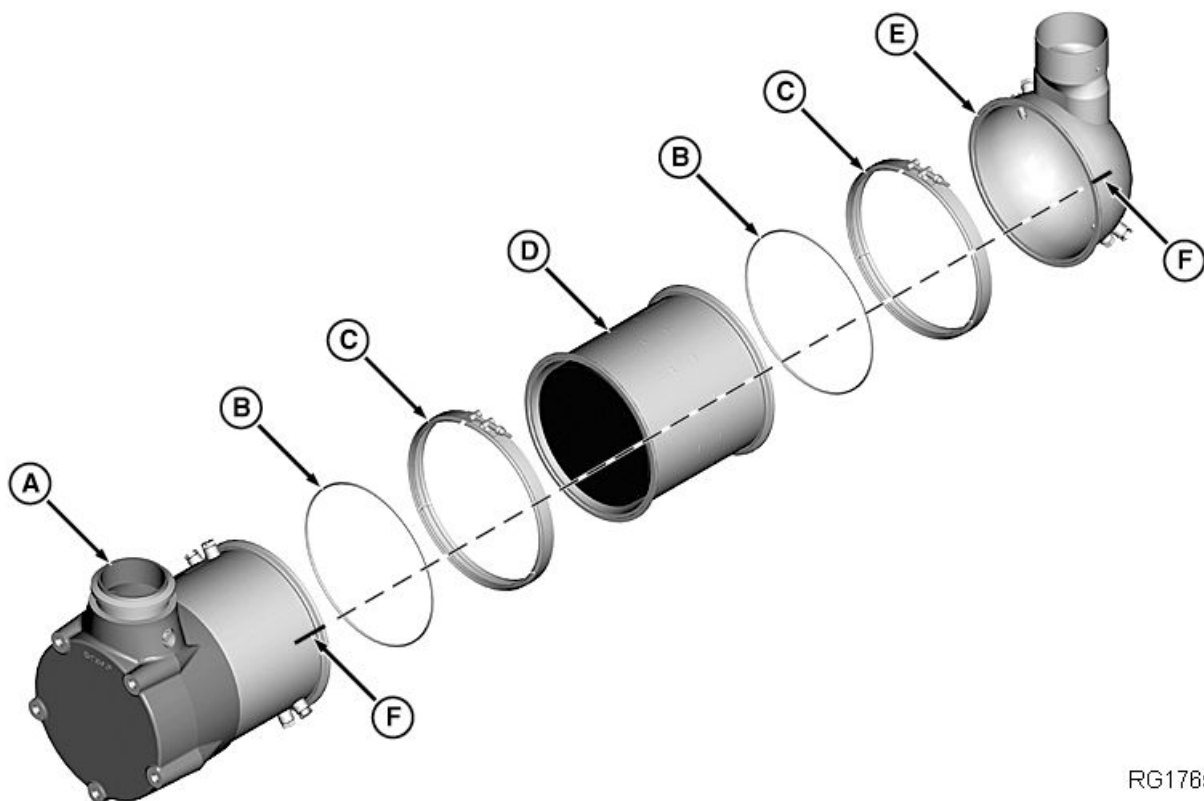
JDG11005 — Handling Tool — Vertical Mounting

RG18241 —UN—16MAR10

RE38635,0000086 -19-22JUN12-1/1

Exhaust Filter — Tear Down and Inspection

Tear down Exhaust Filter Assembly



RG17655C

RG17655C—UN—22JUN12

Exhaust Filter Components

A—Exhaust Inlet and Diesel Oxidation Catalyst (DOC)

B—Gaskets

C—Clamps

D—Diesel Particulate Filter (DPF)

E—Outlet Cone

F— Orientation Marks

CAUTION: Do not work on filter assembly when external temperature exceeds 50° C (120° F).

CAUTION: DO NOT power wash the exhaust filter when it is hot. The clamps securing sections of the filter may loosen, resulting in exhaust gas leaks.

CAUTION: DO NOT use screwdrivers or pry bars to separate assembly from mounting brackets.

1. Mark location of inlet and outlet covers (F) to be used for orientation during assembly.

NOTE: Apply anti-seize on to stud threads before assembly and disassembly. Inspect stud threads for any damage and replace clamp as necessary.

IMPORTANT: Do not use power tools when loosening or tightening clamps. Tool rpm greater than 160 rpm can damage clamps.

2. Loosen band clamps (C) by loosening nut. Remove clamps from filter OD and set aside.

3. Remove exhaust outlet assembly (E) from filter and set aside.

IMPORTANT: DOC and DPF are susceptible to damage by careless handling. Handle these components with care and DO NOT DROP. These components contain chemicals and precious metals which are susceptible to damage by dropping or hard blows to canister.

4. Carefully remove DPF from assembly and set aside.
5. Using a pick, remove the 2 gaskets (B). Discard gaskets.
6. Inspect DOC and DPF inlet and outlet for any signs of damage or plugging.

NOTE: If the DOC inlet is wet or there are any signs of oil, fuel, or coolant pooling, contact DTAC for support.

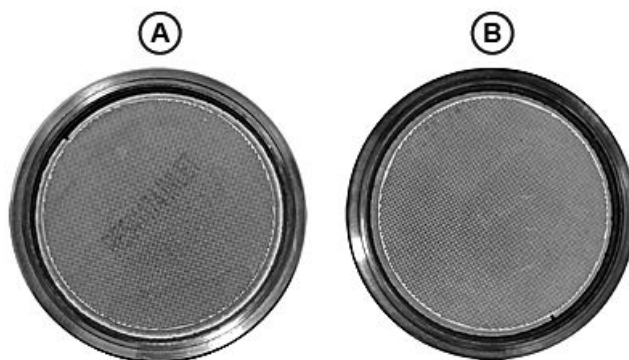
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RE38635,000009E -19-17JUL12-1/11

Inspect Diesel Particulate Filter (DPF) and Diesel Oxidation Catalyst (DOC)

Appearance - Clean diesel particulate filter.

Action - New filter ready for use.



Clean DPF

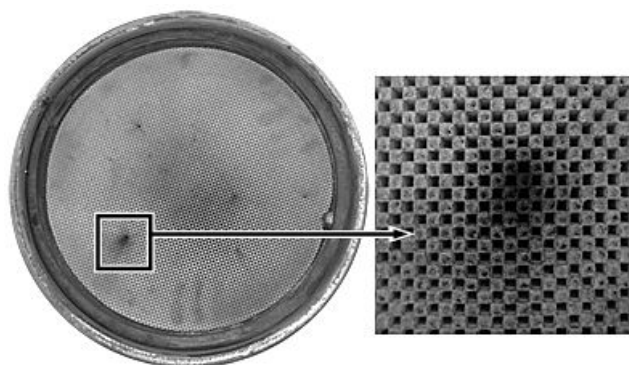
RG17895—UN—04NOV09

RE38635,000009E -19-17JUL12-2/11

Appearance - With soot in the DPF, air flowing onto inlet face produces “black holes” on the outlet face. With no soot in the part, it is still possible to see a pulse of ash come out of the outlet face. Attached graphics show the appearance of a leaking channel.

Cause - A leaking channel from the inlet face to the outlet face.

Action - The DPF needs to be replaced if localized damage is present as shown in the graphic. If only a single channel is damaged, a total of 15 locations need to be present on the outlet face to replace the DPF. After replacement, perform DPF Calibration and a Service Regeneration.



Indication of Soot Present due to damaged channels on the DPF outlet

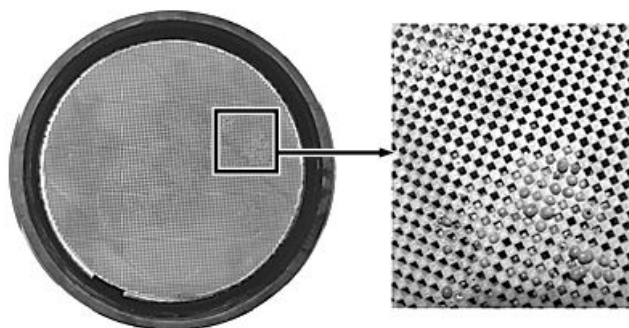
RG17896—UN—04NOV09

RE38635,000009E -19-17JUL12-3/11

Appearance - This graphic indicates a melted area on the outlet face.

Cause - Excessive temperature.

Action - The DPF needs to be replaced if localized damage is present as shown in the graphic. After replacement, perform DPF Calibration and a Service Regeneration.



Melted area on the Outlet Face

RG17898—UN—04NOV09

Continued on next page

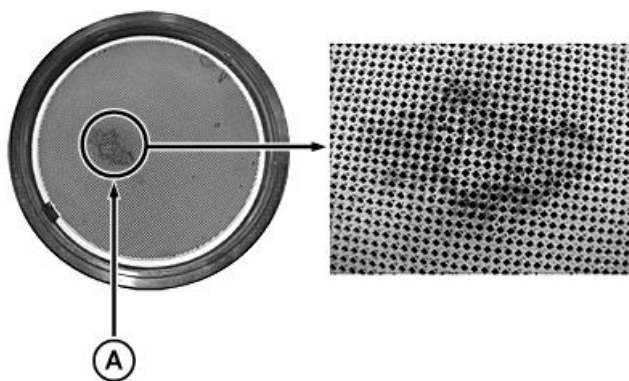
RE38635,000009E -19-17JUL12-4/11

Appearance - Area (A) indicates an internal melt on the DPF outlet.

Cause - Excessive temperature.

Action - The DPF will need to be replaced in this incident. After replacement, perform DPF Calibration and a Service Regeneration.

A—Area of Melt on DPF outlet



Melted DPF

RG17902—UN—04NOV09

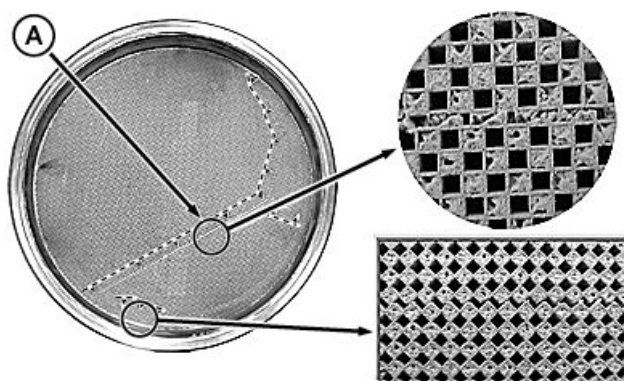
RE38635,000009E -19-17JUL12-5/11

Appearance - Graphic illustrates a longitudinal crack extended through the outlet face.

Cause - Physical damage to the DPF.

Action - The DPF will need to be replaced in this incident. After replacement, perform DPF Calibration and a Service Regeneration.

A—Longitudinal Crack



Crack Through Outlet Face

RG17999—UN—04NOV09

RE38635,000009E -19-17JUL12-6/11

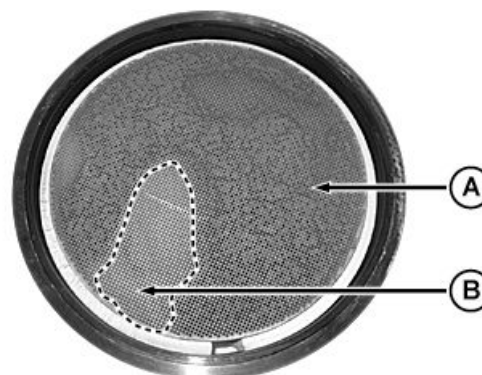
Appearance - Black spotted channels (A) indicate an internal crack in this area. An internal melt in the outlet face is indicated by the area (B).

Cause - Internal crack or melt due to excessive temperatures.

Action - The DPF will need to be replaced in this incident. After replacement, perform DPF Calibration and a Service Regeneration.

A—Black Spotted Channels

B—Internal Melt



Outlet Face

RG17900—UN—04NOV09

Continued on next page

RE38635,000009E -19-17JUL12-7/11

Appearance - This graphic of the inlet face indicates a filter that has been exposed to oil. A film has been formed on the inlet side.

Cause - Oil leak into the exhaust.

Action - If the DPF outlet looks good, perform the DPF Recovery in Service ADVISOR.



Plugged DPF

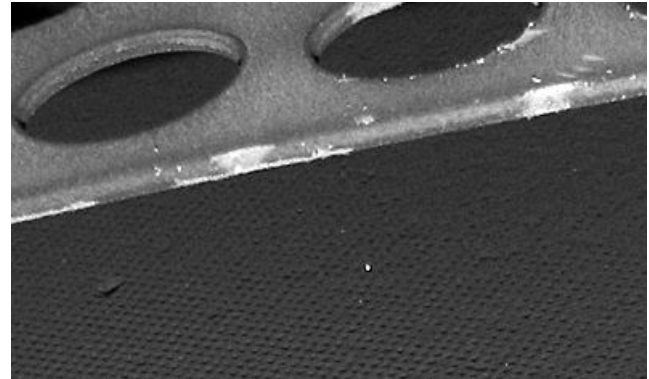
RG17903—UN—04NOV09

RE38635,000009E -19-17JUL12-8/11

Appearance - This graphic shows the DOC inlet with face plugging. Use JDG11100 Flexible Bore Scope through the inlet to view the level of face plugging.

Cause - Excessive soot, oil, fuel, or coolant in the exhaust.

Action - In this incident, perform the Diesel Oxidation Catalyst (DOC) Cleaning procedure in Section 02, Group 115.



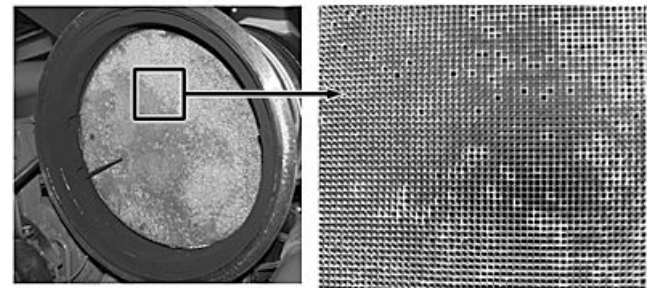
Severe Soot

RG20179—UN—01APR11

RE38635,000009E -19-17JUL12-9/11

Appearance - This graphic is of a DOC outlet face. This is not a new DOC, rather, is one from a running engine.

Action - This graphic is showing an acceptable case where the DOC can continue to be used.



Outlet Side

RG17906—UN—04NOV09

Continued on next page

RE38635,000009E -19-17JUL12-10/11

Appearance - There should be minimal soot on the outlet cone. A light grey color is normal. There may be a red rust residue on the cone. This is normal.

Action - This graphic is showing an acceptable case where the exhaust filter can continue to be used.



Outlet Cone

RG17907 —UN—04NOV09

RE38635,000009E -19-17JUL12-11/11

Exhaust Filter — Cleaning

The Exhaust Filter, which includes the Diesel Oxidation Catalyst (DOC) and Diesel Particulate Filter (DPF), is a critical component in the engine's emissions control system, which is required to meet governmental emissions regulations. The Exhaust Filter captures diesel particulate matter or "soot" to prevent its release into the

atmosphere. This soot must be eliminated from the DPF to keep it functioning properly. The process of eliminating collected soot is carefully controlled by the Engine Control Unit (ECU) and is called "exhaust filter cleaning" or "regeneration". During this process, a raise in exhaust temperature occurs and allows the soot to be oxidized within the DPF.

RG41061,0000006 -19-22JUN12-1/1

Exhaust Filter — Disposal

⚠ CAUTION: Proper management of an Exhaust Filter that has reached the end of its useful life is required, since the ash or catalyst material in the device may be classified as

hazardous waste under federal, state, and/or local laws or regulations. Used Exhaust Filters, which include the Diesel Particulate Filter, may be exchanged at any John Deere dealer or qualified service provider.

RG41061,0000009 -19-22JUN12-1/1

Exhaust Filter, Brackets, and Piping — Installation

Special Tools:

- None

Consumable Materials:

- Gasket, exhaust throttle actuator assembly to exhaust tube

NOTE: This procedure only applies to factory installed option. See application manual for assembly and installation instructions for all other options.

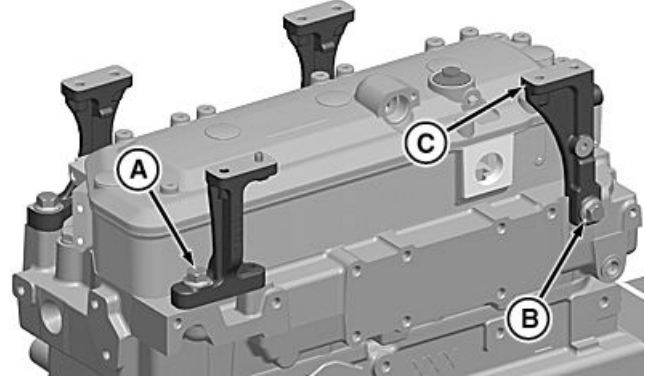
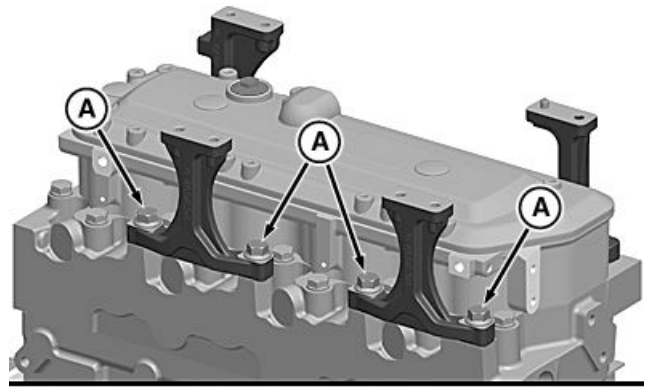
1. Install aftertreatment support legs as shown using cap screws (A). Install right front support leg (C) with cap screw (B). Torque to specification.

Specification

Cap Screw (A)—Torque..... 125 N·m (92 lb.-ft.)
Cap Screw (B)—Torque..... 70 N·m (52 lb.-ft.)

A—Cap Screws
B—Cap Screw

C—Right Front Support Leg

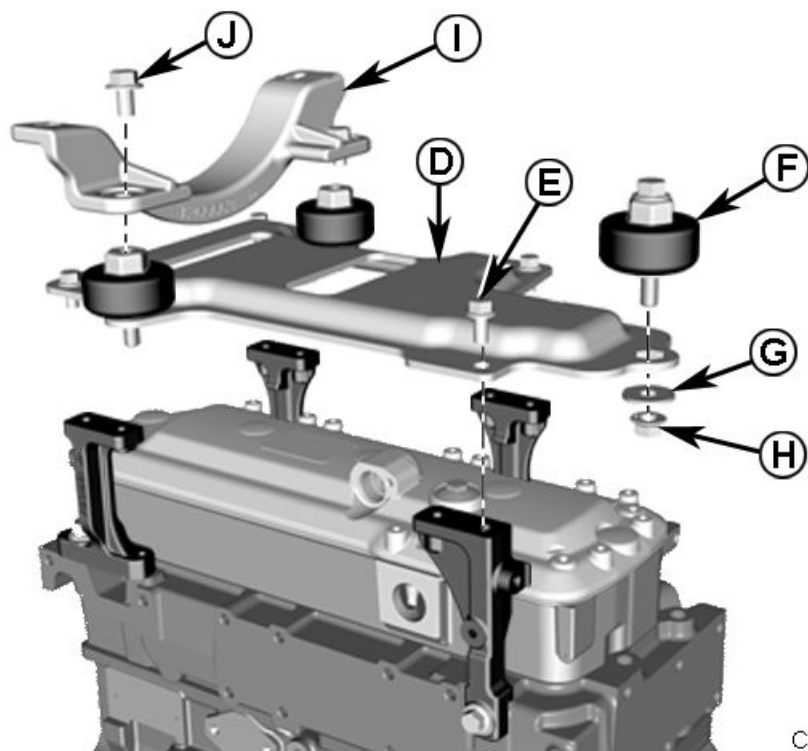


Install Aftertreatment Assembly Support Legs

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CD05019,000008C -19-10JUL12-1/8

RG19853 —UN—11JAN11



CD31398

Install Aftertreatment Devices; Brackets

D—Mounting Plate
E—Cap Screw

F—Isolator
G—Washer

H—Nut
I—Cradle
J—Cap Screw

2. Install mounting plate (D) onto support legs with cap screws (E). Thread cap screws in place but do not torque at this time.
3. Install isolators (F) to mounting plate using washers (G) and nuts (H). Torque to specification.

NOTE: Use a backup wrench on the top of the isolator when torquing cap screws.

4. Install cradle (I) to isolators and torque cap screws (J) to specification using backup wrench.

Specification

Nuts (H)—Torque..... 100 N·m (74 lb.-ft.)

Specification

Cap Screws (J)—Torque..... 100 N·m (74 lb.-ft.)

Continued on next page

CD05019,000008C -19-10JUL12-2/8

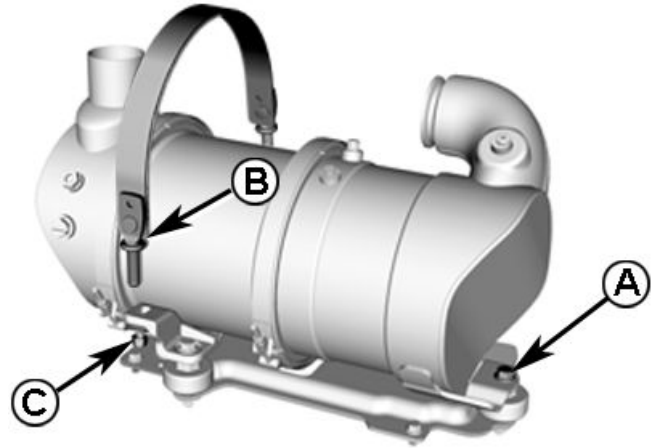
CD31398 —UN—09JUL12

5. Remove cap screw (A) and install aftertreatment canister to cradle by tightening strap (B) and nut (C) until nut bottoms out threaded stud (B) onto cradle face. Reinstall cap screw (A) through aftertreatment canister bracket. Torque to specification.

Specification

Cap Screw—Torque..... 100 N·m (74 lb.-ft.)
Nut—Torque..... 39 N·m (29 lb.-ft.) max

A—Isolator Cap Screw C—Nut
B—Threaded Stud and Strap



CD31399

Aftertreatment Canister

CD05019,000008C -19-10JUL12-3/8

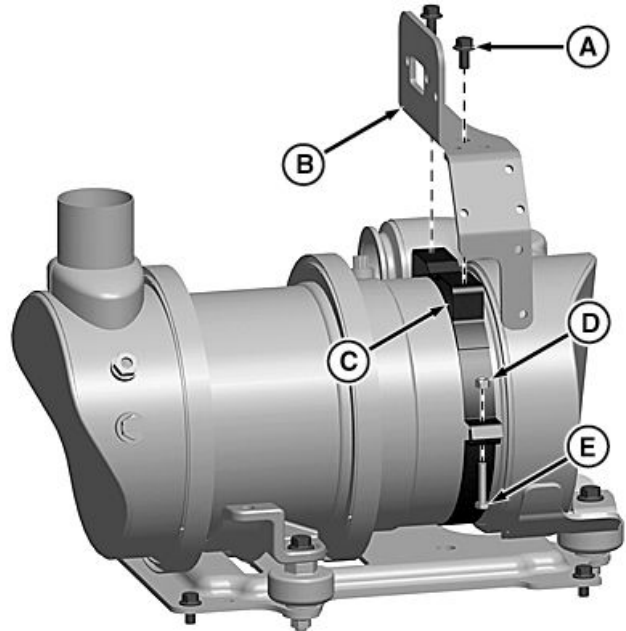
CD31399 —UN—09JUL12

6. Install strap (C) onto aftertreatment canister. Install bracket (B) to top of aftertreatment canister using cap screws (A). Tighten strap (C) using a backup wrench on nut (D) and cap screw (E). Torque to specification.

Specification

Cap Screw (A)—Torque..... 70 N·m (52 lb.-ft.)
Cap Screw (E)—Torque..... 35 N·m (26 lb.-ft.)

A—Cap Screws D—Nut
B—Bracket E—Cap Screw
C—Strap



Bracket Mounting

Continued on next page

CD05019,000008C -19-10JUL12-4/8

RG19856 —UN—07JAN11

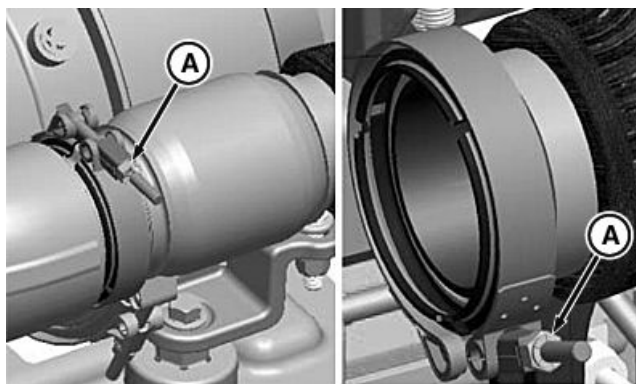
7. Connect exhaust piping with flanges and torque two clamp nuts (A) to specification.

Specification

Clamp Nuts—Torque..... 20 N·m (15 lb.-ft.)

NOTE: Do not exceed 160 rpm if a power tool is used to tighten clamp nuts.

A—Clamp Nut



Flange Clamps

CD05019,000008C -19-10JUL12-5/8

RG19859 —UN—07/JAN11

8. Install exhaust tube flange (B) with gasket (C) to exhaust throttle actuator assembly (D) with three stainless steel cap screws (A). Torque to specification.

Specification

Stainless Steel Cap

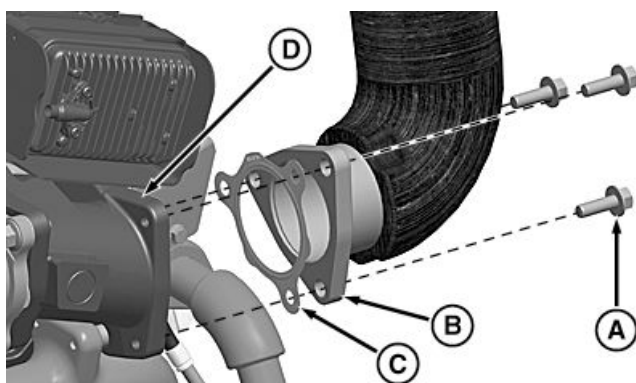
Screws—Torque..... 70 N·m (52 lb.-ft.)

A—Stainless Steel Cap Screw

B—Exhaust Tube Flange

C—Gasket

D—Exhaust Throttle Actuator Assembly Flange



Exhaust Throttle Actuator Assembly

Continued on next page

CD05019,000008C -19-10JUL12-6/8

RG19860 —UN—07/JAN11

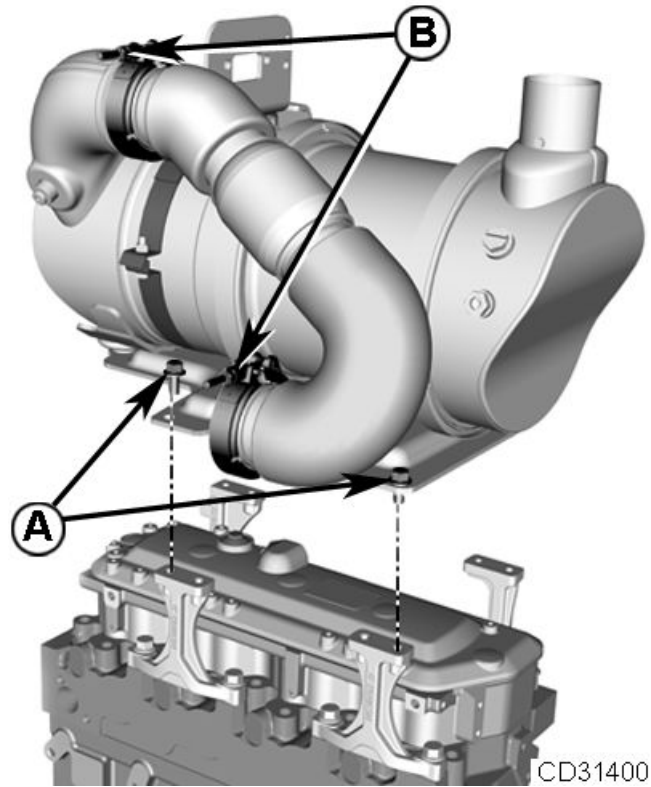
9. Torque cap screws (A) to legs at this time. Retorque clamp nuts (B) on exhaust tubes. Torque to specification.

Specification

Cap Screws—Torque..... 70 N·m (52 lb.-ft.)
 Clamp Nuts—Torque..... 20 N·m (15 lb.-ft.)

A—Cap Screws

B—Clamp Nuts

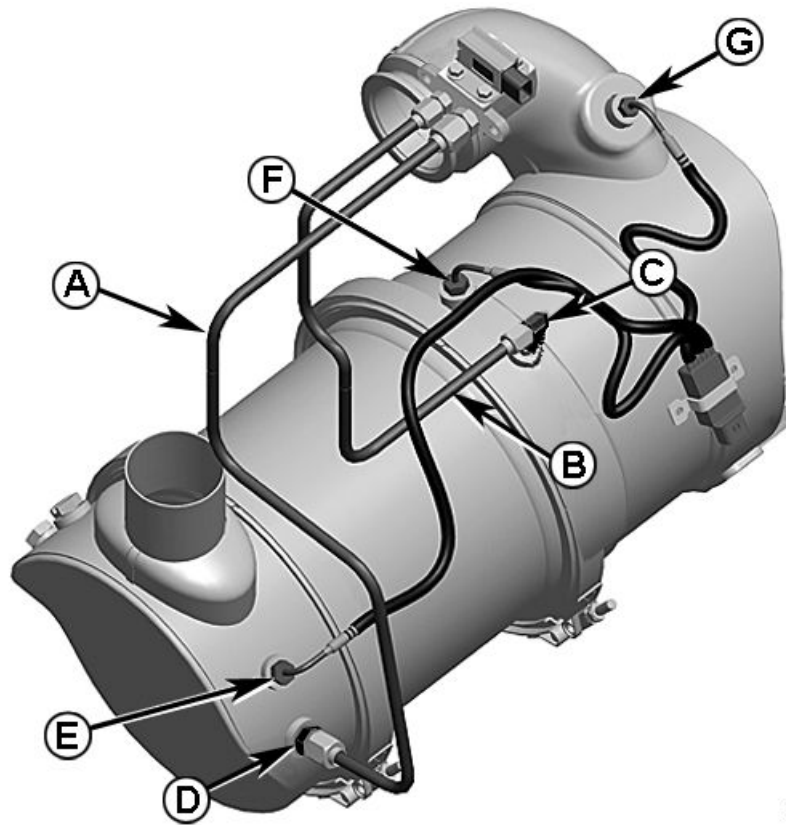


Torque Assembly to Support Legs

Continued on next page

CD05019,000008C -19-10JUL12-7/8

CD31400—UN—10JUL12



Exhaust Filter (typical assembly)

A, B— Pressures Lines

C, D— Fittings

E, F, G—Temperature Sensors

NOTE: Pressure lines, fittings, and temperature sensors should have pre-applied anti-seize coating on the threads.

10. Install pressure line fittings (C, D) onto aftertreatment canister as shown. Torque to specification

Specification

Fitting (C)—Torque..... 24 N·m (18 lb.-ft.)
Fitting (D)—Torque..... 49 N·m (36 lb.-ft.)

11. Install pressure lines (A, B) onto aftertreatment canister. Torque to specification.

Specification

Pressure Line
(A)—Torque..... 49 N·m (36 lb.-ft.)

Pressure Line
(B)—Torque..... 24 N·m (18 lb.-ft.)

12. Install temperature sensors (E, F, G) onto aftertreatment canister as shown. Torque to specification.

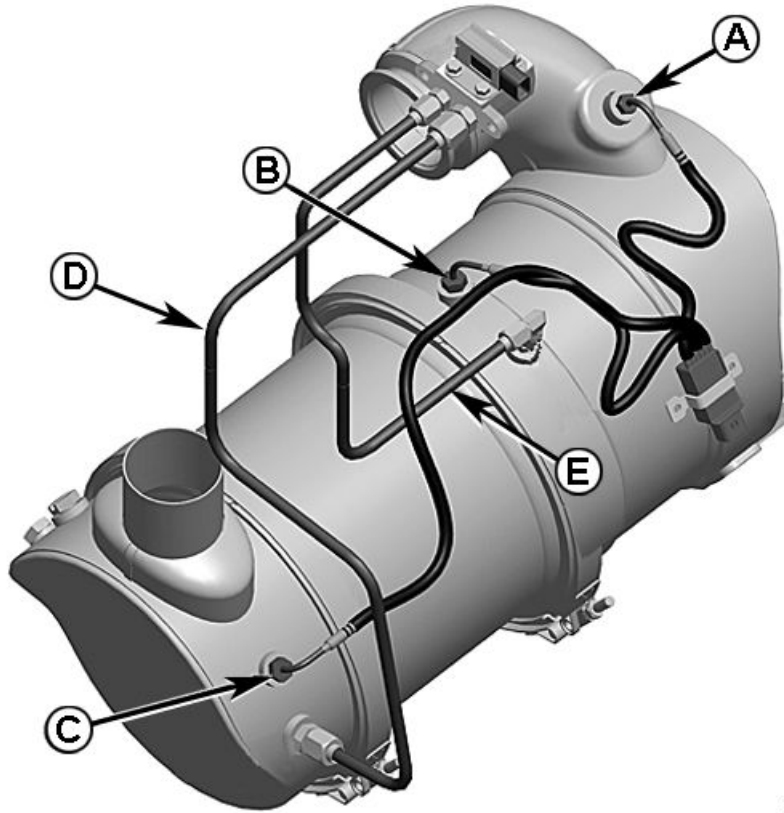
Specification

Temperature Sensors (E, F)—Torque..... 45 N·m (33 lb.-ft.)
Temperature Sensor
(G)—Torque..... 35 N·m (26 lb.-ft.)

CD05019,000008C -19-10JUL12-8/8

CD31402 —UN—10JUL12

Exhaust Filter, Brackets, and Piping — Removal



CD31401

Exhaust Filter (typical assembly)

A, B, C—Temperature Sensors D, E— Pressure Lines

Special Tools:

- None

Consumable Materials:

- None

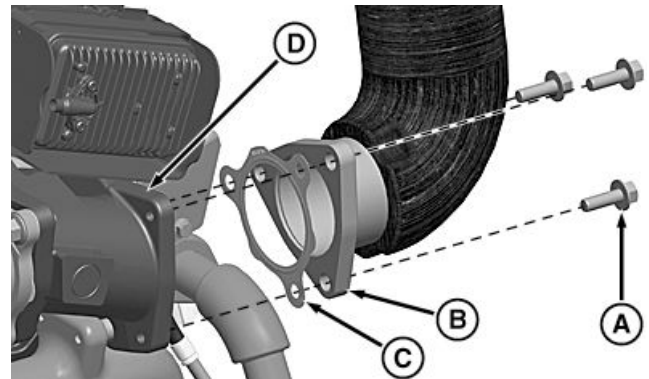
NOTE: This procedure only applies to factory installed option. See application manual for removal instructions for all other options.

1. Remove Temperature Sensors (A, B, C,).
2. Remove Pressure Lines (D, E).

CD05019,000008B -19-10JUL12-1/6

3. Remove exhaust tube flange (B) with gasket (C) from exhaust throttle actuator assembly (D) by removing three stainless steel cap screws (A).

A—Stainless Steel Cap Screws C—Gasket
B—Exhaust Tube Flange D—Exhaust Throttle Actuator Assembly Flange



Exhaust Throttle Actuator Assembly

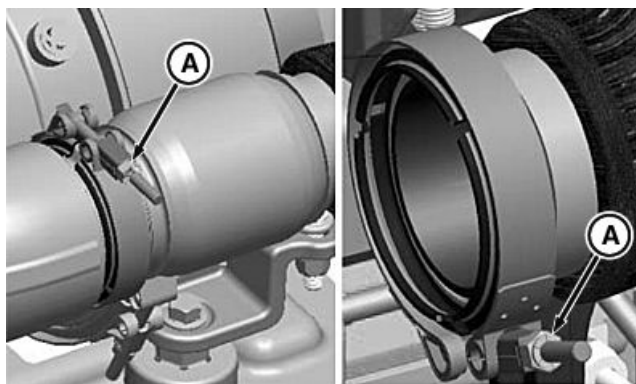
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CD05019,000008B -19-10JUL12-2/6

4. Remove flanges from exhaust piping by loosening two clamp nuts (A).

IMPORTANT: If a power tool is used to loosen clamp nuts, DO NOT exceed 160 rpm. DO NOT use an impact driver. Damage to clamp threads will occur.

A—Clamp Nut



Flange Clamps

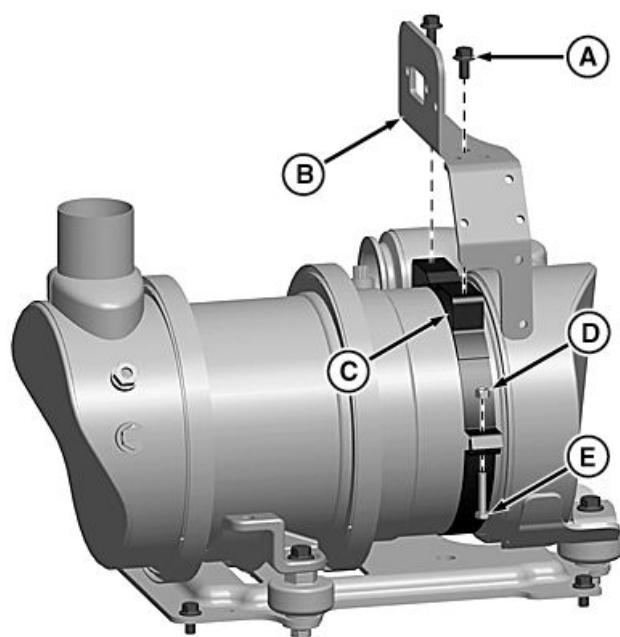
CD05019,000008B -19-10JUL12-3/6

RG19859—UN—07JAN11

5. Remove bracket (B) from top of aftertreatment canister by removing two cap screws (A), loosen nut (D) and cap screw (E) from strap (C) and remove strap.

A—Cap Screws
B—Bracket
C—Strap

D—Nut
E—Cap Screw



Bracket Removal

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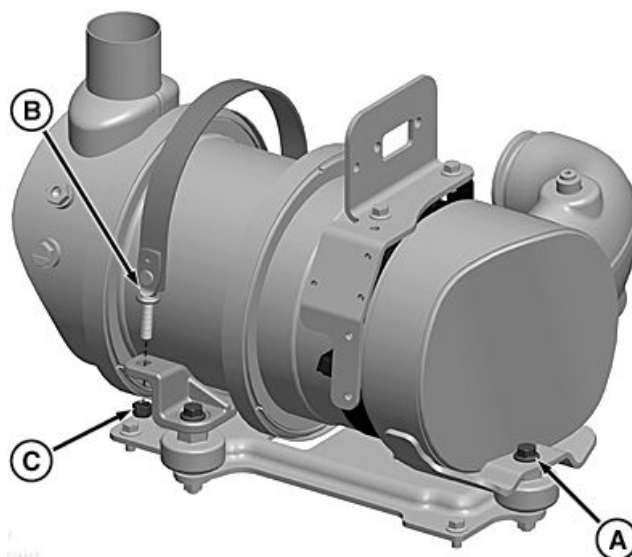
CD05019,000008B -19-10JUL12-4/6

RG19856—UN—07JAN11

6. Remove aftertreatment canister by removing cap screw (A) and nut (C) from tightening strap (B) and then removing strap.

CAUTION: DO NOT use screwdrivers or pry bars to separate assembly from mounting brackets.

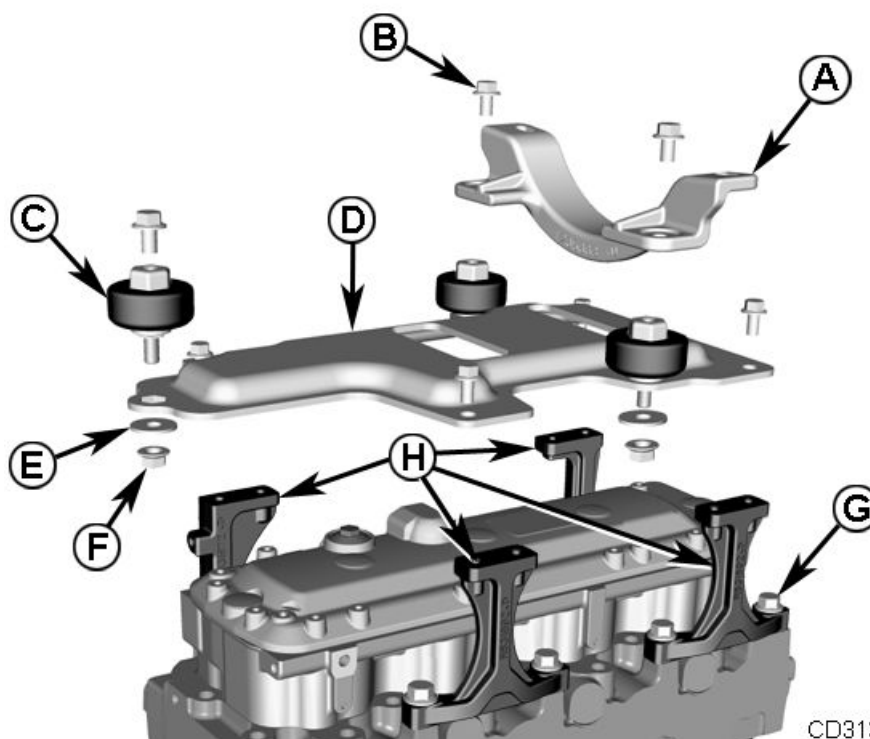
A—Isolator Cap Screw
B—Threaded Stud and Strap
C—Nut



Aftertreatment Canister

CD05019,000008B -19-10JUL12-5/6

RG19857 —UN—07JAN11



Remove Aftertreatment Devices; Brackets

A—Cradle
B—Isolator Cap Screw
C—Isolator
D—Mounting plate
E—Washer
F—Nut
G—Cap Screw
H—Support Leg

7. Remove cradle (A) from isolators by removing cap screws (B).
8. Remove isolators (C) from mounting plate (D) by removing nuts (F).
9. Remove support legs (H) from engine by removing cap screws (G).

CD05019,000008B -19-10JUL12-6/6

CD31397 —UN—09JUL12

Section 03 Theory of Operation

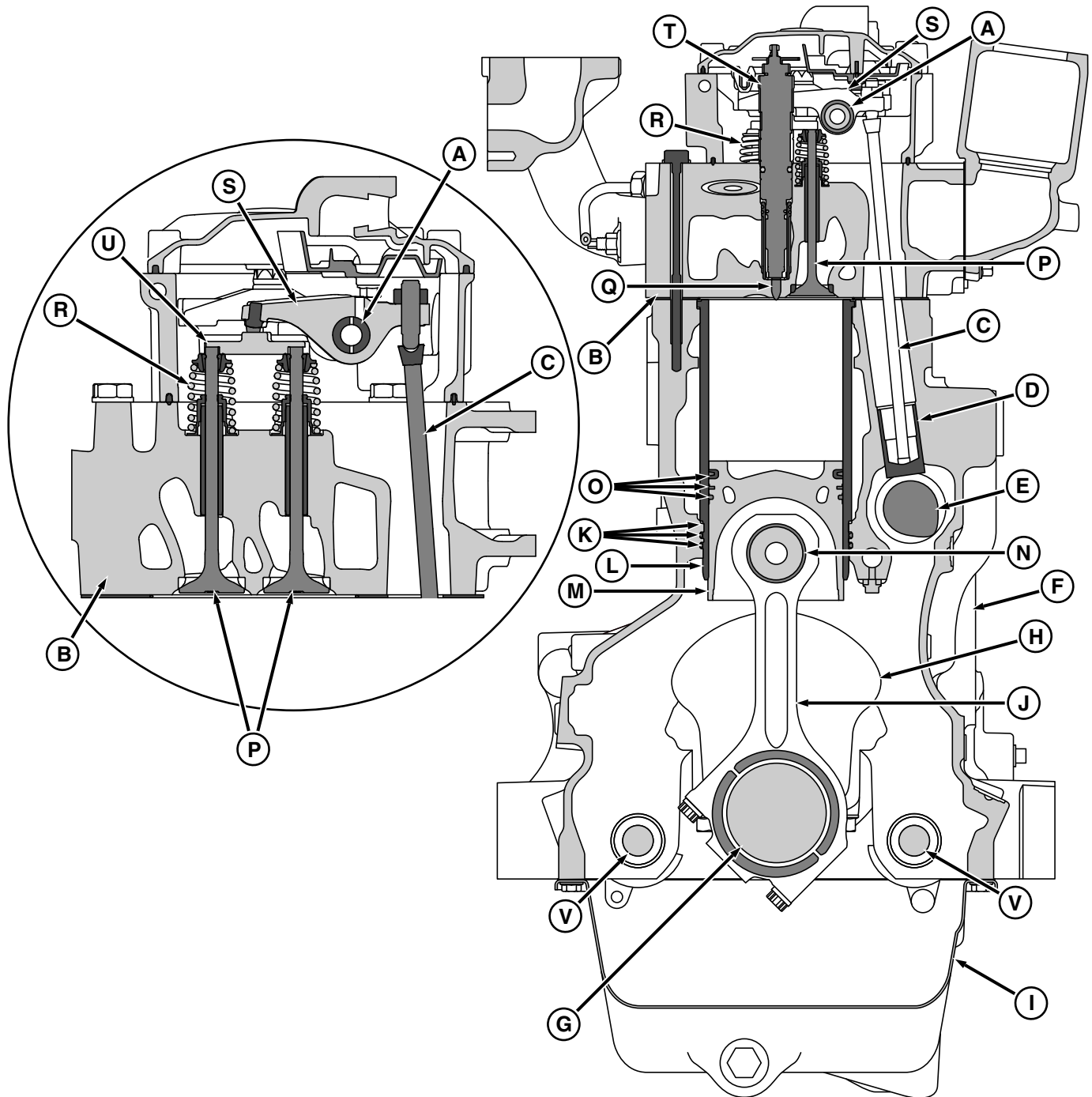
Contents

	Page		Page
Group 120—Base Engine Operation			
Engine Sectional View Component Location Diagrams.....	03-120-1	Air Intake and Exhaust System Operation - PVX	03-135-7
General Engine Operation.....	03-120-2	Air Intake and Exhaust System Operation - PWX	03-135-9
General Engine Operation — Continued	03-120-3	Air Intake and Exhaust System Operation - PSX	03-135-11
Head Gasket Joint Construction and Operation.....	03-120-4	Air Throttle Actuator Operation.....	03-135-12
		Cold Start Aid Operation.....	03-135-13
		EGR Cooler Operation	03-135-14
		EGR Valve Operation	03-135-14
		Exhaust Throttle Operation.....	03-135-15
		VGT Operation	03-135-15
Group 123—Cooling System			
Component Location Diagrams	03-123-1		
Cooling System Operation.....	03-123-2		
Group 126—Lubrication System			
Component Location Diagrams	03-126-1		
Lubrication System Operation	03-126-2		
Group 130—Electronic Fuel System			
Component Location Diagram 1	03-130-1		
Component Location Diagram 2	03-130-2		
Component Location Diagram 3	03-130-3		
Component Location Diagram 4	03-130-4		
Electric Low-Pressure Fuel Pump Operation	03-130-5		
Electric Low-Pressure Fuel System Operation	03-130-6		
Electric Pump Primary and Secondary Fuel Filter Operation	03-130-8		
Electronic Injector (EI) Operation	03-130-9		
High-Pressure Common-Rail (HPCR) Operation	03-130-11		
High-Pressure Fuel Pump Operation	03-130-12		
High-Pressure Fuel System Operation	03-130-13		
Mechanical Low-Pressure Fuel Pump Operation	03-130-14		
Mechanical Low-Pressure Fuel System Operation	03-130-15		
Mechanical Pump Primary and Secondary Fuel Filter Operation	03-130-17		
Group 135—Air Intake and Exhaust System			
Component Location Diagram 1	03-135-1		
Component Location Diagram 2	03-135-2		
Component Location Diagram 3	03-135-3		
Component Location Diagram 4	03-135-4		
Component Location Diagram 5	03-135-5		
Component Location Diagram 6	03-135-6		
Group 137—Aftertreatment System			
Component Location Diagram.....	03-137-1		
Aftertreatment System Operation	03-137-1		
Exhaust Filter Operation.....	03-137-2		
Group 140—Electronic Control System			
Analog Throttle	03-140-1		
B5100 - Fuel Rail Pressure Sensor	03-140-1		
B5101 - Engine Oil Pressure Sensor	03-140-2		
B5102 - Exhaust Manifold Pressure Sensor	03-140-3		
B5103 - EGR Flow Sensor	03-140-4		
B5104 - Manifold Air Pressure (MAP) Sensor	03-140-5		
B5105 — Engine Crankcase Pressure Sensor	03-140-6		
B5107 - Low-Pressure Fuel Pressure Sensor	03-140-8		
B5109 - DPF Differential Pressure Sensor	03-140-9		
B5204 - Exhaust Filter Temperature Module	03-140-9		
B5205 - Charge Air Cooler Outlet Air Temperature Sensor.....	03-140-10		
B5206 - Manifold Air Temperature (MAT) Sensor	03-140-11		
B5207 - EGR Temperature Sensor	03-140-12		
B5208 - Engine Coolant Temperature Sensor	03-140-13		
B5209 - Fuel Temperature Sensor.....	03-140-14		
B5300 - VGT Speed Sensor	03-140-15		
B5301 - Crankshaft Position Sensor	03-140-17		
B5302 - Camshaft Position Sensor	03-140-18		
B5500 - Intake Air Sensor	03-140-19		

Continued on next page

	Page
B5600 - Water-In-Fuel Sensor.....	03-140-20
Barometric Air Pressure Sensor.....	03-140-20
CAN Throttle.....	03-140-21
Combination Throttle.....	03-140-22
Controller Area Network (CAN).....	03-140-22
Cruise Control Operation.....	03-140-23
Determining Engine Speed and Piston Position.....	03-140-23
Digital Throttle.....	03-140-24
Engine Control Unit (ECU) System Operation.....	03-140-25
Engine Control Unit (ECU) Temperature Sensor.....	03-140-27
Engine Derate and Shutdown Protection.....	03-140-28
Governor Droop Mode Selection.....	03-140-29
Measuring Pressure.....	03-140-30
Measuring Speed.....	03-140-30
Measuring Temperature.....	03-140-30
Pulse-Width-Modulated (PWM) Throttle.....	03-140-31
R5602 - 24V Low-Pressure Fuel Pump Resistor.....	03-140-31
S5001 - Engine Coolant Level Alarm Switch.....	03-140-32
S5002 - Engine Coolant Level Information Switch.....	03-140-33
Sensor Supply #1.....	03-140-34
Sensor Supply #2.....	03-140-34
Sensor Supply #3.....	03-140-35
Sensor Supply #4.....	03-140-35
Sensor Supply #5.....	03-140-35
Sensor Supply #6.....	03-140-35
Sensor Supply #7.....	03-140-35
Sensor Supply #8.....	03-140-36
Sensor Supply #9.....	03-140-36
Throttle Adjustments.....	03-140-36
Throttle Offset.....	03-140-36
Throttle Self-Calibration.....	03-140-37
X5000 - Fuel Injector Harness.....	03-140-37
Y5002 - Suction Control Valve.....	03-140-38
Y5004 - Low-Pressure Fuel Pump.....	03-140-39
Y5005 - Variable Speed Fan.....	03-140-40
Y5400 - EGR Valve.....	03-140-41
Y5401 - Air Throttle Actuator.....	03-140-42
Y5500 — Exhaust Throttle Actuator.....	03-140-43
Y5500 — VGT Actuator.....	03-140-44

Engine Sectional View Component Location Diagrams



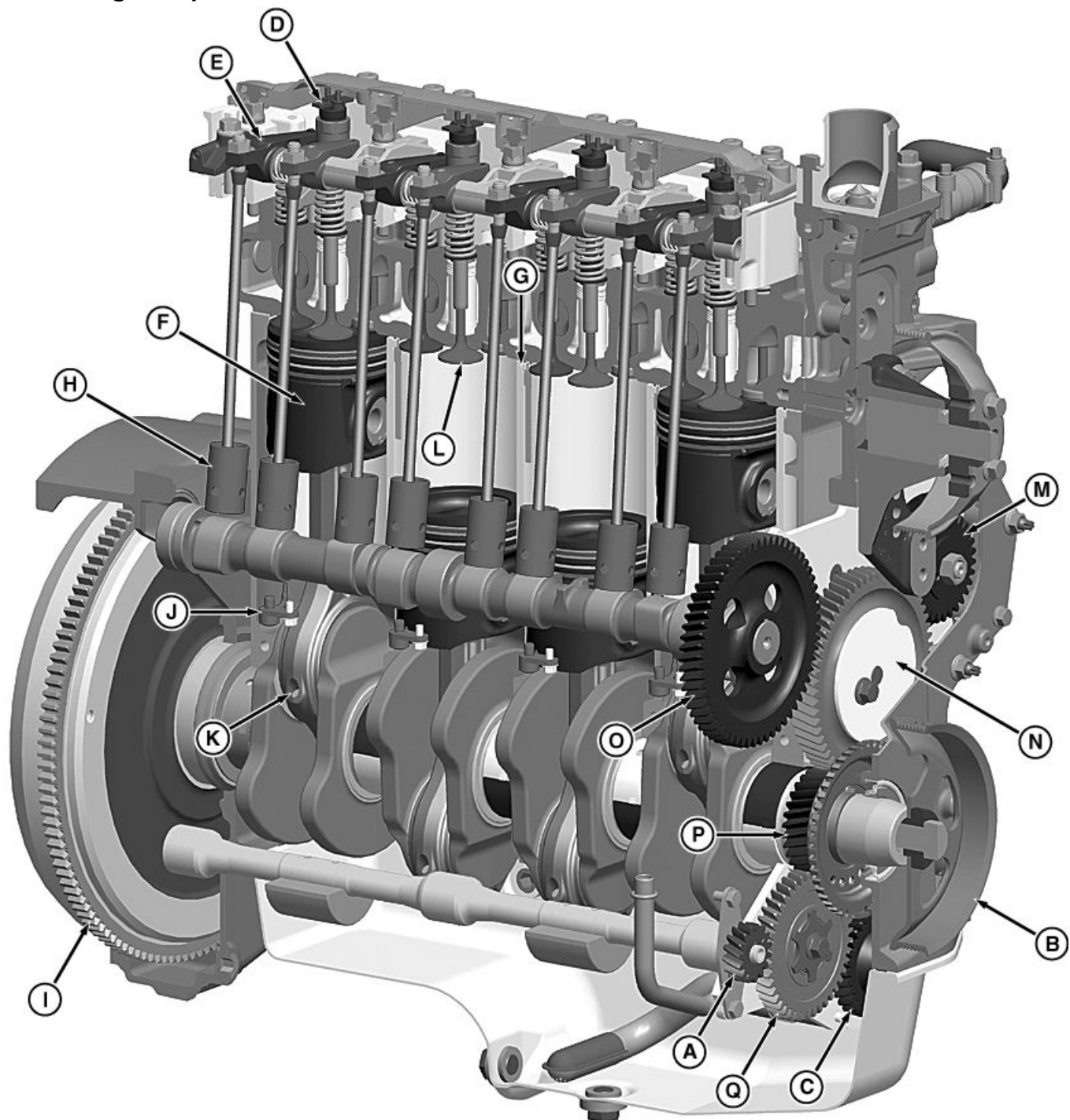
Sectional View IT4 4045

- | | | | |
|---------------------|------------------------------|-----------------------------|------------------|
| A—Rocker Arm Shaft | G—Connecting Rod Bearing | L—Cylinder Liner | R—Valve Spring |
| B—Cylinder Head | H—Crankshaft | M—Piston | S—Rocker Arm |
| C—Push Rod | I—Oil Pan | N—Piston Pin | T—Injector |
| D—Camshaft Follower | J—Connecting Rod | O—Piston Rings | U—Valve Bridge |
| E—Camshaft | K—Cylinder Liner-to-Cylinder | P—Intake and Exhaust Valves | V—Balancer Shaft |
| F—Cylinder Block | Block Packings | Q—Injector Tip | |

RG20097 —UN—05AUG11

BF67790,00001EE -19-05AUG11-1/1

General Engine Operation



Base Engine — 4045 PowerTech

A—Balancer Shaft Gear
B—Crankshaft Pulley
C—Oil Pump Drive Gear
D—Electronic Injector

E—Rocker Arm
F—Piston
G—Cylinder Liner
H—Camshaft Follower
I—Flywheel
J—Piston Cooling Orifice

K—Connecting Rod
L—Valve
M—Fuel Pump Drive Gear
N—Upper Idler Gear
O—Camshaft Drive Gear

P—Crankshaft Gear
Q—Lower Idler Gear

RG20098 —UN—04MAR11

BF67790,00001EF -19-09AUG11-1/1

General Engine Operation — Continued

Engines are vertical, in-line, 4 valve-in-head, 4-cycle (stroke) diesel engines.

Direct fuel injection, monitored by the engine control unit (ECU), is provided by a HP-3 high-pressure fuel pump, high-pressure fuel rail, and electronic injectors mounted vertically in the cylinder head. The camshaft and fuel pump are timed to the crankshaft by the timing gear train.

The intake air flows to the variable geometry turbocharger (VGT) or the wastegate turbocharger where the intake air is pressurized. The intake air is then mixed with a percentage of cooled exhaust gas. This mixture is ECU controlled by an exhaust gas recirculation (EGR) valve. The amount of exhaust gas mixed with the intake air is related to load demands of the engine.

The VGT has adjustable vanes in the exhaust turbine housing. The VGT vane position is controlled by the ECU. The ECU uses an electronic actuator to control the position of the vanes. The commanded vane position depends on engine load. The wastegate turbocharger is fixed and has an exhaust throttle following the exhaust side of the turbocharger. The exhaust throttle is controlled by an actuator that regulates the amount of exhaust gases exiting the turbocharger. The exhaust throttle also regulates the amount of exhaust gases entering the EGR cooler.

The turbocharger compressor (intake) discharge air is cooled by routing it through a heat exchanger before it enters the intake manifold. For engines equipped with a variable geometry turbocharger, the air is passed through the air throttle actuator and into the intake manifold. The throttle plate in the air throttle is normally open. It closes during exhaust filter active regenerations. See [Aftertreatment System Operation](#) in Section 03, Group 137.

The cylinder block is a one-piece casting.

The camshaft is timed to the crankshaft through the timing gear train. The camshaft rotates on one bushing in the front journal and the rest in honed bores in the cylinder block. The camshaft lobes determine the duration and lift of each valve, and operate the mechanical transfer pump. There is an electronic transfer pump option available.

Intake and exhaust valves are operated by camshaft followers, push rods, valve bridges, and rocker arm

assembly. Each valve bridge mates with two intake valves or two exhaust valves. The valves are driven simultaneously by the rocker arm. Valve seat inserts in cylinder head are used for intake and exhaust valves.

The crankshaft is a one-piece, ductile, cast iron or steel forging which operates in replaceable two-piece main bearings. Crankshafts are dynamically balanced and are machined with undercut and rolled fillets. Two-piece main thrust bearing inserts are used to control crankshaft end play.

Cylinder liners are “wet” sleeve type and are individually replaceable. Liner packing rings are used at the lower connection between cylinder block and liners.

Pistons are made of high-grade cast aluminum alloy with internal ribbing. The skirt is cam ground to allow for expansion during operation. The piston crown has a cut out combustion bowl with a truncated cone center. All piston rings are located above the piston pin. Two compression rings and one oil control ring are used. The top compression ring is a keystone-shaped ring, located close to the top of the piston for improved engine performance.

The hardened, fully-floating piston pins are held in place by snap rings. Spray jets (piston cooling orifices) in cylinder block spray pressurized oil on the underside of the piston to lubricate piston pins and cool pistons.

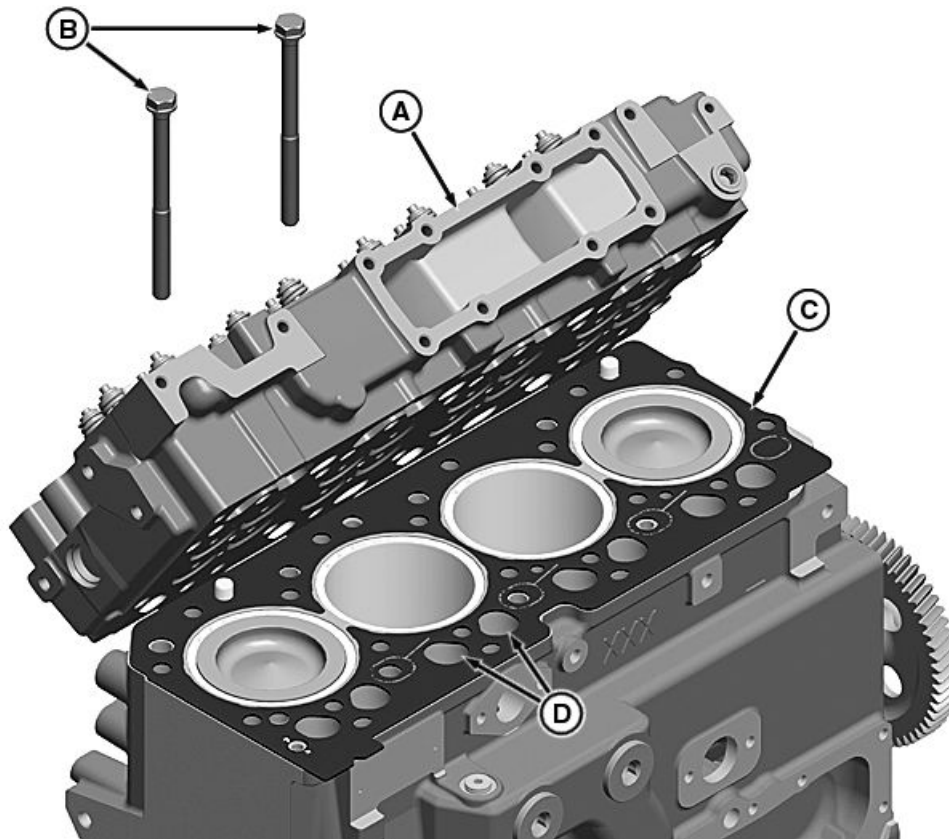
The forged steel connecting rods have replaceable pin bushing and bearing inserts. Connecting rods have a tapered pin-end.

The engine is equipped with a gear-driven oil pump and full-flow oil filter. The oil filter has an internal bypass valve located in the filter header. The bypass valve opens if the filter element becomes restricted. Engines are equipped with an oil cooler mounted on the right side of the cylinder block. Engine system pressure is controlled with a pressure regulator valve to relieve excessive pressure buildup in the main oil gallery, and a bypass valve to prevent oil starvation if the oil cooler and filter become plugged.

The engine has a pressurized cooling system, consisting of radiator, coolant pump, multi-blade fan, and two thermostats.

BK34394,0000E9A -19-09AUG11-1/1

Head Gasket Joint Construction and Operation



Cylinder Head Gasket Joint

A—Cylinder Head
B—Cylinder Head Bolts

C—Cylinder Head gasket

D—Push Rod Holes

The head gasket forms a seal between cylinder liners and cylinder head that can withstand the temperatures and pressures of the combustion process. The gasket must also form a liquid tight seal between the cylinder head and cylinder block to retain coolant and oil in their respective passages. The gasket (C) is constructed of thin, formed sheets of steel-inserted, non-asbestos material. The surface of gasket is treated to improve liquid sealing and anti-stick characteristics. A fire ring combustion seal is located at each cylinder bore and is held in place by a U shaped stainless steel flange.

The cylinder head and block must be flat to provide an even clamping pressure over the entire surface of gasket, and must have the proper surface finish to keep gasket material from moving in the joint. Dowel pins are used to properly locate head gasket on block.

The cylinder liners must protrude evenly from top of cylinder block the specified amount to provide adequate clamping force on fire ring of each cylinder.

The cap screws (B) must be proper length, made of proper material, and be tightened to proper torque in order to provide an adequate clamp load between other joint components.

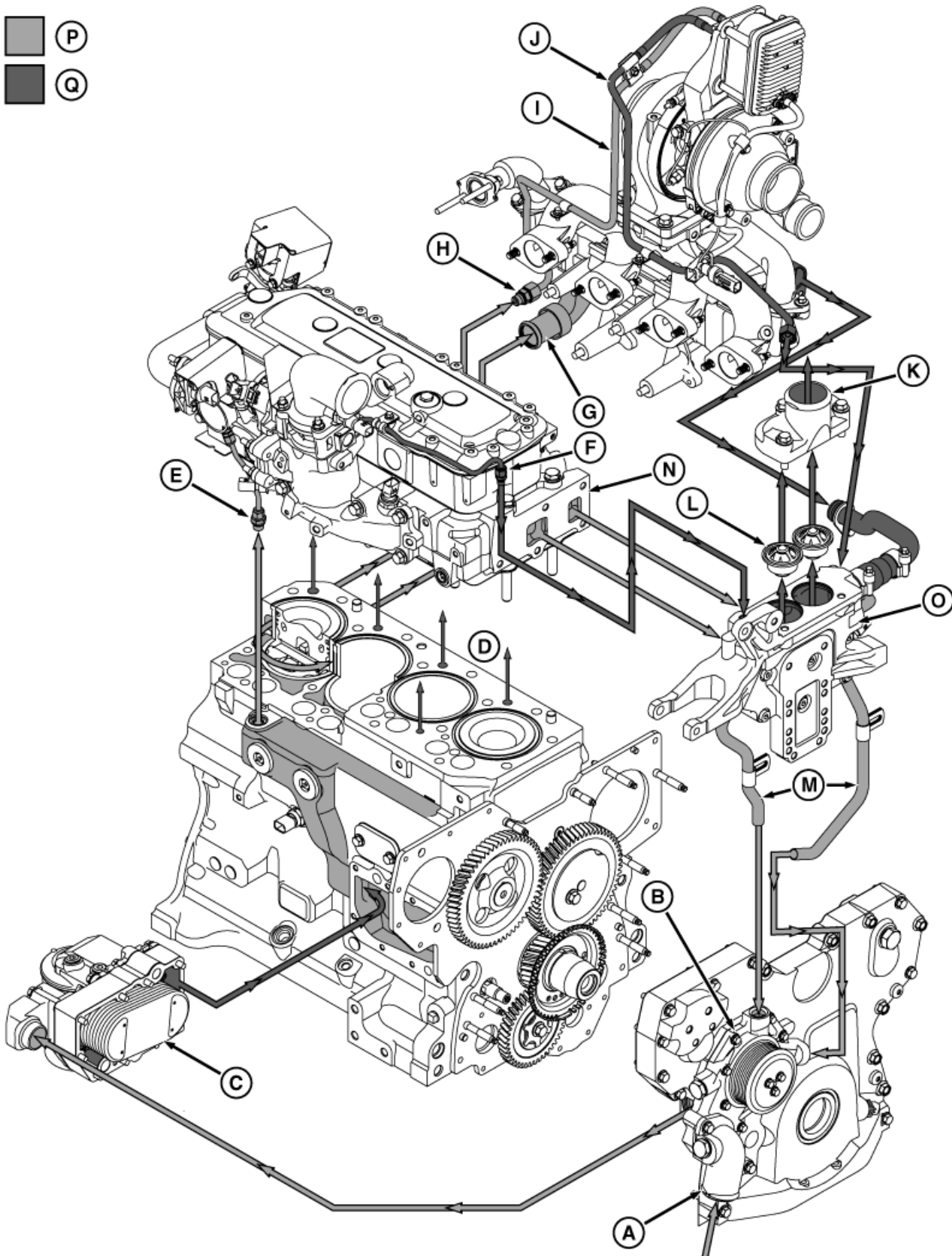
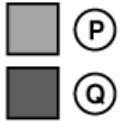
Each of the above components contributes to the integrity of the head gasket joint. If any of these components do not conform to specifications, gasket joint may fail, resulting in combustion leaks, coolant leaks, or oil leaks.

Failure of head gasket and mating parts may occur when coolant and oil temperatures become excessive, or when abnormally high combustion temperatures and pressures persist.

BK34394,0000E9B -19-01APR11-1/1

RG20099 —UN—04MAR11

Component Location Diagrams



IT4 4045 PVX Cooling System

Continued on next page

BF67790,00001F0 -19-01AUG11-1/2

A—Coolant Inlet	F—Venturi to Thermostat Cover Line	J—VGT Actuator Coolant Return Line	N—Cylinder Head
B—Coolant Pump	G—Coolant Supply — EGR Cooler	K—Coolant Outlet — Thermostat Housing to Radiator	O—Thermostat Housing
C—Oil Cooler	H—Block to VGT Actuator Coolant Line Adapter	L—Thermostats	P—Coolant Supply
D—Coolant Supply — Cylinder Head	I—VGT Actuator Coolant Supply Line	M—Coolant Bypass	Q—Coolant Return
E—Coolant Manifold to Venturi Line			

NOTE: PWX engines will have a different actuator coolant supply and a different actuator coolant return line than the ones shown.

BF67790,00001F0 -19-01AUG11-2/2

Cooling System Operation

The cooling system includes the radiator, coolant pump (B), various coolant lines, coolant galley, and thermostat(s) (L).

Coolant is circulated from the radiator to the coolant pump. The coolant flows into the cylinder block manifold, which in turn supplies coolant to the cylinder block liner cooling passages, the oil cooler, cylinder head, and the EGR cooler. Some engines will also have coolant flowing through the EGR flow venturi. In the cylinder head, the coolant flows through passages around the intake and exhaust ports, valve seats, and injection nozzles. Coolant flows toward the front end of the cylinder head and exits through the thermostat housing. Engines are equipped with a dual thermostat assembly.

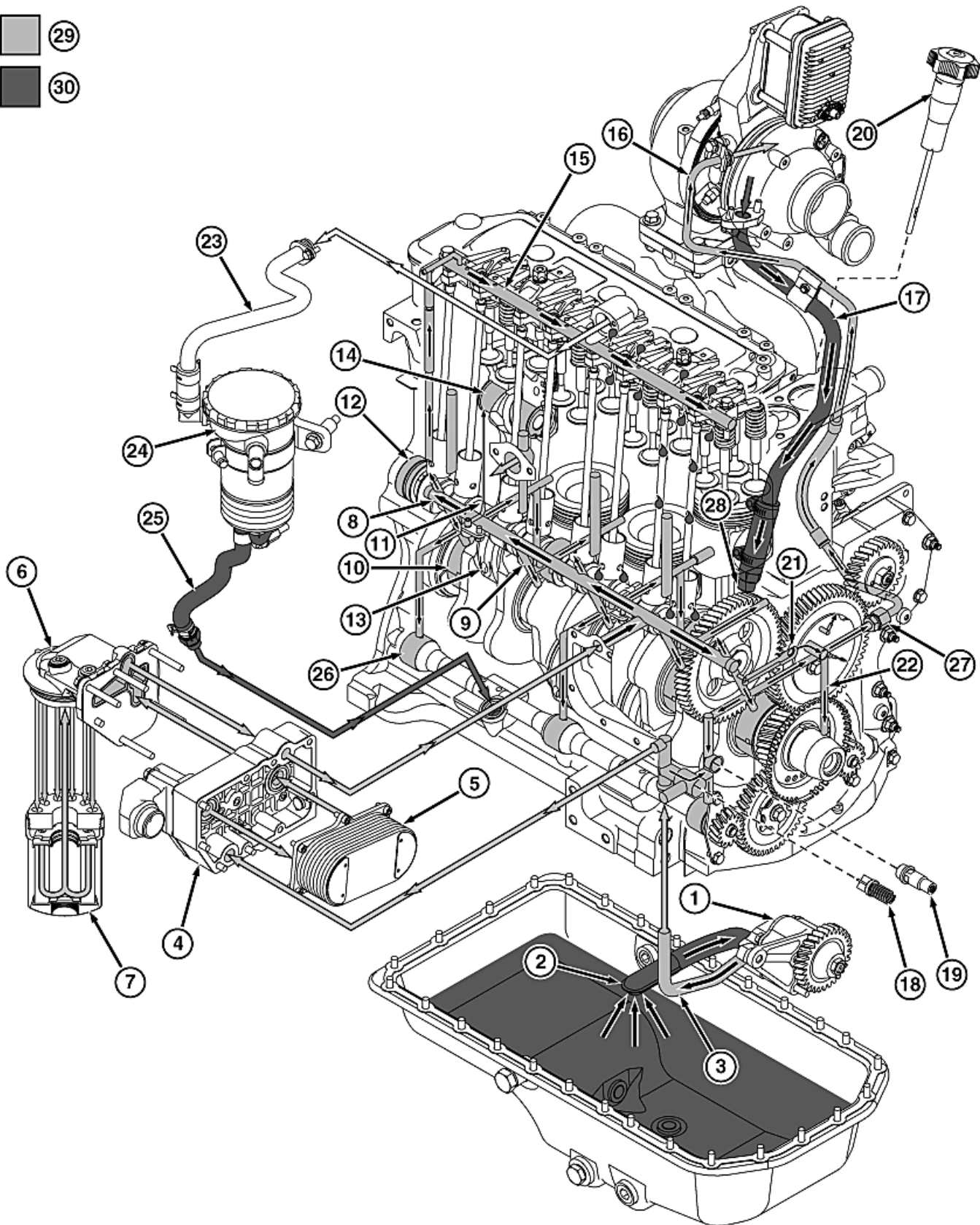
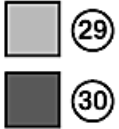
During the warm-up period, thermostats are closed and coolant is directed through a bypass circuit into suction side of coolant pump. The coolant continues circulating through the cylinder block, cylinder head, and coolant pump.

Once the engine has reached operating temperature, the thermostats open and allow coolant to flow through the upper radiator hose to the radiator top tank. Coolant circulates through the radiator, dissipates heat, and then flows out of the radiator through the lower hose and into the suction side of the coolant pump. Coolant continues flowing through the engine and radiator circuit until the coolant temperature drops below the thermostat opening temperature.

A portion of the coolant is circulated from the cylinder block through the EGR cooler and back to the thermostat housing. Coolant flow is opposite exhaust gas flow and is controlled with a separate thermostat located in the thermostat housing. During the warm-up period, the EGR thermostat is closed and coolant circulates through a bypass circuit in the thermostat housing to the suction side of the water pump.

BF67790,0000A0D -19-28JUL11-1/1

Component Location Diagrams



IT4 4045 PVX Lubrication System

RG20107—UN—03AUG11

Continued on next page

BF67790,00001EA -19-20SEP11-1/2

- | | | | |
|---|---|---|---|
| 1— Oil Pump | 9— Oil Supply — Main Bearings | 18— Bypass Valve | 25— OCV Oil Drain Hose |
| 2— Oil Pump Pickup Tube | 10— Main Bearing | 19— Oil Pressure Regulating Valve | 26— Balancer Shaft Bearing |
| 3— Oil Pump Discharge Tube to Cylinder Block | 11— Oil Supply — Connecting Rod Bearing | 20— Oil Fill Tube and Dipstick | 27— Oil Drain Line Port — Wastegate Turbocharger |
| 4— Oil Cooler Mounting Bracket and Filter Housing | 12— Camshaft | 21— Oil Supply — Upper Idler Gear | 28— Oil Supply Line Port — Wastegate Turbocharger |
| 5— Oil Cooler | 13— Connecting Rod Bearing | 22— Oil Supply — Gear Train | 29— Oil Supply |
| 6— Oil Filter Header | 14— Piston Pin | 23— Rocker Arm Cover to OCV Filter Housing Tube | 30— Oil Return |
| 7— Oil Filter | 15— Rocker Arm Shaft | 24— OCV Filter Housing | |
| 8— Main Oil Galley — Cylinder Block | 16— Oil Supply Line — VGT Turbocharger | | |
| | 17— Oil Drain Line — VGT Turbocharger | | |

NOTE: PWX engines have different turbocharger oil supply and turbocharger oil drain lines than

the ones shown. The lines are installed on the same fittings (27 and 28).

BF67790,00001EA -19-20SEP11-2/2

Lubrication System Operation

The engine lubrication system consists of a positive displacement gear-driven oil pump, full-flow oil filter, oil cooler, oil pressure regulating valve, oil bypass valve, oil lines and oil galleries.

The oil pump pulls oil from the oil pan sump through a strainer and a suction line. The pump forces oil through the outlet tube into a vertical drilling in the cylinder block, and up to the oil cooler and filter. Oil filters can be mounted on the engine in various locations. After flowing through the cooler and filter, oil flows into the main oil gallery.

The main oil gallery runs the length of the cylinder block and delivers oil to oil passages that feed the camshaft bushings and main bearings.

From the main bearings, oil flows to the connecting rod bearings through drilled cross-passages in the crankshaft between the main journals and connecting rod journals. Oil from the main bearing also supplies oil to the piston cooling orifices.

Oil from the piston cooling orifices sprays on the underside of the piston to keep the piston crown cool. The oil spray also provides splash lubrication for the piston pin.

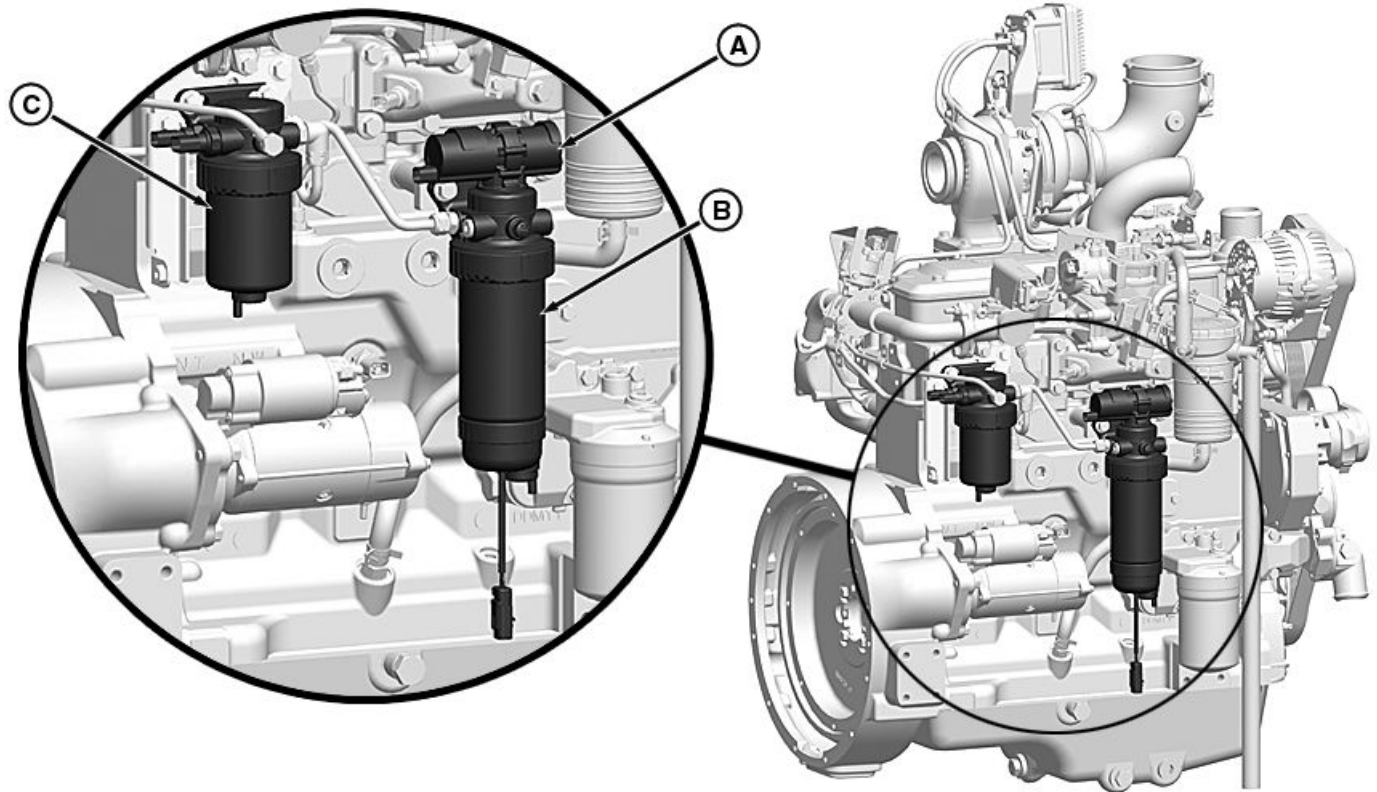
At the rear of the cylinder block, oil flows from the rear camshaft bushing, up through the cylinder head, and into the rocker arm shaft. Oil flows through the rocker arm shaft and lubricates each of the rocker arms. Oil drips from the rocker arms to lubricate the adjusting screws, push rods, and camshaft followers.

At the front of the cylinder block, oil flows from the oil passage into a machined groove in the front face of the block. This groove connects with the upper idler gear shaft to provide oil to the idler gear bushing. The lower idler gear bushing is splash lubricated.

The turbocharger oil supply lines supplies oil to both turbochargers from filtered side of oil filter adapter. Oil returns from the turbochargers through the drain lines.

RE38635,000002E -19-10SEP10-1/1

Component Location Diagram 1



Component Location Diagram 1

A—Low-Pressure Fuel Pump

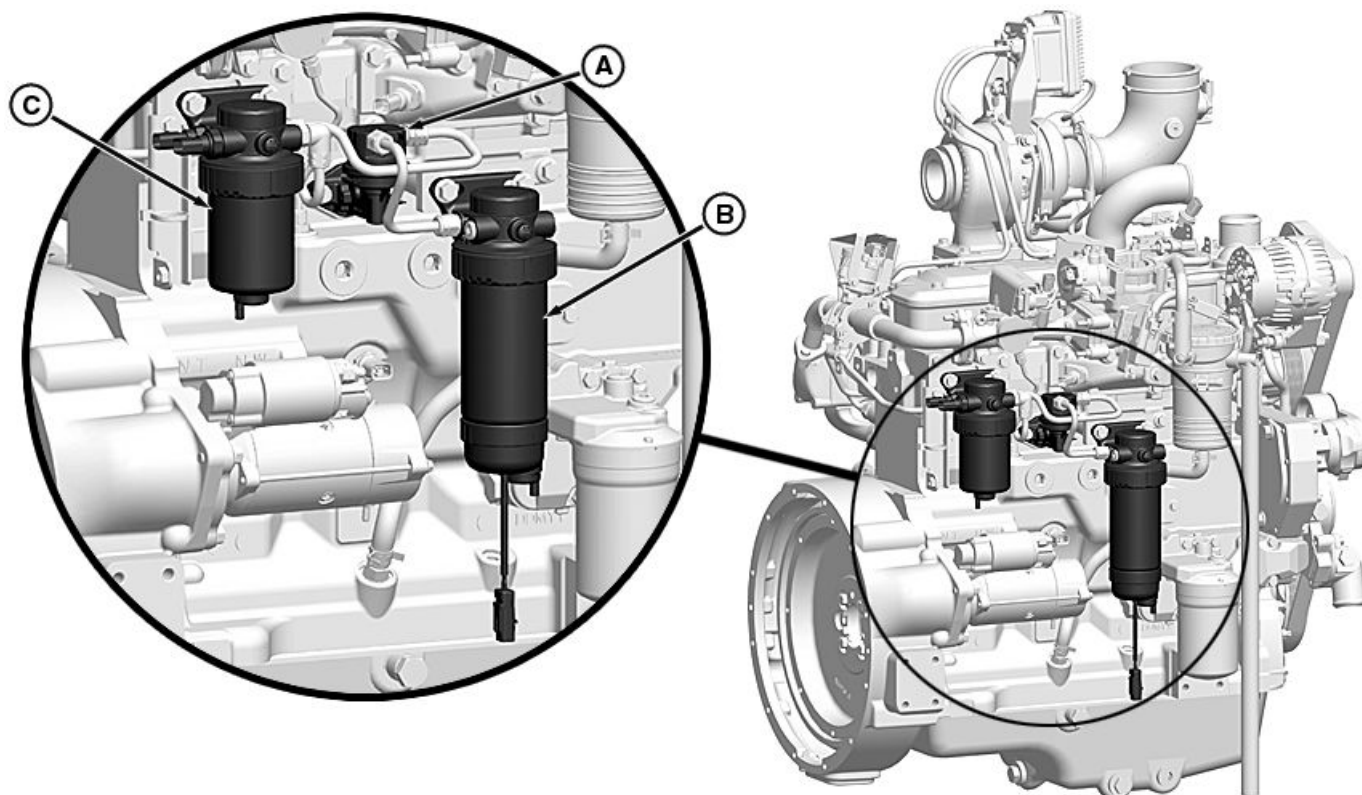
B—Primary Fuel Filter

C—Secondary Fuel Filter

RG20117 —UN—21MAR11

RG40049,0000A8E -19-28MAR11-1/1

Component Location Diagram 2



Component Location Diagram 2

A—Mechanical Low-Pressure
Fuel Pump

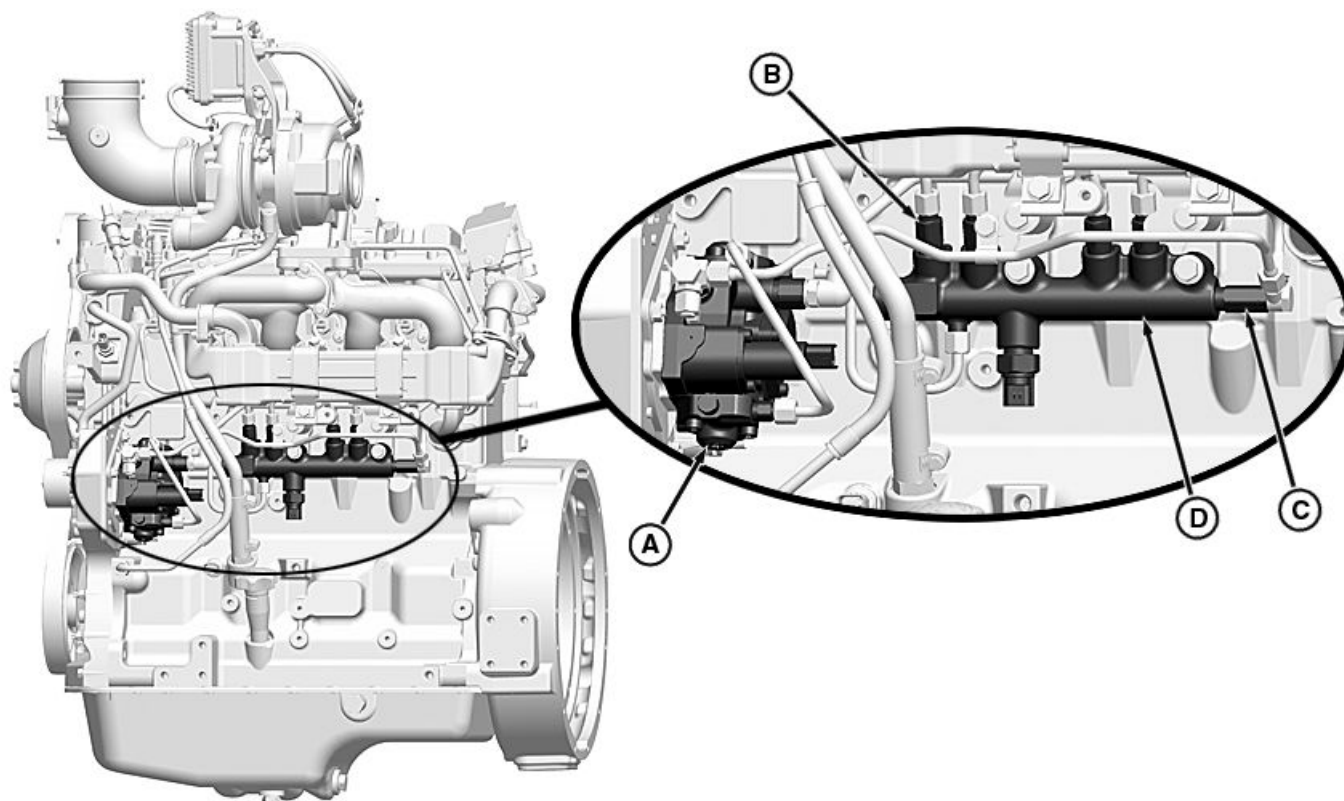
B—Primary Fuel Filter

C—Secondary Fuel Filter

RG20114 —UN—21MAR11

RG40049,0000A97 -19-28JUL11-1/1

Component Location Diagram 3



Component Location Diagram 3

A—High-Pressure Fuel Pump

B—Flow Damper

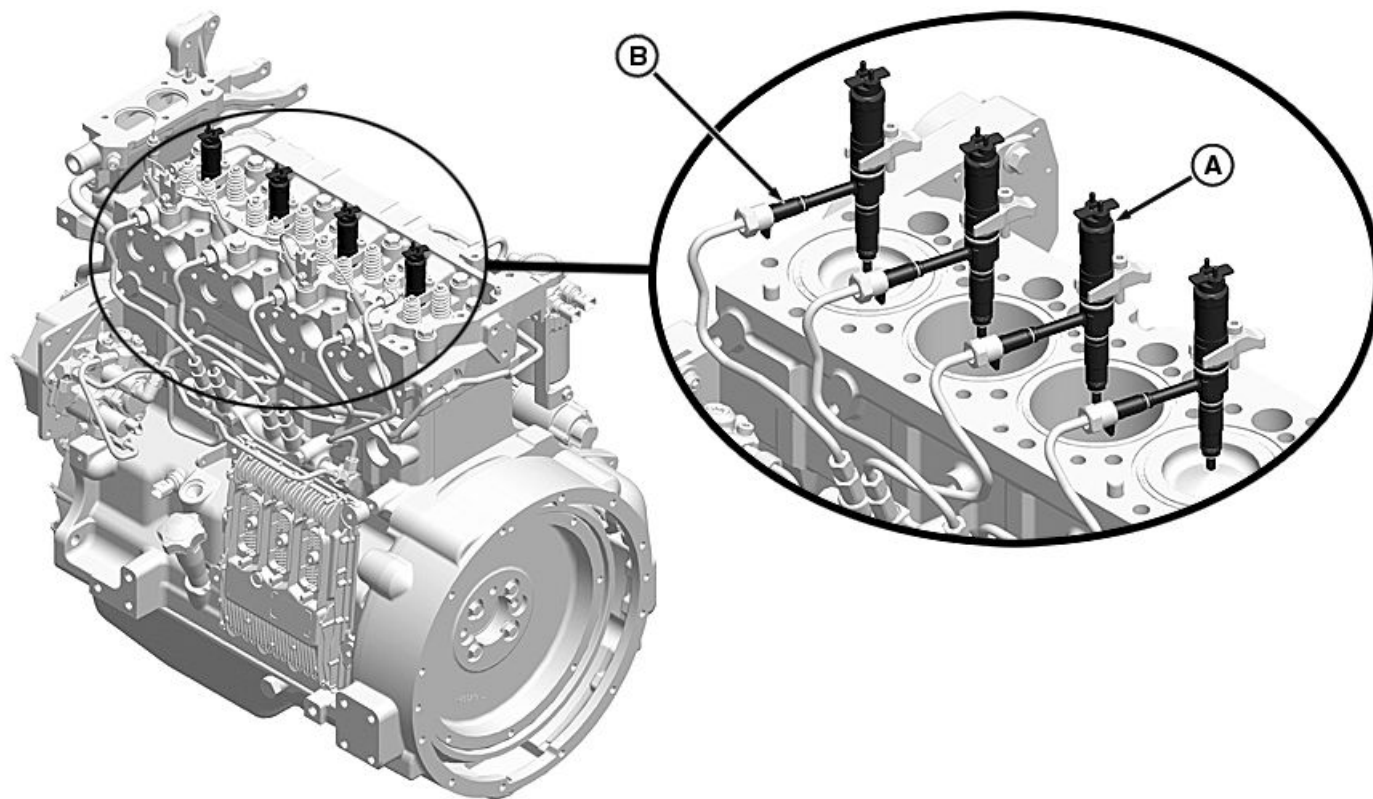
D—High-Pressure Common-Rail

C—Pressure Limiter

RG20115 —UN—21MAR11

RG40049,0000A8F -19-27JUL11-1/1

Component Location Diagram 4



Component Location Diagram 4

A—Electronic Injector

B—Injector Feed Tube

RG20116 —UN—21MAR11

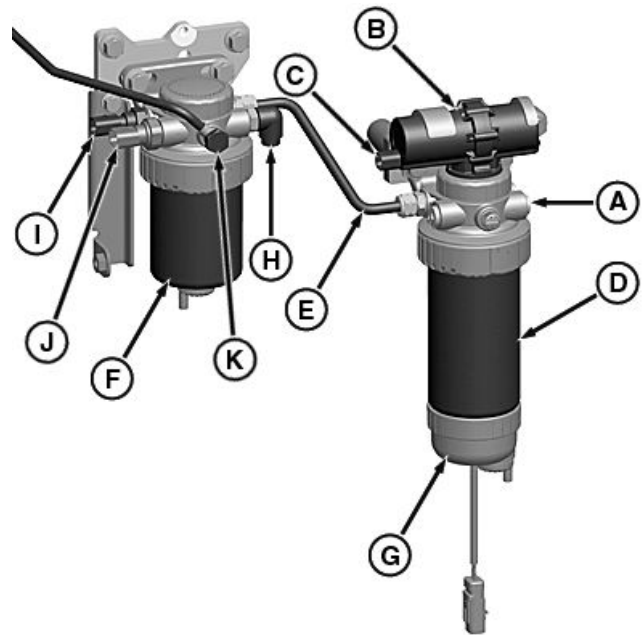
RG40049,0000A90 -19-03AUG11-1/1

Electric Low-Pressure Fuel Pump Operation

NOTE: The low-pressure fuel pump is NOT repairable.
The entire primary fuel filter assembly must be replaced when replacing the low-pressure fuel pump.

The electric low-pressure fuel pump (B) is powered when the ignition is in the Key ON position. Fuel is drawn from the fuel tank through the fuel inlet (A) and through the 10 micron primary fuel filter (D). The low-pressure fuel pump directs fuel to the 2 micron secondary fuel filter (F) through the primary fuel filter to secondary fuel filter fuel line (E). Fuel exits the secondary fuel filter at outlet (H) to the high-pressure fuel pump.

The low-pressure fuel pump is also used to automatically prime and purge the air from the fuel system. To aid in the purging of air, an air bleed line (K) is connected to the secondary fuel filter head. When the low-pressure fuel pump is running, a small amount of fuel continuously passes through the air bleed line (K) to aid in removal of air from the low-pressure fuel system. The low-pressure fuel pressure sensor (J) measures fuel pressure. The ECU uses the low-pressure fuel pressure sensor for diagnostics to detect low-pressure fuel system problems such as a plugged primary fuel filter or secondary fuel filter, or air leaks in fuel suction lines. The fuel temperature sensor (I) measures the temperature of the fuel being supplied to the high-pressure fuel pump.



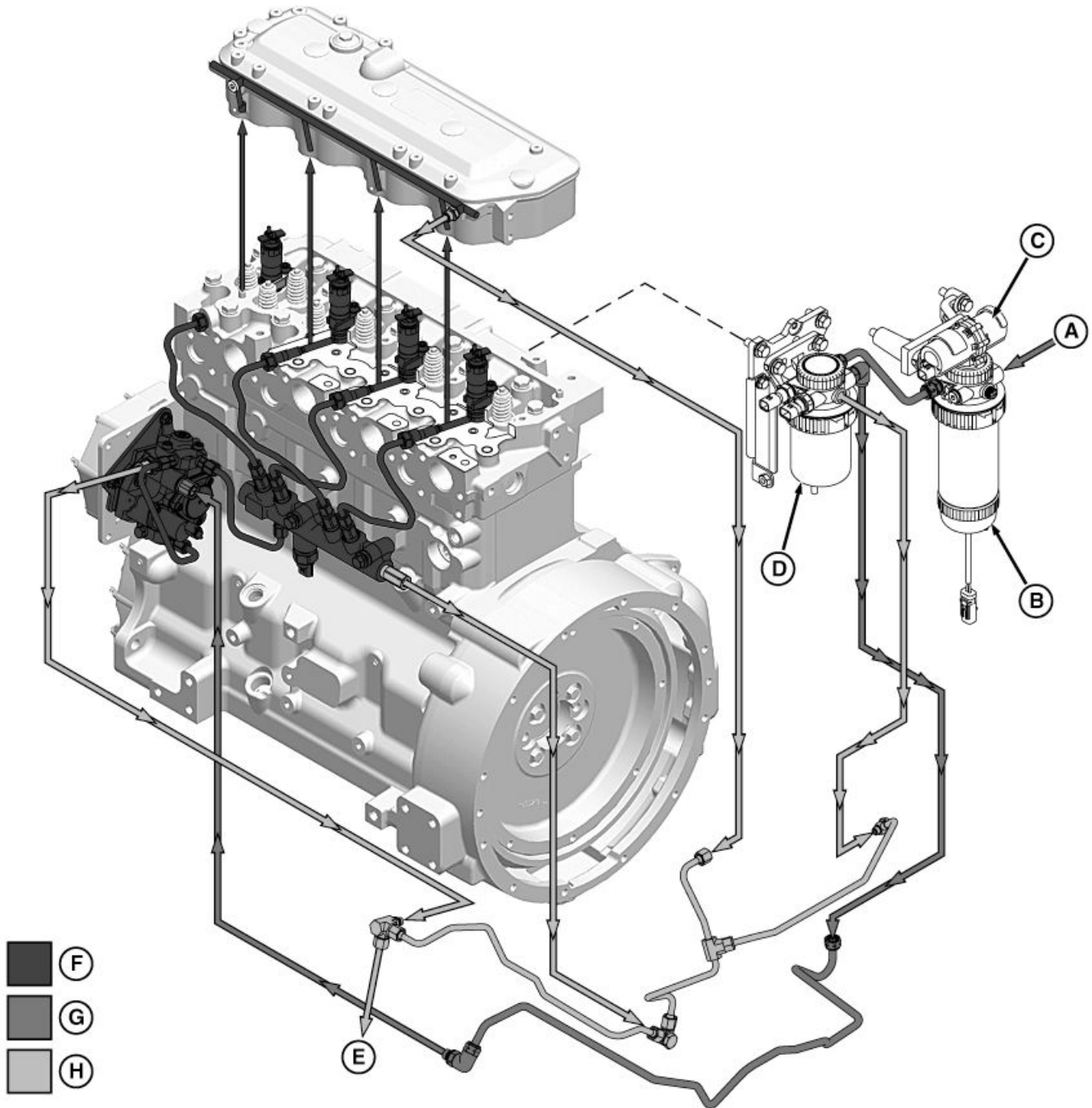
Front View, Fuel Filter Head Assembly

- | | |
|--|--|
| A—Fuel Inlet from Fuel Tank | G—Water Separator Bowl |
| B—Electric Low-Pressure Fuel Pump | H—Fuel Outlet to High-Pressure Fuel Pump |
| C—Electrical Connector | I— Fuel Temperature Sensor |
| D—Primary Fuel Filter | J— Low-Pressure Fuel Pressure Sensor |
| E—Primary Fuel Filter to Secondary Fuel Filter Fuel Line | K—Air Bleed Line |
| F—Secondary Fuel Filter | |

RG20126 —UN—31MAR11

RG40049,0000A94 -19-31MAR11-1/1

Electric Low-Pressure Fuel System Operation



Low-Pressure Fuel System

- | | | | |
|---|-------------------------------------|---------------------------|--------------------|
| A—Primary Fuel Filter Inlet (From Tank) | C—Electrical Low-Pressure Fuel Pump | E—Return Fuel to Tank | H—Return Fuel Flow |
| B—Primary Fuel Filter | D—Secondary Fuel Filter | F—High-Pressure Fuel Flow | |
| | | G—Low-Pressure Fuel Flow | |

The electric low-pressure fuel pump (C) draws fuel from the fuel tank through the primary fuel filter inlet (A) and

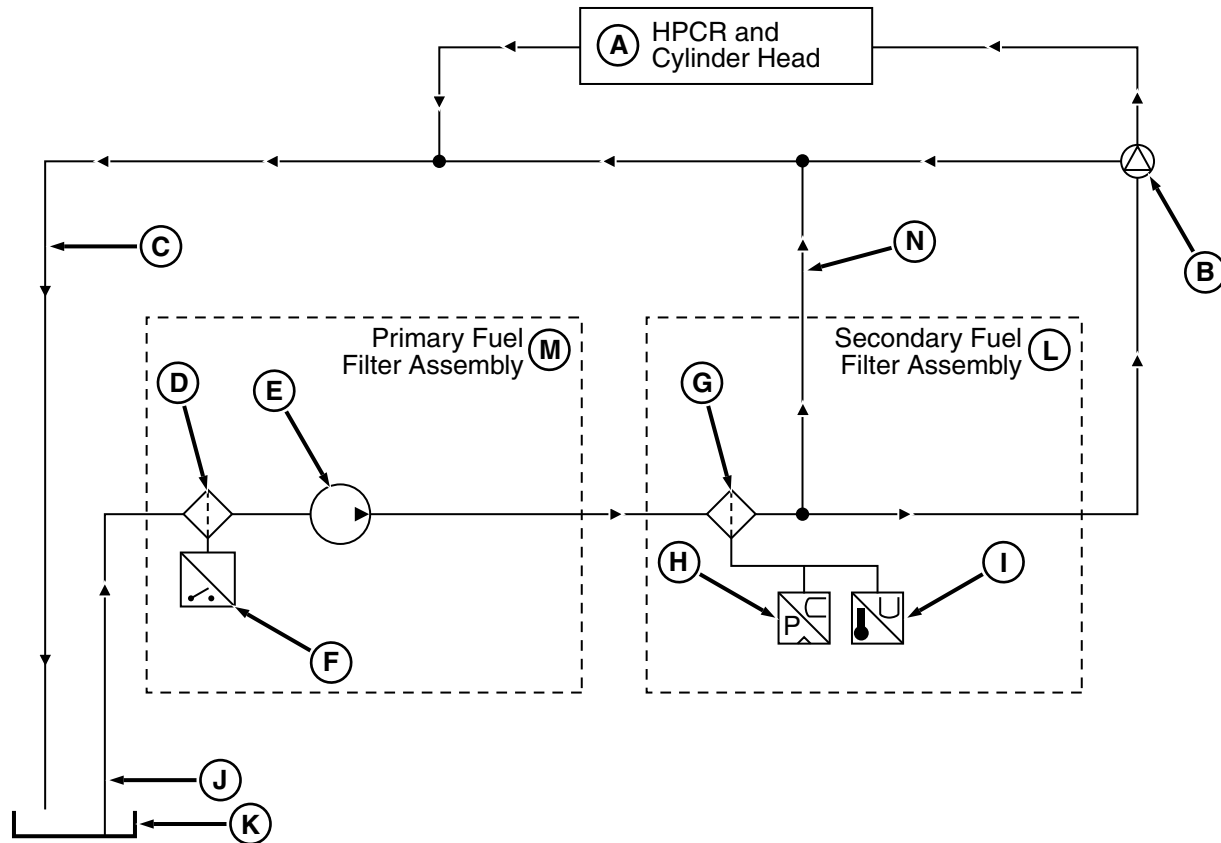
primary fuel filter (B). Fuel is then pumped through the secondary fuel filter (D) to the high-pressure fuel pump.

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RG40049,0000A95 -19-31MAR11-1/2

RG20128—UN—24MAR11

Low-Pressure Fuel System Flow



Low-Pressure Fuel System Flow

A—HPCR and Cylinder Head
B—High-Pressure Fuel Pump
C—Return-to-Tank Fuel Line
D—Primary Fuel Filter

E—Electric Low-Pressure Fuel Pump
F—Water-In-Fuel Sensor
G—Secondary Fuel Filter
H—Low-Pressure Fuel Pressure Sensor

I—Fuel Temperature Sensor
J—Primary Fuel Filter Inlet Fuel Line (From Tank)
K—Fuel Tank
L—Secondary Fuel Filter Assembly

M—Primary Fuel Filter Assembly

Fuel is drawn from the fuel tank (K) and flows through the primary fuel filter inlet fuel line (J) to the primary fuel filter (D) inlet port. Fuel is drawn through the 10 micron primary fuel filter (D) by the electrical low-pressure fuel pump (E). A water-in-fuel sensor (F) is located in the water separator bowl on the primary fuel filter (D). The low-pressure fuel pump delivers fuel to the secondary fuel filter (G). An outlet port is located on the secondary fuel filter housing, providing pressurized fuel to the high-pressure fuel pump (B). The low-pressure fuel pressure sensor (H) and fuel temperature sensor (I), located in the secondary fuel filter assembly (L), measure the fuel supply system pressure and temperature of the fuel being delivered to the high-pressure fuel pump.

Fuel entering the high-pressure fuel pump (B) is then routed either to lubricate the pump crankcase or to the

internal fuel control valve. The high-pressure fuel pump is driven by the camshaft. Excess fuel in the pump crankcase is routed through an overflow port and to the fuel return system. This prevents damage to the high-pressure pump shaft seal. The high-pressure fuel pump creates fuel pressure as high as 200 MPa (2000 bar) (29000 psi). This high-pressure fuel is routed into the high-pressure common-rail (HPCR) and cylinder head (A) for delivery by the electronic injectors. Leak-off fuel from the high-pressure common-rail, electronic injectors, and high-pressure fuel pump flows through the return-to-tank fuel line (C).

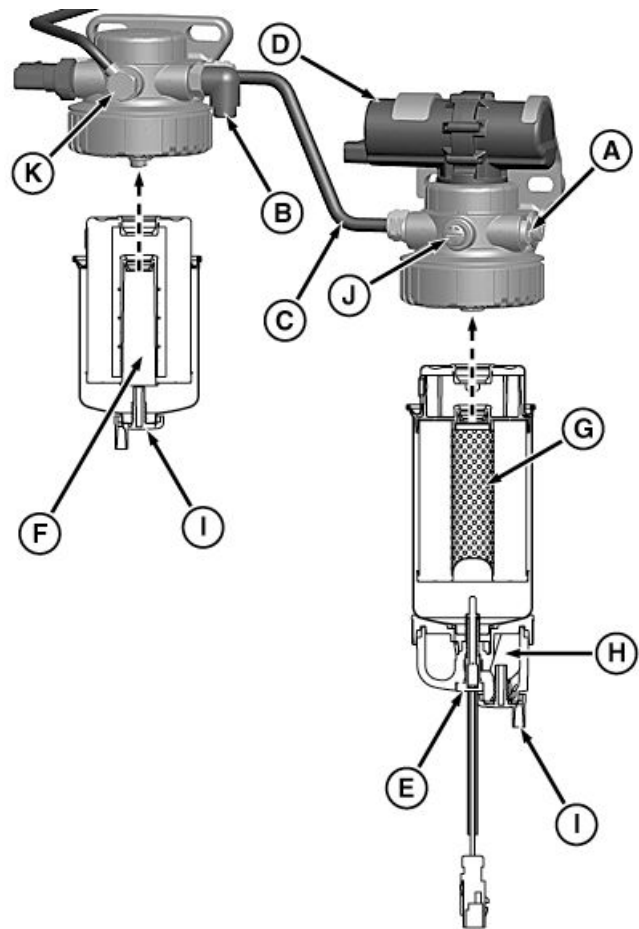
RG20163—UN—30MAR11

RG40049,0000A95 -19-31MAR11-2/2

Electric Pump Primary and Secondary Fuel Filter Operation

Fuel is drawn into the primary fuel filter housing through the fuel inlet (A) and is directed through the upper passageway of the filter head and around the outside of the 10 micron primary filter element (G). Fuel is then drawn upwards through the center of the filter element to the low-pressure fuel pump housing. The electrical low-pressure fuel pump (D) pumps fuel through the fuel line (C), around the 2 micron secondary filter element (F), upwards through the center of the secondary fuel filter element, and out of the fuel filter head fuel outlet (B). An air bleed line (K) is located on the secondary fuel filter head to assist with bleeding air from the system.

Water and the heavier fuel contaminants settle to the bottom of the water separator bowl (H). Water and contaminants can be removed by using the drain valve (I). Also incorporated in the assembly is a water-in-fuel (WIF) sensor (E). This sensor is used to determine the quality of the fuel entering the system.



- | | |
|--|-------------------------------|
| A—Fuel Inlet From Tank | G—Primary Fuel Filter Element |
| B—Fuel Outlet to High Pressure Fuel Pump | H—Water Separator Bowl |
| C—Primary Fuel Filter to Secondary Fuel Filter Fuel Line | I— Drain Valve |
| D—Electric Low-Pressure Fuel Pump | J— Air Bleed Vent Screw |
| E—Water-In-Fuel Sensor | K—Air Bleed Line |
| F—Secondary Fuel Filter Element | |

Primary and Secondary Fuel Filter

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RG20130 —UN—31MAR11

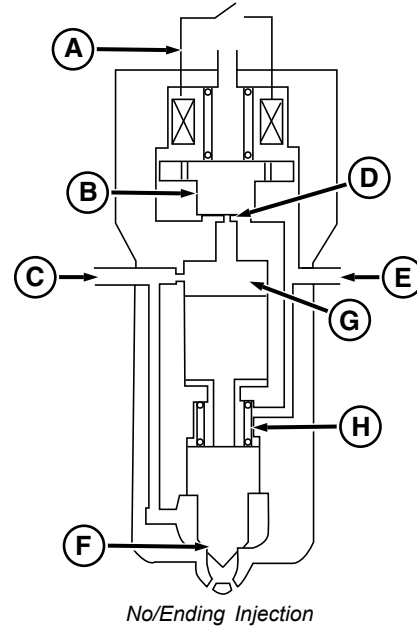
Electronic Injector (EI) Operation

The electronic injectors (EIs) are located in the engine cylinder head and are electronically controlled by the ECU. The amount of fuel delivered to the cylinder is controlled by the ECU. The amount of fuel delivered to the cylinder is controlled by the length of time current is supplied to the two-way electromagnetic valve (TWV) on each electronic injector. This controls the volume of fuel, and the timing of delivery for each injector.

EI - No Injection

Fuel from the HPCR enters the EI at the fuel inlet (C). When no current is supplied to the TWV (A), the valve spring (H) and the hydraulic pressure of the fuel in the control chamber (G) cause the hydraulic piston to push the needle down and close the nozzle. This holds the high-pressure fuel from the common rail inside the nozzle until injection.

- | | |
|-----------------------|-------------------|
| A—Two-Way Valve (TWV) | E—Fuel Leakoff |
| B—Solenoid Valve | F—Nozzle |
| C—Fuel Inlet | G—Control Chamber |
| D—Orifice Seat | H—Valve Spring |



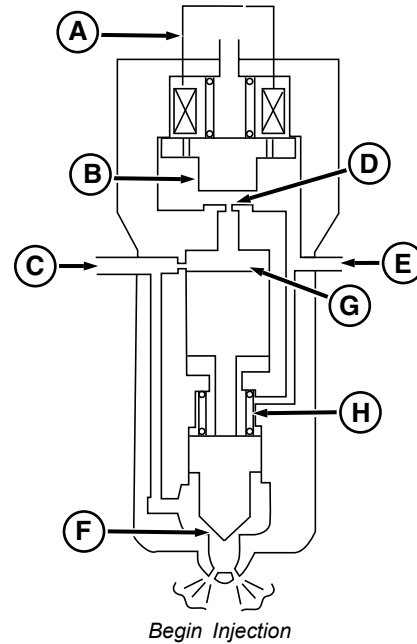
RG11556A —UN—16FEB01

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EI - Begin Injection

Injection begins when current is supplied from the ECU to the TWV (A). The electromagnetic force pulls the solenoid valve (B) up, causing the orifice seat (D) to open. The fuel in the control chamber (G) flows out of the injector to the fuel leak-off (E) line. Fuel is then routed back to the fuel tank. As the fuel exits the injector, the force is removed from the hydraulic piston and the nozzle needle lifts, allowing fuel through nozzle (F) to begin the injection process.

- | | |
|-----------------------|-------------------|
| A—Two-Way Valve (TWV) | E—Fuel Leakoff |
| B—Solenoid Valve | F—Nozzle |
| C—Fuel Inlet | G—Control Chamber |
| D—Orifice Seat | H—Valve Spring |



RG11557A —UN—26FEB01

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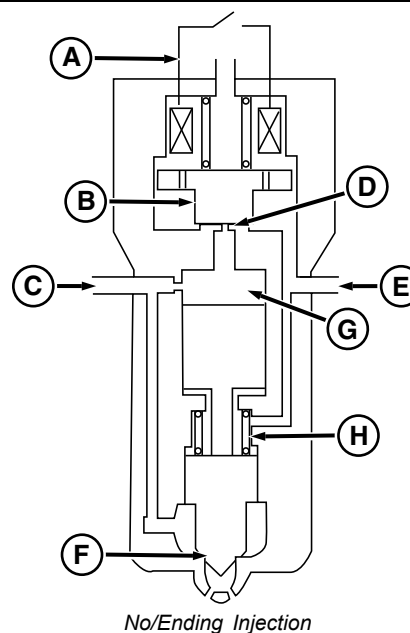
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EI - Ending Injection

Injection ends when the current is removed from the TWV (A). The solenoid valve (B) closes causing fuel to fill the control chamber (G). The valve spring and the hydraulic force from the fuel in the control chamber cause the hydraulic piston to push the needle down and close the nozzle. At this time the injection is complete.

A—Two-Way Valve (TWV)
B—Solenoid Valve
C—Fuel Inlet
D—Orifice Seat

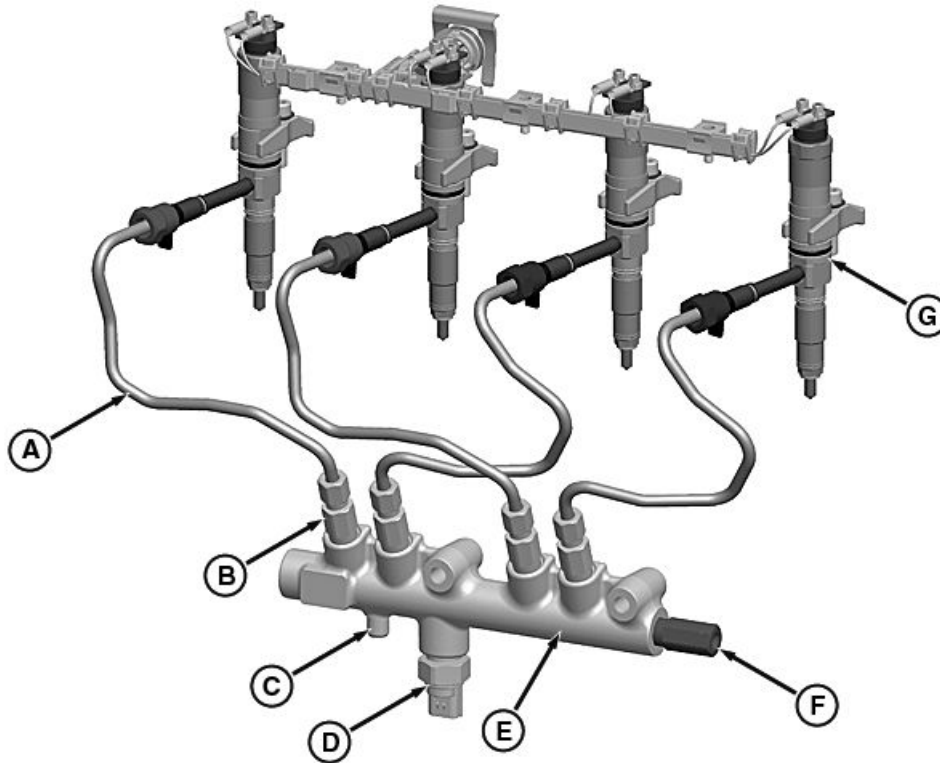
E—Fuel Leakoff
F—Nozzle
G—Control Chamber
H—Valve Spring



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High-Pressure Common-Rail (HPCR) Operation



High-Pressure Common-Rail Assembly

A—High-Pressure Injection Lines **C—High-Pressure Common-Rail Fuel Inlet** **E—High-Pressure Common-Rail** **G—Electronic Injector (EI)**
B—Flow Dampers **D—Fuel Rail Pressure Sensor** **F—Pressure Limiter**

High-pressure fuel is delivered to the high-pressure common-rail (HPCR) (E) through the high-pressure common-rail fuel inlet (C) from the high-pressure fuel pump. The high-pressure injection lines (A) transport the fuel to the electronic injectors (EIs) (G). The fuel rail pressure sensor (D), monitored by the ECU detects the fuel pressure inside the rail. The fuel rail pressure is used to determine how long the suction control valve remains open.

If an abnormally high pressure is generated within the HPCR, the pressure limiter (F) opens to relieve pressure and drain excess fuel to the tank.

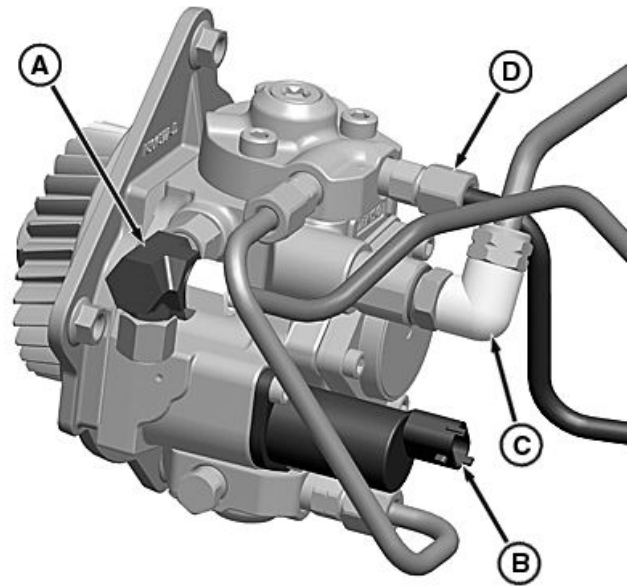
The flow dampers (B) reduce pressure pulsations and thus ensure a steady pressure in the high-pressure injection lines. Furthermore, the flow dampers limit the maximum fuel flow to the EIs to prevent engine damage due to a failed EI or high-pressure leak. If such a failure occurs, a ball valve blocks the fuel supply to a particular EI.

RG20118 —UN—21MAR11

RG40049.0000A91 -19-28MAR11-1/1

High-Pressure Fuel Pump Operation

The 4045 high-pressure common-rail fuel system uses the Denso HP3 high-pressure fuel pump. Filtered fuel enters the high-pressure pump through the fuel inlet (C) and goes through a fuel inlet filter. Fuel continues through an internally located transfer pump and is then routed either to lubricate the pump crankcase or to the internal suction control valve (B). There are two high-pressure plunger chambers on this pump located 90 degrees from one another. Fuel in each chamber is pressurized when the pump drive shaft rotates. Each chamber is pressurized once per complete rotation of the engine. The engine takes two revolutions to fire all 4 injectors. Each plunger chamber is pressurized twice for one complete firing of all 4 injectors. The pressurized fuel leaves through fuel outlet (D). Excess fuel used to lubricate the pump crankcase leaves through the return port (A) and into the return-to-tank line.



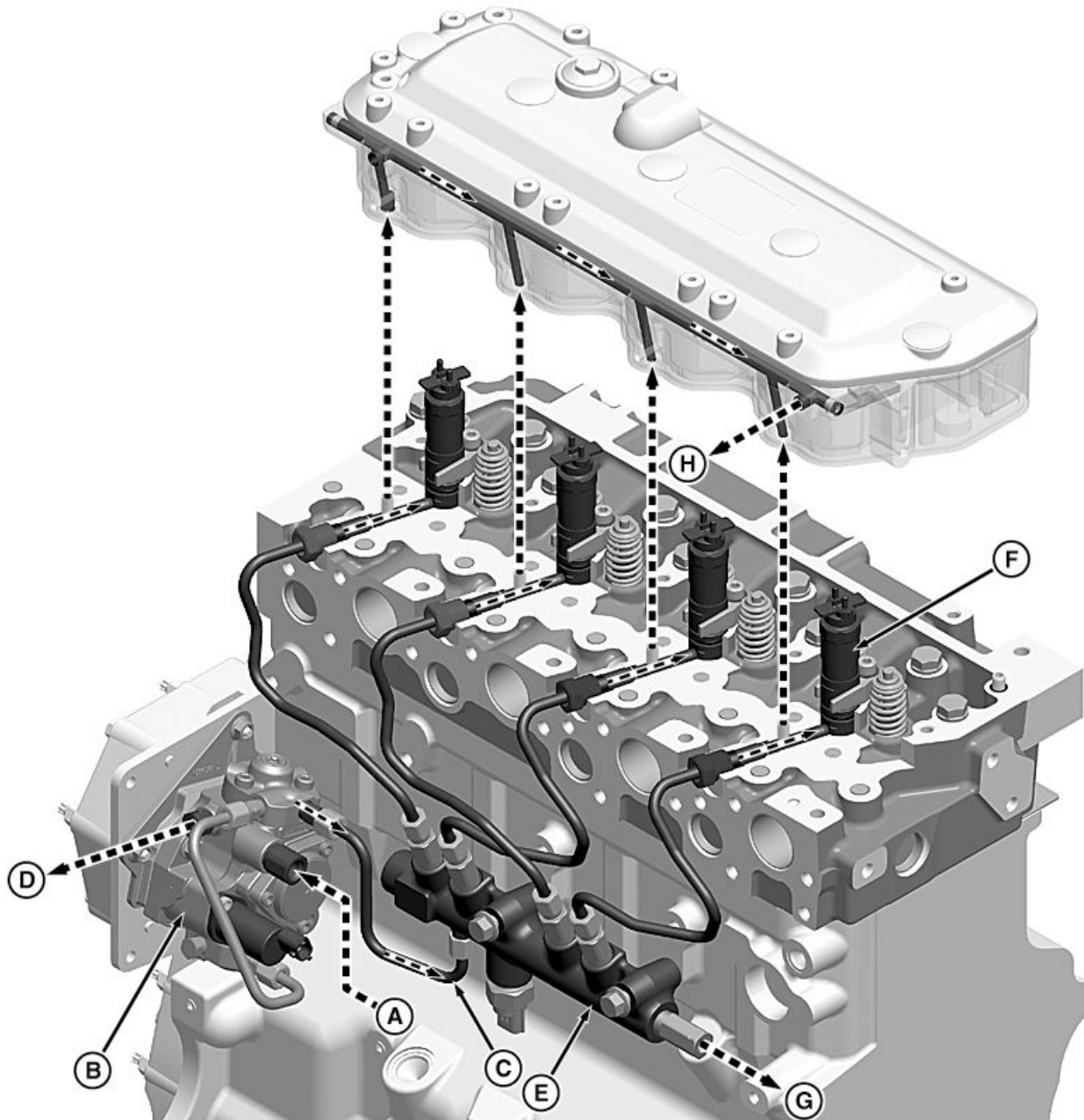
High-Pressure Fuel Pump

- | | |
|----------------------------------|----------------------|
| A—High-Pressure Fuel Pump | C—Fuel Inlet |
| Return Port | D—Fuel Outlet |
| B—Suction Control Valve | |
| Solenoid | |

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RG40049,0000A92 -19-05OCT11-1/1

High-Pressure Fuel System Operation



High-Pressure Fuel System

A—Pump Inlet from
Low-Pressure Fuel System
B—High-Pressure Fuel Pump

C—Pump Outlet to High-Pressure
Common-Rail
D—High-Pressure Fuel Pump
Return Line

E—High-Pressure Common-Rail
F—Electronic Injector
G—Pressure Limiter Fuel Return

H—Electronic Injector Fuel
Return Passages

The high-pressure fuel pump (B) creates fuel pressure as high as 200 MPa (2000 bar) (29 000 psi). This high-pressure fuel is routed into the high-pressure common-rail (HPCR) (E). The HPCR evenly distributes fuel to the electronic injectors (EIs) (F) which introduce fuel into their respective cylinders. Passageways (H) in the rocker arm carrier collect the leak-off fuel from the injectors. Return fuel lines from the rocker arm carrier, HPCR, and the high-pressure fuel pump all connect to a

single line, which directs all the return fuel back into the fuel tank.

The ECU sends a current pulse signal in proper sequence to each electronic injector (F). This signal momentarily enables the electronic injector to spray fuel into their respective cylinders. The length of time an electronic injector injects fuel is determined by the ECU and the current operating conditions of the engine.

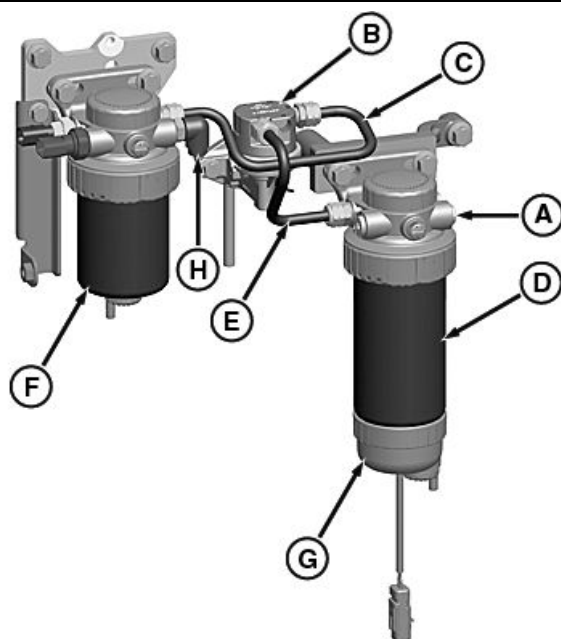
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Mechanical Low-Pressure Fuel Pump Operation

The mechanical low-pressure fuel pump (B) is driven by a lobe on the camshaft when the engine is running. Fuel is drawn from the fuel tank, into the fuel inlet (A), and through the 10 micron primary fuel filter (D). The mechanical low-pressure fuel pump pressurizes the fuel and pumps it to the 2 micron secondary fuel filter (F). Fuel exits the secondary fuel filter at outlet (H) to the high-pressure fuel pump.

- | | |
|---|--|
| A—Fuel Inlet from Fuel Tank | E—Primary Fuel Filter to Mechanical Low-Pressure Fuel Pump Fuel Line |
| B—Mechanical Low-Pressure Fuel Pump | F—Secondary Fuel Filter |
| C—Mechanical Low-Pressure Pump to Secondary Fuel Filter Fuel Line | G—Water Separator Bowl |
| D—Primary Fuel Filter | H—Fuel Outlet to High-Pressure Fuel Pump |

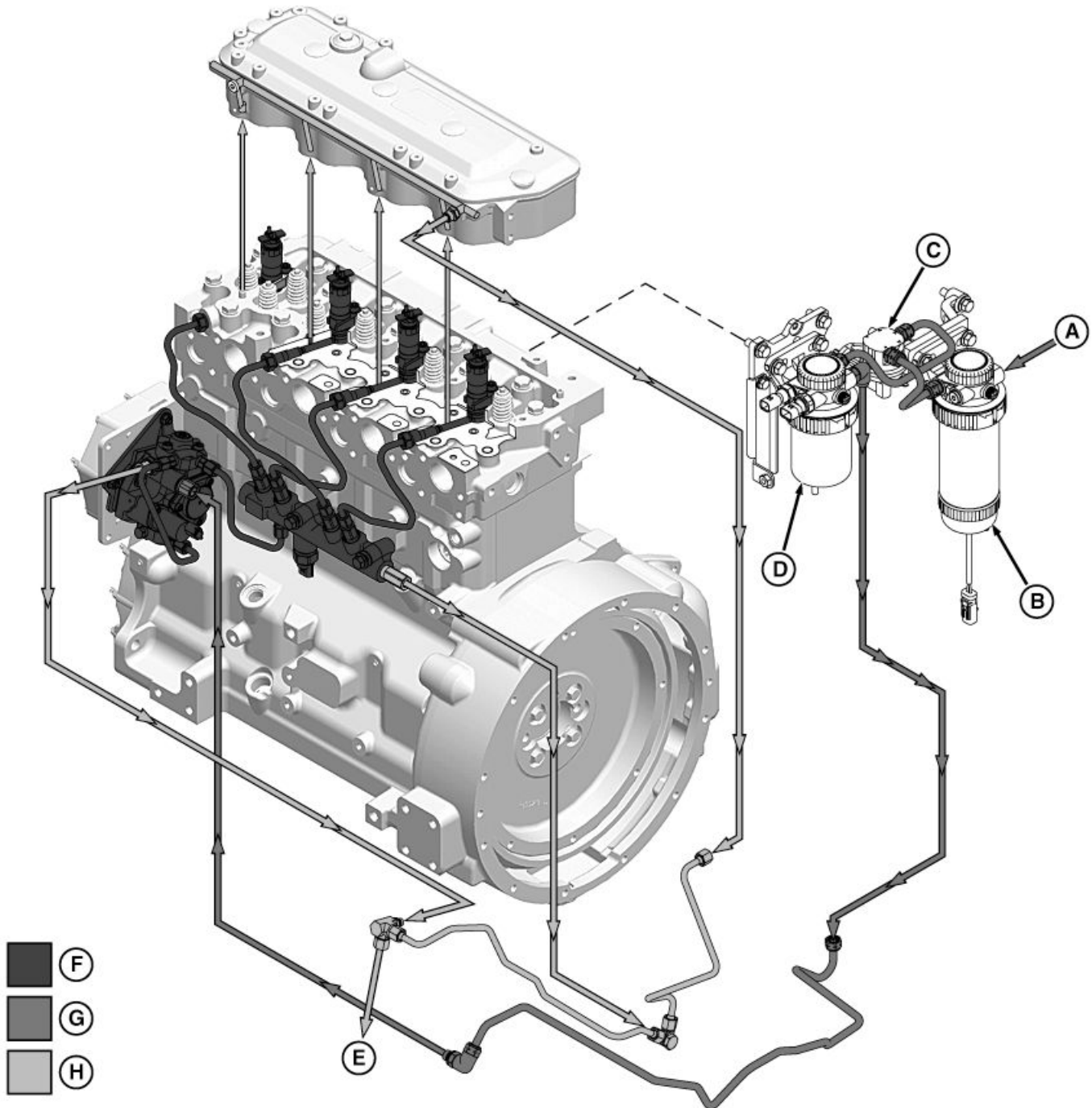


Front View, Fuel Filter Head Assembly

RG40049,0000A98 -19-01AUG11-1/1

RG20127—UN—23MAR11

Mechanical Low-Pressure Fuel System Operation



Low-Pressure Fuel System

A—Primary Fuel Filter Inlet (From Tank)
 B—Primary Fuel Filter With Water Separator

C—Mechanical Low-Pressure Fuel Pump
 D—Secondary Fuel Filter

E—Return Fuel to Tank
 F—High-Pressure Fuel Flow
 G—Low-Pressure Fuel Flow

H—Return Fuel Flow

The mechanical low-pressure fuel pump (C) draws fuel from the fuel tank through the primary fuel filter inlet (A)

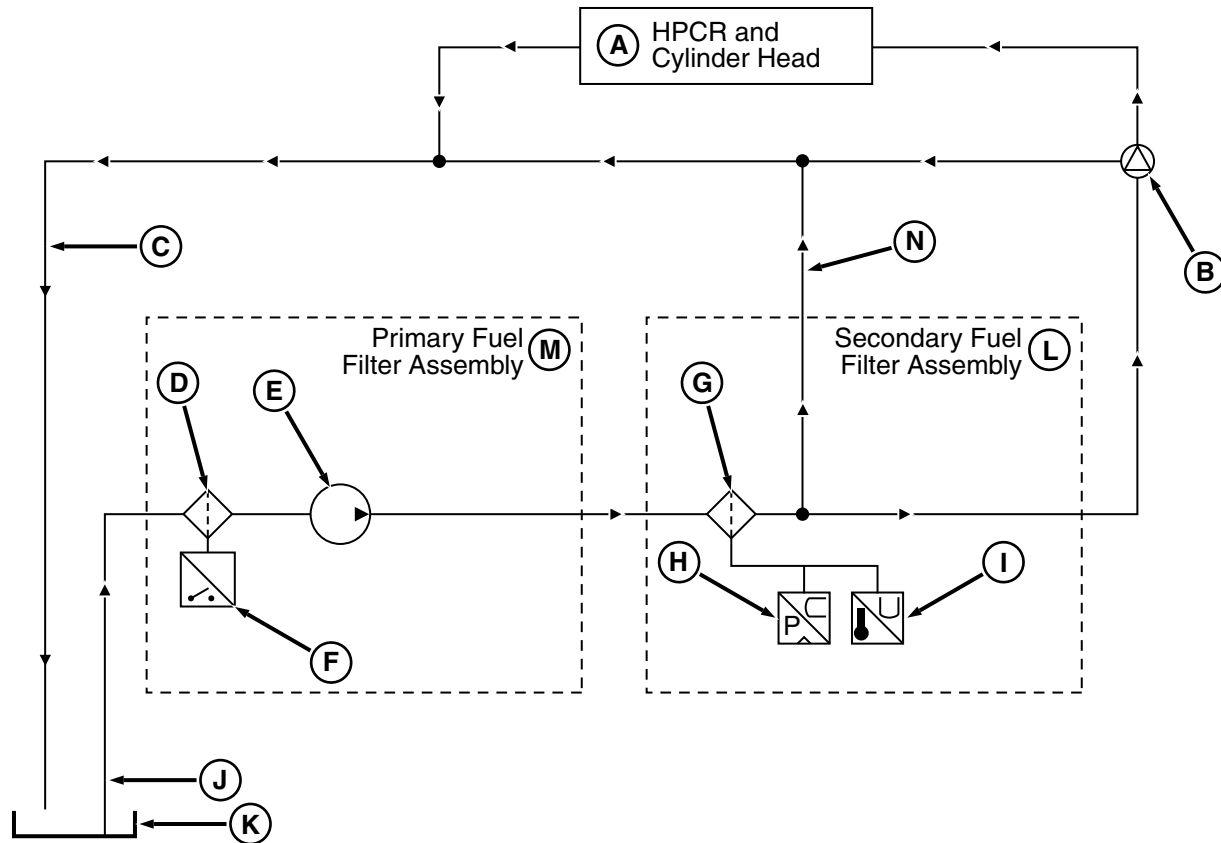
and primary fuel filter (B). Fuel is then pumped through the secondary fuel filter (D) to the high-pressure fuel pump.

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RG20129—UN—08AUG11

Low-Pressure Fuel System Flow



Low-Pressure Fuel System Flow

A—HPCR and Cylinder Head
B—High-Pressure Fuel Pump
C—Return-to-Tank Fuel Line
D—Primary Fuel Filter

E—Mechanical Low-Pressure Fuel Pump
F—Water-In-Fuel Sensor
G—Secondary Fuel Filter
H—Low-Pressure Fuel Pressure Sensor

I—Fuel Temperature Sensor
J—Primary Fuel Filter Inlet Fuel Line (From Tank)
K—Fuel Tank

L—Secondary Fuel Filter Assembly

Fuel is drawn from the fuel tank (K) and flows through the primary fuel filter inlet fuel line (J) to the primary fuel filter (D) inlet port. Fuel is drawn through the 10 micron primary fuel filter (D) by the mechanical low-pressure fuel pump (E). A water-in-fuel sensor (F) is located in the water separator bowl on the primary fuel filter (D). The low-pressure fuel pump delivers fuel to the secondary fuel filter (G). An outlet port is located on the secondary fuel filter housing, providing pressurized fuel to the high-pressure fuel pump (B). The low-pressure fuel pressure sensor (H) and fuel temperature sensor (I), located in the secondary fuel filter assembly (L), measure the fuel supply system pressure and temperature of the fuel being delivered to the high-pressure fuel pump.

Fuel entering the high-pressure fuel pump (B) is then routed either to lubricate the pump crankcase or to the

internal fuel control valve. The high-pressure fuel pump is driven by the camshaft. Excess fuel in the pump crankcase is routed through an overflow port and to the fuel return system. This prevents damage to the high-pressure pump shaft seal. The high-pressure fuel pump creates fuel pressure as high as 200 MPa (2000 bar) (29000 psi). This high-pressure fuel is routed into the high-pressure common-rail (HPCR) and cylinder head (A) for delivery by the electronic injectors. Leak-off fuel from the high-pressure common-rail, electronic injectors, and high-pressure fuel pump flows through the return-to-tank fuel line (C).

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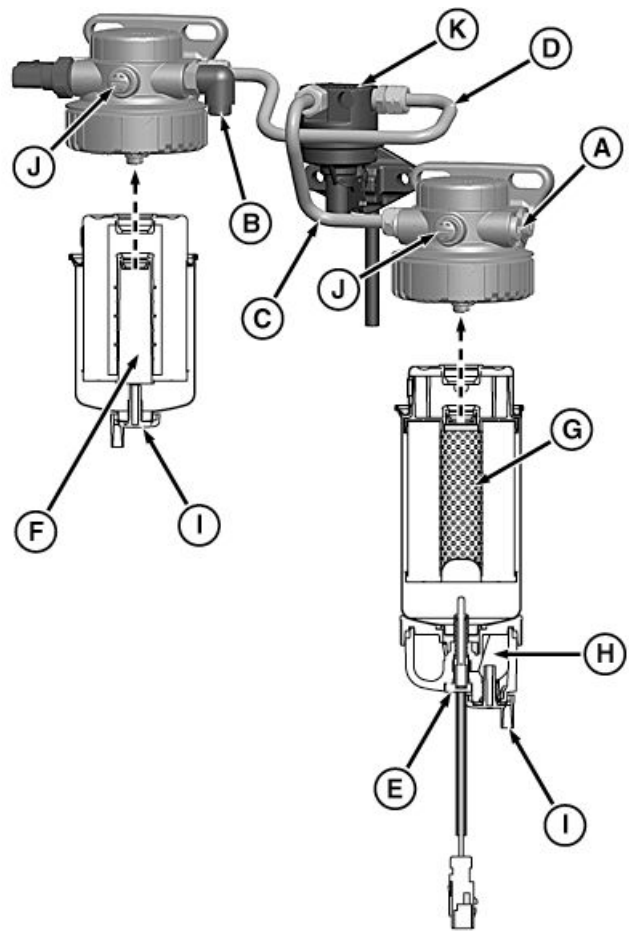
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Mechanical Pump Primary and Secondary Fuel Filter Operation

Fuel is drawn into the primary fuel filter housing through the fuel inlet (A) and is directed through the upper passageway of the filter head and around the outside of the 10 micron primary filter element (G). Fuel is then drawn upwards through the center of the filter element to the low-pressure fuel pump housing. The mechanical low-pressure fuel pump (K) pulls fuel through the fuel line (C) and pumps it through fuel line (D), around the 2 micron secondary filter element (F), upwards through the center of the secondary fuel filter element, and out of the fuel filter head fuel outlet (B). Air bleed vent screws (J) are located on each fuel filter head to assist with bleeding air from the system, if necessary.

Water and the heavier fuel contaminants settle to the bottom of the water separator bowl (H). Water and contaminants can be removed by using the drain valve (I). Also incorporated in the assembly is a water-in-fuel (WIF) sensor (E). This sensor is used to determine the quality of the fuel entering the system.

- | | |
|---|-------------------------------------|
| A—Fuel Inlet From Tank | G—Primary Fuel Filter Element |
| B—Fuel Outlet to High-Pressure Fuel Pump | H—Water Separator Bowl |
| C—Primary Fuel Filter to Secondary Fuel Filter Fuel Line | I—Drain Valve |
| D—Mechanical Low-Pressure Pump to Secondary Fuel Filter Fuel Line | J—Air Bleed Vent Screw |
| E—Water-In-Fuel Sensor | K—Mechanical Low-Pressure Fuel Pump |
| F—Secondary Fuel Filter Element | |

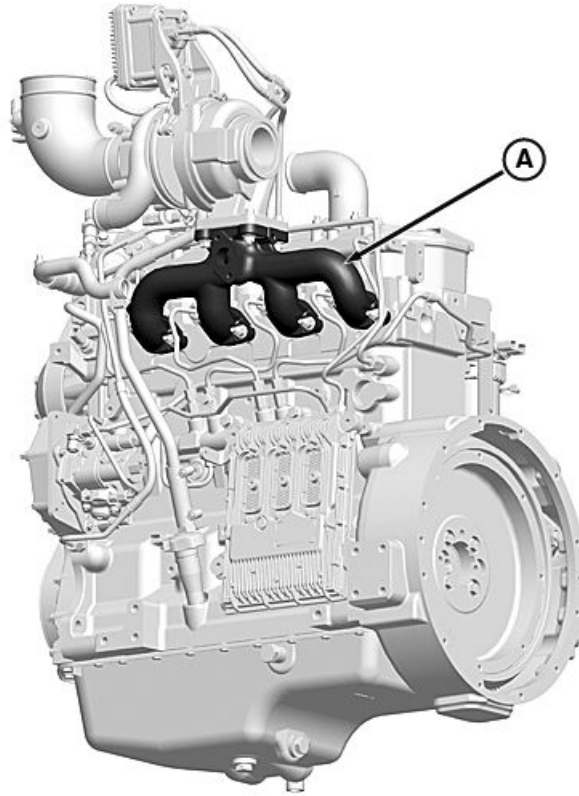


Primary and Secondary Fuel Filter

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Component Location Diagram 1



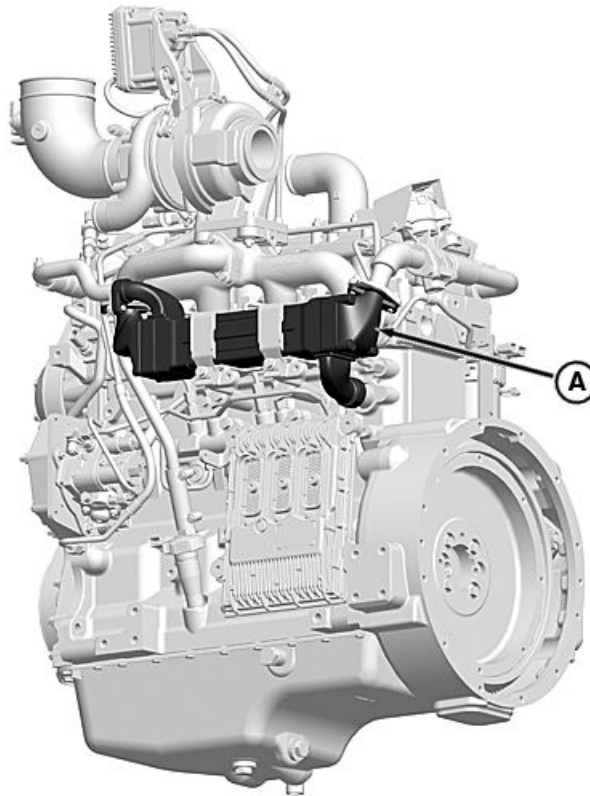
Component Location Diagram 1

A—Exhaust Manifold

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Component Location Diagram 2



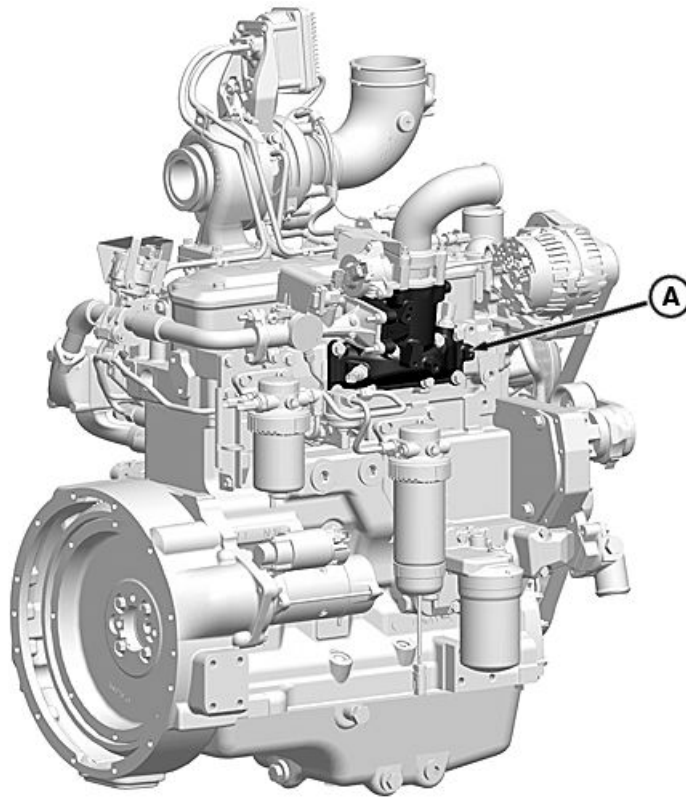
Component Location Diagram 2

A—EGR Cooler

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Component Location Diagram 3



Component Location Diagram 3

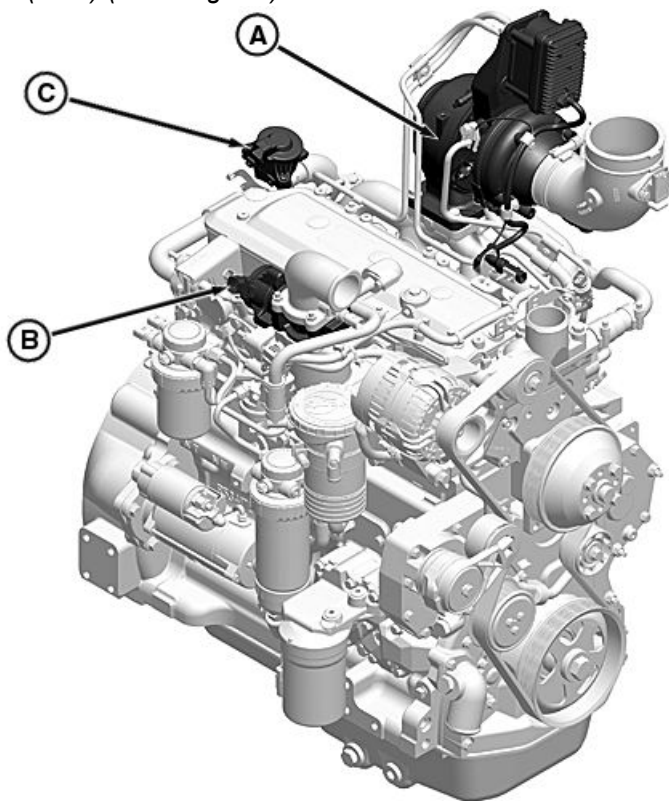
A—Intake Manifold

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Component Location Diagram 4

NOTE: This diagram only applies to engines with a variable geometry turbocharger (VGT) (PVX engines).



Component Location Diagram 4

A—VGT Turbocharger

B—Air Throttle Actuator

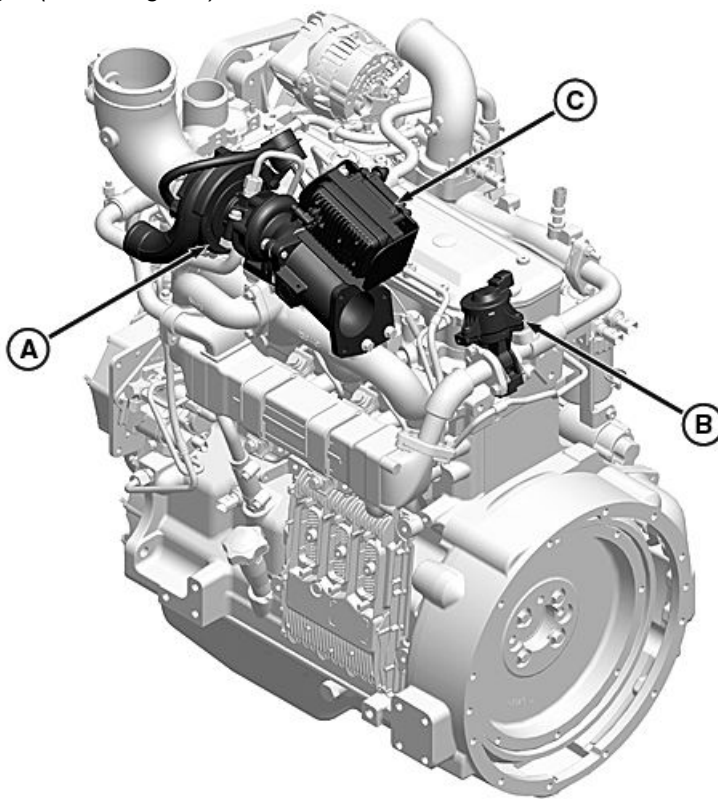
C—EGR Valve

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Component Location Diagram 5

NOTE: This diagram only applies to engines with a wastegate turbocharger (PWX engines).



Component Location Diagram 5

A—Wastegate Turbocharger

B—EGR Valve

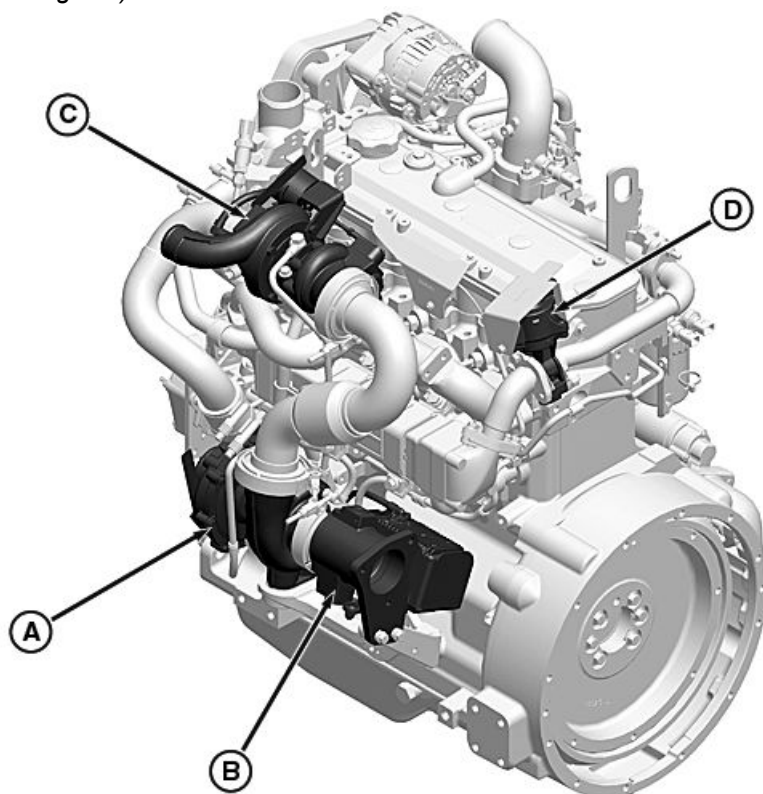
C—Exhaust Throttle Actuator

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Component Location Diagram 6

NOTE: This diagram only applies to engines with dual turbochargers (PSX engines).



Component Location Diagram 6

A—Wastegate Turbocharger

B—Exhaust Throttle Actuator

C—Fixed Turbocharger

D—EGR Valve

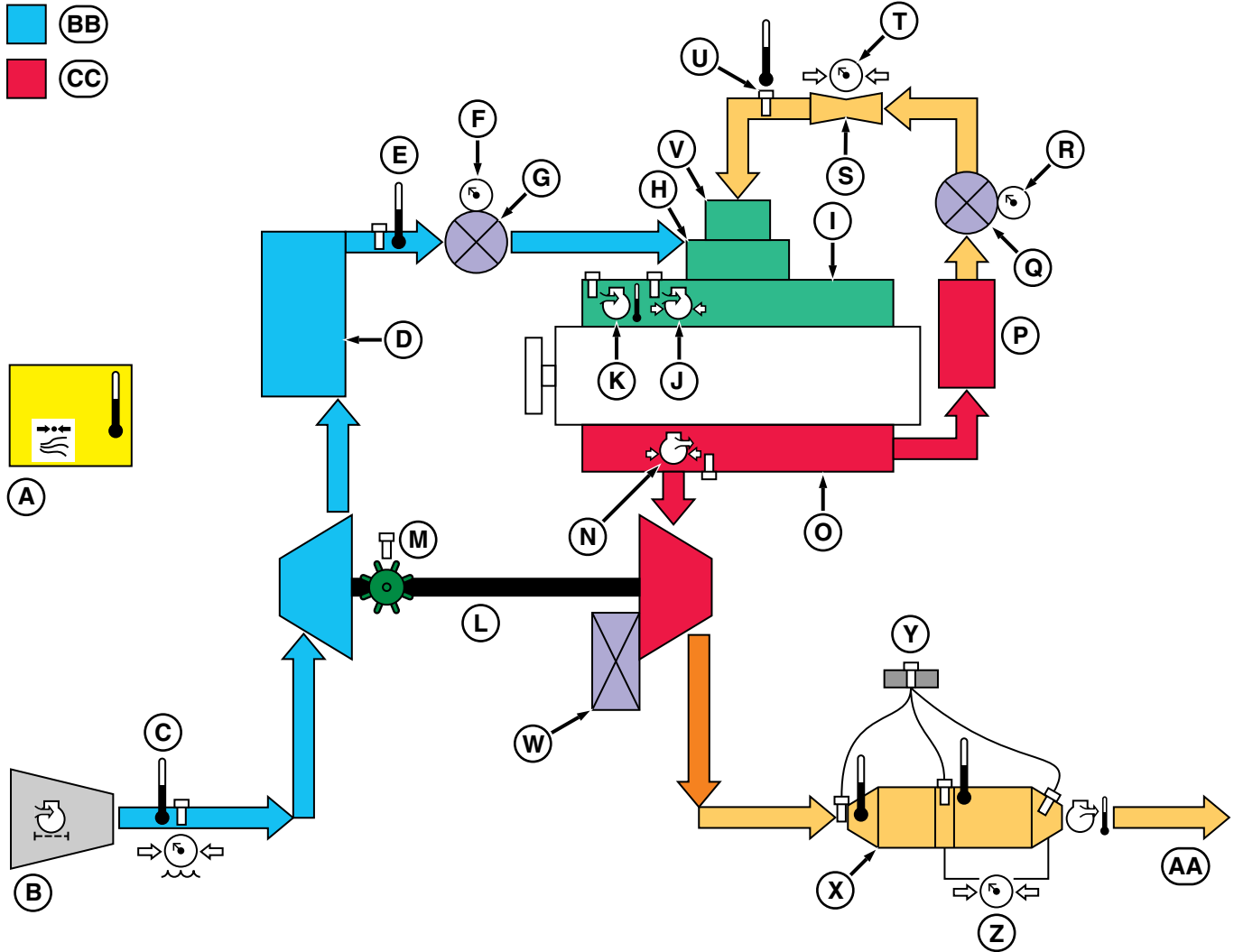
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Air Intake and Exhaust System Operation - PVX

Air Intake and Exhaust System - PVX Engines

NOTE: This diagram only applies to engines with a variable geometry turbocharger (VGT) (PVX engines).



Air Intake and Exhaust System - PVX Engines

- | | | | |
|---|---|--------------------------------------|-------------------------------------|
| A—ECU Temperature and Barometric Air Pressure | G—Air Throttle Actuator | N—Exhaust Manifold Pressure Sensor | W—VGT Actuator |
| B—Air Filter | H—Mixer | O—Exhaust Manifold | X—Exhaust Filter |
| C—Intake Air Sensor | I—Intake Manifold | P—EGR Cooler | Y—Exhaust Filter Temperature Module |
| D—Charge Air Cooler | J—Manifold Air Pressure (MAP) Sensor | Q—EGR Valve | Z—DPF Differential Pressure Sensor |
| E—Charge Air Cooler Outlet Air Temperature Sensor | K—Manifold Air Temperature (MAT) Sensor | R—EGR Valve Actuator Position Sensor | AA—Exhaust Pipe |
| F—Air Throttle Actuator Position Sensor | L—Variable Geometry Turbocharger (VGT) | S—Venturi Tube | BB—Intake Air |
| | M—VGT Speed Sensor | T—EGR Flow Sensor | CC—Exhaust Gas |
| | | U—EGR Temperature Sensor | |
| | | V—Reed Valve | |

RG20180 —UN—05APR11

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Ambient air is drawn through the air filter (B) and compressed by the variable geometry turbocharger (VGT) (L). Air compressed by the VGT increases engine output. Turbocharged air flows through the air-to-air charge air cooler (D) where it becomes more dense. This air is passed through the air throttle actuator (G) and into the intake manifold (I). The air throttle butterfly plate is normally open and closes during DPF active regeneration (exhaust filter cleaning). An exhaust gas recirculation (EGR) system cools and directs inert exhaust gas into a mixer (H) located in the intake manifold. With the engine under load, the fresh intake air mixes with cooled, recirculated exhaust gases before flowing through the cylinder head and combustion chamber. EGR reduces oxygen in the intake air and lowers peak combustion temperatures. During the exhaust stroke, gas exits the cylinder and cylinder head and flows through the exhaust manifold (O). With the engine under load, the exhaust gas spins the turbine of the VGT (L), providing the primary source of intake manifold air pressure. The turbine vanes

of the VGT, when closed, also provide the back pressure source for EGR flow. The EGR valve (Q) is commanded open and some exhaust gas recirculates through the venturi tube (S) and EGR cooler (P) and back to the intake manifold (I). The exhaust gas that does not get recirculated flows from the VGT turbine to the exhaust filter (X).

During engine operation the ECU continuously monitors and compares signal inputs from the temperature and pressure sensors on the engine. The ECU then calculates the amount of fuel needed to meet the required or requested condition and the amount of exhaust gas to be mixed with the fresh air. Once the ECU calculates that all required conditions have been met, it signals the EGR valve to open. It also signals the VGT actuator (W) to begin closing the turbocharger variable vanes.

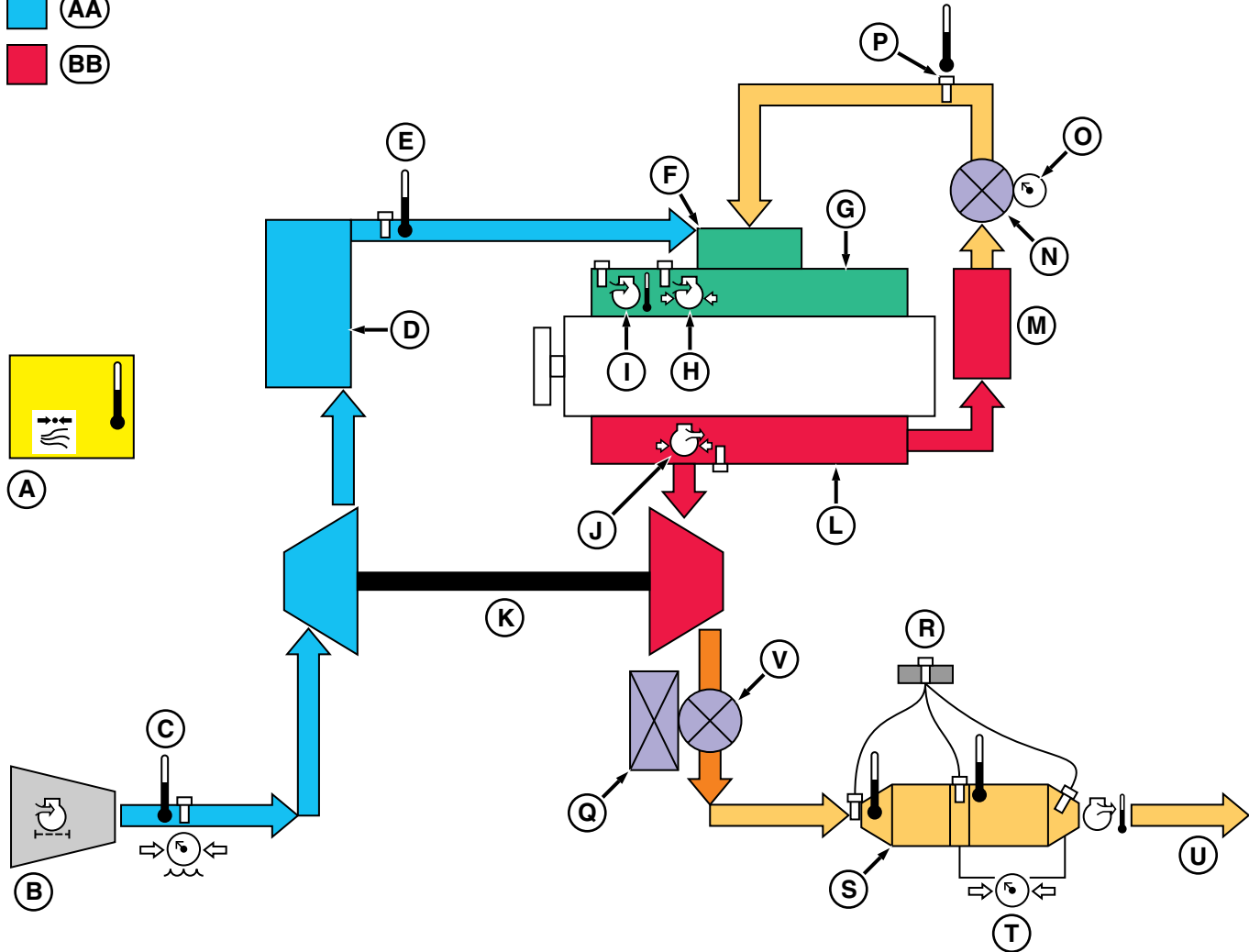
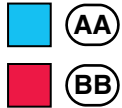
NOTE: During exhaust filter cleaning or regeneration, the EGR valve is closed and no exhaust gas is recirculated.

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Air Intake and Exhaust System Operation - PWX

Air Intake and Exhaust System - PWX Engines

NOTE: This diagram only applies to engines with a wastegate turbocharger (PWX engines).



Air Intake and Exhaust System - PWX Engines

- | | | | |
|---|---|--------------------------------------|------------------------------------|
| A—ECU Temperature and Barometric Air Pressure | G—Intake Manifold | L—Exhaust Manifold | S—Exhaust Filter |
| B—Air Filter | H—Manifold Air Pressure (MAP) Sensor | M—EGR Cooler | T—DPF Differential Pressure Sensor |
| C—Intake Air Sensor | I—Manifold Air Temperature (MAT) Sensor | N—EGR Valve | U—Exhaust Pipe |
| D—Charge Air Cooler | J—Exhaust Manifold Pressure Sensor | O—EGR Valve Actuator Position Sensor | V—Exhaust Throttle |
| E—Charge Air Cooler Outlet Air Temperature Sensor | K—Wastegate Turbocharger | P—EGR Temperature Sensor | AA—Intake Air |
| F—Mixer | | Q—Exhaust Throttle Actuator | BB—Exhaust Gas |
| | | R—Exhaust Filter Temperature Module | |

RG20181—UN—05APR11

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BK34394,0001B51 -19-08APR11-1/2

Ambient air is drawn through the air filter (B) and compressed by the wastegate turbocharger (K). Air compressed by the turbocharger increases engine output. Turbocharged air flows through the air-to-air charge air cooler (D) where it becomes more dense. This air is passed into the intake manifold (G). An exhaust gas recirculation (EGR) system cools and directs inert exhaust gas into a mixer (F) located in the intake manifold. With the engine under load, the fresh intake air mixes with cooled, recirculated exhaust gases before flowing through the cylinder head and combustion chamber. EGR reduces oxygen in the intake air and lowers peak combustion temperatures. During the exhaust stroke, gas exits the cylinder and cylinder head and flows through the exhaust manifold (L). With the engine under load, the exhaust gas spins the turbine of the wastegate turbocharger (K). The exhaust throttle, when closed, provides the back pressure source for EGR flow. The EGR valve (N) is commanded open and some exhaust gas recirculates through the

EGR cooler (M) and back to the intake manifold (G). The exhaust gas that does not get recirculated flows past the exhaust throttle (V), to the exhaust filter (S).

During engine operation the ECU continuously monitors and compares signal inputs from the temperature and pressure sensors on the engine. The ECU then calculates the amount of fuel needed to meet the required or requested condition and the amount of exhaust gas to be mixed with the fresh air. Once the ECU calculates that all required conditions have been met, it signals the EGR valve (N) to open. It also signals the exhaust throttle actuator (Q) to begin closing the exhaust throttle (V) to increase exhaust temperatures.

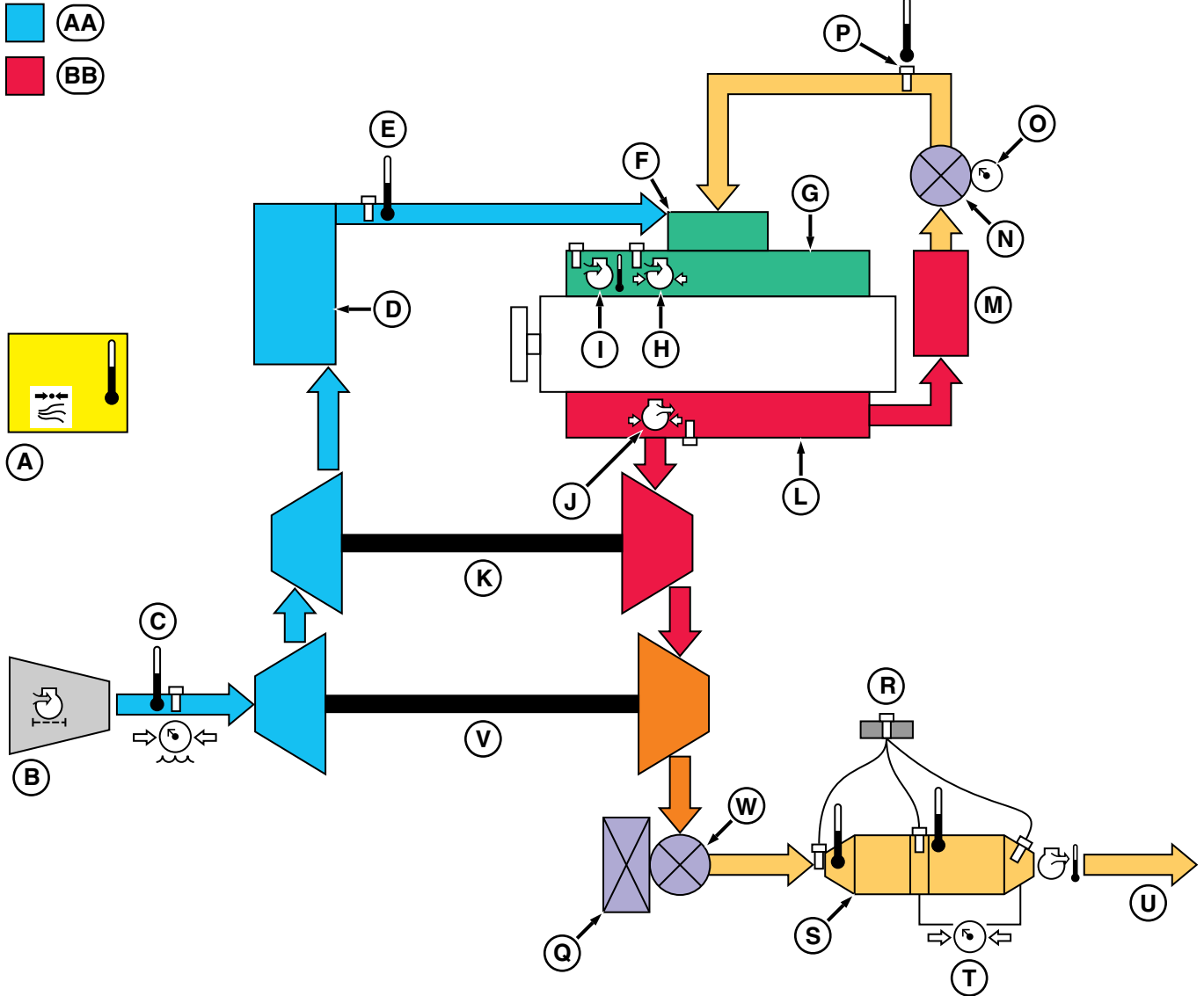
NOTE: During exhaust filter cleaning or regeneration, the EGR valve is closed and no exhaust gas is recirculated.

BK34394,0001B51 -19-08APR11-2/2

Air Intake and Exhaust System Operation - PSX

Air Intake and Exhaust System - PSX Engines

NOTE: This diagram only applies to engines with dual turbochargers (PSX engines).



Air Intake and Exhaust System - PSX Engines

- | | | | |
|---|---|--------------------------------------|------------------------------------|
| A—ECU Temperature and Barometric Air Pressure | G—Intake Manifold | M—EGR Cooler | T—DPF Differential Pressure Sensor |
| B—Air Filter | H—Manifold Air Pressure (MAP) Sensor | N—EGR Valve | U—Exhaust Pipe |
| C—Intake Air Sensor | I—Manifold Air Temperature (MAT) Sensor | O—EGR Valve Actuator Position Sensor | V—Wastegate Turbocharger |
| D—Charge Air Cooler | J—Exhaust Manifold Pressure Sensor | P—EGR Temperature Sensor | W—Exhaust Throttle |
| E—Charge Air Cooler Outlet Air Temperature Sensor | K—Fixed Turbocharger | Q—Exhaust Throttle Actuator | AA—Intake Air |
| F—Mixer | L—Exhaust Manifold | R—Exhaust Filter Temperature Module | BB—Exhaust Gas |
| | | S—Exhaust Filter | |

RG21547—UN—07JUN12

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BL90236,0000313 -19-15JUN12-1/2

Ambient air is drawn through the air filter (B) and compressed by two turbochargers (K and V) in series. Air compressed by the turbochargers increases engine output. Turbocharged air flows through the air-to-air charge air cooler (D) where it becomes more dense. This air is passed into the intake manifold (G). An exhaust gas recirculation (EGR) system cools and directs inert exhaust gas into a mixer (F) located in the intake manifold. With the engine under load, the fresh intake air mixes with cooled, recirculated exhaust gases before flowing through the cylinder head and combustion chamber. EGR reduces oxygen in the intake air and lowers peak combustion temperatures. During the exhaust stroke, gas exits the cylinder and cylinder head and flows through the exhaust manifold (L). With the engine under load, the exhaust gas spins the turbine of the wastegate turbocharger (K), providing the primary source of intake manifold air pressure. The exhaust throttle, when closed, provides the back pressure source for EGR flow. The EGR valve (N)

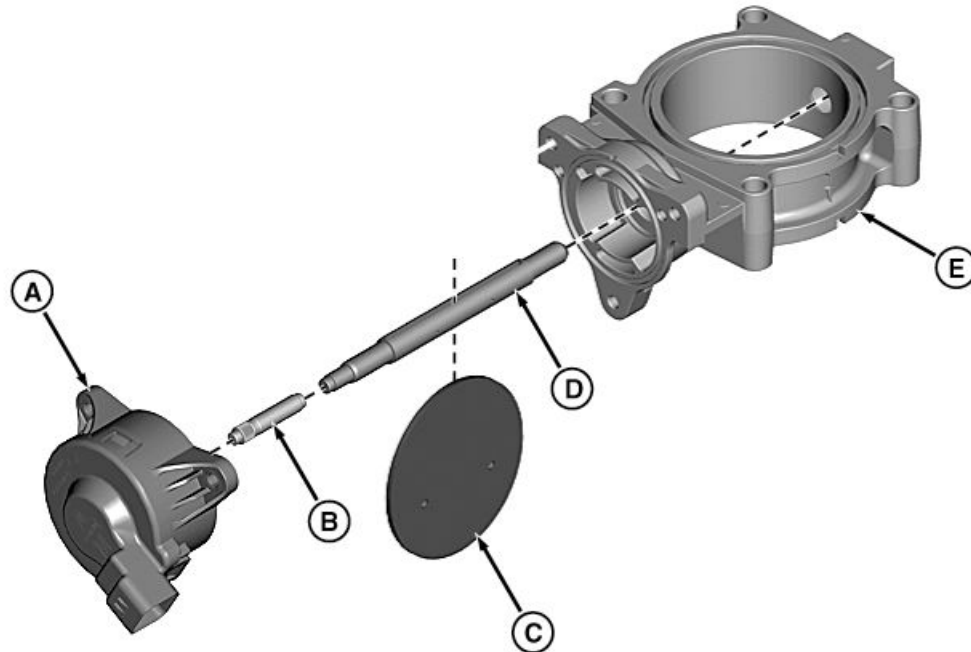
is commanded open and some exhaust gas recirculates through the EGR cooler (M) and back to the intake manifold (G). The exhaust gas that does not get recirculated flows past the exhaust throttle (V), to the exhaust filter (S).

During engine operation the ECU continuously monitors and compares signal inputs from the temperature and pressure sensors on the engine. The ECU then calculates the amount of fuel needed to meet the required or requested condition and the amount of exhaust gas to be mixed with the fresh air. Once the ECU calculates that all required conditions have been met, it signals the EGR valve (N) to open. It also signals the exhaust throttle actuator (Q) to begin closing the exhaust throttle (V) to increase exhaust temperatures.

NOTE: During exhaust filter cleaning or regeneration, the EGR valve is closed and no exhaust gas is recirculated.

BL90236,0000313 -19-15JUN12-2/2

Air Throttle Actuator Operation



Air Throttle Actuator

A—Electric Motor
B—Motor Shaft

C—Butterfly
D—Throttle Link

E—Throttle Body

NOTE: Only PVX engines are equipped with an air throttle.

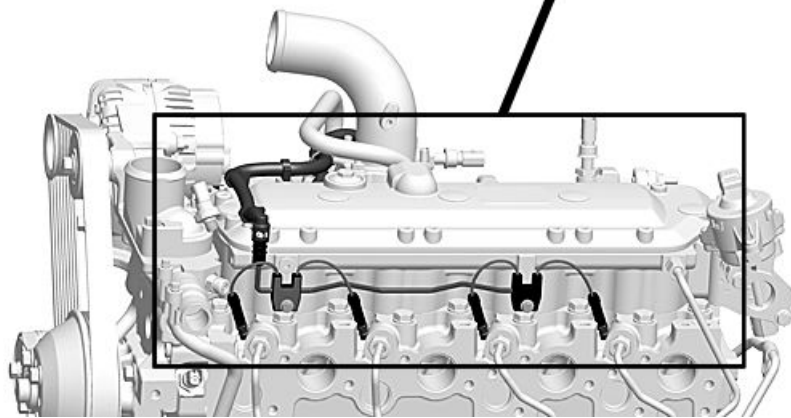
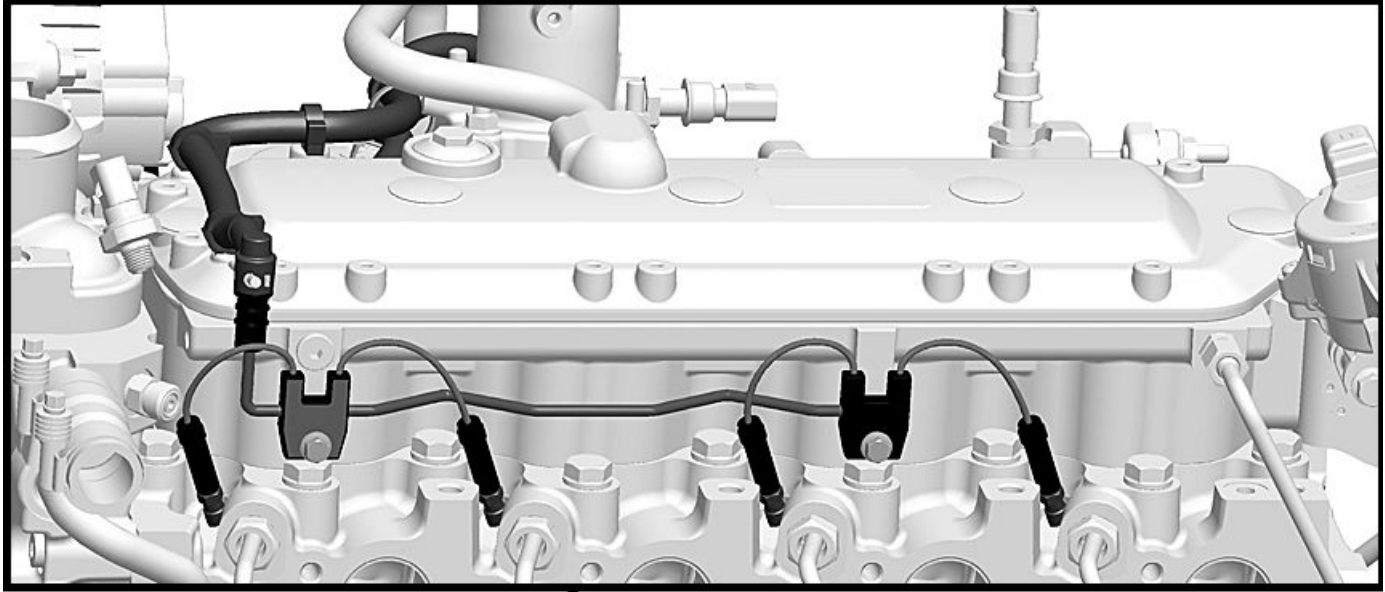
The air throttle is located upstream of the intake manifold and is normally open. An electric motor (A) opens and closes butterfly (C). To raise the exhaust gas temperature before and during DPF active regeneration, the ECU

commands the air throttle to close. The value of Manifold Air Pressure - Actual can be negative if a vacuum develops in the intake manifold while the butterfly is closed. The ECU receives position feedback from a sensor located inside the throttle assembly.

BF67790,00001D2 -19-29JUL11-1/1

RG16942 —UN—27MAR09

Cold Start Aid Operation



Glow Plug

The glow plugs are used to increase air temperature inside the combustion chamber to improve cold start capability. When the operator turns the ignition from OFF to ON, the ECU determines if the fuel temperature is below a specified temperature, turns on the glow plug indicator light on the dash, and energizes the glow plug relay. The glow plug relay energizes the glow plugs which heat the air inside the combustion chamber. The ECU determines the length of time to energize the glow plugs by the measured fuel temperature. Once the determined time has been reached, the ECU turns off the glow plug indicator light and de-energize the glow plug relay.

If the operator begins cranking the engine prior to waiting for the glow plug indicator light to turn off, the ECU de-energizes the glow plug relay and the ignition must be cycled from OFF to ON before preheating is allowed again.

Anytime the engine is cranked and does not start, the ignition must be cycled from OFF to ON to reset the glow plug preheating cycle.

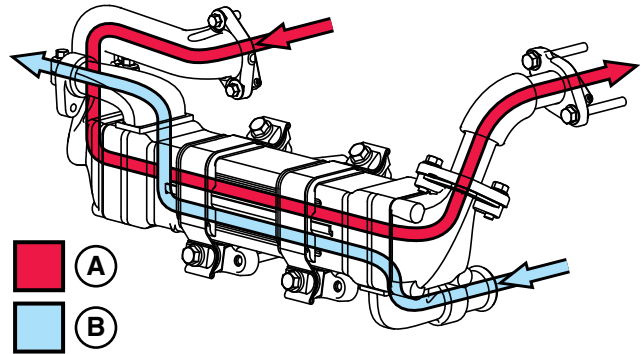
BF67790,00001D3 -19-29MAR11-1/1

RG20137 —UN—25MAR11

EGR Cooler Operation

The EGR cooler lowers the temperature of the exhaust gas to allow a greater mass to be recirculated. Exhaust gas flows through tubes and engine coolant flows around the tubes in the opposite direction. Coolant is routed from the coolant manifold on the cylinder block, through the cooler, and returns to the thermostat housing.

A—Exhaust Gas Direction Flow B—Coolant Direction Flow



EGR Cooler Flow Diagram

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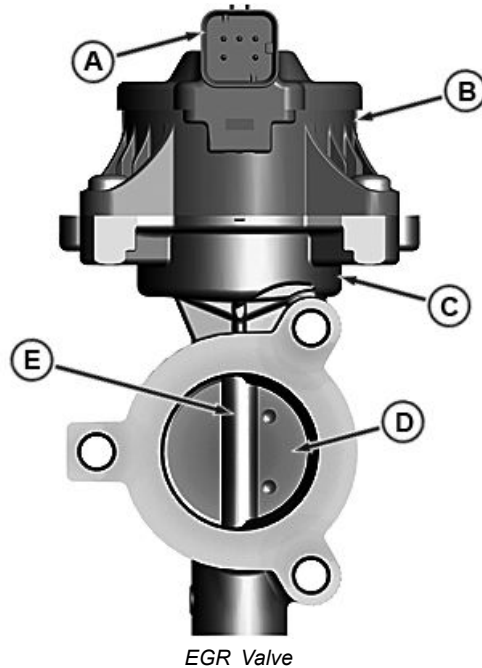
RG20720 —UN—04AUG11

EGR Valve Operation

The EGR valve opens so exhaust gas can recirculate back into the intake manifold. This recirculating exhaust gas lowers combustion temperatures and, therefore, lowers oxides of Nitrogen (NOx) emissions. The EGR valve contains a motor driven butterfly (D) and a position sensor. The 6-pin electrical connector (A) contains circuits for the motor and position feedback. The valve is opened by the ECU when the engine is at operating temperature and under load. The valve is located near the rear of the engine, prior to the venturi tube. The valve is normally closed.

The ECU calculates the appropriate position for the EGR valve based upon engine load requirements and inputs from various temperature and pressure sensors. The valve position changes as the ECU varies the pulse-width modulated signal to the valve.

A—Electrical Connector D—Butterfly
B—Electric Motor E—Valve Link
C—Clutch Housing



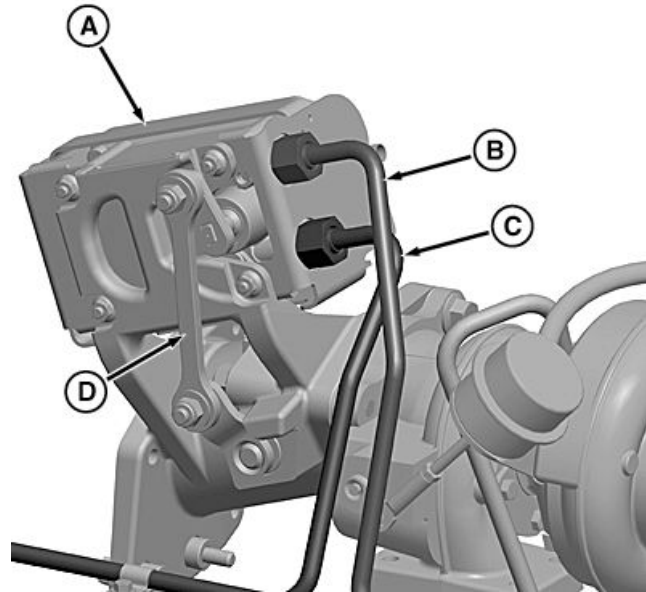
EGR Valve

BF67790,00001D5 -19-28MAR11-1/1

RG17272A —UN—19JUN09

Exhaust Throttle Operation

The exhaust throttle is a butterfly style valve that is located immediately after the wastegate turbocharger. When the valve closes, exhaust flow is restricted and the exhaust gas temperature increases when high exhaust gas temperatures are needed for regeneration. The position of the exhaust throttle is also used as a source to increase back pressure for EGR flow. The exhaust throttle is operated by an electronically controlled exhaust throttle actuator (A). The exhaust throttle actuator (A) is connected to the exhaust throttle by an exhaust throttle actuator arm (D). The ECU communicates to the exhaust throttle actuator (A) via CAN communication system. The ECU sends desired position commands to the exhaust throttle actuator (A). The ECU monitors the messages from the exhaust throttle actuator (A) that contain status, faults, and operating conditions. Engine coolant is circulated through the exhaust throttle actuator (A) through coolant lines (B) and (C), to prevent overheating inside the exhaust throttle actuator (A).



Exhaust Throttle Actuator

RG20138—UN—01APR11

- | | |
|-----------------------------|---------------------------------|
| A—Exhaust Throttle Actuator | C—Coolant Out Line |
| B—Coolant In Line | D—Exhaust Throttle Actuator Arm |

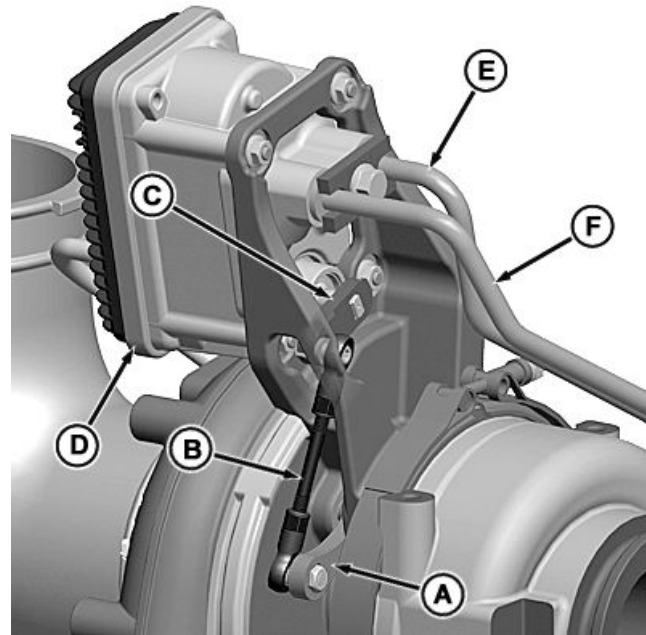
BK34394,0001B4F -19-28JUL11-1/1

VGT Operation

NOTE: Only PVX engines are equipped with the variable geometry turbocharger.

The VGT compresses intake air which increases the mass air flow rate to the engine. The amount of fuel commanded by the ECU is increased to match the greater air mass entering the engine. The turbine wheel spins as exhaust gas flows over it. The turbine wheel is connected to the compressor wheel by the turbocharger shaft. As the shaft spins, the compressor compresses the intake air and forces the air to the charge air cooler.

The ECU controls the turbocharger geometry by changing the angle of the turbine vanes that route exhaust gas to the turbine wheel. Regardless of engine speed, the vanes close or open to regulate the compressor wheel speed to control the amount of boost produced by the turbocharger. A ring rotates and changes the angle of all the internal vanes. The ring is coupled to the vane actuator arm (A). The vane actuator arm (A) is moved by the VGT actuator (D). The VGT actuator (D) is an electronically controlled actuator and connected to the vane actuator arm (A) by a linkage arm (B). The ECU communicates to the VGT actuator (D) via CAN communication system. The ECU sends desired position commands to the VGT actuator (D) and monitors the messages from the VGT actuator (D) that contain status, faults, and operating conditions. Engine coolant is circulated through the VGT actuator (D) through coolant lines (E) and (F), to prevent overheating inside the VGT actuator (D).



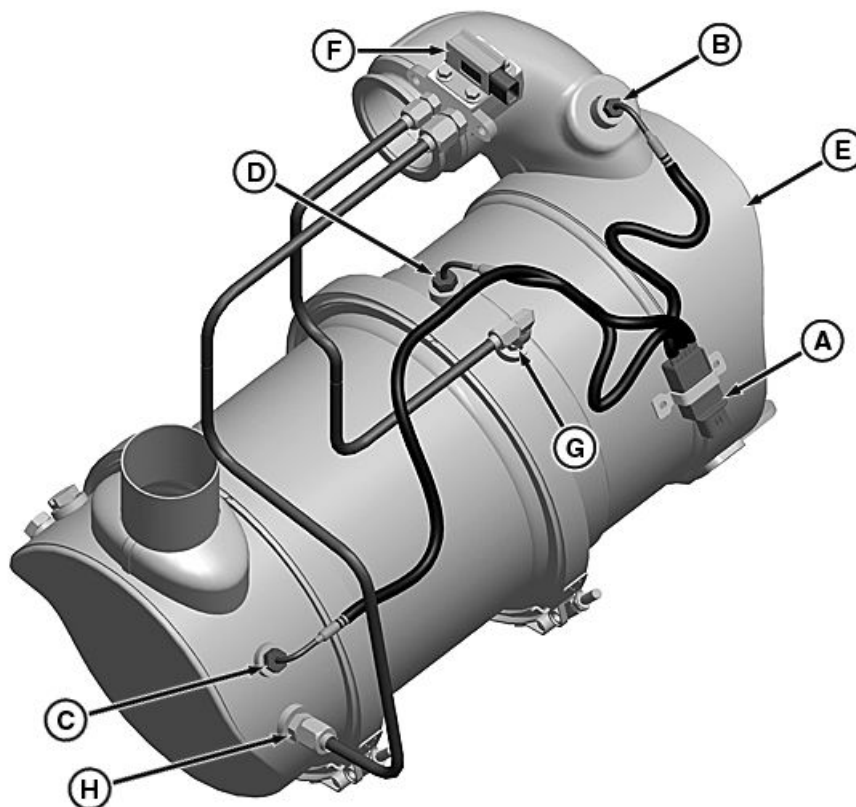
VGT Actuator

RG19665—UN—18NOV10

- | | |
|---------------------|--------------------|
| A—Vane Actuator Arm | D—VGT Actuator |
| B—Linkage Arm | E—Coolant Out Line |
| C—VGT Actuator Arm | F—Coolant In Line |

BF67790,00001D6 -19-29JUL11-1/1

Component Location Diagram



A—Exhaust Filter Temperature Module

B—DOC Inlet Temperature Measurement

C—DPF Outlet Temperature Measurement

D—DOC Outlet Temperature Measurement

E—Exhaust Filter Sensor

F—DPF Differential Pressure Sensor
G—DPF Inlet Pressure Measurement

H—DPF Outlet Pressure Measurement

BK53208,000002A -19-23JUN11-1/1

RG20582 —UN—22JUN11

Aftertreatment System Operation

In accordance with Interim Tier 4/Stage III B emissions regulations, a NOx reduction of 50 percent and particulate matter (PM) reduction of 90 percent is a requirement of the latest 4045 engine, as compared to Tier 3/Stage III A regulations. To reduce NOx emissions, the engine combustion temperatures must be lowered. This is

obtained by recirculating a greater and cooler amount of exhaust gas using an EGR cooler. However, lower combustion temperatures cause particulate matter levels to increase. Therefore, a diesel particulate filter is used to control the particulate matter levels that exit the exhaust system into the atmosphere.

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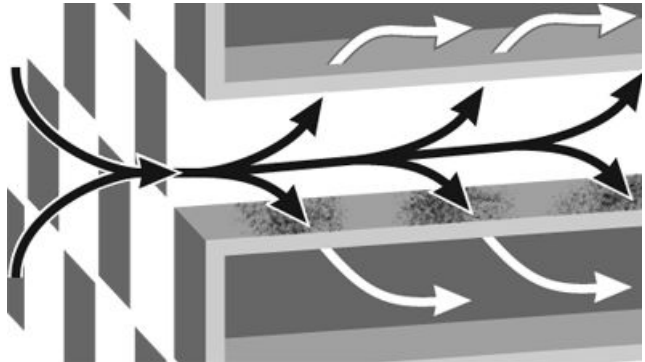
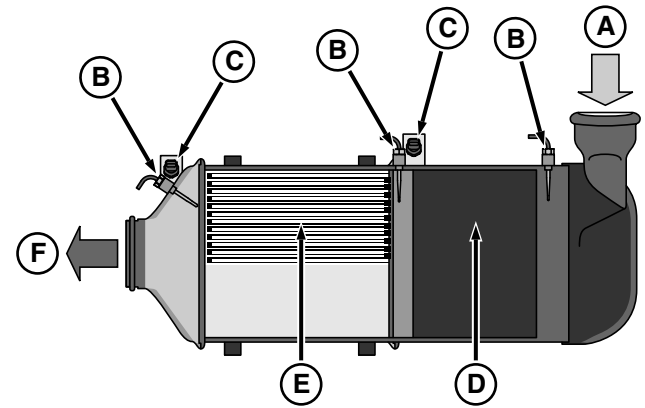
Exhaust Filter Operation

The exhaust filter contains the diesel oxidation catalyst (DOC) and the diesel particulate filter (DPF). Exhaust gas flows through the filter radial inlet (A), DOC (D), DPF (E), and exits through an axial or radial outlet (F), depending on the application.

With the engine under load, Nitric Oxide (NO) oxidizes in the DOC into Nitrogen Dioxide, which is an agent that allows particulates to oxidize easier in the DPF. During active regeneration, fuel is dosed into the exhaust and oxidized in the DOC. The ECU monitors the DOC outlet temperature to determine the temperature increase across the DOC.

The DPF traps particulate matter, or soot. Exhaust gas passes through channels in the ceramic filter core. Every other channel is obstructed at the outlet. Exhaust gas moves through porous channel walls until it exits through an open outlet. While the exhaust gas circulates within the filter, particulates get trapped on the channel walls. The channel walls are coated with precious metals that help oxidize particulates into less harmful emissions.

Regeneration (exhaust filter cleaning) oxidizes trapped particulate matter from the DPF.



Diesel Particulate Filter Substrate Cutaway

- | | |
|---|-----------------------------------|
| A—Exhaust Gas from Engine | D—Diesel Oxidation Catalyst (DOC) |
| B—Exhaust Filter Temperature Measurements | E—Diesel Particulate Filter (DPF) |
| C—DPF Differential Pressure Sensor Ports | F—Exhaust Gas Outlet |

RG17227 —UN—02FEB10

RG17166 —UN—26MAY09

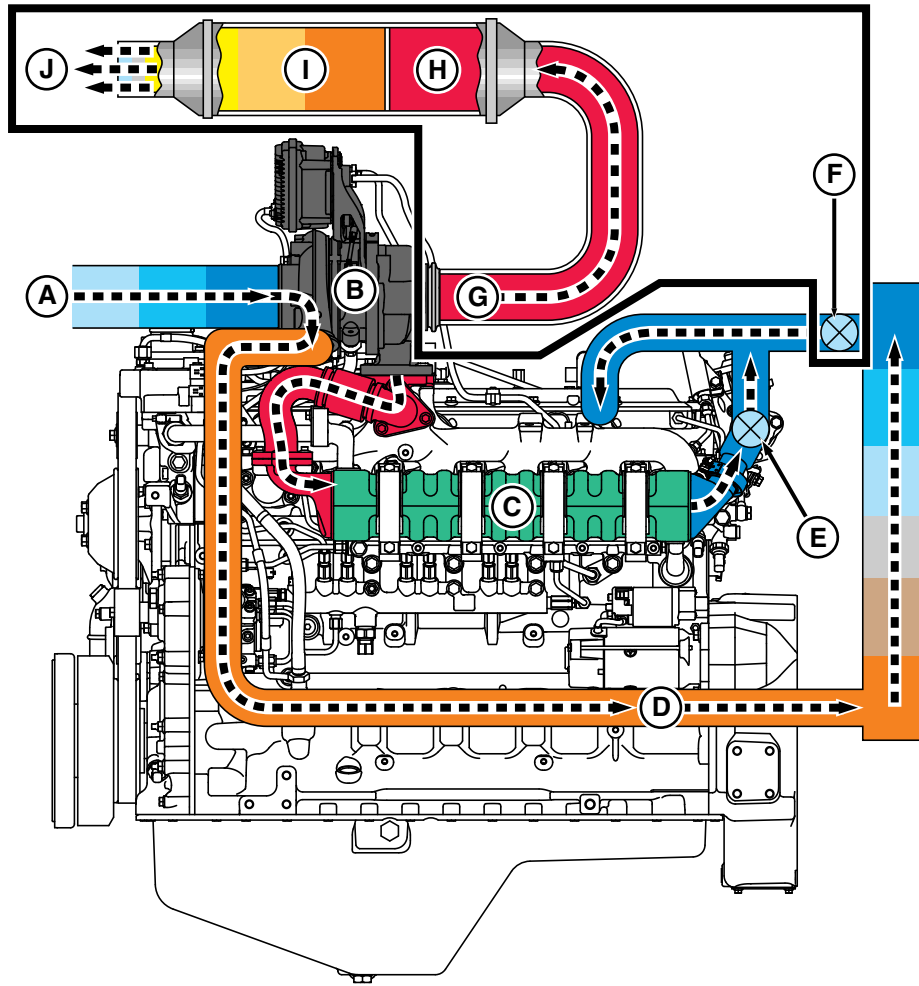
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BK34394,0000DFB -19-29JUL11-1/4

Passive Regeneration

The DPF is regenerated during normal engine operation under moderate to heavy load when the exhaust

temperatures are high. No in-cylinder fuel dosing occurs during these ideal conditions, and no operator input is required.



Air Flow Diagram

A—Inlet Air
B—VGT Turbocharger
C—EGR Cooler

D—Compressed Air from
Turbocharger
E—EGR Valve

F—Air Throttle Actuator
G—Exhaust Gas
H—DOC

I—DPF
J—Exhaust Gas Outlet

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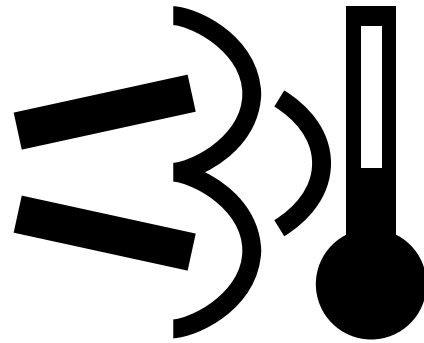
RG19666 —UN—18NOV10

Active Regeneration

NOTE: During active or manual regeneration, exhaust gas recirculation (EGR) is never flowed.

Certain applications do not generate sustained high exhaust gas temperatures and require DPF (I) regeneration controlled by the ECU. Regeneration occurs when the ECU calculates a high amount of particulate matter in the DPF. The air throttle actuator (F) is commanded to close and exhaust gas temperatures increase. When DOC (H) temperatures exceed 300° C (572° F), regeneration will take place. The ECU initiates fuel injection into the exhaust gas (G) via in-cylinder dosing. This is when controlled amounts of fuel are dosed directly into one or more cylinders during the exhaust stroke. The fuel then enters the exhaust gas for reaction at the DOC. The exhaust filter cleaning indicator light comes on when in-cylinder fuel dosing is occurring or when the exhaust gas temperature in the DPF is in the 500° C - 650° C (932° F - 1202° F) range. The ECU monitors sensor inputs to determine when the regeneration is completed. Active regeneration is aborted when the ECU detects any of the following:

- DOC inlet or DOC outlet temperature is too low
- DOC outlet or DPF outlet temperature is too high
- Operator inhibit switch is depressed



Exhaust Filter Cleaning Indicator Light

- Component failure

Manual Regeneration

NOTE: During active or manual regeneration, exhaust gas recirculation (EGR) is never flowed.

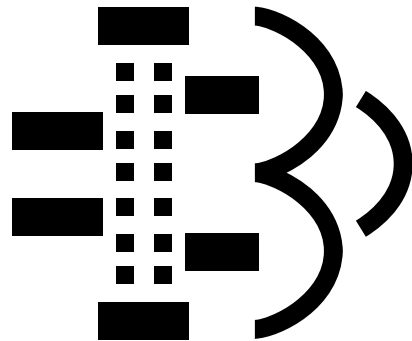
When the ECU turns on the exhaust filter indicator light, the operator has to initiate manual regeneration. The machine must be stationary for manual regeneration. Engine idle speed is increased to 1800 rpm, the ECU closes the air throttle actuator, and commands fuel to be injected into the exhaust gas.

BK34394,0000DFB -19-29JUL11-3/4

RG16862 —UN—01APR10

Ash Buildup

Ash is non-combustible residue from normal oil consumption. John Deere Plus-50™ II is the recommended engine oil. Regeneration can not oxidize the ash. Ash buildup in the DPF causes restrictions. The ash removal service interval for engines below 175 hp/130kW will be at least 3,000 hours while engines at or above 175 hp/130 kW will be at least 4,500 hours.



Exhaust Filter Indicator Light

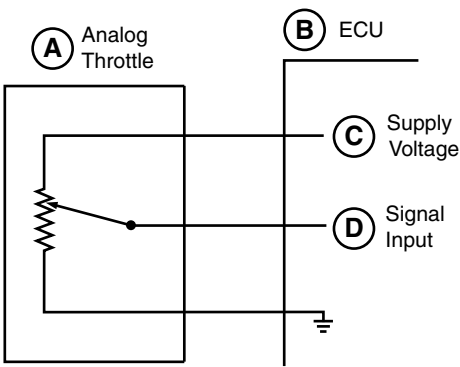
BK34394,0000DFB -19-29JUL11-4/4

RG16860 —UN—01APR10

Analog Throttle

An analog throttle uses a variable resistor (potentiometer) to supply voltage to the ECU. A supply voltage is sent to the throttle by the ECU. The resistance changes as the throttle position changes. In turn, signal voltage to the ECU varies according to the throttle position. The signal voltage is monitored by the ECU which responds by sending out the appropriate control signals according to its programming.

A second analog throttle can also be enabled with the first (primary) analog throttle if that option has been set in the ECU software.



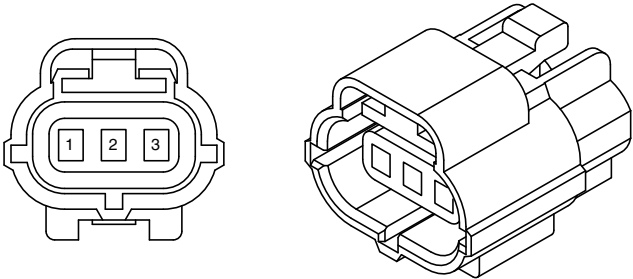
- A—Analog Throttle
- B—ECU
- C—Supply Voltage
- D—Signal

RG18917—UN—05AUG10

RG40049,00002CA -19-05AUG10-1/1

B5100 - Fuel Rail Pressure Sensor

Component Information			
Pin	Description	Circuit Number	Wire Color
1	Return	5427	Violet
2	Signal	5475	Green
3	Supply	5946	Blue

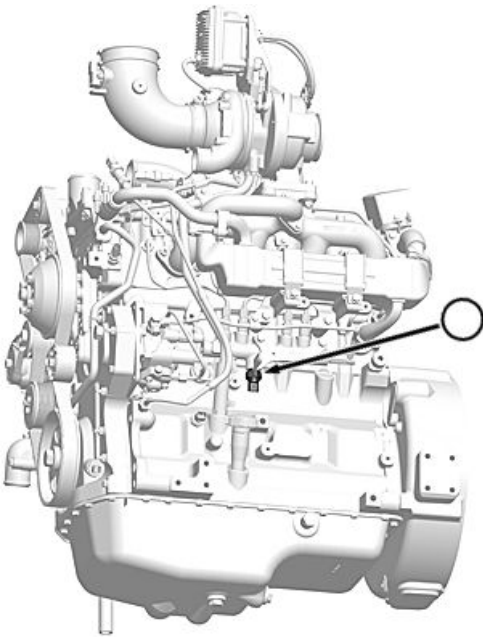


3-Pin Connector

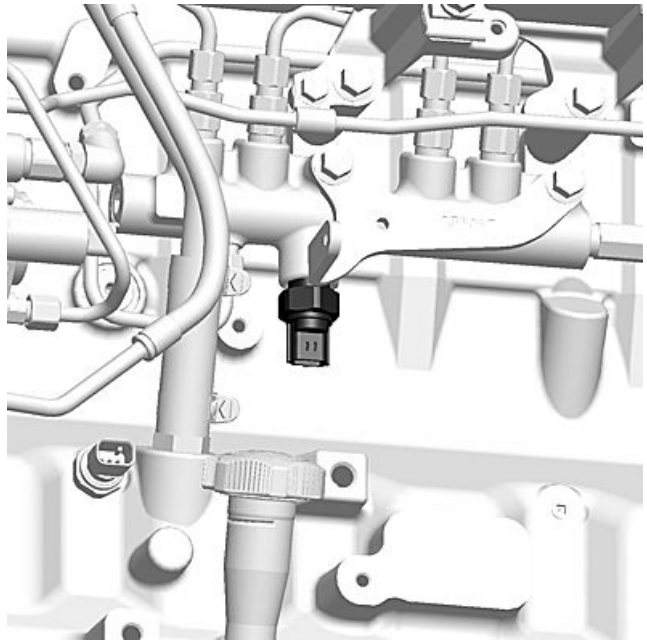
RG16587—UN—26NOV08

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BK34394,0001507 -19-11MAR11-1/2



Fuel Rail Pressure Sensor Location Overview



B5100 Image

The fuel rail pressure sensor sends a pressure equivalent signal to the ECU. The ECU monitors fuel rail pressure to control the amount and timing of fuel being transferred from the high-pressure fuel pump to the high-pressure common rail (HPCR). The ECU uses this signal input to determine if fuel rail pressure is adequate for the current operating condition. The ECU commands more or less fuel from the high-pressure fuel pump by altering the signal to the suction control valve. The ECU also uses this sensor to determine if there is an electronic injector problem by measuring the drop of pressure in the HPCR during each injection. This sensor is used for engine protection.

For more information on how pressure sensors operate, see [Measuring Pressure](#) in Section 03, Group 140.

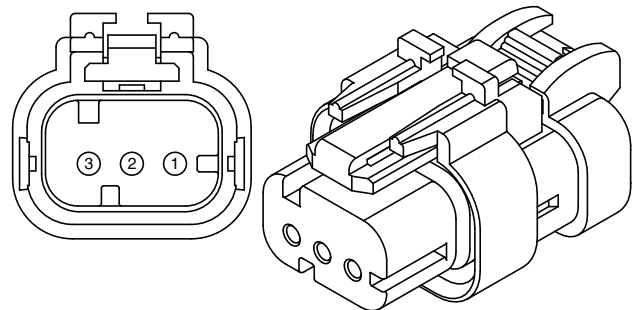
For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

For more information on the suction control valve, see [Y5002 - Suction Control Valve](#) in Section 03, Group 140.

BK34394,0001507 -19-11MAR11-2/2

B5101 - Engine Oil Pressure Sensor

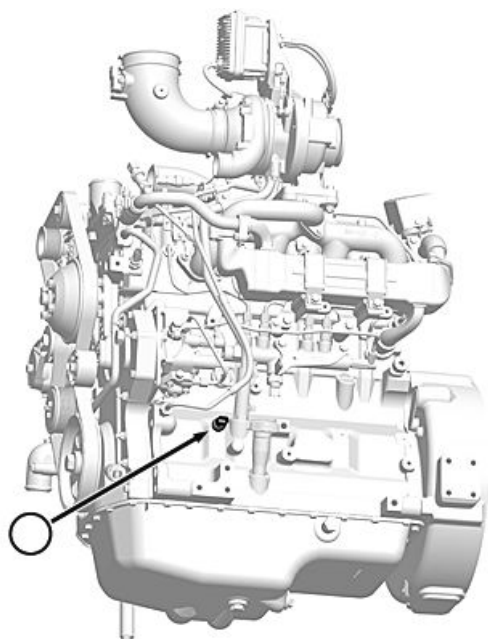
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply	5416	Blue
2	Return	5414	Yellow
3	Signal	5467	Violet



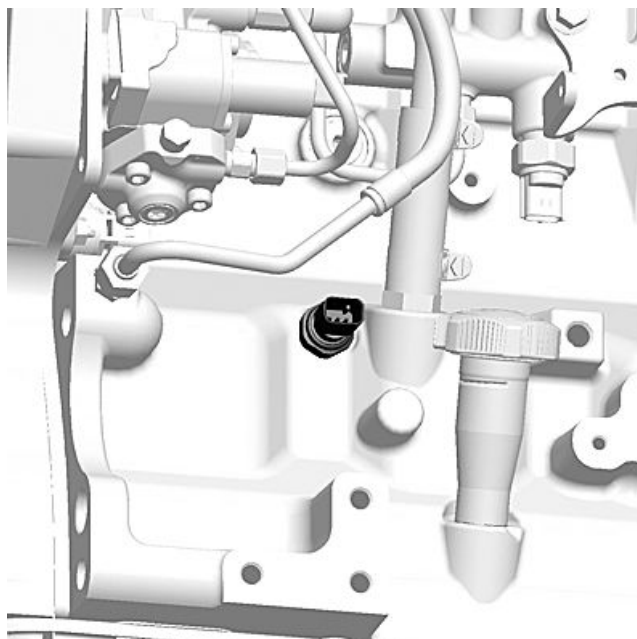
3-Pin Connector

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BK34394,0001508 -19-11MAR11-1/2



Engine Oil Pressure Sensor Location Overview



B5101 Image

The oil pressure sensor sends an oil pressure equivalent signal to the ECU. The ECU uses this signal to determine that engine oil pressure is adequate for the current operating conditions. The ECU monitors oil pressure for engine protection purposes.

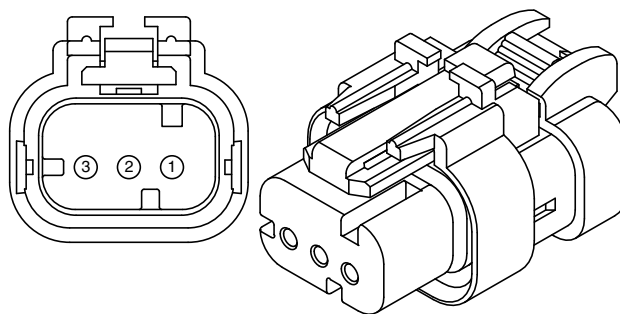
For more information on how pressure sensors operate, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,0001508 -19-11MAR11-2/2

B5102 - Exhaust Manifold Pressure Sensor

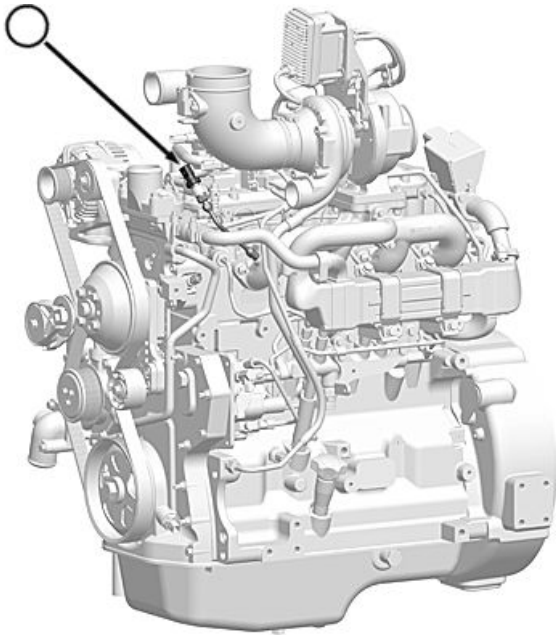
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply	5416	Blue
2	Return	5414	Yellow
3	Signal	5465	Green



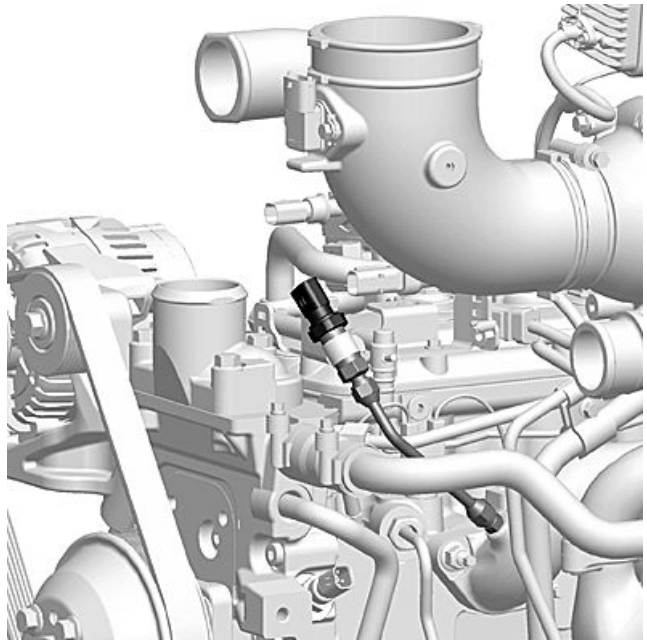
3-Pin Connector

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BK34394,0001509 -19-08AUG11-1/2



Exhaust Manifold Pressure Sensor Location Overview (PVX Engine)



B5102 Image

The exhaust manifold pressure sensor provides feedback to the control systems for the air throttle actuator, VGT turbocharger (PVX engines), EGR valve, and the exhaust throttle (PWX engines) to maximize engine performance while meeting the applicable emissions regulations. Prior to DPF active regeneration, the ECU changes the VGT vane position or the exhaust throttle position to meet an ideal exhaust manifold pressure that to achieve the highest DOC inlet temperature. The ECU uses the exhaust manifold pressure for the volumetric efficiency calculation.

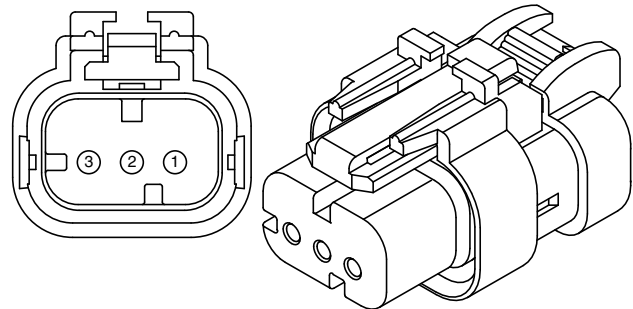
For more information on how pressure sensors operate, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,0001509 -19-08AUG11-2/2

B5103 - EGR Flow Sensor

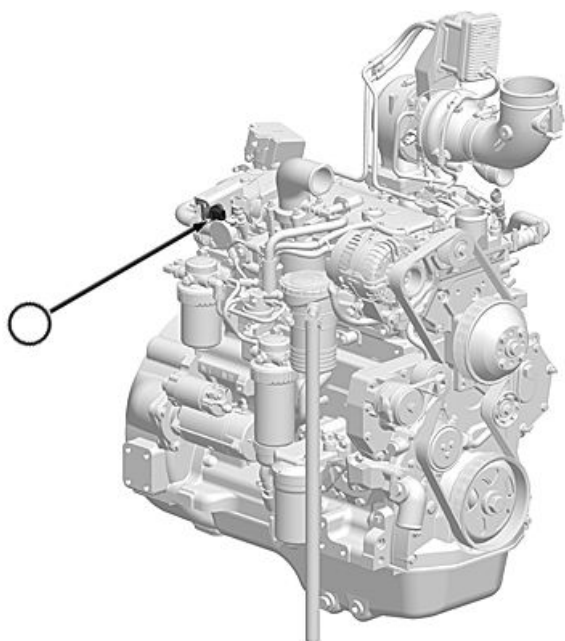
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (5 V)	5466	Blue
2	Return	5444	Yellow
3	Signal	5051	Brown



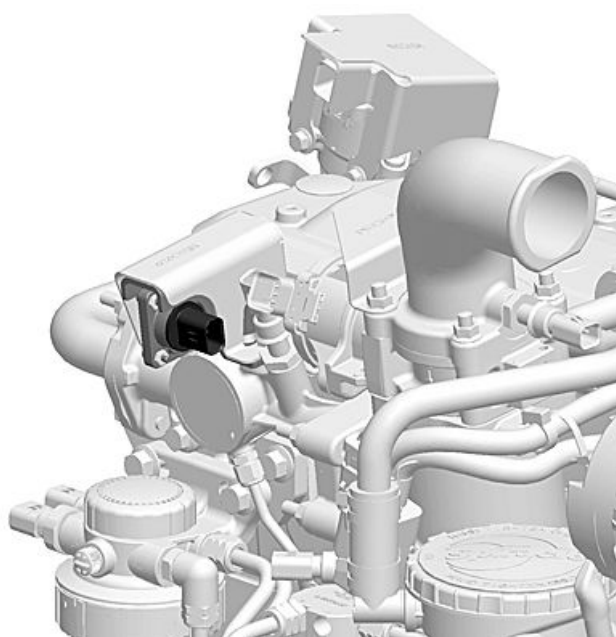
3-Pin Connector

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BK34394,000150A -19-07JUL11-1/2



EGR Flow Sensor Location Overview



B5103 Image

NOTE: EGR Flow Sensor *ONLY* applies to engines equipped with VGT Turbochargers.

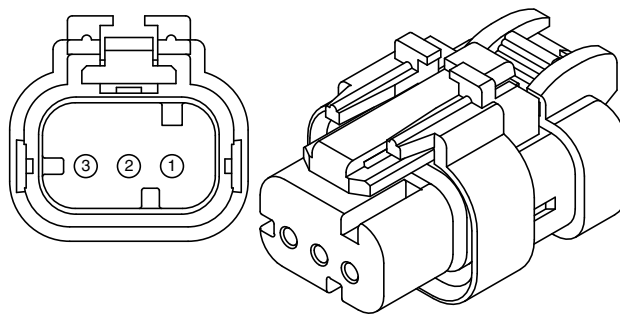
The EGR flow sensor measures the pressure drop across the EGR venturi tube. The ECU calculates the amount of

the recirculated exhaust gas using this measurement and the venturi tube physical dimensions. The ECU controls the EGR valve and VGT actuator to recirculate the ideal amount of exhaust gas for the operating condition.

BK34394,000150A -19-07JUL11-2/2

B5104 - Manifold Air Pressure (MAP) Sensor

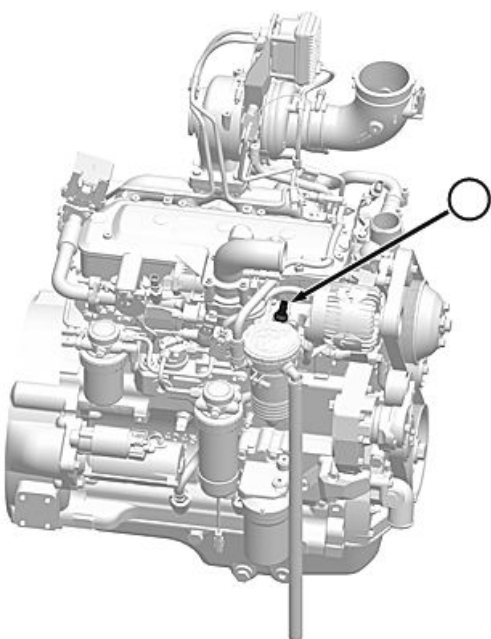
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (5 V)	5441	Brown
2	Return	5446	Blue
3	Signal	5468	Gray



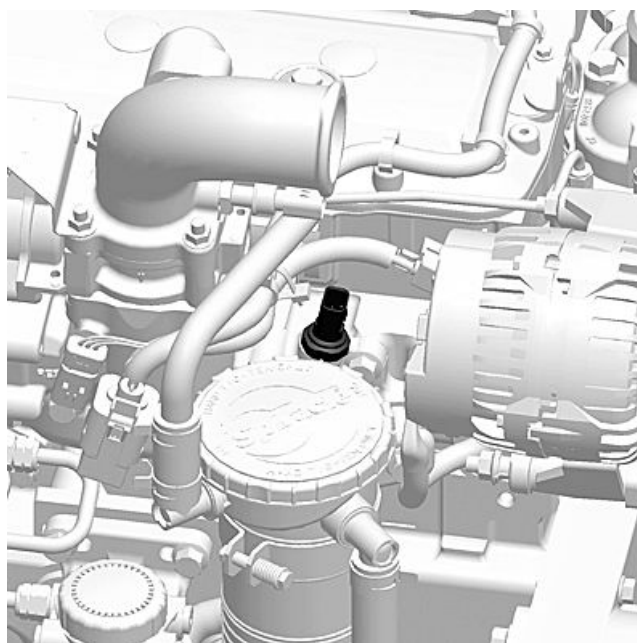
3-Pin Connector

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BK34394,000150B -19-21MAR11-1/2



MAP Sensor Location Overview



RG19935 —UN—03FEB11

RG19936 —UN—03FEB11

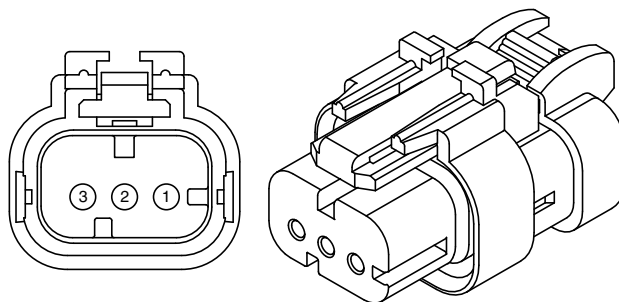
The ECU uses the MAP sensor to help calculate the amount of airflow into the engine. The MAP sensor also supplies the ECU with a direct measurement of the intake manifold pressure.

For more information on how pressure sensors operate, see [Measuring Pressure](#) in Section 03, Group 140.

BK34394,000150B -19-21MAR11-2/2

B5105 — Engine Crankcase Pressure Sensor

Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (5 V)	5441	Brown
2	Return	5446	Blue
3	Signal	5504	Yellow

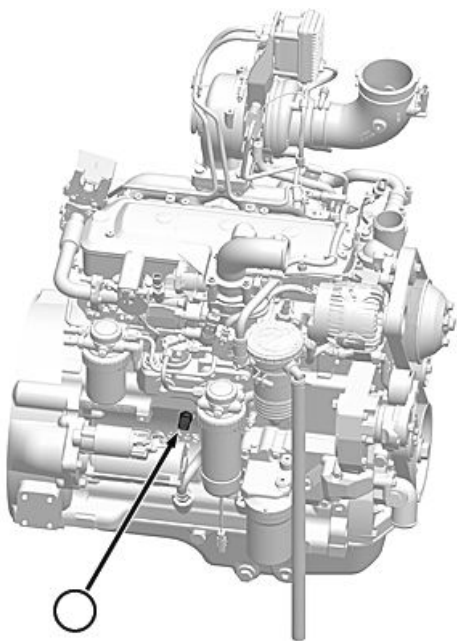


3-Pin Connector

RG17665 —UN—23SEP09

Continued on next page

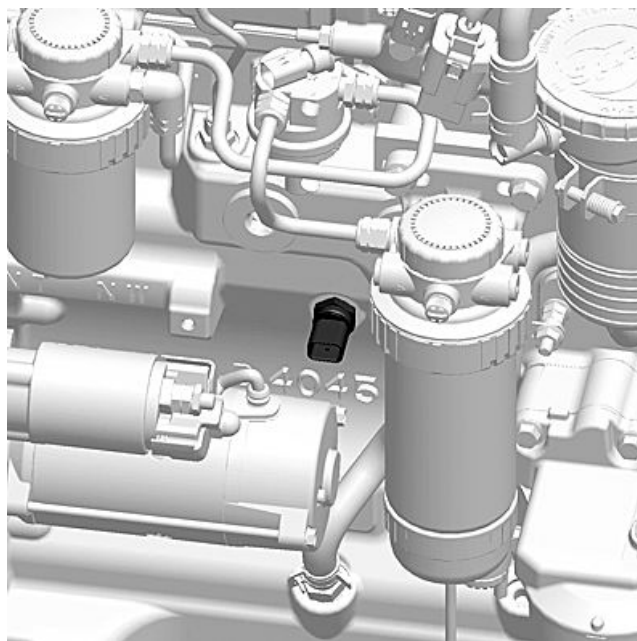
BK34394,000150C -19-21MAR11-1/2



Engine Crankcase Pressure Sensor Location Overview

The ECU uses the engine crankcase pressure sensor to monitor the amount of pressure in the crankcase of the engine. The ECU uses the engine crankcase pressure sensor value to indicate when the crankcase ventilation filter needs replaced or if there is a problem with the

RG19937 —UN—03FEB11



B5105 Image

crankcase pressure relief valve that is located in the rocker arm cover.

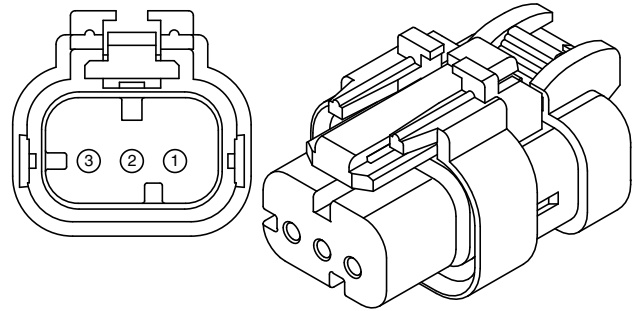
For more information on how pressure sensors operate, see [Measuring Pressure](#) in Section 03, Group 140.

RG19938 —UN—03FEB11

BK34394,000150C -19-21MAR11-2/2

B5107 - Low-Pressure Fuel Pressure Sensor

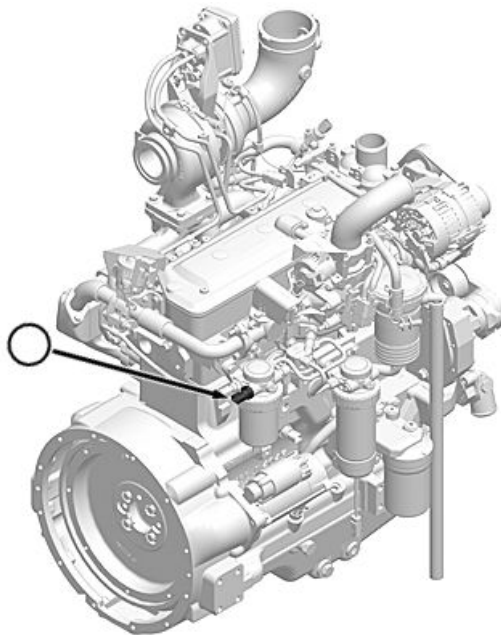
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (5 V)	5484	Yellow
2	Return	5478	Gray
3	Signal	5469	White



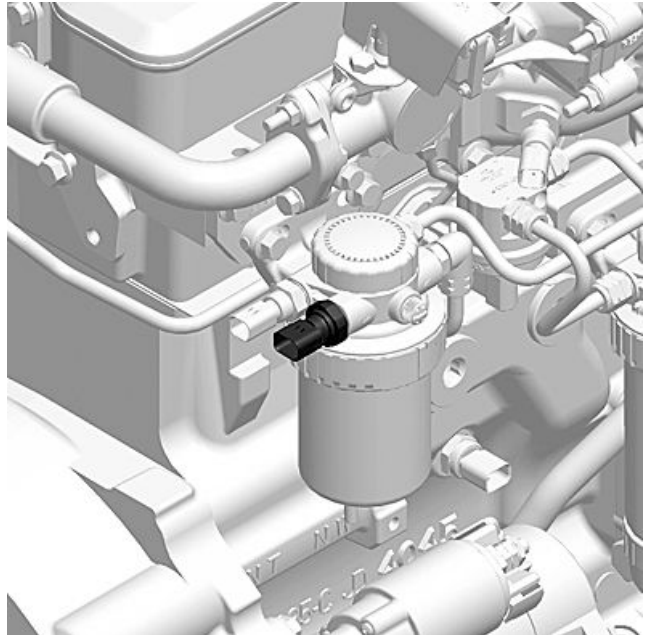
3-Pin Connector

BK34394,000150D -19-21MAR11-1/2

RG16628 —UN—10MAY12



Low-Pressure Fuel Pressure Sensor Location Overview



B5107 Image

RG19939 —UN—03FEB11

RG19940 —UN—03FEB11

The low-pressure fuel pressure sensor sends a pressure equivalent signal to the ECU. The ECU monitors fuel pressure to determine if fuel is continuously passing through the low-pressure side of the fuel system, or if there is a leak or blockage in it.

For more information on how pressure sensors operate, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,000150D -19-21MAR11-2/2

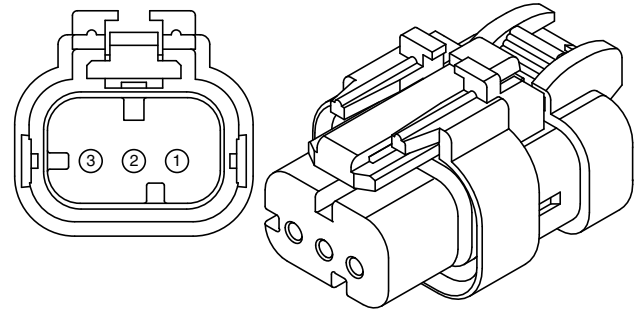
B5109 - DPF Differential Pressure Sensor

Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (5 V)	5437	Violet
2	Return	5474	Yellow
3	Signal	5785	Green

Differential pressure between the inlet and the outlet of the DPF is measured at two pressure ports that are connected to the sensor by hard lines. Differential pressure across the DPF is an indication of accumulated soot quantity. DPF regeneration is required when there is a high differential pressure. The ECU uses the measurement to determine when regeneration is complete.

For more information on how pressure sensors operate, see [Measuring Pressure](#) in Section 03, Group 140.

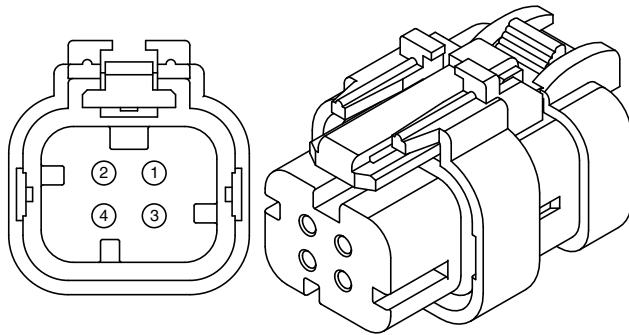
For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.



3-Pin Connector

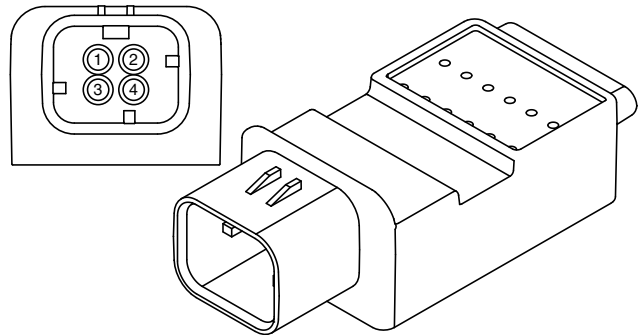
RG16628—UN—10MAY12

BK34394,000150F -19-23MAR11-1/1

B5204 - Exhaust Filter Temperature Module

4-Pin Connector

RG16710—UN—22MAY12



Exhaust Filter Temperature Module

RG16983—UN—08APR09

Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (5 V)	5437	Violet
2	Return	5474	Yellow
3	LIN Voltage (10 V)	5783	Orange
4	Signal	5786	Blue

The ECU communicates with the exhaust filter temperature module over the LIN (Local Interconnect Network) bus. This communication occurs over a single wire, and no other devices besides the ECU communicate over the LIN bus.

The module contains three temperature sensors that are mounted in the exhaust filter. DOC inlet temperature,

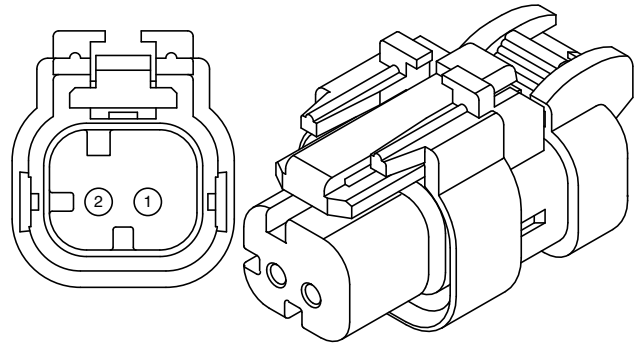
DOC outlet temperature, and DPF outlet temperature are measured by these sensors. DOC inlet temperature is used to determine if the temperature is high enough for fuel dosing to occur. If the temperature is low, the ECU commands the air throttle to close so the temperature increases. The DOC outlet temperature provides regeneration and fuel dosing feedback to the ECU. Unintended hydrocarbons can be detected by this measurement. The DPF outlet temperature is used for exhaust filter protection and determines if the temperature is too high where the filter could crack.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,0001510 -19-06JUL11-1/1

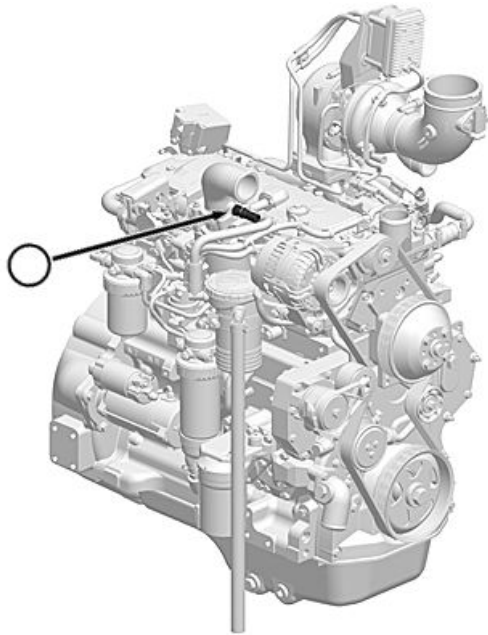
B5205 - Charge Air Cooler Outlet Air Temperature Sensor

Component Information			
Pin	Description	Circuit Number	Wire Color
1	Signal	5455	Green
2	Return	5774	Yellow

*2-Pin Connector*

RG16634 —UN—10MAY12

BK34394,0001511 -19-21MAR11-1/3



RG19941 —UN—03FEB11

Charge Air Cooler Outlet Air Temperature Sensor Location Overview

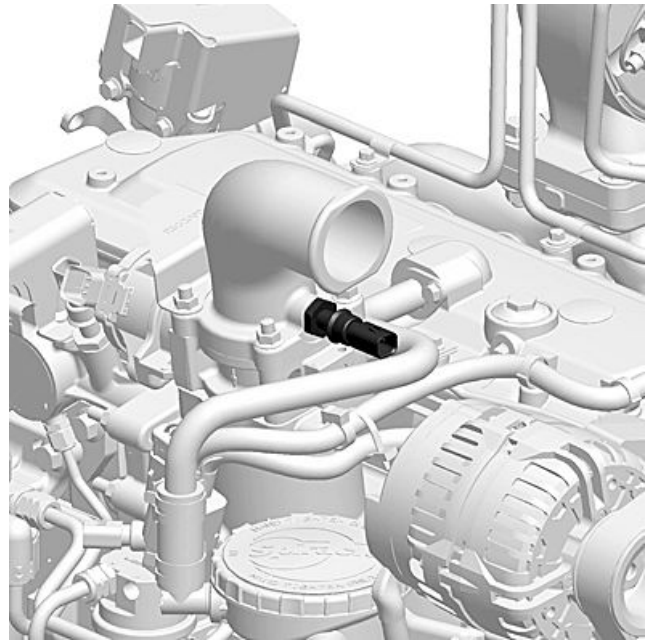
Continued on next page

BK34394,0001511 -19-21MAR11-2/3

The ECU uses this sensor to measure the temperature of the charge air cooler outlet air entering the intake manifold. The ECU then compares the temperatures of the recirculated exhaust gas, charge air cooler outlet air, and the mixed air in the intake manifold to determine if proper cooling and mixing has occurred. If the temperature is not correct, the ECU adjusts the signal going to the EGR valve to compensate the mixture accordingly. The ECU also uses this sensor for engine protection purposes.

For more information on how temperature sensors operate, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.



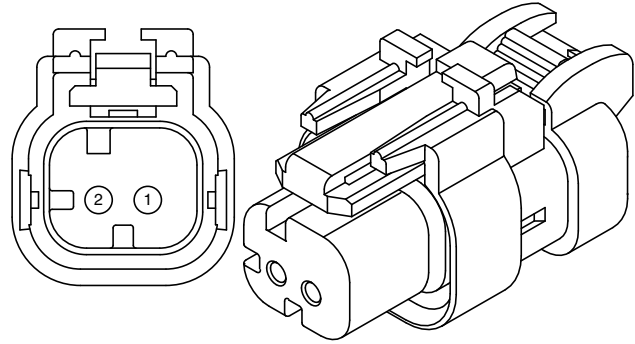
B5205 Image

BK34394,0001511 -19-21MAR11-3/3

RG19842 —UN—03FEB11

B5206 - Manifold Air Temperature (MAT) Sensor

Component Information			
Pin	Description	Circuit Number	Wire Color
1	Signal	5456	Blue
2	Return	5774	Yellow

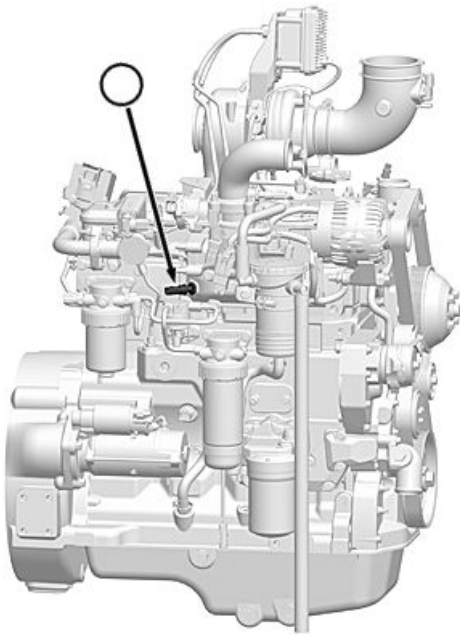


2-Pin Connector

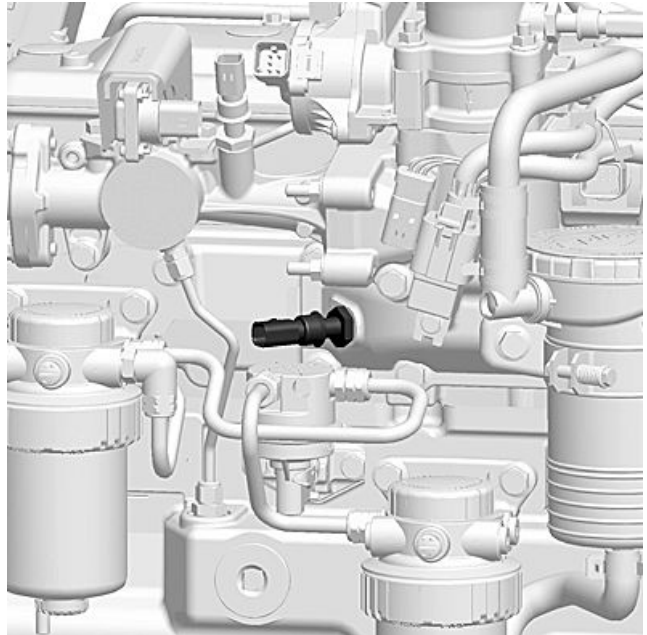
Continued on next page

BK34394,0001512 -19-21MAR11-1/2

RG16634 —UN—10MAY12



MAT Sensor Location Overview



B5206 Image

The ECU uses this sensor to measure the temperature of the air in the intake manifold. The ECU then compares the temperatures of the recirculated exhaust gas, charge air cooler outlet air, and the mixed air in the intake manifold to determine if proper cooling and mixing has occurred. If the temperature is not correct, the ECU adjusts the signal going to the EGR valve to compensate the mixture accordingly. The MAT sensor helps the ECU calculate the correct fueling for the engine. The ECU also uses this sensor for engine protection purposes.

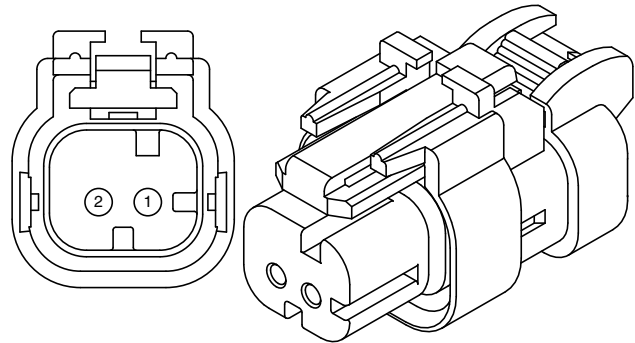
For more information on how temperature sensors operate, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,0001512 -19-21MAR11-2/2

B5207 - EGR Temperature Sensor

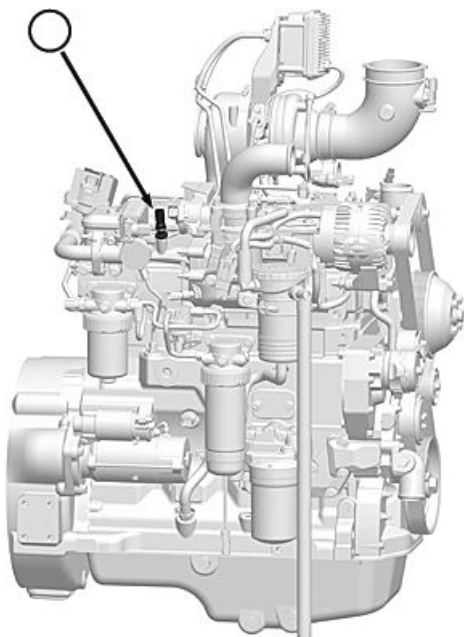
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Signal	5463	Orange
2	Return	5774	Yellow



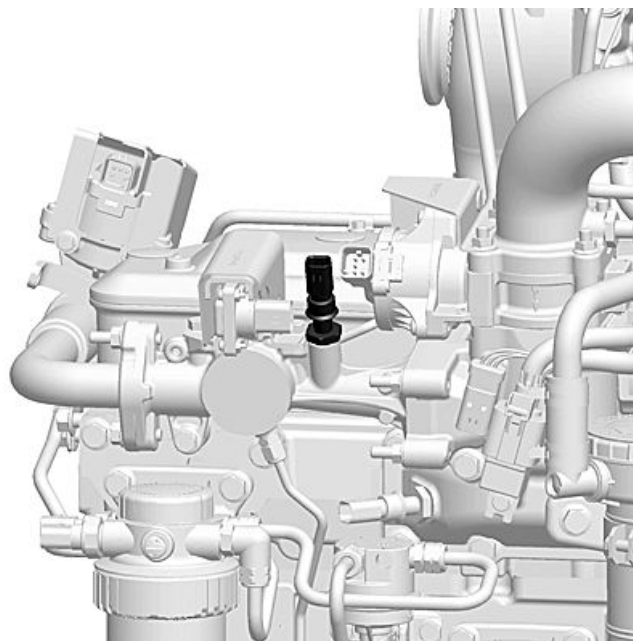
2-Pin Connector

Continued on next page

BK34394,0001513 -19-21MAR11-1/2



EGR Temperature Sensor Location Overview



B5207 Image

The ECU uses this sensor to measure the temperature of the exhaust gas entering the intake manifold. The ECU then compares the temperatures of the EGR exhaust gas, charge air cooler outlet air, and the intake manifold air to determine if proper cooling and mixing has occurred. If the temperature is not correct, the ECU adjusts the signal going to the EGR valve to compensate the mixture accordingly. The ECU also uses this sensor for engine protection purposes.

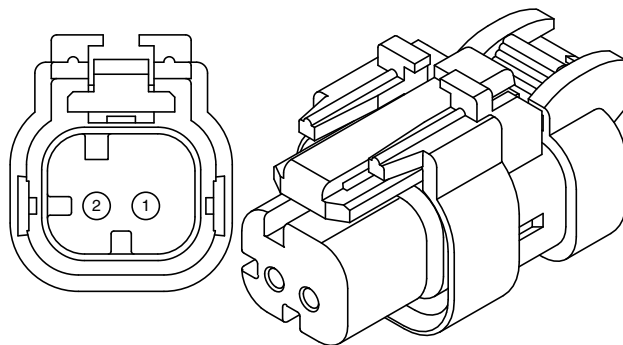
For more information on how temperature sensors operate, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,0001513 -19-21MAR11-2/2

B5208 - Engine Coolant Temperature Sensor

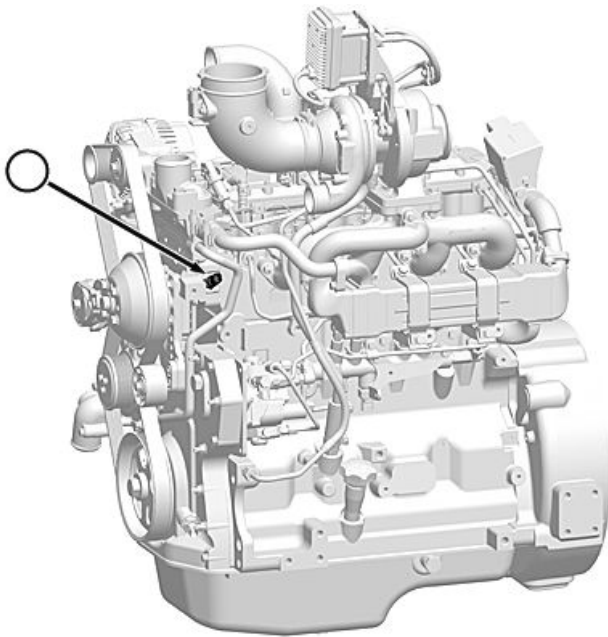
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Signal	5461	Brown
2	Return	5479	White



2-Pin Connector

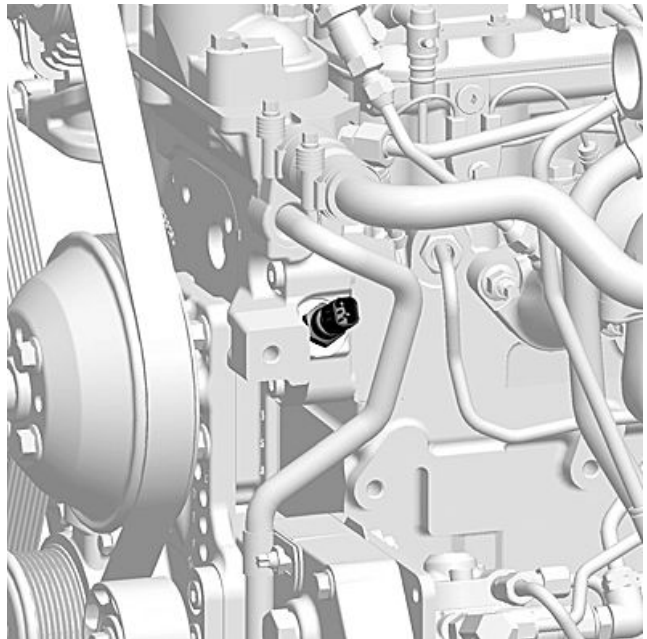
Continued on next page

BK34394,0001514 -19-21MAR11-1/2



Engine Coolant Temperature Sensor Location Overview

RG19947—UN—03FEB11



B5208 Image

RG19948—UN—03FEB11

The ECU monitors engine coolant temperature for:

- Engine protection purposes. Depending on the severity of the temperature increase, ECU transmits a diagnostic code for either moderate or extreme levels. The engine is derated correspondingly to each level of severity.
- If the ECU determines the coolant temperature is too low for the current operating conditions it sets a diagnostic trouble code. This normally indicates a thermostat that is stuck open.

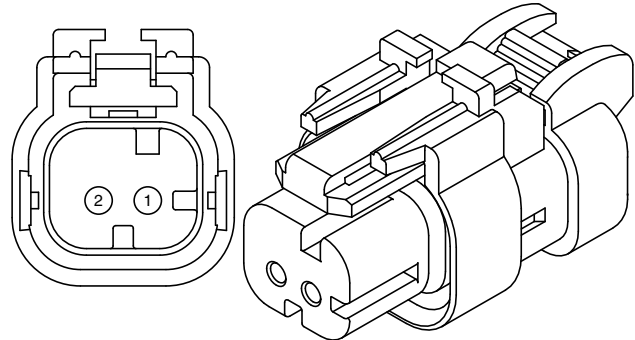
For more information on how temperature sensors operate, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,0001514 -19-21MAR11-2/2

B5209 - Fuel Temperature Sensor

Component Information			
Pin	Description	Circuit Number	Wire Color
1	Signal	5428	Gray
2	Return	5479	White

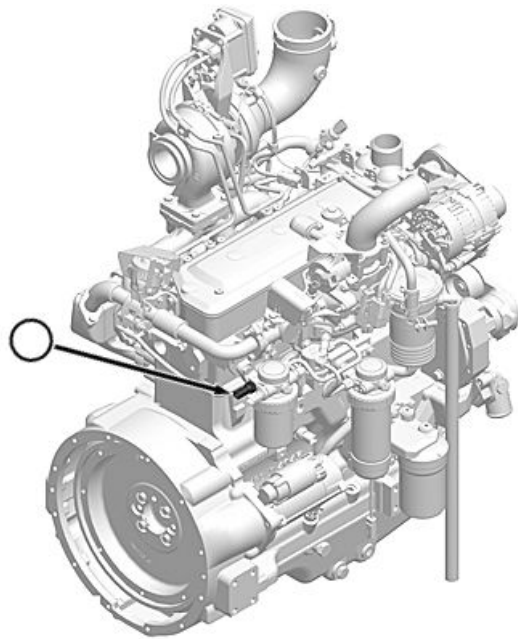


2-Pin Connector

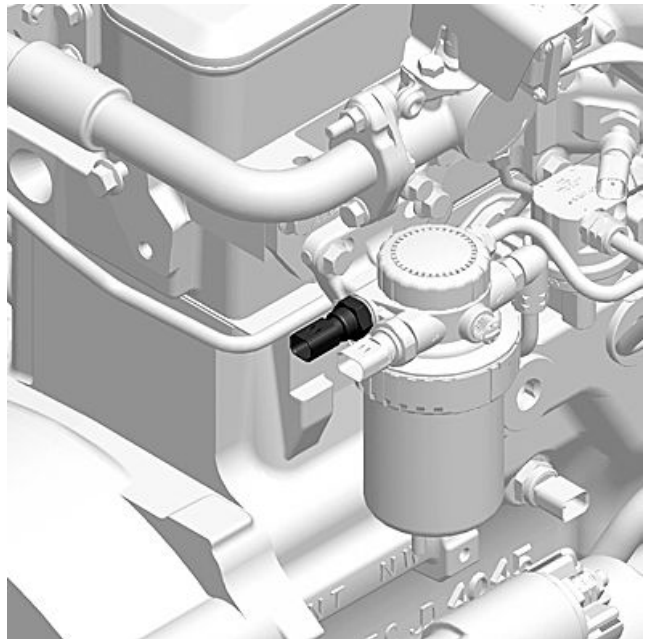
RG16613—UN—10MAY12

Continued on next page

BK34394,0001515 -19-21MAR11-1/2



Fuel Temperature Sensor Location Overview



B5209 Image

The ECU uses this sensor input to calculate fuel density and adjust fuel delivery accordingly. The ECU also uses the fuel temperature sensor for engine protection purposes. For certain ECU software configurations, use of the glow plugs depends on the fuel temperature. If the temperature of the fuel drops below specification, the glow plugs turn on for a predetermined length of time.

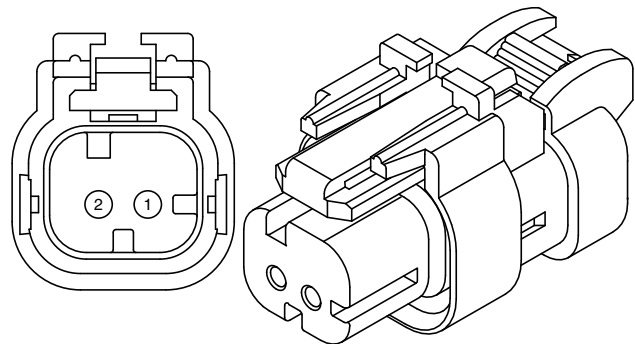
For more information on how temperature sensors operate, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,0001515 -19-21MAR11-2/2

B5300 - VGT Speed Sensor

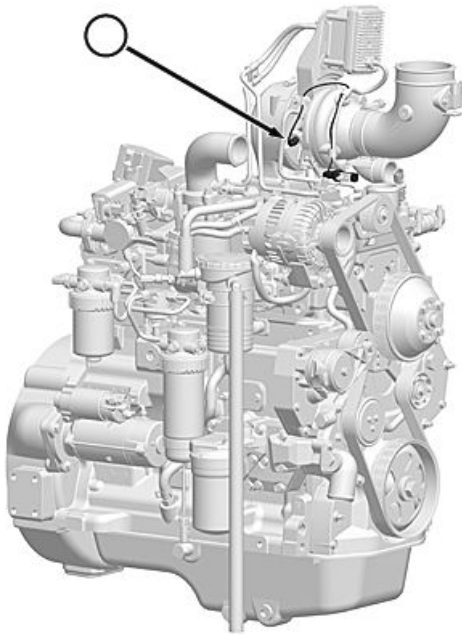
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Signal	5435	Green
2	Return	5417	Violet



2-Pin Connector

Continued on next page

BK34394,0001516 -19-21MAR11-1/3



VGT Speed Sensor Location Overview

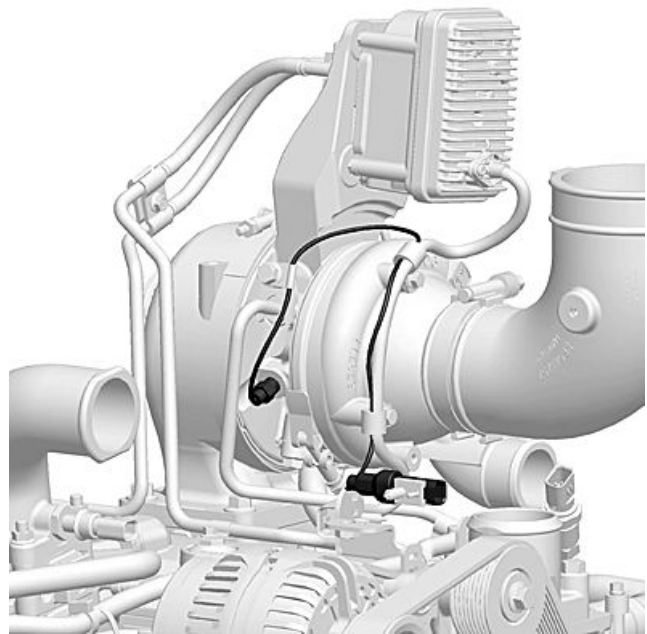
RG19951 —UN—03FEB11

BK34394,0001516 -19-21MAR11-2/3

It is an inductive type pickup sensor that uses a flat spot on the shaft to measure turbocharger speed. The ECU monitors turbocharger speed to ensure that the turbocharger is running within acceptable range. At most severe high turbocharger speed levels, the ECU uses this sensor for engine protection. The ECU estimates manifold air pressure using this measurement.

For more information on how speed sensors operate, see [Measuring Speed](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.



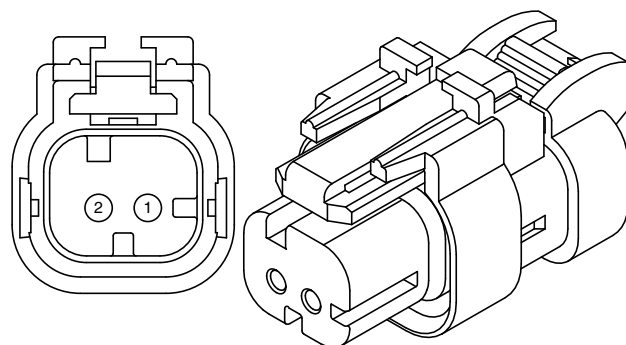
B5300 Image

RG19952 —UN—03FEB11

BK34394,0001516 -19-21MAR11-3/3

B5301 - Crankshaft Position Sensor

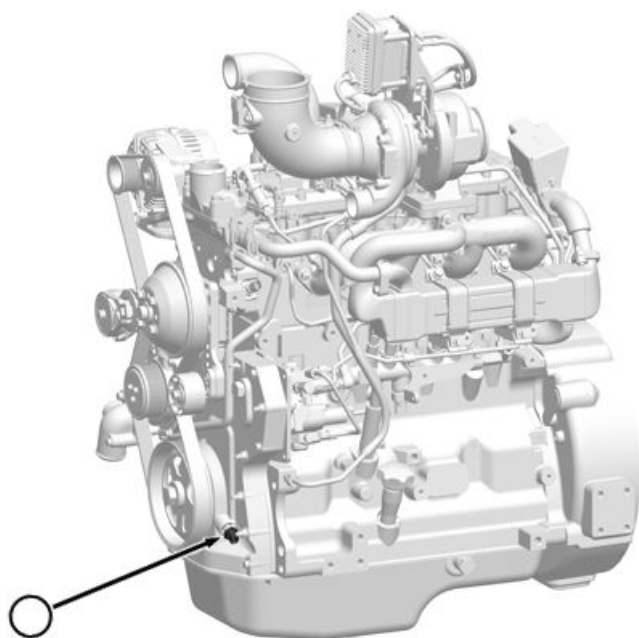
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Return	5447	Violet
2	Signal	5448	Gray



2-Pin Connector

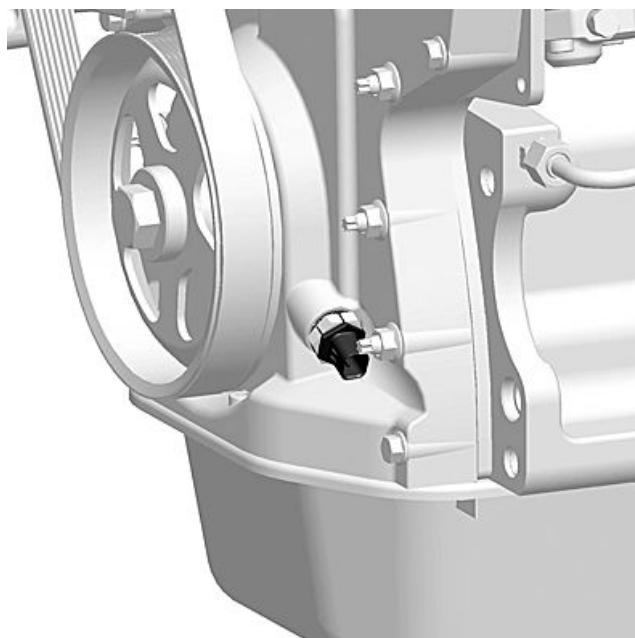
RG16573 —UN—10MAY12

BK34394,0001517 -19-07JUL11-1/2



Crankshaft Position Sensor Location Overview

RG19953 —UN—03FEB11



B5301 Image

RG19954 —UN—03FEB11

It is an inductive type pickup sensor that detects teeth on the crankshaft timing gear. The ECU uses the crankshaft position input to determine engine speed and the angular position of the crankshaft in its 360 degree field of rotation. The crankshaft timing gear is composed of 45 evenly spaced teeth along with one wide tooth. Either piston 1 or 6 is at the top dead center of its compression stroke when this differentiating pulse is detected. The ECU uses the inputs of both the crankshaft position and camshaft position sensors to accurately control the timing and duration of fuel injection.

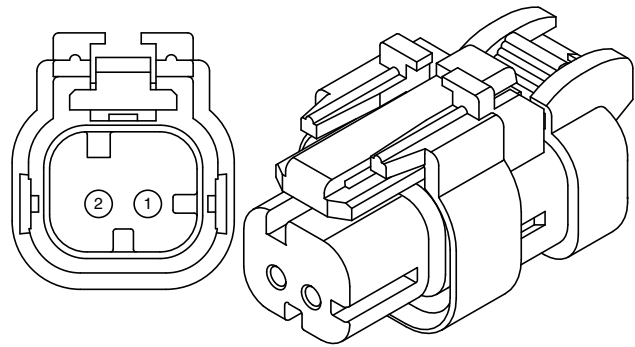
The ECU provides engine protection for crankshaft position sensor problems. If there is a problem with the crankshaft position sensor, the ECU uses the camshaft position sensor to determine engine timing. This may require prolonged engine cranking to start the engine. For more information on how speed sensors operate, see [Measuring Speed](#) in Section 03, Group 140.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,0001517 -19-07JUL11-2/2

B5302 - Camshaft Position Sensor

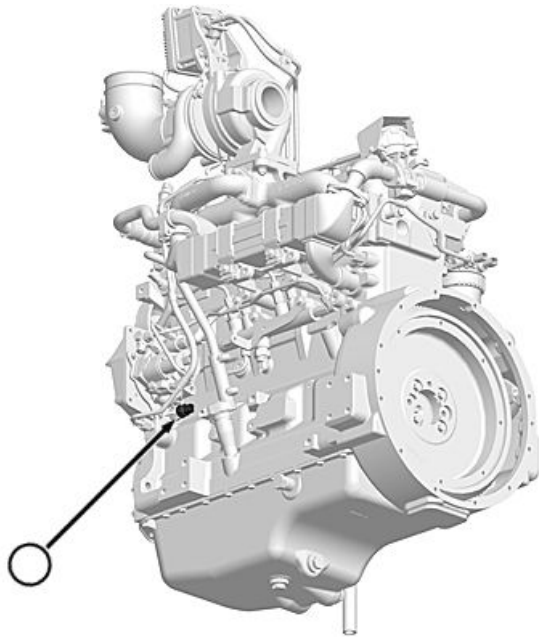
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Return	5443	Orange
2	Signal	5445	Green



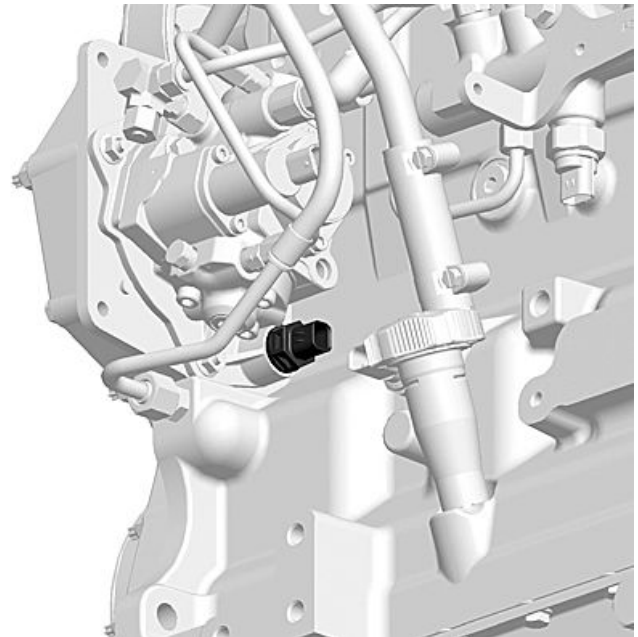
2-Pin Connector

BK34394,0001518 -19-21MAR11-1/2

RG16573—UN—10MAY12



Camshaft Position Sensor Location Overview



B5302 Image

RG19955—UN—04FEB11

RG19956—UN—04FEB11

The camshaft position sensor is an inductive type pickup sensor that detects ridges on the upper idler gear of the engine. The upper idler gear has 12 evenly spaced ridges with one additional ridge offset to indicate to the ECU that cylinder #1 is approaching Top Dead Center (TDC). The ECU uses this information to determine fuel injection timing for all of the cylinders.

If there is a problem with the camshaft position sensor, the ECU uses the crankshaft position sensor to determine

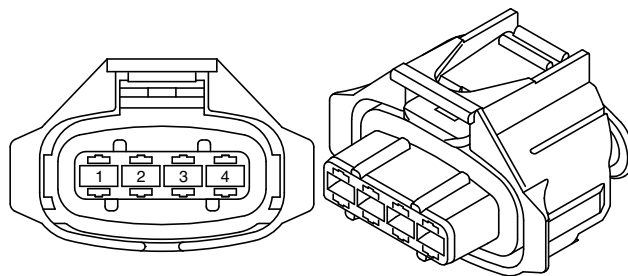
engine timing. This may require prolonged engine cranking to start the engine.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,0001518 -19-21MAR11-2/2

B5500 - Intake Air Sensor

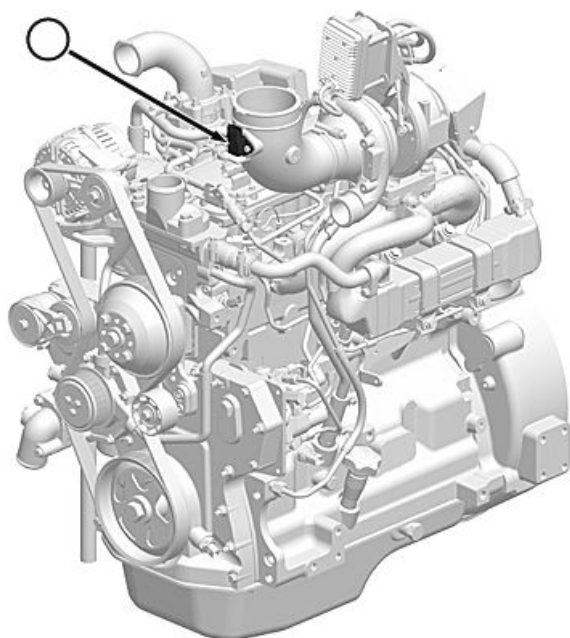
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (10 V)	5008	Gray
2	Return	5004	Yellow
3	Engine CAN High	5804	Yellow
4	Engine CAN Low	5805	Green



4-Pin Connector

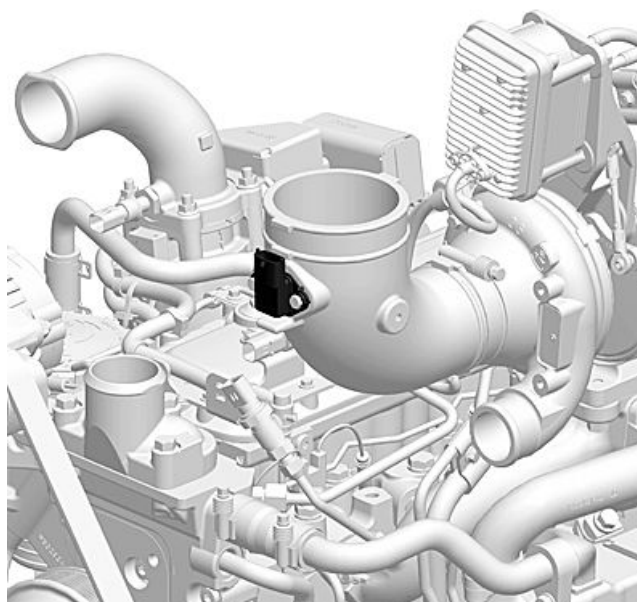
BK34394,0001519 -19-07JUL11-1/2

RG16605—UN—10MAY12



Intake Air Sensor Location Overview

RG19957—UN—04FEB11



B5500 Image

RG19958—UN—04FEB11

The intake air sensor measures temperature, pressure, and humidity of the turbocharger compressor inlet air. The location of the measurements is in the intake between the air cleaner and turbocharger. The sensor communicates with the ECU over the engine CAN bus. These measurements provide input for fueling calculations made by the ECU. Humidity affects the exhaust gas

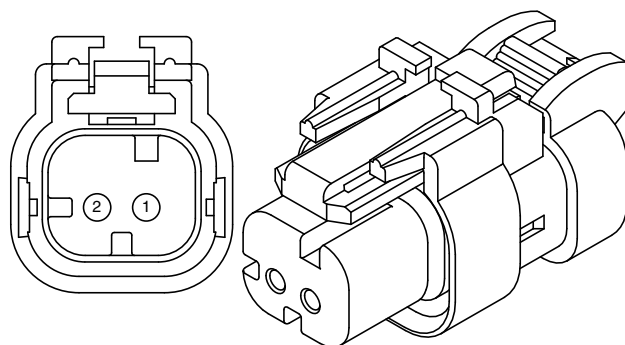
temperature and therefore the effectiveness of DPF passive regeneration. The ECU compares turbocharger compressor inlet pressure to barometric air pressure to calculate the intake air pressure drop.

For more information on CAN communication, see Controller Area Network (CAN) in Section 03, Group 140.

BK34394,0001519 -19-07JUL11-2/2

B5600 - Water-In-Fuel Sensor

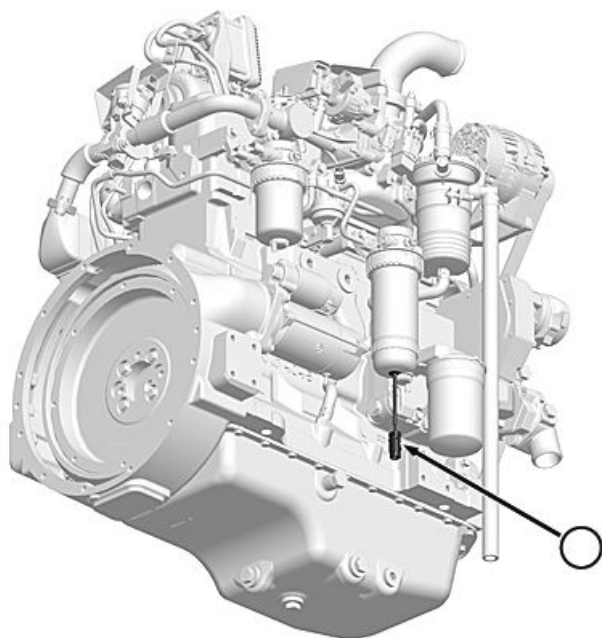
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Signal	5453	Orange
2	Return	5459	White



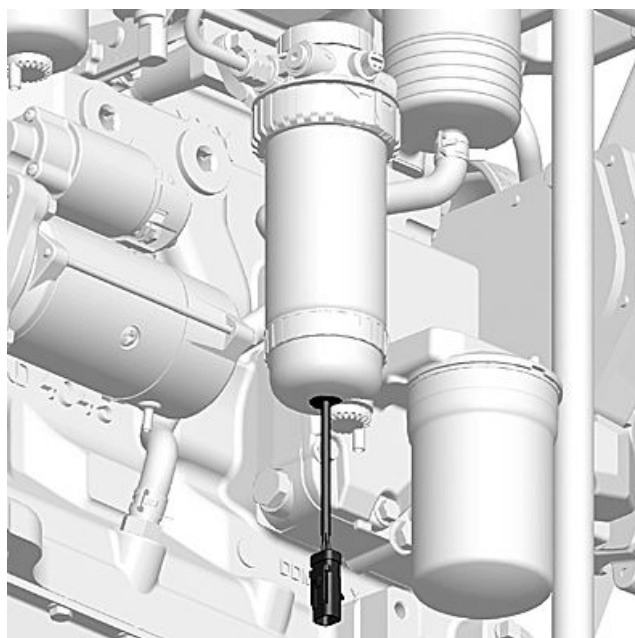
2-Pin Connector

RG16579 —UN—21MAY12

BK34394,000151A -19-21MAR11-1/2



Water-In-Fuel Sensor Location Overview



B5600 Image

RG19959 —UN—04FEB11

RG19960 —UN—04FEB11

The Water-In-Fuel (WIF) sensor is located on the bottom of the primary fuel filter in the water separator bowl. When water is detected in the fuel, a signal is sent to the ECU. The WIF sensor uses the resistance of fuel and water in the fuel system along with the principle that water is a better conductor than fuel. If water is present, the voltage

will be lower. The ECU monitors this for engine protection purposes.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,000151A -19-21MAR11-2/2

Barometric Air Pressure Sensor

The barometric air pressure sensor is located internal to the ECU and measures the pressure of the ambient air. The ECU uses the measurement to determine air density

for calculating the air/fuel ratio. For more information on how pressure sensors operate, see [Measuring Pressure](#) in Section 03, Group 140.

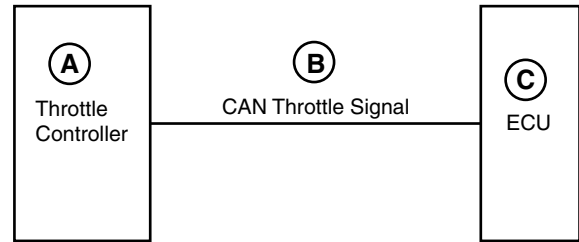
RG40049,00002CB -19-22JUN10-1/1

CAN Throttle

CAN (Controller Area Network) throttle is a desired throttle position that is sent to the ECU by another control unit over the CAN bus. It is also referred to as torque speed control.

A—Throttle Controller
B—CAN Throttle Signal

C—ECU



RG15038 —UN—12OCT06

RG40049,00002E3 -19-04AUG10-1/1

Combination Throttle

The combination throttle is the use of two or more throttle controls on an application to give coarse/fine/extra fine control. A maximum of three throttles may be combined. Normally, only two are used.

If the combination throttle is enabled, a master and a secondary throttle are selected. An additional third throttle can be selected as part of the combination. Each throttle can only be used once in the combination series (i.e. the primary analog throttle selected as the master throttle cannot be selected as the second or third throttle in the combination).

Any type of throttle can be used in the combination. Currently, the only OEM throttle types used are 2-state, 3-state, ramp, and analog. PWM and CAN throttles can be used but are not currently configured for use within the software.

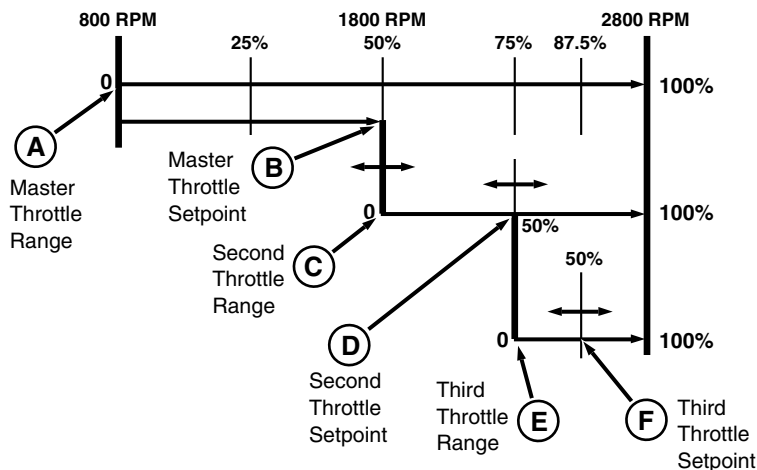
The ECU uses inputs from all enabled throttles to set engine speed. If a combination throttle with two throttles

is enabled, and a third throttle is enabled, the ECU looks at the input from the combination throttle and compare it to the third throttle. The engine speed then sets to whichever one is highest.

The basic role of the throttle controls is to act as accelerators. This means that, as the throttle input increases, the engine speed increases. The master throttle always functions in this fashion.

While not common, there are throttle controls that function as decelerators. This means as the throttle input increases, the engine speed decreases. However, this function is not compatible with 3-state throttles.

The combination throttle operates in the following fashion: each throttle has an available throttle range of 0-100% (slow idle to fast idle speed), and as each throttle is added to the master, a finer resolution in engine speed is defined.



A—Master Throttle Range
B—Master Throttle Setpoint

C—Second Throttle Range
D—Second Throttle Setpoint

E—Third Throttle Range
F—Third Throttle Setpoint

RG40049,00002E4 -19-07MAY10-1/1

RG15049—UN—09OCT06

Controller Area Network (CAN)

The CAN bus is a high-speed open interconnect network for electronic systems on the vehicle. It allows electronic systems to communicate with each other through a standard architecture of electronic signals over shielded twisted-pair wires. About any type of information can be communicated over the CAN bus. Information such as throttle position, safety systems, engine condition, fuel system information, etc. can be transferred between vehicle control units. Vehicles can communicate with laptop computers and other accessories. Information transmitted via the CAN bus can be displayed to the operator on a display panel, or relayed to another location via telemetry. Up to 30 electronic control units or modules

can be connected together through a single CAN network segment. A CAN connection (SAE J1939) is provided on the vehicle wiring harness. A round DEUTSCH 9-pin connector is provided primarily for service/diagnostic purposes. CAN also allows diagnostic software to communicate with the vehicle.

Certain devices communicate on a separate engine CAN bus. The intake air sensor and VGT or Exhaust Throttle actuator communicate on this engine CAN bus with only one control unit, the ECU. The engine CAN bus has two terminating resistors; one of them is located inside the ECU and is not accessible.

BK34394,000043E -19-07JUL11-1/1

Cruise Control Operation

The ECU is available with and without the cruise control function. It is an off-road cruise control that maintains constant engine speed under varying load conditions. Cruise control is not an engine governor. It does utilize an isochronous governor regardless of whether the operator has selected a drooped governor or not.

The cruise control has the normal functions of:

- Cruise control power ON or OFF
- Set or bump up engine speed
- Resume or bump down engine speed
- Vehicle brake or clutch pedal to disengage cruise control

RG40049,00002E6 -19-05AUG10-1/1

Determining Engine Speed and Piston Position

Engine speed is calculated by the ECU using the pulses detected by the crankshaft position sensor. The crankshaft timing gear is composed of 45 evenly spaced teeth with one occurrence of a wider tooth. Rotational speed of the crankshaft is then known since the time between

the pulses is known. Piston position is determined by the camshaft position sensor. The cam shaft upper idler gear has 12 evenly spaced notches and one additional notch offset to indicate to the ECU that cylinder #1 is approaching Top Dead Center (TDC) of its compression stroke. Based on the firing order of the engine, the ECU determines exact position of each piston.

BF67790,00009FB -19-06JUL11-1/1

Digital Throttle

2-state, 3-state, and ramp throttles use switches to send speed control commands to the ECU and are classified as digital throttles.

2-State

The switch uses two different resistors to change the voltage returned to the ECU. The ECU uses an internal conversion table to convert the voltage to a specific engine speed. When the switch is in the minimum throttle position, the current is routed through a 390 ohm resistor. Fast idle position uses a 3000 ohm resistor.

3-State

The switch has three positions: minimum throttle, maximum throttle, and fast idle. The fast idle (no-load) position speed is set in the ECU according to the needs of the application. In the maximum or minimum throttle positions, engine speed can be set within a range programmed into the ECU or by bump switches. The switch uses three different resistors to change the voltage returned to the ECU. When the switch is in the minimum throttle position, current is routed through a 390 ohm resistor. The maximum throttle position uses a 1300 ohm resistor and the fast idle position uses a 3000 ohm resistor.

Ramp

The digital ramp throttle operates between minimum throttle and fast idle and uses a 3-position ramp throttle switch. If the switch is held in the increase throttle position, the engine speed ramps up in small increments. If the switch is held in the decrease throttle position, the engine speed ramps down. As long as this switch is held in a momentary position, the engine continues to ramp up or down until the maximum high or low throttle speed setting is reached. When released, the switch returns to the center hold throttle position.

This is a 3-position, spring-loaded-to-center switch. The increase speed position uses a 3000 ohm resistor. The

decrease speed position uses a 390 ohm resistor, and the hold position uses a 1300 ohm resistor. The ramp throttle settings are reset to the factory settings when the key is turned off and back on. The ramp rate selection is a trim option and sets the rate of change for engine speed increases or decreases. There are four ramp rate options available.

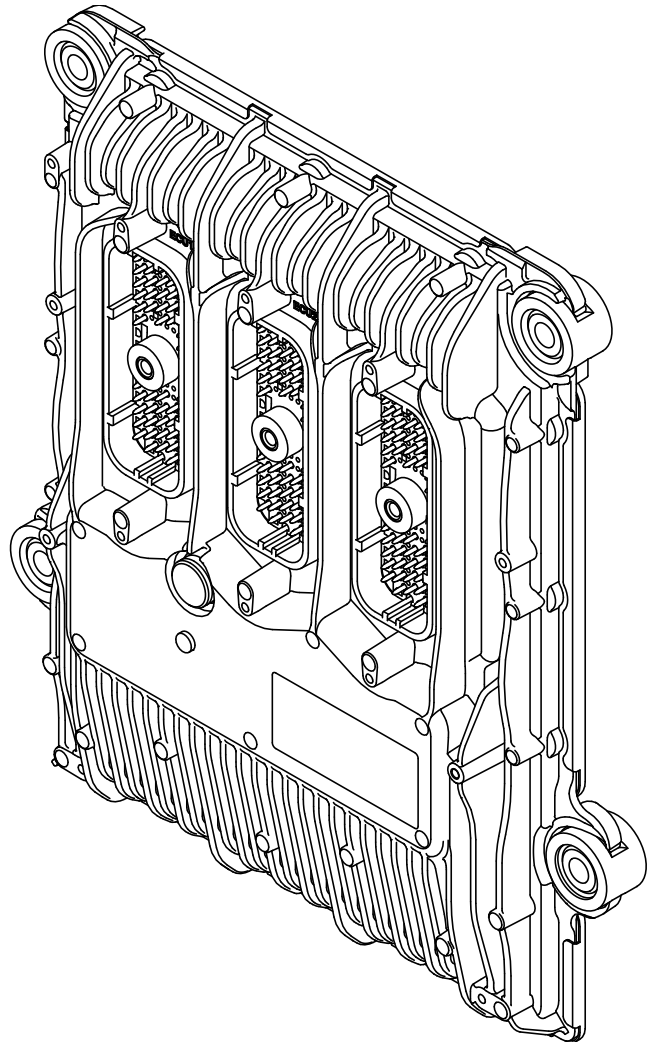
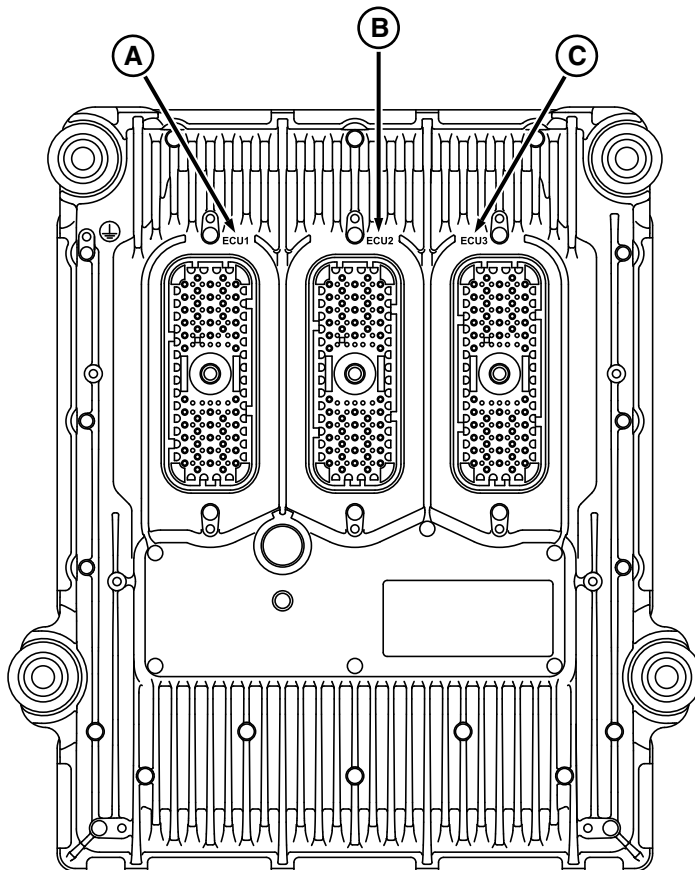
- **3 second exponential:** Engine speed starts to increase/decrease at a slow rate and will accelerate/decelerate at an increasingly faster rate the longer the switch is held. The engine throttle setting goes from 0% to 100% throttle in 3—5 seconds.
- **5 Second Linear:** Engine speed increases/decreases at a constant rate. With this setting the engine throttle setting goes from 0% to 100% throttle in 5 seconds.
- **7 Second Linear:** Engine speed increases/decreases at a constant rate. With this setting the engine throttle setting goes from 0% to 100% throttle in 7 seconds.
- **9 Second Linear:** Engine speed increases/decreases at a constant rate. With this setting the engine throttle setting goes from 0% to 100% throttle in 9 seconds.
- **Custom Linear:** Engine speed increases/decreases at a rate set by the operator. With this setting the engine throttle setting goes from 0% to 100% throttle at a rate from 5 through 30 seconds determined by the operator. Ramp steps or bumps are minor increases or decreases, in the engine speed setting. When the ramp throttle switch is momentarily held in the Increase Throttle or Decrease Throttle positions, the engine speed increases/decreases a selected percentage of the throttle range. The actual engine rpm speed change for each setting varies.

Four ramp step rates are available:

- 0.4% of throttle range
- 0.8% of throttle range
- 1.6% of throttle range
- 2.8% of throttle range

RG40049,00002E8 -19-01OCT10-1/1

Engine Control Unit (ECU) System Operation



RG16674—UN—05DEC08

A—A5501 - ECU J1

B—A5502 - ECU J2

C—A5503 - ECU J3

IMPORTANT: DO NOT OPEN ENGINE CONTROL UNIT (ECU). THERE ARE NO SERVICEABLE COMPONENTS INSIDE.

NOTE: The ECU is the system component LEAST likely to fail. Follow proper troubleshooting procedures and isolate the problem. ONLY replace ECU if the troubleshooting procedure directs you to.

IMPORTANT: ECUs do not come programmed. You MUST reprogram the ECU using the newest software available for the application that the ECU came from. For programming instructions, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04 Group 160.

Main Components of the Engine Control Unit (ECU)

The ECU is the control unit that follows a defined program to run the engine at the desired operating point while

keeping within emissions regulations. This system is made up of input components (i.e. temperature and pressure sensors), and controlled components (i.e. injectors and actuators). The ECU consists of:

- Analog-to-digital converters (A/D)
- Digital-to-analog converters (D/A)
- Microprocessor (CPU)
- Memory (storage)
- Internal power supplies for external components

Analog-to-Digital and Digital-to-Analog Converters (A/D and D/A)

The A/D takes the analog input information from the external components and converts it to a digital value that the CPU can understand. The D/A converts the digital information from the CPU to analog information that is used by the external components.

Continued on next page

RG40049,00002E9 -19-05JUL11-1/2

Microprocessor (CPU)

The CPU is considered the brains of the ECU. It reads instructions from storage (memory) and interprets them. It receives information from external components, like sensors, through the A/D. It sends outputs to control external components, like actuators. It also performs mathematical computations and logical functions.

Memory

Memory is a component capable of retaining digital information. This information can be operation code, data files, or fragments of data.

Temporary memory (RAM) is used to hold data for short periods of time. This information is lost when the key is turned to OFF position.

Permanent memory (FLASH) stores information for long periods of time. This is where the program and calibration information is stored. The information in this type of memory is not lost when power is removed or if the control unit is removed from the engine harness.

Internal Power Supplies for External Components

The ECU has several internal power supplies commonly referred to as sensor supplies, that deliver reference voltages to the engine sensors, throttles, and switches. There are out of range high and out of range low voltage diagnostic trouble codes associated with each power supply. Multiple power supplies are used, because there are so many external components. This also prevents critical components from being damaged by shorts in other components.

Basic Functions of the Engine Control System

The electronic control system serves as an engine governor by controlling the electronic injectors (EIs) so that the fuel is delivered according to a given set of engine conditions, in precise amount, and at precise time in relation to piston position. In order to achieve this, the control system performs the following functions:

- Constantly monitor engine operating conditions.
- Precisely determine piston position.
- Deliver optimum amount of fuel for a given set of operating conditions.
- Deliver fuel at optimum piston position.
- Provide multiple control modes.
- Perform system diagnosis.

System Problem Diagnosis

The ECU detects problems with external components and their associated wiring. There is a harness diagnostic test that can be run from Service ADVISOR to help diagnose some of the problems, see [Harness Diagnostic Mode Test](#) in Section 4 Group 160.

Sensor Monitoring

The ECU monitors its internal temperature. It monitors the power supplies to ensure that they are operating at the proper voltage and monitors proper running of stored programs. When the key is turned off, it even monitors its shutdown process to ensure that it happens properly. If a problem exists, the ECU generates a diagnostic trouble code (DTC). The ECU is continuously receiving real-time inputs from temperature, pressure, speed, and position sensors. The ECU compares these values with expected values for the operating conditions. If the ECU detects a problem, it generates a DTC.

Diagnostic Trouble Codes (DTC)

These are codes that the ECU sends out over the CAN bus to alert the operator or service equipment it sees a problem. Some of these codes contain a snapshot of certain parameters at the time the code sets that is stored in the ECU. There can also be a recording of more data that is stored depending on the DTC.

Engine Starting Mode

When the key is turned to the ON position, a switched power voltage is sent to the Engine Control Unit (ECU). This energizes the ECU and allows it to boot-up and ready itself for engine start. NOTE: If a wiring problem prevents the key ON signal from getting to the ECU, the engine will not start.

As soon as the ECU determines using the crankshaft position sensor input that the engine is cranking, it determines using the camshaft position sensor input when cylinder number 1 is coming to top-dead-center at the end of the compression stroke. It begins injecting fuel when the next cylinder in the firing order (cylinder number 5) is at the correct position. At this point, the engine starts and the ECU goes into the engine running mode. To provide cold temperature enrichment, the amount of fuel injected is based on the temperature measured by the engine coolant temperature (ECT) sensor.

Engine Running Mode

In the engine running mode, both the crankshaft and the camshaft position sensors allow the ECU to accurately determine piston position in relation to top-dead-center. The ECU uses this information to determine injection timing and rate. The ECU controls fuel delivery by energizing and de-energizing the two-way valve (TWV), which is located in the EI.

Engine Stopping Mode

In the engine stopping mode, the ECU remains powered on for several seconds with the ignition off. The ECU performs checks of several engine components and stores information in memory during this time.

RG40049,00002E9 -19-05JUL11-2/2

Engine Control Unit (ECU) Temperature Sensor

The ECU temperature sensor is located internal to the ECU. This sensor cannot be repaired or replaced without replacing the entire ECU. This sensor is used to determine the internal temperature of the ECU. If the temperature

exceeds the temperature specification, the ECU sets a fault code and limit the speed of the engine in an attempt to protect the ECU from permanent damage.

RG40049,00002EA -19-22JUN10-1/1

Engine Derate and Shutdown Protection

The Engine Control Unit (ECU) decreases the amount of fuel that is delivered to the engine (fuel derate), set the engine to a certain speed (speed derate), or shut down the engine when sensor inputs exceed normal operating ranges. A diagnostic trouble code (DTC) always accompanies a derate.

There are three ECU engine protection options:

- **No Protection:** ECUs with no protection do not derate or shut down the engine if a fault occurs. The standard warning light illuminates when a warning fault is detected by the ECU, and the standard stop engine light illuminates when a shutdown fault is detected. The engine operator is responsible for reducing engine speed and power when a warning fault exists and for shutting down the engine when a shutdown fault exists.
- **Engine Derate Protection WITHOUT Shutdown:** In addition to illuminating the standard fault indicating lights, the ECU derates the engine when certain warning faults are detected (depending on application). It is the responsibility of the operator to decide if it is necessary to shut down the engine.
- **Engine Derate Protection with Shutdown:** In addition to illuminating the standard fault indicating lights, the ECU derates the engine when certain warning and shutdown faults are detected (depending on application). If a DTC that requires shutdown is set, the ECU severely derates the engine and shuts down the engine either immediately or in 30 seconds, depending on the shutdown timer setting in the ECU. If the fault has a 30 second shutdown delay, and the problem is corrected within the 30 second delay period, the power increases at a rate determined by the fault, until full power is reached.

NOTE: CAN wait-to-start enables the CAN bus messages for shutdown and for wait-to-start. Disabling this feature disables both the wait-to-start broadcast and the shutdown broadcast.

Shutdown Override

NOTE: Holding the shut-down override switch continuously ON will not reset the 30 second timer.

Shutdowns can be overridden for 30 seconds at a time. This can be used to move a vehicle to a safe location. Each time the switch is pushed, the shutdown timer is reset to 30 seconds, and the engine runs in a derated power mode.

Similarly, if the key switch is turned off, the engine shutdown feature resets, but when restarted only 30 seconds of running is allowed until the engine shuts down again. Engine remains in shutdown mode until fault condition has been corrected.

Auxiliary Derate

Wiring is provided on the engine harness for additional switches that control engine derate. These additional auxiliary switches can provide an additional level of engine protection. The auxiliary switch type and derate rate are selectable:

- **Auxiliary Derate Enable:** When enabled with an active auxiliary derate circuit, the auxiliary derate feature derates the engine when activated by an auxiliary device.
- **Auxiliary Derate Switch Input Type:** A normally open switch, or normally closed switch can be used for the auxiliary derate input.
- **Auxiliary Derate Amount:** Three auxiliary derate rates are available: 20% derate over 4 minutes, 20% derate over 1 minute, and 50% derate over 2.5 minutes. Each provides a linear derate of engine power over the time selected. Derates are based on the 100% torque curve value, so operation below the derated power level is still possible.

NOTE: Auxiliary derate is not compatible with cruise control.

Auxiliary Shutdown

Wiring is provided on the engine harness for additional engine shutdown switches. Either a normally open or normally closed switch can be used for the auxiliary shutdown input. When enabled and the auxiliary shutdown circuit is activated, the ECU shuts down the engine. Features include:

- **Auxiliary Shutdown Enable:** When enabled with an active auxiliary shutdown circuit, the auxiliary shutdown feature shuts down the engine when activated by an auxiliary device.
- **Auxiliary Shutdown Switch Input Type:** A normally open switch, or normally closed switch can be used for the auxiliary shutdown input.
- **Auxiliary Shutdown Timer:** The auxiliary shutdown timer can be set for either immediate shutdown, or a 30 second delayed shutdown. If the shutdown switch returns to normal before the end of the 30 second delay, the engine resumes normal running.
- **Override Auxiliary Shutdown at Engine Start:** Some auxiliary shutdowns must be overridden when starting the engine. When enabled, the ECU disables auxiliary shutdowns during engine start-up.
- **Override Auxiliary Shutdown Time:** Once the engine switches to run mode (reaches slow idle), the ECU continues to override the auxiliary shutdown for the duration that has been selected. Three override times are available: 5 seconds, 30 seconds, and 60 seconds.

RG40049,00002EB -19-06JUL11-1/1

Governor Droop Mode Selection

The electronic control system provides all-speed governing. The Engine Control Unit (ECU) controls the engine speed based on the throttle input.

The ECU also has the ability to provide normal and isochronous (0%) droop governing. The normal droop gives a drop in engine speed with an increase in load or an increase in engine speed with a decrease in load. When in isochronous, the droop is set at 0%, and there

is a no change in engine speed with changing loads until engines torque limit is reached. The factory slow idle speed is always set for isochronous governing. Droop selection can be determined by engine speed, load, cruise control, and through the S5008 — Droop Governor Switch depending on the application.

Refer to application manual for information on governor droop parameters.

BF67790,00009FA -19-06JUL11-1/1

Measuring Pressure

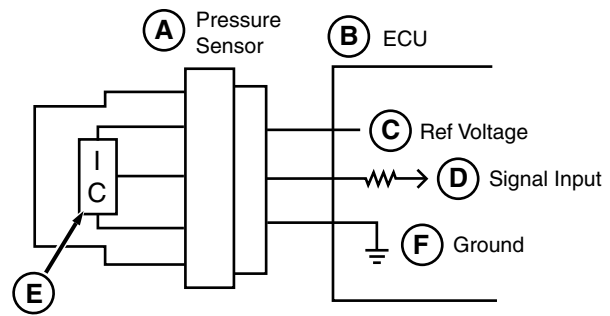
All engine pressure sensors (A) are 3-wire devices. As pressure changes, output changes. The ECU (B) supplies the sensor with a supply voltage (C) and return (F). It monitors the output voltage from the sensor signal output wire (D). As the pressure changes, it causes the input to the ECU to change. The ECU compares the input value to a pre-programmed value in the ECU's memory.

There are many types of devices, and depending on the circuitry (E) in the device, the ECU determines how to process the input signal.

If the input value is near the expected value, then the ECU assumes that everything is functioning properly. If the value is above or below the expected value, the ECU sets the appropriate diagnostic trouble code (DTC).

The ECU has the ability to derate the engine power, engine speed, or shut down the engine in an attempt to protect the engine and its components. If certain pressures exceed the threshold, the ECU enables the engine protection.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.



Typical Pressure Sensor Schematic

A—Pressure Sensor
B—ECU
C—Supply Voltage

D—Signal Input
E—IC (Integrated Circuit)
F—Return

For more information on DTCs, see [Diagnostic Trouble Codes List](#) in Section 4, Group 160.

RG40049,00002ED -19-23AUG10-1/1

Measuring Speed

Speed sensors use a coil wound around a magnet to create a voltage signal. As a tooth in the rotating timing wheel or gear nears the sensor tip, the magnetic field is pulled towards the tooth. As the tooth passes the sensor,

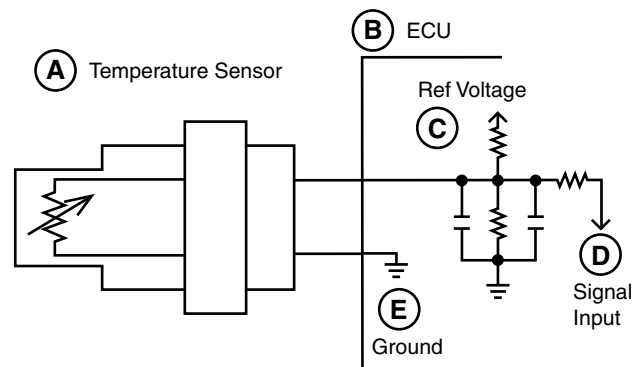
the magnetic field moves back toward the sensor. This creates a voltage in the coil that is sent to the ECU. By monitoring the frequency of these signals, the ECU calculates the shaft speed.

RG40049,00002EE -19-22JUN10-1/1

Measuring Temperature

Temperature sensors are generally thermistors, i.e. temperature-sensitive variable resistors. The resistance of the sensor decreases as temperature increases (negative temperature coefficient). As the temperature changes it causes the voltage of the signal input (D) to change. The ECU compares this voltage with values programmed into its memory. If the value measured is near the expected value, the ECU assumes everything is correct. If the value is above or below the expected value, the ECU sets the appropriate diagnostic trouble code (DTC).

For more information on DTCs, see [Diagnostic Trouble Codes List](#) in Section 4, Group 160. The ECU has the ability to derate the engine power, engine speed, or to shut down the engine in an attempt to protect the engine and its components. If certain temperatures exceed the threshold, the ECU enables the engine protection. For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.



Thermistor Circuit

A—Temperature Sensor
B—ECU
C—Supply Voltage

D—Signal Input
E—Return

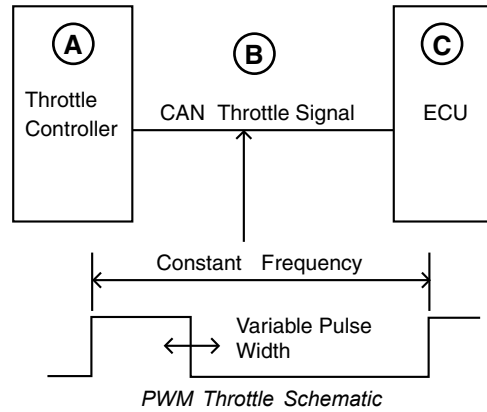
RG40049,00002EF -19-07JUN12-1/1

Pulse-Width-Modulated (PWM) Throttle

The PWM throttle signal is sent to the ECU by another control unit. The PWM signal is a square wave signal with a constant frequency. The pulse width of the signal varies to indicate the desired throttle opening.

A—Throttle Controller
B—CAN Bus Throttle Signal

C—ECU

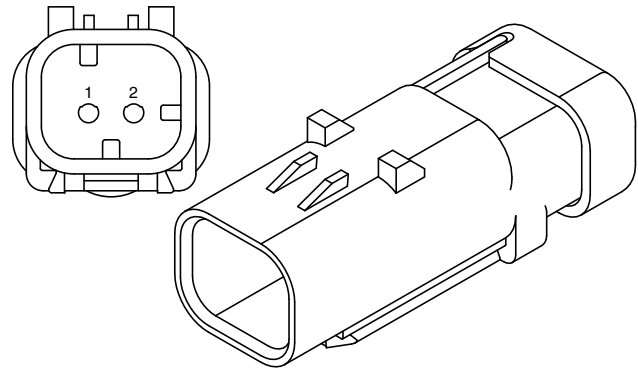


RG15076 —UN—13OCT06

RG40049,00002F0 -19-25MAR11-1/1

R5602 - 24V Low-Pressure Fuel Pump Resistor

Component Information			
Pin	Description	Circuit Number	Wire Color
1	24V Signal In	5001	Brown
2	12V Signal Out	5071	Brown

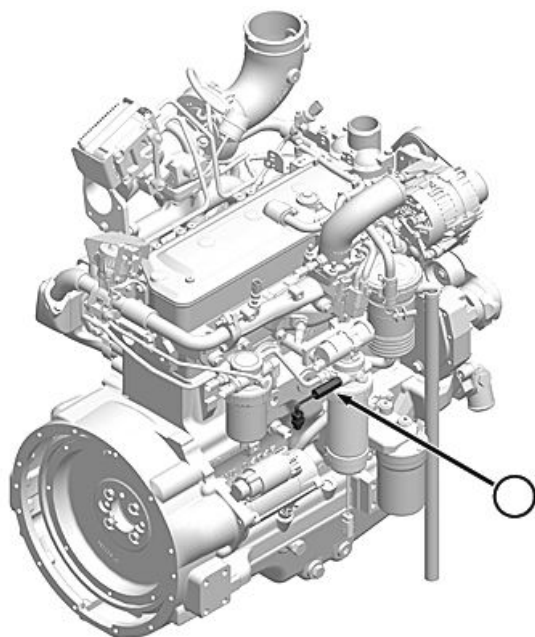


2-Pin Connector

RG18381 —UN—22MAY12

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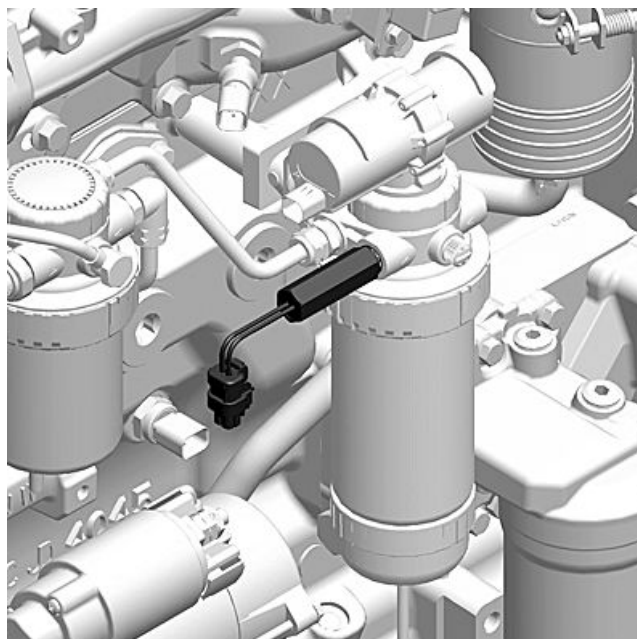
BK34394,000152A -19-28JUL11-1/2



24V Low-Pressure Fuel Pump Resistor Location Overview

The 24V Low-Pressure Fuel Pump Resistor is used only on applications with 24V electrical systems to provide the correct input voltage for the low-pressure fuel pump.

RG20007 —UN—10FEB11



R5602 Image

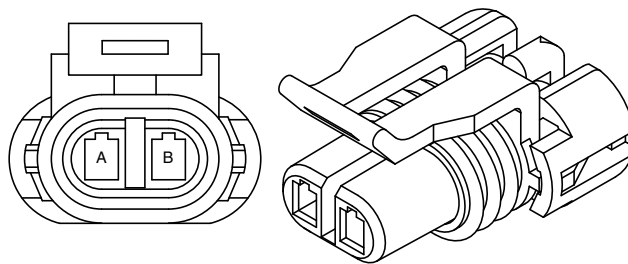
RG20008 —UN—10FEB11

For additional low-pressure fuel pump information, see [Electric Low-Pressure Fuel Pump Operation](#) in Section 03, Group 130.

BK34394,000152A -19-28JUL11-2/2

S5001 - Engine Coolant Level Alarm Switch

Component Information			
Pin	Description	Circuit Number	Wire Color
A	Signal	5948	Gray
B	Return	5050	Black

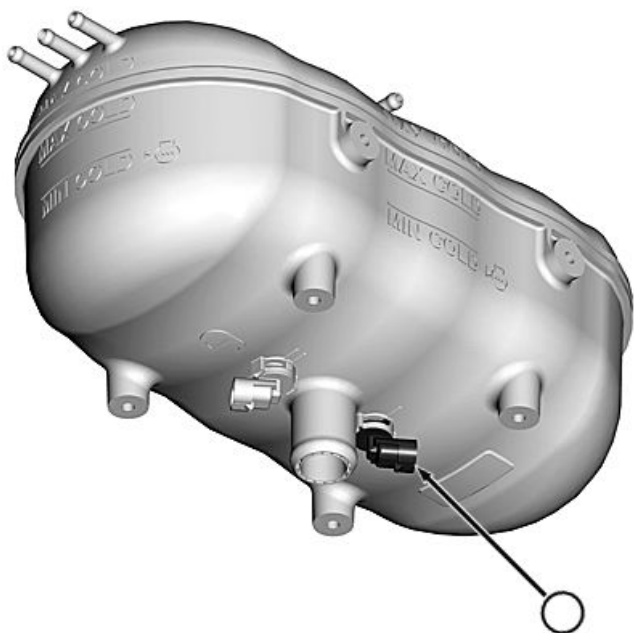


2-Pin Connector

RG17963 —UN—15DEC09

Continued on next page

BK34394,000152B -19-11MAR11-1/2



RG17959 —UN—14DEC09

Engine Coolant Level Alarm Switch Location Overview



RG17960 —UN—14DEC09

S5001 Image

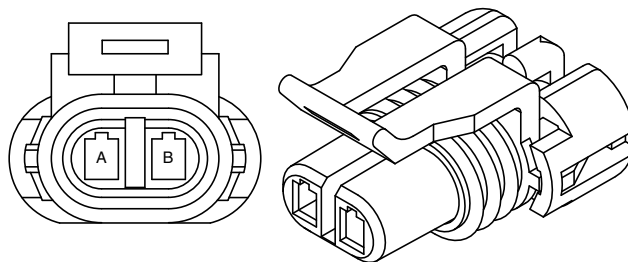
The device is a reed switch that extends from the bottom of the surge tank. A float in the tank changes position with coolant level. When the coolant level falls, the ring magnet on the bottom of the float moves to the bottom of the tank, below the switch position. The magnetic field is removed, the switch opens, a DTC sets, and, the engine is derated.

For more information on engine protection and derate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,000152B -19-11MAR11-2/2

S5002 - Engine Coolant Level Information Switch

Component Information			
Pin	Description	Circuit Number	Wire Color
A	Signal	5436	Blue
B	Return	5050	Black

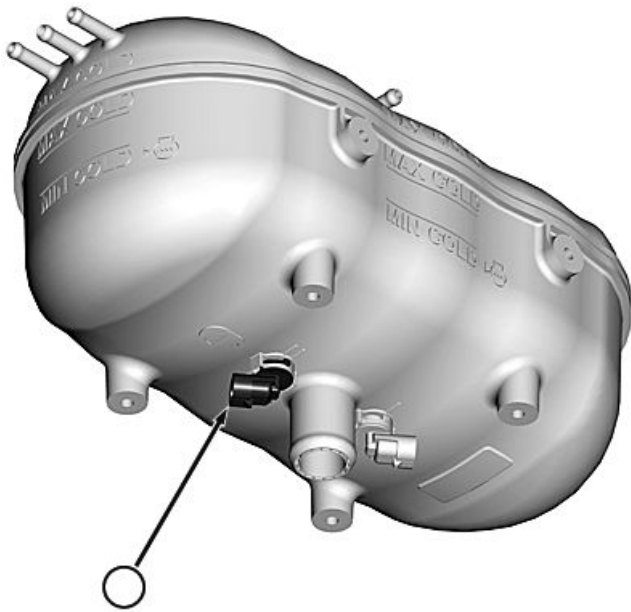


RG20662 —UN—06JUL11

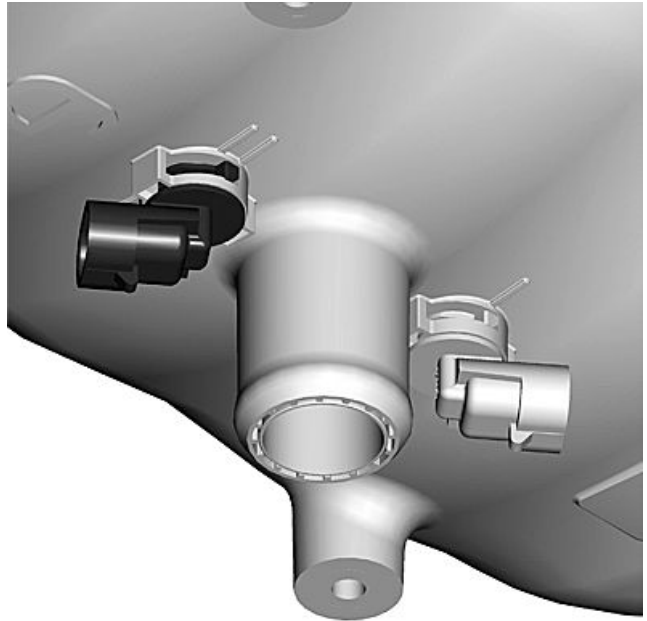
2-Pin Connector

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BK34394,000152C -19-06JUL11-1/2



Engine Coolant Level Information Switch Location Overview



S5002 Image

RG17961 —UN—14DEC09

RG17962 —UN—14DEC09

The engine coolant level information switch is optional and can be enabled in the trim page. It is a reed switch that extends from the bottom of the surge tank. A float in the tank changes position with coolant level. When the coolant level falls, the ring magnet on the bottom of the float moves to the bottom of the tank, below the switch position. DTC 000111.17 sets. The purpose of the switch is only to inform the operator of a moderately low coolant level when the ignition is turned on. Once the engine is

running, the switch is only used for mismatch detection with the engine coolant level alarm switch.

The associated float in the surge tank is longer than the float associated with the engine coolant level alarm switch. Therefore, the magnet for the engine coolant level information switch falls to the bottom of the tank sooner if the engine coolant level decreases.

BK34394,000152C -19-06JUL11-2/2

Sensor Supply #1

John Deere engine sensors must have 5 V and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Sensor Supply #1:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Fuel Rail Pressure Sensor

BK34394,000152D -19-11MAR11-1/1

Sensor Supply #2

John Deere engine sensors must have 5 V and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Sensor Supply #2:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Low-Pressure Fuel Pressure Sensor

BK34394,000152E -19-11MAR11-1/1

Sensor Supply #3

John Deere engine sensors must have 5 V and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Sensor Supply #3:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- EGR Flow Sensor (PVX Engine)
- EGR Valve
- Air Throttle Actuator (PVX Engine)

BK34394,000152F -19-27JUL11-1/1

Sensor Supply #4

John Deere engine sensors must have 5 V and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Sensor Supply #4:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Primary Analog Throttle
- Variable Speed Fan (optional)
- AC High Pressure Switch (optional)
- Droop/Isochronous Governor Switch (optional)
- PTO Speed (optional)

BK34394,0001530 -19-27JUL11-1/1

Sensor Supply #5

John Deere engine sensors must have 5 V and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Sensor Supply #5:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Secondary Analog Throttle
- Remote Analog Throttle

BK34394,0001531 -19-11MAR11-1/1

Sensor Supply #6

John Deere engine sensors must have 5 V and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Sensor Supply #6:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- DPF Differential Pressure Sensor
- Exhaust Filter Temperature Module
- Engine Coolant Pressure Sensor (Optional)

BK34394,0001532 -19-11MAR11-1/1

Sensor Supply #7

John Deere engine sensors must have 5 V and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Sensor Supply #7:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Crankcase Pressure Sensor
- Manifold Air Pressure (MAP) Sensor

BK34394,0001533 -19-11MAR11-1/1

Sensor Supply #8

John Deere engine sensors must have 5 V and sensor return (ground) supplied to them to function properly. There are too many sensors for just one power supply and return to handle. For this reason, there are several sets of power supply voltages and grounds.

The following sensors use Sensor Supply #8:

NOTE: Some sensors are not available or are optional for certain applications. The sensors on the following list may not all be available on this engine.

- Exhaust Manifold Pressure Sensor
- Engine Oil Pressure Sensor

BK34394,0001534 -19-11MAR11-1/1

Sensor Supply #9

This supply has two different 10 V outputs - both on ECU connector A5501. The following components use Sensor Supply #9:

Output 9A

- Exhaust Filter Temperature Module

Output 9B

- Intake Air Sensor

BK34394,0001535 -19-11MAR11-1/1

Throttle Adjustments

Throttle Rate

Throttle rate is how quickly the ECU changes the engine fuel rate in response to a throttle increase signal. The ECU is shipped with the maximum rate selected. Five rates are available: maximum, fast, medium, custom, and slow.

NOTE: If ramp throttle is enabled, the throttle rate feature is disabled for all throttles.

Throttle Out-of-Range (OOR) Recovery

A throttle is determined to be out-of-range (OOR) when the ECU detects the input signal from that device is outside its expected normal limits (invalid). When the OOR condition is detected the ECU sets a diagnostic trouble code. The ECU then ignores the input from the OOR throttle until it becomes valid, essentially setting its input to 0%. When the input becomes valid again the ECU takes appropriate action, determined by the recovery type programmed into the ECU. Typically, these errors occur when analog throttle endpoints are misaligned, but it can also be caused by faulty wiring.

Recovery types are:

- **Resume Recovery:** When a throttle out-of-range error (OORE) condition is detected, only the OOR throttle

input is considered 0% until a valid input is received. The OOR throttle will immediately operate again as soon as the input is valid.

IMPORTANT: This setting can cause rapid changes in the throttle if an intermittent OOR condition exists.

- **Idle Recovery:** When a throttle OOR condition is detected, only the OOR throttle input is considered 0%. If the input becomes valid again after the OOR condition, the OOR throttle must be returned to slow idle position (0% throttle) before the output of the throttle is allowed to increase above 0%.
- **Locked Recovery:** When a throttle OOR condition is detected, only the OOR throttle input is considered 0% and will not be allowed to operate again until the key has been switched off for 30 seconds and the throttle input is valid.

The throttle out-of-range (OOR) recovery applies to all throttles except ramp throttle. Because the ramp throttle resets itself to minimum throttle for any out-of-range condition, selecting a different throttle out-of-range recovery will have no effect on the ramp throttle.

BF67790,00009F9 -19-06JUL11-1/1

Throttle Offset

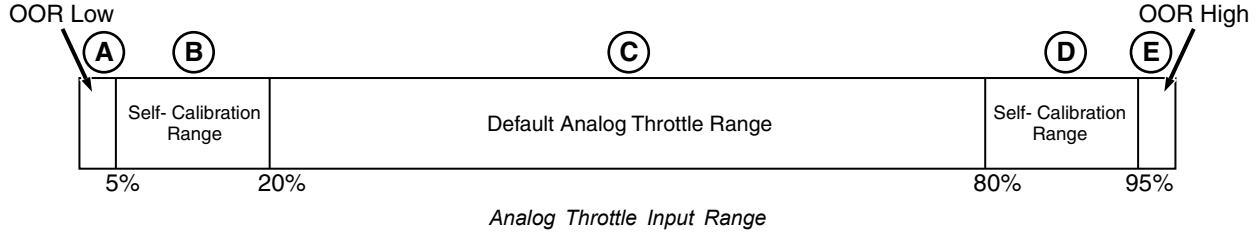
Minimum throttle offset adjusts the 0% throttle speed. The amount of offset is the rpm increase above slow idle. The offset is made during programming or the minimum throttle speed adjustment can be made using bump switches on the control panel.

Maximum throttle offset is used to adjust the 100% throttle speed on a 3-state digital throttle. The amount of offset is the rpm decrease below the fixed fast idle speed. The maximum offset allowed is controlled by the ECU software. The offset is made during programming or the maximum throttle speed adjustment can be made using bump switches on the control panel.

RG40049,00002FD -19-06JUL11-1/1

Throttle Self-Calibration

RG15048A —UN—02OCT08



A—OOR (Out Of Range) Low
B—Self-Calibration Range

C—Default Analog Throttle Range E—OOR (Out Of Range) High
D—Self-Calibration Range

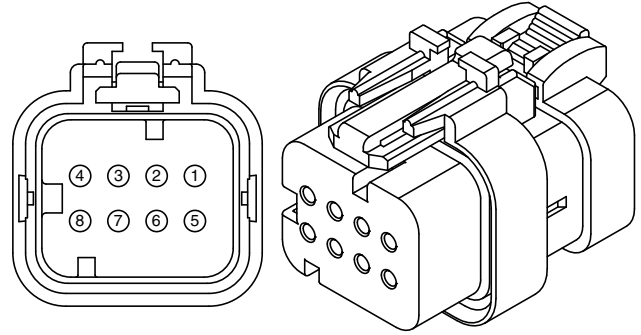
With this feature enabled, it will automatically adjust throttle dead-band on every sweep of the throttle from idle to full throttle position. The self-calibration feature can adjust the 0% throttle setpoint from 5% to 20% of the analog throttle input range. Similarly, the 100% throttle setpoint can be adjusted between 80% and 95% of the analog throttle input range.

If the self-calibration feature is disabled, the operating range of the throttle is limited to the default analog throttle range.

RG40049,00002FE -19-06JUL11-1/1

X5000 - Fuel Injector Harness

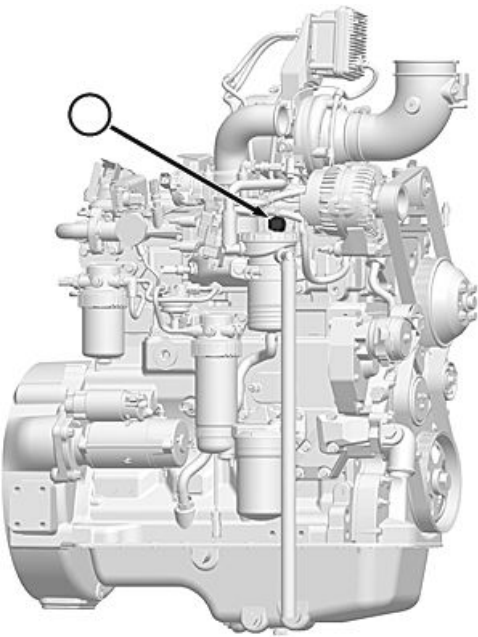
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Not Used	Not Used	Not Used
2	Not Used	Not Used	Not Used
3	Injector #4 Pulse	5495	Green
4	Injector #1 Pulse	5493	Orange
5	Injector #3 Pulse	5498	Gray
6	Injector #2 Pulse	5499	White
7	Injector #2 and #3 Power	5496	Blue
8	Injector #1 and #4 Power	5491	Brown



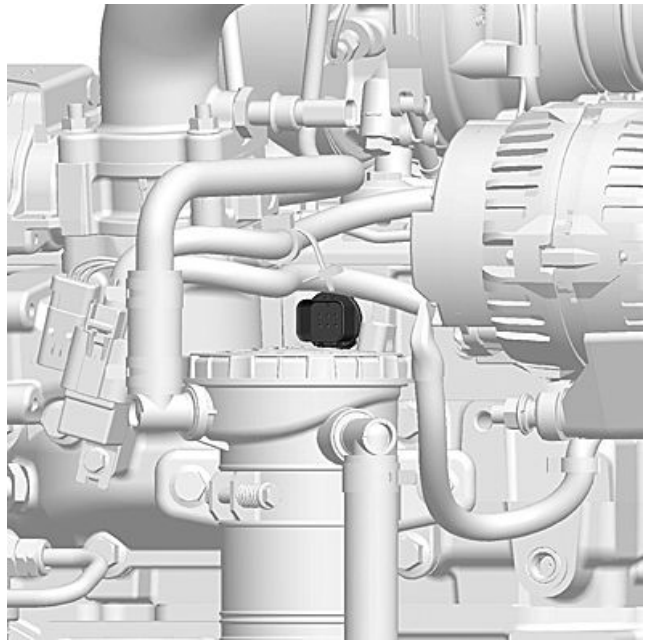
RG16595 —UN—21MAY12

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BK34394,0001539 -19-23MAR11-1/2



Fuel Injector Harness Location Overview



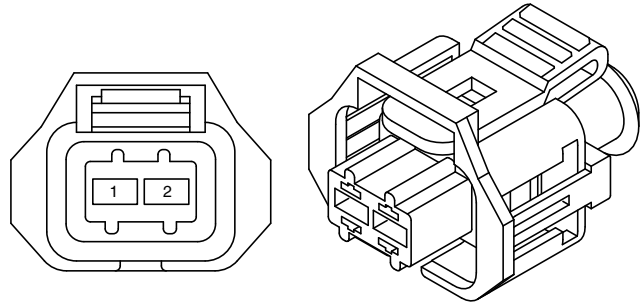
X5000 Image

The injector harness connects the main engine wiring harness to the fuel injectors and is routed under the rocker arm cover.

BK34394,0001539 -19-23MAR11-2/2

Y5002 - Suction Control Valve

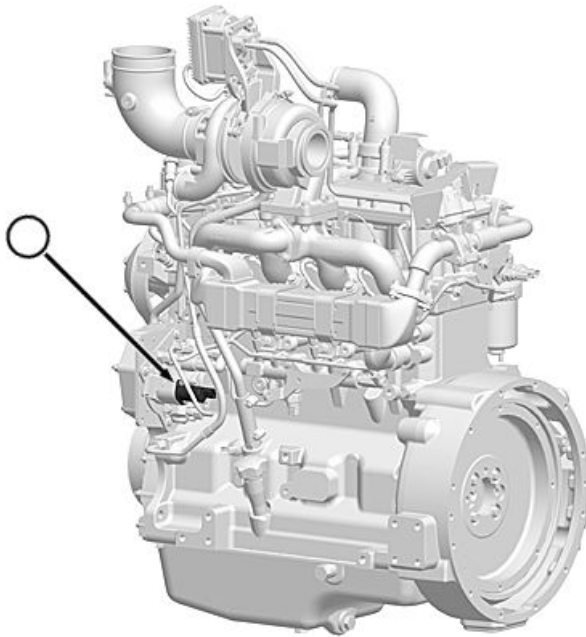
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Drive +	5424	Yellow
2	Drive -	5419	White



2-Pin Connector

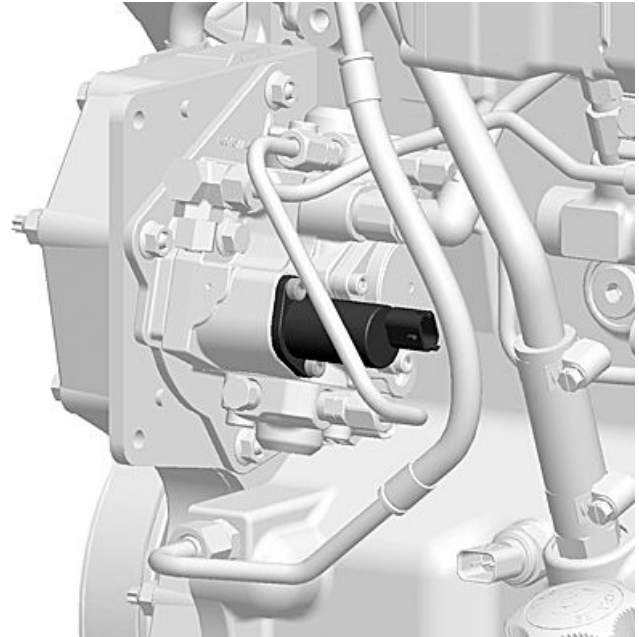
Continued on next page

BK34394,000153A -19-05OCT11-1/2



Suction Control Valve Location Overview

RG19961—UN—04FEB11



Y5002 Image

RG19962—UN—04FEB11

The suction control valve is located on the high-pressure fuel pump. The ECU sends an electronic signal to the suction control valve through the solenoid to regulate the delivery of fuel to the high-pressure common-rail (HPCR). When the suction control valve is de-energized, fuel is allowed into the pumping chamber of the high-pressure fuel pump. The pressurized fuel is then sent to the HPCR.

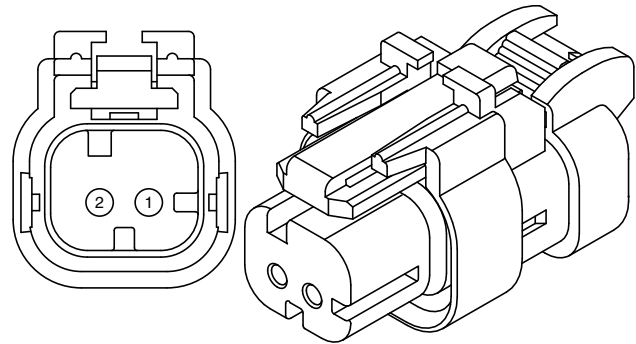
The ECU varies the on-time of this signal to ensure that the proper amount of fuel is available.

For more information on engine protection and de-rate programs, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

BK34394,000153A -19-05OCT11-2/2

Y5004 - Low-Pressure Fuel Pump

Component Information			
Pin	Description	Circuit Number	Wire Color
1	Signal	5071	Brown
2	Return	5016	Blue

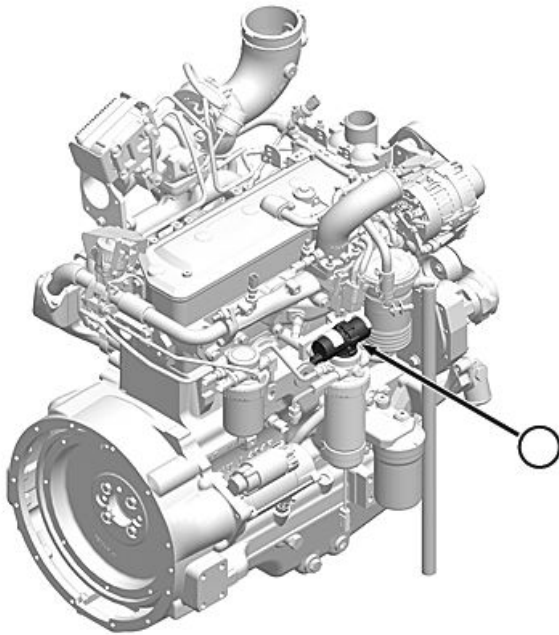


2-Pin Connector

RG16573—UN—10MAY12

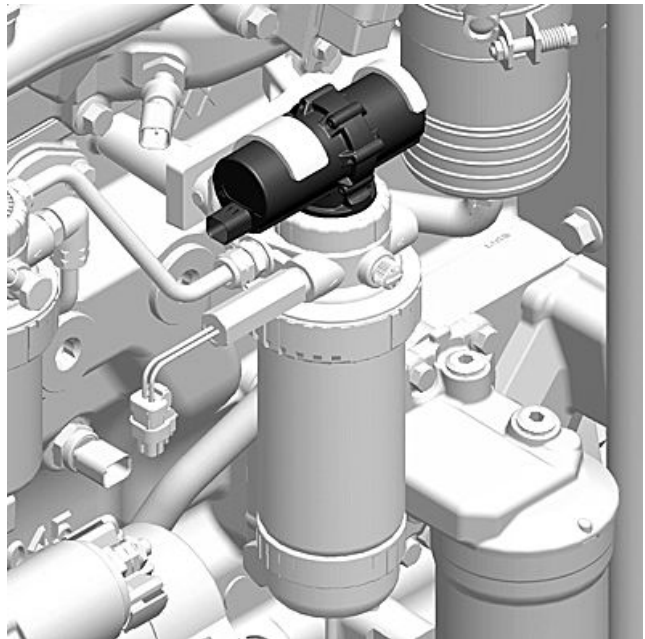
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BK34394,000153B -19-21MAR11-1/2



Low-Pressure Fuel Pump Location Overview

RG19963 —UN—10FEB11



Y5004 Image

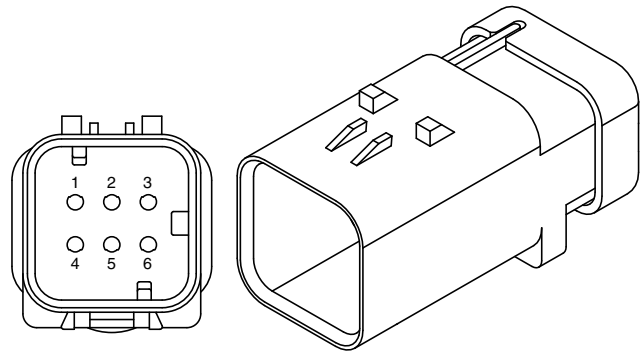
RG19964 —UN—10FEB11

For additional low-pressure fuel pump information, see [Low-Pressure Fuel Pump Operation](#) in Section 03, Group 130.

BK34394,000153B -19-21MAR11-2/2

Y5005 - Variable Speed Fan

Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (5 V)	5616	Blue
2	Clutch PWM Drive	5018	Gray
3	Battery (-)	5050	Black
4	Return	5814	Yellow
5	Fan Speed Signal	5019	White
6	Unused	Unused	Unused



6-Pin Connector

RG17461 —UN—16OCT09

4045 engines can be equipped with an electronic variable speed cooling fan. The fan is either driven off the engine with a viscous clutch or driven off a hydraulic motor with a clutch.

Inputs to the ECU allow the ECU to determine fan clutch control include: Engine Speed, Fan Speed, Throttle Position, Engine Coolant Temperature, Transmission Oil Temperature, A/C selection (ON or OFF) and manual control inputs (used for diagnostics). The clutch partially changes the mechanical fan engagement with the drive mechanism. The viscous or hydraulic operated clutch is controlled based on the input that the ECU determines has the highest desired fan speed. The ECU sends a

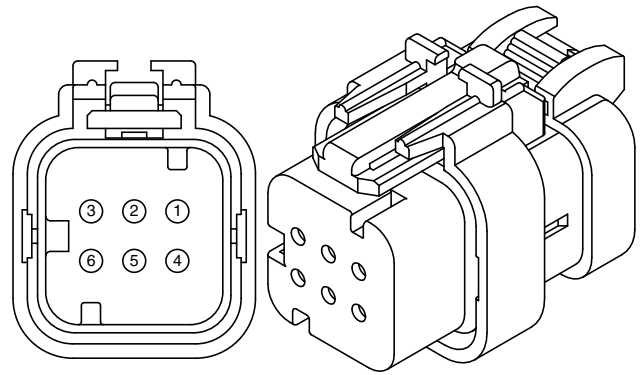
PWM signal to control the fan clutch solenoid to meet the desired fan speed. Engine driven variable speed fans contain a fan speed sensor. If the speed feedback indicates the desired speed is met, then the pulse width is adjusted to maintain the clutch position. Fans without speed sensors are controlled based off an ECU lookup table using different sensor inputs. If the ECU cannot detect a system to be monitored for cooling, an ECU diagnostic trouble code will be set.

Disconnecting the Y5005 connector causes the fan to go to maximum speed.

BK34394,000153C -19-05JUL11-1/1

Y5400 - EGR Valve

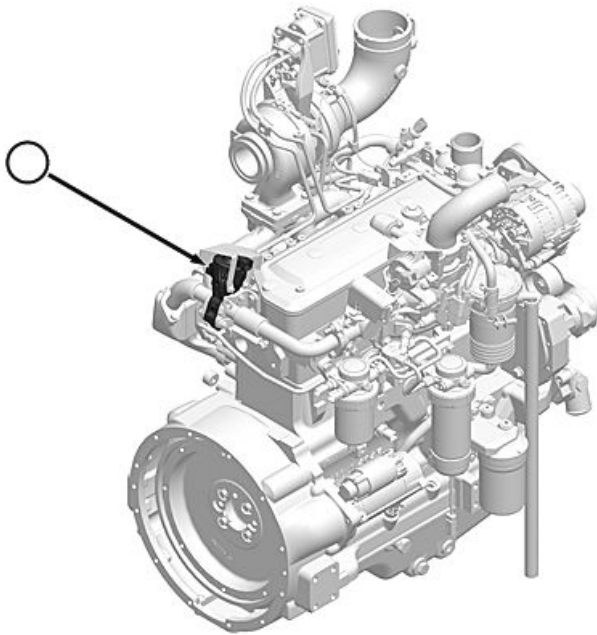
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (5 V)	5466	Blue
2	Return	5444	Yellow
3	EGR Valve Position Signal	5425	Green
4	EGR Valve PWM Drive #2	5423	Orange
5	Unused	Unused	Unused
6	EGR Valve PWM Drive #1	5421	Brown



6-Pin Connector

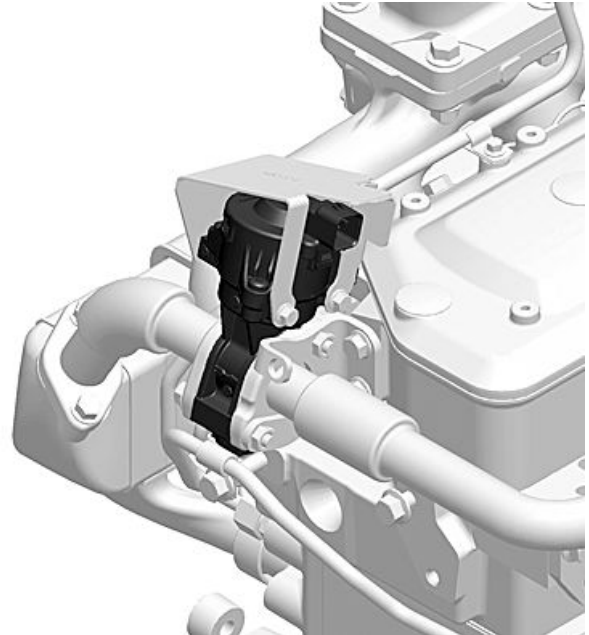
RG16646—UN—21MAY12

BK34394,000153D -19-21MAR11-1/2



EGR Valve Location Overview

RG19965—UN—04FEB11



Y5400 Image

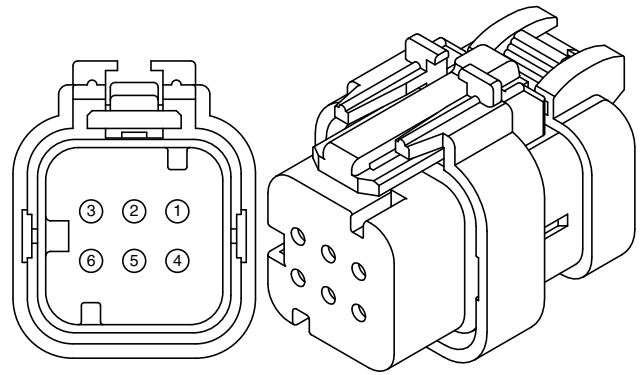
RG19966—UN—04FEB11

For additional EGR valve information, see [EGR Valve Operation](#) in Section 03, Group 135.

BK34394,000153D -19-21MAR11-2/2

Y5401 - Air Throttle Actuator

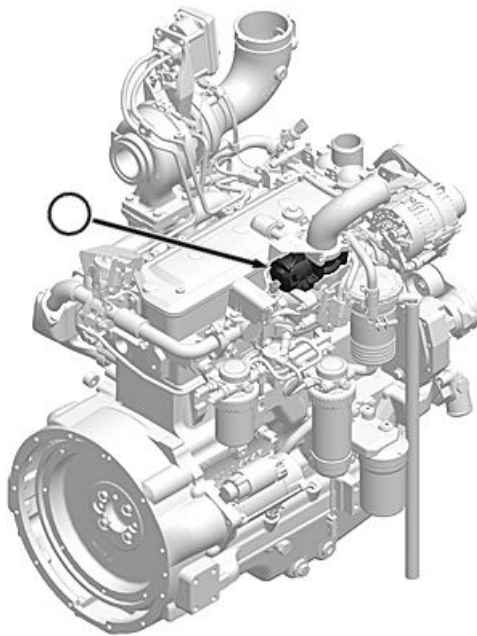
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Supply (5 V)	5466	Blue
2	Return	5444	Yellow
3	Air Throttle Actuator Position Signal	5509	White
4	Air Throttle Actuator PWM Drive #1	5013	Orange
5	Unused	Unused	Unused
6	Air Throttle Actuator PWM Drive #2	5011	Brown



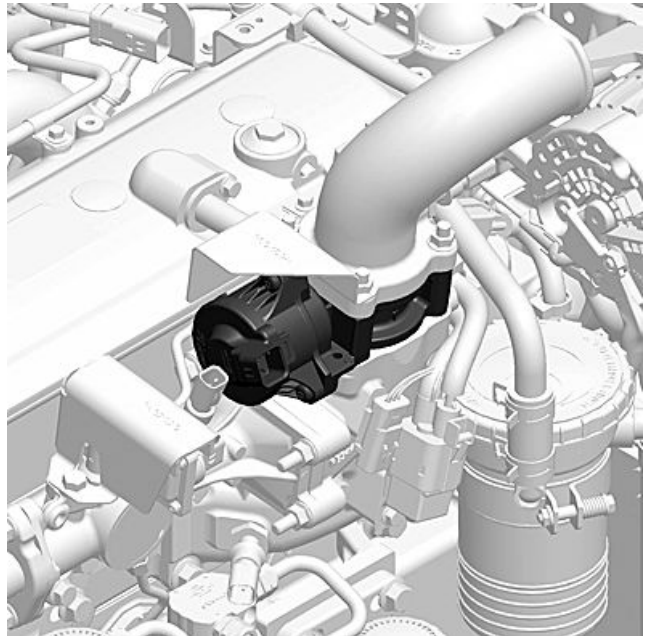
6-Pin Connector

RG16646 —UN—21MAY12

BK34394.000153E -19-21MAR11-1/2



Air Throttle Actuator Location Overview



Y5401 Image

RG19967 —UN—04FEB11

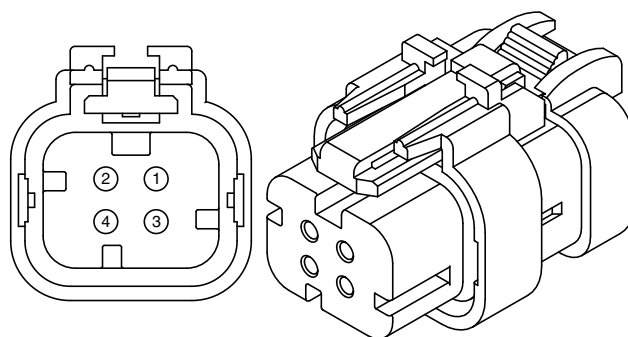
RG19968 —UN—04FEB11

For additional air throttle actuator information, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

BK34394.000153E -19-21MAR11-2/2

Y5500 — Exhaust Throttle Actuator

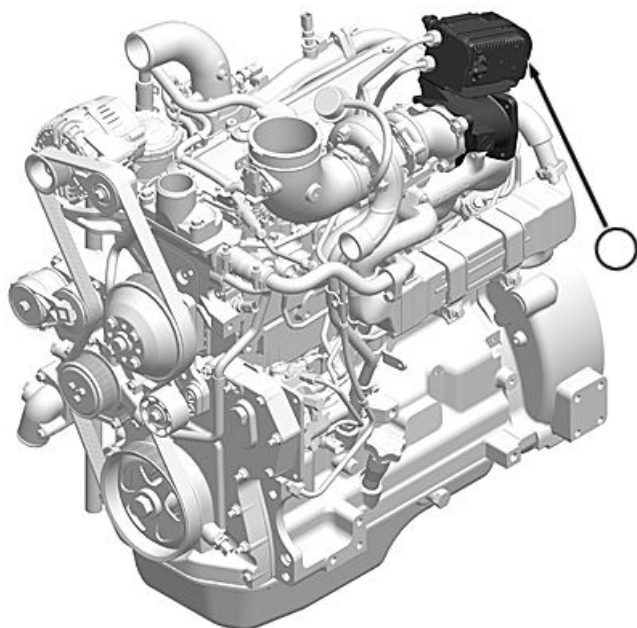
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Power ON Signal	5007	Violet
2	Return	5006	Blue
3	CAN Low	5805	Green
4	CAN High	5804	Yellow



4-Pin Connector

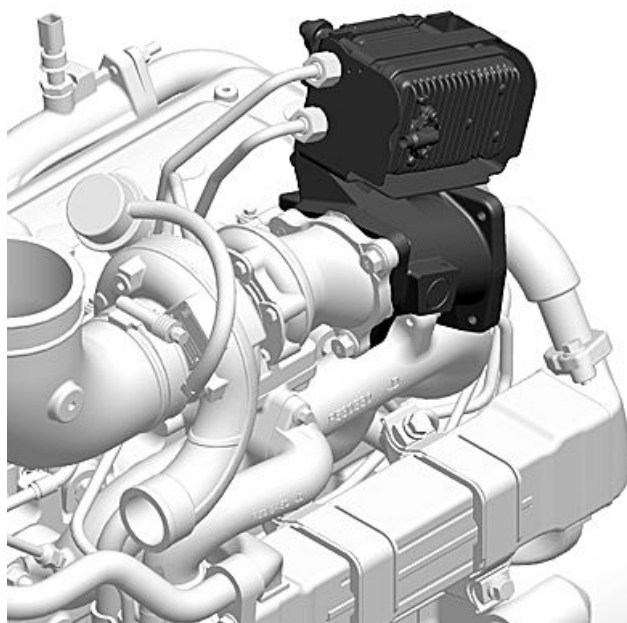
BK34394,0001B4E -19-31MAR11-1/2

RG16710 —UN—22MAY12



Exhaust Throttle Actuator Location Overview

NOTE: The exhaust throttle actuator is only used on engines with a wastegate turbocharger.



Y5500 Image

For additional exhaust throttle actuator information, see [Exhaust Throttle Operation](#) in Section 03, Group 135.

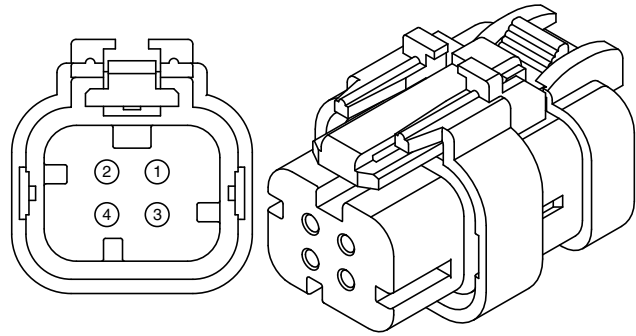
BK34394,0001B4E -19-31MAR11-2/2

RG19972 —UN—09FEB11

RG19971 —UN—09FEB11

Y5500 — VGT Actuator

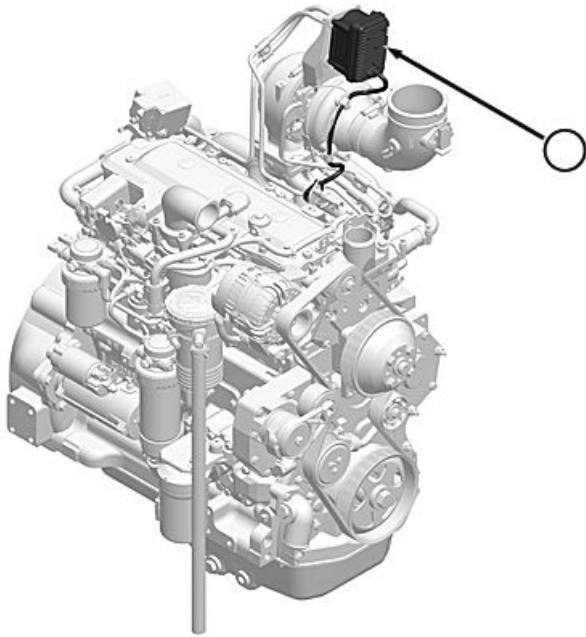
Component Information			
Pin	Description	Circuit Number	Wire Color
1	Power ON Signal	5007	Violet
2	Return	5006	Blue
3	CAN Low	5805	Green
4	CAN High	5804	Yellow



4-Pin Connector

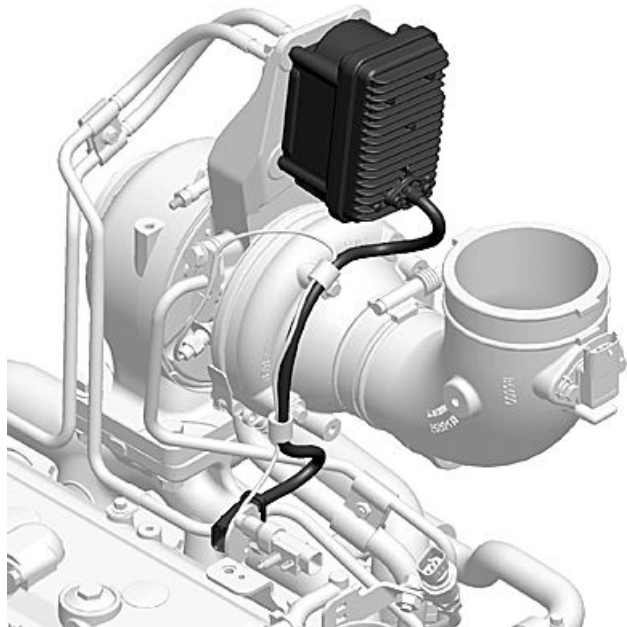
BK34394,000153F -19-18MAY11-1/2

RG16710 —UN—22MAY12



VGT Actuator Location Overview

RG19969 —UN—03FEB11



VGT Actuator Location Overview

RG19970 —UN—03FEB11

For additional VGT actuator information, see [VGT Operation](#) in Section 03, Group 135.

BK34394,000153F -19-18MAY11-2/2

Section 04 Diagnostics

Contents

Page	Page
Group 150—Observable Diagnostics and Tests	Group 155—Checks, Tests, and Procedures
Abnormal Engine Noise.....04-150-1	Aftertreatment Verification
Coolant in Oil or Oil in Coolant.....04-150-3	Procedure.....04-155-1
Coolant Leaking from Weep Hole.....04-150-3	Air in Fuel Check.....04-155-2
Coolant System Loses Pressure.....04-150-3	Camshaft to Crankshaft Timing
ECU Does Not Communicate with	Check.....04-155-3
Powerview.....04-150-4	CAN Diagnostics Procedure.....04-155-4
Diagnostic Procedure.....04-150-5	Diagnostic Procedure.....04-155-5
ECU Does Not Communicate with	CAN Message Not Received.....04-155-9
Service ADVISOR.....04-150-8	CAN Message Received Error.....04-155-10
Diagnostic Procedure.....04-150-9	CAN Message Received Is
ECU Does Not Program with Service	Incorrect.....04-155-11
ADVISOR.....04-150-16	Carbon Removal Procedure.....04-155-12
Diagnostic Procedure.....04-150-16	Charge Air Cooler Test.....04-155-13
EGR Cooler Leaking.....04-150-16	Cooling System Test.....04-155-15
Engine Coolant Temperature Below	Crankcase Pressure (Blow-By)
Normal.....04-150-17	Test.....04-155-16
Diagnostic Procedure.....04-150-17	Crankcase Pressure (Blow-By)
Engine Cranks and Will Not Start.....04-150-20	Diagnostic Procedure.....04-155-16
Diagnostic Procedure.....04-150-20	EGR Cooler Test.....04-155-19
Engine Does Not Develop Full	Engine Cranking Speed Check.....04-155-20
Power.....04-150-26	Engine Oil Pressure Check.....04-155-21
Diagnostic Procedure.....04-150-26	Exhaust Condition Check.....04-155-21
Engine Emits Excessive Black or Gray	Exhaust Condition Check.....04-155-21
Exhaust Smoke.....04-150-31	Fuel Rail Cap and Plug
Engine Emits Excessive Black or	Procedure.....04-155-28
Gray Exhaust Smoke Diagnostic	Fuel Return Line (Leak off)
Procedure.....04-150-31	Restriction Check.....04-155-29
Engine Emits Excessive Blue Exhaust	Fuel Supply Quality Check.....04-155-30
Smoke.....04-150-32	Check Fuel Supply Quality Diagnostic
Engine Emits Excessive Blue Exhaust	Procedure.....04-155-30
Smoke Diagnostic Procedure.....04-150-32	Fuel System Bleeding.....04-155-30
Engine Emits Excessive White Exhaust	Fuel System Bleeding.....04-155-31
Smoke.....04-150-33	High-Pressure Fuel System
Engine Emits Excessive White Exhaust	Check.....04-155-32
Smoke Diagnostic Procedure.....04-150-33	High-Pressure Fuel System
Engine Misfires or Runs	Check.....04-155-33
Irregularly.....04-150-34	Low-Pressure Fuel System
Diagnostic Procedure.....04-150-34	Check.....04-155-43
Engine Will Not Crank.....04-150-38	Low-Pressure Fuel System Test
Diagnostic Procedure.....04-150-38	Diagnostic Procedure.....04-155-44
Excessive Fuel Consumption.....04-150-41	Mechanical Compression Test.....04-155-50
Excessive Oil Carryover.....04-150-42	Problem Not Found Procedure.....04-155-51
Diagnostic Procedure.....04-150-42	Diagnostic Procedure.....04-155-51
Excessive Oil Consumption.....04-150-43	Short to Voltage Procedure.....04-155-51
Diagnostic Procedure.....04-150-43	Diagnostic Procedure.....04-155-51
Fuel in Coolant.....04-150-45	Terminal Test.....04-155-53
Diagnostic Procedure.....04-150-45	Turbocharger Oil Seal Leak
Fuel in Oil.....04-150-46	Check.....04-155-55
Diagnostic Procedure.....04-150-46	Venturi — Cleaning.....04-155-56
Throttle Does Not Respond.....04-150-48	Verification Procedure.....04-155-56
Throttle Does Not Respond.....04-150-48	

Continued on next page

Page	Page
Verification Procedure04-155-56	Interactive Tests and Calibration
Wiggle Test.....04-155-57	Results — Printing, Exporting, or
	Saving Instructions04-160-72
Group 160—Diagnostic Instructions and Information	Internal Data Monitor —
Air Throttle Actuator Learn Value	Instructions04-160-73
Reset Test Instructions04-160-1	Keep Electronic Control Unit
Carbon Removal Procedure04-160-1	Connectors Clean.....04-160-76
Clear Aftertreatment Latched DTC	Load Profile Information Test —
— Test Instructions04-160-2	Instructions04-160-77
Connecting to Service ADVISOR04-160-3	Payload File — Component
Control Unit Information and	Payload Downloading
Overview Test.....04-160-5	Instructions04-160-79
Cylinder Cutout Test Instructions.....04-160-6	Payload File — ECU Payload
Cylinder Electronic Compression	Downloading Instructions04-160-80
Test Instructions.....04-160-8	Regeneration Abort Source
Cylinder Misfire Test Instructions.....04-160-12	Identification Test —
Data Points Used in Service	Instructions04-160-80
ADVISOR04-160-14	Regeneration Failure — Possible
Diagnostic Gauge — Active DTC	Causes04-160-81
Viewing Instructions.....04-160-19	Service Regeneration
Diagnostic Gauge — Data	Instructions04-160-82
Parameters Viewing	Servicing Electronic Control Units.....04-160-82
Instructions04-160-20	Snapshot Instructions.....04-160-83
Diagnostic Gauge — Exhaust Filter	Trim Options Information04-160-85
Service Recovery Instructions.....04-160-22	VGT or Exhaust Throttle — Learn
Diagnostic Gauge — Stored DTC	Value Reset Instructions.....04-160-86
Clearing Instructions.....04-160-28	View Non-Clearable DTCs — Test
Diagnostic Gauge — Stored DTC	Instructions04-160-86
Viewing Instructions.....04-160-29	Welding Near Electronic Control
Diagnostic Test Box — Using04-160-31	Units04-160-86
Diagnostic Trouble Code (DTC)	
Group Locator.....04-160-36	Group 161—Engine Position Diagnostics
Diagnostic Trouble Code (DTC)	000190.00 — Engine Speed Extremely
Group Locator (Continued).....04-160-46	High.....04-161-1
Diagnostic Trouble Code	Diagnostic Procedure04-161-1
Designations.....04-160-57	000190.16 — Engine Speed
Digital Multimeter — Using04-160-59	Moderately High04-161-2
DOC Calibration — Instructions04-160-59	000636.02 — Camshaft Position
DPF Calibration — Instructions04-160-60	Signal Invalid.....04-161-3
EGR Valve — Clean Test	Diagnostic Procedure04-161-4
Instructions04-160-62	000636.05 — Camshaft Position
EGR Valve — Learn Value Reset	Circuit Has High Resistance04-161-7
Instructions04-160-62	Diagnostic Procedure04-161-8
Electrical Circuit Concepts.....04-160-63	000636.06 — Camshaft Position
Electrical Noise — Possible	Circuit Has Low Resistance04-161-10
Causes04-160-68	Diagnostic Procedure04-161-11
Electronic Injector - Calibration	000636.08 — Camshaft Position
Information.....04-160-69	Signal Missing04-161-16
Engine Control Unit (ECU) —	Diagnostic Procedure04-161-17
Reprogramming Instructions04-160-70	000636.10 — Camshaft Position Signal
Engine Hours — Updating	Rate of Change Abnormal.....04-161-20
Instructions04-160-70	Diagnostic Procedure04-161-21
Engine Overspeed Verification	000637.02 — Crankshaft Position
Test.....04-160-70	Signal Invalid.....04-161-26
Exhaust Temperature Management	Diagnostic Procedure04-161-27
Test Instructions.....04-160-71	000637.05 — Crankshaft Position
Harness Diagnostic Mode Test.....04-160-71	Circuit Has High Resistance04-161-30
	Diagnostic Procedure04-161-31

Continued on next page

Page	Page
000637.06 — Crankshaft Position Circuit Has Low Resistance04-161-34 Diagnostic Procedure04-161-35	000107.15 — Air Filter Pressure Differential Slightly High04-162-56
000637.07 — Crankshaft Position and Camshaft Position Signals Out of Sync04-161-40 Diagnostic Procedure04-161-41	000107.16 — Air Filter Pressure Differential Moderately High04-162-57
000637.08 — Crankshaft Position Signal Missing04-161-44 Diagnostic Procedure04-161-45	000412.00 — EGR Temperature Signal Extremely High04-162-58 Diagnostic Procedure04-162-59
000637.10 — Crankshaft Position Signal Rate of Change Abnormal04-161-48 Diagnostic Procedure04-161-49	000412.03 — EGR Temperature Signal Out of Range High04-162-63 Diagnostic Procedure04-162-64
001322.31 — Engine Misfire Detected04-161-53 Diagnostic Procedure04-161-53	000412.04 — EGR Temperature Signal Out Of Range Low04-162-67 Diagnostic Procedure04-162-68
Group 162—Air Intake and Exhaust System Diagnostics	000412.15 — EGR Temperature Signal Slightly High04-162-72
000102.00 — Manifold Air Pressure Signal Extremely High04-162-1 Diagnostic Procedure04-162-2	000412.16 — EGR Temperature Signal Moderately High04-162-73
000102.03 — Manifold Air Pressure Signal Out of Range High04-162-6 Diagnostic Procedure04-162-7	000676.05 — Cold Start Aid Drive Circuit has High Resistance04-162-74 Diagnostic Procedure04-162-75
000102.04 — Manifold Air Pressure Signal Out of Range Low04-162-11 Diagnostic Procedure04-162-12	000676.06 — Cold Start Aid Drive Circuit Has Low Resistance04-162-79 Diagnostic Procedure04-162-80
000102.07 — Manifold Air Pressure Signal In Range Invalid04-162-16 Diagnostic Procedure04-162-17	000676.14 — Cold Start Aid Signal Received When Not Expected04-162-84 Diagnostic Procedure04-162-85
000102.16 — Manifold Air Pressure Signal Moderately High04-162-22	000676.31 — Cold Start Aid Relay Signal Not Received When Expected04-162-89 Diagnostic Procedure04-162-90
000103.00 — VGT Speed Signal Extremely High04-162-23 Diagnostic Procedure04-162-24	001172.12 — Intake Air Temperature Error04-162-94 Diagnostic Procedure04-162-95
000103.02 — VGT Speed Signal Invalid04-162-27 Diagnostic Procedure04-162-28	001176.07 — Intake Air Pressure Mismatch04-162-96 Diagnostic Procedure04-162-97
000103.05 — VGT Speed Circuit Has High Resistance04-162-32 Diagnostic Procedure04-162-33	001176.12 — Intake Air Pressure Error04-162-99 Diagnostic Procedure04-162-100
000105.00 — Manifold Air Temperature Signal Extremely High04-162-37 Diagnostic Procedure04-162-38	001209.03 — Exhaust Manifold Pressure Signal Out of Range High04-162-102 Diagnostic Procedure04-162-103
000105.03 — Manifold Air Temperature Signal Out of Range High04-162-42 Diagnostic Procedure04-162-43	001209.04 — Exhaust Manifold Pressure Signal Out of Range Low04-162-108 Diagnostic Procedure04-162-109
000105.04 — Manifold Air Temperature Signal Out of Range Low04-162-46 Diagnostic Procedure04-162-47	001209.07 — Exhaust Manifold Pressure Mismatch04-162-114 Diagnostic Procedure04-162-115
000105.15 — Manifold Air Temperature Signal Slightly High04-162-51	002630.00 — Charge Air Cooler Outlet Temperature Signal Extremely High04-162-121 Diagnostic Procedure04-162-122
000105.16 — Manifold Air Temperature Signal Moderately High04-162-52	002630.03 — Charge Air Cooler Outlet Temperature Signal Out Of Range High04-162-126 Diagnostic Procedure04-162-127
000107.00 — Air Filter Pressure Differential Extremely High04-162-53 Diagnostic Procedure04-162-54	

Continued on next page

Page	Page
002630.04 — Charge Air Cooler Outlet Temperature Signal Out Of Range Low.....04-162-130 Diagnostic Procedure04-162-131	000110.15 — Engine Coolant Temperature Signal Slightly High.....04-163-58
002630.15 — Charge Air Cooler Outlet Temperature Signal Slightly High.....04-162-135	000110.16 — Engine Coolant Temperature Signal Moderately High.....04-163-59
002630.16 — Charge Air Cooler Outlet Temperature Signal Moderately High.....04-162-136	000110.17 — Engine Coolant Temperature Signal Slightly Low.....04-163-60
004490.12 — Intake Air Humidity Error04-162-137 Diagnostic Procedure04-162-138	000111.01 — Engine Coolant Level Alarm Switch Activated at High Coolant Temperature.....04-163-61 Diagnostic Procedure04-163-62
522494.09 — Intake Air Sensor Communication Error04-162-140 Diagnostic Procedure04-162-141	000111.07 — Engine Coolant Level Switch Mismatch04-163-65 Diagnostic Procedure04-163-66
Group 163—Lubrication and Cooling System Diagnostics	000111.17 — Engine Coolant Level Information Switch Activated.....04-163-71 Diagnostic Procedure04-163-72
000100.01 — Engine Oil Pressure Signal Extremely Low.....04-163-1 Diagnostic Procedure04-163-2	000111.18 — Engine Coolant Level Alarm Switch Activated at Moderate Coolant Temperature.....04-163-76
000100.02 — Engine Oil Pressure is not Zero with Engine Stopped.....04-163-7 Diagnostic Procedure04-163-8	Group 164— Fuel System Diagnostics
000100.03 — Engine Oil Pressure Signal Out of Range High04-163-13 Diagnostic Procedure04-163-14	000094.03 — Low-Pressure Fuel Signal Out of Range High04-164-1 Diagnostic Procedure04-164-2
000100.04 — Engine Oil Pressure Signal Out of Range Low04-163-19 Diagnostic Procedure04-163-20	000094.04 — Low-Pressure Fuel Signal Out of Range Low04-164-6 Diagnostic Procedure04-164-7
000100.18 — Engine Oil Pressure Signal Moderately Low.....04-163-26	000094.16 — Low-Pressure Fuel Signal Moderately High04-164-12 Diagnostic Procedure04-164-13
000101.00 — Engine Crankcase Pressure Extremely High04-163-27 Diagnostic Procedure04-163-28	000094.17 — Low-Pressure Fuel Signal Slightly Low04-164-16
000101.03 — Engine Crankcase Pressure Signal Out of Range High.....04-163-32 Diagnostic Procedure04-163-33	000094.18 — Low-Pressure Fuel Signal Moderately Low.....04-164-17 Diagnostic Procedure04-164-18
000101.04 — Engine Crankcase Pressure Signal Out of Range Low.....04-163-37 Diagnostic Procedure04-163-38	000097.00 — Water-In-Fuel Level Extremely High04-164-22 Diagnostic Procedure04-164-23
000101.16 — Engine Crankcase Pressure Moderately High.....04-163-42	000097.03 — Water-In-Fuel Signal Out Of Range High04-164-28 Diagnostic Procedure04-164-29
000110.00 — Engine Coolant Temperature Signal Extremely High.....04-163-43 Diagnostic Procedure04-163-44	000097.04 — Water-In-Fuel Signal Out Of Range Low04-164-32 Diagnostic Procedure04-164-33
000110.03 — Engine Coolant Temperature Signal Out of Range High.....04-163-49 Diagnostic Procedure04-163-50	000097.16 — Water-In-Fuel Level Moderately High04-164-37
000110.04 — Engine Coolant Temperature Signal Out of Range Low.....04-163-53 Diagnostic Procedure04-163-54	000157.01 — Fuel Rail Pressure Signal Extremely Low.....04-164-38 Diagnostic Procedure04-164-39
	000157.03 — Fuel Rail Pressure Signal Out of Range High04-164-41 Diagnostic Procedure04-164-42
	000157.04 — Fuel Rail Pressure Signal Out of Range Low04-164-46 Diagnostic Procedure04-164-47

Continued on next page

Page	Page
000157.16 — Fuel Rail Pressure Signal Moderately High04-164-52	Diagnostic Procedure04-164-120
Diagnostic Procedure04-164-53	000653.02 — Injector #3 Part Number Data Invalid04-164-121
000157.17 — Fuel Rail Pressure Signal Slightly Low04-164-55	Diagnostic Procedure04-164-121
000157.18 — Fuel Rail Pressure Signal Moderately Low04-164-56	000653.05 — Injector #3 Circuit Has High Resistance04-164-123
000174.00 — Fuel Temperature Signal Extremely High04-164-57	Diagnostic Procedure04-164-124
Diagnostic Procedure04-164-58	000653.06 — Injector #3 Circuit Has Low Resistance04-164-128
000174.03 — Fuel Temperature Signal Out Of Range High04-164-62	Diagnostic Procedure04-164-129
Diagnostic Procedure04-164-63	000653.13 — Injector #3 Calibration Fault04-164-133
000174.04 — Fuel Temperature Signal Out Of Range Low04-164-67	Diagnostic Procedure04-164-133
Diagnostic Procedure04-164-68	000653.18 — Injector #3 Not Responding04-164-134
000174.16 — Fuel Temperature Signal Moderately High04-164-72	Diagnostic Procedure04-164-134
000611.03 — Injector Drive #1 Shorted to Voltage Source04-164-73	000654.02 — Injector #4 Part Number Data Invalid04-164-135
Diagnostic Procedure04-164-74	Diagnostic Procedure04-164-135
000611.04 — Injector Drive #1 Shorted to Ground04-164-78	000654.05 — Injector #4 Circuit Has High Resistance04-164-137
Diagnostic Procedure04-164-79	Diagnostic Procedure04-164-138
000612.03 — Injector Drive #2 Shorted to Voltage Source04-164-83	000654.06 — Injector #4 Circuit Has Low Resistance04-164-142
Diagnostic Procedure04-164-84	Diagnostic Procedure04-164-143
000612.04 — Injector Drive #2 Shorted to Ground04-164-88	000654.13 — Injector #4 Calibration Fault04-164-147
Diagnostic Procedure04-164-89	Diagnostic Procedure04-164-147
000651.02 — Injector #1 Part Number Data Invalid04-164-93	000654.18 — Injector #4 Not Responding04-164-148
Diagnostic Procedure04-164-93	Diagnostic Procedure04-164-148
000651.05 — Injector #1 Circuit Has High Resistance04-164-95	001347.01 — Suction Control Valve Sticking and Fuel Rail Pressure Extremely Low04-164-149
Diagnostic Procedure04-164-96	Diagnostic Procedure04-164-150
000651.06 — Injector #1 Circuit Has Low Resistance04-164-100	001347.05 — Suction Control Valve Circuit Has High Resistance04-164-152
Diagnostic Procedure04-164-101	Diagnostic Procedure04-164-153
000651.13 — Injector #1 Calibration Fault04-164-105	001347.06 — Suction Control Valve Circuit Has Low Resistance04-164-158
Diagnostic Procedure04-164-105	Diagnostic Procedure04-164-159
000651.18 — Injector #1 Not Responding04-164-106	001347.16 — Suction Control Valve Sticking and Fuel Rail Pressure Moderately High04-164-163
Diagnostic Procedure04-164-106	Diagnostic Procedure04-164-164
000652.02 — Injector #2 Part Number Data Invalid04-164-107	001347.18 — Suction Control Valve Sticking and Fuel Rail Pressure Slightly Low04-164-166
Diagnostic Procedure04-164-107	Diagnostic Procedure04-164-167
000652.05 — Injector #2 Circuit Has High Resistance04-164-109	002797.03 — Injector High Voltage Supply #1 Out of Range High04-164-169
Diagnostic Procedure04-164-110	002797.05 — Injector High Voltage Supply #1 Circuit Has High Resistance04-164-170
000652.06 — Injector #2 Circuit Has Low Resistance04-164-114	Diagnostic Procedure04-164-170
Diagnostic Procedure04-164-115	002797.06 — Injector High Voltage Supply #1 Circuit Has Low Resistance04-164-172
000652.13 — Injector #2 Calibration Fault04-164-119	Diagnostic Procedure04-164-172
Diagnostic Procedure04-164-119	
000652.18 — Injector #2 Not Responding04-164-120	

Continued on next page

Page	Page
002798.03 — Injector High Voltage Supply #2 Out of Range High04-164-174	000168.18 — Unswitched Battery Voltage Moderately Low04-165-59
002798.05 — Injector High Voltage Supply #2 Circuit Has High Resistance04-164-175	000189.31 — Engine Speed Derate Condition Exists04-165-60
Diagnostic Procedure04-164-175	000629.11 — ECU Binary Input Error04-165-61
002798.06 — Injector High Voltage Supply #2 Circuit Has Low Resistance04-164-177	Diagnostic Procedure04-165-61
Diagnostic Procedure04-164-177	000629.12 — ECU EEPROM Error04-165-63
003597.01 — Injector High Voltage Supply Extremely Low04-164-179	Diagnostic Procedure04-165-63
Diagnostic Procedure04-164-179	000629.13 — ECU Boot Block Error04-165-65
Group 165—Engine Control Unit (ECU) and Throttle Diagnostics	000629.13 — ECU Boot Block Error Diagnostic Procedure04-165-65
000028.03 — Digital Throttle Signal Out of Range High04-165-1	000974.03 — Remote Analog Throttle Signal Out of Range High04-165-66
Diagnostic Procedure04-165-2	Diagnostic Procedure04-165-67
000028.04 — Digital Throttle Signal Out of Range Low04-165-6	000974.04 — Remote Analog Throttle Signal Out of Range Low04-165-72
Diagnostic Procedure04-165-7	Diagnostic Procedure04-165-73
000028.14 — Digital Throttle Inhibited04-165-12	001136.00 — ECU Temperature Signal Extremely High04-165-79
000029.03 — Secondary Analog Throttle Signal Out of Range High04-165-13	Diagnostic Procedure04-165-79
Diagnostic Procedure04-165-14	001136.02 — ECU Temperature Signal Invalid04-165-82
000029.04 — Secondary Analog Throttle Signal Out of Range Low04-165-19	Diagnostic Procedure04-165-82
Diagnostic Procedure04-165-20	001136.16 — ECU Temperature Signal Moderately High04-165-83
000029.14 — Secondary Analog Throttle Inhibited04-165-26	001569.31 — Engine Power Derate Condition Exists04-165-84
000091.03 — Primary Analog Throttle Signal Out of Range High04-165-27	003509.03 — Sensor Supply #1 Voltage Out of Range High04-165-85
Diagnostic Procedure04-165-28	Diagnostic Procedure04-165-85
000091.04 — Primary Analog Throttle Signal Out of Range Low04-165-33	003509.04 — Sensor Supply #1 Voltage Out of Range Low04-165-90
Diagnostic Procedure04-165-34	Diagnostic Procedure04-165-90
000091.09 — Primary Analog Throttle Signal Erratic04-165-40	003510.03 — Sensor Supply #2 Voltage Out of Range High04-165-94
000091.14 — Primary Analog Throttle Inhibited04-165-41	Diagnostic Procedure04-165-94
000108.02 — Barometric Pressure Signal Invalid04-165-42	003510.04 — Sensor Supply #2 Voltage Out of Range Low04-165-98
Diagnostic Procedure04-165-42	Diagnostic Procedure04-165-98
000108.07 — Barometric Pressure Signal Mismatch04-165-44	003511.03 — Sensor Supply #3 Voltage Out of Range High04-165-103
Diagnostic Procedure04-165-44	Diagnostic Procedure04-165-104
000158.12 — ECU Power Down Error04-165-46	003511.04 — Sensor Supply #3 Voltage Out of Range Low04-165-113
Diagnostic Procedure04-165-46	Diagnostic Procedure04-165-114
000168.01 — Unswitched Battery Voltage Extremely Low04-165-48	003512.03 — Sensor Supply #4 Voltage Out of Range High04-165-119
Diagnostic Procedure04-165-49	Diagnostic Procedure04-165-119
000168.16 — Unswitched Battery Voltage Moderately High04-165-55	003512.04 — Sensor Supply #4 Voltage Out of Range Low04-165-122
Diagnostic Procedure04-165-56	Diagnostic Procedure04-165-122
	003513.03 — Sensor Supply #5 Voltage Out of Range High04-165-127
	Diagnostic Procedure04-165-127
	003513.04 — Sensor Supply #5 Voltage Out of Range Low04-165-130

Continued on next page

Page	Page
Diagnostic Procedure04-165-130	Diagnostic Procedure04-166-42
003514.03 — Sensor Supply #6	000641.07 — VGT Actuator Learn
Voltage Out of Range High04-165-135	Error04-166-45
Diagnostic Procedure04-165-135	Diagnostic Procedure04-166-45
003514.04 — Sensor Supply #6	000641.09 — VGT Actuator Loss of
Voltage Out of Range Low04-165-142	Communication04-166-47
Diagnostic Procedure04-165-143	Diagnostic Procedure04-166-48
005125.03 — Sensor Supply #7	000641.12 — VGT Actuator Internal
Voltage Out of Range High04-165-148	Error04-166-52
Diagnostic Procedure04-165-148	Diagnostic Procedure04-166-53
005125.04 — Sensor Supply #7	000641.13 — VGT Actuator Calibration
Voltage Out of Range Low04-165-155	Error04-166-55
Diagnostic Procedure04-165-156	Diagnostic Procedure04-166-56
005126.03 — Sensor Supply #8	000641.16 — VGT Actuator
Voltage Out of Range High04-165-161	Temperature Moderately High04-166-58
Diagnostic Procedure04-165-161	000641.31 — VGT Actuator Supply
005126.04 — Sensor Supply #8	Voltage Fault04-166-59
Voltage Out of Range Low04-165-168	Diagnostic Procedure04-166-60
Diagnostic Procedure04-165-168	002659.02 — EGR Flow Signal
005127.03 — Sensor Supply #9	Invalid04-166-64
Voltage Out of Range High04-165-172	Diagnostic Procedure04-166-65
Diagnostic Procedure04-165-173	002659.03 — EGR Flow Signal Out of
005127.04 — Sensor Supply #9	Range High04-166-70
Voltage Out of Range Low04-165-179	Diagnostic Procedure04-166-71
Diagnostic Procedure04-165-180	002659.04 — EGR Flow Signal Out of
	Range Low04-166-76
	Diagnostic Procedure04-166-77
	002659.14 — EGR Flow Signal
	Error04-166-82
	Diagnostic Procedure04-166-82
	002659.15 — EGR Flow Signal
	Moderately High04-166-83
	Diagnostic Procedure04-166-84
	002659.17 — EGR Flow Signal
	Moderately Low04-166-88
	Diagnostic Procedure04-166-89
	002791.05 — EGR Valve Drive Circuit
	Fault04-166-94
	Diagnostic Procedure04-166-95
	002791.06 — EGR Valve Drive Circuit
	Has Low Resistance04-166-100
	Diagnostic Procedure04-166-101
	002791.07 — EGR Valve Desired and
	Actual Position Mismatch During a
	Learn04-166-105
	Diagnostic Procedure04-166-106
	002791.13 — EGR Valve Calibration
	Error04-166-111
	Diagnostic Procedure04-166-112
	002795.07 — VGT Vane Desired and
	Actual Position Mismatch04-166-115
	Diagnostic Procedure04-166-116
	003464.05 — Air Throttle Actuator
	Drive Circuit Fault04-166-119
	Diagnostic Procedure04-166-120
	003464.06 — Air Throttle
	Actuator Drive Circuit Has Low
	Resistance04-166-125
	Diagnostic Procedure04-166-126

Group 166—Air or Exhaust Throttle**Actuator, EGR Valve, and VGT Diagnostics**

000027.03 — EGR Valve Position	
Signal Out of Range High04-166-1	
Diagnostic Procedure04-166-2	
000027.04 — EGR Valve Position	
Signal Out of Range Low04-166-7	
Diagnostic Procedure04-166-8	
000027.07 — EGR Valve Desired and	
Actual Position Mismatch04-166-14	
000051.03 — Air Throttle Actuator	
Position Signal Out of Range	
High04-166-15	
Diagnostic Procedure04-166-16	
000051.04 — Air Throttle Actuator	
Position Signal Out of Range	
Low04-166-21	
Diagnostic Procedure04-166-22	
000051.07 — Air Throttle Actuator	
Desired and Actual Position	
Mismatch04-166-28	
000051.14 — Air Throttle Actuator	
and EGR Valve Connectors	
Swapped04-166-29	
Diagnostic Procedure04-166-30	
000641.00 — VGT Actuator	
Temperature Extremely High04-166-33	
Diagnostic Procedure04-166-34	
000641.05 — VGT Actuator Drive	
Circuit Has High Resistance04-166-37	
Diagnostic Procedure04-166-38	
000641.06 — VGT Actuator Drive	
Circuit Has Low Resistance04-166-41	

Continued on next page

Page	Page
003464.07 — Air Throttle Actuator Desired and Actual Position Mismatch During a Learn04-166-129	003719.10 — Calculated Soot Loading Rate of Change Abnormal.....04-167-19
Diagnostic Procedure04-166-130	Diagnostic Procedure04-167-20
003464.13 — Air Throttle Actuator Calibration Error04-166-134	003719.13 — Excessive DPF Recovery Attempts.....04-167-24
Diagnostic Procedure04-166-135	Diagnostic Procedure04-167-24
003465.00 — Exhaust Throttle Actuator Temperature Extremely High.....04-166-138	003719.15 — Calculated Soot Level Slightly High04-167-26
Diagnostic Procedure04-166-139	003719.16 — Calculated Soot Level Moderately High04-167-27
003465.05 — Exhaust Throttle Actuator Drive Circuit Has High Resistance04-166-142	003720.15 — Calculated Ash Level Slightly High04-167-28
Diagnostic Procedure04-166-143	003720.16 — Calculated Ash Level Moderately High04-167-29
003465.06 — Exhaust Throttle Actuator Drive Circuit Has Low Resistance04-166-146	Diagnostic Procedure04-167-29
Diagnostic Procedure04-166-147	003936.00 — Calculated Unintended Combustibles in DPF Extremely High.....04-167-30
003465.07 — Exhaust Throttle Actuator Learn Error.....04-166-150	Diagnostic Procedure04-167-30
Diagnostic Procedure04-166-151	003936.15 — Calculated Unintended Combustibles In DPF Slightly High.....04-167-32
003465.09 — Exhaust Throttle Actuator Loss of Communication.....04-166-154	003936.16 — Calculated Unintended Combustibles In DPF Moderately High.....04-167-33
Diagnostic Procedure04-166-155	005018.00 — Calculated Unintended Combustibles in DOC Extremely High.....04-167-34
003465.12 — Exhaust Throttle Actuator Internal Error.....04-166-159	Diagnostic Procedure04-167-34
Diagnostic Procedure04-166-160	005018.15 — Calculated Unintended Combustibles In DOC Slightly High.....04-167-36
003465.13 — Exhaust Throttle Actuator Calibration Error.....04-166-162	005018.16 — Calculated Unintended Combustibles In DOC Moderately High.....04-167-37
Diagnostic Procedure04-166-163	
003465.16 — Exhaust Throttle Actuator Temperature Moderately High.....04-166-165	
003465.31 — Exhaust Throttle Actuator Supply Voltage Fault.....04-166-166	
Diagnostic Procedure04-166-167	
003673.07 — Exhaust Throttle Actuator Desired and Actual Position Mismatch.....04-166-171	
Diagnostic Procedure04-166-172	
003673.31 — Exhaust Throttle Position Invalid.....04-166-175	
Diagnostic Procedure04-166-176	
Group 167—VGT and Fuel Dosing Calculated Values Diagnostics	Group 168—Fuel Dosing Aftertreatment System Diagnostics
001180.00 — Calculated VGT Turbine Inlet Temperature Extremely High.....04-167-1	003246.00 — DPF Outlet Temperature Extremely High.....04-168-1
Diagnostic Procedure04-167-2	Diagnostic Procedure04-168-1
001180.16 — Calculated VGT Turbine Inlet Temperature Moderately High.....04-167-8	003246.12 — DPF Outlet Temperature Error04-168-3
002790.16 — Calculated VGT Compressor Outlet Temperature Moderately High04-167-9	Diagnostic Procedure04-168-3
Diagnostic Procedure04-167-10	003251.00 — DPF Differential Pres- sure Signal Not Responding04-168-6
003719.00 — Calculated Soot Level Extremely High.....04-167-14	Diagnostic Procedure04-168-7
Diagnostic Procedure04-167-15	003251.02 — DPF Differential Pressure Signal Invalid04-168-12
	003251.03 — DPF Differential Pressure Signal Out of Range High.....04-168-13
	Diagnostic Procedure04-168-14
	003251.04 — DPF Differential Pressure Signal Out of Range Low.....04-168-18
	Diagnostic Procedure04-168-19
	003251.07 — DPF Differential Pressure Signal Mismatch04-168-24

Continued on next page

Page	Page
Diagnostic Procedure04-168-25	000640.11 — External Engine Protection Activated04-178-8
004765.00 — DOC Inlet Temperature Extremely High04-168-27	000640.31 — External Derate Activated04-178-9
Diagnostic Procedure04-168-27	000647.03 — Engine Fan Drive Circuit Shorted to Voltage04-178-10
004765.12 — DOC Inlet Temperature Error04-168-28	000647.05 — Engine Fan Drive Circuit Has High Resistance04-178-11
Diagnostic Procedure04-168-28	Diagnostic Procedure04-178-12
004766.12 — DOC Outlet Temperature Error04-168-30	000647.06 — Engine Fan Drive Circuit Has Low Resistance04-178-15
Diagnostic Procedure04-168-30	Diagnostic Procedure04-178-16
004766.15 — DOC Outlet Temperature Slightly High04-168-33	000647.07 — Engine Fan Speed Decrease Circuit Fault04-178-19
Diagnostic Procedure04-168-33	Diagnostic Procedure04-178-20
004766.16 — DOC Outlet Temperature Moderately High04-168-35	000695.19 — Unapproved Engine Speed Request04-178-23
Diagnostic Procedure04-168-35	000876.05 — A/C System Drive Circuit Has High Resistance04-178-24
004766.17 — DOC Outlet Temperature Slightly Low04-168-37	000876.06 — A/C System Drive Circuit Has Low Resistance04-178-25
004766.18 — DOC Outlet Temperature Moderately Low04-168-38	000970.31 — External Shutdown Commanded04-178-25
Diagnostic Procedure04-168-38	Diagnostic Procedure04-178-26
004795.13 — Exhaust Filter Calibration Fault04-168-40	000971.31 — External Derate Commanded04-178-28
Diagnostic Procedure04-168-40	Diagnostic Procedure04-178-29
004795.31 — DPF Missing04-168-42	001069.31 — Calculated Tire Size Is Out Of Range04-178-32
Diagnostic Procedure04-168-43	001110.31 — Engine Protection System Activated04-178-32
005298.01 — DOC Efficiency Extremely Low04-168-47	001321.05 — Engine Starter Solenoid Lockout Relay Circuit Has High Resistance04-178-32
Diagnostic Procedure04-168-47	Diagnostic Procedure04-178-33
005298.18 — DOC Efficiency Moderately Low04-168-49	001321.06 — Engine Starter Solenoid Lockout Relay Circuit Has Low Resistance04-178-36
522495.09 — Exhaust Filter Temperature Module Loss of Communication04-168-50	Diagnostic Procedure04-178-37
Diagnostic Procedure04-168-51	001321.16 — Engine Starter Engaged for Too Long04-178-39
Group 178—Application Diagnostics	Diagnostic Procedure04-178-39
000137.00 — Auxiliary Gauge Pressure Reading Extremely High04-178-1	001321.31 — Engine Speed Zero with Starter Solenoid Energized04-178-40
000137.01 — Auxiliary Gauge Pressure Reading Extremely Low04-178-2	Diagnostic Procedure04-178-40
000158.01 — Battery Voltage Extremely Low04-178-2	001550.05 — Air Conditioner Compressor Current Low04-178-42
000160.02 — Primary Shaft Speed Invalid04-178-3	001550.06 — Air Conditioner Compressor Current High04-178-43
000237.02 — VIN Security Data Invalid04-178-3	001638.03 — Hydraulic Oil Temperature Signal Out of Range High04-178-44
000237.13 — VIN Option Code Security Data Conflict04-178-4	Diagnostic Procedure04-178-45
000237.31 — VIN Security Data Missing04-178-5	001638.04 — Hydraulic Oil Temperature Signal Out of Range Low04-178-48
000443.00 — Auxiliary Gauge Pressure #2 Reading Extremely High04-178-6	Diagnostic Procedure04-178-49
000443.01 — Auxiliary Gauge Pressure #2 Reading Extremely Low04-178-7	001639.01 — Fan Speed Signal Extremely Low04-178-53

Continued on next page

Page	Page
Diagnostic Procedure04-178-54	002005.09 — No CAN Message
001639.16 — Fan Speed Signal	Received From Source Address
Moderately High04-178-57	504-179-2
Diagnostic Procedure04-178-58	002005.14 — Incorrect CAN Message
001639.18 — Fan Speed Signal	Received From Source Address
Moderately Low04-178-61	504-179-2
003353.31 — Alternator Excitation	002005.19 — Communication Error
Fault04-178-62	with Source Address 504-179-2
003587.05 — Ether Control Circuit Has	002006.09 — No CAN Message
High Resistance04-178-63	Received From Source Address
003587.06 — Ether Control Circuit Has	604-179-2
Low Resistance04-178-64	002006.14 — Incorrect CAN Message
003711.14 — Exhaust Temperature	Received From Source Address
Management Failure Without	604-179-2
Load04-178-65	002006.19 — Communication Error
003711.31 — Exhaust Temperature	with Source Address 604-179-3
Management Failure With Load04-178-65	002007.09 — No CAN Message
520956.05 — Battery Cutoff	Received From Source Address
Relay Drive Circuit Has High	704-179-3
Resistance04-178-66	002007.14 — Incorrect CAN Message
520956.06 — Battery Cutoff	Received From Source Address
Relay Drive Circuit Has Low	704-179-3
Resistance04-178-67	002007.19 — Communication Error
521192.11 — Unable to Initiate	with Source Address 704-179-3
Immobilizer Authentication04-178-68	002008.09 — No CAN Message
521214.09 — Immobilizer	Received From Source Address
Authentication Timed Out04-178-69	804-179-3
521214.14 — Immobilizer	002008.14 — Incorrect CAN Message
Authentication Response	Received From Source Address
Incorrect04-178-70	804-179-3
523744.09 — A/C Clutch Status	002008.19 — Communication Error
Message Not Received04-178-70	with Source Address 804-179-3
	002009.09 — No CAN Message
	Received From Source Address
	904-179-4
	002009.14 — Incorrect CAN Message
	Received From Source Address
	904-179-4
	002009.19 — Communication Error
	with Source Address 904-179-4
	002010.09 — No CAN Message
	Received From Source Address
	1004-179-4
	002010.14 — Incorrect CAN Message
	Received From Source Address
	1004-179-4
	002010.19 — Communication Error
	with Source Address 1004-179-4
	002011.09 — No CAN Message
	Received From Source Address
	1104-179-4
	002011.14 — Incorrect CAN Message
	Received From Source Address
	1104-179-5
	002011.19 — Communication Error
	with Source Address 1104-179-5
	002012.09 — No CAN Message
	Received From Source Address
	1204-179-5

Group 179—Communication Diagnostics

002002.09 — No CAN Message	
Received From Source Address	
204-179-1	
002002.14 — Incorrect CAN Message	
Received From Source Address	
204-179-1	
002002.19 — Communication Error	
with Source Address 204-179-1	
002003.09 — No CAN Message	
Received From Source Address	
304-179-1	
002003.14 — Incorrect CAN Message	
Received From Source Address	
304-179-1	
002003.19 — Communication Error	
with Source Address 304-179-1	
002004.09 — No CAN Message	
Received From Source Address	
404-179-1	
002004.14 — Incorrect CAN Message	
Received From Source Address	
404-179-2	
002004.19 — Communication Error	
with Source Address 404-179-2	

Continued on next page

Page	Page
002012.14 — Incorrect CAN Message Received From Source Address 1204-179-5	002019.19 — Communication Error with Source Address 1904-179-8
002012.19 — Communication Error with Source Address 1204-179-5	002020.09 — No CAN Message Received From Source Address 2004-179-8
002013.09 — No CAN Message Received From Source Address 1304-179-5	002020.14 — Incorrect CAN Message Received From Source Address 2004-179-8
002013.14 — Incorrect CAN Message Received From Source Address 1304-179-5	002020.19 — Communication Error with Source Address 2004-179-9
002013.19 — Communication Error with Source Address 1304-179-6	002021.09 — No CAN Message Received From Source Address 2104-179-9
002014.09 — No CAN Message Received From Source Address 1404-179-6	002021.14 — Incorrect CAN Message Received From Source Address 2104-179-9
002014.14 — Incorrect CAN Message Received From Source Address 1404-179-6	002021.19 — Communication Error with Source Address 2104-179-9
002014.19 — Communication Error with Source Address 1404-179-6	002022.09 — No CAN Message Received From Source Address 2204-179-9
002015.09 — No CAN Message Received From Source Address 1504-179-6	002022.14 — Incorrect CAN Message Received From Source Address 2204-179-9
002015.14 — Incorrect CAN Message Received From Source Address 1504-179-6	002022.19 — Communication Error with Source Address 2204-179-9
002015.19 — Communication Error with Source Address 1504-179-6	002023.09 — No CAN Message Received From Source Address 2304-179-10
002016.09 — No CAN Message Received From Source Address 1604-179-7	002023.14 — Incorrect CAN Message Received From Source Address 2304-179-10
002016.14 — Incorrect CAN Message Received From Source Address 1604-179-7	002023.19 — Communication Error with Source Address 2304-179-10
002016.19 — Communication Error with Source Address 1604-179-7	002024.09 — No CAN Message Received From Source Address 2404-179-10
002017.09 — No CAN Message Received From Source Address 1704-179-7	002024.14 — Incorrect CAN Message Received From Source Address 2404-179-10
002017.14 — Incorrect CAN Message Received From Source Address 1704-179-7	002024.19 — Communication Error with Source Address 2404-179-10
002017.19 — Communication Error with Source Address 1704-179-7	002025.09 — No CAN Message Received From Source Address 2504-179-10
002018.09 — No CAN Message Received From Source Address 1804-179-7	002025.14 — Incorrect CAN Message Received From Source Address 2504-179-11
002018.14 — Incorrect CAN Message Received From Source Address 1804-179-8	002025.19 — Communication Error with Source Address 2504-179-11
002018.19 — Communication Error with Source Address 1804-179-8	002026.09 — No CAN Message Received From Source Address 2604-179-11
002019.09 — No CAN Message Received From Source Address 1904-179-8	002026.14 — Incorrect CAN Message Received From Source Address 2604-179-11
002019.14 — Incorrect CAN Message Received From Source Address 1904-179-8	002026.19 — Communication Error with Source Address 2604-179-11

Continued on next page

Page	Page
002027.09 — No CAN Message Received From Source Address 2704-179-11	002034.14 — Incorrect CAN Message Received From Source Address 3404-179-14
002027.14 — Incorrect CAN Message Received From Source Address 2704-179-11	002034.19 — Communication Error with Source Address 3404-179-15
002027.19 — Communication Error with Source Address 2704-179-12	002035.09 — No CAN Message Received From Source Address 3504-179-15
002028.09 — No CAN Message Received From Source Address 2804-179-12	002035.14 — Incorrect CAN Message Received From Source Address 3504-179-15
002028.14 — Incorrect CAN Message Received From Source Address 2804-179-12	002035.19 — Communication Error with Source Address 3504-179-15
002028.19 — Communication Error with Source Address 2804-179-12	002036.09 — No CAN Message Received From Source Address 3604-179-15
002029.09 — No CAN Message Received From Source Address 2904-179-12	002036.14 — Incorrect CAN Message Received From Source Address 3604-179-15
002029.14 — Incorrect CAN Message Received From Source Address 2904-179-12	002036.19 — Communication Error with Source Address 3604-179-15
002029.19 — Communication Error with Source Address 2904-179-12	002037.09 — No CAN Message Received From Source Address 3704-179-16
002030.09 — No CAN Message Received From Source Address 3004-179-13	002037.14 — Incorrect CAN Message Received From Source Address 3704-179-16
002030.14 — Incorrect CAN Message Received From Source Address 3004-179-13	002037.19 — Communication Error with Source Address 3704-179-16
002030.19 — Communication Error with Source Address 3004-179-13	002038.09 — No CAN Message Received From Source Address 3804-179-16
002031.09 — No CAN Message Received From Source Address 3104-179-13	002038.14 — Incorrect CAN Message Received From Source Address 3804-179-16
002031.14 — Incorrect CAN Message Received From Source Address 3104-179-13	002038.19 — Communication Error with Source Address 3804-179-16
002031.19 — Communication Error with Source Address 3104-179-13	002039.09 — No CAN Message Received From Source Address 3904-179-16
002032.09 — No CAN Message Received From Source Address 3204-179-13	002039.14 — Incorrect CAN Message Received From Source Address 3904-179-17
002032.14 — Incorrect CAN Message Received From Source Address 3204-179-14	002039.19 — Communication Error with Source Address 3904-179-17
002032.19 — Communication Error with Source Address 3204-179-14	002040.09 — No CAN Message Received From Source Address 4004-179-17
002033.09 — No CAN Message Received From Source Address 3304-179-14	002040.14 — Incorrect CAN Message Received From Source Address 4004-179-17
002033.14 — Incorrect CAN Message Received From Source Address 3304-179-14	002040.19 — Communication Error with Source Address 4004-179-17
002033.19 — Communication Error with Source Address 3304-179-14	002041.09 — No CAN Message Received From Source Address 4104-179-17
002034.09 — No CAN Message Received From Source Address 3404-179-14	002041.14 — Incorrect CAN Message Received From Source Address 4104-179-17

Continued on next page

Page	Page
002041.19 — Communication Error with Source Address 4104-179-18	002049.09 — No CAN Message Received From Source Address 4904-179-21
002042.09 — No CAN Message Received From Source Address 4204-179-18	002049.14 — Incorrect CAN Message Received From Source Address 4904-179-21
002042.14 — Incorrect CAN Message Received From Source Address 4204-179-18	002049.19 — Communication Error with Source Address 4904-179-21
002042.19 — Communication Error with Source Address 4204-179-18	002050.09 — No CAN Message Received From Source Address 5004-179-21
002043.09 — No CAN Message Received From Source Address 4304-179-18	002050.14 — Incorrect CAN Message Received From Source Address 5004-179-21
002043.14 — Incorrect CAN Message Received From Source Address 4304-179-18	002050.19 — Communication Error with Source Address 5004-179-21
002043.19 — Communication Error with Source Address 4304-179-18	002051.09 — No CAN Message Received From Source Address 5104-179-22
002044.09 — No CAN Message Received From Source Address 4404-179-19	002051.14 — Incorrect CAN Message Received From Source Address 5104-179-22
002044.14 — Incorrect CAN Message Received From Source Address 4404-179-19	002051.19 — Communication Error with Source Address 5104-179-22
002044.19 — Communication Error with Source Address 4404-179-19	002052.09 — No CAN Message Received From Source Address 5204-179-22
002045.09 — No CAN Message Received From Source Address 4504-179-19	002052.14 — Incorrect CAN Message Received From Source Address 5204-179-22
002045.14 — Incorrect CAN Message Received From Source Address 4504-179-19	002052.19 — Communication Error with Source Address 5204-179-22
002045.19 — Communication Error with Source Address 4504-179-19	002053.09 — No CAN Message Received From Source Address 5304-179-22
002046.09 — No CAN Message Received From Source Address 4604-179-19	002053.14 — Incorrect CAN Message Received From Source Address 5304-179-23
002046.14 — Incorrect CAN Message Received From Source Address 4604-179-20	002053.19 — Communication Error with Source Address 5304-179-23
002046.19 — Communication Error with Source Address 4604-179-20	002054.09 — No CAN Message Received From Source Address 5404-179-23
002047.09 — No CAN Message Received From Source Address 4704-179-20	002054.14 — Incorrect CAN Message Received From Source Address 5404-179-23
002047.14 — Incorrect CAN Message Received From Source Address 4704-179-20	002054.19 — Communication Error with Source Address 5404-179-23
002047.19 — Communication Error with Source Address 4704-179-20	002055.09 — No CAN Message Received From Source Address 5504-179-23
002048.09 — No CAN Message Received From Source Address 4804-179-20	002055.14 — Incorrect CAN Message Received From Source Address 5504-179-23
002048.14 — Incorrect CAN Message Received From Source Address 4804-179-20	002055.19 — Communication Error with Source Address 5504-179-24
002048.19 — Communication Error with Source Address 4804-179-21	002056.09 — No CAN Message Received From Source Address 5604-179-24

Continued on next page

Page	Page
002056.14 — Incorrect CAN Message Received From Source Address 5604-179-24	002063.19 — Communication Error with Source Address 6304-179-27
002056.19 — Communication Error with Source Address 5604-179-24	002064.09 — No CAN Message Received From Source Address 6404-179-27
002057.09 — No CAN Message Received From Source Address 5704-179-24	002064.14 — Incorrect CAN Message Received From Source Address 6404-179-27
002057.14 — Incorrect CAN Message Received From Source Address 5704-179-24	002064.19 — Communication Error with Source Address 6404-179-27
002057.19 — Communication Error with Source Address 5704-179-24	002065.09 — No CAN Message Received From Source Address 6504-179-28
002058.09 — No CAN Message Received From Source Address 5804-179-25	002065.14 — Incorrect CAN Message Received From Source Address 6504-179-28
002058.14 — Incorrect CAN Message Received From Source Address 5804-179-25	002065.19 — Communication Error with Source Address 6504-179-28
002058.19 — Communication Error with Source Address 5804-179-25	002066.09 — No CAN Message Received From Source Address 6604-179-28
002059.09 — No CAN Message Received From Source Address 5904-179-25	002066.14 — Incorrect CAN Message Received From Source Address 6604-179-28
002059.14 — Incorrect CAN Message Received From Source Address 5904-179-25	002066.19 — Communication Error with Source Address 6604-179-28
002059.19 — Communication Error with Source Address 5904-179-25	002067.09 — No CAN Message Received From Source Address 6704-179-28
002060.09 — No CAN Message Received From Source Address 6004-179-25	002067.14 — Incorrect CAN Message Received From Source Address 6704-179-29
002060.14 — Incorrect CAN Message Received From Source Address 6004-179-26	002067.19 — Communication Error with Source Address 6704-179-29
002060.19 — Communication Error with Source Address 6004-179-26	002068.09 — No CAN Message Received From Source Address 6804-179-29
002061.09 — No CAN Message Received From Source Address 6104-179-26	002068.14 — Incorrect CAN Message Received From Source Address 6804-179-29
002061.14 — Incorrect CAN Message Received From Source Address 6104-179-26	002068.19 — Communication Error with Source Address 6804-179-29
002061.19 — Communication Error with Source Address 6104-179-26	002069.09 — No CAN Message Received From Source Address 6904-179-29
002062.09 — No CAN Message Received From Source Address 6204-179-26	002069.14 — Incorrect CAN Message Received From Source Address 6904-179-29
002062.14 — Incorrect CAN Message Received From Source Address 6204-179-26	002069.19 — Communication Error with Source Address 6904-179-30
002062.19 — Communication Error with Source Address 6204-179-27	002070.09 — No CAN Message Received From Source Address 7004-179-30
002063.09 — No CAN Message Received From Source Address 6304-179-27	002070.14 — Incorrect CAN Message Received From Source Address 7004-179-30
002063.14 — Incorrect CAN Message Received From Source Address 6304-179-27	002070.19 — Communication Error with Source Address 7004-179-30

Continued on next page

Page	Page
002071.09 — No CAN Message Received From Source Address 7104-179-30	002077.14 — Incorrect CAN Message Received From Source Address 7704-179-33
002071.14 — Incorrect CAN Message Received From Source Address 7104-179-30	002077.19 — Communication Error with Source Address 7704-179-33
002071.19 — Communication Error with Source Address 7104-179-30	002078.09 — No CAN Message Received From Source Address 7804-179-34
002072.09 — No CAN Message Received From Source Address 7204-179-31	002078.14 — Incorrect CAN Message Received From Source Address 7804-179-34
002072.14 — Incorrect CAN Message Received From Source Address 7204-179-31	002078.19 — Communication Error with Source Address 7804-179-34
002072.19 — Communication Error with Source Address 7204-179-31	002079.09 — No CAN Message Received From Source Address 7904-179-34
002072.09 — No CAN Message Received From Source Address 7204-179-31	002079.14 — Incorrect CAN Message Received From Source Address 7904-179-34
002072.14 — Incorrect CAN Message Received From Source Address 7204-179-31	002079.19 — Communication Error with Source Address 7904-179-34
002072.19 — Communication Error with Source Address 7204-179-31	002080.09 — No CAN Message Received From Source Address 8004-179-34
002073.09 — No CAN Message Received From Source Address 7304-179-31	002080.14 — Incorrect CAN Message Received From Source Address 8004-179-35
002073.14 — Incorrect CAN Message Received From Source Address 7304-179-32	002080.19 — Communication Error with Source Address 8004-179-35
002073.19 — Communication Error with Source Address 7304-179-32	002081.09 — No CAN Message Received From Source Address 8104-179-35
002074.09 — No CAN Message Received From Source Address 7404-179-32	002081.14 — Incorrect CAN Message Received From Source Address 8104-179-35
002074.14 — Incorrect CAN Message Received From Source Address 7404-179-32	002081.19 — Communication Error with Source Address 8104-179-35
002074.19 — Communication Error with Source Address 7404-179-32	002082.09 — No CAN Message Received From Source Address 8204-179-35
002075.09 — No CAN Message Received From Source Address 7504-179-32	002082.14 — Incorrect CAN Message Received From Source Address 8204-179-35
002075.14 — Incorrect CAN Message Received From Source Address 7504-179-32	002082.19 — Communication Error with Source Address 8204-179-36
002075.19 — Communication Error with Source Address 7504-179-33	002083.09 — No CAN Message Received From Source Address 8304-179-36
002076.09 — No CAN Message Received From Source Address 7604-179-33	002083.14 — Incorrect CAN Message Received From Source Address 8304-179-36
002076.14 — Incorrect CAN Message Received From Source Address 7604-179-33	002083.19 — Communication Error with Source Address 8304-179-36
002076.19 — Communication Error with Source Address 7604-179-33	002084.09 — No CAN Message Received From Source Address 8404-179-36
002077.09 — No CAN Message Received From Source Address 7704-179-33	002084.14 — Incorrect CAN Message Received From Source Address 8404-179-36

Continued on next page

Page	Page
002084.19 — Communication Error with Source Address 8404-179-36	002092.09 — No CAN Message Received From Source Address 9204-179-40
002085.09 — No CAN Message Received From Source Address 8504-179-37	002092.14 — Incorrect CAN Message Received From Source Address 9204-179-40
002085.14 — Incorrect CAN Message Received From Source Address 8504-179-37	002092.19 — Communication Error with Source Address 9204-179-40
002085.19 — Communication Error with Source Address 8504-179-37	002093.09 — No CAN Message Received From Source Address 9304-179-40
002086.09 — No CAN Message Received From Source Address 8604-179-37	002093.14 — Incorrect CAN Message Received From Source Address 9304-179-40
002086.14 — Incorrect CAN Message Received From Source Address 8604-179-37	002093.19 — Communication Error with Source Address 9304-179-40
002086.19 — Communication Error with Source Address 8604-179-37	002094.09 — No CAN Message Received From Source Address 9404-179-40
002087.09 — No CAN Message Received From Source Address 8704-179-37	002094.14 — Incorrect CAN Message Received From Source Address 9404-179-41
002087.14 — Incorrect CAN Message Received From Source Address 8704-179-38	002094.19 — Communication Error with Source Address 9404-179-41
002087.19 — Communication Error with Source Address 8704-179-38	002095.09 — No CAN Message Received From Source Address 9504-179-41
002088.09 — No CAN Message Received From Source Address 8804-179-38	002095.14 — Incorrect CAN Message Received From Source Address 9504-179-41
002088.14 — Incorrect CAN Message Received From Source Address 8804-179-38	002095.19 — Communication Error with Source Address 9504-179-41
002088.19 — Communication Error with Source Address 8804-179-38	002096.09 — No CAN Message Received From Source Address 9604-179-41
002089.09 — No CAN Message Received From Source Address 8904-179-38	002096.14 — Incorrect CAN Message Received From Source Address 9604-179-41
002089.14 — Incorrect CAN Message Received From Source Address 8904-179-38	002096.19 — Communication Error with Source Address 9604-179-42
002089.19 — Communication Error with Source Address 8904-179-39	002097.09 — No CAN Message Received From Source Address 9704-179-42
002090.09 — No CAN Message Received From Source Address 9004-179-39	002097.14 — Incorrect CAN Message Received From Source Address 9704-179-42
002090.14 — Incorrect CAN Message Received From Source Address 9004-179-39	002097.19 — Communication Error with Source Address 9704-179-42
002090.19 — Communication Error with Source Address 9004-179-39	002098.09 — No CAN Message Received From Source Address 9804-179-42
002091.09 — No CAN Message Received From Source Address 9104-179-39	002098.14 — Incorrect CAN Message Received From Source Address 9804-179-42
002091.14 — Incorrect CAN Message Received From Source Address 9104-179-39	002098.19 — Communication Error with Source Address 9804-179-42
002091.19 — Communication Error with Source Address 9104-179-39	002099.09 — No CAN Message Received From Source Address 9904-179-43

Continued on next page

Page	Page
002099.14 — Incorrect CAN Message Received From Source Address 9904-179-43	002106.19 — Communication Error with Source Address 10604-179-46
002099.19 — Communication Error with Source Address 9904-179-43	002107.09 — No CAN Message Received From Source Address 10704-179-46
002100.09 — No CAN Message Received From Source Address 10004-179-43	002107.14 — Incorrect CAN Message Received From Source Address 10704-179-46
002100.14 — Incorrect CAN Message Received From Source Address 10004-179-43	002107.19 — Communication Error with Source Address 10704-179-46
002100.19 — Communication Error with Source Address 10004-179-43	002108.09 — No CAN Message Received From Source Address 10804-179-46
002101.09 — No CAN Message Received From Source Address 10104-179-43	002108.14 — Incorrect CAN Message Received From Source Address 10804-179-47
002101.14 — Incorrect CAN Message Received From Source Address 10104-179-44	002108.19 — Communication Error with Source Address 10804-179-47
002101.19 — Communication Error with Source Address 10104-179-44	002109.09 — No CAN Message Received From Source Address 10904-179-47
002102.09 — No CAN Message Received From Source Address 10204-179-44	002109.14 — Incorrect CAN Message Received From Source Address 10904-179-47
002102.14 — Incorrect CAN Message Received From Source Address 10204-179-44	002109.19 — Communication Error with Source Address 10904-179-47
002102.19 — Communication Error with Source Address 10204-179-44	002110.09 — No CAN Message Received From Source Address 11004-179-47
002103.09 — No CAN Message Received From Source Address 10304-179-44	002110.14 — Incorrect CAN Message Received From Source Address 11004-179-47
002103.14 — Incorrect CAN Message Received From Source Address 10304-179-44	002110.19 — Communication Error with Source Address 11004-179-48
002103.19 — Communication Error with Source Address 10304-179-45	002111.09 — No CAN Message Received From Source Address 11104-179-48
002104.09 — No CAN Message Received From Source Address 10404-179-45	002111.14 — Incorrect CAN Message Received From Source Address 11104-179-48
002104.14 — Incorrect CAN Message Received From Source Address 10404-179-45	002111.19 — Communication Error with Source Address 11104-179-48
002104.19 — Communication Error with Source Address 10404-179-45	002112.09 — No CAN Message Received From Source Address 11204-179-48
002105.09 — No CAN Message Received From Source Address 10504-179-45	002112.14 — Incorrect CAN Message Received From Source Address 11204-179-48
002105.14 — Incorrect CAN Message Received From Source Address 10504-179-45	002112.19 — Communication Error with Source Address 11204-179-48
002105.19 — Communication Error with Source Address 10504-179-45	002113.09 — No CAN Message Received From Source Address 11304-179-49
002106.09 — No CAN Message Received From Source Address 10604-179-46	002113.14 — Incorrect CAN Message Received From Source Address 11304-179-49
002106.14 — Incorrect CAN Message Received From Source Address 10604-179-46	002113.19 — Communication Error with Source Address 11304-179-49

Continued on next page

Page	Page
002114.09 — No CAN Message Received From Source Address 11404-179-49	002121.14 — Incorrect CAN Message Received From Source Address 12104-179-52
002114.14 — Incorrect CAN Message Received From Source Address 11404-179-49	002121.19 — Communication Error with Source Address 12104-179-52
002114.19 — Communication Error with Source Address 11404-179-49	002122.09 — No CAN Message Received From Source Address 12204-179-52
002115.09 — No CAN Message Received From Source Address 11504-179-49	002122.14 — Incorrect CAN Message Received From Source Address 12204-179-53
002115.14 — Incorrect CAN Message Received From Source Address 11504-179-50	002122.19 — Communication Error with Source Address 12204-179-53
002115.19 — Communication Error with Source Address 11504-179-50	002123.09 — No CAN Message Received From Source Address 12304-179-53
002116.09 — No CAN Message Received From Source Address 11604-179-50	002123.14 — Incorrect CAN Message Received From Source Address 12304-179-53
002116.14 — Incorrect CAN Message Received From Source Address 11604-179-50	002123.19 — Communication Error with Source Address 12304-179-53
002116.19 — Communication Error with Source Address 11604-179-50	002124.09 — No CAN Message Received From Source Address 12404-179-53
002117.09 — No CAN Message Received From Source Address 11704-179-50	002124.14 — Incorrect CAN Message Received From Source Address 12404-179-53
002117.14 — Incorrect CAN Message Received From Source Address 11704-179-50	002124.19 — Communication Error with Source Address 12404-179-54
002117.19 — Communication Error with Source Address 11704-179-51	002125.09 — No CAN Message Received From Source Address 12504-179-54
002118.09 — No CAN Message Received From Source Address 11804-179-51	002125.14 — Incorrect CAN Message Received From Source Address 12504-179-54
002118.14 — Incorrect CAN Message Received From Source Address 11804-179-51	002125.19 — Communication Error with Source Address 12504-179-54
002118.19 — Communication Error with Source Address 11804-179-51	002126.09 — No CAN Message Received From Source Address 12604-179-54
002119.09 — No CAN Message Received From Source Address 11904-179-51	002126.14 — Incorrect CAN Message Received From Source Address 12604-179-54
002119.14 — Incorrect CAN Message Received From Source Address 11904-179-51	002126.19 — Communication Error with Source Address 12604-179-54
002119.19 — Communication Error with Source Address 11904-179-51	002127.09 — No CAN Message Received From Source Address 12704-179-55
002120.09 — No CAN Message Received From Source Address 12004-179-52	002127.14 — Incorrect CAN Message Received From Source Address 12704-179-55
002120.14 — Incorrect CAN Message Received From Source Address 12004-179-52	002127.19 — Communication Error with Source Address 12704-179-55
002120.19 — Communication Error with Source Address 12004-179-52	002128.09 — No CAN Message Received From Source Address 12804-179-55
002121.09 — No CAN Message Received From Source Address 12104-179-52	002128.14 — Incorrect CAN Message Received From Source Address 12804-179-55

Continued on next page

Page	Page
002128.19 — Communication Error with Source Address 12804-179-55	002136.09 — No CAN Message Received From Source Address 13604-179-58
002129.09 — No CAN Message Received From Source Address 12904-179-55	002136.14 — Incorrect CAN Message Received From Source Address 13604-179-59
002129.14 — Incorrect CAN Message Received From Source Address 12904-179-56	002136.19 — Communication Error with Source Address 13604-179-59
002129.19 — Communication Error with Source Address 12904-179-56	002137.09 — No CAN Message Received From Source Address 13704-179-59
002130.09 — No CAN Message Received From Source Address 13004-179-56	002137.14 — Incorrect CAN Message Received From Source Address 13704-179-59
002130.14 — Incorrect CAN Message Received From Source Address 13004-179-56	002137.19 — Communication Error with Source Address 13704-179-59
002130.19 — Communication Error with Source Address 13004-179-56	002138.09 — No CAN Message Received From Source Address 13804-179-59
002131.09 — No CAN Message Received From Source Address 13104-179-56	002138.14 — Incorrect CAN Message Received From Source Address 13804-179-59
002131.14 — Incorrect CAN Message Received From Source Address 13104-179-56	002138.19 — Communication Error with Source Address 13804-179-60
002131.19 — Communication Error with Source Address 13104-179-57	002139.09 — No CAN Message Received From Source Address 13904-179-60
002132.09 — No CAN Message Received From Source Address 13204-179-57	002139.14 — Incorrect CAN Message Received From Source Address 13904-179-60
002132.14 — Incorrect CAN Message Received From Source Address 13204-179-57	002139.19 — Communication Error with Source Address 13904-179-60
002132.19 — Communication Error with Source Address 13204-179-57	002140.09 — No CAN Message Received From Source Address 14004-179-60
002133.09 — No CAN Message Received From Source Address 13304-179-57	002140.14 — Incorrect CAN Message Received From Source Address 14004-179-60
002133.14 — Incorrect CAN Message Received From Source Address 13304-179-57	002140.19 — Communication Error with Source Address 14004-179-60
002133.19 — Communication Error with Source Address 13304-179-57	002141.09 — No CAN Message Received From Source Address 14104-179-61
002134.09 — No CAN Message Received From Source Address 13404-179-58	002141.14 — Incorrect CAN Message Received From Source Address 14104-179-61
002134.14 — Incorrect CAN Message Received From Source Address 13404-179-58	002141.19 — Communication Error with Source Address 14104-179-61
002134.19 — Communication Error with Source Address 13404-179-58	002142.09 — No CAN Message Received From Source Address 14204-179-61
002135.09 — No CAN Message Received From Source Address 13504-179-58	002142.14 — Incorrect CAN Message Received From Source Address 14204-179-61
002135.14 — Incorrect CAN Message Received From Source Address 13504-179-58	002142.19 — Communication Error with Source Address 14204-179-61
002135.19 — Communication Error with Source Address 13504-179-58	002143.09 — No CAN Message Received From Source Address 14304-179-61

Continued on next page

Page	Page
002143.14 — Incorrect CAN Message Received From Source Address 14304-179-62	002150.19 — Communication Error with Source Address 15004-179-65
002143.19 — Communication Error with Source Address 14304-179-62	002151.09 — No CAN Message Received From Source Address 15104-179-65
002144.09 — No CAN Message Received From Source Address 14404-179-62	002151.14 — Incorrect CAN Message Received From Source Address 15104-179-65
002144.14 — Incorrect CAN Message Received From Source Address 14404-179-62	002151.19 — Communication Error with Source Address 15104-179-65
002144.19 — Communication Error with Source Address 14404-179-62	002152.09 — No CAN Message Received From Source Address 15204-179-65
002145.09 — No CAN Message Received From Source Address 14504-179-62	002152.14 — Incorrect CAN Message Received From Source Address 15204-179-65
002145.14 — Incorrect CAN Message Received From Source Address 14504-179-62	002152.19 — Communication Error with Source Address 15204-179-66
002145.19 — Communication Error with Source Address 14504-179-63	002153.09 — No CAN Message Received From Source Address 15304-179-66
002146.09 — No CAN Message Received From Source Address 14604-179-63	002153.14 — Incorrect CAN Message Received From Source Address 15304-179-66
002146.14 — Incorrect CAN Message Received From Source Address 14604-179-63	002153.19 — Communication Error with Source Address 15304-179-66
002146.19 — Communication Error with Source Address 14604-179-63	002154.09 — No CAN Message Received From Source Address 15404-179-66
002147.09 — No CAN Message Received From Source Address 14704-179-63	002154.14 — Incorrect CAN Message Received From Source Address 15404-179-66
002147.14 — Incorrect CAN Message Received From Source Address 14704-179-63	002154.19 — Communication Error with Source Address 15404-179-66
002147.19 — Communication Error with Source Address 14704-179-63	002155.09 — No CAN Message Received From Source Address 15504-179-67
002148.09 — No CAN Message Received From Source Address 14804-179-64	002155.14 — Incorrect CAN Message Received From Source Address 15504-179-67
002148.14 — Incorrect CAN Message Received From Source Address 14804-179-64	002155.19 — Communication Error with Source Address 15504-179-67
002148.19 — Communication Error with Source Address 14804-179-64	002156.09 — No CAN Message Received From Source Address 15604-179-67
002149.09 — No CAN Message Received From Source Address 14904-179-64	002156.14 — Incorrect CAN Message Received From Source Address 15604-179-67
002149.14 — Incorrect CAN Message Received From Source Address 14904-179-64	002156.19 — Communication Error with Source Address 15604-179-67
002149.19 — Communication Error with Source Address 14904-179-64	002157.09 — No CAN Message Received From Source Address 15704-179-67
002150.09 — No CAN Message Received From Source Address 15004-179-64	002157.14 — Incorrect CAN Message Received From Source Address 15704-179-68
002150.14 — Incorrect CAN Message Received From Source Address 15004-179-65	002157.19 — Communication Error with Source Address 15704-179-68

Continued on next page

Page	Page
002158.09 — No CAN Message Received From Source Address 15804-179-68	002165.14 — Incorrect CAN Message Received From Source Address 16504-179-71
002158.14 — Incorrect CAN Message Received From Source Address 15804-179-68	002165.19 — Communication Error with Source Address 16504-179-71
002158.19 — Communication Error with Source Address 15804-179-68	002166.09 — No CAN Message Received From Source Address 16604-179-71
002159.09 — No CAN Message Received From Source Address 15904-179-68	002166.14 — Incorrect CAN Message Received From Source Address 16604-179-71
002159.14 — Incorrect CAN Message Received From Source Address 15904-179-68	002166.19 — Communication Error with Source Address 16604-179-72
002159.19 — Communication Error with Source Address 15904-179-69	002167.09 — No CAN Message Received From Source Address 16704-179-72
002160.09 — No CAN Message Received From Source Address 16004-179-69	002167.14 — Incorrect CAN Message Received From Source Address 16704-179-72
002160.14 — Incorrect CAN Message Received From Source Address 16004-179-69	002167.19 — Communication Error with Source Address 16704-179-72
002160.19 — Communication Error with Source Address 16004-179-69	002168.09 — No CAN Message Received From Source Address 16804-179-72
002161.09 — No CAN Message Received From Source Address 16104-179-69	002168.14 — Incorrect CAN Message Received From Source Address 16804-179-72
002161.14 — Incorrect CAN Message Received From Source Address 16104-179-69	002168.19 — Communication Error with Source Address 16804-179-72
002161.19 — Communication Error with Source Address 16104-179-69	002169.09 — No CAN Message Received From Source Address 16904-179-73
002162.09 — No CAN Message Received From Source Address 16204-179-70	002169.14 — Incorrect CAN Message Received From Source Address 16904-179-73
002162.14 — Incorrect CAN Message Received From Source Address 16204-179-70	002169.19 — Communication Error with Source Address 16904-179-73
002162.19 — Communication Error with Source Address 16204-179-70	002170.09 — No CAN Message Received From Source Address 17004-179-73
002163.09 — No CAN Message Received From Source Address 16304-179-70	002170.14 — Incorrect CAN Message Received From Source Address 17004-179-73
002163.14 — Incorrect CAN Message Received From Source Address 16304-179-70	002170.19 — Communication Error with Source Address 17004-179-73
002163.19 — Communication Error with Source Address 16304-179-70	002171.09 — No CAN Message Received From Source Address 17104-179-73
002164.09 — No CAN Message Received From Source Address 16404-179-70	002171.14 — Incorrect CAN Message Received From Source Address 17104-179-74
002164.14 — Incorrect CAN Message Received From Source Address 16404-179-71	002171.19 — Communication Error with Source Address 17104-179-74
002164.19 — Communication Error with Source Address 16404-179-71	002172.09 — No CAN Message Received From Source Address 17204-179-74
002165.09 — No CAN Message Received From Source Address 16504-179-71	002172.14 — Incorrect CAN Message Received From Source Address 17204-179-74

Continued on next page

Page	Page
002172.19 — Communication Error with Source Address 17204-179-74	002180.09 — No CAN Message Received From Source Address 18004-179-77
002173.09 — No CAN Message Received From Source Address 17304-179-74	002180.14 — Incorrect CAN Message Received From Source Address 18004-179-77
002173.14 — Incorrect CAN Message Received From Source Address 17304-179-74	002180.19 — Communication Error with Source Address 18004-179-78
002173.19 — Communication Error with Source Address 17304-179-75	002181.09 — No CAN Message Received From Source Address 18104-179-78
002174.09 — No CAN Message Received From Source Address 17404-179-75	002181.14 — Incorrect CAN Message Received From Source Address 18104-179-78
002174.14 — Incorrect CAN Message Received From Source Address 17404-179-75	002181.19 — Communication Error with Source Address 18104-179-78
002174.19 — Communication Error with Source Address 17404-179-75	002182.09 — No CAN Message Received From Source Address 18204-179-78
002175.09 — No CAN Message Received From Source Address 17504-179-75	002182.14 — Incorrect CAN Message Received From Source Address 18204-179-78
002175.14 — Incorrect CAN Message Received From Source Address 17504-179-75	002182.19 — Communication Error with Source Address 18204-179-78
002175.19 — Communication Error with Source Address 17504-179-75	002183.09 — No CAN Message Received From Source Address 18304-179-79
002176.09 — No CAN Message Received From Source Address 17604-179-76	002183.14 — Incorrect CAN Message Received From Source Address 18304-179-79
002176.14 — Incorrect CAN Message Received From Source Address 17604-179-76	002183.19 — Communication Error with Source Address 18304-179-79
002176.19 — Communication Error with Source Address 17604-179-76	002184.09 — No CAN Message Received From Source Address 18404-179-79
002177.09 — No CAN Message Received From Source Address 17704-179-76	002184.14 — Incorrect CAN Message Received From Source Address 18404-179-79
002177.14 — Incorrect CAN Message Received From Source Address 17704-179-76	002184.19 — Communication Error with Source Address 18404-179-79
002177.19 — Communication Error with Source Address 17704-179-76	002185.09 — No CAN Message Received From Source Address 18504-179-79
002178.09 — No CAN Message Received From Source Address 17804-179-76	002185.14 — Incorrect CAN Message Received From Source Address 18504-179-80
002178.14 — Incorrect CAN Message Received From Source Address 17804-179-77	002185.19 — Communication Error with Source Address 18504-179-80
002178.19 — Communication Error with Source Address 17804-179-77	002186.09 — No CAN Message Received From Source Address 18604-179-80
002179.09 — No CAN Message Received From Source Address 17904-179-77	002186.14 — Incorrect CAN Message Received From Source Address 18604-179-80
002179.14 — Incorrect CAN Message Received From Source Address 17904-179-77	002186.19 — Communication Error with Source Address 18604-179-80
002179.19 — Communication Error with Source Address 17904-179-77	002187.09 — No CAN Message Received From Source Address 18704-179-80

Continued on next page

Page	Page
002187.14 — Incorrect CAN Message Received From Source Address 18704-179-80	002194.19 — Communication Error with Source Address 19404-179-84
002187.19 — Communication Error with Source Address 18704-179-81	002195.09 — No CAN Message Received From Source Address 19504-179-84
002188.09 — No CAN Message Received From Source Address 18804-179-81	002195.14 — Incorrect CAN Message Received From Source Address 19504-179-84
002188.14 — Incorrect CAN Message Received From Source Address 18804-179-81	002195.19 — Communication Error with Source Address 19504-179-84
002188.19 — Communication Error with Source Address 18804-179-81	002196.09 — No CAN Message Received From Source Address 19604-179-84
002189.09 — No CAN Message Received From Source Address 18904-179-81	002196.14 — Incorrect CAN Message Received From Source Address 19604-179-84
002189.14 — Incorrect CAN Message Received From Source Address 18904-179-81	002196.19 — Communication Error with Source Address 19604-179-84
002189.19 — Communication Error with Source Address 18904-179-81	002197.09 — No CAN Message Received From Source Address 19704-179-85
002190.09 — No CAN Message Received From Source Address 19004-179-82	002197.14 — Incorrect CAN Message Received From Source Address 19704-179-85
002190.14 — Incorrect CAN Message Received From Source Address 19004-179-82	002197.19 — Communication Error with Source Address 19704-179-85
002190.19 — Communication Error with Source Address 19004-179-82	002198.09 — No CAN Message Received From Source Address 19804-179-85
002191.09 — No CAN Message Received From Source Address 19104-179-82	002198.14 — Incorrect CAN Message Received From Source Address 19804-179-85
002191.14 — Incorrect CAN Message Received From Source Address 19104-179-82	002198.19 — Communication Error with Source Address 19804-179-85
002191.19 — Communication Error with Source Address 19104-179-82	002199.09 — No CAN Message Received From Source Address 19904-179-85
002192.09 — No CAN Message Received From Source Address 19204-179-82	002199.14 — Incorrect CAN Message Received From Source Address 19904-179-86
002192.14 — Incorrect CAN Message Received From Source Address 19204-179-83	002199.19 — Communication Error with Source Address 19904-179-86
002192.19 — Communication Error with Source Address 19204-179-83	002200.09 — No CAN Message Received From Source Address 20004-179-86
002193.09 — No CAN Message Received From Source Address 19304-179-83	002200.14 — Incorrect CAN Message Received From Source Address 20004-179-86
002193.14 — Incorrect CAN Message Received From Source Address 19304-179-83	002200.19 — Communication Error with Source Address 20004-179-86
002193.19 — Communication Error with Source Address 19304-179-83	002201.09 — No CAN Message Received From Source Address 20104-179-86
002194.09 — No CAN Message Received From Source Address 19404-179-83	002201.14 — Incorrect CAN Message Received From Source Address 20104-179-86
002194.14 — Incorrect CAN Message Received From Source Address 19404-179-83	002201.19 — Communication Error with Source Address 20104-179-87

Continued on next page

Page	Page
002201.09 — No CAN Message Received From Source Address 20104-179-87	002208.14 — Incorrect CAN Message Received From Source Address 20804-179-90
002201.14 — Incorrect CAN Message Received From Source Address 20104-179-87	002208.19 — Communication Error with Source Address 20804-179-90
002201.19 — Communication Error with Source Address 20104-179-87	002209.09 — No CAN Message Received From Source Address 20904-179-90
002202.09 — No CAN Message Received From Source Address 20204-179-87	002209.14 — Incorrect CAN Message Received From Source Address 20904-179-90
002202.14 — Incorrect CAN Message Received From Source Address 20204-179-87	002209.19 — Communication Error with Source Address 20904-179-90
002202.19 — Communication Error with Source Address 20204-179-87	002210.09 — No CAN Message Received From Source Address 21004-179-91
002203.09 — No CAN Message Received From Source Address 20304-179-88	002210.14 — Incorrect CAN Message Received From Source Address 21004-179-91
002203.14 — Incorrect CAN Message Received From Source Address 20304-179-88	002210.19 — Communication Error with Source Address 21004-179-91
002203.19 — Communication Error with Source Address 20304-179-88	002211.09 — No CAN Message Received From Source Address 21104-179-91
002204.09 — No CAN Message Received From Source Address 20404-179-88	002211.14 — Incorrect CAN Message Received From Source Address 21104-179-91
002204.14 — Incorrect CAN Message Received From Source Address 20404-179-88	002211.19 — Communication Error with Source Address 21104-179-91
002204.19 — Communication Error with Source Address 20404-179-88	002212.09 — No CAN Message Received From Source Address 21204-179-91
002205.09 — No CAN Message Received From Source Address 20504-179-88	002212.14 — Incorrect CAN Message Received From Source Address 21204-179-92
002205.14 — Incorrect CAN Message Received From Source Address 20504-179-89	002212.19 — Communication Error with Source Address 21204-179-92
002205.19 — Communication Error with Source Address 20504-179-89	002213.09 — No CAN Message Received From Source Address 21304-179-92
002206.09 — No CAN Message Received From Source Address 20604-179-89	002213.14 — Incorrect CAN Message Received From Source Address 21304-179-92
002206.14 — Incorrect CAN Message Received From Source Address 20604-179-89	002213.19 — Communication Error with Source Address 21304-179-92
002206.19 — Communication Error with Source Address 20604-179-89	002214.09 — No CAN Message Received From Source Address 21404-179-92
002207.09 — No CAN Message Received From Source Address 20704-179-89	002214.14 — Incorrect CAN Message Received From Source Address 21404-179-92
002207.14 — Incorrect CAN Message Received From Source Address 20704-179-89	002214.19 — Communication Error with Source Address 21404-179-93
002207.19 — Communication Error with Source Address 20704-179-90	002215.09 — No CAN Message Received From Source Address 21504-179-93
002208.09 — No CAN Message Received From Source Address 20804-179-90	002215.14 — Incorrect CAN Message Received From Source Address 21504-179-93

Continued on next page

Page	Page
002215.19 — Communication Error with Source Address 21504-179-93	002223.09 — No CAN Message Received From Source Address 22304-179-96
002216.09 — No CAN Message Received From Source Address 21604-179-93	002223.14 — Incorrect CAN Message Received From Source Address 22304-179-96
002216.14 — Incorrect CAN Message Received From Source Address 21604-179-93	002223.19 — Communication Error with Source Address 22304-179-96
002216.19 — Communication Error with Source Address 21604-179-93	002224.09 — No CAN Message Received From Source Address 22404-179-97
002217.09 — No CAN Message Received From Source Address 21704-179-94	002224.14 — Incorrect CAN Message Received From Source Address 22404-179-97
002217.14 — Incorrect CAN Message Received From Source Address 21704-179-94	002224.19 — Communication Error with Source Address 22404-179-97
002217.19 — Communication Error with Source Address 21704-179-94	002225.09 — No CAN Message Received From Source Address 22504-179-97
002218.09 — No CAN Message Received From Source Address 21804-179-94	002225.14 — Incorrect CAN Message Received From Source Address 22504-179-97
002218.14 — Incorrect CAN Message Received From Source Address 21804-179-94	002225.19 — Communication Error with Source Address 22504-179-97
002218.19 — Communication Error with Source Address 21804-179-94	002226.09 — No CAN Message Received From Source Address 22604-179-97
002219.09 — No CAN Message Received From Source Address 21904-179-94	002226.14 — Incorrect CAN Message Received From Source Address 22604-179-98
002219.14 — Incorrect CAN Message Received From Source Address 21904-179-95	002226.19 — Communication Error with Source Address 22604-179-98
002219.19 — Communication Error with Source Address 21904-179-95	002227.09 — No CAN Message Received From Source Address 22704-179-98
002220.09 — No CAN Message Received From Source Address 22004-179-95	002227.14 — Incorrect CAN Message Received From Source Address 22704-179-98
002220.14 — Incorrect CAN Message Received From Source Address 22004-179-95	002227.19 — Communication Error with Source Address 22704-179-98
002220.19 — Communication Error with Source Address 22004-179-95	002228.09 — No CAN Message Received From Source Address 22804-179-98
002221.09 — No CAN Message Received From Source Address 22104-179-95	002228.14 — Incorrect CAN Message Received From Source Address 22804-179-98
002221.14 — Incorrect CAN Message Received From Source Address 22104-179-95	002228.19 — Communication Error with Source Address 22804-179-99
002221.19 — Communication Error with Source Address 22104-179-96	002229.09 — No CAN Message Received From Source Address 22904-179-99
002222.09 — No CAN Message Received From Source Address 22204-179-96	002229.14 — Incorrect CAN Message Received From Source Address 22904-179-99
002222.14 — Incorrect CAN Message Received From Source Address 22204-179-96	002229.19 — Communication Error with Source Address 22904-179-99
002222.19 — Communication Error with Source Address 22204-179-96	002230.09 — No CAN Message Received From Source Address 23004-179-99

Continued on next page

Page	Page
002230.14 — Incorrect CAN Message Received From Source Address 23004-179-99	002237.19 — Communication Error with Source Address 23704-179-102
002230.19 — Communication Error with Source Address 23004-179-99	002238.09 — No CAN Message Received From Source Address 23804-179-103
002231.09 — No CAN Message Received From Source Address 23104-179-100	002238.14 — Incorrect CAN Message Received From Source Address 23804-179-103
002231.14 — Incorrect CAN Message Received From Source Address 23104-179-100	002238.19 — Communication Error with Source Address 23804-179-103
002231.19 — Communication Error with Source Address 23104-179-100	002239.09 — No CAN Message Received From Source Address 23904-179-103
002232.09 — No CAN Message Received From Source Address 23204-179-100	002239.14 — Incorrect CAN Message Received From Source Address 23904-179-103
002232.14 — Incorrect CAN Message Received From Source Address 23204-179-100	002239.19 — Communication Error with Source Address 23904-179-103
002232.19 — Communication Error with Source Address 23204-179-100	002240.09 — No CAN Message Received From Source Address 24004-179-103
002233.09 — No CAN Message Received From Source Address 23304-179-100	002240.14 — Incorrect CAN Message Received From Source Address 24004-179-104
002233.14 — Incorrect CAN Message Received From Source Address 23304-179-101	002240.19 — Communication Error with Source Address 24004-179-104
002233.19 — Communication Error with Source Address 23304-179-101	002241.09 — No CAN Message Received From Source Address 24104-179-104
002234.09 — No CAN Message Received From Source Address 23404-179-101	002241.14 — Incorrect CAN Message Received From Source Address 24104-179-104
002234.14 — Incorrect CAN Message Received From Source Address 23404-179-101	002241.19 — Communication Error with Source Address 24104-179-104
002234.19 — Communication Error with Source Address 23404-179-101	002242.09 — No CAN Message Received From Source Address 24204-179-104
002235.09 — No CAN Message Received From Source Address 23504-179-101	002242.14 — Incorrect CAN Message Received From Source Address 24204-179-104
002235.14 — Incorrect CAN Message Received From Source Address 23504-179-101	002242.19 — Communication Error with Source Address 24204-179-105
002235.19 — Communication Error with Source Address 23504-179-102	002243.09 — No CAN Message Received From Source Address 24304-179-105
002236.09 — No CAN Message Received From Source Address 23604-179-102	002243.14 — Incorrect CAN Message Received From Source Address 24304-179-105
002236.14 — Incorrect CAN Message Received From Source Address 23604-179-102	002243.19 — Communication Error with Source Address 24304-179-105
002236.19 — Communication Error with Source Address 23604-179-102	002244.09 — No CAN Message Received From Source Address 24404-179-105
002237.09 — No CAN Message Received From Source Address 23704-179-102	002244.14 — Incorrect CAN Message Received From Source Address 24404-179-105
002237.14 — Incorrect CAN Message Received From Source Address 23704-179-102	002244.19 — Communication Error with Source Address 24404-179-105

Continued on next page

Page	Page
002245.09 — No CAN Message Received From Source Address 24504-179-106	002252.14 — Incorrect CAN Message Received From Source Address 25204-179-109
002245.14 — Incorrect CAN Message Received From Source Address 24504-179-106	002252.19 — Communication Error with Source Address 25204-179-109
002245.19 — Communication Error with Source Address 24504-179-106	002253.09 — No CAN Message Received From Source Address 25304-179-109
002246.09 — No CAN Message Received From Source Address 24604-179-106	002253.14 — Incorrect CAN Message Received From Source Address 25304-179-109
002246.14 — Incorrect CAN Message Received From Source Address 24604-179-106	002253.19 — Communication Error with Source Address 25304-179-109
002246.19 — Communication Error with Source Address 24604-179-106	
002247.09 — No CAN Message Received From Source Address 24704-179-106	
002247.14 — Incorrect CAN Message Received From Source Address 24704-179-107	
002247.19 — Communication Error with Source Address 24704-179-107	
002248.09 — No CAN Message Received From Source Address 24804-179-107	
002248.14 — Incorrect CAN Message Received From Source Address 24804-179-107	
002248.19 — Communication Error with Source Address 24804-179-107	
002249.09 — No CAN Message Received From Source Address 24904-179-107	
002249.14 — Incorrect CAN Message Received From Source Address 24904-179-107	
002249.19 — Communication Error with Source Address 24904-179-108	
002250.09 — No CAN Message Received From Source Address 25004-179-108	
002250.14 — Incorrect CAN Message Received From Source Address 25004-179-108	
002250.19 — Communication Error with Source Address 25004-179-108	
002251.09 — No CAN Message Received From Source Address 25104-179-108	
002251.14 — Incorrect CAN Message Received From Source Address 25104-179-108	
002251.19 — Communication Error with Source Address 25104-179-108	
002252.09 — No CAN Message Received From Source Address 25204-179-109	

Abnormal Engine Noise

Symptom	Problem	Solution
Upper Engine Noise	Worn timing gears or excess backlash	See Idler Gears — Measure End Play and Timing Gears — Check Backlash in Section 02, Group 050.
	Excessive valve clearance	See Valve Clearance — Adjustment in Section 02, Group 020
	Worn camshaft	See Camshaft — Visual Inspection in Section 02, Group 050.
	Worn rocker arm shaft	Inspect Rocker Arm Shafts. See Rocker Arm Shaft Assembly — Tear Down and Rocker Arm Shaft Assembly — Inspect and Assemble in Section 02, Group 020.
	Worn Valve Guides	See Valve Guide — Measurement in Section 02, Group 020.
	Sticking Valves	See Valve — Cleaning and Inspection in Section 02, Group 020.
	Damaged Valve Retainers, Retainer Locks, or Bridges	See Valve Retainer, Valve Bridges, and Valve Retainer Locks — Inspection in Section 02, Group 020.
	Loose or Worn Rocker Arms	See Rocker Arm Shaft Assembly — Inspect and Assemble in Section 02, Group 020.
	Bent Pushrods	See Push Rod — Cleaning and Inspection in Section 02, Group 020.
	Broken Valve Springs	See Valve Springs — Inspection in Section 02, Group 020.
Lower Engine Noise	Turbo noise (whining)	Check for possible leaks in air intake and exhaust system such as ruptured seals and loose clamps.
	Worn connecting rod bushings and piston pins	See Piston Pin and Bushing — Inspection in Section 02, Group 030.
	Worn main or connecting rod bearings	Determine bearing clearance. See Group 030 — Cylinder Block, Liners, Pistons and Rods in Section 06, Group 200 or Group 040 — Crankshaft, Main Bearings and Flywheel in Section 06, Group 200.
	Bent Connecting Rods	See Connecting Rod and Cap — Inspection in Section 02, Group 030.

Continued on next page

RE42287,000057C -19-04OCT11-1/2

Symptom	Problem	Solution
	Scored Pistons	See Piston Cooling Orifice - Cleaning and Inspection and Piston Pin and Bushing — Inspection in Section 02, Group 030.
	Excessive Crankshaft End Play	Check crankshaft end play. See Crankshaft — End Play Check in Section 02, Group 040.
	Loose Flywheel	See Flywheel — Inspection in Section 02, Group 040.
	Oil Pump Oil Pickup Tube Loose	See Oil Pump and Tubes — Installation in Section 02, Group 060.
	Worn Balancer Shaft	See Balancer Shaft — Visual Inspection and Measurement
Engine Noise Under Load	Loose Flywheel	See Flywheel — Inspection in Section 02, Group 040.
	Excessive Piston-To-Liner Clearance	See Piston to Liner — Clearance Check in Section 02, Group 030.
	Excessive thrust bearing clearance	See Thrust Bearing — Inspection in Section 02, Group 040.
	Worn main or connecting rod bearings	Determine bearing clearance. See Group 030 — Cylinder Block, Liners, Pistons and Rods in Section 06, Group 200 or Group 040 — Crankshaft, Main Bearings and Flywheel in Section 06, Group 200.
Engine Noise at Initial Start-Up	Excessive Piston-To-Liner Clearance	See Piston to Liner — Clearance Check in Section 02, Group 030.
	High Oil Viscosity	Drain engine oil and refill with correct viscosity engine oil.
	Worn main or connecting rod bearings	Determine bearing clearance. See Group 030 — Cylinder Block, Liners, Pistons and Rods in Section 06, Group 200 or Group 040 — Crankshaft, Main Bearings and Flywheel in Section 06, Group 200.
Other Possible Causes of Abnormal Engine Noise	Engine Accessories	Check other application specific components that could cause abnormal engine noise such as air compressors or auxiliary drives and components.

RE42287,000057C -19-04OCT11-2/2

Coolant in Oil or Oil in Coolant

Symptom	Problem	Solution
Coolant In Oil or Oil In Coolant	Leak at Cylinder Head Gasket	See Cylinder Head Gasket — Inspection in Section 02, Group 020.
	Leak at Oil Cooler	See Oil Cooler and Filter — Removal and Inspection in Section 02, Group 060.
	Pitted or Cavitated Cylinder Liner(s)	See Cylinder Liner — Visual Inspection in Section 02, Group 030.
	Coolant System Not Holding Pressure	See Cooling System Test in Section 04, Group 155.
	Cracked cylinder head or block	See Cylinder Head — Cleaning and Inspection in Section 02, Group 020. See Cylinder Block — Cleaning and Inspection in Section 02, Group 030.

RE42287,000057D -19-12JUN12-1/1

Coolant Leaking from Weep Hole

Symptom	Problem	Solution
Coolant Leaking from Weep Hole	Normal Operation or Seal Failure	See Coolant Pump — Visual Inspection in Section 02, Group 070.

BK34394,00001D0 -19-12JUN12-1/1

Coolant System Loses Pressure

Symptom	Problem	Solution
Coolant System Loses Pressure	See Test	See Cooling System Test in Section 04, Group 155.

BK34394,00001DE -19-13JUN12-1/1

ECU Does Not Communicate with Powerview

Continued on next page

RE42287,000057E -19-05AUG11-1/11

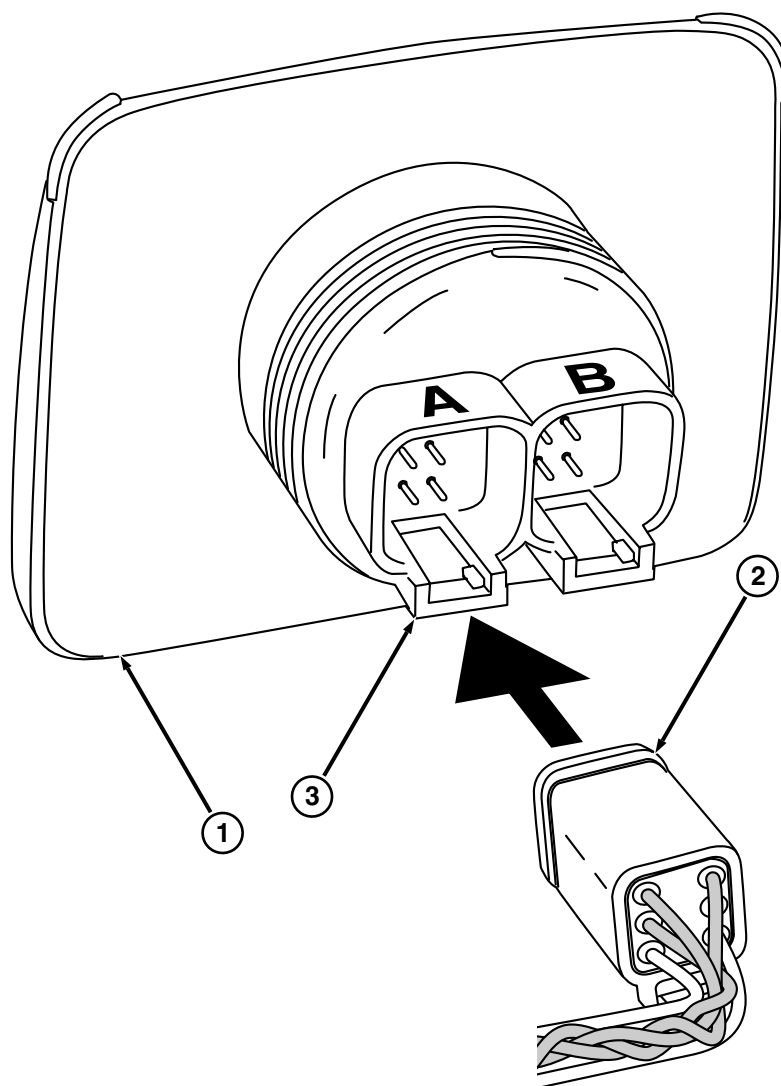
Diagnostic Procedure**Additional References:**

None

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 10](#) located in Section 06, Group 210.



Rear of Powerview

- 1—Rear of Powerview
2—Wiring harness connector with CAN wiring

- 3—Left Side Connector (A)

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Powerview

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

Continued on next page

RE42287,000057E -19-05AUG11-2/11

RG17481 —UN—12AUG09

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RE42287,000057E -19-05AUG11-3/11

1 Blank Diagnostic Gauge Check

1. Ignition ON, Engine OFF.
2. View Powerview Display.
Is screen blank?

YES: GO TO 2

NO: GO TO 5

RE42287,000057E -19-05AUG11-4/11

2 Terminal Test

NOTE: The diagnostic gauge has two identical 6-way connectors identified as "A" and "B". The diagnostic gauge left-side connector "A", as viewed from the rear of the gauge, must be connected to the wire harness containing the CAN wires, ignition, and ground.

1. Ignition OFF, Engine OFF.
2. Disconnect Powerview connector A.
3. Perform Terminal Test on Powerview and connector A.

Were any problems found?

YES: Repair problem.
Verify Service ADVISOR connects to ECU.

NO: GO TO 3

RE42287,000057E -19-05AUG11-5/11

3 Supply Voltage Check

1. Connect Diagnostic Test Box :
 - A to Powerview connector A, female socket 1 (+).
 - B to Powerview connector A, female socket 6 (-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Press and hold S3 on Diagnostic Test Box.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage consistently within +/- 0.75 V of battery voltage?

YES: Replace Powerview gauge. Perform Verification Procedure.

NO: GO TO 4

RE42287,000057E -19-05AUG11-6/11

4 Ground Wire Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Is voltage within +/- 0.75 V of battery voltage?

YES: Repair open or high resistance in return wire. Verify Powerview communicates with ECU.

NO: Repair open or high resistance in supply wire. Verify Powerview communicates with ECU.

Continued on next page

RE42287,000057E -19-05AUG11-7/11

Observable Diagnostics and Tests

5 Service ADVISOR Communication Check	<p>Check to see if Service ADVISOR communicated with ECU.</p> <p>Does Service ADVISOR connect to the ECU?</p>	<p>YES: <u>GO TO 6</u></p> <p>NO: <u>GO TO ECU Does Not Communicate With Service ADVISOR.</u></p> <p style="text-align: right;">RE42287,000057E -19-05AUG11-8/11</p>
6 Check Powerview for Correct Connection	<p><i>NOTE: The diagnostic gauge has two identical 6-way connectors identified as "A" and "B". The diagnostic gauge left-side connector "A", as viewed from the rear of the gauge, must be connected to the wire harness containing the CAN wires, ignition, and ground.</i></p> <ol style="list-style-type: none"> 1. Ignition OFF, engine OFF 2. Verify the wiring harness containing the CAN communication wires is mated to Connector "A" at the rear of the Powerview gauge. <p>Is the Powerview connected properly?</p>	<p>YES: <u>GO TO 7</u></p> <p>NO: Reconnect connectors properly. Verify Powerview communicates with ECU.</p> <p style="text-align: right;">RE42287,000057E -19-05AUG11-9/11</p>
7 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Powerview connector A. 3. Perform <u>Terminal Test</u> on Powerview and connector A. <p>Were any problems found?</p>	<p>YES: Repair problem. Verify Service ADVISOR connects to ECU.</p> <p>NO: <u>GO TO 8</u></p> <p style="text-align: right;">RE42287,000057E -19-05AUG11-10/11</p>
8 Continuity Check	<p>Measure the resistance between:</p> <ul style="list-style-type: none"> • Powerview connector A female socket 2 and diagnostic connector X5005 female socket C. • Powerview connector A female socket 3 and diagnostic connector X5005 female socket D. <p>Are both measurements less than 5 ohms?</p>	<p>YES: Replace Powerview. Verify Service ADVISOR connects to ECU.</p> <p>NO: Repair open or high resistance in harness. Verify Powerview communicates with ECU. Perform <u>Harness Diagnostic Mode Test</u>.</p> <p style="text-align: right;">RE42287,000057E -19-05AUG11-11/11</p>

**ECU Does Not Communicate with Service
ADVISOR**

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RE42287,000057F -19-17FEB12-1/33

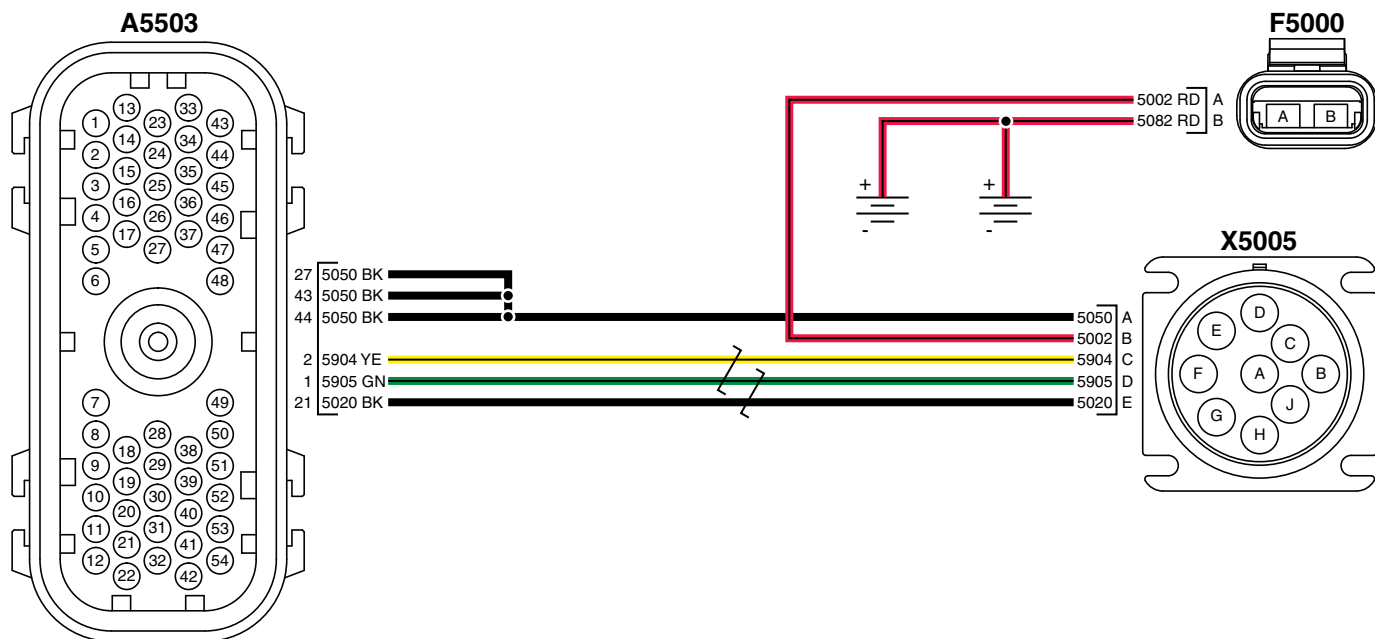
Diagnostic Procedure**Additional References:**

None

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 7](#)
- located in Section 06, Group 210.



Diagnostic Connector Wiring Diagram

X5005-A—Battery (-)
X5005-B—Battery (+)

X5005-C—CAN Hi
X5005-D—CAN Lo

X5005-E—CAN Shield

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Diagnostic Connector

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

ECU

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

EDL Cable

- [JDG10461](#) — Male — Yellow/Purple
- [JDG11233](#) — Male — Blue/Gray

Tools:

- [JT07306](#) — Digital Multimeter
- [J-35616-20](#) — Test Leads

Continued on next page

RE42287,000057F -19-17FEB12-2/33

RG20725—UN—08AUG11

Observable Diagnostics and Tests

1 Preliminary Checks	<p>1. Ignition ON, Engine OFF</p> <p>2. Verify all connections between X5005 diagnostic connector and personal computer.</p> <p>3. Verify that the adaptor shown in the Select Reading Connection Option in Service ADVISOR is set to EDL and the type of communication between computer and adaptor is set for the type you are using (Bluetooth or USB).</p> <p>Does Service ADVISOR now connect?</p>	<p>YES: Perform Verification Procedure.</p> <p>NO: GO TO 2</p> <p style="text-align: right;">RE42287,000057F -19-17FEB12-3/33</p>
2 Bluetooth Check	<p>Verify adapter setting.</p> <p>Are you using Bluetooth?</p>	<p>YES: Try using USB connection or contact John Deere Information Systems (JDIS) for support.</p> <p>NO: GO TO 3</p> <p style="text-align: right;">RE42287,000057F -19-17FEB12-4/33</p>
3 EDL Check	<p>Check EDL error light.</p> <p>Is red light on?</p>	<p>YES: Replace EDL. Perform Verification Procedure.</p> <p>NO: GO TO 4</p> <p style="text-align: right;">RE42287,000057F -19-17FEB12-5/33</p>
4 Reboot Computer	<p>1. Reboot computer.</p> <p>2. Disconnect both ends of the EDL and reconnect.</p> <p>Does Service ADVISOR now connect to the ECU?</p>	<p>YES: Perform Verification Procedure.</p> <p>NO: GO TO 5</p> <p style="text-align: right;">RE42287,000057F -19-17FEB12-6/33</p>
5 Equipment Check	<p>Do you have other Service ADVISOR equipment (computer, EDL, and cables) available?</p>	<p>YES: GO TO 6</p> <p>NO: GO TO 10</p> <p style="text-align: right;">RE42287,000057F -19-17FEB12-7/33</p>
6 Computer Check	<p>Try to connect using a different computer.</p> <p>Does Service ADVISOR now connect to the ECU?</p>	<p>YES: Computer problem. Contact JDIS for support.</p> <p>NO: GO TO 7</p> <p style="text-align: right;">RE42287,000057F -19-17FEB12-8/33</p>
7 USB Cable Check	<p>Try to connect using different USB to EDL cable.</p> <p>Does Service ADVISOR now connect to the ECU?</p>	<p>YES: Replace USB to EDL cable. Verify Service ADVISOR connects to ECU.</p> <p>NO: GO TO 8</p> <p style="text-align: right;">RE42287,000057F -19-17FEB12-9/33</p>
8 EDL Cable Check	<p>Try to connect using different EDL to 9-pin connector cable.</p> <p>Does Service ADVISOR now connect to the ECU?</p>	<p>YES: Replace EDL to 9-pin cable. Verify Service ADVISOR connects to ECU.</p> <p>NO: GO TO 9</p> <p style="text-align: right;">RE42287,000057F -19-17FEB12-10/33</p>

Continued on next page

Observable Diagnostics and Tests

9 EDL Check

Try to connect using different EDL.

Does Service ADVISOR now connect to the ECU?

YES: Replace EDL. Verify Service ADVISOR connects to ECU.

NO: [GO TO 10](#)

RE42287,000057F -19-17FEB12-11/33

10 Connect to Other Application

Take equipment and try connecting with Service ADVISOR to another application.

Did you connect successfully to another application?

YES: [GO TO 17](#)

NO: Connection to other application was unsuccessful. Contact JDIS

NO: No other application available. [GO TO 11](#)

RE42287,000057F -19-17FEB12-12/33

11 Operator Interface Check

1. Ignition ON, Engine OFF.

2. Check application operator interface for communication with ECU.

NOTE: For example, does engine coolant temp value update and reflect a believable value?

Does operator interface communicate with ECU?

YES: [GO TO 12](#)

NO: There is no operator interface available. [GO TO 15](#)

NO: The operator interface does not communicate with ECU. [GO TO 21](#)

RE42287,000057F -19-17FEB12-13/33

12 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5503.

3. Perform [Terminal Test](#) on ECU and A5503 connector.

Were any problems found?

YES: Repair problem. Verify Service ADVISOR connects to ECU. Perform [Harness Diagnostic Mode Test](#).

NO: [GO TO 13](#)

RE42287,000057F -19-17FEB12-14/33

13 Terminal Test

1. Disconnect X5005 connector.

2. Perform [Terminal Test](#) on X5005 connector.

Were any problems found?

YES: Repair problem. Verify Service ADVISOR connects to ECU. Perform [Harness Diagnostic Mode Test](#).

NO: [GO TO 14](#)

RE42287,000057F -19-17FEB12-15/33

Continued on next page

14 Continuity Check

Measure the resistance between:

- A5503 female socket 1 and X5005 connector male pin D
- A5503 female socket 2 and X5005 connector male pin C

Are all measurements less than 5 ohms?

YES: Contact JDIS

NO: Repair open or high resistance in harness. Verify Service ADVISOR connects to ECU. Perform [Harness Diagnostic Mode Test](#).

RE42287,000057F -19-17FEB12-16/33

15 Orange Light Check

1. Ignition ON, Engine OFF.

2. Monitor orange connection indicator while attempting to connect to ECU.

Did orange EDL light flash once and go off?

YES: [GO TO 16](#)

NO: Contact JDIS.

RE42287,000057F -19-17FEB12-17/33

16 EDL Cable Check Continuity Check

1. Disconnect both ends of the EDL to 9-pin cable.

2. Measure the resistance between:

- X5005 connector female socket A and EDL connector female socket 9
- X5005 connector female socket B and EDL connector female socket 12

Are both measurements less than 5 ohms?

YES: [GO TO 21](#)

NO: Replace EDL cable. Verify Service ADVISOR connects to ECU.

RE42287,000057F -19-17FEB12-18/33

17 Try to Connect Again

1. Return to original application.

2. Ignition ON, Engine OFF.

3. Try connecting to Service ADVISOR.

Is green EDL power light on steady?

YES: [GO TO 21](#)

NO: [GO TO 18](#)

RE42287,000057F -19-17FEB12-19/33

18 Battery Voltage Check

Measure battery voltage.

Does battery voltage read normal?

YES: [GO TO 19](#)

NO: Service battery. Verify Service ADVISOR connects to ECU. Perform [Harness Diagnostic Mode Test](#).

Continued on next page

RE42287,000057F -19-17FEB12-20/33

19 Voltage Check at Diagnostic Connector	<p>On the X5005 connector, measure the voltage between female sockets B (+) and A (-).</p> <p>Does voltage read near battery voltage?</p>	<p>YES: Possible intermittent EDL Cable. Replace EDL cable. Verify Service ADVISOR connects. Perform Harness Diagnostic Mode Test.</p> <p>NO: GO TO 20</p> <p>RE42287,000057F -19-17FEB12-21/33</p>
20 Open Return Wire Check	<p>On the X5005 connector, measure the voltage between female sockets B (+) and single point ground.</p> <p>Does voltage read near battery voltage?</p>	<p>YES: Repair open or high resistance in return wire. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.</p> <p>NO: Repair open or high resistance in supply wire. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.</p> <p>RE42287,000057F -19-17FEB12-22/33</p>
21 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect X5005 connector. 3. Perform Terminal Test on X5005 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.</p> <p>NO: GO TO 22</p> <p>RE42287,000057F -19-17FEB12-23/33</p>
22 CAN Lo Voltage Check	<p>On the X5005 connector, measure the voltage between female sockets C (+) and A (-).</p> <p>Is voltage greater than 4.7 V?</p>	<p>YES: GO TO Short to Voltage Procedure and substitute CAN Lo as the signal. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.</p> <p>NO: GO TO 23</p> <p>RE42287,000057F -19-17FEB12-24/33</p>
23 Start Engine	<p>Try starting engine.</p> <p>Did engine start?</p>	<p>YES: GO TO 24</p> <p>NO: Engine does not crank. GO TO Engine Will Not Crank Procedure.</p> <p>NO: Engine cranks but does not start. GO TO 24</p> <p>Continued on next page</p> <p>RE42287,000057F -19-17FEB12-25/33</p>

24 Terminal Test

1. Ignition OFF, Engine OFF
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on ECU and A5503 connector.

Were any problems found?

YES: Repair problem. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.

NO: GO TO 25

RE42287,000057F -19-17FEB12-26/33

25 Verify Voltages to ECU and Ignition

1. Ignition ON, Engine OFF.
2. Measure voltages between A5503 connector female sockets:
 - 23 (+) and 27(-)
 - 24 (+) and 43(-)
 - 25 (+) and 44(-)
 - 13 (+) and 27(-)
 - 14 (+) and 43(-)
 - 7 (+) and 44(-)

Are all voltage measurements near battery voltage?

YES: GO TO 26

NO: Repair open or high resistance in wiring harness. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.

RE42287,000057F -19-17FEB12-27/33

26 Continuity Check

1. Ignition OFF, Engine OFF.
2. Measure the resistance between:
 - A5503 female socket 1 and X5005 connector male pin D.
 - A5503 female socket 2 and X5005 connector male pin C.

Are both measurements less than 5 ohms?

YES: GO TO 27

NO: Repair open or high resistance in harness. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.

RE42287,000057F -19-17FEB12-28/33

27 Short to Single Point Ground Check

Measure the resistance between:

- X5005 connector female socket C and single point ground.
- X5005 connector female socket D and single point ground.

Are all resistances greater than 100K ohms?

YES: GO TO 28

NO: Repair short in harness. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.

Continued on next page

RE42287,000057F -19-17FEB12-29/33

Observable Diagnostics and Tests

28 Wire to Wire Check

On the A5503 connector, measure the resistance between female sockets 1 and 2.

YES: GO TO 29

Is resistance greater than 100K ohms?

NO: Repair short in harness. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.

RE42287,000057F -19-17FEB12-30/33

29 Wire to Wire Check

Measure the resistance between:

- A5503 connector female socket 1 to all other terminals in A5503.
- A5503 connector female socket 2 to all other terminals in A5503.

Are all resistances greater than 100K ohms?

YES: GO TO 30

NO: Repair short in harness. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.

RE42287,000057F -19-17FEB12-31/33

30 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect all other ECU connectors.
3. Perform Terminal Test on ECU connectors.

Were any problems found?

YES: Repair problem. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.

NO: GO TO 31

RE42287,000057F -19-17FEB12-32/33

31 Wire to Wire Check

Measure the resistance between:

- A5503 connector female socket 1 to all other terminals in all other ECU connectors.
- A5503 connector female socket 2 to all other terminals in all other ECU connectors.

Are all resistances greater than 100K ohms?

YES: Contact DTAC

NO: Repair short in harness. Verify Service ADVISOR connects to ECU. Perform Harness Diagnostic Mode Test.

RE42287,000057F -19-17FEB12-33/33

ECU Does Not Program with Service ADVISOR

RE42287,0000580 -19-05AUG11-1/4

Diagnostic Procedure

Additional References:

For more ECU reprogramming information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

For more connecting to Service ADVISOR information, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

RE42287,0000580 -19-05AUG11-2/4

1 Preliminary Checks

NOTE: If Program Controller option is not available or grayed out, contact John Deere Information Systems (JDIS).

1. Verify all connections between computer and Diagnostic Connector
2. Verify adaptor type shown in the Available Adaptors menu in Service ADVISOR is set to Electronic Data Link (EDL) Stand-alone USB Device.

NOTE: Do not use Bluetooth when programming ECU.

3. Check engine payload file name for correct engine serial number.
4. If replacing the ECU, verify that the new ECU serial number was correctly entered when downloading the payload.
5. Verify all ECU connectors are connected at ECU.
6. Ignition ON, engine OFF.

Are you able to program ECU?

YES: Problem solved.

NO: [GO TO 2](#)

RE42287,0000580 -19-05AUG11-3/4

2 Service ADVISOR Communication Check

Check to see if Service ADVISOR communicated with ECU.

Does Service ADVISOR connect to the ECU?

YES: Possible payload problem. Capture programming error message and contact DTAC for support.

NO: [GO TO ECU Does Not Communicate With Service ADVISOR.](#)

RE42287,0000580 -19-05AUG11-4/4

EGR Cooler Leaking

Symptom	Problem	Solution
EGR Cooler Leaking	See Test	See EGR Cooler Test in Section 04, Group 155.

BK34394,00001DF -19-13JUN12-1/1

Engine Coolant Temperature Below Normal

RE42287,0000581 -19-05AUG11-1/10

Diagnostic Procedure

Additional References:

For sensor location see B5208 — Engine Coolant Temperature Sensor in Section 03, Group 140.

For more temperature sensor information, see Measuring Temperature in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.

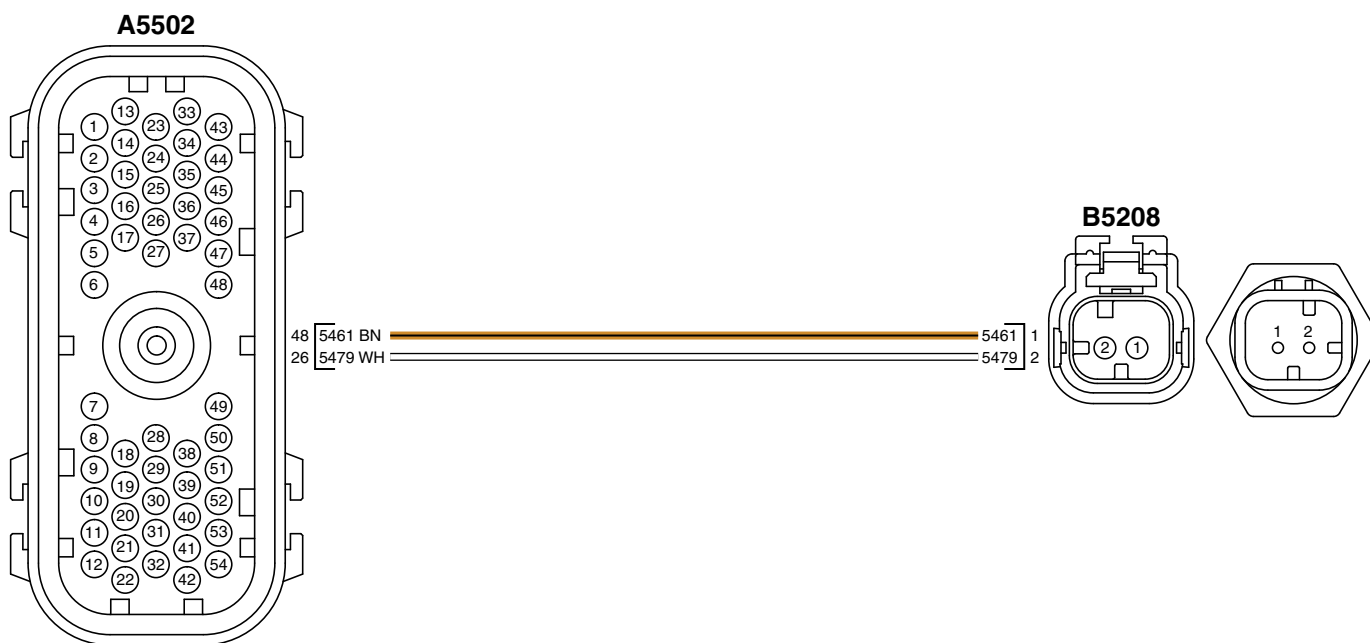
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 3

located in Section 06, Group 210.



Engine Coolant Temperature Sensor Wiring Diagram

A5502 — 26—Return

A5502 — 48—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

- JT07253 — Infrared Temperature Gun

- J-35616-20 — Test Leads

Continued on next page

RE42287,0000581 -19-05AUG11-2/10

RG16722 —UN—22DEC09

1 Sensor Check	<ol style="list-style-type: none"> 1. Ignition ON, engine running. 2. Operate engine at fast idle for 15 minutes. 3. Ignition OFF, Engine OFF. 4. Let engine set for 10 minutes to stabilize. 5. Ignition ON, Engine OFF. 6. In Service ADVISOR, monitor Engine Coolant Temperature. 7. Measure temperature of thermostat housing near engine coolant temperature sensor with <u>JT07253 — Infrared Temperature Gun</u>. 8. Compare sensor reading in Service ADVISOR to measurement taken with the infrared temperature gun. <p>Are the readings within 5 °C (9 °F) of each other?</p>	<p>YES: <u>GO TO 2</u></p> <p>NO: <u>GO TO 3</u></p>
2 Thermostat Check	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Check thermostat function. See <u>Thermostat — Remove and Testing</u> in Section 2, Group 070. <p>Are thermostats functioning properly?</p>	<p>YES: <u>GO TO 3</u></p> <p>NO: Replace thermostat(s). Verify problem is resolved.</p>
3 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF 2. Disconnect engine coolant temperature sensor connector B5208. 3. Perform <u>Terminal Test</u> on sensor and B5208 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. Verify problem is resolved.</p> <p>NO: <u>GO TO 4</u></p>
4 Circuit Check	<ol style="list-style-type: none"> 1. Connect Diagnostic Test Box: <ul style="list-style-type: none"> • A to B5208 connector female socket 1(+). • B to B5208 connector female socket 2(-). 2. Set S1 to position 7 on Diagnostic Test Box. 3. Connect multimeter to Diagnostic Test Box. 4. Ignition ON, Engine OFF. 5. Monitor voltage on multimeter. 6. Perform <u>Wiggle Test</u> on engine coolant temperature circuit. <p>Is voltage always between 2.3 and 2.7 V?</p>	<p>YES: <u>GO TO 5</u></p> <p>NO: Voltage is greater than 2.7 V. GO TO <u>Short to Voltage Procedure</u>.</p> <p>NO: Voltage is less than 2.3 V. <u>GO TO 7</u></p>
5 Software Check	<p>In Service ADVISOR, monitor Engine Coolant Temperature Input Voltage.</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: <u>GO TO 8</u></p> <p>NO: <u>GO TO 6</u></p>

Continued on next page

Observable Diagnostics and Tests

6 Reprogram ECU

1. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.

2. Ignition ON, Engine OFF.

3. With Diagnostic Test Box still connected and S1 in position 7, in Service ADVISOR, monitor Engine Coolant Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform Verification Procedure.

NO: Replace ECU. Perform Verification Procedure.

RE42287,0000581 -19-05AUG11-8/10

7 Return Circuit Check

1. Press and hold S2 on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Is voltage between 2.3 and 2.7 V?

YES: Repair high resistance in return wire. Verify problem is resolved.

NO: Repair high resistance in signal wire. Verify problem is resolved.

RE42287,0000581 -19-05AUG11-9/10

8 Replace Sensor

1. Replace engine coolant temperature sensor.

2. If possible, operate engine under conditions where problem occurred.

Is engine coolant temperature still low?

YES: Contact DTAC for support.

NO: Verify problem is resolved.

RE42287,0000581 -19-05AUG11-10/10

Engine Cranks and Will Not Start

RE42287,0000582 -19-28OCT11-1/23

Diagnostic Procedure

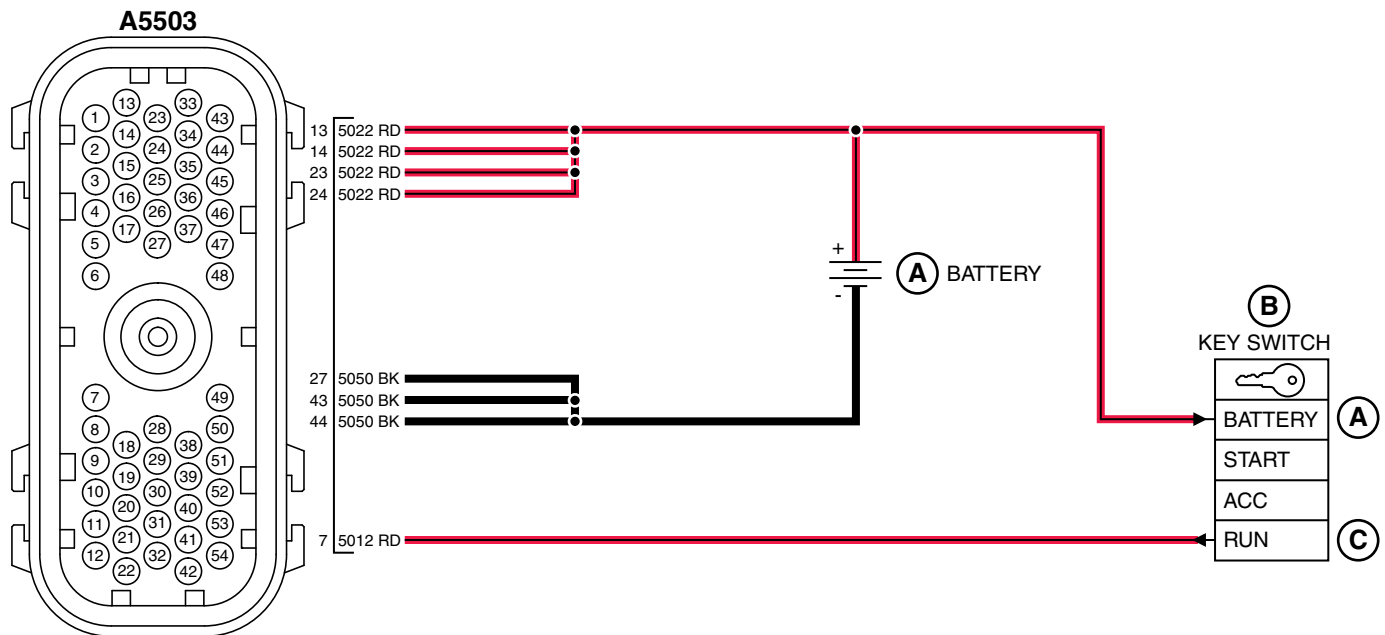
Additional References:

None

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagrams 8](#)
 - see [4.5L Wiring Diagrams 10](#)
- located in Section 06, Group 210.



ECU Power Distribution and Ignition Wiring Diagram

A5503-13—Battery (+)
A5503-14—Battery (+)
A5503-23—Battery (+)

A5503-24—Battery (+)
A5503-27—Battery (-)
A5503-43—Battery (-)

A5503-44—Battery (-)
A5503-7—Ignition
A—Battery

B—Key Switch
C—Run

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

ECU

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

Tools:

- [JT07306](#) — Digital Multimeter
- [JDG10273](#) — Diagnostic Test Box
- [J-35616-20](#) — Test Leads

Continued on next page

RE42287,0000582 -19-28OCT11-2/23

1 Preliminary Checks

Inspect for the following:

- Low amount of fuel in tanks
- Proper fuel in tanks
- Fuel leak
- Restricted exhaust
- Restricted intake or air filter
- Blown F5001 fuse

Any problems found?

YES: Repair problem.
Verify engine starts.
Perform [Exhaust Condition Check](#).

NO: [GO TO 2](#)

RE42287,0000582 -19-28OCT11-3/23

2 Attempt to connect with Service ADVISOR

1. Verify Service ADVISOR adapter setting.
 2. Ignition ON, Engine OFF
 3. Connect to ECU with Service ADVISOR.
- Does Service ADVISOR connect to ECU?

YES: [GO TO 10](#)

NO: [GO TO 3](#)

RE42287,0000582 -19-28OCT11-4/23

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform [Terminal Test](#) on ECU and A5503 connector.

Were any problems found?

YES: Repair problem.
Verify engine starts. In Service ADVISOR, perform Harness Diagnostic Mode Test. . Perform [Exhaust Condition Check](#)

NO: [GO TO 4](#)

RE42287,0000582 -19-28OCT11-5/23

4 Verify Voltages to ECU and Ignition

1. Connect Diagnostic Test Box :
 - A to A5503 connector female socket 13 (+).
 - B to A5503 connector female socket 27 (-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Press and hold S3 on Diagnostic Test Box.
 5. Monitor voltage on multimeter.
- Is voltage measurement within +/- 0.75 V of battery voltage?

YES: [GO TO 5](#)

NO: Repair open or high resistance in wiring harness.
Verify engine starts. In Service ADVISOR, perform Harness Diagnostic Mode Test. . Perform [Exhaust Condition Check](#)

Continued on next page

RE42287,0000582 -19-28OCT11-6/23

5 Verify Voltages to ECU and Ignition

1. Connect Diagnostic Test Box :
 - A to A5503 connector female socket 14 (+).
 - B to A5503 connector female socket 43 (-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Press and hold S3 on Diagnostic Test Box.
 5. Monitor voltage on multimeter.
- Is voltage measurement within +/- 0.75 V of battery voltage?

YES: GO TO 6

NO: Repair open or high resistance in wiring harness. Verify engine starts. In Service ADVISOR, perform Harness Diagnostic Mode Test. . Perform Exhaust Condition Check

RE42287,0000582 -19-28OCT11-7/23

6 Verify Voltages to ECU and Ignition

1. Connect Diagnostic Test Box :
 - A to A5503 connector female socket 23 (+).
 - B to A5503 connector female socket 44 (-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Press and hold S3 on Diagnostic Test Box.
 5. Monitor voltage on multimeter.
- Is voltage measurement within +/- 0.75 V of battery voltage?

YES: GO TO 7

NO: Repair open or high resistance in wiring harness. Verify engine starts. In Service ADVISOR, perform Harness Diagnostic Mode Test. . Perform Exhaust Condition Check

RE42287,0000582 -19-28OCT11-8/23

7 Verify Voltages to ECU and Ignition

1. Connect Diagnostic Test Box :
 - A to A5503 connector female socket 24 (+).
 - B to A5503 connector female socket 44 (-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Press and hold S3 on Diagnostic Test Box.
 5. Monitor voltage on multimeter.
- Is voltage measurement within +/- 0.75 V of battery voltage?

YES: GO TO 8

NO: Repair open or high resistance in wiring harness. Verify engine starts. In Service ADVISOR, perform Harness Diagnostic Mode Test. . Perform Exhaust Condition Check

Continued on next page

RE42287,0000582 -19-28OCT11-9/23

8 Verify Voltages to ECU and Ignition

1. Connect Diagnostic Test Box :
 - A to A5503 connector female socket 7 (+).
 - B to A5503 connector female socket 44 (-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Ignition ON, Engine OFF
 5. Press and hold S3 on Diagnostic Test Box.
 6. Monitor voltage on multimeter.
- Is voltage measurement within +/- 0.75 V of battery voltage?

YES: GO TO 9

NO: Repair open or high resistance in wiring harness or ignition switch. Verify engine starts. In Service ADVISOR, perform Harness Diagnostic Mode Test. . Perform Exhaust Condition Check

RE42287,0000582 -19-28OCT11-10/23

9 Attempt to connect with Service ADVISOR

1. Verify Service ADVISOR adapter setting.
 2. Ignition ON, Engine OFF
 3. Connect to ECU with Service ADVISOR.
- Does Service ADVISOR connect to ECU?

YES: GO TO 10

NO: GO TO ECU Does Not Communicate with Service ADVISOR in Section 04, Group 155.

RE42287,0000582 -19-28OCT11-11/23

10 Harness Diagnostic Mode Test

- In Service ADVISOR, perform Harness Diagnostic Mode Test.
- Are there any active DTCs?

YES: Discontinue this test and perform test for the active DTCs.

NO: GO TO 11

RE42287,0000582 -19-28OCT11-12/23

11 Cranking Speed Check

1. Remove DOC inlet pipe.
 2. Perform Cranking Speed Test in Section 04, Group 155.
- Does test pass?

YES: GO TO 12

NO: Repair problem. Verify engine starts. Perform Exhaust Condition Check

Continued on next page

RE42287,0000582 -19-28OCT11-13/23

12 Abnormal Engine Noise Check

1. DOC inlet pipe still removed.
2. Ignition ON, engine cranking.
3. Listen for abnormal engine noise. If a noise is heard, see [Abnormal Engine Noise](#) in Section 4 Group 150.

Any problems found?

YES: Repair problem.
Verify engine starts.
Perform [Exhaust Condition Check](#)

NO: Reinstall DOC inlet pipe. [GO TO 13](#)

RE42287,0000582 -19-28OCT11-14/23

13 Cold Weather Check

Inspect for hard starting only in cold ambient temperatures. This may cause an intermittent condition that is not easily duplicated.

- Ether canister empty or leaking.
- Ice blockage at the fuel pickup in the fuel tank.
- Fuel heater not working properly.
- Correct glow plug operation.

Any problems found?

YES: Repair problem.
Verify engine starts.
Perform [Exhaust Condition Check](#)

NO: [GO TO 14](#)

RE42287,0000582 -19-28OCT11-15/23

14 Low-Pressure Fuel System Check

Perform [Low-Pressure Fuel System Check](#) in Section 04, Group 155.

Any problems found?

YES: Repair problem.
Verify engine starts.
Perform [Exhaust Condition Check](#).

NO: [GO TO 15](#)

RE42287,0000582 -19-28OCT11-16/23

15 High-Pressure Fuel System Check

Perform [High-Pressure Fuel System Check](#) in Section 04, Group 155.

Any problems found?

YES: Repair problem.
Verify engine starts.
Perform [Exhaust Condition Check](#)

NO: [GO TO 16](#)

RE42287,0000582 -19-28OCT11-17/23

16 Compression Check

In Service ADVISOR, perform Cylinder Electronic Compression Test.

Do test results indicate a compression problem?

YES: Perform [Mechanical Compression Test](#) in Section 04, Group 155.

NO: [GO TO 17](#)

Continued on next page

RE42287,0000582 -19-28OCT11-18/23

17 Camshaft to Crankshaft Timing Check	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Perform <u>Camshaft to Crankshaft Timing Check</u> in Section 4, Group 155.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. Verify engine starts. Perform <u>Exhaust Condition Check</u></p> <p>NO: <u>GO TO 18</u></p>
18 Hardware Check	<p>Is the engine you are working on equipped with a Variable Geometry Turbocharger?</p>	<p>YES: <u>GO TO 19</u></p> <p>NO: <u>GO TO 20</u></p>
19 Air Throttle Actuator Check	<p>1. Remove necessary components to gain visual access to air throttle actuator butterfly, see <u>Air Throttle Actuator (PVX) — Removal</u> in Section 02, Group 80.</p> <p>2. Ensure air throttle connector Y5401 is connected to the actuator.</p> <p>3. Ignition ON, Engine OFF</p> <p>4. Visually inspect position of air throttle actuator butterfly.</p> <p>Is air throttle actuator butterfly in the full open position?</p>	<p>YES: <u>GO TO 21</u></p> <p>NO: Diagnose and repair air throttle actuator problem. Verify engine starts. Perform <u>Exhaust Condition Check</u></p>
20 Exhaust Throttle Actuator Check	<p>1. Remove necessary components to gain visual access to the exhaust throttle actuator butterfly, see <u>Exhaust Throttle Assembly (PWX Engine) — Removal</u> in Section 02, Group 80.</p> <p>2. Ensure exhaust throttle connector Y5500 is connected to the actuator.</p> <p>3. Ignition ON, Engine OFF</p> <p>4. Visually inspect position of exhaust throttle actuator butterfly.</p> <p>Is exhaust throttle actuator butterfly in the full open position?</p>	<p>YES: <u>GO TO 21</u></p> <p>NO: Diagnose and repair exhaust throttle actuator problem. Verify engine starts. Perform <u>Exhaust Condition Check</u></p>
21 Valve Clearance Check	<p>Perform <u>Valve — Clearance Adjustment</u> in Section 2 Group 20.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. Verify engine starts. Perform <u>Exhaust Condition Check</u></p> <p>NO: Contact DTAC for support.</p>

Engine Does Not Develop Full Power

RE42287,0000583 -19-29MAR11-1/23

Diagnostic Procedure

RE42287,0000583 -19-29MAR11-2/23

1 Check for Active DTCs

Were you referred to this test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?

YES: GO TO 2

NO: Check for and resolve any active DTCs before performing this test.

RE42287,0000583 -19-29MAR11-3/23

2 Harness Diagnostic Mode Test

1. Write down any stored DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will also be cleared.

2. Perform Harness Diagnostic Mode Test in Service ADVISOR.

Were any active DTCs generated during Harness Diagnostic Mode Test?

YES: Discontinue this test and perform test for the active DTC.

NO: GO TO 3

RE42287,0000583 -19-29MAR11-4/23

3 Preliminary Checks

NOTE: Low engine power complaints are often due to the operator's expectations, rather than the engine not actually developing rated power. Compare the suspect engine's performance to another identical application, if possible.

Check for the following, if applicable, on the application.

- Transmission problems, overheating, or slipping.
- Driven load has changed.
- Auxiliary drives with abnormally high loads.
- Hydraulic system problems causing high engine loads.
- Engine is otherwise overloaded.

Is engine performance restored?

YES: Problem fixed.**NO:** GO TO 4

RE42287,0000583 -19-29MAR11-5/23

4 Exhaust Check

Operate engine under the conditions where the low-power complaint occurs.

Does the engine produce excessive blue, white, or black exhaust smoke?

YES: Blue smoke - Check for internal engine damage. Perform Crankcase Pressure (Blow-By) Test in Section 04, Group 155.

YES: White smoke - Perform test Engine Emits Excessive White Exhaust Smoke in Section 04, Group 150.

YES: Black smoke - Perform test Engine Emits Excessive Black or Gray Exhaust Smoke in Section 04, Group 150.

NO: GO TO 5

Continued on next page

RE42287,0000583 -19-29MAR11-6/23

Observable Diagnostics and Tests

5 Misfire Check	Does engine misfire or run irregularly?	YES: Perform test <u>Engine Misfires or Runs Irregularly</u> . NO: <u>GO TO 6</u>
		RE42287,0000583 -19-29MAR11-7/23
6 Throttle Test	<p><i>NOTE: Some applications may have a limit on maximum throttle percentage by design. Consult engine distributor for more information.</i></p> <p>1. Ignition ON, engine OFF. 2. In Service ADVISOR, monitor Throttle Position. 3. Fully advance throttle lever. Is Throttle Position 97% or higher?</p>	YES: <u>GO TO 7</u> NO: Check for throttle circuit problem.
		RE42287,0000583 -19-29MAR11-8/23
7 Charge Air System Check	Perform <u>Charge Air Cooler Test</u> in Section 04, Group 155. Is engine performance restored?	YES: Problem fixed. NO: <u>GO TO 8</u>
		RE42287,0000583 -19-29MAR11-9/23
8 Low-Pressure Fuel Supply System Test	Perform <u>Low-Pressure Fuel System Check</u> in Section 04, Group 155. Is engine performance restored?	YES: Problem fixed. NO: <u>GO TO 9</u>
		RE42287,0000583 -19-29MAR11-10/23
9 High-Pressure Fuel Supply System Test	Perform <u>High-Pressure Fuel System Check</u> in Section 04, Group 155. Is engine performance restored?	YES: Problem fixed. NO: <u>GO TO 10</u>
		RE42287,0000583 -19-29MAR11-11/23
10 Fuel Quality Check	Perform procedure <u>Fuel Supply Quality Check</u> in Section 04, Group 155. Is engine performance restored?	YES: Problem fixed. NO: <u>GO TO 11</u>
		RE42287,0000583 -19-29MAR11-12/23
11 Intake and Exhaust Restriction and Air Leak Test	Check for intake and exhaust restrictions and leaks. See <u>Check Air Intake System</u> and <u>Check Exhaust System</u> in Section 02, Group 010. Was a problem found?	YES: Fix problem, recheck engine performance. NO: <u>GO TO 12</u>
		RE42287,0000583 -19-29MAR11-13/23

Continued on next page

12 Governor Selection Check

NOTE: The following procedure does not apply to all applications.

1. In Service ADVISOR, monitor Speed Governor Curve.
2. Toggle the governor type switch between the two settings.

Does Desired Speed Governor Curve data point change?

YES: GO TO 13

NO: See application manual for switch wiring and repair problem. Recheck engine performance.

RE42287,0000583 -19-29MAR11-14/23

13 Reprogram ECU

1. Download latest ECU payload.
2. Modify Custom Performance trimmable options to values specified by the engine distributor, if applicable.
3. Reprogram ECU.

Is engine performance restored?

YES: Problem fixed.

NO: GO TO 14

RE42287,0000583 -19-29MAR11-15/23

14 EGR Valve and EGR Cooler Check

NOTE: For EGR valve removal and installation instructions, see Section 02, Group 080.

1. In Service ADVISOR, monitor EGR Valve Position - Actual.
2. Operate engine under load at 1500 rpm until coolant temperature is above 79 °C (175 °F) and EGR valve begins to open as indicated by EGR valve position. Note that EGR valve will not open unless engine is under load.
3. Permit engine to run at slow idle for five minutes.
4. Ignition OFF, engine OFF.
5. Remove EGR valve and check for presence of coolant in EGR cooler.
6. Check for damaged or broken EGR valve.
7. Verify that the part number of the EGR valve removed is the correct part for the engine.

Is coolant present in EGR cooler or is EGR valve damaged or the incorrect part?

YES: Cooler leaking.
Replace EGR cooler.

YES: EGR valve damaged or incorrect part. Replace EGR valve.

NO: Reinstall EGR valve.
GO TO 15

RE42287,0000583 -19-29MAR11-16/23

15 Pressure Sensors Check

1. Check MAP sensor wiring and terminals.
2. Replace MAP sensor if no wiring problems found.
3. Ignition ON, engine OFF.
4. In Service ADVISOR, monitor Manifold Air Pressure - Absolute.
5. In Service ADVISOR, monitor Barometric Air Pressure - Absolute.

Is Manifold Air Pressure - Absolute and Barometric Air Pressure - Absolute within 10 kPa (0.1 bar) (1.5 psi) of each other with ignition ON, engine OFF?

YES: Engine performance is restored. Problem fixed.

YES: Engine performance is NOT restored. GO TO 16

NO: Replace ECU and recheck engine performance.

Continued on next page

RE42287,0000583 -19-29MAR11-17/23

16 Valve Clearance Check	<p>Perform <u>Valve — Clearance Adjustment</u> in Section 02, Group 020.</p> <p>Is engine performance restored?</p>	<p>YES: Problem fixed.</p> <p>NO: <u>GO TO 17</u></p>
RE42287,0000583 -19-29MAR11-18/23		
17 Engine Load Check	<p>1. In Service ADVISOR, monitor Engine Load at Current Speed.</p> <p>2. Operate engine at speed and load where low-power complaint occurs.</p> <p>Does Engine Load at Current Speed data point indicate a value of 95 percent or more?</p>	<p>YES: <u>GO TO 18</u></p> <p>NO: ECU is limiting engine power. Contact DTAC for support.</p>
RE42287,0000583 -19-29MAR11-19/23		
18 Fuel Rail Pressure Sensor Check	<p>1. Ignition OFF, engine OFF.</p> <p>2. Disconnect fuel rail pressure sensor connector B5100.</p> <p>3. Disconnect ECU A5502 connector.</p> <p>4. Perform <u>Terminal Test</u> on rail pressure sensor connector and A5502 connector.</p> <p>5. On the harness, measure the resistance between the rail pressure sensor signal (B5100-2) and the ECU rail pressure signal (A5502-8).</p> <p>6. On the harness, measure the resistance between the rail pressure sensor 5 V supply (B5100-3) and the ECU 5 V supply (A5502-22).</p> <p>7. On the harness, measure the resistance between the rail pressure sensor return (B5100-1) and the ECU return (A5502-30).</p> <p>Were Terminal Test results good and all resistance measurements less than 10 ohms?</p>	<p>YES: <u>GO TO 19</u></p> <p>NO: Fix problem. Retest engine performance.</p>
RE42287,0000583 -19-29MAR11-20/23		
19 Replace Fuel Rail Pressure Sensor	<p>1. Replace fuel rail pressure sensor.</p> <p><i>NOTE: Verify that the replacement fuel rail pressure sensor is the correct part number for the 6.8L engine.</i></p> <p>2. Reconnect all electrical connectors.</p> <p>3. Retest engine performance.</p> <p>Is engine performance restored?</p>	<p>YES: Problem fixed.</p> <p>NO: <u>GO TO 20</u></p>
RE42287,0000583 -19-29MAR11-21/23		
20 Check on Dynamometer	<p>Check engine power on a certified dynamometer, if possible.</p> <p>Does engine develop rated power on dynamometer?</p>	<p>YES: Engine is operating as designed.</p> <p>NO: <u>GO TO 21</u></p> <p>NO: Engine cannot be tested on a dynamometer. Contact DTAC for support.</p>
<div>Continued on next page</div> <div>RE42287,0000583 -19-29MAR11-22/23</div>		

Observable Diagnostics and Tests

21 Replace Injectors

NOTE: For injector replacement instructions, see Section 2, group 090.

Replace injectors.

Does engine develop rated power on dynamometer?

YES: Problem fixed.

NO: Contact DTAC for support

RE42287,0000583 -19-29MAR11-23/23

Engine Emits Excessive Black or Gray Exhaust Smoke

RE42287,0000584 -19-28JUL11-1/4

Engine Emits Excessive Black or Gray Exhaust Smoke Diagnostic Procedure**Additional References:**For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155

RE42287,0000584 -19-28JUL11-2/4

① Harness Diagnostic Mode Test

1. Ignition ON, engine OFF.

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Were any active DTCs generated during Harness Diagnostic Mode Test?

YES: Discontinue this procedure and perform procedure for the active DTC.**NO:** [GO TO 2](#)

RE42287,0000584 -19-28JUL11-3/4

② Check for Black SmokeIs black or gray smoke only for a short period of time after a Service Regeneration is performed or 50 hours or less after a **new** DPF is installed?**YES:** This is normal operation.**NO:** Perform [Exhaust Condition Check](#)

RE42287,0000584 -19-28JUL11-4/4

Engine Emits Excessive Blue Exhaust Smoke

RE42287,0000585 -19-28JUL11-1/3

Engine Emits Excessive Blue Exhaust Smoke Diagnostic Procedure

Additional References:

For more information on Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

RE42287,0000585 -19-28JUL11-2/3

① Harness Diagnostic Mode Test

1. Ignition ON, engine OFF.

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Were any active DTCs generated during Harness Diagnostic Mode Test?

YES: Discontinue this procedure and perform procedure for the active DTC.

NO: Perform [Exhaust Condition Check](#)

RE42287,0000585 -19-28JUL11-3/3

Engine Emits Excessive White Exhaust Smoke

SS01820,00002A8 -19-23JUL12-1/4

Engine Emits Excessive White Exhaust Smoke Diagnostic Procedure**Additional References:**For more information on the Exhaust Condition Check, see Exhaust Condition Check in Section 04, Group 0155.

SS01820,00002A8 -19-23JUL12-2/4

❶ Excessive White Exhaust Smoke

Is the smoke coming from the engine compartment only during an active regeneration?

YES: Perform a Service Regeneration. Check all exhaust connections for leaks.**NO:** Go To 2.

SS01820,00002A8 -19-23JUL12-3/4

❷ Harness Diagnostic Mode Test

1. Ignition ON, engine OFF.

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Were any active DTCs generated during Harness Diagnostic Mode Test?

YES: Discontinue this procedure and perform procedure for the active DTC.**NO:** Perform Exhaust Condition Check in Section 04, Group 155.

SS01820,00002A8 -19-23JUL12-4/4

Engine Misfires or Runs Irregularly

RE42287,0000587 -19-20MAR12-1/19

Diagnostic Procedure

RE42287,0000587 -19-20MAR12-2/19

1 Check for Active DTCs

Were you referred to this test while performing the diagnostic procedures for a diagnostic trouble code (DTC)?

YES: GO TO 2

NO: Check for and resolve any active DTCs before performing this test.

RE42287,0000587 -19-20MAR12-3/19

2 Items Possibly Mistaken As Misfire or Irregular Running Engine

Check for the following items which may be mistaken for a misfire:

- Engine accessories such as air conditioning clutch or fan drives cycling on and off.
- Alterations to the engine and/or machine harness such as radios or non John-Deere accessories.

Does disabling or switching off these devices temporarily restore engine performance?

YES: Problem resolved.**NO:** GO TO 3

RE42287,0000587 -19-20MAR12-4/19

3 Camshaft Position and Crank Position Signal Test

NOTE: See DTC procedures 000636.02 and 000637.02 in Group 04, Section 160 for more information on speed sensor data points.

1. In Service ADVISOR, monitor, and record the following data points.

Data Point	Value
Crankshaft Position Signal Status	
Camshaft Position Signal Status	
Crankshaft Position Signal Improper Pattern Indicator	
Camshaft Position Signal Improper Pattern Indicator	
Crankshaft Position Signal Noise Indicator	
Camshaft Position Signal Noise Indicator	

2. Operate engine at speed and load where problem occurs.

3. Replay recording and review the recorded data points.

Did the data points indicate the following with engine running?

- Crankshaft Position Signal Status – Value should be 16 at 0 rpm, 63 with engine cranking (below 400 rpm), and 47 with engine running above 400 rpm.
- Camshaft Position Signal Status – Value should be 16 at 0 rpm, 63 with engine cranking (below 400 rpm), and 47 with engine running above 400 rpm.
- Crankshaft Position Signal Improper Pattern Indicator - 0
- Camshaft Position Signal Improper Pattern Indicator - 0
- Crankshaft Position Signal Noise Indicator - 0
- Camshaft Position Signal Noise Indicator - 0

YES: GO TO 6**NO:** GO TO 4

Continued on next page

RE42287,0000587 -19-20MAR12-5/19

4 Check for Crank Sensor Pattern Problem

1. Ignition OFF, engine OFF.
2. Disconnect crankshaft position sensor and secure connector away from rotating components.
3. Ignition ON, engine OFF.
4. Operate engine at speed and load where problem occurs.
5. Ignition OFF, engine OFF.
6. Reconnect crankshaft position sensor.

Was engine performance restored?

YES: Perform diagnostic procedure for 000637.02 as though DTC were active.

NO: GO TO 5

RE42287,0000587 -19-20MAR12-6/19

5 Check for Camshaft Position Pattern Problem

1. Verify that crankshaft position sensor is reconnected.
2. Disconnect camshaft position sensor and secure connector away from rotating components.
3. Ignition ON, engine OFF.
4. Operate engine at speed and load where problem occurs.
5. Ignition OFF, engine OFF.
6. Reconnect camshaft position sensor.

Was engine performance restored?

YES: Perform diagnostic procedure for 000636.02 as though DTC were active.

NO: GO TO 6

RE42287,0000587 -19-20MAR12-7/19

6 Check Throttle

1. Engine running at speed where misfire or irregular running occurs.
2. Throttle held at a steady position.
3. In Service ADVISOR, monitor Throttle Position.

Does Throttle Position data point indicate throttle signal is changing by more than 3 percent?

YES: Repair throttle circuit problem. Perform Exhaust Condition Check.

NO: GO TO 7

RE42287,0000587 -19-20MAR12-8/19

7 Misfire and Cut-Out Test

1. In Service ADVISOR, perform Cylinder Misfire Test.
2. In Service ADVISOR, perform Cylinder Cutout Test with engine at conditions where misfire was observed.

Is each cylinder contribution within 10 percent of the others during the Cylinder Misfire Test and does the sound of the engine change equally when each injector is disabled during the Cylinder Cut-Out Test?

YES: GO TO 11

NO: GO TO 8

Continued on next page

RE42287,0000587 -19-20MAR12-9/19

8 Check Compression	<p>In Service ADVISOR, perform Cylinder Electronic Compression Test.</p> <p>Does the test indicate a compression problem with the cylinder(s) identified in the previous step?</p>	<p>YES: GO TO 9</p> <p>NO: GO TO 10</p> <p>RE42287,0000587 -19-20MAR12-10/19</p>
9 Check Valve Adjustment	<p>Perform valve adjustment.</p> <p>Is engine performance restored?</p>	<p>YES: Problem resolved. Perform Exhaust Condition Check.</p> <p>NO: Perform Mechanical Compression Test in Section 04, Group 155. Repair any problems. Perform Exhaust Condition Check.</p> <p>RE42287,0000587 -19-20MAR12-11/19</p>
10 Clean Injectors	<p>1. Perform Fuel Supply Quality Check in Section 04, Group 155.</p> <p>2. Perform Clean Electronic Injectors (In Engine) in Section 02 Group 90. Run engine.</p> <p>Did cleaning the injectors make a noticeable difference in performance?</p>	<p>YES: Problem resolved. Recommend the use of John Deere Fuel Protect Keep Clean to prevent reoccurring symptoms. Perform Exhaust Condition Check.</p> <p>NO: Replace injector(s) in cylinder(s) that had a low contribution during the Cylinder Misfire Test or no change in sound during the Cylinder Cutout Test.</p> <p>RE42287,0000587 -19-20MAR12-12/19</p>
11 Reprogram ECU	<p>Check to see if there is a software update available for the engine.</p> <p>Was a software update available?</p>	<p>YES: Download engine payload and reprogram ECU. GO TO 12</p> <p>NO: GO TO 13</p> <p>RE42287,0000587 -19-20MAR12-13/19</p>
12 Verification	<p>Is engine performance restored?</p>	<p>YES: Problem resolved. Perform Exhaust Condition Check.</p> <p>NO: GO TO 13</p> <p>RE42287,0000587 -19-20MAR12-14/19</p>
13 Check for Air in Fuel	<p>Perform Air in Fuel Check in Section 04, Group 155.</p> <p>Is engine performance restored?</p>	<p>YES: Problem resolved. Perform Exhaust Condition Check.</p> <p>NO: GO TO 14</p> <p>Continued on next page</p> <p>RE42287,0000587 -19-20MAR12-15/19</p>

Observable Diagnostics and Tests

14 Fuel Quality

Perform [Fuel Supply Quality Check](#) found in Section 04, Group 155.

Is fuel quality an issue?

YES: Exchange poor quality fuel with ultra low sulfur fuel. Perform [Exhaust Condition Check](#).

NO: [GO TO 15](#)

RE42287,0000587 -19-20MAR12-16/19

15 Low-Pressure Fuel Supply System Test

Perform [Low-Pressure Fuel System Check](#) in Section 04, Group 155.

Is engine performance restored?

YES: Problem resolved. Perform [Exhaust Condition Check](#).

NO: [GO TO 16](#)

RE42287,0000587 -19-20MAR12-17/19

16 High-Pressure Fuel Supply System Test

Perform [High-Pressure Fuel System Check](#) in Section 04, Group 155.

Is engine performance restored?

YES: Problem resolved. Perform [Exhaust Condition Check](#).

NO: [GO TO 17](#)

RE42287,0000587 -19-20MAR12-18/19

17 Clean Injectors

Perform [Clean Electronic Injectors \(In Engine\)](#) in Section 02 Group 90.

Run engine.

Did cleaning the injectors make a noticeable difference in performance?

YES: Problem resolved. Recommend the use of John Deere Fuel Protect Keep Clean to prevent reoccurring symptoms. Perform [Exhaust Condition Check](#)

NO: Contact DTAC for assistance.

RE42287,0000587 -19-20MAR12-19/19

Engine Will Not Crank

RE42287,0000588 -19-29MAR11-1/15

Diagnostic Procedure

Control Unit Response:

The ECU is not part of the engine cranking circuit.

Additional References:

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:

- see [4.5L Wiring Diagram 8](#)

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RE42287,0000588 -19-29MAR11-2/15

1 Preliminary Checks

1. Inspect batteries, stater motor, starter solenoid, starter relay, and single point ground for loose connections, corroded terminals, or cables that are not connected.
2. Check fuse F5000.
3. Verify that any remote switch used to shut down engine is in the RUN position.
4. If application has no remote switches, verify that remote switch jumper at connector X5007 is present.

Were any problems found?

YES: Fix problem. [GO TO 13](#)

NO: [GO TO 2](#)

RE42287,0000588 -19-29MAR11-3/15

2 Check Battery State of Charge

1. Ignition OFF, engine OFF.

2. Measure battery terminal voltage.

Is the voltage greater than 12.2 V for 12 V systems or 24.4 V for 24 V systems?

YES: [GO TO 3](#)

NO: Recharge or replace batteries. [GO TO 13](#)

RE42287,0000588 -19-29MAR11-4/15

3 Check Battery Voltage While Attempting Crank

1. Ignition ON, engine OFF for 30 seconds.

2. Monitor battery terminal voltage.

3. Hold key switch in start position for 3 seconds.

Is the voltage greater than 11 V for 12 V systems or 22 V for 24 V systems while attempting to start engine?

YES: [GO TO 5](#)

NO: [GO TO 4](#)

Continued on next page

RE42287,0000588 -19-29MAR11-5/15

4 Load Test Batteries

1. Ignition OFF, engine OFF.

2. Load test batteries.

Do batteries pass load test?

YES: Check for internal starter problem Check for hydro locked or seized engine, or load not disengaged.

NO: Recharge or replace batteries. GO TO 13

RE42287,0000588 -19-29MAR11-6/15

5 Check Starter Relay Battery Supply Voltage

1. Ignition OFF, engine OFF.

2. Measure the voltage from the starter relay battery voltage supply terminal to single point ground.

Is the voltage within 1 V of battery terminal voltage?

YES: GO TO 6

NO: Fix problem. GO TO 13

RE42287,0000588 -19-29MAR11-7/15

6 Check Voltage at Starter Relay Coil

NOTE: Some applications may have safety switches or other interlocks which interrupt the starter relay control circuit (high side or ground). Consult equipment manufacturer information to determine if application has any starter interlocks.

1. Monitor the voltage between the starter relay coil high side terminal (wire between key switch and relay) and single point ground.

2. Hold key switch in start position for 3 seconds.

Is the voltage within 2 V of battery terminal voltage while attempting to start engine?

YES: GO TO 7

NO: GO TO 11

RE42287,0000588 -19-29MAR11-8/15

7 Check Starter Relay Coil Ground

1. Monitor the voltage between the starter relay coil high side terminal and starter relay coil ground terminal.

2. Hold key switch in start position for 3 seconds.

Is the voltage within 2 V of battery terminal voltage while attempting to start engine?

YES: GO TO 8

NO: Fix open ground circuit. GO TO 13

RE42287,0000588 -19-29MAR11-9/15

8 Check Starter Relay Output Voltage

1. Monitor the voltage between the starter relay output terminal and single point ground.

2. Hold key switch in start position for 3 seconds.

Is the voltage within 2 V of battery terminal voltage while attempting to start engine?

YES: GO TO 9

NO: Replace starter relay. GO TO 13

Continued on next page

RE42287,0000588 -19-29MAR11-10/15

9 Check Starter Solenoid Control Circuit	<p><i>NOTE: Some gear-reduction type starter motors may have an additional starter relay located near the starter motor which controls the voltage supplied to the starter solenoid. Consult stater motor manufacturer for more information.</i></p> <ol style="list-style-type: none"> 1. Monitor the voltage between the starter solenoid "S" terminal and single point ground. 2. Hold key switch in start position for 3 seconds. <p>Is the voltage within 2 V of battery terminal voltage while attempting to start engine?</p>	<p>YES: <u>GO TO 10</u></p> <p>NO: Fix open circuit between starter relay output and starter solenoid. <u>GO TO 13</u></p>
10 Check Starter Cables	<ol style="list-style-type: none"> 1. Monitor the voltage between the starter solenoid battery terminal and starter ground terminal (large cable connections). 2. Hold key switch in start position for 3 seconds. <p>Is the voltage within 2 V of battery terminal voltage while attempting to start engine?</p>	<p>YES: Remove and bench test stater motor and starter solenoid.</p> <p>NO: Check starter cables for poor connections or high resistance. <u>GO TO 13</u></p>
11 Check Key Switch Voltage Supply	<ol style="list-style-type: none"> 1. Ignition OFF, engine OFF. 2. Measure the voltage between the key switch battery supply terminal and single point ground. <p>Is the voltage within 2 V of battery terminal voltage?</p>	<p>YES: <u>GO TO 12</u></p> <p>NO: Fix open circuit between key switch and battery positive terminal. <u>GO TO 13</u></p>
12 Check Key Switch	<ol style="list-style-type: none"> 1. Monitor the voltage between the key switch start terminal and single point ground. 2. Hold key switch in start position for 3 seconds. <p>Is the voltage within 2 V of battery terminal voltage while attempting to start engine?</p>	<p>YES: Fix open circuit between key switch and starter relay coil high side terminal. <u>GO TO 13</u></p> <p>NO: Replace key switch. <u>GO TO 13</u></p>
13 Verification	<p>Attempt to start engine.</p> <p>Does engine start?</p>	<p>YES: Problem fixed.</p> <p>NO: <u>GO TO 1</u></p>

Excessive Fuel Consumption

Symptom	Problem	Solution
Excessive Fuel Consumption	Diagnostic trouble codes	Resolve active diagnostic trouble codes.
	Poor fuel quality	Drain fuel and replace with quality fuel of the proper grade.
	Engine overloaded	Reduce engine load
	Air cleaner restricted or dirty	Replace air cleaner element as required.
	Compression too low	Determine cause of low compression and repair as required.
	Leaks in fuel supply system	Locate source of leak and repair as required.
	Improper valve clearance.	Adjust valves. See Valve — Clearance Adjustment in Section 02 Group 020.
	Fuel injectors defective.	If testing indicates a possible faulty injector, remove and inspect injectors. See Remove Electronic Injectors Install Electronic Injectors in Section 02, Group 100.
	Low engine temperature.	Coolant temperature too low. Check thermostat. See Thermostat — Removal and Testing in Section 02, Group 070.
	Incorrect EGR Valve or Restricted EGR Cooler, if equipped.	Replace EGR valve with correct part number or replace EGR cooler.
<i>NOTE: For component location, see Y5400 - EGR Valve in Section 03, Group 140.</i>		
<i>NOTE: Calculated low EGR flow causes the ECU to increase exhaust back pressure using exhaust throttle or VGT position in an attempt to increase EGR flow.</i>		
Check for ECU Software Updates	Reprogram ECU with latest payload.	

RE42287,0000589 -19-05AUG11-1/1

Excessive Oil Carryover

All engines have some oil carryover suspended in the blow-by exiting the rocker arm cover vent hose to the crankcase ventilation canister. The crankcase ventilation system uses a crankcase ventilation filter that filters the oil out of the blow-by and returns the oil to the oil sump. Refer to the operators manual for service intervals for the crankcase ventilation filter. Excessive oil carryover is identifiable by oil dripping from the vent tube that routes

from the crankcase ventilation canister to atmosphere or oil dripping from the pressure relief valve located in the rocker arm cover.

Excessive oil carryover is caused by:

- Improperly serviced crankcase ventilation filter.
- Restricted or kinked crankcase ventilation system hoses and piping.
- Excessive crankcase pressure (blow-by).

RE42287,000058A -19-29MAR11-1/5

Diagnostic Procedure

Preliminary Checks

Check for engine oil level too high.

Check for too low viscosity, or coolant or fuel diluted engine oil.

Check for excessive external oil leaks.

RE42287,000058A -19-29MAR11-2/5

1 Line Check

1. Ignition OFF, Engine OFF

2. Inspect all crankcase ventilation pipes and hoses for kinks, restrictions, and blockages.

Any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,000058A -19-29MAR11-3/5

2 Crankcase Pressure Check

Perform [Crankcase Pressure \(Blow-By\) Test](#).

Does Engine pass Crankcase Pressure (Blow-By) Test?

YES: [GO TO 3](#)

NO: Repair problem.
Perform [Verification Procedure](#).

RE42287,000058A -19-29MAR11-4/5

3 Replace Filter Check

1. Replace engine crankcase filter.

2. Reconnect all hoses, pipes, sensors, and electrical connectors.

3. Ignition ON, engine running.

4. Run engine at fast idle for 10 minutes.

Is oil carryover present at outlet of vent tube?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

RE42287,000058A -19-29MAR11-5/5

Excessive Oil Consumption

All engines consume some oil. The consumption rate depends on engine operating conditions, design of key parts, and the age of the engine. Since fuel consumption is an indicator of operating power levels, fuel used versus oil consumed is a critical factor in analyzing oil consumption.

Long-term oil consumption (three oil drain intervals after the engine is broken in) with consumption rates poorer than 400:1 (100 gal. of fuel and 1 qt. of oil) indicates a need to monitor or investigate. Suggested steps would be:

- Check for signs of ingested dust or have an oil analysis performed to check for silicon.
- Check for proper crankcase oil fill level.
- Perform cylinder electronic compression test to find low compression cylinders.
- Remove head and inspect for glazed or worn liners.
- Inspect pistons for carbon deposits in the ring land grooves.

Plus-50 is a trademark of Deere & Company

- Measure valve stem OD and valve guide ID to determine clearance.

When changing to a premium oil such as John Deere Plus-50™ II, little oil consumption change is expected, although a small percentage of engines may experience a noticeable change in consumption rates. This may be due to the following:

- The previous oil may have left deposits on internal components. Plus-50 II oil contains high levels of performance additives, such as detergent and dispersant, to remove deposits. This may temporarily increase oil consumption for a period of time. However, oil consumption amount should stabilize after two or three oil change service intervals.
- Oil with a high viscosity grade such as 15W-40 is less volatile than an oil with a lower viscosity grade such as 10W-30. This results in less oil consumption when using an oil with a higher viscosity.

RE42287,000058B -19-04OCT11-1/5

Diagnostic Procedure

Preliminary Checks

Check for too low or too high engine oil level.

Check for too low viscosity, or coolant or fuel diluted engine oil.

Check for excessive external oil leaks.

RE42287,000058B -19-04OCT11-2/5

1 Oil In Coolant Check

Check the coolant for signs of oil.

Is there any signs of oil found within the coolant?

YES: See Coolant in Oil or Oil in Coolant in Section 04, Group 150.

NO: GO TO 2

Continued on next page

RE42287,000058B -19-04OCT11-3/5

2 Excessive Crankcase Pressure Check

Check for excessive crankcase pressure. See [Crankcase Pressure \(Blow-By\) Test](#) in Section 4, Group 155.

Were any problems found?

YES: Excessive fumes or dripping oil observed; appears to be caused by boost pressure. Check the turbocharger, repair or replace as needed. See [Turbocharger — Failure Analysis](#) in Section 02, Group 080.

YES: Excessive fumes or dripping oil observed; does NOT appear to be caused by boost pressure. Excessive blow-by, not caused by boost pressure is most likely caused by faulty piston rings/cylinder liners not providing an adequate combustion seal. Perform a compression test to verify this is the case. See [Mechanical Compression Test](#) in Section 04, Group 155.

NO: [GO TO 3](#)

RE42287,000058B -19-04OCT11-4/5

3 Pistons, Rings, Cylinder Liners Check

The most likely cause of the excessive oil consumption is one of the following failures in the pistons, rings, and/or cylinder liners or in the valve guides. Check the most likely item as needed.

- Oil control rings worn or broken
- Scored cylinder liners or pistons
- Piston ring grooves excessively worn
- Piston rings sticking in ring grooves
- Insufficient piston ring tension
- Piston ring gaps not staggered
- Cylinder liners glazed (insufficient load during engine break-in)
- Worn valve guides or stems

Were any problems found?

YES: Repair problem as necessary. Verify that problem is resolved. Perform [Exhaust Condition Check](#).

NO: Contact DTAC for support.

RE42287,000058B -19-04OCT11-5/5

Fuel in Coolant

RE42287,000058C -19-08AUG11-1/4

Diagnostic Procedure

RE42287,000058C -19-08AUG11-2/4

**❶ Inspect Fuel Cooler
(if equipped)**

If the application has a liquid-to-liquid fuel cooler, test for an internal leak.

YES: Replace Fuel Cooler.

Were any problems found?

NO: GO TO 2

RE42287,000058C -19-08AUG11-3/4

❷ Compression Check

In Service ADVISOR, perform the Cylinder Electronic Compression Test.

YES: Replace Fuel Injector Sleeve in suspect cylinders.

Were any problems found with any cylinders?

NO: Replace Cylinder Head.

RE42287,000058C -19-08AUG11-4/4

Fuel in Oil

RE42287,000058D -19-22SEP11-1/12

Diagnostic Procedure

RE42287,000058D -19-22SEP11-2/12

1 Oil Contamination Test

NOTE: Hydraulic oil leaking into the engine crankcase from a hydraulic pump may be mistaken as fuel in the oil. Laboratory analysis can be used to determine if the contaminate is fuel or hydraulic oil.

1. Check for an increase in engine oil level and a decrease in oil viscosity (oil is too thin).
2. Check oil change interval schedule. Make sure the oil and oil filter are replaced per the operators manual.
3. Submit oil sample to laboratory to identify contaminant, if uncertain.

Is the contaminant fuel?

YES: [GO TO 2](#)

NO: Perform test for identified contaminant.

RE42287,000058D -19-22SEP11-3/12

2 Connect to Service Advisor

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

2. In Service ADVISOR, perform Load Profile Information Test.

Was the engine run for long periods of time at less than 30% load?

NOTE: Operating the engine at less than 30% load does not bring the engine oil to proper temperature, which cause the fuel to evaporate. Operating the engine at less than 30% load can also cause more frequent regenerations.

YES: Talk to operator about proper application usage.

NO: [GO TO 3](#)

RE42287,000058D -19-22SEP11-4/12

3 Check for Restricted Fuel Return Lines

Perform [Fuel Return Line \(Leak off\) Restriction Check](#) in Section 4, Group 155. Did return fuel system pass test?

YES: For Mechanical Low-Pressure Fuel Transfer Pumps [GO TO 4](#)

YES: For Electronic Low-Pressure Fuel Transfer Pumps [GO TO 5](#)

NO: Repair problem.

RE42287,000058D -19-22SEP11-5/12

4 Check Mechanical Fuel Transfer Pump

Perform [Fuel System Bleeding](#) for PWX engines in Section 4, Group 155. Was transfer pump operating correctly?

YES: [GO TO 5](#)

NO: Replace mechanical fuel transfer pump.

Continued on next page

RE42287,000058D -19-22SEP11-6/12

Observable Diagnostics and Tests

5 Bench Test Low Pressure Fuel Pump	<ol style="list-style-type: none">1. Remove low pressure fuel pump.2. Install a regulated compressed air supply with pressure gauge to the low pressure fuel pump inlet fitting.3. Install a cap on the low pressure fuel pump fitting.4. Regulate the air pressure to 70 kPa (10 psi).5. Submerge the low pressure fuel pump in a container of diesel fuel.6. Check for air bubbles. <p>Are air bubbles present in the fuel?</p>	<p>YES: Replace low pressure fuel pump</p> <p>NO: Reinstall low pressure fuel pump. <u>GO TO 6</u></p> <p>RE42287,000058D -19-22SEP11-7/12</p>
6 Check High-Pressure Pump Front Seal	<p><i>NOTE: For removal and installation procedures, see <u>High-Pressure Fuel Pump — Removal</u> and <u>High-Pressure Fuel Pump — Installation</u>, Section 02, Group 090.</i></p> <p>Remove high-pressure pump and check for seal damage.</p> <p>Is there evidence of seal damage?</p>	<p>YES: Replace high-pressure pump.</p> <p>NO: Reinstall pump. <u>GO TO 7</u></p> <p>RE42287,000058D -19-22SEP11-8/12</p>
7 Check for Black Smoke	<p><i>NOTE: Disconnect exhaust filter to observe smoke.</i></p> <p>Does engine emit gray or black exhaust smoke?</p>	<p>YES: Perform <u>Exhaust Condition Check</u> in Section 04, Group 150.</p> <p>NO: <u>GO TO 8</u></p> <p>RE42287,000058D -19-22SEP11-9/12</p>
8 Check Engine Performance	<ol style="list-style-type: none">1. In Service ADVISOR, perform Cylinder Misfire Test.2. In Service ADVISOR, perform Cylinder Cutout Test. <p>Do test results indicate low contribution from a single cylinder?</p>	<p>YES: Replace injector for that cylinder.</p> <p>NO: <u>GO TO 9</u></p> <p>RE42287,000058D -19-22SEP11-10/12</p>
9 Check for Loose Injector Clamp	<p><i>NOTE: For torque specifications, see <u>Injectors — Installation</u> in Section 2, Group 090.</i></p> <p>Remove rocker cover and check for loose Electronic Injector clamps. Were the clamps tight?</p>	<p>YES: <u>GO TO 10</u></p> <p>NO: Tighten all loose electronic injector clamps.</p> <p>RE42287,000058D -19-22SEP11-11/12</p>
10 Check Injectors	<ol style="list-style-type: none">1. Remove injectors.2. Check for damaged injector O-rings. <p>Was any O-ring damage observed?</p>	<p>YES: Replace O-rings and feed tubes.</p> <p>NO: Replace injectors and feed tubes.</p> <p>RE42287,000058D -19-22SEP11-12/12</p>

Throttle Does Not Respond

RE42287,000058E -19-01AUG11-1/9

Throttle Does Not Respond

RE42287,000058E -19-01AUG11-2/9

1 Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. Refresh Codes.

Are there any active DTC codes?

YES: Troubleshoot those codes first.

NO: [GO TO 2](#)

RE42287,000058E -19-01AUG11-3/9

2 Engine RPM

Is the engine RPM at or above slow idle of 800 RPM?

YES: [GO TO 3](#)

NO: Perform step 3 of [Engine Does Not Develop Full Power](#) in Section 04, Group 150. If no fault is found then [GO TO 3](#).

RE42287,000058E -19-01AUG11-4/9

3 Reprogram ECU

1. Download new ECU software payload file.

2. Program ECU and ensure correct throttle options are set on the trim page as you start the programming sequence.

Was programming successful?

YES: [GO TO 7](#)

NO: Repeat this step. If ECU will still not program, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

RE42287,000058E -19-01AUG11-5/9

4 Throttle Response Test

1. Ignition ON, Engine ON.

2. Adjust throttle to different speed points.

Does engine respond to throttle movement?

YES: Problem fixed, return to service.

NO: [GO TO 5](#)

Continued on next page

RE42287,000058E -19-01AUG11-6/9

Observable Diagnostics and Tests

5 Low-Pressure Fuel Test

Perform low-pressure fuel test, see [Low-Pressure Fuel System Check](#) in Section 04, Group 155.

Did test pass?

YES: [GO TO 6](#)

NO: Return to [Low-Pressure Fuel System Check](#) procedure and perform tests.

RE42287,000058E -19-01AUG11-7/9

6 High-Pressure Fuel Test

Perform high-pressure fuel test, see [High-Pressure Fuel System Check](#) in Section 04, Group 155.

Did test pass?

YES: [GO TO 7](#)

NO: Return to [High-Pressure Fuel System Check](#) procedure and perform tests.

RE42287,000058E -19-01AUG11-8/9

7 Throttle Response Test

1. Ignition ON, Engine ON.

2. Adjust throttle to different speed points.

Does engine respond to throttle movement?

YES: Problem fixed, return to service.

NO: Start a DTAC case.

RE42287,000058E -19-01AUG11-9/9

Aftertreatment Verification Procedure

1. Ignition ON, engine running.
2. Enable auto exhaust filter cleaning.
3. In Service ADVISOR, monitor Engine Coolant Temperature and allow it to reach 70 °C (158 °F).

IMPORTANT: If exhaust filter cleaning begins, allow it to complete.

4. Monitor DTCs. If any DTCs become active, go to those troubleshooting procedures.

NOTE: Upon key cycle, DTCs related to the aftertreatment system may become stored.

BB78437,0000003 -19-13JUL10-1/1

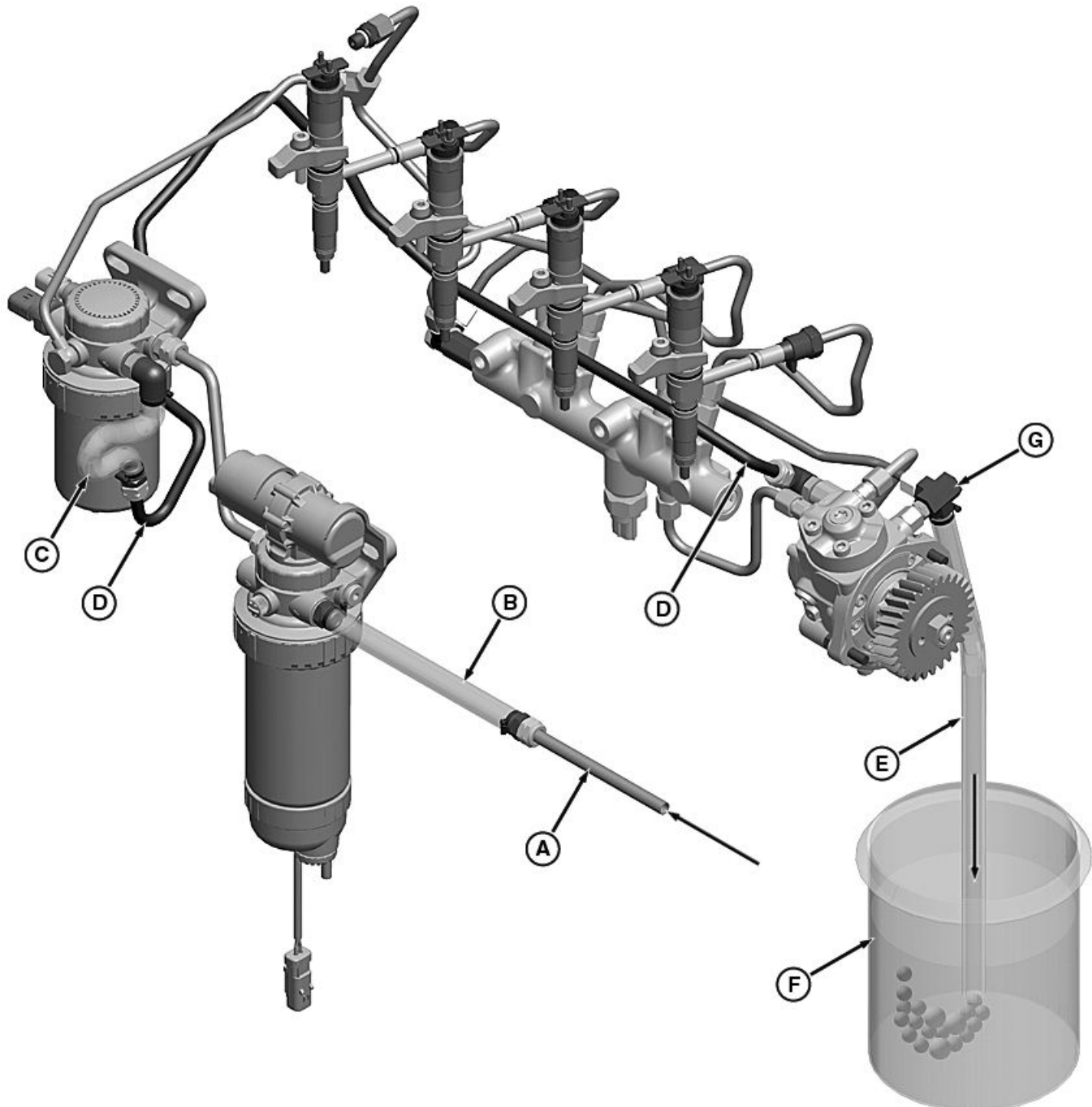
Air in Fuel Check

To check for air in the fuel system, follow the procedure below.

1. Preliminary checks:

- Check for loose fittings between fuel tank and primary fuel filter inlet.
- Check for loose fittings on the fuel cooler, if applicable.
- Make sure primary fuel filter element is on tight and gasket is intact.
- Check for damaged fuel pick-up tube in tank.
- Check for low fuel level in tank.

- Check for foaming in tank. Foaming strongly suggests air leaking past injectors. If there is foaming, inspect the injector hold down clamp torque, O-rings and seals. See [High-Pressure Injection Lines — Removal](#), [Electronic Injectors — Removal](#), and [Electronic Injectors — Installation](#) in Section 02.
- Air may enter system when engine is turned off. Verify lines are properly tightened between the secondary fuel filter, fuel filter header, and the high-pressure fuel pump, and between high-pressure fuel pump leak off port and EGR cooler bracket.



Test for Air in Fuel for Engines With Electronic Transfer Pumps
Continued on next page

BK34394,0000DF0 -19-02AUG11-1/2

RG20178 —UN—01APR11

- A—Fuel Supply Line from Tank D—Fuel Line Between Secondary Fuel Filter Outlet and Fuel Filter Header F—Container with Clean Fuel
 B—Clear Fuel Line at Primary Fuel Filter Inlet G—Return Fuel (To Tank) Leak Off Port on EGR Cooler Bracket
 C—Clear Fuel Line at Secondary Fuel Filter Outlet E—Clear Plastic Hose

2. Check for air in fuel system:

NOTE: For engines equipped with a mechanical transfer pump the fuel supply line is located in the same place.

- Disconnect the return-to-tank line from the EGR cooler bracket fuel leak off port (G).
 - Install a clear plastic hose (E) with proper fittings from JT03513C, Fuel Supply System Test Kit, between the leak off port and the return-to-tank line, OR submerge hose in a container of clean fuel (F), as shown.
 - Start engine. Run engine for 1 minute at 1500 rpm. Observe hose and container (if used) for bubbles. Stop engine.
 - If bubbles were present in the return fuel, go to the next step to determine source of the air. Reconnect fuel lines.
3. Check for air in fuel tank supply line:
- Disconnect the fuel tank supply line (A) at primary fuel filter inlet.
 - Install a clear plastic hose (B) with proper fittings between the fuel tank supply line and the primary fuel filter inlet.
 - Operate engine and check for air bubbles in hose. If bubbles are present, check for loose or damaged fuel pickup tube, fuel supply lines, or hoses.
 - If no problem was found, go to the next step. Reconnect fuel lines.
4. Check for air in the fuel filter header line:
- Disconnect the line between the secondary fuel filter outlet and the fuel filter header.
 - Install a clear plastic hose (C) with proper fittings between the secondary fuel filter outlet and the fuel filter header.

- Bleed air from the fuel system. See [Fuel System Bleeding](#) in this section.
 - Operate engine and check for air bubbles in hose. If bubbles are present, check for damaged primary fuel filter head or gasket, and for loose or damaged primary fuel filter.
5. Check for air in the high-pressure fuel pump line:

CAUTION: Do NOT disconnect high-pressure fuel pump OUTLET line between high-pressure pump and fuel rail.

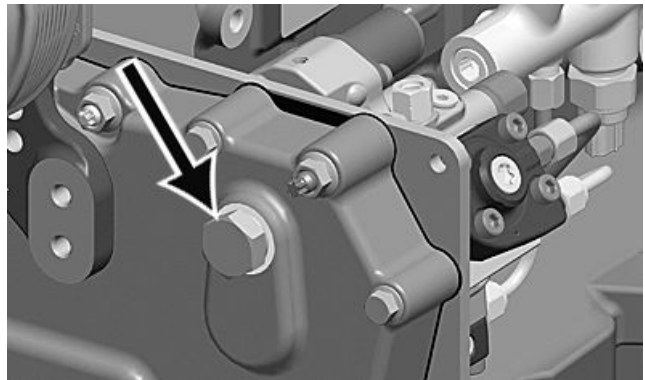
- Disconnect the line (D) between the fuel filter header and the high-pressure fuel pump.
 - Install a clear plastic hose with proper fittings between the fuel filter header and high-pressure fuel pump.
 - Bleed air from the fuel system. See [Fuel System Bleeding](#) in this section.
 - Operate engine and check for air bubbles in hose. If bubbles are present, check for damaged fuel filter header or high-pressure fuel pump supply line.
6. Check for other causes of air in return line:
- Check fuel cooler for air leaks, if applicable.
 - If source of air was not found, combustion gas may be leaking into the fuel return of one or more injectors. Inspect the injector hold down clamp torque, O-rings and seals. See [High Pressure Injection Lines — Removal](#), [Electronic Injectors — Removal](#), and [Electronic Injectors — Installation](#) in Section 02. Reconnect fuel lines.

BK34394,0000DF0 -19-02AUG11-2/2

Camshaft to Crankshaft Timing Check

See [High-Pressure Fuel Pump — Removal](#) and [High-Pressure Fuel Pump — Installation](#) in Section 02, Group 090 for more information on high-pressure fuel pump timing.

- Rotate the engine flywheel with [JDE81-1](#) or [JDG820](#) Flywheel Tool and lock engine at No. 1 cylinder's TDC-compression stroke with [JDE81-4](#) Timing Pin.
- Remove plug on front of timing gear cover.



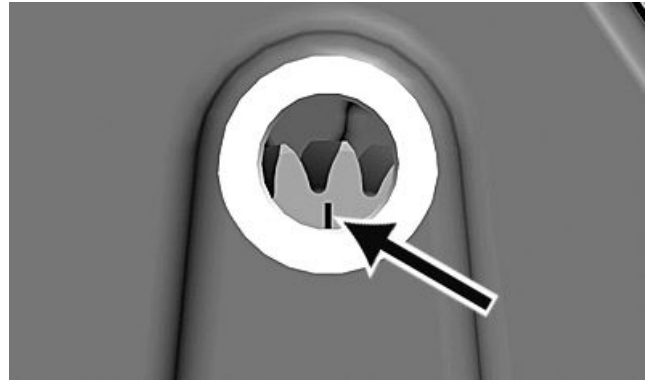
RG18845—UN—22JUL10

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RG40049,000067A -19-23AUG10-1/2

When the engine is at number 1 TDC, the mark on the high-pressure fuel pump gear should be visible.

NOTE: If the high-pressure fuel pump has been removed without the engine locked at Number 1 cylinder's TDC-compression stroke, this check may not be valid for identifying camshaft to crankshaft timing.



RG18946—UN—22JUL10

RG40049,000067A -19-23AUG10-2/2

CAN Diagnostics Procedure

Continued on next page

BK34394,0000DF7 -19-08AUG11-1/15

Diagnostic Procedure

Additional References:

For more intake air sensor information, see [B5500 — Intake Air Sensor](#) in Section 03, Group 140.

For more VGT Actuator information, see [Y5500 — VGT Actuator](#) in Section 03, Group 140.

For more Exhaust Throttle Actuator information, see [Y5500 — Exhaust Throttle Actuator](#) in Section 03, Group 140.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

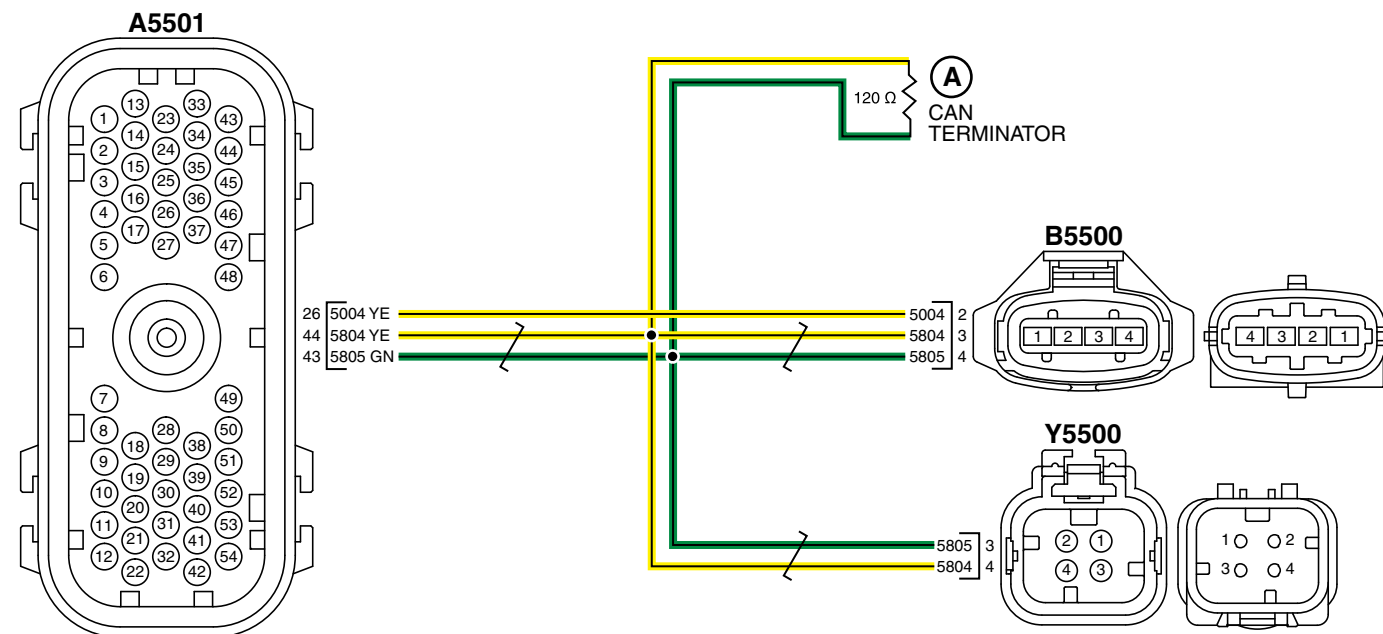
For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

- see [4.5L Wiring Diagram 7](#)

located in Section 06, Group 210.



CAN Wiring Diagram

A—CAN Terminator 120 Ohm Resistor

A5501 - 44—CAN High

A5501 - 43—CAN Low

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Pumps

- [JDG10460](#) – Female -- Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

VGT

- [JDG10460](#) – Female -- Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

Sensor

- [JDG10233](#) – Female – Blue/Red

- [JDG10243](#) – Male – Blue/Red

ECU

- [JDG10460](#) – Female -- Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

Tools:

- [JT07306](#) — Digital Multimeter

- [J-35616-20](#) – Test Leads

Continued on next page

BK34394,0000DF7 -19-08AUG11-2/15

1 Verify Problem

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.
2. Ignition ON, Engine OFF.
3. In Service ADVISOR, monitor data points:
 - Intake Air Sensor Status
 - VGT or Exhaust Throttle Actuator Status

Do all data points display Invalid?

YES: GO TO 2

NO: Perform Wiggle Test while performing each step within the procedure that requires monitoring or making a measurement.
GO TO 2

BK34394,0000DF7 -19-08AUG11-3/15

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect VGT or Exhaust Throttle actuator connector Y5500.
3. Perform Terminal Test on actuator and Y5500 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 3

BK34394,0000DF7 -19-08AUG11-4/15

3 Communication Status Check

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Intake Air Sensor Status.

Does Intake Air Sensor Status display Valid?

YES: Replace VGT or Exhaust Throttle actuator. In Service ADVISOR, perform VGT or Exhaust Throttle Learn Value Reset Test. Perform Verification Procedure.

NO: GO TO 4

BK34394,0000DF7 -19-08AUG11-5/15

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect intake air sensor connector B5500.
3. Perform Terminal Test on sensor and B5500 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 5

Continued on next page

BK34394,0000DF7 -19-08AUG11-6/15

Checks, Tests, and Procedures

5 Communication Status Check

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor VGT or Exhaust Throttle Actuator Status.

Does VGT or Exhaust Throttle Actuator Status display Valid?

YES: Replace intake air sensor. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

BK34394,0000DF7 -19-08AUG11-7/15

6 CAN Low Voltage Check

On B5500 connector, measure voltage between female sockets 4(+) and 2(-).

Is voltage greater than 4.7 V?

YES: GO TO [Short to Voltage Procedure](#) and substitute CAN Low as the signal in the procedure. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

BK34394,0000DF7 -19-08AUG11-8/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501
3. Perform [Terminal Test](#) on A5501 connector female sockets 43 and 44.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

BK34394,0000DF7 -19-08AUG11-9/15

8 Continuity Check

1. Measure resistance between A5501 connector female socket 43 and B5500 connector female socket 3.
2. Measure resistance between A5501 connector female socket 44 and B5500 connector female socket 4.

Are all resistances less than 5 ohms?

YES: [GO TO 9](#)

NO: Repair open or high resistance in harness. Perform [Verification Procedure](#).

BK34394,0000DF7 -19-08AUG11-10/15

9 Short to Ground Check

1. Disconnect VGT or Exhaust Throttle actuator connector Y5500.
2. On B5500 connector, measure resistance between female socket 3 and single point ground.
3. On B5500 connector, measure resistance between female socket 4 and single point ground.

Are all resistances greater than 100k ohms?

YES: [GO TO 10](#)

NO: Repair short in harness. Perform [Verification Procedure](#).

BK34394,0000DF7 -19-08AUG11-11/15

Continued on next page

Checks, Tests, and Procedures

10 CAN Shorted Check

On A5501 connector, measure resistance between female sockets 43 and 44.

Is resistance less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: [GO TO 11](#)

BK34394,0000DF7 -19-08AUG11-12/15

11 Wire to Wire Short Check

1. On A5501 connector, measure resistance between female socket 43 and all other terminals in A5501 connector.

2. On A5501 connector, measure resistance between female socket 44 and all other terminals in A5501 connector.

Are all resistances greater than 100k ohms?

YES: [GO TO 12](#)

NO: Repair short in harness. Perform [Verification Procedure](#).

BK34394,0000DF7 -19-08AUG11-13/15

12 Terminal Test

1. Disconnect all ECU connectors.

2. Perform [Terminal Test](#) on all ECU terminals in all ECU connectors.

Were any problems found?

YES: Repair Problem. Perform [Verification Procedure](#).

NO: [GO TO 13](#)

BK34394,0000DF7 -19-08AUG11-14/15

13 Wire to Wire Short Check

1. Measure resistance between A5501 connector female socket 43 and all other terminals in all ECU connectors.

2. Measure resistance between A5501 connector female socket 44 and all other terminals in all ECU connectors.

Are all resistances greater than 100k ohms?

YES: Contact DTAC for support.

NO: Repair short in harness. Perform [Verification Procedure](#).

BK34394,0000DF7 -19-08AUG11-15/15

CAN Message Not Received

The ECU did not receive a CAN message from another control unit.

When DTC is Displayed:

When the ECU does not receive a CAN message from another control unit.

Related Information:

NOTE: The last three digits of the SPN you just came from correlate to the Source Address of the control unit in question.

Additional references:

Application technical manual, which lists all controllers on the application.

For connector repair or ECU wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Engine Schematic 2](#)
- see [4.5L Wiring Diagram 7](#)

located in Section 06, Group 210.

To determine which control unit has stopped sending messages to the ECU, use the following procedure:

IMPORTANT: You MUST look at the application technical manual to see how many controllers are on the application and what their source addresses are.

1. Ignition ON, Engine OFF.

2. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.
3. Using Service ADVISOR, go to the Readings menu and select Get Controllers.
4. Service ADVISOR should now be displaying a list of control units communicating on your application.
5. From the list supplied by the application technical manual, determine which controller is no longer communicating.

IMPORTANT: If the control unit source address is not listed, it is not communicating on the communication bus.

Were you able to identify the control unit that is not communicating?

Yes: Look for an open or short connection of the CAN wiring between the ECU and the other controller. Repair problem. Perform [Verification Procedure](#).

No, all control units are communicating: While performing the [Wiggle Test](#), close displayed list, repeat step 3 and watch for a new controller to be displayed. If a new controller is displayed look for an intermittent connection of the CAN wiring between the ECU and the other controller or corrosion at the connectors. Repair problem. Perform [Verification Procedure](#).

BF67790,00001EB -19-02AUG11-1/1

CAN Message Received Error

The ECU received a CAN message error when communicating to another control unit.

When DTC is Displayed:

When the ECU receives a CAN message error when communicating to another control unit.

Related Information:

NOTE: The last three digits of the SPN you just came from correlate to the Source Address of the control unit in question.

Additional references:

Application technical manual, which lists all controllers on the application.

For connector repair or ECU wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Engine Schematic 2](#)
- see [4.5L Wiring Diagram 7](#)

located in Section 06, Group 210.

To determine which controller has the communication error, use the following procedure.

IMPORTANT: You **MUST** look at the application technical manual to see how many controllers are on the application and what their source addresses are.

1. Identify Control Unit

- a. Ignition ON, Engine OFF.
- b. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.
- c. In Service ADVISOR, go to Readings menu and select Get Controllers.
- d. Service ADVISOR should now be displaying a list of controllers communicating on your application.
- e. Look for the last three digits of the diagnostic trouble code that sent you here in the source address column of the displayed list to identify the controller the ECU is having communications problems with.

Were you able to identify the control unit that is generating the communication error?

Yes: GO TO 2

No, source address is not in the displayed list:

While performing the [Wiggle Test](#), close displayed list, repeat step c and watch for a new controller to be displayed. If a new controller is displayed look for

an intermittent connection of the CAN wiring between the ECU and the other controller or corrosion at the connectors. Repair problem. Perform [Verification Procedure](#).

2. Inspect Connectors and Harness

- a. Ignition OFF, Engine OFF.
- b. Disconnect ECU connector A5503 and connector of controller identified in step 1.
- c. Look for corrosion at the disconnected connectors and the mating connectors in the CAN wiring terminals.
- d. Look for chaffed or pinched places in the harness between the ECU and the identified controller.

Were any problems found?

Yes: Repair problem. Perform [Verification Procedure](#).

No: GO TO 3

3. Reprogram ECU

- a. Ignition ON, Engine OFF.
 - b. Reprogram ECU.
 - c. Refresh codes.
- Is DTC that sent you here active?

Yes: GO TO 4

No: Problem resolved. Perform [Verification Procedure](#).

4. Troubleshoot Identified Controller

- a. Ignition OFF, Engine OFF.
- b. Troubleshoot identified controller using applicable application technical manual.
- c. Ignition ON, Engine OFF.
- d. Refresh codes.

Is DTC that sent you here active?

Yes: GO TO 5

No: Problem resolved. Perform [Verification Procedure](#).

5. Replace ECU

- a. Ignition OFF, Engine OFF.
- b. Replace ECU programmed with identical software that was in the removed ECU.
- c. Ignition ON, Engine OFF.
- d. Refresh codes.

Is DTC that sent you here active?

Yes: Contact DTAC for support.

No: Problem resolved. Perform [Verification Procedure](#).

BF67790,00001EC -19-02AUG11-1/1

CAN Message Received Is Incorrect

The ECU received a CAN message that was incorrect when communicating to another control unit.

When DTC is Displayed:

When the ECU receives a CAN message that is incorrect when communicating to another control unit.

Related Information:

NOTE: The last three digits of the SPN you just came from correlate to the Source Address of the control unit in question.

Additional references:

Application technical manual, which lists all controllers on the application.

For connector repair or ECU wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Engine Schematic 2](#)
- see [4.5L Wiring Diagram 7](#)

located in Section 06, Group 210.

To determine which controller has the communication error, use the following procedure.

IMPORTANT: You **MUST** look at the application technical manual to see how many controllers are on the application and what their source addresses are.

1. Identify Control Unit

- a. Ignition ON, Engine OFF.
- b. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.
- c. In Service ADVISOR, go to Readings menu and select Get Controllers.
- d. Service ADVISOR should now be displaying a list of controllers communicating on your application.
- e. Look for the last three digits of the diagnostic trouble code that sent you here in the source address column of the displayed list to identify the controller the ECU is having communications problems with.

Were you able to identify the control unit that is generating the communication error?

Yes: GO TO 2

No, source address is not in the displayed list:

While performing the [Wiggle Test](#), close displayed list, repeat step c and watch for a new controller to be displayed. If a new controller is displayed look for

an intermittent connection of the CAN wiring between the ECU and the other controller or corrosion at the connectors. Repair problem. Perform [Verification Procedure](#).

2. Inspect Connectors and Harness

- a. Ignition OFF, Engine OFF.
- b. Disconnect ECU connector A5503 and connector of controller identified in step 1.
- c. Look for corrosion at the disconnected connectors and the mating connectors in the CAN wiring terminals.
- d. Look for chaffed or pinched places in the harness between the ECU and the identified controller.

Were any problems found?

Yes: Repair problem. Perform [Verification Procedure](#).

No: GO TO 3

3. Reprogram ECU

- a. Ignition ON, Engine OFF.
 - b. Reprogram ECU.
 - c. Refresh codes.
- Is DTC that sent you here active?

Yes: GO TO 4

No: Problem resolved. Perform [Verification Procedure](#).

4. Troubleshoot Identified Controller

- a. Ignition OFF, Engine OFF.
- b. Troubleshoot identified controller using applicable application technical manual.
- c. Ignition ON, Engine OFF.
- d. Refresh codes.

Is DTC that sent you here active?

Yes: GO TO 5

No: Problem resolved. Perform [Verification Procedure](#).

5. Replace ECU

- a. Ignition OFF, Engine OFF.
- b. Replace ECU programmed with identical software that was in the removed ECU.
- c. Ignition ON, Engine OFF.
- d. Refresh codes.

Is DTC that sent you here active?

Yes: Contact DTAC for support.

No: Problem resolved. Perform [Verification Procedure](#).

BF67790,00001ED -19-02AUG11-1/1

Carbon Removal Procedure

Handle Chemical Products Safely

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before starting any job using a hazardous chemical. This will explain what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS information on chemical products used with John Deere equipment.)

IMPORTANT: For cleaning, use a nylon or plastic brush. DO NOT use a metal brush, Scotch-Brite®, or abrasive material to clean.

IMPORTANT: Never submerge the component in the solvent tank.

For more EGR valve information, see [EGR Valve Operation](#) in Section 03, Group 135.

For more air throttle actuator information, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

Scotch-Brite is a trademark of 3M Co.



TS1132 —UN—26NOV90

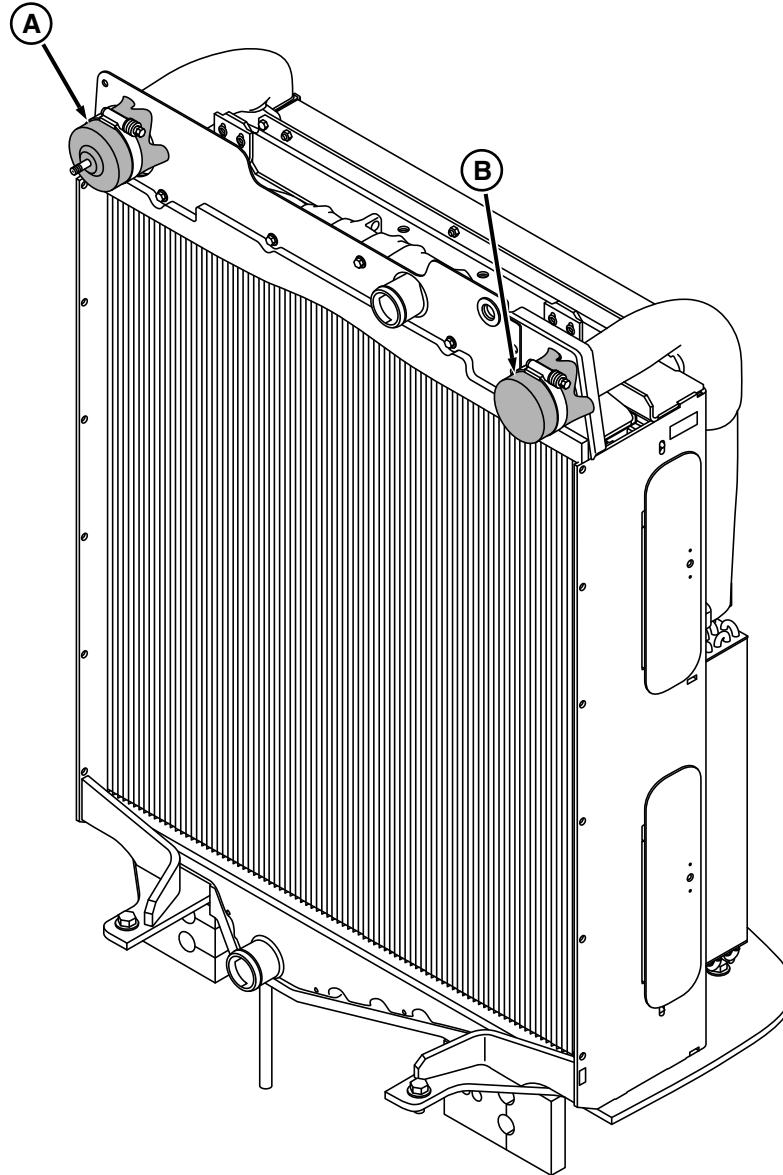
For more exhaust throttle information see [Exhaust Throttle Operation](#) in Section 03, Group 135.

NOTE: For installation and removal procedures of component, see Section 02.

1. Use a nylon or plastic brush with a solvent (for example: diesel fuel) to remove carbon deposits from bore.
2. Move the butterfly by hand if needed to clean the valve seat.
3. Remove debris and dry with compressed air regulated to 210 kPa (2.1 bar) (30 psi).
4. Clear any residual solvent with a rag.

BL90236,000030A -19-29MAY12-1/1

Charge Air Cooler Test



Charge Air Cooler Leak Test

A—Inlet

B—Outlet

NOTE: The location of the charge air cooler inlet and outlet varies by application.

1. Remove both the intake inlet tube and turbocharger outlet tube from the charge air cooler.
2. Fabricate and install the charge air cooler leak tester on the intake tube and turbocharger outlet tube. For instructions, see [DFRG11](#) in the [JDPS Master Tool Manual](#).
3. Secure a regulated supply air line and pressure gauge to the valve stem.
4. Slowly pressurize the system in 34—69 kPa (0.3—0.7 bar) (5—10 psi) increments while listening for escaping air.

5. Once the system pressure has reached 206.85 kPa (2 bar) (30 psi), close the air supply valve. Monitor the gauge reading for 15 seconds and note the pressure drop.
6. Repeat steps 4 and 5 three times to verify the accuracy of results.

Specification

Charge Air Cooler—Average pressure drop over 15 seconds..... 34 kPa (0.3 bar) (5 psi)

7. If charge air cooler does not meet specification repair or replace charge air cooler.

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SS01820,00002B3 -19-29JUN12-1/2

RG15675 —UN—12NOV07

8. Return to the procedure that sent you here.

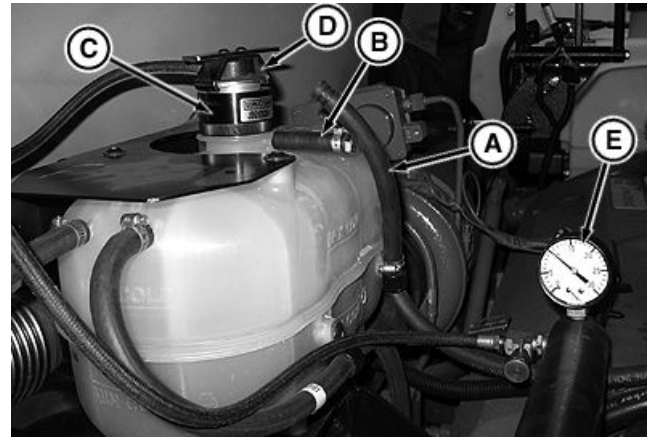
SS01820,00002B3 -19-29JUN12-2/2

Cooling System Test

This procedure requires D05104ST Cooling System Pressure Pump.

CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.



Pressure Test Surge Tank

A—Overflow Hose
B—Overflow Hose Plug
C—JDG10539-1 Tank Adapter
D—JDG839-2 Adapter (Application Specific)
E—D05104ST Pressure Tester

Test Surge Tank Cap Pressure

1. Remove Overflow Hose (A), if equipped. Install overflow hose plug (B) on tank.
2. Remove surge tank cap and attach to D05104ST tester.
3. Pressurize to the rating listed on the cap. The cap should hold the rated pressure for 10 seconds. If the gauge indicates a pressure drop, the cap is damaged and needs replaced.
4. If there was no pressure drop remove the cap from the gauge, turn it 180 degrees, and retest cap. This verifies that the first measurement was accurate.

Test Cooling System for Leaks

1. Allow engine to cool, then carefully remove surge tank cap.
2. Fill surge tank with coolant to the normal operating level.

IMPORTANT: DO NOT apply excessive pressure to the cooling system, doing so may damage radiator and hoses.

3. Connect gauge (E) and JDG10539-1 adapter (C) to surge tank filler neck. Pressurize cooling system to the rating on the cap.
4. With pressure applied, check all cooling system hose connections, radiator, and engine block for leaks. If leakage is detected, repair as necessary and pressure test system again. If no leakage is detected, but the gauge indicated a drop in pressure, coolant may be leaking internally within the system. See below for possible causes of internal coolant leaks:

Symptom	Problem	Solution
Internal Cooling System Leak	EGR Cooler Leaking.	See <u>EGR Cooler Test</u> in Section 04, Group 155.
	Leak at Oil Cooler	See <u>Oil Cooler — Inspection</u> in Section 02, Group 060.
	Leak at Cylinder Head Gasket	See <u>Head Gasket Joint Construction and Operation</u> in Section 03, Group 120.
	Pitted or Cavitated Cylinder Liners	See <u>Cylinder Liner — Visual Inspection</u> in Section 02, Group 030.
	Cracked Cylinder Head or Block	See <u>Cylinder Head — Cleaning and Inspection</u> in Section 02, Group 020. Also see <u>Cylinder Block — Cleaning and Inspection</u> in Section 02, Group 030.

Continued on next page

SS01820,00002B6 -19-14JUL11-1/2

Crankcase Pressure (Blow-By) Test

Combustion gas or air entering the crankcase creates higher than normal crankcase pressure.

Symptoms: Excessive oil carryover (oil out of the crankcase breather tube) and possibly low power.

A maximum manometer reading of 50.8 mm (2 in) water can be used as a general guideline for crankcase pressure for John Deere diesel engines.

Most blow-by comes from combustion gas leakage past one of three places:

- Piston rings
- Valve guides
- Turbocharger sealing ring

NOTE: the following items are required

- JT05697A manometer
- AT346594 oil test kit for obtaining an engine oil sample
- DFRG9 oil fill cap adapter (see TM11119)

BK34394,0000DF6 -19-13JUL11-1/5

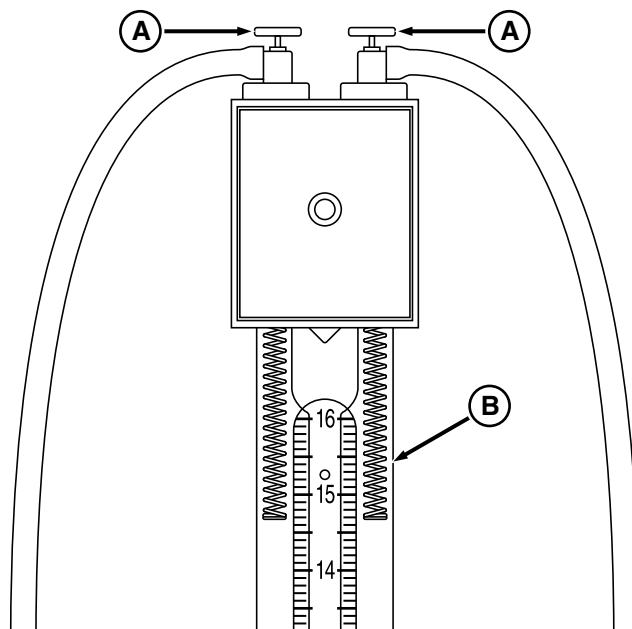
Crankcase Pressure (Blow-By) Diagnostic Procedure

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BK34394,0000DF6 -19-13JUL11-2/5

① Measure Crankcase Pressure Test

1. Disconnect the vent line between the rocker arm cover and the crankcase ventilation filter unit.
2. Prepare the JT05697A manometer with the appropriate water/dye mix using the directions supplied with the manometer.
3. Attach the manometer securely in an upright position next to the engine.
4. Install the DFRG9 oil fill cap adaptor in place of the oil fill cap on the engine and connect one of the plastic hoses from the manometer to the adaptor.



RG18176 —UN—09MAR10

JT05697A Manometer

A—Valves built into hose adapter

B—Manometer scale

IMPORTANT: Make sure that the manometer valve attached to the oil fill is closed before starting the engine. Failure to do so could allow the water in the manometer to be sucked into the engine while starting. Close both valves when the testing is completed to avoid losing the water/dye mix.

NOTE: Fluid travel is calculated by adding the travel of the fluid on both sides of the manometer. If the fluid travel exceeds 50.8 mm (2 in) at any time during the test discontinue test, and go to Turbocharger Seal Leakage Diagnostic Test below.

5. Ignition ON, Engine running.
6. Open both valves on the manometer. Let the engine stabilize at low idle. Observe the fluid travel in the manometer.
7. Slowly load the engine in small increments. If not possible to load the engine, slowly advance the idle speed in approximately 350 – 400 RPM increments instead. Stabilize the engine at each increment and record the amount of fluid travel in manometer. Continue to as near as possible full load or high idle.
8. Ignition OFF, Engine OFF.

At any time during test, did total fluid travel exceed 50.8 mm (2 in.)?

YES: Close the valve on the manometer that is connected to the flexible tubing. [GO TO 2](#)

NO: The crankcase pressure meets John Deere application guidelines. Either return to original diagnostic procedure, or return to customer.

Continued on next page

BK34394,0000DF6 -19-13JUL11-3/5

2 Turbocharger Seal Leakage Diagnostic Test

Some engines use one turbocharger and some use two in series. If the turbocharger oil seals are leaking, intake air or exhaust pressure can be passing through the seals, through the oil drain line, and into the crankcase. This would add to the overall crankcase blow-by reading.

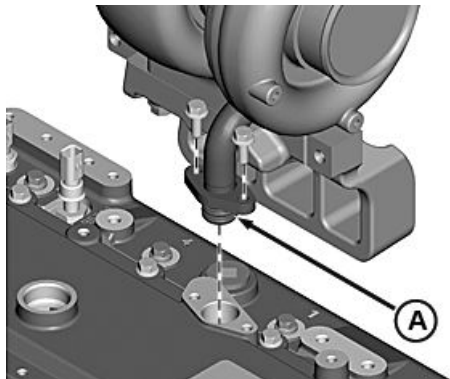
Based on the turbocharger configuration, find your installation in the graphics below as the oil drain line installations are different.

IMPORTANT: Test one turbocharger at a time carefully watching the oil level in the engine and the bucket.

1. Ignition OFF, Engine OFF.

IMPORTANT: If the configuration is different than described below, proceed to step 5.

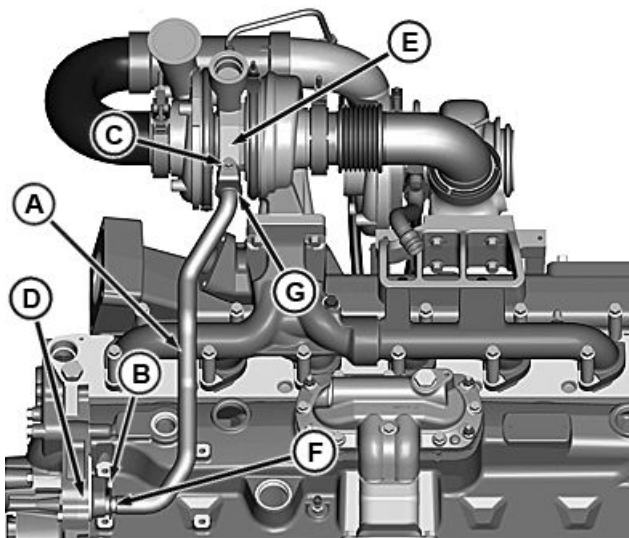
2. Dismount the turbocharger and disconnect the rocker arm cover end of the short oil drain line on the fixed turbocharger shown in the figure at location (A).



RG18234 —UN—09MAR10

Typical Short Oil Drain Line

3. Install a R52982 Turbo Oil Drain Back Plate and R521349 gasket over the opening in the rocker arm cover.
4. Install a new long oil drain line to the short line (flange to flange with gasket). Proceed to step 7.
5. Disconnect the VGT long oil drain line from the engine block. Location (F) in the figure shows one drain line fitting.



RG17322A —UN—10SEP09

Typical Long Oil Drain Line

6. Install an oil pan plug with O-ring in the oil pan opening using the original clamp to secure. Match the plug to the hole size.
7. Install a flexible tube on the end of the oil drain line just disconnected.
8. Obtain a bucket and place it on the ground or floor near the turbocharger oil drain line.

Continued on next page

BK34394,0000DF6 -19-13JUL11-4/5

9. Install the free end of the flexible tubing into the bucket making sure the tubing lies at the bottom of the bucket.

IMPORTANT: Be very careful to assure that the flexible tubing does not kink or restrict the oil flow in the turbocharger oil drain line at any time. If the line is restricted, the turbocharger could be damaged.

IMPORTANT: Fill the engine oil to the correct level. The turbocharger oil drains into the bucket when you run the engine so make sure the engine does not run low on oil during this test. Also, make sure that the bucket does not overflow or spill. Shut down the engine and add oil back into the engine from the bucket if necessary as the testing continues.

10. Use the manometer installed and left in place from earlier. Ignition ON, Engine ON.
11. Open both valves on the manometer. Let the engine stabilize at low idle. Observe the fluid travel in the manometer
12. Slowly load the engine in small increments. If not possible to load the engine, slowly advance the idle speed in approximately 350—400 RPM increments instead. Stabilize the engine at each increment and record the amount of fluid travel in manometer. Continue to as near as possible full load or high idle.
13. Check for bubbles appearing in the bucket. If more than just a few bubbles are present, this indicates that the turbocharger needs repair/replacement.
14. Ignition OFF, Engine OFF.
15. Refill engine oil level.
16. If the VGT turbocharger has not already been tested as a source for excessive crankcase pressure, go to step 5.

At any time during test, did total fluid travel exceed 50.8 mm (2 in.)?

YES: See [Mechanical Compression Test](#) in Section 4 Group 155.

NO: See [Turbocharger Oil Seal Leak Check](#) in Section 4 Group 155.

BK34394,0000DF6 -19-13JUL11-5/5

EGR Cooler Test

NOTE: The EGR cooler can be pressure checked for leaks at a radiator shop.

1. Remove EGR cooler from engine.
2. Block off one of the coolant openings.
3. Attach shop air and regulator to the other coolant opening and submerge cooler in water.

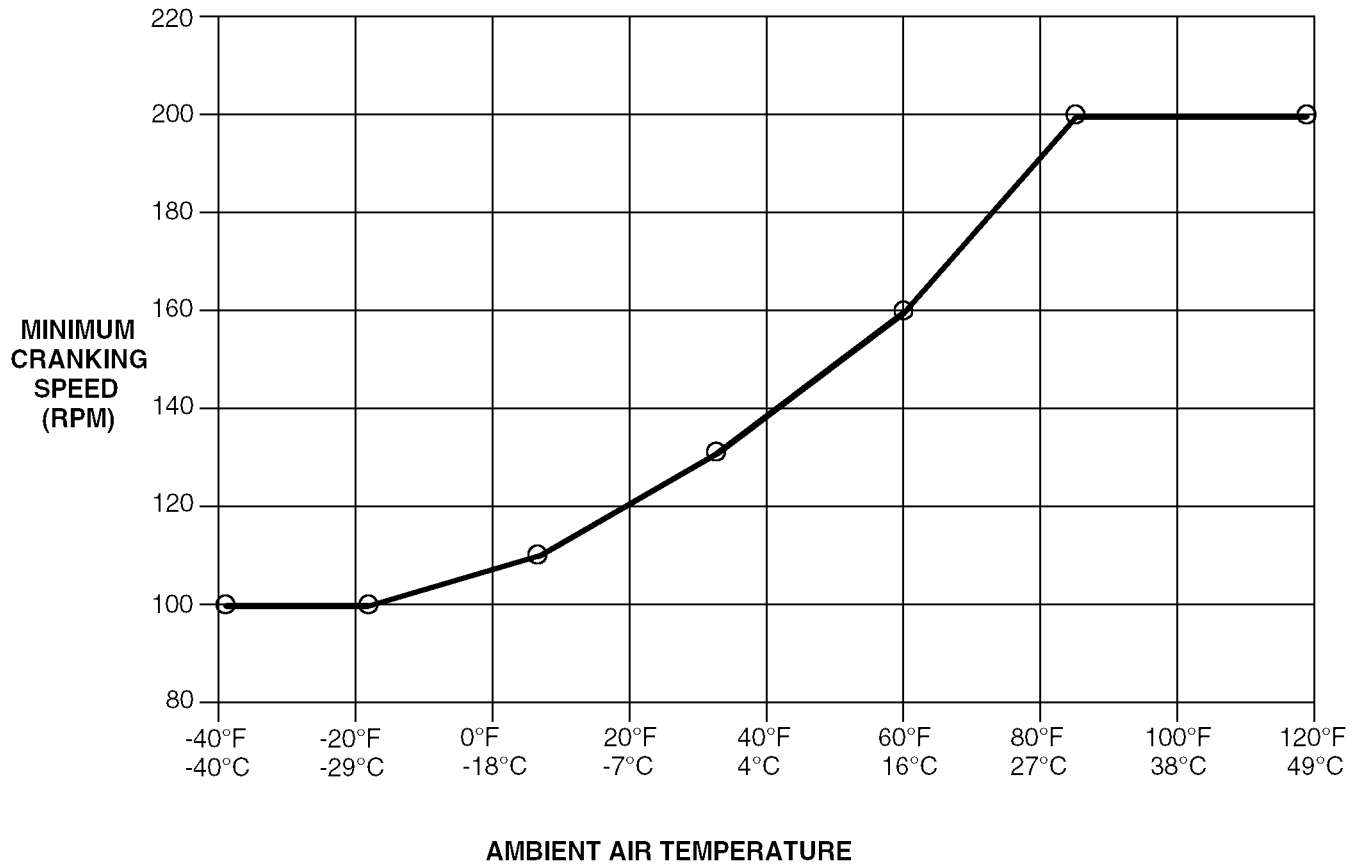
4. Apply 207 kPa (2.1 bar) (30 psi) air pressure to cooler and watch for air bubbles indicating leaks.

If leakage is detected, replace cooler assembly and perform [Exhaust Condition Check](#).

BF67790,00009FF -19-28JUL11-1/1

Engine Cranking Speed Check

IMPORTANT: Make sure that batteries are fully charged before performing this test.



RG9444 —UN—23JUL98

1. Disconnect the injector wiring harness connector X5000, at the rocker arm carrier.

NOTE: Multiple codes will be present as a result of engine cranking with X5000 disconnected.

2. If not using the machine tachometer, install a photo tachometer.
3. Crank engine for 15 seconds and record engine speed.
4. Reconnect the injector wiring harness and clear the stored codes after this test.
5. Compare recorded engine speed to chart above.

Cranking speed should meet or exceed specified engine rpm for a given ambient air temperature. For example, at 85 °F (29 °C) ambient temperature, cranking speed should be at least 200 rpm.

If cranking speed is below specifications, check the following:

- Starting system problems (low battery, loose or defective wiring, defective starter, etc.)
- Excessive engine loads (hydraulic pumps/thick oil, thick engine oil, etc.).

BF67790,0000A0E -19-08AUG11-1/1

Engine Oil Pressure Check

Special Tools:

- JDG782A — Oil Gallery Plug Tool.

Consumable Material:

- None.

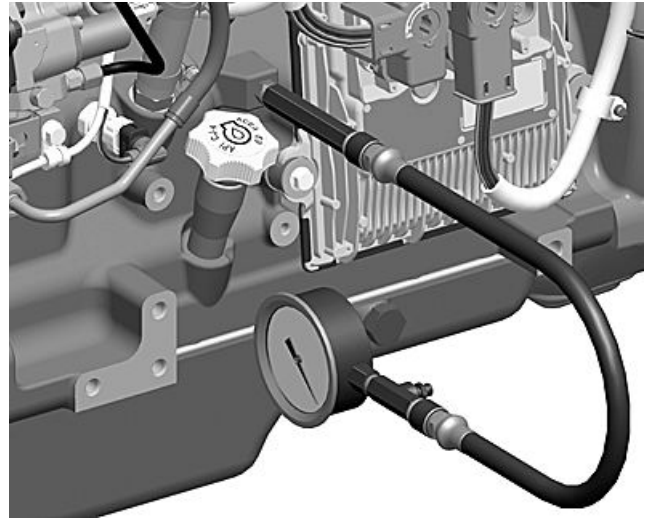
1. Check engine crankcase oil level. Adjust as necessary.
2. Check overall condition of oil (viscosity, presence of coolant, etc.). Change engine oil and replace oil filter if necessary.
3. Remove pipe plug from main oil gallery using JDG782A — Oil Gallery Plug Tool.
4. Attach pressure gauge to oil galley.

IMPORTANT: To achieve an accurate oil pressure reading, warm up engine oil to 105 °C (220 °F).

5. Start engine, run at speeds given below, measure oil pressure, and compare readings.

Specification

OIL PRESSURE SPECIFICATIONS—Minimum	
No Load at 800 rpm (Slow Idle).....	160 kPa (1.60 bar) (23.20 psi)
Minimum No Load at 900 rpm	180 kPa (1.80 bar) (26.1 psi)
Maximum Full Load at 2200 rpm (Tractors = 2100) Rated Speed	330 kPa (3.30 bar) (47.85 psi)



RG20682 —UN—19JUL11

Checking Engine Oil Pressure

6. If engine oil pressure is not close to the specification, see [000100.01 — Engine Oil Pressure Signal Extremely Low](#) in Section 04, Group 163.

NOTE: The oil pressure regulating valve is not adjustable.

BF67790,0000A23 -19-09AUG11-1/1

Exhaust Condition Check

RE42287,00004D3 -19-29JUN12-1/24

Exhaust Condition Check

Additional References:

For aftertreatment system operation, see [Aftertreatment System Operation](#) in Section 03, Group 130.

For exhaust filter operation, see [Exhaust Filter Operation](#) in Section 03, Group 130.

For more information on Clear Aftertreatment Latched DTC test, see [Clear Aftertreatment Latched DTC Test Instructions](#) in Section 04, Group 160.

For more information on Service Regeneration test, see [Service Regeneration](#) in Section 04, Group 160.

For more information on Cylinder Cutout Test, see [Cylinder Cutout Test Instructions](#) in Section 04, Group 160.

For more information on Cylinder Electronic Compression Test, see [Cylinder Electronic Compression Test Instructions](#) in Section 04, Group 160.

Continued on next page

RE42287,00004D3 -19-29JUN12-2/24

1 Exhaust Check

CAUTION: Ensure that the exhaust pipe is cool enough to handle before attempting to remove it.

1. Ignition OFF, Engine OFF.

IMPORTANT: Replace sealing gaskets each time exhaust pipe is disassembled. Inspect clamps for thread damage and replace as needed.

IMPORTANT: Do not use power tools when loosening or tightening clamps. Tool speed greater than 160 rpm can damage clamps.

2. Loosen band clamps by loosening nut. Remove clamps from pipe OD and set aside.
3. Remove DOC inlet pipe assembly and set aside.
4. Using a pick, remove the two gaskets and discard.

CAUTION: Ensure that the area where the exhaust pipe was removed from is clear of any debris or wiring that could be damaged by hot exhaust.

NOTE: Fault code 4795.31 may appear for DPF missing and will cause a 50% derate.

5. Disable auto exhaust filter cleaning.

NOTE: A small puff of smoke at startup and after moving the throttle from low idle to fast idle, is normal

6. Ignition ON, Engine Running.
7. If applicable, move the throttle from low idle to high idle quickly three times.
8. Observe engine exhaust.

Does the engine produce excessive blue, white, or black exhaust smoke?

YES: Black smoke - [GO TO 3](#)

YES: Blue smoke - [GO TO 18](#)

YES: White smoke - [GO TO 8](#)

NO: [GO TO 2](#)

RE42287,00004D3 -19-29JUN12-3/24

2 Exhaust Filter Inspection

1. Ignition OFF, Engine OFF.
2. Using [JDG11100](#) flexible borescope, inspect DOC inlet and DPF outlet.
3. See [Exhaust Filter — Tear Down and Inspection](#) in Section 02, Group 110 for pictures of normal and contaminated components.

Was face plugging or contamination observed?

YES: Perform [Exhaust Filter — Tear Down and Inspection](#) in Section 02, Group 110.

NO: [GO TO 21](#)

RE42287,00004D3 -19-29JUN12-4/24

3 Investigate Potential Air System Problems

1. Check for these potential problems:
 - Restricted Air Filter
 - Restricted Intake
 - Intake Air System Leaks
 - Exhaust Leaks
 - Loose Bracket for EGR Flow Sensor Venturi
 - Seized Fixed Turbocharger
2. Perform [Charge Air Cooler Test](#) in Section 04, Group 155.

Were any problems found?

YES: Repair problem. [GO TO 2](#)

NO: [GO TO 4](#)

Continued on next page

RE42287,00004D3 -19-29JUN12-5/24

4 Low-Pressure Fuel Supply System Test

1. Perform Low-Pressure Fuel System Check, found in Section 04, Group 155.
 2. Ignition ON, Engine Running.
 3. Move the throttle from low idle to high idle quickly three times.
 4. Observe engine exhaust.
- Is black smoke still present?

YES: GO TO 5
NO: Problem resolved.
GO TO 2

RE42287,00004D3 -19-29JUN12-6/24

5 High-Pressure Fuel Supply System Test

1. Perform High-Pressure Fuel System Check, found in Section 04, Group 155.
 2. Ignition ON, Engine Running.
 3. Move the throttle from low idle to high idle quickly three times.
 4. Observe engine exhaust.
- Is black smoke still present?

YES: GO TO 6
NO: Problem resolved.
GO TO 2

RE42287,00004D3 -19-29JUN12-7/24

6 ECU Reprogram

1. Download latest payload and reprogram ECU.
 2. Ignition ON, Engine Running.
 3. Move the throttle from low idle to high idle quickly three times.
 4. Observe engine exhaust.
- Is black smoke still present?

YES: GO TO 7
NO: Problem resolved.
GO TO 2

RE42287,00004D3 -19-29JUN12-8/24

7 Valve Check

1. Perform Valve — Clearance Adjustment found in Section 02, Group 020.
 2. Ignition ON, Engine Running.
 3. Move the throttle from low idle to high idle quickly three times.
 4. Observe engine exhaust.
- Is black smoke still present?

YES: Contact DTAC for support.
NO: Problem resolved. GO TO 2

RE42287,00004D3 -19-29JUN12-9/24

8 Check for Type of White Smoke

NOTE: White exhaust smoke is caused by condensing liquid in the exhaust system. The liquid is typically diesel fuel or coolant. Unburned diesel fuel in the exhaust has a strong diesel fuel odor and causes a severe burning sensation in the eyes. Unburned diesel fuel is caused by a misfire or incomplete combustion. Too low of a coolant temperature may result in white smoke due to incomplete combustion. Poor quality fuel or fuel not blended for the operating conditions may also cause incomplete combustion. Coolant in the exhaust causes an odor that can be described as sweet. White smoke accompanied with coolant loss and overheating indicates that the white smoke is likely due to coolant in the exhaust.

Is the white smoke caused by fuel?

YES: GO TO 9
NO: White smoke is caused by coolant. GO TO 14

Continued on next page

RE42287,00004D3 -19-29JUN12-10/24

Checks, Tests, and Procedures

9 Engine Temperature Verification

Ensure that engine coolant is at proper operating temperature.

YES: [GO TO 10](#)

Is engine reaching the proper operating temperature when white smoke is present?

NO: Repair problem.
Perform [Verification Procedure](#). [GO TO 2](#)

RE42287,00004D3 -19-29JUN12-11/24

10 Cutout Test

NOTE: If white smoke is decreased substantially when a cylinder is cutout, the white smoke is likely caused by a misfire of that cylinder.

In Service ADVISOR, perform Cylinder Cutout Test.

Does the sound of the engine change equally when each injector is disabled during the Cylinder Cutout Test?

YES: [GO TO 12](#)

NO: [GO TO 11](#)

RE42287,00004D3 -19-29JUN12-12/24

11 Compression Check

In Service ADVISOR, perform Cylinder Electronic Compression Test.

Do test results indicate a compression problem?

YES: Perform [Mechanical Compression Test](#) in Section 04, Group 155.
Repair any problems. [GO TO 2](#)

NO: Replace injector in cylinder that had no change in sound during the Cylinder Cutout Test. Perform [Verification Procedure](#). [GO TO 2](#)

RE42287,00004D3 -19-29JUN12-13/24

12 Check Fuel Quality

1. Perform procedure [Fuel Supply Quality Check](#), found in Section 04, Group 155.

2. Ignition ON, Engine Running.

3. Move the throttle from low idle to high idle quickly three times.

4. Observe engine exhaust.

Is white smoke still present?

YES: [GO TO 13](#)

NO: Problem resolved.
[GO TO 2](#)

RE42287,00004D3 -19-29JUN12-14/24

13 Reprogram ECU

1. Download latest payload and reprogram ECU.

2. Ignition ON, Engine Running.

3. Move the throttle from low idle to high idle quickly three times.

4. Observe engine exhaust.

Is white smoke still observed?

YES: Contact DTAC for assistance.

NO: Problem resolved.
[GO TO 2](#)

Continued on next page

RE42287,00004D3 -19-29JUN12-15/24

Checks, Tests, and Procedures

14 Cooling System Check	Perform <u>Cooling System Test</u> in Section 04, Group 155. Did cooling system pass the test?	YES: <u>GO TO 15</u> NO: Repair problem. <u>GO TO 2</u> <small>RE42287,00004D3 -19-29JUN12-16/24</small>
15 EGR Cooler Test	Pressure test the EGR Cooler. See <u>EGR Cooler Test</u> in Section 04, Group 155. Did the EGR Cooler Test pass?	YES: <u>GO TO 16</u> NO: Replace EGR Cooler. <u>GO TO 2</u> <small>RE42287,00004D3 -19-29JUN12-17/24</small>
16 Compression Check	In Service ADVISOR, perform Cylinder Electronic Compression Test. Do test results indicate a compression problem?	YES: Perform <u>Mechanical Compression Test</u> in Section 04, Group 155. Repair problem. <u>GO TO 2</u> NO: <u>GO TO 17</u> <small>RE42287,00004D3 -19-29JUN12-18/24</small>
17 Cylinder Head Check	Remove cylinder head and inspect for cracks. See <u>Cylinder Head — Cleaning and Inspection</u> in Section 02, Group 020. Were any problems found?	YES: Repair problem. <u>GO TO 2</u> NO: Contact DTAC for assistance. <small>RE42287,00004D3 -19-29JUN12-19/24</small>
18 Compression Check	In Service ADVISOR, perform Cylinder Electronic Compression Test. Do test results indicate a compression problem?	YES: Perform <u>Mechanical Compression Test</u> in Section 04, Group 155. Repair any problems. <u>GO TO 2</u> NO: <u>GO TO 19</u> <small>RE42287,00004D3 -19-29JUN12-20/24</small>
19 Turbocharger Oil Seal Check	Inspect turbocharger, or turbochargers, for signs of damage or leaks. See <u>Turbocharger Oil Seal Leak Check</u> in Section 04, Group 155. Were any problems found?	YES: Repair problem. <u>GO TO 2</u> NO: <u>GO TO 20</u> <small>RE42287,00004D3 -19-29JUN12-21/24</small>
20 Crankcase Pressure Check	Perform <u>Crankcase Pressure (Blow-By) Test</u> in Section 04, Group 155. Were any problems found?	YES: Repair problem. <u>GO TO 2</u> NO: Contact DTAC for support. <div>Continued on next page</div> <small>RE42287,00004D3 -19-29JUN12-22/24</small>

21 Smoke Verification

Were you directed to this procedure from the blue or white smoke observable and had blue or white smoke coming out of the exhaust filter during exhaust filter cleaning?

YES: GO TO 22

NO: Reinstall all components and piping. In Service ADVISOR, perform Clear Aftertreatment Latched DTC Test if DTC's 3936.00, 4766.18, 5018.16, or 5298.01 are active. In Service ADVISOR, perform Service Regeneration.

RE42287,00004D3 -19-29JUN12-23/24

22 Fuel Quality

Perform Fuel Supply Quality Check found in Section 04, Group 155.

NOTE: Diesel fuel with a sulfur content above the maximum of 0.0015% (15 ppm) is not in compliance with emission regulations and can cause white or blue smoke.

Is fuel quality an issue?

YES: Exchange poor quality fuel with ultra low sulfur fuel. After approximately three regenerations the blue or white smoke should diminish.

NO: Contact DTAC for support.

RE42287,00004D3 -19-29JUN12-24/24

Fuel Rail Cap and Plug Procedure

This procedure requires JDG10760 Fuel Rail Cap and Plug Kit. This tool is used to determine which cylinder is causing a no start condition because the high-pressure fuel system cannot build pressure.

IMPORTANT: Ensure that the area you are working in is free from debris. Any debris getting into the fuel system causes problems.

Tool Use Instructions:

1. Ignition OFF, Engine OFF.

IMPORTANT: Ensure that engine has not been cranked for at least 5 minutes to let the rail pressure drop to a safe level.

NOTE: Test one fuel line at a time.

2. Loosen the line at both ends.
3. Disconnect the line at the fuel rail end only.

IMPORTANT: Torque cap and plug to specifications to ensure no fuel leaks during testing.

4. Install the "Cap" on the fuel rail outlet and "Plug" on the disconnected end of the chosen line.

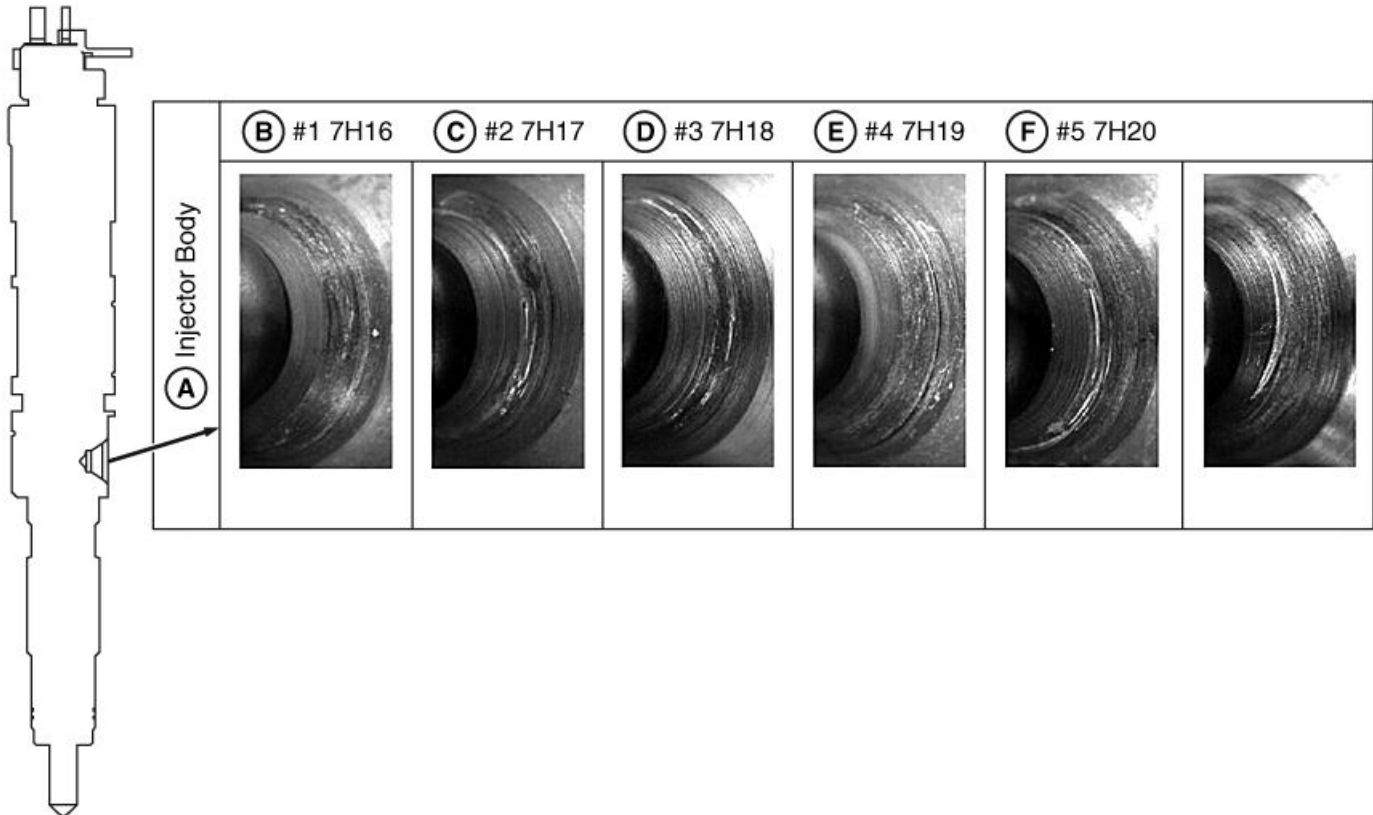
5. Tighten the chosen line at the injector feed tube.
6. Try starting the engine; if it starts you have found the bad cylinder. See troubleshooting procedure below.
7. If engine still does not start, remove cap and plug. Reinstall the chosen line to specification. Select another line to test.
8. If none of the injectors are the problem, return to the procedure that referred you here.

NOTE: Note: It is very uncommon for more than one cylinder to be bad causing a no start; however, that could be a possibility.

Troubleshooting Procedure:

1. Remove the fuel feed tube of the cylinder causing the no start.
2. Inspect the fuel feed tube and fuel inlet on injector for galling.
3. If galling is indicated on fuel feed tube only, replace fuel feed tube and try starting again.
4. If galling is indicated at the injector fuel inlet replace injector and fuel feed tube and try restarting again.

Examples of galling are shown in the graphic below for different injectors.



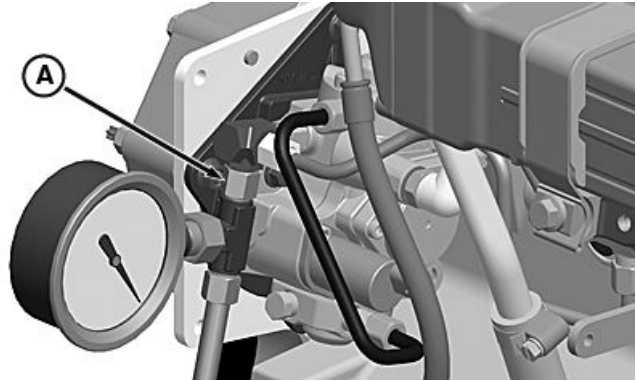
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Fuel Return Line (Leak off) Restriction Check

This check is used to determine if the fuel leak off line is restricted.

1. Check all return lines and ensure that there are no kinked or pinched lines.
2. Install (T - in) a pressure gauge capable of accurately reading 23 kPa (0.2 bar) (3.3 psi) in fuel leak off line between engine and fuel tank. Install the gauge at the engine end of the leak off line.
3. Do NOT remove fuel tank cap.
4. Monitor pressure gauge.
5. Operate engine under various speed and load conditions from slow idle to maximum load, if possible.
6. If the pressure gauge does not exceed 23 kPa (0.2 bar) (3.3 psi) at any time the restriction check is OK.
7. If the pressure gauge reading exceeds 23 kPa (0.2 bar) (3.3 psi) at any time, remove the fuel tank cap and recheck return pressure.
8. If return pressure is less than 23 kPa (0.2 bar) (3.3 psi) with fuel cap removed, inspect tank vent. If pressure does not decrease with fuel cap removed, locate source of restriction in fuel return line.



Fuel Return Line Restriction Check

A—T-Fitting/Fuel Pressure Gauge

RG20177 —UN—19JUL11

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Fuel Supply Quality Check

BF67790,0000A00 -19-15JUL11-1/5

Check Fuel Supply Quality Diagnostic Procedure

Additional References:

Fuel samples can be analyzed in a laboratory for contamination and ratings. See Testing Diesel Fuel in Section 01, Group 002, for more information.

BF67790,0000A00 -19-15JUL11-2/5

1 Low-Pressure Fuel System Check

Has Low-Pressure Fuel System Check been performed?

YES: GO TO 3

NO: GO TO 2

BF67790,0000A00 -19-15JUL11-3/5

2 Replace Fuel Filters

1. Ignition OFF, Engine OFF.
2. Remove primary and secondary fuel filters.
3. Drain fuel from filters into a clean container.
4. Check for water, dirt, or other contaminants in the drained fuel.
5. For Engines equipped with a mechanical fuel pump, bleed the excess fuel from the pump.
6. Replace primary and secondary fuel filter elements.

Was an abnormal amount of water or contaminants present in the fuel?

YES: Inspect fuel tank for cause of contamination issues and correct as needed. Ensure that good fuel supply is available.

NO: GO TO 3

BF67790,0000A00 -19-15JUL11-4/5

3 Temporary Known Good Fuel Supply Installation

NOTE: Use a clean hose and fresh fuel that has known-good quality in a clean container for this step. Do not use fuel from the fuel tank.

1. Ignition OFF, engine OFF.
2. Disconnect fuel inlet line from the fuel filter head.
3. Install a hose on primary filter housing fuel inlet port and place other end of hose in a container of at least 3.8L (1 gal) of clean fuel.
4. Ignition ON, engine OFF for 60 seconds.

NOTE: Step 4 is only used for engines equipped with an electronic fuel pump..

5. Attempt to start engine.
 - a. If engine starts, monitor the engine performance with the temporary fuel supply.
 - b. If engine does not start, crank engine for 20 second intervals with 2 minutes between intervals, cycling ignition OFF between crank intervals. Repeat until engine starts.

Does engine start and have good performance?

YES: Replace fuel in tank.

NO: Contact DTAC for support.

BF67790,0000A00 -19-15JUL11-5/5

Fuel System Bleeding

Continued on next page

BF67790,0000A21 -19-09AUG11-1/4

Fuel System Bleeding

IMPORTANT: Do not pressurize the fuel tank to prime the fuel system after running out of fuel or servicing the fuel filters. Pressurizing the fuel system causes the front seal on the high-pressure pump to rupture. Do not restrict or block the fuel lines, as this will also cause a seal rupture. A ruptured front seal on the high-pressure fuel pump fills the engine crankcase with diesel fuel, and causes damage to the engine. It also requires replacement of the high-pressure fuel pump.

IMPORTANT: Engines can either be equipped with an electronic or mechanical fuel transfer pump.

Additional References:

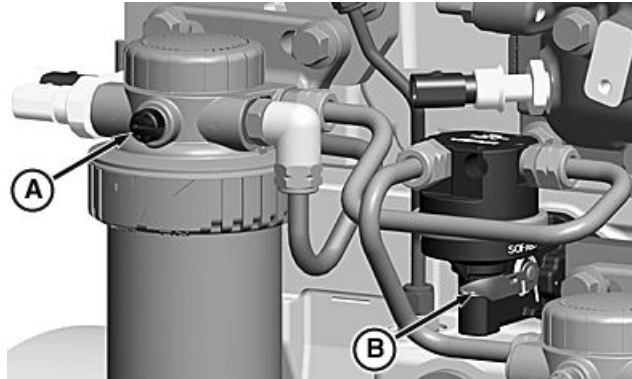
For more low-pressure fuel pump information, see Low-Pressure Fuel Pump in Section 03, Group 140.

BF67790,0000A21 -19-09AUG11-2/4

❶ Purge Air

IMPORTANT: The electrical low-pressure fuel transfer system is self purging, running the low-pressure fuel pump at Key ON should remove any air in the low-pressure fuel system. If air is not automatically being purged from the low-pressure fuel system, inspect the air bleed orifice for foreign material and proper function. The mechanical transfer pump needs to be purged by hand.

1. Ignition ON, Engine OFF for 60 seconds to allow a prime cycle.
2. For engines with a mechanical transfer pump, bleed the excess air from the pump by opening the air bleed vent screw on the secondary fuel filter.



RG20709 —UN—03AUG11

*Air Bleed Vent Screw and Fuel Supply Pump Primer Lever***A—Vent Screw****B—Fuel Supply Pump Primer Lever**

3. Manually prime the mechanical transfer pump using the supply pump lever until there is no air in the fuel.
4. Tighten the air bleed vent screw and continue pumping the hand primer until pumping action is not felt.
5. Attempt to start the engine.

Does the engine start?

YES: The air has been purged from fuel system.

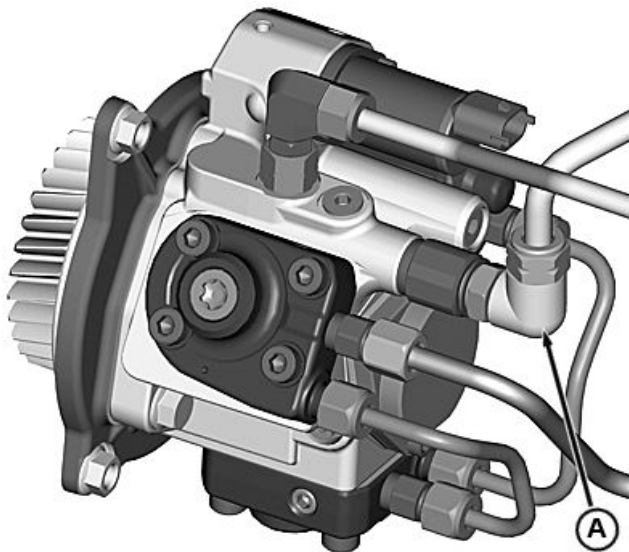
NO: GO TO 2

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BF67790,0000A21 -19-09AUG11-3/4

2 Check for Air

1. Ignition OFF, Engine OFF.
2. Disconnect high-pressure fuel pump inlet line (A).



RG18851 —UN—22JUL10

High-Pressure Fuel Pump

A—Fuel Inlet Line

3. Attach a fuel line to the fuel inlet line (A), and place other end in a 3.8 L (1.0 gal.) or larger container.
4. Ignition ON, Engine OFF.
5. For engines with a mechanical fuel transfer pump, manually prime the fuel line.
6. Observe discharge into bucket until an approximate 3 mm (0.125 in.) diameter stream of fuel is present without air bubbles.

Did you observe a fuel stream as described?

YES: The air has been purged from the fuel system. Reinstall fuel inlet line.

NO: GO TO [Low-Pressure Fuel System Check](#)

BF67790,0000A21 -19-09AUG11-4/4

High-Pressure Fuel System Check

Continued on next page

BF67790,0000A22 -19-08AUG12-1/30

High-Pressure Fuel System Check

Additional References:

For fuel system operation information, see Fuel System Operation in Section 03, Group 130.

For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.

For more information on the Exhaust Condition Check, see Exhaust Condition Check in Section 04, Group 155.

For more information on how to use the Fuel Rail Cap and Plug Kit, see Fuel Rail Cap and Plug Procedure in Section 04, Group 155.

For more information on the Cylinder Electronic Compression Test, see Cylinder Electronic Compression Test Instructions in Section 04, Group 160.

For more information on the Cylinder Misfire Test, see Cylinder Misfire Test Instructions in Section 04, Group 160.

For more information on the Cylinder Cutout Test, see Cylinder Cutout Test in Section 04, Group 160.

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

IMPORTANT: Thoroughly clean all fuel lines, fittings, and components prior to making any disconnections or connections to prevent debris from entering the fuel system, which can damage engine and components.

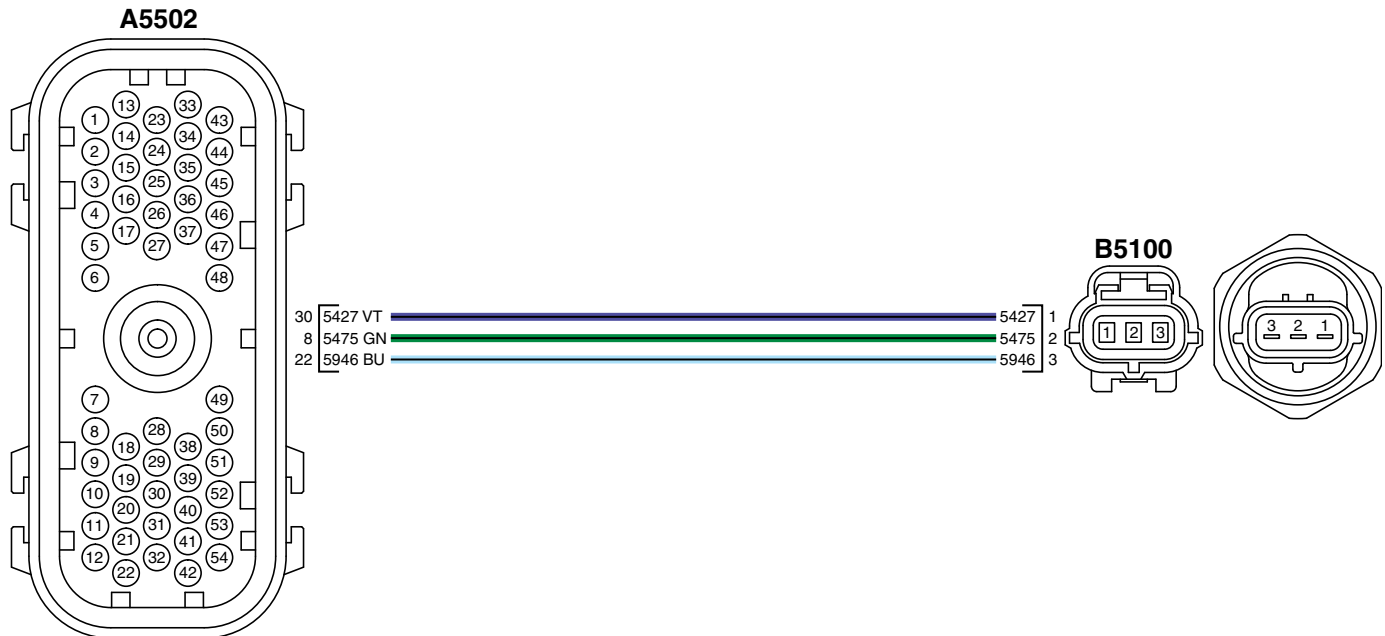
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.



Fuel Rail Pressure Sensor Wiring Diagram

A5502 — 22—Supply

A5502 — 30—Return

A5502 — 8—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

BF67790,0000A22 -19-08AUG12-2/30

Flex probes:

Sensor

- JDG10456 — Female — Blue/Orange
- JDG10457 — Male — Blue/Orange

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- JDG10760 — Fuel Rail Cap and Plug Kit
- JDG820 — Flywheel Turning Tool
- JDG10991 — Fuel Pump Timing Pin
- J-35616-20 — Test Leads

BF67790,0000A22 -19-08AUG12-3/30

1 Check for Active DTCs

Were you referred to this High-Pressure Fuel System Check while performing the diagnostic procedures for a diagnostic trouble code (DTC)?

YES: [GO TO 2](#)

NO: Check for and diagnose any active DTCs prior to performing this test.

BF67790,0000A22 -19-08AUG12-4/30

2 Preliminary Fuel System Checks

Has the Low-Pressure Fuel System Check been performed?

YES: [GO TO 3](#)

NO: Perform [Low-Pressure Fuel System Check](#) in Section 04, Group 155.

BF67790,0000A22 -19-08AUG12-5/30

3 Engine Start Status

Does engine start?

YES: [GO TO 11](#)

NO: [GO TO 4](#)

BF67790,0000A22 -19-08AUG12-6/30

4 Check Fuel Rail Pressure

1. In Service ADVISOR, monitor Fuel Rail Pressure — Actual.

2. Ignition ON, engine cranking.

Is the fuel rail pressure - actual 20 MPa (2900 psi) or greater with engine cranking?

YES: [GO TO 17](#)

NO: [GO TO 5](#)

Continued on next page

BF67790,0000A22 -19-08AUG12-7/30

5 Check High-Pressure Fuel Pump

NOTE: This check is used to verify that the high-pressure pump is rotating and capable of delivering fuel to the rail when the engine is cranking. The suction at the high-pressure pump inlet draws the low-pressure fuel system into a negative pressure (partial vacuum) if the high-pressure fuel pump is rotating and low-pressure fuel pump is not operating.

1. Ignition OFF, Engine OFF.
2. Ignition ON, Engine OFF 60 seconds to cause low-pressure fuel pump to prime system.
3. Ignition OFF, Engine OFF.
4. Disconnect low-pressure fuel pump connector Y5004.
5. Ignition ON, Engine OFF.
6. In Service ADVISOR, monitor Low-Pressure Fuel — Actual Pressure.
7. For mechanical fuel transfer pumps, disconnect the fuel line going to the high pressure pump.
8. Connect a hose to the fuel line and drain in a bucket.
9. Pump the priming handle and monitor the pressure from the fuel line.
10. Crank engine for 30 seconds while monitoring the pressure.
11. Observe the pressure of the mechanical fuel transfer pump.

Does Low-Pressure Fuel — Actual Pressure decrease by 7 kPa (0.07 bar) (1 psi) or more during cranking or is there a noticeable pressure drop in the mechanical transfer pump?

YES: GO TO 6

NO: Check for high-pressure fuel pump shaft failure, debris at pump inlet, or stuck closed suction control valve.

BF67790,0000A22 -19-08AUG12-8/30

6 Pressure Limiter Test



CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

NOTE: For pressure limiter replacement, see Pressure Limiter — Installation in Section 02, Group 090 earlier in this manual.

1. Ignition OFF, engine OFF for at least 5 minutes to permit rail pressure to decrease.
2. Reconnect low-pressure fuel pump connector Y5004.
3. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the pressure limiter.
4. Disconnect fuel return line from the pressure limiter valve. DO NOT remove the pressure limiter valve from fuel rail.
5. Cap the return line fitting that was originally connected to the pressure limiter. DO NOT cap the pressure limiter.
6. Connect a temporary fuel line to the pressure limiter outlet and route to a suitable container for diesel fuel.
7. Ignition ON, engine cranking for 20 seconds.
8. Check temporary fuel line for fuel flow through pressure limiter with engine cranking.

Is fuel flow through the pressure limiter present?

YES: Replace pressure limiter valve and retest fuel rail pressure.

NO: Reinstall return line.

GO TO 7

Continued on next page

BF67790,0000A22 -19-08AUG12-9/30

Checks, Tests, and Procedures

7 Fuel Rail Cap and Plug Procedure

Perform [Fuel Rail Cap and Plug Procedure](#) in Section 04, Group 155.

Were any problems found?

YES: Repair problem.
Retest fuel rail pressure.

NO: [GO TO 8](#)

BF67790,0000A22 -19-08AUG12-10/30

8 Check High-Pressure Fuel Pump Timing

1. Ignition OFF, Engine OFF.
2. Rotate engine using [JDG820](#) Flywheel Turning Tool.
3. Set engine at #1 TDC of compression stroke.
4. Check High-Pressure Fuel Pump Timing. See [High-Pressure Fuel Pump — Installation](#) in Section 02, Group 090.
5. Remove timing pin and turning tool.

Were any mechanical problems found?

YES: Repair mechanical problem. Retest fuel rail pressure.

NO: [GO TO 9](#)

BF67790,0000A22 -19-08AUG12-11/30

9 Replace Suction Control Valve

Replace Suction Control Valve.

Is the fuel rail pressure - actual 20 MPa (2900 psi) or above with engine cranking or running?

YES: Problem resolved.
Perform [Exhaust Condition Check](#)

NO: [GO TO 10](#).

BF67790,0000A22 -19-08AUG12-12/30

10 Replace High-Pressure Fuel Pump

Replace high-pressure fuel pump.

Is the fuel rail pressure - actual 20 MPa (2900 psi) or above with engine cranking or running?

YES: Problem resolved.
Perform [Exhaust Condition Check](#)

NO: Replace injectors.
Perform [Exhaust Condition Check](#) Open DTAC case if fuel rail pressure is still below 20 MPa (2900 psi).

Continued on next page

BF67790,0000A22 -19-08AUG12-13/30

11 Suction Control Valve and Pressure Limiter Check



CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

NOTE: For pressure limiter replacement, see Pressure Limiter — Installation in Section 02, Group 090 earlier in this manual.

NOTE: A sticking suction control valve causes low power and DTCs 001347.16 or 001347.18. The suction control valve may only stick intermittently, and usually occurs after the engine is at slow idle for a period of time and throttle is then advanced. If the suction control valve sticks open, the fuel rail pressure rapidly increases to 241 MPa (35,000 psi) or more, causing the pressure limiter to open. Fuel rail pressure is then limited to approximately 50 MPa (7250 psi) with the pressure limiter open. Shutting down the engine and restarting should reset the pressure limiter and temporarily restore performance. The suction control valve may also stick closed such that it causes fuel rail pressure to be low resulting in poor performance and possibly generating DTC 001347.18.

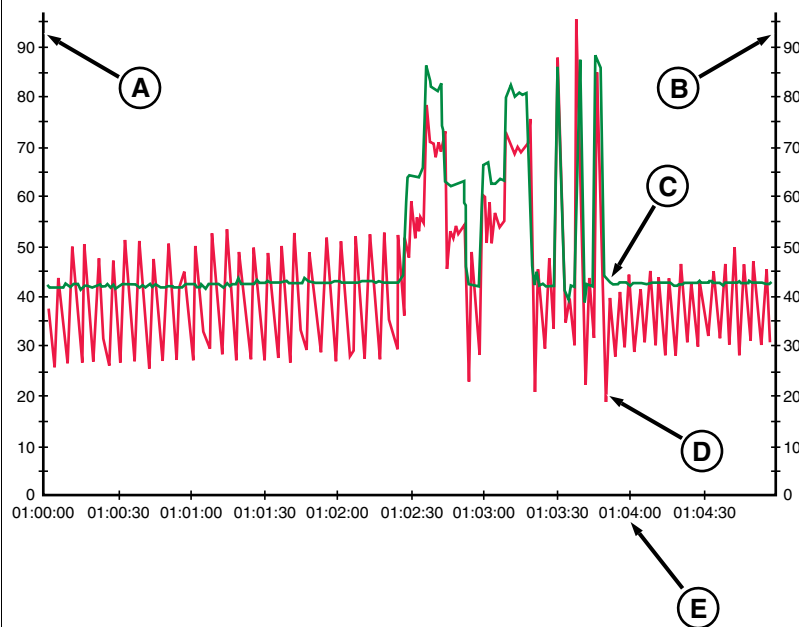
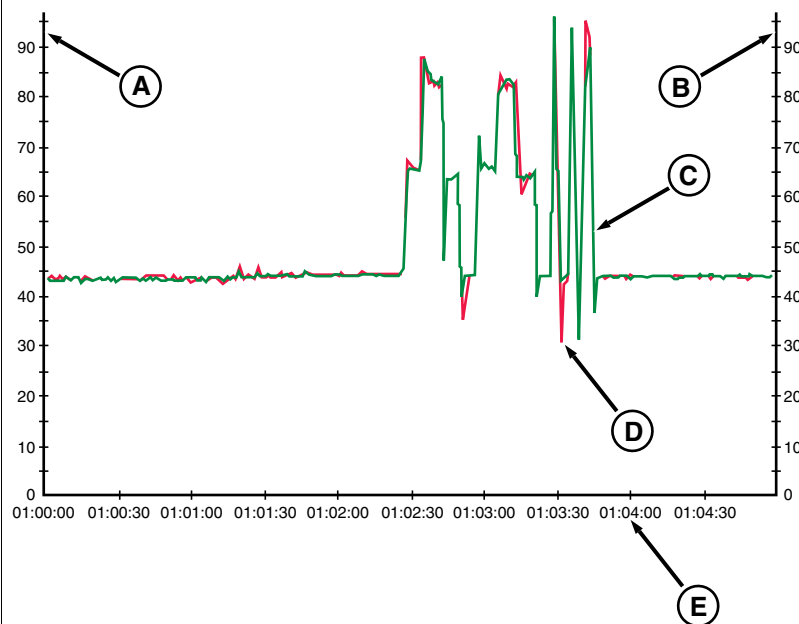
1. Ignition OFF, engine OFF for at least 5 minutes to permit rail pressure to decrease.
2. Thoroughly clean all fuel lines, fittings, components, and chamfered area around the pressure limiter.
3. Disconnect fuel return line from the pressure limiter valve. DO NOT remove the pressure limiter valve from fuel rail.
4. Cap the return line fitting that was originally connected to the pressure limiter. DO NOT cap the pressure limiter.
5. Connect a temporary fuel line to the pressure limiter outlet and route to a suitable container for diesel fuel.
6. Ignition ON, engine OFF.
7. Using the graph feature in Service ADVISOR, record the following data points:
 - Fuel Rail Pressure — Actual
 - Fuel Rail Pressure — Desired
8. Start engine and operate at slow idle for 2 minutes.

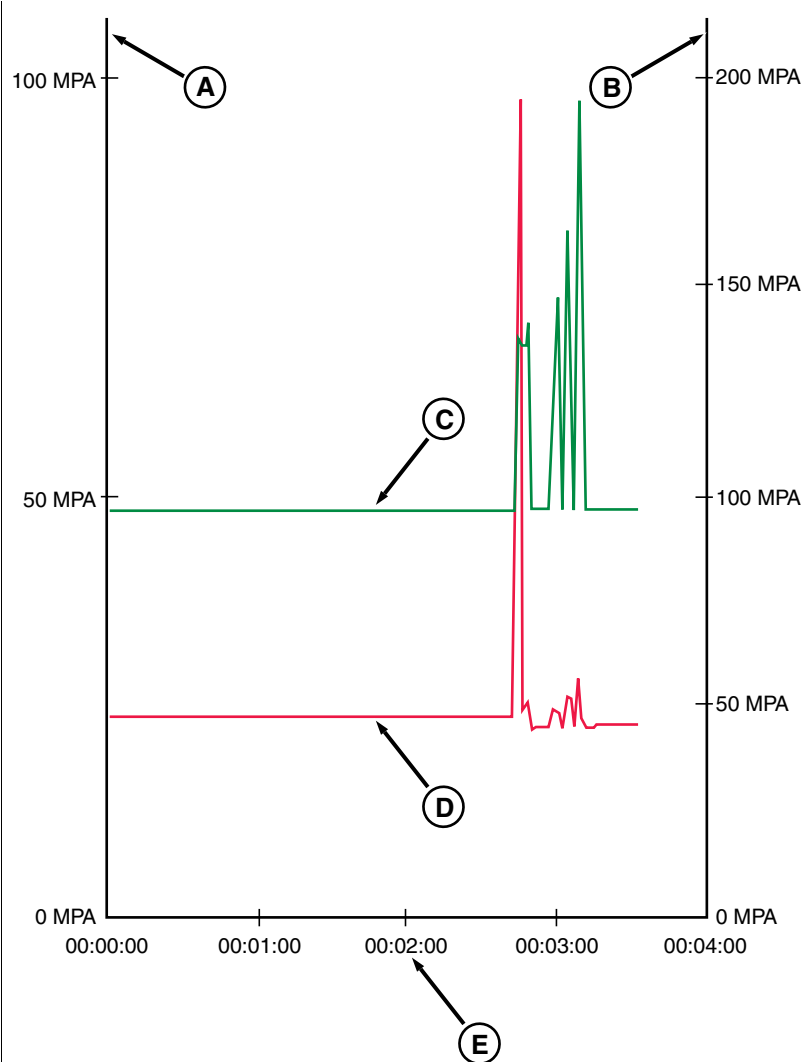
NOTE: If any fuel flow is present through pressure limiter; discontinue test, replace pressure limiter, and return to this step.

9. Snap throttle several times.
10. Operate engine at speed and load where problem occurs.
11. Compare graph of Fuel Rail Pressure - Actual and Fuel Rail Pressure - Desired to those shown in the examples below.

Continued on next page

BF67790,0000A22 -19-08AUG12-14/30





RG15372 —UN—26JUL07

Sticking suction control valve Causing Pressure Limiter to Open. Note Difference in Pressure Scales.

- A—Fuel Rail Pressure — Desired scale (MPa)**
- B—Fuel Rail Pressure — Actual scale (MPa)**
- C—Fuel Rail Pressure — Desired (Green)**
- D—Fuel Rail Pressure — Actual (Red)**
- E—Time Scale (HH:MM:SS)**

Is the graph that is generated like the examples of a sticking suction control valve or was any fuel flow present through pressure limiter?

YES: Replace suction control valve and pressure limiter. Perform Exhaust Condition Check

NO: GO TO 12

Continued on next page

BF67790,0000A22 -19-08AUG12-16/30

12 Injector Leak-off Check

1. Ignition OFF, engine OFF.
2. Disconnect injector fuel leak-off line at tee and cap tee.
3. Connect a clear hose to the injector leak off line, routing the other end into a suitable container for diesel fuel.
4. Start engine and operate at 800 rpm.

Is fuel flow from injector leak-off line greater than 440 mL (15 oz.) per minute?

YES: Check for damaged feed tubes or injectors.
NO: No fuel flow is present. Check for restrictions in the injector leak off line and gallery.
NO: Fuel flow present and within specification. Reinstall fuel return line.
GO TO 13

BF67790,0000A22 -19-08AUG12-17/30

13 High-Pressure Fuel Pump Overflow Orifice Test

1. Ignition OFF, engine OFF.
2. Disconnect the fuel leak-off line between the tee coming from the injector and fuel rail leak-off lines, and the high-pressure fuel pump overflow orifice fitting.
3. Connect a clear hose to the overflow orifice, routing the other end into a suitable container for diesel fuel.
4. Start engine and operate at 800 rpm.

Is fuel flow from pump leak-off line greater than 489 mL (16.5 oz.) per minute?

YES: Replace high-pressure fuel pump. Perform Exhaust Condition Check
NO: No fuel flow is present. Replace high-pressure fuel pump. Perform Exhaust Condition Check
NO: Fuel flow present and within specification. Reinstall fuel return line.
GO TO 14

BF67790,0000A22 -19-08AUG12-18/30

14 Check High-Pressure Fuel Pump Timing

1. Ignition OFF, Engine OFF.
2. Rotate engine using JDG820 Flywheel Turning Tool.
3. Set engine at #1 TDC of compression stroke.
4. Check High-Pressure Fuel Pump Timing. See High-Pressure Fuel Pump — Installation in Section 02, Group 090.
5. Remove timing pin and turning tool.

Were any mechanical problems found?

YES: Fix mechanical problem. Retest fuel rail pressure.
NO: GO TO 15

Continued on next page

BF67790,0000A22 -19-08AUG12-19/30

15 Misfire and Cut-Out Test

1. In Service ADVISOR, perform Cylinder Misfire Test.
2. In Service ADVISOR, perform Cylinder Cutout Test.

Is each cylinder contribution within 10 percent of the others during the Cylinder Misfire Test and does the sound of the engine change equally when each injector is disabled during the Cylinder Cutout Test?

YES: [GO TO 17](#)

NO: [GO TO 16](#)

BF67790,0000A22 -19-08AUG12-20/30

16 Check Compression

In Service ADVISOR, perform Cylinder Electronic Compression Test.

Is compression in the cylinder with low contribution identified in previous step also at least 10 percent less than the other cylinders (compression is low and contribution is low in the same cylinder) ?

YES: See [Mechanical Compression Test](#) in Section 04, Group 155.

NO: Replace injector and flow limiter in cylinder with low contribution. Perform [Exhaust Condition Check](#)

BF67790,0000A22 -19-08AUG12-21/30

17 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel rail pressure sensor connector B5100.
3. Perform [Terminal Test](#) on sensor and B5100 connector.

Were any problems found?

YES: Repair problem. Perform [Exhaust Condition Check](#) Perform [Verification Procedure](#).

NO: [GO TO 18](#)

BF67790,0000A22 -19-08AUG12-22/30

18 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5100 connector female socket 3 (+).
 - B to B5100 connector female socket 1 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform [Wiggle Test](#).

Does voltage remain between 4.8 and 5.2 V?

YES: [GO TO 20](#)

NO: [GO TO 19](#)

Continued on next page

BF67790,0000A22 -19-08AUG12-23/30

19 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform [Verification Procedure](#).

NO: Repair open or high resistance in supply wire. Perform [Verification Procedure](#).

BF67790,0000A22 -19-08AUG12-24/30

20 Signal Circuit Check

1. Ignition OFF, Engine OFF
2. Connect Diagnostic Test Box :
 - A to B5100 connector female socket 2 (+).
 - B to B5100 connector female socket 1 (-).
3. Set S1 to position 3 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 21](#)

NO: [GO TO 23](#)

BF67790,0000A22 -19-08AUG12-25/30

21 Software Check

In Service ADVISOR, monitor Fuel Rail Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: [GO TO 25](#)

NO: [GO TO 22](#)

BF67790,0000A22 -19-08AUG12-26/30

22 Reprogram ECU

1. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
2. Ignition ON, Engine OFF.
3. With Diagnostic Test Box still connected and S1 is set to position 3.
4. In Service ADVISOR, monitor Fuel Rail Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform [Exhaust Condition Check](#). Perform [Verification Procedure](#).

NO: Replace ECU. Perform [Exhaust Condition Check](#). Perform [Verification Procedure](#).

Continued on next page

BF67790,0000A22 -19-08AUG12-27/30

23 Terminal Test

1. Ignition OFF, Engine OFF
2. Disconnect Diagnostic Test Box.
3. Disconnect ECU connector A5502.
4. Perform Terminal Test on A5502 connector female sockets 8, 22, and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 24

BF67790,0000A22 -19-08AUG12-28/30

24 Continuity Check

Measure resistance between A5502 connector female socket 8 and B5100 connector female socket 2.

Is resistance less than 5 ohms?

YES: GO TO 25

NO: Repair high resistance, open, or mis-pin in harness. Perform Verification Procedure.

BF67790,0000A22 -19-08AUG12-29/30

25 Check for Stored DTCs

1. Ignition ON, Engine OFF.
2. Refresh codes.

Are there any stored or active DTCs related to the Fuel Rail Pressure Signal?

YES: Replace fuel rail pressure sensor. Perform Verification Procedure.

NO: High-Pressure Fuel System check is good. Return to diagnostic procedure that referred you here.

BF67790,0000A22 -19-08AUG12-30/30

Low-Pressure Fuel System Check

Continued on next page

RG40049,0000C3B -19-17OCT11-1/23

Low-Pressure Fuel System Test Diagnostic Procedure

Additional References:

For low-pressure fuel pressure sensor information, see [B5107 — Low-Pressure Fuel Pressure Sensor](#) in Section 03, Group 140.

For more electric low-pressure fuel system information, see [Electric Low-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more mechanical low-pressure fuel system information, see [Mechanical Low-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more electric low-pressure fuel pump information, see [Electric Low-Pressure Fuel Pump Operation](#) in Section 03, Group 130.

For more mechanical low-pressure fuel pump information, see [Mechanical Low-Pressure Fuel Pump Operation](#) in Section 03, Group 130.

For more electric primary and secondary fuel filter information, see [Electric Pump Primary and Secondary Fuel Filter Operation](#) in Section 03, Group 130.

For more mechanical pump primary and secondary fuel filter information, see [Mechanical Pump Primary and Secondary Fuel Filter Operation](#) in Section 03, Group 130.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

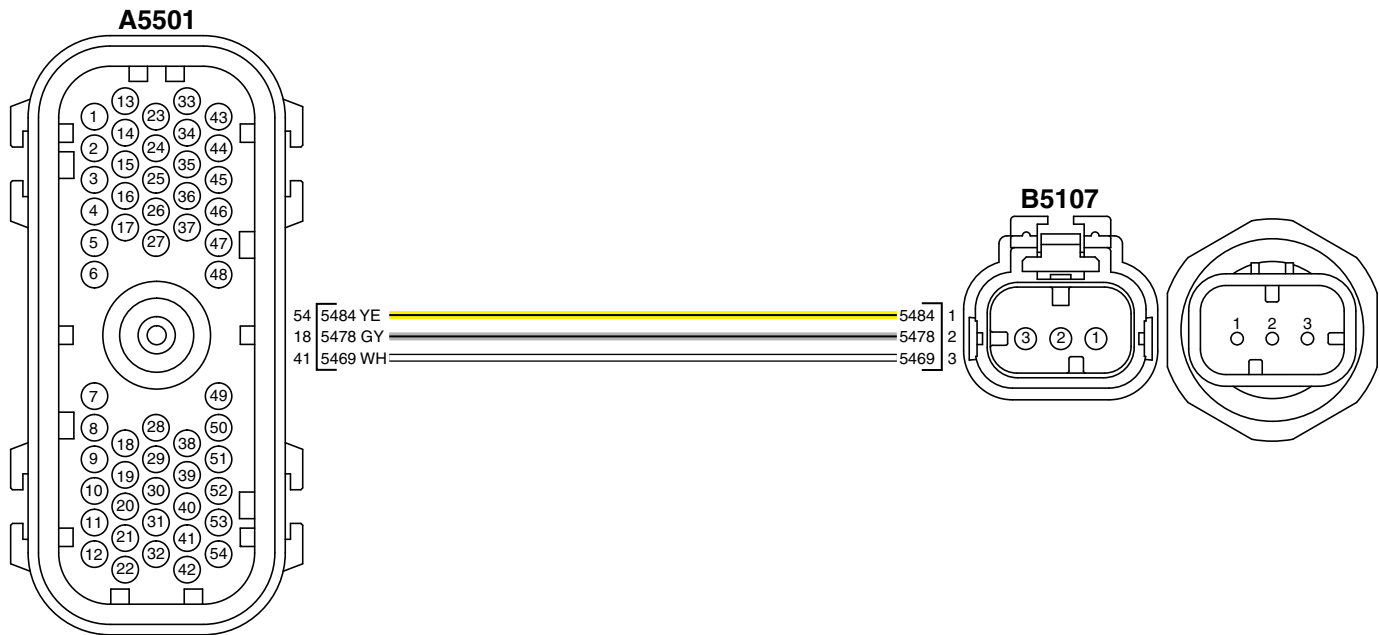
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Low-Pressure Fuel Pressure Sensor Wiring Diagram

A5501—54—Supply

A5501—18—Return

A5501—41—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probe:

Sensor

- [JDG10460](#) — Female — Yellow/Purple

- [JDG10461](#) — Male — Yellow/Purple

Continued on next page

RG40049,0000C3B -19-17OCT11-2/23

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads
- JT05470 — Universal Pressure Test Kit

RG40049,0000C3B -19-17OCT11-3/23

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Check for the following:
 - Low fuel level
 - Air in fuel lines
 - Restricted vent in fuel tank or fuel cap
 - Loose or misaligned fuel filters
 - Broken fuel lines
 - Pinched or kinked inlet or return fuel lines
 - Loose, broken, or cracked fuel line fittings

Were any problems found?

YES: Repair Problem.
Perform Verification Procedure.

NO: GO TO 2

RG40049,0000C3B -19-17OCT11-4/23

2 Replace Fuel Filters

1. Ignition OFF, Engine OFF.
2. Remove primary and secondary fuel filters.
3. Drain fuel from filters into a clean container.
4. Check for water, dirt, or other contaminants in the drained fuel.
5. Replace primary and secondary fuel filter elements.

Was an abnormal amount of water or contaminants present in the drained fuel?

YES: Inspect fuel tank for cause of contamination issues and correct as needed. Ensure that good fuel supply is available. GO TO 3

NO: GO TO 3

RG40049,0000C3B -19-17OCT11-5/23

3 Pump Identification

CAUTION: DO NOT PRESSURIZE THE FUEL TANK! Doing this causes the seal on the front of the high pressure pump to rupture. When such a rupture occurs, fuel passes around the seal, and fills the engine crankcase. This condition causes severe damage to the engine and requires replacement of the high pressure pump.

NOTE: There are two different low-pressure fuel pump options: A mechanical low-pressure fuel pump, and an electric low-pressure fuel pump.

Identify what type of low-pressure fuel pump is on the engine.

Is the low-pressure fuel pump electric?

YES: GO TO 4

NO: GO TO 20

Continued on next page

RG40049,0000C3B -19-17OCT11-6/23

4 Mechanical Gauge Pressure Check

1. Ignition OFF, Engine OFF.
2. Disconnect fuel line from secondary fuel outlet to supply fuel manifold.
3. Install 0—103 kPa (0—1.03 bar) (0—15 psi) gauge between secondary fuel filter outlet and high-pressure fuel pump, using [JT05470](#) Universal Pressure Test Kit.
4. Ignition ON, engine cranking or running
5. Monitor mechanical pressure gauge reading.

Is pressure 30 kPa (0.3 bar) (4.4 psi) or higher?

YES: Low-Pressure Fuel System Check passes

NO: [GO TO 5](#)

RG40049,0000C3B -19-17OCT11-7/23

5 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect low-pressure fuel pressure pump connector Y5004.
3. Perform [Terminal Test](#) on pump and Y5004 connector.

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000C3B -19-17OCT11-8/23

6 Supply Voltage Check

1. Connect Diagnostic Test Box :
 - A to Y5004 connector female socket 1 (+).
 - B to Y5004 connector female socket 2 (-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Press and hold S3 on Diagnostic Test Box.
6. Monitor voltage on multimeter.
7. Perform [Wiggle Test](#).

Is voltage consistently within +/- 0.75 V of battery voltage?

YES: Replace low-pressure fuel pump. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RG40049,0000C3B -19-17OCT11-9/23

7 Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Is voltage within +/- 0.75 V of battery voltage?

YES: Repair problem in return wire. Perform [Verification Procedure](#).

NO: [GO TO 8](#).

RG40049,0000C3B -19-17OCT11-10/23

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform [Terminal Test](#) on A5501 connector female sockets 5 and 25. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

Continued on next page

RG40049,0000C3B -19-17OCT11-11/23

Checks, Tests, and Procedures

9 System Voltage	Is the application using 12 V battery voltage?	YES: GO TO 10
		NO: GO TO 15
RG40049,0000C3B -19-17OCT11-12/23		
10 Continuity Check	Measure resistance between A5501 connector female socket 5 and Y5004 connector female socket 1. Is resistance less than 5 ohms?	YES: GO TO 11 NO: Repair open or high resistance in supply circuit. Perform Verification Procedure .
RG40049,0000C3B -19-17OCT11-13/23		
11 Short to Ground Check	Measure resistance between Y5004 connector female socket 1 and single point ground. Is resistance greater 100K ohms?	YES: GO TO 12 NO: Repair short in harness. Perform Verification Procedure .
RG40049,0000C3B -19-17OCT11-14/23		
12 Wire to Wire Check	Measure resistance between A5501 connector female socket 5 and all other terminals in A5501. Are all resistances greater than 100K ohms?	YES: GO TO 13 NO: Repair short in harness. Perform Verification Procedure .
RG40049,0000C3B -19-17OCT11-15/23		
13 Terminal Test	1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors A5502 and A5503. 3. Perform Terminal Test on all female sockets. And corresponding ECU male pins. Were any problems found?	YES: Repair problem. Perform Verification Procedure . NO: GO TO 14
RG40049,0000C3B -19-17OCT11-16/23		
14 Wire to Wire Check	Measure resistance between A5501 connector female socket 5 and all terminals in connectors A5502 and A5503. Are all resistances greater than 100K ohms?	YES: Contact DTAC for support. NO: Repair short in harness. Perform Verification Procedure .
Continued on next page		
RG40049,0000C3B -19-17OCT11-17/23		

Checks, Tests, and Procedures

15 Continuity Check

Measure resistance between A5501 connector female socket 5 and Y5004 connector female socket 1.

IMPORTANT: On 24 V operating systems, there is a 4 ohm resistor in series with the low-pressure fuel pump on the supply circuit. This is the reason for measuring for 9 ohms or less in this step.

Is resistance less than 9 ohms?

YES: [GO TO 16](#)

NO: Repair open or high resistance in supply circuit. Perform [Verification Procedure](#).

RG40049,0000C3B -19-17OCT11-18/23

16 Short to Ground Check

Measure resistance between Y5004 connector female socket 1 and single point ground.

Is resistance greater 100K ohms?

YES: [GO TO 17](#)

NO: Repair short in harness. Perform [Verification Procedure](#).

RG40049,0000C3B -19-17OCT11-19/23

17 Wire to Wire Check

Measure resistance between A5501 connector female socket 5 and all other terminals in A5501.

Are all resistances greater than 100K ohms?

YES: [GO TO 18](#)

NO: Repair short in harness. Perform [Verification Procedure](#).

RG40049,0000C3B -19-17OCT11-20/23

18 Terminal Test

1. Disconnect ECU connectors A5502 and A5503.

2. Perform [Terminal Test](#) on all female sockets. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 19](#)

RG40049,0000C3B -19-17OCT11-21/23

19 Wire to Wire Check

Measure resistance between A5501 connector female socket 5 and all terminals in connectors A5502 and A5503.

Are all resistances greater than 100K ohms?

YES: Contact DTAC for support.

NO: Repair short in harness. Perform [Verification Procedure](#).

Continued on next page

RG40049,0000C3B -19-17OCT11-22/23

20 Mechanical Gauge Pressure Check

1. Ignition OFF, Engine OFF.
2. Disconnect fuel line from secondary fuel outlet to supply fuel manifold.
3. Install 0—103 kPa (0—1.03 bar) (0—15 psi) gauge between secondary fuel filter outlet and high-pressure fuel pump, using [JT05470](#) Universal Pressure Test Kit.
4. Ignition ON, engine cranking or running at low slow idle.
5. Monitor mechanical pressure gauge reading.

Is pressure 30 kPa (0.3 bar) (4.4 psi) or higher?

YES: Low-Pressure Fuel System Check passes. Return to diagnostic procedure that referred you here.

NO: Replace mechanical low-pressure fuel pump. Perform [Verification Procedure](#).

RG40049,0000C3B -19-17OCT11-23/23

Mechanical Compression Test

IMPORTANT: Compression pressures are affected by the cranking speed of the engine. Before beginning the test, ensure that batteries are fully charged and injection nozzle area is thoroughly cleaned.

1. Start engine and run at rated speed until it warms up to normal operating temperature. (From a cold start, operate engine 10-15 minutes at slow idle.)
2. Ignition OFF, Engine OFF
3. Remove glow plugs.
4. Install a suitable M10 x 1.0 adapter with thread sealer to cylinder head and install compression gauge to adapter. Do not tighten adapter to more than glow plug torque specification.
5. Connect JT01682 Gauge and Hose Assembly to nozzle adapter.
6. Remove battery power supply to the Engine Control Unit (ECU) by removing the ECU power supply fuse, or by disconnecting the ECU from the wiring harness.

NOTE: A 3.6% reduction in gauge pressure will result for each additional 300 m (1000 ft) of altitude.

All cylinders within an engine should have approximately the same pressure. There

should be less than 340 kPa (3.4 bar) (50 psi) difference between cylinders.

7. Crank engine over with starting motor for approximately 10 seconds and record compression readings. Compare readings with adjacent cylinders. There should be less than 340 kPa (3.4 bar) (50 psi) difference between cylinders.
8. If pressure difference between cylinders is excessive, remove gauge and apply oil to ring area of piston through the glow plug bore. Do not use too much oil and do not get oil on valves.
9. Crank engine over and record compression reading again.
 - If pressure is significantly higher than the first compression reading taken, worn or stuck rings are indicated. Either replace piston rings or install new piston and liner set as needed. and Section 02, Group 030 of this manual.
 - If pressure remains much lower than the specification, it is possible that valve lash is incorrect or valves are worn or sticking. Measure valve lash to specifications or recondition cylinder as needed.
10. Measure compression pressure in all remaining cylinders and compare readings. Recondition power cylinders and cylinder head as required.

RG40049,0000687 -19-01AUG11-1/1

Problem Not Found Procedure

BK34394,0000DA5 -19-05JAN12-1/6

Diagnostic Procedure

BK34394,0000DA5 -19-05JAN12-2/6

1 Read DTCs and Store Snapshot Information

1. Review [Snapshot Information](#) stored from previous diagnostics.
2. Ignition OFF, Engine OFF.
3. Reconnect all components and connectors.
4. Operate engine under condition where DTC became active.

Did DTC reappear active?

YES: Perform diagnostics for active DTC.**NO:** [GO TO 2](#)

BK34394,0000DA5 -19-05JAN12-3/6

2 Obtain More Information

1. Speak with operator that observed problem and obtain more information about when problem occurred.
2. Operate engine under same conditions as when problem occurred.

Did DTC reappear active?

YES: Perform diagnostics for active DTC.**NO:** [GO TO 3](#)

BK34394,0000DA5 -19-05JAN12-4/6

3 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for known issues which may cause DTC you are troubleshooting.

Are DTAC solutions found?

YES: Perform steps found in DTAC solution.**NO:** [GO TO 4](#)

BK34394,0000DA5 -19-05JAN12-5/6

4 ECU Reprogram

Search Custom Performance for ECU software updates.

Is a new version of software available?

YES: Reprogram ECU with newest version of software. Perform [Verification Procedure](#).**NO:** Contact DTAC for support.

BK34394,0000DA5 -19-05JAN12-6/6

Short to Voltage Procedure

BK34394,0000DA6 -19-22OCT10-1/6

Diagnostic Procedure

Continued on next page

BK34394,0000DA6 -19-22OCT10-2/6

Checks, Tests, and Procedures

1 Unswitched Voltage Check	<p><i>NOTE: For appropriate connector and terminal identification, reference the Diagram in the DTC that you are diagnosing.</i></p> <ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box, if connected. 3. On the harness, use multimeter to measure voltage between component connector signal (+) and return (-) terminals. <p>Is voltage greater than 0.5 volts?</p>	<p>YES: Disconnect battery and <u>GO TO 2</u>.</p> <p>NO: <u>GO TO 2</u></p>
2 Signal Circuit Continuity Check	<ol style="list-style-type: none"> 1. Disconnect applicable ECU connector containing the component signal wire terminal. 2. On the harness, measure resistance between the component signal wire terminal in ECU connector and component connector signal wire terminal. 3. On the harness, measure resistance between the component return wire terminal in ECU connector and component connector return wire terminal. <p>Are both measurements less than 5 ohms?</p>	<p>YES: <u>GO TO 3</u></p> <p>NO: Repair mis-pin. Perform <u>Verification Procedure</u>.</p>
3 Wire to Wire Short Check	<ol style="list-style-type: none"> 1. Disconnect battery if not already disconnected. 2. On the harness, measure resistance between component signal terminal in ECU connector to all other terminals in applicable ECU connector. <p>Are any measurements less than 100k ohms?</p>	<p>YES: Repair short to signal wire. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 4</u></p>
4 Wire to Wire Short Check	<ol style="list-style-type: none"> 1. Disconnect all other ECU connectors. 2. On the harness, measure resistance between component signal terminal in ECU connector to all other terminals in all other ECU connectors. <p>Are any measurements less than 100k ohms?</p>	<p>YES: Repair short to signal wire. Perform <u>Verification Procedure</u>.</p> <p>NO: Contact DTAC for support.</p>

BK34394,0000DA6 -19-22OCT10-3/6

BK34394,0000DA6 -19-22OCT10-4/6

BK34394,0000DA6 -19-22OCT10-5/6

BK34394,0000DA6 -19-22OCT10-6/6

Terminal Test

The purpose of this test is to check for electrical terminal and connector problems.

Terminal Basics

Terminals are typically made from a base metal that is plated with tin, gold, or an alloy. The plating material helps protect the base metal of the terminal from corroding. There are two main varieties of terminals; pins (male) and sockets (female). The male pins are inserted into the female sockets to provide the electrical connection between wires or electrical devices. The female socket terminals typically contain one or more contact springs which provide firm contact points with the male pin terminal.

Terminal Problems

The five main types of terminal problems are corrosion, loose fit, bent terminals, pushed out terminals, and crimp problems.

Corrosion or foreign material on terminals acts as a series resistance between the contact spring and the mating terminal. This series resistance can decrease the voltage measured by the ECU at its inputs. Corrosion, liquids, or other foreign material in a connector may also provide a parallel resistance that permits current to flow between other terminals in the connector. This parallel path can increase or decrease the voltage measured by the ECU at its inputs. Once terminals are corroded, they must be replaced. Scraping the layer of corrosion from the terminal also removes any remaining plating material resulting in a rapid reappearance of the corrosion.

A loose fit between the pin and the socket terminals may result in an intermittent open circuit. The loose fit is usually due to a damaged or worn contact spring inside the female socket terminal. Loose fitting terminals may be caused by misaligned terminals or by previous troubleshooting procedures where a probe was inserted into the female socket terminal to obtain a measurement.

Bent male pin terminals may cause an open circuit and possibly a short circuit with adjacent pins in the connector. Bent terminals are often caused by connector alignment or improper terminal crimping techniques.

Terminals that are partially pushed out of the connector may cause an open circuit or an intermittent connection if the tip of the partially pushed out terminal makes electrical contact with the tip of the mating terminal. Pushed out terminals are caused by misaligned terminals or by

terminals that were not fully seated in the connector during assembly.

Terminals are crimped to wire ends to provide electrical and mechanical connection to the wire. The wire end may pull out of the terminal if not crimped correctly or if the wire has been pulled on with too much force. This results in an open circuit or an intermittent open circuit if the wire end makes contact with the terminal.

Terminal Test Visual Inspection

Inspect the terminals on both sides of the connection including the ECU or sensor for the following problems:

- Corrosion on the terminals or in the connector.
- Water or other foreign material in the connector.
- Bent terminals.
- Pushed out terminals.

Replace or reinsert terminals. Replace connector if damaged.

Terminal Test Loose Fit Check

- Select the proper terminal adapter, Flex Probe, from JDG10466 that matches the terminal you are testing.
- Gently insert the male pin terminal fully into the female socket terminal without twisting or bending.
- Slowly pull the male pin terminal out of the female socket terminal. There should be a noticeable tension as terminal probe is withdrawn.

Replace terminals that have a loose fit.

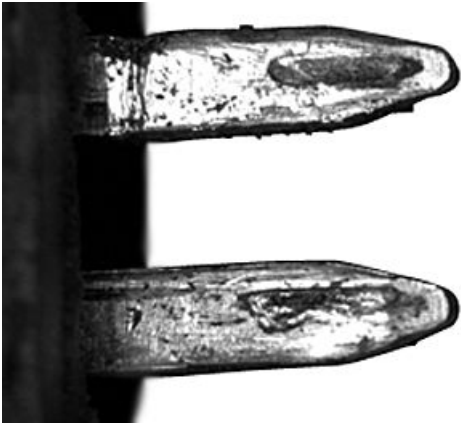
Terminal Test Crimp Check

- Remove connector back shell to gain access to wire insertion end of connector, if applicable.
- Gently pull on each wire in the connector.

Replace terminal if wire end pulls out of the terminal.

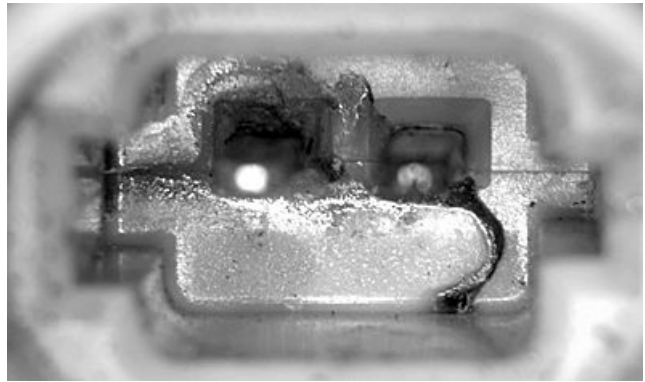
Terminal Tips

- Use the specified extraction tools to remove terminals.
- Always use the specified terminal as a replacement. The plating on mating terminals must be compatible or corrosion could occur.
- Always use the specified seals for those connectors that require them.
- Always use the correct crimping tool to attach replacement terminals.
- After crimping a terminal to the wire end, pull gently on the terminal to make sure that it is securely crimped.



Fuse- Worn and Corroded Pins

RG16614 —UN—25NOV08



2-pin female- Corroded Pins

RG16615 —UN—25NOV08



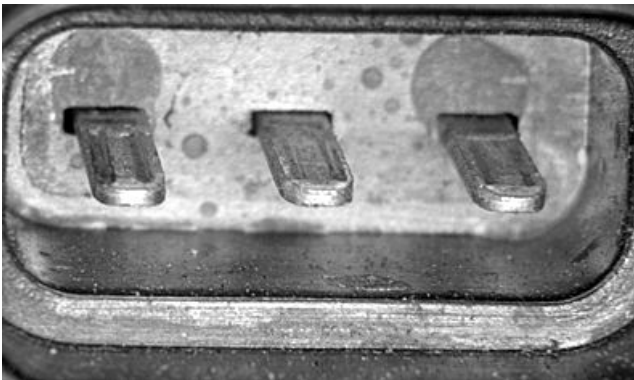
3-pin male- Worn Pins

RG16616 —UN—25NOV08



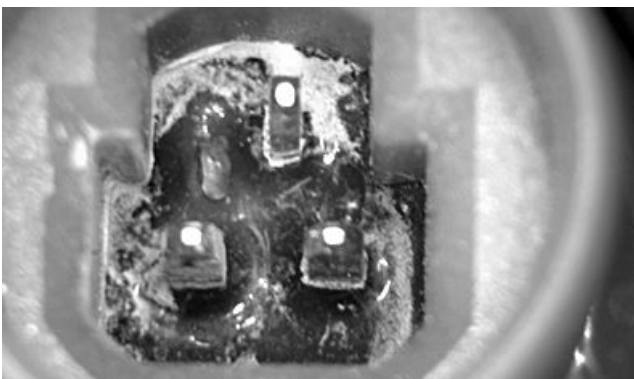
2-pin male- Worn and Corroded Pins

RG16617 —UN—25NOV08



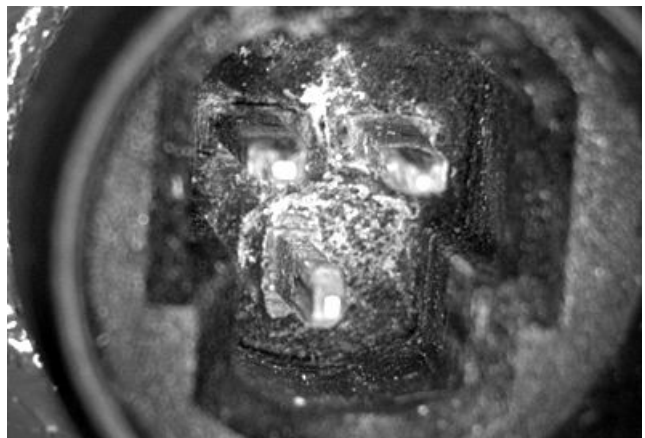
3-pin male- Corroded Pins

RG16618 —UN—25NOV08



3-pin male- Corroded Pins

RG16621 —UN—25NOV08



3-pin male- Corroded Pins

RG16623 —UN—25NOV08

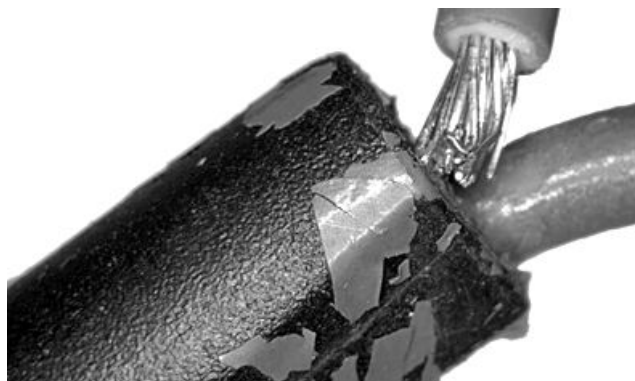
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DN22556,0000056 -19-17AUG11-2/3



3-pin male- Worn Pins

RG16624—UN—25NOV08



Faulty Wire- Not Crimped Correctly

RG16619—UN—25NOV08

DN22556,0000056 -19-17AUG11-3/3

Turbocharger Oil Seal Leak Check

Seals are used on both sides of the turbocharger rotor assembly. The seals are used to prevent exhaust gases and air from entering the turbocharger housing. Oil leakage past the seals is uncommon but can occur.

A restricted or damaged turbocharger oil return line can cause the housing to pressurize causing oil to leak by the seals. Additionally, intake or exhaust restrictions can cause a vacuum between the compressor and turbocharger housing causing oil to leak by the seals.

1. Remove intake tube and exhaust pipe.

NOTE: The intake tube from the air cleaner would not have to be removed for this test.

2. Inspect the intake tube and turbocharger turbine casing for evidence of oil leakage.

If oil leakage is present, perform the following:

- Inspect turbocharger oil return line for kinks or damage. Replace if necessary.
- Check the air intake filter and hoses for restrictions.
- Check the exhaust system for restrictions to include position of exhaust outlet.

3. Perform necessary repairs and retest. Perform Exhaust Condition Check in Section 04 Group 155.

SS01820,0000793 -19-08AUG11-1/1

Venturi — Cleaning

The venturi and EGR flow sensor assembly measures the EGR rate. The venturi is cooled by engine coolant and the narrow ID — 12 mm — (inlet side) of the venturi may become restricted from carbon buildup.

The venturi should be checked and cleaned:

- If EGR cooler has a coolant leak.
- If there is evidence of excessive electronic unit injector misfiring.
- If DTC 002659.14 — EGR Flow Signal Error is active or stored.

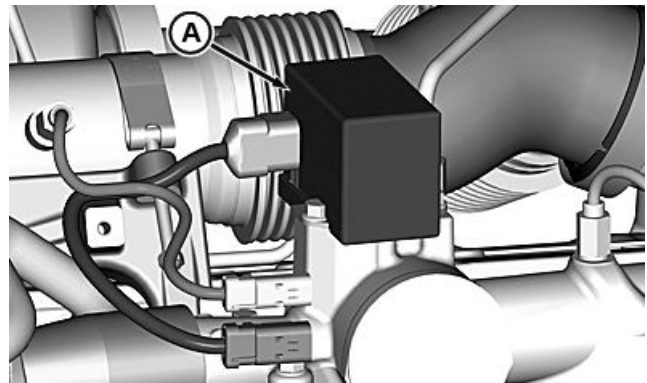
Venturi — Cleaning

1. Remove the heat shield (A).
2. Disconnect wiring harness connectors (E) and (G).
3. Remove cap screws (B) and remove the EGR flow sensor (C) from the venturi assembly (D).
4. Remove EGR temperature sensor (F) from the venturi assembly (D).
5. Remove venturi assembly. See [Venturi Assembly — Removal](#) in Section 02, Group 080.

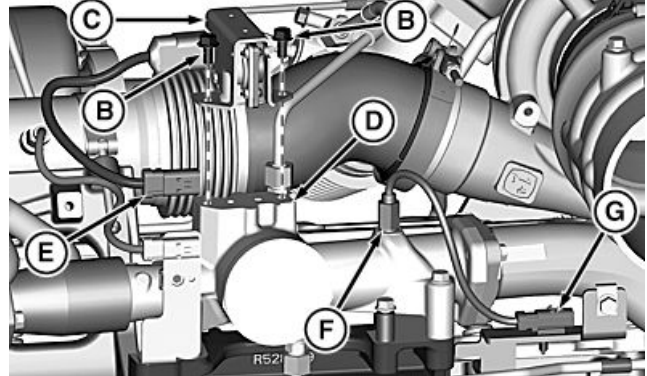
IMPORTANT: For cleaning, use a nylon or plastic brush. DO NOT use a metal brush, Scotch-Brite®, or abrasive material to clean. The use of a solvent tank is acceptable.

6. Clean the 12 mm ID (inlet side) of the venturi assembly with a nylon or plastic brush and solvent to remove carbon buildup.
7. Thoroughly dry venturi assembly using compressed air regulated to 210 kPa (2.1 bar) (30 psi)..
8. Install venturi assembly, see [Venturi Assembly—Installation](#) in Section 02, Group 080.
9. Install EGR temperature sensor, see [EGR Temperature Sensor — Installation](#) in Section 02 Group 100.

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Heat Shield and Connector



Components

A—Heat Shield
B—Cap Screws
C—EGR Flow Sensor
D—Venturi Assembly

E—B5103 - EGR Flow Sensor Connector
F—EGR Temperature Sensor
G—B5207 - EGR Temperature Sensor Connector

10. Reconnect connector (G).
11. Install EGR flow sensor and heat shield, see [EGR Flow Sensor — Installation](#) in Section 02 Group 100.
12. Reconnect connector (E).

BL90236,000030B -19-22MAY12-1/1

Verification Procedure

BK34394,0000DA7 -19-14FEB12-1/6

Verification Procedure

BK34394,0000DA7 -19-14FEB12-2/6

1 DTC Check

Did you come to this procedure from a DTC procedure?

YES: [GO TO 2](#)

NO: [GO TO 4](#)

Continued on next page

BK34394,0000DA7 -19-14FEB12-3/6

2 Harness Diagnostic Mode Test

1. Ignition OFF, Engine OFF.
2. Reconnect all components and connectors.
3. Ignition ON, Engine OFF
4. In Service ADVISOR, perform Harness Diagnostic Mode Test and record codes.

Is DTC you are troubleshooting active?

YES: Return to DTC Procedure step 1 due to possible change in conditions.

NO: GO TO 3

BK34394,0000DA7 -19-14FEB12-4/6

3 Operating Conditions

Operate engine under conditions where DTC became active.

Did DTC you were troubleshooting become active?

YES: Return to DTC procedure step 1 due to possible change in conditions.

NO: Procedure complete. Continue troubleshooting any other DTC's, if present.

BK34394,0000DA7 -19-14FEB12-5/6

4 Operating Conditions

Operate engine under conditions where observable symptom was present.

Did observable symptom you were troubleshooting become active?

YES: Return to observable procedure step 1 due to possible change in conditions.

NO: Procedure complete. Continue any other necessary troubleshooting.

BK34394,0000DA7 -19-14FEB12-6/6

Wiggle Test

NOTE: For appropriate connector and terminal identification, reference the Diagram in the DTC that you are diagnosing.

This is to help diagnose intermittent faults.

Intermittent DTCs are problems that periodically "go away". A problem such as a loose terminal that intermittently does not make contact with its mating terminal is a likely cause of an intermittent fault. Other intermittent DTCs may only be set under certain operating conditions such as heavy load, extended idle, and others. When diagnosing intermittent DTCs, take special note of the condition of wiring and connectors since a high percentage of intermittent problems originate here. Check for loose, dirty, or partially disconnected connectors. Inspect the wiring routing looking for possible intermittent shorts to ground caused by contact with external parts (for example, rubbing against sharp sheet metal edges).

Inspect the connector vicinity looking for wires that are partially pulled out of connector terminals, damaged connectors, poorly positioned terminals, and corroded or damaged terminals. Look for broken wires, damaged splices, and wire-to-wire shorts.

NOTE: The ECU is the component *LEAST* likely to fail. Only replace the ECU if the diagnostic procedure indicates that ECU replacement is necessary.

Inspect harness and connectors for signs of damage such as heat damage, chaffing, corrosion, and other possible causes.

While monitoring or making measurements, watch for changes and perform the following:

- Beginning at the suspect component, gently wiggle the harness.
- Continue to gently wiggle the harness at different points along the harness until reaching the ECU connectors.

PU00210,0000367 -19-29JUN10-1/1

Air Throttle Actuator Learn Value Reset Test Instructions

For instructions on connecting to Service ADVISOR, see [Connecting to Service ADVISOR](#) also in this Group.

This procedure resets all stored values for the open and closed actuator positions. For more information on the air throttle actuator, see [Air Throttle Actuator Operation](#) in Section 3, Group 135.

NOTE: This procedure is only performed if you replace the air throttle actuator with a new actuator.

NOTE: Replacing an actuator to test for a failed actuator (part swapping) is not recommended. It causes error codes to be generated because the stored values the ECU is using to compare to are out of tolerance of the new actuator.

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, select the Tests and Calibrations tab, select Connected Calibrations, Select Interactive Calibrations, select ECU - (Serial Number of ECU), select Air Throttle Actuator Learn Value Reset.
3. Follow the instructions on the screens.
4. Ignition OFF, Engine OFF for 120 seconds.
5. Ignition ON, Engine OFF for 30 seconds minimum. The air throttle actuator performs a learn process for minimum and maximum travel.
6. Refresh codes. Troubleshoot all active DTCs.

SS01820,00007F1 -19-26JUL11-1/1

Carbon Removal Procedure

Handle Chemical Products Safely

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before starting any job using a hazardous chemical. This will explain what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

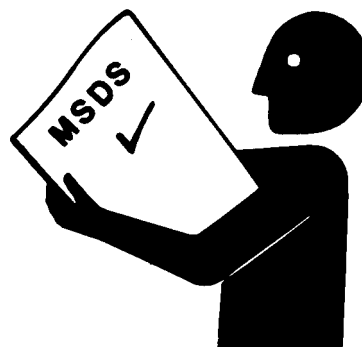
(See your John Deere dealer for MSDS information on chemical products used with John Deere equipment.)

IMPORTANT: For cleaning, use a nylon or plastic brush. **DO NOT** use a metal brush, Scotch-Brite®, or abrasive material to clean.

IMPORTANT: Never submerge the component in the solvent tank.

For more EGR valve information, see [EGR Valve Operation](#) in Section 03, Group 135.

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TS1132—UN—26NOV90

For more air throttle actuator information, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

1. Use a nylon or plastic brush with a solvent (for example: diesel fuel) to remove carbon deposits from bore.
2. Move the butterfly by hand if needed to clean the valve seat.
3. Remove debris and dry with compressed air regulated to 210 kPa (2.1 bar) (30 psi).
4. Clear any residual solvent with a rag.

BB78437,0000052 -19-29MAY12-1/1

Clear Aftertreatment Latched DTC — Test Instructions

For instructions on connecting to Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

The term “latched” refers to the fact that the fault code reappears active after a key cycle, whether the conditions that set the fault are still present or not. These Aftertreatment DTCs cannot be cleared by the operator or a key cycle, they require a special message to be sent to the ECU by Service ADVISOR.

IMPORTANT: Performing this test causes all aftertreatment latched DTCs to be cleared.

Before Performing the Test

Repair the cause of the Diagnostic Trouble Codes (DTCs) you are attempting to clear.

Performing the Test

1. Ignition ON, Engine OFF.

2. Select Interactive Tests from the Tests and Calibrations shortcut bar in Service ADVISOR. Select Clear Aftertreatment Latched DTC's
3. Follow instruction given by the diagnostic software.

IMPORTANT: Some of the latched DTCs may stay active until the key is turned off.

4. Ignition OFF, Engine OFF for 90 seconds.
5. Ignition ON, Engine OFF.
6. Select Connected Diagnostic Trouble Codes in the Diagnostics shortcut bar in Service ADVISOR.
7. In the Controllers box select Clear All. A message pops up and says: Are you sure yo want to clear the Diagnostic Trouble Codes? Select “YES”.
8. Review DTC list to ensure the DTC you were working on is no longer in the list.

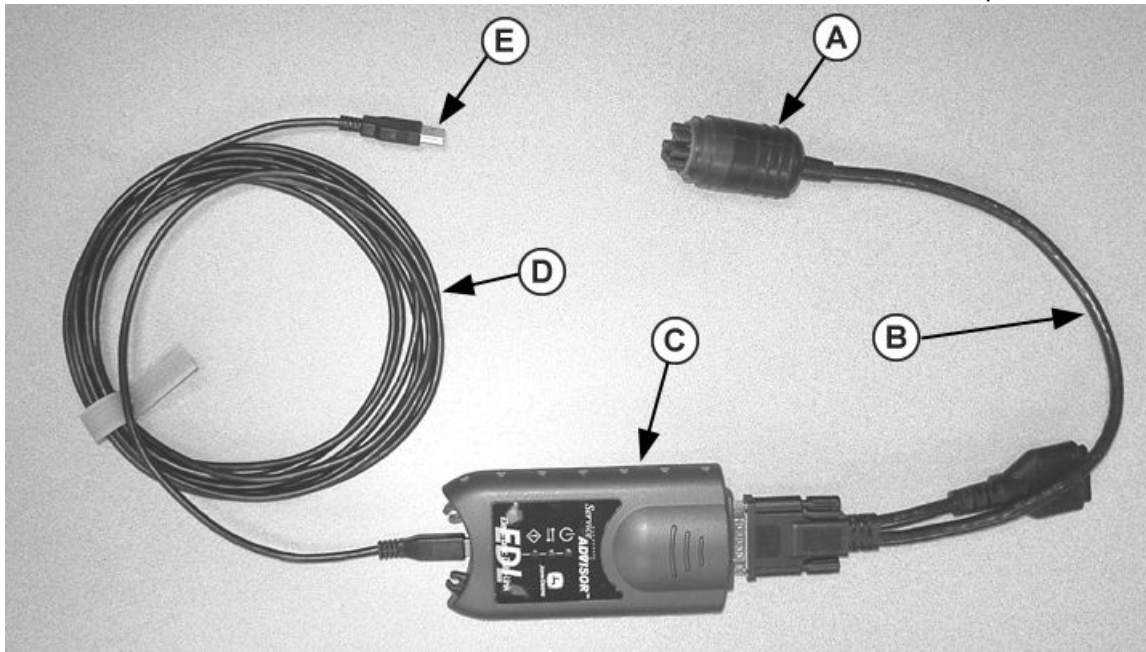
BB78437,0000054 -19-14FEB12-1/1

Connecting to Service ADVISOR

Refer to the appropriate portion of the following procedure for instructions on connecting Service ADVISOR to your application.

Connecting to Service ADVISOR with EDL Adaptor using USB Cable

The Electronic Data Link (EDL) adapter is used to provide communication between the computer and the ECU.



Connecting to Service ADVISOR

A—to 9-Pin Diagnostic Connector on Engine B—John Deere Controller Cable
C—EDL (Electronic Data Link) D—USB Cable
E—to Computer with Service ADVISOR

The EDL is connected to the engine ECU through the diagnostic connector (A). The diagnostic connector on the application is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

SA1001 ECU Communication Hardware Kit contains the EDL and cables necessary to connect Service ADVISOR to the ECU.

NOTE: This kit must be purchased through the same system used to order parts.

Instructions for connecting Service ADVISOR to the ECU:

1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable (B) to diagnostic connector on engine harness.
3. Connect other end of John Deere Controller Cable (B) to EDL (C).
4. Connect USB cable (D) to EDL.
5. Connect other end of USB cable (E) to computer with Service ADVISOR installed.
6. Key ON, Engine OFF or running.

7. Start Service ADVISOR and select Connect to Model(s) from Readings menu, or press the Connect to Model(s) icon on toolbar. Select the appropriate connection method.
8. Select Electronic Data Link (EDL) Stand-alone USB Device as Current Adapter in Select Readings Adapter box.
9. Select engine model. Press Change Models button in this box to see a list of engine models if your engine model is not listed.
10. Press Connect button after selecting engine model.
11. If Service ADVISOR does not connect, see [ECU Does Not Communicate with Service ADVISOR](#) diagnostic procedure in Section 4, Group 150.
12. When finished, replace dust cap on diagnostic connector.

Connecting to Service ADVISOR with EDL Adaptor using Bluetooth

The Electronic Data Link (EDL) adapter is used to provide communication between the computer and the ECU using Bluetooth wireless communications. The computer must have a Bluetooth adaptor or be Bluetooth capable for this feature to work.

RG14546 —UN—27OCT05

Continued on next page

SS01820,00002CE -19-21JUL11-1/2

The EDL is connected to the engine ECU through the diagnostic connector (A). The diagnostic connector on the application is a 9-pin circular connector with a square mounting flange and a dust cap. The location of the diagnostic connector may vary depending on application. On OEM engines, the connector is located near the ECU on the engine wiring harness.

SA1001 ECU Communication Hardware Kit contains the EDL and cables necessary to connect Service ADVISOR to the ECU.

NOTE: This kit must be purchased through the same system used to order parts.

IMPORTANT: For instructions on how to configure your Bluetooth, see Bluetooth Configuration in Service ADVISOR help.

Instructions for connecting Service ADVISOR to the ECU using Bluetooth wireless:

1. Locate diagnostic connector on engine and remove dust cap.
2. Connect John Deere Controller Cable (B) to the diagnostic connector on the engine harness.
3. Connect the other end of the John Deere Controller Cable (B) to the EDL (C).
4. Key ON, Engine OFF or running.
5. Start Service ADVISOR and select Connect to Model(s) from Readings menu, or press the Connect to Model(s) icon on toolbar. Select the appropriate connection method.
6. Select Electronic Data Link (EDL) Using Bluetooth as the Current Adapter in the Select Readings Adapter box.
7. Click on the Pair button. In the Bluetooth Configuration window, click search and select your device.
8. Once the proper device has been selected, click pair and then click close.
9. Select the engine model. Press the Change Models button in this box to see a list of engine models if the engine model is not listed.
10. Press the Connect button after selecting the engine model.
11. If Service ADVISOR does not connect, see ECU Does Not Communicate with Service ADVISOR diagnostic procedure in Section 04, Group 150.
12. When finished, replace the dust cap on the diagnostic connector.

SS01820,00002CE -19-21JUL11-2/2

Control Unit Information and Overview Test

This test gathers specific information from the ECU and puts it into a printable format. The test automatically starts and gathers all of the information listed below. When all the information has been gathered, it is displayed on the screen. The following options are then displayed: Refresh, Exit, and Print.

Refresh:

Selecting this option gathers the information again and displays the new data.

Exit:

Selecting this option exits the test.

Print:

Selecting this option allows the user to print the data now or save it to a file and print it later. For more information, see [Interactive Tests and Calibration Results — Printing, Exporting, or Saving Instructions](#) in this group.

The information gathered is:

- Date tested
- Engine Serial number
- Engine Hourmeter
- ECU serial number
- ECU software assembly part number
- Engine model number
- ECU configuration file part number
- ECU software part number
- Vehicle option part number
- Performance option part number
- Operating code compatibility code
- EOL compatibility code
- Option assembly part number
- ECU part number
- Injector number
- Injector part number
- Injector serial number
- Injector calibration code

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- See, **Other data that can be collected** below to collect additional data points.
- Active and Stored trouble codes at the time test data is taken

Other data that can be collected:

This test can be set up to collect other static data. Any data point that is available to view can be setup to get sent with this report. In WINDOWS® XP, the ControlUnitInformation.ini file located in the "C:\Documents and Settings\All Users\Application Data\Service ADVISOR\CAL\Connectivity Applications\AEA Data Files\Procedure Files" folder just needs to be modified. To modify the file see below:

1. Open the ControlUnitInformation.ini using a text editor like Notepad.
2. Scan down to the text that starts with "[Level".
3. Insert your ECU level under the one(s) listed or replace the number with the controller you are connecting to.
4. The first item under the Level is NumberofDPs. This is the number of data points you want to list. You MUST match the number of data points and this number for the test to run properly.
5. The first data point is DP1= "the data point name you want to record"
6. Continue adding data points using the format in step 5 above.
7. When finished adding the data points simply save the file and close the text editor.

To perform the test:

1. Select Connected Interactive Tests in the Tests and Calibrations shortcut bar of Service ADVISOR.
2. Select Control Unit Information and Overview.
3. The test automatically starts to gather information, then displays it on the screen.
4. At the end of the data gathering, the following options are available: Refresh, Exit, or Print.

DN22556,00006A8 -19-21JUL11-1/1

Cylinder Cutout Test Instructions

For instructions on connecting to Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

The Cylinder Cutout Test is used to aid in identifying a cylinder that is having a problem or to help in diagnosing mechanical or intermittent problems. During the test, the Engine Control Unit (ECU) disables the cylinder that the technician selects while the engine is running. Ideally the test would be performed while operating the vehicle under the conditions that the problem occurs especially if the engine is loaded. At the end of test, a results page can be displayed for diagnostic purposes. The Cylinder Cutout Test cannot determine if an engine is developing low power. The test is only a guide to help determine if there is a problem in a cylinder. The results alone should not be used as a conclusive reason for replacing parts. Other information such as the results of a Cylinder Electronic Compression Test, Cylinder Misfire Test, and other engine diagnostic procedures should be used along with this test information to accurately determine the source of the engine problem.

1. Ensure that the battery and starter are in good working condition.
2. Remove DOC inlet pipe.

⚠ CAUTION: Ensure that the area where the exhaust pipe was removed from is clear of any debris or wiring that could be damaged by hot exhaust.

3. Ignition ON, engine running.
4. Warm engine to normal operating temperature, 85°—97 °C (185°—207 °F).
5. Check for Diagnostic Trouble Codes (DTCs) and address any active codes.

NOTE: The ECU does not allow the test to run if there is an active DTC related to the crankshaft or camshaft position signal or if the coolant temperature is out of normal operating range. If the engine goes into an overspeed condition while running test, the test stops.

6. Select Connected Interactive Tests in the Tests and Calibrations shortcut bar of Service ADVISOR.
7. Select Cylinder Cutout Test.
8. Click on the “Active” button under the cylinder number to be cut out and then click on “Initiate”.

NOTE: You can cut out only one cylinder at a time, but you can test all cylinders before proceeding to the Results page.

9. Observe engine operation closely during the test, especially the engine sound and any vibrations. If the

sound or vibration does not change with a cylinder cut out, that cylinder probably has issues. If the sound or vibration changes or increases with a cylinder cut out, that cylinder is probably contributing normally. If the engine is loaded, you may detect a slight change in engine RPM, especially in the first 1 or 2 seconds of the test. The governor quickly responds and regains any lost engine speed. The active data points displayed are: Current Fuel Rate, Engine Speed, Manifold Air Pressure - Actual, and Engine Load at Current Speed.

10. Elapsed Time is displayed at the bottom of the screen. Click on the Restore button to stop the test
11. Repeat the procedure for each cylinder to be cutout by using the instructions in steps 6, 7, and 8. Try to run each test for approximately the same amount of time.
12. Click on the “Results” button to view the test results.
13. The results data points displayed are: Average Desired Fuel, Engine Speed, Manifold Air Pressure, and Engine Load at Current Speed.

NOTE: Run this test at least 3 times to ensure repeatable, accurate results.

The best analysis is obtained by observing the engine during the cutout test. An increase in engine sound or vibration (as in a “miss” or “misfire”) would indicate that the cylinder being cutout was contributing to the total engine operation and probably is operating normally. The governor on the engine corrects the engine speed to compensate for the cutout cylinder very quickly, so it is difficult to see an rpm change. If the cylinder being cutout does not make a significant difference to the engine sound or vibration, then the cylinder is probably not working.

If the engine vibration or sound slightly changes when the cylinder is cutout, the cylinder is working but not to the full potential. To confirm this diagnostic, perform a Cylinder Misfire Test and Cylinder Electronic Compression Test to help confirm the cylinder has a problem.

If the sound is better with a cylinder cutout, this cylinder is probably firing at the wrong time. This may be due to a damaged injector or a bad electrical connection between the ECU and injector. If the results of the Cylinder Cutout Test and Cylinder Misfire Test lead to the same cylinder and the Cylinder Electronic Compression Test checks good for that cylinder, then the injector wiring or injector is probably bad. If this is the case, first check the electrical connections, looking for shorts or damaged wires. Then if no problems are found, replace faulty injector.

Compare the values from cylinder to cylinder displayed on the results screen to further evaluate each cylinders contribution to the engine operation.

In the sample report below, Cylinder 1 injector was disconnected prior to the test. The Average Desired Fuel results show that the ECU did cutout Cylinder 1 during the test. Cylinder 1 data points do not show enough change to verify that the cylinder was not working, but the sound or vibration observable did indicate that the engine definitely has a miss.

	Average Desired Fuel	Engine Speed	Manifold Air Pressure	Engine Load
Cyl1				
Initial	1.54 oz./min.	1000 rpm	0.4 psi	10.5 percent
Average	1.53 oz./min.	1003 rpm	0.4 psi	10.9 percent
Cyl2				
Initial	1.51 oz./min.	999 rpm	0.5 psi	11.4 percent
Average	1.96 oz./min.	1000 rpm	0.5 psi	13.2 percent
Cyl3				
Initial	1.54 oz./min.	1004 rpm	0.5 psi	10.0 percent
Average	1.93 oz./min.	1000 rpm	0.4 psi	13.1 percent
Cyl4				
Initial	1.54 oz./min.	1006 rpm	0.5 psi	10.3 percent
Average	1.80 oz./min.	999 rpm	0.5 psi	12.8 percent
Cyl5				
Initial	1.50 oz./min.	1007 rpm	0.5 psi	11.6 percent
Average	1.83 oz./min.	999 rpm	0.5 psi	12.9 percent
Cyl6				
Initial	1.50 oz./min.	1000 rpm	0.5 psi	11.1 percent
Average	1.98 oz./min.	1000 rpm	0.5 psi	13.3 percent

Result: Cylinder Cutout Test Completed Successfully

RE42287,0000592 -19-21JUL11-2/2

Cylinder Electronic Compression Test Instructions

For instructions on connecting to Service ADVISOR, see [Connecting to Service ADVISOR](#) in this Group.

The Service ADVISOR™ cylinder electronic compression test is used in conjunction with the cylinder cutout and cylinder misfire tests to help diagnose engine performance issues. During the compression test, the engine is cranked while the ECU inhibits fueling to prevent the engine from starting. The ECU uses the crankshaft position sensor (or camshaft position sensor on some engines) to precisely measure engine speed and crankshaft position during the test. The ECU uses this information to measure the speed of the crankshaft through a range of a few degrees before top dead center and a range of a few degrees after top dead center of the compression stroke of each cylinder.

In a cylinder with good compression, the work of compressing air in the cylinder causes the crankshaft speed to decrease as a piston approaches top dead center of its compression stroke. Conversely, the compressed air in the cylinder pushes this piston back downward after top dead center resulting in an increase of the crankshaft speed. This is also evident when an engine is rotated over by hand using a crankshaft turning tool. It is difficult to rotate the crankshaft as each piston approaches top dead center of its compression stroke. The crankshaft is then easy to rotate, or may rotate on its own, for a few degrees after top dead center of each compression stroke.

In a cylinder with low compression, the crankshaft speed does not decrease much as a piston approaches top dead center of its compression stroke. Also, the crankshaft speed will not increase much after top dead center. This difference in crankshaft speed before and after top dead center is how Service ADVISOR determines the difference in compression between cylinders. The larger the difference between the crankshaft speed before and after top dead center of the compression stroke for each cylinder, the higher the compression for that cylinder.

The results for the compression test are displayed in Service ADVISOR as a percentage. The cylinder, or cylinders, with the largest difference between the crankshaft speed before and after top dead center is assigned a value of 100%. The value of compression for the other cylinders is expressed as a percentage of the cylinder with the highest compression. Therefore, the results are an indication of relative compression, which is the compression of each cylinder compared to the cylinder with the highest compression. In an engine with good compression in all cylinders, the relative compression percentage values are typically all greater than 80%. However, the same would be true of an engine where all cylinders had low compression, such as a dusted engine.

NOTE: It is important to understand that the compression test only indicates the difference between the compression measured for each cylinder, not if the compression is sufficient for good engine performance.

The compression test is most useful for determining if the cause of a misfire of one or two cylinders is likely due to a compression problem. For example, if the cutout and misfire test indicated that cylinder #6 was contributing less than the other cylinders, the compression test results could be used to help determine if the cause of low contribution from #6 was compression-related.

When the compression is similar in all cylinders, interpreting the test results is easy. Figure 1 shows typical engine cranking speed during the compression test along with the test results. If all readings are greater than approximately 80%, then there is likely not a significant difference between the compression in each cylinder.

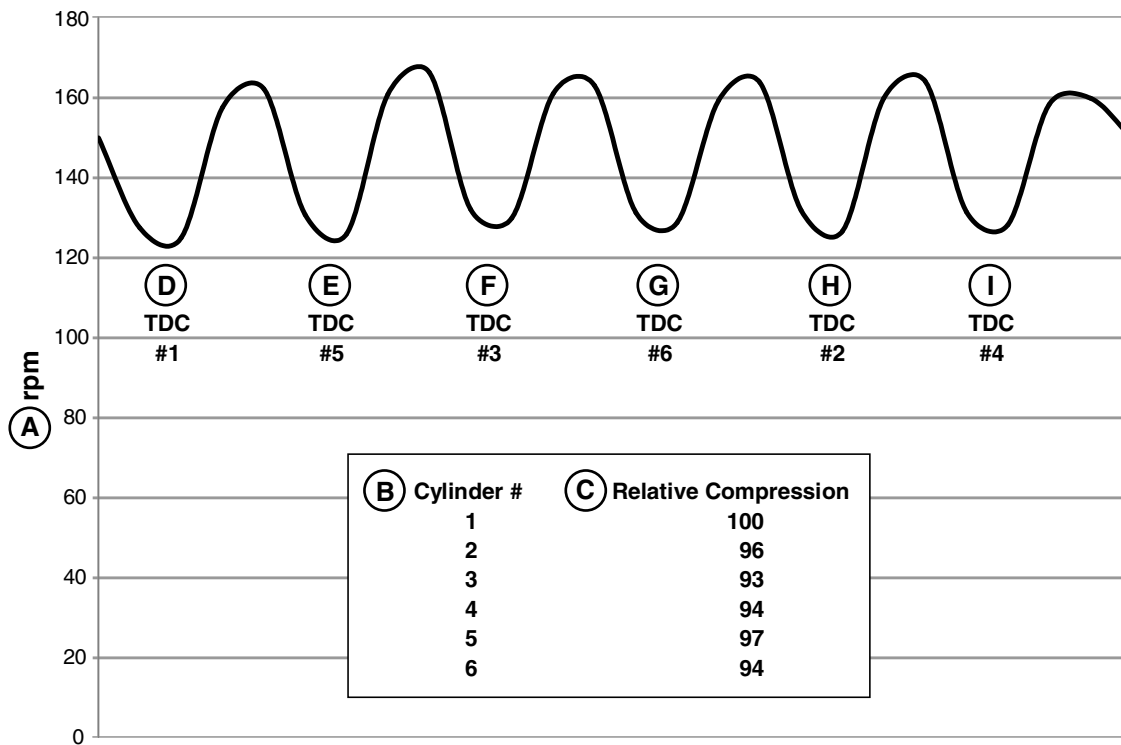


Figure 1
Cranking Speed and Typical Cylinder Electronic Compression Test Results when All Cylinders have Similar Compression.

A—rpm
B—Cylinder Number
C—Relative Compression
D—Top Dead Center (TDC) #1
E—Top Dead Center (TDC) #5
F—Top Dead Center (TDC) #3
G—Top Dead Center (TDC) #6
H—Top Dead Center (TDC) #2
I—Top Dead Center (TDC) #4

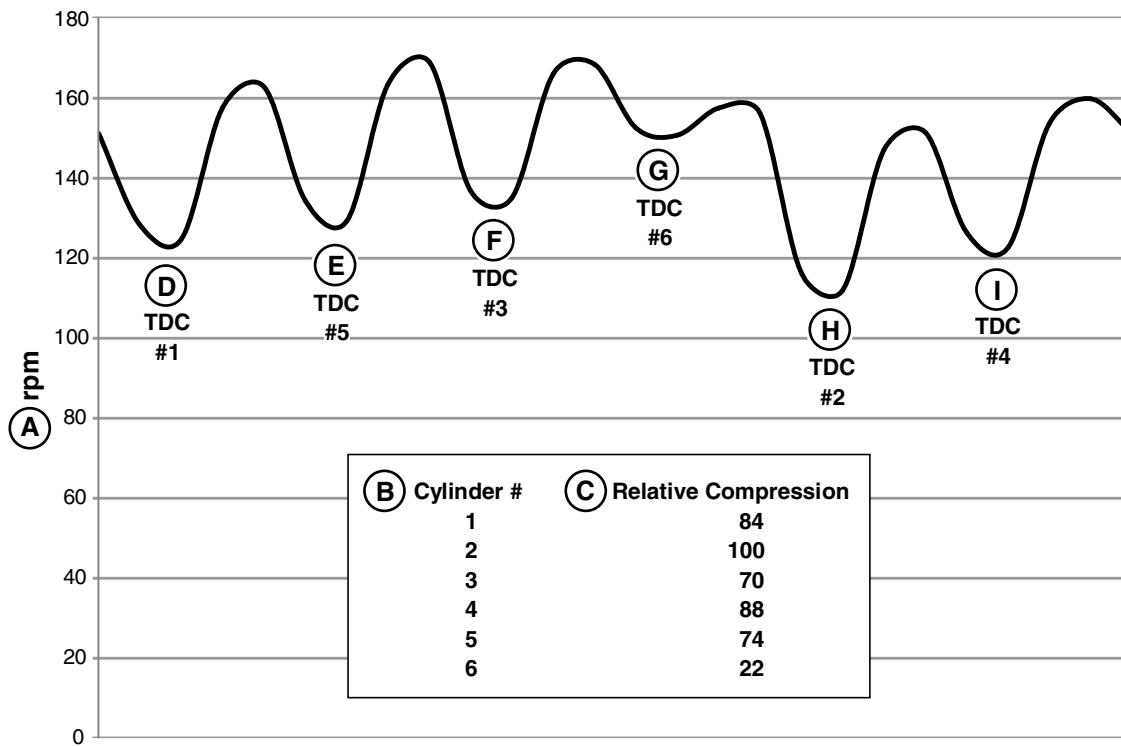
However, when one cylinder has very low compression, the crankshaft speed is also affected for all the other cylinders. In the example shown in Figure 2, cylinder #6 of a 6 cylinder engine with firing order 1 5 3 6 2 4 has very low compression. The low compression in cylinder #6 causes the crankshaft speed to not decrease much as the #6 piston approaches top dead center of its compression stroke. The cranking motor has an easy task of rotating the crankshaft over top dead center for cylinder #6. However, the crankshaft speed also does not increase much after top dead center of the #6 compression stroke since there is not much compressed air in the cylinder to push the piston back downward. This lack of help from the compressed air in cylinder #6 after top dead

center causes a decrease in the speed of the crankshaft. Therefore, the speed of the crankshaft when the next piston in the firing order (#2) approaches top dead center will be less than it would have been if #6 had good compression. Thus cylinder #2 will likely be determined to have the highest relative compression (100%) since its speed before top dead center is probably less than that of the other cylinders. It takes time for the cranking motor to accelerate the crankshaft back up to speed, so the cylinders in the firing order after #2 may also be affected by the decrease in crankshaft momentum due to the #6 compression problem. As the crankshaft speed continues to increase, the next cylinders in the firing order may indicate an increasingly lower relative compression.

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SS01820,00007F2 -19-22JUL11-2/4

RG16707 —UN—15JAN09



RG16708 —UN—15JAN09

Figure 2
Cranking Speed and Typical Cylinder Electronic Compression Test Results When One Cylinder has Low Compression (Cylinder #6).

A—rpm
B—Cylinder Number
C—Relative Compression
D—Top Dead Center (TDC) #1
E—Top Dead Center (TDC) #5
F—Top Dead Center (TDC) #3
G—Top Dead Center (TDC) #6
H—Top Dead Center (TDC) #2
I—Top Dead Center (TDC) #4

There are a couple of hints from the compression test results shown in Figure 2 that indicate there is likely a compression problem with cylinder #6. First, cylinder #6 is indicating the lowest relative compression value which is substantially less than the other cylinders. Second, the next cylinder in the firing order, #2, has the highest relative compression. However, the decrease in crankshaft speed after top dead center of #6 due to the lack of help from the compressed air in the cylinder makes it difficult to determine if there is also a problem with the other cylinders. Note that the test results for some cylinders are lower than 80% due to low compression in cylinder

#6, even though there is likely no compression problem in these cylinders. However, if the engine is partially disassembled to repair the low compression problem with #6, then the other cylinders should also be inspected.

The compression test can also be used to diagnose problems such as a damaged cylinder head gasket causing a compression leak between adjacent cylinders. This would likely result in two adjacent cylinders also having low compression as shown in Figure 3. Again, the other cylinders in the firing order would be affected by the two cylinders with low compression.

Continued on next page

SS01820,00007F2 -19-22JUL11-3/4

Be aware that the compression test can provide inconclusive results if the engine is coupled to a high-inertia load through a rubber coupling or long shaft. The shaft or coupling acts as a torsional spring while the engine is being cranked. Thus the engine cranking speed fluctuations due to cylinder compression are not as evident. It may be necessary to temporarily disconnect the engine from the coupling or shaft to perform the compression test.

Before executing the Cylinder Electronic Compression Test

- Warm engine to normal operating temperature.
- Repair the cause of any Diagnostic Trouble Codes (DTCs) if possible.

NOTE: The ECU does not allow the test to run if there is an active engine timing error code (any 637 code), the engine cranking speed is below 100 rpm, coolant temperature is below -30 °C (-22 °F) or above 200 °C (392 °F).

- Ensure that the battery and starter are in good working condition

Performing the Cylinder Electronic Compression Test:

1. Ignition ON, Engine OFF.
2. In Service ADVISOR select the Tests and Calibrations shortcut bar then select Connected Interactive Tsets then select Cylinder Electronic Compression Test.

Cylinder	Relative Compression
1	81
2	100
3	99
4	80
5	14
6	17

Figure 3

Typical Results with Compression Leak between Cylinders #5 and #6

3. Follow instruction given by the diagnostic software.

NOTE: The software instructs that the engine be cranked for up to 12 seconds. Typically, it should take less than 5 seconds. Service ADVISOR should be observed carefully for instructions during the test.

Error messages and test results are displayed on the Service ADVISOR screen.

NOTE: Run this test at least 3 times to ensure repeatable, accurate results.

Further engine diagnostics should be performed to determine the cause of low compression.

RG18411 —UN—11MAY10

SS01820,00007F2 -19-22JUL11-4/4

Cylinder Misfire Test Instructions

For instructions on connecting to Service ADVISOR, see Connecting to Service ADVISOR in Section 04 Group160.

The Cylinder Misfire Test compares the performance of each cylinder relative to each of the other cylinders. The test helps identify problems such as an engine misfire or irregularly running engine. During the test, the Engine Control Unit (ECU) disables a cylinder, then when the operator moves the throttle the engine accelerates using a fixed amount of fuel and the ECU measures the time taken to accelerate the engine from one speed to the next with that cylinder disabled. This is then repeated for the remaining cylinders.

The Cylinder Misfire Test cannot determine if an engine is delivering low power. The test results are only a guide to help determine if there is a problem in a cylinder. The results alone should not be used as a conclusive reason for replacing parts. Other information such as the results of a Cylinder Electronic Compression Test, Cylinder Cutout Test, and other engine diagnostic procedures should be used along with this test information to accurately determine the source of an engine problem.

1. Ignition ON, Engine running.
2. Warm engine to normal operating temperature, between 40 °C (104 °F) and 110 °C (230 °F).
3. Refresh codes and address all active DTCs.

NOTE: The ECU does not allow the test to run if there is an active DTC related to the crankshaft or camshaft position signal or if the coolant

temperature is out of normal operating range. If the engine goes into an over speed condition while running test, the test stops.

4. Remove any load to the engine that may change during the test. For example, turn off the air conditioner.
5. In Service ADVISOR select the Tests and Calibrations shortcut bar then select Connected Interactive Tests then select Cylinder Misfire Test.
6. Follow instruction given by the diagnostic software. The software instructs the user to move the throttle from slow idle position to wide open throttle position, then back to slow idle position once for each cylinder tested. The throttle movement triggers the ECU to accelerate the engine with a fixed amount of fuel.

Results shown represent each cylinder's performance as a percentage in relation to the average of all cylinders. If any cylinder is above or below the average by more than 10%, it indicates the cylinder is contributing either too much (above average) or not enough (below average) in relation to the average engine performance.

Service ADVISOR displays the test results and whether the test was successful. These results and the Cylinder Electronic Compression and Cylinder Cutout Test results should be compared to help determine if there is a problem in a specific cylinder.

NOTE: Run this test at least three times to ensure repeatable, accurate results.

RE42287,0000593 -19-29JUN12-1/1

Data Points Used in Service ADVISOR

Following is a list of the data points that can be read in Service ADVISOR. Included in the list is a brief description of each data point and its unit of measurement.

Data Point	Units Metric (English)	Description
Air Throttle Actuator Last Valid Closed Position	None	Value of Air Throttle Actuator stored closed position from last valid learn cycle.
Air Throttle Actuator Last Valid Open Position	None	Value of Air Throttle Actuator stored open position from last valid learn cycle
Air Throttle Actuator Latest Learned Closed Position	None	Value of Air Throttle Actuator most recent learned closed position (valid or invalid). Value is 0 if no learn cycle has occurred since ignition was switched ON.
Air Throttle Actuator Latest Learned Open Position	None	Value of Air Throttle Actuator most recent learned open position (valid or invalid). Value is 0 if no learn cycle has occurred since ignition was switched ON.
Air Throttle Actuator Original Closed Position	None	Value of Air Throttle Actuator closed position when the initial learn cycle is complete. Value is 0 if calibration fails.
Air Throttle Actuator Original Open Position	None	Value of Air Throttle Actuator open position when the initial learn cycle is complete. Value is 0 if calibration fails.
Air Throttle Actuator Position - Actual	Percent	Current position of Air Throttle Actuator indicated by Air Throttle Actuator position sensor.
Air Throttle Actuator Position - Desired	Percent	Air Throttle Actuator position commanded by ECU.
Air Throttle Actuator Position Input Voltage	Volts	Input voltage measured by the ECU.
Ambient Air Temperature	° C (° F)	Temperature of the surroundings.
Barometric Air Pressure	kPa (bar) (psi)	Atmospheric pressure indicated by barometric air pressure sensor (internal to ECU).
Boot Block Compatibility Code		Used for checking compatibility with the ECU Op Code and ECU EOL data. Software is stuck in boot block if the numbers are not compatible.
Camshaft Position Signal Improper Pattern Indicator	Percent	Value of 0 indicates proper operation. Any other value indicates a problem has been detected.
Camshaft Position Signal Differential Time	microsecond	Time between camshaft position signal pulses.
Camshaft Position Signal Missing Indicator	Percent	Value of 0 indicates proper operation. Any other value indicates a problem has been detected.
Camshaft Position Signal Noise Indicator	Percent	Value of 0 indicates proper operation. Any other value indicates a problem has been detected.
Camshaft Position Signal Status	None	Value should be 16 at 0 rpm, 63 with engine cranking (below 400 rpm), and 47 with engine running above 400 rpm. Any other value indicates a problem has been detected.
Charge Air Cooler Outlet Temperature	° C (° F)	Temperature indicated by charge air cooler outlet temperature sensor.
Charge Air Cooler Outlet Temperature Input Voltage	Volts	Input voltage measured by the ECU.
Cold Start Aid On Time Remaining	Sec.	Amount of time remaining for energizing the cold start aid relay.
Cold Start Aid Status		Indicates if cold start aid relay is on.
Cold Start Aid Wait Lamp		Indicates if cold start aid wait lamp is on.
Completed Regenerations	Counts	Number of completed DPF regenerations.
Crankshaft Position Signal Differential Time	microsecond	Time between crankshaft position signal pulses.
Crankshaft Position Signal Improper Pattern Indicator	Percent	Value of 0 indicates proper operation. Any other value indicates a problem has been detected.
Crankshaft Position Signal Missing Indicator	Percent	Value of 0 indicates proper operation. Any other value indicates a problem has been detected.
Crankshaft Position Signal Noise Indicator	Percent	Value of 0 indicates proper operation. Any other value indicates a problem has been detected.
Crankshaft Position Signal Status	None	Value should be 16 at 0 rpm, 63 with engine cranking (below 400 rpm), and 47 with engine running above 400 rpm. Any other value indicates a problem has been detected.
Cruise Brake Switch		Indicates the status of the cruise brake switch.
Cruise Clutch Switch		Indicates the status of the cruise clutch switch.
Cruise Control Active		Indicates if the cruise control is active.
Cruise Control On/Off Switch		Indicates the status of the cruise ON or OFF switch.
Cruise Control State		Indicates current cruise control mode.

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BK34394.0000DEB -19-28MAR11-1/5

Data Point	Units Metric (English)	Description
Cruise Resume Switch		Indicates the status of the cruise resume switch.
Cruise Set Switch		Indicates the status of the cruise set switch.
Cumulative Incompleted Regenerations	N/A	Total number of incompleted regenerations.
Desired DOC Outlet Temperature	° C (° F)	Desired DOC outlet temperature during DPF regeneration..
Digital Throttle Input Voltage	Volts	Input voltage measured by the ECU.
DOC Efficiency Fault Counter	N/A	Number of times during active DPF regeneration that unintended combustibles went through the DOC without being oxidized.
DOC End of Life	None	Value of True indicates the DOC is near the end of its effective life.
DOC Inlet Temperature	° C (° F)	Temperature at inlet of DOC indicated by exhaust filter temperature module.
DOC Outlet Temperature	° C (° F)	Temperature at outlet of DOC indicated by exhaust filter temperature module.
DOC Outlet Temperature High Counter	Counts	Indicates if DOC outlet temperature too high threshold has been exceeded.
DOC Unintended Combustibles Indicator	Percent	Value of 0 indicates proper operation. Any other value or increment indicates a problem has been detected.
DPF Differential Pressure	kPa (psi) (bar)	Pressure drop across DPF measured by the DPF differential pressure sensor
DPF Differential Pressure Input Voltage	Volts	Input voltage measured by the ECU.
DPF Outlet Temperature	° C (° F)	Temperature at outlet of DPF indicated by exhaust filter temperature module.
DPF Regeneration Abort Source	Idle, Normal Regeneration, Deep Clean, Abort	Coded value used by DTAC to determine cause of last aborted DPF regeneration.
DPF Regeneration State		Indicates the status of an active regeneration. Deep Clean regenerations occur once out of every 10 regenerations.
DPF Soot Load - Differential Pressure Based	g/L	DPF soot load calculated by DPF differential pressure.
DPF Soot Load - Fuel Based	g/L	DPF soot load calculated by fuel usage.
DPF Soot Load - Time Based	g/L	DPF soot load calculated by engine run time.
DPF Unintended Combustibles Indicator	Percent	Value of 0 indicates proper operation. Any other value or increment indicates a problem has been detected.
ECU A5503-45 Input Voltage	Volts	Input voltage measured by the ECU.
ECU Boot Block Part Number		File name of the ECU boot block.
ECU Configuration File Part Number		Part number of a file containing specific software configuration information.
ECU EOL Data Part Number		File name of the data programmed into the ECU at the End of the Assembly Line (EOL).
ECU Op Code		Executable software which embodies the operating system and feature algorithms and is stored in the ECU memory.
ECU Operating State		Indicates if the ECU is operating in Boot Block.
ECU Part Number		Part number for the ECU hardware.
ECU Serial Number		Serial number of the ECU.
ECU Software Assembly Part Number		Software Assembly Part Number Programed in the ECU.
ECU Temperature	° C (° F)	Temperature indicated by ECU temperature sensor (internal to ECU).
EGR Flow Input Voltage	Volts	Input voltage measured by the ECU.
EGR Flow Sensor Differential Pressure	kPa (psi) (bar)	Pressure drop across venturi in EGR tube, measured by the EGR flow sensor, and is used in the calculation of EGR flow.
EGR Temperature	° C (° F)	Temperature indicated by EGR temperature sensor.
EGR Temperature Input Voltage	Volts	Input voltage measured by the ECU.
EGR Valve Clean In Progress		Current EGR clean command. True, False
EGR Valve Last Valid Closed Position	None	Value of EGR valve stored closed position from last valid learn cycle.
EGR Valve Last Valid Open Position	None	Value of EGR valve stored open position from last valid learn cycle.
EGR Valve Latest Learned Closed Position	None	Value of EGR valve most recent learned closed position (valid or invalid). Value is 0 if no learn cycle has occurred since ignition was switched ON.
EGR Valve Latest Learned Open Position	None	Value of EGR valve most recent learned open position (valid or invalid). Value is 0 if no learn cycle has occurred since ignition was switched ON.
EGR Valve Learn Status		Current EGR learn command. Off, Requested, Abort
EGR Valve Original Closed Position	None	Value of EGR valve closed position when originally learned. Value is 0 if learn fails.
EGR Valve Original Open Position	None	Value of EGR valve open position when originally learned. Value is 0 if learn fails.

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BK34394,0000DEB -19-28MAR11-2/5

Data Point	Units Metric (English)	Description
EGR Valve Position - Actual	Percent	Current position of EGR valve indicated by EGR valve position sensor.
EGR Valve Position - Desired	Percent	EGR valve position commanded by ECU.
EGR Valve Position Input Voltage	Volts	Input voltage measured by the ECU.
EGR Valve Successful Learn Cycles	Cycles	Number of successful learn cycles since the original learn.
Engine Coolant Level Alarm Switch Status		The level of coolant as indicated by the engine coolant level alarm switch
Engine Coolant Level Information Switch Status		The level of coolant as indicated by the engine coolant level information switch
Engine Coolant Pressure	kPa (psi) (bar)	Engine coolant pressure at the EGR cooler.
Engine Coolant Pressure Input Voltage	Volts	Input voltage measured by the ECU.
Engine Coolant Temperature	° C (° F)	Temperature indicated by coolant temperature sensor.
Engine Coolant Temperature Input Voltage	Volts	Input voltage measured by the ECU.
Engine Crankcase Pressure	kPa (psi) (bar)	Pressure inside the engine crankcase
Engine Crankcase Pressure Input Voltage	Volts	Input voltage measured by the ECU
Engine Hourmeter	hr	Stored engine hours.
Engine Load at Current Speed	Percent	Percentage of load on the engine at a given speed.
Engine Model Number		The model number for the engine.
Engine Oil Pressure	kPa (psi) (bar)	Pressure indicated by engine oil pressure sensor.
Engine Oil Pressure Input Voltage	Volts	Input voltage measured by the ECU.
Engine Oil Temperature	° C (° F)	Temperature of engine oil.
Engine Serial Number		Serial number of the engine.
Engine Speed	rpm	Engine speed measured by crankshaft position sensor or camshaft position sensor.
Engine Speed Indicated by Camshaft Position Sensor	rpm	Engine speed measured by camshaft position sensor (value indicates crankshaft speed).
Engine Speed Indicated by Crankshaft Position Sensor	rpm	Engine speed measured by crankshaft position sensor.
EOL Compatibility Code		Used for checking compatibility with the ECU Op Code and ECU EOL data. Software is stuck in boot block if the numbers are not compatible.
ESM Operator Action Information	N/A	Engine speed management operator action information. A value of non-zero indicates that the operator does not have all conditions for parked regeneration met.
Exhaust Filter Cleaning Inhibit Status		Value of not inhibited means that regenerations are allowed.
Exhaust Filter Cleaning Request Switch Status		Status of the exhaust filter cleaning request switch as seen by the ECU.
Exhaust Filter Temperature Module Temperature	° C (° F)	Internal temperature of exhaust filter temperature module.
Exhaust Manifold Pressure	kPa (psi) (bar)	Pressure (gauge) indicated by exhaust manifold pressure sensor.
Exhaust Manifold Pressure Input Voltage	Volts	Input voltage measured by the ECU.
Exhaust Manifold Temperature - Calculated	° C (° F)	The calculation is based on manifold air temperature measurements and air-to-fuel ratio calculations made by the ECU.
External Shutdown Switch Status		Status of the external shutdown switch.
Fan Speed - Actual	rpm	Current fan speed indicated by sensor.
Fan Speed - Desired	rpm	Fan speed commanded by ECU.
Fan State		Indicates if fan is commanded ON or OFF.
Fuel Mode		Control state that determines desired fuel.
Fuel Rail Pressure - Actual	MPa (psi) (bar)	Pressure indicated by the fuel rail pressure sensor.
Fuel Rail Pressure - Desired	MPa (psi) (bar)	Fuel rail pressure commanded by ECU.
Fuel Rail Pressure Input Voltage	Volts	Input voltage measured by the ECU.
Fuel System Part Number		The part number for the fuel system used on the engine.
Fuel System Serial Number		The serial number for the fuel system used on the engine.
Fuel Temperature	° C (° F)	Temperature indicated by fuel temperature sensor.
Fuel Temperature High Indicator	Percent	Value of 0 indicates proper operation. Any other value or increment indicates a problem has been detected.
Fuel Temperature Input Voltage	Volts	Input voltage measured by the ECU.
Fuel Usage Rate	L/hr (gal./hr.)	Current rate of fuel usage.
Governor Reference Speed	rpm	Target speed of the governor.

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BK34394,0000DEB -19-28MAR11-3/5

Diagnostic Instructions and Information

Data Point	Units Metric (English)	Description
Incompleted Regenerations	N/A	Number of incompleted DPF regenerations that have occurred since last successful DPF regeneration.
Injector Drive #1 Diagnostic Voltage	Volts	Voltage of injector driver #1 in the ECU.
Injector Drive #2 Diagnostic Voltage	Volts	Voltage of injector driver #2 in the ECU.
Intake Air Pressure	kPa (psi) (bar)	Pressure of air downstream of air filter, measured by the intake air sensor, transmitted over the CAN Bus.
Intake Air Sensor Status		Indicates invalid if intake air sensor has detected a communication problem.
Intake Air Temperature	° C (° F)	Temperature of air downstream of air filter, measured by the intake air sensor, transmitted over the CAN Bus.
Low-Pressure Fuel — Actual Pressure	kPa (psi) (bar)	Pressure indicated by low-pressure fuel sensor.
Low-Pressure Fuel — Desired Pressure	kPa (psi) (bar)	Pressure of the low-pressure fuel system as commanded by ECU.
Manifold Air Pressure - Actual	kPa (psi) (bar)	Pressure (gauge) indicated by manifold air pressure sensor.
Manifold Air Pressure - Estimated	kPa (psi) (bar)	ECU estimate of manifold air pressure (gauge).
Manifold Air Pressure Input Voltage	Volts	Input voltage measured by the ECU.
Manifold Air Temperature	° C (° F)	Temperature indicated by manifold air temperature sensor.
Manifold Air Temperature Input Voltage	Volts	Input voltage measured by the ECU.
Maximum Speed Governor Curve	None	Identifies which governor curve is used at rated speed.
Operating Code Compatibility Code		Used for checking compatibility with the ECU Op Code and ECU EOL data. Software is stuck in boot block if the numbers are not compatible.
Option Assembly Part Number		Part number of application options.
Performance Option Part Number		Part number indicating engine power level.
Primary Analog Throttle Input Voltage	Volts	Input voltage measured by the ECU.
Product Serial Number		Serial number of the application or vehicle.
Remote Analog Throttle Input Voltage	Volts	Remote analog throttle input voltage measured by ECU.
Secondary Analog Throttle Input Voltage	Volts	Input voltage measured by the ECU.
Sensor Supply #1 Voltage	Volts	Voltage of ECU 5 V power supply #1.
Sensor Supply #2 Voltage	Volts	Voltage of ECU 5 V power supply #2.
Sensor Supply #3 Voltage	Volts	Voltage of ECU 5 V power supply #3.
Sensor Supply #4 Voltage	Volts	Voltage of ECU 5 V power supply #4.
Sensor Supply #5 Voltage	Volts	Voltage of ECU 5 V power supply #5.
Sensor Supply #6 Voltage	Volts	Voltage of ECU 5 V power supply #6.
Sensor Supply #7 Voltage	Volts	Voltage of ECU 5 V power supply #7.
Sensor Supply #8 Voltage	Volts	Voltage of ECU 5 V power supply #8.
Sensor Supply #9 Voltage	Volts	Voltage of ECU 10 V power supply #9.
Soot Level		Calculated amount of soot in DPF. A value of "not needed" means the DPF does not need a regeneration currently. A value of "Service Only" means the DPF is full of soot.
Start of Injection Position	Degrees BTDC	Position of crankshaft when injection is commanded, relative to Before Top Dead Center (BTDC).
Switched Battery Voltage	Volts	Battery voltage to ECU that is only present when the ignition switch is on.
Throttle Position	Percent	Percent of the throttle being used.
Throttle Type		Type of throttle being used on this application.
Torque Curve Number		Indicates the torque curve number the ECU is using.
Unswitched Battery Voltage	Volts	Battery voltage measured by the ECU.
Vehicle Driveshaft Speed	rpm	Speed of the vehicle driveshaft.
Vehicle Option Code Number		Option Code representing programmed payload options such as throttle selection.
Vehicle Option Part Number		Part number of payload options programmed.
Vehicle Speed - Calculated	km/h (mph)	Vehicle speed calculated by ECU from speed signal.
Vehicle Speed - CAN	km/h (mph)	Vehicle speed as determined by some other module and transmitted on CAN.
VGT Actuator Status		Indicates invalid if VGT actuator or ECU has detected a communication problem.
VGT Speed - Actual	krpm	Speed indicated by VGT speed sensor.
VGT Speed - Estimated	krpm	ECU estimate of turbo speed.
VGT Speed Signal Voltage	Volts	Input voltage measured by the ECU.

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BK34394,0000DEB -19-28MAR11-4/5

Diagnostic Instructions and Information

Data Point	Units Metric (English)	Description
Water-In-Fuel		Indicates if water is detected by water-in-fuel sensor. True, False
Water-In-Fuel High Voltage Threshold	Volts	A diagnostic threshold used for the water-in-fuel input voltage that is used during troubleshooting of DTC 000097.16.
Water-In-Fuel Indicator	Percent	Value of 0 indicates proper operation. Any other value or increment indicates a problem has been detected.
Water-In-Fuel Input Voltage	Volts	Input voltage measured by the ECU.
Water-In-Fuel Low Voltage Threshold	Volts	A diagnostic threshold used for the water-in-fuel input voltage that is used during troubleshooting of DTC 000097.16.

Data Parameter List

BK34394,0000DEB -19-28MAR11-5/5

Diagnostic Gauge — Active DTC Viewing Instructions

NOTE: For complete diagnostic gauge operating instructions, refer to the Operator's Manual, associated with this application.

NOTE: The engine does not need to be running to navigate the diagnostic gauge screens.

NOTE: For more information on fault codes, see Diagnostic Trouble Code (DTC) Group Locator in Section 04, Group 160.

IMPORTANT: Ignoring active trouble codes can result in severe engine damage. Refer to the trouble shooting procedures to resolve active DTCs.

A Diagnostic Trouble Code (DTCs) is set when an operating condition is not within a specified range. This is an indicator to the operator that a problem needs to be corrected. The diagnostic gauge alerts the operator when a DTC is active by turning on a warning light and changing to the WARNING screen showing information about the DTC. The warning screen is described below.

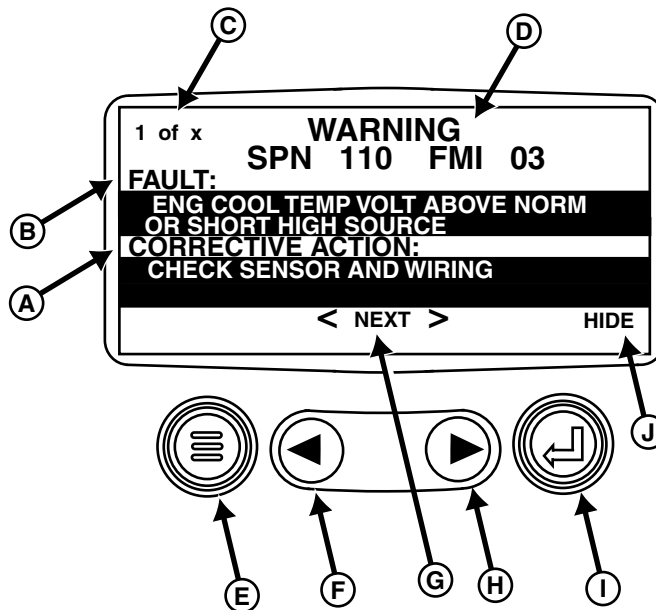


Figure 1. Active Code Diagnostic Screen

A—Corrective Action
B—Diagnostic Code Description
C—Current and Total number of Active Codes

D—SPN (Suspect Parameter Number) FMI (Failure Mode Identifier) Diagnostic Code

E—Menu Key
F—Left/Up Scroll Key
G—Next
H—Right/Down Scroll Key

I—Enter Key
J—Hide

- When the diagnostic gauge receives a diagnostic trouble code, the engine parameter screen is replaced with the "Warning" screen. See figure 1.
- Display features for the Active Codes Diagnostic Screen are described below:

- SPN/FMI code (D). Refers to the trouble shooting diagnostic procedure.
- Name of diagnostic code (B) referenced in manual.
- A brief description for corrective action (A).
- The word "NEXT" (G) indicates there are more fault codes to be viewed.
- Two SCROLL KEYS (F,H) are used to cycle through the codes.

- "1 of x" (C) indicates the current diagnostic code displayed of the total number.
- To hide (J) this screen and return to the parameter display screen, press the "Enter" Key (I). Pressing the Enter Key again returns to the warning screen.

NOTE: To refresh active DTCs, you must return to the 1-UP or 4-UP screen.

- To return to the Main Menu screen, press the menu button (E), shown in figure 4.

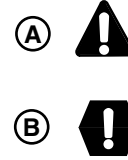
Continued on next page

SS01820,00002D5 -19-30JUN10-1/2

RG14794—UN—15MAY07

4. The parameter display screen displays one of the following icons when a DTC is active. See figure 2. An amber light sets when a DTC becomes active and a red light sets when the engine has derated or shutdown.

RG14795 —UN—14MAY07



A—Warning

B—Engine Derate or Shutdown

Figure 2. Icons Indicates a Fault Warning, Engine Derate, or Shutdown

SS01820,00002D5 -19-30JUN10-2/2

Diagnostic Gauge — Data Parameters Viewing Instructions

NOTE: For complete operating instructions, refer to the Operator's Manual, associated with this application.

NOTE: The engine does not need to be running to navigate the diagnostic gauge screens.

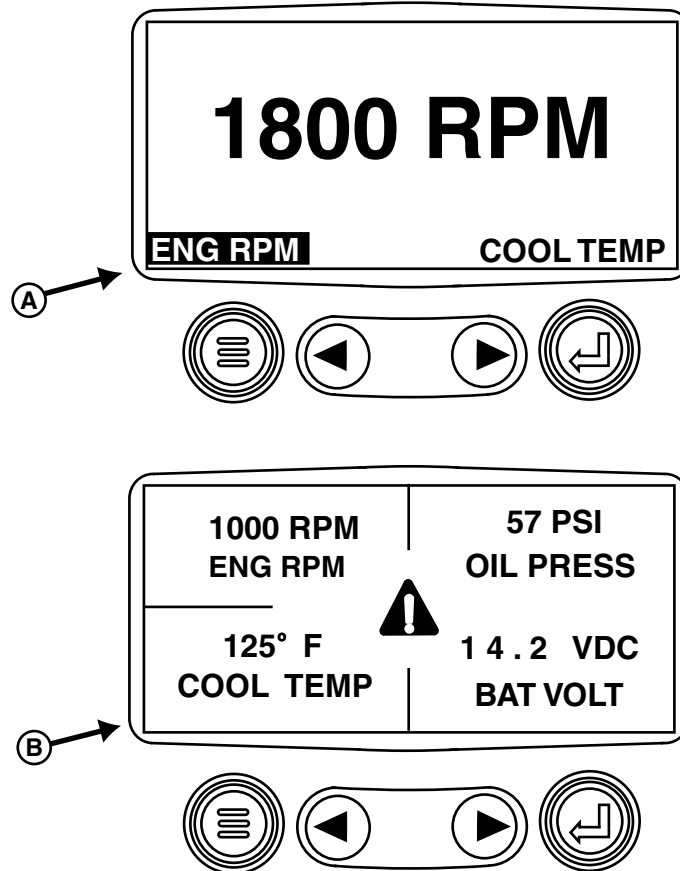


Figure 1. One and Four Parameter Displays

A—1-Up Display

B—4-Up Display

The diagnostic gauge can be used for displaying engine parameters. Two display modes can be selected, one showing a single selectable parameter, called 1-Up Display (A), and the other showing four selectable parameters, called 4-Up Display (B). At power up, the gauge defaults to the mode that was last used. Examples of both are shown in Figure 1.

NOTE: When the one-parameter display is selected, main menu shows GO TO 4-UP DISPLAY, and when the four-parameter display is selected, main menu shows GO TO 1-UP DISPLAY in the top line.

Continued on next page

BK34394,0000234 -19-30JUN10-1/3

RG14784 —UN—14MAY07

1. Changing to the 4-Up Display. See Figure 2.
 - a. Press the MENU KEY (F). Main Menu Screen 1 is displayed.
 - b. With the SCROLL KEYS (G,H), select GO TO 4-UP DISPLAY (B).
 - c. Press the ENTER KEY (I).
 - d. The 4-Up Display is shown.

A—Go To 4-Up Display
 B—Exhaust Filter
 C—Engine Speed Control
 D—Languages

E—Stored Codes
 F—Engine Configuration
 G—Setup 1-Up Display
 H—Setup 4-Up Display

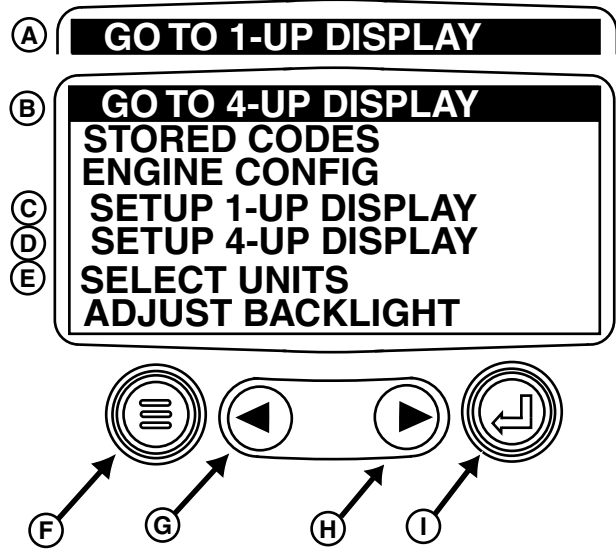


Figure 2. Main Menu Screen 1.

BK34394,0000234 -19-30JUN10-2/3

RG14791 —UN—14MAY07

2. Selecting engine parameters for 4-UP Display.
 - a. Press the MENU KEY (F). Main Menu Screen 2 is displayed.
 - b. Using the SCROLL KEYS (G,H), select SETUP 4-UP DISPLAY (B). Press ENTER KEY (I).
 - c. In the next screen, select CUSTOM SETUP and press ENTER KEY (I). The 4-Up Display appears without the exhaust filter recovery switch and engine warning graphics.
 - d. With the SCROLL KEYS (G,H), select the window on the display you want to change. Press ENTER KEY (I).
 - e. Scroll through the parameter list and select the parameter you want to display. Press ENTER KEY (I).
 - f. The number of the display window appears next to the selected parameter.
 - g. Press MENU KEY (F) to return to the 4-Up Display. The new parameter should be displayed on the screen.

NOTE: The same method is used for selecting the default parameter for the 1-UP Display.

3. Changing units of measure.
 - a. Press the MENU KEY (F). Main menu is displayed.
 - b. Scroll through the menu to SELECT UNITS (C). Press ENTER KEY (I).

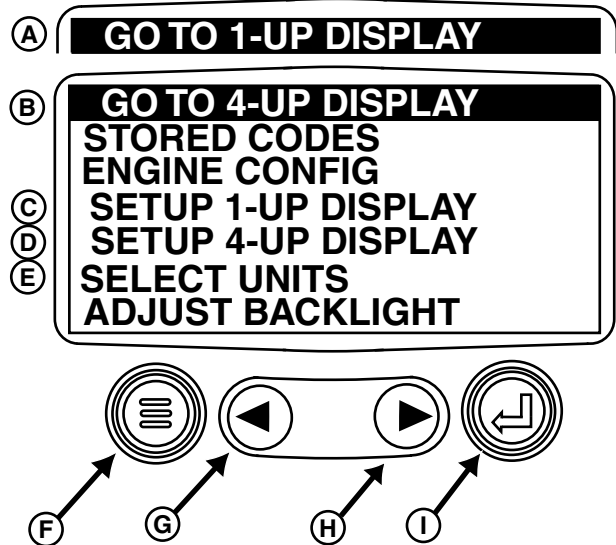


Figure 2. Main Menu Screen 2.

A—Setup 1-Up Display
 B—Setup 4-Up Display
 C—Select Units

D—Adjust Backlight
 E—Adjust Contrast
 F—Utilities

- c. With the SCROLL KEYS (G,H), select the desired unit of measure. Press ENTER KEY (I).
- d. Press MENU KEY (F) to return to the parameter display.

BK34394,0000234 -19-30JUN10-3/3

RG14791 —UN—14MAY07

Diagnostic Gauge — Exhaust Filter Service Recovery Instructions

NOTE: For more diagnostic gauge operating instructions, refer to the Operator's Manual, associated with this application.

The exhaust filter service recovery is a special procedure that is not meant or recommended to be used as a normal operating practice. This procedure can only be performed using the diagnostic gauge when the soot level in the exhaust filter is extremely high or at the service only level. Continued disabling of exhaust filter cleaning or a component failure can cause the soot level in the exhaust filter to become extremely high. In both of these cases, service personnel should be involved by either educating the operator on proper exhaust filter cleaning practices or servicing the component failure.

An exhaust filter service recovery cleaning takes approximately three hours to complete successfully. Once initiated, the engine speed is increased and Exhaust Temperature Management becomes active, similar to a normal Parked/Manual Exhaust Filter Cleaning. The process slowly increases exhaust temperatures to remove soot in a slow, reliable way using passive regeneration. After the passive regeneration is complete, the ECU determines if an active regeneration with fuel dosing is required to further clean the DPF. If needed, the ECU will automatically start the active regeneration upon completion of the passive regeneration. If there is a component failure that prevents the entire exhaust filter service recovery procedure from being successfully completed, the ECU limits the number of times an operator can perform the recovery before requiring the application to be serviced.

⚠ CAUTION: Prior to the exhaust filter recovery procedure being performed, the person

performing the procedure **MUST** be informed of the following:

1. This exhaust filter service recovery cleaning takes approximately 3 hours.
2. Verify exhaust filter, components, and outlet are free of debris.
3. Keep exhaust outlet away from people and anything that can melt, burn, or explode.
4. Closely monitor the machine and surrounding area while exhaust filter service recovery is being performed.

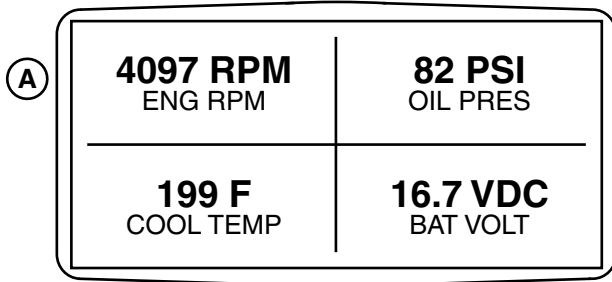
NOTE: The application must be in all of the conditions required for a Parked/Manual Exhaust Filter Cleaning in order to perform the Exhaust Filter Service Recovery. For more information on these conditions, see your application Operator's Manual.

Determining Exhaust Filter Service Recovery Availability

When the exhaust filter is at an extremely high soot level, the engine has previously been derated and the following screens are present on the diagnostic gauge when trying to perform an active exhaust filter cleaning:

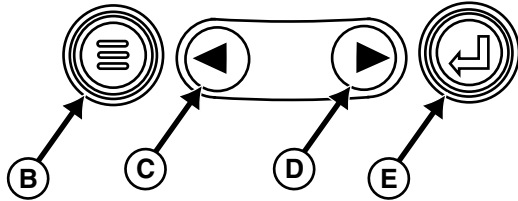
1. Press the "MENU KEY" (B).

NOTE: When the one-parameter display is selected, main menu shows GO TO 4-UP DISPLAY, and when the four-parameter display is selected, main menu shows GO TO 1-UP DISPLAY in the top line.



A—4-UP DISPLAY
B—MENU KEY
C—LEFT/UP SCROLL KEY

D—RIGHT/DOWN SCROLL KEY
E—ENTER KEY



4-UP DISPLAY

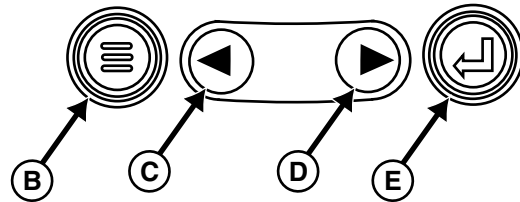
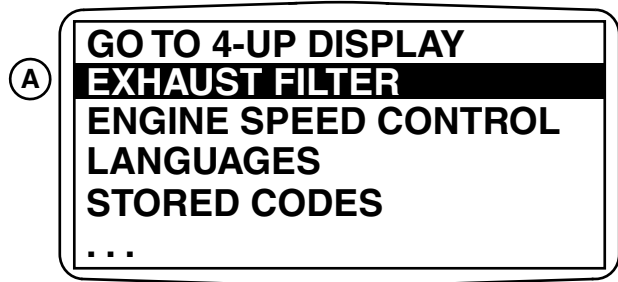
RG18316—UN—30MAR10

BK34394,0000235 -19-04APR11-2/10

2. Using the "RIGHT/DOWN SCROLL KEY" (D), scroll to EXHAUST FILTER (A). Press the "ENTER KEY" (E).

A—EXHAUST FILTER
B—MENU KEY
C—LEFT/UP SCROLL KEY

D—RIGHT/DOWN SCROLL KEY
E—ENTER KEY



Select EXHAUST FILTER

RG18308—UN—30MAR10

Continued on next page

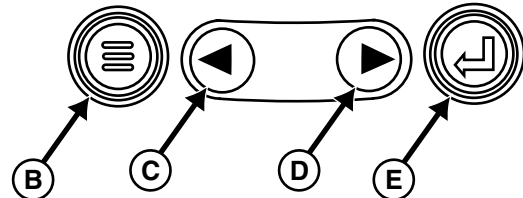
BK34394,0000235 -19-04APR11-3/10

3. Select AUTO EXH FLT CLEAN (A). Press the "ENTER KEY" (E).

A—AUTO EXH FLT CLEAN D—RIGHT/DOWN SCROLL KEY
 B—MENU KEY E—ENTER KEY
 C—LEFT/UP SCROLL KEY

(A)

AUTO EXH FLT CLEAN
REQUEST EXH FLT CLEAN
DISABLE EXH FLT CLEAN



Select AUTO FLT CLEAN

BK34394,0000235 -19-04APR11-4/10

RG18309 —UN—30MAR10

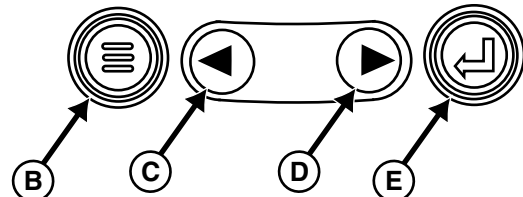
4. If the text SERVICE LEVEL RECOVERY REQUIRED SEE OPERATORS MANUAL (A) is displayed, an active regeneration is not allowed using the diagnostic gauge and an exhaust filter service recovery or service call is required. If not, a normal Parked/Manual Exhaust Filter Cleaning is allowed.

A—SERVICE LEVEL RECOVERY REQUIRED SEE OPERATORS MANUAL D—RIGHT/DOWN SCROLL KEY
 B—MENU KEY E—ENTER KEY
 C—LEFT/UP SCROLL KEY

(A)

SERVICE LEVEL
RECOVERY REQUIRED
SEE OPERATOR'S MANUAL

CANCEL



SERVICE LEVEL RECOVERY REQUIRED

Continued on next page

BK34394,0000235 -19-04APR11-5/10

RG18315 —UN—30MAR10

Performing Exhaust Filter Service Recovery

To perform an exhaust filter service recovery using the diagnostic gauge:

1. Press the "MENU KEY" (B).

A—4-UP DISPLAY D—RIGHT/DOWN SCROLL KEY
B—MENU KEY E—ENTER KEY
C—LEFT/UP SCROLL KEY

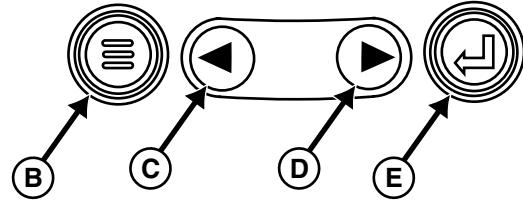
(A)

4097 RPM
ENG RPM

82 PSI
OIL PRES

199 F
COOL TEMP

16.7 VDC
BAT VOLT



4-UP DISPLAY

RG18316—UN—30MAR10

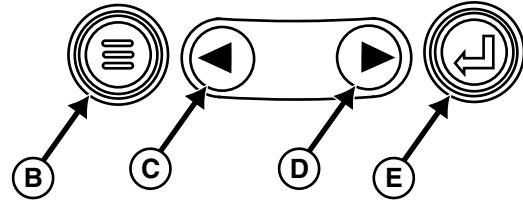
BK34394,0000235 -19-04APR11-6/10

2. Using the "LEFT/UP SCROLL KEY" (C), scroll to UTILITIES (A). Press the "ENTER KEY" (E).

A—UTILITIES D—RIGHT/DOWN SCROLL KEY
B—MENU KEY E—ENTER KEY
C—LEFT/UP SCROLL KEY

(A)

...
SELECT UNITS
ADJUST BACKLIGHT
CONTROL
ADJUST CONTRAST
UTILITIES



UTILITIES

RG18311—UN—30MAR10

Continued on next page

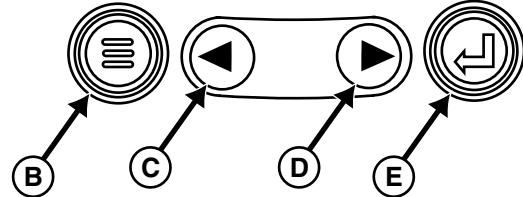
BK34394,0000235 -19-04APR11-7/10

3. Using the "LEFT/UP SCROLL KEY" (C), scroll to EXH FILTER RECOVERY (A). Press the "ENTER KEY" (E).

A—EXH FILTER RECOVERY D—RIGHT/DOWN SCROLL KEY
 B—MENU KEY E—ENTER KEY
 C—LEFT/UP SCROLL KEY

(A)

...
**PERFORMANCE DATA
 INTERACTIVE TESTS
 RESET TRIP GRP PARAMS
 EXH FILTER RECOVERY**



EXH FILTER RECOVERY

BK34394,0000235 -19-04APR11-8/10

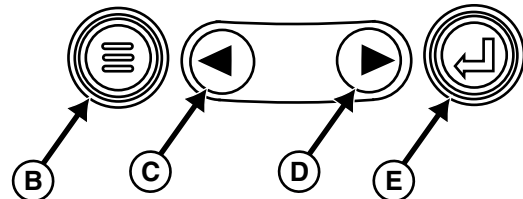
RG18313 —UN—30MAR10

4. The text SERVICE LEVEL RECOVERY SEE OPERATORS MANUAL (A) should be displayed.

A—SERVICE LEVEL RECOVERY SEE OPERATORS MANUAL D—RIGHT/DOWN SCROLL KEY
 B—MENU KEY E—ENTER KEY
 C—LEFT/UP SCROLL KEY

(A)

**SERVICE LEVEL
 RECOVERY
 SEE OPERATOR'S MANUAL**

CANCEL

SERVICE LEVEL RECOVERY

Continued on next page

BK34394,0000235 -19-04APR11-9/10

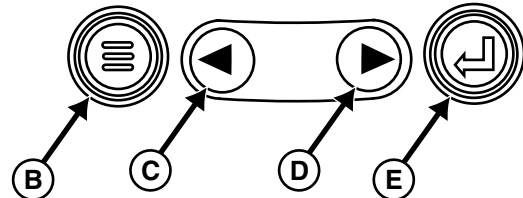
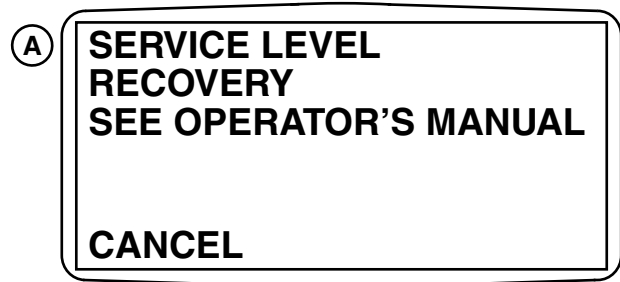
RG18314 —UN—30MAR10

5. To begin the exhaust filter service recovery process, press both the "RIGHT/DOWN SCROLL KEY" (D) and "LEFT/UP SCROLL KEY" (C) at the same time.

IMPORTANT: The application must be in all of the conditions required for a Parked/Manual Exhaust Filter Cleaning in order to perform the Exhaust Filter Service Recovery. For more information on these conditions or Safety information related to Exhaust Filter Cleaning, see your application Operators Manual.

A—SERVICE LEVEL
RECOVERY SEE
OPERATORS MANUAL
B—MENU KEY
C—LEFT/UP SCROLL KEY

D—RIGHT/DOWN SCROLL
KEY
E—ENTER KEY



SERVICE LEVEL RECOVERY

RG18314 —UN—30MAR10

BK34394,0000235 -19-04APR11-10/10

Diagnostic Gauge — Stored DTC Clearing Instructions

NOTE: For complete diagnostic gauge operating instructions, refer to the Operator's Manual, associated with this application.

NOTE: The engine does not need to be running to navigate the diagnostic gauge screens.

NOTE: For more information on fault codes, see Diagnostic Trouble Code (DTC) Group Locator in Section 04, Group 160.

Procedure for clearing stored diagnostic codes on the diagnostic gauge.

1. Turn power to diagnostic gauge OFF.
2. Turn power to diagnostic gauge ON. As soon as screen backlight comes on, simultaneously press and hold MENU (C) and ENTER (F) keys. See figure 1.
3. If successful, the screen shown in figure 1 appears.

NOTE: If the screen in figure 1 does not appear, repeat step 2. This may take several attempts due to the short timing window.

4. Select CLEAR FAULT CODES (A). Press ENTER (F) key.

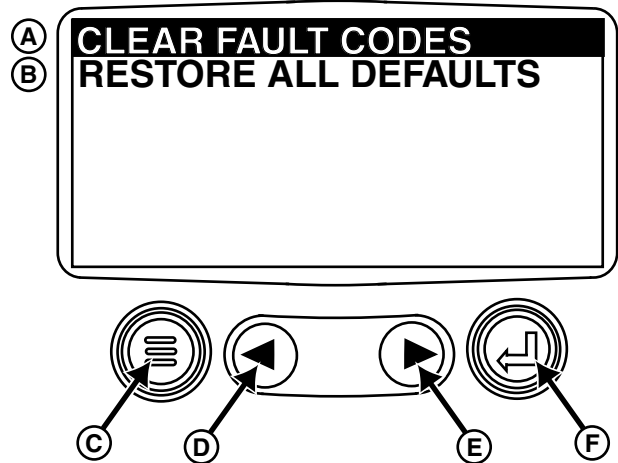


Figure 1. Clear Stored Fault Codes Screen

A—Clear Fault Codes
B—Restore All Defaults
C—Menu Key

D—Left/Up Scroll Key
E—Right/Down Scroll Key
F—Enter Key

RG14802 —UN—10MAR08

SS01820,00002D7 -19-30JUN10-1/2

5. Screen shows stored fault codes have been cleared. See figure 2.
6. Cycle power to the diagnostic gauge again for normal operation.

A—Cleared All Fault Codes

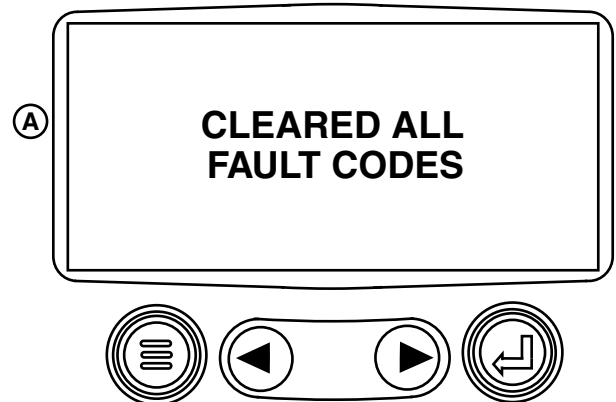


Figure 2. Clear All Fault Codes Screen

SS01820,00002D7 -19-30JUN10-2/2

RG14804 —UN—10MAR08

Diagnostic Gauge — Stored DTC Viewing Instructions

NOTE: For complete diagnostic gauge operating instructions, refer to the Operator's Manual, associated with this application.

NOTE: The engine does not need to be running to navigate the diagnostic gauge screens.

NOTE: For more information on fault codes, see Diagnostic Trouble Code (DTC) Group Locator in Section 04, Group 160.

Stored Diagnostic Trouble Codes (DTCs) are a history of DTCs that were once active. When a DTC becomes inactive, it is saved as a 'STORED' code. Stored codes can be reviewed and used as a troubleshooting aid in diagnosing intermittent problems and in range operating conditions. A count is kept of how many times a code has been active. **Stored codes can be cleared from the diagnostic gauge. For more information on clearing stored DTCs, see Diagnostic Gauge — Stored DTC Clearing Instructions in Section 04, Group 160.**

Instructions for viewing stored codes are described below.

1. Press MENU KEY (B). Main menu is displayed. See figure 1.
2. Using the SCROLL KEYS (C,D), navigate the menu until STORED CODES (A) is highlighted. Press the ENTER KEY (E).
3. REQUESTING FAULT CODES is momentarily displayed on the display screen.

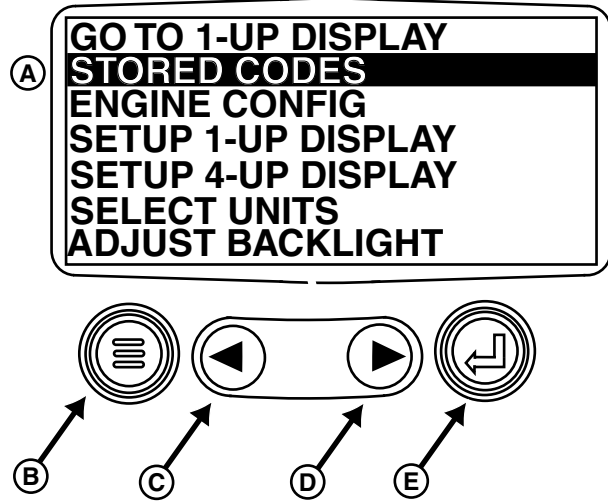


Figure 1. Main Menu

A—Stored Codes
B—Menu Key
C—Left/Up Scroll Key

D—Right/Down Scroll Key
E—Enter Key

4. A new screen showing stored code information appears. See figure 2. If there are no stored fault codes, "No Stored Fault Codes" screen is momentarily displayed. The diagnostic gauge then returns to main menu display. Press the MENU KEY (E) to get back to the parameter display screen.

Continued on next page

SS01820,00002D8 -19-30JUN10-1/2

RG14792 —UN—14MAY07

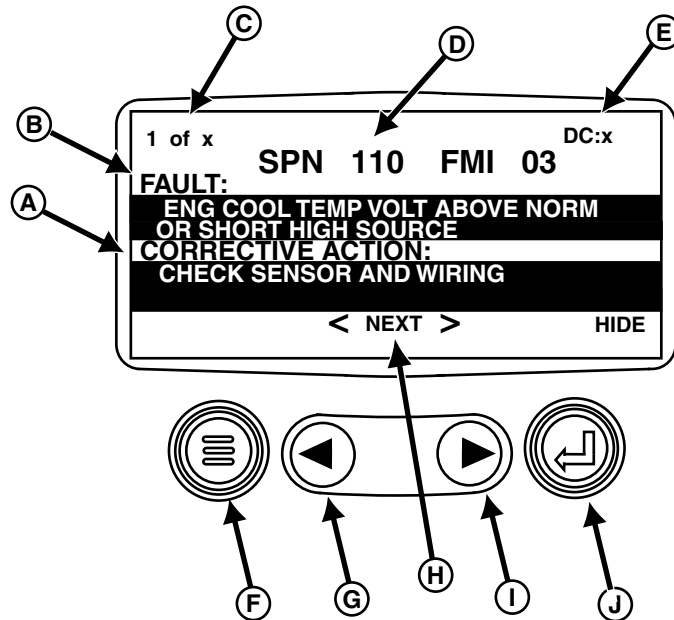


Figure 2. Stored Code Diagnostic Screen

A—Corrective Action
B—Diagnostic Code Description
C—Current and Total number of Stored Codes

D—SPN (Suspect Parameter Number) FMI (Failure Mode Identifier) Diagnostic Code

E—Diagnostic Count
F—Menu Key
G—Left/Up Scroll Key
H—Next
I—Right/Down Scroll Key

J—Enter Key
K—Hide Key

5. Display features for the Stored Codes Diagnostic Screen are described below:

- SPN/FMI code (D). Refers to the troubleshooting diagnostic procedure.
- Name of diagnostic code (B) referenced in manual.
- The word "NEXT" (H) indicates there are more stored codes to can be viewed.
- The two ARROW KEYS (G,I) are used to cycle through the codes.

- 1 of x (C) indicates the current diagnostic code displayed of the total number.
- Diagnostic Count (E) indicates how many times the code has been active since it was last cleared.
- Hide

6. Press the MENU KEY (F) to return to the main menu. Press the MENU KEY (E) again to return to the parameter screen.

SS01820,00002D8 -19-30JUN10-2/2

RG14796—UN—16MAY07

Diagnostic Test Box — Using

Diagnostic Test Box — Functionality

The JDG10273 Diagnostic Test Box is designed to aid the technician in troubleshooting electronically controlled engine systems. The tool must be used along with the following according to the CTM instructions:

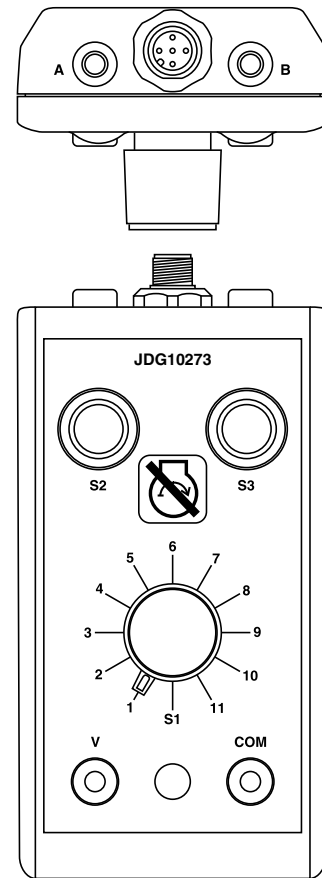
- Service ADVISOR
- JT07306 — Digital Multimeter
- JDG10466 — Flex Probe Kit
- J-35616-20 — Test Leads

The Diagnostic Test Box is used to find some of the following wiring harness problems:

- Open wires
- Shorted wires
- Series resistance
- Parallel resistance

Functional components of the Diagnostic Test Box are:

- Power connector and power harness provide connection to the machine battery terminals.
- LED indicates that power is applied correctly to Diagnostic Test Box.
- Test lead inputs A and B provide connection to the harness.
- Test lead inputs V and COM provide connection to the Digital Multimeter.
- Switch S1 is used to create a voltage divider circuit as specified within the CTM diagnostic procedure.
- Switch S2 is used to provide an alternate ground path as specified within the CTM diagnostic procedure.
- Switch S3 is used to provide a load on a circuit as specified within the CTM diagnostic procedure.



JDG10273 - Diagnostic Test Box

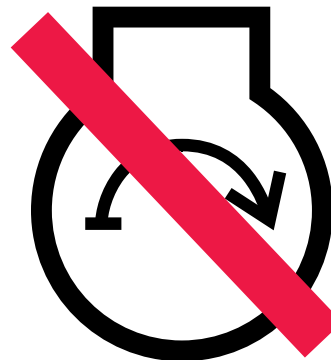
RG17892 —UN—15FEB10

BK34394,00001F1 -19-22NOV11-1/6

Before Connecting Diagnostic Test Box

IMPORTANT: RUNNING ENGINE WITH DIAGNOSTIC TEST BOX CONNECTED COULD CAUSE SEVERE ENGINE DAMAGE

- Key OFF, Engine OFF when connecting or disconnecting Diagnostic Test Box.
- Follow all safety warnings of the machine manufacturer.



Do Not Run Engine

RG17193 —UN—26MAY09

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BK34394,00001F1 -19-22NOV11-2/6

Diagnostic Test Box — User Instructions

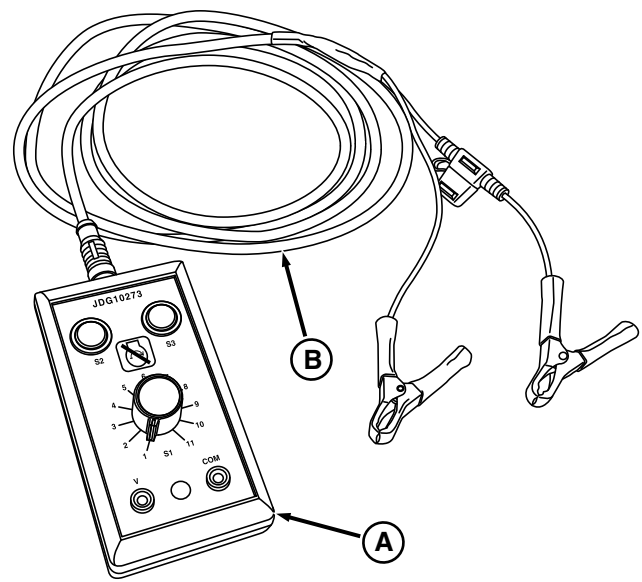
Visually inspect Diagnostic Test Box for signs of damage or corrosion on terminals, harnesses, and case.

Verify that test leads and test lead inputs fit securely to each other when connected.

If applicable, use the tie strap to secure Diagnostic Test Box to application. Place in a location away from moving parts and excessive heat.

NOTE: When connecting power harness to battery terminals, observe proper polarity when making connections. Make sure that connections are secure and harness is routed away from moving objects and operating personnel.

To apply power to Diagnostic Test Box, attach connector end of power harness to Diagnostic Test Box. Attach red power clamp to the application's positive (+) battery terminal. Attach black power clamp to the application's negative (-) battery terminal. Use the optional power harness extension cable if provided power harness does not reach battery.



JDG10273 - Diagnostic Test Box

A—Test Box

B—Power Harness

RG17891 —UN—30OCT09

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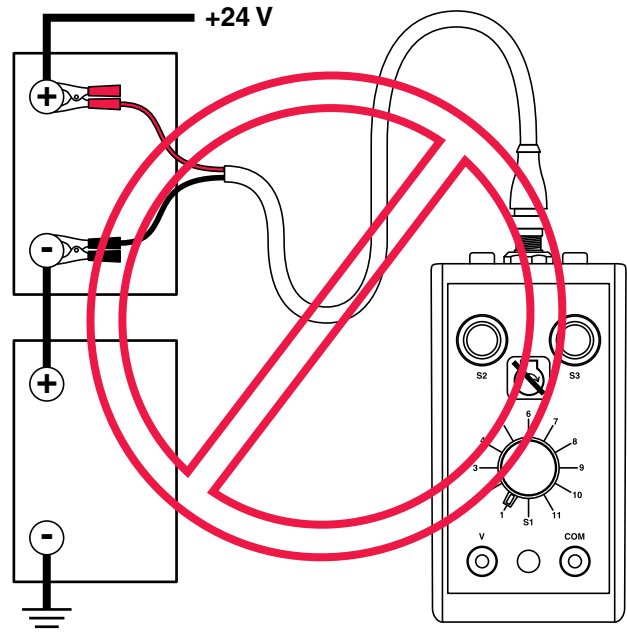
BK34394,00001F1 -19-22NOV11-3/6

If the application that the Diagnostic Test Box is being used on has a 24V system, the Diagnostic Test Box must be hooked up to the second battery in the series to ensure that the black power clamp is connected to the negative (-) terminal that goes to chassis ground. See graphics.

If LED is not turned on, see step 3 in Diagnostic Test Box — Operational Test Procedure before proceeding.

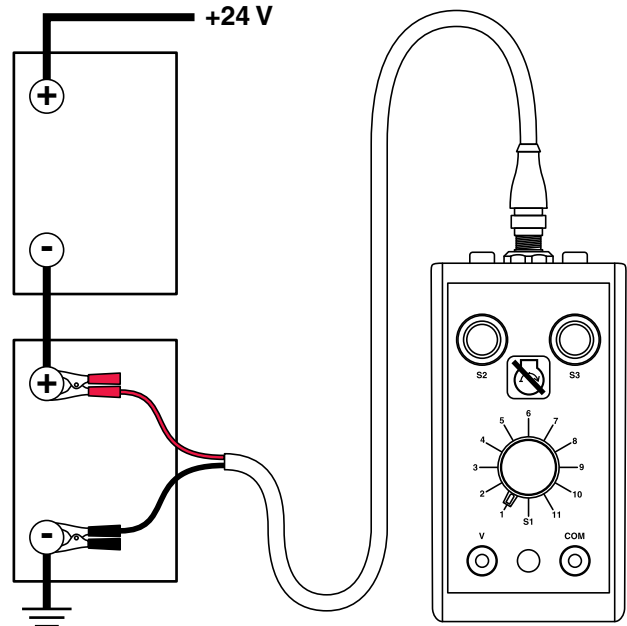
Perform the steps in Diagnostic Test Box — Operational Test Procedure if Diagnostic Test Box is giving misdiagnoses during troubleshooting procedures. It is good practice to perform the test periodically to ensure that Diagnostic Test Box is functioning properly.

NOTE: Always follow CTM diagnostic procedures for proper operation of Diagnostic Test Box.



RG21086 —UN—22NOV11

Hooked up incorrectly



RG21087 —UN—21NOV11

Hooked up correctly

Continued on next page

BK34394,00001F1 -19-22NOV11-4/6

Diagnostic Test Box — Operational Test Procedure

Diagnostic Test Box

Perform the following steps to verify proper functionality of the Diagnostic Test Box. If any of the steps indicate a problem, the Diagnostic Test Box must be replaced.

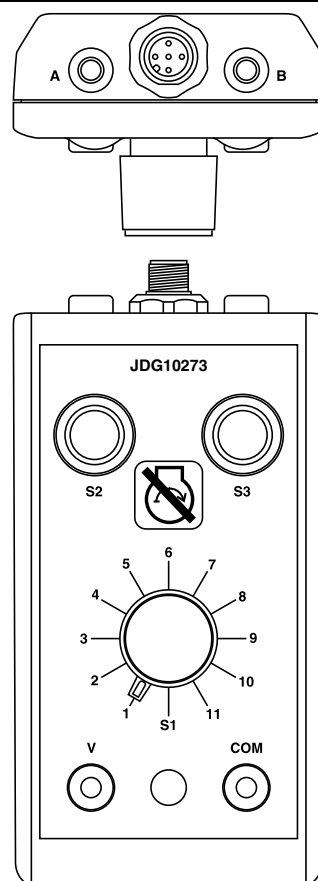
Required components to test Diagnostic Test Box operation are a Digital Multimeter and a 12—30 volt DC power source or 12 volt vehicle battery.

1. Disconnect power harness from battery or any other power source and remove Diagnostic Test Box from application.
2. Set Digital Multimeter function to measure resistance (Ω). Make sure to zero the Digital Multimeter prior to making the following resistance measurements. Attach red (+) meter probe to 'V' test lead input and black (-) meter probe to 'COM' test lead input of Diagnostic Test Box. Turn Switch S1 to each position as indicated within the table below and verify that the meter readings are within the corresponding value ranges listed.
While performing this check, also verify that Switch S1 physically holds, or has a detent, at each position and does not turn past switch stops.

Switch S1 Position	Meter Reading (Ω)
1	Open (OL)
2	1M (980K—1.02M)
3	150K (147K—153K)
4	10K (9.8K—10.2K)
5	3K (2.94K—3.06K)
6	2.2K (2.16K—2.24K)
7	1K (980—1.02K)
8	750 (735—765)

Switch S1 Readings, Pull down

3. Connect the power cable connector to the Diagnostic Test Box and the other end to a battery or DC power source between 12 and 30 volts. Attach red power clamp to the positive (+) terminal and black power clamp to the negative (-) terminal of battery or power source. Verify Green LED is on. If LED is off, verify power connections and power source. Check the fuse and replace fuse with a 5 amp, 32 volt fuse if necessary. If LED is still not on, replace the Diagnostic Test Box.
4. Set Digital Multimeter function to measure volts. Turn Switch S1 to each position as indicated in the table below. Then verify the meter readings are within 5% of the corresponding values listed while Switch S2 is open and closed.



JDG10273 - Diagnostic Test Box

Switch S1 Position	Meter Reading with Switch S2 Open (Not Pressed)	Meter Reading with Switch S2 Closed (Pressed)
9	0.0—0.2 V	4.7—5.2 V
10	0.0—0.2 V	4.7—5.2 V
11	0.0—0.2 V	4.7—5.2 V

Switch S1 Readings, Pull Up

5. Disconnect power source from Diagnostic Test Box and set Switch S1 to position 1. Set Digital Multimeter function to diode test. Connect red (+) meter probe of Digital Multimeter to 'A' (yellow input) of Diagnostic Test Box. Connect black (-) meter probe of Digital Multimeter to 'B' (blue input) of Diagnostic Test Box.
 - Verify that Digital Multimeter reads 'OL' or 0 V.
 - Press Switch S3 and verify that the Digital Multimeter reads 0.20—0.75 V.
 - Press both Switch S2 and Switch S3 at the same time and verify that the Digital Multimeter reads 'OL' or 0 V.
 - With the multimeter probes reversed, press Switch S3 verify that the Digital Multimeter reads 'OL' or 0 V.

Test Leads

Test leads must be functional to prevent misdiagnosis.

- Visually inspect insulation on test leads for any damage.
- Test leads must be completely covered with insulation.
- Visually inspect test lead tips for corrosion and other environmental damage.

Continued on next page

BK34394,00001F1 -19-22NOV11-5/6

Diagnostic Instructions and Information

- Make sure test leads fit tightly into test lead inputs of Diagnostic Test Box.
- With Digital Multimeter, measure resistance from each end of test lead to measure its continuity. Verify that resistance is less than 1 ohm for each test lead.

BK34394,00001F1 -19-22NOV11-6/6

Diagnostic Trouble Code (DTC) Group Locator

SPN.FMI	Description	Group
000027.03	EGR Valve Position Signal Out of Range High	166
000027.04	EGR Valve Position Signal Out of Range Low	166
000027.07	EGR Valve Desired and Actual Position Mismatch	166
000028.03	Digital Throttle Signal Out of Range High	165
000028.04	Digital Throttle Signal Out of Range Low	165
000028.14	Digital Throttle Inhibited	165
000029.03	Secondary Analog Throttle Signal Out of Range High	165
000029.04	Secondary Analog Throttle Signal Out of Range Low	165
000029.14	Secondary Analog Throttle Inhibited	165
000051.03	Air Throttle Actuator Position Signal Out of Range High	166
000051.04	Air Throttle Actuator Position Signal Out of Range Low	166
000051.07	Air Throttle Actuator Desired and Actual Position Mismatch	166
000051.14	Air Throttle Actuator and EGR Valve Connectors Swapped	166
000091.03	Primary Analog Throttle Signal Out of Range High	165
000091.04	Primary Analog Throttle Signal Out of Range Low	165
000091.09	Primary Analog Throttle Signal Erratic	165
000091.14	Primary Analog Throttle Inhibited	165
000094.03	Low-Pressure Fuel Signal Out of Range High	164
000094.04	Low-Pressure Fuel Signal Out of Range Low	164
000094.16	Low-Pressure Fuel Signal Moderately High	164
000094.17	Low-Pressure Fuel Signal Slightly Low	164
000094.18	Low-Pressure Fuel Signal Moderately Low	164
000097.00	Water-In-Fuel Level Extremely High	164
000097.03	Water-In-Fuel Signal Out of Range High	164
000097.04	Water-In-Fuel Signal Out of Range Low	164
000097.16	Water-In-Fuel Level Moderately High	164
000100.01	Engine Oil Pressure Signal Extremely Low	163
000100.02	Engine Oil Pressure is not Zero with Engine Stopped	163
000100.03	Engine Oil Pressure Signal Out of Range High	163
000100.04	Engine Oil Pressure Signal Out of Range Low	163
000100.18	Engine Oil Pressure Signal Moderately Low	163
000101.00	Engine Crankcase Pressure Signal Extremely High	163
000101.03	Engine Crankcase Pressure Signal Out of Range High	163
000101.04	Engine Crankcase Pressure Signal Out of Range Low	163
000101.16	Engine Crankcase Pressure Signal Moderately High	163
000102.00	Manifold Air Pressure Signal Extremely High	162
000102.03	Manifold Air Pressure Signal Out of Range High	162
000102.04	Manifold Air Pressure Signal Out of Range Low	162
000102.07	Manifold Air Pressure Signal In Range Invalid	162
000102.16	Manifold Air Pressure Signal Moderately High	162
000103.00	VGT Speed Signal Extremely High	162
000103.02	VGT Speed Signal Invalid	162
000103.05	VGT Speed Circuit Has High Resistance	162
000105.00	Manifold Air Temperature Signal Extremely High	162
000105.03	Manifold Air Temperature Signal Out of Range High	162
000105.04	Manifold Air Temperature Signal Out of Range Low	162
000105.15	Manifold Air Temperature Signal Slightly High	162
000105.16	Manifold Air Temperature Signal Moderately High	162
000107.00	Air Filter Pressure Differential Extremely High	162

Continued on next page

BK34394,0000DEC -19-26JUL11-1/10

Diagnostic Instructions and Information

000107.15	Air Filter Pressure Differential Slightly High	162
000107.16	Air Filter Pressure Differential Moderately High	162
000108.02	Barometric Pressure Signal Invalid	165
000108.07	Barometric Pressure Signal Mismatch	165
000110.00	Engine Coolant Temperature Signal Extremely High	163
000110.03	Engine Coolant Temperature Signal Out of Range High	163
000110.04	Engine Coolant Temperature Signal Out of Range Low	163
000110.15	Engine Coolant Temperature Signal Slightly High	163
000110.16	Engine Coolant Temperature Signal Moderately High	163
000110.17	Engine Coolant Temperature Signal Slightly Low	163
000111.01	Engine Coolant Level Alarm Switch Activated at High Coolant Temperature	163
000111.07	Engine Coolant Level Switch Mismatch	163
000111.17	Engine Coolant Level Information Switch Activated	163
000111.18	Engine Coolant Level Alarm Switch Activated at Moderate Coolant Temperature	163
000137.00	Auxiliary Gauge Pressure Reading Extremely High	178
000137.01	Auxiliary Gauge Pressure Reading Extremely Low	178
000157.01	Fuel Rail Pressure Signal Extremely Low	164
000157.03	Fuel Rail Pressure Signal Out of Range High	164
000157.04	Fuel Rail Pressure Signal Out of Range Low	164
000157.16	Fuel Rail Pressure Signal Moderately High	164
000157.17	Fuel Rail Pressure Signal Slightly Low	164
000157.18	Fuel Rail Pressure Signal Moderately Low	164
000158.12	ECU Power Down Error	165
000160.02	Primary Shaft Speed Invalid	178
000168.01	Unswitched Battery Voltage Extremely Low	165
000168.16	Unswitched Battery Voltage Moderately High	165
000168.18	Unswitched Battery Voltage Moderately Low	165
000174.00	Fuel Temperature Signal Extremely High	164
000174.03	Fuel Temperature Signal Out of Range High	164
000174.04	Fuel Temperature Signal Out of Range Low	164
000174.16	Fuel Temperature Signal Moderately High	164
000189.31	Engine Speed Derate Condition Exists	165
000190.00	Engine Speed Extremely High	161
000190.16	Engine Speed Moderately High	161
000237.02	VIN Security Data Invalid	178
000237.13	VIN Option Code Security Data Conflict	178
000237.31	VIN Security Data Missing	178
000412.00	EGR Temperature Signal Extremely High	162
000412.03	EGR Temperature Signal Out of Range High	162
000412.04	EGR Temperature Signal Out of Range Low	162
000412.15	EGR Temperature Signal Slightly High	162
000412.16	EGR Temperature Signal Moderately High	162
000443.00	Auxiliary Gauge Pressure #2 Reading Extremely High	178
000443.01	Auxiliary Gauge Pressure #2 Reading Extremely Low	178
000611.03	Injector Drive #1 Shorted to Voltage Source	164
000611.04	Injector Drive #1 Shorted to Ground	164
000612.03	Injector Drive #2 Shorted to Voltage Source	164
000612.04	Injector Drive #2 Shorted to Ground	164
000629.11	ECU Binary Input Error	165
000629.12	ECU EEPROM Error	165
000629.13	ECU Boot Block Fault	165
000636.02	Camshaft Position Signal Invalid	161
000636.05	Camshaft Position Circuit Has High Resistance	161

Continued on next page

BK34394,0000DEC -19-26JUL11-2/10

Diagnostic Instructions and Information

000636.06	Camshaft Position Circuit Has Low Resistance	161
000636.08	Camshaft Position Signal Missing	161
000636.10	Camshaft Position Signal Rate of Change Abnormal	161
000637.02	Crankshaft Position Signal Invalid	161
000637.05	Crankshaft Position Circuit Has High Resistance	161
000637.06	Crankshaft Position Circuit Has Low Resistance	161
000637.07	Crankshaft Position and Camshaft Position Signals Out of Sync	161
000637.08	Crankshaft Position Signal Missing	161
000637.10	Crankshaft Position Signal Rate of Change Abnormal	161
000640.11	External Engine Protection Activated	178
000640.31	External Derate Activated	178
000641.00	VGT Actuator Temperature Extremely High	166
000641.05	VGT Actuator Drive Circuit Has High Resistance	166
000641.06	VGT Actuator Drive Circuit Has Low Resistance	166
000641.07	VGT Actuator Learn Error	166
000641.09	VGT Actuator Loss of Communication	166
000641.12	VGT Actuator Internal Error	166
000641.13	VGT Actuator Calibration Error	166
000641.16	VGT Actuator Temperature Moderately High	166
000641.31	VGT Actuator Supply Voltage Fault	166
000647.03	Engine Fan Drive Circuit Shorted to Voltage	178
000647.05	Engine Fan Drive Circuit Has High Resistance	178
000647.06	Engine Fan Drive Circuit Has Low Resistance	178
000647.07	Engine Fan Speed Decrease Circuit Fault	178
000651.02	Injector #1 Part Number Data Invalid	164
000651.05	Injector #1 Circuit Has High Resistance	164
000651.06	Injector #1 Circuit Has Low Resistance	164
000651.13	Injector #1 Calibration Fault	164
000651.18	Injector #1 Not Responding	164
000652.02	Injector #2 Part Number Data Invalid	164
000652.05	Injector #2 Circuit Has High Resistance	164
000652.06	Injector #2 Circuit Has Low Resistance	164
000652.13	Injector #2 Calibration Fault	164
000652.18	Injector #2 Not Responding	164
000653.02	Injector #3 Part Number Data Invalid	164
000653.05	Injector #3 Circuit Has High Resistance	164
000653.06	Injector #3 Circuit Has Low Resistance	164
000653.13	Injector #3 Calibration Fault	164
000653.18	Injector #3 Not Responding	164
000654.02	Injector #4 Part Number Data Invalid	164
000654.05	Injector #4 Circuit Has High Resistance	164
000654.06	Injector #4 Circuit Has Low Resistance	164
000654.13	Injector #4 Calibration Fault	164
000654.18	Injector #4 Not Responding	164
000676.05	Cold Start Aid Drive Circuit Has High Resistance	162
000676.06	Cold Start Aid Drive Circuit Has Low Resistance	162
000676.14	Cold Start Aid Signal Received When Not Expected	162
000676.31	Cold Start Aid Signal Not Received When Expected	162
000695.19	Unapproved Engine Speed Request	178
000876.05	A/C System Drive Circuit Has High Resistance	178
000876.06	A/C System Drive Circuit Has Low Resistance	178
000970.31	External Shutdown Commanded	178
000971.31	External Derate Commanded	178

Continued on next page

BK34394,0000DEC -19-26JUL11-3/10

Diagnostic Instructions and Information

000974.03	Remote Analog Throttle Signal Out of Range High	165
000974.04	Remote Analog Throttle Signal Out of Range Low	165
001069.31	Calculated tire size is out of range	178
001110.31	Engine Protection System Activated	178
001136.00	ECU Temperature Signal Extremely High	165
001136.02	ECU Temperature Signal Invalid	165
001136.16	ECU Temperature Signal Moderately High	165
001172.12	Intake Air Temperature Error	162
001176.07	Intake Air Pressure Mismatch	162
001176.12	Intake Air Pressure Error	162
001180.00	Calculated VGT Turbine Inlet Temperature Extremely High	167
001180.16	Calculated VGT Turbine Inlet Temperature Moderately High	167
001209.03	Exhaust Manifold Pressure Signal Out of Range High	162
001209.04	Exhaust Manifold Pressure Signal Out of Range Low	162
001209.07	Exhaust Manifold Pressure Mismatch	162
001321.05	Engine Starter Solenoid Lockout Relay Driver Circuit Has High Resistance	178
001321.06	Engine Starter Solenoid Lockout Relay Driver Circuit Has Low Resistance	178
001321.16	Engine Starter Engaged for Over Thirty Seconds	178
001321.31	Engine Speed Zero with Starter Solenoid Energized	178
001347.01	Suction Control Valve Sticking and Fuel Rail Pressure Extremely Low	164
001347.05	Suction Control Valve Circuit Has High Resistance	164
001347.06	Suction Control Valve Circuit Has Low Resistance	164
001347.16	Suction Control Valve Sticking and Fuel Rail Pressure Moderately High	164
001347.18	Suction Control Valve Sticking and Fuel Rail Pressure Slightly Low	164
001550.05	Air Conditioner Compressor Current Low	178
001550.06	Air Conditioner Compressor Current High	178
001569.31	Engine Power Derate Condition Exists	165
001638.03	Hydraulic Oil Temperature Signal Out of Range High	178
001638.04	Hydraulic Oil Temperature Signal Out of Range Low	178
001639.01	Fan Speed Signal Extremely Low	178
001639.16	Fan Speed Signal Moderately High	178
001639.18	Fan Speed Signal Moderately Low	178
002002.09	No CAN Message Received From Source Address 2	179
002002.14	Incorrect CAN Message received From Source Address 2	179
002002.19	Communication Error with Source Address 2	179
002003.09	No CAN Message Received From Source Address 3	179
002003.14	Incorrect CAN Message received From Source Address 3	179
002003.19	Communication Error with Source Address 3	179
002004.09	No CAN Message Received From Source Address 4	179
002004.14	Incorrect CAN Message received From Source Address 4	179
002004.19	Communication Error with Source Address 4	179
002005.09	No CAN Message Received From Source Address 5	179
002005.14	Incorrect CAN Message received From Source Address 5	179
002005.19	Communication Error with Source Address 5	179
002006.09	No CAN Message Received From Source Address 6	179
002006.14	Incorrect CAN Message received From Source Address 6	179
002006.19	Communication Error with Source Address 6	179
002007.09	No CAN Message Received From Source Address 7	179
002007.14	Incorrect CAN Message received From Source Address 7	179
002007.19	Communication Error with Source Address 7	179
002008.09	No CAN Message Received From Source Address 8	179
002008.14	Incorrect CAN Message received From Source Address 8	179
002008.19	Communication Error with Source Address 8	179

Continued on next page

BK34394,0000DEC -19-26JUL11-4/10

Diagnostic Instructions and Information

002009.09	No CAN Message Received From Source Address 9	179
002009.14	Incorrect CAN Message received From Source Address 9	179
002009.19	Communication Error with Source Address 9	179
002010.09	No CAN Message Received From Source Address 10	179
002010.14	Incorrect CAN Message received From Source Address 10	179
002010.19	Communication Error with Source Address 10	179
002011.09	No CAN Message Received From Source Address 11	179
002011.14	Incorrect CAN Message received From Source Address 11	179
002011.19	Communication Error with Source Address 11	179
002012.09	No CAN Message Received From Source Address 12	179
002012.14	Incorrect CAN Message received From Source Address 12	179
002012.19	Communication Error with Source Address 12	179
002013.09	No CAN Message Received From Source Address 13	179
002013.14	Incorrect CAN Message received From Source Address 13	179
002013.19	Communication Error with Source Address 13	179
002014.09	No CAN Message Received From Source Address 14	179
002014.14	Incorrect CAN Message received From Source Address 14	179
002014.19	Communication Error with Source Address 14	179
002015.09	No CAN Message Received From Source Address 15	179
002015.14	Incorrect CAN Message received From Source Address 15	179
002015.19	Communication Error with Source Address 15	179
002016.09	No CAN Message Received From Source Address 16	179
002016.14	Incorrect CAN Message received From Source Address 16	179
002016.19	Communication Error with Source Address 16	179
002017.09	No CAN Message Received From Source Address 17	179
002017.14	Incorrect CAN Message received From Source Address 17	179
002017.19	Communication Error with Source Address 17	179
002018.09	No CAN Message Received From Source Address 18	179
002018.14	Incorrect CAN Message received From Source Address 18	179
002018.19	Communication Error with Source Address 18	179
002019.09	No CAN Message Received From Source Address 19	179
002019.14	Incorrect CAN Message received From Source Address 19	179
002019.19	Communication Error with Source Address 19	179
002020.09	No CAN Message Received From Source Address 20	179
002020.14	Incorrect CAN Message received From Source Address 20	179
002020.19	Communication Error with Source Address 20	179
002021.09	No CAN Message Received From Source Address 21	179
002021.14	Incorrect CAN Message received From Source Address 21	179
002021.19	Communication Error with Source Address 21	179
002022.09	No CAN Message Received From Source Address 22	179
002022.14	Incorrect CAN Message received From Source Address 22	179
002022.19	Communication Error with Source Address 22	179
002023.09	No CAN Message Received From Source Address 23	179
002023.14	Incorrect CAN Message received From Source Address 23	179
002023.19	Communication Error with Source Address 23	179
002024.09	No CAN Message Received From Source Address 24	179
002024.14	Incorrect CAN Message received From Source Address 24	179
002024.19	Communication Error with Source Address 24	179
002025.09	No CAN Message Received From Source Address 25	179
002025.14	Incorrect CAN Message received From Source Address 25	179
002025.19	Communication Error with Source Address 25	179
002026.09	No CAN Message Received From Source Address 26	179
002026.14	Incorrect CAN Message received From Source Address 26	179

Continued on next page

BK34394,0000DEC -19-26JUL11-5/10

Diagnostic Instructions and Information

002026.19	Communication Error with Source Address 26	179
002027.09	No CAN Message Received From Source Address 27	179
002027.14	Incorrect CAN Message received From Source Address 27	179
002027.19	Communication Error with Source Address 27	179
002028.09	No CAN Message Received From Source Address 28	179
002028.14	Incorrect CAN Message received From Source Address 28	179
002028.19	Communication Error with Source Address 28	179
002029.09	No CAN Message Received From Source Address 29	179
002029.14	Incorrect CAN Message received From Source Address 29	179
002029.19	Communication Error with Source Address 29	179
002030.09	No CAN Message Received From Source Address 30	179
002030.14	Incorrect CAN Message received From Source Address 30	179
002030.19	Communication Error with Source Address 30	179
002031.09	No CAN Message Received From Source Address 31	179
002031.14	Incorrect CAN Message received From Source Address 31	179
002031.19	Communication Error with Source Address 31	179
002032.09	No CAN Message Received From Source Address 32	179
002032.14	Incorrect CAN Message received From Source Address 32	179
002032.19	Communication Error with Source Address 32	179
002033.09	No CAN Message Received From Source Address 33	179
002033.14	Incorrect CAN Message received From Source Address 33	179
002033.19	Communication Error with Source Address 33	179
002034.09	No CAN Message Received From Source Address 34	179
002034.14	Incorrect CAN Message received From Source Address 34	179
002034.19	Communication Error with Source Address 34	179
002035.09	No CAN Message Received From Source Address 35	179
002035.14	Incorrect CAN Message received From Source Address 35	179
002035.19	Communication Error with Source Address 35	179
002036.09	No CAN Message Received From Source Address 36	179
002036.14	Incorrect CAN Message received From Source Address 36	179
002036.19	Communication Error with Source Address 36	179
002037.09	No CAN Message Received From Source Address 37	179
002037.14	Incorrect CAN Message received From Source Address 37	179
002037.19	Communication Error with Source Address 37	179
002038.09	No CAN Message Received From Source Address 38	179
002038.14	Incorrect CAN Message received From Source Address 38	179
002038.19	Communication Error with Source Address 38	179
002039.09	No CAN Message Received From Source Address 39	179
002039.14	Incorrect CAN Message received From Source Address 39	179
002039.19	Communication Error with Source Address 39	179
002040.09	No CAN Message Received From Source Address 40	179
002040.14	Incorrect CAN Message received From Source Address 40	179
002040.19	Communication Error with Source Address 40	179
002041.09	No CAN Message Received From Source Address 41	179
002041.14	Incorrect CAN Message received From Source Address 41	179
002041.19	Communication Error with Source Address 41	179
002042.09	No CAN Message Received From Source Address 42	179
002042.14	Incorrect CAN Message received From Source Address 42	179
002042.19	Communication Error with Source Address 42	179
002043.09	No CAN Message Received From Source Address 43	179
002043.14	Incorrect CAN Message received From Source Address 43	179
002043.19	Communication Error with Source Address 43	179
002044.09	No CAN Message Received From Source Address 44	179

Continued on next page

BK34394,0000DEC -19-26JUL11-6/10

Diagnostic Instructions and Information

002044.14	Incorrect CAN Message received From Source Address 44	179
002044.19	Communication Error with Source Address 44	179
002045.09	No CAN Message Received From Source Address 45	179
002045.14	Incorrect CAN Message received From Source Address 45	179
002045.19	Communication Error with Source Address 45	179
002046.09	No CAN Message Received From Source Address 46	179
002046.14	Incorrect CAN Message received From Source Address 46	179
002046.19	Communication Error with Source Address 46	179
002047.09	No CAN Message Received From Source Address 47	179
002047.14	Incorrect CAN Message received From Source Address 47	179
002047.19	Communication Error with Source Address 47	179
002048.09	No CAN Message Received From Source Address 48	179
002048.14	Incorrect CAN Message received From Source Address 48	179
002048.19	Communication Error with Source Address 48	179
002049.09	No CAN Message Received From Source Address 49	179
002049.14	Incorrect CAN Message received From Source Address 49	179
002049.19	Communication Error with Source Address 49	179
002050.09	No CAN Message Received From Source Address 50	179
002050.14	Incorrect CAN Message received From Source Address 50	179
002050.19	Communication Error with Source Address 50	179
002051.09	No CAN Message Received From Source Address 51	179
002051.14	Incorrect CAN Message received From Source Address 51	179
002051.19	Communication Error with Source Address 51	179
002052.09	No CAN Message Received From Source Address 52	179
002052.14	Incorrect CAN Message received From Source Address 52	179
002052.19	Communication Error with Source Address 52	179
002053.09	No CAN Message Received From Source Address 53	179
002053.14	Incorrect CAN Message received From Source Address 53	179
002053.19	Communication Error with Source Address 53	179
002054.09	No CAN Message Received From Source Address 54	179
002054.14	Incorrect CAN Message received From Source Address 54	179
002054.19	Communication Error with Source Address 54	179
002055.09	No CAN Message Received From Source Address 55	179
002055.14	Incorrect CAN Message received From Source Address 55	179
002055.19	Communication Error with Source Address 55	179
002056.09	No CAN Message Received From Source Address 56	179
002056.14	Incorrect CAN Message received From Source Address 56	179
002056.19	Communication Error with Source Address 56	179
002057.09	No CAN Message Received From Source Address 57	179
002057.14	Incorrect CAN Message received From Source Address 57	179
002057.19	Communication Error with Source Address 57	179
002058.09	No CAN Message Received From Source Address 58	179
002058.14	Incorrect CAN Message received From Source Address 58	179
002058.19	Communication Error with Source Address 58	179
002059.09	No CAN Message Received From Source Address 59	179
002059.14	Incorrect CAN Message received From Source Address 59	179
002059.19	Communication Error with Source Address 59	179
002060.09	No CAN Message Received From Source Address 60	179
002060.14	Incorrect CAN Message received From Source Address 60	179
002060.19	Communication Error with Source Address 60	179
002061.09	No CAN Message Received From Source Address 61	179
002061.14	Incorrect CAN Message received From Source Address 61	179
002061.19	Communication Error with Source Address 61	179

Continued on next page

BK34394,0000DEC -19-26JUL11-7/10

Diagnostic Instructions and Information

002062.09	No CAN Message Received From Source Address 62	179
002062.14	Incorrect CAN Message received From Source Address 62	179
002062.19	Communication Error with Source Address 62	179
002063.09	No CAN Message Received From Source Address 63	179
002063.14	Incorrect CAN Message received From Source Address 63	179
002063.19	Communication Error with Source Address 63	179
002064.09	No CAN Message Received From Source Address 64	179
002064.14	Incorrect CAN Message received From Source Address 64	179
002064.19	Communication Error with Source Address 64	179
002065.09	No CAN Message Received From Source Address 65	179
002065.14	Incorrect CAN Message received From Source Address 65	179
002065.19	Communication Error with Source Address 65	179
002066.09	No CAN Message Received From Source Address 66	179
002066.14	Incorrect CAN Message received From Source Address 66	179
002066.19	Communication Error with Source Address 66	179
002067.09	No CAN Message Received From Source Address 67	179
002067.14	Incorrect CAN Message received From Source Address 67	179
002067.19	Communication Error with Source Address 67	179
002068.09	No CAN Message Received From Source Address 68	179
002068.14	Incorrect CAN Message received From Source Address 68	179
002068.19	Communication Error with Source Address 68	179
002069.09	No CAN Message Received From Source Address 69	179
002069.14	Incorrect CAN Message received From Source Address 69	179
002069.19	Communication Error with Source Address 69	179
002070.09	No CAN Message Received From Source Address 70	179
002070.14	Incorrect CAN Message received From Source Address 70	179
002070.19	Communication Error with Source Address 70	179
002071.09	No CAN Message Received From Source Address 71	179
002071.14	Incorrect CAN Message received From Source Address 71	179
002071.19	Communication Error with Source Address 71	179
002072.09	No CAN Message Received From Source Address 72	179
002072.14	Incorrect CAN Message received From Source Address 72	179
002072.19	Communication Error with Source Address 72	179
002073.09	No CAN Message Received From Source Address 73	179
002073.14	Incorrect CAN Message received From Source Address 73	179
002073.19	Communication Error with Source Address 73	179
002074.09	No CAN Message Received From Source Address 74	179
002074.14	Incorrect CAN Message received From Source Address 74	179
002074.19	Communication Error with Source Address 74	179
002075.09	No CAN Message Received From Source Address 75	179
002075.14	Incorrect CAN Message received From Source Address 75	179
002075.19	Communication Error with Source Address 75	179
002076.09	No CAN Message Received From Source Address 76	179
002076.14	Incorrect CAN Message received From Source Address 76	179
002076.19	Communication Error with Source Address 76	179
002077.09	No CAN Message Received From Source Address 77	179
002077.14	Incorrect CAN Message received From Source Address 77	179
002077.19	Communication Error with Source Address 77	179
002078.09	No CAN Message Received From Source Address 78	179
002078.14	Incorrect CAN Message received From Source Address 78	179
002078.19	Communication Error with Source Address 78	179
002079.09	No CAN Message Received From Source Address 79	179
002079.14	Incorrect CAN Message received From Source Address 79	179

Continued on next page

BK34394,0000DEC -19-26JUL11-8/10

Diagnostic Instructions and Information

002079.19	Communication Error with Source Address 79	179
002080.09	No CAN Message Received From Source Address 80	179
002080.14	Incorrect CAN Message received From Source Address 80	179
002080.19	Communication Error with Source Address 80	179
002081.09	No CAN Message Received From Source Address 81	179
002081.14	Incorrect CAN Message received From Source Address 81	179
002081.19	Communication Error with Source Address 81	179
002082.09	No CAN Message Received From Source Address 82	179
002082.14	Incorrect CAN Message received From Source Address 82	179
002082.19	Communication Error with Source Address 82	179
002083.09	No CAN Message Received From Source Address 83	179
002083.14	Incorrect CAN Message received From Source Address 83	179
002083.19	Communication Error with Source Address 83	179
002084.09	No CAN Message Received From Source Address 84	179
002084.14	Incorrect CAN Message received From Source Address 84	179
002084.19	Communication Error with Source Address 84	179
002085.09	No CAN Message Received From Source Address 85	179
002085.14	Incorrect CAN Message received From Source Address 85	179
002085.19	Communication Error with Source Address 85	179
002086.09	No CAN Message Received From Source Address 86	179
002086.14	Incorrect CAN Message received From Source Address 86	179
002086.19	Communication Error with Source Address 86	179
002087.09	No CAN Message Received From Source Address 87	179
002087.14	Incorrect CAN Message received From Source Address 87	179
002087.19	Communication Error with Source Address 87	179
002088.09	No CAN Message Received From Source Address 88	179
002088.14	Incorrect CAN Message received From Source Address 88	179
002088.19	Communication Error with Source Address 88	179
002089.09	No CAN Message Received From Source Address 89	179
002089.14	Incorrect CAN Message received From Source Address 89	179
002089.19	Communication Error with Source Address 89	179
002090.09	No CAN Message Received From Source Address 90	179
002090.14	Incorrect CAN Message received From Source Address 90	179
002090.19	Communication Error with Source Address 90	179
002091.09	No CAN Message Received From Source Address 91	179
002091.14	Incorrect CAN Message received From Source Address 91	179
002091.19	Communication Error with Source Address 91	179
002092.09	No CAN Message Received From Source Address 92	179
002092.14	Incorrect CAN Message received From Source Address 92	179
002092.19	Communication Error with Source Address 92	179
002093.09	No CAN Message Received From Source Address 93	179
002093.14	Incorrect CAN Message received From Source Address 93	179
002093.19	Communication Error with Source Address 93	179
002094.09	No CAN Message Received From Source Address 94	179
002094.14	Incorrect CAN Message received From Source Address 94	179
002094.19	Communication Error with Source Address 94	179
002095.09	No CAN Message Received From Source Address 95	179
002095.14	Incorrect CAN Message received From Source Address 95	179
002095.19	Communication Error with Source Address 95	179
002096.09	No CAN Message Received From Source Address 96	179
002096.14	Incorrect CAN Message received From Source Address 96	179
002096.19	Communication Error with Source Address 96	179
002097.09	No CAN Message Received From Source Address 97	179

Continued on next page

BK34394,0000DEC -19-26JUL11-9/10

Diagnostic Instructions and Information

002097.14	Incorrect CAN Message received From Source Address 97	179
002097.19	Communication Error with Source Address 97	179
002098.09	No CAN Message Received From Source Address 98	179
002098.14	Incorrect CAN Message received From Source Address 98	179
002098.19	Communication Error with Source Address 98	179
002099.09	No CAN Message Received From Source Address 99	179
002099.14	Incorrect CAN Message received From Source Address 99	179
002099.19	Communication Error with Source Address 99	179

Diagnostic Trouble Codes Group Location Index

BK34394,0000DEC -19-26JUL11-10/10

Diagnostic Trouble Code (DTC) Group Locator (Continued)

SPN.FMI	Description	Group
002100.14	Incorrect CAN Message received From Source Address 100	179
002100.19	Communication Error with Source Address 100	179
002101.09	No CAN Message Received From Source Address 101	179
002101.14	Incorrect CAN Message received From Source Address 101	179
002101.19	Communication Error with Source Address 101	179
002102.09	No CAN Message Received From Source Address 102	179
002102.14	Incorrect CAN Message received From Source Address 102	179
002102.19	Communication Error with Source Address 102	179
002103.09	No CAN Message Received From Source Address 103	179
002103.14	Incorrect CAN Message received From Source Address 103	179
002103.19	Communication Error with Source Address 103	179
002104.09	No CAN Message Received From Source Address 104	179
002104.14	Incorrect CAN Message received From Source Address 104	179
002104.19	Communication Error with Source Address 104	179
002105.09	No CAN Message Received From Source Address 105	179
002105.14	Incorrect CAN Message received From Source Address 105	179
002105.19	Communication Error with Source Address 105	179
002106.09	No CAN Message Received From Source Address 106	179
002106.14	Incorrect CAN Message received From Source Address 106	179
002106.19	Communication Error with Source Address 106	179
002107.09	No CAN Message Received From Source Address 107	179
002107.14	Incorrect CAN Message received From Source Address 107	179
002107.19	Communication Error with Source Address 107	179
002108.09	No CAN Message Received From Source Address 108	179
002108.14	Incorrect CAN Message received From Source Address 108	179
002108.19	Communication Error with Source Address 108	179
002109.09	No CAN Message Received From Source Address 109	179
002109.14	Incorrect CAN Message received From Source Address 109	179
002109.19	Communication Error with Source Address 109	179
002110.09	No CAN Message Received From Source Address 110	179
002110.14	Incorrect CAN Message received From Source Address 110	179
002110.19	Communication Error with Source Address 110	179
002111.09	No CAN Message Received From Source Address 111	179
002111.14	Incorrect CAN Message received From Source Address 111	179
002111.19	Communication Error with Source Address 111	179
002112.09	No CAN Message Received From Source Address 112	179
002112.14	Incorrect CAN Message received From Source Address 112	179
002112.19	Communication Error with Source Address 112	179
002113.09	No CAN Message Received From Source Address 113	179
002113.14	Incorrect CAN Message received From Source Address 113	179
002113.19	Communication Error with Source Address 113	179
002114.09	No CAN Message Received From Source Address 114	179
002114.14	Incorrect CAN Message received From Source Address 114	179
002114.19	Communication Error with Source Address 114	179
002115.09	No CAN Message Received From Source Address 115	179
002115.14	Incorrect CAN Message received From Source Address 115	179
002115.19	Communication Error with Source Address 115	179
002116.09	No CAN Message Received From Source Address 116	179
002116.14	Incorrect CAN Message received From Source Address 116	179

Continued on next page

DN22556,0000133 -19-10AUG11-1/11

Diagnostic Instructions and Information

002116.19	Communication Error with Source Address 116	179
002117.09	No CAN Message Received From Source Address 117	179
002117.14	Incorrect CAN Message received From Source Address 117	179
002117.19	Communication Error with Source Address 117	179
002118.09	No CAN Message Received From Source Address 118	179
002118.14	Incorrect CAN Message received From Source Address 118	179
002118.19	Communication Error with Source Address 118	179
002119.09	No CAN Message Received From Source Address 119	179
002119.14	Incorrect CAN Message received From Source Address 119	179
002119.19	Communication Error with Source Address 119	179
002120.09	No CAN Message Received From Source Address 120	179
002120.14	Incorrect CAN Message received From Source Address 120	179
002120.19	Communication Error with Source Address 120	179
002121.09	No CAN Message Received From Source Address 121	179
002121.14	Incorrect CAN Message received From Source Address 121	179
002121.19	Communication Error with Source Address 121	179
002122.09	No CAN Message Received From Source Address 122	179
002122.14	Incorrect CAN Message received From Source Address 122	179
002122.19	Communication Error with Source Address 122	179
002123.09	No CAN Message Received From Source Address 123	179
002123.14	Incorrect CAN Message received From Source Address 123	179
002123.19	Communication Error with Source Address 123	179
002124.09	No CAN Message Received From Source Address 124	179
002124.14	Incorrect CAN Message received From Source Address 124	179
002124.19	Communication Error with Source Address 124	179
002125.09	No CAN Message Received From Source Address 125	179
002125.14	Incorrect CAN Message received From Source Address 125	179
002125.19	Communication Error with Source Address 125	179
002126.09	No CAN Message Received From Source Address 126	179
002126.14	Incorrect CAN Message received From Source Address 126	179
002126.19	Communication Error with Source Address 126	179
002127.09	No CAN Message Received From Source Address 127	179
002127.14	Incorrect CAN Message received From Source Address 127	179
002127.19	Communication Error with Source Address 127	179
002128.09	No CAN Message Received From Source Address 128	179
002128.14	Incorrect CAN Message received From Source Address 128	179
002128.19	Communication Error with Source Address 128	179
002129.09	No CAN Message Received From Source Address 129	179
002129.14	Incorrect CAN Message received From Source Address 129	179
002129.19	Communication Error with Source Address 129	179
002130.09	No CAN Message Received From Source Address 130	179
002130.14	Incorrect CAN Message received From Source Address 130	179
002130.19	Communication Error with Source Address 130	179
002131.09	No CAN Message Received From Source Address 131	179
002131.14	Incorrect CAN Message received From Source Address 131	179
002131.19	Communication Error with Source Address 131	179
002132.09	No CAN Message Received From Source Address 132	179
002132.14	Incorrect CAN Message received From Source Address 132	179
002132.19	Communication Error with Source Address 132	179
002133.09	No CAN Message Received From Source Address 133	179
002133.14	Incorrect CAN Message received From Source Address 133	179
002133.19	Communication Error with Source Address 133	179
002134.09	No CAN Message Received From Source Address 134	179

Continued on next page

DN22556,0000133 -19-10AUG11-2/11

Diagnostic Instructions and Information

002134.14	Incorrect CAN Message received From Source Address 134	179
002134.19	Communication Error with Source Address 134	179
002135.09	No CAN Message Received From Source Address 135	179
002135.14	Incorrect CAN Message received From Source Address 135	179
002135.19	Communication Error with Source Address 135	179
002136.09	No CAN Message Received From Source Address 136	179
002136.14	Incorrect CAN Message received From Source Address 136	179
002136.19	Communication Error with Source Address 136	179
002137.09	No CAN Message Received From Source Address 137	179
002137.14	Incorrect CAN Message received From Source Address 137	179
002137.19	Communication Error with Source Address 137	179
002138.09	No CAN Message Received From Source Address 138	179
002138.14	Incorrect CAN Message received From Source Address 138	179
002138.19	Communication Error with Source Address 138	179
002139.09	No CAN Message Received From Source Address 139	179
002139.14	Incorrect CAN Message received From Source Address 139	179
002139.19	Communication Error with Source Address 139	179
002140.09	No CAN Message Received From Source Address 140	179
002140.14	Incorrect CAN Message received From Source Address 140	179
002140.19	Communication Error with Source Address 140	179
002141.09	No CAN Message Received From Source Address 141	179
002141.14	Incorrect CAN Message received From Source Address 141	179
002141.19	Communication Error with Source Address 141	179
002142.09	No CAN Message Received From Source Address 142	179
002142.14	Incorrect CAN Message received From Source Address 142	179
002142.19	Communication Error with Source Address 142	179
002143.09	No CAN Message Received From Source Address 143	179
002143.14	Incorrect CAN Message received From Source Address 143	179
002143.19	Communication Error with Source Address 143	179
002144.09	No CAN Message Received From Source Address 144	179
002144.14	Incorrect CAN Message received From Source Address 144	179
002144.19	Communication Error with Source Address 144	179
002145.09	No CAN Message Received From Source Address 145	179
002145.14	Incorrect CAN Message received From Source Address 145	179
002145.19	Communication Error with Source Address 145	179
002146.09	No CAN Message Received From Source Address 146	179
002146.14	Incorrect CAN Message received From Source Address 146	179
002146.19	Communication Error with Source Address 146	179
002147.09	No CAN Message Received From Source Address 147	179
002147.14	Incorrect CAN Message received From Source Address 147	179
002147.19	Communication Error with Source Address 147	179
002148.09	No CAN Message Received From Source Address 148	179
002148.14	Incorrect CAN Message received From Source Address 148	179
002148.19	Communication Error with Source Address 148	179
002149.09	No CAN Message Received From Source Address 149	179
002149.14	Incorrect CAN Message received From Source Address 149	179
002149.19	Communication Error with Source Address 149	179
002150.09	No CAN Message Received From Source Address 150	179
002150.14	Incorrect CAN Message received From Source Address 150	179
002150.19	Communication Error with Source Address 150	179
002151.09	No CAN Message Received From Source Address 151	179
002151.14	Incorrect CAN Message received From Source Address 151	179
002151.19	Communication Error with Source Address 151	179

Continued on next page

DN22556,0000133 -19-10AUG11-3/11

Diagnostic Instructions and Information

002152.09	No CAN Message Received From Source Address 152	179
002152.14	Incorrect CAN Message received From Source Address 152	179
002152.19	Communication Error with Source Address 152	179
002153.09	No CAN Message Received From Source Address 153	179
002153.14	Incorrect CAN Message received From Source Address 153	179
002153.19	Communication Error with Source Address 153	179
002154.09	No CAN Message Received From Source Address 154	179
002154.14	Incorrect CAN Message received From Source Address 154	179
002154.19	Communication Error with Source Address 154	179
002155.09	No CAN Message Received From Source Address 155	179
002155.14	Incorrect CAN Message received From Source Address 155	179
002155.19	Communication Error with Source Address 155	179
002156.09	No CAN Message Received From Source Address 156	179
002156.14	Incorrect CAN Message received From Source Address 156	179
002156.19	Communication Error with Source Address 156	179
002157.09	No CAN Message Received From Source Address 157	179
002157.14	Incorrect CAN Message received From Source Address 157	179
002157.19	Communication Error with Source Address 157	179
002158.09	No CAN Message Received From Source Address 158	179
002158.14	Incorrect CAN Message received From Source Address 158	179
002158.19	Communication Error with Source Address 158	179
002159.09	No CAN Message Received From Source Address 159	179
002159.14	Incorrect CAN Message received From Source Address 159	179
002159.19	Communication Error with Source Address 159	179
002160.09	No CAN Message Received From Source Address 160	179
002160.14	Incorrect CAN Message received From Source Address 160	179
002160.19	Communication Error with Source Address 160	179
002161.09	No CAN Message Received From Source Address 161	179
002161.14	Incorrect CAN Message received From Source Address 161	179
002161.19	Communication Error with Source Address 161	179
002162.09	No CAN Message Received From Source Address 162	179
002162.14	Incorrect CAN Message received From Source Address 162	179
002162.19	Communication Error with Source Address 162	179
002163.09	No CAN Message Received From Source Address 163	179
002163.14	Incorrect CAN Message received From Source Address 163	179
002163.19	Communication Error with Source Address 163	179
002164.09	No CAN Message Received From Source Address 164	179
002164.14	Incorrect CAN Message received From Source Address 164	179
002164.19	Communication Error with Source Address 164	179
002165.09	No CAN Message Received From Source Address 165	179
002165.14	Incorrect CAN Message received From Source Address 165	179
002165.19	Communication Error with Source Address 165	179
002166.09	No CAN Message Received From Source Address 166	179
002166.14	Incorrect CAN Message received From Source Address 166	179
002166.19	Communication Error with Source Address 166	179
002167.09	No CAN Message Received From Source Address 167	179
002167.14	Incorrect CAN Message received From Source Address 167	179
002167.19	Communication Error with Source Address 167	179
002168.09	No CAN Message Received From Source Address 168	179
002168.14	Incorrect CAN Message received From Source Address 168	179
002168.19	Communication Error with Source Address 168	179
002179.09	No CAN Message Received From Source Address 179	179
002179.14	Incorrect CAN Message received From Source Address 179	179

Continued on next page

DN22556,0000133 -19-10AUG11-4/11

Diagnostic Instructions and Information

002179.19	Communication Error with Source Address 179	179
002170.09	No CAN Message Received From Source Address 170	179
002170.14	Incorrect CAN Message received From Source Address 170	179
002170.19	Communication Error with Source Address 170	179
002171.09	No CAN Message Received From Source Address 171	179
002171.14	Incorrect CAN Message received From Source Address 171	179
002171.19	Communication Error with Source Address 171	179
002172.09	No CAN Message Received From Source Address 172	179
002172.14	Incorrect CAN Message received From Source Address 172	179
002172.19	Communication Error with Source Address 172	179
002173.09	No CAN Message Received From Source Address 173	179
002173.14	Incorrect CAN Message received From Source Address 173	179
002173.19	Communication Error with Source Address 173	179
002174.09	No CAN Message Received From Source Address 174	179
002174.14	Incorrect CAN Message received From Source Address 174	179
002174.19	Communication Error with Source Address 174	179
002175.09	No CAN Message Received From Source Address 175	179
002175.14	Incorrect CAN Message received From Source Address 175	179
002175.19	Communication Error with Source Address 175	179
002176.09	No CAN Message Received From Source Address 176	179
002176.14	Incorrect CAN Message received From Source Address 176	179
002176.19	Communication Error with Source Address 176	179
002177.09	No CAN Message Received From Source Address 177	179
002177.14	Incorrect CAN Message received From Source Address 177	179
002177.19	Communication Error with Source Address 177	179
002178.09	No CAN Message Received From Source Address 178	179
002178.14	Incorrect CAN Message received From Source Address 178	179
002178.19	Communication Error with Source Address 178	179
002179.09	No CAN Message Received From Source Address 179	179
002179.14	Incorrect CAN Message received From Source Address 179	179
002179.19	Communication Error with Source Address 179	179
002180.09	No CAN Message Received From Source Address 180	179
002180.14	Incorrect CAN Message received From Source Address 180	179
002180.19	Communication Error with Source Address 180	179
002181.09	No CAN Message Received From Source Address 181	179
002181.14	Incorrect CAN Message received From Source Address 181	179
002181.19	Communication Error with Source Address 181	179
002182.09	No CAN Message Received From Source Address 182	179
002182.14	Incorrect CAN Message received From Source Address 182	179
002182.19	Communication Error with Source Address 182	179
002183.09	No CAN Message Received From Source Address 183	179
002183.14	Incorrect CAN Message received From Source Address 183	179
002183.19	Communication Error with Source Address 183	179
002184.09	No CAN Message Received From Source Address 184	179
002184.14	Incorrect CAN Message received From Source Address 184	179
002184.19	Communication Error with Source Address 184	179
002185.09	No CAN Message Received From Source Address 185	179
002185.14	Incorrect CAN Message received From Source Address 185	179
002185.19	Communication Error with Source Address 185	179
002186.09	No CAN Message Received From Source Address 186	179
002186.14	Incorrect CAN Message received From Source Address 186	179
002186.19	Communication Error with Source Address 186	179
002187.09	No CAN Message Received From Source Address 187	179

Continued on next page

DN22556,0000133 -19-10AUG11-5/11

Diagnostic Instructions and Information

002187.14	Incorrect CAN Message received From Source Address 187	179
002187.19	Communication Error with Source Address 187	179
002188.09	No CAN Message Received From Source Address 188	179
002188.14	Incorrect CAN Message received From Source Address 188	179
002188.19	Communication Error with Source Address 188	179
002189.09	No CAN Message Received From Source Address 189	179
002189.14	Incorrect CAN Message received From Source Address 189	179
002189.19	Communication Error with Source Address 189	179
002190.09	No CAN Message Received From Source Address 190	179
002190.14	Incorrect CAN Message received From Source Address 190	179
002190.19	Communication Error with Source Address 190	179
002191.09	No CAN Message Received From Source Address 191	179
002191.14	Incorrect CAN Message received From Source Address 191	179
002191.19	Communication Error with Source Address 191	179
002192.09	No CAN Message Received From Source Address 192	179
002192.14	Incorrect CAN Message received From Source Address 192	179
002192.19	Communication Error with Source Address 192	179
002193.09	No CAN Message Received From Source Address 193	179
002193.14	Incorrect CAN Message received From Source Address 193	179
002193.19	Communication Error with Source Address 193	179
002194.09	No CAN Message Received From Source Address 194	179
002194.14	Incorrect CAN Message received From Source Address 194	179
002194.19	Communication Error with Source Address 194	179
002195.09	No CAN Message Received From Source Address 195	179
002195.14	Incorrect CAN Message received From Source Address 195	179
002195.19	Communication Error with Source Address 195	179
002196.09	No CAN Message Received From Source Address 196	179
002196.14	Incorrect CAN Message received From Source Address 196	179
002196.19	Communication Error with Source Address 196	179
002197.09	No CAN Message Received From Source Address 197	179
002197.14	Incorrect CAN Message received From Source Address 197	179
002197.19	Communication Error with Source Address 197	179
002198.09	No CAN Message Received From Source Address 198	179
002198.14	Incorrect CAN Message received From Source Address 198	179
002198.19	Communication Error with Source Address 198	179
002199.09	No CAN Message Received From Source Address 199	179
002199.14	Incorrect CAN Message received From Source Address 199	179
002199.19	Communication Error with Source Address 199	179
002200.09	No CAN Message Received From Source Address 200	179
002200.14	Incorrect CAN Message received From Source Address 200	179
002200.19	Communication Error with Source Address 200	179
002201.09	No CAN Message Received From Source Address 201	179
002201.14	Incorrect CAN Message received From Source Address 201	179
002201.19	Communication Error with Source Address 201	179
002202.09	No CAN Message Received From Source Address 202	179
002202.14	Incorrect CAN Message received From Source Address 202	179
002202.19	Communication Error with Source Address 202	179
002203.09	No CAN Message Received From Source Address 203	179
002203.14	Incorrect CAN Message received From Source Address 203	179
002203.19	Communication Error with Source Address 203	179
002204.09	No CAN Message Received From Source Address 204	179
002204.14	Incorrect CAN Message received From Source Address 204	179
002204.19	Communication Error with Source Address 204	179

Continued on next page

DN22556,0000133 -19-10AUG11-6/11

Diagnostic Instructions and Information

002205.09	No CAN Message Received From Source Address 205	179
002205.14	Incorrect CAN Message received From Source Address 205	179
002205.19	Communication Error with Source Address 205	179
002206.09	No CAN Message Received From Source Address 206	179
002206.14	Incorrect CAN Message received From Source Address 206	179
002206.19	Communication Error with Source Address 206	179
002207.09	No CAN Message Received From Source Address 207	179
002207.14	Incorrect CAN Message received From Source Address 207	179
002207.19	Communication Error with Source Address 207	179
002208.09	No CAN Message Received From Source Address 208	179
002208.14	Incorrect CAN Message received From Source Address 208	179
002208.19	Communication Error with Source Address 208	179
002209.09	No CAN Message Received From Source Address 209	179
002209.14	Incorrect CAN Message received From Source Address 209	179
002209.19	Communication Error with Source Address 209	179
002210.09	No CAN Message Received From Source Address 210	179
002210.14	Incorrect CAN Message received From Source Address 210	179
002210.19	Communication Error with Source Address 210	179
002211.09	No CAN Message Received From Source Address 211	179
002211.14	Incorrect CAN Message received From Source Address 211	179
002211.19	Communication Error with Source Address 211	179
002212.09	No CAN Message Received From Source Address 212	179
002212.14	Incorrect CAN Message received From Source Address 212	179
002212.19	Communication Error with Source Address 212	179
002213.09	No CAN Message Received From Source Address 213	179
002213.14	Incorrect CAN Message received From Source Address 213	179
002213.19	Communication Error with Source Address 213	179
002214.09	No CAN Message Received From Source Address 214	179
002214.14	Incorrect CAN Message received From Source Address 214	179
002214.19	Communication Error with Source Address 214	179
002215.09	No CAN Message Received From Source Address 215	179
002215.14	Incorrect CAN Message received From Source Address 215	179
002215.19	Communication Error with Source Address 215	179
002216.09	No CAN Message Received From Source Address 216	179
002216.14	Incorrect CAN Message received From Source Address 216	179
002216.19	Communication Error with Source Address 216	179
002217.09	No CAN Message Received From Source Address 217	179
002217.14	Incorrect CAN Message received From Source Address 217	179
002217.19	Communication Error with Source Address 217	179
002218.09	No CAN Message Received From Source Address 218	179
002218.14	Incorrect CAN Message received From Source Address 218	179
002218.19	Communication Error with Source Address 218	179
002219.09	No CAN Message Received From Source Address 219	179
002219.14	Incorrect CAN Message received From Source Address 219	179
002219.19	Communication Error with Source Address 219	179
002220.09	No CAN Message Received From Source Address 220	179
002220.14	Incorrect CAN Message received From Source Address 220	179
002220.19	Communication Error with Source Address 220	179
002221.09	No CAN Message Received From Source Address 221	179
002221.14	Incorrect CAN Message received From Source Address 221	179
002221.19	Communication Error with Source Address 221	179
002222.09	No CAN Message Received From Source Address 222	179
002222.14	Incorrect CAN Message received From Source Address 222	179

Continued on next page

DN22556,0000133 -19-10AUG11-7/11

Diagnostic Instructions and Information

002222.19	Communication Error with Source Address 222	179
002223.09	No CAN Message Received From Source Address 223	179
002223.14	Incorrect CAN Message received From Source Address 223	179
002223.19	Communication Error with Source Address 223	179
002224.09	No CAN Message Received From Source Address 224	179
002224.14	Incorrect CAN Message received From Source Address 224	179
002224.19	Communication Error with Source Address 224	179
002225.09	No CAN Message Received From Source Address 225	179
002225.14	Incorrect CAN Message received From Source Address 225	179
002225.19	Communication Error with Source Address 225	179
002226.09	No CAN Message Received From Source Address 226	179
002226.14	Incorrect CAN Message received From Source Address 226	179
002226.19	Communication Error with Source Address 226	179
002227.09	No CAN Message Received From Source Address 227	179
002227.14	Incorrect CAN Message received From Source Address 227	179
002227.19	Communication Error with Source Address 227	179
002228.09	No CAN Message Received From Source Address 228	179
002228.14	Incorrect CAN Message received From Source Address 228	179
002228.19	Communication Error with Source Address 228	179
002229.09	No CAN Message Received From Source Address 229	179
002229.14	Incorrect CAN Message received From Source Address 229	179
002229.19	Communication Error with Source Address 229	179
002230.09	No CAN Message Received From Source Address 230	179
002230.14	Incorrect CAN Message received From Source Address 230	179
002230.19	Communication Error with Source Address 230	179
002231.09	No CAN Message Received From Source Address 231	179
002231.14	Incorrect CAN Message received From Source Address 231	179
002231.19	Communication Error with Source Address 231	179
002232.09	No CAN Message Received From Source Address 232	179
002232.14	Incorrect CAN Message received From Source Address 232	179
002232.19	Communication Error with Source Address 232	179
002233.09	No CAN Message Received From Source Address 233	179
002233.14	Incorrect CAN Message received From Source Address 233	179
002233.19	Communication Error with Source Address 233	179
002234.09	No CAN Message Received From Source Address 234	179
002234.14	Incorrect CAN Message received From Source Address 234	179
002234.19	Communication Error with Source Address 234	179
002235.09	No CAN Message Received From Source Address 235	179
002235.14	Incorrect CAN Message received From Source Address 235	179
002235.19	Communication Error with Source Address 235	179
002236.09	No CAN Message Received From Source Address 236	179
002236.14	Incorrect CAN Message received From Source Address 236	179
002236.19	Communication Error with Source Address 236	179
002237.09	No CAN Message Received From Source Address 237	179
002237.14	Incorrect CAN Message received From Source Address 237	179
002237.19	Communication Error with Source Address 237	179
002238.09	No CAN Message Received From Source Address 238	179
002238.14	Incorrect CAN Message received From Source Address 238	179
002238.19	Communication Error with Source Address 238	179
002239.09	No CAN Message Received From Source Address 239	179
002239.14	Incorrect CAN Message received From Source Address 239	179
002239.19	Communication Error with Source Address 239	179
002240.09	No CAN Message Received From Source Address 240	179

Continued on next page

DN22556,0000133 -19-10AUG11-8/11

Diagnostic Instructions and Information

002240.14	Incorrect CAN Message received From Source Address 240	179
002240.19	Communication Error with Source Address 240	179
002241.09	No CAN Message Received From Source Address 241	179
002241.14	Incorrect CAN Message received From Source Address 241	179
002241.19	Communication Error with Source Address 241	179
002242.09	No CAN Message Received From Source Address 242	179
002242.14	Incorrect CAN Message received From Source Address 242	179
002242.19	Communication Error with Source Address 242	179
002243.09	No CAN Message Received From Source Address 243	179
002243.14	Incorrect CAN Message received From Source Address 243	179
002243.19	Communication Error with Source Address 243	179
002244.09	No CAN Message Received From Source Address 244	179
002244.14	Incorrect CAN Message received From Source Address 244	179
002244.19	Communication Error with Source Address 244	179
002245.09	No CAN Message Received From Source Address 245	179
002245.14	Incorrect CAN Message received From Source Address 245	179
002245.19	Communication Error with Source Address 245	179
002246.09	No CAN Message Received From Source Address 246	179
002246.14	Incorrect CAN Message received From Source Address 246	179
002246.19	Communication Error with Source Address 246	179
002247.09	No CAN Message Received From Source Address 247	179
002247.14	Incorrect CAN Message received From Source Address 247	179
002247.19	Communication Error with Source Address 247	179
002248.09	No CAN Message Received From Source Address 248	179
002248.14	Incorrect CAN Message received From Source Address 248	179
002248.19	Communication Error with Source Address 248	179
002249.09	No CAN Message Received From Source Address 249	179
002249.14	Incorrect CAN Message received From Source Address 249	179
002249.19	Communication Error with Source Address 249	179
002250.09	No CAN Message Received From Source Address 250	179
002250.14	Incorrect CAN Message received From Source Address 250	179
002250.19	Communication Error with Source Address 250	179
002251.09	No CAN Message Received From Source Address 251	179
002251.14	Incorrect CAN Message received From Source Address 251	179
002251.19	Communication Error with Source Address 251	179
002252.09	No CAN Message Received From Source Address 252	179
002252.14	Incorrect CAN Message received From Source Address 252	179
002252.19	Communication Error with Source Address 252	179
002253.09	No CAN Message Received From Source Address 253	179
002253.14	Incorrect CAN Message received From Source Address 253	179
002253.19	Communication Error with Source Address 253	179
002630.00	Charge Air Cooler Outlet Temperature Signal Extremely High	162
002630.03	Charge Air Cooler Outlet Temperature Signal Out of Range High	162
002630.04	Charge Air Cooler Outlet Temperature Signal Out of Range Low	162
002630.15	Charge Air Cooler Outlet Temperature Signal Slightly High	162
002630.16	Charge Air Cooler Outlet Temperature Signal Moderately High	162
002659.02	EGR Flow Signal Invalid	166
002659.03	EGR Flow Signal Out of Range High	166
002659.04	EGR Flow Signal Out of Range Low	166
002659.14	EGR Flow Signal Error	166
002659.15	EGR Flow Signal Slightly High	166
002659.17	EGR Flow Signal Slightly Low	166
002790.16	Calculated VGT Compressor Outlet Temperature Moderately High	167

Continued on next page

DN22556,0000133 -19-10AUG11-9/11

Diagnostic Instructions and Information

002791.05	EGR Valve Drive Circuit Fault	166
002791.06	EGR Valve Drive Circuit Has Low Resistance	166
002791.07	EGR Valve Desired and Actual Position Mismatch During a Learn	166
002791.13	EGR Valve Calibration Error	166
002795.07	VGT Vane Desired and Actual Position Mismatch	166
002797.03	Injector High Voltage Supply #1 Out of Range High	164
002797.05	Injector High Voltage Supply #1 Circuit Has High Resistance	164
002797.06	Injector High Voltage Supply #1 Circuit Has Low Resistance	164
002798.03	Injector High Voltage Supply #2 Out of Range High	164
002798.05	Injector High Voltage Supply #2 Circuit Has High Resistance	164
002798.06	Injector High Voltage Supply #2 Circuit Has Low Resistance	164
003246.00	DPF Outlet Temperature Extremely High	168
003246.12	DPF Outlet Temperature Error	168
003251.00	DPF Differential Pressure Signal Not Responding	168
003251.02	DPF Differential Pressure Signal Invalid	168
003251.03	DPF Differential Pressure Signal Out of Range High	168
003251.04	DPF Differential Pressure Signal Out of Range Low	168
003251.07	DPF Differential Pressure Signal Mismatch	168
003353.31	Alternator Error	178
003464.05	Air Throttle Actuator Drive Circuit Fault	166
003464.06	Air Throttle Actuator Drive Circuit Has Low Resistance	166
003464.07	Air Throttle Actuator Desired and Actual Position Mismatch During a Learn	166
003464.13	Air Throttle Actuator Calibration Error	166
003465.00	Exhaust Throttle Actuator Temperature Extremely High	166
003465.05	Exhaust Throttle Actuator Drive Circuit Fault	166
003465.06	Exhaust Throttle Actuator Drive Circuit Has Low Resistance	166
003465.07	Exhaust Throttle Actuator Learn Error	166
003465.09	Exhaust Throttle Actuator Loss of Communication	166
003465.12	Exhaust Throttle Actuator Internal Error	166
003465.13	Exhaust Throttle Actuator Calibration Error	166
003465.16	Exhaust Throttle Actuator Temperature Moderately High	166
003465.31	Exhaust Throttle Actuator Supply Voltage Fault	166
003509.03	Sensor Supply #1 Voltage Out of Range High	165
003509.04	Sensor Supply #1 Voltage Out of Range Low	165
003510.03	Sensor Supply #2 Voltage Out of Range High	165
003510.04	Sensor Supply #2 Voltage Out of Range Low	165
003511.03	Sensor Supply #3 Voltage Out of Range High	165
003511.04	Sensor Supply #3 Voltage Out of Range Low	165
003512.03	Sensor Supply #4 Voltage Out of Range High	165
003512.04	Sensor Supply #4 Voltage Out of Range Low	165
003513.03	Sensor Supply #5 Voltage Out of Range High	165
003513.04	Sensor Supply #5 Voltage Out of Range Low	165
003514.03	Sensor Supply #6 Voltage Out of Range High	165
003514.04	Sensor Supply #6 Voltage Out of Range Low	165
003597.01	Injector High Voltage Supply Extremely Low	164
003673.07	Exhaust Throttle Actuator Desired and Actual Position Mismatch	166
003673.31	Exhaust Throttle Actuator Fault	166
003711.14	Failed to Meet ETM Minimum Temp With Parasitic Load	168
003711.31	Failed to Meet ETM Minimum Temp Without Parasitic Load	168
003719.00	Calculated Soot Level Extremely High	167
003719.10	Soot Loading Rate of Change Abnormal	167
003719.13	Excessive DPF Recovery Attempts	167
003719.15	Calculated Soot Level Slightly High	167

Continued on next page

DN22556,0000133 -19-10AUG11-10/11

Diagnostic Instructions and Information

003719.16	Calculated Soot Level Moderately High	167
003720.15	Calculated Ash Level Slightly High	167
003720.16	Calculated Ash Level Moderately High	167
003936.00	Calculated Unintended Combustibles In DPF Extremely High	167
003936.15	Calculated Unintended Combustibles In DPF Slightly High	167
003936.16	Calculated Unintended Combustibles In DPF Moderately High	167
004490.12	Intake Air Humidity Error	162
004765.00	DOC Inlet Temperature Extremely High	168
004765.12	DOC Inlet Temperature Error	168
004766.12	DOC Outlet Temperature Error	168
004766.16	DOC Outlet Temperature Moderately High	168
004766.17	DOC Outlet Temperature Slightly Low	168
004766.18	DOC Outlet Temperature Moderately Low	168
004795.13	Exhaust Filter Calibration Fault	168
004795.31	DPF Missing	168
005018.00	Calculated Unintended Combustibles In DOC Extremely High	167
005018.15	Calculated Unintended Combustibles In DOC Slightly High	167
005018.16	Calculated Unintended Combustibles In DOC Moderately High	167
005125.03	Sensor Supply #7 Voltage Out of Range High	165
005125.04	Sensor Supply #7 Voltage Out of Range Low	165
005126.03	Sensor Supply #8 Voltage Out of Range High	165
005126.04	Sensor Supply #8 Voltage Out of Range Low	165
005127.03	Sensor Supply #9 Voltage Out of Range High	165
005127.04	Sensor Supply #9 Voltage Out of Range Low	165
005298.01	DOC Efficiency Extremely Low	168
005298.18	DOC Efficiency Moderately Low (Stored Only)	168
520956.05	Battery Cutoff Relay Drive Circuit Has High Resistance	178
520656.06	Battery Cutoff Relay Drive Circuit Has Low Resistance	178
521192.119	Unable to Initiate Immobilizer Authentication	178
521214.09	Immobilizer Authentication Timed Out	178
521214.14	Immobilizer Authentication Response Incorrect	178
522494.09	Intake Air Sensor Communication Error	162
522495.09	Exhaust Filter Temperature Module Loss of Communication	168
523744.09	A/C Clutch Status Message Not Received	178

Diagnostic Trouble Codes Group Location Index

DN22556,0000133 -19-10AUG11-11/11

Diagnostic Trouble Code Designations

SPN/FMI CODES

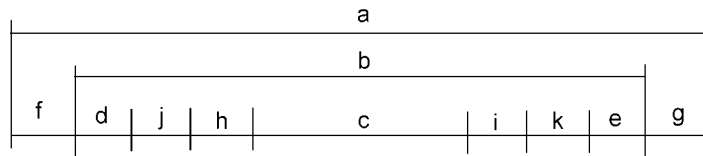
SPN/FMI codes are written as a two-part code derived from the SAE J1939 standard. The first part is called the Suspect Parameter Number (SPN). The SPN can contain up to six digits. The SPN identifies the system or the component that has the failure; for example SPN 110 indicates a failure in the engine coolant temperature system. The second part of the code is called the Failure Mode Identifier (FMI) code. The FMI contains two digits and identifies the type of failure that has occurred. For example, FMI 03 indicates value Out Of Range High (OORH). In order to determine the exact failure, both the

RG14537 —UN—31OCT05

SPN and FMI are required. Combining SPN 110 with FMI 03 yields "Engine Coolant Temperature Input Voltage Out Of Range High."

On this application the ECU transmits SPN/FMI codes over the Controller Area Network (CAN). This allows for service tools such as Service ADVISOR to display active and stored DTCs. When using Service ADVISOR, the codes are displayed in a 000000.00 format. For example, code 110.03 is displayed as 000110.03.

FMI Designators



Relationship of FMI Designations and Range of Sensor Input

Region a: Total signal input range possible that can be seen by an electronic module.

Region b: Total signal range physically possible as defined by an application.

Region c: Range defined as normal for a given real world measurement.

Region d: Range defined as Extremely below normal, of what is considered normal for the given real world measurement. Associated with FMI 01.

Region e: Range defined as Extremely above normal, of what is considered normal for the given real world measurement. Associated with FMI 00.

Region f: Range which is low outside the range of what is considered physically possible for a given system. Associated with FMI 04 (Out Of Range Low, OORL), 05.

Region g: Range which is high outside the range of what is considered physically possible for a given system. Associated with FMI 03 (Out Of Range High, OORH), 06.

Region h: Range defined as Slightly below normal, of what is considered normal for a given real-world measurement. Associated with FMI 17.

Region i: Range defined as Slightly above normal, of what is considered normal for a given real-world measurement. Associated with FMI 15.

Region j: Range defined as Moderately below normal, of what is considered normal for a given real-world measurement. Associated with FMI 18.

Region k: Range defined as Moderately above normal, of what is considered normal for a given real-world measurement. Associated with FMI 16.

FMI	Description
00	Data Valid but Above Normal Operational Range—Extreme Level. The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined extreme level limits for that particular measure of the real world condition (region e). Broadcast of data values is continued as normal.
01	Data Valid but Below Normal Operational Range—Extreme Level. The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined extreme level limits for that particular measure of the real world condition (region d). Broadcast of data values is continued as normal.
02	Data Erratic, Intermittent or Incorrect. Measurements that change at a rate that is not considered possible in the real world condition and caused by improper operation of the measuring device or its connection to the module (outside region b). Broadcast of data value is substituted with the "error indicator" value. Incorrect data includes any data not received and any data that is exclusive of the situations covered by FMIs 03, 04, 05 and 06 below. Data may also be considered incorrect if it is inconsistent with other information collected or known about the system.
03	Value Out Of Range High (OORH). A voltage signal, data or otherwise, is above the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose voltage remains at a high level when the control unit commands it to low (region g). Broadcast of data value is substituted with the "error indicator" value.
04	Value Out Of Range Low (OORL). A voltage signal, data or otherwise, is below the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose voltage remains at a low level when the control unit commands it to high (region f). Broadcast of data value is substituted with the "error indicator" value.
05	Current Below Normal. A current signal, data or otherwise, is below the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose current remains off when the control unit commands it on (between regions h, j, and d). Broadcast of data value is substituted with the "error indicator" value.

Continued on next page

SS01820,00002DA -19-28MAR11-1/2

- 06 Current Above Normal.** A current signal, data or otherwise, is above the predefined limits that bound the range. Broadcast of data value is substituted with the "error indicator" value. Any signal external to an electronic control module whose current remains on when the control unit commands it off (between regions i, k, and e). Broadcast of data value is substituted with the "error indicator" value.
- 07 Mechanical System not Responding or Out of Adjustment.** Any fault that is detected as the result of an improper mechanical adjustment or an improper response or action of a mechanical system that, with a reasonable confidence level, is not caused by an electronic or electrical system failure. This type of fault may or may not be directly associated with the value of general broadcast information.
- 08 Abnormal Frequency or Pulse Width or Period.** To be considered in cases of FMI 04 and 05. Any frequency or PWM signal that is outside the predefined limits which bound the signal range for frequency or duty cycle (outside region b of the signal range). Also if the signal is a control unit output, any signal whose frequency or duty cycle is not consistent with the signal which is emitted. Broadcast of data value is substituted with the "error indicator" value.
- 09 Abnormal Update Rate.** Any failure that is detected when receipt of data via the data link or as input from a smart actuator or smart sensor is not at the update rate expected or required by the control unit (outside region c of the signal range). Also any error that causes the control unit not to send information at the rate required by the system. This type of fault may or may not be directly associated with the value of general broadcast information.
- 10 Abnormal Rate of Change.** Any data, exclusive of the abnormalities covered by FMI 02, that is considered valid but whose data is changing at a rate that is outside the predefined limits that bound the rate of change for a properly functioning system (outside region c of the signal range). Broadcast of data values is continued as normal.
- 11 Root Cause Not Known.** It has been detected that a failure has occurred in a particular subsystem but the exact nature of the fault is not known. Broadcast of data value is substituted with the "error indicator" value.
- 12 Bad Intelligent Device or Component.** Inconsistency of data indicates that a device with some internal intelligence, such as a control unit, module, smart sensor or smart actuator, is not properly functioning. This data may be internal to a module or external from a data link message or from various system responses. Broadcast of data value is substituted with the "error indicator" value. This error is to include all internal control unit trouble codes that cannot be caused by connections or systems external to the control unit.
- 13 Out of Calibration.** A failure that can be identified to be the result of not being properly calibrated. This may be the case for a subsystem which can identify that the calibration attempting to be used by the control unit is out of date. Or it may be the case that the mechanical subsystem is determined to be out of calibration. This failure mode does not relate to a signal range.
- 14 Special Instructions.** SPNs 611 through 615 are defined as "System Diagnostic Codes" and are used to identify failures that cannot be tied to a specific field-replaceable component. Specific subsystem fault isolation is the goal of any diagnostic system, but for various reasons this cannot always be accomplished. These SPNs allow the manufacturer some flexibility to communicate non-"specific component" diagnostic information. Because SPN 611-615 use the standard SPN/FMI format, it allows the use of standard diagnostic tools, electronic dashboards, satellite systems and other advanced devices that scan Parameter Groups containing the SPN/FMI formats. Because manufacturer-defined codes are not desirable in terms of standardization, the use of these codes should only occur when diagnostic information cannot be communicated as a specific component and failure mode. This failure mode does not relate to the signal range, and may or may not be directly associated with the value of general broadcast information.
- 15 Data Valid but Above Normal Operating Range—Slight Level.** The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined slight level limits for that particular message of the real world condition (region i). Broadcast of data values is continued as normal.
- 16 Data Valid but Above Normal Operating Range—Moderate Level.** The signal communicating information is within a defined acceptable and valid range, but the real world condition is above what would be considered normal as determined by the predefined moderate level limits for that particular message of the real world condition (region k). Broadcast of data values is continued as normal.
- 17 Data Valid but Below Normal Operating Range—Slight Level.** The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined slight level limits for that particular message of the real world condition (region h). Broadcast of data values is continued as normal.
- 18 Data Valid but Below Normal Operating Range—Moderate Level.** The signal communicating information is within a defined acceptable and valid range, but the real world condition is below what would be considered normal as determined by the predefined moderate level limits for that particular message of the real world condition (region j). Broadcast of data values is continued as normal.
- 19 Received Network Data In Error.** Any failure that is detected when the data received via the network is found substituted with the "error indicator" value (for example, FE (16), see J1939/71). This type of failure is associated with received network data. The component used to measure the real world signal is wired directly to the module sourcing the data to the network and not to the module receiving the data via the network. This type of fault may or may not be directly associated with the value of general broadcast information.
- 20-30 Reserved for SAE Assignment.**
- 31 Not Available or Condition Exists.** Used to indicate that the FMI is not available or that the condition that is identified by the SPN exists. When no applicable FMI exists for the reported SPN, FMI 31 can be used. Also in cases when the reported SPN name has the failure information in it, FMI 31 can be used to indicate that the condition reported by the SPN exists. This type of fault may or may not be directly associated with the value of general broadcast information.

Description of FMI Designations

SS01820,00002DA -19-28MAR11-2/2

Digital Multimeter — Using

It is recommended that a digital multimeter (JT07306 or equivalent with an analog display) be used to make the required measurements in the diagnostic procedures. A knowledge of the operation of the particular meter used is assumed.

Instructions for measuring voltages from Point A (+) to Point B (-):

- Ignition OFF, Engine OFF.
- Disconnect connectors as directed by diagnostic procedure.
- Connect test leads as directed by diagnostic procedure.
- Select 'V' with the selector knob.
- Ignition ON, Engine OFF.

NOTE: The display indicates the selected function. In this example, the positive test lead from the volt-ohm input of the meter should be connected to Point A and the negative test lead from the common input of the meter should be connected to Point B.

Unless otherwise stated, all voltage measurements are direct current (D.C.).

IMPORTANT: Before making a resistance measurement, make sure that there is no voltage on the circuit.



Digital Multimeter

Instructions for measuring resistance from Point A to Point B:

- Ignition OFF, Engine OFF.
- Disconnect connectors as directed by diagnostic procedure.
- Connect test leads as directed by diagnostic procedure.
- Select Ω with the selector knob.

NOTE: Some procedures may require the meter leads to be reversed to get the proper measurement.

DN22556,000003F -19-30JUN10-1/1

DOC Calibration — Instructions

For instructions on connecting to Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: This calibration is performed only when the DOC is replaced.

NOTE: Replacing a DOC to test for a bad DOC (part swapping) is not recommended.

The new DOC part number, serial number, and calibration code are needed to complete the procedure. The information particular to the new DOC is loaded into the ECU using this procedure. For more information see [Exhaust Filter Operation](#) in Section 03, Group 137.

1. Obtain DOC payload from Custom Performance or use data sheet for manual entry of DOC information.

2. Ignition ON, Engine OFF.
3. Select Connected Calibrations in the Service ADVISOR Calibrations shortcut bar.
4. Select Interactive Calibrations.
5. Select DOC Calibration.
6. Follow the instructions in the diagnostic software.
7. Ignition OFF, Engine OFF for two minutes.
8. Connect to the Deere network to automatically send the return file to Custom Performance.

BB78437,0000055 -19-14FEB12-1/1

DPF Calibration — Instructions

For instructions on connecting to Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: This calibration is performed only when the DPF is replaced.

NOTE: Replacing a DPF to test for a bad DPF (part swapping) is not recommended.

The new DPF part number, serial number, and calibration code are needed to complete the procedure. The information particular to the new DPF is loaded into the ECU using this procedure. For more DPF information see Exhaust Filter Operation in Section 03, Group 137.

1. Obtain DPF payload from Custom Performance or use data sheet for manual entry of DPF information.
2. Ignition ON, Engine OFF.
3. Select Connected Calibrations in the Service ADVISOR Tests and Calibrations shortcut bar.
4. Select Interactive Calibrations.
5. Select DPF Calibration.
6. Follow the instructions in the diagnostic software.
7. Ignition OFF, Engine OFF for two minutes.
8. Connect to the Deere network to automatically send the return file to Custom Performance.

BB78437,0000056 -19-14FEB12-1/1

EGR Valve — Clean Test Instructions

This test is used to aid in identifying an EGR valve problem. Problems could include mechanical or electrical problems. During this test the EGR valve is forced to open and close rapidly using full power. This may dislodge soot or other contaminants allowing the valve to move freely. There is no indication the valve has moved during the test except sound, unless the valve is removed.

NOTE: If the valve is removed, ensure that it is in a place that is stable because the valve will move as it opens and closes.

IMPORTANT: There is a pinch hazard while the valve is opening and closing. Keep fingers away from valve.

EGR Valve Clean Test

IMPORTANT: Do not run the engine if the EGR valve is removed from the system.

- Warm engine to normal operating temperature.

Performing the EGR Valve Clean Test

NOTE: If EGR valve is installed on the engine, proceed to step 1. If EGR valve is removed from system go directly to step 2 with Ignition ON, Engine OFF.

1. Ignition ON, engine running at slow idle.
2. Select Connected Interactive Tests in the Service ADVISOR Tests and Calibrations shortcut bar.
3. Select EGR Valve Clean Test.
4. Follow instructions given by the diagnostic software.
5. Ignition ON, Engine OFF
6. Select Connected Interactive tests in the Service ADVISOR Tests and Calibrations shortcut bar.
7. Select Harness Diagnostic Mode Test.
8. Review and diagnose DTCs displayed at end of the Harness Diagnostic Mode Test. If codes related to the EGR valve are present, refer to their troubleshooting procedures first.

DN22556,0000001 -19-21JUL11-1/1

EGR Valve — Learn Value Reset Instructions

For instructions on connecting to Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

The procedure resets the original stored values for the open and closed valve positions. For more information see [EGR Valve Operation](#) in Section 3 Group 135.

NOTE: This procedure is performed only when the EGR valve is replaced with a new valve.

NOTE: Replacing a valve to test for a bad valve (part swapping) is not recommended. It could cause several DTCs to set, because the values stored in the ECU will be out of tolerance when the new valve performs a learn.

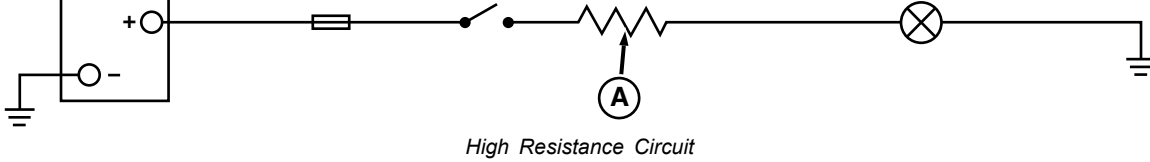
1. Ignition ON, engine OFF.
2. Select Tests and Calibrations in the Service ADVISOR shortcut bar.
3. Select Connected Calibrations. Select Interactive Calibrations. Select EGR Valve Learn Value Reset.
4. Follow the instructions in the diagnostic software.
5. Ignition OFF for 90 seconds.
6. Ignition ON, Engine OFF for 90 seconds minimum. The EGR valve now performs a learn process for minimum and maximum travel.
7. Refresh codes and address all active DTCs.

SS01820,00002DB -19-20JUL11-1/1

Electrical Circuit Concepts

Tests include making measurements of voltage and resistance, as well as checking for open circuits and short circuits. An understanding of Voltage (volts), Current (amps), Resistance (ohms), Open circuit, and Short circuit is required to properly diagnose electrical problems.

RG9891 —UN—03MAR08



A—Unwanted Resistance

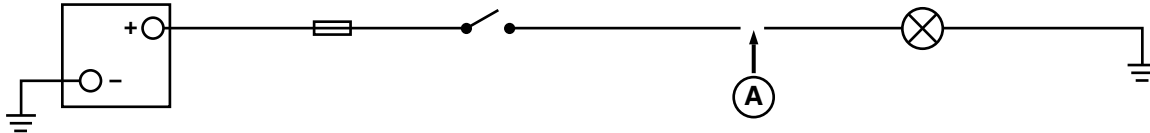
A circuit having unwanted resistance (A) that causes a voltage drop and reduces current flow.

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DN22556,000003E -19-27JUN12-1/6

2. Open Circuit:

RG9892 —UN—03MAR08

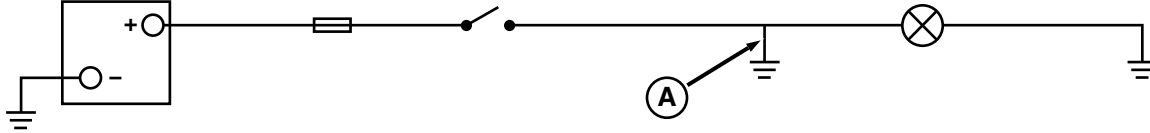


Open Circuit

A—Break or Separation in Circuit

A circuit having a break or a separation (A) that prevents current from flowing in the circuit.

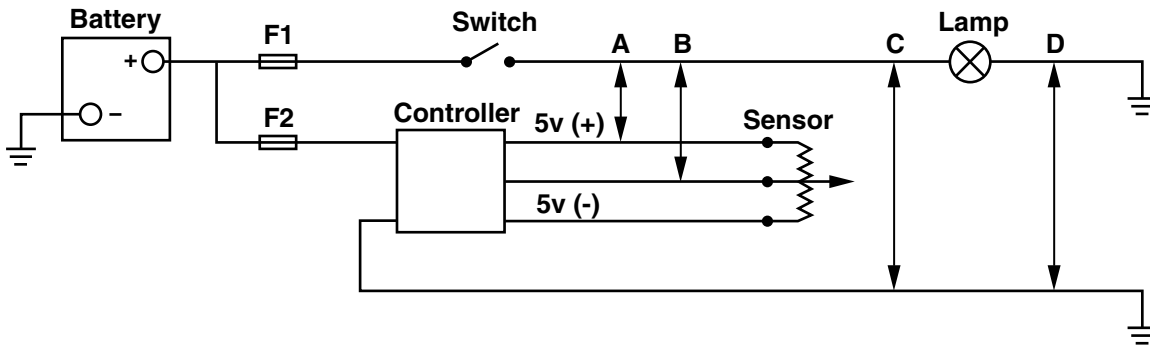
RG9893 —UN—04MAR08



Grounded Circuit

A—Voltage Wire in Contact with Machine Frame

A voltage wire in contact with the machine frame (A), providing continuity with the battery ground terminal.

3. Grounded Circuit:**4. Shorted Circuit:**

Shorted Circuit

A wire-to-wire contact of two adjacent wires that provides unwanted continuity between the two wires. The following are types of short circuits:

- (A) Voltage wire shorted to another voltage wire (wires of equal or unequal voltage).
- (B) Voltage wire shorted to a sensor signal wire (wires of unequal voltage).
- (C) Voltage wire shorted to a ground wire (wires of battery voltage or regulated voltage, shorted to a

ground wire connecting a component to the battery negative terminal).

- (D) Ground wire shorted to another ground wire (wires of zero voltage).

NOTE: The ground to ground type of short does not create an observable malfunction. Therefore, no further explanation for trouble shooting is necessary.

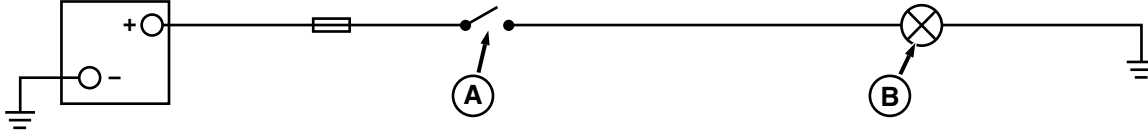
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DN22556,000003E -19-27JUN12-2/6

RG9894 —UN—12MAY10

Locations of Circuit Malfunctions:

RG9895 —UN—04MAR08



Locations of Circuit Malfunctions

A—Controlling Switch**B—Load**

In a “Simple Electrical Circuit” the circuit malfunctions occur at only three locations. They are:

1. Before the controlling switch (A).
2. Between the controlling switch (A) and the load (B).
3. After the load (B).

Electrical components can become faulty with the same three circuit malfunctions. Sometimes component malfunctions can easily be confused with circuit

malfunctions. Therefore, care must be exercised when isolating the cause of the problem.

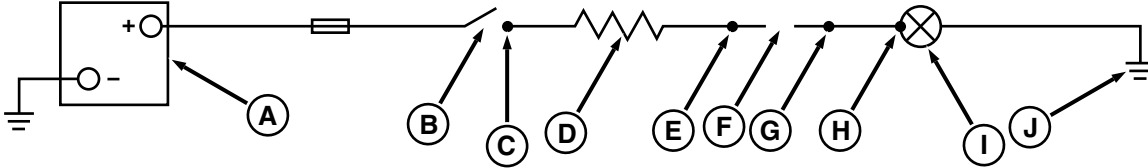
Example: A component may not operate before disconnecting an electrical connection, but it operates after reconnecting the connector.

Reason: Oxidation of the terminals created “High Resistance” and a voltage drop that prevents the proper amount of current flow to the component. Disconnecting and reconnecting the connector, removed some oxidation and reestablished good continuity through the connector.

DN22556,000003E -19-27JUN12-3/6

Electrical Circuit — Malfunction Troubleshooting

RG9896 —UN—04MAR08



Troubleshooting Circuit Malfunctions

A—Battery**B—Switch****C—Component Terminal****D—Unwanted Resistance****E—Circuit Connector****F—Open Circuit****G—Circuit Connector****H—Component Terminal****I— Load (Lamp)****J— Ground****1. High Resistance Circuit:**

A “High Resistance” circuit can result in slow, dim or no component operation (for example: loose, corroded, dirty, or oily terminals, gauge of wire too small or broken strands of wire).

2. Open Circuit:

An “Open” circuit results in no component operation because the circuit is incomplete (for example: broken wire, terminals disconnected, open protective device, or open switch).

Do the following to isolate the location of a “High Resistance” or “Open” circuit:

- a. With the controlling switch (B) closed (on) and the load (I) connected into the circuit, check for proper

voltage at a location easily accessible between (C) and (H).

- If voltage is low, move toward the voltage source (A) to locate the point of voltage drop.
- If voltage is correct, move toward the load (I) and ground terminal (J) to locate the voltage drop.

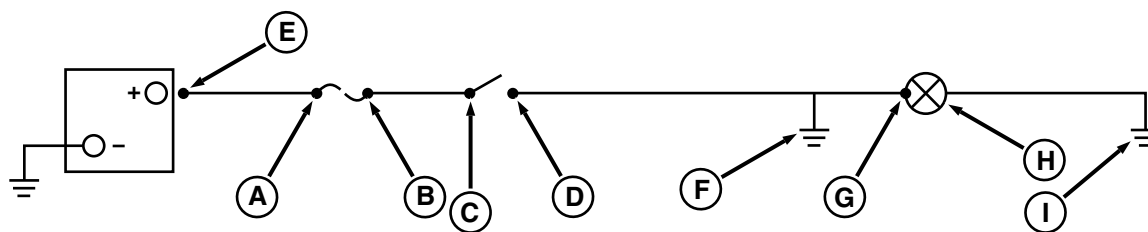
NOTE: The example shows high resistance (D) between (C) and (E) and the open circuit (F) between (E) and (G).

- b. Repair the circuit as required.

- c. After completing the repair verify problem is resolved.

Continued on next page

DN22556,000003E -19-27JUN12-4/6



RG9897 —UN—12MAY10

A—Fuse "A" Terminal
B—Fuse "B" Terminal

C—Switch
D—Component Terminal
E—Wire Terminal

Ground Circuit

F—Grounded Circuit
G—Component Terminal

H—Load (Lamp)
I—Ground

3. Ground Circuit:

A "Grounded" circuit (F) results in no component operation and the fuse or circuit breaker opens (for example: a power wire contacting the machine frame, chassis, or component housing).

Do the following to isolate the location of a "Grounded" circuit:

a. Switch (C) must be open (off). Check for continuity to ground between (D) and (I).

- If there is continuity, there is a grounded circuit between (D) and (I). Repair the circuit.

- No continuity, go to step b.

b. Disconnect the load (H) at component terminal (G).

c. With the controlling switch (C) open (off), check for continuity to ground between (D) and (G).

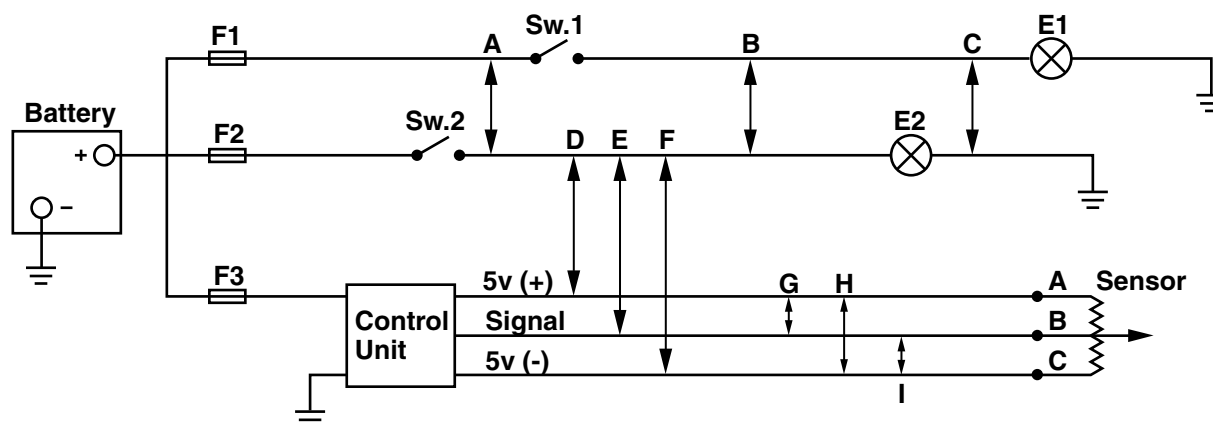
- If there is continuity, there is a grounded circuit between (D) and (G). Repair the circuit.

NOTE: The example is grounded between (D) and (G) at (F).

- Perform an operational check-out on the component after completing the repair.

Continued on next page

DN22556,000003E -19-27JUN12-5/6



Shorted Circuit

4. Shorted Circuit:

Machines equipped with several electronic control devices contain wiring harnesses that can become shorted by one of the following ways shown above.

1. Battery wire from fuse (F1) is shorted at (A) to another battery wire after switch (Sw.2).
- Result: Lamp (E2) is on all of the time.
2. Battery wire from fuse (F1) is shorted at (B) to another battery wire after switches (Sw.1 and 2).
- Result: Both lamps (E1 and E2) operate on either switch (Sw. 1 or 2).
3. Battery wire from fuse (F1) is shorted at (C) to a ground wire.
- Result: Fuse (F1) opens after closing switch (Sw. 1)
4. Battery wire from switch (Sw. 2) is shorted at (D) to a regulated voltage wire.
- Result: The sensor signal voltage is distorted. ¹
5. Battery wire from switch (Sw. 2) is shorted at (E) to the sensor signal voltage wire.
- Result: The sensor signal is distorted. ¹
6. Battery wire from switch (Sw. 2) is shorted at (F) to the sensor ground wire.
- Result: Fuse (F2) opens after closing switch (Sw. 2) and the sensor signal is distorted. ¹
7. Controller regulated voltage wire is shorted at (G) to the sensor signal voltage wire.
- Result: The sensor signal is distorted.
8. Controller regulated voltage wire is shorted at (H) to the sensor ground wire.
- Result: The sensor signal is distorted. ¹
9. Sensor voltage wire is shorted at (I) to the sensor ground wire.
- Result: The sensor signal is distorted. ¹

Do the following to isolate a "Shorted Circuit:"

- a. Review the machine electrical schematic to identify the circuits for the component that does not operate.
- b. Disconnect the components at each end of the circuits, to single out the affected wires.

¹The sensor signal voltage goes out of range and a fault code may be restored. The control unit may shut down or provide limited operation for its function.

c. Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used. DO NOT force meter probes into connector terminals.

d. Connect the meter leads across two of the affected circuits. The meter should show no continuity between the two circuits. Repeat the check across another combination of two circuits until all affected circuits have been checked.

e. Then, connect a meter lead to each affected circuit one at a time and touch the other meter leads to all terminals in the connector. The meter should show no continuity between any two circuits.
Example: A 37 pin connector contains three wires to a sensor. With one meter probe attached to each of the three wires, one at a time, touch the other meter probe to the remaining 36 wires. If there is continuity between any two wires, the circuit is shorted. Repair the circuit.

f. Alternate Method to Check for Shorted Circuit.
With the components disconnected at each end of the suspected circuits, turn on the key switch. Connect one meter lead to a good frame ground. With the other meter probe, touch each of the suspected circuits one at a time. If there is a voltage reading, the circuit is shorted to another voltage wire. Repair the circuit.

g. Repair the "Shorted Circuit" as follows:

- Wires not in a loom: Wrap individual wires with electrical tape or replace the damaged wire and band as required.
- Wires in a loom: If hot spots exist in shorted area of the harness, replace the harness. If hot spots are not noticeable, install a new wire of proper gauge between the last two connections. Use tie bands to secure the wire to outside of the harness.

h. After completing the repair verify problem is resolved.

RG11399—UN—04MAR08

Electrical Noise — Possible Causes

1. Radio
2. Citizen Band Radio
3. Damaged Wiring or Shielding
4. Nearby High Voltage Power Lines
5. Bad Grounds
6. Radio/Cellular Towers
7. Implements
8. Alternators
9. Global Positioning Systems
10. Any Other Aftermarket Electrical Devices

SS01820,00006CC -19-30JUN10-1/1

Electronic Injector - Calibration Information

Purpose:

The purpose of this test is to place the proper injector information in the ECU for each injector whether swapping them or installing a new one. Information in the ECU is specific for each injector and the cylinder that it is installed in. If the information is not correct, it could cause the engine to be out of emissions regulations or cause engine problems like low power.

A Service ADVISOR connection is required. In the Tests and Calibrations shortcut bar, select Connected Calibrations, select Interactive Tests, Select ECU - (Serial Number of the engine), select Injector Calibration.

Operation:

Options:

- Swap Injectors
- Change Information
- View History
- Exit
- Print

Swap Injectors:

This procedure is used when moving injectors from one cylinder to another to see if the symptom moves with the injector. When injectors are moved to different cylinders, the ECU needs to be updated with this information. Since the information for the existing injectors is already in the ECU, it needs to be moved to a different cylinder number. Select the "Swap Injectors" button and the screen displays a Swap To box for each cylinder, with a pull down menu that allows you to select the injector to transfer the information to. After making the selections and clicking on the "Next" button, Service ADVISOR will display the original injector information, the new injector information and ask for confirmation before actually moving the injector information. Pressing the "Yes" button will swap the injectors and pressing the "No" button will take you back to the previous screen to make the correction. Once the injectors information has been swapped press "Ok".

Change Information

If an injector is being replaced, then the information for that injector must be loaded into the ECU. This is

done by selecting the "Change Information" button. The screen displays a table showing the existing information that is stored in the ECU. There is a Change To box for each cylinder, with a pull down menu that allows you to select the injector to transfer the information to, if you have an injector calibration file (injector payload). For downloading injector calibration files, see [Payload File — Downloading Instructions](#) in Section 04 Group 160. If the injector calibration file is available, selecting the file that corresponds with the injector serial number installed in the cylinder automatically populates all information fields for that cylinder. If the specific calibration file for the injector was not downloaded then select Unlisted and enter the data manually. Once all the injector information has been updated, click the "Next" button, verify that the data entered is correct, and then click the "Yes" button.

View History

Anytime an injector calibration is performed with Service ADVISOR a history is kept for reviewing any injector changes in the past. This information is only kept on the computer that performed the injector calibration procedure. So if multiple computers are used, not all information will be in one history report.

Exit

Stops test and asks for Cancel confirmation. If "Yes" is Selected, test is exited. If "No" is selected then you are returned to the opening screen to start testing again.

NOTE: If you have changed some information and press Exit you will need to turn the key off for 120 seconds for the data to be properly stored in the ECU.

Print

Allows you to print what is displayed on the screen. For more information see [Interactive Tests and Calibration Results — Printing, Exporting, or Saving Instructions](#) in Section 04 Group 160.

IMPORTANT: When you connect back up to the Deere network the information you changed will be uploaded to Deere.

RG41183,00000FD -19-26JUL11-1/1

Engine Control Unit (ECU) — Reprogramming Instructions

IMPORTANT: Some applications may have more than one ECU on the same CAN Bus. All ECUs, except the one to be programmed, must be disabled by either disconnecting them or pulling their power fuse.

The ECU may be reprogrammed using Service ADVISOR. See eLearning under the Service ADVISOR help section.

Also, refer to the training material provided with your Service ADVISOR training course. All authorized Service ADVISOR users have received this training. On-line training is available at John Deere University, which is an internet-based distance-learning application.

ECU can be reprogrammed while not installed on the engine using appropriate components from kit [JDG11263](#).

SS01820,00002DE -19-07MAR12-1/1

Engine Hours — Updating Instructions

This procedure explains how to update the engine hours in the ECU. The opening screen displays the current operating hours and asks you to enter the new engine hours value.

IMPORTANT: Once the values have been saved to the ECU, the new hours cannot be less than the current hours displayed.

You can use whole and tenths of hours. You can change the value before you save it to the ECU, if you have made a mistake, or you can change it after you save it.

1. From the Short Cut bar select "Tests and Calibrations".
2. Select "Connected Calibrations".
3. Select "Data Input Calibrations".

NOTE: On applications that have more than one ECU you need to select that ECU from the list.

4. From the list select "ECU-Engine Serial Number".
5. Select "Engine Hourmeter".
6. On the first screen enter the new engine hours then click "Send".

7. The next screen asks if you want to proceed. Select the "Yes" button to continue and "No" button to return to the first screen.
8. The next screen displays the value you entered. If correct select the "OK" button. If not select the "Not OK" button to return to the first screen.

IMPORTANT: Be sure to cycle the key before selecting OK. If you do not cycle the key the screen displays "Calibration was successfully completed" even though it was not.

9. Next screen says to turn the Ignition OFF for 90 seconds then back ON. Wait 10 seconds, then press "OK" button.
10. The Next screen says "Calibration was successfully completed", if it was. If you want to run it again select "Yes". Select "No" to exit the calibration. Select the "Print" button to print the test results.

For more information on printing see, [Interactive Tests and Calibration Results — Printing, Exporting, or Saving Instructions](#) in Section 04, Group160.

SS01820,00002DF -19-21JUL11-1/1

Engine Overspeed Verification Test

Description:

The Engine Overspeed Verification Test will permit engine overspeed protection to be verified at a reduced engine speed.

IMPORTANT: This test should only be performed when instructed by a qualified engineer.

NOTE: This test is typically for industrial and marine engine applications that are configured for Engine Overspeed Verification.

Instructions:

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.
2. Ignition ON, engine running.

3. At slow idle, select Engine Overspeed Verification Test from the Test and Calibrations tab in Service ADVISOR.
4. Follow the directions on the screen to begin the Engine Overspeed Verification Test.

NOTE: Test speed and duration are set parameters. The parameters will be displayed at the beginning of the test.

5. Continue to follow the directions on the screen while test is in progress.
6. If the ECU detects fault codes 190.00 or 190.16, the test passed.
7. If the ECU does not detect any fault codes, run the test again.
8. If test fails again, contact DTAC for support.

BF67790,00001E9 -19-14FEB12-1/1

Exhaust Temperature Management Test Instructions

For instructions on connecting to Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160. For more information on the Exhaust Filter, see [Exhaust Filter Operation](#) in Section 03, Group 137.

The Exhaust Temperature Management Test is used for diagnostic purposes and to verify troubleshooting procedures by monitoring certain parameters and DTCs.

The Exhaust Temperature Management Test is a 20—30 minute test that attempts to raise DOC inlet and outlet temperatures to greater than 250 °C (482 °F) to help meet the conditions necessary to set or check certain DTCs. This test is also used to help relieve some exhaust filter symptoms such as DOC face plugging.

1. Ignition ON, engine running.

2. In the Service ADVISOR, select the Tests and Calibrations shortcut bar.
3. Select Connected Interactive Tests for the correct ECU level.
4. Select Exhaust Temperature Management Test
5. Follow the directions on the screen to begin the Exhaust Temperature Management Test.

NOTE: If DTCs are set or if a problem is detected, the test stops automatically and prompts you with those details. If this occurs, follow the instructions displayed and exit the test.

6. Continue to follow the directions on the screen while test is in progress.
7. If no problems are detected, the test passed.

BK34394,0000236 -19-28MAR11-1/1

Harness Diagnostic Mode Test

NOTE: Before performing this test, ensure that you have saved all Snapshot Captures and Snapshot Recordings. For more information see [Snapshot Instructions](#) in this group.

Purpose:

This procedure is designed to test the engine wiring harness and associated components for numerous types of errors. Including opens, shorts, actuator communication, and cycling.

Test Conditions:

This test can only be performed when the engine is not running. Cylinder fueling is disabled for all cylinders when the test is initiated. If the ECU senses an engine start request, the Harness Diagnostic Mode Test is aborted and the engine will start.

Test Operation:

The ECU continuously monitors the wiring harness and it also sets up and triggers some special tests. When the Harness Diagnostic Mode Test starts, all codes and related Snapshot information is erased from the ECU memory. The test starts and checks are made of various components. You may hear various actuators move, as the actuators do a learn cycle. The ECU compares these new learned values with the original values that were created when the part was new and last good learned. If the ECU determines the learned values are valid, it stores them as the last valid values, but does not change the original values. The ECU gathers test information as it runs the various tests. If it finds any problems during the test, it stores the code and display it at the end of the test.

Test Procedures:

1. In Service ADVISOR, select Tests and Calibrations from the shortcut bar.
2. Select "Connected Interactive Tests".
3. Select "Harness Diagnostic Mode Test".

NOTE: Before performing this test, ensure that you have saved all Snapshot Captures and Snapshot Recordings. For more information see [Snapshot Instructions](#) in this group.

4. A screen appears with a list of all the ECU codes (active and stored) and an Occurrence Count. These codes are presently active or stored in the ECU.
5. Press "Next" to start the test, "Cancel" to exit the test, or "Print" to print a list of the codes. For more information on printing see [Interactive Tests and Calibration Results — Printing, Exporting, or Saving Instructions](#). After pressing "Next" follow the directions on the screen.
6. At the end of the test, another list of codes are presented.
7. Go to those DTCs displayed and troubleshoot them to resolve the problem, starting with the active codes.

NOTE: If a stored code does not show back up after the test, it may be a bad or intermittent connection. You may want to run the test again while performing the wiggling the wiring harness to see if the code reappears. If it does, check the harness and connector for problems.

SS01820,00002E1 -19-30MAR11-1/1

Interactive Tests and Calibration Results — Printing, Exporting, or Saving Instructions

In Service ADVISOR, the user can print or save the results screen of interactive tests and calibrations. The user can also export entire jobs for technical review that include the test or calibration results.

With a live connection to the ECU:

Perform your selected test or calibration.

Printing or Saving Results from an Interactive Test or Calibration:

Perform your selected test or calibration. When complete, perform the steps below.

1. Select the "Print" button.
2. In the dialog box that opens:
 - a. Select your printer to print a hard copy.
 - b. Select PDF to save a PDF copy to the location you want.
 - c. Select Microsoft XPS Document Writer to save as an internet viewable file.

To Export or Save a "Job":

1. Select "File" from the Menu bar.

2. Select "Open/Manage Jobs" from the drop-down list.
3. Your current job will already be open.
4. If you need to Export a different job, select the job from the list. This terminates your current readings connection to the ECU.
5. Do not select "Open Job" at this time, or the dialog box is closed and you will need to go back to step 2.
6. Select "Edit Job" to add description or serial number information if needed.
7. Select "OK".
8. Select "Export Job".
9. Fill in details and attachments as applicable.
10. Select the "Export Type".
11. Select "DTAC Case" and add your case number if applicable.
12. Select "Attach File" and add any attachments as needed.
13. Select "Save" to save the Job to the hard drive as a Zip file.
14. Select "Send" to send the job to the Export Type selected.
15. If "Send" is selected, the job is exported directly to a .ftp server that is viewable by authorized John Deere personnel. Make sure that you contact the person who is to receive the information and inform them that you have exported the data.

SS01820,00002E2 -19-30JUN10-1/1

Internal Data Monitor — Instructions

Internal Data Monitor (IDM) is a feature in Service ADVISOR that is used for recording multiple data points monitored by the Engine Control Unit (ECU) at a selectable sample rate. The number of data points selected for recording and the sample rate that is selected determines the length of the recording. These recordings are stored internally in the ECU RAM memory and then uploaded to Service ADVISOR.

Selecting Data Points: To select a data point, place the cursor over the name of the data point and click. To select more than one data point hold down the Ctrl key on the keyboard and click on the data points to be recorded. A maximum of 32 data points may be selected.

NOTE: If you make a mistake and do not hold the Ctrl key down, you must go back and re-select all other data points you selected. You can un-select a data point by holding down the Ctrl key and clicking on the data point.

Select Sampling Rate: Choose desired sample rate from the drop-down menu.

NOTE: The sample rate is how often the ECU gathers the information and stores it. Selecting 5 ms (5 milliseconds or 0.005 seconds) means every 5 ms the ECU takes and stores data. Selecting 1000 ms (1 second) means every 1000 ms the ECU gathers and stores data. The faster the sample rate more often the data is taken, reducing the available recording time. The number of data points selected also affects recording time.

Start Trigger Modes:

- **One Time** – This mode records the data points selected at the selected sample rate selected until the allocated ECU RAM memory is full or user clicks “Stop”.
- **Continuous** – This mode records the selected data points until the user clicks “Stop” to stop the recording session.

NOTE: If the estimated recording time is exceeded and the allocated ECU RAM memory is full the data collected starts over writing the oldest data in that allocated memory area

- **Internal** – This mode allows the user to record the selected data points triggered by selected data point value(s). You can set a trigger using One Data Point or Two Data Points. Select the data point(s) you want to use as start trigger(s) from the drop-down list. There are three start trigger conditions: Equal To, Greater Than, and Less Than. Also there is a user-defined trigger value. The options allow a maximum of two different data points to control start triggering. If the Two Data Point start trigger is selected there is a selection for an operand of either an And or an Or between the two. Here is an example using two start trigger data points:

Engine RPM Greater Than 1000 rpm And Engine Load Less Than 50%. The recording begins when both data point trigger values are met.

Stop Trigger Modes of Internal Start Trigger Mode:

- **One Time** – In this mode the recording stops when the allocated ECU RAM memory is full or user clicks “Stop”.
- **Continuous** – In this mode the recording stops when the user selects the “Stop” button.

NOTE: If the estimated recording time is exceeded and the allocated ECU RAM memory is full the data collected starts over writing the oldest data in that allocated memory area

- **Internal** – In this mode the recording stops when triggered by the selected stop data point value(s). You can set a trigger using One Data Point or Two Data Points. Select the data point(s) you want to use as stop trigger(s) from the drop-down list. There are three stop trigger conditions: Equal To, Greater Than, and Less Than. Also there is a user-defined trigger value. The options allow a maximum of two different data points to control stop triggering. If the Two Data Point stop trigger is selected there is a selection for an operand of either an And or an Or between the two. Here is an example using two stop trigger data points: Engine rpm Greater Than 1000 rpm, Or Engine Load Less Than 50%. The recording stops when both data point trigger values are met or “Cancel” is selected.

IMPORTANT: Recordings made with IDM are stored temporarily in the ECU RAM memory, so if a power interruption occurs while the recording is being made or downloading it to Service ADVISOR, the recording is lost.

Set Up Procedure:

1. Connect Service ADVISOR, see [Connecting To Service ADVISOR](#) in Section 04, Group 160.
2. In Service ADVISOR, select tests and Calibrations from the short cut bar.
3. Select Connected Interactive Tests.
4. Select Internal Data Monitor.
5. Select the data points you want to record and click the “Next” button to continue.
6. The different start trigger modes for recording IDM data are shown below.

One Time:

1. Select the start trigger mode One Time. Select the desired sampling rate then click “Next” to continue.
2. Ensure the data points you selected are displayed on the screen. Click “Next” to continue.

Continued on next page

SS01820,00002E4 -19-21JUL11-1/3

NOTE: The software estimates the recording length and displays it on the screen.

3. Click "Start" to begin recording. Once the recording is complete or user clicks "Stop", Service ADVISOR automatically begins to upload the recording from the ECU to the computer used to connect to the ECU.
4. Once Service ADVISOR has completed the upload, the screen displays the name and location of the recording. In WINDOWS® XP this location is: C:\Documents and Settings\All Users\Application Data\Service ADVISOR\Recording-Files\IDM_RG6090M123456_20100518_200637.zip, where IDM_RG6090M123456_20100518_200637.zip is the name and C:\Documents and Settings\All Users\Application Data\Service ADVISOR\Recording-Files is the location. This is the default location.
5. Select "Yes" or "No" to run this test again.

NOTE: You are required to re-enter your previous selections or enter new selections to run the test again. The software does not automatically remember your previous selections.

See [Recording Playback](#) in this procedure to play a recording.

Continuous:

1. Select the start trigger mode Continuous. Select the desired sampling rate then click "Next" to continue.
2. Ensure the data points you selected are displayed on the screen. Click "Next" to continue.

NOTE: The software estimates the recording length and display it on the screen.

3. Click "Start" to begin recording. The recording stops when the "Stop" button is pressed. Once the recording is complete, Service ADVISOR automatically begins to upload the recording from the ECU to the computer used to connect to the ECU.
4. Once Service ADVISOR has completed the upload the screen displays the name and location of the recording. In WINDOWS® XP this location is: C:\Documents and Settings\All Users\Application Data\Service ADVISOR\Recording-Files\IDM_RG6090M123456_20100518_200637.zip. Where IDM_RG6090M123456_20100518_200637.zip is the name and C:\Documents and Settings\All Users\Application Data\Service ADVISOR\Recording-Files is the location. This is the default location.
5. Select "Yes" or "No" to run this test again.

NOTE: You are required to re-enter your previous selections or enter new selections to run the test again. The software does not automatically remember your previous selections.

See [Recording Playback](#) in this procedure to play a recording.

Internal:

1. Select the start trigger mode Internal. Select the desired sampling rate then click "Next" to continue.
2. In the pull down menu "Select number of start triggers", select One Data Point or Two Data Points.
3. In the "Select trigger options for data point 1" use the pull down menu to select the data point that is to be designated as the start trigger. Then select the condition from the pull down menu and enter a trigger value.
4. If two data point start triggers are selected, in the "Select trigger options for data point 2" use the pull down menu to select the data point that is to be designated as the start trigger. Then select the condition from the pull down menu and enter a trigger value. Enter the operand And/Or based on your desired trigger mode.
5. Click "Next" to continue to the next screen.
6. Select the stop trigger mode from the pull down menu and click "Next".

NOTE: If you selected One Time or Continuous start triggering skip to step 11.

NOTE: See [Stop Trigger Modes of Internal Start Trigger Mode](#) above for specific information about stop trigger modes.

7. In the pull down menu "Select number of stop triggers", select One Data Point or Two Data Points.
8. In the "Select trigger options for data point 1" use the pull down menu to select the data point that is to be designated as the stop trigger. Then select the condition from the pull down menu and enter a trigger value.
9. If two data point start triggers are selected, in the "Select trigger options for data point 2" use the pull down menu to select the data point that is to be designated as the stop trigger. Then select the condition from the pull down menu and enter a trigger value. Enter the operand And/Or based on your desired trigger mode.
10. Click "Next" to continue setup.
- NOTE:** The software will estimate the recording length and display it on the screen.
11. Confirm the data points you selected and the recording setup displayed on the screen are correct. Click "Next" to continue or "Back" to make changes.

12. Click "Start" to begin the recording. When all trigger(s) that were configured are met, the recording begins and records until the stop trigger(s) settings are met or the memory is full or "Stop" or "Cancel" is selected, depending on the type of stop trigger you selected.
13. Once the recording is complete, Service ADVISOR automatically begins to upload the recording from the ECU RAM to the computer used to connect to the ECU.
14. Once Service ADVISOR has completed the upload, the screen displays the name and location of the recording. In WINDOWS® XP this location is: C:\Documents and Settings\All Users\Application Data\Service ADVISOR\Recording-Files\IDM_RG6090M123456_20100518_200637.zip, where IDM_RG6090M123456_20100518_200637.zip is the name and C:\Documents and Settings\All Users\Application Data\Service ADVISOR\Recording-Files is the location. This is the default location.
15. Select "Yes" or "No" to run this test again.

See Recording Playback in this procedure to play a recording.

Recording Playback:

In WINDOWS® XP the default IDM recording location is "C:\Documents and Settings\All Users\Application Data\Service ADVISOR\RecordingFiles\". The IDM prefix means that the file is an IDM recording.

Example:

IDM_RG6090R123456_20100330_113523.zip was created on March 30, 2010 at 11:35:23 AM.

To playback a recording from the Shortcut Bar:

1. Select the Disconnect From Model(s) icon to disconnect from the current connection, if you are connected live or viewing a recording.

NOTE: If you do not disconnect when you try to open a recording a popup box appears that says "This will terminate your Readings connection. Would you like to proceed?" Select "Yes" so you can open or import your recording.

2. Select Recordings in the Readings shortcut bar of Service ADVISOR.
3. Select the recording you want to view.

NOTE: If the recording you want to view is not listed, see To import a recording to playback in this procedure.

4. Now view the recording as though it was a live connection.

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IMPORTANT: The Disconnect From Model(s) icon displays as though a real connection is being made. Do not forget this is a recording of a live connection.

5. To close the recording select the Disconnect From Model(s) icon. A window appears that says "This will terminate your Readings connection. Would you like to proceed?" Select "Yes" so you can close your recording.

To import a recording to playback:

1. Select the Disconnect From Model(s) icon to disconnect from the current connection, if you are connected live or viewing a recording.

NOTE: If you do not disconnect when you try to open a recording a popup box appears that says "This will terminate your Readings connection. Would you like to proceed?" Select "Yes" so you can open or import your recording.

2. From the Menu bar, click on Readings.
3. Click on Recordings.
4. Click Open / Manage Recordings. The Open / Manage Recordings window appears.
5. Click "Import" and a Browse for Folder window appears, where you can select the file you want to view.
6. Select the file you want to view and press "OK". The recording is opened in Service ADVISOR.
7. A window appears that says "The recording file "name of file" import was successful. Would you like to replay this recording now?" Select "Yes" to open the file in Service ADVISOR. Select "No" if you do not want to open the file at this time.

NOTE: You can import the file for playback at a later time or import several so you can have them available to view at a later time.

8. Now view the recording as though it was a live connection.

IMPORTANT: The Disconnect From Model(s) icon displays as though a real connection is being made. Do not forget this is a recording of a live connection.

9. To close the recording select the Disconnect From Model(s) icon. A window appears that says "This will terminate your Readings connection. Would you like to proceed?" Select "Yes" so you can close your recording.

Keep Electronic Control Unit Connectors Clean

IMPORTANT: Keep terminals clean and free of foreign debris. Moisture, dirt and other contaminants may cause the terminals to erode over time and not make a good electrical connection.

1. If a connector is not in use, put on the proper dust cap or an appropriate seal to protect it from foreign debris and moisture.

IMPORTANT: Do not probe through the wire insulation or through the back of the connector. Do not insert items such as paper clips or wires into connector terminals.

2. Make measurements on a connector terminal using JDG10466 Flex Probe Kit in SERVICEGARD.
3. Observe the locking mechanism of the connector when disconnecting and reconnecting.
4. Do not pull on wires to disconnect.
5. Before reconnecting:
 - Look for bent terminals; do not force connectors into each other.
 - Replace any terminal where corrosion exists.
 - Clean the connector of any foreign debris.
 - Dry the connector of any moisture.
6. When reconnecting, make sure seals around the connector pairs are functional.

DX,WW,ECU03 -19-11JUN09-1/1

Load Profile Information Test — Instructions

Overview

The Engine Load Profile Information interactive test is a tool meant to allow the John Deere technician to determine usage of the engine over time. This usage data can assist when diagnosing certain problems. The load information is displayed from left to right with zero engine speed and zero load percentage displayed as the start point on the lower left with the maximum load and maximum speed operating points displayed on the upper right hand side of the graph.

NOTE: Do not compare the Percent Load at Current Speed parameter directly with the Engine Load Profile Information test results. The two parameters are calculated differently and cannot be used in direct comparison.

NOTE: Total engine hours and amount of time stored in the Engine Load Profile Information may not be the same based on whether or not the ECU has been replaced and whether the original data was transferred to the new ECU. Whenever possible, make sure to connect the old ECU when prompted during the ECU Programming process.

The test displays information in two ways or views, an **updated view** and **original view**. The updated view provides the following features

Updated View

The view will be selected for the technician when the test is started. If the test cannot automatically identify the vehicle or engine model that matches the database, the data will be displayed in the original view. Data will be displayed as a percentage of overall engine operating time. Generally it can be assumed that the percentages displayed are based on the total engine hours displayed in the same screen. See warning #2 for exceptions. A four color system will be used to highlight the areas of operation that are the most significant. The colors in order from least amount of time to most amount of time are white, yellow, orange, and dark orange. A blue reference curve will be displayed overtop of the data. The blue reference curve represents the general operating range of that application. The updated view is intended for all Tier-3 and later applications that have Flex Power, except Generator Set and Marine applications.

Also, the current list of applications which will be displayed using the updated view is expanding daily. Currently that list includes most Tier 3 AG and C&F applications. IT4 applications will be released shortly. All other updates will coincide with the release dates of other new engine models.

Original view

The original view displays time at load (Y-axis) and engine speed (X-axis) on a 15 by 15 grid. This load data is considered raw and may or may not appear to be skewed (up or down) based on the application and what the user

expects to see within that data. Please see the note at the beginning of the procedure for the explanation.

If you run the test and it displays the data in the original view please see the list of applications later in this solution that can be accurately reviewed without assistance from DTAC. If your engine/application uses the original view to display the data and it is not on the list you will need to contact DTAC for additional assistance.

Application List

The list below includes applications which can be viewed in Original view without assistance from DTAC.

SPFH-Zweibrücken

7350, 7450, 7550 & 7750 Self Propelled Forage Harvester
7250 Self Propelled Forage harvester (Non-EGR)
7350 Self Propelled Forage harvester (Non-EGR)
7450 Self Propelled Forage harvester (Non-EGR)

Tractors-Saltio

5075M
6115M
6130M
6140M
7220 Tractor T1 OOS
7320 Tractor T1 OOS
7420 Tractor T1 OOS
7520 Tractor T1 OOS

Tractors-Waterloo

5075M
6115M
6130M
6140M
7220 Tractor T1 OOS
7320 Tractor T1 OOS
7420 Tractor T1 OOS
7520 Tractor T1 OOS

Windrower - Thibodaux

R450 and D400

Loaders - Davenport

444K* (*Series II Only)
524K*
544K*
624K*
625KR*
644K*
724K*
744K*
824K*
844K*
J Series Loaders

Loaders - Thibodaux

SP1850

SP2224

210LJ Landscape Loader

Skidders - Davenport

540G

548G

640H

648H

748H

848H

SII Series Skidders

Articulated Dump Trucks - Davenport

250D

300D

350D

Test Procedure

1. Open Service ADVISOR™.
2. Add the model to the job (use the machine model or the engine model).
3. Click on 'Tests and Calibrations' in the left hand shortcut bar.

4. Double-click on the model, and then double-click on 'Connected Interactive Tests' to expand the folders. Service ADVISOR™ will make a Readings connection.
5. Click on the Interactive Tests shortcut again. You may need to expand the folder for the ECU.
6. Double-click on the interactive test 'Load Profile Information Test'.
7. OEM engine applications will need to select "Genset" or "Other" as appropriate
8. The test will then take 15-20 seconds to return the data.
9. The data will either be displayed in the updated view or the original view.

Saving the data

There are two options to save the data. The first option is to print the data.

The second option is to select the Save button. The save button will save the raw data only to your Service Advisor Readings folder. This file can then be attached to an E-mail or DTAC case if requested.

VP98307,000000A -19-05JUN12-2/2

Payload File — Component Payload Downloading Instructions

NOTE: An Internet connection is needed.

Electronic components on this engine have specific settings for optimum performance and to maintain emissions compliance. To maintain these settings, when any of the electronic components are replaced or swapped, the ECU needs to be reprogrammed with the correct settings for that component. This is done by performing the applicable calibration in Service ADVISOR.

The default location for the files to be downloaded to is "C:\sds\payloadsn".

To download a component payload file:

1. Connect to the internet.
2. In Service ADVISOR, select "Program" from the Menu Bar.
3. Select "Download Payloads" from the drop-down list.
4. On the John Deere Custom Performance web page that comes up, click on the "Calibrated Component Search" tab.
5. Select the tab for the component you are downloading the payload for.

NOTE: For injectors, first select the type of search you would like to do.

6. Type in the required information.

IMPORTANT: If you mis-typed one of the numbers it may be a valid component but not the one you want which could cause problems when updating the ECU or operation of the engine.

7. Verify the information you typed in.
8. If the information is correct click the "Submit" button.
9. Verify the information displayed is correct.
10. If the information is not for your item, click on the "Search Again" button and repeat steps 5 - 10.
11. If the information is correct click the "Download Selected" button.
12. A window will popup and tell you if the file was downloaded successfully.

SS01820,00002E5 -19-09MAY12-1/1

Payload File — ECU Payload Downloading Instructions

NOTE: An Internet connection is needed.

Electronic components on this engine have specific settings for optimum performance and to maintain emissions compliance. To maintain these settings, when any of the electronic components or an engine are replaced or swapped, the ECU needs to be reprogrammed with the correct settings for that component. This is done by downloading the applicable calibration in Service ADVISOR.

The default location for the files to be downloaded to is "C:\sds\payloadsn".

To download an ECU payload file:

NOTE: If at anytime during this procedure any errors appear that prevent the payload from being downloaded, contact DTAC.

1. Connect to the internet.
2. In Service ADVISOR, select "Program" from the Menu Bar.
3. Select "Download Payloads" from the drop-down list.
4. On the John Deere Custom Performance web page that comes up, click on the "Serial Number Search" tab.
5. Type in the engine serial number you are downloading the payload for.

NOTE: If you are downloading a payload for a replacement engine, enter the serial number of the replacement engine. After this is done you will be prompted to enter the serial number of the engine that was replaced.

6. Verify the information you typed in.
7. If the information is correct click the "Submit" button.
8. Verify the information displayed is correct.
9. If the information is not for your engine, click on the "Search Again" button and repeat steps 5 - 10.
10. If the information is correct click the "Download Selected" button.
11. Another window pops up titled "Download Controller Options".
12. Select one of the options and fill in the required information.
13. Verify the information you typed in.
14. If the information is correct click the "Submit" button.
15. A window will popup and tell you if the file was downloaded successfully.

RE42287,0000DC5 -19-07JUN12-1/1

Regeneration Abort Source Identification Test — Instructions

Description:

The Regeneration Abort Source Identification Test displays the reason(s) that up to the last five DPF regenerations were aborted by the ECU.

NOTE: Fuel dosing must have been commanded by the ECU for a failed DPF regeneration to be considered as aborted by the ECU.

The results of this test can be used to help determine the reason parked regenerations or DPF Recovery are needed.

The results from this test can be saved as a file, and attached to a DTAC case.

Instructions:

1. Ignition ON, Engine OFF.
2. Select Regeneration Abort Source Identification Test in the Connected Interactive Test under the Tests and Calibrations tab in Service ADVISOR.
3. Select OK to initiate the test.
4. If aborted regeneration causes are present, print or save the results.
5. Restart or Exit the test.

RG40049,0000A8D -19-22MAR11-1/1

Regeneration Failure — Possible Causes

Diagnostic Trouble Codes (DTCs) that Inhibit Regeneration (Prevent Exhaust Filter Cleaning)

SPN/FMI	Fault Name
000027.03	EGR Valve Position Signal Out of Range High
000027.04	EGR Valve Position Signal Out of Range Low
000051.03	Air Throttle Actuator Position Signal Out of Range High
000051.04	Air Throttle Actuator Position Signal Out of Range Low
000102.03	Manifold Air Pressure Signal Out of Range High
000102.04	Manifold Air Pressure Signal Out of Range Low
000102.07	Manifold Air Pressure Signal In Range Invalid
000105.03	Manifold Air Temperature Signal Out of Range High
000105.04	Manifold Air Temperature Signal Out of Range High
000641.07	VGT Actuator Desired and Actual Position Mismatch During a Learn
000641.13	VGT Actuator Calibration Error
001209.03	Exhaust Manifold Pressure Signal Out of Range High
001209.04	Exhaust Manifold Pressure Signal Out of Range Low
001209.07	Exhaust Manifold Pressure Mismatch
002659.03	EGR Flow Signal Out of Range High
002659.04	EGR Flow Signal Out of Range Low
002791.07	EGR Valve Desired and Actual Position Mismatch During a Learn
002791.13	EGR Valve Calibration Error
003246.12	DPF Outlet Temperature Error
003464.07	Air Throttle Actuator Desired and Actual Position Mismatch During a Learn
003464.13	Air Throttle Actuator Calibration Error
003465.07	Exhaust Throttle Actuator Learn Error
003465.13	Exhaust Throttle Actuator Calibration Error

SPN/FMI	Fault Name
003511.03	Sensor Supply #3 Voltage Out of Range High
003511.04	Sensor Supply #3 Voltage Out of Range Low
003936.00	Calculated Unintended Combustibles In DPF Extremely High
003936.15	Calculated Unintended Combustibles In DPF Slightly High
003936.16	Calculated Unintended Combustibles In DPF Moderately High
004765.12	DOC Inlet Temperature Error
004766.12	DOC Outlet Temperature Error
004766.16	DOC Outlet Temperature Moderately High
004766.17	DOC Outlet Temperature Slightly Low
004766.18	DOC Outlet Temperature Moderately Low
004795.13	DPF Calibration Error
005018.00	Calculated Unintended Combustibles In DOC Extremely High
005018.15	Calculated Unintended Combustibles In DOC Slightly High
005018.16	Calculated Unintended Combustibles In DOC Moderately High
005298.01	DOC Efficiency Extremely Low
005298.18	DOC Efficiency Moderately Low

Other Possible Causes of Failed Automatic Regenerations (Auto Exhaust Filter Cleaning)

NOTE: Perform Parked/Manual Regeneration (Exhaust Filter Cleaning) when prompted if Auto Regenerations are failing with no fault codes.

- Increased amount of transient operations
- Extended idle time
- Other application specific items

BK34394,0000DED -19-08AUG11-1/1

Service Regeneration Instructions

For instructions on connecting to Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160. For more information on the Exhaust Filter, see [Exhaust Filter Operation](#) in Section 03, Group 137.

NOTE: A Service Regeneration can be performed when the application meets the conditions for a Parked/Manual Exhaust Filter Cleaning. For more information on these conditions, see the application Operator's Manual.

1. Ignition ON, engine running.
2. Ensure the application exhaust filter cleaning mode is enabled. For more information on enabling exhaust filter cleaning, see the application Operator's Manual.
3. Select Connected Interactive Tests in the Service ADVISOR Tests and Calibrations shortcut bar.
4. Select Service Regeneration.
5. Follow the directions on the screen. Select the type of Service Regeneration to be performed:
 - Service Regeneration — An active regeneration with fuel dosing. During this test the ECU also performs additional diagnostics on the DPF.
 - DPF Service Recovery — An approximately 3 hour long process which begins with a passive regeneration without fuel dosing. After the passive regeneration is complete, the ECU determines if an active regeneration with fuel dosing is required to further clean the DPF. If needed, the ECU will automatically start the active regeneration upon completion of the passive regeneration.

NOTE: If you select a Service Regeneration and it automatically prompts you that a DPF Service Recovery is necessary, this is because the soot level in the exhaust filter is very high or at the Service Only level.

NOTE: DO NOT begin a DPF Service Recovery unless you are absolutely certain that one needs to be performed. Once selected, the DPF Service Recovery runs until it is completed.

CAUTION: Prior to the Service Regeneration or DPF Service Recovery procedure being performed, make sure that there is adequate fuel in the machine and be aware that:

1. This DPF service recovery cleaning takes approximately 3 hours.
2. Verify exhaust filter, components, and outlet are free of debris.
3. Keep exhaust outlet away from people and anything that can melt, burn, or explode.
4. Closely monitor the machine and surrounding area while the Service Regeneration or DPF service recovery are being performed.
6. At the end of the Service Regeneration, return to the DTC or troubleshooting procedure that you came from and continue to follow those instructions. If there are no more instructions or if you did not come from a procedure, troubleshoot any new DTCs, beginning with any active ones.

BK34394,0000237 -19-29MAR11-1/1

Servicing Electronic Control Units

IMPORTANT: Do not open control unit and do not clean with a high pressure spray. Moisture, dirt and other contaminants may cause permanent damage.

1. Control units are not repairable; replace only if indicated in the diagnostic procedure.
2. Since control units are the components LEAST likely to fail, isolate failure before replacing by completing the diagnostic procedure.
3. The wiring harness terminals and connectors for electronic control units are repairable.

IMPORTANT: Misleading diagnostic messages and poor performance may occur if an electronic control unit is not programmed identical to the original controller.



RG16946 —UN—31MAR09

4. Before putting back into service, verify the control unit is programmed identical to the original controller.

DX,WW,ECU01 -19-11JUN09-1/1

Snapshot Instructions

NOTE: To view Snapshot information Service ADVISOR is required.

Snapshot information is categorized in two types, Snapshot Capture, and Snapshot Recording. Snapshot information is generated when an engine DTC is set.

- **Snapshot Capture** - Is a snapshot of specific Data Points at the exact instant in time that the DTC was set. All engine DTCs have a Snapshot Capture associated with them. This information also contains the engine hours for the first and latest occurrence of the DTC.
- **Snapshot Recording** - Is a short recording of specific data points when certain DTCs are set. The recording will include data point readings for a short period before and after the DTC was set. These are normally 2—5 seconds long, depending on the DTC that was set. Only specific DTCs have a Snapshot Recording associated with them when the DTC is set. If the DTC Count is greater than one then the snapshot recording could contain playbacks of the first and latest occurrences and can be played back by selecting the occurrence to be viewed.

IMPORTANT: It is important to save all Snapshot information before clearing DTCs or running the Harness Diagnostic Mode Test. Once codes have been cleared then the Snapshot information is also cleared. For help in troubleshooting engine DTCs it is recommended not to clear codes until the problem has been resolved.

NOTE: To save all Snapshot Capture and Snapshot Recording information, at one time, click the “Save All Snapshots” button at the bottom of the screen.

NOTE: Snapshot Capture and Snapshot Recording files are stored in “C:\Documents and Settings\All Users\Application Data\Service ADVISOR\RecordingFiles”.

Viewing a Snapshot Capture

1. With a live connection already established with Service ADVISOR, click on the Get Diagnostic Trouble Codes icon to get codes.
2. The window displays all active and stored codes. In this window there is a button displayed for each DTC to get the Snapshot Capture information.
3. To view the Snapshot Capture information for a DTC, click the “Snapshot Capture” button under the Status and Counts columns for that DTC. At the same time the information is being displayed in the Service ADVISOR window, Service ADVISOR is downloading this information for viewing off-line.

Viewing a Snapshot Recording

1. With a live connection already established with Service ADVISOR, click on the Get Diagnostic Trouble Codes icon to get codes.
2. The window displays all active and stored codes. In this window there is a button displayed for each DTC to get the Snapshot Recording information.
3. To view the Snapshot Recording information for a DTC, click the “Snapshot Recording” button under the Status and Counts columns for that DTC. At the same time the information is being displayed in the Service ADVISOR window, Service ADVISOR is downloading this information for viewing off-line.
4. Click on the play button to start the playback of the recording. For more information about playing a recording and other options available select “Help” from the menu bar and then select either “Help Topics” or “Service ADVISOR eLearning”.

Importing a Snapshot Recording for playback when off-line can be found in “C:\Documents and Settings\All Users\Application Data\Service ADVISOR\RecordingFiles”.

Viewing a Snapshot Capture or Snapshot Recording Off-Line

1. Select “Readings” from the Menu Bar.
2. Select “Recordings” from the drop-down list.
3. Select “Open / Manage Recordings” from the expanded drop-down list.
4. Select the capture or recording you would like to view then Click the “Open” button.

NOTE: If the capture or recording you want to view is not in the list click the “Import” button. For instructions on how to Import a file, see Importing Snapshot Files below.

5. The item selected opens in the recording window.

Importing Snapshot Files

1. Select “Readings” from the Menu Bar.
2. Select “Recordings” from the drop-down list.
3. Select “Open / Manage Recordings” from the expanded drop-down list.
4. Click the “Import” button.

NOTE: The Browse For Folder dialog box opens to the “C:\Documents and Settings\All Users\Application Data\Service ADVISOR\RecordingFiles” folder.

5. Select the folder where the item you want to import is located.

Continued on next page

SS01820,00002E6 -19-16FEB11-1/2

6. Click on the "OK" button and the import process starts.
7. A dialog box is displayed saying import successful and ask if you want to view it.
8. Click on the "No" button if you want to import more files.
9. Click on the "Yes" button to view the item.
2. Select "Help Topics" from the drop-down list.
3. Type in "export" in the keyword box.
4. Select, "Export Recording File" and follow the instructions.

Exporting a Snapshot Capture or Snapshot Recording

1. Select "Help" from the Menu Bar.

SS01820,00002E6 -19-16FEB11-2/2

Trim Options Information

Trim options refer to engine parameters and configuration settings that can be adjusted or set during the engine ECU programming sequence. These features can be used to customize engines for individual OEM customers. All OEM FT4 electronic engines have the trim feature.

There are four drop-down boxes at the top of the page that are used to select:

- Application
- Trim Software
- Engine Model
- Rated Speed

The pages are divided into tab sections based on what features are covered in each section. Options within the tabs are determined by the selections above.

Trim options information is sectioned into the following tabs:

- Sensor Configuration
- CAN Configuration
- Output Configuration
- Exhaust Filter
- Speed Control
- Governors
- Engine Protection
- Variable Speed Fan
- Pressure Control
- Report Option

IMPORTANT: Each section contains a "Help" button. Click on the button for complete information on the subject that you have selected. Be sure that you have selected the correct parameter before making changes. The trim page settings affect normal engine operation as well as engine protection settings.

NOTE: The programming process can be used to view and verify current settings in the trim pages OR to make changes. When programming an engine ECU and trim changes are not required, simply click through the page without making changes. Normal ECU programming then continues. If changes are required, they need to be made at this time.

To update or view the trim features, use Service ADVISOR to download the software payload file for the engine being programmed. Start the programming sequence using the normal procedures. The trim page automatically appears as the first step in the programming sequence. Trim settings can now be viewed or changed as required.

1. Download the payload using Service ADVISOR.
2. Connect Service ADVISOR to the engine ECU.
3. In Service ADVISOR select "Program Controller."
4. As the programming begins, the trim page opens and displays JOHN DEERE Custom Performance.
5. Select the individual tabs to view, print, or change the parameters listed.

NOTE: The entire programming sequence must be completed for the changes to take effect.

6. Click "Program" in the lower right corner of the page when you are ready to start programming, otherwise, select the "Cancel" button.
7. When programming has been completed, connect to the John Deere network so the return file for the programming event is returned to the server.

SS01820,00002E8 -19-27JUN12-1/1

VGT or Exhaust Throttle — Learn Value Reset Instructions

For instructions on connecting to Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

The procedure resets the original stored values for the open and closed actuator positions. For more information see [VGT Operation](#) or [Exhaust Throttle Operation](#) in Section 3 Group 135, or .

NOTE: This procedure is performed only when the VGT or Exhaust Throttle actuator are replaced with a new actuator.

NOTE: Replacing an actuator to test for a bad actuator (part swapping) is not recommended. It could cause several DTCs to set, because the values stored in the ECU will be out of tolerance when the new actuator performs a learn.

1. Ignition ON, engine OFF.
2. Select Connected Calibrations in the Service ADVISOR Tests and Calibrations shortcut bar.
3. Select Interactive Calibrations.
4. Select VGT or Exhaust Throttle Learn Value Reset.
5. Follow the instructions in the diagnostic software.
6. Ignition OFF for 90 seconds.
7. Ignition ON, Engine OFF. The VGT or Exhaust Throttle automatically go through the learn process. The VGT or Exhaust Throttle create an audible noise when cycling.

BK34394,0001B5A -19-12AUG11-1/1

View Non-Clearable DTCs — Test Instructions

For instructions on connecting to Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

The View Non-Clearable DTCs test is used to view certain DTCs that remain in ECU memory after being cleared.

Performing the Test

1. Ignition ON, Engine OFF.

2. Select Interactive Tests from the Tests and Calibrations shortcut bar in Service ADVISOR. Select View Non-Clearable DTCs.
3. Follow instructions given by the diagnostic software.

BK34394,0001B5B -19-14FEB12-1/1

Welding Near Electronic Control Units

IMPORTANT: Do not jump-start engines with arc welding equipment. Currents and voltages are too high and may cause permanent damage.

1. Disconnect the negative (-) battery cable(s).
2. Disconnect the positive (+) battery cable(s).
3. Connect the positive and negative cables together. Do not attach to vehicle frame.
4. Clear or move any wiring harness sections away from welding area.
5. Connect welder ground close to welding point and away from control units.



TS953 —UN—15MAY90

6. After welding, reverse Steps 1—5.

DX,WW,ECU02 -19-14AUG09-1/1

000190.00 — Engine Speed Extremely High

The ECU detects that the engine speed exceeds the maximum RPM.

RE42287,00004AD -19-25JUL11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

000636.02
000636.10
000637.02
000637.07
000190.00

When DTC is Displayed:

When the ignition is on and the engine is running.

Related Information:

The ECU detects that the engine speed exceeds the maximum RPM.

Alarm Level:

Stop

Control Unit Response:

The ECU stops fuel flow to the high-pressure common-rail (HPCR), by energizing the suction control valve on the high-pressure fuel pump and turning off the electronic injectors.

Additional References:

For more high-pressure fuel system information, see [High-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more information on speed sensors, see [Measuring Speed](#) in Section 03, Group 140.

RE42287,00004AD -19-25JUL11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Obtain information about operating conditions from the operator that observed this code being set.
6. Inspect for possible conditions that may possibly cause this code:
 - Unintended fuel in intake.
 - Application driving the engine to an excessive speed. Example: Going down a hill and using the engine as a brake.

Have any of these conditions occurred?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RE42287,00004AD -19-25JUL11-3/3

000190.16 — Engine Speed Moderately High

The engine speed is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The ECU detected that engine speed has exceeded the maximum speed allowed.

Alarm Level:

Warning

Control Unit Response:

The ECU stops fuel flow to the high-pressure common-rail (HPCR), by energizing the suction control valve on the high-pressure fuel pump and turning off the electronic injectors.

For troubleshooting procedure see [000190.00 – Engine Speed Extremely High](#).

RE42287,00004AE -19-25JUL11-1/1

**000636.02 — Camshaft Position Signal
Invalid**

*The ECU detects excessive noise (extra pulses)
on the camshaft position signal.*

Continued on next page

RE42287,00004AF -19-25JUL11-1/9

Diagnostic Procedure

Troubleshooting Sequence:

000636.05
000636.06
000636.02

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information:

The ECU has detected excessive noise (extra pulses) on the camshaft position signal.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and uses the crankshaft position sensor for engine speed.

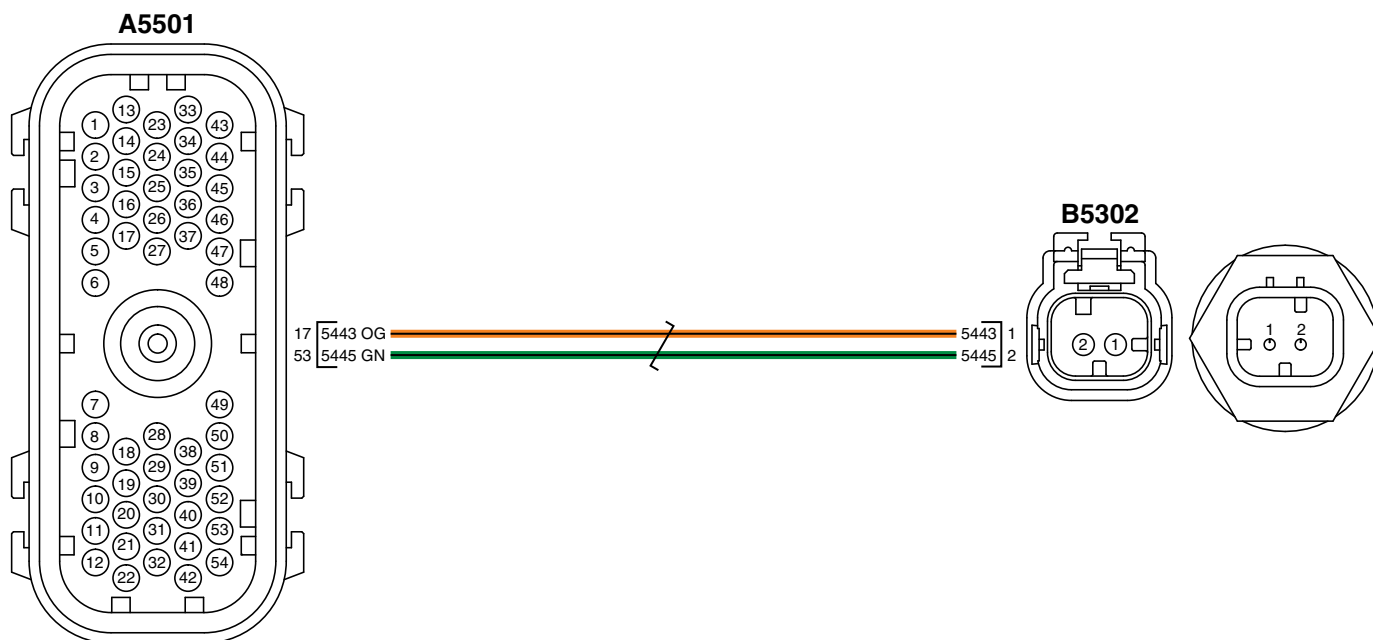
Additional References:

For more camshaft position sensor information, see [B5302 — Camshaft Position Sensor](#) in Section 03, Group 140.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 2](#)
- located in Section 06, Group 210.



Camshaft Position Sensor Wiring Diagram

A5501 — 17—Return

A5501 — 53—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

RG20005 —UN—09FEB11

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG11100 — Flexible Borescope
- JDG820 — Flywheel Turning Tool

RE42287,00004AF -19-25JUL11-3/9

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.

5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000636.05 in results list? Or, is DTC 000636.06 in results list?

YES: 000636.05 is in results list. GO TO [000636.05 — Camshaft Position Circuit Has High Resistance](#).

YES: 000636.06 is in results list. GO TO [000636.06 — Camshaft Position Circuit Has Low Resistance](#).

NO: [GO TO 2](#)

RE42287,00004AF -19-25JUL11-4/9

2 DTC Check

1. Ignition OFF, Engine OFF.
2. Ensure that all auxiliary devices are turned off.
3. Ignition ON, engine running.
4. In Service ADVISOR, monitor Camshaft Position Signal Noise Indicator.

Is the value greater than 0?

YES: [GO TO 3](#)

NO: [GO TO 6](#)

RE42287,00004AF -19-25JUL11-5/9

3 Terminal Test

1. Ignition OFF, engine OFF.
2. Disconnect camshaft position sensor connector B5302.
3. Perform [Terminal Test](#) on sensor and B5302 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,00004AF -19-25JUL11-6/9

4 Sensor Inspection

1. Remove camshaft position sensor.
2. Visually inspect camshaft position sensor for damage to threads or tip.

Any damage found?

YES: Replace sensor. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004AF -19-25JUL11-7/9

Engine Position Diagnostics

5 Physical Damage Inspection

Using [JDG11100](#) Flexible Borescope, inspect gear through camshaft sensor port for physical damage while turning engine over by hand using [JDG820](#) Flywheel Turning Tool.

Any damage found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RE42287,00004AF -19-25JUL11-8/9

6 Electrical Noise Check

NOTE: For a list of possible causes of electrical noise, see [Electrical Noise — Possible Causes](#).

1. Ignition ON, engine running.
2. Turn on auxiliary devices one at a time, while waiting 2 minutes between turning on each device.
3. In Service ADVISOR, monitor Camshaft Position Signal Noise Indicator.

Is value greater than 0 when a specific device was turned on?

YES: Repair problem. Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RE42287,00004AF -19-25JUL11-9/9

000636.05 — Camshaft Position Circuit Has High Resistance

The ECU detects high resistance in the camshaft position sensor circuit.

Continued on next page

RE42287,00004B0 -19-25JUL11-1/6

Diagnostic Procedure

Troubleshooting Sequence: 000636.05

When DTC is Displayed:

When the ignition is on, the engine stopped, and the error is active as the ECU does its periodic diagnostic check or during the Harness Diagnostic Mode Test.

Related Information:

The ECU detects high resistance or an open circuit in the camshaft position sensor circuit during the ECU periodic diagnostic check and the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and uses the crankshaft position sensor for engine speed and position.

Additional References:

For more camshaft position sensor information, see B5302 – Camshaft Position Sensor in Section 03, Group 140.

For more information on how to use the Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

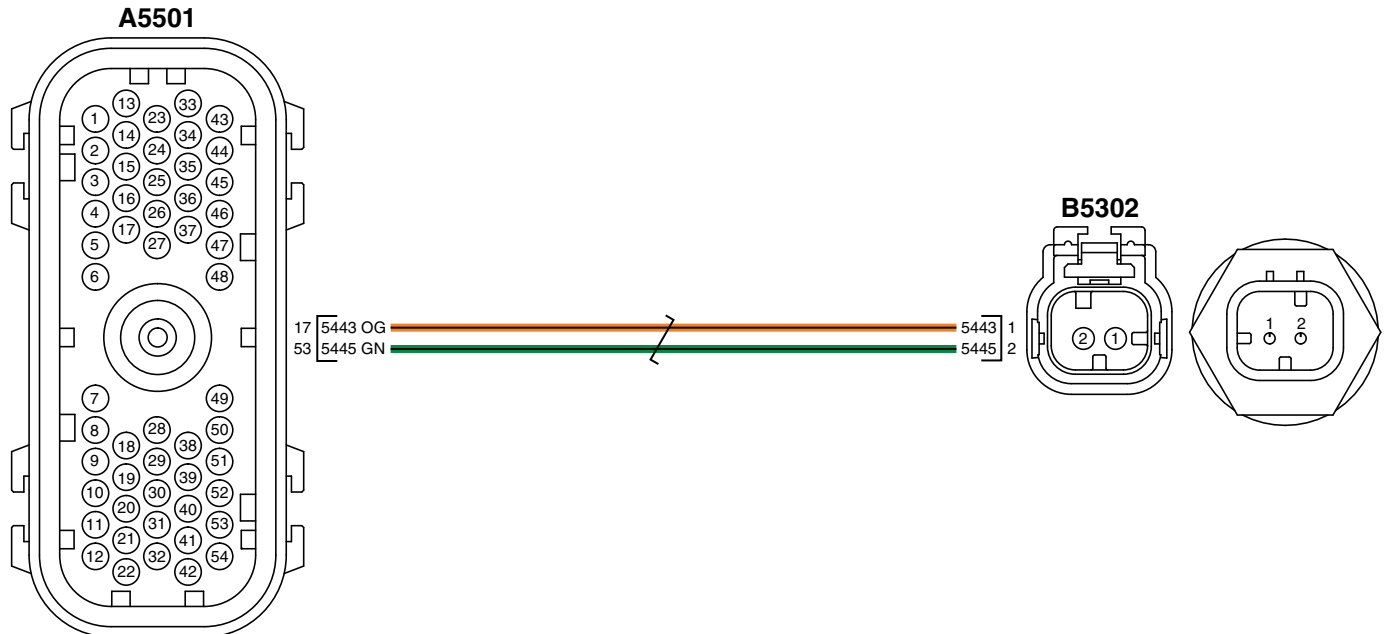
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Camshaft Position Sensor Wiring Diagram

A5501 — 17—Return

A5501 — 53—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG20005—UN—09FEB11

Continued on next page

RE42287,00004B0 -19-25JUL11-2/6

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004B0 -19-25JUL11-3/6

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect camshaft position sensor connector B5302.
7. Perform [Terminal Test](#) on sensor and B5302 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,00004B0 -19-25JUL11-4/6

2 Circuit Check

1. Connect Diagnostic Test Box:
 - A to B5302 connector female sockets 2 (+).
 - B to B5302 connector female sockets 1 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Monitor voltage on multimeter.
4. Perform [Wiggle Test](#).

Does voltage remain between 1.3 V and 1.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: Voltage goes greater than 1.7 V. [GO TO Short to Voltage Procedure](#).

NO: Voltage goes less than 1.3 V. [GO TO 3](#)

RE42287,00004B0 -19-25JUL11-5/6

3 High Resistance Check

1. Press and hold S2 on Diagnostic Test Box.
2. Perform [Wiggle Test](#).

Did multimeter reading stay between 1.3 V and 1.7 V?

YES: Repair high resistance on return wire. Perform [Verification Procedure](#).

NO: Repair high resistance on signal wire. Perform [Verification Procedure](#).

RE42287,00004B0 -19-25JUL11-6/6

**000636.06 — Camshaft Position Circuit Has
Low Resistance**

*The ECU detects low resistance in the camshaft
position sensor circuit.*

Continued on next page

RE42287,00004B1 -19-08AUG11-1/18

Diagnostic Procedure

Troubleshooting Sequence:
000636.06

When DTC is Displayed:

When the ignition is on, the engine stopped, and the error is active, or as the ECU does its periodic diagnostic check. During Harness Diagnostic Mode Test.

Related Information:

The ECU detects low resistance or a short circuit in the camshaft position sensor circuit during the ECU periodic diagnostic check and the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and uses the crankshaft position sensor for engine speed and position.

Additional References:

For more camshaft position sensor information, see B5302 – Camshaft Position Sensor in Section 03, Group 140.
For more information on how to use the Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.
For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

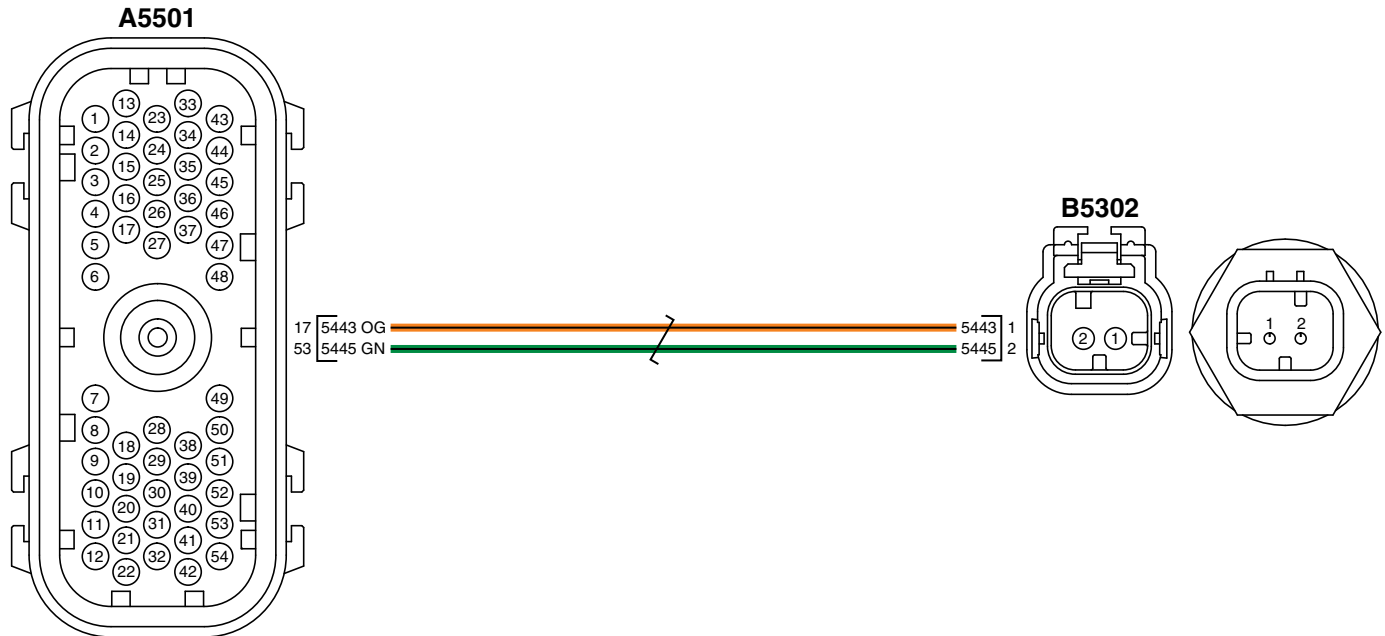
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 2

located in Section 06, Group 210.



Camshaft Position Sensor Wiring Diagram

A5501 — 17—Return

A5501 — 53—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

RG20005—UN—09FEB11

Continued on next page

RE42287,00004B1 -19-08AUG11-2/18

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004B1 -19-08AUG11-3/18

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.
6. Wait 60 seconds.

Is DTC 000636.06 active?

YES: [GO TO 2](#)

NO: [GO TO 10](#)

RE42287,00004B1 -19-08AUG11-4/18

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect camshaft position sensor connector B5302.
3. Perform [Terminal Test](#) on sensor and B5302 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004B1 -19-08AUG11-5/18

3 Wiggle Test

1. Connect Diagnostic Test Box:
 - A to B5302 connector female sockets 2 (+).
 - B to B5302 connector female sockets 1 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.

NOTE: Every 30 seconds the voltage on the meter changes for an instant. Disregard this change.

6. Perform [Wiggle Test](#).

Does voltage consistently read 1.3 V to 1.8 V?

YES: [GO TO 4](#)

NO: [GO TO 5](#)

Continued on next page

RE42287,00004B1 -19-08AUG11-6/18

Engine Position Diagnostics

4 Circuit Check

1. Set S1 to position 5 on Diagnostic Test Box.

2. Wait 60 seconds.

Is DTC 000636.06 active?

YES: Contact DTAC for support.

NO: Replace sensor. Perform [Verification Procedure](#).

RE42287,00004B1 -19-08AUG11-7/18

5 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501.

3. Perform [Terminal Test](#) on A5501 connector female sockets 17 and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,00004B1 -19-08AUG11-8/18

6 Short to Return Wire Check

On A5501 connector, measure resistance between female sockets 53 and 17.

Is resistance less than 100k ohms?

YES: Repair short to return wire. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,00004B1 -19-08AUG11-9/18

7 Short to Ground Check

On A5501 connector, measure resistance between female socket 53 and single point ground.

Is resistance less than 100k ohms?

YES: Repair short to ground in harness. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004B1 -19-08AUG11-10/18

8 Wire to Wire Check

On A5501 connector, measure resistance between female socket 53 and all other sockets in A5501 connector.

Are any resistances less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,00004B1 -19-08AUG11-11/18

9 Wire to Wire Short Check

1. Disconnect all other ECU connectors.

2. On A5501 connector, measure resistance between female socket 53 and all other sockets in all other ECU harness connectors.

Are any measurements less than 100k ohms?

YES: Repair short to signal wire. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

Continued on next page

RE42287,00004B1 -19-08AUG11-12/18

Engine Position Diagnostics

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect camshaft position sensor connector B5302.
3. Perform Terminal Test on sensor and B5302 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

RE42287,00004B1 -19-08AUG11-13/18

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 17 and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,00004B1 -19-08AUG11-14/18

12 Short to Return Wire Check

NOTE: While making the following measurement, perform Wiggle Test.

On A5501 connector, measure resistance between female sockets 53 and 17.

Is resistance less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 13

RE42287,00004B1 -19-08AUG11-15/18

13 Short to Ground Check

NOTE: While making the following measurement, perform Wiggle Test.

On A5501 connector, measure resistance between female socket 53 and single point ground.

Is resistance less than 100k ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: GO TO 14

RE42287,00004B1 -19-08AUG11-16/18

14 Wire to Wire Check

NOTE: While making the following measurement, perform Wiggle Test.

On A5501 connector, measure resistance between female socket 53 and all other sockets in A5501 connector.

Are any resistances less than 100k ohms?

YES: Repair short to signal wire in harness. Perform Verification Procedure.

NO: GO TO 15

Continued on next page

RE42287,00004B1 -19-08AUG11-17/18

15 Wire to Wire Short Check

NOTE: While making the following measurement, perform Wiggle Test.

1. Disconnect all other ECU connectors.
2. On A5501 connector, measure resistance between female socket 53 and all other sockets in all other ECU harness connectors.

Are any resistances less than 100k ohms?

YES: Repair short to signal wire. Perform Verification Procedure.

NO: Perform Problem Not Found Procedure.

RE42287,00004B1 -19-08AUG11-18/18

**000636.08 — Camshaft Position Signal
Missing**

The ECU has not detected the camshaft position signal.

Continued on next page

RE42287,00004B2 -19-25JUL11-1/11

Diagnostic Procedure

Troubleshooting Sequence:

000636.05
000636.06
000636.08

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information:

The ECU has not detected the camshaft position signal.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

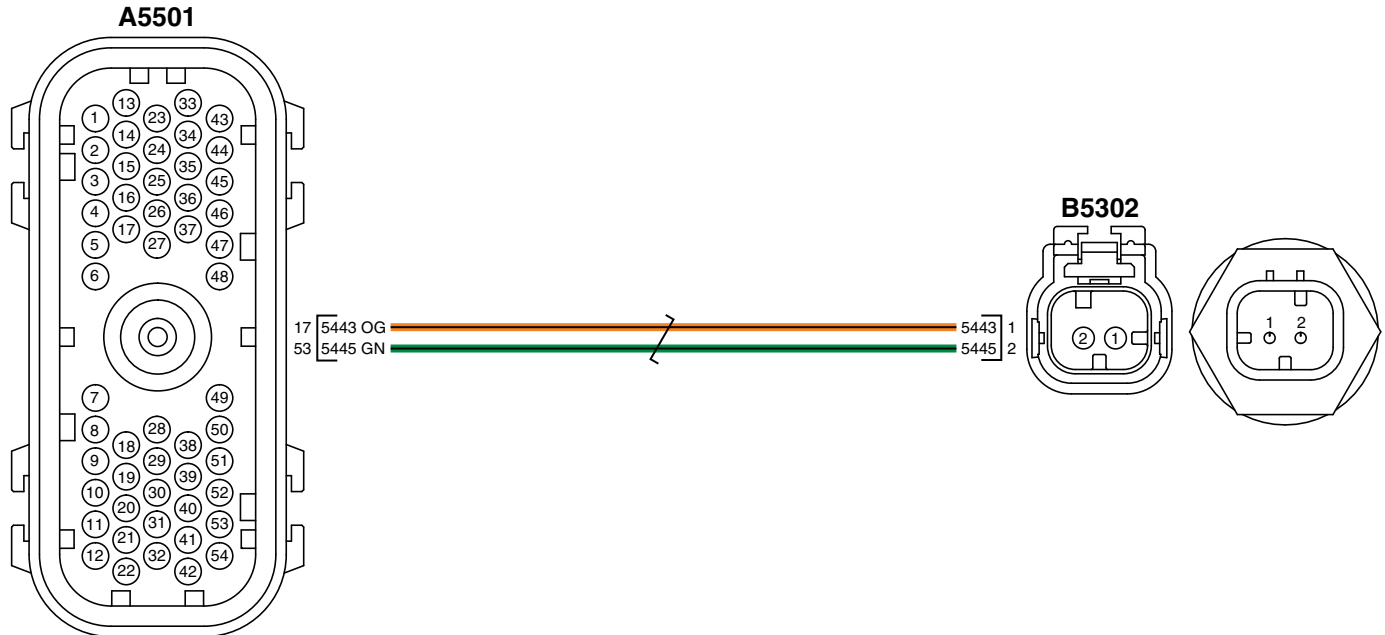
For more camshaft position sensor information, see [B5302 — Camshaft Position Sensor](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 2](#)
- located in Section 06, Group 210.



A5501 — 17—Return

A5501 — 53—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

Continued on next page

RE42287,00004B2 -19-25JUL11-2/11

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

RE42287,00004B2 -19-25JUL11-3/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 000636.05 in results list?

YES: 000636.05 is in results list. GO TO [000636.05 — Camshaft Position Circuit Has High Resistance](#).

NO: [GO TO 2](#)

RE42287,00004B2 -19-25JUL11-4/11

2 Code Check

Is DTC 000636.06 in results list?

YES: 000636.06 is in results list. GO TO [000636.06 — Camshaft Position Circuit Has Low Resistance](#).

NO: [GO TO 3](#)

RE42287,00004B2 -19-25JUL11-5/11

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect camshaft position sensor connector B5302.
3. Perform [Terminal Test](#) on sensor and B5302 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,00004B2 -19-25JUL11-6/11

4 Sensor Inspection

1. Remove camshaft position sensor.
2. Visually inspect camshaft position sensor for damage to threads or tip.

Any damage found?

YES: Replace sensor. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004B2 -19-25JUL11-7/11

Engine Position Diagnostics

5 Short to Voltage Check

1. Ignition ON, Engine OFF.

NOTE: While making the following measurements, perform Wiggle Test.

2. On B5302 connector, measure voltage between female socket 2 (+) and single point ground (-).
3. On B5302 connector, measure voltage between female socket 1(+) and single point ground (-).

Is either voltage greater than 0.2 V?

YES: Go to Short to Voltage Procedure.

NO: GO TO 6.

RE42287,00004B2 -19-25JUL11-8/11

6 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501.

3. . Perform Terminal Test on A5501 connector female sockets 17 and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RE42287,00004B2 -19-25JUL11-9/11

7 Continuity Check

NOTE: While making the following measurements, perform Wiggle Test.

1. Measure resistance between A5501 connector female socket 17 and B5302 connector female socket 1.
2. Measure resistance between A5501 connector female socket 53 and B5302 connector female socket 2.

Are both resistances less than 5 ohms?

YES: GO TO 8

NO: Repair open in harness. Perform Verification Procedure

RE42287,00004B2 -19-25JUL11-10/11

8 Short to Ground Check

NOTE: While making the following measurement, perform Wiggle Test.

On B5302 connector, measure resistance between female socket 2 (+) and single point ground (-).

Is resistance less than 100k ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004B2 -19-25JUL11-11/11

**000636.10 — Camshaft Position Signal Rate
of Change Abnormal**

*The ECU detects an improper pattern or noise on
the camshaft position signal.*

Continued on next page

RE42287,00004B3 -19-20MAR12-1/17

Diagnostic Procedure

Troubleshooting Sequence:
000636.10

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information:

The ECU has detected an improper pattern (pulses missing or noise) on the camshaft position signal.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and uses the crankshaft position sensor for engine speed and position.

Additional References:

For more camshaft position sensor information, see [B5302 — Camshaft Position Sensor](#) in Section 03, Group 140.

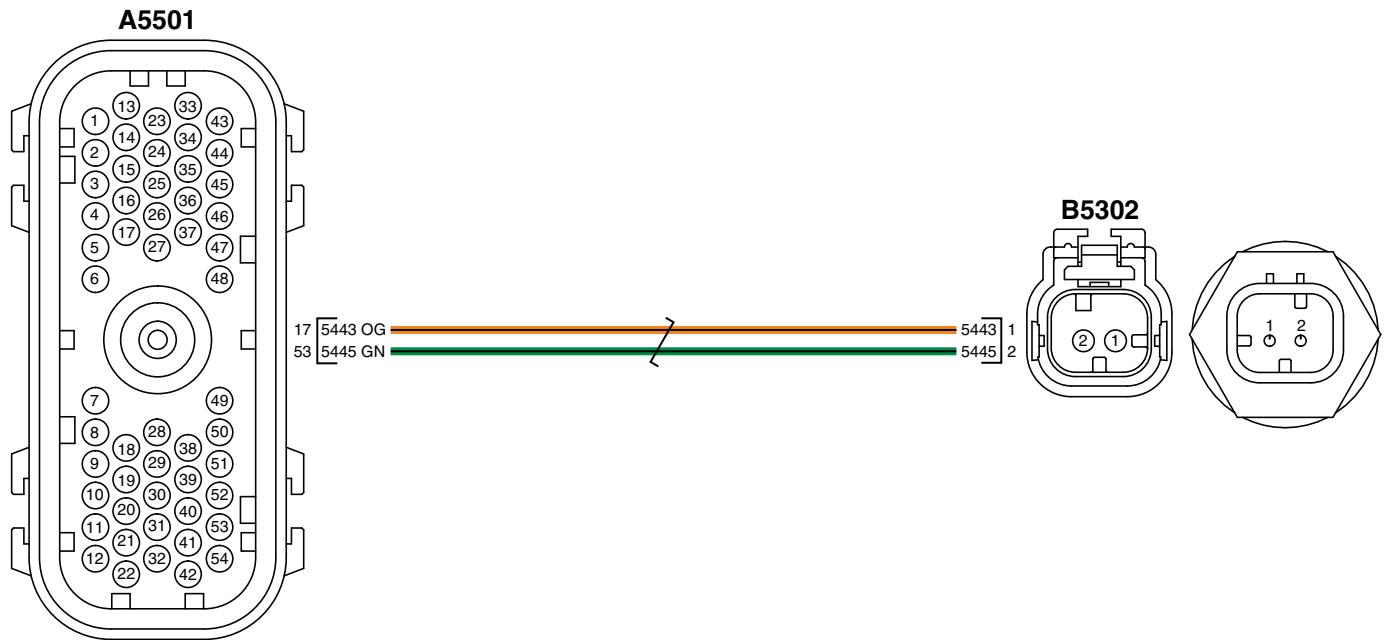
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Camshaft Position Sensor Wiring Diagram

A5501 — 17—Return

A5501 — 53—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

RG20005 —UN—09FEB11

Continued on next page

RE42287,00004B3 -19-20MAR12-2/17

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- JDG11100 — Flexible Borescope

RE42287,00004B3 -19-20MAR12-3/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. In Service ADVISOR, monitor Camshaft Position Signal Improper Pattern Indicator and Camshaft Position Signal Noise Indicator.

Data Point	Value
Camshaft Position Signal Improper Pattern Indicator	
Camshaft Position Signal Noise Indicator	

Do both indicators remain at 0%?

YES: [GO TO 10](#)

NO: [GO TO 2](#)

RE42287,00004B3 -19-20MAR12-4/17

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect camshaft position sensor connector B5302.
3. Perform [Terminal Test](#) on sensor and B5302 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004B3 -19-20MAR12-5/17

3 Check for Loose Sensor

NOTE: For sensor torque specifications, see [Camshaft Position Sensor — Installation](#) in Section 02, Group 110 earlier in this manual.

1. Ignition OFF, Engine OFF.
2. Verify camshaft position sensor torque.

Was camshaft position sensor fully threaded into mounting hole?

YES: [GO TO 4](#)

NO: Torque sensor to specified value. Perform [Verification Procedure](#)

Continued on next page

RE42287,00004B3 -19-20MAR12-6/17

Engine Position Diagnostics

4 Sensor Inspection

1. Remove camshaft position sensor.
2. Visually inspect camshaft position sensor for damage to threads or tip.

Any damage found?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,00004B3 -19-20MAR12-7/17

5 Physical Damage Inspection

Using [JDG11100](#) Flexible Borescope, inspect gear through camshaft sensor port for physical damage while turning engine over by hand using [JDG820](#) Flywheel Turning Tool.

Any damage found to gear?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,00004B3 -19-20MAR12-8/17

6 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 17 and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,00004B3 -19-20MAR12-9/17

7 Continuity Check

1. Measure resistance between A5501 connector female socket 17 and B5302 connector female socket 1.
2. Measure resistance between A5501 connector female socket 53 and B5302 connector female socket 2.

Are both resistances less than 5 ohms?

YES: [GO TO 8](#)

NO: Repair harness problem. Perform [Verification Procedure](#).

RE42287,00004B3 -19-20MAR12-10/17

8 Wire-to-Wire Short

1. Disconnect ECU connectors A5502 and A5503.
2. Measure resistance between A5501 connector female socket 53 and all other sockets in ECU connectors A5501, A5502, and A5503.

Are any of the resistance measurements less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,00004B3 -19-20MAR12-11/17

9 Shorted Sensor Return

On A5501 connector, measure resistance between female socket 17 and single point ground.

Is resistance less than 100k ohms?

YES: Repair short to ground in harness. Perform [Verification Procedure](#).

NO: [GO TO 13](#)

Continued on next page

RE42287,00004B3 -19-20MAR12-12/17

10 Wiggle Test

1. Ignition ON, Engine running.

CAUTION: Avoid exposure and skin contact with hot exhaust gases and components. Use caution when working near rotating components.

2. Ensure that all auxiliary devices are turned off.
3. In Service ADVISOR, monitor the following parameters:

Data Point	Value
Camshaft Position Signal Improper Pattern Indicator	
Camshaft Position Signal Noise Indicator	

4. Perform Wiggle Test on B5302 harness.

Do both indicators remain at 0%?

YES: GO TO 11

NO: GO TO 2

RE42287,00004B3 -19-20MAR12-13/17

11 Electrical Noise Check

NOTE: For a list of possible causes of electrical noise, see Electrical Noise — Possible Causes.

1. In Service ADVISOR, monitor the following parameters:

Data Point	Value
Camshaft Position Signal Improper Pattern Indicator	
Camshaft Position Signal Noise Indicator	

2. Turn on auxiliary devices one at a time.

Do both indicators remain at 0%?

YES: GO TO 12

NO: Repair problem with auxiliary device just turned on. Perform Verification Procedure.

RE42287,00004B3 -19-20MAR12-14/17

12 Reprogram ECU

1. Ignition OFF, Engine OFF.

2. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.

3. Ignition ON, Engine ON.

4. Refresh codes.

Is DTC 000636.10 active?

YES: GO TO 2

NO: Perform Verification Procedure.

RE42287,00004B3 -19-20MAR12-15/17

13 Reprogram ECU

1. Ignition OFF, Engine OFF.

2. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.

3. Ignition ON, Engine ON.

4. Refresh codes.

Is DTC 000636.10 active?

YES: GO TO 14

NO: Perform Verification Procedure.

Continued on next page

RE42287,00004B3 -19-20MAR12-16/17

14 Replace Camshaft Sensor

Has camshaft position sensor been replaced during this procedure?

YES: Contact DTAC for support.

NO: Replace camshaft position sensor. Perform Verification Procedure.

RE42287,00004B3 -19-20MAR12-17/17

000637.02 — Crankshaft Position Signal Invalid

The ECU detects excessive noise (extra pulses) on the crankshaft position signal.

Continued on next page

RE42287,00004B4 -19-02AUG11-1/9

Diagnostic Procedure

Troubleshooting Sequence:

000637.05
000637.06
000637.02

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information:

The ECU has detected excessive noise (extra pulses) on the crankshaft position signal.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and uses the camshaft position sensor for engine speed.

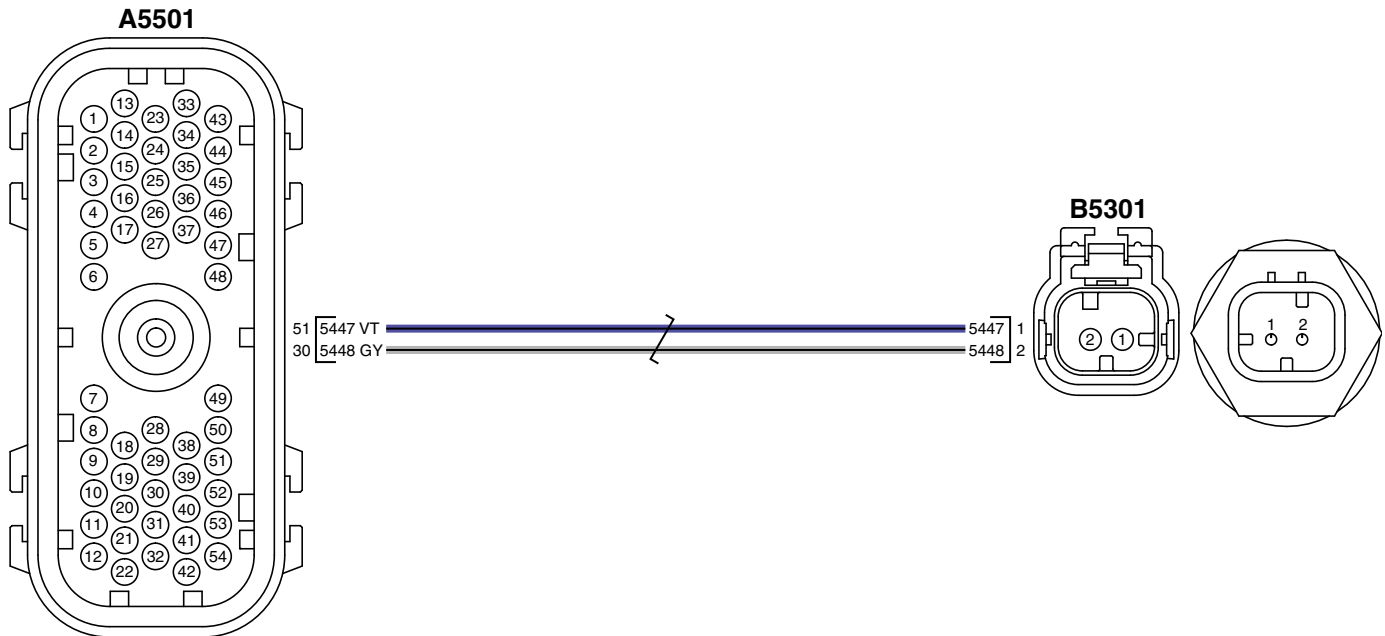
Additional References:

For more crankshaft position sensor information, see [B5301 — Crankshaft Position Sensor](#) in Section 03, Group 140.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 2](#)
- located in Section 06, Group 210.



Crankshaft Position Sensor Wiring Diagram

A5501—30—Return

A5501—51—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

RG20004 —UN—01AUG11

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG11100 — Flexible Borescope
- JDG820 — Flywheel Turning Tool

RE42287,00004B4 -19-02AUG11-3/9

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.

5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000637.05 in results list? Or, is DTC 000637.06 in results list?

YES: 000637.05 is in results list. GO TO [000637.05 — Crankshaft Position Circuit Has High Resistance](#).

YES: 000637.06 is in results list. GO TO [000637.06 — Crankshaft Position Circuit Has Low Resistance](#).

NO: [GO TO 2](#)

RE42287,00004B4 -19-02AUG11-4/9

2 DTC Check

1. Ignition OFF, Engine OFF.
2. Ensure that all auxiliary devices are turned off.
3. Ignition ON, engine running.
4. In Service ADVISOR, monitor Crankshaft Position Signal Noise Indicator.

Is the value greater than 0?

YES: [GO TO 3](#)

NO: [GO TO 6](#)

RE42287,00004B4 -19-02AUG11-5/9

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankshaft position sensor connector B5301.
3. Perform [Terminal Test](#) on sensor and B5301 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,00004B4 -19-02AUG11-6/9

4 Sensor Inspection

1. Remove crankshaft position sensor.
2. Visually inspect crankshaft position sensor for damage to threads or tip.

Any damage found?

YES: Replace sensor. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,00004B4 -19-02AUG11-7/9

Continued on next page

Engine Position Diagnostics

5 Physical Damage Inspection

Using [JDG11100](#) Flexible Borescope, inspect gear through crankshaft sensor port for physical damage while turning engine over by hand using [JDG820](#) Flywheel Turning Tool.

Any damage found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RE42287,00004B4 -19-02AUG11-8/9

6 Electrical Noise Check

NOTE: For a list of possible causes of electrical noise, see [Electrical Noise — Possible Causes](#).

1. Ignition ON, engine running.
2. Turn on auxiliary devices one at a time, while waiting 2 minutes between turning on each device.
3. In Service ADVISOR, monitor Crankshaft Position Signal Noise Indicator.

Is the value greater than 0 when a specific device was turned on?

YES: Repair problem. Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RE42287,00004B4 -19-02AUG11-9/9

000637.05 — Crankshaft Position Circuit Has High Resistance

The ECU detects high resistance in the crankshaft position sensor circuit.

Continued on next page

RE42287,00004B5 -19-25JUL11-1/6

Diagnostic Procedure

Troubleshooting Sequence: 000637.05

When DTC is Displayed:

When the ignition is on, the engine stopped, and the error is active as the ECU does its periodic diagnostic check or during Harness Diagnostic Mode Test.

Related Information:

The ECU detects high resistance or an open circuit in the crankshaft position sensor circuit during the ECU periodic diagnostic check and the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and uses the camshaft position sensor for engine speed and position.

Additional References:

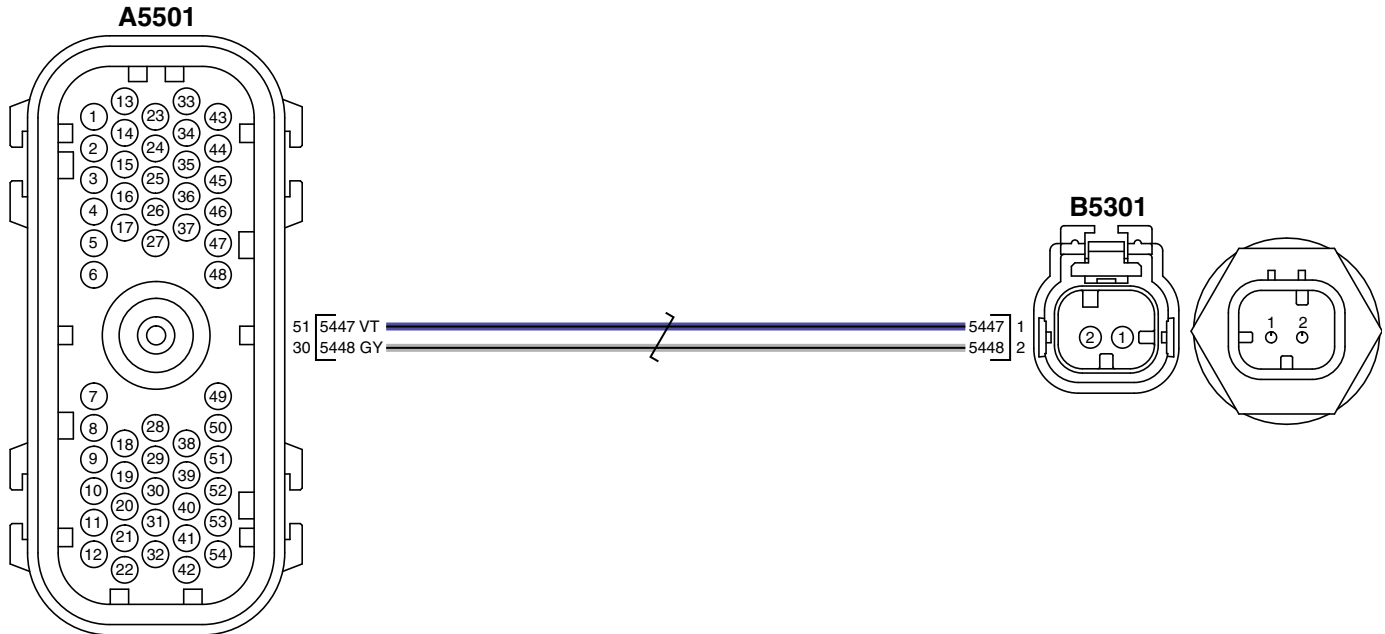
For more crankshaft position sensor information, see B5301 – Crankshaft Position Sensor in Section 03, Group 140.
For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.
For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
- see 4.5L Wiring Diagram 2

located in Section 06, Group 210.



Crankshaft Position Sensor Wiring Diagram

A5501—30—Return

A5501—51—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

RG20004—UN—01AUG11

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004B5 -19-25JUL11-3/6

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect crankshaft position sensor connector B5301.
7. Perform Terminal Test on sensor and B5301 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 2

RE42287,00004B5 -19-25JUL11-4/6

2 Circuit Check

1. Connect Diagnostic Test Box:
 - A to B5301 connector female sockets 1 (+).
 - B to B5301 connector female sockets 2(-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Monitor voltage on multimeter.
4. Perform Wiggle Test.

Does voltage remain between 1.3 V and 1.7 V?

YES: Replace sensor.
Perform Verification Procedure.

NO: Voltage goes greater than 1.7 V. GO TO Short to Voltage Procedure.

NO: Voltage goes less than 1.3 V. GO TO 3

Continued on next page

RE42287,00004B5 -19-25JUL11-5/6

3 High Resistance Check

1. Press and hold S2 on Diagnostic Test Box.
2. Perform Wiggle Test.

Did multimeter reading stay between 1.3 V and 1.7 V?

YES: Repair open or high resistance on return wire. Perform Verification Procedure.

NO: Repair open or high resistance on signal wire. Perform Verification Procedure.

RE42287,00004B5 -19-25JUL11-6/6

**000637.06 — Crankshaft Position Circuit Has
Low Resistance**

*The ECU detects low resistance in the crankshaft
position sensor circuit.*

Continued on next page

RE42287,00004B6 -19-08AUG11-1/18

Diagnostic Procedure

Troubleshooting Sequence: 000637.06

When DTC is Displayed:

When the ignition is on, the engine stopped, and the error is active as the ECU does its periodic diagnostic check.
During Harness Diagnostic Mode Test.

Related Information:

The ECU detects low resistance or a short circuit in the crankshaft position sensor circuit during the ECU periodic diagnostic check and the Harness Diagnostic Mode Test in Service ADVISOR.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and uses the camshaft position sensor for engine speed.

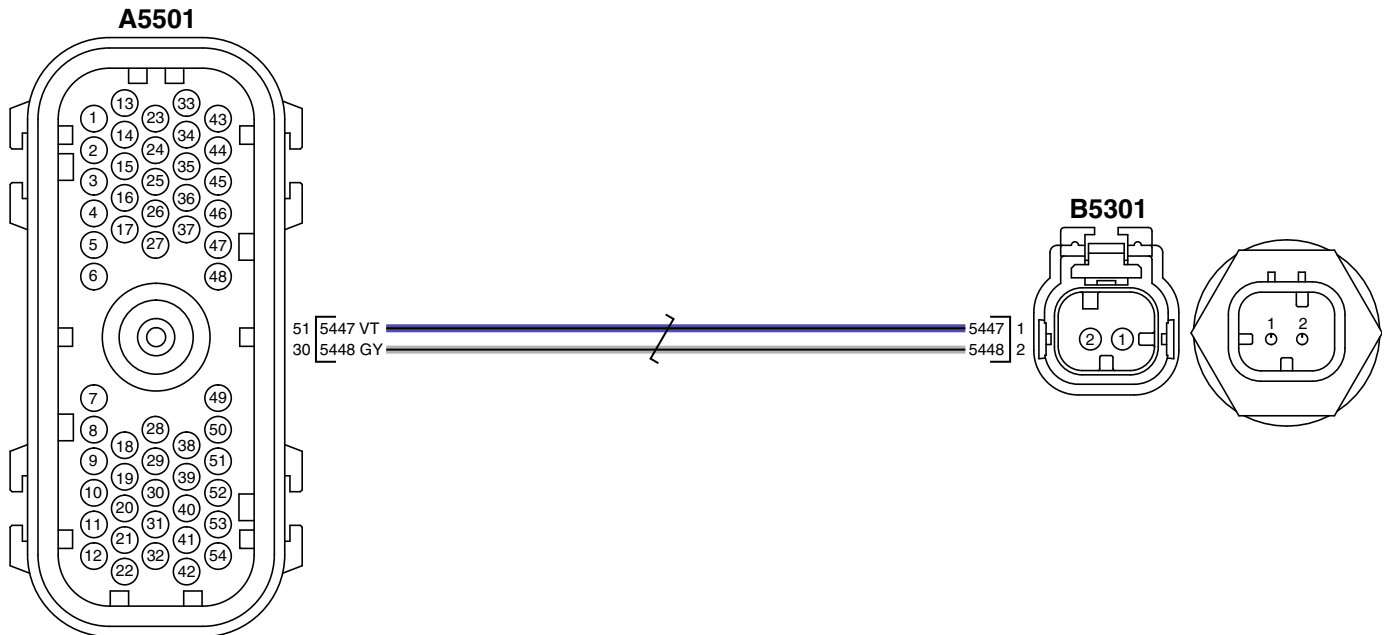
Additional References:

For more crankshaft position sensor information, see [B5301 – Crankshaft Position Sensor](#) in Section 03, Group 140.
For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 2](#)
- located in Section 06, Group 210.



Crankshaft Position Sensor Wiring Diagram

A5501—30—Return

A5501—51—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG20004—UN—01AUG11

Continued on next page

RE42287,00004B6 -19-08AUG11-2/18

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004B6 -19-08AUG11-3/18

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.
6. Wait 60 seconds.

Is DTC 000637.06 active?

YES: [GO TO 2](#)

NO: [GO TO 10](#)

RE42287,00004B6 -19-08AUG11-4/18

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankshaft position sensor connector B5301.
3. Perform [Terminal Test](#) on sensor and B5301 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004B6 -19-08AUG11-5/18

3 Wiggle Test

1. Connect Diagnostic Test Box:
 - A to B5301 connector female sockets 1(+).
 - B to B5301 connector female sockets 2(-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.

NOTE: Every 30 seconds the voltage on the meter changes for an instant. Disregard this change

6. Perform [Wiggle Test](#).

Does voltage consistently read 1.3 V to 1.8 V?

YES: [GO TO 4](#)

NO: [GO TO 5](#)

Continued on next page

RE42287,00004B6 -19-08AUG11-6/18

Engine Position Diagnostics

4 Circuit Check	<ol style="list-style-type: none">1. Set S1 to position 5 on Diagnostic Test Box.2. Wait 60 seconds. <p>Is DTC 000637.06 active?</p>	<p>YES: Contact DTAC for support.</p> <p>NO: Replace sensor. Perform Verification Procedure.</p> <p>RE42287,00004B6 -19-08AUG11-7/18</p>
5 Terminal Test	<ol style="list-style-type: none">1. Ignition OFF, Engine OFF.2. Disconnect ECU connector A5501.3. Perform Terminal Test on A5501 connector female sockets 30 and 51. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 6</p> <p>RE42287,00004B6 -19-08AUG11-8/18</p>
6 Short to Return Wire Check	<p>On A5501 connector, measure resistance between female sockets 51 and 30.</p> <p>Is resistance less than 100k ohms?</p>	<p>YES: Repair short to return wire. Perform Verification Procedure.</p> <p>NO: GO TO 7</p> <p>RE42287,00004B6 -19-08AUG11-9/18</p>
7 Short to Ground Check	<p>On A5501 connector, measure resistance between female socket 51 and single point ground.</p> <p>Is resistance less than 100k ohms?</p>	<p>YES: Repair short to ground in harness. Perform Verification Procedure.</p> <p>NO: GO TO 8</p> <p>RE42287,00004B6 -19-08AUG11-10/18</p>
8 Wire to Wire Check	<p>On A5501 connector, measure resistance between female socket 51 and all other sockets in A5501 connector.</p> <p>Are any resistances less than 100k ohms?</p>	<p>YES: Repair short in harness. Perform Verification Procedure.</p> <p>NO: GO TO 9</p> <p>RE42287,00004B6 -19-08AUG11-11/18</p>
9 Wire to Wire Short Check	<ol style="list-style-type: none">1. Disconnect all other ECU connectors.2. On A5501 connector, measure resistance between female socket 51 and all other sockets in all other ECU harness connectors. <p>Are any measurements less than 100k ohms?</p>	<p>YES: Repair short to signal wire. Perform Verification Procedure.</p> <p>NO: Contact DTAC for support.</p> <p>RE42287,00004B6 -19-08AUG11-12/18</p>

Continued on next page

Engine Position Diagnostics

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankshaft position sensor connector B5301.
3. Perform Terminal Test on sensor and B5301 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

RE42287,00004B6 -19-08AUG11-13/18

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 30 and 51. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,00004B6 -19-08AUG11-14/18

12 Short to Return Wire Check

NOTE: While making the following measurements, perform Wiggle Test.

On A5501 connector, measure resistance between female sockets 51 and 30.

Is resistance less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 13

RE42287,00004B6 -19-08AUG11-15/18

13 Short to Ground Check

NOTE: While making the following measurement, perform Wiggle Test.

On A5501 connector, measure resistance between female socket 51 and single point ground.

Is resistance less than 100k ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: GO TO 14

RE42287,00004B6 -19-08AUG11-16/18

14 Wire to Wire Check

NOTE: While making the following measurement, perform Wiggle Test.

On A5501 connector, measure resistance between female socket 51 and all other sockets in A5501 connector.

Are any resistances less than 100k ohms?

YES: Repair short to signal wire in harness. Perform Verification Procedure.

NO: GO TO 15

Continued on next page

RE42287,00004B6 -19-08AUG11-17/18

15 Wire to Wire Short Check

NOTE: While making the following measurement, perform Wiggle Test.

1. Disconnect all other ECU connectors.
2. On A5501 connector, measure resistance between female socket 51 and all other sockets in all other ECU harness connectors.

Are any resistances less than 100k ohms?

YES: Repair short to signal wire. Perform Verification Procedure.

NO: Perform Problem Not Found Procedure

RE42287,00004B6 -19-08AUG11-18/18

**000637.07 — Crankshaft Position and
Camshaft Position Signals Out of Sync**

*The ECU detects that the camshaft position sensor and the
crankshaft position sensor are not in sync with each other.*

Continued on next page

RE42287,00004B7 -19-25JUL11-1/9

Diagnostic Procedure

Troubleshooting Sequence: 000637.07

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information:

The ECU detects that the camshaft position sensor signal is not correctly timed relative to the crankshaft position sensor signal.

This DTC may be caused by incorrect camshaft timing.

Wiring problems such as loose terminals, moisture in the connectors, or reverse polarity may also cause this DTC to be active intermittently.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more crankshaft position sensor information, see [B5301 – Crankshaft Position Sensor](#) in Section 03, Group 140.

For more camshaft position sensor information, see [B5302 – Camshaft Position Sensor](#) in Section 03, Group 140.

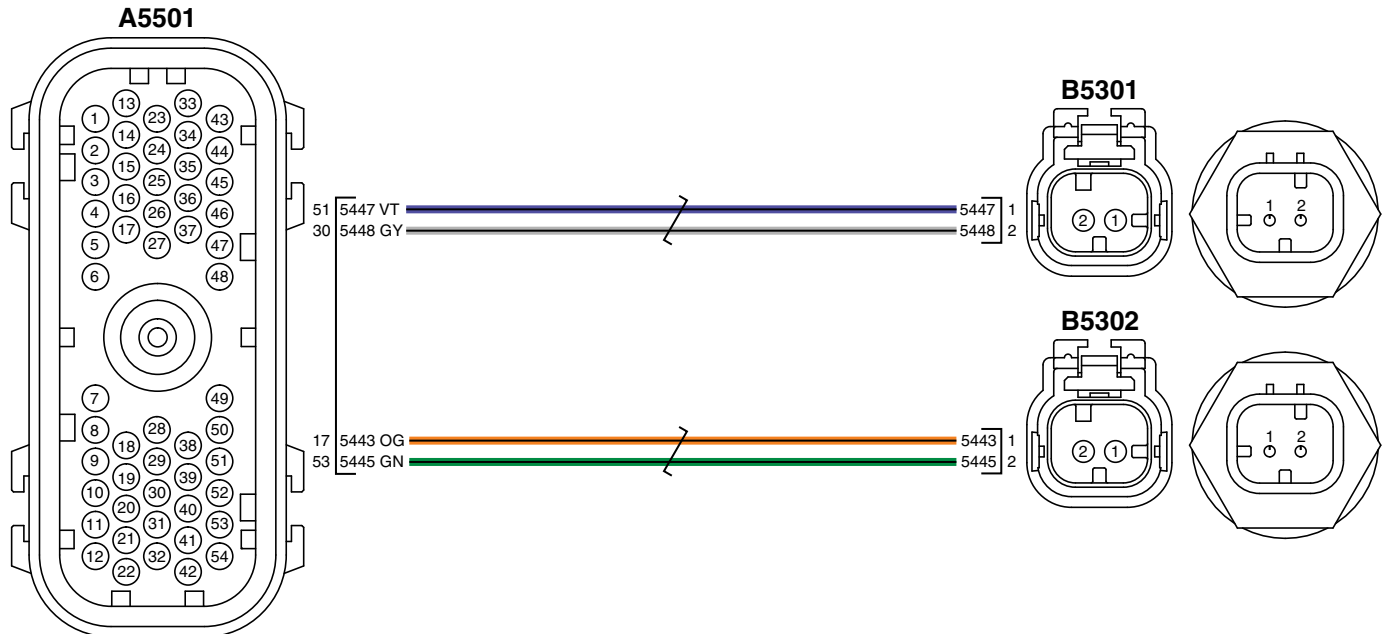
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Crankshaft Position and Camshaft Position Sensor Wire Diagram

A5501 — 30—Crankshaft Return A5501 — 51—Crankshaft Signal A5501 — 17—Camshaft Return
A5501 — 53—Camshaft Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306— Digital Multimeter

RE42287,00004B7 -19-25JUL11-3/9

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine cranking or running.
6. Refresh Codes.

Is DTC 000637.07 active?

YES: [GO TO 2](#)

NO: [GO TO 3](#)

RE42287,00004B7 -19-25JUL11-4/9

2 Service Check

Has camshaft or crankshaft been removed recently?

YES: Perform [Camshaft to Crankshaft Timing Check](#).

NO: [GO TO 3](#)

RE42287,00004B7 -19-25JUL11-5/9

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankshaft position sensor connector B5301.
3. Perform [Terminal Test](#) on sensor and B5301 connector.
4. Disconnect camshaft position sensor connector B5302.
5. Perform [Terminal Test](#) on sensor and B5302 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,00004B7 -19-25JUL11-6/9

4 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 17, 30, 51, and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004B7 -19-25JUL11-7/9

Engine Position Diagnostics

5 Continuity Check

1. Measure resistance between A5501 connector female socket 30 and B5301 connector female socket 2.
2. Measure resistance between A5501 connector female socket 51 and B5301 connector female socket 1.

Are both resistances less than 5 ohms?

YES: GO TO 6.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,00004B7 -19-25JUL11-8/9

6 Continuity Check

1. Measure resistance between A5501 connector female socket 17 and B5302 connector female socket 1.
2. Measure resistance between A5501 connector female socket 53 and B5302 connector female socket 2.

Are both resistances less than 5 ohms?

YES: Go to Problem Not Found Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,00004B7 -19-25JUL11-9/9

**000637.08 — Crankshaft Position Signal
Missing**

The ECU has not detected the crankshaft position signal.

Continued on next page

RE42287,00004B8 -19-28JUL11-1/11

Diagnostic Procedure

Troubleshooting Sequence:

000637.05
000637.06
000637.08

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information:

The ECU has not detected the crankshaft position signal.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

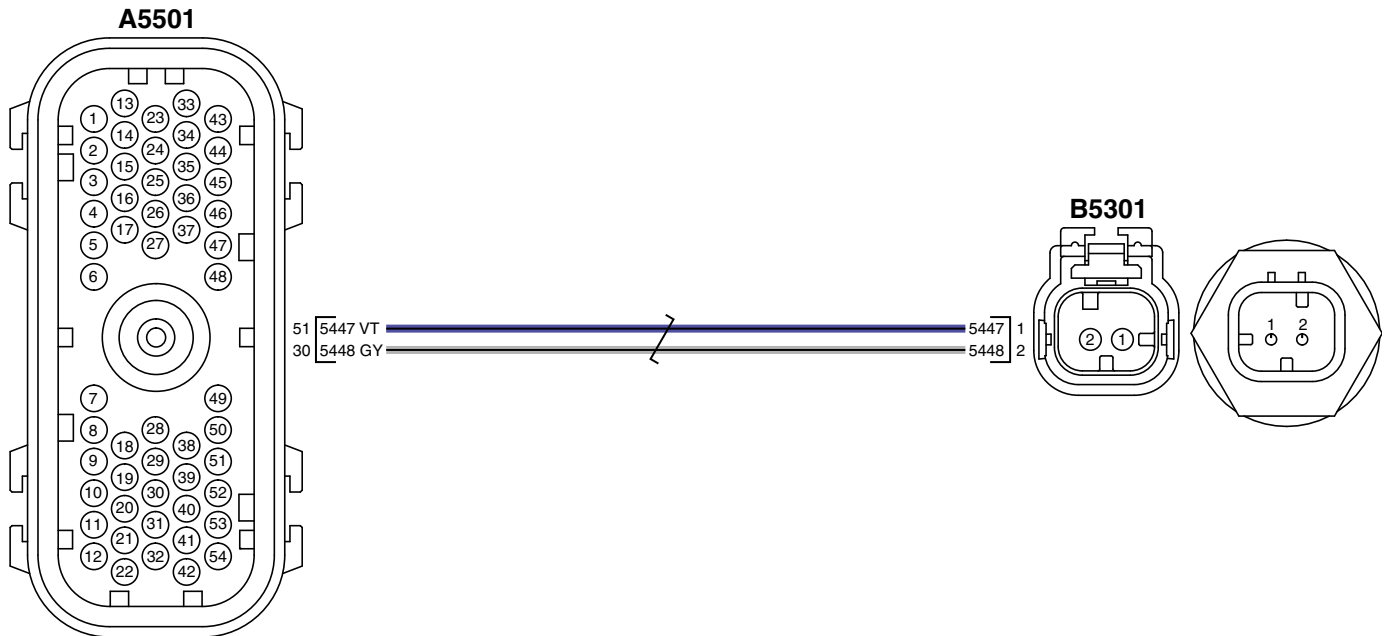
Additional References:

For more crankshaft position sensor information, see [B5301 – Crankshaft Position Sensor](#) in Section 03, Group 140.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
- see [4.5L Wiring Diagram 2](#) located in Section 06, Group 210.



Crankshaft Position Sensor Wiring Diagram

A5501—30—Return

A5501—51—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

RG20004 —UN—01AUG11

Continued on next page

RE42287,00004B8 -19-28JUL11-2/11

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

RE42287,00004B8 -19-28JUL11-3/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 000637.05 in results list, either active or stored?

YES: 000637.05 is in results list. GO TO [000637.05 – Crankshaft Position Circuit Has High Resistance](#).

NO: [GO TO 2](#)

RE42287,00004B8 -19-28JUL11-4/11

2 Read DTC List

Is DTC 000637.06 in results list, either active or stored?

YES: 000637.06 is in results list. GO TO [000637.06 – Crankshaft Position Circuit Has Low Resistance](#).

NO: [GO TO 3](#)

RE42287,00004B8 -19-28JUL11-5/11

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankshaft position sensor connector B5301.
3. Perform [Terminal Test](#) on sensor and B5301 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,00004B8 -19-28JUL11-6/11

4 Sensor Inspection

1. Remove crankshaft position sensor.
2. Visually inspect crankshaft position sensor for damage to threads or tip.

Any damage found?

YES: Replace sensor. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004B8 -19-28JUL11-7/11

Engine Position Diagnostics

5 Short to Voltage Check

1. Ignition ON, Engine OFF.

NOTE: While making the following measurements, perform Wiggle Test.

2. On B5301 connector, measure voltage between female socket 1 (+) and single point ground (-).
3. On B5301 connector, measure voltage between female socket 2 (+) and single point ground (-).

Is either voltage greater than 0.2 V?

YES: GO TO Short to Voltage Procedure procedure.

NO: GO TO 6.

RE42287,00004B8 -19-28JUL11-8/11

6 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501.

3. Perform Terminal Test on A5501 connector female sockets 30 and 51. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RE42287,00004B8 -19-28JUL11-9/11

7 Continuity Check

NOTE: While making the following measurements, perform Wiggle Test.

1. Measure resistance between A5501 connector female socket 30 and B5301 connector female socket 2.
2. Measure resistance between A5501 connector female socket 51 and B5301 connector female socket 1.

Are both resistances less than 5 ohms?

YES: GO TO 8

NO: Repair open in harness. Perform Verification Procedure

RE42287,00004B8 -19-28JUL11-10/11

8 Short to Ground Check

NOTE: While making the following measurement, perform Wiggle Test.

On B5301 connector, measure resistance between female socket 1 (+) and single point ground (-).

Is resistance less than 100k ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004B8 -19-28JUL11-11/11

**000637.10 — Crankshaft Position Signal Rate
of Change Abnormal**

*The ECU detects an improper pattern or noise on
the crankshaft position signal.*

Continued on next page

RE42287,00004B9 -19-20MAR12-1/17

Diagnostic Procedure

Troubleshooting Sequence:
000637.10

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information:

The ECU has detected an improper pattern (pulses missing or noise) on the crankshaft position signal.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and uses the camshaft position sensor for engine speed and position.

Additional References:

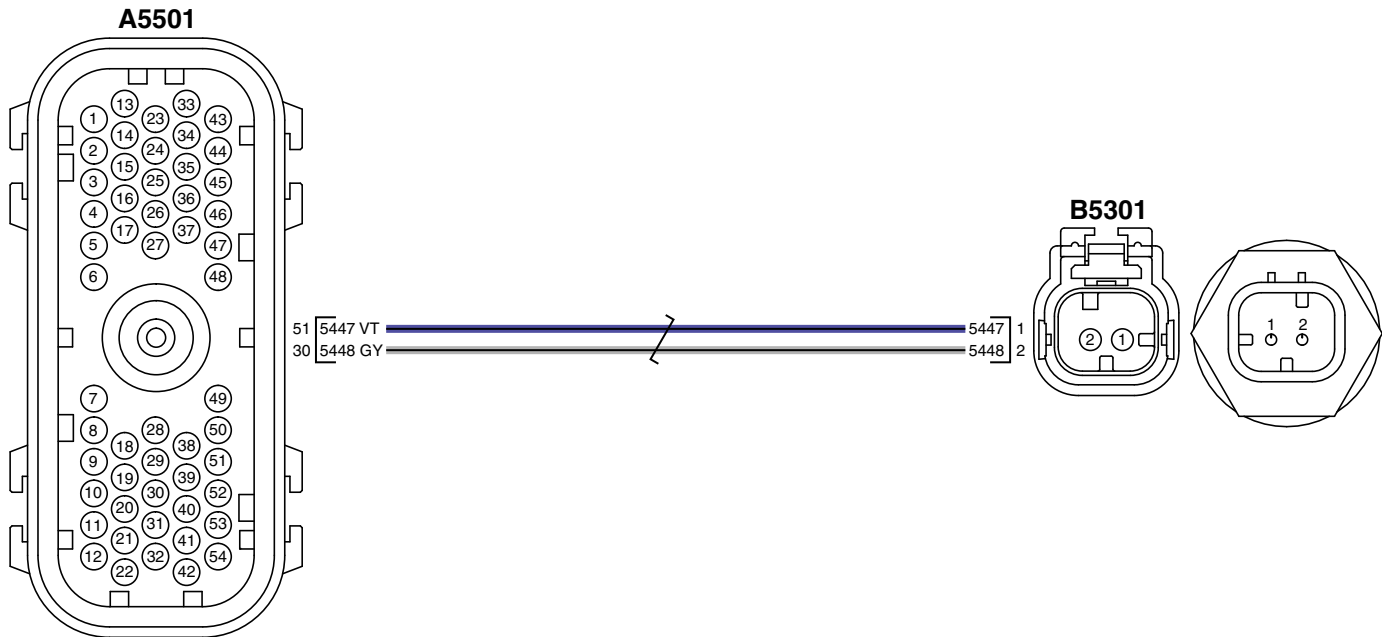
For more crankshaft position sensor information, see [B5301 — Crankshaft Position Sensor](#) in Section 03, Group 140. For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Crankshaft Position Sensor Wiring Diagram

A5501—30—Return

A5501—51—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

RG20004 —UN—01AUG11

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

RE42287,00004B9 -19-20MAR12-3/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. In Service ADVISOR, monitor Crankshaft Position Signal Improper Pattern Indicator and Crankshaft Position Signal Noise Indicator.

Data Point	Value
Crankshaft Position Signal Improper Pattern Indicator	
Crankshaft Position Signal Noise Indicator	

Do both indicators remain at 0%?

YES: [GO TO 10](#)

NO: [GO TO 2](#)

RE42287,00004B9 -19-20MAR12-4/17

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankshaft position sensor connector B5301.
3. Perform [Terminal Test](#) on sensor and B5301 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004B9 -19-20MAR12-5/17

3 Check for Loose Sensor

NOTE: For sensor torque specifications, see [Crankshaft Position Sensor — Installation](#) in Section 02, Group 110 earlier in this manual.

1. Ignition Off, Engine OFF.
2. Verify crankshaft position sensor torque.

Was crankshaft position sensor fully threaded into mounting hole?

YES: [GO TO 4](#)

NO: Torque sensor to specified value. Perform [Verification Procedure](#)

RE42287,00004B9 -19-20MAR12-6/17

4 Sensor Inspection

1. Remove crankshaft position sensor.
2. Visually inspect crankshaft position sensor for damage to threads or tip.

Any damage found?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004B9 -19-20MAR12-7/17

Engine Position Diagnostics

5 Physical Damage Inspection

Using JDG11100 Flexible Borescope, inspect gear through crankshaft sensor port for physical damage while turning engine over by hand using JDG820 Flywheel Turning Tool.

Any damage found to gear?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 6

RE42287,00004B9 -19-20MAR12-8/17

6 Terminal Test

1. Disconnect ECU connector A5501.

2. Perform Terminal Test on A5501 connector female sockets 30 and 51. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RE42287,00004B9 -19-20MAR12-9/17

7 Continuity Check

1. Measure resistance between A5501 connector female socket 30 and B5301 connector female socket 1.

2. Measure resistance between A5501 connector female socket 51 and B5301 connector female socket 2.

Are both resistances less than 5 ohms?

YES: GO TO 8

NO: Repair harness problem. Perform Verification Procedure.

RE42287,00004B9 -19-20MAR12-10/17

8 Wire-to-Wire Short

1. Disconnect ECU connectors A5502 and A5503.

2. Measure resistance between A5501 connector female socket 51 and all other sockets in ECU connectors A5501, A5502, and A5503.

Are any of the resistance measurements less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 9

RE42287,00004B9 -19-20MAR12-11/17

9 Shorted Sensor Return

On A5501 connector, measure resistance between female socket 30 and single point ground.

Is resistance less than 100k ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: GO TO 13

RE42287,00004B9 -19-20MAR12-12/17

10 Wiggle Test

1. Ignition ON, Engine running.



CAUTION: Avoid exposure and skin contact with hot exhaust gases and components. Use caution when working near rotating components.

2. Ensure that all auxiliary devices are turned off.

3. In Service ADVISOR, monitor the following parameters:

Data Point	Value
Crankshaft Position Signal Improper Pattern Indicator	
Crankshaft Position Signal Noise Indicator	

4. Perform Wiggle Test on B5301 harness.

Do both indicators remain at 0%?

YES: GO TO 11

NO: GO TO 2

Continued on next page

RE42287,00004B9 -19-20MAR12-13/17

11 Electrical Noise Check

NOTE: For a list of possible causes of electrical noise, see [Electrical Noise — Possible Causes](#).

1. In Service ADVISOR, monitor Crankshaft Position Signal Improper Pattern Indicator and Crankshaft Position Signal Noise Indicator.

Data Point	Value
Crankshaft Position Signal Improper Pattern Indicator	
Crankshaft Position Signal Noise Indicator	

2. Turn on auxiliary devices one at a time.

Do both indicators remain at 0%?

YES: [GO TO 12](#)

NO: Repair problem with auxiliary device just turned on. Perform [Verification Procedure](#).

RE42287,00004B9 -19-20MAR12-14/17

12 Reprogram ECU

1. Ignition OFF, Engine OFF.

2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

3. Ignition ON, Engine ON.

4. Refresh codes.

Is DTC 000637.10 active?

YES: [GO TO 2](#)

NO: Perform [Verification Procedure](#).

RE42287,00004B9 -19-20MAR12-15/17

13 Reprogram ECU

1. Ignition OFF, Engine OFF.

2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

3. Ignition ON, Engine ON.

4. Refresh codes.

Is DTC 000637.10 active?

YES: [GO TO 14](#)

NO: Perform [Verification Procedure](#).

RE42287,00004B9 -19-20MAR12-16/17

14 Replace Crankshaft Sensor

Has crankshaft position sensor been replaced during this procedure?

YES: Contact DTAC for support.

NO: Replace crankshaft position sensor. Perform [Verification Procedure](#).

RE42287,00004B9 -19-20MAR12-17/17

001322.31 — Engine Misfire Detected

The ECU detects that one or multiple cylinders are misfiring.

DN28805,0000016 -19-03MAY12-1/10

Diagnostic Procedure**Troubleshooting Sequence:**

Any DTC with SPN 000636
 Any DTC with SPN 000637
 Any DTC with SPN 000094
 Any DTC with SPN 000097
 Any DTC with SPN 000157
 Any DTC with SPN 000174
 Any DTC with SPN 000611
 Any DTC with SPN 000612
 Any DTC with SPN 000651
 Any DTC with SPN 000652
 Any DTC with SPN 000653
 Any DTC with SPN 000654
 Any DTC with SPN 000655
 Any DTC with SPN 000656
 Any DTC with SPN 001075
 Any DTC with SPN 003597
 Any DTC with SPN 003598
 Any DTC with SPN 003659
 Any DTC with SPN 003660
 Any DTC with SPN 003661
 Any DTC with SPN 003662
 Any DTC with SPN 003663
 Any DTC with SPN 003664

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information:

The ECU monitors the change in engine RPM between the firing of each cylinder. Small changes in RPM can indicate misfire in a cylinder. Some machine applications cause a cyclic loading of the engine that sets the 001322.31 Engine Misfire DTC.

Alarm Level:

STOP or NO ALARM Depending on application.

Control Unit Response:

The ECU tries to maintain proper operating conditions. Engine may be Derated.

Additional References:

For more information on the Harness Diagnostic Mode Test, see [Harness Diagnostic Mode Test](#) in Section 04, Group 160.

DN28805,0000016 -19-03MAY12-2/10

① Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.

Are any DTCs with the SPN 003936 or 005018 or is 001569.31 active or stored?

YES: [GO TO 2](#)

NO: [GO TO 8](#)

Continued on next page

DN28805,0000016 -19-03MAY12-3/10

Engine Position Diagnostics

2 Check for active DTCs	<p>In Service ADVISOR, perform <u>Harness Diagnostic Mode Test</u> in Section 04, Group 160.</p> <p>Are any DTCs in the troubleshooting sequence now active or stored?</p>	<p>YES: Troubleshoot active and stored DTCs</p> <p>NO: <u>GO TO 3</u></p> <p>DN28805,0000016 -19-03MAY12-4/10</p>
3 Verify if Engine is Misfiring	<p>Ignition ON, Engine running</p> <p>Is engine misfiring or running rough?</p> <p>CAUTION: Operating a misfiring engine may cause severe damage to the exhaust aftertreatment system.</p>	<p>YES: GO TO <u>Engine Misfires or Runs Irregularly</u> procedure.</p> <p>NO: <u>GO TO 4</u></p> <p>DN28805,0000016 -19-03MAY12-5/10</p>
4 Monitor Misfire Detector Indicator	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Ignition ON, Engine Running at conditions that set DTC 001322.31. Engine must be running for at least 10 minutes and at operating temperature.</p> <p>3. In Service ADVISOR, monitor Misfire Detected Indicator.</p> <p>Is the Misfire Detected Indicator greater than zero and is the engine misfiring or running rough?</p>	<p>YES: GO TO <u>Engine Misfires or Runs Irregularly</u> procedure.</p> <p>NO: <u>GO TO 5</u></p> <p>DN28805,0000016 -19-03MAY12-6/10</p>
5 Read DTCs and Stored Snapshot Information	<p>Review snapshot information stored from step 1.</p> <p>Were any DTCs with the SPN 003936 or 005018 active or stored in step 1?</p> <p>CAUTION: Failure to resolve Unintended Combustibles in the DPF and DOC causes severe damage to the exhaust aftertreatment system.</p>	<p>YES: Troubleshoot 003936 and 005018 DTCs.</p> <p>NO: <u>GO TO 6</u></p> <p>DN28805,0000016 -19-03MAY12-7/10</p>
6 ECU Reprogram	<p>Search Custom Performance for ECU software updates.</p> <p>Is there a new version of software available?</p>	<p>YES: Reprogram ECU with new version of software.</p> <p><u>GO TO 7</u></p> <p>NO: <u>GO TO 7</u></p> <p>DN28805,0000016 -19-03MAY12-8/10</p>
7 Application Interference	<p>Certain normal operating conditions and applications can cause the 001322.31 Engine Misfire DTC to set.</p> <p>Was code caused by application interference and no other problems were found?</p>	<p>YES: Problem resolved. Perform <u>Verification Procedure</u>.</p> <p>NO: Contact DTAC for assistance.</p> <p>Continued on next page</p> <p>DN28805,0000016 -19-03MAY12-9/10</p>

8 ECU Reprogram

Search Custom Performance for ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform [Verification Procedure](#)

NO: Certain normal operating conditions in some applications may cause 001322.31 Engine Misfire DTC to be saved as a stored DTC. In this case the DTC can be disregarded.

DN28805,0000016 -19-03MAY12-10/10

Air Intake and Exhaust System Diagnostics

Group 162

000102.00 — Manifold Air Pressure Signal Extremely High

The ECU has detected that the manifold air pressure is extremely high.

Continued on next page

BK34394,0001B5F -19-26OCT11-1/12

Diagnostic Procedure**Troubleshooting Sequence:**

005125.03
000102.03
000102.00

When DTC is Displayed:

When the ignition is on, engine is running, and the fault is active.

Related Information:

The manifold air pressure sensor signal voltage to the ECU corresponds to a pressure higher than a threshold defined in the ECU.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

Additional references:

For sensor location, see B5104 — Manifold Air Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see Measuring Pressure in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

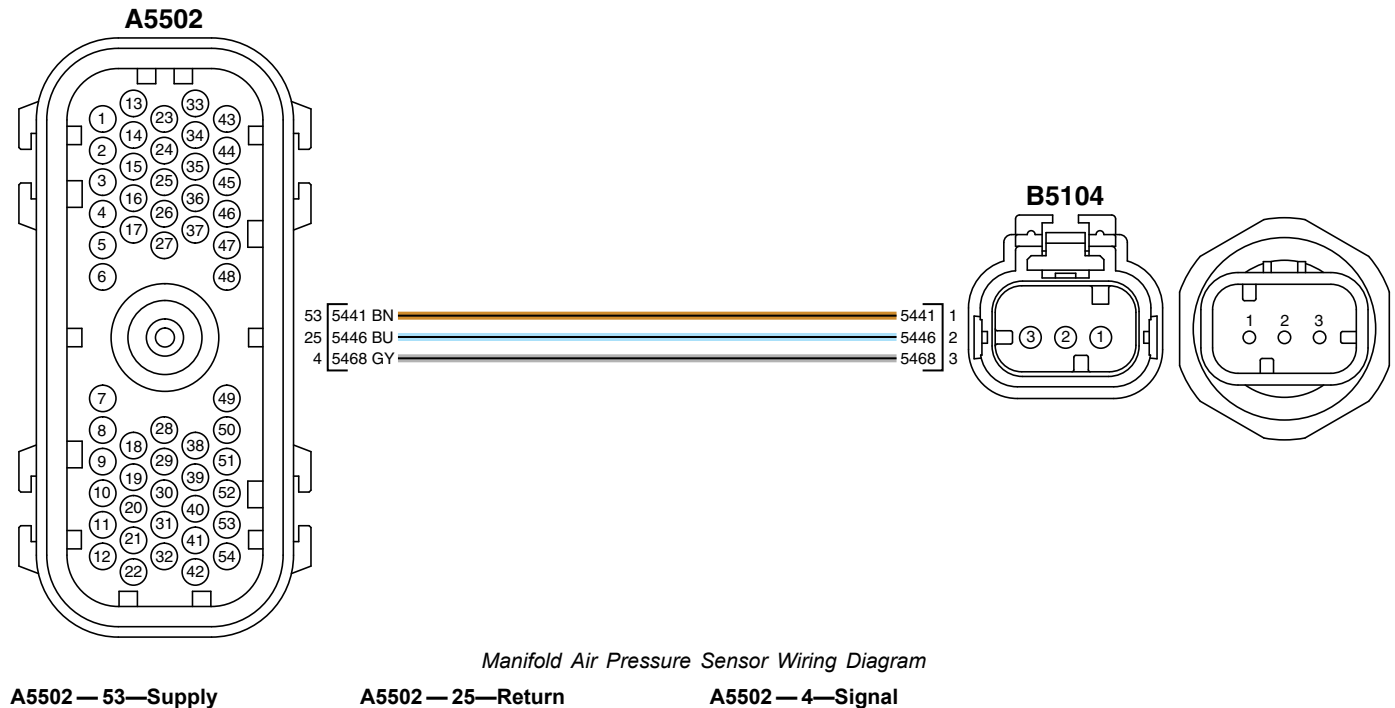
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 3

located in Section 06, Group 210.



RG16751 —UN—22DEC09

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

BK34394,0001B5F -19-26OCT11-2/12

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

BK34394,0001B5F -19-26OCT11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005125.03 active or stored?

YES: GO TO 005125.03
— Sensor Supply #7
Voltage Out of Range High
procedure.

NO: GO TO 2

BK34394,0001B5F -19-26OCT11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air pressure sensor connector B5104.
3. Perform Terminal Test on sensor and B5104 connector.

Were any problems found?

YES: Repair problem.
Perform Verification
Procedure.

NO: GO TO 3

BK34394,0001B5F -19-26OCT11-5/12

3 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5104 connector female socket 1 (+).
 - B to B5104 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 5

NO: GO TO 4

Continued on next page

BK34394,0001B5F -19-26OCT11-6/12

4 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform [Verification Procedure](#).

NO: Repair open or high resistance in supply wire. Perform [Verification Procedure](#).

BK34394,0001B5F -19-26OCT11-7/12

5 Signal Circuit Check

1. Connect Diagnostic Test Box :

- A to B5104 connector female socket 3 (+).
- B to B5104 connector female socket 2 (-).

2. Set S1 to position 9 on Diagnostic Test Box.

3. Connect multimeter to Diagnostic Test Box.

4. Ignition ON, Engine OFF.

5. Monitor voltage on multimeter.

6. Perform [Wiggle Test](#).

Is voltage greater than 2.7 V?

YES: GO TO [Short to Voltage Procedure](#).

NO: [GO TO 6](#)

BK34394,0001B5F -19-26OCT11-8/12

6 Software Check

In Service ADVISOR, monitor Manifold Air Pressure Input Voltage.

YES: [GO TO 8](#)

Is voltage between 2.3 and 2.7 V?

NO: [GO TO 7](#)

BK34394,0001B5F -19-26OCT11-9/12

7 Reprogram ECU

1. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

2. Connect Diagnostic Test Box :

- A to B5104 connector female socket 3 (+).
- B to B5104 connector female socket 2 (-).

3. Set S1 to position 9 on Diagnostic Test Box.

4. Connect multimeter to Diagnostic Test Box.

5. Ignition ON, Engine OFF.

6. In Service ADVISOR, monitor Manifold Air Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform [Verification Procedure](#).

NO: Replace ECU. Perform [Verification Procedure](#).

Continued on next page

BK34394,0001B5F -19-26OCT11-10/12

8 Sensor Check

1. Ignition OFF, Engine OFF.
2. Replace manifold air pressure sensor.
3. Ignition ON, engine running.
4. Refresh codes.

Is DTC 000102.16 or 000102.00 active?

YES: [GO TO 9](#)

NO: Perform [Verification Procedure](#).

BK34394,0001B5F -19-26OCT11-11/12

9 Replace Wastegate Turbocharger

1. Ignition OFF, Engine OFF.
2. Allow components to cool down.
3. Replace wastegate turbocharger. For more information, see [Wastegate Turbocharger Assembly — Installation](#) in Section 02, Group 080.
4. Ignition ON, engine running.
5. Refresh codes.

Is DTC 000102.16 or 000102.00 active?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

BK34394,0001B5F -19-26OCT11-12/12

**000102.03 — Manifold Air Pressure Signal
Out of Range High**

*The manifold air pressure signal exceeds the sensor
high voltage specification.*

Continued on next page

RE42287,00004D4 -19-14FEB11-1/15

Diagnostic Procedure**Troubleshooting Sequence:****005125.03****000102.03****When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The manifold air pressure sensor signal voltage to the ECU corresponds to a pressure higher than what is physically possible for the manifold air pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for manifold air pressure.

Additional references:

For sensor location see B5104 — Manifold Air Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see Measuring Pressure in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

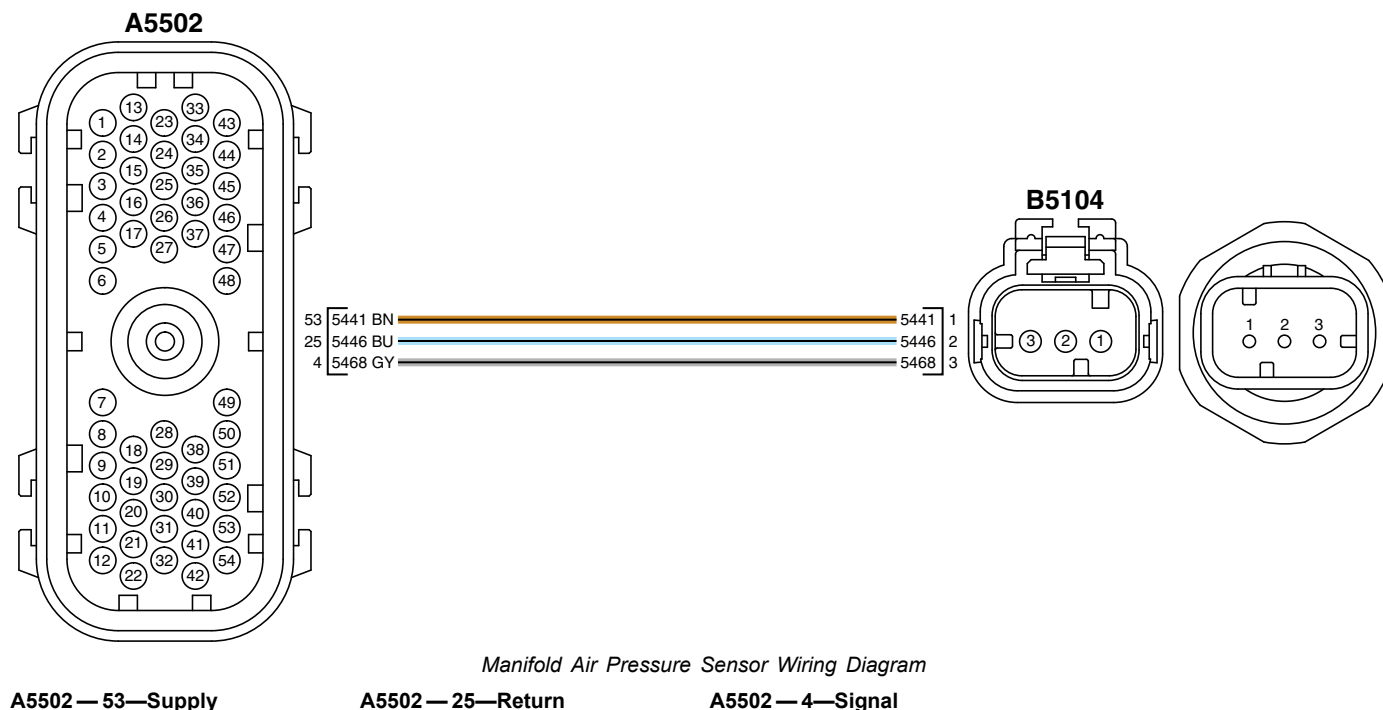
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 3

located in Section 06, Group 210.



RG16751 —UN—22DEC09

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

RE42287,00004D4 -19-14FEB11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004D4 -19-14FEB11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005125.03 active or stored?

YES: GO TO 005125.03
— Sensor Supply #7
Voltage Out of Range High
procedure.

NO: GO TO 2

RE42287,00004D4 -19-14FEB11-4/15

2 Code Check

Is DTC 000102.03 active?

YES: GO TO 3

NO: GO TO 10

RE42287,00004D4 -19-14FEB11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air pressure sensor connector B5104.
3. Perform Terminal Test on sensor and B5104 connector.

Were any problems found?

YES: Repair problem.
Perform Verification
Procedure.

NO: GO TO 4

Continued on next page

RE42287,00004D4 -19-14FEB11-6/15

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5104 connector female socket 3 (+).
 - B to B5104 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 8

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 5

RE42287,00004D4 -19-14FEB11-7/15

5 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform Verification Procedure.

NO: GO TO 6

RE42287,00004D4 -19-14FEB11-8/15

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 4, 25, and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RE42287,00004D4 -19-14FEB11-9/15

7 Continuity Check

1. Measure the resistance between A5502 connector female socket 25 and B5104 connector female socket 2.
2. Measure the resistance between A5502 connector female socket 4 and B5104 connector female socket 3.

Are both resistance measurements less than 5 ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,00004D4 -19-14FEB11-10/15

8 Software Check

In Service ADVISOR, monitor Manifold Air Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RE42287,00004D4 -19-14FEB11-11/15

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000102.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004D4 -19-14FEB11-12/15

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Manifold Air Pressure Input Voltage.
3. Perform [Wiggle Test](#).

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RE42287,00004D4 -19-14FEB11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air pressure sensor connector B5104.
3. Perform [Terminal Test](#) on sensor and B5104 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RE42287,00004D4 -19-14FEB11-14/15

12 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform [Terminal Test](#) on A5502 connector female sockets 4, 25, and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RE42287,00004D4 -19-14FEB11-15/15

**000102.04 — Manifold Air Pressure Signal
Out of Range Low**

*The manifold air pressure signal is lower than the
sensor low voltage specification.*

Continued on next page

RE42287,00004D5 -19-08AUG11-1/17

Diagnostic Procedure**Troubleshooting Sequence:****005125.03****005125.04****000102.03****000102.04****When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The manifold air pressure sensor signal voltage to the ECU corresponds to a pressure lower than what is physically possible for the manifold air pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

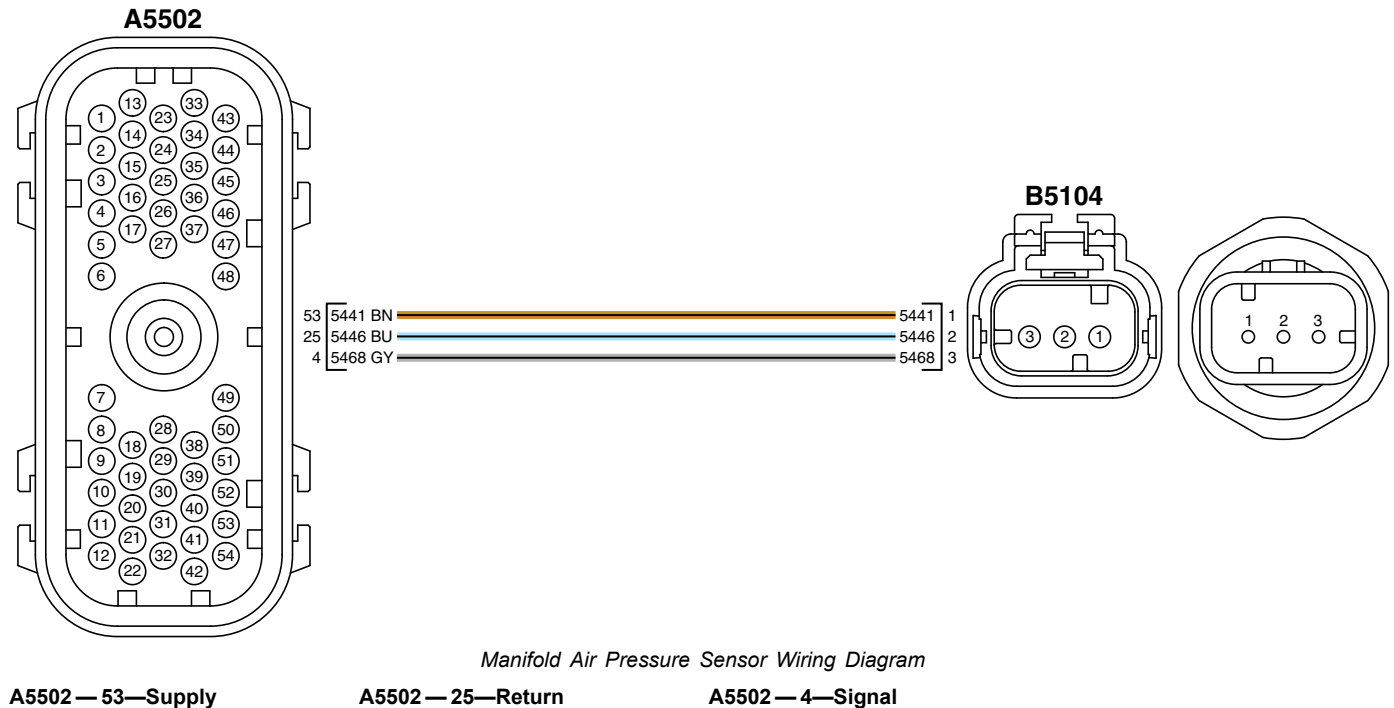
The ECU uses a default value for manifold air pressure.

Additional References:For sensor location see [B5104 — Manifold Air Pressure Sensor](#) in Section 03, Group 140.For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.*NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.*

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



RG16751 —UN—22DEC09

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

RE42287,00004D5 -19-08AUG11-2/17

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004D5 -19-08AUG11-3/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005125.04 stored?

YES: GO TO 005125.04 — Sensor Supply #7 Voltage Out of Range Low procedure.

NO: GO TO 2

RE42287,00004D5 -19-08AUG11-4/17

2 Code Check

Is DTC 000102.03 stored?

YES: GO TO 000102.03 — Manifold Air Pressure Signal Out of Range High procedure.

NO: GO TO 3

RE42287,00004D5 -19-08AUG11-5/17

3 Code Check

Is DTC 000102.04 active?

YES: GO TO 4

NO: GO TO 12

RE42287,00004D5 -19-08AUG11-6/17

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air pressure sensor connector B5104.
3. Perform Terminal Test on sensor and B5104 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 5

Continued on next page

RE42287,00004D5 -19-08AUG11-7/17

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5104 connector female socket 1 (+).
 - B to B5104 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 7

NO: GO TO 6

RE42287,00004D5 -19-08AUG11-8/17

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

RE42287,00004D5 -19-08AUG11-9/17

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5104 connector female socket 3 (+).
 - B to B5104 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 8

NO: GO TO 10

RE42287,00004D5 -19-08AUG11-10/17

8 Software Check

In Service ADVISOR, monitor Manifold Air Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RE42287,00004D5 -19-08AUG11-11/17

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000102.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004D5 -19-08AUG11-12/17

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform [Terminal Test](#) on A5502 connector female sockets 4, 25, and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RE42287,00004D5 -19-08AUG11-13/17

11 Continuity Check

Measure resistance between A5502 connector female socket 4 and B5104 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mis-pin in harness. Perform [Verification Procedure](#).

RE42287,00004D5 -19-08AUG11-14/17

12 Wiggle Test

1. In Service ADVISOR, monitor Manifold Air Pressure Input Voltage.
2. Perform [Wiggle Test](#).

Does voltage ever go below 0.2 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 13](#)

RE42287,00004D5 -19-08AUG11-15/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air pressure sensor connector B5104.
3. Perform [Terminal Test](#) on sensor and B5104 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 14](#)

Continued on next page

RE42287,00004D5 -19-08AUG11-16/17

14 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 4, 25, and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004D5 -19-08AUG11-17/17

**000102.07 — Manifold Air Pressure Signal
In Range Invalid**

*The ECU has detected that the manifold air pressure
signal is in range, but invalid.*

Continued on next page

RE42287,00004D6 -19-08APR11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

005125.03
005125.04
000103.00
000103.02
000103.05
000102.07

When DTC is Displayed:

When the ignition is on, engine is off or running, and the fault is active.

Related Information:

The ECU compares the manifold air pressure to the intake air pressure sensor, exhaust manifold pressure sensor, and the barometric pressure sensor at ignition on, engine off and at ECU power down. When the engine is running, the ECU compares the manifold air pressure value against an ECU estimated value for the operating conditions and sets this fault if the two values are not within a certain range of each other.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for manifold air pressure.

Additional References:

For sensor location see B5104 — Manifold Air Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

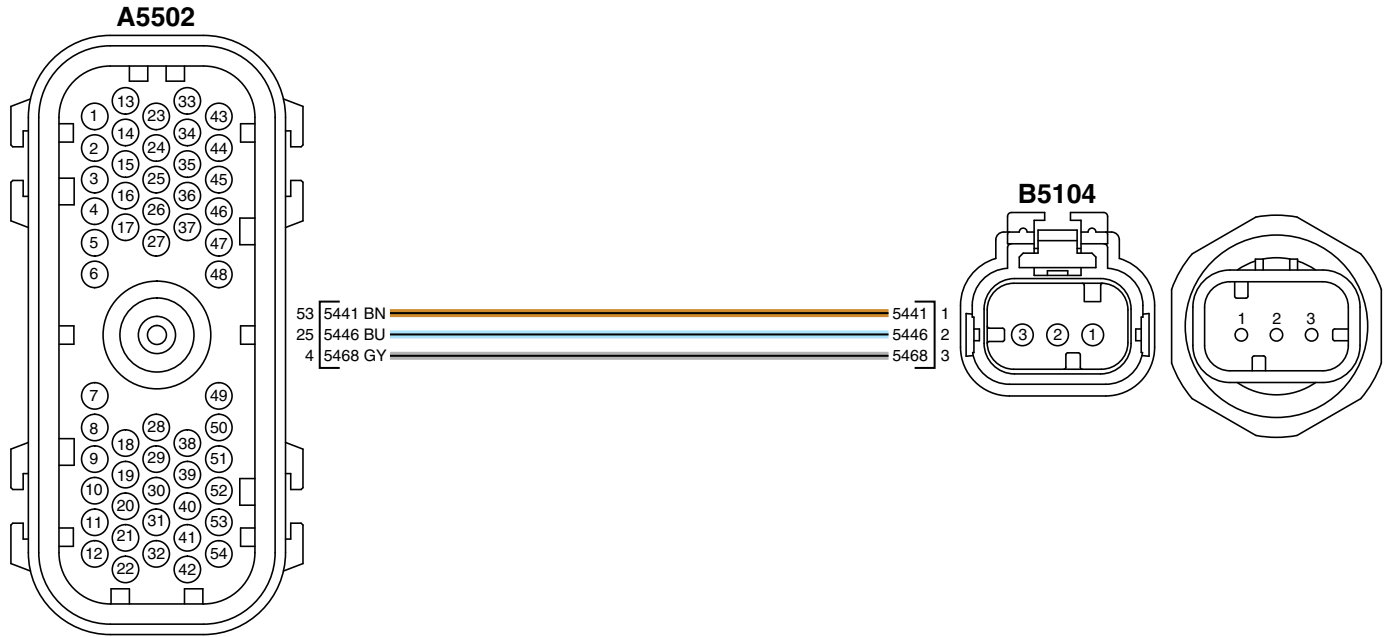
For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 3](#)
located in Section 06, Group 210.



Manifold Air Pressure Sensor Wiring Diagram

A5502 — 53—Supply

A5502 — 25—Return

A5502 — 4—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004D6 -19-08APR11-3/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005125.03 active or stored?

YES: GO TO [005125.03 — Sensor Supply #7 Voltage Out of Range High](#) procedure.

NO: GO TO 2

Continued on next page

RE42287,00004D6 -19-08APR11-4/17

Air Intake and Exhaust System Diagnostics

2 Code Check

Is DTC 005125.04 active or stored?

YES: GO TO 005125.04
— Sensor Supply #7
Voltage Out of Range Low
procedure.

NO: GO TO 3

RE42287,00004D6 -19-08APR11-5/17

3 Code Check

Is DTC 000102.07 active?

YES: GO TO 7

NO: GO TO 4

RE42287,00004D6 -19-08APR11-6/17

4 Code Check

1. Ignition ON, engine running.
 2. Wait for a minimum of 60 seconds.
 3. Refresh codes.
- Is DTC 000102.07 active?

YES: GO TO 6

NO: GO TO 5

RE42287,00004D6 -19-08APR11-7/17

5 Code Check

1. Review Snapshot Information stored from step 1 or speak with operator to determine conditions where DTC became active.
 2. Operate engine under condition where DTC became active.
 3. Refresh codes.
- Is DTC 000102.07 active?

YES: GO TO 6

NO: GO TO Problem Not Found Procedure.

RE42287,00004D6 -19-08APR11-8/17

6 Boost Leak Check

Inspect application for boost leaks or restrictions in air system.

For example, check for:

- Loose hoses or clamps
- Plugged air filter
- Internal or external charge air cooler restrictions
- Loose fan belt
- Turbocharger leaks or damage

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,00004D6 -19-08APR11-9/17

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air pressure sensor connector B5104.
3. Perform Terminal Test on sensor and B5104 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 8

Continued on next page

RE42287,00004D6 -19-08APR11-10/17

8 Supply Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5104 connector female socket 1 (+).
 - B to B5104 connector female socket 2 (-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Ignition ON, Engine OFF.
 5. Press and hold S3 on Diagnostic Test Box.
 6. Monitor voltage on multimeter.
 7. Perform Wiggle Test.
- Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 10

NO: GO TO 9

RE42287,00004D6 -19-08APR11-11/17

9 Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
 2. Monitor voltage on multimeter.
- Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open, high resistance, or short in return wire. Perform Verification Procedure.

NO: Repair open, high resistance, or short in supply wire. Perform Verification Procedure.

RE42287,00004D6 -19-08APR11-12/17

10 Signal Circuit Check

1. Ignition OFF, Engine OFF.
 2. Connect Diagnostic Test Box :
 - A to B5104 connector female socket 3 (+).
 - B to B5104 connector female socket 2 (-).
 3. Set S1 to position 9 on Diagnostic Test Box.
 4. Connect multimeter to Diagnostic Test Box.
 5. Ignition ON, Engine OFF.
 6. Monitor voltage on multimeter.
 7. Perform Wiggle Test.
- Is voltage between 2.3 and 2.7 V?

YES: GO TO 11

NO: GO TO 13

RE42287,00004D6 -19-08APR11-13/17

11 Software Check

In Service ADVISOR, monitor Manifold Air Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 12

Continued on next page

RE42287,00004D6 -19-08APR11-14/17

12 Reprogram ECU

1. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
2. Ignition OFF, Engine OFF.
3. Connect Diagnostic Test Box :
 - A to B5104 connector female socket 3 (+).
 - B to B5104 connector female socket 2 (-).
4. Set S1 to position 9 on Diagnostic Test Box.
5. Connect multimeter to Diagnostic Test Box.
6. Ignition ON, Engine OFF.
7. Monitor voltage on multimeter.
8. Perform [Wiggle Test](#).

Is voltage between 2.3 and 2.7 V?

YES: Perform [Verification Procedure](#).

NO: Replace ECU. Perform [Verification Procedure](#).

RE42287,00004D6 -19-08APR11-15/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform [Terminal Test](#) on A5502 connector female sockets 4, 25, and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 14](#)

RE42287,00004D6 -19-08APR11-16/17

14 Continuity Check

Measure resistance between A5502 connector female socket 4 and B5104 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mis-pin in harness. Perform [Verification Procedure](#).

RE42287,00004D6 -19-08APR11-17/17

000102.16 — Manifold Air Pressure Signal Moderately High

The ECU has detected that the manifold air pressure is moderately high.

Diagnostic Procedure

When DTC is Displayed:

When the ignition is on, engine is running, and the fault is active.

Related Information:

This code is set when the ECU detects the manifold air pressure is moderately high. This fault is intended to identify a problem or incorrect adjustment of the wastegate turbocharger actuator.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see [000102.16 – Manifold Air Pressure Signal Extremely High](#)

BK34394,0001B60 -19-24OCT11-1/1

000103.00 — VGT Speed Signal Extremely High

The ECU detects that the turbo speed signal is extremely high.

Continued on next page

RE42287,00004D7 -19-14FEB11-1/9

Diagnostic Procedure**Troubleshooting Sequence:**

000051.07
 000103.02
 000105.00
 000105.03
 000105.04
 000105.15
 000105.16
 000107.00
 000107.15
 000107.16
 001176.07
 001176.12
 001209.03
 001209.04
 001209.07
 002795.07
 000103.00

When DTC is Displayed:

When the ignition is on and the engine is running.

Related Information:

This DTC may be caused by working the application at high altitudes and at high power.

This DTC may also be caused by boost leaks, VGT speed sensor wiring problems, injector wiring shielding problems, or physical VGT damage.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional References:

For more VGT speed sensor information, see [B5300 — VGT Speed Sensor](#) in Section 03, Group 140.

For more information on speed sensors, see [Measuring Speed](#) in Section 03, Group 140.

For more information on the VGT Learn Value Reset Test, see [VGT — Learn Value Reset Test Instructions](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

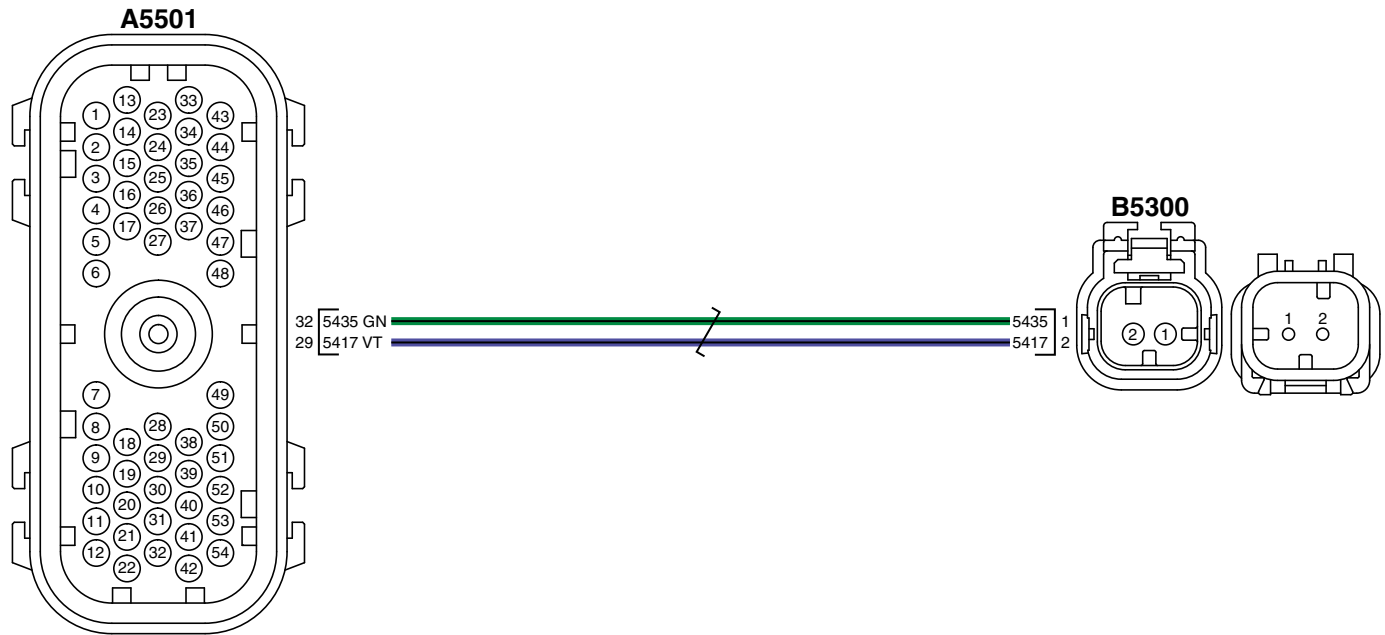
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



VGT Speed Sensor Wiring Diagram

A5501 — 32—Signal

A5501 — 29—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

JDG11100 — Flexible Borescope

RE42287,00004D7 -19-14FEB11-3/9

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Are any of the codes within the Troubleshooting Sequence active or stored?

YES: GO TO the troubleshooting procedure for the active or stored DTCs within the list.

NO: [GO TO 2](#)

Continued on next page

RE42287,00004D7 -19-14FEB11-4/9

Air Intake and Exhaust System Diagnostics

2 Boost Leak Check

Inspect application for boost leaks in the VGT piping and charge air cooler system.

Any leaks found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004D7 -19-14FEB11-5/9

3 Wiring Check

1. Ignition OFF, Engine OFF

2. Inspect VGT speed sensor wiring on the engine harness to ensure:

- the wires are twisted (twisted wires aid in the reduction of sensitivity to electrical noise)
- that incorrect repairs have not been made

Any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,00004D7 -19-14FEB11-6/9

4 Injector Wiring Check

Inspect injector wiring harness for damage to shielding.

Any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,00004D7 -19-14FEB11-7/9

5 VGT Check

1. Ignition OFF, Engine OFF.

2. Remove VGT speed sensor.

IMPORTANT: When removing speed sensor, do not turn or spin compressor or turbine wheels. The speed sensor aligns with a slot in a spacer on the bearing shaft. If this slot is moved out of alignment with the sensor, the risk of turbocharger and sensor failure increases. See Turbocharger VGT Speed Sensor — Installation in Section 02 Group 110 for a cutaway view of the sensor to turbocharger assembly.

3. Inspect sensor tip for damage.

4. Inspect VGT shaft for damage using [JDG11100](#) flexible borescope,

Any problems found?

YES: Replace VGT. In Service ADVISOR, perform VGT Learn Value Reset Test. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,00004D7 -19-14FEB11-8/9

6 Reprogram ECU

NOTE: This DTC may be caused by working the application at high altitudes and at high power.

1. Download new ECU software payload. For more information, see [Payload File — Downloading Instructions](#) in Section 04, Group 160.

2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

3. Try recreating the conditions that set the DTC.

Were you able to set DTC 000103.00?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

RE42287,00004D7 -19-14FEB11-9/9

000103.02 — VGT Speed Signal Invalid

The ECU detects that the VGT speed signal is not valid.

Continued on next page

RE42287,00004D8 -19-02AUG11-1/14

Diagnostic Procedure**Troubleshooting Sequence:**

000103.05
000103.00
000103.02

When DTC is Displayed:

When the ignition is on and the engine is running.

Related Information:

This DTC may be caused by electrical noise interfering with the signal coming from the VGT speed sensor to the ECU. This DTC may also be caused by a problem with the VGT speed sensor or wiring.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and use the ECU calculated VGT speed for maintaining engine parameters.

Additional References:

For more VGT speed sensor information, see [B5300 — VGT Speed Sensor](#) in Section 03, Group 140.

For more information on speed sensors, see [Measuring Speed](#) in Section 03, Group 140.

For more information on the VGT Learn Value Reset Test, see [VGT — Learn Value Reset Test Instructions](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

For more information on the Harness Diagnostic Mode Test, see [Harness Diagnostic Mode Test Instructions](#) in Section 04, Group 160.

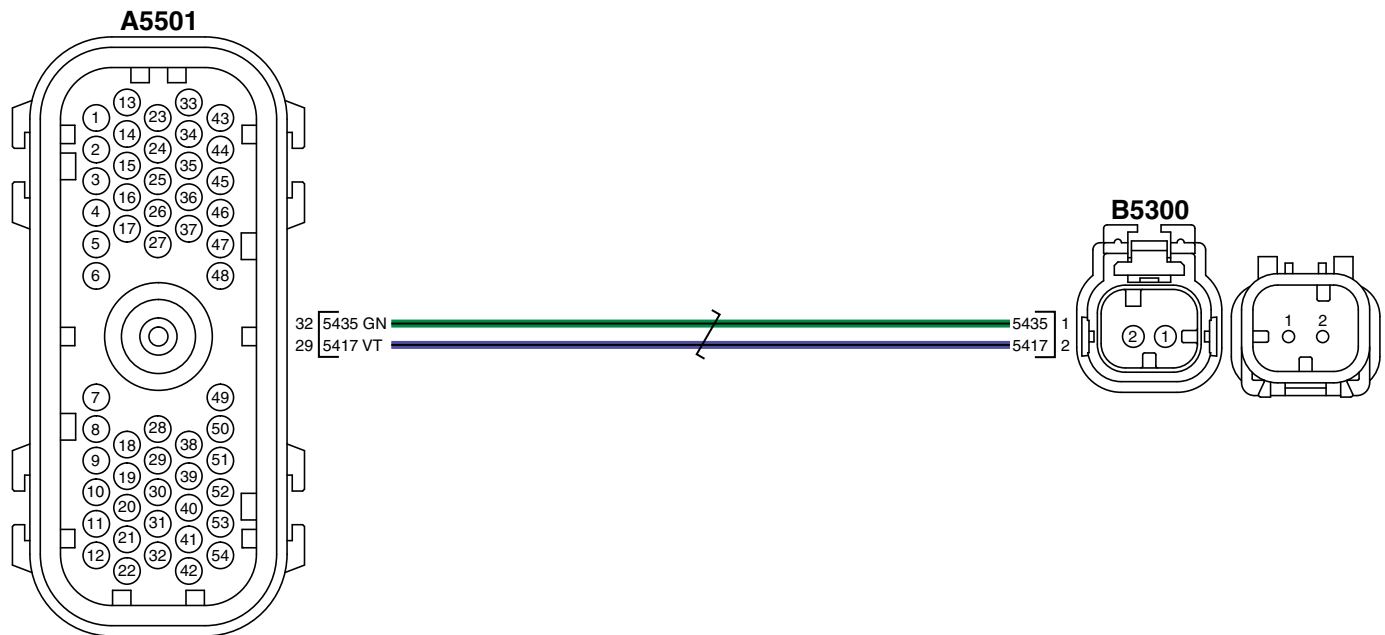
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



VGT Speed Sensor Wiring Diagram

A5501 — 32—Signal

A5501 — 29—Return

RG17733 — UN—06MAY10

Continued on next page

RE42287,00004D8 -19-02AUG11-2/14

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG11100 — Flexible Borescope

RE42287,00004D8 -19-02AUG11-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh DTCs.
6. Monitor DTCs for 2 minutes.

Are DTCs 000103.05 or 000103.00 in DTC list as active or stored?

YES: Troubleshoot the DTC(s) according to the troubleshooting sequence.

NO: GO TO 2

RE42287,00004D8 -19-02AUG11-4/14

2 Noise Check

1. Ignition OFF, Engine OFF.
2. Ensure that all auxiliary devices are turned off.
3. Ignition ON, Engine running.
4. Monitor DTC list for 2 minutes.

Is DTC 000103.02 active?

YES: GO TO 3

NO: GO TO 8

RE42287,00004D8 -19-02AUG11-5/14

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect VGT speed sensor connector B5300.
3. Perform Terminal Test on sensor and B5300 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 4

Continued on next page

RE42287,00004D8 -19-02AUG11-6/14

4 VGT Speed Sensor Circuit Check

1. Connect Diagnostic Test Box:
 - A to B5300 connector female socket 1 (+).
 - B to B5300 connector female socket 2 (-).
2. Set S1 to position 11 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter while performing Wiggle Test.

NOTE: A negative voltage is less than 2.1 V.

Does voltage always measure between 2.1 V and 2.5 V?

YES: GO TO 9

NO: Voltage is greater than 2.5 and less than 5.2 V. GO TO 11

NO: Voltage is greater than 5.2 V. GO TO Short to Voltage Procedure.

NO: Voltage is less than 2.1 V. GO TO 5

RE42287,00004D8 -19-02AUG11-7/14

5 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 29 and 32. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 6

RE42287,00004D8 -19-02AUG11-8/14

6 Short to Ground Check

1. Disconnect Diagnostic Test Box.
2. On A5501 connector, measure resistance between female socket 32 and single point ground.
3. Perform Wiggle Test on VGT speed sensor circuit.

Is measurement always greater than 100k ohms?

YES: GO TO 7

NO: Repair short to ground. Perform Verification Procedure.

RE42287,00004D8 -19-02AUG11-9/14

7 Wire to Wire Check

1. On A5501 connector, measure resistance between female socket 29 and 32.
2. Perform Wiggle Test on VGT speed sensor circuit.

Is measurement always greater than 100k ohms?

YES: Contact DTAC for support.

NO: Repair wire to wire short. Perform Verification Procedure.

Continued on next page

RE42287,00004D8 -19-02AUG11-10/14

Air Intake and Exhaust System Diagnostics

8 Electrical Noise Check

NOTE: For a list of possible causes of electrical noise, see [Electrical Noise — Possible Causes](#).

1. Ignition ON, Engine running.
2. Turn on auxiliary devices one at a time, while waiting 2 minutes between turning on each device.
3. Monitor DTC list.

Does DTC 000103.02 appear active when a specific device was turned on?

YES: Noise is being generated by the device. Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,00004D8 -19-02AUG11-11/14

9 VGT Speed Sensor Check

1. Ignition OFF, Engine OFF.
2. Remove VGT speed sensor.
3. Inspect sensor tip for damage.

Any problems found?

YES: Replace VGT speed sensor. Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RE42287,00004D8 -19-02AUG11-12/14

10 VGT Shaft Check

1. Inspect VGT shaft for damage using [JDG11100](#) flexible borescope,
2. Remove inlet and outlet tubing from VGT.
3. Spin compressor wheel and ensure that turbine is spinning also.

Was shaft damage found?

YES: Replace VGT. In Service ADVISOR, perform VGT Learn Value Reset Test. Perform [Verification Procedure](#).

NO: Reinstall VGT speed sensor. See [VGT Speed Sensor — Installation](#) in Section 02, Group 110. GO TO [Problem Not Found Procedure](#).

RE42287,00004D8 -19-02AUG11-13/14

11 High Resistance Check

Press and hold S2 on Diagnostic Test Box while performing Wiggle Test.

Did multimeter reading stay within 2.1 V and 2.5 V?

YES: Repair high resistance on return wire. Perform [Verification Procedure](#).

NO: Repair high resistance on signal wire. Perform [Verification Procedure](#).

RE42287,00004D8 -19-02AUG11-14/14

000103.05 — VGT Speed Circuit Has High Resistance

The ECU detects high resistance in the VGT speed sensor circuit.

Continued on next page

RE42287,00004D9 -19-02AUG11-1/11

Diagnostic Procedure**Troubleshooting Sequence:**
000103.05**When DTC is Displayed:**

When the ignition is on, the engine stopped, and the error condition exists when the ECU does its periodic diagnostic check. Or during Harness Diagnostic Mode Test.

Related Information:

The ECU detects high resistance or an open circuit in the VGT speed sensor circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions and uses a modeled VGT speed.

Additional References:

For more VGT speed sensor information, see [B5300 – VGT Speed Sensor](#) in Section 03, Group 140.

For more information on how to use the Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

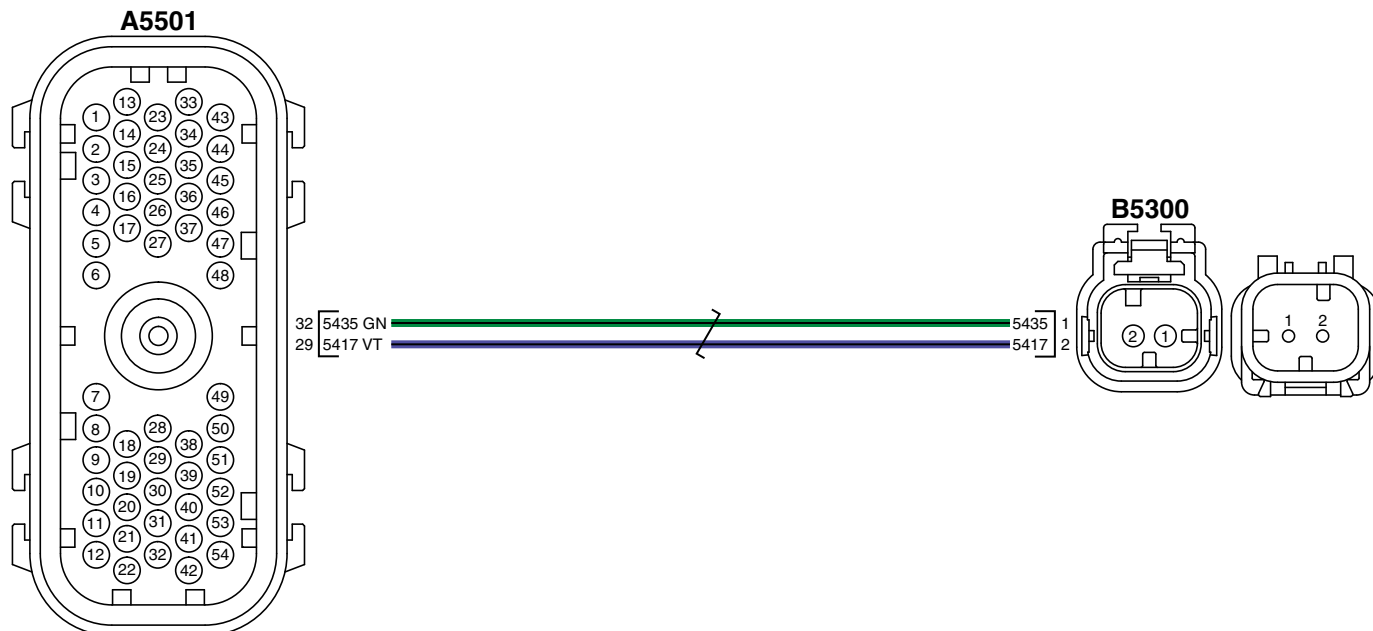
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



VGT Speed Sensor Wiring Diagram

A5501 — 32—Signal

A5501 — 29—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple

- [JDG10461](#) — Male — Yellow/Purple

Continued on next page

RE42287,00004D9 -19-02AUG11-2/11

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004D9 -19-02AUG11-3/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform [Control Unit Information and Overview](#) test.
5. Wait 2 minutes.
6. Refresh codes.

Is DTC 000103.05 active or stored?

YES: [GO TO 2](#)

NO: [GO TO 6](#)

RE42287,00004D9 -19-02AUG11-4/11

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect VGT speed sensor connector B5300.
3. Perform [Terminal Test](#) on sensor and B5300 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004D9 -19-02AUG11-5/11

3 Sensor Check

1. Ignition OFF, Engine OFF
 2. Measure resistance between B5300 sensor connector male pins 1 and 2.
- Is resistance from 700 through 1000 ohms?

YES: [GO TO 4](#)

NO: Replace sensor.
Perform [Verification Procedure](#).

Continued on next page

RE42287,00004D9 -19-02AUG11-6/11

4 Circuit Check

1. Connect Diagnostic Test Box:
 - A to B5300 connector female sockets 1 (+).
 - B to B5300 connector female sockets 2 (-).
2. Set S1 to position 11 on Diagnostic Test Box.
3. Monitor voltage on multimeter.

4. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.1 V.

Is voltage between 2.1 V and 2.5 V?

YES: Replace sensor. Perform Verification Procedure.

NO: Voltage is greater than 5.2 V. GO TO Short to Voltage Procedure.

NO: Voltage is greater than 2.5 V and less than 5.2 V. GO TO 5

NO: Voltage is less than 2.1 V. GO TO 6

RE42287,00004D9 -19-02AUG11-7/11

5 High Resistance Check

1. Press and hold S2 on Diagnostic Test Box.

2. Perform Wiggle Test.

Did multimeter reading stay between 2.1 V and 2.5 V?

YES: Repair high resistance on return wire. Perform Verification Procedure.

NO: Repair high resistance on signal wire. Perform Verification Procedure.

RE42287,00004D9 -19-02AUG11-8/11

6 Terminal Test

1. Disconnect ECU connector A5501.

2. Perform Terminal Test on A5501 connector female sockets 29 and 32. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RE42287,00004D9 -19-02AUG11-9/11

7 Short to Ground Check

1. Disconnect Diagnostic Test Box, if connected.

2. On A5501 connector, measure resistance between female socket 32 and single point ground.

3. Perform Wiggle Test on VGT speed sensor circuit.

Is measurement always greater than 100k ohms?

YES: GO TO 8

NO: Repair short to ground. Perform Verification Procedure.

Continued on next page

RE42287,00004D9 -19-02AUG11-10/11

8 Wire to Wire Check

1. On A5501 connector, measure resistance between female socket 29 and 32.
2. Perform Wiggle Test on VGT speed sensor circuit.

Is measurement always greater than 100k ohms?

YES: Contact DTAC for support.

NO: Repair wire to wire short. Perform Verification Procedure.

RE42287,00004D9 -19-02AUG11-11/11

**000105.00 — Manifold Air Temperature
Signal Extremely High**

*The manifold air temperature signal is much
higher than expected.*

Continued on next page

RE42287,00004DA -19-02AUG11-1/9

Diagnostic Procedure

Troubleshooting Sequence:

000111.01
000111.17
000111.18
000110.00
000110.03
000110.04
000109.01
000109.03
000109.04
000109.17
000109.18
000109.31
000412.00
000412.03
000412.04
002629.03
002629.04
002630.00
002630.03
002630.04
002630.15
002630.16
001209.03
001209.03
001209.04
000102.03
000102.04
000108.02
003464.13
000051.07
002791.13
000027.07
002795.07
000102.02
001209.02
002659.07
002659.14
002659.17
001639.18
001639.01
000105.00

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The manifold air temperature signal is much higher than expected at the operating conditions that set the DTC.
The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Continued on next page

RE42287,00004DA -19-02AUG11-2/9

Additional References:

For sensor location, see [B5206 — Manifold Air Temperature Sensor](#) in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

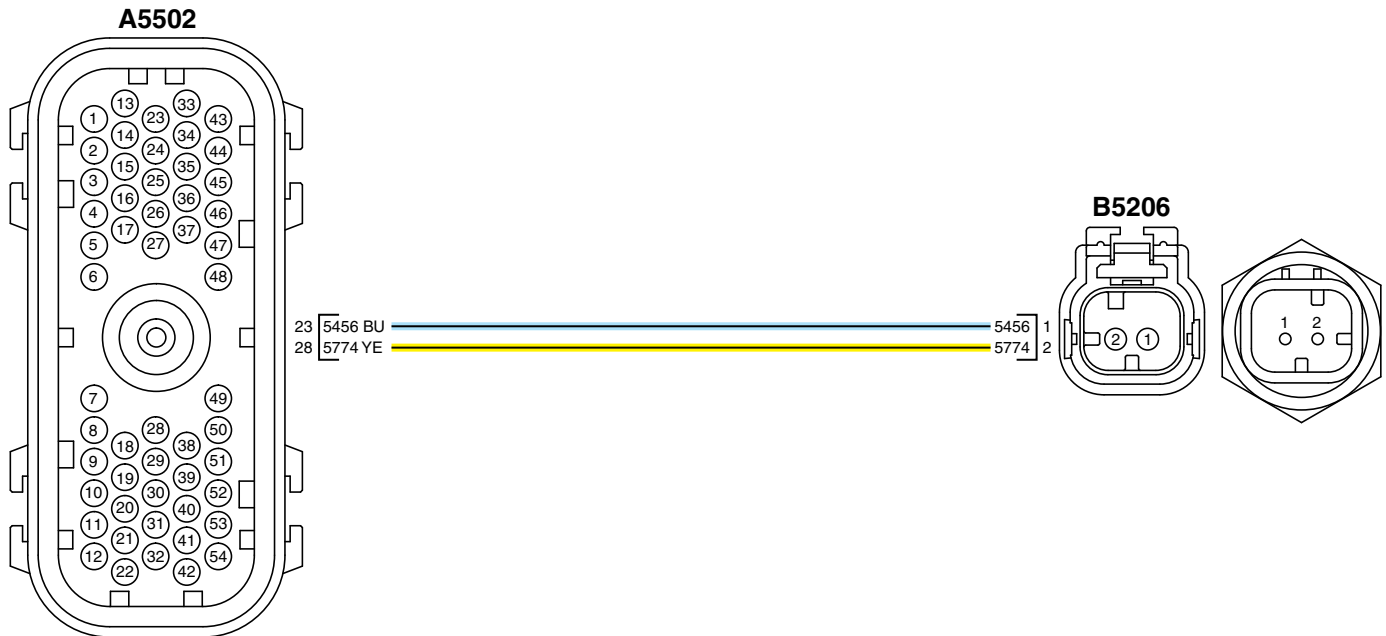
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Manifold Air Temperature Sensor Wiring Diagram

A5502 — 23—Signal

A5502 — 28—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple

- [JDG10461](#) — Male — Yellow/Purple

ECU

- [JDG10460](#) — Female — Yellow/Purple

- [JDG10461](#) — Male — Yellow/Purple

Tools:

- [JDG10273](#) — Diagnostic Test Box

- [JT07306](#) — Digital Multimeter

Continued on next page

RE42287,00004DA -19-02AUG11-3/9

RG16752 —UN—22DEC09

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Perform Preliminary Checks for:
 - Plugged air filter
 - Charge air cooler for external airflow obstructions
 - Loose fan belt
 - Listen for major exhaust leak or boost leaks.
 - Fan shroud for damage
 - EGR flow sensor venturi for loose bracket (if equipped)

Are any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 2

RE42287,00004DA -19-02AUG11-4/9

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air temperature sensor connector B5206.
3. Perform Terminal Test on sensor and B5206 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RE42287,00004DA -19-02AUG11-5/9

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5206 connector female socket 1 (+).
 - B to B5206 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 4

NO: GO TO Short to Voltage Procedure.

RE42287,00004DA -19-02AUG11-6/9

4 Software Check

In Service ADVISOR, monitor Manifold Air Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 6

NO: GO TO 5

Continued on next page

RE42287,00004DA -19-02AUG11-7/9

5 Reprogram ECU

1. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
2. Ignition ON, Engine OFF.
3. With Diagnostic Test Box still connected and S1 in position 7, in Service ADVISOR, monitor Manifold Air Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform Verification Procedure.

NO: Replace ECU.
Perform Verification Procedure.

RE42287,00004DA -19-02AUG11-8/9

6 Replace Sensor

1. Replace Manifold Air Temperature sensor.
2. If possible, run engine under operating conditions that set code.
3. Refresh codes.

Did DTC 000105.00 reappear?

YES: Investigate other potential mechanical problems:

- Internal Charge Air Cooler Plugging
- VGT vanes sticking
- Plugged EGR circuit
- Boost leak
- EGR system leak
- Exhaust leak
- EGR flow sensor low
- Air throttle restriction
- Exhaust restriction
- Exhaust throttle sticking
- Wastegate sticking
- Damaged turbocharger
- VGT vane position sensor inaccurate

NO: Perform Verification Procedure.

RE42287,00004DA -19-02AUG11-9/9

**000105.03 — Manifold Air Temperature
Signal Out of Range High**

*The manifold air temperature signal exceeds the
sensor high voltage specification.*

Continued on next page

RE42287,00004DB -19-14FEB11-1/12

Diagnostic Procedure**Troubleshooting Sequence:**
000105.03**When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The manifold air temperature sensor signal voltage to the ECU corresponds to a temperature higher than what is physically possible for the manifold air temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for manifold air temperature.

Additional References:

For sensor location see [B5206 — Manifold Air Temperature Sensor](#) in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

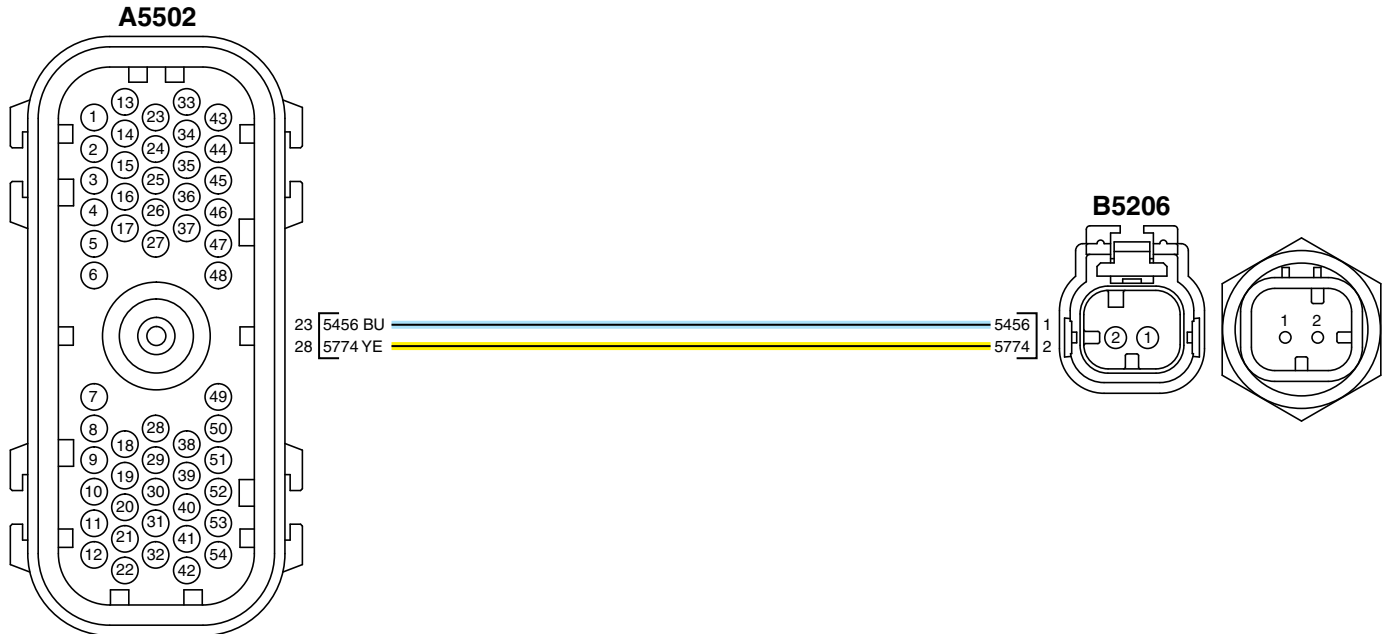
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Manifold Air Temperature Sensor Wiring Diagram

A5502—23—Signal

A5502—28—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG16752 —UN—22DEC09

Continued on next page

RE42287,00004DB -19-14FEB11-2/12

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004DB -19-14FEB11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 000105.03 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

RE42287,00004DB -19-14FEB11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air temperature sensor connector B5206.
3. Perform [Terminal Test](#) on sensor and B5206 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004DB -19-14FEB11-5/12

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5206 connector female socket 1 (+).
 - B to B5206 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 4](#)

NO: Voltage greater than 2.7 V. [GO TO Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 6](#)

RE42287,00004DB -19-14FEB11-6/12

4 Software Check

In Service ADVISOR, monitor Manifold Air Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004DB -19-14FEB11-7/12

Air Intake and Exhaust System Diagnostics

5 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000105.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004DB -19-14FEB11-8/12

6 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing [Wiggle Test](#).

Does voltage now remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform [Verification Procedure](#).

NO: Repair open in signal wire. Perform [Verification Procedure](#).

RE42287,00004DB -19-14FEB11-9/12

7 Wiggle Test

1. In Service ADVISOR, monitor Manifold Air Temperature Input Voltage.
2. Perform [Wiggle Test](#).

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004DB -19-14FEB11-10/12

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air temperature sensor connector B5206.
3. Perform [Terminal Test](#) on sensor and connector B5206.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,00004DB -19-14FEB11-11/12

9 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform [Terminal Test](#) on A5502 connector female sockets 28 and 23. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RE42287,00004DB -19-14FEB11-12/12

**000105.04 — Manifold Air Temperature
Signal Out of Range Low**

*The manifold air temperature signal is lower than
the sensor low voltage specification.*

Continued on next page

RE42287,00004DC -19-14FEB11-1/15

Diagnostic Procedure**Troubleshooting Sequence:****000105.03****000105.04****When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The manifold air temperature sensor signal voltage to the ECU corresponds to a temperature lower than what is physically possible for the manifold air temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for manifold air temperature.

Additional References:

For sensor location see B5206 — Manifold Air Temperature Sensor in Section 03, Group 140.

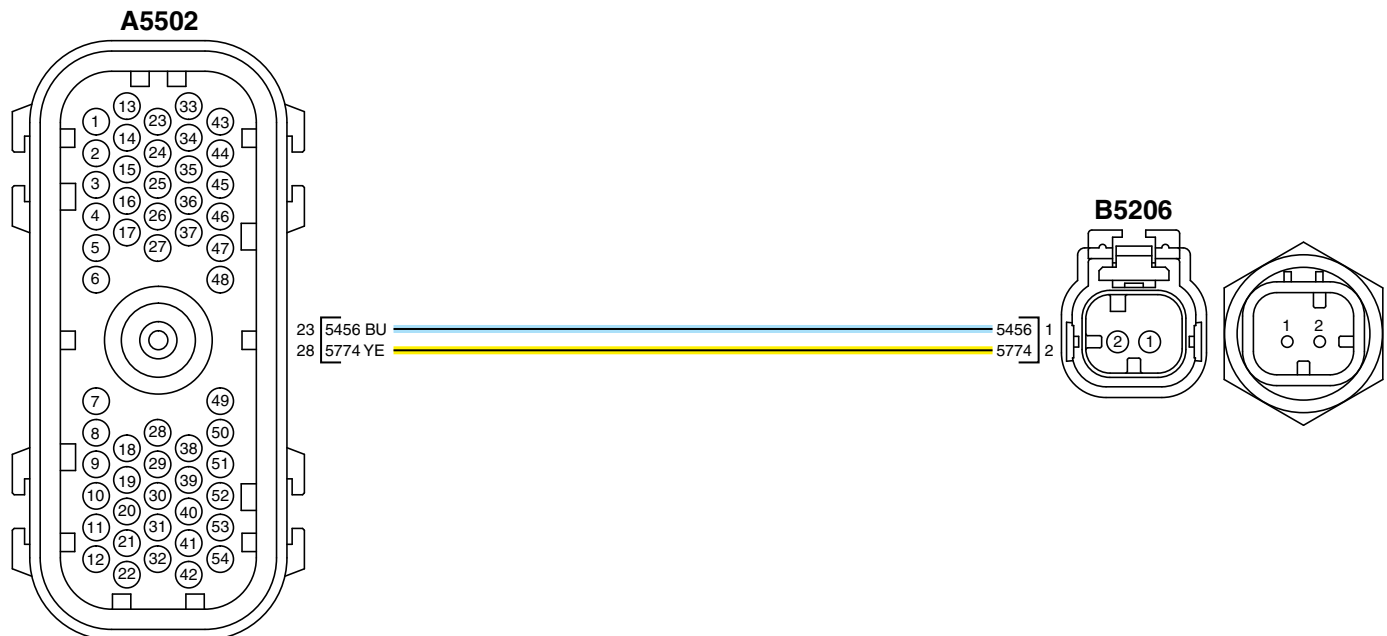
For more temperature sensor information, see Measuring Temperature in Section 03, Group 140.For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table- see 4.5L Wiring Diagram 3

located in Section 06, Group 210.



Manifold Air Temperature Sensor Wiring Diagram

A5502—23—Signal**A5502—28—Return**

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

RE42287,00004DC -19-14FEB11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004DC -19-14FEB11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000105.03 a stored code?

YES: GO TO 000105.03 — Manifold Air Temperature Signal Out Of Range High procedure.

NO: GO TO 2

RE42287,00004DC -19-14FEB11-4/15

2 Code Check

Is DTC 000105.04 active?

YES: GO TO 3

NO: GO TO 10

RE42287,00004DC -19-14FEB11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air temperature sensor connector B5206.
3. Perform Terminal Test on sensor and B5206 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 4

RE42287,00004DC -19-14FEB11-6/15

4 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5206 connector female socket 1 (+).
 - B to B5206 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 5

NO: GO TO 7

Continued on next page

RE42287,00004DC -19-14FEB11-7/15

Air Intake and Exhaust System Diagnostics

5 Software Check

In Service ADVISOR, monitor Manifold Air Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,00004DC -19-14FEB11-8/15

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000105.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004DC -19-14FEB11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502 .
3. Perform [Terminal Test](#) on A5502 connector female sockets 23 and 28. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004DC -19-14FEB11-10/15

8 Harness Check

NOTE: Many new error codes appear in the next step. Disregard all DTCs except 000105.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 000105.03 active?

YES: [GO TO 9](#)

NO: Replace ECU.
Perform [Verification Procedure](#).

RE42287,00004DC -19-14FEB11-11/15

9 Continuity Check

Measure resistance between A5502 connector female socket 23 and B5206 connector female socket 1.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mis-pin in harness. Perform [Verification Procedure](#).

Continued on next page

RE42287,00004DC -19-14FEB11-12/15

Air Intake and Exhaust System Diagnostics

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Manifold Air Temperature Input Voltage.
3. Perform Wiggle Test.

Does voltage ever go below 0.2 V?

YES: Repair short to ground on signal wire. Perform Verification Procedure.

NO: GO TO 11

RE42287,00004DC -19-14FEB11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air temperature sensor connector B5206.
3. Perform Terminal Test on sensor and B5206 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 12

RE42287,00004DC -19-14FEB11-14/15

12 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 23 and 28. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004DC -19-14FEB11-15/15

000105.15 — Manifold Air Temperature Signal Slightly High

The manifold air temperature signal is slightly higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The manifold air temperature signal is slightly higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see [000105.00 – Manifold Air Temperature Signal Extremely High](#)

RE42287,00004DD -19-14FEB11-1/1

000105.16 — Manifold Air Temperature Signal Moderately High

The manifold air temperature signal is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The manifold air temperature signal is moderately higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see [000105.00 – Manifold Air Temperature Signal Extremely High](#)

RE42287,00004DE -19-14FEB11-1/1

**000107.00 — Air Filter Pressure Differential
Extremely High**

*The ECU has detected an excessive amount of
restriction across the air filter.*

Continued on next page

RE42287,00004DF -19-15FEB11-1/4

Diagnostic Procedure**Troubleshooting Sequence:**

000108.02
 000108.07
 522494.09
 001176.07
 001176.12
 000107.16
 000107.00

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The air filter pressure differential is calculated in the ECU by subtracting the intake air sensor pressure value from the barometric air pressure sensor value. The result of this calculation is used to identify a restricted air filter.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional References:

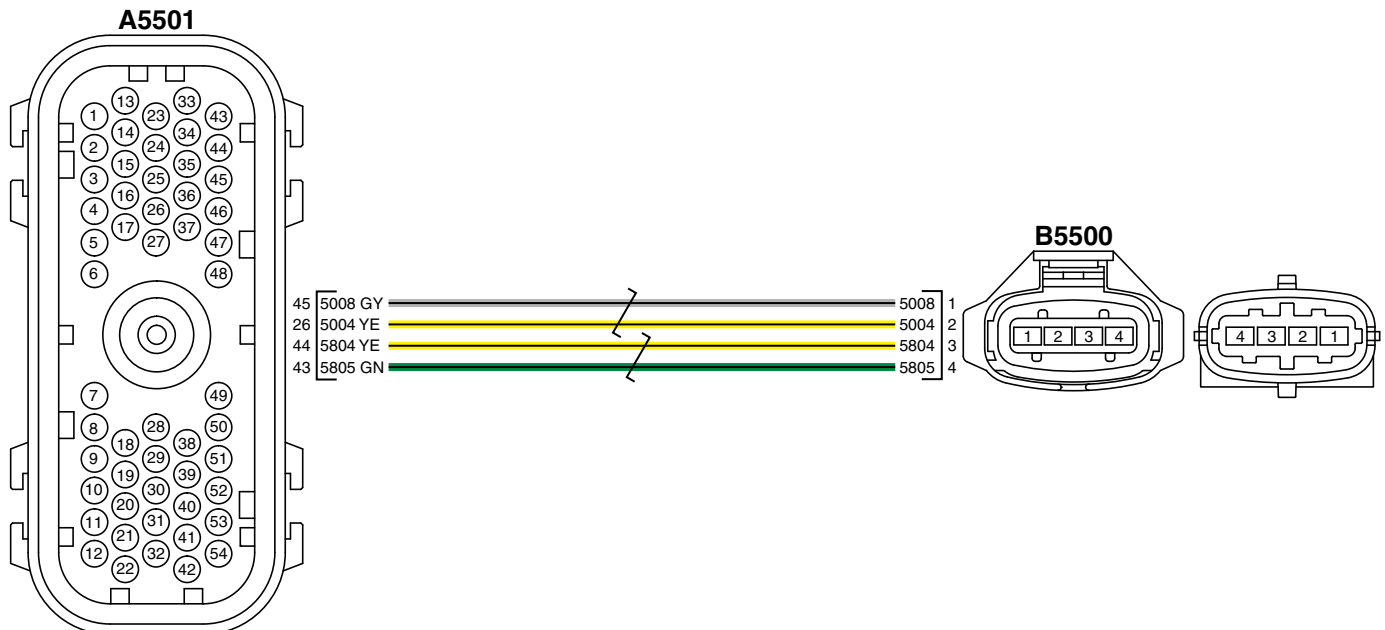
For more intake air sensor information, see [B5500 – Intake Air Sensor](#) in Section 03, Group 140.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Intake Air Sensor Wiring Diagram

A5501 – 45—Supply
 A5501 – 26—Return

A5501 – 44—CAN High

A5501 – 43—CAN Low

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG19582 —UN—14OCT10

Continued on next page

RE42287,00004DF -19-15FEB11-2/4

Flex probes:

Sensor

- JDG10233 — Female — Blue/Red
- JDG10243 — Male — Blue/Red

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

RE42287,00004DF -19-15FEB11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform [Control Unit Information and Overview](#) test.
5. Wait a minimum of 60 seconds for ECU to perform sensor crosscheck.

Are any of the following DTCs active or stored: 000108.02, 000108.07, 0001176.07, 0001176.12, or 522494.09?

YES: Troubleshoot all of the active or stored listed codes. Perform [Verification Procedure](#).

NO: Service air filter. Perform [Verification Procedure](#).

RE42287,00004DF -19-15FEB11-4/4

000107.15 — Air Filter Pressure Differential Slightly High

The ECU has detected a slightly excessive amount of restriction across the air filter.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The air filter pressure differential is calculated in the ECU by subtracting the intake air sensor pressure value from

the barometric air pressure sensor value. The result of this calculation is used to identify a restricted air filter.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see [000107.00 – Air Pressure Differential Extremely High](#)

RE42287,00004E0 -19-15FEB11-1/1

000107.16 — Air Filter Pressure Differential Moderately High

The ECU has detected a moderately excessive amount of restriction across the air filter.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The air filter pressure differential is calculated in the ECU by subtracting the intake air sensor pressure value from

the barometric air pressure sensor value. The result of this calculation is used to identify a restricted air filter.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see [000107.00 – Air Filter Pressure Differential Extremely High](#)

RE42287,00004E1 -19-15FEB11-1/1

**000412.00 — EGR Temperature Signal
Extremely High**

*The EGR temperature signal indicates a much
higher temperature than expected.*

Continued on next page

RE42287,00004E2 -19-01AUG11-1/9

Diagnostic Procedure

Troubleshooting Sequence:

000111.01
000111.17
000111.18
000110.00
000110.03
000110.04
000110.15
000110.16
000110.17
000109.01
000109.03
000109.04
000109.17
000109.18
000109.31
002629.03
002629.04
002630.00
002630.03
002630.04
002630.15
002630.16
001209.03
001209.03
001209.04
000102.03
000102.04
000108.02
003464.13
000051.07
002791.13
000027.07
002795.07
000102.02
001209.02
002659.07
002659.14
002659.17
001639.18
001639.01
000412.00

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The EGR temperature signal indicates a much higher temperature than is expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Stop

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Continued on next page

RE42287,00004E2 -19-01AUG11-2/9

Additional References:

For sensor location see [B5207 — EGR Temperature Sensor](#) in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

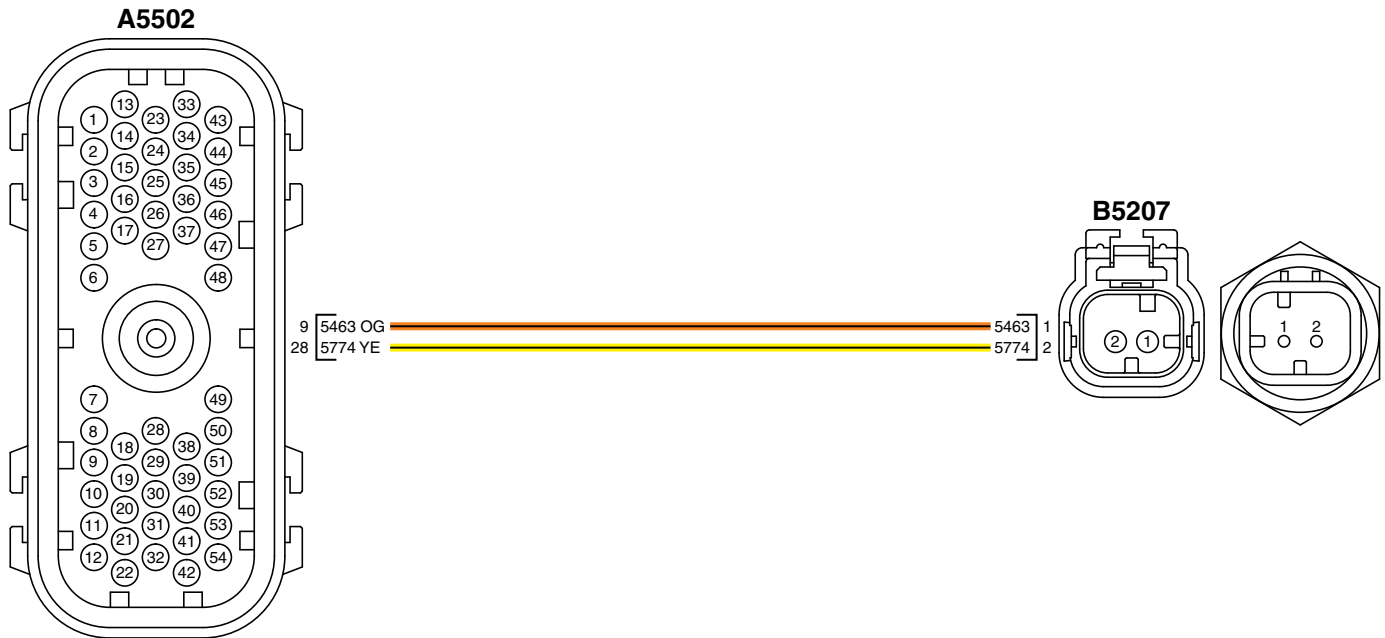
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



EGR Temperature Sensor Wiring Diagram

A5502—9—Signal

A5502—28—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple

- [JDG10461](#) — Male — Yellow/Purple

ECU

- [JDG10460](#) — Female — Yellow/Purple

- [JDG10461](#) — Male — Yellow/Purple

Tools:

- [JDG10273](#) — Diagnostic Test Box

- [JT07306](#) — Digital Multimeter

Continued on next page

RE42287,00004E2 -19-01AUG11-3/9

RG16749 —UN—22DEC09

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Perform Preliminary Checks for:
 - Loose fan belt
 - Fan shroud for damage
 - EGR flow sensor venturi for loose bracket (if equipped)
 - Proper coolant level

Are any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,00004E2 -19-01AUG11-4/9

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR temperature sensor connector B5207.
3. Perform [Terminal Test](#) on sensor and B5207 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004E2 -19-01AUG11-5/9

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5207 connector female socket 1 (+).
 - B to B5207 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 4](#)

NO: [GO TO Short to Voltage Procedure](#).

RE42287,00004E2 -19-01AUG11-6/9

4 Software Check

In Service ADVISOR, monitor EGR Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: [GO TO 6](#)

NO: [GO TO 5](#)

Continued on next page

RE42287,00004E2 -19-01AUG11-7/9

5 Reprogram ECU

1. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
2. Ignition ON, Engine OFF.
3. With Diagnostic Test Box still connected and S1 in position 7, in Service ADVISOR, monitor EGR Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform Verification Procedure.

NO: Replace ECU. Perform Verification Procedure.

RE42287,00004E2 -19-01AUG11-8/9

6 Replace Sensor

1. Replace EGR temperature sensor.
2. If possible, run engine under operating conditions that set code.
3. Refresh codes.

Did DTC 000412.00 reappear?

YES: Investigate other potential mechanical problems:

- VGT vanes sticking
- Plugged EGR circuit
- EGR system leak
- Exhaust leak
- EGR flow sensor restriction
- Exhaust restriction
- Exhaust throttle sticking
- Damaged turbocharger
- VGT vane position sensor inaccurate

NO: Perform Verification Procedure.

RE42287,00004E2 -19-01AUG11-9/9

000412.03 — EGR Temperature Signal Out of Range High

The EGR temperature signal exceeds the sensor high voltage specification.

Continued on next page

RE42287,00004E3 -19-15FEB11-1/12

Diagnostic Procedure**Troubleshooting Sequence:****000412.03****When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The EGR temperature sensor signal voltage to the ECU corresponds to a temperature higher than what is physically possible for the EGR temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for EGR temperature.

Additional References:

For sensor location see [B5207 — EGR Temperature Sensor](#) in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

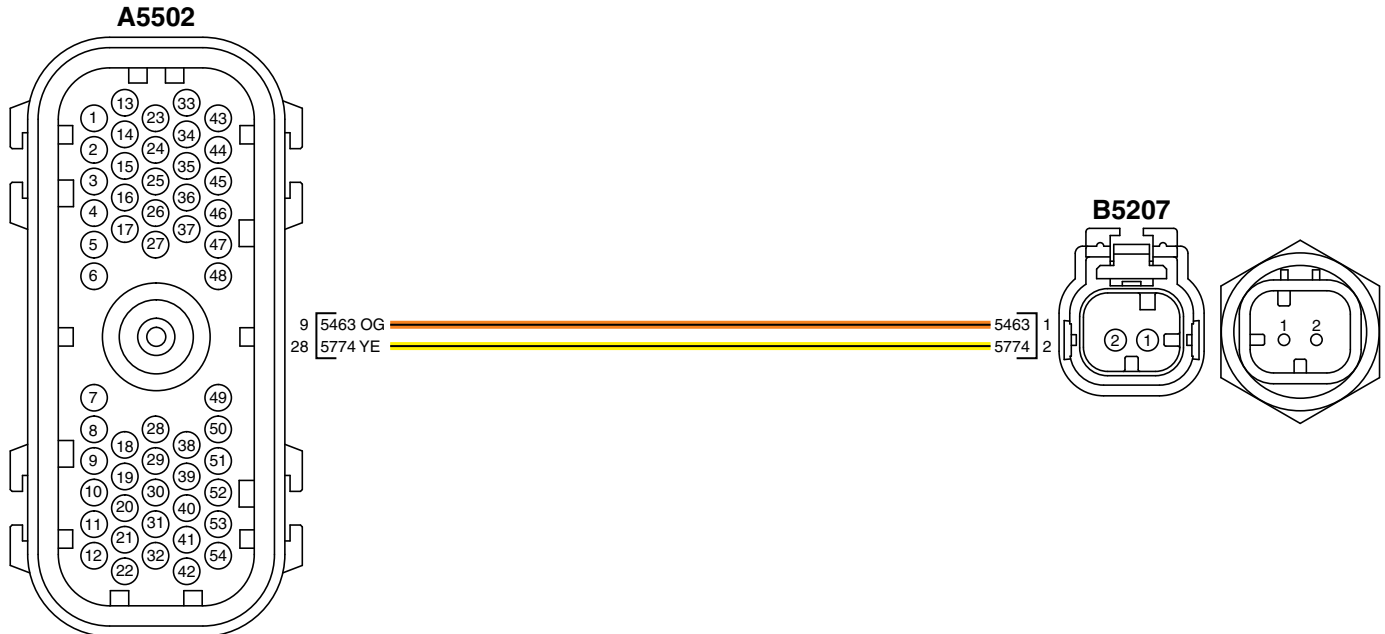
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.

*EGR Temperature Sensor Wiring Diagram***A5502—9—Signal****A5502—28—Return**

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG16749 —UN—22DEC09

Continued on next page

RE42287,00004E3 -19-15FEB11-2/12

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004E3 -19-15FEB11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 000412.03 active?

YES: GO TO 2

NO: GO TO 7

RE42287,00004E3 -19-15FEB11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR temperature sensor connector B5207.
3. Perform Terminal Test on sensor and B5207 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RE42287,00004E3 -19-15FEB11-5/12

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5207 connector female socket 1 (+).
 - B to B5207 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 4

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 6

RE42287,00004E3 -19-15FEB11-6/12

4 Software Check

In Service ADVISOR, monitor EGR Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform Verification Procedure.

NO: GO TO 5

Continued on next page

RE42287,00004E3 -19-15FEB11-7/12

Air Intake and Exhaust System Diagnostics

5 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000412.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004E3 -19-15FEB11-8/12

6 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing [Wiggle Test](#).

Does voltage now remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform [Verification Procedure](#).

NO: Repair open in signal wire. Perform [Verification Procedure](#).

RE42287,00004E3 -19-15FEB11-9/12

7 Wiggle Test

1. In Service ADVISOR, monitor EGR Temperature Input Voltage.
2. Perform [Wiggle Test](#).

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004E3 -19-15FEB11-10/12

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR temperature sensor connector B5207.
3. Perform [Terminal Test](#) on sensor and connector B5207.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,00004E3 -19-15FEB11-11/12

9 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform [Terminal Test](#) on A5502 connector female sockets 28 and 9. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RE42287,00004E3 -19-15FEB11-12/12

**000412.04 — EGR Temperature Signal Out
Of Range Low**

*The EGR temperature signal is lower than the
sensor low voltage specification.*

Continued on next page

RE42287,00004E4 -19-15FEB11-1/15

Diagnostic Procedure**Troubleshooting Sequence:****000412.03****000412.04****When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The EGR temperature sensor signal voltage to the ECU corresponds to a temperature lower than what is physically possible for the EGR temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for EGR temperature.

Additional References:

For sensor location see B5207 — EGR Temperature Sensor in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

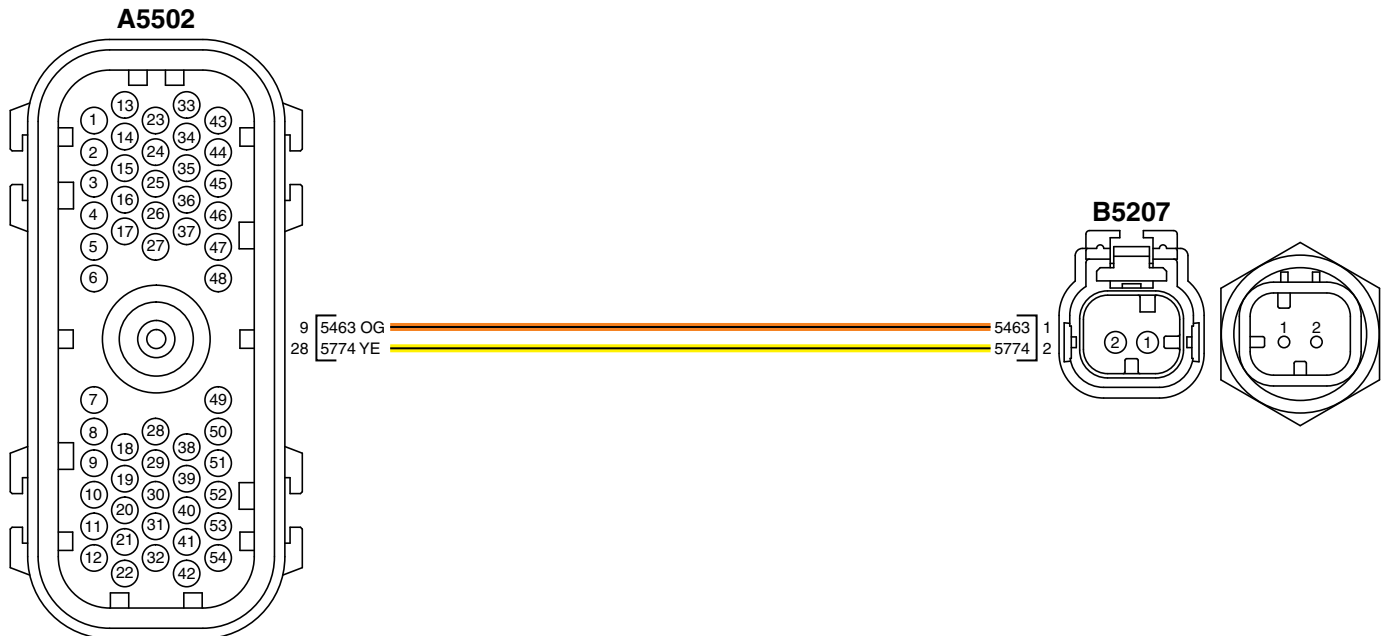
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



EGR Temperature Sensor Wiring Diagram

A5502—9—Signal**A5502—28—Return**

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG16749 —UN—22DEC09

Continued on next page

RE42287,00004E4 -19-15FEB11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004E4 -19-15FEB11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000412.03 a stored code?

YES: GO TO 000412.03
— EGR Temperature
Signal Out of Range High
procedure.

NO: GO TO 2

RE42287,00004E4 -19-15FEB11-4/15

2 Code Check

Is DTC 000412.04 active?

YES: GO TO 3

NO: GO TO 10

RE42287,00004E4 -19-15FEB11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR temperature sensor connector B5207.
3. Perform Terminal Test on sensor and B5207 connector.

Were any problems found?

YES: Repair problem.
Perform Verification
Procedure.

NO: GO TO 4

RE42287,00004E4 -19-15FEB11-6/15

4 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5207 connector female socket 1 (+).
 - B to B5207 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 5

NO: GO TO 7

Continued on next page

RE42287,00004E4 -19-15FEB11-7/15

Air Intake and Exhaust System Diagnostics

5 Software Check

In Service ADVISOR, monitor EGR Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,00004E4 -19-15FEB11-8/15

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000412.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004E4 -19-15FEB11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502 .
3. Perform [Terminal Test](#) on A5502 connector female sockets 28 and 9. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004E4 -19-15FEB11-10/15

8 Harness Check

NOTE: Many new error codes appear in the next step. Disregard all DTCs except 000412.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 000412.03 active?

YES: [GO TO 9](#)

NO: Replace ECU.
Perform [Verification Procedure](#).

RE42287,00004E4 -19-15FEB11-11/15

9 Continuity Check

Measure resistance between A5502 connector female socket 9 and B5207 connector female socket 1.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mispin in harness. Perform [Verification Procedure](#).

Continued on next page

RE42287,00004E4 -19-15FEB11-12/15

Air Intake and Exhaust System Diagnostics

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor EGR Temperature Input Voltage.
3. Perform Wiggle Test.

Does voltage ever go below 0.2 V?

YES: Repair short to ground on signal wire. Perform Verification Procedure.

NO: GO TO 11

RE42287,00004E4 -19-15FEB11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR temperature sensor connector B5207 .
3. Perform Terminal Test on sensor and B5207 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 12

RE42287,00004E4 -19-15FEB11-14/15

12 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 28 and 9. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004E4 -19-15FEB11-15/15

000412.15 — EGR Temperature Signal Slightly High

The EGR temperature signal is slightly higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The EGR temperature signal is slightly higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see [000412.00 – EGR Temperature Signal Extremely High](#).

RE42287,00004E5 -19-15FEB11-1/1

000412.16 — EGR Temperature Signal Moderately High

The EGR temperature signal is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The EGR temperature signal is moderately higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see [000412.00 – EGR Temperature Signal Extremely High](#).

RE42287,00004E6 -19-15FEB11-1/1

000676.05 — Cold Start Aid Drive Circuit has High Resistance

The ECU has detected high resistance on cold start aid drive circuit.

Continued on next page

RE42287,00004E7 -19-02AUG11-1/9

Diagnostic Procedure

Troubleshooting Sequence:

000105.00
000105.03
000105.04
000105.15
000105.16
000676.05

When DTC is Displayed:

When ignition is on, cold start aid is activated and error occurs.

Related Information:

The ECU has detected a fault on the cold start aid drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

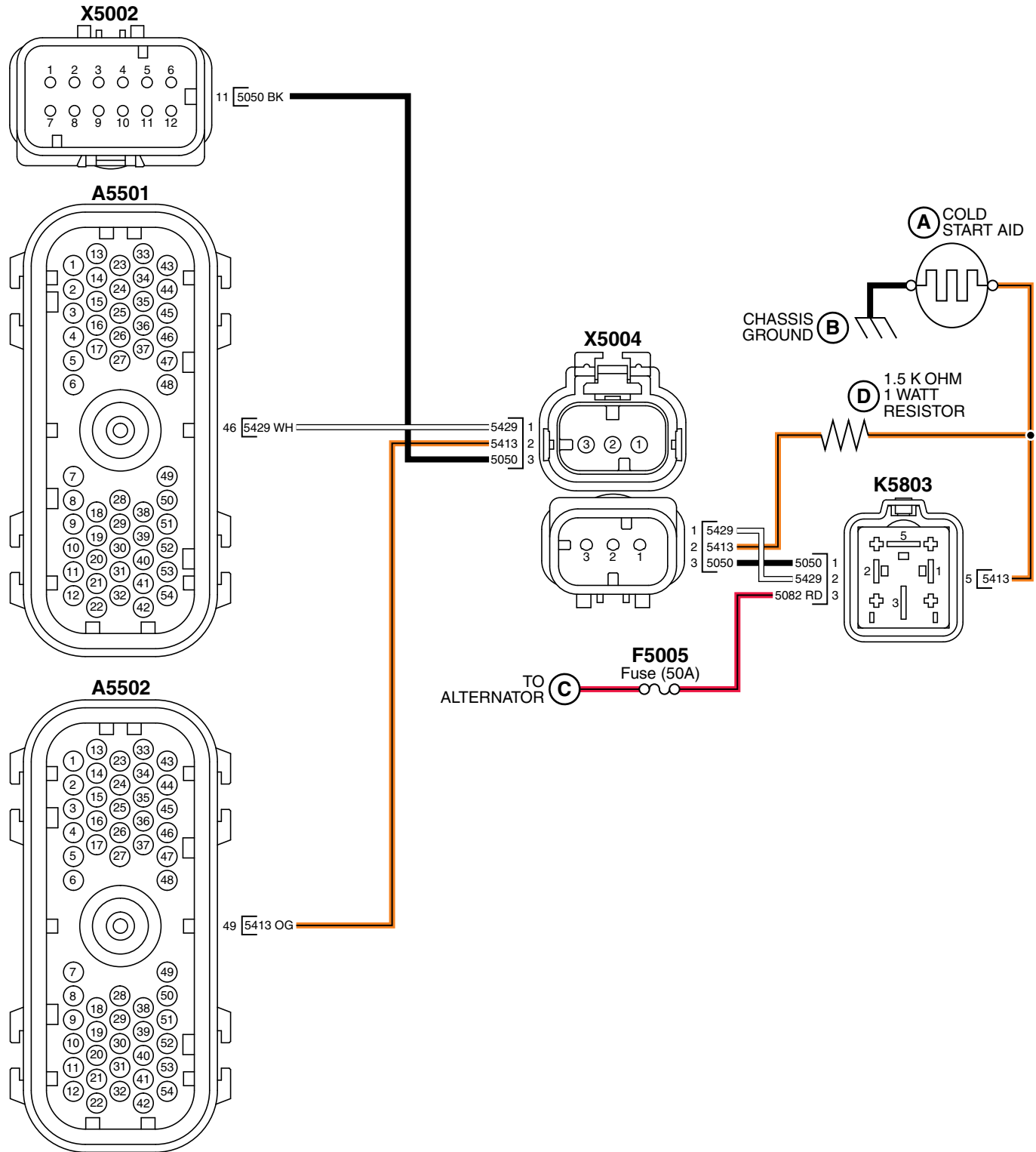
Additional references:

For more information on Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 5](#)
 - see [4.5L Engine Schematic 1](#)
- located in Section 06, Group 210.



Start Aid Wiring Diagram

A5502-49—Cold Start Aid Relay Feedback
A5501-46—Cold Start Aid Relay Control
X5002-11—Ground
K5803—Cold Start Relay
A—Cold Start Aid
B—Chassis Ground
C—To Alternator
D—1.5k ohm 1 Watt Resistor

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

RE42287,00004E7 -19-02AUG11-3/9

Flex probe:

X5002

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

X5004

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

K5803

- JDG10451 — Male — Purple/Orange

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

RE42287,00004E7 -19-02AUG11-4/9

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect cold start aid relay connector K5803.
7. Perform Terminal Test on K5803 connector and cold start aid relay.

Were any problems found?

YES: Repair Problem. GO TO 6

NO: GO TO 2

RE42287,00004E7 -19-02AUG11-5/9

2 Ground Circuit Check

On K5803 connector, measure resistance between female socket 1 and single point ground.

Is resistance less than 5 ohms?

YES: GO TO 3

NO: Repair open or high resistance in ground wire.
GO TO 6

RE42287,00004E7 -19-02AUG11-6/9

3 Control Circuit Check

1. Connect Multimeter to:
 - K5803 female socket 2 (+).
 - K5803 female socket 1 (-).
2. Disconnect the fuel temperature sensor.

NOTE: You only have 15 seconds to make the next reading after cycling ignition switch.

3. Ignition ON, Engine OFF.
4. In Service ADVISOR, monitor Unswitched Battery Voltage.
5. Monitor voltage on multimeter.

Is voltage within 2 V of battery voltage?

YES: Replace cold start aid relay. GO TO 6

NO: GO TO 4

Continued on next page

RE42287,00004E7 -19-02AUG11-7/9

Air Intake and Exhaust System Diagnostics

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female socket 46. And corresponding ECU male pin.

Were any problems found?

YES: Repair problem. GO TO 6

NO: GO TO 5

RE42287,00004E7 -19-02AUG11-8/9

5 Continuity Check

Measure resistance between A5501 connector female socket 46 and K5803 female socket 2.

Is resistance less than 5 ohms?

YES: Contact DTAC for support.

NO: Repair open or high resistance in harness on cold start aid relay control circuit. GO TO 6

RE42287,00004E7 -19-02AUG11-9/9

6 Verification Check

1. Ignition OFF, Engine OFF.
 2. Reconnect all components and connectors except the fuel temperature sensor.
- NOTE: The fuel temperature sensor must remain disconnected for this check. Reconnect sensor before returning application to service.*
3. Ignition ON, Engine OFF.
 4. Wait 60 seconds.
 5. Refresh codes.

Is DTC 000676.05 active?

YES: Contact DTAC for support.

NO: Reconnect the fuel temperature sensor. Perform Verification Procedure.

RE42287,00004E7 -19-02AUG11-10/9

000676.06 — Cold Start Aid Drive Circuit Has Low Resistance

The ECU has detected low resistance on the cold start aid drive circuit.

Continued on next page

RE42287,00004E8 -19-02AUG11-1/8

Diagnostic Procedure

Troubleshooting Sequence:

000105.00
000105.03
000105.04
000105.15
000105.16
000676.06

When DTC is Displayed:

When the ignition is on, cold start aid is activated and error occurs.

Related Information:

The ECU has detected a fault on the cold start aid drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

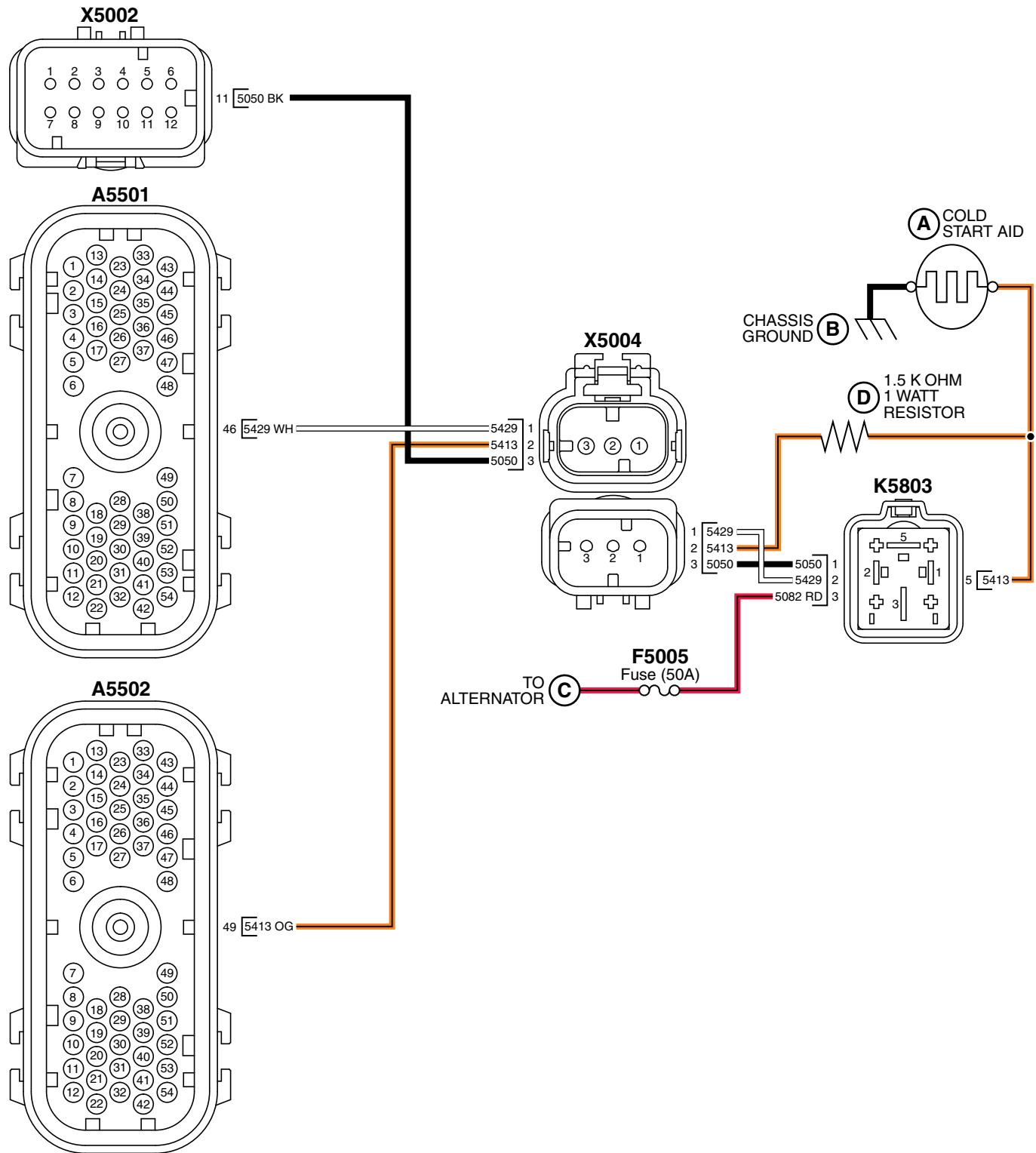
Additional references:

For more information on Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 5](#)
 - see [4.5L Engine Schematic 1](#)
- located in Section 06, Group 210.



Start Aid Wiring Diagram

A5502-49—Cold Start Aid Relay Feedback
A5501-46—Cold Start Aid Relay Control
X5002-11—Ground
K5803—Cold Start Relay
A—Cold Start Aid
B—Chassis Ground
C—To Alternator
D—1.5k ohm 1 Watt Resistor

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

RE42287,00004E8 -19-02AUG11-3/8

Flex probe:

X5002

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

X5004

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

K5803

- JDG10451 — Male — Purple/Orange

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

RE42287,00004E8 -19-02AUG11-4/8

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect cold start aid relay connector K5803.
7. Perform Terminal Test on K5803 connector and cold start aid relay.

Were any problems found?

YES: Repair Problem. GO TO 5

NO: GO TO 2

RE42287,00004E8 -19-02AUG11-5/8

2 Control Circuit Check

1. Connect Multimeter to:
 - K5803 female socket 2 (+).
 - K5803 female socket 1 (-).
2. Disconnect fuel temperature sensor connector B5209.

NOTE: You only have 15 seconds to make the next reading after cycling the ignition switch.

3. Ignition ON, Engine OFF.
4. In Service ADVISOR, monitor Unswitched Battery Voltage.
5. Monitor voltage on multimeter.

Is voltage within 2 V of battery voltage?

YES: Replace cold start aid relay. GO TO 5

NO: GO TO 3

RE42287,00004E8 -19-02AUG11-6/8

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female socket 46. And corresponding ECU male pin.

Were any problems found?

YES: Repair problem. GO TO 5

NO: GO TO 4

Continued on next page

RE42287,00004E8 -19-02AUG11-7/8

Air Intake and Exhaust System Diagnostics

4 Short to Ground Check

Measure resistance between A5501 connector female socket 46 and single point ground.

Is resistance less than 100k ohms?

YES: Repair short to ground in harness on cold start aid control circuit. GO TO 5
NO: Contact DTAC for support.

RE42287,00004E8 -19-02AUG11-8/8

5 Verification Check

1. Ignition OFF, Engine OFF.

2. Reconnect all components and connectors except fuel temperature sensor connector B5209.

NOTE: The fuel temperature sensor must remain disconnected for this check. Reconnect sensor before returning application to service.

3. Ignition ON, Engine OFF.

4. Wait 60 seconds.

5. Refresh codes.

Is DTC 000676.06 active?

YES: Contact DTAC for support.

NO: Reconnect fuel temperature sensor connector B5209. Perform Verification Procedure.

RE42287,00004E8 -19-02AUG11-9/8

**000676.14 — Cold Start Aid Signal Received
When Not Expected**

*The ECU detects the cold start aid relay output is high
when the ECU is not energizing the relay.*

Continued on next page

RG40049,0000C39 -19-02AUG11-1/11

Diagnostic Procedure

Troubleshooting Sequence:

000105.03

000105.00

000676.06

000676.31

When DTC is Displayed:

The ignition is ON and the conditions exists where the ECU is detecting the cold start aid relay is energized when it should not be.

Related Information:

The ECU uses fuel temperature to determine if the cold start aid relay should be energized.

The ECU supplies Battery Voltage control to the cold start aid relay to energize the relay. The ECU monitors the output of the relay to determine if cold start aid relay is energized.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

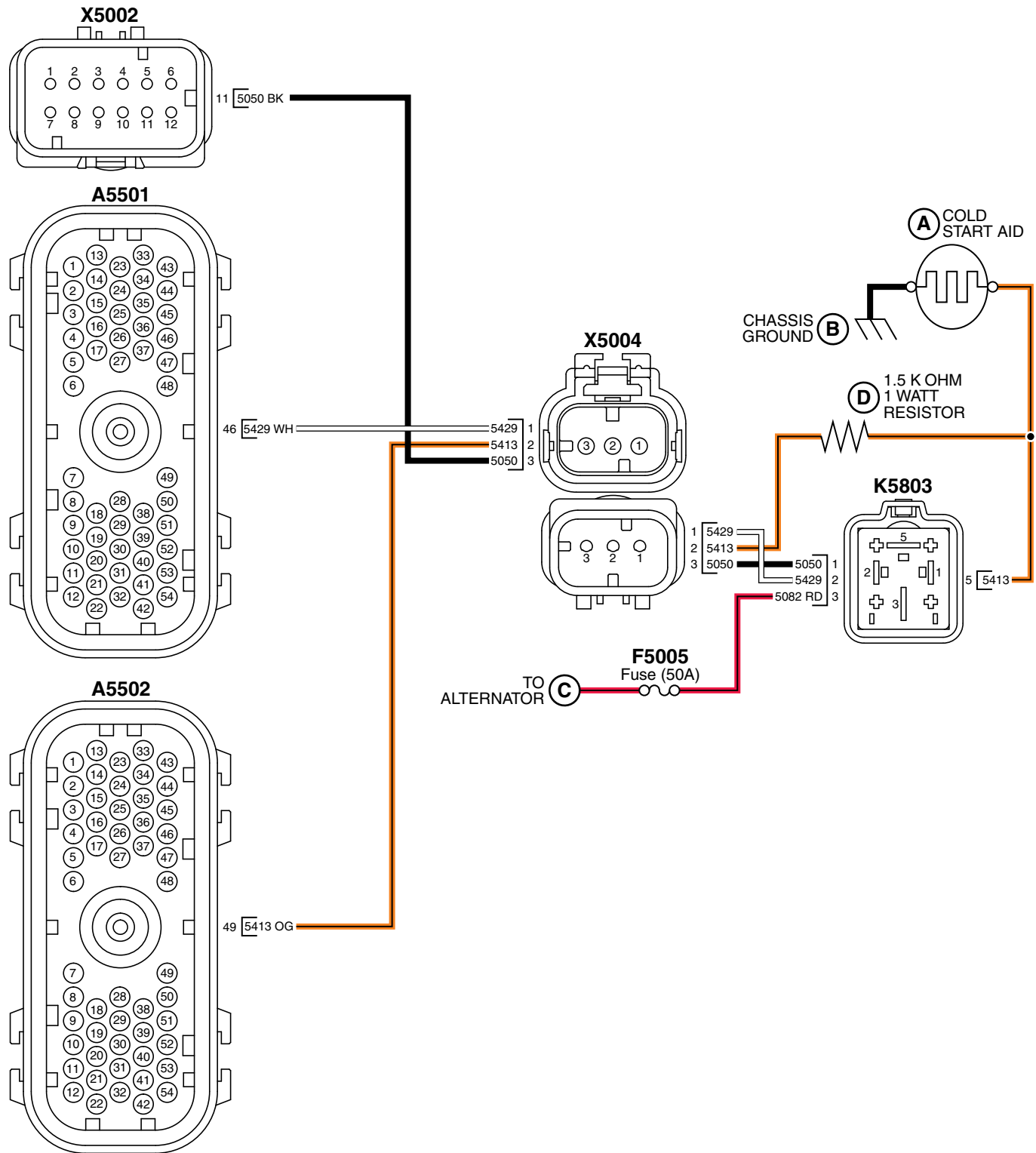
For further cold start aid information, see Cold Start Aid Operation in Section 03, Group 135 earlier in this manual.

For more information on connector and terminal testing see Terminal Test in Section 04, Group 160 earlier in this manual.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

Continued on next page

RG40049,0000C39 -19-02AUG11-2/11



Start Aid Wiring Diagram

A5502-49—Cold Start Aid Relay Feedback
 A5501-46—Cold Start Aid Relay Control
 X5002-11—Ground
 K5803—Cold Start Relay
 A—Cold Start Aid
 B—Chassis Ground
 C—To Alternator
 D—1.5k ohm 1 Watt Resistor

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

Continued on next page

RG40049,0000C39 -19-02AUG11-3/11

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 5](#)
 - see [4.5L Engine Schematic 1](#)
- located in Section 06, Group 210 later in this manual.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probe:

X5002

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

X5004

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

K5803

- JDG10451 — Male — Purple/Orange

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

RG40049,0000C39 -19-02AUG11-4/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Does 000676.14 appear active?

YES: [GO TO 2](#)

NO: GO TO [Problem Not Found Procedure](#)

RG40049,0000C39 -19-02AUG11-5/11

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect cold start aid relay connector K5803.
3. Perform [Terminal Test](#) on relay and K5803 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RG40049,0000C39 -19-02AUG11-6/11

3 Relay Check

On cold start aid relay K5803, measure resistance between male pins 3 and 5.

Is resistance less than 100k ohms?

YES: Replace cold start aid relay. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

Continued on next page

RG40049,0000C39 -19-02AUG11-7/11

Air Intake and Exhaust System Diagnostics

4 Key OFF Short To Voltage Check

On K5803 connector, measure voltage between female socket 3 (+) and 1 (-).

Is voltage greater than 0.5 V?

YES: Repair short to voltage on feedback circuit in harness. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RG40049,0000C39 -19-02AUG11-8/11

5 Key ON Short To Voltage Check

1. Ignition ON, Engine OFF.

2. On K5803 connector, measure voltage between female socket 3 (+) and 1 (-).

Is voltage greater than 0.5 V?

YES: Repair short to voltage on feedback circuit in harness. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000C39 -19-02AUG11-9/11

6 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5502

3. Perform [Terminal Test](#) on A5502 female socket 49. And corresponding ECU male pin.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RG40049,0000C39 -19-02AUG11-10/11

7 Resistance Check

Measure resistance between A5502 connector female socket 49 and single point ground.

Is resistance greater than 2.5 k ohms?

YES: Repair open or high resistance in harness on cold start aid feedback circuit. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000C39 -19-02AUG11-11/11

8 Reprogram ECU

1. Ignition OFF, Engine OFF.

2. Reconnect all connectors and components.

3. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

4. Ignition ON, Engine OFF.

5. Refresh codes.

Is DTC 000676.14 active?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

RG40049,0000C39 -19-02AUG11-12/11

000676.31 — Cold Start Aid Relay Signal Not Received When Expected

The ECU detects the cold start aid relay output is low when the ECU is energizing the relay.

Continued on next page

RG40049,0000C3A -19-02AUG11-1/10

Diagnostic Procedure

Troubleshooting Sequence:

000676.05

000676.06

000676.31

000676.14

When DTC is Displayed:

The ECU is commanding the cold start aid relay ON but is detecting that the cold start aid relay is not energized. This DTC will become stored when the ECU commands the cold start aid relay OFF. Approximately 15 seconds after turning the relay on.

The brief length of time that DTC is active may cause DTC to only be shown as a stored DTC.

Related Information:

The ECU uses fuel temperature to determine if the cold start aid relay should be energized.

The ECU supplies battery voltage control to the cold start aid relay to energize the relay. The ECU monitors the output of the relay to determine if cold start aid relay is energized.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The engine may require extended crank time or may not start in low ambient temperatures if the cold start aid is not powered.

Additional References:

For further cold start aid information, see [Cold Start Aid Operation](#) in Section 03, Group 135 earlier in this manual.

For more information on connector and terminal testing see [Terminal Test](#) in Section 04, Group 160 earlier in this manual.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

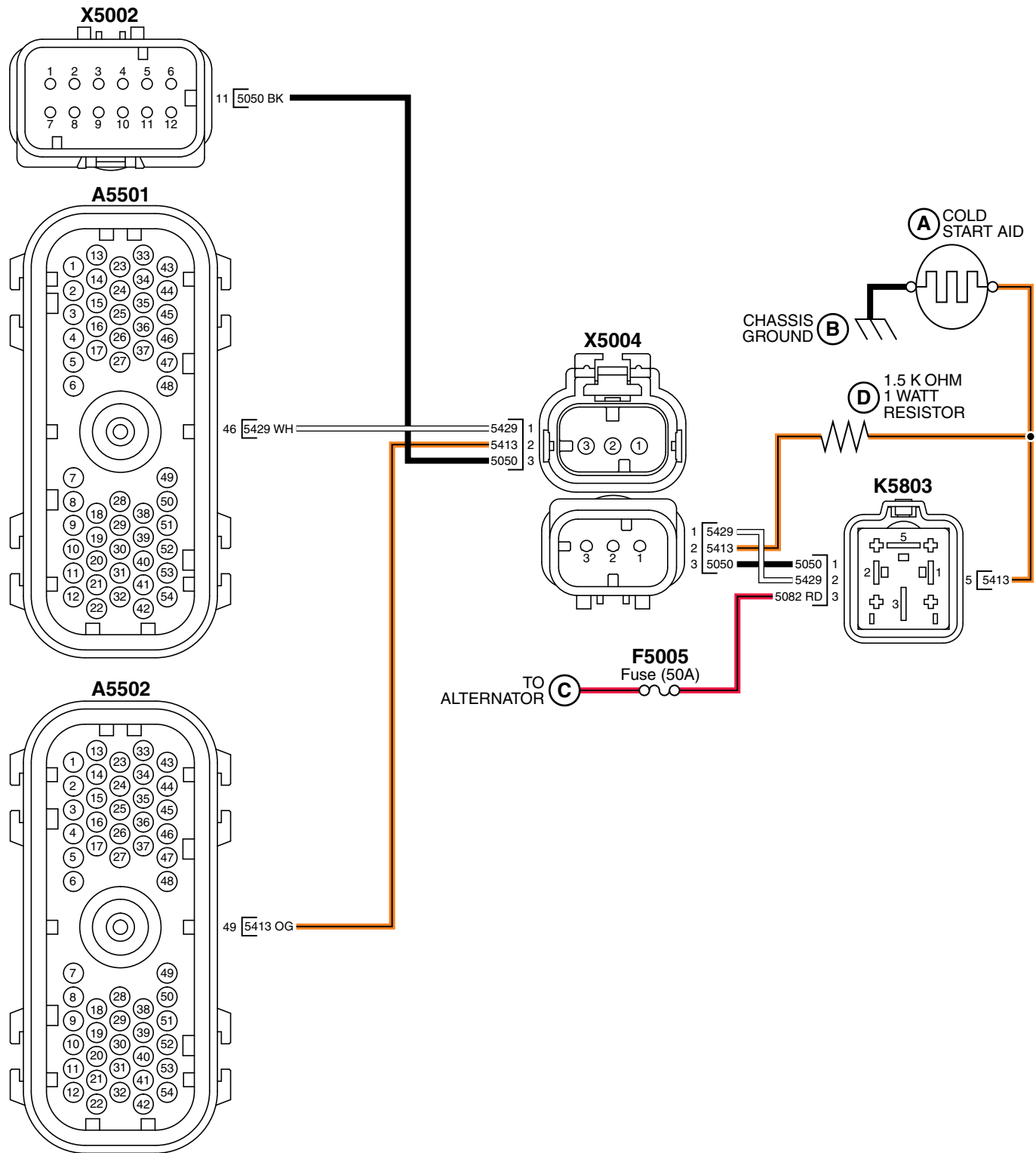
For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 5](#)

- see [4.5L Engine Schematic 1](#)

located in Section 06, Group 210 later in this manual.



Start Aid Wiring Diagram

A5502-49 —Cold Start Aid Relay Feedback	X5002-11 —Ground	B —Chassis Ground
A5501-46 —Cold Start Aid Relay Control	K5803 —Cold Start Relay	C —To Alternator
	A —Cold Start Aid	D —1.5k ohm 1 Watt Resistor

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

Continued on next page

RG40049,0000C3A -19-02AUG11-3/10

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probe:

X5002

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

X5004

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

K5803

- JDG10451 — Male — Purple/Orange

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

RG40049,0000C3A -19-02AUG11-4/10

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect cold start aid relay connector K5803.
7. Perform Terminal Test on K5803 connector and cold start aid relay.

Were any problems found?

YES: Repair Problem. GO TO 7

NO: GO TO 2

RG40049,0000C3A -19-02AUG11-5/10

2 Supply Voltage Check

1. Ignition ON, Engine OFF
2. In Service ADVISOR, monitor Unswitched Battery Voltage.
3. On K5803 connector, measure voltage between socket 5 (+) and 1 (-).
4. Ignition ON, Engine OFF.

Is voltage reading +/- 1 V of unswitched battery voltage?

YES: GO TO 4

NO: GO TO 3

RG40049,0000C3A -19-02AUG11-6/10

3 Return Circuit Check

On K5803 connector, measure voltage between socket 5 (+) and single point ground (-).

Is voltage reading +/- 1 V of unswitched battery voltage?

YES: Repair open or high resistance in ground circuit in harness. GO TO 7

NO: Inspect fuse F5005 and repair problem on supply circuit in harness. GO TO 7

Continued on next page

RG40049,0000C3A -19-02AUG11-7/10

Air Intake and Exhaust System Diagnostics

4 Control Circuit Check

1. Ignition OFF, Engine OFF.

2. Connect Multimeter to:

- K5803 female socket 2 (+).
- K5803 female socket 1 (-).

3. Disconnect fuel temperature sensor connector B5209.

NOTE: The ECU will energize the cold start aid relay for 15 seconds after the ignition is turned ON. The voltage measurement must be completed during the 15 second time frame.

4. Ignition ON, Engine OFF.

5. In Service ADVISOR, monitor Cold Start Aid Status.

6. In Service ADVISOR, monitor Unswitched Battery Voltage.

7. Monitor voltage on multimeter.

Is voltage within 2 V of battery voltage?

YES: Replace cold start aid relay. [GO TO 7](#)

NO: [GO TO 5](#)

RG40049,0000C3A -19-02AUG11-8/10

5 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501.

3. Perform Terminal Test on A5501 connector female socket 46. And corresponding ECU male pin.

Were any problems found?

YES: Repair problem. [GO TO 7](#)

NO: [GO TO 6](#)

RG40049,0000C3A -19-02AUG11-9/10

6 Continuity Check

Measure resistance between A5501 connector female socket 46 and K5803 connector female socket 2.

Is resistance less than 5 ohms?

YES: Contact DTAC for support.

NO: Repair open or high resistance in harness on cold start aid relay control circuit. [GO TO 7](#)

RG40049,0000C3A -19-02AUG11-10/10

7 Verification Check

1. Ignition OFF, Engine OFF.

2. Reconnect all components and connectors except fuel temperature sensor.

NOTE: The fuel temperature sensor must remain disconnected for this check. Reconnect sensor before returning application to service.

3. Ignition ON, Engine OFF.

4. Wait 60 seconds.

5. Refresh codes.

Is DTC 000676.31 active?

YES: Contact DTAC for support.

NO: Reconnect fuel temperature sensor. Perform Verification Procedure.

RG40049,0000C3A -19-02AUG11-11/10

001172.12 — Intake Air Temperature Error

The intake air sensor has detected a problem with measuring intake air temperature.

Continued on next page

RE42287,00004EB -19-24FEB11-1/4

Diagnostic Procedure**Troubleshooting Sequence:**
001172.12**When DTC is Displayed:**

When the ignition is on and the error is active.

Related Information:

The intake air sensor has detected a problem with measuring intake air temperature. The intake air sensor sends the error message via CAN to the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for the intake air temperature.

Additional References:

For more Intake Air Sensor information, see [B5500 – Intake Air Sensor](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

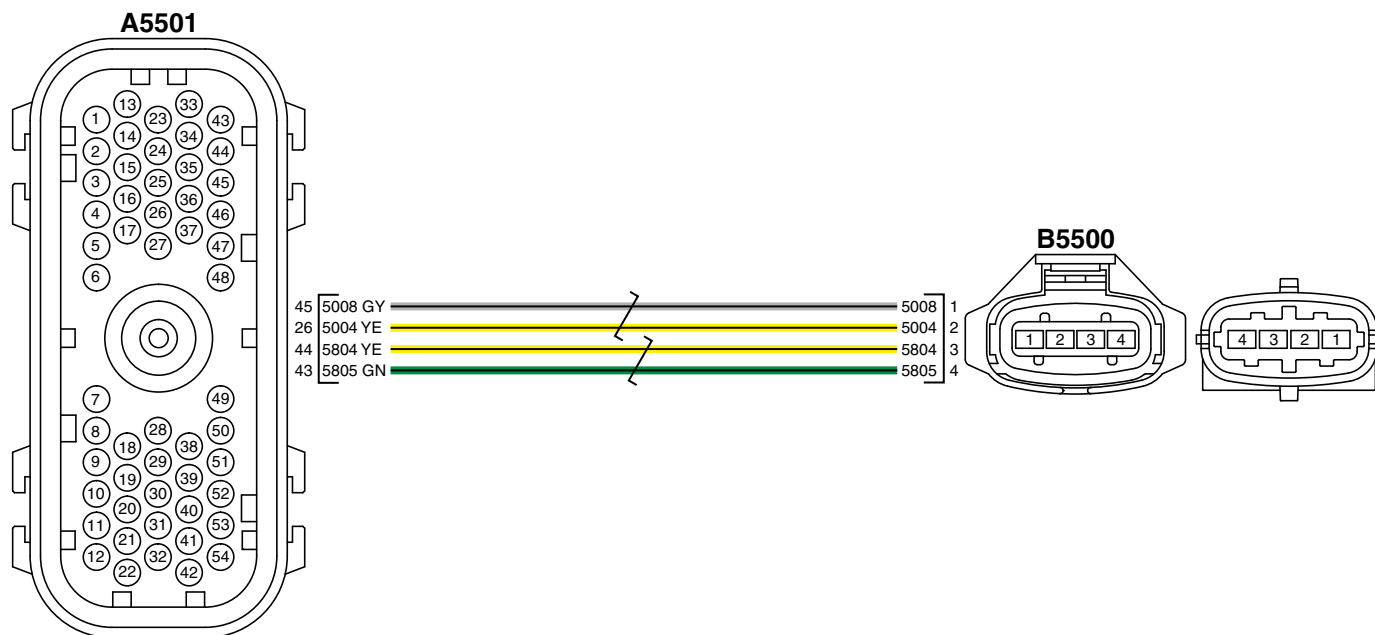
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Intake Air Sensor Wiring Diagram

A5501 – 45—Supply
A5501 – 26—Return

A5501 – 44—CAN High

A5501 – 43—CAN Low

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10233](#) — Female — Blue/Red

- [JDG10243](#) — Male — Blue/Red

Continued on next page

RE42287,00004EB -19-24FEB11-2/4

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RE42287,00004EB -19-24FEB11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.

NOTE: The ignition must be ON for 90 seconds to allow the DTC to set if it is active.

3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 001172.12 active?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RE42287,00004EB -19-24FEB11-4/4

001176.07 — Intake Air Pressure Mismatch

The ECU has determined there is a problem with the intake air pressure measurement.

Continued on next page

RE42287,00004EC -19-08APR11-1/4

Diagnostic Procedure**Troubleshooting Sequence:**
001176.12**When DTC is Displayed:**

When the ignition is on and the fault is active.

Related Information:

The ECU compares the intake air pressure sensor to the manifold air pressure sensor, exhaust manifold pressure sensor, and the barometric pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for the intake air pressure.

Additional References:

For more Intake Air Sensor information, see [B5500 – Intake Air Sensor Operation](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

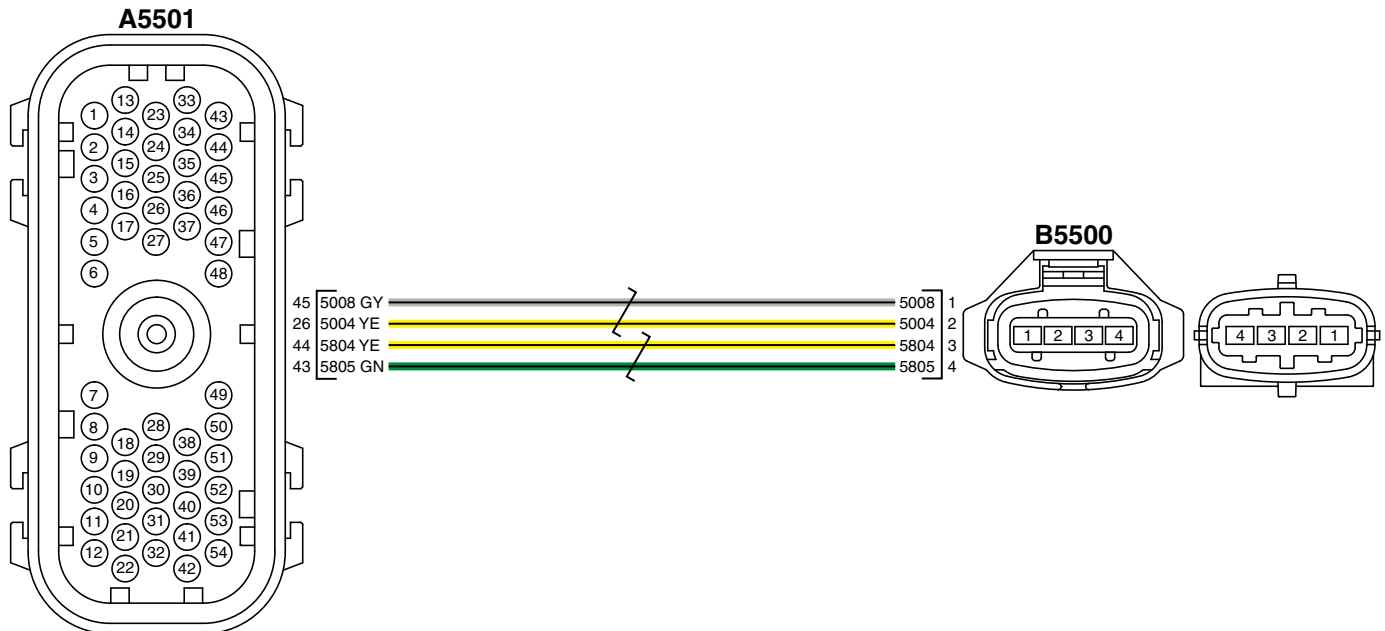
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Intake Air Sensor Wiring Diagram

A5501 – 45—Supply
A5501 – 26—Return

A5501 – 44—CAN High

A5501 – 43—CAN Low

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- JDG10233 — Female — Blue/Red

- JDG10243 — Male — Blue/Red

Continued on next page

RE42287,00004EC -19-08APR11-2/4

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RE42287,00004EC -19-08APR11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.

NOTE: The ignition must be ON for 90 seconds to allow the DTC to set if it is active.

3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 001176.07 active?

YES: Replace intake air sensor. Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RE42287,00004EC -19-08APR11-4/4

001176.12 — Intake Air Pressure Error

The intake air sensor has detected a problem with measuring intake air pressure.

Continued on next page

RE42287,00004ED -19-24FEB11-1/4

Diagnostic Procedure**Troubleshooting Sequence:**
001176.12**When DTC is Displayed:**

When the ignition is on and the error is active.

Related Information:

The intake air sensor has detected a problem with measuring intake air pressure. The intake air sensor sends the error message via CAN to the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for the intake air pressure.

Additional References:

For more intake air sensor information, see B5500 – Intake Air Sensor Operation in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

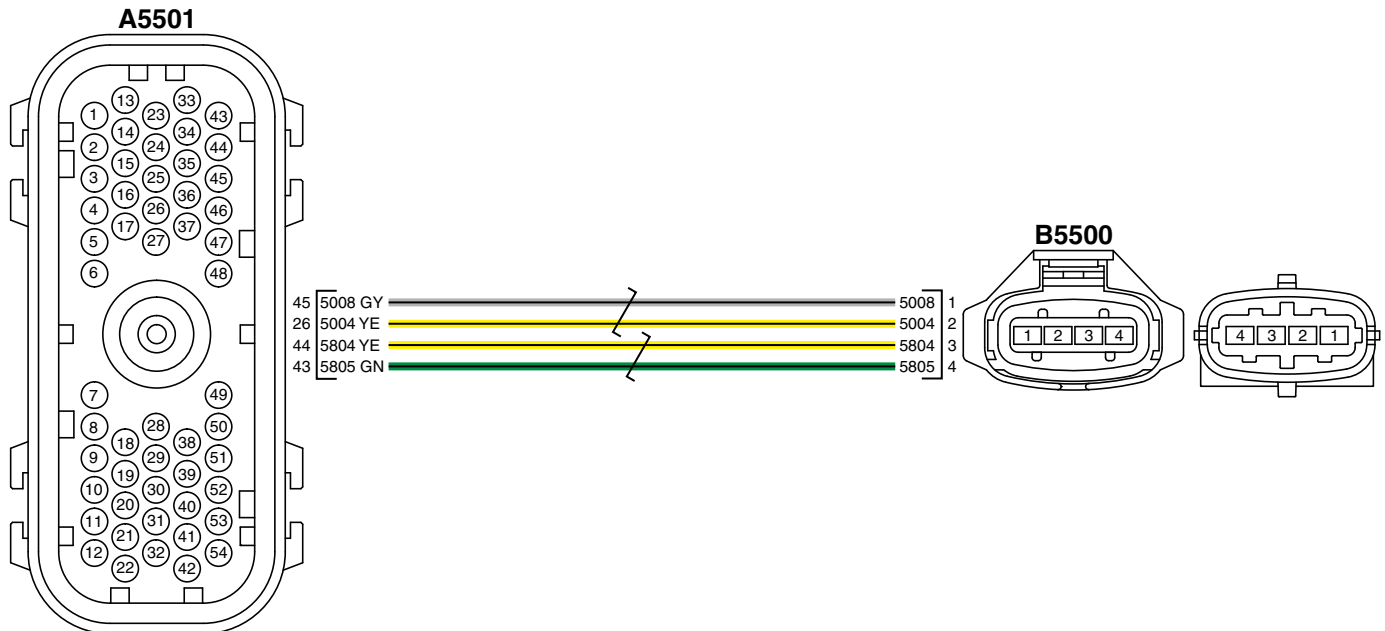
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 1

located in Section 06, Group 210.



Intake Air Sensor Wiring Diagram

A5501 – 45—Supply
A5501 – 26—Return

A5501 – 44—CAN High

A5501 – 43—CAN Low

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10233 — Female — Blue/Red

- JDG10243 — Male — Blue/Red

Continued on next page

RE42287,00004ED -19-24FEB11-2/4

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RE42287,00004ED -19-24FEB11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.

NOTE: The ignition must be ON for 90 seconds to allow the DTC to set if it is active.

3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 001176.12 active?

YES: Replace intake air sensor. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004ED -19-24FEB11-4/4

**001209.03 — Exhaust Manifold Pressure
Signal Out of Range High**

*The exhaust manifold pressure signal exceeds the
sensor high voltage specification.*

Continued on next page

RE42287,00004EE -19-01AUG11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

005126.03

001209.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The exhaust manifold pressure sensor signal voltage to the ECU corresponds to a pressure higher than what is physically possible for exhaust manifold pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for exhaust manifold pressure.

Additional references:

For sensor location see B5102 — Exhaust Manifold Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

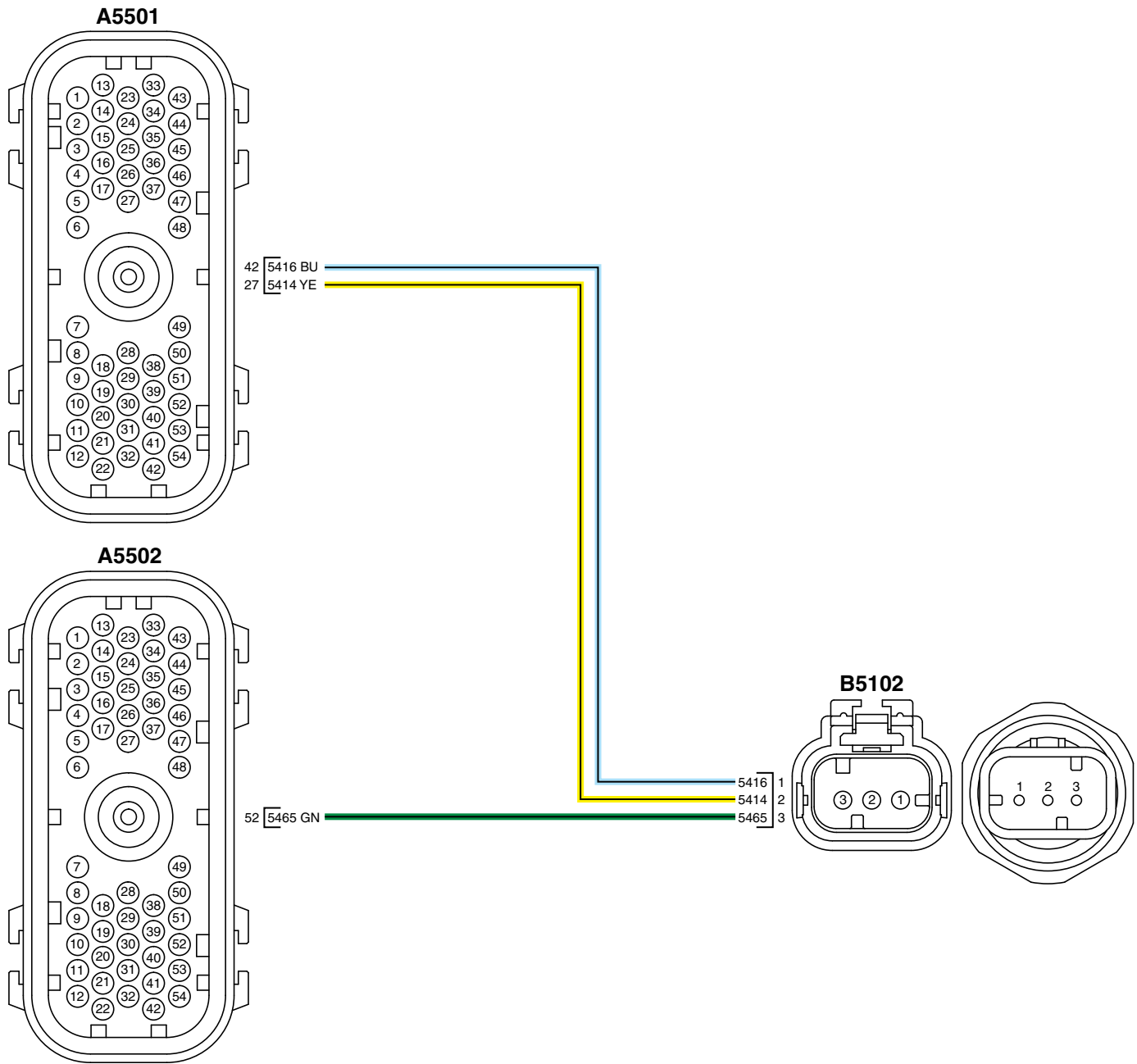
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Exhaust Manifold Pressure Sensor Wiring Diagram

A5501 — 42—Supply

A5501 — 27—Return

A5502 — 52—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16778 —UN—22DEC09

Continued on next page

RE42287,00004EE -19-01AUG11-3/15

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 – Digital Multimeter

RE42287,00004EE -19-01AUG11-4/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005126.03 active or stored?

YES: GO TO [005126.03 — Sensor Supply #8 Voltage Out of Range High](#) procedure.

NO: [GO TO 2](#)

RE42287,00004EE -19-01AUG11-5/15

2 Code Check

Is DTC 001209.03 active?

YES: [GO TO 3](#)

NO: [GO TO 10](#)

RE42287,00004EE -19-01AUG11-6/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect exhaust manifold pressure sensor connector B5102.
3. Perform [Terminal Test](#) on sensor and B5102 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,00004EE -19-01AUG11-7/15

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5102 connector female socket 3 (+).
 - B to B5102 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 8](#)

NO: Voltage greater than 2.7 V. GO TO [Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 5](#)

Continued on next page

RE42287,00004EE -19-01AUG11-8/15

5 Open Circuit Check	<p>Press and hold S2 on Diagnostic Test Box while performing <u>Wiggle Test</u>.</p> <p>Does voltage remain between 2.3 and 2.7 V?</p>	<p>YES: Repair open in return wire. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 6</u></p> <p style="text-align: right;">RE42287,00004EE -19-01AUG11-9/15</p>
6 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors A5501 and A5502. 3. Perform <u>Terminal Test</u> on A5501 connector female sockets 27 and 42, and A5502 connector female socket 52. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 7</u></p> <p style="text-align: right;">RE42287,00004EE -19-01AUG11-10/15</p>
7 Continuity Check	<ol style="list-style-type: none"> 1. Measure the resistance between A5501 connector female socket 27 and B5102 connector female socket 2. 2. Measure the resistance between A5502 connector female socket 52 and B5102 connector female socket 3. <p>Are both resistance measurements less than 5 ohms?</p>	<p>YES: <u>GO TO Problem Not Found Procedure</u>.</p> <p>NO: Repair mis-pin. Perform <u>Verification Procedure</u>.</p> <p style="text-align: right;">RE42287,00004EE -19-01AUG11-11/15</p>
8 Software Check	<p>In Service ADVISOR, monitor Exhaust Manifold Pressure Input Voltage.</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: Replace sensor. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 9</u></p> <p style="text-align: right;">RE42287,00004EE -19-01AUG11-12/15</p>
9 Reprogram ECU	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see <u>Engine Control Unit (ECU) — Reprogramming Instructions</u> in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 001209.03 active?</p>	<p>YES: Replace ECU. Perform <u>Verification Procedure</u>.</p> <p>NO: Perform <u>Verification Procedure</u>.</p> <p style="text-align: right;">RE42287,00004EE -19-01AUG11-13/15</p>

Continued on next page

Air Intake and Exhaust System Diagnostics

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. Monitor Exhaust Manifold Pressure Sensor Input Voltage in Service ADVISOR.
3. Perform Wiggle Test.

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform Verification Procedure

NO: GO TO 11

RE42287,00004EE -19-01AUG11-14/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect exhaust manifold pressure sensor connector B5102.
3. Perform Terminal Test on sensor and B5102 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure

NO: GO TO 12

RE42287,00004EE -19-01AUG11-15/15

12 Terminal Test

1. Disconnect ECU connectors A5501 and A5502.
2. Perform Terminal Test on A5501 connector female sockets 27 and 42, and **A5502** connector female socket 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure

NO: GO TO Problem Not Found Procedure.

RE42287,00004EE -19-01AUG11-16/15

**001209.04 — Exhaust Manifold Pressure
Signal Out of Range Low**

*The exhaust manifold pressure signal is lower than
the sensor low voltage specification.*

Continued on next page

RE42287,00004EF -19-27JUL11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

005126.03

005126.04

001209.03

001209.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The exhaust manifold pressure sensor signal voltage to the ECU corresponds to a pressure lower than what is physically possible for the exhaust manifold pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for manifold air pressure.

Additional References:

For sensor location see [B5102 — Exhaust Manifold Pressure Sensor](#) in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

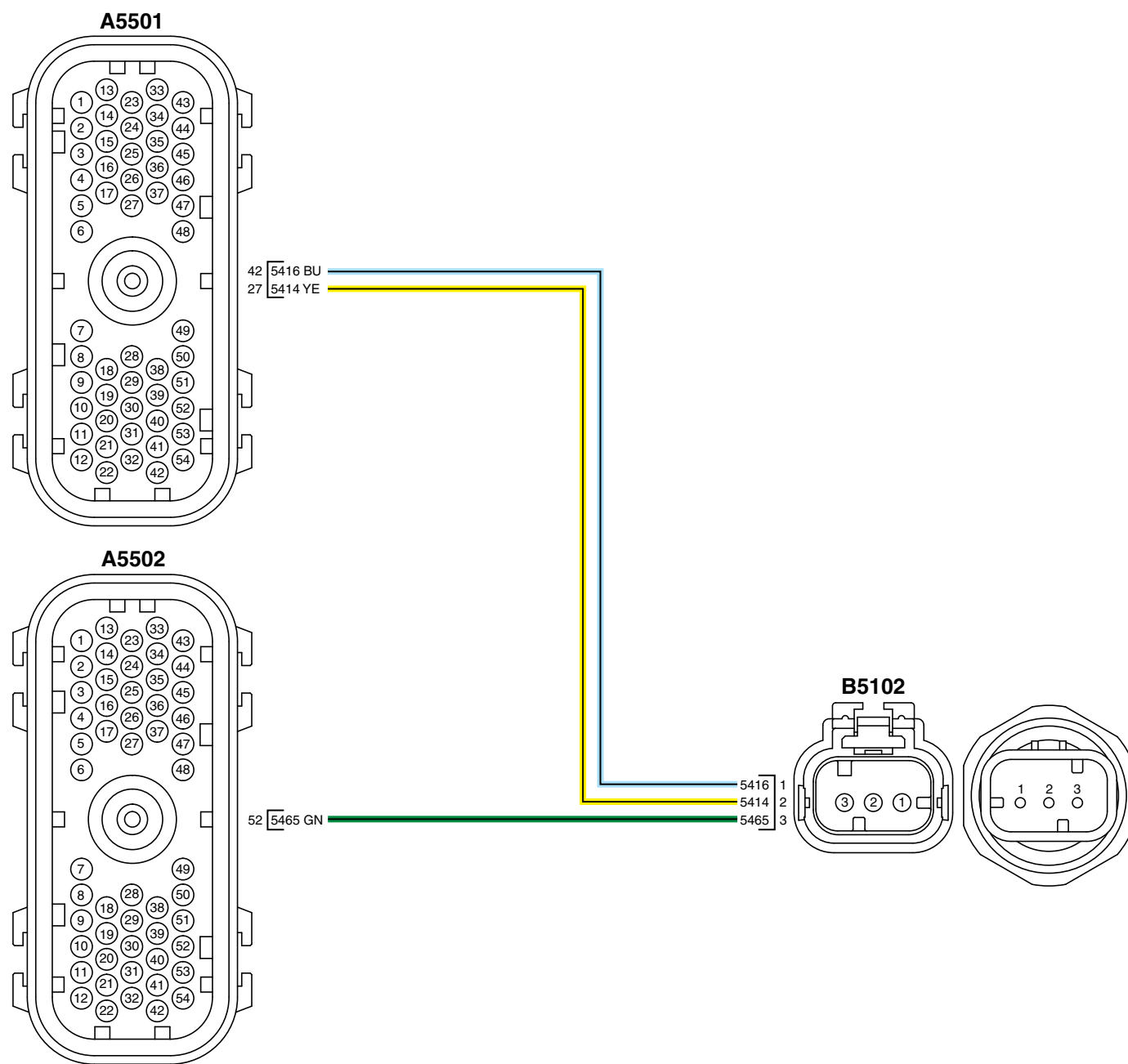
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Exhaust Manifold Pressure Sensor Wiring Diagram

A5501—42—Supply

A5501—27—Return

A5502—52—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16778 —UN—22DEC09

Continued on next page

RE42287.00004EF -19-27JUL11-3/17

Air Intake and Exhaust System Diagnostics

Tools:

- [JDG10273](#) — Diagnostic Test Box
- [JT07306](#) — Digital Multimeter

RE42287,00004EF -19-27JUL11-4/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005126.03 stored?

YES: GO TO [005126.03 — Sensor Supply #8 Voltage Out of Range High](#) procedure.

NO: [GO TO 2](#)

RE42287,00004EF -19-27JUL11-5/17

2 Code Check

Is DTC 001209.03 stored?

YES: GO TO [001209.03 — Exhaust Manifold Pressure Signal Out of Range High](#) procedure.

NO: [GO TO 3](#)

RE42287,00004EF -19-27JUL11-6/17

3 Code Check

Is DTC 001209.04 active?

YES: [GO TO 4](#)

NO: [GO TO 12](#)

RE42287,00004EF -19-27JUL11-7/17

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect exhaust manifold pressure sensor connector B5102.
3. Perform [Terminal Test](#) on sensor and B5102 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004EF -19-27JUL11-8/17

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5102 connector female socket 1 (+).
 - B to B5102 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 7

NO: GO TO 6

RE42287,00004EF -19-27JUL11-9/17

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

RE42287,00004EF -19-27JUL11-10/17

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5102 connector female socket 3 (+).
 - B to B5102 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 8

NO: GO TO 10

RE42287,00004EF -19-27JUL11-11/17

8 Software Check

In Service ADVISOR, monitor Exhaust Manifold Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RE42287,00004EF -19-27JUL11-12/17

<p>9 Reprogram ECU</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 001209.04 active?</p>	<p>YES: Replace ECU. Perform Verification Procedure.</p> <p>NO: Perform Verification Procedure.</p> <p>RE42287,00004EF -19-27JUL11-13/17</p>
<p>10 Terminal Test</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors A5501 and A5502. 3. Perform Terminal Test on A5501 connector female sockets 42, 27, and A5502 female socket 52. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 11</p> <p>RE42287,00004EF -19-27JUL11-14/17</p>
<p>11 Continuity Check</p>	<p>Measure resistance between A5502 connector female socket 52 and B5102 connector female socket 3.</p> <p>Is resistance less than 5 ohms?</p>	<p>YES: Repair short to signal wire in harness. Perform Verification Procedure.</p> <p>NO: Repair open, high resistance, or mis-pin in harness. Perform Verification Procedure.</p> <p>RE42287,00004EF -19-27JUL11-15/17</p>
<p>12 Wiggle Test</p>	<ol style="list-style-type: none"> 1. In Service ADVISOR, monitor Exhaust Manifold Pressure Input Voltage. 2. Perform Wiggle Test. <p>Does voltage ever go below 0.2 V?</p>	<p>YES: Repair harness problem. Perform Verification Procedure.</p> <p>NO: GO TO 13</p> <p>RE42287,00004EF -19-27JUL11-16/17</p>
<p>13 Terminal Test</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect exhaust manifold pressure sensor connector B5102. 3. Perform Terminal Test on sensor and B5102 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 14</p> <p>RE42287,00004EF -19-27JUL11-17/17</p>

14 Terminal Test

1. Disconnect ECU connectors A5501 and A5502.
2. Perform Terminal Test on A5501 connector female sockets 42, 27, and **A5502** female socket 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004EF -19-27JUL11-18/17

001209.07 — Exhaust Manifold Pressure Mismatch

The ECU has detected an exhaust manifold pressure mismatch.

Continued on next page

RE42287,00004F0 -19-25MAY12-1/17

Diagnostic Procedure

Troubleshooting Sequence:

002659.15
005126.03
005126.04
000103.00
000103.02
000103.05
001209.07

When DTC is Displayed:

When the ignition is on, engine is off, and the fault is active.

When the ignition is on, engine is running and the actual exhaust manifold pressure is not within an estimated range the ECU expects, based off engine operating conditions.

Related Information:

The ECU compares the exhaust manifold pressure to the intake air pressure sensor, manifold air pressure sensor, and the barometric pressure sensor at ignition on, engine off. When the engine is running, the ECU compares the exhaust manifold pressure value against an ECU estimated value for the operating conditions and sets this fault if the two values are not within a certain range of each other.

IMPORTANT: A shop exhaust ventilation system connected to the outlet of the exhaust may cause this code to set falsely by drawing a vacuum on the engines exhaust system.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for manifold air pressure.

Additional References:

For sensor location see B5102 — Exhaust Manifold Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

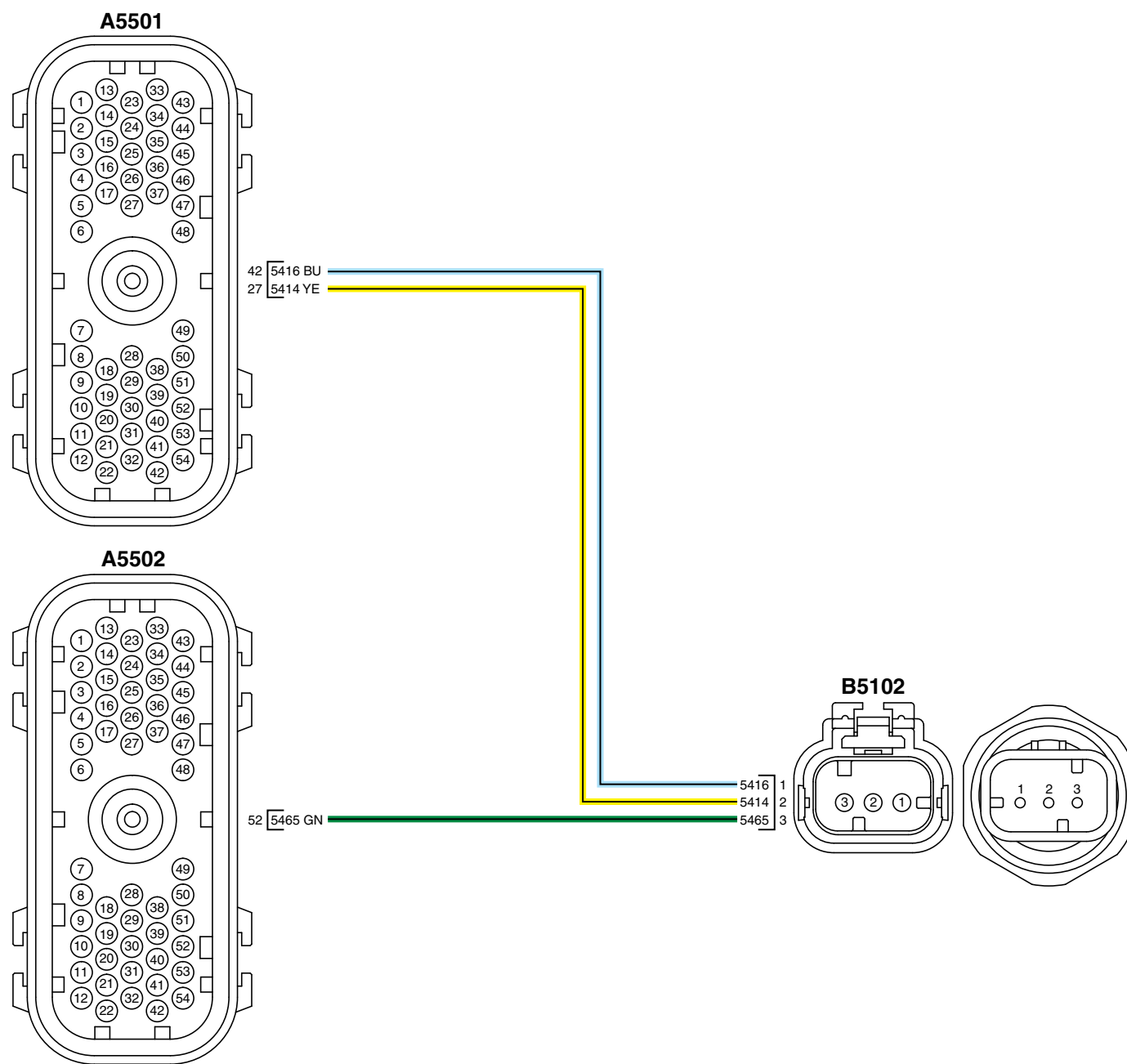
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Exhaust Manifold Pressure Sensor Wiring Diagram

A5501—42—Supply

A5501—27—Return

A5502—52—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16778 —UN—22DEC09

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RE42287,00004F0 -19-25MAY12-3/17

Air Intake and Exhaust System Diagnostics

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004F0 -19-25MAY12-4/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005126.03 stored?

YES: GO TO [005126.03](#)
— [Sensor Supply #8](#)
[Voltage Out of Range High](#)
procedure.
NO: [GO TO 2](#)

RE42287,00004F0 -19-25MAY12-5/17

2 Code Check

Is DTC 005126.04 active or stored?

YES: GO TO [005126.04](#)
— [Sensor Supply #8](#)
[Voltage Out of Range Low](#)
procedure.
NO: [GO TO 3](#)

RE42287,00004F0 -19-25MAY12-6/17

3 Code Check

Is DTC 001209.07 active?

YES: [GO TO 7](#)

NO: [GO TO 4](#)

RE42287,00004F0 -19-25MAY12-7/17

4 Code Check

1. Ignition ON, engine running.
2. Wait for a minimum of 60 seconds.
3. Refresh codes.

Is DTC 001209.07 active?

YES: [GO TO 6](#)
NO: [GO TO 5](#)

RE42287,00004F0 -19-25MAY12-8/17

5 Code Check

1. Review Snapshot Information stored from step 1 or speak with operator to determine conditions where DTC became active.
2. Operate engine under condition where DTC became active.
3. Refresh codes.

Is DTC 001209.07 active?

YES: [GO TO 6](#)
NO: GO TO [Problem Not Found Procedure](#).

Continued on next page

RE42287,00004F0 -19-25MAY12-9/17

6 Boost Leak Check

Inspect application for leaks or restrictions in air system.

For example, check for:

- Loose hoses or clamps
- Plugged air filter
- Internal or external charge air cooler restrictions
- Loose fan belt
- Turbocharger leaks or damage
- Frozen exhaust manifold pressure sensor tube
- Exhaust manifold pressure sensor tube leaks

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,00004F0 -19-25MAY12-10/17

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect exhaust manifold pressure sensor connector B5102.
3. Perform [Terminal Test](#) on sensor and B5102 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004F0 -19-25MAY12-11/17

8 Supply Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5102 connector female socket 1 (+).
 - B to B5102 connector female socket 2 (-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Press and hold S3 on Diagnostic Test Box.
6. Monitor voltage on multimeter.
7. Perform [Wiggle Test](#).

Does voltage remain between 4.8 and 5.2 V?

YES: [GO TO 10](#)

NO: [GO TO 9](#)

RE42287,00004F0 -19-25MAY12-12/17

9 Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open, high resistance, or short in return wire. Perform [Verification Procedure](#).

NO: Repair open, high resistance, or short in supply wire. Perform [Verification Procedure](#).

Continued on next page

RE42287,00004F0 -19-25MAY12-13/17

10 Signal Circuit Check

1. Ignition OFF, Engine OFF.
 2. Connect Diagnostic Test Box :
 - A to B5102 connector female socket 3 (+).
 - B to B5102 connector female socket 2 (-).
 3. Set S1 to position 9 on Diagnostic Test Box.
 4. Connect multimeter to Diagnostic Test Box.
 5. Ignition ON, Engine OFF.
 6. Monitor voltage on multimeter.
 7. Perform Wiggle Test.
- Is voltage between 2.3 and 2.7 V?

YES: GO TO 11

NO: GO TO 13

RE42287,00004F0 -19-25MAY12-14/17

11 Software Check

In Service ADVISOR, monitor Exhaust Manifold Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace exhaust manifold pressure sensor. Perform Verification Procedure.

NO: GO TO 12

RE42287,00004F0 -19-25MAY12-15/17

12 Reprogram ECU

1. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
 2. Ignition OFF, Engine OFF.
 3. Connect Diagnostic Test Box :
 - A to B5102 connector female socket 3 (+).
 - B to B5102 connector female socket 2 (-).
 4. Set S1 to position 9 on Diagnostic Test Box.
 5. Connect multimeter to Diagnostic Test Box.
 6. Ignition ON, Engine OFF.
 7. Monitor voltage on multimeter.
 8. Perform Wiggle Test.
- Is voltage between 2.3 and 2.7 V?

YES: Perform Verification Procedure.

NO: Replace ECU. Perform Verification Procedure.

RE42287,00004F0 -19-25MAY12-16/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
 2. Disconnect ECU connectors A5501 and A5502.
 3. Perform Terminal Test on A5501 connector female sockets 27 and 42, and **A5502** connector female socket 52. And corresponding ECU male pins.
- Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 14

RE42287,00004F0 -19-25MAY12-17/17

14 Continuity Check

Measure resistance between A5502 connector female socket 52 and B5102 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform Verification Procedure.

NO: Repair open, high resistance, or mis-pin in harness. Perform Verification Procedure.

RE42287,00004F0 -19-25MAY12-18/17

**002630.00 — Charge Air Cooler Outlet
Temperature Signal Extremely High**

*The ECU has detected that the Charge Air Cooler
Outlet Temperature is extremely high.*

Continued on next page

RE42287,00004F1 -19-02AUG11-1/9

Diagnostic Procedure**Troubleshooting Sequence:**

000111.01
 000111.17
 000111.18
 000110.17
 000109.01
 000109.03
 000109.04
 000109.17
 000109.18
 000109.31
 000412.00
 000412.03
 000412.04
 002629.03
 002629.04
 001209.03
 001209.03
 001209.04
 000102.03
 000102.04
 000108.02
 003464.13
 000051.07
 002791.13
 000027.07
 002795.07
 000102.02
 001209.02
 002659.07
 002659.14
 002659.17
 001639.18
 001639.01
 002630.00

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The ECU has detected that the charge air cooler outlet temperature is extremely high.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine power.

Additional References:

For more sensor information, see [B5205 — Charge Air Cooler Outlet Temperature Sensor](#) in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

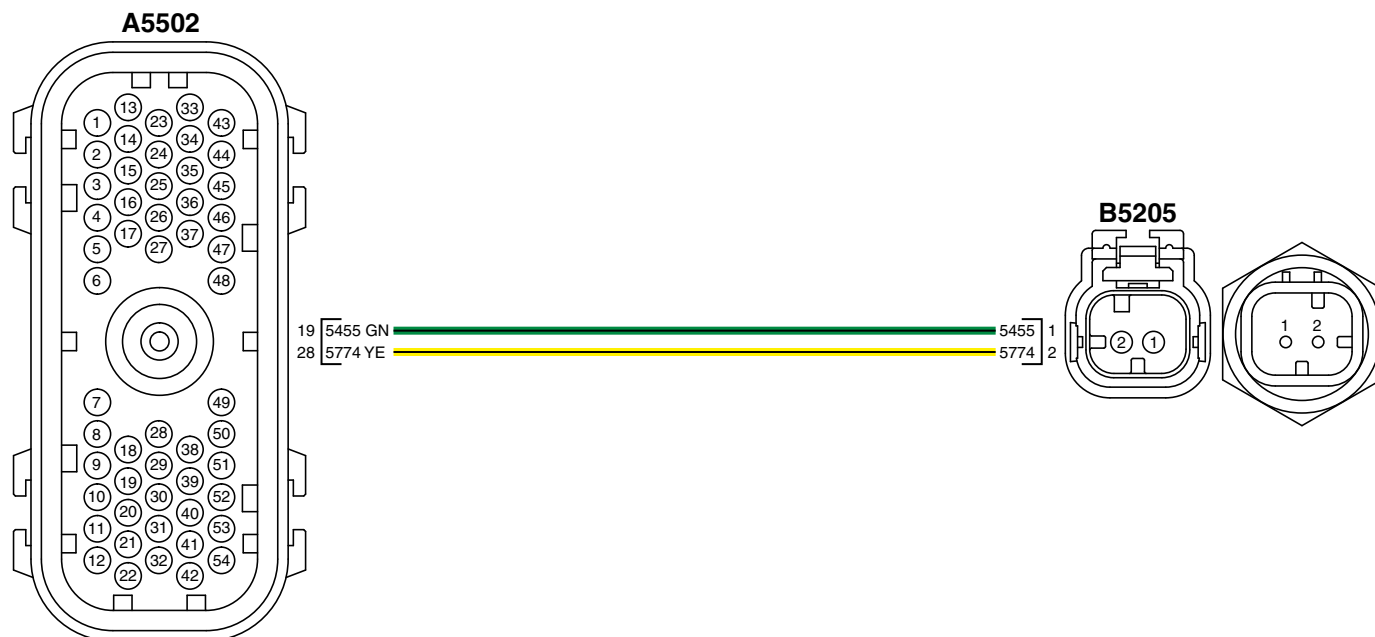
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 3](#)
- located in Section 06, Group 210.

Continued on next page

RE42287,00004F1 -19-02AUG11-2/9



RG16750 —UN—22DEC09

Charge Air Cooler Outlet Temperature Sensor Wiring Diagram

A5502—19—Signal

A5502—28—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

Continued on next page

RE42287,00004F1 -19-02AUG11-3/9

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Perform Preliminary Checks for:
 - Plugged air filter
 - Charge air cooler for external airflow obstructions
 - Loose fan belt
 - Listen for major exhaust leak or boost leaks.
 - Fan shroud for damage
 - EGR flow sensor venturi for loose bracket (if equipped)

Are any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,00004F1 -19-02AUG11-4/9

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect charge air cooler outlet temperature sensor connector B5205.
3. Perform [Terminal Test](#) on sensor and B5205 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004F1 -19-02AUG11-5/9

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5205 connector female socket 1 (+).
 - B to B5205 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 4](#)

NO: [GO TO Short to Voltage Procedure](#).

RE42287,00004F1 -19-02AUG11-6/9

4 Software Check

In Service ADVISOR, monitor Charge Air Cooler Outlet Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: [GO TO 6](#)

NO: [GO TO 5](#)

Continued on next page

RE42287,00004F1 -19-02AUG11-7/9

5 Reprogram ECU

1. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
2. Ignition ON, Engine OFF.
3. With Diagnostic Test Box still connected and S1 in position 7, in Service ADVISOR, monitor Charge Air Cooler Outlet Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform Verification Procedure.

NO: Replace ECU. Perform Verification Procedure.

RE42287,00004F1 -19-02AUG11-8/9

6 Replace Sensor

1. Replace charge air cooler outlet temperature sensor.
2. If possible, run engine under operating conditions that set code.
3. Refresh codes.

Did DTC 002630.00 reappear?

YES: Investigate other potential mechanical problems:

- Internal Charge Air Cooler Plugging
- VGT vanes sticking
- Plugged EGR circuit
- Boost leak
- EGR system leak
- Exhaust leak
- EGR flow sensor low
- Air throttle restriction
- Exhaust restriction
- Wastegate sticking
- Engine cooling fan problem
- Damaged turbocharger
- VGT vane position sensor inaccurate

NO: Perform Verification Procedure.

RE42287,00004F1 -19-02AUG11-9/9

**002630.03 — Charge Air Cooler Outlet
Temperature Signal Out Of Range High**

*The charge air cooler outlet temperature signal exceeds
the sensor high voltage specification.*

Continued on next page

RE42287,00004F2 -19-02MAR11-1/12

Diagnostic Procedure**Troubleshooting Sequence:**
002630.03**When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The charge air cooler outlet temperature sensor signal voltage to the ECU corresponds to a temperature higher than what is physically possible for the charge air cooler outlet temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for charge air cooler outlet temperature.

Additional References:

For sensor location see [B5205 — Charge Air Cooler Outlet Temperature Sensor](#) in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

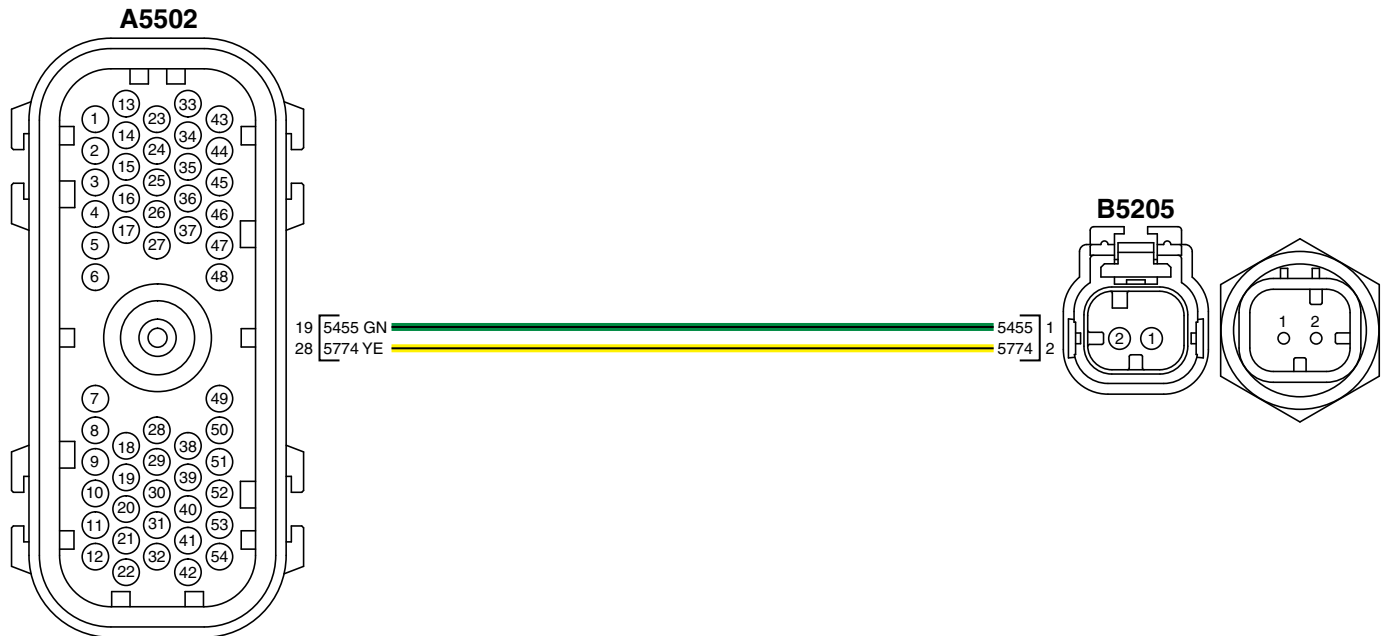
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Charge Air Cooler Outlet Temperature Sensor Wiring Diagram

A5502—19—Signal

A5502—28—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG16750 —UN—22DEC09

Continued on next page

RE42287,00004F2 -19-02MAR11-2/12

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004F2 -19-02MAR11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 002630.03 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

RE42287,00004F2 -19-02MAR11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect charge air cooler outlet temperature sensor connector B5205.
3. Perform [Terminal Test](#) on sensor and B5205 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004F2 -19-02MAR11-5/12

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5205 connector female socket 1 (+).
 - B to B5205 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 4](#)

NO: Voltage greater than 2.7 V. [GO TO Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 6](#)

RE42287,00004F2 -19-02MAR11-6/12

4 Software Check

In Service ADVISOR, monitor Charge Air Cooler Outlet Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004F2 -19-02MAR11-7/12

Air Intake and Exhaust System Diagnostics

5 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 002630.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004F2 -19-02MAR11-8/12

6 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing [Wiggle Test](#).

Does voltage now remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform [Verification Procedure](#).

NO: Repair open in signal wire. Perform [Verification Procedure](#).

RE42287,00004F2 -19-02MAR11-9/12

7 Wiggle Test

1. In Service ADVISOR, monitor Charge Air Cooler Outlet Temperature Input Voltage.
2. Perform [Wiggle Test](#).

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004F2 -19-02MAR11-10/12

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect charge air cooler outlet temperature sensor connector B5205.
3. Perform [Terminal Test](#) on sensor and connector B5205.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,00004F2 -19-02MAR11-11/12

9 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform [Terminal Test](#) on A5502 connector female sockets 28 and 19. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RE42287,00004F2 -19-02MAR11-12/12

**002630.04 — Charge Air Cooler Outlet
Temperature Signal Out Of Range Low**

*The charge air cooler outlet temperature signal is lower
than the sensor low voltage specification.*

Continued on next page

RE42287,00004F3 -19-02MAR11-1/15

Diagnostic Procedure**Troubleshooting Sequence:****002630.03****002630.04****When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The charge air cooler outlet temperature sensor signal voltage to the ECU corresponds to a temperature lower than what is physically possible for the charge air cooler outlet temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for charge air cooler outlet temperature.

Additional References:

For sensor location see B5205 — Charge Air Cooler Outlet Temperature Sensor in Section 03, Group 140.

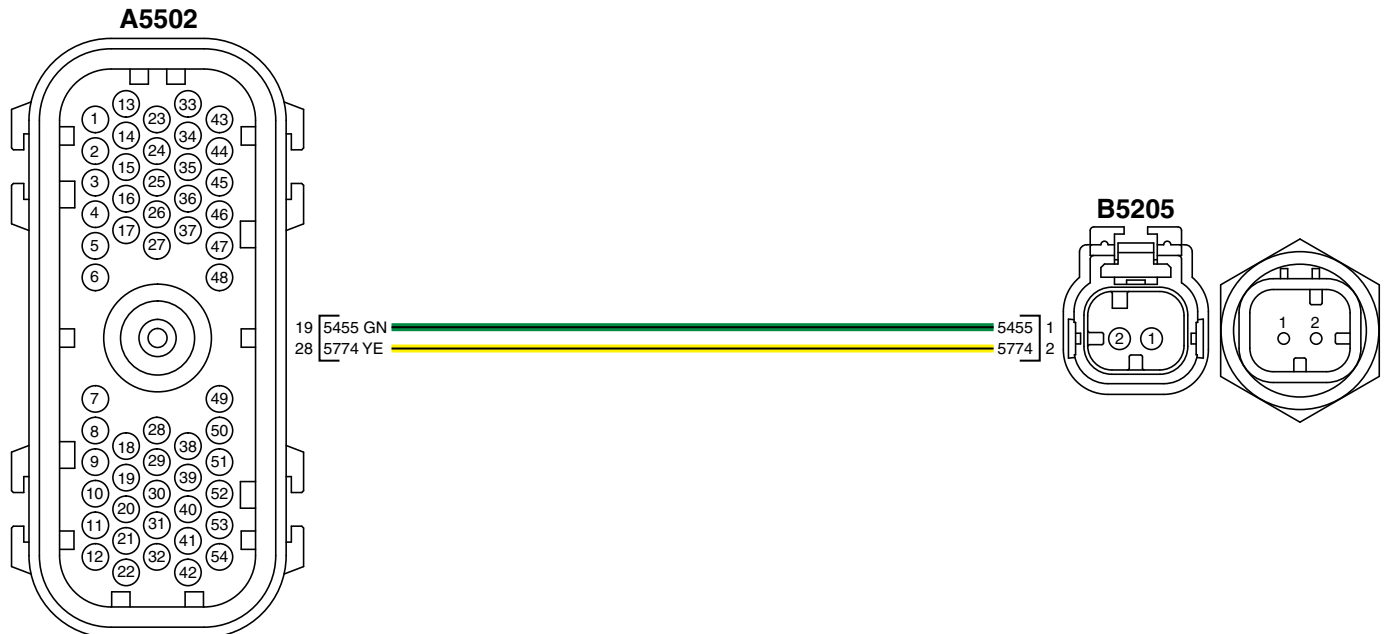
For more temperature sensor information, see Measuring Temperature in Section 03, Group 140.For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table- see 4.5L Wiring Diagram 3

located in Section 06, Group 210.



Charge Air Cooler Outlet Temperature Sensor Wiring Diagram

A5502—19—Signal**A5502—28—Return**

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

RE42287,00004F3 -19-02MAR11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004F3 -19-02MAR11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 002630.03 a stored code?

YES: GO TO 002630.03 — Charge Air Cooler Outlet Temperature Signal Out Of Range High procedure.

NO: GO TO 2

RE42287,00004F3 -19-02MAR11-4/15

2 Code Check

Is DTC 002630.04 active?

YES: GO TO 3

NO: GO TO 10

RE42287,00004F3 -19-02MAR11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect charge air cooler outlet temperature sensor connector B5205.
3. Perform Terminal Test on sensor and B5205 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 4

RE42287,00004F3 -19-02MAR11-6/15

4 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5205 connector female socket 1 (+).
 - B to B5205 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 5

NO: GO TO 7

Continued on next page

RE42287,00004F3 -19-02MAR11-7/15

5 Software Check

In Service ADVISOR, monitor Charge Air Cooler Outlet Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,00004F3 -19-02MAR11-8/15

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 002630.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004F3 -19-02MAR11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502 .
3. Perform [Terminal Test](#) on A5502 connector female sockets 28 and 19. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004F3 -19-02MAR11-10/15

8 Harness Check

NOTE: Many new error codes appear in the next step. Disregard all DTCs except 002630.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 002630.03 active?

YES: [GO TO 9](#)

NO: Replace ECU.
Perform [Verification Procedure](#).

RE42287,00004F3 -19-02MAR11-11/15

9 Continuity Check

Measure resistance between A5502 connector female socket 19 and B5205 connector female socket 1.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mispin in harness. Perform [Verification Procedure](#).

Continued on next page

RE42287,00004F3 -19-02MAR11-12/15

Air Intake and Exhaust System Diagnostics

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Charge Air Cooler Outlet Temperature Input Voltage.
3. Perform Wiggle Test.

Does voltage ever go below 0.2 V?

YES: Repair short to ground on signal wire. Perform Verification Procedure.

NO: GO TO 11

RE42287,00004F3 -19-02MAR11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect charge air cooler outlet temperature sensor connector B5205 .
3. Perform Terminal Test on sensor and B5205 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 12

RE42287,00004F3 -19-02MAR11-14/15

12 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 28 and 19. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004F3 -19-02MAR11-15/15

002630.15 — Charge Air Cooler Outlet Temperature Signal Slightly High

The charge air cooler outlet temperature signal is slightly higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The charge air cooler outlet temperature signal is slightly higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 002630.00 – Charge Air Cooler Outlet Temperature Signal Extremely High.

RE42287,00004F4 -19-02MAR11-1/1

002630.16 — Charge Air Cooler Outlet Temperature Signal Moderately High

The charge air cooler outlet temperature signal is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The charge air cooler outlet temperature signal is moderately higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 002630.00 – Charge Air Cooler Outlet Temperature Signal Extremely High.

RE42287,00004F5 -19-02MAR11-1/1

004490.12 — Intake Air Humidity Error

The intake air sensor has detected a problem with measuring intake air humidity.

Continued on next page

RE42287,00004F6 -19-08APR11-1/4

Diagnostic Procedure

Troubleshooting Sequence:
004490.12

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The Intake Air Sensor has detected a problem with measuring intake air humidity. The intake air sensor sends the error message via CAN to the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
 The ECU uses a default value for the intake air humidity.

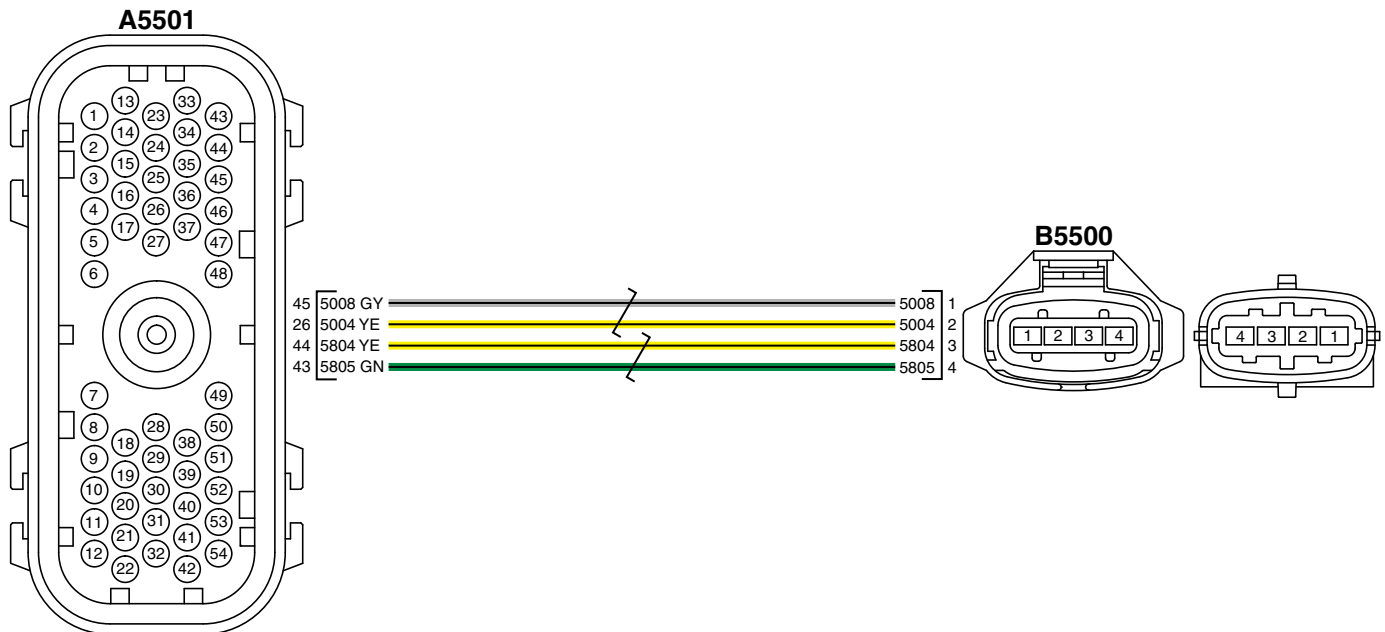
Additional References:

For more Intake Air Sensor information, see B5500 – Intake Air Sensor Operation in Section 03, Group 140.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
- see 4.5L Wiring Diagram 1 located in Section 06, Group 210.



Intake Air Sensor Wiring Diagram

A5501 – 45—Supply
A5501 – 26—Return

A5501 – 44—CAN High

A5501 – 43—CAN Low

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10233 — Female -- Blue/Red
- JDG10243 — Male -- Blue/Red

RG19582 —UN—14OCT10

Continued on next page

RE42287,00004F6 -19-08APR11-2/4

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RE42287,00004F6 -19-08APR11-3/4

❶ Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.

NOTE: The ignition must be ON for 90 seconds to allow the DTC to set if it is active.

3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 004490.12 active?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RE42287,00004F6 -19-08APR11-4/4

**522494.09 — Intake Air Sensor
Communication Error**

*The ECU has not detected CAN communication
with the Intake Air Sensor.*

Continued on next page

RE42287,00004F7 -19-30APR12-1/17

Diagnostic Procedure**Troubleshooting Sequence:****005127.03****005127.04****522494.09****When DTC is Displayed:**

When the ignition is on and the error is active.

Related Information:

The ECU has not detected CAN communication with the Intake Air Sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default intake air temperature.

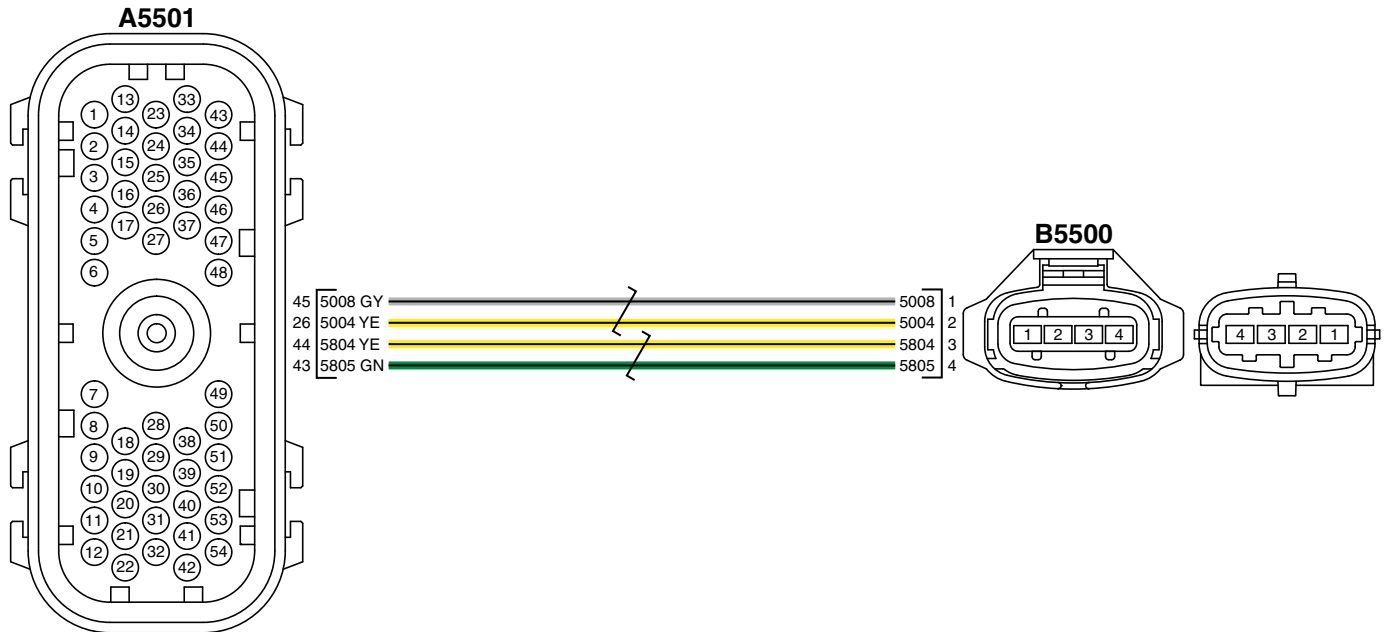
Additional references:For more intake air information, see [B5500 — Intake Air Sensor](#) in Section 03, Group 140.For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.*NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.*

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.

*Intake Air Sensor Wiring Diagram***A5501 – 45—Supply**
A5501 – 26—Return**A5501 – 44—CAN High****A5501 – 43—CAN Low****IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.**

Continued on next page

RE42287,00004F7 -19-30APR12-2/17

Flex probe:

Intake Air Sensor

- JDG10233 — Female — Blue/Red
- JDG10243 — Male — Blue/Red

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RE42287,00004F7 -19-30APR12-3/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. Perform Control Unit Information and Overview test.
5. Refresh codes.

Is 522494.09 active?

YES: GO TO 2

NO: GO TO 12

RE42287,00004F7 -19-30APR12-4/17

2 Review DTC List

Is code 000641.09 stored or active?

YES: Perform CAN Diagnostics Procedure.

NO: GO TO 3

RE42287,00004F7 -19-30APR12-5/17

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect intake air sensor connector B5500.
3. Perform Terminal Test on sensor and B5500 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 4

Continued on next page

RE42287,00004F7 -19-30APR12-6/17

4 Supply Voltage Check

1. Connect Diagnostic Test Box:
 - A to B5500 connector female socket 1(+)
 - B to B5500 connector female socket 2(-)
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Press and hold S3 on Diagnostic Test Box.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Does voltage remain between 10 and 11 V?

YES: GO TO 5

NO: Voltage is less than 10 V. GO TO 9

NO: Voltage is greater than 11 V. GO TO 10

RE42287,00004F7 -19-30APR12-7/17

5 CAN Circuit Check

1. Ignition ON, Engine OFF.
2. On B5500 connector, measure voltage between female socket 3 (+) and single point ground (-).
3. On B5500 connector, measure voltage between female socket 4 (+) and single point ground (-).

Is voltage for both measurements between 1.5 and 3.5 V?

YES: Replace intake air sensor. Perform Verification Procedure.

NO: GO TO 6

RE42287,00004F7 -19-30APR12-8/17

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 26, 43, 44, and 45. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RE42287,00004F7 -19-30APR12-9/17

7 Continuity Check

1. Measure resistance between A5501 connector female socket 44 and B5500 connector female socket 3.
2. Measure resistance between A5501 connector female socket 45 and B5500 connector female socket 4.

Are both resistances less than 5 ohms?

YES: GO TO 8

NO: Repair open or high resistance in harness. Perform Verification Procedure.

RE42287,00004F7 -19-30APR12-10/17

8 Harness Check

Inspect harness for damage to insulation and shielding.

Any damage found?

YES: Replace harness. Perform Verification Procedure.

NO: Contact DTAC for support.

Continued on next page

RE42287,00004F7 -19-30APR12-11/17

9 Sensor Ground Check	<p>1. With Diagnostic Test Box still connected press and hold switches S2 and S3.</p> <p>2. Monitor voltage on multimeter.</p> <p>Is voltage between 10 and 11 V?</p>	<p>YES: Repair open or high resistance in return wire. Perform <u>Verification Procedure</u>.</p> <p>NO: repair open or high resistance in supply wire. Perform <u>Verification Procedure</u>.</p> <p style="text-align: right;">RE42287,00004F7 -19-30APR12-12/17</p>
10 Unswitched Voltage Check	<p>1. Ignition OFF, Engine OFF.</p> <p><i>NOTE: Wait 90 seconds for ECU to shut down before making measurement.</i></p> <p>2. Monitor voltage on multimeter.</p> <p>Is voltage between 0.0 and 0.2 V?</p>	<p>YES: GO TO 11</p> <p>NO: Repair short to unswitched battery voltage on supply wire. Perform <u>Verification Procedure</u>.</p> <p style="text-align: right;">RE42287,00004F7 -19-30APR12-13/17</p>
11 Wire to Wire Short Check	<p>1. Disconnect ECU connectors A5502 and A5503.</p> <p>2. On A5501 connector, measure resistance between:</p> <p><i>NOTE: Terminals 20 and 45 are tied together inside the ECU.</i></p> <ul style="list-style-type: none"> • female sockets 20 and all other terminals in all ECU connectors. • female sockets 45 and all other terminals in all ECU connectors. <p>Any resistances less than 100k ohms?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: Contact DTAC</p> <p style="text-align: right;">RE42287,00004F7 -19-30APR12-14/17</p>
12 Review DTC list	<p>Review DTC List.</p> <p>Is 005127.04 stored?</p>	<p>YES: GO TO <u>005127.04 — Sensor Supply #9 Voltage Out of Range Low</u> procedure.</p> <p>NO: <u>GO TO 13</u></p> <p style="text-align: right;">RE42287,00004F7 -19-30APR12-15/17</p>
13 Review DTC list	<p>Review DTC List.</p> <p>Is 522495.09 stored?</p>	<p>YES: Replace ECU. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 14</u></p> <p style="text-align: right;">RE42287,00004F7 -19-30APR12-16/17</p>

Continued on next page

14 Wiggle Test

1. Monitor DTCs in Service ADVISOR.

2. Perform Wiggle Test.

Does DTC 522494.09 become active?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004F7 -19-30APR12-17/17

Group 163 Lubrication and Cooling System Diagnostics

000100.01 — Engine Oil Pressure Signal Extremely Low

*The engine oil pressure signal is much lower
than expected.*

Continued on next page

RE42287,00004BA -19-26JUL11-1/13

Diagnostic Procedure

Troubleshooting Sequence: 000100.01

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

NOTE: OEM engines are programmed using John Deere Custom Performance trim page features. The customer has the option to choose an engine shutdown feature. If this feature was programmed into the ECU, the ECU shuts down the engine if this code sets. If the shutdown feature was not selected, a standard derate is activated.

The engine oil pressure signal is much lower than expected at the operating conditions that set the DTC.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

Additional references:

For sensor location see [B5101 — Engine Oil Pressure Sensor](#) in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

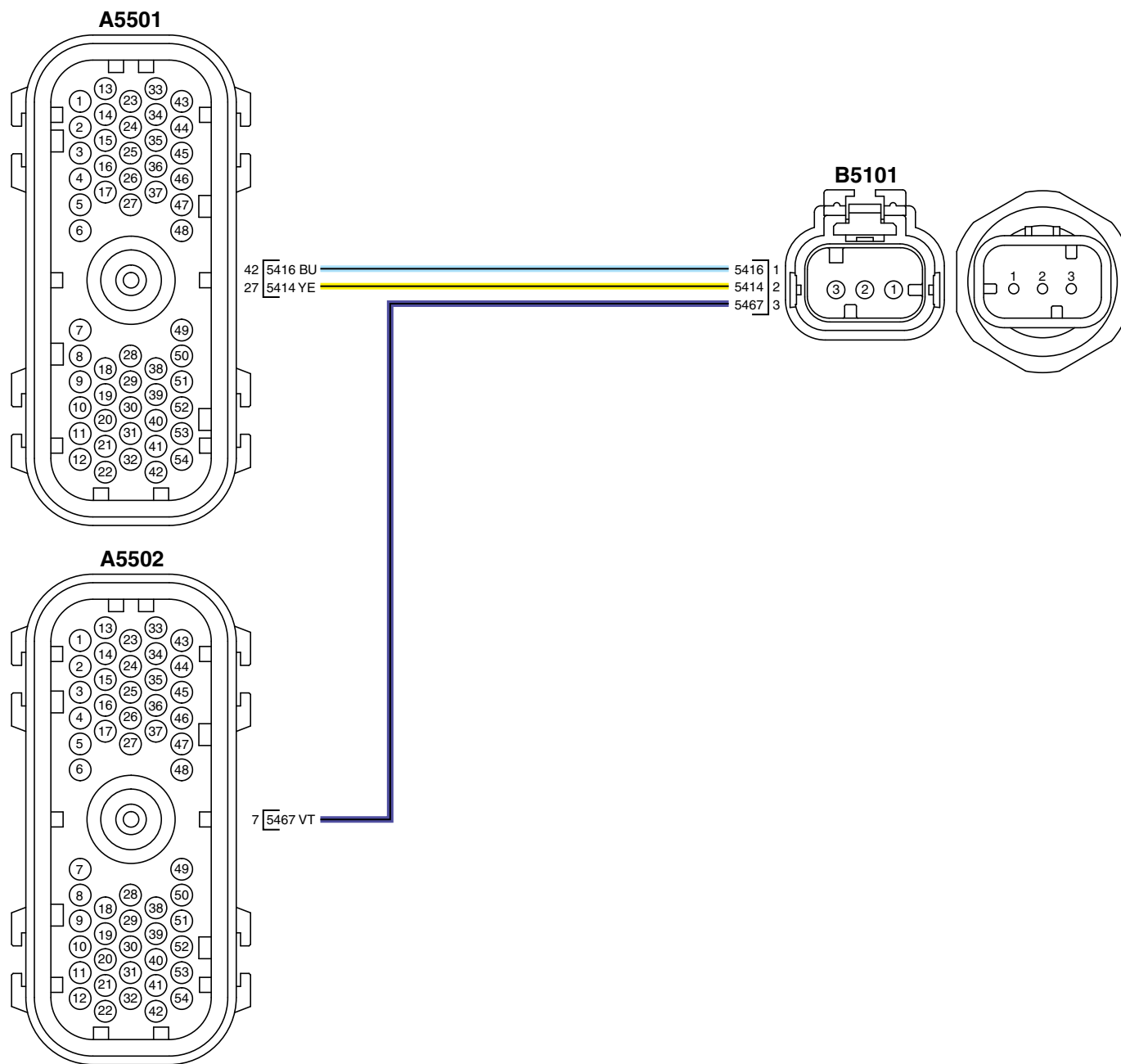
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Engine Oil Pressure Sensor Wiring Diagram

A5501—42—Supply

A5501—27—Return

A5502—7—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RG16726 —UN—22DEC09

Continued on next page

RE42287,00004BA -19-26JUL11-3/13

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 – Digital Multimeter
- JT05470 – Universal Pressure Test Kit

RE42287,00004BA -19-26JUL11-4/13

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Check engine oil level.

Is level between the “Add” and “Full” marks?

YES: GO TO 2

NO: Adjust oil level to the proper level. Perform Verification Procedure.

RE42287,00004BA -19-26JUL11-5/13

2 Verify Sensor Operation

1. Remove an oil gallery plug from the engine and install a pressure gauge in engine block using JT05470 Universal Pressure Test Kit.

2. Run engine at speed where code sets and verify that the reading is within specification. For specification, see Group 060 — Lubrication System in Section 06, Group 200.

Was the gauge reading within specification?

YES: GO TO 3

NO: Investigate other potential mechanical problems:

- Incorrect Oil
- Plugged Oil Filter
- Excessive Oil Temperature
- Sticky Oil Pressure Regulating Valve
- Plugged Oil Pump Screen
- Cracked Pick-up Tube
- Worn or dirty Oil Pump
- Faulty or missing piston cooling orifice
- Excessive main bearing clearance
- Excessive rod bearing clearance
- Drain back valve in oil filter canister is out of position

Continued on next page

RE42287,00004BA -19-26JUL11-6/13

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine oil pressure sensor connector B5101.
3. Perform Terminal Test on sensor and B5101 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 4

RE42287,00004BA -19-26JUL11-7/13

4 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5101 connector female socket 1 (+).
 - B to B5101 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 6

NO: GO TO 5

RE42287,00004BA -19-26JUL11-8/13

5 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

RE42287,00004BA -19-26JUL11-9/13

6 Signal Circuit Check

1. Ignition OFF, Engine OFF
2. Connect Diagnostic Test Box :
 - A to B5101 connector female socket 3 (+).
 - B to B5101 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 7

NO: GO TO 9

Continued on next page

RE42287,00004BA -19-26JUL11-10/13

7 Software Check

In Service ADVISOR, monitor Engine Oil Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004BA -19-26JUL11-11/13

8 Reprogram ECU

1. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

2. Ignition ON, Engine OFF.

3. With Diagnostic Test Box still connected and S1 is set to position 9.

4. In Service ADVISOR, monitor Engine Oil Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform [Verification Procedure](#).

NO: Replace ECU.
Perform [Verification Procedure](#).

RE42287,00004BA -19-26JUL11-12/13

9 Terminal Test

1. Ignition OFF, Engine OFF

2. Disconnect Diagnostic Test Box.

3. Disconnect ECU connectors A5502 and A5501.

4. Perform [Terminal Test](#) on A5502 connector female socket 7 and **A5501** connector female sockets 42 and 27. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RE42287,00004BA -19-26JUL11-13/13

10 Continuity Check

Measure resistance between A5502 connector female socket 7 and B5101 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair high resistance, open, or mis-pin in harness. Perform [Verification Procedure](#).

RE42287,00004BA -19-26JUL11-14/13

**000100.02 — Engine Oil Pressure is not Zero
with Engine Stopped**

*The engine oil pressure signal is not at zero
with the engine stopped.*

Continued on next page

RE42287,00004BB -19-09FEB11-1/13

Diagnostic Procedure

Troubleshooting Sequence:

005126.03

000100.02

When DTC is Displayed:

When the ignition is on, engine is off and the fault is active.

Related Information:

The engine oil pressure sensor signal voltage to the ECU corresponds to a pressure higher than what is physically possible with the engine stopped.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For sensor location and theory of operation, see B5101 — Engine Oil Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see Measuring Pressure in Section 03, Group 140.

For more information on the Control Unit Information and Overview test see Control Unit Information and Overview in Section 4, Group 160.

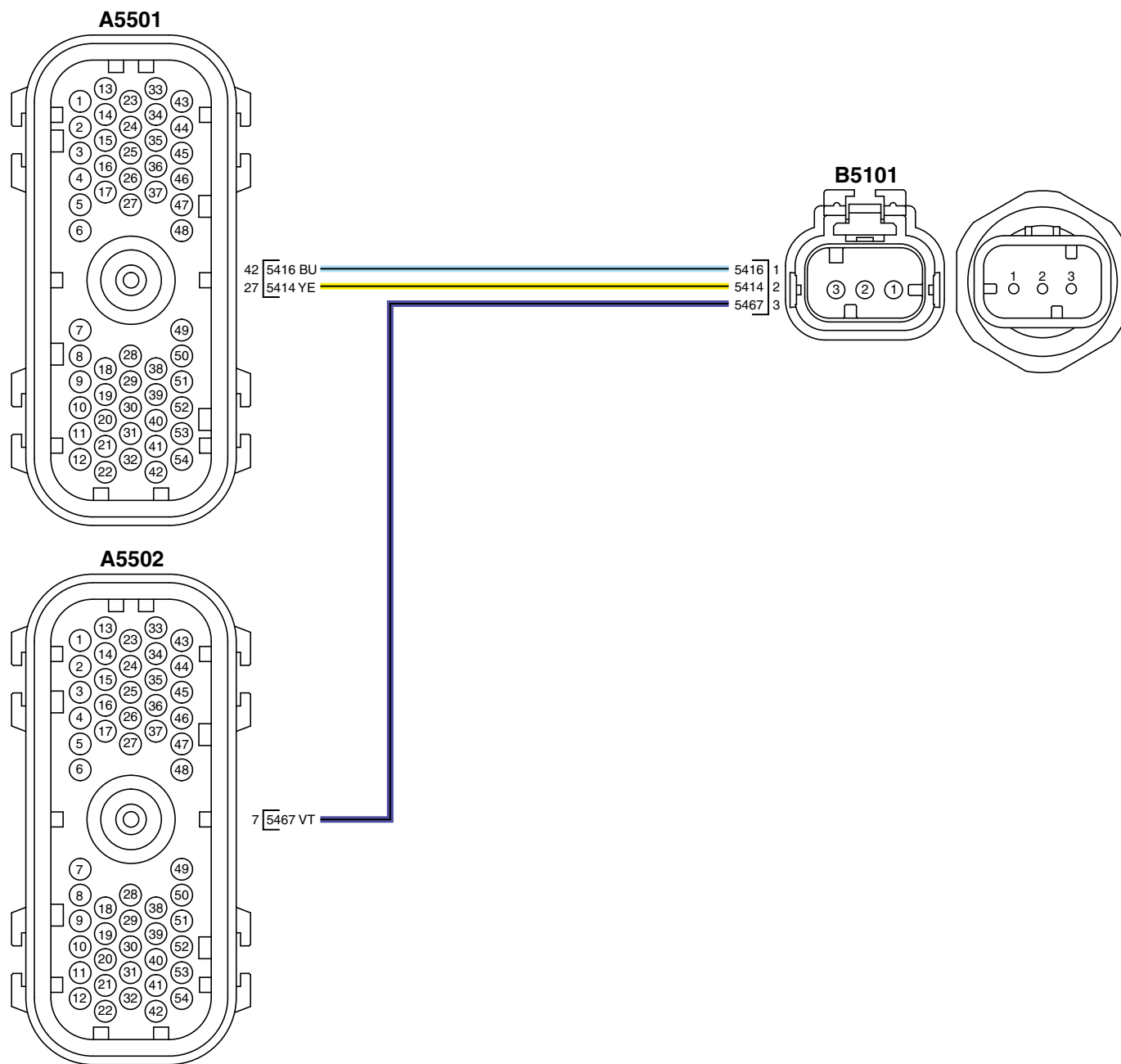
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors,, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.



Engine Oil Pressure Sensor Wiring Diagram

A5501—42—Supply

A5501—27—Return

A5502—7—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RG16726 —UN—22DEC09

Continued on next page

RE42287,00004BB -19-09FEB11-3/13

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004BB -19-09FEB11-4/13

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 005126.03 stored?

YES: GO TO [005126.03 — Sensor Supply #8 Voltage Out of Range High](#) procedure.

NO: [GO TO 2](#)

RE42287,00004BB -19-09FEB11-5/13

2 Code Check

Is DTC 000100.02 active?

YES: [GO TO 3](#)

NO: [GO TO 8](#)

RE42287,00004BB -19-09FEB11-6/13

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine oil pressure sensor connector B5101.
3. Perform [Terminal Test](#) on sensor and B5101 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,00004BB -19-09FEB11-7/13

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5101 connector female socket 3 (+).
 - B to B5101 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

NOTE: A negative voltage is less than 2.3 V.

YES: [GO TO 6](#)

NO: Voltage greater than 2.7 V. GO TO [Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 5](#)

Continued on next page

RE42287,00004BB -19-09FEB11-8/13

5 Ground Circuit Check

1. Press and hold the S2 button on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 2.3 and 2.7 V?

YES: Repair open or high resistance in return wire. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RE42287,00004BB -19-09FEB11-9/13

6 Software Check

In Service ADVISOR, monitor Engine Oil Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,00004BB -19-09FEB11-10/13

7 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000100.02 active?

YES: Replace ECU. Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004BB -19-09FEB11-11/13

8 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Engine Oil Pressure Input Voltage.
3. Perform [Wiggle Test](#).

Does voltage ever go above 2.4 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,00004BB -19-09FEB11-12/13

9 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine oil pressure sensor connector B5101.
3. Perform [Terminal Test](#) on sensor and B5101 connector.

Were any problems found?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RE42287,00004BB -19-09FEB11-13/13

10 Terminal Test

1. Disconnect ECU connectors A5501 and A5502.
2. Perform Terminal Test on A5501 connector female socket 27 and A5502 female sockets 7 and 42. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004BB -19-09FEB11-14/13

**000100.03 — Engine Oil Pressure Signal Out
of Range High**

*The engine oil pressure signal exceeds the sensor
high voltage specification.*

Continued on next page

RE42287,00004BC -19-09FEB11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

005126.03

000100.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The engine oil pressure sensor signal voltage to the ECU corresponds to a pressure higher than what is physically possible for the engine oil pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for engine oil pressure sensor.

Additional references:

For sensor location see [B5101 — Engine Oil Pressure Sensor](#) in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

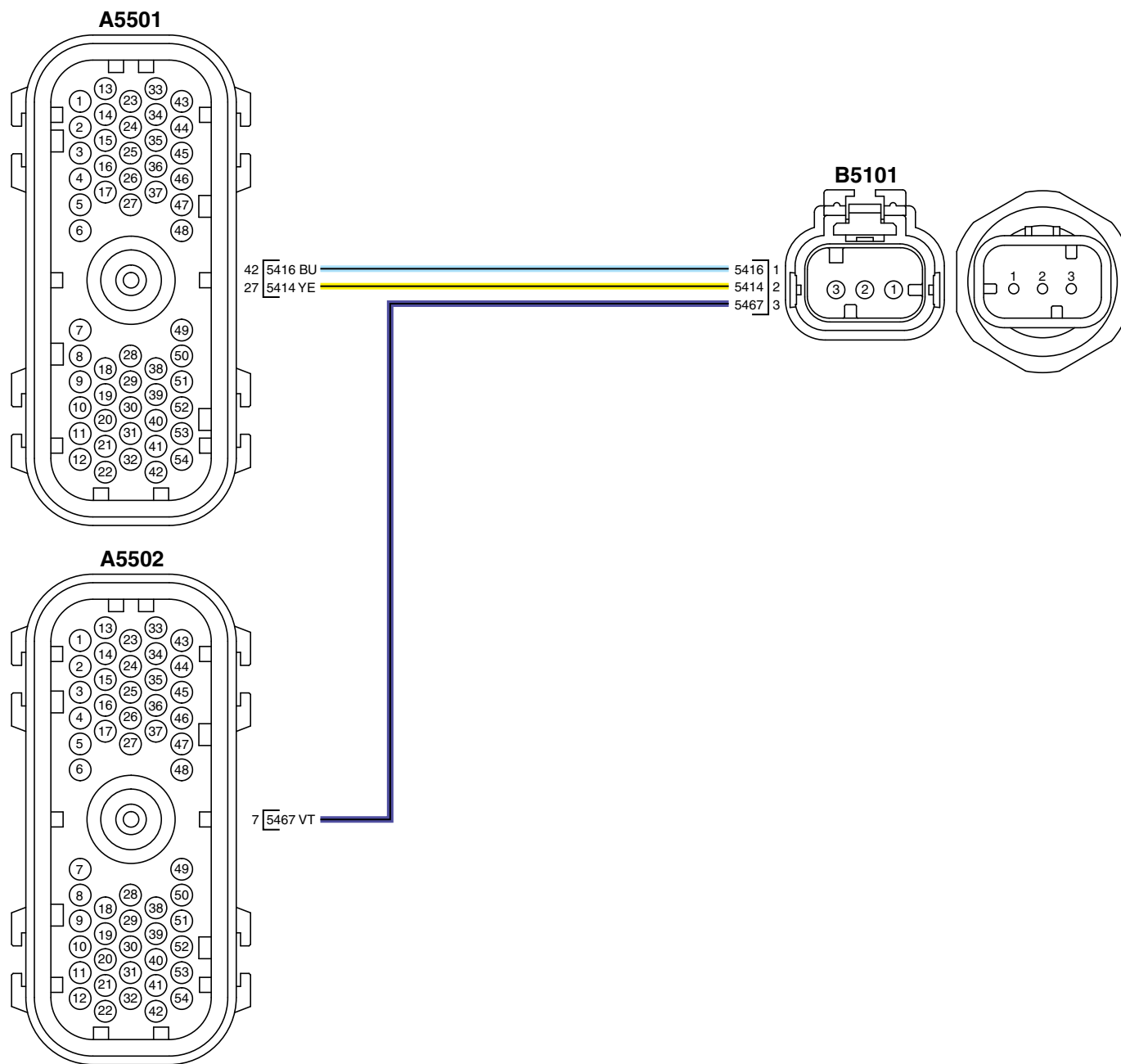
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Engine Oil Pressure Sensor Wiring Diagram

A5501—42—Supply

A5501—27—Return

A5502—7—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RG16726 —UN—22DEC09

Continued on next page

RE42287,00004BC -19-09FEB11-3/15

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 – Digital Multimeter

RE42287,00004BC -19-09FEB11-4/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005126.03 active or stored?

YES: GO TO 005126.03
—Sensor Supply #8
Voltage Out of Range High
procedure.
NO: GO TO 2

RE42287,00004BC -19-09FEB11-5/15

2 Code Check

Is DTC 000100.03 active?

YES: GO TO 3

NO: GO TO 10

RE42287,00004BC -19-09FEB11-6/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine oil pressure sensor connector B5101.
3. Perform Terminal Test on sensor and B5101 connector.

Were any problems found?

YES: Repair problem.
 Perform Verification
Procedure.
NO: GO TO 4

RE42287,00004BC -19-09FEB11-7/15

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5101 connector female socket 3 (+).
 - B to B5101 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 8
NO: Voltage greater than
 2.7 V. GO TO Short to
Voltage Procedure.
NO: Voltage less than 2.3
 V. GO TO 5

Continued on next page

RE42287,00004BC -19-09FEB11-8/15

5 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform Verification Procedure.

NO: GO TO 6

RE42287,00004BC -19-09FEB11-9/15

6 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connectors A5501 and A5502.

3. Perform Terminal Test on A5501 connector female sockets 42 and 27, A5502 connector female socket 7. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RE42287,00004BC -19-09FEB11-10/15

7 Continuity Check

1. Measure the resistance between A5501 connector female socket 27 and B5101 connector female socket 2.

2. Measure the resistance between A5502 connector female socket 7 and B5101 connector female socket 3.

Are both resistance measurements less than 5 ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair mispin. Perform Verification Procedure.

RE42287,00004BC -19-09FEB11-11/15

8 Software Check

In Service ADVISOR, monitor Engine Oil Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 9

RE42287,00004BC -19-09FEB11-12/15

9 Reprogram ECU

1. Ignition OFF, Engine OFF.

2. Disconnect Diagnostic Test Box.

3. Reconnect all connectors and components.

4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.

5. Ignition ON, Engine OFF.

6. Refresh codes.

Is DTC 000100.03 active?

YES: Replace ECU. Perform Verification Procedure.

NO: Perform Verification Procedure.

Continued on next page

RE42287,00004BC -19-09FEB11-13/15

Lubrication and Cooling System Diagnostics

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Engine Oil Pressure Input Voltage.
3. Perform Wiggle Test.

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 11

RE42287,00004BC -19-09FEB11-14/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine oil pressure sensor connector B5101.
3. Perform Terminal Test on sensor and B5101 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 12

RE42287,00004BC -19-09FEB11-15/15

12 Terminal Test

1. Disconnect ECU connectors A5501 and A5502.
2. Perform Terminal Test on A5501 connector female sockets 42 and 27, **A5502** connector female socket 7. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004BC -19-09FEB11-16/15

**000100.04 — Engine Oil Pressure Signal Out
of Range Low**

*The engine oil pressure signal is lower than the
sensor low voltage specification.*

Continued on next page

RE42287,00004BD -19-09FEB11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

005126.03

005126.04

000100.03

000100.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The engine oil pressure sensor signal voltage to the ECU corresponds to a pressure lower than what is physically possible for the engine oil pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for engine oil pressure.

Additional References:

For sensor location see [B5101 — Engine Oil Pressure Sensor](#) in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

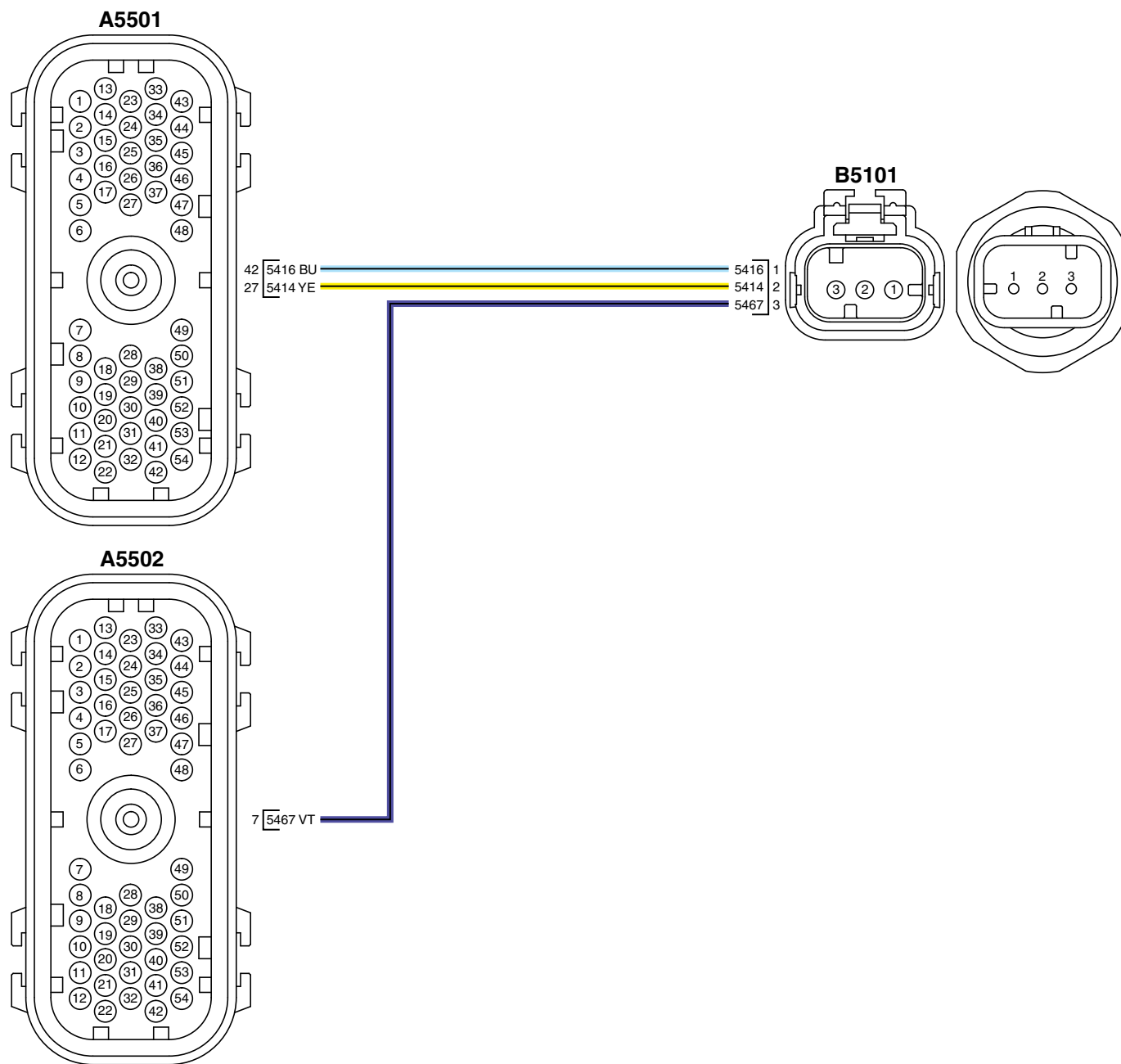
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors,, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Engine Oil Pressure Sensor Wiring Diagram

A5501—42—Supply

A5501—27—Return

A5502—7—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RG16726 —UN—22DEC09

Continued on next page

RE42287,00004BD -19-09FEB11-3/17

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004BD -19-09FEB11-4/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005126.03 stored?

YES: GO TO 005126.03
— Sensor Supply #8
Voltage Out of Range High
procedure.
NO: GO TO 2

RE42287,00004BD -19-09FEB11-5/17

2 Code Check

Is DTC 000100.03 stored?

YES: GO TO 000100.03
— Engine Oil Pressure
Signal Out of Range High
procedure.
NO: GO TO 3

RE42287,00004BD -19-09FEB11-6/17

3 Code Check

Is DTC 000100.04 active?

YES: GO TO 4

NO: GO TO 12

RE42287,00004BD -19-09FEB11-7/17

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine oil pressure sensor connector B5101.
3. Perform Terminal Test on sensor and B5101 connector.

Were any problems found?

YES: Repair problem.
Perform Verification
Procedure.
NO: GO TO 5

Continued on next page

RE42287,00004BD -19-09FEB11-8/17

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5101 connector female socket 1 (+).
 - B to B5101 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 7

NO: GO TO 6

RE42287,00004BD -19-09FEB11-9/17

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

RE42287,00004BD -19-09FEB11-10/17

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5101 connector female socket 3 (+).
 - B to B5101 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 8

NO: GO TO 10

RE42287,00004BD -19-09FEB11-11/17

8 Software Check

In Service ADVISOR monitor Engine Oil Pressure Input Voltage. .

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RE42287,00004BD -19-09FEB11-12/17

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000100.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004BD -19-09FEB11-13/17

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501 and A5502.
3. Perform [Terminal Test](#) on A5501 connector female sockets 42 and 27, **A5502** connector female socket 7. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RE42287,00004BD -19-09FEB11-14/17

11 Continuity Check

Measure resistance between A5502 connector female socket 7 and B5101 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mispin in harness. Perform [Verification Procedure](#).

RE42287,00004BD -19-09FEB11-15/17

12 Wiggle Test

1. In Service ADVISOR monitor Engine Oil Pressure Input Voltage. .
2. Perform [Wiggle Test](#).

Does voltage ever go below 0.2 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 13](#)

RE42287,00004BD -19-09FEB11-16/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine oil pressure sensor connector B5101.
3. Perform [Terminal Test](#) on sensor and B5101 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 14](#)

RE42287,00004BD -19-09FEB11-17/17

14 Terminal Test

1. Disconnect ECU connectors A5501 and A5502.
2. Perform Terminal Test on A5501 connector female sockets 42 and 27, **A5502** connector female socket 7. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004BD -19-09FEB11-18/17

000100.18 — Engine Oil Pressure Signal Moderately Low

The engine oil pressure signal is moderately lower than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The engine oil pressure signal is moderately lower than expected at the operating conditions that set the DTC.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure, see [000100.01 – Engine Oil Pressure Signal Extremely Low](#).

RE42287,00004BE -19-09FEB11-1/1

**000101.00 — Engine Crankcase Pressure
Extremely High**

The crankcase pressure signal is extremely high.

Continued on next page

RE42287,00004BF -19-02AUG11-1/14

Diagnostic Procedure

Troubleshooting Sequence:

005125.03

000101.03

000101.00

When DTC is Displayed:

When the ignition is on, engine is running, and the fault is active.

Related Information:

The crankcase pressure sensor signal voltage to the ECU corresponds to a pressure higher than a threshold defined in the ECU.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

Additional references:

For sensor location see B5105 — Crankcase Pressure Sensor in Section 03, Group 140.

For more information on the Exhaust Condition Check, see Exhaust Condition Check in Section 04, Group 155

For more pressure sensor information, see Measuring Pressure in Section 03, Group 140.

For more information on the Crankcase Pressure (Blow-By) Test, see Crankcase Pressure (Blow-By) Test in Section 04, Group 155.

For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

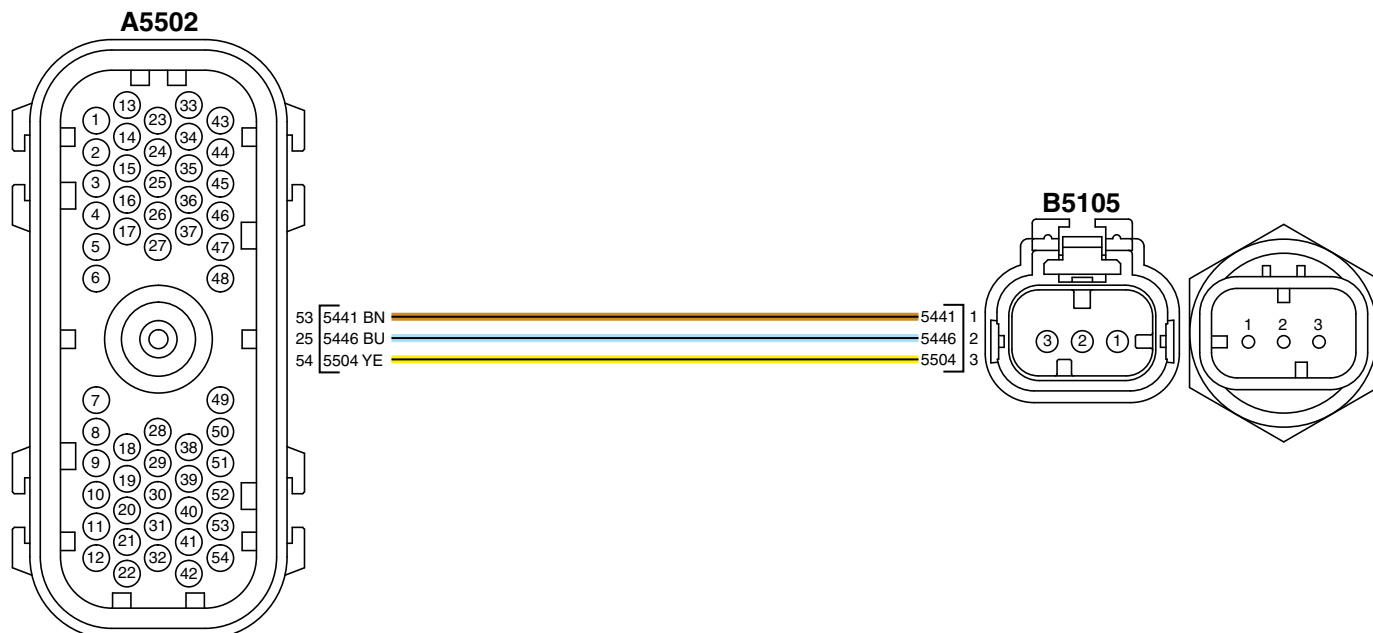
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 3

located in Section 06, Group 210.



Engine Crankcase Pressure Sensor Wiring Diagram

A5502—53—Supply

A5502—25—Return

A5502—54—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

RE42287,00004BF -19-02AUG11-2/14

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004BF -19-02AUG11-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005125.03 active or stored?

YES: GO TO 005125.03
— Sensor Supply #7
Voltage Out of Range High
procedure.

NO: GO TO 2

RE42287,00004BF -19-02AUG11-4/14

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankcase pressure sensor connector B5105.
3. Perform Terminal Test on sensor and B5105 connector.

Were any problems found?

YES: Repair problem.
Perform Verification
Procedure.

NO: GO TO 3

RE42287,00004BF -19-02AUG11-5/14

3 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5105 connector female socket 1 (+).
 - B to B5105 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 5

NO: GO TO 4

Continued on next page

RE42287,00004BF -19-02AUG11-6/14

4 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform [Verification Procedure](#).

NO: Repair open or high resistance in supply wire. Perform [Verification Procedure](#).

RE42287,00004BF -19-02AUG11-7/14

5 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5105 connector female socket 3 (+).
 - B to B5105 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Is voltage greater than 2.7 V?

YES: GO TO [Short to Voltage Procedure](#).

NO: [GO TO 6](#)

RE42287,00004BF -19-02AUG11-8/14

6 Software Check

In Service ADVISOR, monitor Engine Crankcase Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: [GO TO 8](#)

NO: [GO TO 7](#)

RE42287,00004BF -19-02AUG11-9/14

7 Reprogram ECU

1. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
2. Connect Diagnostic Test Box :
 - A to B5105 connector female socket 3 (+).
 - B to B5105 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. In Service ADVISOR, monitor Engine Crankcase Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform [Exhaust Condition Check](#).

NO: Replace ECU. Perform [Exhaust Condition Check](#).

Continued on next page

RE42287,00004BF -19-02AUG11-10/14

Lubrication and Cooling System Diagnostics

8 Line Check

1. Ignition OFF, Engine OFF

2. Inspect all crankcase ventilation pipes and hoses for kinks, restrictions, and blockages.

Any problems found?

YES: Repair problem.
Perform [Exhaust Condition Check](#).

NO: [GO TO 9](#)

RE42287,00004BF -19-02AUG11-11/14

9 Replace Filter Check

1. Replace engine crankcase filter.

2. Reconnect all hoses, pipes, sensors, and electrical connectors.

3. Ignition ON, engine running.

4. Run engine at high idle for 10 minutes.

5. Refresh codes.

Is DTC 000101.16 or 000101.00 active?

YES: [GO TO 10](#)

NO: Perform [Exhaust Condition Check](#).

RE42287,00004BF -19-02AUG11-12/14

10 Crankcase Pressure Check

Perform [Crankcase Pressure \(Blow-By\) Test](#).

Does Engine pass Crankcase Pressure (Blow-By) Test?

YES: [GO TO 11](#)

NO: Repair problem.
Perform [Exhaust Condition Check](#).

RE42287,00004BF -19-02AUG11-13/14

11 Sensor Check

1. Ignition OFF, Engine OFF

2. Reconnect all hoses, pipes, sensors, and electrical connectors.

3. Replace engine crankcase pressure sensor.

4. Ignition ON, engine running.

5. Run engine at high idle for 10 minutes.

6. Refresh codes.

Is DTC 000101.16 or 000101.00 active?

YES: Contact DTAC for support.

NO: Perform [Exhaust Condition Check](#).

RE42287,00004BF -19-02AUG11-14/14

**000101.03 — Engine Crankcase Pressure
Signal Out of Range High**

*The crankcase pressure signal exceeds the sensor's
high voltage specification.*

Continued on next page

RE42287,00004C0 -19-02AUG11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

005125.03

000101.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The crankcase pressure sensor signal voltage to the ECU corresponds to a pressure higher than what is physically possible for the crankcase pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for crankcase pressure.

Additional references:

For sensor location see B5105 — Crankcase Pressure Sensor in Section 03, Group 140.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

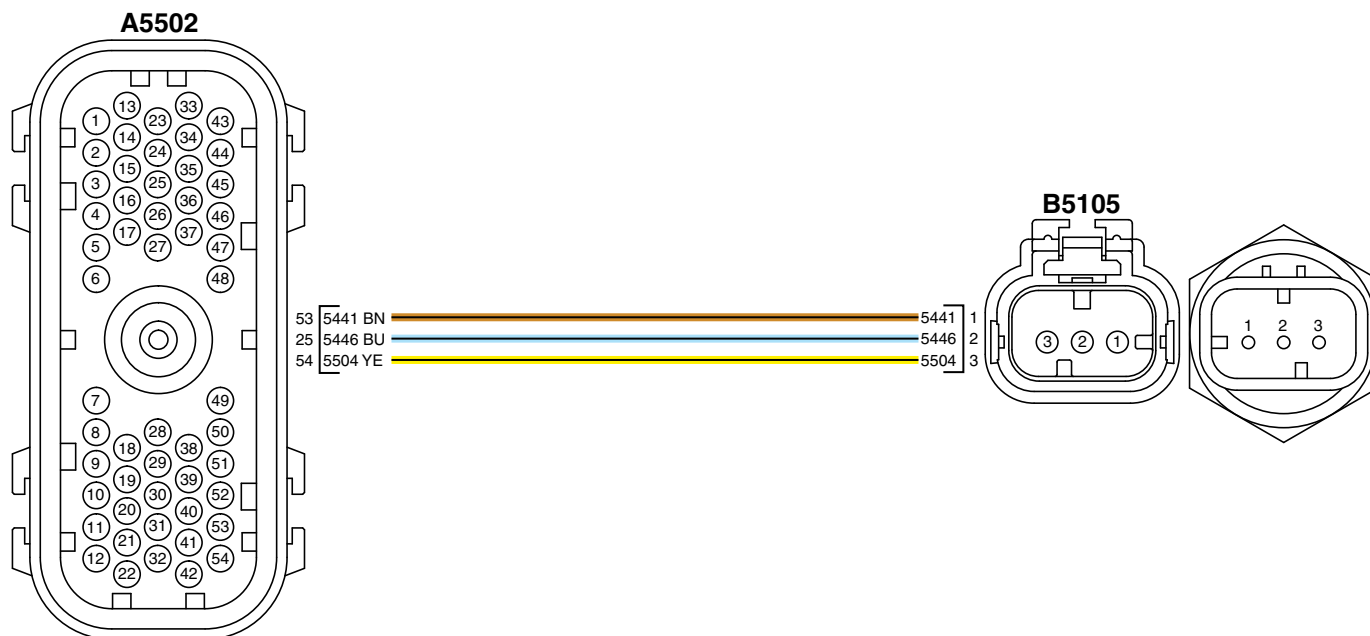
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Engine Crankcase Pressure Sensor Wiring Diagram

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RE42287,00004C0 -19-02AUG11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004C0 -19-02AUG11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005125.03 active or stored?

YES: GO TO 005125.03 — Sensor Supply #7 Voltage Out of Range High procedure.

NO: GO TO 2

RE42287,00004C0 -19-02AUG11-4/15

2 Code Check

Is DTC 000101.03 active?

YES: GO TO 3

NO: GO TO 10

RE42287,00004C0 -19-02AUG11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankcase pressure sensor connector B5105.
3. Perform Terminal Test on sensor and B5105 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 4

Continued on next page

RE42287,00004C0 -19-02AUG11-6/15

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5105 connector female socket 3 (+).
 - B to B5105 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 8

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 5

RE42287,00004C0 -19-02AUG11-7/15

5 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform Verification Procedure.

NO: GO TO 6

RE42287,00004C0 -19-02AUG11-8/15

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 25, 53, and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RE42287,00004C0 -19-02AUG11-9/15

7 Continuity Check

1. Measure the resistance between A5502 connector female socket 25 and B5105 connector female socket 2.
2. Measure the resistance between A5502 connector female socket 54 and B5105 connector female socket 3.

Are both resistance measurements less than 5 ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,00004C0 -19-02AUG11-10/15

8 Software Check

In Service ADVISOR, monitor Engine Crankcase Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace crankcase pressure sensor. Perform Exhaust Condition Check.

NO: GO TO 9

Continued on next page

RE42287,00004C0 -19-02AUG11-11/15

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000101.03 active?

YES: Replace ECU.
Perform Exhaust Condition Check.

NO: Perform Exhaust Condition Check.

RE42287,00004C0 -19-02AUG11-12/15

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Engine Crankcase Pressure Input Voltage.
3. Perform Wiggle Test.

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 11

RE42287,00004C0 -19-02AUG11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankcase pressure sensor connector B5105.
3. Perform Terminal Test on sensor and B5105 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 12

RE42287,00004C0 -19-02AUG11-14/15

12 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 25, 53, and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004C0 -19-02AUG11-15/15

**000101.04 — Engine Crankcase Pressure
Signal Out of Range Low**

*The crankcase pressure signal is lower than the
sensor's low voltage specification.*

Continued on next page

RE42287,00004C1 -19-02AUG11-1/17

Diagnostic Procedure**Troubleshooting Sequence:****005125.03****005125.04****000101.03****000101.04****When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The crankcase pressure sensor signal voltage to the ECU corresponds to a pressure lower than what is physically possible for the crankcase pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

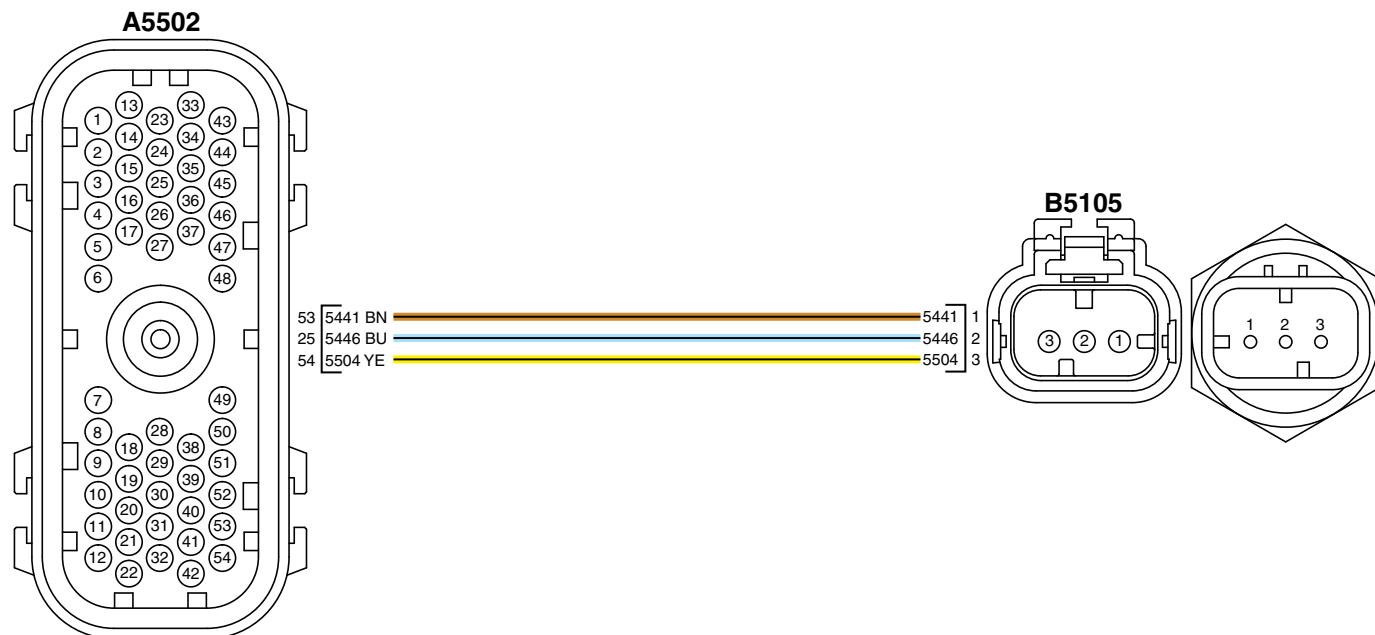
The ECU uses a default value for crankcase pressure.

Additional References:For sensor location see [B5105 — Crankcase Pressure Sensor](#) in Section 03, Group 140.For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.*NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.*

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.

*Engine Crankcase Pressure Sensor Wiring Diagram***A5502—53—Supply****A5502—25—Return****A5502—54—Signal****IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.**

Continued on next page

RE42287,00004C1 -19-02AUG11-2/17

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004C1 -19-02AUG11-3/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005125.03 stored?

YES: GO TO 005125.03 — Sensor Supply #7 Voltage Out of Range High procedure.

NO: GO TO 2

RE42287,00004C1 -19-02AUG11-4/17

2 Code Check

Is DTC 000101.03 stored?

YES: GO TO 000101.03 — Engine Crankcase Pressure Signal Out of Range High procedure.

NO: GO TO 3

RE42287,00004C1 -19-02AUG11-5/17

3 Code Check

Is DTC 000101.04 active?

YES: GO TO 4

NO: GO TO 12

RE42287,00004C1 -19-02AUG11-6/17

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankcase pressure sensor connector B5105.
3. Perform Terminal Test on sensor and B5105 connector.

Were any problems found?

YES: Repair problem. Perform Exhaust Condition Check.

NO: GO TO 5

Continued on next page

RE42287,00004C1 -19-02AUG11-7/17

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5105 connector female socket 1 (+).
 - B to B5105 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 7

NO: GO TO 6

RE42287,00004C1 -19-02AUG11-8/17

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Exhaust Condition Check.

NO: Repair open or high resistance in supply wire. Perform Exhaust Condition Check.

RE42287,00004C1 -19-02AUG11-9/17

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5105 connector female socket 3 (+).
 - B to B5105 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 8

NO: GO TO 10

RE42287,00004C1 -19-02AUG11-10/17

8 Software Check

In Service ADVISOR, monitor Engine Crankcase Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace crankcase pressure sensor. Perform Exhaust Condition Check.

NO: GO TO 9

Continued on next page

RE42287,00004C1 -19-02AUG11-11/17

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000101.04 active?

YES: Replace ECU.
Perform [Exhaust Condition Check](#).

NO: Perform [Exhaust Condition Check](#).

RE42287,00004C1 -19-02AUG11-12/17

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform [Terminal Test](#) on A5502 connector female sockets 25, 53, and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Exhaust Condition Check](#).

NO: [GO TO 11](#)

RE42287,00004C1 -19-02AUG11-13/17

11 Continuity Check

Measure resistance between A5502 connector female socket 54 and B5105 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Exhaust Condition Check](#).

NO: Repair open or mis-pin in harness. Perform [Exhaust Condition Check](#).

RE42287,00004C1 -19-02AUG11-14/17

12 Wiggle Test

1. In Service ADVISOR, monitor Engine Crankcase Pressure Input Voltage.
2. Perform [Wiggle Test](#).

Does voltage ever go below 0.2 V?

YES: Repair harness problem. Perform [Exhaust Condition Check](#).

NO: [GO TO 13](#)

RE42287,00004C1 -19-02AUG11-15/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect crankcase pressure sensor connector B5105.
3. Perform [Terminal Test](#) on sensor and B5105 connector.

Were any problems found?

YES: Repair problem.
Perform [Exhaust Condition Check](#).

NO: [GO TO 14](#)

Continued on next page

RE42287,00004C1 -19-02AUG11-16/17

14 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 25, 53, and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Exhaust Condition Check.

NO: GO TO Problem Not Found Procedure.

RE42287,00004C1 -19-02AUG11-17/17

000101.16 — Engine Crankcase Pressure Moderately High

The ECU has detected that the engine crankcase pressure is moderately high.

Diagnostic Procedure

When DTC is Displayed:

When the ignition is on, engine is running, and the fault is active.

Related Information:

This code is set when the ECU detects the engine crankcase pressure is moderately high. This fault is intended to identify a plugged crankcase ventilation filter or a failure of the open crankcase ventilation system (OCV system).

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see 000101.00 — Engine Crankcase Pressure Extremely High

RE42287,00004C2 -19-09FEB11-1/1

**000110.00 — Engine Coolant Temperature
Signal Extremely High**

*The engine coolant temperature signal is much
higher than expected*

Continued on next page

RE42287,00004C9 -19-27JUL11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

000110.03
001639.01
001639.02
001639.18
000647.05
000647.07
000109.17
000109.18
000109.01
000110.00

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information:

The engine coolant temperature sensor signal is much higher than expected at the operating conditions that set the DTC.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional References:

For sensor location see B5208 — Engine Coolant Temperature Sensor in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

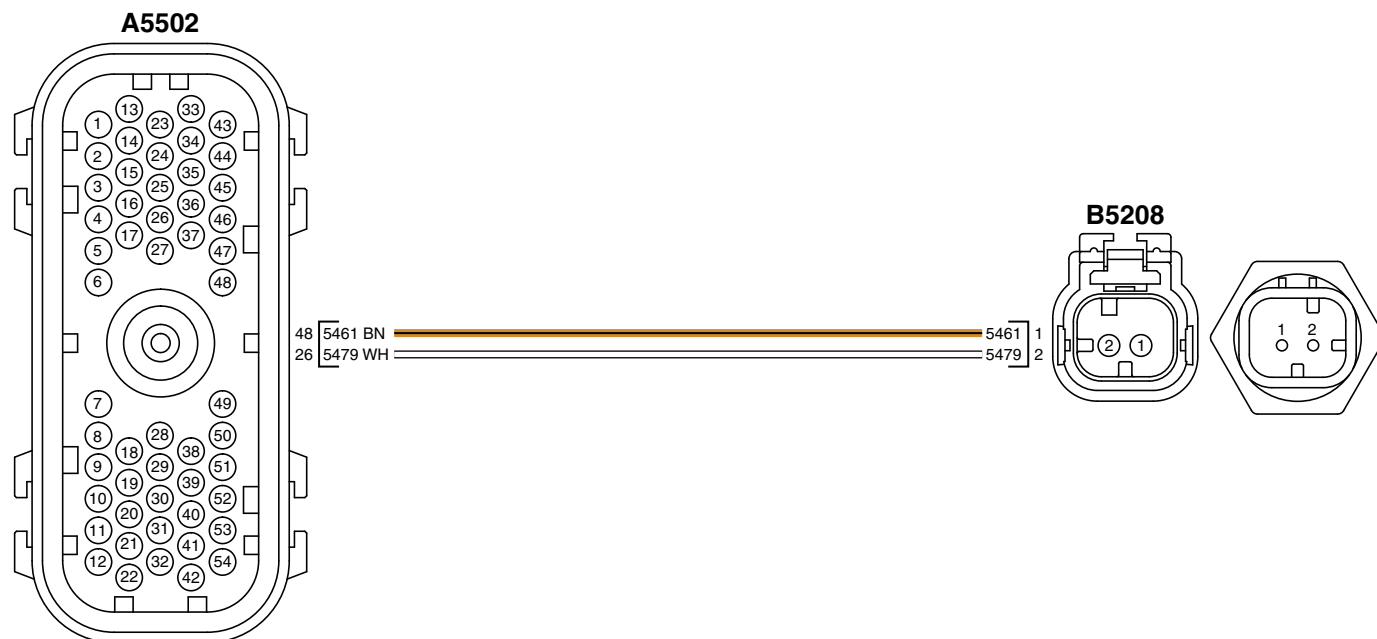
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Engine Coolant Temperature Sensor Wiring Diagram

A5502—48—Signal

A5502—26—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- JT07253 — Infrared Temperature Gun
- JT05719 — Hand Held Digital Tachometer

Continued on next page

RE42287,00004C9 -19-27JUL11-3/17

RG16722 —UN—22DEC09

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Perform Preliminary Checks for:

- Leaks around hoses and clamps
- Indication of spraying
- Leaks around water pump housing
- Blockage of air flow through radiator
- Loose belt
- Fan damage
- Improper fan orientation
- Damaged shrouds and shutters
- Low coolant level

Are any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,00004C9 -19-27JUL11-4/17

2 Verify Sensor Operation

1. Ignition ON, engine running.
2. Operate engine at fast idle for 15 minutes.
3. Ignition OFF, Engine OFF.
4. Let engine cool for 10 minutes.
5. Ignition ON, Engine OFF.
6. Monitor Engine Coolant Temperature in Service ADVISOR.
7. Measure temperature of thermostat housing with [JT07253](#) infrared temperature gun.
8. Compare the readings.

Were the readings within 5 °C (9 °F) of each other?

YES: [GO TO 8](#)

NO: [GO TO 3](#)

RE42287,00004C9 -19-27JUL11-5/17

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine coolant temperature sensor connector B5208.
3. Perform Terminal Test on sensor and B5208 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

Continued on next page

RE42287,00004C9 -19-27JUL11-6/17

4 Circuit Check

1. Connect Diagnostic Test Box:
 - A to B5208 connector female socket 1 (+)
 - B to B5208 connector female socket 2 (-)
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 5

NO: GO TO Short to Voltage Procedure.

RE42287,00004C9 -19-27JUL11-7/17

5 Software Check

In Service ADVISOR, monitor Engine Coolant Temperature Input Voltage.

YES: GO TO 7

Is voltage between 2.3 and 2.7 V?

NO: GO TO 6

RE42287,00004C9 -19-27JUL11-8/17

6 Reprogram ECU

1. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.

2. Ignition ON, Engine OFF.

3. With Diagnostic Test Box still connected and S1 in position 7, in Service ADVISOR, monitor Engine Coolant Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform Verification Procedure.

NO: Replace ECU. Perform Verification Procedure.

RE42287,00004C9 -19-27JUL11-9/17

7 Replace Sensor

1. Replace Engine Coolant Temperature Sensor.

2. If possible, run engine under operating conditions that set code.
3. Refresh codes.

Did DTC 000110.00 reappear?

YES: GO TO 8

NO: Perform Verification Procedure.

RE42287,00004C9 -19-27JUL11-10/17

8 Cooling System Test

Perform Cooling System Test in Section 04, Group 155.

YES: GO TO 9

Did test pass?

NO: Repair problem. Perform Verification Procedure.

RE42287,00004C9 -19-27JUL11-11/17

9 Thermostat Test

See Thermostat — Testing in Section 02, Group 070.

YES: GO TO 10

Did test pass?

NO: Replace thermostat. Perform Verification Procedure.

Continued on next page

RE42287,00004C9 -19-27JUL11-12/17

10 Check Coolant Pump

1. Ignition OFF, Engine OFF.
2. Allow engine to cool and perform Coolant Pump Assembly — Removal in Section 02, Group 070.
3. Inspect coolant pump for damage. See Coolant Pump — Visual Inspection in Section 02, Group 070.

Were any problems found?

YES: Replace coolant pump. Perform Verification Procedure.

NO: GO TO 11

RE42287,00004C9 -19-27JUL11-13/17

11 Check for Plugged Radiator

Inspect radiator and hoses for coating or plugging.

Was evidence of coating or plugging found?

YES: Flush cooling system and add proper coolant. Perform Verification Procedure.

NO: GO TO 12

RE42287,00004C9 -19-27JUL11-14/17

12 Check Fan

Is the fan driven off of the engine?

YES: GO TO 13

NO: GO TO 14

RE42287,00004C9 -19-27JUL11-15/17

13 Check Fan Speed

1. Disconnect variable speed fan connector Y5005, if applicable.
2. Ignition ON, engine running for 2 minutes.
3. Measure fan speed with JT05719 Hand Held Digital Tachometer.
4. Measure fan pulley speed with JT05719 Hand Held Digital Tachometer.
5. Ignition OFF, Engine OFF.
6. Reconnect fan connector.

Did fan speed stay within 90% of the pulley speed?

YES: GO TO Problem Not Found procedure.

NO: Replace fan control valve. Perform Verification Procedure.

RE42287,00004C9 -19-27JUL11-16/17

14 Check Fan Speed

1. Disconnect variable speed fan connector Y5005.
 2. Ignition ON, Engine running for 2 minutes.
 3. Measure fan speed with JT05719 Hand Held Digital Tachometer.
 4. Ignition OFF, Engine OFF.
 5. Reconnect fan connector.
- NOTE: Fan speeds for hydraulic fan clutches vary by hydraulic pump and motor.*
6. Compare fan speed to the maximum fan speed specification for the application.
- Is fan speed within specification?

YES: GO TO Problem Not Found procedure.

NO: Contact DTAC.

RE42287,00004C9 -19-27JUL11-17/17

**000110.03 — Engine Coolant Temperature
Signal Out of Range High**

*The engine coolant temperature signal exceeds the
sensor high voltage specification.*

Continued on next page

RE42287,00004CA -19-27JUL11-1/12

Diagnostic Procedure

Troubleshooting Sequence: 000110.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The engine coolant temperature sensor signal voltage to the ECU corresponds to a temperature higher than what is physically possible for the engine coolant temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for engine coolant temperature.

Additional References:

For sensor location see [B5208 — Engine Coolant Temperature Sensor](#) in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

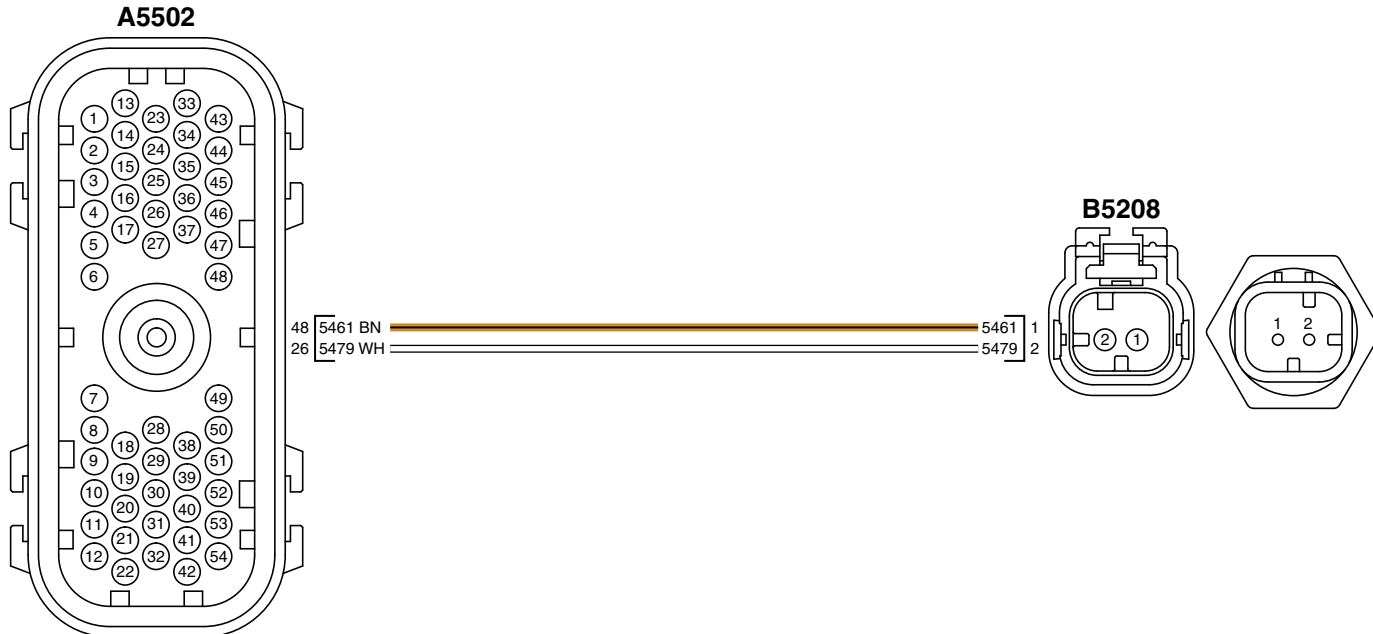
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors,, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Engine Coolant Temperature Sensor Wiring Diagram

A5502—48—Signal

A5502—26—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG16722 —UN—22DEC09

Continued on next page

RE42287,00004CA -19-27JUL11-2/12

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004CA -19-27JUL11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 000110.03 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

RE42287,00004CA -19-27JUL11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine coolant temperature sensor connector B5208.
3. Perform [Terminal Test](#) on sensor and B5208 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,00004CA -19-27JUL11-5/12

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5208 connector female socket 1 (+).
 - B to B5208 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 4](#)

NO: Voltage greater than 2.7 V. [GO TO Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 6](#)

RE42287,00004CA -19-27JUL11-6/12

4 Software Check

In Service ADVISOR, monitor Engine Coolant Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004CA -19-27JUL11-7/12

5 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000110.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004CA -19-27JUL11-8/12

6 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing [Wiggle Test](#).

Does voltage now remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform [Verification Procedure](#).

NO: Repair open in signal wire. Perform [Verification Procedure](#).

RE42287,00004CA -19-27JUL11-9/12

7 Wiggle Test

1. In Service ADVISOR, monitor Engine Coolant Temperature Input Voltage.
2. Perform [Wiggle Test](#).

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004CA -19-27JUL11-10/12

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine coolant temperature sensor connector B5208.
3. Perform [Terminal Test](#) on sensor and connector B5208.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,00004CA -19-27JUL11-11/12

9 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform [Terminal Test](#) on A5502 connector female sockets 26 and 48. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RE42287,00004CA -19-27JUL11-12/12

**000110.04 — Engine Coolant Temperature
Signal Out of Range Low**

*The engine coolant temperature signal is lower than
the sensor low voltage specification.*

Continued on next page

RE42287,00004CB -19-27JUL11-1/15

Diagnostic Procedure

Troubleshooting Sequence: 000110.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The engine coolant temperature sensor signal voltage to the ECU corresponds to a temperature lower than what is physically possible for the engine coolant temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for engine coolant temperature.

Additional References:

For sensor location see [B5208 — Engine Coolant Temperature Sensor](#) in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

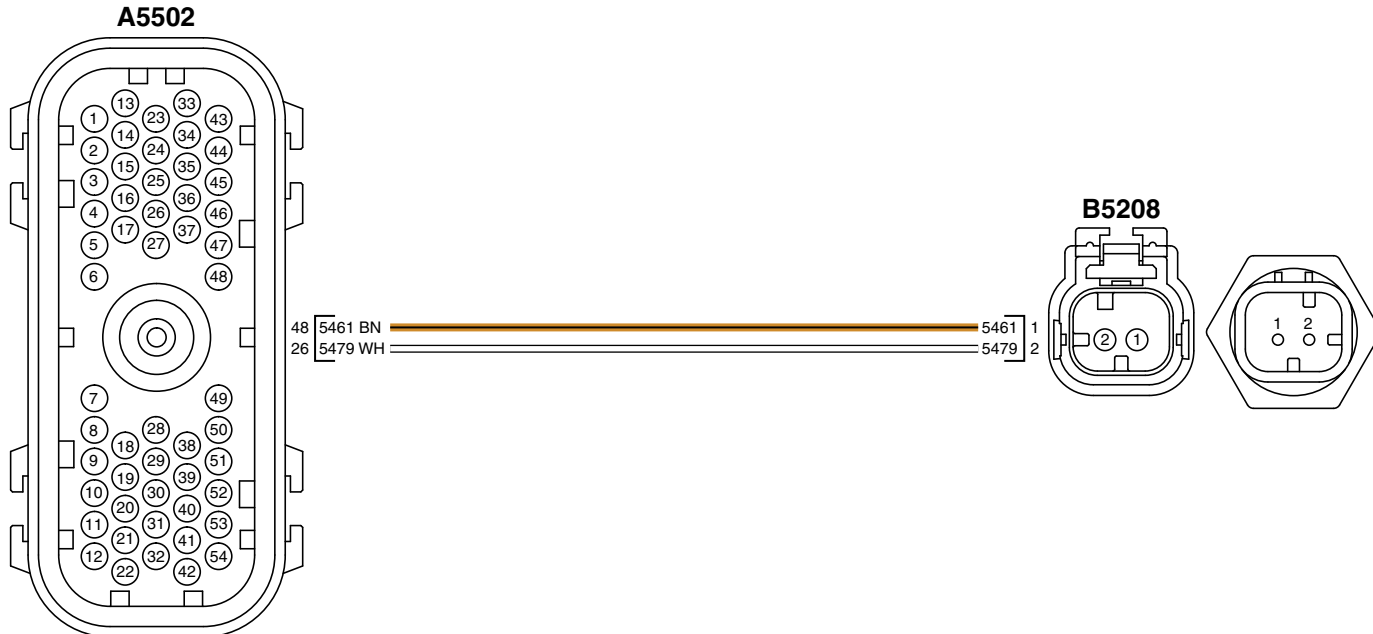
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Engine Coolant Temperature Sensor Wiring Diagram

A5502—48—Signal

A5502—26—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG16722 —UN—22DEC09

Continued on next page

RE42287,00004CB -19-27JUL11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004CB -19-27JUL11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000110.03 a stored code?

YES: GO TO 000110.03
— Engine Coolant
Temperature Signal Out
of Range High.

NO: GO TO 2

RE42287,00004CB -19-27JUL11-4/15

2 Code Check

Is DTC 000110.04 active?

YES: GO TO 3

NO: GO TO 10

RE42287,00004CB -19-27JUL11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine coolant temperature sensor connector B5208.
3. Perform Terminal Test on sensor and B5208 connector.

Were any problems found?

YES: Repair problem.
Perform Verification
Procedure.

NO: GO TO 4

RE42287,00004CB -19-27JUL11-6/15

4 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5208 connector female socket 1 (+).
 - B to B5208 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 5

NO: GO TO 7

Continued on next page

RE42287,00004CB -19-27JUL11-7/15

5 Software Check

In Service ADVISOR, monitor Engine Coolant Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,00004CB -19-27JUL11-8/15

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000110.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,00004CB -19-27JUL11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502 .
3. Perform [Terminal Test](#) on A5502 connector female sockets 26 and 48. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,00004CB -19-27JUL11-10/15

8 Harness Check

NOTE: Many new error codes appear in the next step. Disregard all DTCs except 000110.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 000110.03 active?

YES: [GO TO 9](#)

NO: Replace ECU.
Perform [Verification Procedure](#).

RE42287,00004CB -19-27JUL11-11/15

9 Continuity Check

Measure resistance between A5502 connector female socket 48 and B5208 connector female socket 1.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mis-pin in harness. Perform [Verification Procedure](#).

Continued on next page

RE42287,00004CB -19-27JUL11-12/15

Lubrication and Cooling System Diagnostics

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISER, monitor Engine Coolant Temperature Input Voltage.
3. Perform Wiggle Test.

Does voltage ever go below 0.2 V?

YES: Repair short to ground on signal wire. Perform Verification Procedure.

NO: GO TO 11

RE42287,00004CB -19-27JUL11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine coolant temperature sensor connector B5208 .
3. Perform Terminal Test on sensor and B5208 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 12

RE42287,00004CB -19-27JUL11-14/15

12 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 26 and 48. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,00004CB -19-27JUL11-15/15

000110.15 — Engine Coolant Temperature Signal Slightly High

The engine coolant temperature signal is slightly higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The engine coolant temperature signal is slightly higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see [000110.00 — Engine Coolant Temperature Signal Extremely High](#) in Section 04 Group 163.

RE42287,00004CC -19-09FEB11-1/1

000110.16 — Engine Coolant Temperature Signal Moderately High

The engine coolant temperature signal is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The engine coolant temperature signal is moderately higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see [000110.00 – Engine Coolant Temperature Signal Extremely High](#).

RE42287,00004CD -19-09FEB11-1/1

000110.17 — Engine Coolant Temperature Signal Slightly Low

The engine coolant temperature signal is slightly lower than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The engine coolant temperature signal is slightly lower than expected at the operating conditions that set the DTC.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see [Engine Coolant Temperature Below Normal](#) in Section 04 Group 150.

RE42287,00004CE -19-09FEB11-1/1

**000111.01 — Engine Coolant Level
Alarm Switch Activated at High Coolant
Temperature**

*The ECU detects a low coolant level at high
coolant temperature.*

Continued on next page

RE42287,00004CF -19-01AUG11-1/10

Diagnostic Procedure

Troubleshooting Sequence: 000111.01

When DTC is Displayed:

When the engine coolant temperature is above 95 °C (203 °F) and the ECU detects engine coolant level is below the alarm switch level.

Related Information:

The engine coolant level alarm switch is closed when engine coolant level is above the alarm level.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

Additional References:

For more sensor information, see [S5001 – Engine Coolant Level Alarm Switch](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

NOTE: This procedure is only for a John Deere OEM surge tank and level switches. At low coolant level, the John Deere level switches go to the open position. Non John Deere switches are configurable during ECU programming by using the OEM trim page.

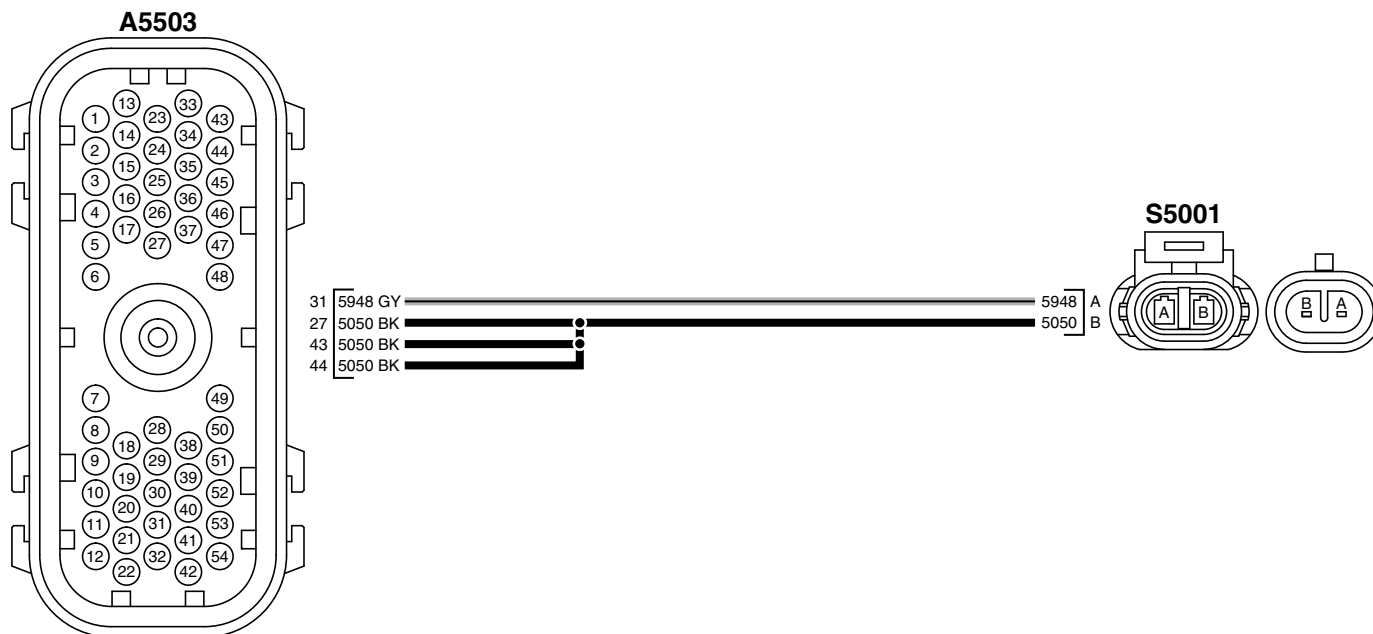
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors,, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 9](#)

located in Section 06, Group 210.



A5503—31—Signal

A5503—27—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

IMPORTANT: If application is not using a John Deere engine coolant surge tank and sensors, probe carefully since correct Flex Probes cannot be specified.

Continued on next page

RE42287,00004CF -19-01AUG11-2/10

Flex probes:

Sensor

- JDG10458 — Female — Blue/Green

- JDG10459 — Male — Blue/Green

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

RE42287,00004CF -19-01AUG11-3/10

1 Verify Problem

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Check engine coolant surge tank for correct coolant fill level.

Is engine coolant level within the normal range?

YES: [GO TO 2](#)

NO: GO TO [Cooling System Test](#) in Section 4, Group 155.

RE42287,00004CF -19-01AUG11-4/10

2 Switch Status Check

1. Ignition ON, Engine OFF.

2. In Service ADVISOR, monitor Engine Coolant Level Alarm Switch Status.

Is Engine Coolant Level Alarm Switch Status Low?

YES: [GO TO 3](#)

NO: [GO TO 7](#)

RE42287,00004CF -19-01AUG11-5/10

3 Verify Trim Settings

Verify that ECU trim page has been set up correctly for the John Deere OEM surge tank and level switches.

Are the trim settings correct?

YES: [GO TO 4](#)

NO: Reprogram ECU with correct trim settings. Perform [Verification Procedure](#).

RE42287,00004CF -19-01AUG11-6/10

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect Engine Coolant Level Alarm Switch connector S5001.
3. Perform [Terminal Test](#) on switch and S5001 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004CF -19-01AUG11-7/10

5 Switch Check

1. Connect Diagnostic Test Box:
 - A to switch connector female socket A(+).
 - B to switch connector female socket B(-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. In Service ADVISOR, monitor Unswitched Battery Voltage.

Does multimeter voltage read within 1 V of Battery Voltage?

YES: Replace switch.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,00004CF -19-01AUG11-8/10

6 Return Circuit Check

Press and hold S2 on Diagnostic Test Box

Does multimeter voltage read within 1 V of Battery Voltage?

YES: Repair open or high resistance in return wire. Perform [Verification Procedure](#).

NO: Repair open or high resistance in signal wire. Perform [Verification Procedure](#).

RE42287,00004CF -19-01AUG11-9/10

7 Intermittent Short to Voltage Check

1. In Service ADVISOR, monitor Engine Coolant Level Alarm Switch Status.
2. Perform [Wiggle Test](#).

Does Engine Coolant Level Alarm Switch Status ever display Low?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RE42287,00004CF -19-01AUG11-10/10

**000111.07 — Engine Coolant Level Switch
Mismatch**

*The Engine Coolant Level Information Switch
indicates a lower coolant level than the Engine
Coolant Level Alarm Switch.*

Continued on next page

RE42287,00004D0 -19-27JUL11-1/19

Diagnostic Procedure**Troubleshooting Sequence:**
000111.07**When DTC is Displayed:**

When the ignition is on and the ECU detects a faulty engine coolant level indication from the two engine coolant level switches.

Related Information:

Both engine coolant level switches are closed when engine coolant levels are normal.

The ECU detects a condition that is not physically possible based on the measurement characteristics of the two engine coolant level switches.

NOTE: This procedure is only for a John Deere OEM surge tank and level switches.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For more Engine Coolant Level Alarm Switch information, see [S5001 – Engine Coolant Level Alarm Switch](#) in Section 03, Group 140.

For more Engine Coolant Level Information Switch information, see [S5002 – Engine Coolant Level Information Switch](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

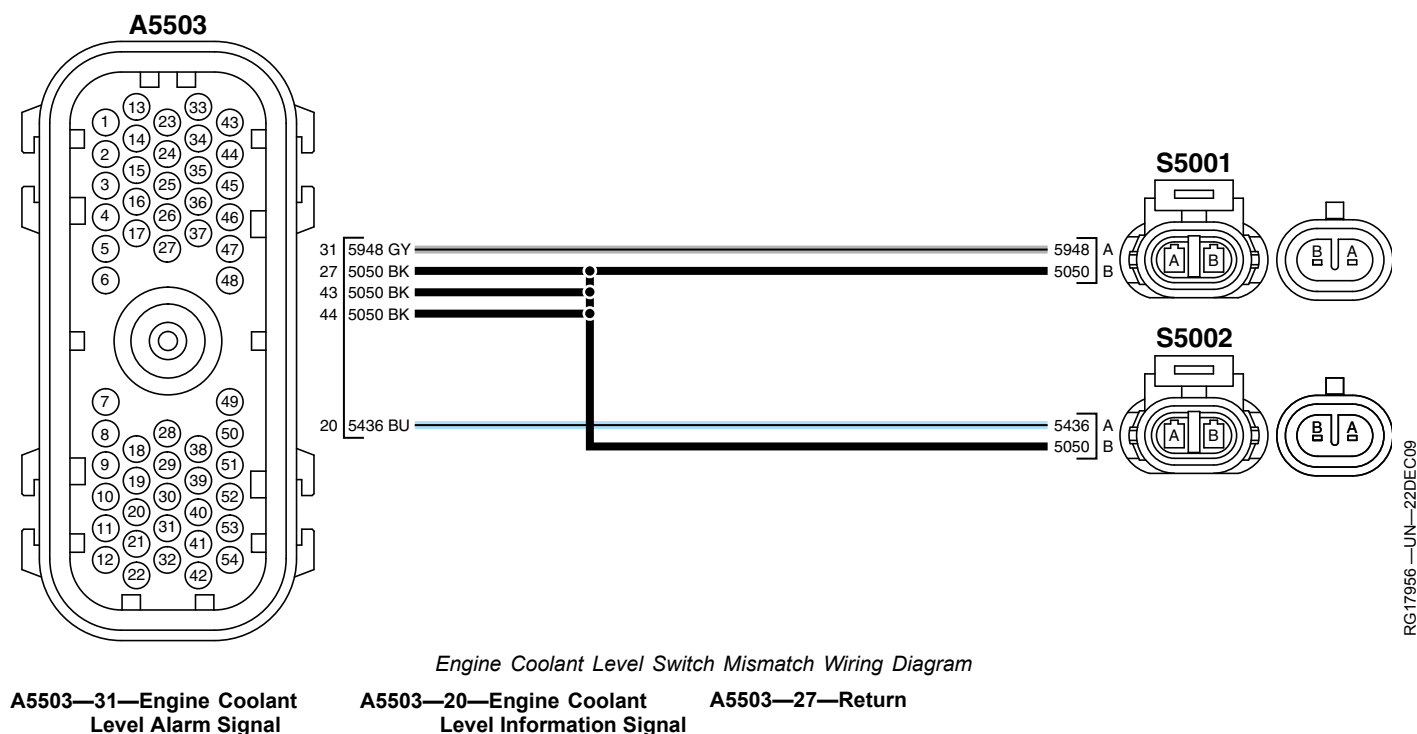
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors,, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 9](#)

located in Section 06, Group 210.



RG17956—UN—22DEC09

Continued on next page

RE42287,00004D0 -19-27JUL11-2/19

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

IMPORTANT: If application is not using a John Deere engine coolant surge tank and sensors, probe carefully since correct Flex Probes cannot be specified.

Flex probes:

Switches

- JDG10458 — Female — Blue/Green

- JDG10459 — Male — Blue/Green

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

RE42287,00004D0 -19-27JUL11-3/19

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF

NOTE: This procedure is only for a John Deere OEM surge tank and level switches.

6. Verify that surge tank and level switches are John Deere OEM parts.

Are surge tank and switches John Deere OEM parts?

YES: [GO TO 2](#)

NO: See your application technical manual for diagnostics of the engine coolant level sensors.

RE42287,00004D0 -19-27JUL11-4/19

2 Level Switch Voltage Check

1. Ignition ON, Engine OFF

2. In Service ADVISOR, monitor Engine Coolant Level Information Switch Input Voltage.

Is Engine Coolant Level Information Switch Input Voltage greater than 3.3 V?

YES: [GO TO 3](#)

NO: [GO TO 4](#)

RE42287,00004D0 -19-27JUL11-5/19

3 Level Switch Status Check

In Service ADVISOR, monitor Engine Coolant Level Information Switch Status.

Is Engine Coolant Level Information Switch Status Normal?

YES: Verify that ECU trim page has been set up correctly for the John Deere OEM surge tank and level switches. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,00004D0 -19-27JUL11-6/19

4 Level Switch Status Check

In Service ADVISOR, monitor Engine Coolant Level Information Switch Status.

YES: GO TO 5

Is Engine Coolant Level Information Switch Status Normal?

NO: Verify that ECU trim page has been set up correctly for the John Deere OEM surge tank and level switches. Perform Verification Procedure.

RE42287,00004D0 -19-27JUL11-7/19

5 Alarm Switch Status Check

1. Ignition OFF, Engine OFF.

2. Fill engine coolant to proper level if low.

3. Ignition ON, Engine OFF

4. In Service ADVISOR, monitor Engine Coolant Level Alarm Switch Status.

YES: GO TO 12

Is Engine Coolant Level Alarm Switch Status Normal?

NO: GO TO 6

RE42287,00004D0 -19-27JUL11-8/19

6 Terminal Test

1. Ignition OFF, Engine OFF

2. Disconnect engine coolant level alarm switch connector S5001.

3. Perform Terminal Test on S5001 connector and switch.

YES: Repair problem. Perform Verification Procedure.

Were any problems found?

NO: GO TO 7

RE42287,00004D0 -19-27JUL11-9/19

7 Alarm Switch Status Check

1. Using flex probes, install jumper wire between S5001 connector female sockets A and B.

2. Ignition ON, Engine OFF.

3. In Service ADVISOR, monitor Engine Coolant Level Alarm Switch Status.

YES: GO TO 8

Is Engine Coolant Level Alarm Switch Status Normal?

NO: GO TO 9

RE42287,00004D0 -19-27JUL11-10/19

8 Switch Check

1. Ignition OFF, Engine OFF

2. Replace Engine Coolant Level Alarm Switch.

3. Ignition ON, Engine OFF.

4. In Service ADVISOR, monitor Engine Coolant Level Alarm Switch Status.

YES: Perform Verification Procedure.

Is Engine Coolant Level Alarm Switch Status Normal?

NO: Replace surge tank. Perform Verification Procedure.

Continued on next page

RE42287,00004D0 -19-27JUL11-11/19

9 Terminal Test

1. Ignition OFF, Engine OFF
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 20, 27, 31, 43, and 47. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 10

RE42287,00004D0 -19-27JUL11-12/19

10 Continuity Check

1. Measure resistance between A5503 connector female socket 31 and S5001 female socket A.
2. Measure resistance between A5503 connector female socket 27 and S5001 female socket B.

Are both resistances less than 5 ohms?

YES: GO TO 11

NO: Repair problem in harness. Perform Verification Procedure.

RE42287,00004D0 -19-27JUL11-13/19

11 ECU Reprogram

1. Ignition OFF, Engine OFF.
2. Reconnect all connectors and components except S5001.
3. Ignition ON, Engine OFF
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition OFF, Engine OFF
6. Using flex probes, install jumper wire between S5001 connector female sockets A and B.
7. In Service ADVISOR, monitor Engine Coolant Level Alarm Switch Status.

Is Engine Coolant Level Alarm Switch Status Normal?

YES: Perform Verification Procedure.

NO: Replace ECU.
Perform Verification Procedure.

RE42287,00004D0 -19-27JUL11-14/19

12 Terminal Test

1. Ignition OFF, Engine OFF
2. Disconnect Engine Coolant Level Alarm Switch connector S5001.
3. Perform Terminal Test on S5001 connector and switch.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 13

RE42287,00004D0 -19-27JUL11-15/19

13 Alarm Switch Status Check

1. Ignition ON, Engine OFF
 2. In Service ADVISOR, monitor Engine Coolant Level Alarm Switch Status.
- Is Engine Coolant Level Alarm Switch Status Low?

YES: GO TO 15

NO: GO TO 14

Continued on next page

RE42287,00004D0 -19-27JUL11-16/19

14 Swap Connector Check

In Service ADVISOR, monitor Engine Coolant Level Information Switch Status.

Is Engine Coolant Level Information Switch Status Low?

YES: Reverse engine coolant level information switch connector and engine coolant level alarm switch connector. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RE42287,00004D0 -19-27JUL11-17/19

15 Terminal Test

1. Ignition OFF, Engine OFF
2. Disconnect engine coolant level information switch connector S5002.
3. Perform [Terminal Test](#) on S5002 connector and switch.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 16](#)

RE42287,00004D0 -19-27JUL11-18/19

16 Level Switch Status Check

1. Ignition ON, Engine OFF
2. In Service ADVISOR, monitor Engine Coolant Level Information Switch Status.

Is Engine Coolant Level Information Switch Status Low?

YES: Replace engine coolant level information switch. Perform [Verification Procedure](#).

NO: Repair short to ground on signal wire in harness. Perform [Verification Procedure](#).

RE42287,00004D0 -19-27JUL11-19/19

**000111.17 — Engine Coolant Level
Information Switch Activated**

The engine coolant level is low.

Continued on next page

RE42287,00004D1 -19-27JUL11-1/16

Diagnostic Procedure

Troubleshooting Sequence: 000111.17

When DTC is Displayed:

When the ignition is on, engine off, and the ECU detects engine coolant level is below the information switch level.

Related Information:

The engine coolant level information switch is optional and can be enabled or disabled on in the trim page.

NOTE: If the engine coolant level information switch is not used on the application it must be disabled in the trim page.

The engine coolant level information switch is closed when engine coolant levels are normal.

NOTE: This procedure is only for a John Deere OEM surge tank and level switches.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For more sensor information, see [S5002 – Engine Coolant Level Information Switch](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

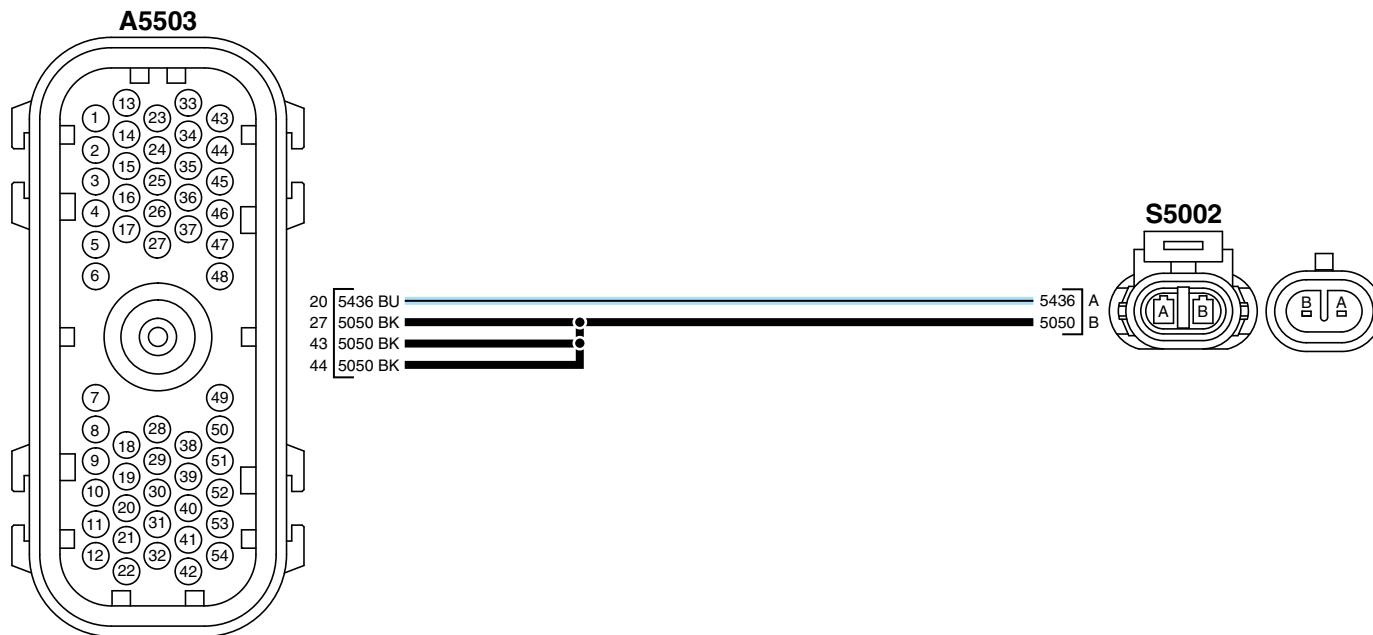
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors,, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 9](#)

located in Section 06, Group 210.



Engine Coolant Level Information Switch Wiring Diagram

A5503—20—Signal

A5503—27—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RE42287,00004D1 -19-27JUL11-2/16

RG17958—UN—22DEC09

IMPORTANT: If application is not using a John Deere engine coolant surge tank and sensors, probe carefully since correct Flex Probes cannot be specified.

Flex probes:

Switches

- JDG10458 — Female — Blue/Green
- JDG10459 — Male — Blue/Green

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,00004D1 -19-27JUL11-3/16

1 Verify Problem

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.

NOTE: The ignition must be ON for 90 seconds to allow the DTC to set if it is active.

3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.

4. In Service ADVISOR, perform Control Unit Information and Overview test.

5. Refresh codes.

Is DTC 000111.17 active?

YES: [GO TO 2](#)

NO: [GO TO 11](#)

RE42287,00004D1 -19-27JUL11-4/16

2 Coolant Level Check

1. Ignition OFF, Engine OFF.

2. Check coolant level in surge tank for correct coolant level.

Is coolant level in the normal range?

YES: [GO TO 3](#)

NO: Fill to proper level.
Perform [Verification Procedure](#).

RE42287,00004D1 -19-27JUL11-5/16

3 Verify OEM Parts

Verify that surge tank and level switches are John Deere OEM parts.

Are surge tank and switches John Deere OEM parts?

YES: [GO TO 4](#)

NO: See your application technical manual for diagnostics of the engine coolant level sensors.

RE42287,00004D1 -19-27JUL11-6/16

4 Level Switch Voltage Check

1. Ignition ON, Engine OFF

2. In Service ADVISOR, monitor Engine Coolant Level Information Switch Input Voltage.

Is Engine Coolant Level Information Switch Input Voltage greater than 3.3 V?

YES: [GO TO 5](#)

NO: [GO TO 6](#)

Continued on next page

RE42287,00004D1 -19-27JUL11-7/16

5 Level Switch Status Check	<p>In Service ADVISOR, monitor Engine Coolant Level Information Switch Status.</p> <p>Is Engine Coolant Level Information Switch Status Normal?</p>	<p>YES: Verify that ECU trim page has been set up correctly for the John Deere OEM surge tank and level switches. Perform Verification Procedure.</p> <p>NO: GO TO 7</p>
6 Level Switch Status Check	<p>In Service ADVISOR, monitor Engine Coolant Level Information Switch Status.</p> <p>Is Engine Coolant Level Information Switch Status Normal?</p>	<p>YES: GO TO 7</p> <p>NO: Verify that ECU trim page has been set up correctly for the John Deere OEM surge tank and level switches. Perform Verification Procedure.</p>
7 Terminal Test	<p>1. Disconnect engine coolant level information switch connector S5002.</p> <p>2. Perform Terminal Test on switch and S5002 connector.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 8</p>
8 Switch Check	<p>1. Connect Diagnostic Test Box :</p> <ul style="list-style-type: none"> • A to switch connector female socket 1(+). • B to switch connector female socket 2(-). <p>2. Set S1 to position 1 on Diagnostic Test Box.</p> <p>3. Connect multimeter to Diagnostic Test Box.</p> <p>4. Ignition ON, Engine OFF.</p> <p>5. Monitor voltage on multimeter.</p> <p>Does multimeter voltage read at least 4.8 V?</p>	<p>YES: GO TO 10</p> <p>NO: GO TO 9</p>
9 Return Circuit Check	<p>Press and hold S2 on Diagnostic Test Box</p> <p>Does multimeter voltage read at least 4.8 V?</p>	<p>YES: Repair open or high resistance in return wire. Perform Verification Procedure.</p> <p>NO: Repair open or high resistance in signal wire. Perform Verification Procedure.</p>

Continued on next page

10 Switch Check

1. Ignition OFF, Engine OFF.
2. Replace Engine Coolant Level Information Switch.
3. Ignition ON, Engine OFF.
4. In Service ADVISOR, monitor Engine Coolant Level Information Switch Status.

Is Engine Coolant Level Information Switch Status Normal?

YES: Perform [Verification Procedure](#).

NO: Replace surge tank. Perform [Verification Procedure](#).

RE42287,00004D1 -19-27JUL11-13/16

11 Intermittent Open Circuit Check

1. In Service ADVISOR, monitor Engine Coolant Level Information Switch Status.

2. Perform [Wiggle Test](#).

Does Engine Coolant Level Information Switch Status ever display Low?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RE42287,00004D1 -19-27JUL11-14/16

12 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine coolant level information switch connector S5002.
3. Perform [Terminal Test](#) on switch and S5002 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 13](#)

RE42287,00004D1 -19-27JUL11-15/16

13 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform [Terminal Test](#) on A5503 connector female sockets 20, 27, 43, and 44. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RE42287,00004D1 -19-27JUL11-16/16

000111.18 — Engine Coolant Level Alarm Switch Activated at Moderate Coolant Temperature

The ECU detects a low coolant level at moderate coolant temperature.

Diagnostic Procedure

When DTC is Displayed:

When the engine coolant temperature is between 60° C (140° F) and 95° C (203° F) and the ECU detects engine coolant level is below the alarm switch level.

Related Information:

The Engine Coolant Level Alarm Switch is closed when engine coolant level is above the alarm level.

NOTE: This procedure and information is only for a John Deere OEM surge tank and level switches.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 000111.01 — Engine Coolant Level Alarm Switch Activated at High Coolant Temperature.

RE42287,00004D2 -19-27JUL11-1/1

**000094.03 — Low-Pressure Fuel Signal Out
of Range High**

*The low-pressure fuel signal exceeds the sensor
high voltage specification.*

Continued on next page

RG40049,0000A4C -19-22MAR11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

003510.03

000094.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The low-pressure fuel pressure sensor signal voltage to the ECU corresponds to a pressure higher than what is physically possible for the low-pressure fuel pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for low-pressure fuel pressure.

Additional references:

For sensor location see B5107 — Low-Pressure Fuel Pressure Sensor in Section 03, Group 140.

For more low-pressure fuel system information, see [Low-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

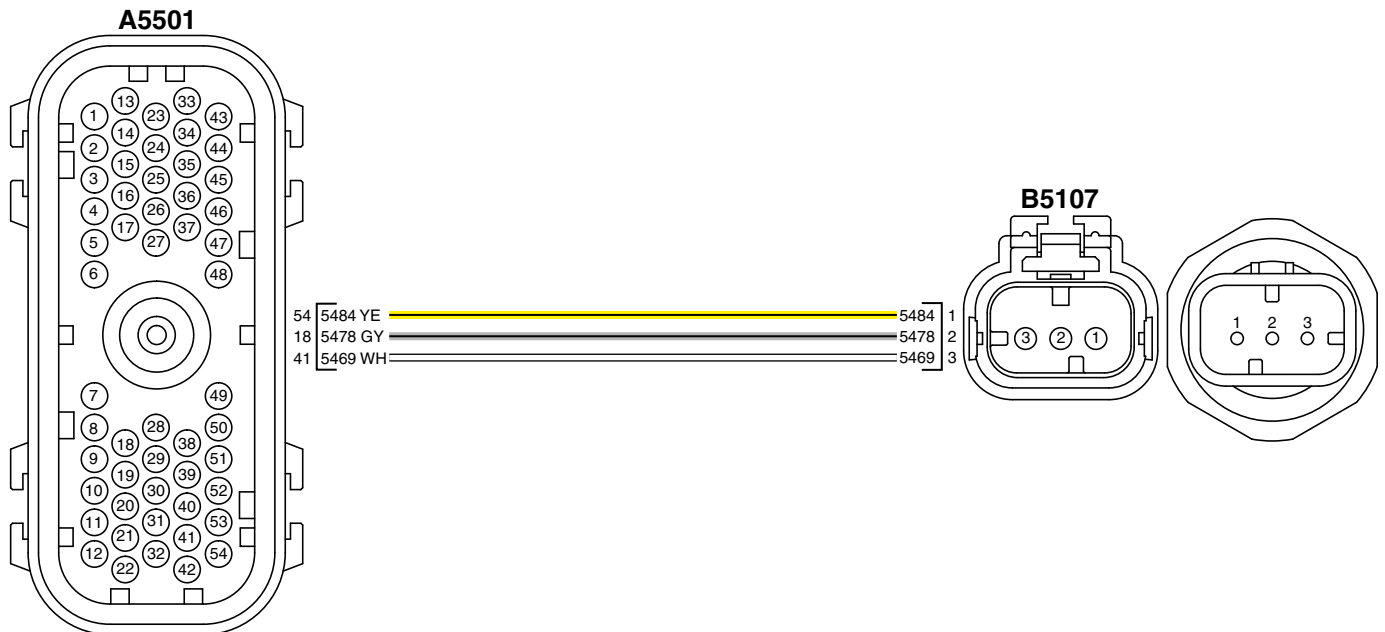
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Low-Pressure Fuel Pressure Sensor Wiring Diagram

A5501—54—Supply

A5501—18—Return

A5501—41—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RG40049,0000A4C -19-22MAR11-2/15

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 – Digital Multimeter

- J-35616-20 – Test Leads

RG40049,0000A4C -19-22MAR11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003510.03 active or stored?

YES: GO TO [003510.03 — Sensor Supply #2 Voltage Out of Range High](#) procedure.

NO: [GO TO 2](#)

RG40049,0000A4C -19-22MAR11-4/15

2 Code Check

Is DTC 000094.03 active?

YES: [GO TO 3](#)

NO: [GO TO 10](#)

RG40049,0000A4C -19-22MAR11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect low-pressure fuel pressure sensor connector B5107.
3. Perform [Terminal Test](#) on sensor and B5107 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

Continued on next page

RG40049,0000A4C -19-22MAR11-6/15

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5107 connector female socket 3 (+).
 - B to B5107 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 8

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 5

RG40049,0000A4C -19-22MAR11-7/15

5 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform Verification Procedure.

NO: GO TO 6

RG40049,0000A4C -19-22MAR11-8/15

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 54, 18, and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RG40049,0000A4C -19-22MAR11-9/15

7 Continuity Check

1. Measure the resistance between A5501 connector female socket 18 and B5107 connector female socket 2.
2. Measure the resistance between A5501 connector female socket 41 and B5107 connector female socket 3.

Are both resistance measurements less than 5 ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair mispin. Perform Verification Procedure.

RG40049,0000A4C -19-22MAR11-10/15

8 Software Check

In Service ADVISOR monitor Low-Pressure Fuel Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RG40049,0000A4C -19-22MAR11-11/15

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000094.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A4C -19-22MAR11-12/15

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR monitor Low-Pressure Fuel Input Voltage.
3. Perform [Wiggle Test](#).

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A4C -19-22MAR11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect low-pressure fuel pressure sensor connector B5107.
3. Perform [Terminal Test](#) on sensor and B5107 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A4C -19-22MAR11-14/15

12 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 54, 18, and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RG40049,0000A4C -19-22MAR11-15/15

**000094.04 — Low-Pressure Fuel Signal Out
of Range Low**

*The low-pressure fuel signal is lower than the
sensor low voltage specification.*

Continued on next page

RG40049,0000A4D -19-20MAR12-1/17

Diagnostic Procedure

Troubleshooting Sequence:

003510.03
003510.04
000094.03
000094.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The low-pressure fuel pressure sensor signal voltage to the ECU corresponds to a pressure lower than what is physically possible for the low-pressure fuel pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for low-pressure fuel pressure.

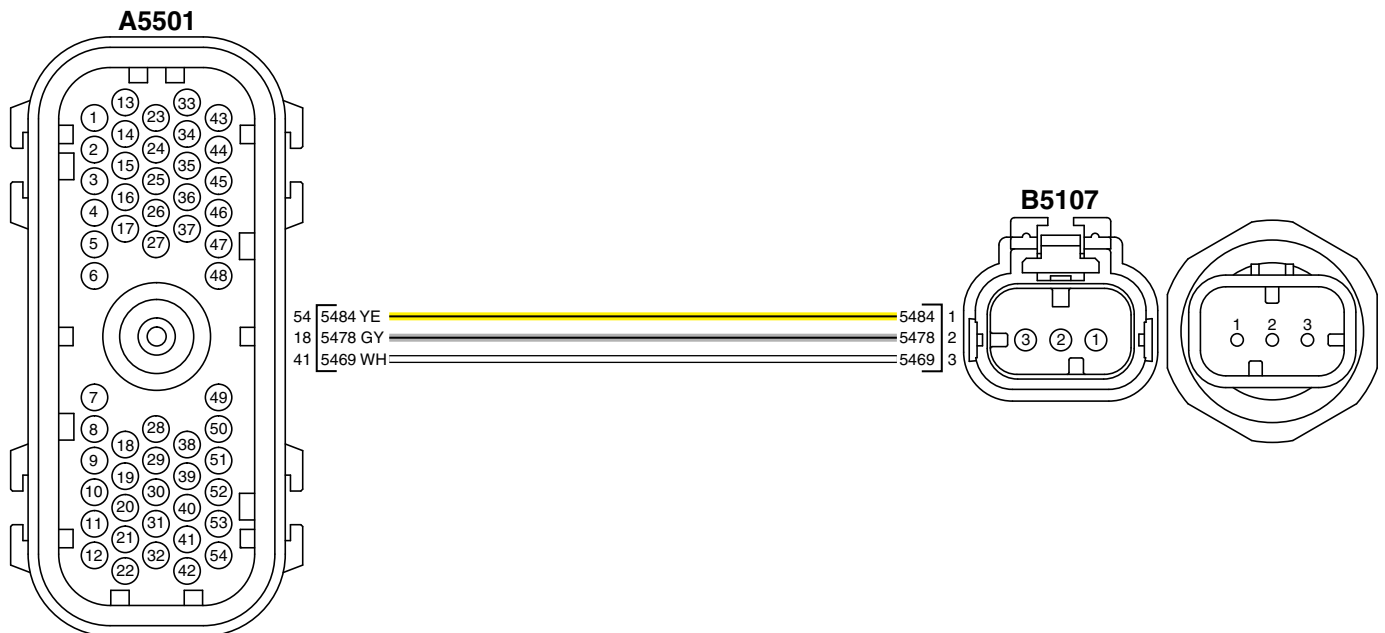
Additional references:

For sensor location see [B5107 — Low-Pressure Fuel Pressure Sensor](#) in Section 03, Group 140.
For more low-pressure fuel system information, see [Low-Pressure Fuel System Operation](#) in Section 03, Group 130.
For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.
For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 2](#)
- located in Section 06, Group 210.



Low-Pressure Fuel Pressure Sensor Wiring Diagram

A5501 — 54 — Supply

A5501 — 18 — Return

A5501 — 41 — Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RG40049,0000A4D -19-20MAR12-2/17

RG17728 —UN—22DEC09

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A4D -19-20MAR12-3/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003510.03 stored?

YES: GO TO 0003510.03 — Sensor Supply #2 Voltage Out of Range High procedure.

NO: GO TO 2

RG40049,0000A4D -19-20MAR12-4/17

2 Code Check

Is DTC 000094.03 stored?

YES: GO TO 000094.03 — Low-Pressure Fuel Pressure Signal Out of Range High procedure.

NO: GO TO 3

RG40049,0000A4D -19-20MAR12-5/17

3 Code Check

Is DTC 000094.04 active?

YES: GO TO 4

NO: GO TO 12

RG40049,0000A4D -19-20MAR12-6/17

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect low-pressure fuel pressure sensor connector B5107.
3. Perform Terminal Test on sensor and B5107 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 5

Continued on next page

RG40049,0000A4D -19-20MAR12-7/17

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5107 connector female socket 1 (+).
 - B to B5107 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 7

NO: GO TO 6

RG40049,0000A4D -19-20MAR12-8/17

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

RG40049,0000A4D -19-20MAR12-9/17

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5107 connector female socket 3 (+).
 - B to B5107 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 8

NO: GO TO 10

RG40049,0000A4D -19-20MAR12-10/17

8 Software Check

In Service ADVISOR monitor Low-Pressure Fuel Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RG40049,0000A4D -19-20MAR12-11/17

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000094.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A4D -19-20MAR12-12/17

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform [Terminal Test](#) on A5501 connector female sockets 54, 18, and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A4D -19-20MAR12-13/17

11 Continuity Check

Measure the resistance between A5501 connector female socket 41 and B5107 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mispin in harness. Perform [Verification Procedure](#).

RG40049,0000A4D -19-20MAR12-14/17

12 Wiggle Test

1. In Service ADVISOR, monitor Low-Pressure Fuel Input Voltage.
2. Perform [Wiggle Test](#).

Does voltage ever go below 0.2 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 13](#)

RG40049,0000A4D -19-20MAR12-15/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect low-pressure fuel pressure sensor connector B5107.
3. Perform [Terminal Test](#) on sensor and B5107 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 14](#)

Continued on next page

RG40049,0000A4D -19-20MAR12-16/17

14 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform Terminal Test on A5501 connector female sockets 54, 18, and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RG40049,0000A4D -19-20MAR12-17/17

**000094.16 — Low-Pressure Fuel Signal
Moderately High**

The low-pressure fuel signal is higher than expected.

Continued on next page

RG40049,0000A4E -19-02AUG11-1/10

Diagnostic Procedure

Troubleshooting Sequence:

Any active DTC

When DTC is Displayed:

When the engine is running, and the fault is active.

Related Information:

The low-pressure fuel pressure sensor signal voltage to the ECU corresponds to a pressure higher than what is expected by the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For sensor location see [B5107 — Low-Pressure Fuel Pressure Sensor](#) in Section 03, Group 140.

For more low-pressure fuel system information, see [Low-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

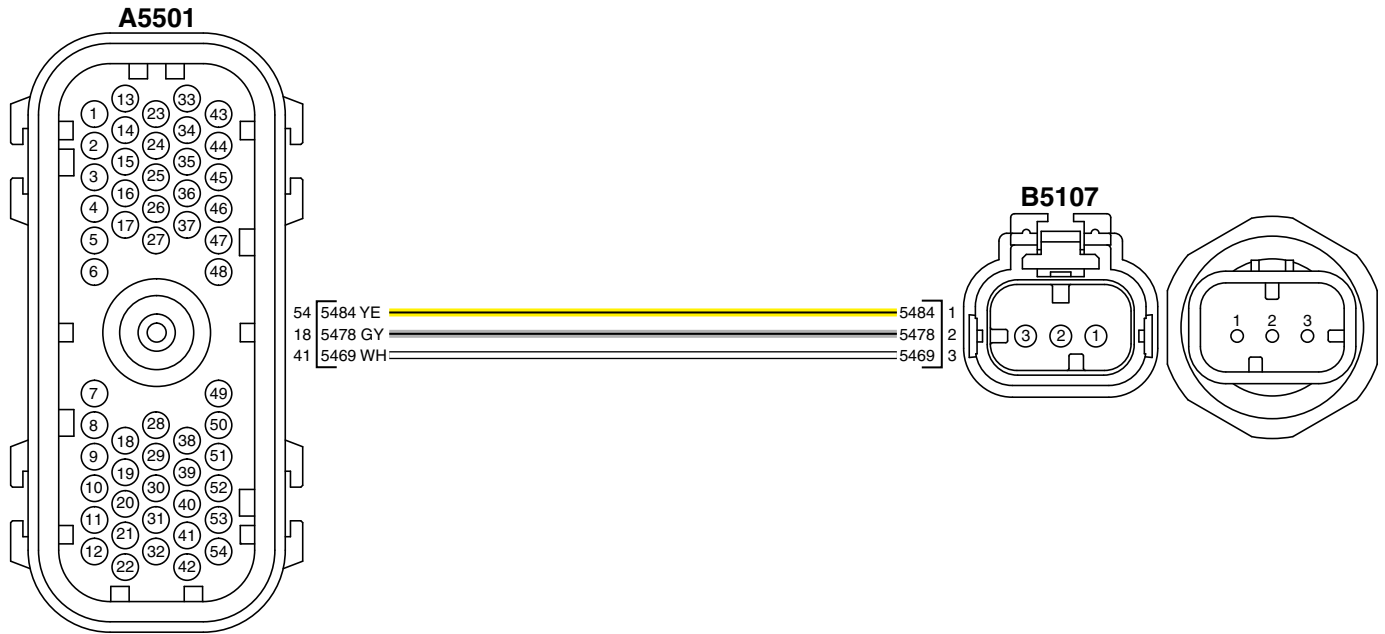
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Low-Pressure Fuel Pressure Sensor Wiring Diagram

A5501—54—Supply

A5501—18—Return

A5501—41—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RG40049,0000A4E -19-02AUG11-2/10

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A4E -19-02AUG11-3/10

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running
6. Refresh codes.

Is DTC 000094.16 active?

YES: GO TO 2

NO: GO TO 7

RG40049,0000A4E -19-02AUG11-4/10

2 Return System Check

Inspect application for pinched, kinked, or damaged return fuel lines.

Any problem found?

YES: Repair problem. GO TO 3.

NO: GO TO 4

RG40049,0000A4E -19-02AUG11-5/10

3 Check High-Pressure Pump Front Seal

NOTE: For removal and installation procedures, see High-Pressure Fuel Pump — Removal High-Pressure Fuel Pump — Installation, Section 02, Group 090.

Remove high-pressure pump and check for seal damage.

Is there evidence of seal damage?

YES: Replace high-pressure pump and change engine oil. Perform Verification Procedure.

NO: Reinstall high-pressure pump. Perform Verification Procedure.

Continued on next page

RG40049,0000A4E -19-02AUG11-6/10

4 Mechanical Pressure Check

1. Ignition OFF, Engine OFF
2. Remove air bleed line or vent screw from secondary fuel filter header.
3. Install a 0—400 kPa (0—4 bar) (0—60 psi) pressure gauge using [JT05470](#) Universal Pressure Test Kit.
4. Ignition ON, engine running.
5. Monitor mechanical gauge pressure.

Does the mechanical gauge read within 15 kPa (0.15 bar) (2.2 psi) of Low-Pressure Fuel — Actual Pressure that is displayed in Service ADVISOR?

YES: Replace fuel filter header. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RG40049,0000A4E -19-02AUG11-7/10

5 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect low-pressure fuel pressure sensor connector B5107.
3. Perform [Terminal Test](#) on sensor and B5107 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000A4E -19-02AUG11-8/10

6 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5107 connector female socket 3 (+).
 - B to B5107 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. In Service ADVISOR, monitor Low-Pressure Fuel Input Voltage.

Does voltage remain between 2.3 and 2.7 V?

YES: Replace sensor. Perform [Verification Procedure](#).

NO: [GO TO Short to Voltage Procedure](#)

RG40049,0000A4E -19-02AUG11-9/10

7 Signal Circuit Check

1. Ignition ON, running.
2. In Service ADVISOR, monitor Low-Pressure Fuel Input Voltage.
3. Perform [Wiggle Test](#).

Does voltage ever fluctuate by more than 0.5 V?

YES: Repair problem in harness. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#)

RG40049,0000A4E -19-02AUG11-10/10

000094.17 — Low-Pressure Fuel Signal Slightly Low

The Low-Pressure Fuel signal is slightly lower than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The low-pressure fuel signal is slightly lower than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of three minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see [000094.18 – Low-Pressure Fuel Signal Moderately Low](#)

RG40049,0000A4F -19-22MAR11-1/1

**000094.18 — Low-Pressure Fuel Signal
Moderately Low**

The low-pressure fuel signal is lower than expected.

Continued on next page

RG40049,0000A50 -19-20MAR12-1/13

Diagnostic Procedure

Troubleshooting Sequence:

003510.04

000094.04

000094.18

When DTC is Displayed:

When the engine is running and the fault is active.

Related Information

The ECU detects a Low-Pressure Fuel - Actual Pressure below -5 kPa (-0.05 bar) (-0.7 psi).

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For sensor location see [B5107 — Low-Pressure Fuel Pressure Sensor](#) in Section 03, Group 140.

For more low-pressure fuel system information, see [Low-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

IMPORTANT: When directed to run the [Harness Diagnostic Mode Test](#), the engine temperature should be above freezing. It is recommended that the engine temperature is at least 20 °C (68 °F). This test is located in [Service ADVISOR](#).

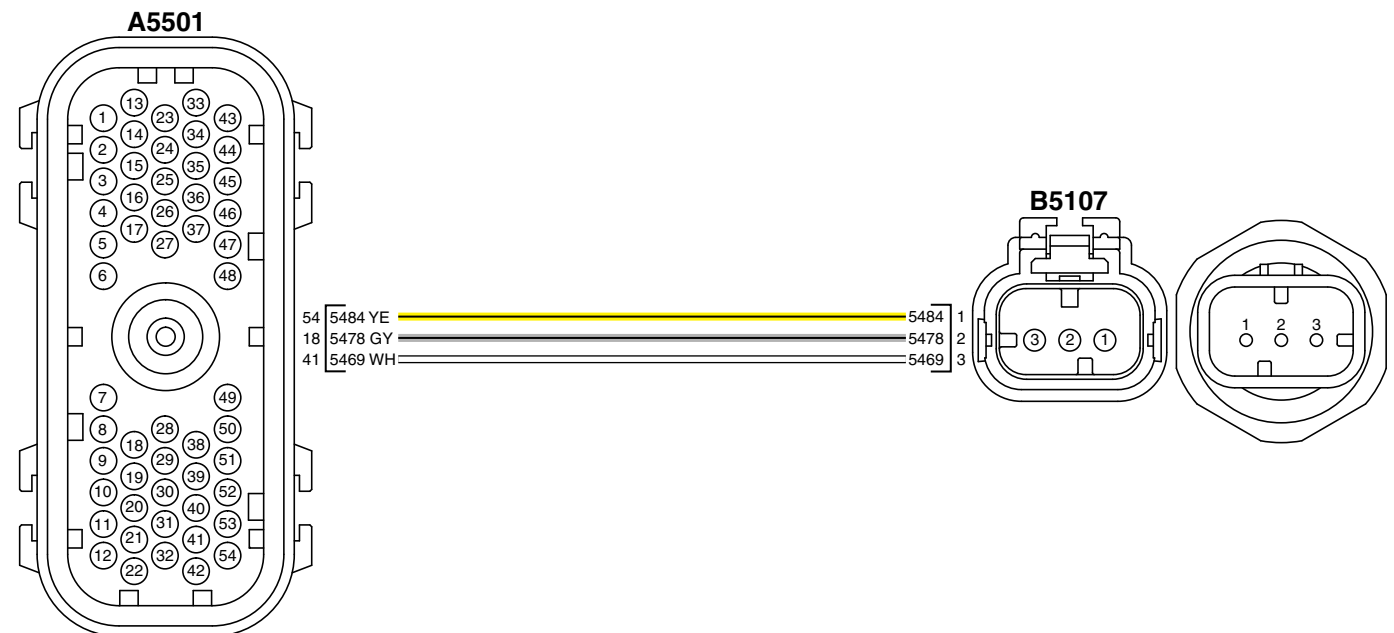
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Low-Pressure Fuel Pressure Sensor Wiring Diagram

A5501—54—Supply

A5501—18—Return

A5501—41—Signal

Continued on next page

RG40049,0000A50 -19-20MAR12-2/13

RG17728—UN—22DEC09

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A50 -19-20MAR12-3/13

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 000094.18 active?

YES: GO TO 2

NO: GO TO Problem Not Found Procedure.

RG40049,0000A50 -19-20MAR12-4/13

2 Low-Pressure Fuel System Check

Check fuel system, see Low-Pressure Fuel System Check in Section 04, Group 155.

Did test pass?

YES: GO TO 3

NO: Repair problem.
Perform Verification Procedure.

RG40049,0000A50 -19-20MAR12-5/13

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect low-pressure fuel pressure sensor connector B5107.
3. Perform Terminal Test on sensor and B5107 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 4

Continued on next page

RG40049,0000A50 -19-20MAR12-6/13

4 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5107 connector female socket 1 (+).
 - B to B5107 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 6

NO: GO TO 5

RG40049,0000A50 -19-20MAR12-7/13

5 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

RG40049,0000A50 -19-20MAR12-8/13

6 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5107 connector female socket 3 (+).
 - B to B5107 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 7

NO: GO TO 9

RG40049,0000A50 -19-20MAR12-9/13

7 Software Check

In Service ADVISOR monitor Low-Pressure Fuel Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 8

Continued on next page

RG40049,0000A50 -19-20MAR12-10/13

8 Reprogram ECU

1. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
2. Ignition ON, Engine OFF.
3. With Diagnostic Test Box still connected and S1 set to position 9.
4. In Service ADVISOR monitor Low-Pressure Fuel Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Perform [Verification Procedure](#).

NO: Replace ECU. Perform [Verification Procedure](#).

RG40049,0000A50 -19-20MAR12-11/13

9 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Disconnect ECU connector A5501.
4. Perform [Terminal Test](#) on A5501 connector female sockets 54, 18, and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RG40049,0000A50 -19-20MAR12-12/13

10 Continuity Check

Measure the resistance between A5501 connector female socket 41 and B5107 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair high resistance, open, or mispin in harness. Perform [Verification Procedure](#).

RG40049,0000A50 -19-20MAR12-13/13

000097.00 — Water-In-Fuel Level Extremely High

The ECU has detected extreme levels of water in the fuel.

Continued on next page

RG40049,0000A51 -19-01AUG11-1/19

Diagnostic Procedure

Troubleshooting Sequence:
000097.00

When DTC is Displayed:

When the ignition is on for a minimum of three minutes and the fault is active.

Related Information:

The ECU has detected that the amount of water in the fuel is much higher than specification.

Alarm Level:

STOP

Control Unit Response:

The ECU derates the engine.

Additional References:

For sensor location see [B5600 — Water-In-Fuel Sensor](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

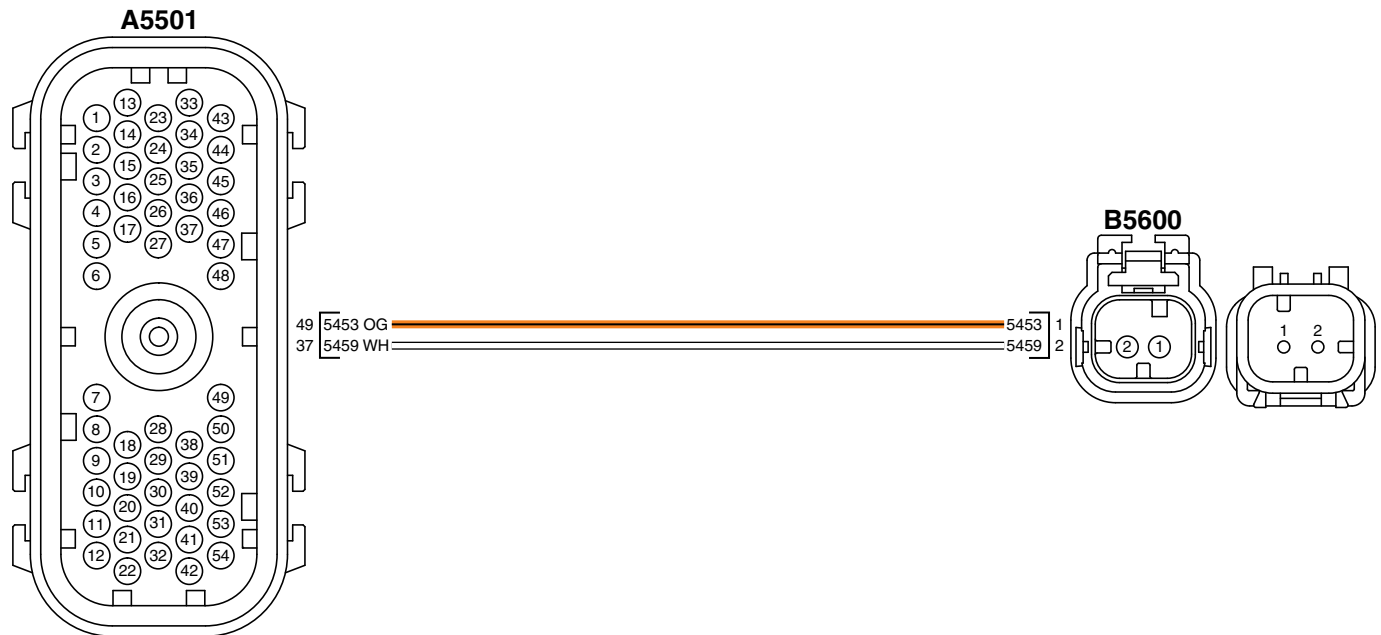
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Water-In-Fuel Sensor Wiring Diagram

A5501 — 49 — Signal

A5501 — 37 — Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple

- [JDG10461](#) — Male — Yellow/Purple

RG17729 —UN—22DEC09

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A51 -19-01AUG11-3/19

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF for three minutes.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 000097.00 or 000097.16 active?

YES: GO TO 2

NO: GO TO 14

RG40049,0000A51 -19-01AUG11-4/19

2 Water in Fuel Check

1. Ignition OFF, Engine OFF.
2. Drain water from fuel filter water separator bowl.
3. If equipped with electric low-pressure fuel pump, disconnect low-pressure fuel pump connector Y5501.
4. Ignition ON, Engine OFF.
5. In Service ADVISOR, monitor Water In Fuel Input Voltage.

Is voltage below 4 V?

YES: GO TO 3

NO: GO TO 12

RG40049,0000A51 -19-01AUG11-5/19

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect water-in-fuel sensor connector B5600.
3. Perform Terminal Test on sensor and B5600 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 4

Continued on next page

RG40049,0000A51 -19-01AUG11-6/19

4 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5600 connector female socket 1 (+).
 - B to B5600 connector female socket 2 (-).
2. Set S1 to position 4 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 5

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 7

RG40049,0000A51 -19-01AUG11-7/19

5 Software Check

In Service ADVISOR, monitor Water In Fuel Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 6

RG40049,0000A51 -19-01AUG11-8/19

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF for 3 minutes.
6. Refresh codes.

Is DTC 000097.00 or 000097.16 active?

YES: Replace ECU. Perform Verification Procedure.

NO: Perform Verification Procedure.

RG40049,0000A51 -19-01AUG11-9/19

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 37 and 49. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 8

Continued on next page

RG40049,0000A51 -19-01AUG11-10/19

Fuel System Diagnostics

8 Continuity Check

1. Disconnect Diagnostic Test Box.
 2. Measure resistance between A5501 connector female socket 49 and B5600 connector female socket 1.
 3. Measure resistance between A5501 connector female socket 37 and B5600 connector female socket 2.
- Are both resistances less than 5 ohms?

YES: [GO TO 9](#)

NO: Repair high resistance in harness. Perform [Verification Procedure](#).

RG40049,0000A51 -19-01AUG11-11/19

9 Short to Ground Check

On B5600 connector, measure resistance between female socket 1 and single point ground.

Is resistance greater than 100k ohms?

YES: [GO TO 10](#)

NO: Repair short in harness. Perform [Verification Procedure](#).

RG40049,0000A51 -19-01AUG11-12/19

10 Wire to Wire Check

On A5501 connector, measure resistance between female socket 49 and all other sockets in A5501 connector.

Are any measurements less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A51 -19-01AUG11-13/19

11 ECU Check

NOTE: Many new error codes appear in the next step. Disregard all DTCs except 000097.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 000097.03 active?

YES: Contact DTAC for support.

NO: Replace ECU. Perform [Verification Procedure](#).

RG40049,0000A51 -19-01AUG11-14/19

12 Prime Fuel System

1. Ignition OFF, Engine OFF.
2. If equipped with electric low-pressure fuel pump, reconnect low-pressure fuel pump connector Y5501. If equipped with mechanical low-pressure fuel pump, prime fuel system with mechanical primer.
3. Ignition ON, Engine OFF.
4. Wait five minutes.
5. Refresh codes.

Is DTC 000097.00 or 000097.16 active?

YES: Perform [Fuel Supply Quality Check](#). Perform [Verification Procedure](#).

NO: [GO TO 13](#)

Continued on next page

RG40049,0000A51 -19-01AUG11-15/19

13 Engine Running DTC Check

1. Ignition ON, engine running.
2. Run engine for a minimum of five minutes at fast idle.
3. Refresh codes.

Is DTC 000097.00 or 000097.16 active?

YES: Perform [Fuel Supply Quality Check](#). Perform [Verification Procedure](#).

NO: Possible Fuel Supply Quality Problem. Perform a DIESELSCAN™ analysis.

RG40049,0000A51 -19-01AUG11-16/19

14 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Water In Fuel Input Voltage.
3. Perform [Wiggle Test](#).

Did voltage ever go below 4 V?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 15](#)

RG40049,0000A51 -19-01AUG11-17/19

15 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect water-in-fuel sensor connector B5600.
3. Perform [Terminal Test](#) on sensor and B5600 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 16](#)

RG40049,0000A51 -19-01AUG11-18/19

16 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 37 and 49. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RG40049,0000A51 -19-01AUG11-19/19

000097.03 — Water-In-Fuel Signal Out Of Range High

The water in fuel signal exceeds the sensor high voltage specification.

Continued on next page

RG40049,0000A52 -19-22JUL11-1/12

Diagnostic Procedure

Troubleshooting Sequence:

000097.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The water-in-fuel sensor signal voltage to the ECU increases above the sensor high voltage specification.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for water in fuel.

Additional References:

For sensor location see [B5600 — Water-In-Fuel Sensor](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

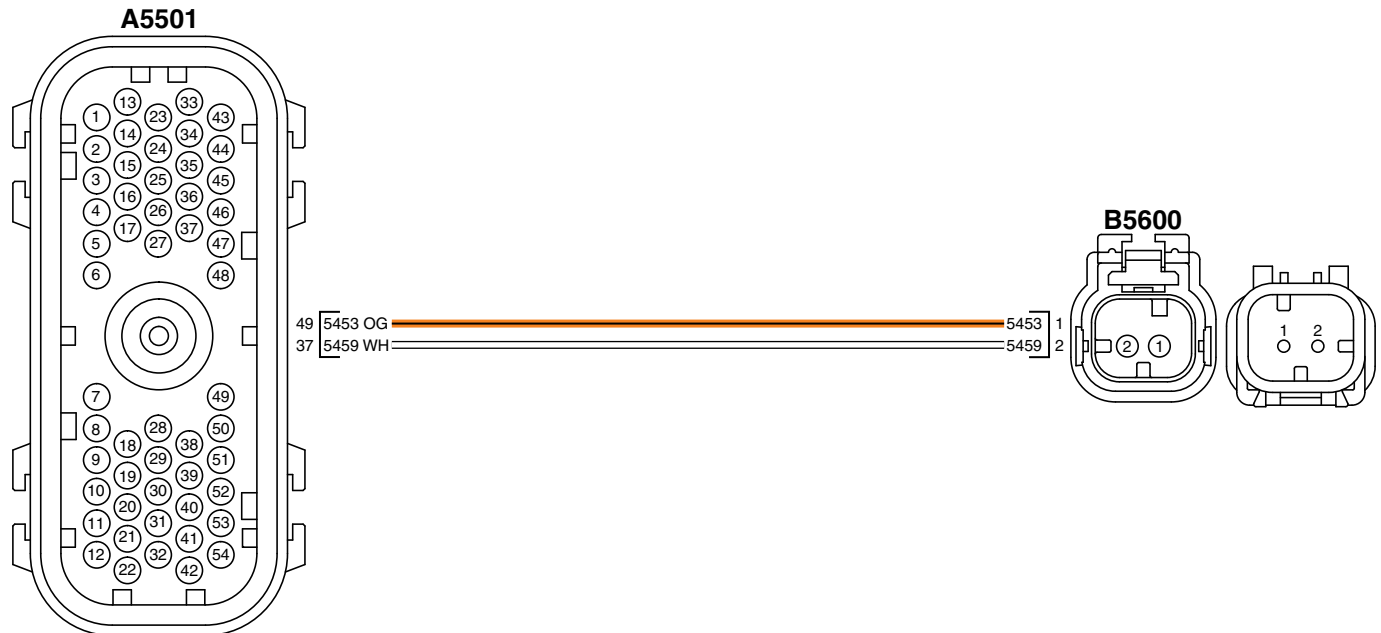
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Water-In-Fuel Sensor Wiring Diagram

A5501 — 49 —Signal

A5501 — 37 —Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple

- [JDG10461](#) — Male — Yellow/Purple

Continued on next page

RG40049,0000A52 -19-22JUL11-2/12

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A52 -19-22JUL11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 000097.03 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

RG40049,0000A52 -19-22JUL11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect water-in-fuel sensor connector B5600.
3. Perform [Terminal Test](#) on sensor and B5600 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RG40049,0000A52 -19-22JUL11-5/12

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5600 connector female socket 1 (+).
 - B to B5600 connector female socket 2 (-).
2. Set S1 to position 4 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 4](#)

NO: Voltage greater than 2.7 V. GO TO [Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 6](#)

RG40049,0000A52 -19-22JUL11-6/12

4 Software Check

In Service ADVISOR, monitor Water In Fuel Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RG40049,0000A52 -19-22JUL11-7/12

5 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000097.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A52 -19-22JUL11-8/12

6 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing [Wiggle Test](#).

Does voltage now remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform [Verification Procedure](#).

NO: Repair open in signal wire. Perform [Verification Procedure](#).

RG40049,0000A52 -19-22JUL11-9/12

7 Wiggle Test

1. In Service ADVISOR, monitor Water In Fuel Input Voltage.
2. Perform [Wiggle Test](#).

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A52 -19-22JUL11-10/12

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect water-in-fuel sensor connector B5600.
3. Perform [Terminal Test](#) on sensor and connector B5600.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RG40049,0000A52 -19-22JUL11-11/12

9 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 37 and 49. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RG40049,0000A52 -19-22JUL11-12/12

000097.04 — Water-In-Fuel Signal Out Of Range Low

The water in fuel signal is lower than the sensor low voltage specification.

Continued on next page

RG40049,0000A53 -19-22JUL11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

000097.03

000097.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The water-in-fuel sensor signal voltage to the ECU decreases below the sensor low voltage specification.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for water in fuel.

Additional References:

For sensor location see [B5600 — Water-In-Fuel Sensor](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

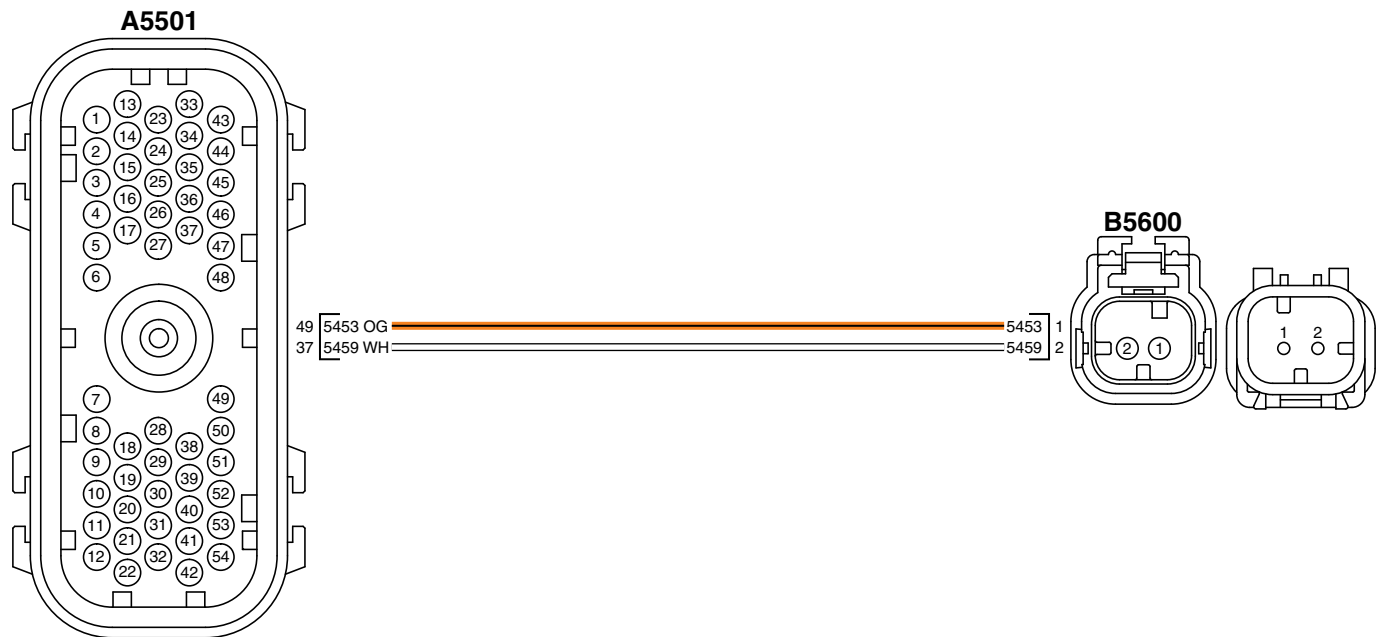
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 2](#)

located in Section 06, Group 210.



Water-In-Fuel Sensor Wiring Diagram

A5501 — 49 —Signal

A5501 — 37 —Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple

- [JDG10461](#) — Male — Yellow/Purple

Continued on next page

RG40049,0000A53 -19-22JUL11-2/15

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A53 -19-22JUL11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000097.03 a stored code?

YES: GO TO [000097.03 — Water-In-Fuel Signal Out Of Range High](#) procedure.

NO: [GO TO 2](#)

RG40049,0000A53 -19-22JUL11-4/15

2 Code Check

Is DTC 000097.04 active?

YES: [GO TO 3](#)

NO: [GO TO 10](#)

RG40049,0000A53 -19-22JUL11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect water-in-fuel sensor connector B5600.
3. Perform [Terminal Test](#) on sensor and B5600 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RG40049,0000A53 -19-22JUL11-6/15

4 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5600 connector female socket 1 (+).
 - B to B5600 connector female socket 2 (-).
2. Set S1 to position 4 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 5](#)

NO: [GO TO 7](#)

Continued on next page

RG40049,0000A53 -19-22JUL11-7/15

5 Software Check

In Service ADVISOR monitor Water In Fuel Input Voltage

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000A53 -19-22JUL11-8/15

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000097.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A53 -19-22JUL11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform [Terminal Test](#) on A5501 connector female sockets 49 and 37. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A53 -19-22JUL11-10/15

8 Harness Check

NOTE: Many new error codes appear in the next step. Disregard all DTCs except 000097.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 000097.03 active?

YES: [GO TO 9](#)

NO: Replace ECU.
Perform [Verification Procedure](#).

RG40049,0000A53 -19-22JUL11-11/15

9 Continuity Check

Measure resistance between A5501 connector female socket 49 and B5600 connector female socket 1.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mispin in harness. Perform [Verification Procedure](#).

Continued on next page

RG40049,0000A53 -19-22JUL11-12/15

Fuel System Diagnostics

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR monitor Water In Fuel Input Voltage
3. Perform Wiggle Test.

Does voltage ever go below 0.2 V?

YES: Repair short to ground on signal wire. Perform Verification Procedure.

NO: GO TO 11

RG40049,0000A53 -19-22JUL11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect water-in-fuel sensor connector B5600 .
3. Perform Terminal Test on sensor and B5600 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 12

RG40049,0000A53 -19-22JUL11-14/15

12 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform Terminal Test on A5501 connector female sockets 37 and 49. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RG40049,0000A53 -19-22JUL11-15/15

000097.16 — Water-In-Fuel Level Moderately High

The ECU has detected moderate water in the fuel.

Diagnostic Procedure

Troubleshooting Sequence:

000097.00

000097.16

When DTC is Displayed:

When the ignition is on for a minimum of three minutes and the fault is active.

Related Information:

The ECU has detected that the amount of water in the fuel is moderately higher than specification.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see 000097.00 — Water-In-Fuel Level Extremely High.

RG40049,0000A54 -19-25JUL11-1/1

**000157.01 — Fuel Rail Pressure Signal
Extremely Low**

The fuel rail pressure signal is extremely low.

Continued on next page

RG40049,0000A55 -19-08AUG12-1/5

Diagnostic Procedure

Troubleshooting Sequence:

003509.04
001347.06
001347.18
000157.01

When DTC is Displayed:

When the ignition is on, engine running, and the error is active.

Related Information:

The fuel rail pressure sensor signal voltage to the ECU corresponds to a pressure lower than an ECU defined threshold.

Alarm Level:

STOP

Control Unit Response:

The ECU derates the engine.

Additional References:

For sensor location see B5100 – Fuel Rail Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see Measuring Pressure in Section 03, Group 140.

For more high-pressure fuel system information, see High-Pressure Fuel System Operation in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

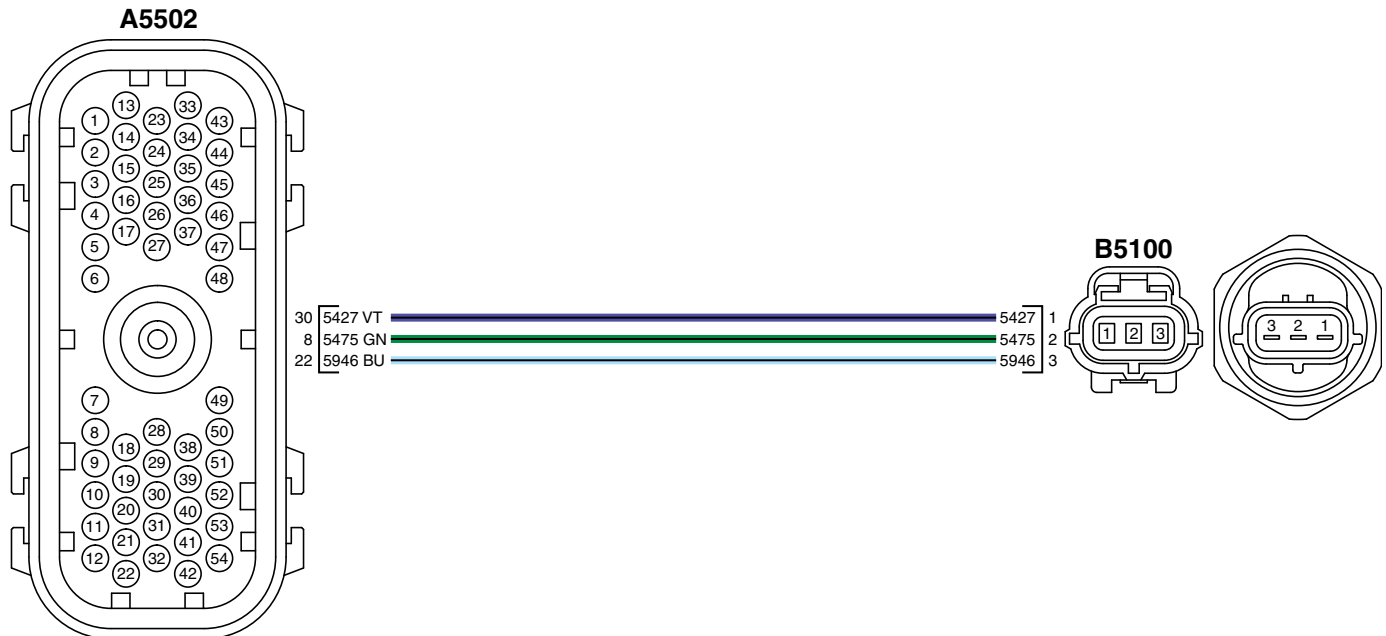
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.



Fuel Rail Pressure Sensor Wiring Diagram

A5502 — 22 — Supply

A5502 — 30 — Return

A5502 — 8 — Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

RG16743 — UN — 22DEC09

Continued on next page

RG40049,0000A55 -19-08AUG12-2/5

Flex probes:

Sensor

- JDG10456 — Female — Blue/Orange
- JDG10457 — Male — Blue/Orange

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A55 -19-08AUG12-3/5

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Wait 90 seconds. Refresh DTCs.

Is DTC 000157.01 active?

YES: [GO TO 2](#)

NO: [GO TO Problem Not Found Procedure](#)

RG40049,0000A55 -19-08AUG12-4/5

2 Low-Pressure Fuel Supply System Test

Perform [Low-Pressure Fuel System Check](#), found in Section 04, Group 155.

Is engine performance restored?

YES: Perform [Verification Procedure](#).

NO: Perform [High-Pressure Fuel System Check](#), found in Section 04, Group 155.

RG40049,0000A55 -19-08AUG12-5/5

000157.03 — Fuel Rail Pressure Signal Out of Range High

The fuel rail pressure signal is higher than the sensor high voltage specification.

Continued on next page

RG40049,0000A56 -19-20MAR12-1/15

Diagnostic Procedure

Troubleshooting Sequence:

003509.03

000157.03

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The fuel rail pressure sensor signal voltage to the ECU corresponds to a pressure higher than what is physically possible for the fuel rail pressure.

Alarm Level:

STOP

Control Unit Response:

The ECU derates the engine.

The ECU commands the high-pressure fuel pump to a default value of 200 MPa (2000 bar) (29,000 psi) and does not use the feedback from the fuel rail pressure sensor.

Additional References:

For sensor location see B5100 – Fuel Rail Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

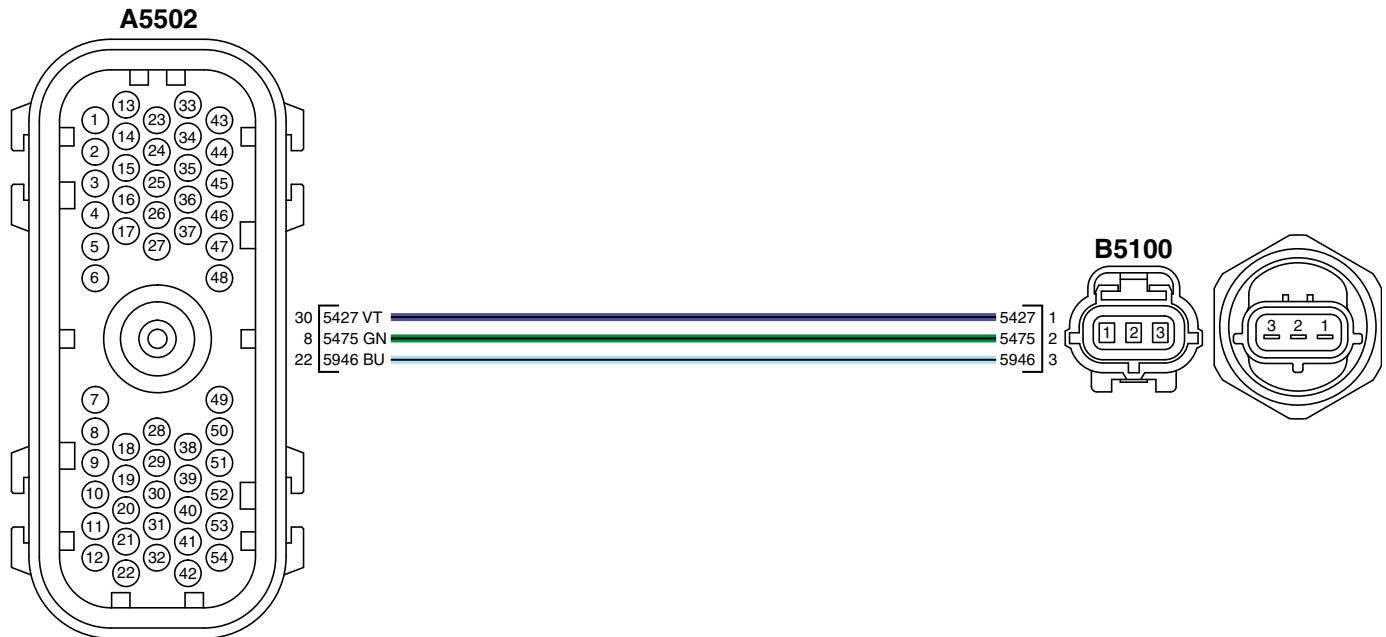
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Fuel Rail Pressure Sensor Wiring Diagram

A5502 — 22 — Supply

A5502 — 30 — Return

A5502 — 8 — Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RG40049,0000A56 -19-20MAR12-2/15

Flex probes:

Sensor

- JDG10456 — Female — Blue/Orange
- JDG10457 — Male — Blue/Orange

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A56 -19-20MAR12-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 003509.03 stored?

YES: GO TO 003509.03
— Sensor Supply #1
Voltage Out of Range High
procedure.

NO: GO TO 2

RG40049,0000A56 -19-20MAR12-4/15

2 Code Check

Is DTC 000157.03 active?

YES: GO TO 3

NO: GO TO 8

RG40049,0000A56 -19-20MAR12-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel rail pressure sensor connector B5100.
3. Perform Terminal Test on sensor and B5100 connector.

Were any problems found?

YES: Repair problem. GO TO 12

NO: GO TO 4

Continued on next page

RG40049,0000A56 -19-20MAR12-6/15

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5100 connector female socket 2 (+).
 - B to B5100 connector female socket 1 (-).
2. Set S1 to position 3 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 6

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 5

RG40049,0000A56 -19-20MAR12-7/15

5 Ground Circuit Check

1. Press and hold S2 button on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 2.3 and 2.7 V?

YES: Repair open or high resistance in return wire.

GO TO 12

NO: Repair open or high resistance in signal wire.

GO TO 12

RG40049,0000A56 -19-20MAR12-8/15

6 Software Check

In Service ADVISOR, monitor Fuel Rail Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. GO TO 12

NO: GO TO 7

RG40049,0000A56 -19-20MAR12-9/15

7 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000157.03 active?

YES: GO TO 11

NO: GO TO 12

RG40049,0000A56 -19-20MAR12-10/15

8 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Fuel Rail Pressure Input Voltage.
3. Perform Wiggle Test.

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. GO TO 12

NO: GO TO 9

Continued on next page

RG40049,0000A56 -19-20MAR12-11/15

Fuel System Diagnostics

9 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel rail pressure sensor connector B5100.
3. Perform Terminal Test on sensor and B5100 connector.

Were any problems found?

YES: Repair harness problem. GO TO 12

NO: GO TO 10

RG40049,0000A56 -19-20MAR12-12/15

10 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 8, 22 and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 12

NO: GO TO Problem Not Found Procedure.

RG40049,0000A56 -19-20MAR12-13/15

11 Continuity Check

1. Measure the resistance between A5502 connector female socket 8 and B5100 connector female socket 2.
2. Measure the resistance between A5502 connector female socket 30 and B5100 connector female socket 1.

Are both resistance measurements less than 5 ohms?

YES: Replace ECU. GO TO 12

NO: Repair mis-pin. GO TO 12.

RG40049,0000A56 -19-20MAR12-14/15

12 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: Perform Exhaust Condition Check.

NO: Perform Verification Procedure.

RG40049,0000A56 -19-20MAR12-15/15

000157.04 — Fuel Rail Pressure Signal Out of Range Low

The fuel rail pressure signal is lower than the sensor low voltage specification.

Continued on next page

RG40049,0000A57 -19-22MAR12-1/20

Diagnostic Procedure

Troubleshooting Sequence:

003509.04

000157.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The fuel rail pressure sensor signal voltage to the ECU corresponds to a pressure lower than what is physically possible for the fuel rail pressure.

Alarm Level:

STOP

Control Unit Response:

The ECU derates the engine.

The ECU commands the high-pressure fuel pump to a default value of 200 MPa (2000 bar) (29,000 psi) and does not use the feedback from the fuel rail pressure sensor.

Additional References:

For sensor location see B5100 – Fuel Rail Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see Measuring Pressure in Section 03, Group 140.

For more information on the Exhaust Condition Check, see Exhaust Condition Check in Section 04, Group 155.

For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

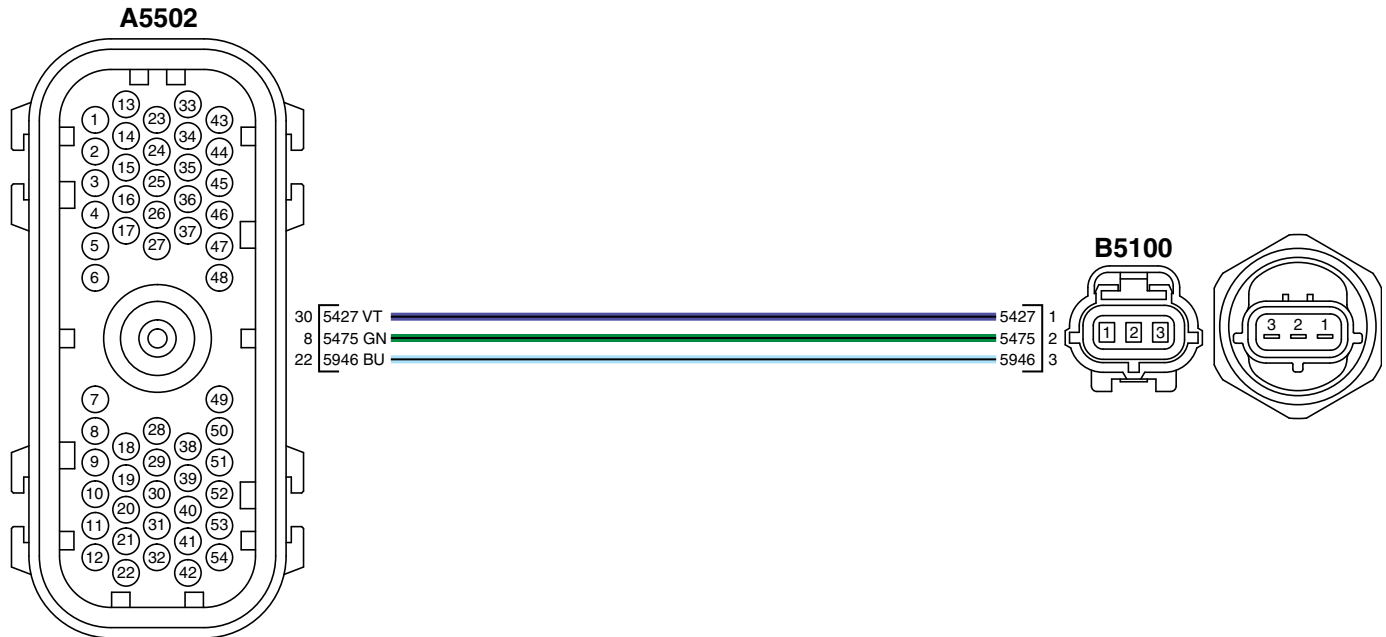
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.



A5502 — 22 — Supply

A5502 — 30 — Return

A5502 — 8 — Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

RG40049,0000A57 -19-22MAR12-2/20

Flex probes:

Sensor

- JDG10456 — Female — Blue/Orange
- JDG10457 — Male — Blue/Orange

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A57 -19-22MAR12-3/20

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000157.03 stored?

YES: GO TO 000157.03
— Fuel Rail Pressure
Signal Out of Range High
procedure.

NO: GO TO 2

RG40049,0000A57 -19-22MAR12-4/20

2 Code Check

Is DTC 000157.04 active?

YES: GO TO 3

NO: GO TO 14

RG40049,0000A57 -19-22MAR12-5/20

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel rail pressure sensor connector B5100.
3. Perform Terminal Test on sensor and B5100 connector.

Were any problems found?

YES: Repair problem. GO TO 17

NO: GO TO 4

Continued on next page

RG40049,0000A57 -19-22MAR12-6/20

4 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5100 connector female socket 3 (+).
 - B to B5100 connector female socket 1 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 6

NO: GO TO 5

RG40049,0000A57 -19-22MAR12-7/20

5 Ground Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire.

GO TO 17

NO: Repair open or high resistance in supply wire.

GO TO 17

RG40049,0000A57 -19-22MAR12-8/20

6 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5100 connector female socket 2 (+).
 - B to B5100 connector female socket 1 (-).
3. Set S1 to position 3 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 7

NO: GO TO 11

RG40049,0000A57 -19-22MAR12-9/20

7 Software Check

In Service ADVISOR, monitor Fuel Rail Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. GO TO 17

NO: GO TO 8

RG40049,0000A57 -19-22MAR12-10/20

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 8, 22, and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 17

NO: GO TO 9

Continued on next page

RG40049,0000A57 -19-22MAR12-11/20

Fuel System Diagnostics

9 Continuity Check	<p>Measure resistance between A5502 connector female socket 8 and B5100 connector female socket 2.</p> <p>Is resistance less than 5 ohms?</p>	<p>YES: GO TO 10</p> <p>NO: Repair mis-pin in harness. GO TO 17</p> <p>RG40049,0000A57 -19-22MAR12-12/20</p>
10 Reprogram ECU	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 000157.04 active?</p>	<p>YES: Replace ECU. GO TO 17</p> <p>NO: GO TO 17</p> <p>RG40049,0000A57 -19-22MAR12-13/20</p>
11 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector A5502. 3. Perform Terminal Test on A5502 connector female sockets 8, 22, and 30. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. GO TO 17</p> <p>NO: GO TO 12</p> <p>RG40049,0000A57 -19-22MAR12-14/20</p>
12 Short to Signal Check	<p>Measure resistance between B5100 connector female sockets 1 and 2.</p> <p>Is resistance less than 100k ohms?</p>	<p>YES: Repair short to signal wire in harness. GO TO 17</p> <p>NO: GO TO 13</p> <p>RG40049,0000A57 -19-22MAR12-15/20</p>
13 Continuity Check	<p>Measure resistance between A5502 connector female socket 8 and B5100 connector female socket 2.</p> <p>Is resistance less than 5 ohms?</p>	<p>YES: GO TO Problem Not Found Procedure.</p> <p>NO: Repair mis-pin in harness. GO TO 17</p> <p>RG40049,0000A57 -19-22MAR12-16/20</p>
14 Wiggle Test	<ol style="list-style-type: none"> 1. In Service ADVISOR, monitor Fuel Rail Pressure Input Voltage. 2. Perform Wiggle Test. <p>Does voltage ever go below 0.2 V?</p>	<p>YES: Repair harness problem. GO TO 17</p> <p>NO: GO TO 15</p> <p>Continued on next page</p> <p>RG40049,0000A57 -19-22MAR12-17/20</p>

Fuel System Diagnostics

15 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel rail pressure sensor connector B5100.
3. Perform Terminal Test on sensor and B5100 connector.

Were any problems found?

YES: Repair problem. GO TO 17

NO: GO TO 16

RG40049,0000A57 -19-22MAR12-18/20

16 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 8, 22, and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 17

NO: GO TO Problem Not Found Procedure.

RG40049,0000A57 -19-22MAR12-19/20

17 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: Perform Exhaust Condition Check.

NO: Perform Verification Procedure.

RG40049,0000A57 -19-22MAR12-20/20

**000157.16 — Fuel Rail Pressure Signal
Moderately High**

The fuel rail pressure signal is moderately high.

Continued on next page

RG40049,0000A58 -19-26JUL11-1/4

Diagnostic Procedure

Troubleshooting Sequence:

003509.03
001347.05
001347.06
001347.18
000157.16

When DTC is Displayed:

When the ignition is on, engine running, and the error is active.

Related Information:

The fuel rail pressure sensor signal voltage to the ECU corresponds to a pressure higher than an ECU defined threshold.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For sensor location see B5100 – Fuel Rail Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see Measuring Pressure in Section 03, Group 140.

For more high-pressure fuel system information, see High-Pressure Fuel System Operation in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

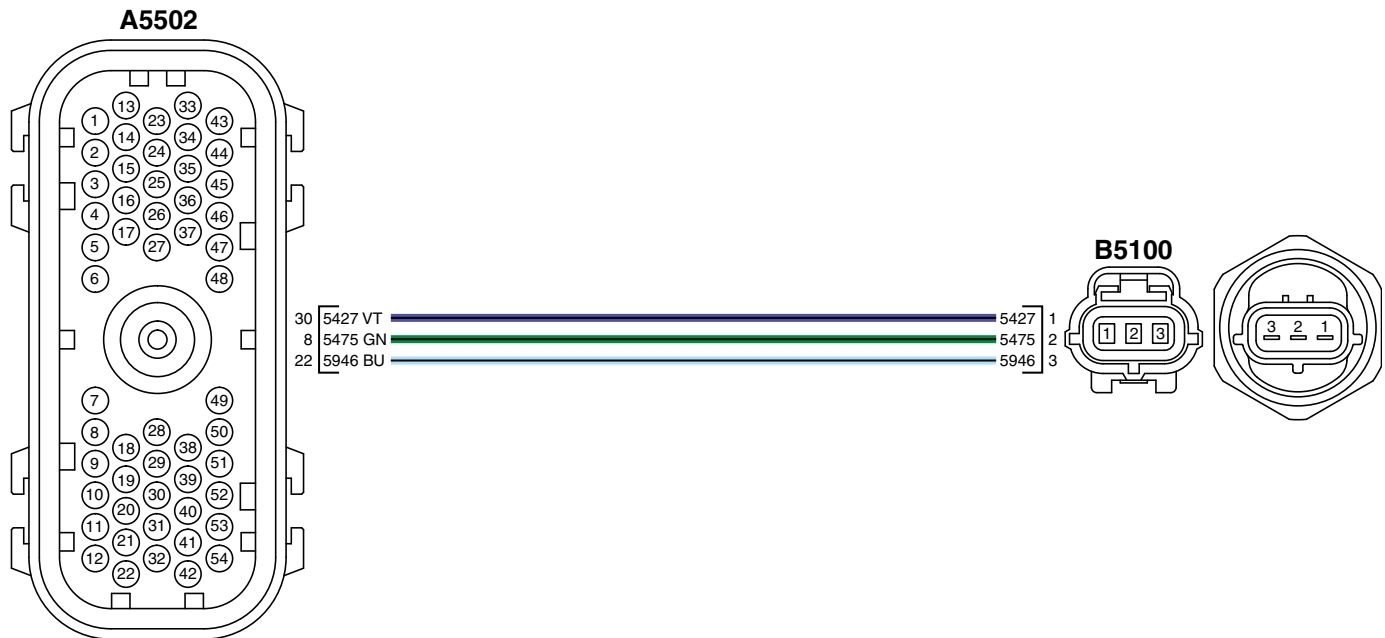
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.



Fuel Rail Pressure Sensor Wiring Diagram

A5502 — 22 — Supply

A5502 — 30 — Return

A5502 — 8 — Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

RG40049,0000A58 -19-26JUL11-2/4

Flex probes:

Sensor

- JDG10456 — Female — Blue/Orange
- JDG10457 — Male — Blue/Orange

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A58 -19-26JUL11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Wait 90 seconds. Refresh DTCs.

Is DTC 000157.16 active?

YES: GO TO High-Pressure Fuel System Check for diagnostics.

NO: GO TO Problem Not Found Procedure

RG40049,0000A58 -19-26JUL11-4/4

000157.17 — Fuel Rail Pressure Signal Slightly Low

The Fuel Rail Pressure signal is slightly lower than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The fuel rail pressure signal is slightly lower than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of three minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 000157.01 – Fuel Rail Pressure Signal Extremely Low.

RG40049,0000A59 -19-22MAR11-1/1

000157.18 — Fuel Rail Pressure Signal Moderately Low

The fuel rail pressure signal is moderately lower than desired.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The ECU has detected that the fuel rail pressure is 5 MPa (50 bar) (725 psi) lower than what the ECU is commanding for a period of 15 seconds.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see [000157.01 – Fuel Rail Pressure Signal Extremely Low](#).

RG40049,0000A5A -19-22MAR11-1/1

**000174.00 — Fuel Temperature Signal
Extremely High**

*The ECU has detected that the fuel temperature
signal is much higher than specification.*

Continued on next page

RG40049,0000A5B -19-26JUL11-1/15

Diagnostic Procedure

Trouble Shooting Sequence:

000110.00
000110.16
000110.15
000174.00

When DTC is Displayed:

When the engine has been running for a minimum of three minutes and the error is active.

Related Information:

The ECU has detected that the fuel temperature signal is much higher than specification.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

Additional References:

For more Fuel Temperature Sensor information, see [B5209 – Fuel Temperature Sensor](#) in Section 03, Group 140.

For more information on measuring temperature, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

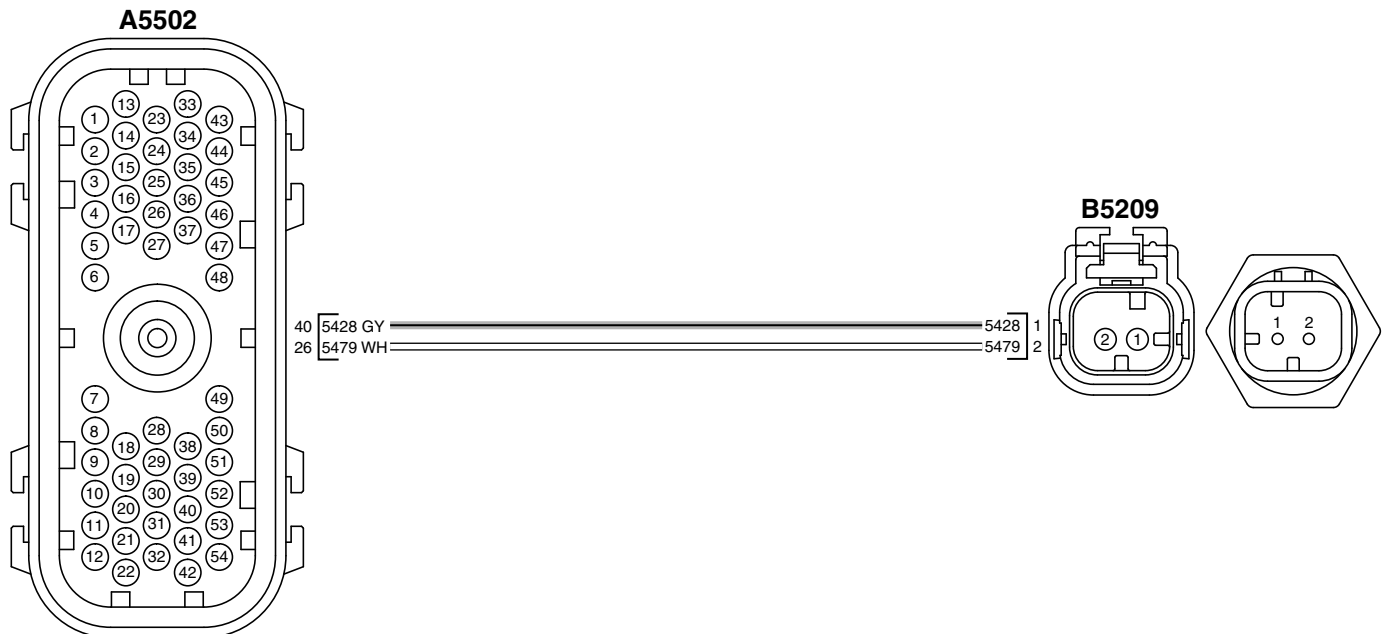
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Fuel Temperature Sensor Wiring Diagram

A5502 — 40 — Signal

A5502 — 26 — Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RG40049,0000A5B -19-26JUL11-2/15

RG17727 —UN—22DEC09

Flex probes:

Sensor

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JDG10273 – Diagnostic Test Box
- JT05719 — Hand Held Digital Tachometer
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A5B -19-26JUL11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

2. Allow engine to sit for five minutes.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

3. Ignition ON, Engine OFF.
4. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
5. In Service ADVISOR perform Control Unit Information and Overview test.
6. Visually inspect fuel cooler (if equipped) for plugging, debris, or damage.
7. Visually inspect for extremely low fuel level in the fuel tank.

Were any problems found?

YES: Repair Problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RG40049,0000A5B -19-26JUL11-4/15

2 Fuel Heater Check

Is your application equipped with a fuel heater?

YES: [GO TO 3](#)

NO: [GO TO 5](#)

RG40049,0000A5B -19-26JUL11-5/15

3 Fuel Heater Disconnected Check

1. Ignition OFF, Engine OFF.
2. Disconnect fuel heater.
3. Ignition ON, engine running.
4. In Service ADVISOR, monitor Fuel Temperature until temperature stabilizes.
5. Refresh codes.

Is DTC 000174.00 active?

YES: [GO TO 5](#)

NO: [GO TO 4](#)

Continued on next page

RG40049,0000A5B -19-26JUL11-6/15

4 Fuel Heater Connected Check

1. Ignition OFF, Engine OFF.
2. Reconnect fuel heater.
3. Ignition ON, engine running.
4. In Service ADVISOR, monitor Fuel Temperature until temperature stabilizes.
5. Refresh codes.

Is DTC 000174.00 active?

YES: Repair fuel heater problem. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RG40049,0000A5B -19-26JUL11-7/15

5 Sensor Check

1. Ignition ON, engine running.
2. In Service ADVISOR, monitor Fuel Temperature until temperature stabilizes.
3. Measure temperature of the fuel near the fuel temperature sensor with [JT07253](#) infrared temperature gun.
4. Compare the readings.

Are the readings within 5° C (9° F) of each other?

YES: Contact DTAC for support.

NO: [GO TO 6](#)

RG40049,0000A5B -19-26JUL11-8/15

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel temperature sensor connector B5209.
3. Perform [Terminal Test](#) on sensor and B5209 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RG40049,0000A5B -19-26JUL11-9/15

7 Circuit Check

1. Connect Diagnostic Test Box:
 - A to B5209 connector female socket 1(+).
 - B to B5209 connector female socket 2(-).
2. Set S1 to position 8 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.

Is voltage between 2.3 and 2.7 V?

YES: Replace fuel temperature sensor. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

Continued on next page

RG40049,0000A5B -19-26JUL11-10/15

Fuel System Diagnostics

8 Terminal Test	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Disconnect ECU connector A5502.</p> <p>3. Perform <u>Terminal Test</u> on A5502 connector female sockets 26 and 40. And corresponding ECU male pins.</p> <p>Were any problems found?</p>	<p>YES: Repair Problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 9</u></p>
9 Continuity Check	<p>1. Measure resistance between A5502 connector female socket 40 and B5209 connector female socket 1.</p> <p>2. Measure resistance between A5502 connector female socket 26 and B5209 connector female socket 2.</p> <p>Are both resistances less than 5 ohms?</p>	<p>YES: <u>GO TO 10</u></p> <p>NO: Repair high resistance in harness. Perform <u>Verification Procedure</u>.</p>
10 Short to Ground Check	<p>On B5209 connector, measure resistance between female socket 1 and single point ground.</p> <p>Is resistance greater than 100k ohms?</p>	<p>YES: <u>GO TO 11</u></p> <p>NO: Repair short in harness. Perform <u>Verification Procedure</u>.</p>
11 Wire to Wire Check	<p>On A5502 connector, measure resistance between female socket 40 and all other sockets in A5502 connector.</p> <p>Are any measurements less than 100k ohms?</p>	<p>YES: Repair short in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 12</u></p>
12 ECU Check	<p><i>NOTE: Many new error codes appear in the next step. Disregard all DTCs except 000174.03.</i></p> <p>1. Ignition ON, Engine OFF.</p> <p>2. Refresh codes.</p> <p>Is DTC 000174.03 active?</p>	<p>YES: Contact DTAC for support.</p> <p>NO: Replace ECU. Perform <u>Verification Procedure</u>.</p>

000174.03 — Fuel Temperature Signal Out Of Range High

The fuel temperature signal exceeds the sensor high voltage specification.

Continued on next page

RG40049,0000A5C -19-23MAR11-1/12

Diagnostic Procedure

Troubleshooting Sequence:

000174.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The fuel temperature sensor signal voltage to the ECU corresponds to a temperature higher than what is physically possible for the fuel temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for fuel temperature.

Additional References:

For sensor location see [B5209 — Fuel Temperature Sensor](#) in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

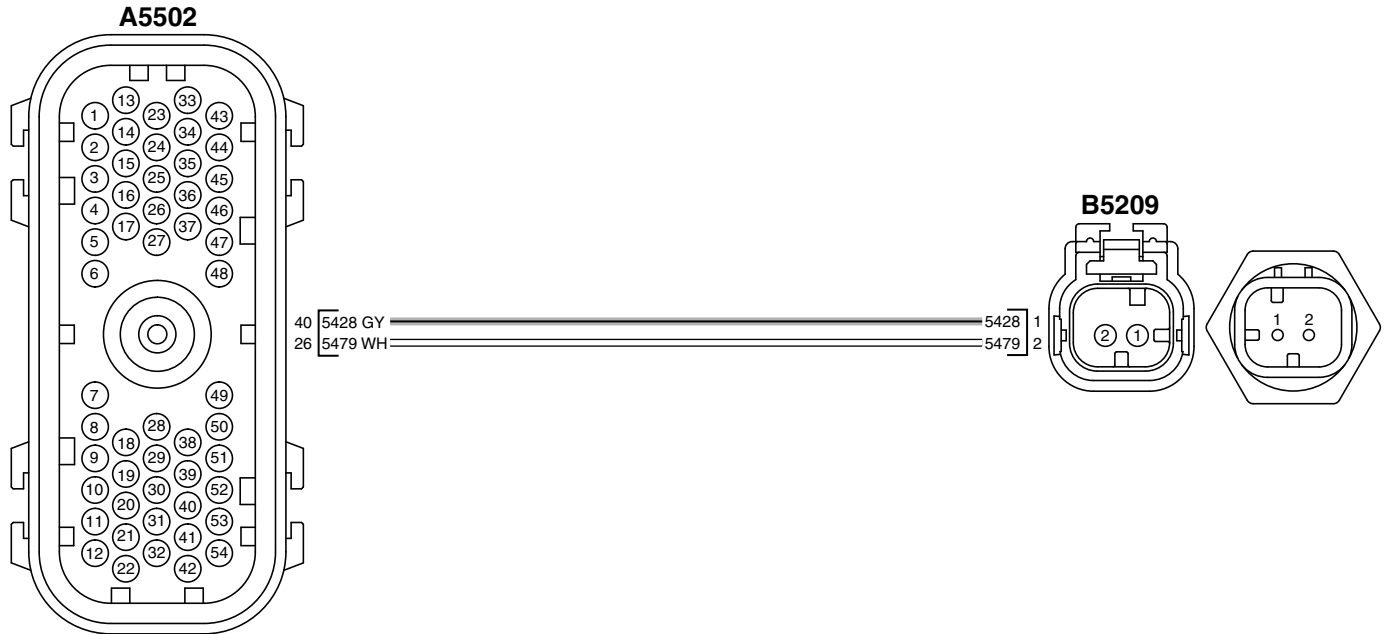
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Fuel Temperature Sensor Wiring Diagram

A5502 — 40 — Signal

A5502 — 26 — Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG17727 —UN—22DEC09

Continued on next page

RG40049,0000A5C -19-23MAR11-2/12

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A5C -19-23MAR11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 000174.03 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

RG40049,0000A5C -19-23MAR11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel temperature sensor connector B5209.
3. Perform [Terminal Test](#) on sensor and B5209 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RG40049,0000A5C -19-23MAR11-5/12

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5209 connector female socket 1 (+).
 - B to B5209 connector female socket 2 (-).
2. Set S1 to position 8 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 4](#)

NO: Voltage greater than 2.7 V. [GO TO Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 6](#)

Continued on next page

RG40049,0000A5C -19-23MAR11-6/12

Fuel System Diagnostics

4 Software Check

In Service ADVISOR, monitor Fuel Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RG40049,0000A5C -19-23MAR11-7/12

5 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000174.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A5C -19-23MAR11-8/12

6 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing [Wiggle Test](#).

Does voltage now remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform [Verification Procedure](#).

NO: Repair open in signal wire. Perform [Verification Procedure](#).

RG40049,0000A5C -19-23MAR11-9/12

7 Wiggle Test

1. In Service ADVISOR, monitor Fuel Temperature Input Voltage.
2. Perform [Wiggle Test](#).

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A5C -19-23MAR11-10/12

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel temperature sensor connector B5209.
3. Perform [Terminal Test](#) on sensor and connector B5209.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 9](#)

Continued on next page

RG40049,0000A5C -19-23MAR11-11/12

9 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform Terminal Test on A5502 connector female sockets 26 and 40. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RG40049,0000A5C -19-23MAR11-12/12

**000174.04 — Fuel Temperature Signal Out
Of Range Low**

*The fuel temperature signal is lower than the sensor
low voltage specification.*

Continued on next page

RG40049,0000A5D -19-23MAR11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

000174.03

000174.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The fuel temperature sensor signal voltage to the ECU corresponds to a temperature lower than what is physically possible for the fuel temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for fuel temperature.

Additional References:

For sensor location see B5209 — Fuel Temperature Sensor in Section 03, Group 140.

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

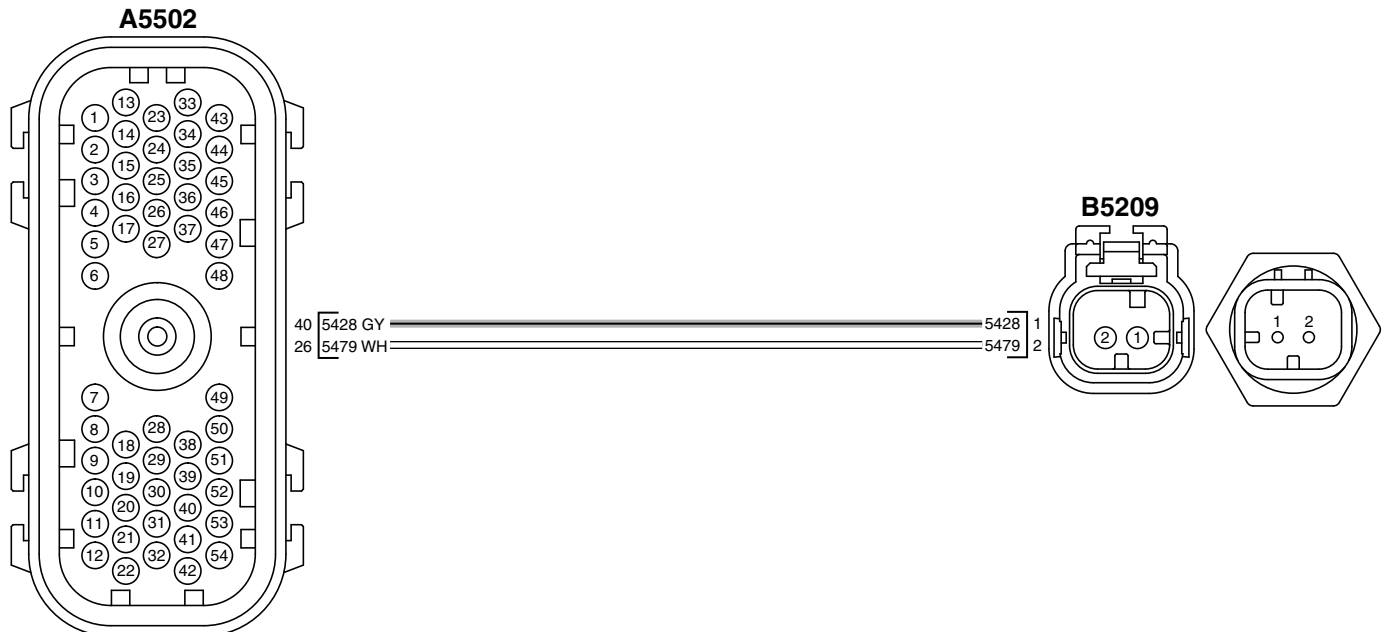
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.



Fuel Temperature Sensor Wiring Diagram

A5502 — 40 — Signal

A5502 — 26 — Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG17727 —UN—22DEC09

Continued on next page

RG40049,0000A5D -19-23MAR11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A5D -19-23MAR11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000174.03 a stored code?

YES: GO TO [000174.03 — Fuel Temperature Signal Out Of Range High](#) procedure.

NO: [GO TO 2](#)

RG40049,0000A5D -19-23MAR11-4/15

2 Code Check

Is DTC 000174.04 active?

YES: [GO TO 3](#)

NO: [GO TO 10](#)

RG40049,0000A5D -19-23MAR11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel temperature sensor connector B5209.
3. Perform [Terminal Test](#) on sensor and B5209 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#)

NO: [GO TO 4](#)

Continued on next page

RG40049,0000A5D -19-23MAR11-6/15

Fuel System Diagnostics

4 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5209 connector female socket 1 (+).
 - B to B5209 connector female socket 2 (-).
2. Set S1 to position 7 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 5

NO: GO TO 7

RG40049,0000A5D -19-23MAR11-7/15

5 Software Check

In Service ADVISOR, monitor Fuel Temperature Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform Verification Procedure.

NO: GO TO 6

RG40049,0000A5D -19-23MAR11-8/15

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000174.04 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: Perform Verification Procedure.

RG40049,0000A5D -19-23MAR11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502 .
3. Perform Terminal Test on A5502 connector female sockets 26 and 40. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 8

RG40049,0000A5D -19-23MAR11-10/15

8 Harness Check

NOTE: Many new error codes appear in the next step. Disregard all DTCs except 000174.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 000174.03 active?

YES: GO TO 9

NO: Replace ECU.
Perform Verification Procedure.

Continued on next page

RG40049,0000A5D -19-23MAR11-11/15

Fuel System Diagnostics

9 Continuity Check

Measure resistance between A5502 connector female socket 40 and B5209 connector female socket 1.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mispin in harness. Perform [Verification Procedure](#).

RG40049,0000A5D -19-23MAR11-12/15

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Fuel Temperature Input Voltage.
3. Perform [Wiggle Test](#).

Does voltage ever go below 0.2 V?

YES: Repair short to ground on signal wire. Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A5D -19-23MAR11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel temperature sensor connector B5209.
3. Perform [Terminal Test](#) on sensor and B5209 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A5D -19-23MAR11-14/15

12 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform [Terminal Test](#) on A5502 connector female sockets 40 and 26. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RG40049,0000A5D -19-23MAR11-15/15

000174.16 — Fuel Temperature Signal Moderately High

The fuel temperature signal is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The fuel temperature signal is moderately higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of three minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see [000174.00 – Fuel Temperature Signal Extremely High](#).

RG40049,0000A5E -19-23MAR11-1/1

000611.03 — Injector Drive #1 Shorted to Voltage Source

The ECU detected a short to voltage on injector drive #1 circuit.

Continued on next page

RG40049,0000A5F -19-25MAR11-1/14

Diagnostic Procedure

Troubleshooting Sequence: 000611.03

When DTC is Displayed:

When the engine is cranking, running, or during Harness Diagnostic Mode Test.

Related Information:

The ECU detected a short to voltage on injector drive #1 circuit.

The ECU supplies injectors #1 and #4 from high voltage injector driver #1.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more electronic injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the harness diagnostic mode test, see [Harness Diagnostic Mode Test Instructions](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

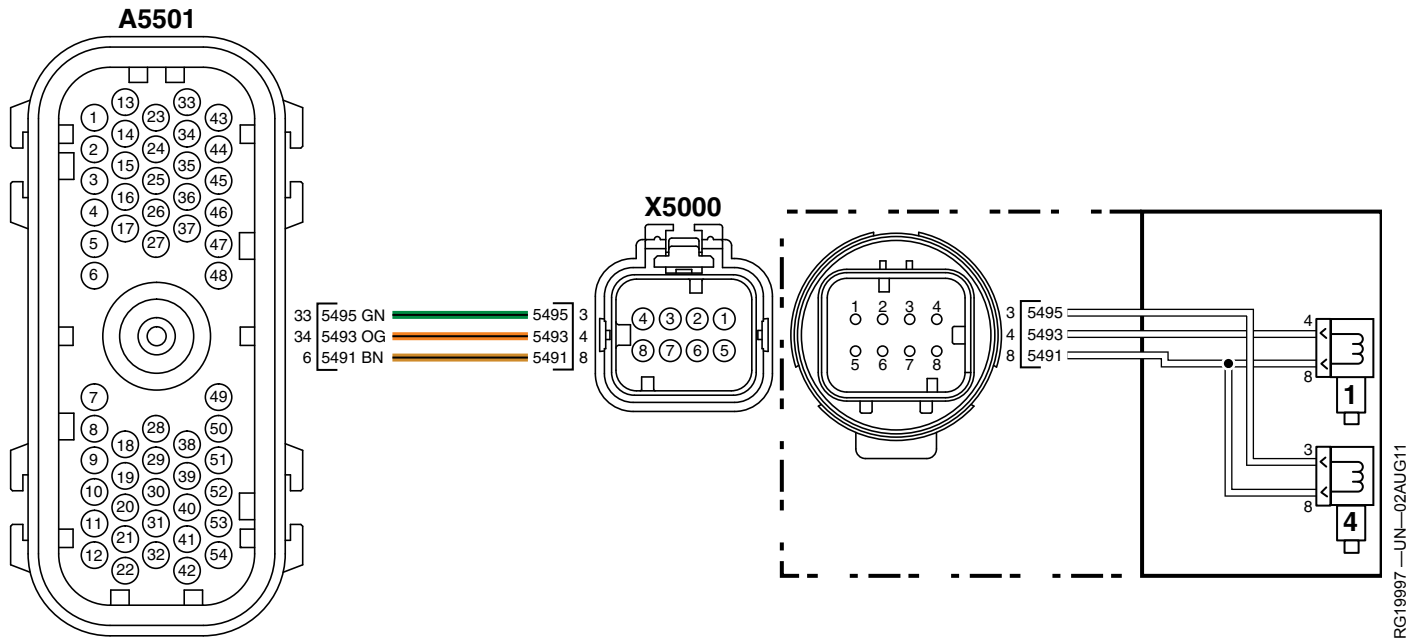
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Injector Drive #1 Wiring Diagram

A5501-34—Injector #1 Return

A5501-6—Injector #1 Supply

A5501-6—Injector #4 Supply

A5501-33—Injector #4 Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RG40049,0000A5F -19-25MAR11-2/14

Flex probes:

Sensor

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A5F -19-25MAR11-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode test.

Is DTC 000611.03 active?

YES: GO TO 2

NO: GO TO 9

RG40049,0000A5F -19-25MAR11-4/14

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine and harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A5F -19-25MAR11-5/14

3 Unswitched Voltage Check

On X5000 connector, measure voltage between:

- Female socket 8 (+) and single point ground (-).
- Female socket 4 (+) and single point ground (-).
- Female socket 3 (+) and single point ground (-).

Are any voltages above 7 V?

YES: Repair short to unswitched battery source.
Perform Verification Procedure.

NO: GO TO 4

Continued on next page

RG40049,0000A5F -19-25MAR11-6/14

Fuel System Diagnostics

4 Switched Voltage Check

1. Ignition ON, Engine OFF.

2. On X5000 connector, measure voltage between:

- Female socket 8 (+) and single point ground (-).
- Female socket 4 (+) and single point ground (-).
- Female socket 3 (+) and single point ground (-).

Are any voltages above 7 V?

YES: [GO TO 5](#)

NO: [GO TO 9](#)

RG40049,0000A5F -19-25MAR11-7/14

5 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501.

3. Perform [Terminal Test](#) on A5501 connector female sockets 6, 33, and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000A5F -19-25MAR11-8/14

6 Wire to Wire Short Check

On A5501 connector, measure resistance between:

- Female socket 6 and all other terminals in A5501.
- Female socket 33 and all other terminals in A5501.
- Female socket 34 and all other terminals in A5501.

Are any resistances less than 100K ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RG40049,0000A5F -19-25MAR11-9/14

7 Terminal Test

1. Disconnect all other ECU connectors.

2. Perform [Terminal Test](#) on all ECU connectors.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A5F -19-25MAR11-10/14

8 Wire to Wire Short Check

On A5501 connector, measure resistance between:

- Female socket 6 and all other terminals in all other ECU connectors.
- Female socket 33 and all other terminals in all other ECU connectors.
- Female socket 34 and all other terminals in all other ECU connectors.

Are any resistance readings less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

Continued on next page

RG40049,0000A5F -19-25MAR11-11/14

Fuel System Diagnostics

9 Wiggle Test

1. Ignition OFF, Engine OFF
2. Reconnect all components and connectors.
3. Ignition ON, Engine OFF
4. In Service ADVISOR, monitor Injector Drive #1 Diagnostic Voltage.
5. Perform Wiggle Test.

Does voltage ever go greater than 0.400 V?

YES: Repair problem in harness. Perform Verification Procedure.

NO: GO TO 10

RG40049,0000A5F -19-25MAR11-12/14

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets. And ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 11

RG40049,0000A5F -19-25MAR11-13/14

11 Wire to Wire Short Check

On A5501 connector, measure resistance between female socket 6 and all sockets in A5501 connector.

Are any resistances less than 100K ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RG40049,0000A5F -19-25MAR11-14/14

000611.04 — Injector Drive #1 Shorted to Ground

The ECU detected a short to ground on injector drive #1 circuit.

Continued on next page

RG40049,0000A60 -19-26JUL11-1/15

Diagnostic Procedure

Troubleshooting Sequence: 000611.04

When DTC is Displayed:

When the engine is cranking, running, or during Harness Diagnostic Mode Test.

Related Information:

The ECU detected a short to ground on injector drive #1 circuit.

The ECU supplies injectors #1 and #4 from high voltage injector driver #1.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more Electronic Injector (EI) information, see Electronic Injector (EI) Operation in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

For more information on the Harness Diagnostic Mode Test, see Harness Diagnostic Mode Test Instructions in Section 04, Group 160.

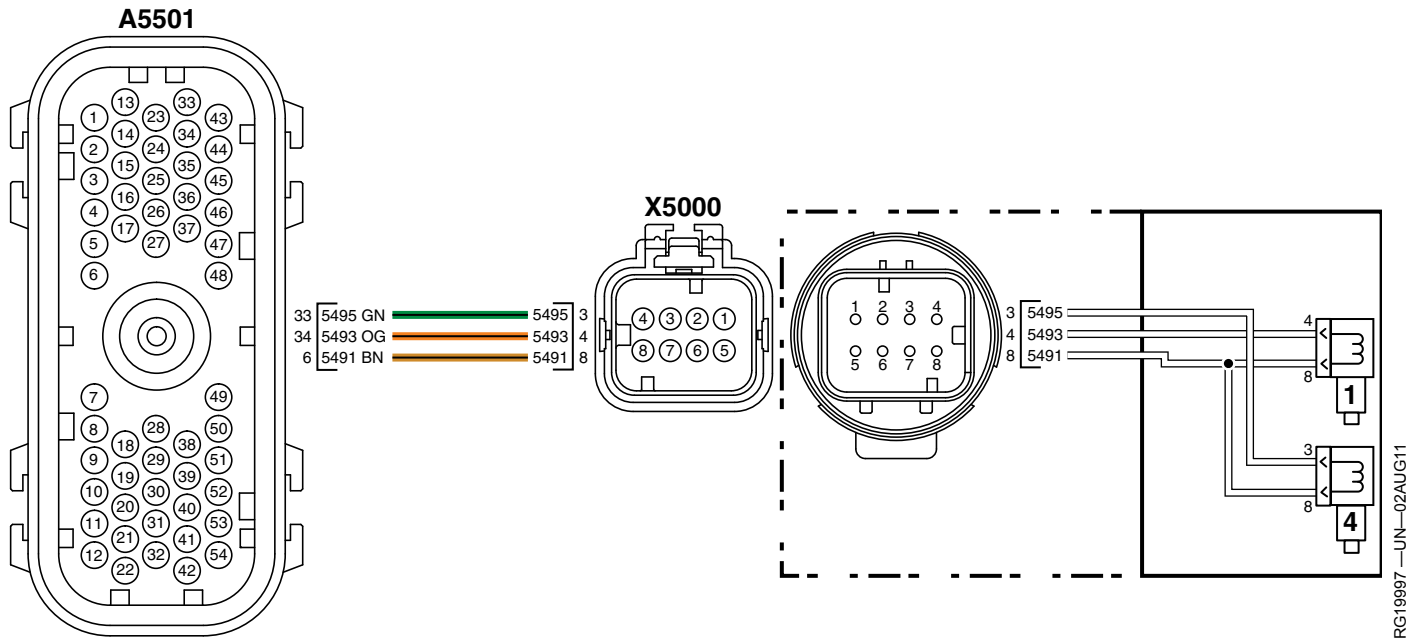
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 1

located in Section 06, Group 210.



Injector Drive #1 Wiring Diagram

A5501-34—Injector #1 Return

A5501-6—Injector #1 Supply

A5501-6—Injector #4 Supply

A5501-33—Injector #4 Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

RG40049,0000A60 -19-26JUL11-2/15

Flex probes:

Sensor

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A60 -19-26JUL11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.
6. Refresh codes.

Is DTC 000611.04 active?

YES: GO TO 2

NO: GO TO 12

RG40049,0000A60 -19-26JUL11-4/15

2 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501.

3. Perform Terminal Test on A5501 connector female sockets 6, 33, and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A60 -19-26JUL11-5/15

3 Internal ECU Check

1. Ignition ON, Engine OFF

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.
3. Refresh codes.

Is DTC 000611.04 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 4

RG40049,0000A60 -19-26JUL11-6/15

4 Short to Ground Check

On A5501 connector, measure resistance between female sockets:

- 6 and single point ground.
- 34 and single point ground.
- 33 and single point ground.

Are any resistances less than 100k ohms?

YES: GO TO 5

NO: GO TO 12

Continued on next page

RG40049,0000A60 -19-26JUL11-7/15

Fuel System Diagnostics

5 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine and harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 6

RG40049,0000A60 -19-26JUL11-8/15

6 Short to Ground Check

On A5501 connector, measure resistance between female sockets:

- 6 and single point ground.
- 34 and single point ground.
- 33 and single point ground.

Are any resistances less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 7

RG40049,0000A60 -19-26JUL11-9/15

7 Injector Wiring Harness Inspection

1. Gain access to fuel injectors by removing rocker arm cover.
2. Remove injector wiring harness ring terminals from injectors #1 and #4.
3. Visually inspect injector wiring harness for physical damage.

Are any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 8

RG40049,0000A60 -19-26JUL11-10/15

8 Short to Ground Check

Measure resistance between:

- Injector #1 ring terminal 4 and single point ground.
- Injector #1 ring terminal 8 and single point ground.
- Injector #4 ring terminal 3 and single point ground.
- Injector #4 ring terminal 8 and single point ground.

Are any resistances less than 100k ohms?

YES: Replace injector wiring harness. Perform Verification Procedure.

NO: GO TO 9

RG40049,0000A60 -19-26JUL11-11/15

9 Injector Check

1. Measure resistance between one of the male terminals on injector #1 and single point ground.
2. Measure resistance between other male terminal on injector #1 and single point ground.

Are any resistances less than 100k ohms?

YES: Replace injector #1. Perform Verification Procedure.

NO: GO TO 10

Continued on next page

RG40049,0000A60 -19-26JUL11-12/15

Fuel System Diagnostics

10 Injector Check

1. Measure resistance between one of the male terminals on injector #4 and single point ground.
2. Measure resistance between other male terminal on injector #4 and single point ground.

Are any resistances less than 100k ohms?

YES: Replace injector #4. Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A60 -19-26JUL11-13/15

11 Internal ECU Check

1. Ignition OFF, Engine OFF
2. Reconnect all components and connectors.
3. Ignition ON, Engine OFF
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.
5. Refresh codes.

Is DTC 000611.04 active?

YES: Replace ECU. Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A60 -19-26JUL11-14/15

12 Wiggle Test

1. Ignition OFF, Engine OFF
2. Reconnect all components and connectors.
3. Gain access to fuel injectors by removing rocker arm cover.
4. Visually inspect injector wiring harness for physical damage.
5. Ignition ON, Engine OFF
6. In Service ADVISOR, monitor Injector Drive #1 Diagnostic Voltage.
7. Perform [Wiggle Test](#).

Does voltage ever go less than 0.100 V?

YES: Repair problem in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RG40049,0000A60 -19-26JUL11-15/15

000612.03 — Injector Drive #2 Shorted to Voltage Source

The ECU detected a short to voltage on injector drive #2 circuit.

Continued on next page

RG40049,0000A61 -19-25MAR11-1/14

Diagnostic Procedure

Troubleshooting Sequence: 000612.03

When DTC is Displayed:

When the engine is cranking, running, or during Harness Diagnostic Mode Test.

Related Information:

The ECU detected a short to voltage on injector drive #2 circuit.

The ECU supplies injectors #2 and #3 from high voltage injector driver #2.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more electronic injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the harness diagnostic mode test, see [Harness Diagnostic Mode Test Instructions](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

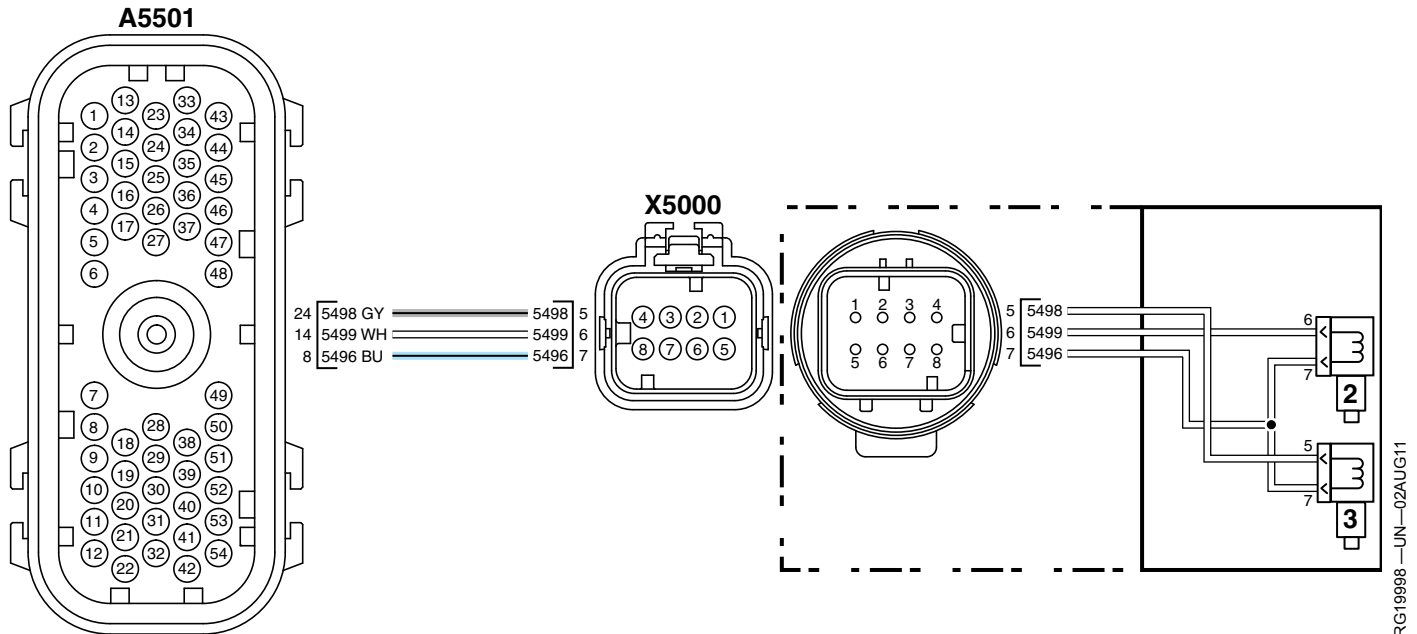
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Injector Drive #2 Wiring Diagram

A5501-14—Injector #2 Return

A5501-8—Injector #2 Supply

A5501-8—Injector #3 Supply

A5501-24—Injector #3 Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

Sensor

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A61 -19-25MAR11-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode test.

Is DTC 000612.03 active?

YES: GO TO 2

NO: GO TO 9

RG40049,0000A61 -19-25MAR11-4/14

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine and harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A61 -19-25MAR11-5/14

3 Unswitched Voltage Check

On X5000 connector, measure voltage between:

- Female socket 5 (+) and single point ground (-).
- Female socket 6 (+) and single point ground (-).
- Female socket 7 (+) and single point ground (-).

Are any voltages above 7 V?

YES: Repair short to unswitched battery source.
Perform Verification Procedure.

NO: GO TO 4

Continued on next page

RG40049,0000A61 -19-25MAR11-6/14

Fuel System Diagnostics

4 Switched Voltage Check

1. Ignition ON, Engine OFF.

2. On X5000 connector, measure voltage between:

- Female socket 5 (+) and single point ground (-).
- Female socket 6 (+) and single point ground (-).
- Female socket 7 (+) and single point ground (-).

Are any voltages above 7 V?

YES: [GO TO 5](#)

NO: [GO TO 9](#)

RG40049,0000A61 -19-25MAR11-7/14

5 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501.

3. Perform [Terminal Test](#) on A5501 connector female sockets 8, 14, and 24. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000A61 -19-25MAR11-8/14

6 Wire to Wire Short Check

On A5501 connector, measure resistance between:

- Female socket 8 and all other terminals in A5501.
- Female socket 14 and all other terminals in A5501.
- Female socket 24 and all other terminals in A5501.

Are any resistances less than 100K ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RG40049,0000A61 -19-25MAR11-9/14

7 Terminal Test

1. Disconnect all other ECU connectors.

2. Perform [Terminal Test](#) on all ECU connectors.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A61 -19-25MAR11-10/14

8 Wire to Wire Short Check

On A5501 connector, measure resistance between:

- Female socket 8 and all other terminals in all other ECU connectors.
- Female socket 14 and all other terminals in all other ECU connectors.
- Female socket 24 and all other terminals in all other ECU connectors.

Are any resistance readings less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

Continued on next page

RG40049,0000A61 -19-25MAR11-11/14

Fuel System Diagnostics

9 Wiggle Test

1. Ignition OFF, Engine OFF
2. Reconnect all components and connectors.
3. Ignition ON, Engine OFF
4. In Service ADVISOR, monitor Injector Drive #2 Diagnostic Voltage.
5. Perform Wiggle Test.

Does voltage ever go greater than 0.400 V?

YES: Repair problem in harness. Perform Verification Procedure.

NO: GO TO 10

RG40049,0000A61 -19-25MAR11-12/14

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets. And ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 11

RG40049,0000A61 -19-25MAR11-13/14

11 Wire to Wire Short Check

On A5501 connector, measure resistance between female socket 8 and all sockets in A5501 connector.

Are any resistances less than 100K ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RG40049,0000A61 -19-25MAR11-14/14

000612.04 — Injector Drive #2 Shorted to Ground

The ECU detected a short to ground on injector drive #2 circuit.

Continued on next page

RG40049,0000A62 -19-26JUL11-1/15

Diagnostic Procedure

Troubleshooting Sequence: 000612.04

When DTC is Displayed:

When the engine is cranking, running, or during Harness Diagnostic Mode Test.

Related Information:

The ECU detected a short to ground on injector drive #2 circuit.

The ECU supplies injectors #2 and #3 from high voltage injector driver #2.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more Electronic Injector (EI) information, see Electronic Injector (EI) Operation in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

For more information on the Harness Diagnostic Mode Test, see Harness Diagnostic Mode Test Instructions in Section 04, Group 160.

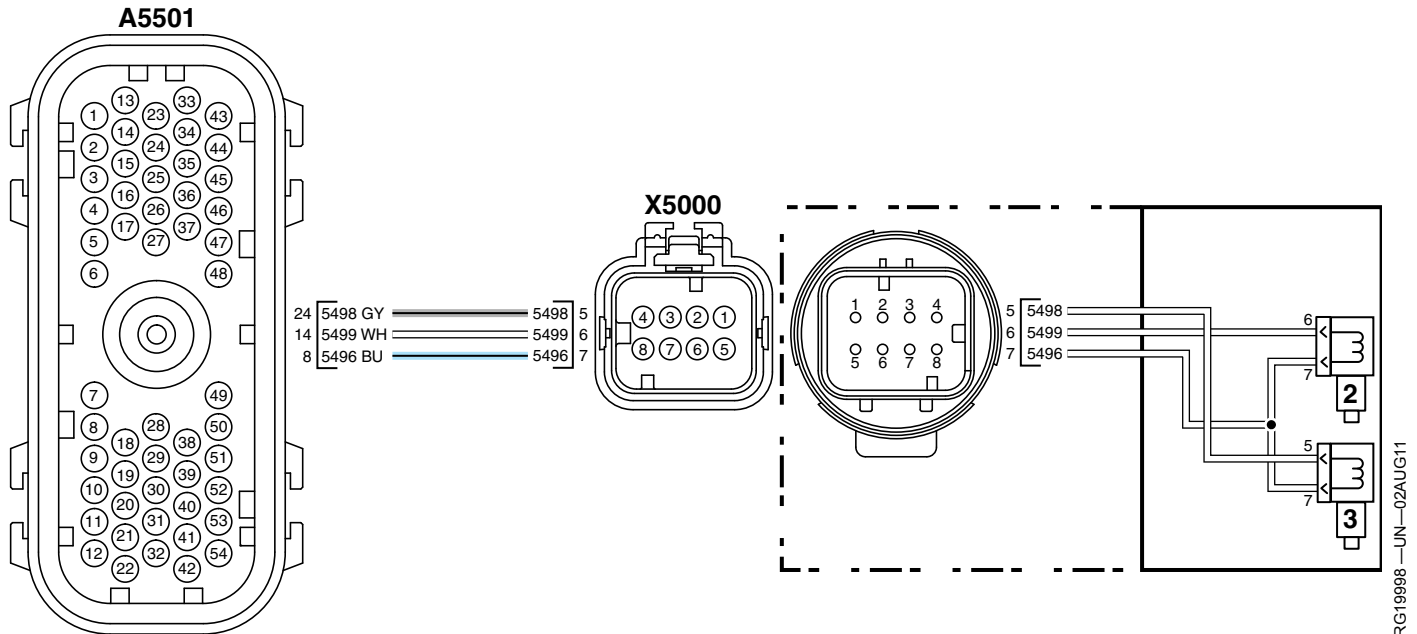
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 1

located in Section 06, Group 210.



Injector Drive #2 Wiring Diagram

A5501-14—Injector #2 Return

A5501-8—Injector #2 Supply

A5501-8—Injector #3 Supply

A5501-24—Injector #3 Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

RG40049,0000A62 -19-26JUL11-2/15

Flex probes:

Sensor

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A62 -19-26JUL11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.
6. Refresh codes.

Is DTC 000612.04 active?

YES: GO TO 2

NO: GO TO 12

RG40049,0000A62 -19-26JUL11-4/15

2 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501.

3. Perform Terminal Test on A5501 connector female sockets 8, 14, and 24. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A62 -19-26JUL11-5/15

3 Internal ECU Check

1. Ignition ON, Engine OFF

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.
3. Refresh codes.

Is DTC 000612.04 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 4

RG40049,0000A62 -19-26JUL11-6/15

4 Short to Ground Check

On A5501 connector, measure resistance between female sockets:

- 8 and single point ground.
- 14 and single point ground.
- 24 and single point ground.

Are any resistances less than 100k ohms?

YES: GO TO 5

NO: GO TO 12

Continued on next page

RG40049,0000A62 -19-26JUL11-7/15

5 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect injector harness connector X5000. 3. Perform <u>Terminal Test</u> on engine and harness sides of connector. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 6</u></p>
6 Short to Ground Check	<p>On A5501 connector, measure resistance between female sockets:</p> <ul style="list-style-type: none"> • 8 and single point ground. • 14 and single point ground. • 24 and single point ground. <p>Are any resistances less than 100k ohms?</p>	<p>YES: Repair short in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 7</u></p>
7 Injector Wiring Harness Inspection	<ol style="list-style-type: none"> 1. Gain access to fuel injectors by removing rocker arm cover. 2. Remove injector wiring harness ring terminals from injectors #2 and #3. 3. Visually inspect injector wiring harness for physical damage. <p>Are any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 8</u></p>
8 Short to Ground Check	<p>Measure resistance between:</p> <ul style="list-style-type: none"> • Injector #2 ring terminal 6 and single point ground. • Injector #2 ring terminal 7 and single point ground. • Injector #3 ring terminal 5 and single point ground. • Injector #3 ring terminal 7 and single point ground. <p>Are any resistances less than 100k ohms?</p>	<p>YES: Replace injector wiring harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 9</u></p>
9 Injector Check	<ol style="list-style-type: none"> 1. Measure resistance between one of the male terminals on injector #2 and single point ground. 2. Measure resistance between other male terminal on injector #2 and single point ground. <p>Are any resistances less than 100k ohms?</p>	<p>YES: Replace injector #2. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 10</u></p>

Continued on next page

Fuel System Diagnostics

10 Injector Check

1. Measure resistance between one of the male terminals on injector #3 and single point ground.
2. Measure resistance between other male terminal on injector #3 and single point ground.

Are any resistances less than 100k ohms?

YES: Replace injector #3. Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A62 -19-26JUL11-13/15

11 Internal ECU Check

1. Ignition OFF, Engine OFF
2. Reconnect all components and connectors.
3. Ignition ON, Engine OFF
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.
5. Refresh codes.

Is DTC 000612.04 active?

YES: Replace ECU. Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A62 -19-26JUL11-14/15

12 Wiggle Test

1. Ignition OFF, Engine OFF
2. Reconnect all components and connectors.
3. Gain access to fuel injectors by removing rocker arm cover.
4. Visually inspect injector wiring harness for physical damage.
5. Ignition ON, Engine OFF
6. In Service ADVISOR, monitor Injector Drive #2 Diagnostic Voltage.
7. Perform [Wiggle Test](#).

Does voltage ever go less than 0.100 V?

YES: Repair problem in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RG40049,0000A62 -19-26JUL11-15/15

000651.02 — Injector #1 Part Number Data Invalid

The ECU detects an invalid injector part number has been entered into the ECU.

RG40049,0000A63 -19-25MAR11-1/7

Diagnostic Procedure

Troubleshooting Sequence: 000651.02

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects an invalid injector part number for injector #1 has been entered into the ECU. Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more fuel injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more fuel system information, see [High-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more electronic injector calibration information, see [Electronic Injector – Calibration Information](#) in Section 04, Group 160.

RG40049,0000A63 -19-25MAR11-2/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000651.02 active?

YES: [GO TO 2](#)

NO: [GO TO 5](#)

RG40049,0000A63 -19-25MAR11-3/7

2 Check Injector Part Number

Compare the current injector part number from the Control Unit Information and Overview Test to the part number listed on the injector data sheet.

NOTE: If datasheet is unavailable, the injector part number must be read off the injector body

Do the part numbers match?

YES: [GO TO 3](#)

NO: In Service ADVISOR, perform Electronic Injector Calibration using correct information. Perform [Verification Procedure](#).

Continued on next page

RG40049,0000A63 -19-25MAR11-4/7

Fuel System Diagnostics

3 Verify Correct Part

Verify that you have the correct electronic injector for the engine.

YES: [GO TO 4](#)

Was the correct injector installed?

NO: Install proper injector. In Service ADVISOR, perform Electronic Injector Calibration. Perform [Verification Procedure](#).

RG40049,0000A63 -19-25MAR11-5/7

4 ECU Reprogram

Check to see if there is a software update for the engine.

YES: Download engine payload and reprogram ECU. Perform [Verification Procedure](#).

Was a software update available?

NO: Contact DTAC.

RG40049,0000A63 -19-25MAR11-6/7

5 Clear DTCs

1. Clear DTCs.

2. Ignition OFF, Engine OFF for at least 90 seconds.

3. Ignition ON, Engine OFF.

4. Refresh codes.

Is DTC 000651.02 active?

YES: [GO TO 2](#)

NO: Perform [Verification Procedure](#).

RG40049,0000A63 -19-25MAR11-7/7

000651.05 — Injector #1 Circuit Has High Resistance

The ECU detected high resistance in the injector #1 circuit.

Continued on next page

RG40049,0000A64 -19-25MAR11-1/16

Diagnostic Procedure

Troubleshooting Sequence:

000611.03
002797.03
000651.05

When DTC is Displayed:

When the engine is cranking or running.

During Harness Diagnostic Mode Test in Service ADVISOR if the Fuel Rail Pressure is below 5 MPa (50 bar) (725 psi).

Related Information:

The ECU detected high resistance in the injector #1 circuit.

The ECU supplies injectors #1 and #4 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

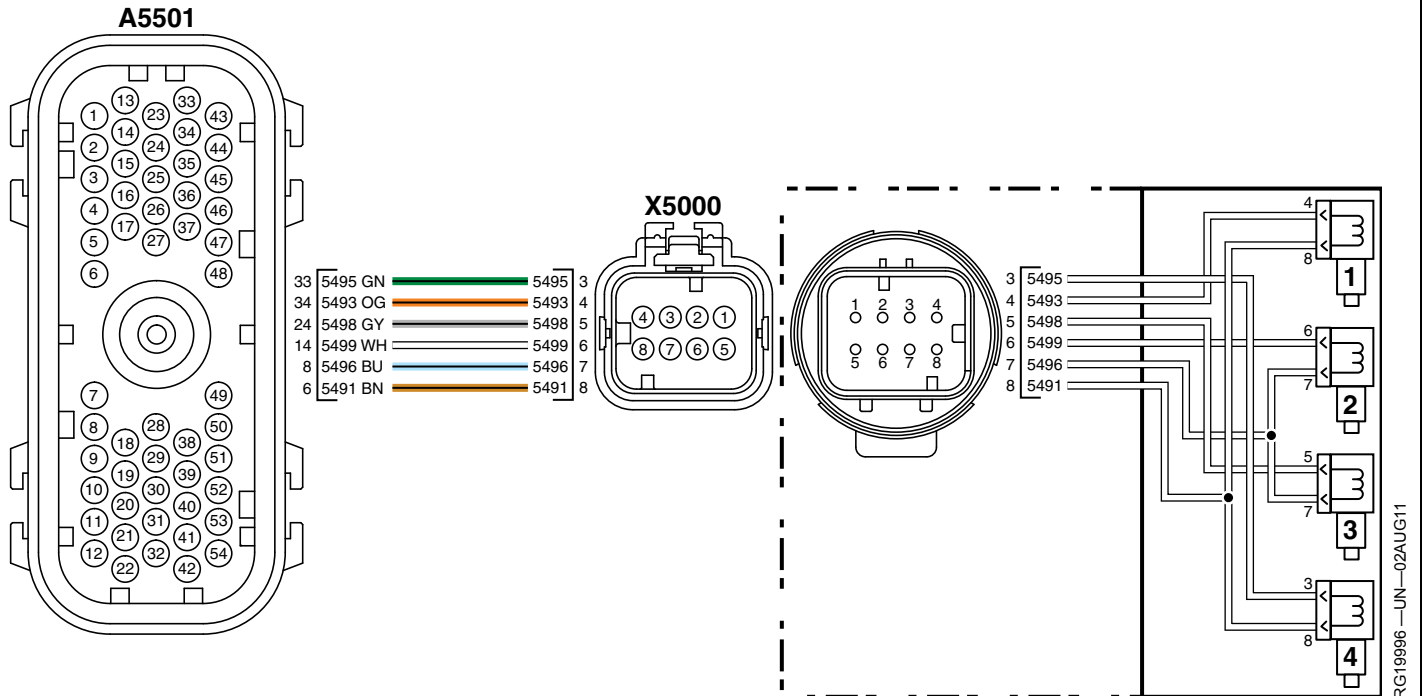
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



A5501—34—Injector #1 Return
A5501—6—Injector #1 Supply
A5501—14—Injector #2 Return

A5501—8—Injector #2 Supply
A5501—24—Injector #3 Return
A5501—8—Injector #3 Supply

A5501—33—Injector #4 Return
A5501—6—Injector #4 Supply

Continued on next page

RG40049,0000A64 -19-25MAR11-2/16

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A64 -19-25MAR11-3/16

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor Fuel Rail Pressure - Actual and verify that it is below 5 MPa. (50 bar) (725 psi.)
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.05 active?

YES: GO TO 2

NO: GO TO 10

RG40049,0000A64 -19-25MAR11-5/16

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A64 -19-25MAR11-5/16

3 Injector and Harness Check

1. Use JDG10466 flex probe kit to connect a jumper wire between female terminals X5000-4 and X5000-8.

2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.06 active?

YES: GO TO 4

NO: GO TO 7

Continued on next page

RG40049,0000A64 -19-25MAR11-6/16

Fuel System Diagnostics

4 Injector and Harness Check

1. Ignition OFF, Engine OFF.
 2. Remove jumper and reconnect X5000.
 3. Ignition ON, Engine OFF.
 4. In Service ADVISOR, perform Harness Diagnostic Mode Test.
- Is DTC 000651.05 active?

YES: [GO TO 5](#)

NO: [GO TO 10](#)

RG40049,0000A64 -19-25MAR11-7/16

5 Check Injector Harness Terminals

1. Ignition OFF, Engine OFF.
2. Gain access to fuel injectors by removing the rocker arm cover.
3. Inspect the terminals and nuts for Injector #1.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000A64 -19-25MAR11-8/16

6 Injector Harness Check

1. Connect alligator clips and jumper wire between the terminals on Injector #1.
2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.05 active?

YES: Replace Injector Harness. Perform [Verification Procedure](#).

NO: Replace Injector #1. Perform [Verification Procedure](#).

RG40049,0000A64 -19-25MAR11-9/16

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform [Terminal Test](#) on A5501 connector female sockets 6 and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A64 -19-25MAR11-10/16

8 Open Circuit Check

1. Measure resistance between A5501 connector female socket 34 and X5000 connector female socket 4 while performing [Wiggle Test](#).
 2. Measure resistance between A5501 connector female socket 6 and X5000 connector female socket 8 while performing [Wiggle Test](#).
- Are both resistances less than 5 ohms?

YES: [GO TO 9](#)

NO: Repair open or high resistance in harness.
Perform [Verification Procedure](#).

Continued on next page

RG40049,0000A64 -19-25MAR11-11/16

Fuel System Diagnostics

9 Controller Check

1. Reconnect all connectors.
2. Ignition ON, Engine OFF
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.05 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RG40049,0000A64 -19-25MAR11-12/16

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform [Terminal Test](#) on engine and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A64 -19-25MAR11-13/16

11 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 6 and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A64 -19-25MAR11-14/16

12 Wiggle Test

1. Measure resistance between A5501 connector female socket 34 and X5000 connector female socket 4 while performing [Wiggle Test](#).
2. Measure resistance between A5501 connector female socket 6 and X5000 connector female socket 8 while performing [Wiggle Test](#).

Is either resistance ever greater than 5 ohms?

YES: Repair open or high resistance in harness.
Perform [Verification Procedure](#).

NO: [GO TO 13](#)

RG40049,0000A64 -19-25MAR11-15/16

13 Terminal Test

1. Gain access to fuel injectors by removing the rocker arm cover.
2. Inspect the injector terminals for loose nuts or poor crimps.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: Contact DTAC.

RG40049,0000A64 -19-25MAR11-16/16

000651.06 — Injector #1 Circuit Has Low Resistance

The ECU detected low resistance in the injector #1 circuit.

Continued on next page

RG40049,0000A65 -19-28JUL11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

000611.03

002797.03

000651.06

When DTC is Displayed:

When the engine is cranking or running.

During Harness Diagnostic Mode Test in Service ADVISOR if the Fuel Rail Pressure is below 5 MPa (50 bar) (725 psi).

Related Information:

The ECU detected low resistance in the injector #1 circuit.

The ECU supplies injectors #1 and #4 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

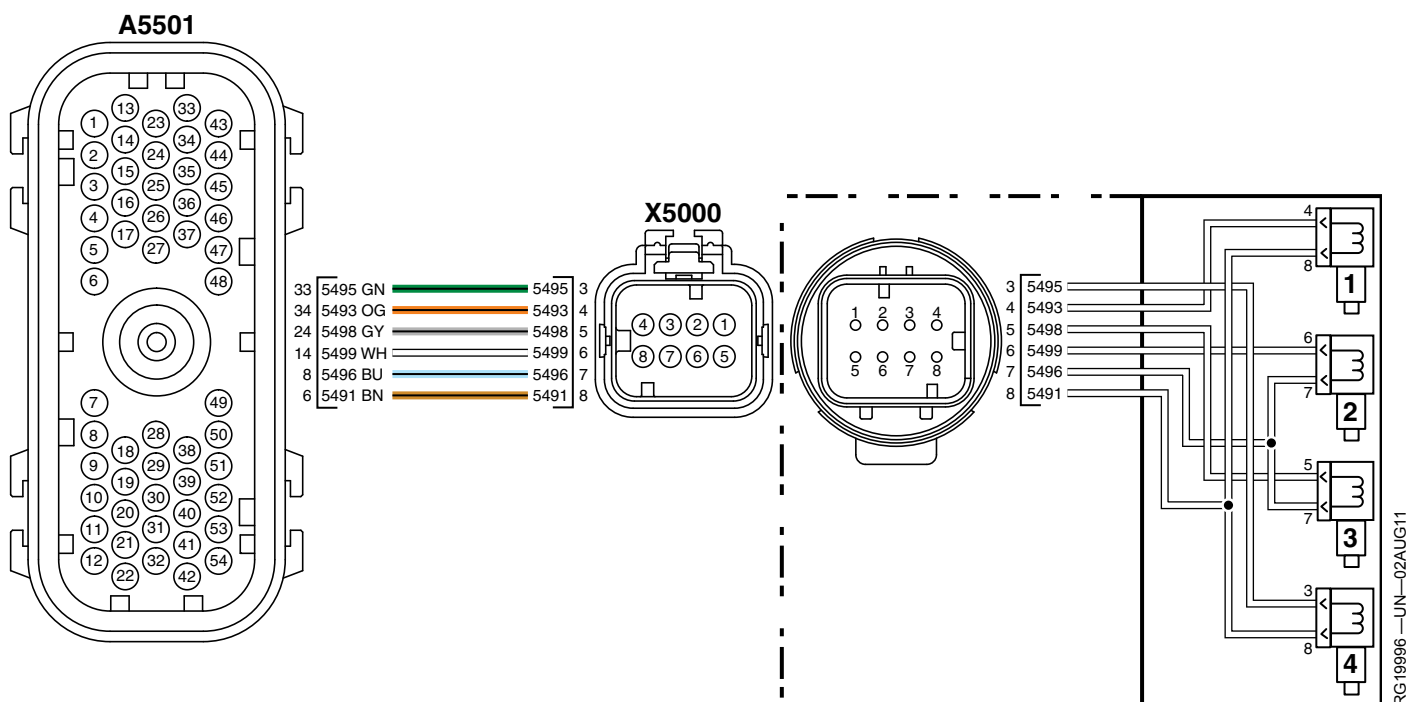
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

RG40049,0000A65 -19-28JUL11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A65 -19-28JUL11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor Fuel Rail Pressure - Actual and verify that it is below 5 MPa (50 bar) (725 psi.).
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.06 active?

YES: GO TO 2

NO: GO TO 10

RG40049,0000A65 -19-28JUL11-4/15

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine harness and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A65 -19-28JUL11-5/15

3 Injector and Harness Check

1. Ignition ON, Engine OFF.

NOTE: Injector harness connector X5000 still disconnected.

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.05 active?

YES: GO TO 4

NO: GO TO 7

RG40049,0000A65 -19-28JUL11-6/15

4 Injector and Harness Check

1. Ignition OFF, Engine OFF.
2. Reconnect X5000.
3. Ignition ON, Engine OFF.
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.06 active?

YES: GO TO 5

NO: GO TO 10

Continued on next page

RG40049,0000A65 -19-28JUL11-7/15

5 Injector Harness Check

1. Ignition OFF, Engine OFF.
2. Gain access to fuel injectors by removing rocker arm cover.
3. Remove injector wiring harness ring terminals from injector #4 and wrap electrical tape around each terminal separately.
4. Set rocker arm cover on top of cylinder head.
5. Ignition ON, Engine OFF.
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.06 active?

YES: Replace Injector Harness. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000A65 -19-28JUL11-8/15

6 Intermittent Connection Check

1. Ignition OFF, Engine OFF.
2. Reinstall the injector wiring harness ring terminals from injector #1.
3. Ignition ON, Engine OFF.
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.06 active?

YES: Replace Injector #1. Perform [Verification Procedure](#).

NO: Replace Injector Harness. Perform [Verification Procedure](#).

RG40049,0000A65 -19-28JUL11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform [Terminal Test](#) on A5501 connector female sockets 6 and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A65 -19-28JUL11-10/15

8 Harness and Injector Check

On A5501 connector, measure resistance between female sockets:

- 34 and 6 (Injector #1)
- 14 and 8 (Injector #2)
- 24 and 8 (Injector #3)
- 33 and 6 (Injector #4)

Are any resistances less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

Continued on next page

RG40049,0000A65 -19-28JUL11-11/15

Fuel System Diagnostics

9 Controller Check

1. Reconnect all connectors.
2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000651.06 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RG40049,0000A65 -19-28JUL11-12/15

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform [Terminal Test](#) on engine harness and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A65 -19-28JUL11-13/15

11 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 6 and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A65 -19-28JUL11-14/15

12 Harness and Injector Check

On A5501 connector, measure resistance between female sockets while performing [Wiggle Test](#):

- 34 and 6 (Injector #1)
- 14 and 8 (Injector #2)
- 24 and 8 (Injector #3)
- 33 and 6 (Injector #4)

Are any resistances ever less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: Contact DTAC.

RG40049,0000A65 -19-28JUL11-15/15

000651.13 — Injector #1 Calibration Fault

The ECU detects an incorrect injector calibration code has been entered into the ECU.

RG40049,0000A66 -19-25MAR11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

000651.13

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects an incorrect injector calibration code for injector #1 has been entered into the ECU. Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more fuel injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more fuel system information, see [High-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more electronic injector calibration information, see [Electronic Injector – Calibration Information](#) in Section 04, Group 160.

RG40049,0000A66 -19-25MAR11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Compare the injector information from the Control Unit Information and Overview Test to what is listed on the injector data sheet.

NOTE: If injector data sheet is unavailable, the injector calibration code is printed on the tab, while part number and serial number are stamped on the body of the injector.

Does the information match?

YES: Contact DTAC.

NO: In Service ADVISOR, perform Injector Calibration.

RG40049,0000A66 -19-25MAR11-3/3

000651.18 — Injector #1 Not Responding

The ECU has detected the injector fuel flow at cylinder #1 is lower than expected.

RG40049,0000A67 -19-25JUL11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

000157.17

000157.18

000157.01

000651.18

When DTC is Displayed:

When the engine is cranking or running and the error is active.

Related Information:

The ECU has detected the injector fuel flow at cylinder #1 is lower than expected.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions. Engine runs rough and misfires since the injector in cylinder #1 is not injecting fuel.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RG40049,0000A67 -19-25JUL11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Download new ECU software payload and reprogram ECU. See [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
6. After reprogramming, key off for a minimum of 90 seconds.
7. Ignition ON, engine running.

Is DTC 000651.18 still active?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

RG40049,0000A67 -19-25JUL11-3/3

000652.02 — Injector #2 Part Number Data Invalid

The ECU detects an invalid injector part number has been entered into the ECU.

RG40049,0000A68 -19-25MAR11-1/7

Diagnostic Procedure

Troubleshooting Sequence: 000652.02

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects an invalid injector part number for injector #2 has been entered into the ECU. Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more fuel injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more fuel system information, see [High-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more electronic injector calibration information, see [Electronic Injector – Calibration Information](#) in Section 04, Group 160.

RG40049,0000A68 -19-25MAR11-2/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000652.02 active?

YES: [GO TO 2](#)

NO: [GO TO 5](#)

RG40049,0000A68 -19-25MAR11-3/7

2 Check Injector Part Number

Compare the current injector part number from the Control Unit Information and Overview Test to the part number listed on the injector data sheet.

NOTE: If datasheet is unavailable, the injector part number must be read off the injector body

Do the part numbers match?

YES: [GO TO 3](#)

NO: In Service ADVISOR, perform Injector Calibration using correct information. Perform [Verification Procedure](#).

Continued on next page

RG40049,0000A68 -19-25MAR11-4/7

Fuel System Diagnostics

3 Verify Correct Part

Verify that you have the correct electronic injector for the engine.

YES: [GO TO 4](#)

Was the correct injector installed?

NO: Install proper injector.
In Service ADVISOR,
perform Injector Calibration.
Perform [Verification Procedure](#).

RG40049,0000A68 -19-25MAR11-5/7

4 ECU Reprogram

Check to see if there is a software update for the engine.

YES: Download engine
payload and reprogram
ECU. Perform [Verification Procedure](#)

Was a software update available?

NO: Contact DTAC.

RG40049,0000A68 -19-25MAR11-6/7

5 Clear DTCs

1. Clear DTCs.

2. Ignition OFF, Engine OFF for at least 90 seconds.

3. Ignition ON, Engine OFF.

4. Refresh codes.

Is DTC 000652.02 active?

YES: [GO TO 2](#)

NO: Perform [Verification Procedure](#).

RG40049,0000A68 -19-25MAR11-7/7

000652.05 — Injector #2 Circuit Has High Resistance

The ECU detected high resistance in the injector #2 circuit.

Continued on next page

RG40049,0000A69 -19-26JUL11-1/16

Diagnostic Procedure

Troubleshooting Sequence:

000612.03
002798.03
000652.05

When DTC is Displayed:

When the engine is cranking or running.

During Harness Diagnostic Mode Test in Service ADVISOR if the Fuel Rail Pressure is below 5 MPa (50 bar) (725 psi).

Related Information:

The ECU detected high resistance in the injector #2 circuit.

The ECU supplies injectors #2 and #3 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

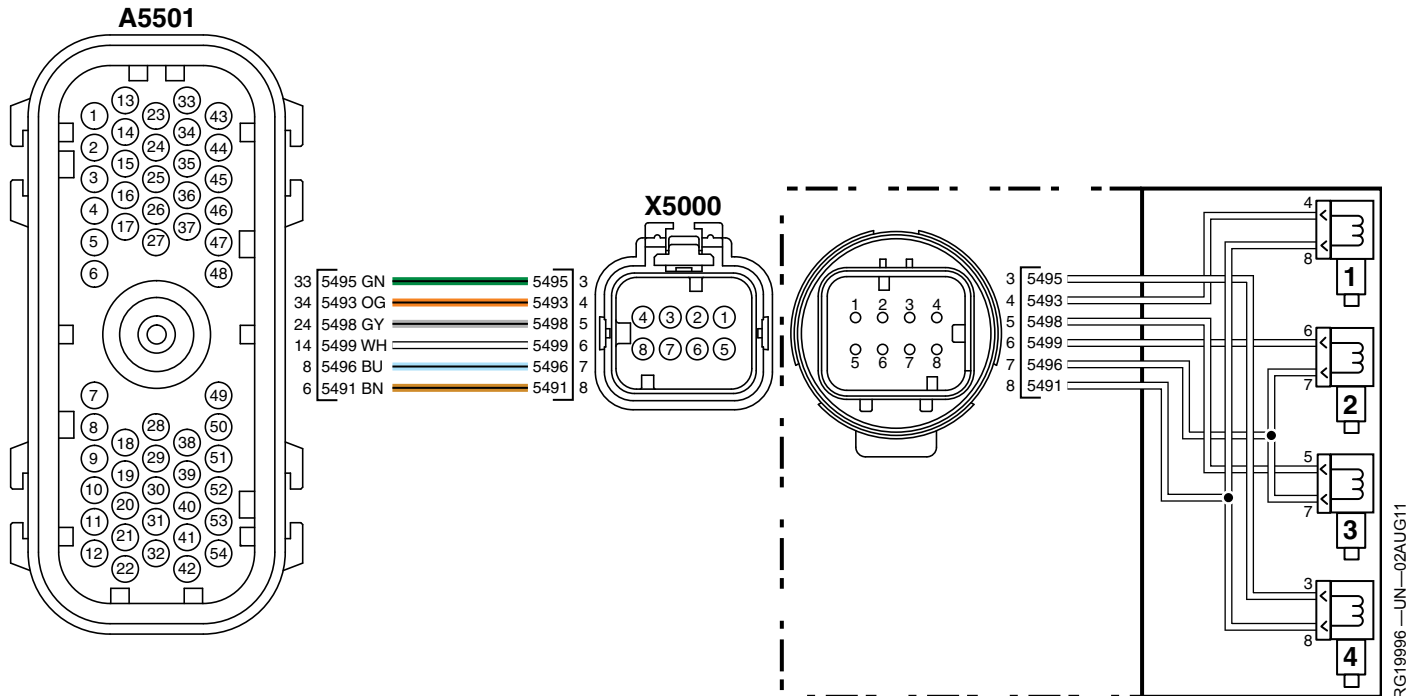
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Injector #2 Circuit

A5501 - 34—Injector #1 Return
A5501 - 6—Injector #1 Supply
A5501 - 14—Injector #2 Return

A5501 - 8—Injector #2 Supply
A5501 - 24—Injector #3 Return
A5501 - 8—Injector #3 Supply

A5501 - 33—Injector #4 Return
A5501 - 6—Injector #4 Supply

Continued on next page

RG40049,0000A69 -19-26JUL11-2/16

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A69 -19-26JUL11-3/16

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor Fuel Rail Pressure - Actual and verify that it is below 5 MPa. (50 bar) (725 psi.)
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.05 active?

YES: [GO TO 2](#)

NO: [GO TO 10](#)

RG40049,0000A69 -19-26JUL11-4/16

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform [Terminal Test](#) on engine and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RG40049,0000A69 -19-26JUL11-5/16

3 Injector and Harness Check

1. Use JDG10466 flex probe kit to connect a jumper wire between female terminals X5000-6 and X5000-7.

2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.06 active?

YES: [GO TO 4](#)

NO: [GO TO 7](#)

Continued on next page

RG40049,0000A69 -19-26JUL11-6/16

Fuel System Diagnostics

4 Injector and Harness Check

1. Ignition OFF, Engine OFF.
 2. Remove jumper and reconnect X5000.
 3. Ignition ON, Engine OFF.
 4. In Service ADVISOR, perform Harness Diagnostic Mode Test.
- Is DTC 000652.05 active?

YES: [GO TO 5](#)

NO: [GO TO 10](#)

RG40049,0000A69 -19-26JUL11-7/16

5 Check Injector Harness Terminals

1. Ignition OFF, Engine OFF.
2. Gain access to fuel injectors by removing the rocker arm cover.
3. Inspect the terminals and nuts for Injector #2.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000A69 -19-26JUL11-8/16

6 Injector Harness Check

1. Connect alligator clips and jumper wire between the terminals on Injector #2.
2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.05 active?

YES: Replace Injector Harness. Perform [Verification Procedure](#).

NO: Replace Injector #2. Perform [Verification Procedure](#).

RG40049,0000A69 -19-26JUL11-9/16

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform [Terminal Test](#) on A5501 connector female sockets 8 and 14. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A69 -19-26JUL11-10/16

8 Open Circuit Check

1. Measure resistance between A5501 connector female socket 14 and X5000 connector female socket 6 while performing [Wiggle Test](#).
 2. Measure resistance between A5501 connector female socket 8 and X5000 connector female socket 7 while performing [Wiggle Test](#).
- Are both resistances less than 5 ohms?

YES: [GO TO 9](#)

NO: Repair open or high resistance in harness.
Perform [Verification Procedure](#).

Continued on next page

RG40049,0000A69 -19-26JUL11-11/16

Fuel System Diagnostics

9 Controller Check

1. Reconnect all connectors.
2. Ignition ON, Engine OFF
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.05 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RG40049,0000A69 -19-26JUL11-12/16

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform [Terminal Test](#) on engine and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A69 -19-26JUL11-13/16

11 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 8 and 14. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A69 -19-26JUL11-14/16

12 Wiggle Test

1. Measure resistance between A5501 connector female socket 14 and X5000 connector female socket 6 while performing [Wiggle Test](#).
2. Measure resistance between A5501 connector female socket 8 and X5000 connector female socket 7 while performing [Wiggle Test](#).

Is either resistance ever greater than 5 ohms?

YES: Repair open or high resistance in harness.
Perform [Verification Procedure](#).

NO: [GO TO 13](#)

RG40049,0000A69 -19-26JUL11-15/16

13 Terminal Test

1. Gain access to fuel injectors by removing the rocker arm cover.
2. Inspect the injector terminals for loose nuts or poor crimps.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: Contact DTAC.

RG40049,0000A69 -19-26JUL11-16/16

000652.06 — Injector #2 Circuit Has Low Resistance

The ECU detected low resistance in the injector #2 circuit.

Continued on next page

RG40049,0000A6A -19-28JUL11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

000612.03
002798.03
000652.06

When DTC is Displayed:

When the engine is cranking or running.

During Harness Diagnostic Mode Test in Service ADVISOR if the Fuel Rail Pressure is below 5 MPa (50 bar) (725 psi).

Related Information:

The ECU detected low resistance in the injector #2 circuit.

The ECU supplies injectors #2 and #3 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

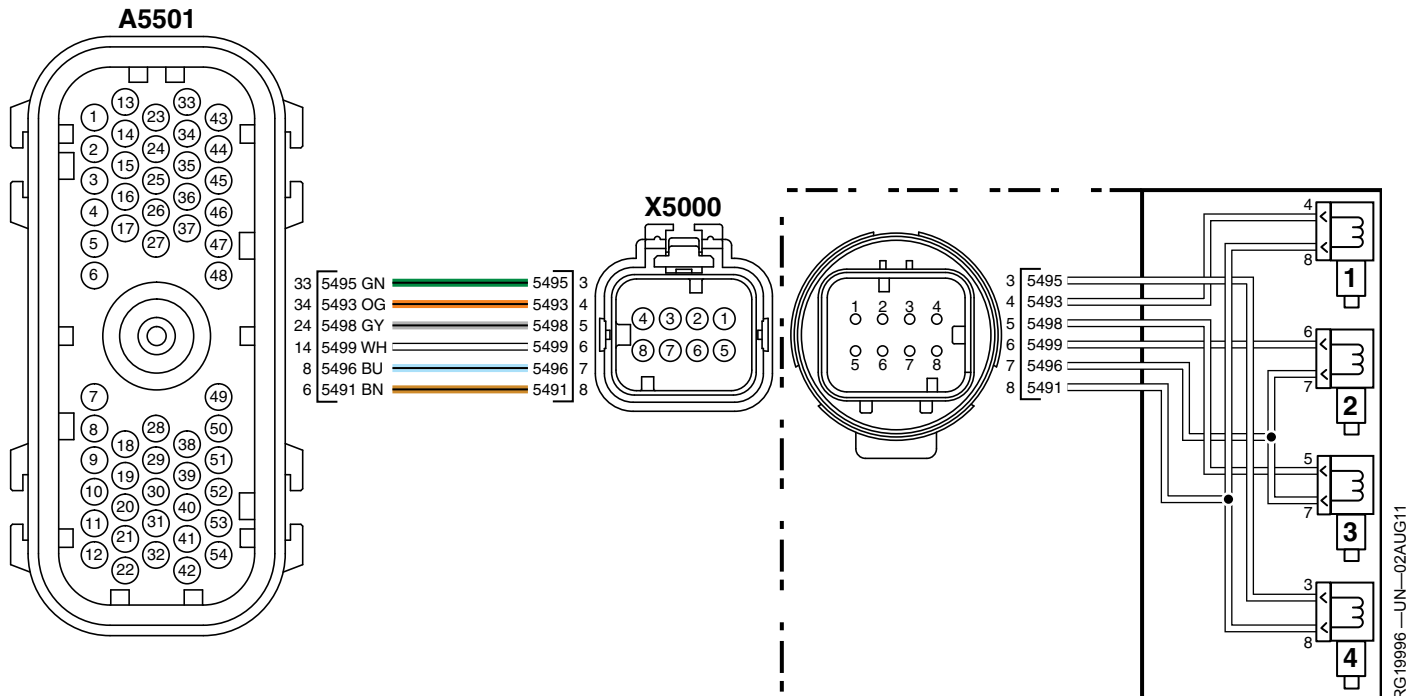
For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



A5501 - 34—Injector #1 Return
A5501 - 6—Injector #1 Supply
A5501 - 14—Injector #2 Return

A5501 - 8—Injector #2 Supply
A5501 - 24—Injector #3 Return
A5501 - 8—Injector #3 Supply

A5501 - 33—Injector #4 Return
A5501 - 6—Injector #4 Supply

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

RG40049,0000A6A -19-28JUL11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A6A -19-28JUL11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor Fuel Rail Pressure - Actual and verify that it is below 5 MPa (50 bar) (725 psi.).
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.06 active?

YES: GO TO 2

NO: GO TO 10

RG40049,0000A6A -19-28JUL11-4/15

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine harness and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A6A -19-28JUL11-5/15

3 Injector and Harness Check

1. Ignition ON, Engine OFF.

NOTE: Injector harness connector X5000 still disconnected.

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.05 active?

YES: GO TO 4

NO: GO TO 7

RG40049,0000A6A -19-28JUL11-6/15

4 Injector and Harness Check

1. Ignition OFF, Engine OFF.
2. Reconnect X5000.
3. Ignition ON, Engine OFF.
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.06 active?

YES: GO TO 5

NO: GO TO 10

Continued on next page

RG40049,0000A6A -19-28JUL11-7/15

5 Injector Harness Check

1. Ignition OFF, Engine OFF.
2. Gain access to fuel injectors by removing rocker arm cover.
3. Remove injector wiring harness ring terminals from injector #4 and wrap electrical tape around each terminal separately.
4. Set rocker arm cover on top of cylinder head.
5. Ignition ON, Engine OFF.
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.06 active?

YES: Replace Injector Harness. Perform Verification Procedure.

NO: GO TO 6

RG40049,0000A6A -19-28JUL11-8/15

6 Intermittent Connection Check

1. Ignition OFF, Engine OFF.
2. Reinstall the injector wiring harness ring terminals from injector #2.
3. Ignition ON, Engine OFF.
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.06 active?

YES: Replace Injector #2. Perform Verification Procedure.

NO: Replace Injector Harness. Perform Verification Procedure.

RG40049,0000A6A -19-28JUL11-9/15

7 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform Terminal Test on A5501 connector female sockets 8 and 14. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 8

RG40049,0000A6A -19-28JUL11-10/15

8 Harness and Injector Kit

On A5501 connector, measure resistance between female sockets:

- 34 and 6 (Injector #1)
- 14 and 8 (Injector #2)
- 24 and 8 (Injector #3)
- 33 and 6 (Injector #4)

Are any resistances less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RG40049,0000A6A -19-28JUL11-11/15

Fuel System Diagnostics

9 Controller Check

1. Reconnect all connectors.
2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000652.06 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RG40049,0000A6A -19-28JUL11-12/15

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform [Terminal Test](#) on engine harness and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A6A -19-28JUL11-13/15

11 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 8 and 14. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A6A -19-28JUL11-14/15

12 Harness and Injector Check

On A5501 connector, measure resistance between female sockets while performing [Wiggle Test](#):

- 34 and 6 (Injector #1)
- 14 and 8 (Injector #2)
- 24 and 8 (Injector #3)
- 33 and 6 (Injector #4)

Are any resistances ever less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: Contact DTAC.

RG40049,0000A6A -19-28JUL11-15/15

000652.13 — Injector #2 Calibration Fault

The ECU detects an incorrect injector calibration code has been entered into the ECU.

RG40049,0000A6B -19-25MAR11-1/3

Diagnostic Procedure

Troubleshooting Sequence:
000652.13

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects an incorrect injector calibration code for injector #2 has been entered into the ECU. Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more fuel injector information, see Electronic Injector (EI) Operation in Section 03, Group 130.

For more fuel system information, see High-Pressure Fuel System Operation in Section 03, Group 130.

For more electronic injector calibration information, see Electronic Injector – Calibration Information in Section 04, Group 160.

RG40049,0000A6B -19-25MAR11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Compare the injector information from the Control Unit Information and Overview Test to what is listed on the injector data sheet.

NOTE: If injector data sheet is unavailable, the injector calibration code is printed on the tab, while part number and serial number are stamped on the body of the injector.

Does the information match?

YES: Contact DTAC.

NO: In Service ADVISOR, perform Injector Calibration.

RG40049,0000A6B -19-25MAR11-3/3

000652.18 — Injector #2 Not Responding

The ECU has detected the injector fuel flow at cylinder #2 is lower than expected.

RG40049,0000A6C -19-25JUL11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

000157.17
000157.18
000157.01
000652.18

When DTC is Displayed:

When the engine is cranking or running and the error is active.

Related Information:

The ECU has detected the injector fuel flow at cylinder #2 is lower than expected.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions. Engine runs rough and misfires since the injector in cylinder #2 is not injecting fuel.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RG40049,0000A6C -19-25JUL11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Download new ECU software payload and reprogram ECU. See [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
6. After reprogramming, key off for a minimum of 90 seconds.
7. Ignition ON, engine running.

Is DTC 000652.18 still active?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

RG40049,0000A6C -19-25JUL11-3/3

000653.02 — Injector #3 Part Number Data Invalid

The ECU detects an invalid injector part number has been entered into the ECU.

RG40049,0000A6D -19-21MAR11-1/7

Diagnostic Procedure

Troubleshooting Sequence: 000653.02

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects an invalid injector part number for injector #3 has been entered into the ECU. Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more fuel injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more fuel system information, see [High-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more electronic injector calibration information, see [Electronic Injector – Calibration Information](#) in Section 04, Group 160.

RG40049,0000A6D -19-21MAR11-2/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000653.02 active?

YES: [GO TO 2](#)

NO: [GO TO 5](#)

RG40049,0000A6D -19-21MAR11-3/7

2 Check Injector Part Number

Compare the current injector part number from the Control Unit Information and Overview Test to the part number listed on the injector data sheet.

NOTE: If datasheet is unavailable, the injector part number must be read off the injector body

Do the part numbers match?

YES: [GO TO 3](#)

NO: In Service ADVISOR, perform Injector Calibration using correct information. Perform [Verification Procedure](#).

Continued on next page

RG40049,0000A6D -19-21MAR11-4/7

Fuel System Diagnostics

3 Verify Correct Part

Verify that you have the correct electronic injector for the engine.

YES: [GO TO 4](#)

Was the correct injector installed?

NO: Install proper injector.
In Service ADVISOR,
perform Injector Calibration.
Perform [Verification Procedure](#).

RG40049,0000A6D -19-21MAR11-5/7

4 ECU Reprogram

Check to see if there is a software update for the engine.

YES: Download engine
payload and reprogram
ECU. Perform [Verification Procedure](#)

Was a software update available?

NO: Contact DTAC.

RG40049,0000A6D -19-21MAR11-6/7

5 Clear DTCs

1. Clear DTCs.

2. Ignition OFF, Engine OFF for at least 90 seconds.

3. Ignition ON, Engine OFF.

4. Refresh codes.

Is DTC 000653.02 active?

YES: [GO TO 2](#)

NO: Perform [Verification Procedure](#).

RG40049,0000A6D -19-21MAR11-7/7

000653.05 — Injector #3 Circuit Has High Resistance

The ECU detected high resistance in the injector #3 circuit.

Continued on next page

RG40049,0000A6E -19-26JUL11-1/16

Diagnostic Procedure

Troubleshooting Sequence:

000612.03
002798.03
000653.05

When DTC is Displayed:

When the engine is cranking or running.

During Harness Diagnostic Mode Test in Service ADVISOR if the Fuel Rail Pressure is below 5 MPa (50 bar) (725 psi).

Related Information:

The ECU detected high resistance in the injector #3 circuit.

The ECU supplies injectors #2 and #3 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

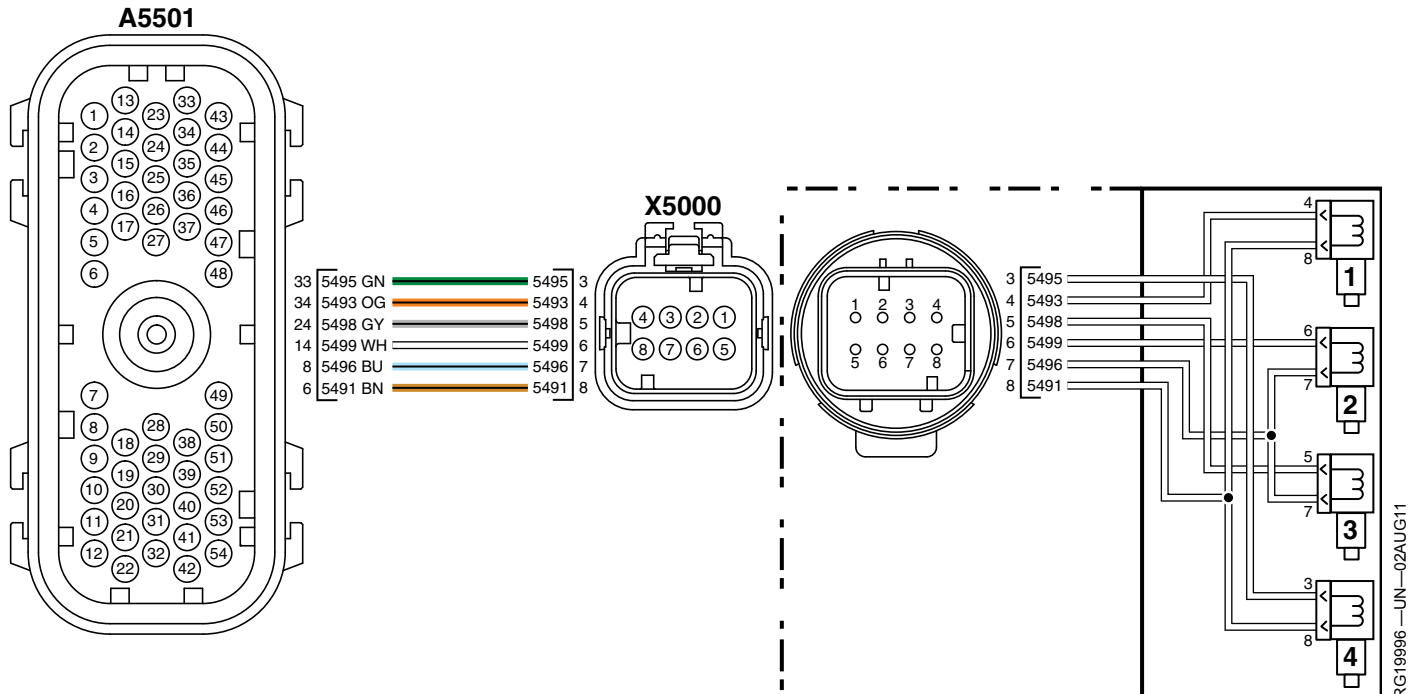
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



A5501 - 34—Injector #1 Return
A5501 - 6—Injector #1 Supply
A5501 - 14—Injector #2 Return

A5501 - 8—Injector #2 Supply
A5501 - 24—Injector #3 Return
A5501 - 8—Injector #3 Supply

A5501 - 33—Injector #4 Return
A5501 - 6—Injector #4 Supply

Continued on next page

RG40049,0000A6E -19-26JUL11-2/16

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RG40049,0000A6E -19-26JUL11-3/16

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor Fuel Rail Pressure - Actual and verify that it is below 5 MPa (50 bar) (725 psi.).
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.05 active?

YES: GO TO 2

NO: GO TO 10

RG40049,0000A6E -19-26JUL11-4/16

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A6E -19-26JUL11-5/16

3 Injector and Harness Check

1. Use JDG10466 flex probe kit to connect a jumper wire between female terminals X5000-5 and X5000-7.

2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.06 active?

YES: GO TO 4

NO: GO TO 7

Continued on next page

RG40049,0000A6E -19-26JUL11-6/16

Fuel System Diagnostics

4 Injector and Harness Check

1. Ignition OFF, Engine OFF.
 2. Remove jumper and reconnect X5000.
 3. Ignition ON, Engine OFF.
 4. In Service ADVISOR, perform Harness Diagnostic Mode Test.
- Is DTC 000653.05 active?

YES: [GO TO 5](#)

NO: [GO TO 10](#)

RG40049,0000A6E -19-26JUL11-7/16

5 Check Injector Harness Terminals

1. Ignition OFF, Engine OFF.
2. Gain access to fuel injectors by removing the rocker arm cover.
3. Inspect the terminals and nuts for Injector #3.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000A6E -19-26JUL11-8/16

6 Injector Harness Check

1. Connect alligator clips and jumper wire between the terminals on Injector #3.
2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.05 active?

YES: Replace Injector Harness. Perform [Verification Procedure](#).

NO: Replace Injector #3. Perform [Verification Procedure](#).

RG40049,0000A6E -19-26JUL11-9/16

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform [Terminal Test](#) on A5501 connector female sockets 8 and 24. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A6E -19-26JUL11-10/16

8 Open Circuit Check

1. Measure resistance between A5501 connector female socket 24 and X5000 connector female socket 5 while performing [Wiggle Test](#).
 2. Measure resistance between A5501 connector female socket 8 and X5000 connector female socket 7 while performing [Wiggle Test](#).
- Are both resistances less than 5 ohms?

YES: [GO TO 9](#)

NO: Repair open or high resistance in harness.
Perform [Verification Procedure](#).

Continued on next page

RG40049,0000A6E -19-26JUL11-11/16

Fuel System Diagnostics

9 Controller Check

1. Reconnect all connectors.
2. Ignition ON, Engine OFF
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.05 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RG40049,0000A6E -19-26JUL11-12/16

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform [Terminal Test](#) on engine and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A6E -19-26JUL11-13/16

11 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 8 and 24. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A6E -19-26JUL11-14/16

12 Wiggle Test

1. Measure resistance between A5501 connector female socket 24 and X5000 connector female socket 5 while performing [Wiggle Test](#).
2. Measure resistance between A5501 connector female socket 8 and X5000 connector female socket 7 while performing [Wiggle Test](#).

Is either resistance ever greater than 5 ohms?

YES: Repair open or high resistance in harness.
Perform [Verification Procedure](#).

NO: [GO TO 13](#)

RG40049,0000A6E -19-26JUL11-15/16

13 Terminal Test

1. Gain access to fuel injectors by removing the rocker arm cover.
2. Inspect the injector terminals for loose nuts or poor crimps.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: Contact DTAC.

RG40049,0000A6E -19-26JUL11-16/16

000653.06 — Injector #3 Circuit Has Low Resistance

The ECU detected low resistance in the injector #3 circuit.

Continued on next page

RG40049,0000A6F -19-28JUL11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

000612.03
002798.03
000653.06

When DTC is Displayed:

When the engine is cranking or running.

During Harness Diagnostic Mode Test in Service ADVISOR if the Fuel Rail Pressure is below 5 MPa (50 bar) (725 psi).

Related Information:

The ECU detected low resistance in the injector #3 circuit.

The ECU supplies injectors #2 and #3 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

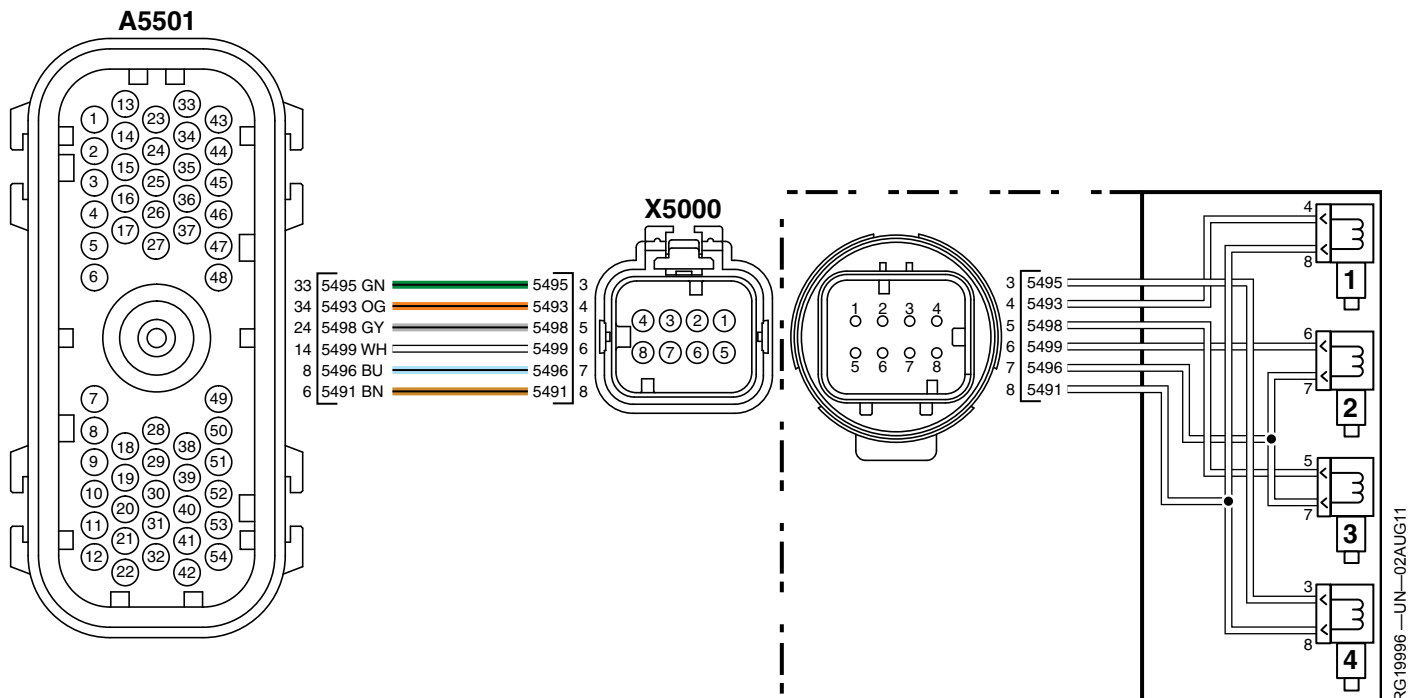
For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Injector #3 Circuit

A5501 - 34—Injector #1 Return A5501 - 8—Injector #2 Supply A5501 - 33—Injector #4 Return
A5501 - 6—Injector #1 Supply A5501 - 24—Injector #3 Return A5501 - 6—Injector #4 Supply
A5501 - 14—Injector #2 Return A5501 - 8—Injector #3 Supply

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

RG40049,0000A6F -19-28JUL11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

- J-35616-20 – Test Leads

RG40049,0000A6F -19-28JUL11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor Fuel Rail Pressure - Actual and verify that it is below 5 MPa (50 bar) (725 psi.)
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.06 active?

YES: GO TO 2

NO: GO TO 10

RG40049,0000A6F -19-28JUL11-4/15

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine harness and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A6F -19-28JUL11-5/15

3 Injector and Harness Check

1. Ignition ON, Engine OFF.

NOTE: Injector harness connector X5000 still disconnected.

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.05 active?

YES: GO TO 4

NO: GO TO 7

RG40049,0000A6F -19-28JUL11-6/15

4 Injector and Harness Check

1. Ignition OFF, Engine OFF.
2. Reconnect X5000.
3. Ignition ON, Engine OFF.
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.06 active?

YES: GO TO 5

NO: GO TO 10

Continued on next page

RG40049,0000A6F -19-28JUL11-7/15

5 Injector Harness Check

1. Ignition OFF, Engine OFF.
2. Gain access to fuel injectors by removing rocker arm cover.
3. Remove injector wiring harness ring terminals from injector #4 and wrap electrical tape around each terminal separately.
4. Set rocker arm cover on top of cylinder head.
5. Ignition ON, Engine OFF.
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.06 active?

YES: Replace Injector Harness. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RG40049,0000A6F -19-28JUL11-8/15

6 Intermittent Connection Check

1. Ignition OFF, Engine OFF.
2. Reinstall the injector wiring harness ring terminals from injector #3.
3. Ignition ON, Engine OFF.
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.06 active?

YES: Replace Injector #3. Perform [Verification Procedure](#).

NO: Replace Injector Harness. Perform [Verification Procedure](#).

RG40049,0000A6F -19-28JUL11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform [Terminal Test](#) on A5501 connector female sockets 8 and 24. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RG40049,0000A6F -19-28JUL11-10/15

8 Harness and Injector Check

On A5501 connector, measure resistance between female sockets:

- 34 and 6 (Injector #1)
- 14 and 8 (Injector #2)
- 24 and 8 (Injector #3)
- 33 and 6 (Injector #4)

Are any resistances less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

Continued on next page

RG40049,0000A6F -19-28JUL11-11/15

Fuel System Diagnostics

9 Controller Check

1. Reconnect all connectors.
2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000653.06 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RG40049,0000A6F -19-28JUL11-12/15

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform [Terminal Test](#) on engine harness and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A6F -19-28JUL11-13/15

11 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 8 and 24. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A6F -19-28JUL11-14/15

12 Harness and Injector Check

On A5501 connector, measure resistance between female sockets while performing [Wiggle Test](#):

- 34 and 6 (Injector #1)
- 14 and 8 (Injector #2)
- 24 and 8 (Injector #3)
- 33 and 6 (Injector #4)

Are any resistances ever less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: Contact DTAC.

RG40049,0000A6F -19-28JUL11-15/15

000653.13 — Injector #3 Calibration Fault

The ECU detects an incorrect injector calibration code has been entered into the ECU.

RG40049,0000A70 -19-21MAR11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

000653.13

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects an incorrect injector calibration code for injector #3 has been entered into the ECU. Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more fuel injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more fuel system information, see [High-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more electronic injector calibration information, see [Electronic Injector — Calibration Information](#) in Section 04, Group 160.

RG40049,0000A70 -19-21MAR11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Compare the injector information from the Control Unit Information and Overview Test to what is listed on the injector data sheet.

NOTE: If injector data sheet is unavailable, the injector calibration code is printed on the tab, while part number and serial number are stamped on the body of the injector.

Does the information match?

YES: Contact DTAC.

NO: In Service ADVISOR, perform Injector Calibration.

RG40049,0000A70 -19-21MAR11-3/3

000653.18 — Injector #3 Not Responding

The ECU has detected the injector fuel flow at cylinder #3 is lower than expected.

RG40049,0000A71 -19-25JUL11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

000157.17

000157.18

000157.01

000653.18

When DTC is Displayed:

When the engine is cranking or running and the error is active.

Related Information:

The ECU has detected the injector fuel flow at cylinder #3 is lower than expected.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions. Engine runs rough and misfires since the injector in cylinder #3 is not injecting fuel.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RG40049,0000A71 -19-25JUL11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Download new ECU software payload and reprogram ECU. See [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
6. After reprogramming, key off for a minimum of 90 seconds.
7. Ignition ON, engine running.

Is DTC 000653.18 still active?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

RG40049,0000A71 -19-25JUL11-3/3

000654.02 — Injector #4 Part Number Data Invalid

The ECU detects an invalid injector part number has been entered into the ECU.

RG40049,0000A72 -19-21MAR11-1/7

Diagnostic Procedure

Troubleshooting Sequence: 000654.02

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects an invalid injector part number for injector #4 has been entered into the ECU. Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more fuel injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more fuel system information, see [High-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more electronic injector calibration information, see [Electronic Injector – Calibration Information](#) in Section 04, Group 160.

RG40049,0000A72 -19-21MAR11-2/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000654.02 active?

YES: [GO TO 2](#)

NO: [GO TO 5](#)

RG40049,0000A72 -19-21MAR11-3/7

2 Check Injector Part Number

Compare the current injector part number from the Control Unit Information and Overview Test to the part number listed on the injector data sheet.

NOTE: If datasheet is unavailable, the injector part number must be read off the injector body

Do the part numbers match?

YES: [GO TO 3](#)

NO: In Service ADVISOR, perform Injector Calibration using correct information. Perform [Verification Procedure](#)

Continued on next page

RG40049,0000A72 -19-21MAR11-4/7

Fuel System Diagnostics

3 Verify Correct Part

Verify that you have the correct electronic injector for the engine.

YES: [GO TO 4](#)

Was the correct injector installed?

NO: Install proper injector.
In Service ADVISOR,
perform Injector Calibration.
Perform [Verification
Procedure](#).

RG40049,0000A72 -19-21MAR11-5/7

4 ECU Reprogram

Check to see if there is a software update for the engine.

YES: Download engine
payload and reprogram
ECU. Perform [Verification
Procedure](#)

Was a software update available?

NO: Contact DTAC.

RG40049,0000A72 -19-21MAR11-6/7

5 Clear DTCs

1. Clear DTCs.

2. Ignition OFF, Engine OFF for at least 90 seconds.

3. Ignition ON, Engine OFF.

4. Refresh codes.

Is DTC 000654.02 active?

YES: [GO TO 2](#)

NO: Perform [Verification
Procedure](#).

RG40049,0000A72 -19-21MAR11-7/7

000654.05 — Injector #4 Circuit Has High Resistance

The ECU detected high resistance in the injector #4 circuit.

Continued on next page

RG40049,0000A73 -19-25JUL11-1/16

Diagnostic Procedure

Troubleshooting Sequence:

000611.03
002797.03
000654.05

When DTC is Displayed:

When the engine is cranking or running.

During Harness Diagnostic Mode Test in Service ADVISOR if the Fuel Rail Pressure is below 5 MPa (50 bar) (725 psi).

Related Information:

The ECU detected high resistance in the injector #4 circuit.

The ECU supplies injectors #1 and #4 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

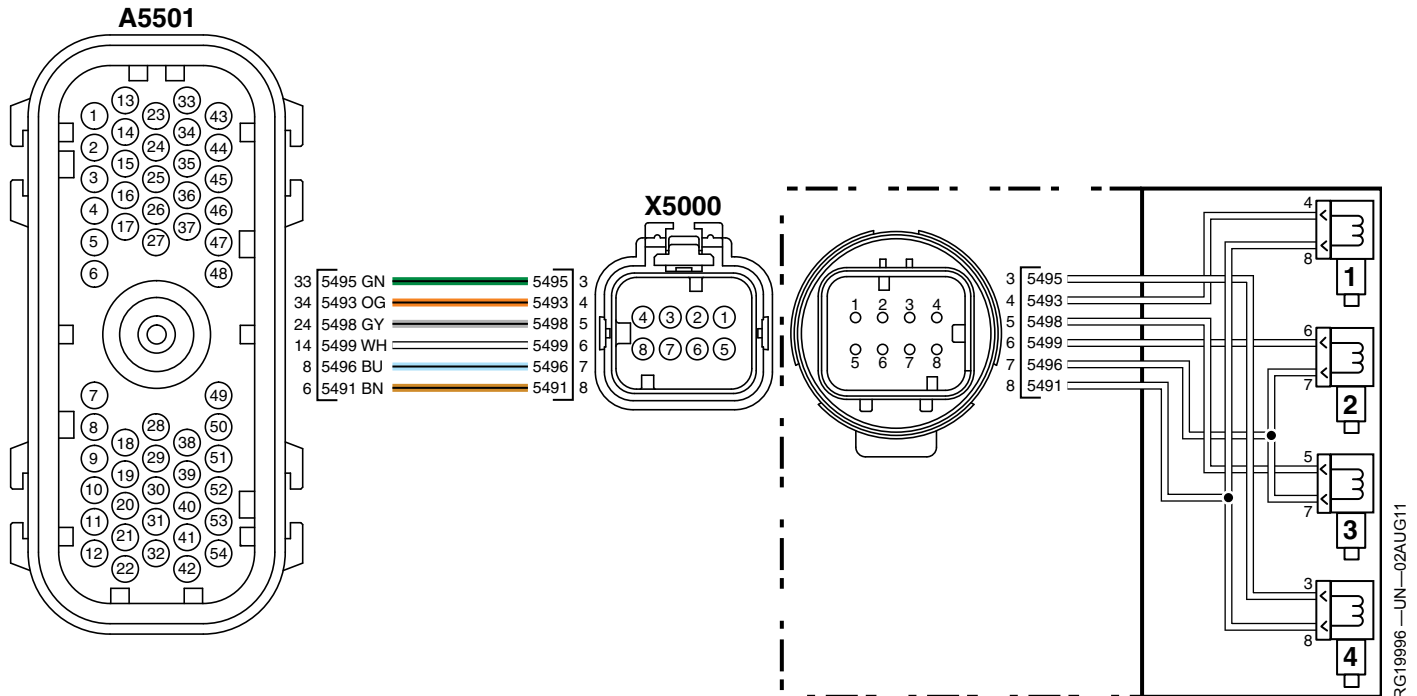
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Injector #4 Circuit

A5501 - 34—Injector #1 Return
A5501 - 6—Injector #1 Supply
A5501 - 14—Injector #2 Return

A5501 - 8—Injector #2 Supply
A5501 - 24—Injector #3 Return
A5501 - 8—Injector #3 Supply

A5501 - 33—Injector #4 Return
A5501 - 6—Injector #4 Supply

Continued on next page

RG40049,0000A73 -19-25JUL11-2/16

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A73 -19-25JUL11-3/16

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor Fuel Rail Pressure - Actual and verify that it is below 5 MPa (50 bar) (725 psi).
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000654.05 active?

YES: GO TO 2

NO: GO TO 10

RG40049,0000A73 -19-25JUL11-4/16

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A73 -19-25JUL11-5/16

3 Injector and Harness Check

1. Use JDG10466 flex probe kit to connect a jumper wire between female terminals X5000-3 and X5000-8.

2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000654.06 active?

YES: GO TO 4

NO: GO TO 7

Continued on next page

RG40049,0000A73 -19-25JUL11-6/16

4 Injector and Harness Check

1. Ignition OFF, Engine OFF.
 2. Remove jumper and reconnect X5000.
 3. Ignition ON, Engine OFF.
 4. In Service ADVISOR, perform Harness Diagnostic Mode Test.
- Is DTC 000654.05 active?

YES: [GO TO 5](#)
NO: [GO TO 10](#)

RG40049,0000A73 -19-25JUL11-7/16

5 Check Injector Harness Terminals

1. Ignition OFF, Engine OFF.
 2. Gain access to fuel injectors by removing the rocker arm cover.
 3. Inspect the terminals and nuts for Injector #4.
- Were any problems found?

YES: Repair problem.
 Perform [Verification Procedure](#).
NO: [GO TO 6](#)

RG40049,0000A73 -19-25JUL11-8/16

6 Injector Harness Check

1. Connect alligator clips and jumper wire between the terminals on Injector #4.
 2. Ignition ON, Engine OFF.
 3. In Service ADVISOR, perform Harness Diagnostic Mode Test.
- Is DTC 000654.05 active?

YES: Replace Injector Harness. Perform [Verification Procedure](#).
NO: Replace Injector #4. Perform [Verification Procedure](#).

RG40049,0000A73 -19-25JUL11-9/16

7 Terminal Test

1. Ignition OFF, Engine OFF.
 2. Disconnect ECU connector A5501.
 3. Perform [Terminal Test](#) on A5501 connector female sockets 6 and 33. And corresponding ECU male pins.
- Were any problems found?

YES: Repair problem.
 Perform [Verification Procedure](#).
NO: [GO TO 8](#)

RG40049,0000A73 -19-25JUL11-10/16

8 Open Circuit Check

1. Measure resistance between A5501 connector female socket 33 and X5000 connector female socket 3 while performing [Wiggle Test](#).
 2. Measure resistance between A5501 connector female socket 6 and X5000 connector female socket 8 while performing [Wiggle Test](#).
- Are both resistances less than 5 ohms?

YES: [GO TO 9](#)
NO: Repair open or high resistance in harness.
 Perform [Verification Procedure](#).

Continued on next page

RG40049,0000A73 -19-25JUL11-11/16

Fuel System Diagnostics

9 Controller Check

1. Reconnect all connectors.
2. Ignition ON, Engine OFF
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000654.05 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: GO TO [Problem Not Found Procedure](#).

RG40049,0000A73 -19-25JUL11-12/16

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform [Terminal Test](#) on engine and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A73 -19-25JUL11-13/16

11 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 6 and 33. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A73 -19-25JUL11-14/16

12 Wiggle Test

1. Measure resistance between A5501 connector female socket 6 and X5000 connector female socket 8 while performing [Wiggle Test](#).
2. Measure resistance between A5501 connector female socket 33 and X5000 connector female socket 3 while performing [Wiggle Test](#).

Is either resistance ever greater than 5 ohms?

YES: Repair open or high resistance in harness.
Perform [Verification Procedure](#).

NO: [GO TO 13](#)

RG40049,0000A73 -19-25JUL11-15/16

13 Terminal Test

1. Gain access to fuel injectors by removing the rocker arm cover.
2. Inspect injector terminals for loose nuts or poor crimps.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: Contact DTAC.

RG40049,0000A73 -19-25JUL11-16/16

000654.06 — Injector #4 Circuit Has Low Resistance

The ECU detected low resistance in the injector #4 circuit.

Continued on next page

RG40049,0000A74 -19-28JUL11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

000611.03
002797.03
000654.06

When DTC is Displayed:

When the engine is cranking or running.

During Harness Diagnostic Mode Test in Service ADVISOR if the Fuel Rail Pressure is below 5 MPa (50 bar) (725 psi).

Related Information:

The ECU detected low resistance in the injector #4 circuit.

The ECU supplies injectors #1 and #4 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

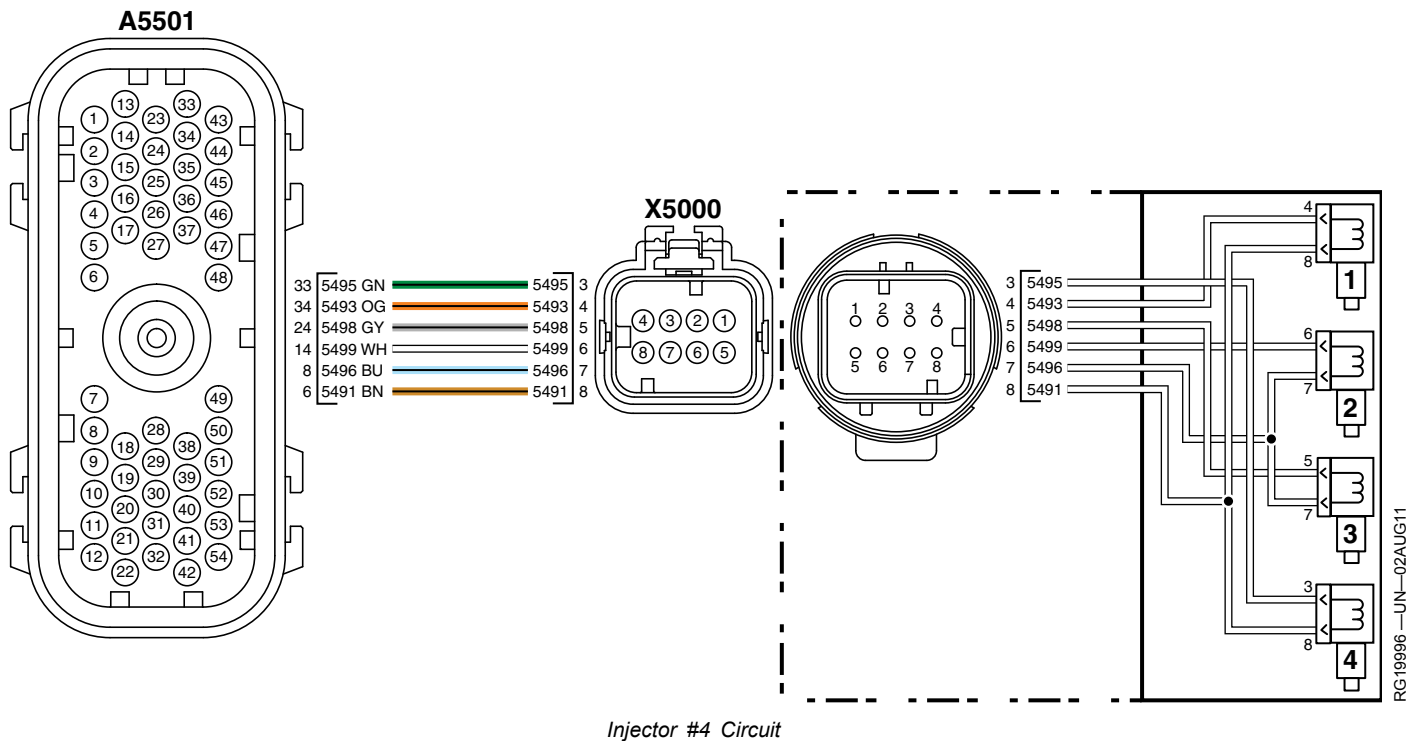
For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



A5501 - 34—Injector #1 Return
A5501 - 6—Injector #1 Supply
A5501 - 14—Injector #2 Return

A5501 - 8—Injector #2 Supply
A5501 - 24—Injector #3 Return
A5501 - 8—Injector #3 Supply

A5501 - 33—Injector #4 Return
A5501 - 6—Injector #4 Supply

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

RG40049,0000A74 -19-28JUL11-2/15

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A74 -19-28JUL11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor Fuel Rail Pressure - Actual and verify it is below 5 MPa (50 bar) (725 psi.).
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000654.06 active?

YES: GO TO 2

NO: GO TO 10

RG40049,0000A74 -19-28JUL11-4/15

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform Terminal Test on engine harness and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A74 -19-28JUL11-5/15

3 Injector and Harness Check

1. Ignition ON, Engine OFF.

NOTE: Injector harness connector X5000 still disconnected.

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000654.05 active?

YES: GO TO 4

NO: GO TO 7

RG40049,0000A74 -19-28JUL11-6/15

4 Injector and Harness Check

1. Ignition OFF, Engine OFF.
2. Reconnect X5000.
3. Ignition ON, Engine OFF.
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000654.06 active?

YES: GO TO 5

NO: GO TO 10

Continued on next page

RG40049,0000A74 -19-28JUL11-7/15

5 Injector Harness Check

1. Ignition OFF, Engine OFF.
2. Gain access to fuel injectors by removing rocker arm cover.
3. Remove injector wiring harness ring terminals from injector #4 and wrap electrical tape around each terminal separately.
4. Set rocker arm cover on top of cylinder head.
5. Ignition ON, Engine OFF.
6. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000654.06 active?

YES: Replace Injector Harness. Perform Verification Procedure.

NO: GO TO 6

RG40049,0000A74 -19-28JUL11-8/15

6 Intermittent Connection Check

1. Ignition OFF, Engine OFF.
2. Reinstall the injector wiring harness ring terminals from injector #4.
3. Ignition ON, Engine OFF.
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000654.06 active?

YES: Replace Injector #4. Perform Verification Procedure.

NO: Replace Injector Harness. Perform Verification Procedure.

RG40049,0000A74 -19-28JUL11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 6 and 33. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 8

RG40049,0000A74 -19-28JUL11-10/15

8 Harness and Injector Check

On A5501 connector, measure resistance between female sockets:

- 34 and 6 (Injector #1)
- 14 and 8 (Injector #2)
- 24 and 8 (Injector #3)
- 33 and 6 (Injector #4)

Are any resistances less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RG40049,0000A74 -19-28JUL11-11/15

Fuel System Diagnostics

9 Controller Check

1. Reconnect all connectors.
2. Ignition ON, Engine OFF.
3. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000654.06 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RG40049,0000A74 -19-28JUL11-12/15

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect injector harness connector X5000.
3. Perform [Terminal Test](#) on engine harness and injector harness sides of connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RG40049,0000A74 -19-28JUL11-13/15

11 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 6 and 33. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RG40049,0000A74 -19-28JUL11-14/15

12 Harness and Injector Check

On A5501 connector, measure resistance between female sockets while performing [Wiggle Test](#):

- 34 and 6 (Injector #1)
- 14 and 8 (Injector #2)
- 24 and 8 (Injector #3)
- 33 and 6 (Injector #4)

Are any resistances ever less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: Contact DTAC.

RG40049,0000A74 -19-28JUL11-15/15

000654.13 — Injector #4 Calibration Fault

The ECU detects an incorrect injector calibration code has been entered into the ECU.

RG40049,0000A75 -19-21MAR11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

000654.13

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects an incorrect injector calibration code for injector #4 has been entered into the ECU. Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more fuel injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more fuel system information, see [High-Pressure Fuel System Operation](#) in Section 03, Group 130.

For more electronic injector calibration information, see [Electronic Injector – Calibration Information](#) in Section 04, Group 160.

RG40049,0000A75 -19-21MAR11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Compare the injector information from the Control Unit Information and Overview Test to what is listed on the injector data sheet.

NOTE: If injector data sheet is unavailable, the injector calibration code is printed on the tab, while part number and serial number are stamped on the body of the injector.

Does the information match?

YES: Contact DTAC.

NO: In Service ADVISOR, perform Injector Calibration.

RG40049,0000A75 -19-21MAR11-3/3

000654.18 — Injector #4 Not Responding

The ECU has detected the injector fuel flow at cylinder #4 is lower than expected.

RG40049,0000A76 -19-25JUL11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

000157.17

000157.18

000157.01

000654.18

When DTC is Displayed:

When the engine is cranking or running and the error is active.

Related Information:

The ECU has detected the injector fuel flow at cylinder #4 is lower than expected.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions. Engine runs rough and misfires since the injector in cylinder #4 is not injecting fuel.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RG40049,0000A76 -19-25JUL11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Download new ECU software payload and reprogram ECU. See [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
6. After reprogramming, key off for a minimum of 90 seconds.
7. Ignition ON, engine running.

Is DTC 000654.18 still active?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

RG40049,0000A76 -19-25JUL11-3/3

**001347.01 — Suction Control Valve Sticking
and Fuel Rail Pressure Extremely Low**

*The ECU has detected that the suction control
valve could be sticking and causing the fuel rail
pressure to be extremely low.*

Continued on next page

RG40049,0000A81 -19-18NOV11-1/6

Diagnostic Procedure

Troubleshooting Sequence:

000094.17

000094.18

000157.01

000157.17

000157.18

001347.01

When DTC is Displayed:

When the ignition is on, engine running, and the fault active.

Related Information:

The ECU has detected that the suction control valve could be sticking and causing the fuel rail pressure to be extremely low.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

Additional references:

For component location, see [Y5002 — Suction Control Valve](#) in Section 03, Group 140.

For more suction control valve information, see [High-Pressure Fuel Pump Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

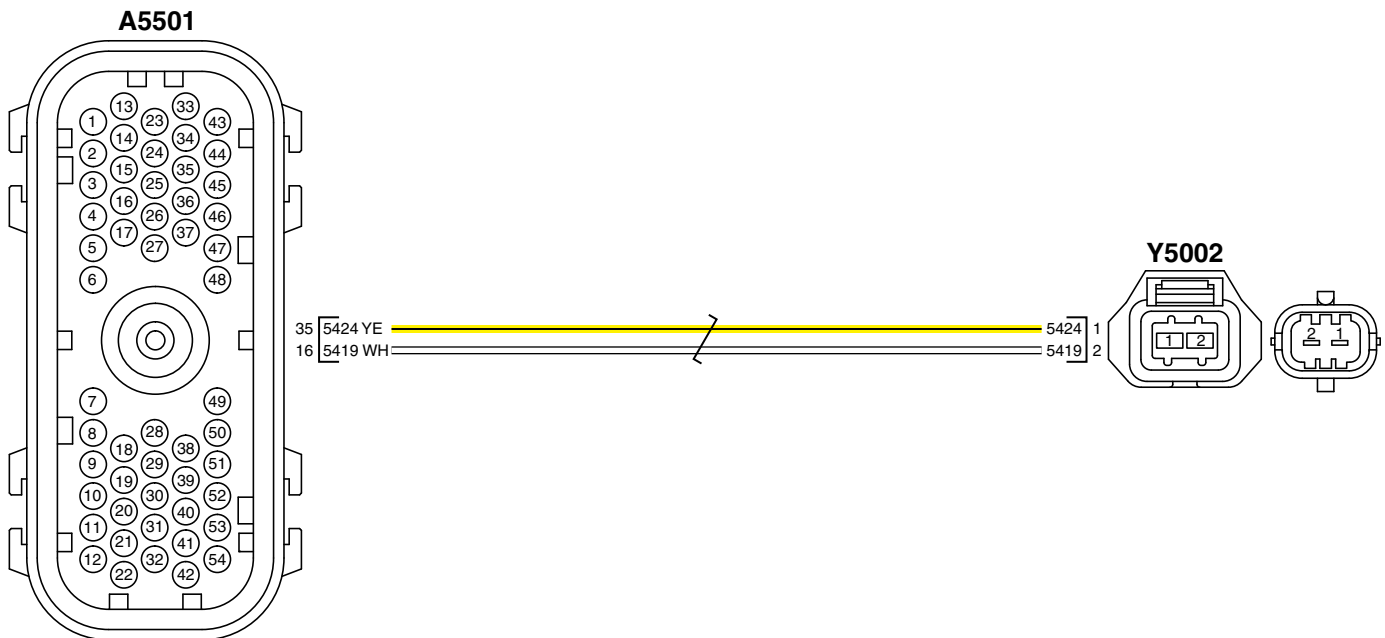
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Suction Control Valve Wiring Diagram

A5501—16—Drive -

A5501—35—Drive +

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RG40049,0000A81 -19-18NOV11-2/6

RG16738 —UN—08MAR10

Flex probe:

Suction Control Valve

- JDG10233 — Female — Blue/Red
- JDG10243 — Male — Blue/Red

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A81 -19-18NOV11-3/6

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Wait 90 seconds. Refresh DTCs.

Is DTC 001347.01 active?

YES: [GO TO 2](#)

NO: [GO TO Problem Not Found Procedure](#)

RG40049,0000A81 -19-18NOV11-4/6

2 Low-Pressure Fuel System Check

Check fuel system, see Low-Pressure Fuel System Check in Section 04, Group 155.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RG40049,0000A81 -19-18NOV11-5/6

3 High-Pressure Fuel System Check

Check fuel system, see High-Pressure Fuel System Check in Section 04, Group 155.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RG40049,0000A81 -19-18NOV11-6/6

**001347.05 — Suction Control Valve Circuit
Has High Resistance**

*The ECU has detected high resistance on the
suction control valve drive circuit.*

Continued on next page

RG40049,0000A82 -19-18APR12-1/17

Diagnostic Procedure

Troubleshooting Sequence: 001347.05

When DTC is Displayed:

When the ignition is on, engine is running.

When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that the current to the suction control valve is lower than expected, which indicates high resistance in the drive circuit.

Alarm Level:

Stop

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For component location, see [Y5002 — Suction Control Valve](#) in Section 03, Group 140.

For more suction control valve information, see [High-Pressure Fuel Pump Operation](#) in Section 03, Group 130.

For more information on the Wiggle Test, see [Wiggle Test](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

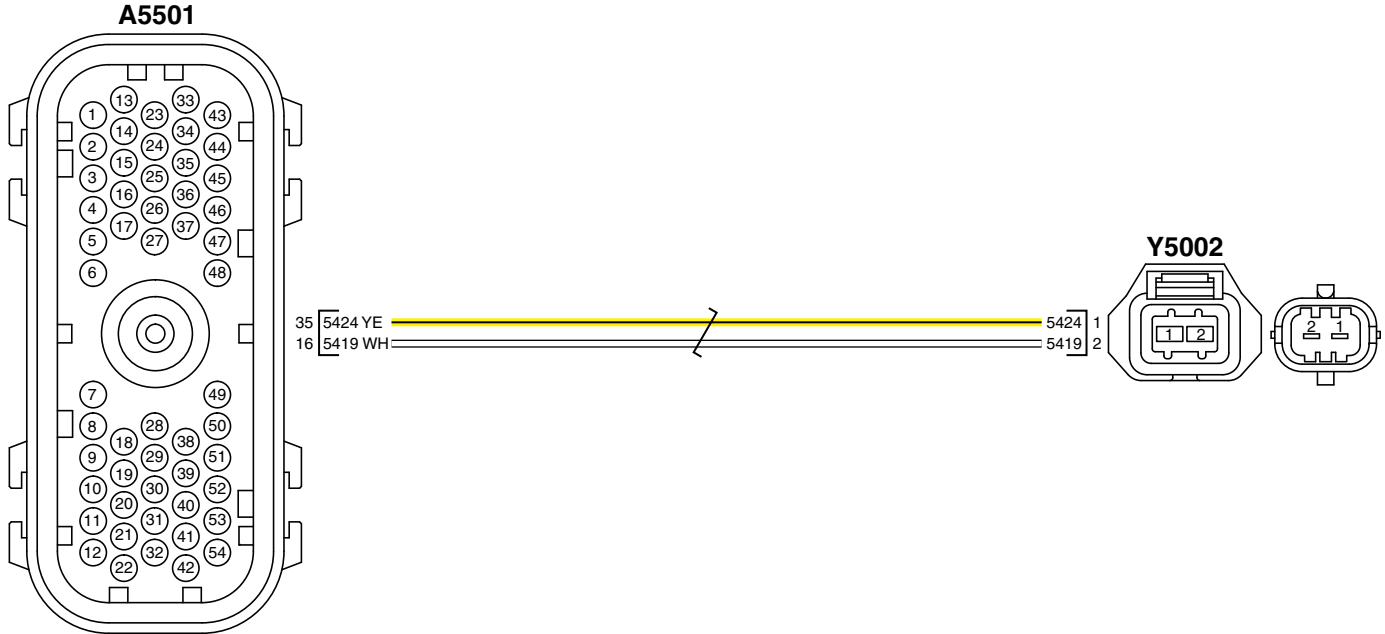
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Suction Control Valve Wiring Diagram

A5501—16—Drive -

A5501—35—Drive +

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG16738 —UN—08MAR10

Continued on next page

RG40049,0000A82 -19-18APR12-2/17

Flex probe:

Suction Control Valve

- JDG10233 — Female — Blue/Red

- JDG10243 — Male — Blue/Red

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

- J-35616-20 – Test Leads

RG40049,0000A82 -19-18APR12-3/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 001347.05 active?

YES: [GO TO 2](#)

NO: [GO TO 9](#)

RG40049,0000A82 -19-18APR12-4/17

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect suction control valve connector Y5002.
3. Perform [Terminal Test](#) on suction control valve and Y5002 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RG40049,0000A82 -19-18APR12-5/17

3 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 16 and 35. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RG40049,0000A82 -19-18APR12-6/17

Continued on next page

4 Short to Voltage Check

1. Ignition ON, Engine OFF.
 2. Measure the voltage between Y5002 connector female socket 1 (+) and single point ground.
 3. Measure the voltage between Y5002 connector female socket 2 (-) and single point ground.
- Are both measurements less than 0.5 V?

YES: GO TO 5

NO: Repair drive wire short to voltage in harness. Perform Verification Procedure.

RG40049,0000A82 -19-18APR12-7/17

5 Continuity Check

1. Ignition OFF, Engine OFF.
 2. Measure the resistance between A5501 connector female socket 35 and Y5002 connector female socket 1.
 3. Measure the resistance between A5501 connector female socket 16 and Y5002 connector female socket 2.
- Are both resistance measurements less than 5 ohms?

YES: GO TO 6

NO: Repair drive wire open or high resistance in harness. Perform Verification Procedure.

RG40049,0000A82 -19-18APR12-8/17

6 Short to Ground Check

1. Measure the resistance between Y5002 connector female socket 1 and single point ground.
 2. Measure the resistance between Y5002 connector female socket 2 and single point ground.
- Is either measurement less than 100k ohms?

YES: Repair drive wire short to ground in harness. Perform Verification Procedure.

NO: GO TO 7

RG40049,0000A82 -19-18APR12-9/17

7 Wire to Wire Check

1. On A5501 connector, measure resistance between female socket 16 and all other sockets in A5501 connector.
 2. On A5501 connector, measure resistance between female socket 35 and all other sockets in A5501 connector.
- Are any measurements less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 8

RG40049,0000A82 -19-18APR12-10/17

8 Replace Suction Control Valve

1. Replace suction control valve.
 2. Reconnect ECU Connector A5501.
 3. Ignition ON, Engine OFF.
 4. In Service ADVISOR, perform Harness Diagnostic Mode Test.
- Is DTC 001347.05 active?

YES: Contact DTAC for support.

NO: Perform Verification Procedure

Continued on next page

RG40049,0000A82 -19-18APR12-11/17

9 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect suction control valve connector Y5002.
3. Perform Terminal Test on suction control valve and Y5002 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 10

RG40049,0000A82 -19-18APR12-12/17

10 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform Terminal Test on A5501 connector female sockets 16 and 35. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

RG40049,0000A82 -19-18APR12-13/17

11 Wire to Wire Check

On A5501 connector, measure resistance between female sockets 16 and 35 while performing Wiggle Test.

Is resistance measurement always greater than 100k ohms?

YES: GO TO 12

NO: Repair short in wiring harness. Perform Verification Procedure.

RG40049,0000A82 -19-18APR12-14/17

12 Continuity Check

1. Ignition OFF, Engine OFF.
2. Measure the resistance between A5501 connector female socket 35 and Y5002 connector female socket 1, while performing Wiggle Test.
3. Measure the resistance between A5501 connector female socket 16 and Y5002 connector female socket 2, while performing Wiggle Test.

Are both resistance measurements always less than 5 ohms?

YES: GO TO 13

NO: Repair drive wire open or high resistance in harness. Perform Verification Procedure.

RG40049,0000A82 -19-18APR12-15/17

13 Short to Ground Check

1. Measure the resistance between Y5002 connector female socket 1 and single point ground, while performing Wiggle Test.
2. Measure the resistance between Y5002 connector female socket 2 and single point ground, while performing Wiggle Test.

Is either measurement ever less than 100k ohms?

YES: Repair drive wire short to ground in harness. Perform Verification Procedure.

NO: GO TO 14

Continued on next page

RG40049,0000A82 -19-18APR12-16/17

14 Wire to Wire Check

1. On A5501 connector, measure resistance between female socket 16 and all other sockets in A5501 connector while performing Wiggle Test.
2. On A5501 connector, measure resistance between female socket 35 and all other sockets in A5501 connector while performing Wiggle Test.

Are all resistance measurements always greater than 100k ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair short in wiring harness. Perform Verification Procedure.

RG40049,0000A82 -19-18APR12-17/17

**001347.06 — Suction Control Valve Circuit
Has Low Resistance**

*The ECU has detected low resistance on the suction
control valve drive circuit.*

Continued on next page

RG40049,0000A83 -19-25JUL11-1/14

Diagnostic Procedure

Troubleshooting Sequence:

001347.05

001347.06

When DTC is Displayed:

When the ignition is on, engine is running.

When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that the current to the suction control valve is higher than expected, which indicates low resistance in the drive circuit.

Alarm Level:

Stop

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For component location, see Y5002 — Suction Control Valve in Section 03, Group 140.

For more suction control valve information, see High-Pressure Fuel Pump Operation in Section 03, Group 130.

For more information on the Wiggle Test, see Wiggle Test in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

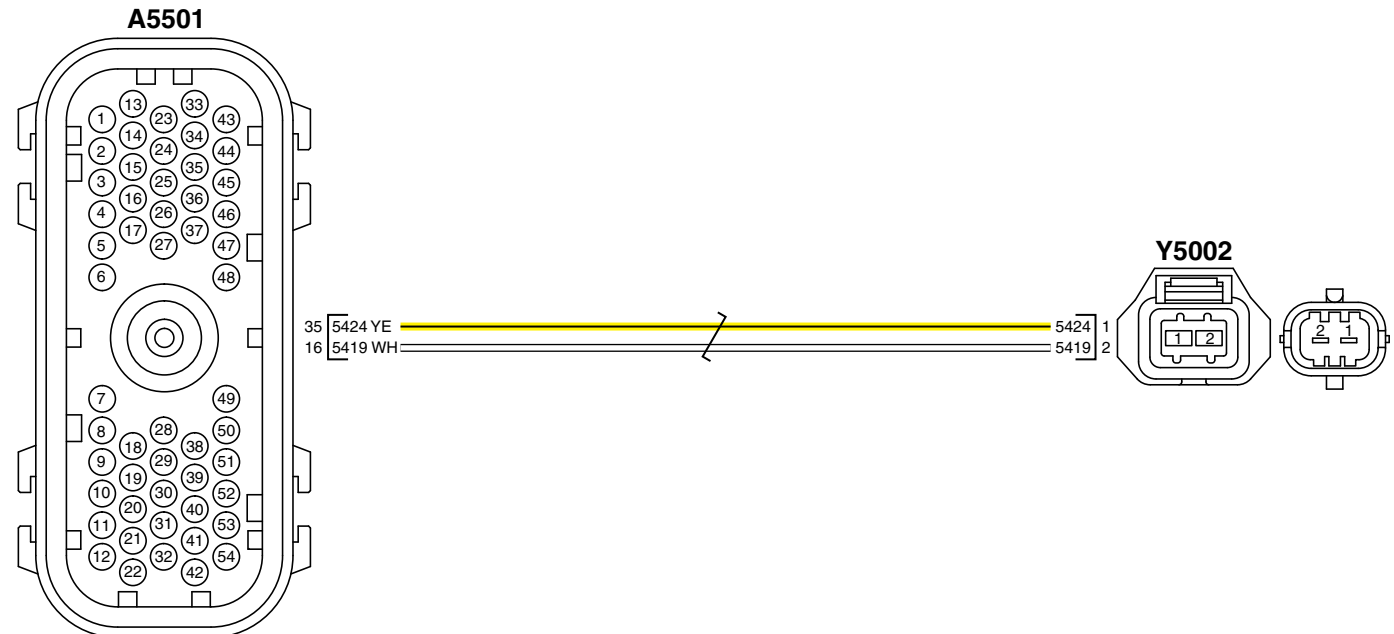
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 1

located in Section 06, Group 210.



A5501—16—Drive -

A5501—35—Drive +

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

RG16738 —UN—08MAR10

Continued on next page

RG40049,0000A83 -19-25JUL11-2/14

Flex probe:

Suction Control Valve

- JDG10233 — Female — Blue/Red

- JDG10243 — Male — Blue/Red

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

- J-35616-20 – Test Leads

RG40049,0000A83 -19-25JUL11-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform the Harness Diagnostic Mode Test.

Is DTC 001347.06 active?

YES: GO TO 2

NO: GO TO 8

RG40049,0000A83 -19-25JUL11-4/14

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect suction control valve connector Y5002.
3. Perform Terminal Test on suction control valve and Y5002 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RG40049,0000A83 -19-25JUL11-5/14

3 Check Drive - Circuit

1. Ignition ON, Engine OFF.
2. Use a multimeter to measure voltage between Y5002 female socket 2 and single point ground.

Was voltage less than 0.2 V?

YES: GO TO 4

NO: Repair short in harness. Perform Verification Procedure.

RG40049,0000A83 -19-25JUL11-6/14

4 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform Terminal Test on A5501 connector female sockets 16 and 35. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 5

Continued on next page

RG40049,0000A83 -19-25JUL11-7/14

Fuel System Diagnostics

5 Wire to Wire Check	<p>On A5501 connector, measure resistance between female sockets 16 and 35.</p> <p>Is resistance greater than 100k ohms?</p>	<p>YES: GO TO 6</p> <p>NO: Repair short in wiring harness. Perform Verification Procedure.</p> <p>RG40049,0000A83 -19-25JUL11-8/14</p>
6 Check Wiring Harness	<ol style="list-style-type: none">1. On A5501 connector, measure resistance between female socket 16 and all other sockets in A5501 connector.2. On A5501 connector, measure resistance between female socket 35 and all other sockets in A5501 connector. <p>Are any measurements less than 100k ohms?</p>	<p>YES: Repair short in harness. Perform Verification Procedure.</p> <p>NO: GO TO 7</p> <p>RG40049,0000A83 -19-25JUL11-9/14</p>
7 Replace Suction Control Valve	<ol style="list-style-type: none">1. Ignition OFF, Engine OFF2. Replace suction control valve.3. Reconnect ECU Connector A5501.4. Ignition ON, Engine OFF.5. In Service ADVISOR, perform the Harness Diagnostic Mode Test. <p>Is DTC 001347.06 active?</p>	<p>YES: Contact DTAC for support.</p> <p>NO: Perform Verification Procedure</p> <p>RG40049,0000A83 -19-25JUL11-10/14</p>
8 Terminal Test	<ol style="list-style-type: none">1. Ignition OFF, Engine OFF.2. Disconnect suction control valve connector Y5002.3. Perform Terminal Test on actuator and Y5002 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 9</p> <p>RG40049,0000A83 -19-25JUL11-11/14</p>
9 Terminal Test	<ol style="list-style-type: none">1. Disconnect ECU connector A5501.2. Perform Terminal Test on A5501 connector female sockets 16 and 35. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 10</p> <p>RG40049,0000A83 -19-25JUL11-12/14</p>
10 Wire to Wire Check	<p>On A5501 connector, measure resistance between female sockets 16 and 35 while performing Wiggle Test.</p> <p>Is resistance measurement always greater than 100k ohms?</p>	<p>YES: GO TO 11</p> <p>NO: Repair short in wiring harness. Perform Verification Procedure.</p> <p>Continued on next page</p> <p>RG40049,0000A83 -19-25JUL11-13/14</p>

11 Check Wiring Harness

1. On A5501 connector, measure resistance between female socket 16 and all other sockets in A5501 connector while performing Wiggle Test.
2. On A5501 connector, measure resistance between female socket 35 and all other sockets in A5501 connector while performing Wiggle Test.

Are all resistance measurements greater than 100k ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair short in wiring harness. Perform Verification Procedure.

RG40049,0000A83 -19-25JUL11-14/14

**001347.16 — Suction Control Valve Sticking
and Fuel Rail Pressure Moderately High**

*The ECU has detected that the suction control
valve is sticking and causing the fuel rail pressure
to be moderately high.*

Continued on next page

RG40049,0000A84 -19-25JUL11-1/4

Diagnostic Procedure

Troubleshooting Sequence:
001347.16

When DTC is Displayed:

When the ignition is on, engine running, and the fault active.

Related Information:

The ECU has detected that the suction control valve is sticking and causing the fuel rail pressure to be moderately high.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For component location, see [Y5002 — Suction Control Valve](#) in Section 03, Group 140.

For more suction control valve information, see [High-Pressure Fuel Pump Operation](#) in Section 03, Group 130.

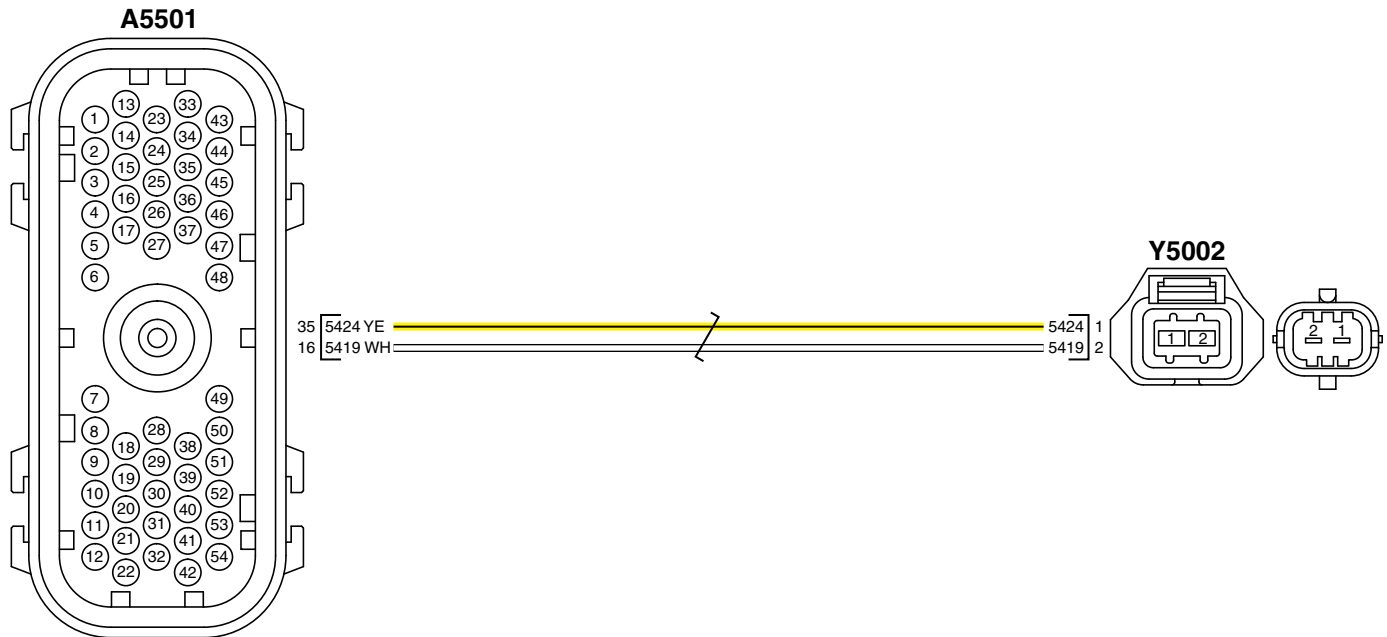
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Suction Control Valve Wiring Diagram

A5501—16—Drive -

A5501—35—Drive +

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probe:

Suction Control Valve

- [JDG10233](#) — Female — Blue/Red
- [JDG10243](#) — Male — Blue/Red

RG16738—UN—08MAR10

Continued on next page

RG40049,0000A84 -19-25JUL11-2/4

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG40049,0000A84 -19-25JUL11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Wait 90 seconds. Refresh DTCs.

Is DTC 001347.16 active?

YES: Replace suction control valve. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure

RG40049,0000A84 -19-25JUL11-4/4

**001347.18 — Suction Control Valve Sticking
and Fuel Rail Pressure Slightly Low**

*The ECU has detected that the suction control valve is
sticking and causing the fuel rail pressure to be slightly low.*

Continued on next page

RG40049,0000A85 -19-25JUL11-1/4

Diagnostic Procedure

Troubleshooting Sequence:

001347.18

When DTC is Displayed:

When the ignition is on, engine running, and the fault active.

Related Information:

The ECU has detected that the suction control valve is sticking and causing the fuel rail pressure to be slightly low.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For component location, see [Y5002 — Suction Control Valve](#) in Section 03, Group 140.

For more suction control valve information, see [High-Pressure Fuel Pump Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

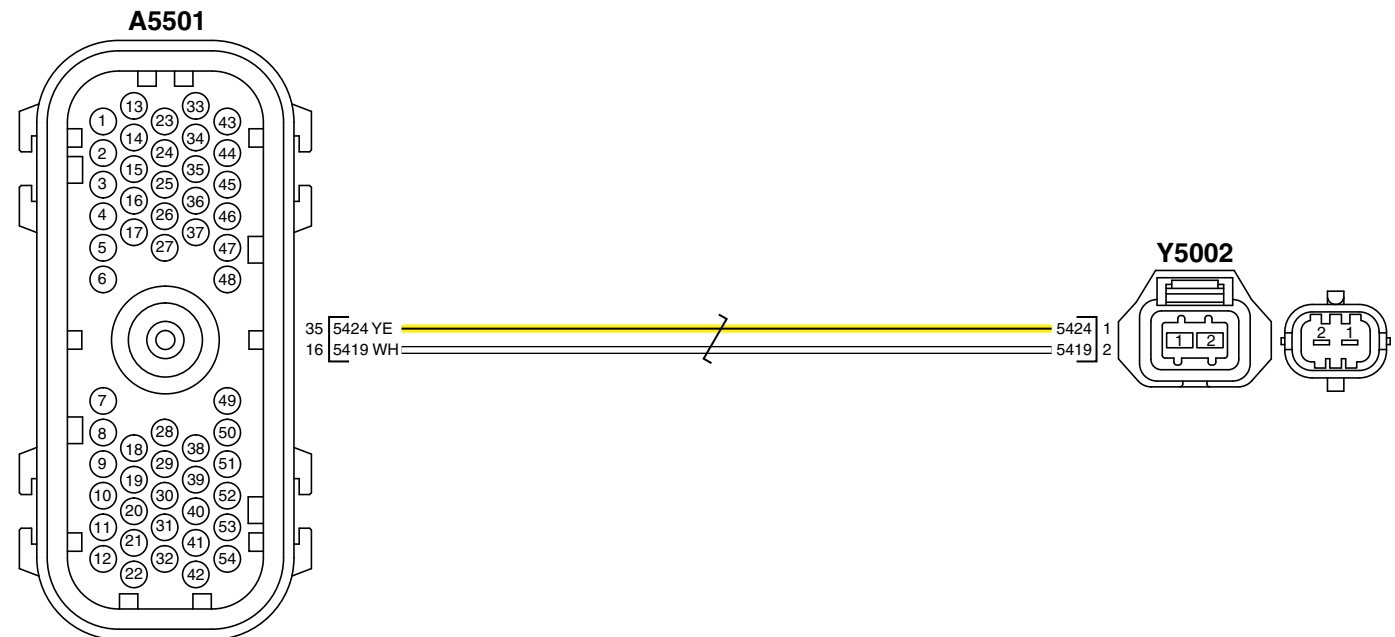
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Suction Control Valve Wiring Diagram

A5501—16—Drive -

A5501—35—Drive +

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probe:

Suction Control Valve

- [JDG10233](#) — Female — Blue/Red

- [JDG10243](#) — Male — Blue/Red

RG16738 —UN—08MAR10

Continued on next page

RG40049,0000A85 -19-25JUL11-2/4

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RG40049,0000A85 -19-25JUL11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Wait 90 seconds. Refresh DTCs.

Is DTC 001347.18 active?

YES: GO TO [High-Pressure Fuel System Check](#) for diagnostics.

NO: GO TO [Problem Not Found Procedure](#)

RG40049,0000A85 -19-25JUL11-4/4

002797.03 — Injector High Voltage Supply #1 Out of Range High

The ECU has detected the injector high voltage supply circuit #1 is out of range high prior to energizing for an injection event.

Diagnostic Procedure

Troubleshooting Sequence: 002797.03

When DTC is Displayed:

When the engine is cranking or running.

Related Information:

The ECU has detected the injector high voltage supply circuit #1 is above battery voltage prior to energizing an injection event.

The ECU supplies injectors #1 and #4 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:
Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

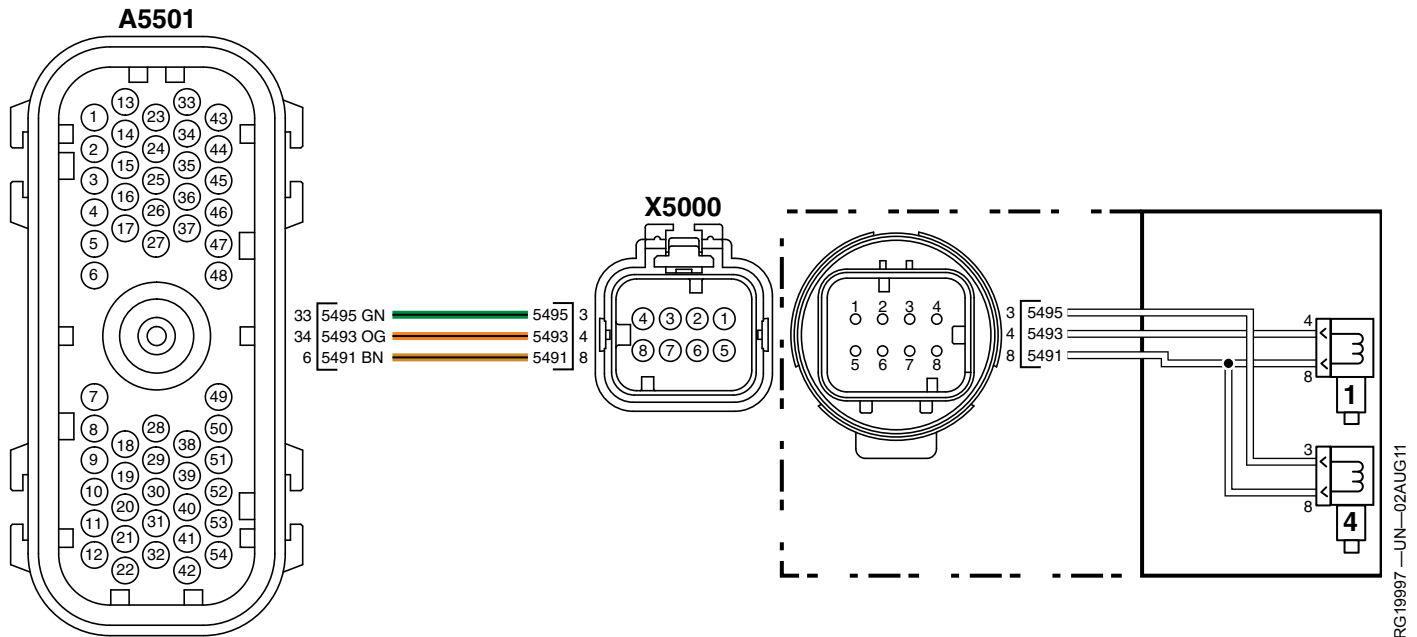
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Injector Drive #1 Wiring Diagram

A5501-34—Injector #1 Return

A5501-6—Injector #1 Supply

A5501-6—Injector #4 Supply

A5501-33—Injector #4 Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.

3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview Test.
5. Ignition OFF, Engine OFF.
6. Replace ECU. Perform [Verification Procedure](#).

RG40049,0000A86 -19-25JUL11-1/1

002797.05 — Injector High Voltage Supply #1 Circuit Has High Resistance

The ECU has detected a problem with injector high voltage supply #1.

RG40049,0000A87 -19-25JUL11-1/4

Diagnostic Procedure

Troubleshooting Sequence: 002797.05

When DTC is Displayed:

When the ignition is on, engine running, and the fault is active.

Related Information:

The ECU has detected an internal problem with the injector high voltage supply #1 circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For more electronic injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 1](#)
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG40049,0000A87 -19-25JUL11-2/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 002797.05 active?

YES: GO TO 2

NO: GO TO [Problem Not Found Procedure](#)

Continued on next page

RG40049,0000A87 -19-25JUL11-3/4

2 Reprogram ECU

1. Ignition ON, Engine OFF
2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
3. Ignition ON, engine running
4. Refresh codes.

Is DTC 002797.05 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A87 -19-25JUL11-4/4

002797.06 — Injector High Voltage Supply #1 Circuit Has Low Resistance

The ECU has detected a problem with injector high voltage supply #1.

RG40049,0000A88 -19-25JUL11-1/4

Diagnostic Procedure

Troubleshooting Sequence: 002797.06

When DTC is Displayed:

When the ignition is on, engine running, and the fault is active.

Related Information:

The ECU has detected an internal problem with the injector high voltage supply #1 circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For more electronic injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 1](#)
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG40049,0000A88 -19-25JUL11-2/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 002797.06 active?

YES: [GO TO 2](#)

NO: [GO TO Problem Not Found Procedure](#)

Continued on next page

RG40049,0000A88 -19-25JUL11-3/4

2 Reprogram ECU

1. Ignition ON, Engine OFF
2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
3. Ignition ON, engine running
4. Refresh codes.

Is DTC 002797.06 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A88 -19-25JUL11-4/4

002798.03 — Injector High Voltage Supply #2 Out of Range High

The ECU has detected the injector high voltage supply circuit #2 is out of range high prior to energizing for an injection event.

Diagnostic Procedure

Troubleshooting Sequence: 002798.03

When DTC is Displayed:

When the engine is cranking or running.

Related Information:

The ECU has detected the injector high voltage supply circuit #2 is above battery voltage prior to energizing an injection event.

The ECU supplies injectors #2 and #3 from one common high voltage driver.

The ECU switches the low side (ground) to control each individual injector.

Alarm Level:
Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more Electronic Injector (EI) information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

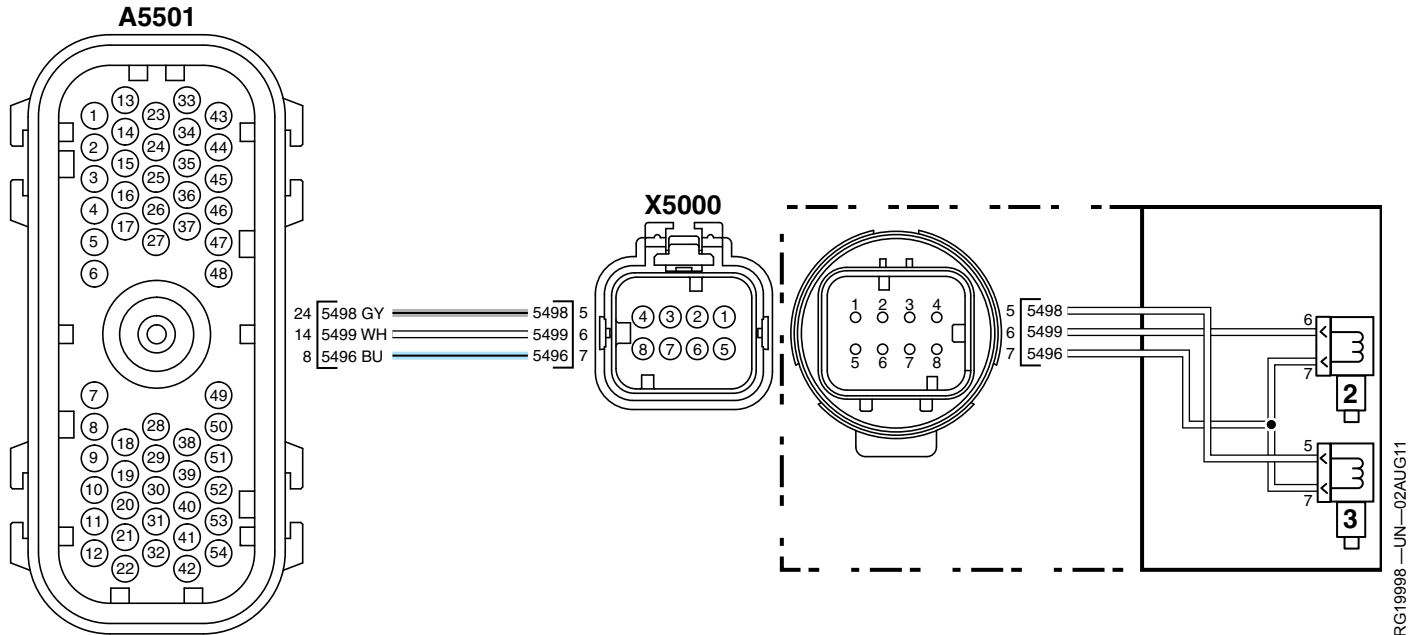
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Injector Drive #2 Wiring Diagram

A5501-14—Injector #2 Return

A5501-8—Injector #2 Supply

A5501-24—Injector #3 Return

A5501-8—Injector #3 Supply

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.

3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview Test.
5. Ignition OFF, Engine OFF
6. Replace ECU. Perform [Verification Procedure](#).

RG40049,0000A89 -19-25JUL11-1/1

002798.05 — Injector High Voltage Supply #2 Circuit Has High Resistance

The ECU has detected a problem with injector high voltage supply #2.

RG40049,0000A8A -19-25JUL11-1/4

Diagnostic Procedure

Troubleshooting Sequence: 002798.05

When DTC is Displayed:

When the ignition is on, engine running, and the fault is active.

Related Information:

The ECU has detected an internal problem with the injector high voltage supply #2 circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For more electronic injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 1](#)
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG40049,0000A8A -19-25JUL11-2/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
 3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
 4. In Service ADVISOR perform Control Unit Information and Overview test.
 5. Ignition ON, engine running.
 6. Refresh codes.
- Is DTC 002798.05 active?

YES: GO TO 2

NO: GO TO [Problem Not Found Procedure](#)

Continued on next page

RG40049,0000A8A -19-25JUL11-3/4

2 Reprogram ECU

1. Ignition ON, Engine OFF
2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
3. Ignition ON, engine running
4. Refresh codes.

Is DTC 002798.05 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A8A -19-25JUL11-4/4

002798.06 — Injector High Voltage Supply #2 Circuit Has Low Resistance

The ECU has detected a problem with injector high voltage supply #2.

RG40049,0000A8B -19-25JUL11-1/4

Diagnostic Procedure

Troubleshooting Sequence: 002798.06

When DTC is Displayed:

When the ignition is on, engine running, and the fault is active.

Related Information:

The ECU has detected an internal problem with the injector high voltage supply #2 circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional references:

For more electronic injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 1](#)
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG40049,0000A8B -19-25JUL11-2/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 002798.06 active?

YES: [GO TO 2](#)

NO: [GO TO Problem Not Found Procedure](#)

Continued on next page

RG40049,0000A8B -19-25JUL11-3/4

2 Reprogram ECU

1. Ignition ON, Engine OFF
2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
3. Ignition ON, engine running
4. Refresh codes.

Is DTC 002798.06 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A8B -19-25JUL11-4/4

003597.01 — Injector High Voltage Supply Extremely Low

The ECU has detected that the injector high voltage supply is extremely low, but the unswitched battery voltage to the ECU is in the correct range.

RG40049,0000A8C -19-25JUL11-1/4

Diagnostic Procedure

Troubleshooting Sequence:

000611.04
000612.04
000651.06
000652.06
000653.06
000654.06
003597.01

When DTC is Displayed:

When the ignition is on, engine running, and the fault is active.

Related Information:

The ECU has detected that the injector high voltage supply is extremely low.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Engine performance may also be affected by this fault.

Additional references:

For more electronic injector information, see [Electronic Injector \(EI\) Operation](#) in Section 03, Group 130.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Continued on next page

RG40049,0000A8C -19-25JUL11-2/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 003597.01 active?

YES: GO TO 2

NO: GO TO [Problem Not Found Procedure](#)

RG40049,0000A8C -19-25JUL11-3/4

2 Reprogram ECU

1. Ignition ON, Engine OFF
2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
3. Ignition ON, engine running
4. Refresh codes.

Is DTC 003597.01 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RG40049,0000A8C -19-25JUL11-4/4

Group 165

Engine Control Unit (ECU) and Throttle Diagnostics

000028.03 — Digital Throttle Signal Out of Range High

The digital throttle signal exceeds the switch high voltage specification.

Continued on next page

RE42287,0000475 -19-03AUG11-1/14

Diagnostic Procedure

Troubleshooting Sequence:

000028.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The digital throttle switch signal voltage to the ECU is higher than what is physically possible for the digital throttle switch.

NOTE: On OEM applications, the digital throttle is configured within the ECU on the Trim page. If the Trim is not configured correctly, fault codes can be caused.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more digital throttle information, see [Digital Throttle](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

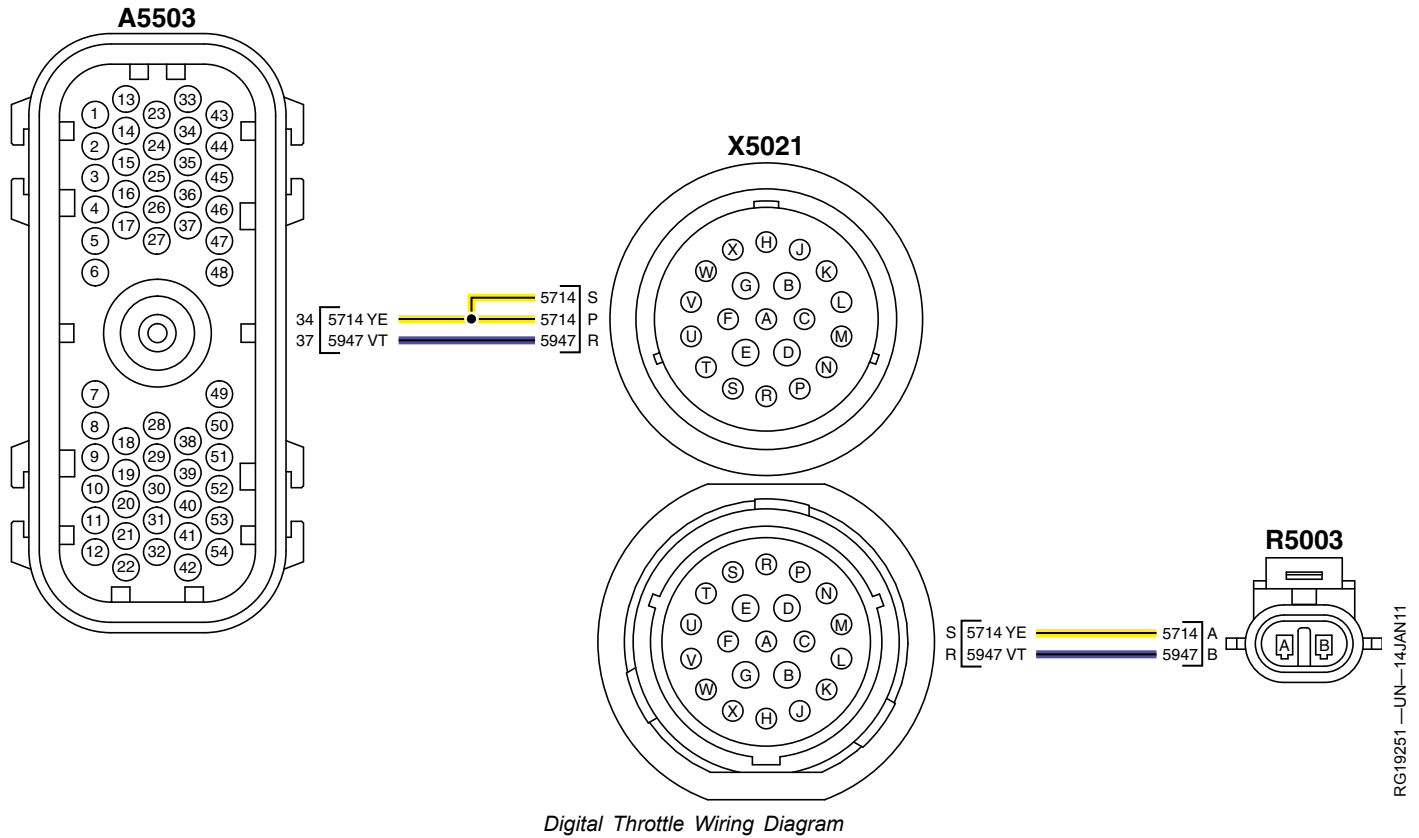
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [OEM Instrument Panel Schematic](#)
- see [4.5L Wiring Diagram 6](#)
- see [4.5L Wiring Diagram 10](#)

located in Section 06, Group 210.



Digital Throttle Wiring Diagram

X5021—R—Signal

X5021—S—Return

X5021—P—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probes:

Switch

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,0000475 -19-03AUG11-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 000028.03 active?

YES: GO TO 2

NO: GO TO 7

Continued on next page

RE42287,0000475 -19-03AUG11-4/14

Engine Control Unit (ECU) and Throttle Diagnostics

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect digital throttle switch connector R5003.
3. Perform Terminal Test on switch and R5003 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RE42287,0000475 -19-03AUG11-5/14

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to R5003 connector female socket B (+).
 - B to R5003 connector female socket A (-).
2. Set S1 to position 8 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 4

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 6

RE42287,0000475 -19-03AUG11-6/14

4 Software Check

In Service ADVISOR, monitor Digital Throttle Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace digital throttle switch. Perform Verification Procedure.

NO: GO TO 5

RE42287,0000475 -19-03AUG11-7/14

5 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000028.03 active?

YES: GO TO 10

NO: Perform Verification Procedure.

RE42287,0000475 -19-03AUG11-8/14

6 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing Wiggle Test.

Does voltage now remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform Verification Procedure.

NO: Repair open in signal wire. Perform Verification Procedure.

Continued on next page

RE42287,0000475 -19-03AUG11-9/14

Engine Control Unit (ECU) and Throttle Diagnostics

7 Wiggle Test

1. In Service ADVISOR, monitor Digital Throttle Input Voltage.
2. Perform Wiggle Test.

Does switch input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 8

RE42287,0000475 -19-03AUG11-10/14

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect digital throttle switch connector R5003.
3. Perform Terminal Test on switch and connector R5003.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 9

RE42287,0000475 -19-03AUG11-11/14

9 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 34 and 37. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,0000475 -19-03AUG11-12/14

10 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 34 and 37. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 11

RE42287,0000475 -19-03AUG11-13/14

11 Continuity Check

1. Measure the resistance between A5503 connector female socket 34 and R5003 connector female socket A.
2. Measure the resistance between A5503 connector female socket 37 and R5003 connector female socket B.

Are all resistance measurements less than 5 ohms?

YES: Replace ECU. Perform Verification Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,0000475 -19-03AUG11-14/14

000028.04 — Digital Throttle Signal Out of Range Low

The digital throttle signal is lower than the switch low voltage specification.

Continued on next page

RE42287,0000476 -19-03AUG11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

000028.03

000028.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The digital throttle switch signal voltage to the ECU is lower than what is physically possible for the digital throttle switch.

NOTE: On OEM applications, the digital throttle is configured within the ECU on the Trim page. If the Trim is not configured correctly, fault codes can be caused.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more digital throttle information, see [Digital Throttle](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

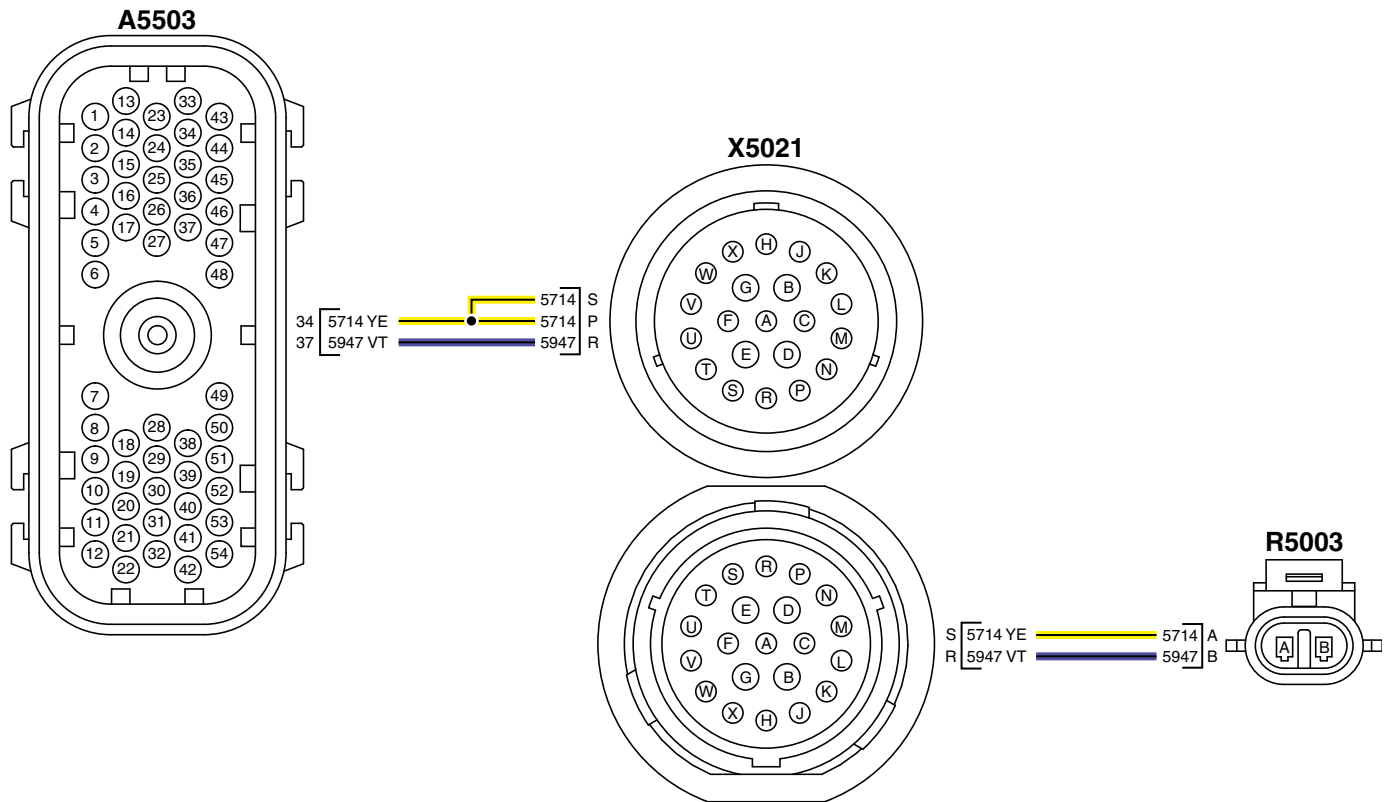
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [OEM Instrument Panel Schematic](#)
- see [4.5L Wiring Diagram 6](#)
- see [4.5L Wiring Diagram 10](#)

located in Section 06, Group 210.



Digital Throttle Wiring Diagram

X5021—R—Signal

X5021—S—Return

X5021—P—Return

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Switch

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

Continued on next page

RE42287,0000476 -19-03AUG11-3/17

RG19251 —UN—14JAN11

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000028.03 a stored code?

YES: GO TO [000028.03 — Digital Throttle Signal Out of Range High](#) procedure.

NO: [GO TO 2](#)

RE42287,0000476 -19-03AUG11-4/17

2 Code Check

Is DTC 000028.04 active?

YES: [GO TO 3](#)

NO: [GO TO 10](#)

RE42287,0000476 -19-03AUG11-5/17

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect digital throttle switch connector R5003.
3. Perform [Terminal Test](#) on switch and R5003 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000476 -19-03AUG11-6/17

4 Circuit Check

1. Connect Diagnostic Test Box :
 - A to R5003 connector female socket B (+).
 - B to R5003 connector female socket A (-).
2. Set S1 to position 8 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 5](#)

NO: [GO TO 7](#)

RE42287,0000476 -19-03AUG11-7/17

5 Software Check

In Service ADVISOR, monitor Digital Throttle Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace digital throttle switch. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,0000476 -19-03AUG11-8/17

Continued on next page

Engine Control Unit (ECU) and Throttle Diagnostics

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
 2. Disconnect Diagnostic Test Box.
 3. Reconnect all connectors and components.
 4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
 5. Ignition ON, Engine OFF.
 6. Refresh codes.
- Is DTC 000028.04 active?

YES: GO TO 13

NO: Perform [Verification Procedure](#).

RE42287,0000476 -19-03AUG11-9/17

7 Terminal Test

1. Ignition OFF, Engine OFF.
 2. Disconnect ECU connector A5503 .
 3. Perform [Terminal Test](#) on A5503 connector female sockets 34 and 37. And corresponding ECU male pins.
- Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,0000476 -19-03AUG11-10/17

8 Harness Check

NOTE: Many new error codes appear in the next step. Disregard all DTCs except 000028.03.

1. Ignition ON, Engine OFF.
 2. Refresh codes.
- Is DTC 000028.03 active?

YES: [GO TO 9](#)

NO: Replace ECU.
Perform [Verification Procedure](#).

RE42287,0000476 -19-03AUG11-11/17

9 Continuity Check

- Measure resistance between A5503 connector female socket 37 and R5003 connector female socket B.
- Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mis-pin in harness. Perform [Verification Procedure](#).

RE42287,0000476 -19-03AUG11-12/17

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Digital Throttle Input Voltage.
3. Perform [Wiggle Test](#).

Does voltage ever go below 0.2 V?

YES: Repair short to ground on signal wire.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

Continued on next page

RE42287,0000476 -19-03AUG11-13/17

Engine Control Unit (ECU) and Throttle Diagnostics

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect digital throttle switch connector R5003.
3. Perform Terminal Test on switch and R5003 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,0000476 -19-03AUG11-14/17

12 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 34 and 37. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,0000476 -19-03AUG11-15/17

13 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 34 and 37. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 14

RE42287,0000476 -19-03AUG11-16/17

14 Continuity Check

1. Measure the resistance between A5503 connector female socket 34 and R5003 connector female socket A.
2. Measure the resistance between A5503 connector female socket 37 and R5003 connector female socket B.

Are all resistance measurements less than 5 ohms?

YES: Replace ECU.
Perform Verification Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,0000476 -19-03AUG11-17/17

000028.14 — Digital Throttle Inhibited

Throttle voltage is above or below the specification.

This code is just an informative code telling you that the digital throttle is either above or below the Out Of Range specification.

To get the engine to change speed you must either set the throttle to the minimum position then increase it or cycle the ignition key to off then back on.

This is a safety feature used to keep the engine from running away when not commanded to after a throttle problem.

RE42287,0000477 -19-08APR11-1/1

**000029.03 — Secondary Analog Throttle
Signal Out of Range High**

*The secondary analog throttle signal exceeds the
throttle high voltage specification.*

Continued on next page

RE42287,0000478 -19-03AUG11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

003513.03

000029.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The secondary analog throttle signal voltage to the ECU corresponds to a throttle position greater than what is physically possible for the secondary analog throttle.

NOTE: On OEM applications, the secondary analog throttle is configured within the ECU on the Trim page. If the Trim is not configured correctly, fault codes can be caused.

Alarm Level:

Warning

Control Unit Response:

Three responses are available:

Idle Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the signal becomes valid, the throttle position must be returned to low idle position (0% throttle) in order for normal operation to resume. This is the default condition.

Resume Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the out-of-range condition clears, normal throttle operation resumes. **Caution:** this can cause large changes in engine speed if an intermittent out-of-range condition exists.

Locked Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. Normal throttle operation resumes only when the signal becomes valid again AND power is cycled on the ECU.

Additional references:

For more analog throttle information, see [Analog Throttle](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

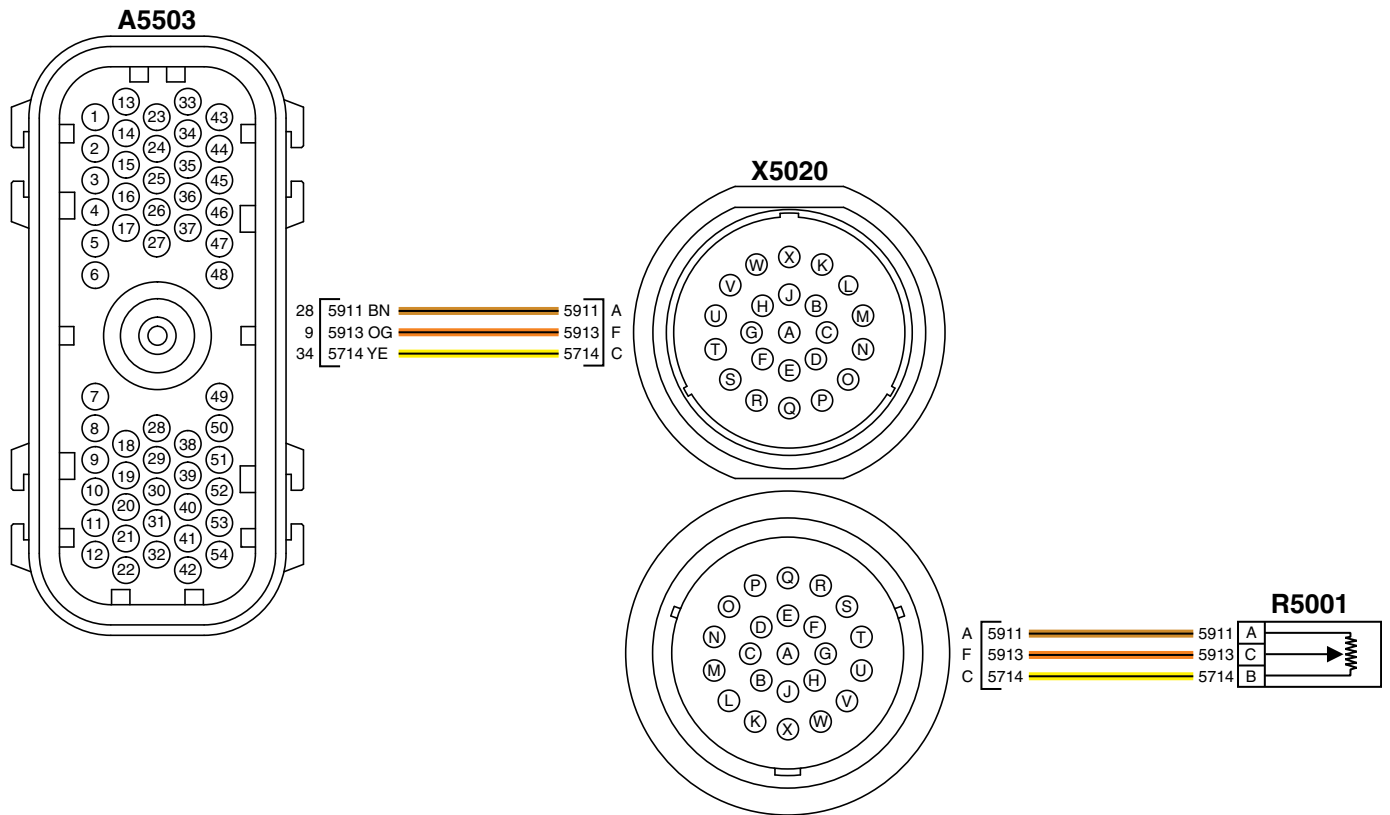
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [OEM Instrument Panel Schematic](#)
- see [4.5L Wiring Diagram 6](#)
- see [4.5L Wiring Diagram 9](#)

located in Section 06, Group 210.



Secondary Analog Throttle Wiring Diagram

X5020—A—Supply

X5020—C—Return

X5020—F—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Throttle

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

Continued on next page

RE42287,0000478 -19-03AUG11-3/17

RG19248 —UN—14JAN11

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003513.03 active or stored?

YES: GO TO [003513.03 — Sensor Supply #5 Voltage Out of Range High](#) procedure.

NO: [GO TO 2](#)

RE42287,0000478 -19-03AUG11-4/17

2 Code Check

Is DTC 000029.03 active?

YES: [GO TO 3](#)

NO: [GO TO 10](#)

RE42287,0000478 -19-03AUG11-5/17

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect secondary analog throttle connector R5001.
3. Perform [Terminal Test](#) on throttle and R5001 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000478 -19-03AUG11-6/17

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to R5001 connector female socket C (+).
 - B to R5001 connector female socket B (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 8](#)

NO: Voltage greater than 2.7 V. GO TO [Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 5](#)

RE42287,0000478 -19-03AUG11-7/17

5 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

Continued on next page

RE42287,0000478 -19-03AUG11-8/17

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 28, 34, and 9. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,0000478 -19-03AUG11-9/17

7 Continuity Check

1. Measure the resistance between A5503 connector female socket 9 and R5001 connector female socket C.
2. Measure the resistance between A5503 connector female socket 34 and R5001 connector female socket B.
3. Measure the resistance between A5503 connector female socket 28 and R5001 connector female socket A.

Are both resistance measurements less than 5 ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,0000478 -19-03AUG11-10/17

8 Software Check

In Service ADVISOR, monitor Secondary Analog Throttle Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace throttle.
Perform Verification Procedure.

NO: GO TO 9

RE42287,0000478 -19-03AUG11-11/17

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000091.03 active?

YES: GO TO 13

NO: Perform Verification Procedure.

RE42287,0000478 -19-03AUG11-12/17

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Secondary Analog Throttle Input Voltage.
3. Perform Wiggle Test.

Does throttle input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 11

Continued on next page

RE42287,0000478 -19-03AUG11-13/17

Engine Control Unit (ECU) and Throttle Diagnostics

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect secondary analog throttle connector R5001.
3. Perform Terminal Test on throttle and R5001 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,0000478 -19-03AUG11-14/17

12 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 28, 34, and 9. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,0000478 -19-03AUG11-15/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 28, 34, and 9. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 14

RE42287,0000478 -19-03AUG11-16/17

14 Continuity Check

1. Measure the resistance between A5503 connector female socket 9 and R5001 connector female socket C.
2. Measure the resistance between A5503 connector female socket 34 and R5001 connector female socket B.
3. Measure the resistance between A5503 connector female socket 28 and R5001 connector female socket A.

Are all resistance measurements less than 5 ohms?

YES: Replace ECU.
Perform Verification Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,0000478 -19-03AUG11-17/17

**000029.04 — Secondary Analog Throttle
Signal Out of Range Low**

*The secondary analog throttle signal is lower than
the throttle low voltage specification.*

Continued on next page

RE42287,0000479 -19-08AUG11-1/19

Diagnostic Procedure

Troubleshooting Sequence:

003513.03
003513.04
000029.03
000029.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The secondary analog throttle signal voltage to the ECU corresponds to a throttle position lower than what is physically possible for the secondary analog throttle.

NOTE: On OEM applications, the secondary analog throttle is configured within the ECU on the Trim page. If the Trim is not configured correctly, fault codes can be caused.

Alarm Level:

Warning

Control Unit Response:

Three responses are available:

Idle Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the signal becomes valid, the throttle position must be returned to low idle position (0% throttle) in order for normal operation to resume. This is the default condition.

Resume Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the out-of-range condition clears, normal throttle operation resumes. **Caution:** this can cause large changes in engine speed if an intermittent out-of-range condition exists.

Locked Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. Normal throttle operation resumes only when the signal becomes valid again AND power is cycled on the ECU.

Additional References:

For more analog throttle information, see [Analog Throttle](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

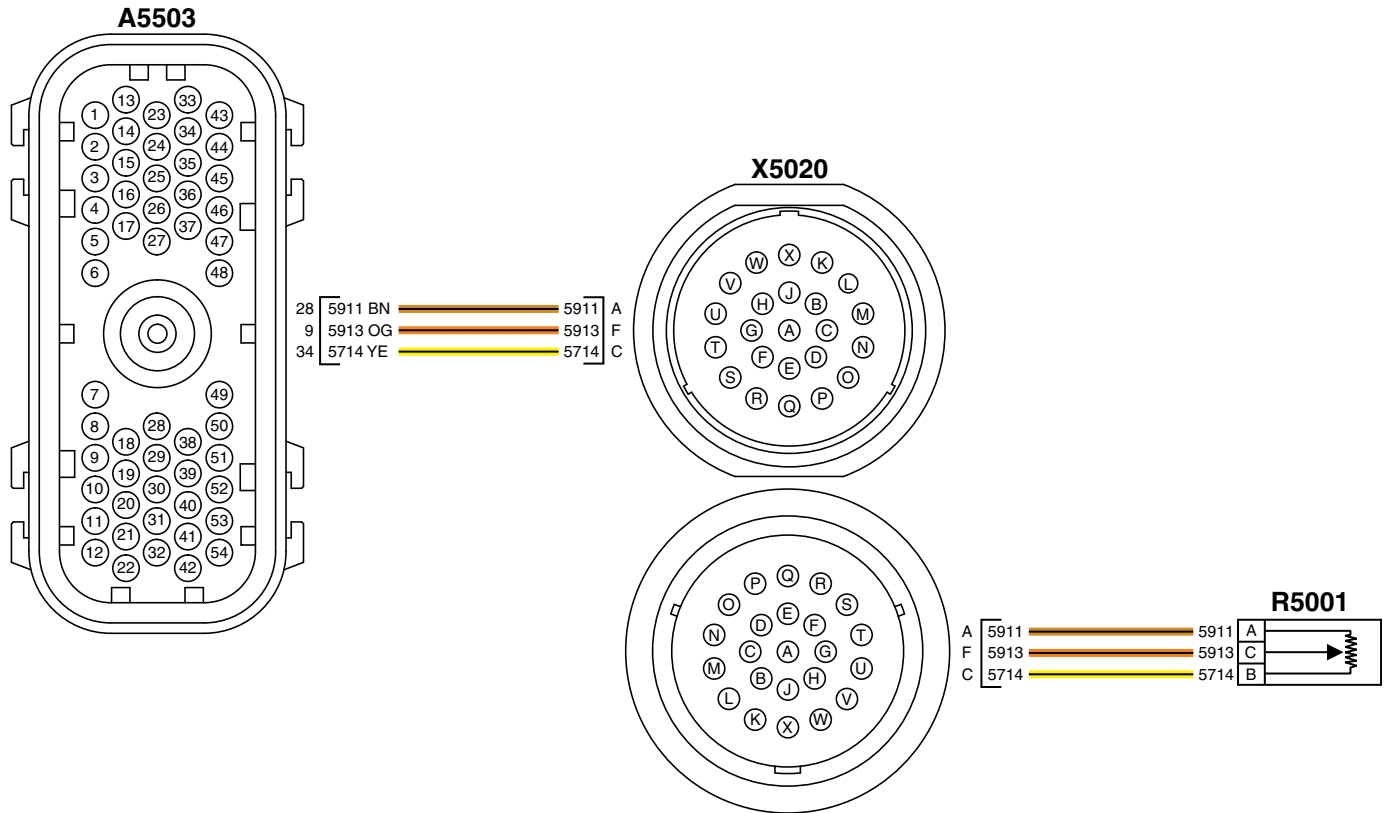
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [OEM Instrument Panel Schematic](#)
- see [4.5L Wiring Diagram 6](#)
- see [4.5L Wiring Diagram 9](#)

located in Section 06, Group 210.



Secondary Analog Throttle Wiring Diagram

X5020—A—Supply

X5020—C—Return

X5020—F—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Throttle

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

Continued on next page

RE42287,0000479 -19-08AUG11-3/19

RG19248 —UN—14JAN11

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003513.04 stored?

YES: GO TO [003513.04 — Sensor Supply #5 Voltage Out of Range Low](#) procedure.

NO: [GO TO 2](#)

RE42287,0000479 -19-08AUG11-4/19

2 Code Check

Is DTC 000029.03 stored?

YES: GO TO [000029.03 — Secondary Analog Throttle Signal Out of Range High](#) procedure.

NO: [GO TO 3](#)

RE42287,0000479 -19-08AUG11-5/19

3 Code Check

Is DTC 000029.04 active?

YES: [GO TO 4](#)

NO: [GO TO 12](#)

RE42287,0000479 -19-08AUG11-6/19

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect secondary analog throttle connector R5001.
3. Perform [Terminal Test](#) on throttle and R5001 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,0000479 -19-08AUG11-7/19

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to R5001 connector female socket A (+).
 - B to R5001 connector female socket B (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform [Wiggle Test](#).

Does voltage remain between 4.8 and 5.2 V?

YES: [GO TO 7](#)

NO: [GO TO 6](#)

Continued on next page

RE42287,0000479 -19-08AUG11-8/19

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform [Verification Procedure](#).

NO: Repair open or high resistance in supply wire. Perform [Verification Procedure](#).

RE42287,0000479 -19-08AUG11-9/19

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.

2. Connect Diagnostic Test Box :

- A to R5001 connector female socket C (+).
- B to R5001 connector female socket B (-).

3. Set S1 to position 9 on Diagnostic Test Box.

4. Connect multimeter to Diagnostic Test Box.

5. Ignition ON, Engine OFF.

6. Monitor voltage on multimeter.

7. Perform [Wiggle Test](#).

Is voltage between 2.3 and 2.7 V?

YES: [GO TO 8](#)

NO: [GO TO 10](#)

RE42287,0000479 -19-08AUG11-10/19

8 Software Check

In Service ADVISOR, monitor Secondary Analog Throttle Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace throttle. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,0000479 -19-08AUG11-11/19

9 Reprogram ECU

1. Ignition OFF, Engine OFF.

2. Disconnect Diagnostic Test Box.

3. Reconnect all connectors and components.

4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

5. Ignition ON, Engine OFF.

6. Refresh codes.

Is DTC 000029.04 active?

YES: [GO TO 15](#)

NO: Perform [Verification Procedure](#).

Continued on next page

RE42287,0000479 -19-08AUG11-12/19

Engine Control Unit (ECU) and Throttle Diagnostics

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 28, 34, and 9. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

RE42287,0000479 -19-08AUG11-13/19

11 Continuity Check

Measure resistance between A5503 connector female socket 9 and R5001 connector female socket C.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform Verification Procedure.

NO: Repair open or mis-pin in harness. Perform Verification Procedure.

RE42287,0000479 -19-08AUG11-14/19

12 Wiggle Test

1. In Service ADVISOR, monitor Secondary Analog Throttle Input Voltage.

2. Perform Wiggle Test.

Does voltage ever go below 0.2 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 13

RE42287,0000479 -19-08AUG11-15/19

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect secondary analog throttle connector R5001.
3. Perform Terminal Test on throttle and R5001 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 14

RE42287,0000479 -19-08AUG11-16/19

14 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 28, 34, and 9. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

Continued on next page

RE42287,0000479 -19-08AUG11-17/19

Engine Control Unit (ECU) and Throttle Diagnostics

15 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 28, 34, and 9. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 16

RE42287,0000479 -19-08AUG11-18/19

16 Continuity Check

1. Measure the resistance between A5503 connector female socket 9 and R5001 connector female socket C.
2. Measure the resistance between A5503 connector female socket 34 and R5001 connector female socket B.
3. Measure the resistance between A5503 connector female socket 28 and R5001 connector female socket A.

Are all resistance measurements less than 5 ohms?

YES: Replace ECU.
Perform Verification Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,0000479 -19-08AUG11-19/19

000029.14 — Secondary Analog Throttle Inhibited

Throttle voltage is out of range high or low.

This code indicates the secondary analog throttle is out of range high or low.

To change engine speed, the throttle is set to the minimum position, then increase the throttle, or cycle the ignition off to on.

This is a safety feature designed to prevent uncontrolled engine speed if a throttle fault is detected.

RE42287,000047A -19-01FEB11-1/1

**000091.03 — Primary Analog Throttle Signal
Out of Range High**

*The primary analog throttle signal exceeds the
throttle high voltage specification.*

Continued on next page

RE42287,000047B -19-07AUG11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

003512.03

000091.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The primary analog throttle signal voltage to the ECU corresponds to a throttle position greater than what is physically possible for the primary analog throttle.

*NOTE: On OEM applications, the primary analog throttle is configured within the ECU on the Trim page.
If the Trim is not configured correctly, fault codes can be caused.*

Alarm Level:

Warning

Control Unit Response:

Three responses are available:

Idle Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the signal becomes valid, the throttle position must be returned to low idle position (0% throttle) in order for normal operation to resume. This is the default condition.

Resume Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the out-of-range condition clears, normal throttle operation resumes. **Caution:** this can cause large changes in engine speed if an intermittent out-of-range condition exists.

Locked Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. Normal throttle operation resumes only when the signal becomes valid again AND power is cycled on the ECU.

Additional references:

For more analog throttle information, see [Analog Throttle](#) in Section 03, Group 140.

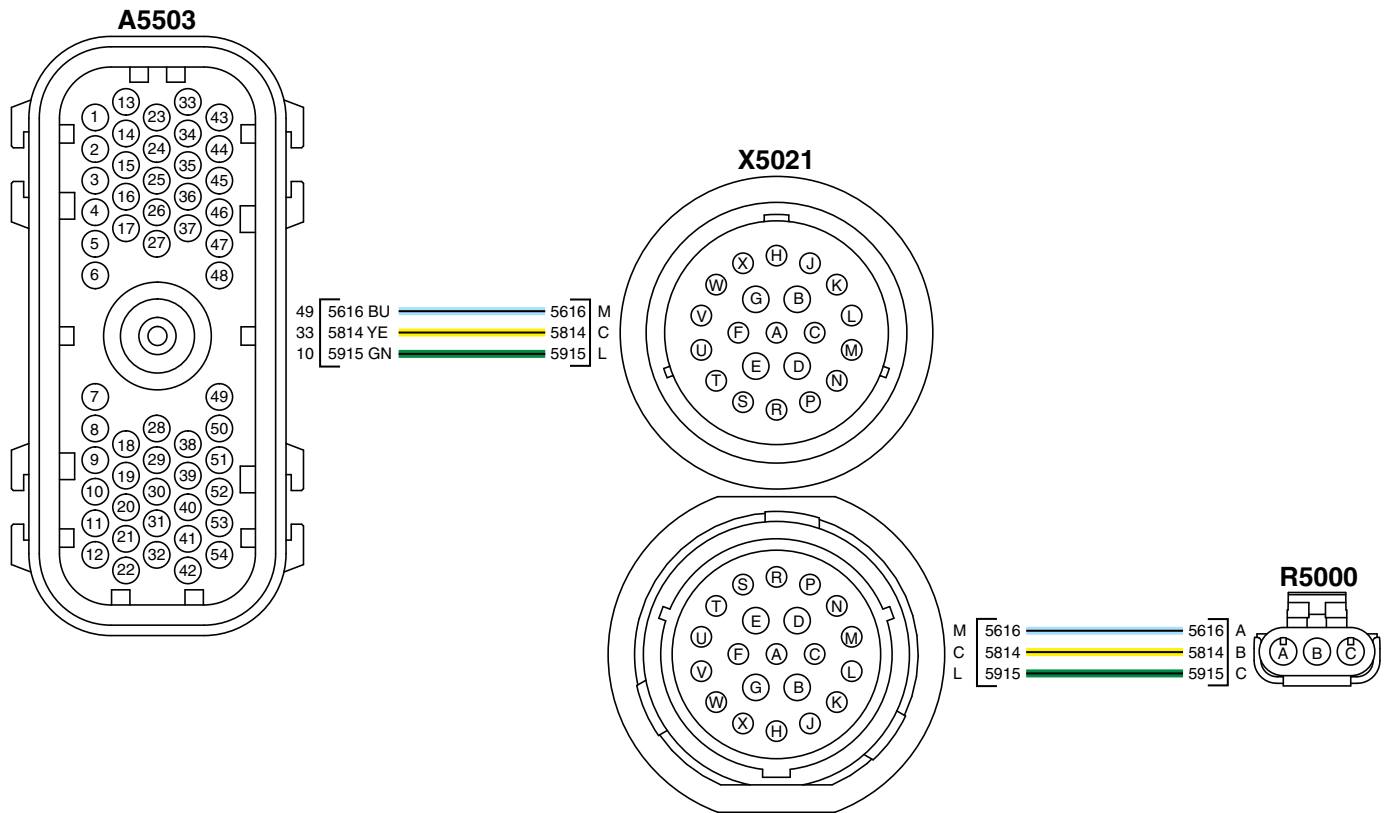
For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [OEM Instrument Panel Schematic](#)
- see [4.5L Wiring Diagram 6](#)
- see [4.5L Wiring Diagram 10](#)
- located in Section 06, Group 210.



Primary Analog Throttle Wiring Diagram

X5021—M—Supply

X5021—C—Return

X5021—L—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Throttle

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

Continued on next page

RE42287,000047B -19-07AUG11-3/17

RG19250 —UN—14JAN11

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003512.03 active or stored?

YES: GO TO [003512.03 — Sensor Supply #4 Voltage Out of Range High](#) procedure.

NO: [GO TO 2](#)

RE42287,000047B -19-07AUG11-4/17

2 Code Check

Is DTC 000091.03 active?

YES: [GO TO 3](#)

NO: [GO TO 10](#)

RE42287,000047B -19-07AUG11-5/17

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect primary analog throttle connector R5000.
3. Perform [Terminal Test](#) on throttle and R5000 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,000047B -19-07AUG11-6/17

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to R5000 connector female socket C (+).
 - B to R5000 connector female socket B (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: [GO TO 8](#)

NO: Voltage greater than 2.7 V. GO TO [Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 5](#)

RE42287,000047B -19-07AUG11-7/17

5 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

Continued on next page

RE42287,000047B -19-07AUG11-8/17

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 49, 33, and 10. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,000047B -19-07AUG11-9/17

7 Continuity Check

1. Measure the resistance between A5503 connector female socket 33 and R5000 connector female socket B.
2. Measure the resistance between A5503 connector female socket 10 and R5000 connector female socket C.

Are both resistance measurements less than 5 ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,000047B -19-07AUG11-10/17

8 Software Check

In Service ADVISOR, monitor Primary Analog Throttle Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace throttle.
Perform Verification Procedure.

NO: GO TO 9

RE42287,000047B -19-07AUG11-11/17

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000091.03 active?

YES: GO TO 13

NO: Perform Verification Procedure.

RE42287,000047B -19-07AUG11-12/17

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Primary Analog Throttle Input Voltage.
3. Perform Wiggle Test.

Does throttle input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 11

Continued on next page

RE42287,000047B -19-07AUG11-13/17

Engine Control Unit (ECU) and Throttle Diagnostics

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect primary analog throttle connector R5000.
3. Perform Terminal Test on throttle and R5000 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,000047B -19-07AUG11-14/17

12 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 49, 33, and 10. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,000047B -19-07AUG11-15/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 49, 33, and 10. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 14

RE42287,000047B -19-07AUG11-16/17

14 Continuity Check

1. Measure the resistance between A5503 connector female socket 33 and R5000 connector female socket B.
2. Measure the resistance between A5503 connector female socket 10 and R5000 connector female socket C.
3. Measure the resistance between A5503 connector female socket 49 and R5000 connector female socket A.

Are all resistance measurements less than 5 ohms?

YES: Replace ECU.
Perform Verification Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,000047B -19-07AUG11-17/17

**000091.04 — Primary Analog Throttle Signal
Out of Range Low**

*The primary analog throttle signal is lower than the
throttle low voltage specification.*

Continued on next page

RE42287,000047C -19-08AUG11-1/19

Diagnostic Procedure

Troubleshooting Sequence:

003512.03
003512.04
000091.03
000091.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The primary analog throttle signal voltage to the ECU corresponds to a throttle position lower than what is physically possible for the primary analog throttle.

*NOTE: On OEM applications, the primary analog throttle is configured within the ECU on the Trim page.
If the Trim is not configured correctly, fault codes can be caused.*

Alarm Level:

Warning

Control Unit Response:

Three responses are available:

Idle Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the signal becomes valid, the throttle position must be returned to low idle position (0% throttle) in order for normal operation to resume. This is the default condition.

Resume Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the out-of-range condition clears, normal throttle operation resumes. **Caution:** this can cause large changes in engine speed if an intermittent out-of-range condition exists.

Locked Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. Normal throttle operation resumes only when the signal becomes valid again AND power is cycled on the ECU.

Additional References:

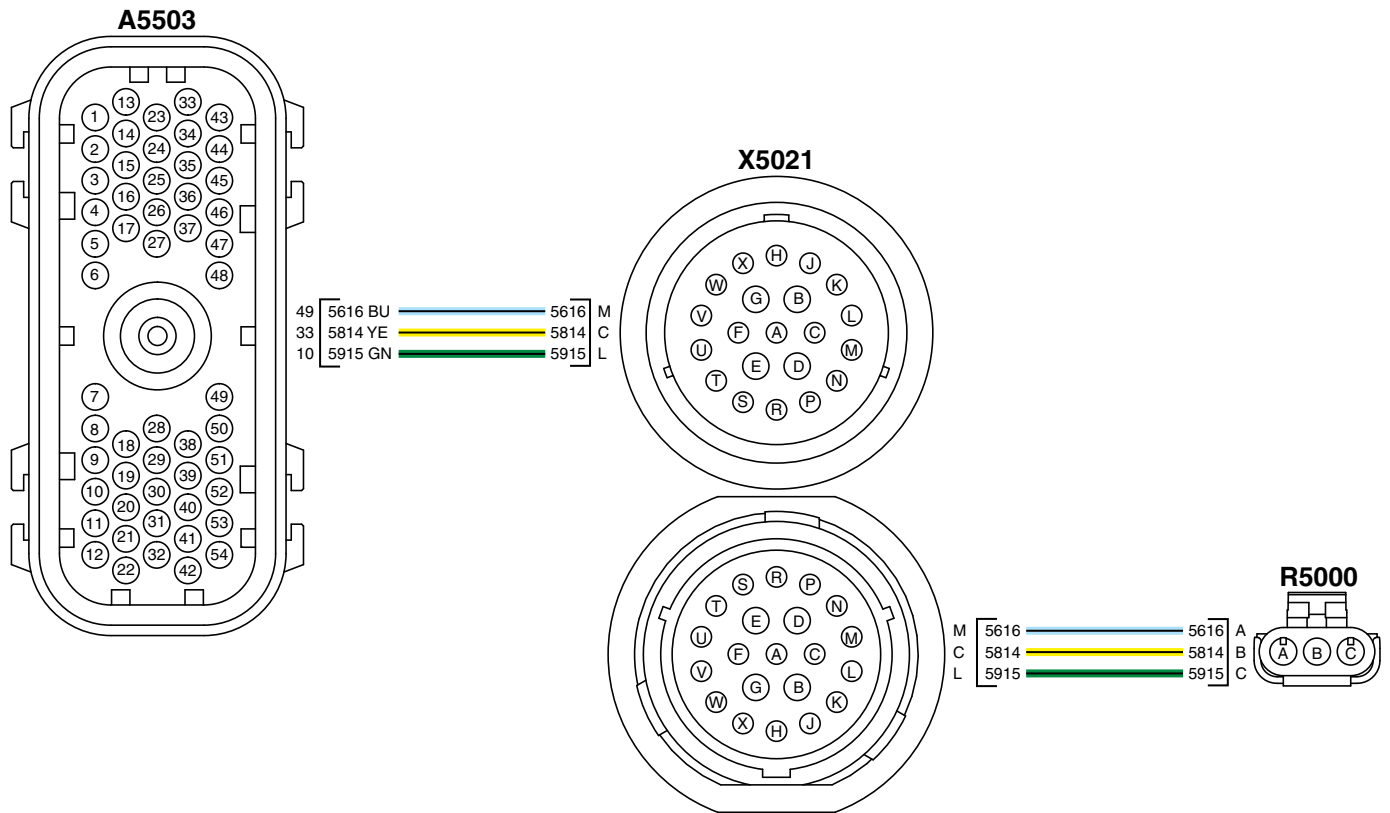
For more analog throttle information, see [Analog Throttle](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [OEM Instrument Panel Schematic](#)
 - see [4.5L Wiring Diagram 6](#)
 - see [4.5L Wiring Diagram 10](#)
- located in Section 06, Group 210.



Primary Analog Throttle Wiring Diagram

X5021—M—Supply

X5021—C—Return

X5021—L—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Throttle

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

Continued on next page

RE42287,000047C -19-08AUG11-3/19

RG19250 —UN—14JAN11

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003512.04 stored?

YES: GO TO [003512.04](#)
— [Sensor Supply #4](#)
[Voltage Out of Range Low](#)
procedure.

NO: [GO TO 2](#)

RE42287,000047C -19-08AUG11-4/19

2 Code Check

Is DTC 000091.03 stored?

YES: GO TO [000091.03](#)
— [Primary Analog Throttle](#)
[Signal Out of Range High](#)
procedure.

NO: [GO TO 3](#)

RE42287,000047C -19-08AUG11-5/19

3 Code Check

Is DTC 000091.04 active?

YES: [GO TO 4](#)

NO: [GO TO 12](#)

RE42287,000047C -19-08AUG11-6/19

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect primary analog throttle connector R5000.
3. Perform [Terminal Test](#) on and R5000 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification](#)
[Procedure](#).

NO: [GO TO 5](#)

RE42287,000047C -19-08AUG11-7/19

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to R5000 connector female socket A (+).
 - B to R5000 connector female socket B (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform [Wiggle Test](#).

Does voltage remain between 4.8 and 5.2 V?

YES: [GO TO 7](#)

NO: [GO TO 6](#)

Continued on next page

RE42287,000047C -19-08AUG11-8/19

Engine Control Unit (ECU) and Throttle Diagnostics

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform [Verification Procedure](#).

NO: Repair open or high resistance in supply wire. Perform [Verification Procedure](#).

RE42287,000047C -19-08AUG11-9/19

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.

2. Connect Diagnostic Test Box :

- A to R5000 connector female socket C (+).
- B to R5000 connector female socket B (-).

3. Set S1 to position 9 on Diagnostic Test Box.

4. Connect multimeter to Diagnostic Test Box.

5. Ignition ON, Engine OFF.

6. Monitor voltage on multimeter.

7. Perform [Wiggle Test](#).

Is voltage between 2.3 and 2.7 V?

YES: [GO TO 8](#)

NO: [GO TO 10](#)

RE42287,000047C -19-08AUG11-10/19

8 Software Check

In Service ADVISOR, monitor Primary Analog Throttle Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace throttle. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,000047C -19-08AUG11-11/19

9 Reprogram ECU

1. Ignition OFF, Engine OFF.

2. Disconnect Diagnostic Test Box.

3. Reconnect all connectors and components.

4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

5. Ignition ON, Engine OFF.

6. Refresh codes.

Is DTC 000091.04 active?

YES: [GO TO 15](#)

NO: Perform [Verification Procedure](#).

Continued on next page

RE42287,000047C -19-08AUG11-12/19

Engine Control Unit (ECU) and Throttle Diagnostics

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 49, 33, and 10. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

RE42287,000047C -19-08AUG11-13/19

11 Continuity Check

Measure resistance between A5503 connector female socket 10 and R5000 connector female socket C.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform Verification Procedure.

NO: Repair open or mis-pin in harness. Perform Verification Procedure.

RE42287,000047C -19-08AUG11-14/19

12 Wiggle Test

1. In Service ADVISOR, monitor Primary Analog Throttle Input Voltage.

2. Perform Wiggle Test.

Does voltage ever go below 0.2 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 13

RE42287,000047C -19-08AUG11-15/19

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect primary analog throttle connector R5000.
3. Perform Terminal Test on throttle and R5000 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 14

RE42287,000047C -19-08AUG11-16/19

14 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 49, 33, and 10. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

Continued on next page

RE42287,000047C -19-08AUG11-17/19

Engine Control Unit (ECU) and Throttle Diagnostics

15 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 49, 33, and 10. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 16

RE42287,000047C -19-08AUG11-18/19

16 Continuity Check

1. Measure the resistance between A5503 connector female socket 33 and R5000 connector female socket B.
2. Measure the resistance between A5503 connector female socket 10 and R5000 connector female socket C.
3. Measure the resistance between A5503 connector female socket 49 and R5000 connector female socket A.

Are all resistance measurements less than 5 ohms?

YES: Replace ECU.
Perform Verification Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,000047C -19-08AUG11-19/19

**000091.09 — Primary Analog Throttle Signal
Erratic**

*ECU received invalid or missing throttle information
from the CAN Bus. See application manual for
troubleshooting procedures.*

RE42287,000047D -19-01FEB11-1/1

000091.14 — Primary Analog Throttle Inhibited

Throttle voltage is out of range high or low.

This code indicates the primary analog throttle is out of range high or low.

To change engine speed, the throttle is set to the minimum position, then increase the throttle, or cycle the ignition off to on.

This is a safety feature designed to prevent uncontrolled engine speed if a throttle fault is detected.

RE42287,000047E -19-01FEB11-1/1

000108.02 — Barometric Pressure Signal Invalid

The ECU receives an invalid pressure from the barometric air pressure sensor.

RE42287,000047F -19-01AUG11-1/7

Diagnostic Procedure**Troubleshooting Sequence:**
000108.02**Related Information:**

The barometric air pressure sensor is an internal ECU sensor and cannot be repaired.

Alarm Level:

Warning

Control Unit Response:

If this code sets, the ECU uses manifold air pressure for the barometric pressure value. If the manifold air pressure is invalid, a default value of 101 kPa (1 bar) (14.6 psi) is used as barometric air pressure to run the engine.

Additional References:

For more barometric air pressure sensor information, see [Barometric Air Pressure Sensor](#) in Section 03, Group 140.

RE42287,000047F -19-01AUG11-2/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Wait a minimum of 60 seconds for ECU to perform sensor crosscheck after Ignition ON.

Is DTC 000108.02 active?

YES: [GO TO 2](#)

NO: [GO TO 5](#)

RE42287,000047F -19-01AUG11-3/7

2 Preliminary Check

1. Ignition OFF, Engine OFF.

2. Inspect the air vent located on the side of the ECU.

Is vent free from debris?

YES: [GO TO 4](#)

NO: Clear debris from air vent. [GO TO 3.](#)

RE42287,000047F -19-01AUG11-4/7

3 Check Codes

1. Ignition ON, Engine OFF.

2. Wait a minimum of 60 seconds for ECU to perform sensor crosscheck after Ignition ON.

Is DTC 000108.02 active?

YES: [GO TO 4](#)

NO: Perform [Verification Procedure](#).

Continued on next page

RE42287,000047F -19-01AUG11-5/7

Engine Control Unit (ECU) and Throttle Diagnostics

4 Reprogram ECU

1. Download new ECU software payload. For more information, see [Payload File — Downloading Instructions](#) in Section 04, Group 160.
2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
3. Ignition OFF, Engine OFF for a minimum of 60 seconds.
4. Ignition ON, Engine OFF.
5. Wait a minimum of 60 seconds for ECU to perform sensor crosscheck after Ignition ON.

Is DTC 000108.02 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,000047F -19-01AUG11-6/7

5 Air Vent Check

1. Ignition OFF, Engine OFF.
2. Inspect the air vent located on the side of the ECU.

Is the air vent free of debris?

YES: Perform [Verification Procedure](#).

NO: Clear debris from air vent. Perform [Verification Procedure](#).

RE42287,000047F -19-01AUG11-7/7

000108.07 — Barometric Pressure Signal Mismatch

readings when engine is stopped and they are expected to read within a certain range of each other.

The ECU detects a difference between the barometric air pressure reading and other air pressure sensor

RE42287,0000480 -19-01FEB11-1/7

Diagnostic Procedure**Troubleshooting Sequence:**
000108.07**When DTC is Displayed:**

When the ignition is on at power-up and the fault is active.
When the engine is shutdown and the fault is active.

Related Information:

The barometric air pressure sensor is an internal ECU sensor and cannot be repaired.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for barometric pressure.

Additional References:

For more barometric air pressure sensor information, see [Barometric Air Pressure Sensor](#) in Section 03, Group 140.

RE42287,0000480 -19-01FEB11-2/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Wait a minimum of 60 seconds for ECU to perform sensor crosscheck after Ignition ON.

Is DTC 000108.07 active?

YES: [GO TO 2](#)

NO: [GO TO 5](#)

RE42287,0000480 -19-01FEB11-3/7

2 Preliminary Check

1. Ignition OFF, Engine OFF.
 2. Inspect the air vent located on the side of the ECU.
- Is the air vent free of debris?

YES: [GO TO 4](#)

NO: Clear debris from air vent. [GO TO 3](#)

Continued on next page

RE42287,0000480 -19-01FEB11-4/7

Engine Control Unit (ECU) and Throttle Diagnostics

3 Check Codes

1. Ignition ON, Engine OFF.
 2. Wait a minimum of 60 seconds for ECU to perform sensor crosscheck after Ignition ON.
- Is DTC 000108.07 active?

YES: GO TO 4

NO: Perform Verification Procedure.

RE42287,0000480 -19-01FEB11-5/7

4 Reprogram ECU

1. Download new ECU software payload. For more information, see Payload File — Downloading Instructions in Section 04, Group 160.
 2. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
 3. Ignition OFF, Engine OFF for a minimum of 5 seconds.
 4. Ignition ON, Engine OFF.
 5. Wait a minimum of 60 seconds for ECU to perform sensor crosscheck after Ignition ON.
- Is DTC 000108.07 active?

YES: Replace ECU. Perform Verification Procedure.

NO: Perform Verification Procedure.

RE42287,0000480 -19-01FEB11-6/7

5 Air Vent Check

1. Ignition OFF, Engine OFF.
 2. Inspect the air vent located on the side of the ECU.
- Is the air vent free of debris?

YES: Perform Verification Procedure.

NO: Clear debris from air vent. Perform Verification Procedure.

RE42287,0000480 -19-01FEB11-7/7

000158.12 — ECU Power Down Error

The ECU is unable to complete proper power down procedures after detecting a key off condition.

RE42287,0000481 -19-01FEB11-1/4

Diagnostic Procedure**Troubleshooting Sequence:****000158.12****When DTC is Displayed:**

DTC is active 164 seconds after ECU commands an internal electronic switch OFF.

Related Information:

The ECU contains an electronic switch which is commanded OFF several seconds after the ECU detects ignition as being OFF to reduce the amount of current drawn by the ECU.

This DTC is generated if the ECU commands the internal electronic switch OFF but the switch does not respond within 164 seconds.

This DTC is only active when ignition is OFF.

Alarm Level:

Warning

Control Unit Response:

The application battery may be discharged because the ECU will not power down.

Additional References:

For further ECU information, see Engine Control Unit (ECU) System Operation in Section 03, Group 140 earlier in this manual.

RE42287,0000481 -19-01FEB11-2/4

① Reprogram ECU and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Connect Service ADVISOR, see Connecting to Service ADVISOR earlier in this Group.
 3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions earlier in this Group.
 4. Download new ECU payload and reprogram ECU.
 5. Clear DTCs.
 6. Disconnect Service ADVISOR.
 7. Ignition OFF, engine OFF for 5 minutes.
 8. Ignition ON, engine OFF.
 9. Connect Service ADVISOR and check for stored or active DTCs
- Did 000158.12 reappear as an active or stored DTC?

YES: GO TO 2**NO:** Problem fixed.

Continued on next page

RE42287,0000481 -19-01FEB11-3/4

2 Replace ECU

1. Ignition OFF, engine OFF.
 2. Replace ECU.
 3. Clear DTCs.
 4. Disconnect Service ADVISOR.
 5. Ignition OFF, engine OFF for 5 minutes.
 6. Ignition ON, engine OFF.
 7. Connect Service ADVISOR and check for stored or active DTCs
- Did 000158.12 reappear as an active or stored DTC?

YES: Open DTAC case.

NO: Problem fixed.

RE42287,0000481 -19-01FEB11-4/4

**000168.01 — Unswitched Battery Voltage
Extremely Low**

*The ECU has detected the unswitched battery voltage
is much lower than expected.*

Continued on next page

RE42287,0000482 -19-01AUG11-1/15

Diagnostic Procedure

Troubleshooting Sequence: 000168.01

When DTC is Displayed:

When the ignition is on, engine running, and the fault is active.

Related Information:

The ECU monitors the unswitched battery voltage when the engine is running and determines if the battery voltage becomes lower than a threshold defined in the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
Engine performance may be affected by low battery voltage to the ECU.

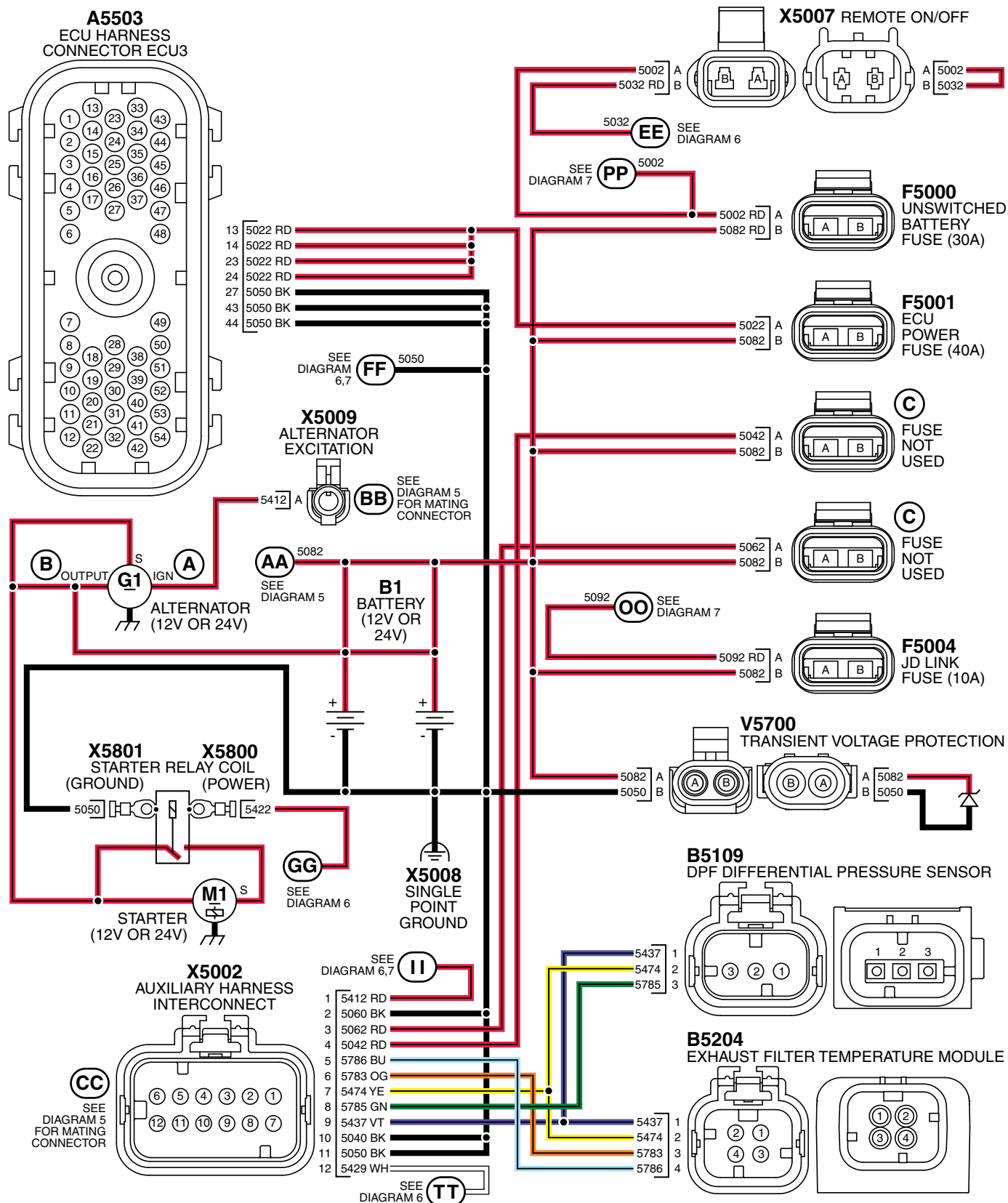
Additional References:

For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.
For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
- see 4.5L Wiring Diagram 8
located in Section 06, Group 210.



Unswitched Battery Voltage Wiring Diagram

Continued on next page

RE42287,0000482 -19-01AUG11-3/15

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

RE42287,0000482 -19-01AUG11-4/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Check battery terminals and battery state of charge.
6. Ignition ON, engine running.
7. Check charging system for proper operation.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,0000482 -19-01AUG11-5/15

2 Voltage Check

1. Ignition ON, Engine OFF
2. In Service ADVISOR, monitor Unswitched Battery Voltage.
3. Using multimeter, measure battery voltage at the battery.

Is voltage reading in Service ADVISOR within 0.5 V of multimeter reading?

YES: Repair problem. GO TO [Problem Not Found Procedure](#).

NO: [GO TO 3](#)

RE42287,0000482 -19-01AUG11-6/15

3 Terminal Test

1. Ignition OFF, Engine OFF
2. Disconnect ECU connector A5503.
3. Perform [Terminal Test](#) on A5503 connector female sockets 13, 14, 23, 24, 27, 43, and 44. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

Continued on next page

RE42287,0000482 -19-01AUG11-7/15

4 Power Circuit Check	<p>IMPORTANT: All of the following Diagnostic Test Box connections are being made to terminals that are supplied by unswitched battery power.</p> <ol style="list-style-type: none"> Using a multimeter, measure battery voltage at the battery. Connect Diagnostic Test Box : <ul style="list-style-type: none"> A to A5503 connector female socket 13 (+). B to A5503 connector female socket 27 (-). Set S1 to position 1 on Diagnostic Test Box. Connect multimeter to Diagnostic Test Box. Press and hold S3 on Diagnostic Test Box. Monitor voltage on multimeter. Perform <u>Wiggle Test</u>. <p>Is multimeter reading within 0.2 V of battery voltage?</p>	<p>YES: GO TO 6</p> <p>NO: GO TO 5</p> <p align="right">RE42287,0000482 -19-01AUG11-8/15</p>
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5 Open or High Resistance Circuit Check	<ol style="list-style-type: none"> Press and hold both S2 and S3 buttons on Diagnostic Test Box. Monitor voltage on multimeter. <p>Is multimeter reading within 0.2 V of battery voltage?</p>	<p>YES: Repair open or high resistance in ground wire. Perform <u>Verification Procedure</u>.</p> <p>NO: Repair open or high resistance in power wire. Perform <u>Verification Procedure</u>.</p> <p align="right">RE42287,0000482 -19-01AUG11-9/15</p>
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6 Power Circuit Check	<ol style="list-style-type: none"> Connect Diagnostic Test Box : <ul style="list-style-type: none"> A to A5503 connector female socket 14 (+). B to A5503 connector female socket 43 (-). Set S1 to position 1 on Diagnostic Test Box. Connect multimeter to Diagnostic Test Box. Press and hold S3 on Diagnostic Test Box. Monitor voltage on multimeter. Perform <u>Wiggle Test</u>. <p>Is multimeter reading within 0.2 V of battery voltage?</p>	<p>YES: GO TO 8</p> <p>NO: GO TO 7</p> <p align="right">RE42287,0000482 -19-01AUG11-10/15</p>
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7 Open or High Resistance Circuit Check	<ol style="list-style-type: none"> Press and hold both S2 and S3 buttons on Diagnostic Test Box. Monitor voltage on multimeter. <p>Is multimeter reading within 0.2 V of battery voltage?</p>	<p>YES: Repair open or high resistance in ground wire. Perform <u>Verification Procedure</u>.</p> <p>NO: Repair open or high resistance in power wire. Perform <u>Verification Procedure</u>.</p> <p align="right">Continued on next page RE42287,0000482 -19-01AUG11-11/15</p>
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8 Power Circuit Check

1. Connect Diagnostic Test Box :
 - A to A5503 connector female socket 23 (+).
 - B to A5503 connector female socket 44 (-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Press and hold S3 on Diagnostic Test Box.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Is multimeter reading within 0.2 V of battery voltage?

YES: GO TO 10

NO: GO TO 9

RE42287,0000482 -19-01AUG11-12/15

9 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Is multimeter reading within 0.2 V of battery voltage?

YES: Repair open or high resistance in ground wire. Perform Verification Procedure.

NO: Repair open or high resistance in power wire. Perform Verification Procedure.

RE42287,0000482 -19-01AUG11-13/15

10 Power Circuit Check

1. Connect Diagnostic Test Box :
 - A to A5503 connector female socket 24 (+).
 - B to A5503 connector female socket 44 (-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Press and hold S3 on Diagnostic Test Box.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Is multimeter reading within 0.2 V of battery voltage?

YES: GO TO 12

NO: GO TO 11

RE42287,0000482 -19-01AUG11-14/15

11 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Is multimeter reading within 0.2 V of battery voltage?

YES: Repair open or high resistance in ground wire. Perform Verification Procedure.

NO: Repair open or high resistance in power wire. Perform Verification Procedure.

RE42287,0000482 -19-01AUG11-15/15

12 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. In Service ADVISOR, monitor Unswitched Battery Voltage.
7. Using multimeter, measure battery voltage at the battery.

Is voltage reading in Service ADVISOR within 0.5 V of multimeter reading?

YES: Perform Verification Procedure.

NO: Replace ECU.
Perform Verification Procedure.

RE42287,0000482 -19-01AUG11-16/15

**000168.16 — Unswitched Battery Voltage
Moderately High**

*The ECU has detected the unswitched battery voltage
is moderately higher than expected.*

Continued on next page

RE42287,0000483 -19-01AUG11-1/6

Diagnostic Procedure

Troubleshooting Sequence:

000168.16

When DTC is Displayed:

When the ignition is on, engine running, and the fault is active.

Related Information:

The ECU monitors the unswitched battery voltage when the engine is running and determines if the battery voltage becomes higher than a threshold defined in the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Engine performance may be affected by high battery voltage to the ECU.

Additional References:

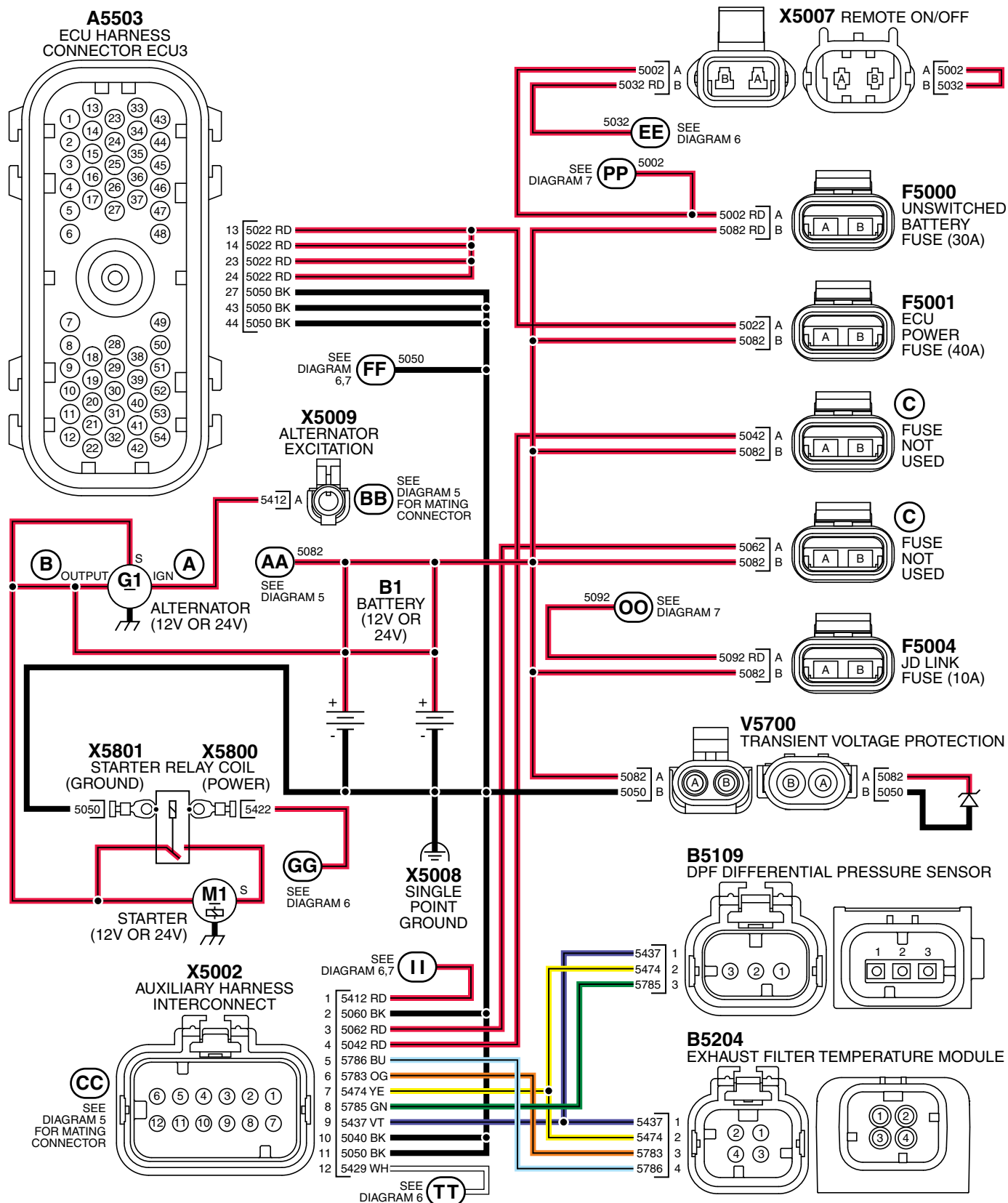
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 8](#)

located in Section 06, Group 210.



Unswitched Battery Voltage Wiring Diagram

A5503 — 13—Power
A5503 — 14—Power

A5503 — 23—Power
A5503 — 24—Power

A5503 — 27—Ground
A5503 — 43—Ground

A5503 — 44—Ground

Continued on next page

RE42287,0000483 -19-01AUG11-3/6

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

RE42287,0000483 -19-01AUG11-4/6

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Check battery state of charge.
6. Ignition ON, engine running.
7. Check charging system for proper operation.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,0000483 -19-01AUG11-5/6

2 Voltage Check

1. Ignition ON, engine running
2. In Service ADVISOR, monitor Unswitched Battery Voltage.
3. Using multimeter, measure battery voltage at the battery.

Is voltage reading in Service ADVISOR within 0.6 V of multimeter reading?

YES: [GO TO Problem Not Found Procedure](#).

NO: [GO TO 3](#)

RE42287,0000483 -19-01AUG11-6/6

3 Reprogram ECU

1. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

2. Ignition ON, Engine OFF.
3. In Service ADVISOR, monitor Unswitched Battery Voltage.
4. Using multimeter, measure battery voltage at the battery.

Is voltage reading in Service ADVISOR within 0.6 V of multimeter reading?

YES: Perform [Verification Procedure](#).

NO: Replace ECU.
Perform [Verification Procedure](#).

RE42287,0000483 -19-01AUG11-7/6

000168.18 — Unswitched Battery Voltage Moderately Low

The ECU has detected the unswitched battery voltage is moderately lower than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The ECU has detected that the unswitched battery voltage is moderately lower than the ECUs threshold.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 000168.01 — Unswitched Battery Voltage Extremely Low.

RE42287,0000484 -19-01FEB11-1/1

000189.31 — Engine Speed Derate Condition Exists

The ECU detects a condition that requires an engine speed derate.

Related Information:

The engine speed derate diagnostic trouble code is information to the operator that the ECU has detected a condition and is derating the engine by limiting the maximum amount of engine speed available to the engine. This code only sets as a result of another DTC setting.

Alarm Level:

Warning

Control Unit Response:

The ECU limits the amount of engine speed in an attempt to protect the engine.

Additional References:

For more information on derates, see [Engine Derate and Shutdown Protection](#) in Section 03, Group 140.

RE42287,0000485 -19-01FEB11-1/1

000629.11 — ECU Binary Input Error*The ECU detects a binary input problem.*

RE42287,0000486 -19-26MAY11-1/5

Diagnostic Procedure**Troubleshooting Sequence:**

000168.16
 001136.00
 001136.16
 000629.11

When DTC is Displayed:

The ECU detects an internal binary input problem caused by over voltage or high temperature.

Related Information:

The binary inputs and devices that are used may vary depending on your application. Some binary inputs are also configurable.

Alarm Level:

Warning

Control Unit Response:

The ECU detects that all binary inputs are invalid and uses default values for all binary input devices.

Additional References:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

For further ECU information, see [Engine Control Unit \(ECU\) System Operation](#) in Section 03, Group 140.

RE42287,0000486 -19-26MAY11-2/5

1 Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Perform the following:
 - Remove any items that are restricting the air flow around the ECU.
 - Remove dirt and debris from the ECU. Be cautious not to damage the connectors or strike ECU housing. Do not use a pressure wash to clean the ECU.
 - Verify the ECU is not mounted near high temperature components or in the path of high temperature air flow.

Do any of the above conditions exist?

YES: Correct conditions.
[GO TO 2](#)

NO: [GO TO 2](#)

RE42287,0000486 -19-26MAY11-3/5

2 Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 000629.11 active?

YES: [GO TO 3](#)

NO: Perform [Verification Procedure](#).

Continued on next page

RE42287,0000486 -19-26MAY11-4/5

3 Reprogram ECU

1. Download new ECU software payload. For more information, see [Payload File — Downloading Instructions](#) in Section 04, Group 160.
2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
3. Ignition OFF, Engine OFF for a minimum of 90 seconds.
4. Ignition ON, Engine OFF.
5. Wait a minimum of 60 seconds and refresh codes.

Is DTC 000629.11 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,0000486 -19-26MAY11-5/5

000629.12 — ECU EEPROM Error

The ECU detects an internal problem.

RE42287,0000487 -19-01FEB11-1/5

Diagnostic Procedure

Troubleshooting Sequence:
000629.12

When DTC is Displayed:

The ECU detects an internal memory problem.

Related Information:

This may be generated after ECU has been reprogrammed.

Alarm Level:

Stop

Control Unit Response:

The ECU attempts to control the engine in a normal manner. Engine may not run or may run poorly.

RE42287,0000487 -19-01FEB11-2/5

1 Reprogram ECU and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) earlier in this Group.
3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) earlier in this Group.
4. Monitor Unswitched Battery Voltage data point in Service ADVISOR.

Is the voltage greater than 11.7V for 12 V systems or 23.5 V for 24 V systems?

YES: GO TO 2

NO: Recharge application batteries or determine cause of low ECU voltage.

[GO TO 2](#)

RE42287,0000487 -19-01FEB11-3/5

2 Reprogram ECU

1. Download new ECU payload and reprogram ECU.

2. Disconnect Service ADVISOR.
3. Ignition OFF, engine OFF for 5 minutes.
4. Ignition ON, engine OFF.
5. Connect Service ADVISOR

Did 000629.12 reappear active?

YES: [GO TO 3](#)

NO: Problem fixed.

Continued on next page

RE42287,0000487 -19-01FEB11-4/5

Engine Control Unit (ECU) and Throttle Diagnostics

3 Replace ECU

1. Ignition OFF, engine OFF.
 2. Replace ECU.
 3. Disconnect Service ADVISOR.
 4. Ignition OFF, engine OFF for 5 minutes.
 5. Ignition ON, engine OFF.
 6. Connect Service ADVISOR
- Did 000629.12 reappear active?

YES: Open DTAC case.

NO: Problem fixed.

RE42287,0000487 -19-01FEB11-5/5

000629.13 — ECU Boot Block Error

The ECU detects an internal problem.

RE42287,00005BD -19-26JUL11-1/4

000629.13 — ECU Boot Block Error Diagnostic Procedure

Troubleshooting Sequence: 000629.13

When DTC is Displayed:

The ECU detects an internal memory problem.

Related Information:

This DTC will be present if the ECU has not been programmed or may be present if there is an internal memory problem.

Alarm Level:

Stop

Control Unit Response:

The ECU will not permit engine to run.

RE42287,00005BD -19-26JUL11-2/4

❶ Reprogram ECU

1. Download new ECU software payload. For more information, see [Payload File — Downloading Instructions](#) in Section 04, Group 160.
2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
3. Ignition OFF, Engine OFF for a minimum of 90 seconds.
4. Ignition ON, Engine OFF.
5. Wait a minimum of 60 seconds and refresh codes.

Is DTC 000629.13 active?

YES: GO TO 2

NO: Perform [Verification Procedure](#).

RE42287,00005BD -19-26JUL11-3/4

❷ Replace ECU

1. Ignition OFF, engine OFF.
 2. Replace ECU.
 3. Download new ECU software payload. For more information, see [Payload File — Downloading Instructions](#) in Section 04, Group 160.
 4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
 5. Disconnect Service ADVISOR.
 6. Ignition OFF, engine OFF for 5 minutes.
 7. Ignition ON, engine OFF.
 8. Connect Service ADVISOR
- Did 000629.13 reappear active?

YES: Open DTAC case.

NO: Perform [Verification Procedure](#).

RE42287,00005BD -19-26JUL11-4/4

**000974.03 — Remote Analog Throttle Signal
Out of Range High**

*The remote analog throttle signal exceeds the
throttles high voltage specification.*

Continued on next page

RE42287,0000488 -19-03AUG11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

003513.03

000974.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The remote analog throttle signal voltage to the ECU corresponds to a throttle position higher than what is physically possible for the remote analog throttle.

*NOTE: On OEM applications, the remote analog throttle is configured within the ECU on the Trim page.
If the Trim is not configured correctly, fault codes can be caused.*

Alarm Level:

Warning

Control Unit Response:

Three responses are available:

Idle Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the signal becomes valid, the throttle position must be returned to low idle position (0% throttle) in order for normal operation to resume. This is the default condition.

Resume Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the out-of-range condition clears, normal throttle operation resumes. **Caution:** this can cause large changes in engine speed if an intermittent out-of-range condition exists.

Locked Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. Normal throttle operation resumes only when the signal becomes valid again AND power is cycled on the ECU.

Additional references:

For more analog throttle information, see [Analog Throttle](#) in section 03 Group 140.

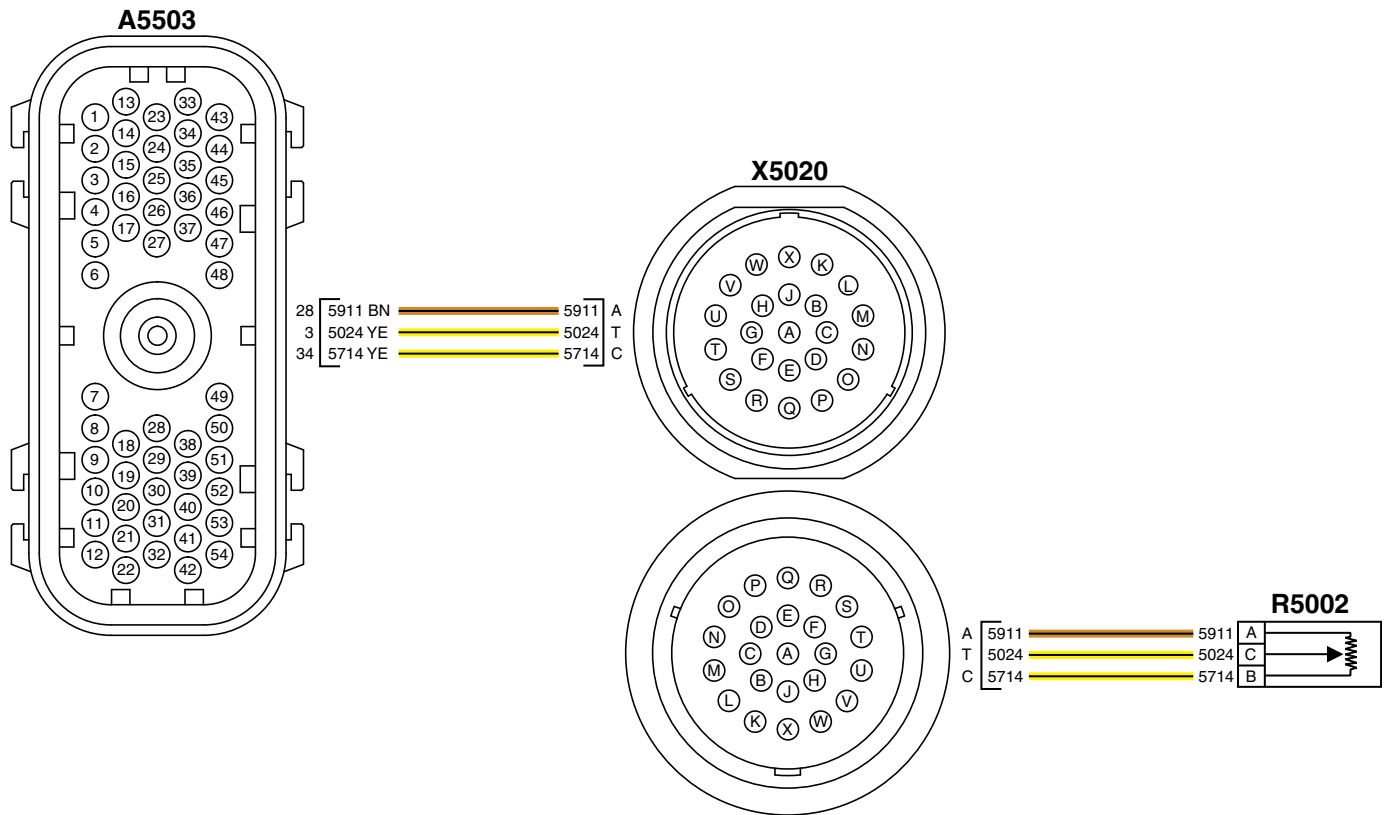
For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [OEM Instrument Panel Schematic](#)
 - see [4.5L Wiring Diagram 6](#)
 - see [4.5L Wiring Diagram 9](#)
- located in Section 06, Group 210.



Remote Analog Throttle Wiring Diagram

X5020—A—Supply

X5020—C—Return

X5020—T—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Throttle

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter

Continued on next page

RE42287,0000488 -19-03AUG11-3/17

RG19249 —UN—14JAN11

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003512.03 active or stored?

YES: GO TO [003513.03](#)
— [Sensor Supply #5](#)
[Voltage Out of Range High](#)
procedure.

NO: [GO TO 2](#)

RE42287,0000488 -19-03AUG11-4/17

2 Code Check

Is DTC 000974.03 active?

YES: [GO TO 3](#)

NO: [GO TO 10](#)

RE42287,0000488 -19-03AUG11-5/17

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect remote analog throttle connector R5002.
3. Perform [Terminal Test](#) on throttle and R5002 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000488 -19-03AUG11-6/17

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to R5002 connector female socket C (+).
 - B to R5002 connector female socket B (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 V and 2.7 V?

YES: [GO TO 8](#)

NO: Voltage greater than 2.7 V. GO TO [Short to Voltage Procedure](#).

NO: Voltage less than 2.3 V. [GO TO 5](#)

RE42287,0000488 -19-03AUG11-7/17

5 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing [Wiggle Test](#).

Does voltage remain between 2.3 V and 2.7 V?

YES: Repair open in return wire. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

Continued on next page

RE42287,0000488 -19-03AUG11-8/17

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 3, 28, and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,0000488 -19-03AUG11-9/17

7 Continuity Check

1. Measure the resistance between A5503 connector female socket 34 and R5002 connector female socket B.
2. Measure the resistance between A5503 connector female socket 3 and R5002 connector female socket C.

Are both resistance measurements less than 5 ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,0000488 -19-03AUG11-10/17

8 Software Check

In Service ADVISOR, monitor Remote Analog Throttle Input Voltage.

Is voltage between 2.3 V and 2.7 V?

YES: Replace throttle.
Perform Verification Procedure.

NO: GO TO 9

RE42287,0000488 -19-03AUG11-11/17

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000974.03 active?

YES: GO TO 13

NO: Perform Verification Procedure.

RE42287,0000488 -19-03AUG11-12/17

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor Remote Analog Throttle Input Voltage.
3. Perform Wiggle Test.

Does throttle input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 11

Continued on next page

RE42287,0000488 -19-03AUG11-13/17

Engine Control Unit (ECU) and Throttle Diagnostics

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect remote analog throttle connector R5002.
3. Perform Terminal Test on throttle and R5002 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,0000488 -19-03AUG11-14/17

12 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 3, 28, and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,0000488 -19-03AUG11-15/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 3, 28, and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 14

RE42287,0000488 -19-03AUG11-16/17

14 Continuity Check

1. Measure the resistance between A5503 connector female socket 34 and R5002 connector female socket B.
2. Measure the resistance between A5503 connector female socket 3 and R5002 connector female socket C.
3. Measure the resistance between A5503 connector female socket 28 and R5002 connector female socket A.

Are all resistance measurements less than 5 ohms?

YES: Replace ECU.
Perform Verification Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,0000488 -19-03AUG11-17/17

**000974.04 — Remote Analog Throttle Signal
Out of Range Low**

*The remote analog throttle signal is lower than the
throttles low voltage specification.*

Continued on next page

RE42287,0000489 -19-08AUG11-1/19

Diagnostic Procedure

Troubleshooting Sequence:

003513.03

003513.04

000974.03

000974.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The remote analog throttle signal voltage to the ECU corresponds to a throttle position lower than what is physically possible for the remote analog throttle.

*NOTE: On OEM applications, the remote analog throttle is configured within the ECU on the Trim page.
If the Trim is not configured correctly, fault codes can be caused.*

Alarm Level:

Warning

Control Unit Response:

Three responses are available:

Idle Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the signal becomes valid, the throttle position must be returned to low idle position (0% throttle) in order for normal operation to resume. This is the default condition.

Resume Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. When the out-of-range condition clears, normal throttle operation resumes. **Caution:** this can cause large changes in engine speed if an intermittent out-of-range condition exists.

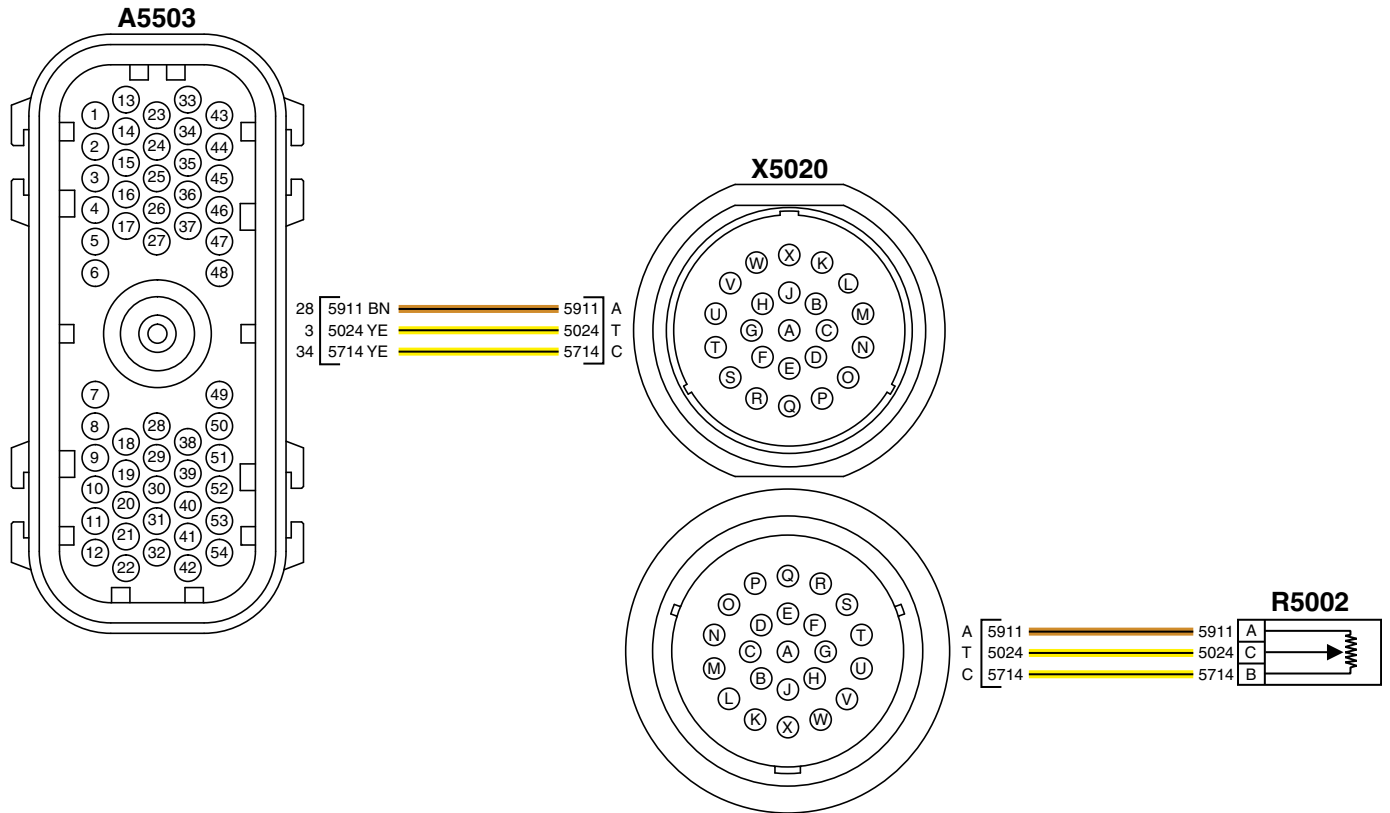
Locked Recovery – When a throttle out-of-range condition is detected the throttle is set to 0%. Normal throttle operation resumes only when the signal becomes valid again AND power is cycled on the ECU.

Additional References:

For more analog throttle information, see Analog Throttle in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.



Remote Analog Throttle Wiring Diagram

X5020—A—Supply

X5020—C—Return

X5020—T—Signal

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [OEM Instrument Panel Schematic](#)
 - see [4.5L Wiring Diagram 6](#)
 - see [4.5L Wiring Diagram 9](#)
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Throttle

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

ECU

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

Tools:

- [JDG10273](#) — Diagnostic Test Box
- [JT07306](#) — Digital Multimeter

Continued on next page

RE42287,0000489 -19-08AUG11-3/19

RG19249 —UN—14JAN11

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003513.04 stored?

YES: GO TO [003513.04](#)
— [Sensor Supply #5](#)
[Voltage Out of Range Low](#)
procedure.

NO: [GO TO 2](#)

RE42287,0000489 -19-08AUG11-4/19

2 Code Check

Is DTC 000974.03 stored?

YES: GO TO [000974.03](#)
— [Remote Analog Throttle](#)
[Signal Out of Range High](#)
procedure.

NO: [GO TO 3](#)

RE42287,0000489 -19-08AUG11-5/19

3 Code Check

Is DTC 000974.04 active?

YES: [GO TO 4](#)

NO: [GO TO 12](#)

RE42287,0000489 -19-08AUG11-6/19

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect remote analog throttle connector R5002.
3. Perform [Terminal Test](#) on and R5002 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification](#)
[Procedure](#).

NO: [GO TO 5](#)

RE42287,0000489 -19-08AUG11-7/19

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to R5002 connector female socket A (+).
 - B to R5002 connector female socket B (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform [Wiggle Test](#).

Does voltage remain between 4.8 V and 5.2 V?

YES: [GO TO 7](#)

NO: [GO TO 6](#)

Continued on next page

RE42287,0000489 -19-08AUG11-8/19

Engine Control Unit (ECU) and Throttle Diagnostics

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 V and 5.2 V?

YES: Repair open or high resistance in return wire. Perform [Verification Procedure](#).

NO: Repair open or high resistance in supply wire. Perform [Verification Procedure](#).

RE42287,0000489 -19-08AUG11-9/19

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.

2. Connect Diagnostic Test Box:

- A to R5002 connector female socket C (+).
- B to R5002 connector female socket B (-).

3. Set S1 to position 9 on Diagnostic Test Box.

4. Connect multimeter to Diagnostic Test Box.

5. Ignition ON, Engine OFF.

6. Monitor voltage on multimeter.

7. Perform [Wiggle Test](#).

Is voltage between 2.3 and 2.7 V?

YES: [GO TO 8](#)

NO: [GO TO 10](#)

RE42287,0000489 -19-08AUG11-10/19

8 Software Check

In Service ADVISOR, monitor Remote Analog Throttle Input Voltage.

Is voltage between 2.3 V and 2.7 V?

YES: Replace throttle. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,0000489 -19-08AUG11-11/19

9 Reprogram ECU

1. Ignition OFF, Engine OFF.

2. Disconnect Diagnostic Test Box.

3. Reconnect all connectors and components.

4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.

5. Ignition ON, Engine OFF.

6. Refresh codes.

Is DTC 000974.04 active?

YES: [GO TO 15](#)

NO: Perform [Verification Procedure](#).

Continued on next page

RE42287,0000489 -19-08AUG11-12/19

Engine Control Unit (ECU) and Throttle Diagnostics

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 28, 34, and 3. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

RE42287,0000489 -19-08AUG11-13/19

11 Continuity Check

Measure resistance between A5503 connector female socket 3 and R5002 connector female socket C.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform Verification Procedure.

NO: Repair open or mis-pin in harness. Perform Verification Procedure.

RE42287,0000489 -19-08AUG11-14/19

12 Wiggle Test

1. In Service ADVISOR, monitor Remote Analog Throttle Input Voltage.

2. Perform Wiggle Test.

Does voltage ever go below 0.2 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 13

RE42287,0000489 -19-08AUG11-15/19

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect remote analog throttle connector R5002.
3. Perform Terminal Test on and R5002 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 14

RE42287,0000489 -19-08AUG11-16/19

14 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 28, 34, and 3. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

Continued on next page

RE42287,0000489 -19-08AUG11-17/19

Engine Control Unit (ECU) and Throttle Diagnostics

15 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 28, 34, and 3. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 16

RE42287,0000489 -19-08AUG11-18/19

16 Continuity Check

1. Measure the resistance between A5503 connector female socket 3 and R5002 connector female socket C.
2. Measure the resistance between A5503 connector female socket 34 and R5002 connector female socket B.
3. Measure the resistance between A5503 connector female socket 28 and R5002 connector female socket A.

Are all resistance measurements less than 5 ohms?

YES: Replace ECU.
Perform Verification Procedure.

NO: Repair mis-pin.
Perform Verification Procedure.

RE42287,0000489 -19-08AUG11-19/19

001136.00 — ECU Temperature Signal Extremely High

The ECU detects an internal temperature above specification.

RE42287,000048A -19-01FEB11-1/8

Diagnostic Procedure

Troubleshooting Sequence:
001136.00

Related Information:

The ECU senses an internal ECU temperature of 135 °C (275 °F) on OEM engines.

Alarm Level:
Stop

Control Unit Response:
The ECU limits the engine to 1200 RPMs.

Additional References:

For further ECU information, see Engine Control Unit (ECU) System Operation in Section 03, Group 140 earlier in this manual.

For further ECU temperature sensor information, see Engine Control Unit Temperature Sensor in Section 03, Group 140 earlier in this manual.

For more information on engine protection, see Engine Derate and Shutdown Protection in Section 03, Group 140 earlier in this manual.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For wiring information:
- see 4.5L Wiring Diagrams
located in Section 06, Group 210 later in this manual.

IMPORTANT: When directed to run the **Harness Diagnostic Mode Test** the engine temperature should be above freezing. It is recommended that the engine temperature be at least 20 °C (68 °F). This test is located in Service ADVISOR.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

RE42287,000048A -19-01FEB11-2/8

1 Read DTCs and Store Snapshot Information

1. Ignition ON, engine OFF.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Connect Service ADVISOR, see Connecting to Service ADVISOR earlier in this Group.

3. Write down all DTCs and their occurrence count. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions earlier in this Group.

4. Refresh Codes.

Did 001136.00 reappear active?

YES: GO TO 2

NO: GO TO 6

Continued on next page

RE42287,000048A -19-01FEB11-3/8

2 Check Physical Environment

NOTE: For Proper ECU mounting, see ECU — Installation in Section 02, Group 110 earlier in this manual.

1. Ignition OFF, Engine OFF.
 2. Make the following checks:
 - Remove any items that are restricting the air flow around the ECU.
 - Remove dirt and debris from the ECU. Be cautious not to damage the connectors or strike ECU housing. Do not use a pressure wash to clean the ECU.
 - Verify the ECU is not mounted near high temperature components or in the path of high temperature air flow.
- Do any of the above conditions exist?

YES: Correct environment.
GO TO 5

NO: GO TO 3

RE42287,000048A -19-01FEB11-4/8

3 Test ECU

If a Programming Harness is available, perform the following steps.

1. Ignition OFF, Engine OFF
2. Disconnect all connectors from ECU.
3. Remove ECU from application.
4. Connect ECU to programming harness
5. Power ECU ON from the Programming Harness.
6. Wait for 20 minutes.
7. Refresh codes from within Service ADVISOR.

Is 001136.00 still active?

YES: Bad sensor. Replace ECU. GO TO 5

NO: Programming Harness not available. GO TO 4

NO: 001136.00 not active. Recheck physical environment. GO TO 1

RE42287,000048A -19-01FEB11-5/8

4 Test ECU

1. Ignition OFF, Engine OFF.
2. Disconnect all connectors from ECU.
3. Remove ECU from application. Isolate ECU from any hot areas.
4. Reconnect ECU connectors.
5. Ignition ON, Engine OFF.
6. Wait 20 minutes.
7. Refresh codes from within Service ADVISOR.

Is 001136.00 still active?

YES: Bad sensor. Replace ECU. GO TO 5

NO: Recheck physical environment. GO TO 1

Continued on next page

RE42287,000048A -19-01FEB11-6/8

5 Verification

1. Ignition OFF, Engine OFF.
 2. Reconnect all connectors, hoses, sensors, etc.
 3. Ignition ON, Engine ON.
 4. Monitor DTCs in Service ADVISOR.
 5. Let engine run for 10 minutes.
 6. Refresh DTCs.
 7. Operate engine through normal speed and load.
- Did DTC 001136.00 reappear as active with engine running?

YES: GO TO 1

NO: Problem resolved.

RE42287,000048A -19-01FEB11-7/8

6 Review Snapshot Information

1. Retrieve snapshot information, see Snapshot Instructions earlier in this Group.
2. Review information to see if you can determine a possible problem or the operating point that causes the code to become active.

Did you find a possible problem or the operating point at which the code becomes active?

YES: Found a possible problem.
Repair possible problem.
Retest.

YES: Found operating point at which the code becomes active.
Try to determine cause.
Repair and retest.

NO: Contact dealer or DTAC.

RE42287,000048A -19-01FEB11-8/8

001136.02 — ECU Temperature Signal Invalid

The ECU detects that its internal temperature sensor signal is not valid.

RE42287,000048B -19-01FEB11-1/3

Diagnostic Procedure

Troubleshooting Sequence: 001136.02

When DTC is Displayed:

When the ignition is on and the fault is active.

Related Information:

The ECU temperature sensor is an internal ECU sensor and cannot be repaired.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for ECU temperature.

Additional References:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

For further ECU information, see [Engine Control Unit \(ECU\) System Operation](#) in Section 03, Group 140.

For further ECU temperature sensor information, see [Engine Control Unit Temperature Sensor](#) in Section 03, Group 140.

RE42287,000048B -19-01FEB11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Download new ECU software payload. For more information, see [Payload File — Downloading Instructions](#) in Section 04, Group 160.
6. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
7. Ignition ON, Engine OFF.
8. Refresh codes.

Is DTC 001136.02 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,000048B -19-01FEB11-3/3

001136.16 — ECU Temperature Signal Moderately High

The ECU detects an internal temperature moderately above specification.

Diagnostic Procedure

Related Information:

The ECU senses an internal ECU temperature of 125 °C (257 °F) on OEM engines.

Alarm Level:

Warning

Control Unit Response:

For troubleshooting procedure, see [001136.00 – ECU Temperature Signal Extremely High](#).

RE42287,000048C -19-01FEB11-1/1

001569.31 — Engine Power Derate Condition Exists

Engine in Power Derate Condition

Related Information:

The engine power derate diagnostic trouble code is information to the operator that the ECU has detected a condition such as high coolant temperature and is derating the engine by limiting the maximum amount of fuel available to the engine. This code sets as a result of another DTC setting.

Alarm Level:

Warning

Control Unit Response:

The ECU limits the amount of engine power in an attempt to protect the engine.

Additional References:

For more information on derates see [Engine Derate and Shutdown Protection](#) in Section 3 Group 140.

RE42287,000048D -19-01FEB11-1/1

003509.03 — Sensor Supply #1 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 V supply #1 circuit.

RE42287,000048E -19-01FEB11-1/21

Diagnostic Procedure

Troubleshooting Sequence: 003509.03

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 V on the Sensor Supply #1 circuit.

Alarm Level:

Stop

Components Using Sensor Supply #1 Voltage:

Fuel Rail Pressure Sensor.

Control Unit Response:

The ECU tries to maintain the engine operating conditions.

Additional References:

For more sensor supply #1 information, see Sensor Supply #1 in Section 03, Group 140.

For more fuel rail pressure sensor information, see B5100 — Fuel Rail Pressure Sensor in Section 03, Group 140.

For more Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Fuel Rail Pressure Sensor:

- JDG10456 – Female – Blue/Orange
- JDG10457 – Male – Blue/Orange

ECU:

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

Continued on next page

RE42287,000048E -19-01FEB11-2/21

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. Perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003509.03 active?

YES: [GO TO 2](#)

NO: [GO TO 14](#)

RE42287,000048E -19-01FEB11-3/21

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect B5100, Fuel Rail Pressure Sensor.
3. Perform [Terminal Test](#) on fuel rail pressure sensor and B5100 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,000048E -19-01FEB11-4/21

3 Fuel Rail Pressure Sensor Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003509.03 active?

YES: [GO TO 4](#)

NO: [GO TO 8](#)

RE42287,000048E -19-01FEB11-5/21

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform [Terminal Test](#) on A5502 connector female sockets 8, 22 and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,000048E -19-01FEB11-6/21

5 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 003509.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 003509.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

Continued on next page

RE42287,000048E -19-01FEB11-7/21

Engine Control Unit (ECU) and Throttle Diagnostics

6 Short To Voltage Check

1. ECU connector A5502 still disconnected.
2. On A5502 connector, measure the voltage between female socket 22 (+) and single point ground (-).
3. Ignition ON, Engine OFF.

Is voltage greater than 0.5 V?

YES: Repair short to voltage on supply wire in harness. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,000048E -19-01FEB11-8/21

7 Wire to Wire Check

1. Ignition OFF, Engine OFF.
2. On the harness, measure the resistance between A5502 female socket 22 and all other female sockets in A5502.

Is any measurement less than 100k ohms?

YES: Repair short to supply wire in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for Support.

RE42287,000048E -19-01FEB11-9/21

8 Signal Wire Short To Voltage Check

1. B5100 still disconnected.
2. On B5100 connector, measure the voltage between female sockets 2 (+) and 1 (-).
3. While monitoring multimeter perform [Wiggle Test](#).
4. Ignition ON, Engine OFF.

Is voltage always less than 5.26 V?

YES: [GO TO 11](#)

NO: [GO TO 9](#)

RE42287,000048E -19-01FEB11-10/21

9 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform [Terminal Test](#) on A5502 connector female sockets 8, 22, and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RE42287,000048E -19-01FEB11-11/21

10 Continuity Check

1. Measure resistance between A5502 connector female socket 30 and B5100 connector female socket 1.
2. Measure resistance between A5502 connector female socket 8 and B5100 connector female socket 2.
3. Measure resistance between A5502 connector female socket 22 and B5100 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace fuel rail pressure sensor. Perform [Verification Procedure](#).

NO: Repair mis-pin in A5502 connector. Perform [Verification Procedure](#).

Continued on next page

RE42287,000048E -19-01FEB11-12/21

Engine Control Unit (ECU) and Throttle Diagnostics

11 Supply Wire Short To Voltage Check

1. B5100 still disconnected.
2. On B5100 connector, measure voltage between female sockets 3 (+) and 1 (-).
3. In Service ADVISOR, monitor Sensor Supply #1 Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 5.26 V?

YES: Contact DTAC for support.

NO: GO TO 12

RE42287,000048E -19-01FEB11-13/21

12 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 8, 22, and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 13

RE42287,000048E -19-01FEB11-14/21

13 Continuity Check

1. Measure resistance between A5502 connector female socket 30 and B5100 connector female socket 1.
2. Measure resistance between A5502 connector female socket 8 and B5100 connector female socket 2.
3. Measure resistance between A5502 connector female socket 22 and B5100 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on supply wire in harness. Perform Verification Procedure.

NO: Repair mis-pin in A5502 connector. Perform Verification Procedure.

RE42287,000048E -19-01FEB11-15/21

14 Wiggle Test

1. In Service ADVISOR, monitor Sensor Supply #1 Voltage.
2. Perform Wiggle Test on B5100, Fuel Rail Pressure Sensor.

Does voltage ever go above 5.26 V?

YES: Repair short to voltage on supply wire in harness. Perform Verification Procedure.

NO: GO TO 15

RE42287,000048E -19-01FEB11-16/21

15 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
 2. Operate engine under condition where DTC became active.
- Does DTC 003509.03 become active?

YES: GO TO 2

NO: GO TO 16

Continued on next page

RE42287,000048E -19-01FEB11-17/21

Engine Control Unit (ECU) and Throttle Diagnostics

16 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
 2. Operate engine under same conditions as when problem occurred.
- Does DTC 003509.03 become active?

YES: [GO TO 2](#)

NO: [GO TO 17](#)

RE42287,000048E -19-01FEB11-18/21

17 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 8, 22 and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: [GO TO 18](#)

RE42287,000048E -19-01FEB11-19/21

18 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC 0003509.03.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: [GO TO 19](#)

RE42287,000048E -19-01FEB11-20/21

19 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software.
Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000048E -19-01FEB11-21/21

003509.04 — Sensor Supply #1 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 V supply #1 circuit.

RE42287,000048F -19-03FEB11-1/18

Diagnostic Procedure

Troubleshooting Sequence:

003509.03

003509.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage less than 4.6 V on the Sensor Supply #1 circuit.

Alarm Level:

Stop

Components Using Sensor Supply #1 Voltage:

Fuel Rail Pressure Sensor.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #1 information, see Sensor Supply #1 in Section 03, Group 140.

For more fuel rail pressure sensor information, see B5100 — Fuel Rail Pressure Sensor in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

B5100 — Fuel Rail Pressure Sensor:

- JDG10456 – Female – Blue/Orange

- JDG10457 – Male – Blue/Orange

ECU:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

Continued on next page

RE42287,000048F -19-03FEB11-2/18

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003509.03 stored?

YES: GO TO [003509.03 — Sensor Supply #1 Voltage Out of Range High](#)
NO: [GO TO 2](#)

RE42287,000048F -19-03FEB11-3/18

2 DTC List Review

Review DTC List.

Is 003509.04 active?

YES: [GO TO 3](#)

NO: [GO TO 11](#)

RE42287,000048F -19-03FEB11-4/18

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel rail pressure sensor.
3. Perform [Terminal Test](#) on fuel rail pressure sensor and B5100 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,000048F -19-03FEB11-5/18

4 Fuel Rail Pressure Sensor Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003509.04 active?

YES: [GO TO 5](#)

NO: [GO TO 8](#)

RE42287,000048F -19-03FEB11-6/18

5 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform [Terminal Test](#) on A5502 connector female sockets 8, 22 and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

Continued on next page

RE42287,000048F -19-03FEB11-7/18

Engine Control Unit (ECU) and Throttle Diagnostics

6 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 003509.04.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 003509.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,000048F -19-03FEB11-8/18

7 Supply Circuit Short to Ground Check

1. Ignition OFF, Engine OFF.
2. On the harness, measure resistance between A5502 female socket 22 and single point ground.

Is resistances less than 100K ohms?

YES: Repair short to supply wire in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RE42287,000048F -19-03FEB11-9/18

8 Component Reconnected Test

1. Ignition OFF, Engine OFF.
2. Reconnect fuel rail pressure sensor.
3. Ignition ON, Engine OFF
4. Refresh codes.

Is DTC 003509.04 active?

YES: Replace fuel rail pressure sensor. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,000048F -19-03FEB11-10/18

9 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform [Terminal Test](#) on A5502 connector female sockets 8, 22 and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 10](#)

RE42287,000048F -19-03FEB11-11/18

10 Supply Wire Short To Ground Check

1. Disconnect fuel rail pressure sensor.
2. On the harness, measure the resistance between A5502 female socket 22 and single point ground.
3. Perform [Wiggle Test](#).

Is measurement ever less than 100k ohms?

YES: Repair short to supply wire in harness. Perform [Verification Procedure](#).

NO: Replace fuel rail pressure sensor. Perform [Verification Procedure](#).

Continued on next page

RE42287,000048F -19-03FEB11-12/18

Engine Control Unit (ECU) and Throttle Diagnostics

11 Wiggle Test

1. In Service ADVISOR, monitor Sensor Supply #1 Voltage .

2. Perform Wiggle Test.

Does voltage ever go below 4.6 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 12

RE42287,000048F -19-03FEB11-13/18

12 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.

2. Operate engine under condition where DTC became active.

Does DTC 003509.03 become active?

YES: GO TO 2

NO: GO TO 13

RE42287,000048F -19-03FEB11-14/18

13 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.

2. Operate engine under same conditions as when problem occurred.

Does DTC 003509.03 become active?

YES: GO TO 2

NO: GO TO 14

RE42287,000048F -19-03FEB11-15/18

14 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5502.

3. Perform Terminal Test on A5502 connector female sockets 8, 22 and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 15

RE42287,000048F -19-03FEB11-16/18

15 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 16

RE42287,000048F -19-03FEB11-17/18

16 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000048F -19-03FEB11-18/18

003510.03 — Sensor Supply #2 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 V supply #2 circuit.

RE42287,0000490 -19-03FEB11-1/18

Diagnostic Procedure

Troubleshooting Sequence: 003510.03

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 V on the Sensor Supply #2 circuit.

Alarm Level:

Warning

Components Using Sensor Supply #2 Voltage:

Low-Pressure Fuel Pressure Sensor

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #2 information, see Sensor Supply #2 in Section 03, Group 140.

For more low-pressure fuel pressure information, see B5107 — Low-Pressure Fuel Pressure Sensor in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and, jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 2

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

B5107 – Low Pressure Fuel Pressure Sensor:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

ECU:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

Continued on next page

RE42287,0000490 -19-03FEB11-2/18

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003510.03 active?

YES: [GO TO 2](#)

NO: [GO TO 11](#)

RE42287,0000490 -19-03FEB11-3/18

2 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect one component that uses Sensor Supply #2 voltage.

NOTE: For a list of components that use Sensor Supply #2, see [Components Using Sensor Supply #2 Voltage](#) in this procedure.

3. Perform [Terminal Test](#) on sensor and connector that was disconnected.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,0000490 -19-03FEB11-4/18

3 Component Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003510.03 active?

YES: [GO TO 4](#)

NO: [GO TO 9](#)

RE42287,0000490 -19-03FEB11-5/18

4 Next Associated Sensor Check

Have all components that use Sensor Supply #2 voltage been disconnected?

YES: [GO TO 5](#)

NO: [GO TO 2](#) and check next associated sensor.

RE42287,0000490 -19-03FEB11-6/18

5 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501.

3. Perform [Terminal Test](#) on A5501 connector female sockets 18, 41, and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

Continued on next page

RE42287,0000490 -19-03FEB11-7/18

Engine Control Unit (ECU) and Throttle Diagnostics

6 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 003510.03.

1. ECU connector A5501 still disconnected.
2. Ignition ON, Engine OFF.
3. Refresh codes.

Is DTC 003510.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,0000490 -19-03FEB11-8/18

7 Short To Voltage Check

On A5501 connector, measure voltage between female socket 54 (+) and single point ground (-).

Is voltage greater than 0.5 V?

YES: Repair short to voltage on supply wire in harness. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,0000490 -19-03FEB11-9/18

8 Wire to Wire Check

1. Ignition OFF, Engine OFF.
2. On A5501 measure the resistance between female socket 54 and all other female sockets in A5501.

Is any measurement less than 100k ohms?

YES: Repair short to supply wire in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RE42287,0000490 -19-03FEB11-10/18

9 Signal Wire Voltage Check

1. On the connector of the component just disconnected, measure voltage between female sockets signal (+) and return (-).
2. Monitor component input voltage in Service ADVISOR and on multimeter, while performing [Wiggle Test](#).

Are both voltages always less than 0.5 V?

YES: [GO TO 10](#)

NO: Repair short to voltage on signal wire, of component just disconnected, in harness. Replace component just disconnected. Perform [Verification Procedure](#).

RE42287,0000490 -19-03FEB11-11/18

10 Supply Wire Voltage Check

1. On the connector of the component just disconnected, measure voltage between female sockets supply (+) and return (-).
2. Monitor Sensor Supply #2 Voltage in Service ADVISOR and on multimeter, while performing [Wiggle Test](#).

Are both measurements always less than 5.26 V?

YES: Contact DTAC for support.

NO: Repair short to voltage on supply wire in harness. Perform [Verification Procedure](#).

Continued on next page

RE42287,0000490 -19-03FEB11-12/18

Engine Control Unit (ECU) and Throttle Diagnostics

11 Wiggle Test

1. Monitor Sensor Supply #2 Voltage in Service ADVISOR.
2. Perform Wiggle Test on components using Sensor Supply #2, see Components Using Sensor Supply #2 Voltage above.

Does voltage ever go above 5.26 V?

YES: Repair short to voltage on supply wire. Perform Verification Procedure.

NO: GO TO 12

RE42287,0000490 -19-03FEB11-13/18

12 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
2. Operate engine under condition where DTC became active.

Does DTC 003510.03 become active?

YES: GO TO 2

NO: GO TO 13

RE42287,0000490 -19-03FEB11-14/18

13 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
2. Operate engine under same conditions as when problem occurred.

Does DTC 003510.03 become active?

YES: GO TO 2

NO: GO TO 14

RE42287,0000490 -19-03FEB11-15/18

14 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 18, 41, and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 15

RE42287,0000490 -19-03FEB11-16/18

15 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC 003510.03.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 16

RE42287,0000490 -19-03FEB11-17/18

16 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000490 -19-03FEB11-18/18

003510.04 — Sensor Supply #2 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 V supply circuit.

RE42287,0000491 -19-02AUG11-1/19

Diagnostic Procedure

Troubleshooting Sequence:

003510.03

003510.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage less than 4.6 V on the Sensor Supply #2 circuit.

IMPORTANT: Verify that too many devices have not been connected to this Sensor Supply. If the load on this Sensor Supply circuit is too great, the ECU will activate a current limit shut down on this supply.

Alarm Level:

Warning

Components Using Sensor Supply #2 Voltage:

Low-Pressure Fuel Pressure Sensor

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #2 information, see Sensor Supply #2 in Section 03, Group 140.

For more low-pressure fuel pressure information, see B5107 – Low-Pressure Fuel Pressure Sensor in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 2

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

B5107 – Low Pressure Fuel Pressure Sensor:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

Continued on next page

RE42287,0000491 -19-02AUG11-2/19

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003510.03 stored?

YES: GO TO [003510.03 — Sensor Supply #2 Voltage Out of Range High](#)
NO: [GO TO 2](#)

RE42287,0000491 -19-02AUG11-3/19

2 DTC List Review

Review DTC List.

Is 003510.04 active?

YES: [GO TO 3](#)

NO: [GO TO 12](#)

RE42287,0000491 -19-02AUG11-4/19

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect one component that uses Sensor Supply #2 voltage.

NOTE: For a list of components that use Sensor Supply #2, see [Components Using Sensor Supply #2 Voltage](#) in this procedure.

3. Perform [Terminal Test](#) on sensor and connector that was disconnected.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).
NO: [GO TO 4](#)

RE42287,0000491 -19-02AUG11-5/19

4 Disconnected Component Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003510.04 active?

YES: [GO TO 5](#)
NO: [GO TO 9](#)

RE42287,0000491 -19-02AUG11-6/19

5 Next Associated Sensor Check

Have all components that use Sensor Supply #2 voltage been disconnected?

YES: [GO TO 6](#)

NO: [GO TO 3](#) and check next associated sensor.

Continued on next page

RE42287,0000491 -19-02AUG11-7/19

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 18 and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,0000491 -19-02AUG11-8/19

7 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 003510.04.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 003510.04 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 8

RE42287,0000491 -19-02AUG11-9/19

8 Supply Circuit Short to Ground Check

1. Ignition OFF, Engine OFF.
2. On the harness, measure resistance between A5501 female socket 54 and single point ground.

Is resistances less than 100K ohms?

YES: Repair short to ground on supply wire in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000491 -19-02AUG11-10/19

9 Component Reconnected Test

1. Ignition OFF, Engine OFF.
2. Reconnect component just disconnected.
3. Ignition ON, Engine OFF
4. Refresh codes.

Is DTC 003510.04 active?

YES: Replace component just connected. Perform Verification Procedure.

NO: GO TO 10

RE42287,0000491 -19-02AUG11-11/19

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 18 and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

Continued on next page

RE42287,0000491 -19-02AUG11-12/19

11 Supply Wire Short To Ground Check

1. Ignition OFF, Engine OFF.
2. Disconnect component just connected.
3. On the harness, measure the resistance between supply wire terminal on connector just disconnected and single point ground.
4. Perform Wiggle Test.

Is measurement ever less than 100k ohms?

YES: Repair short to ground on supply wire in harness. Perform Verification Procedure.

NO: Replace component just disconnected. Perform Verification Procedure.

RE42287,0000491 -19-02AUG11-13/19

12 Wiggle Test

1. In Service ADVISOR, monitor Sensor Supply #2 Voltage.
2. Perform Wiggle Test.

Does voltage ever go below 4.6 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 13

RE42287,0000491 -19-02AUG11-14/19

13 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
 2. Operate engine under condition where DTC became active.
- Does DTC 003510.04 become active?

YES: GO TO 2

NO: GO TO 14

RE42287,0000491 -19-02AUG11-15/19

14 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
 2. Operate engine under same conditions as when problem occurred.
- Does DTC 003510.04 become active?

YES: GO TO 2

NO: GO TO 15

RE42287,0000491 -19-02AUG11-16/19

15 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 18 and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 16

Continued on next page

RE42287,0000491 -19-02AUG11-17/19

Engine Control Unit (ECU) and Throttle Diagnostics

16 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 17

RE42287,0000491 -19-02AUG11-18/19

17 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000491 -19-02AUG11-19/19

**003511.03 — Sensor Supply #3 Voltage Out
of Range High**

*The ECU detects a supply voltage above specification
on the ECU 5 V supply #3 circuit.*

Continued on next page

RE42287,0000492 -19-03AUG11-1/38

Diagnostic Procedure

Troubleshooting Sequence:

003511.03

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 V on the Sensor Supply #3 circuit.

Alarm Level:

Warning

Sensors Using Sensor Supply #3 Voltage:

EGR Valve Position Sensor, Air Throttle Actuator Position Sensor (PVX only), EGR Flow Sensor (PVX only).

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #3 information, see Sensor Supply #3 in Section 03, Group 140.

For more EGR flow sensor information, see B5103 – EGR Flow Sensor in Section 03, Group 140.

For more EGR valve information, see Y5400 – EGR Valve in Section 03, Group 140.

For more air throttle actuator information, see Y5401 – Air Throttle Actuator in Section 03, Group 140.

For air throttle actuator operation, see Air Throttle Actuator Operation in Section 03, Group 135.

For EGR valve operation, see EGR Valve Operation in Section 03, Group 135.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and, jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

B5103 – EGR Flow Sensor:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Y5401 – Air Throttle Actuator:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Y5400 – EGR Valve:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

ECU:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

Continued on next page

RE42287,0000492 -19-03AUG11-2/38

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003511.03 active?

YES: [GO TO 2](#)

NO: [GO TO 31](#)

RE42287,0000492 -19-03AUG11-3/38

2 Hardware Check

Is the engine you are working on equipped with a Variable Geometry Turbocharger?

YES: [GO TO 3](#)

NO: [GO TO 7](#)

RE42287,0000492 -19-03AUG11-4/38

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect air throttle actuator.
3. Perform [Terminal Test](#) on air throttle actuator and Y5401 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000492 -19-03AUG11-5/38

4 Air Throttle Actuator Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003511.03 active?

YES: [GO TO 5](#)

NO: [GO TO 13](#)

RE42287,0000492 -19-03AUG11-6/38

5 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR Flow Sensor.
3. Perform [Terminal Test](#) on EGR flow sensor and B5103 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,0000492 -19-03AUG11-7/38

6 EGR Flow Sensor Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003511.03 active?

YES: [GO TO 7](#)

NO: [GO TO 25](#)

Continued on next page

RE42287,0000492 -19-03AUG11-8/38

Engine Control Unit (ECU) and Throttle Diagnostics

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR Valve.
3. Perform Terminal Test on EGR valve and Y5400 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 8

RE42287,0000492 -19-03AUG11-9/38

8 EGR Valve Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003511.03 active?

YES: GO TO 9

NO: GO TO 19

RE42287,0000492 -19-03AUG11-10/38

9 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU A5501.
3. Perform Terminal Test on A5501 female socket 52 and corresponding ECU male pin.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 10

RE42287,0000492 -19-03AUG11-11/38

10 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 003511.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 003511.03 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 11

RE42287,0000492 -19-03AUG11-12/38

11 Short To Voltage Check

1. Ignition ON, Engine OFF.
2. On A5501 connector, measure voltage between female socket 52 (+) and single point ground (-).

Is measurement less than 0.5 V?

YES: GO TO 12

NO: Repair short to supply wire in harness. Perform Verification Procedure.

Continued on next page

RE42287,0000492 -19-03AUG11-13/38

Engine Control Unit (ECU) and Throttle Diagnostics

12 Wire To Wire Check

1. Ignition OFF, Engine OFF.
2. On the harness, measure between A5501 female socket 52 and all other terminals in A5501.

Is any measurement less than 100k ohms?

YES: Repair short to supply wire in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RE42287,0000492 -19-03AUG11-14/38

13 Signal Wire Short To Voltage Check

1. Y5401 still disconnected.
2. On Y5401 connector, measure voltage between female sockets 3 (+) and 2 (-).
3. In Service ADVISOR, monitor Air Throttle Actuator Position Input Voltage.
4. While monitoring voltages perform [Wiggle Test](#).
5. Ignition ON, Engine OFF.

Are both voltages always less than 0.5 V?

YES: [GO TO 16](#)

NO: [GO TO 14](#)

RE42287,0000492 -19-03AUG11-15/38

14 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform [Terminal Test](#) on A5501 female sockets 2, 4, 19 and 52 also on **A5502** female socket 12. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 15](#)

RE42287,0000492 -19-03AUG11-16/38

15 Continuity Check

1. Measure resistance between A5501 connector female socket 52 and Y5400 connector female socket 1.
2. Measure resistance between A5501 connector female socket 19 and Y5400 connector female socket 2.
3. Measure resistance between A5501 connector female socket 2 and Y5401 connector female socket 4.
4. Measure resistance between A5501 connector female socket 4 and Y5401 connector female socket 6.
5. Measure resistance between **A5502** connector female socket 12 and Y5401 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace air throttle actuator. Perform [Verification Procedure](#).

NO: Repair mis-pin. Perform [Verification Procedure](#).

Continued on next page

RE42287,0000492 -19-03AUG11-17/38

Engine Control Unit (ECU) and Throttle Diagnostics

16 Supply Wire Short To Voltage Check

1. Y5401 still disconnected.
2. On Y5401 connector, measure voltage between female sockets 1 (+) and 2 (-).
3. In Service ADVISOR, monitor Sensor Supply #3 Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 5.26 V?

YES: Contact DTAC for support.

NO: GO TO 17

RE42287,0000492 -19-03AUG11-18/38

17 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform Terminal Test on A5501 female sockets 2, 4, 19 and 52 also on **A5502** female socket 12. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 18

RE42287,0000492 -19-03AUG11-19/38

18 Continuity Check

1. Measure resistance between A5501 connector female socket 52 and Y5401 connector female socket 1.
2. Measure resistance between A5501 connector female socket 19 and Y5401 connector female socket 2.
3. Measure resistance between A5501 connector female socket 2 and Y5401 connector female socket 4.
4. Measure resistance between A5501 connector female socket 4 and Y5401 connector female socket 6.
5. Measure resistance between **A5502** connector female socket 12 and Y5401 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on supply wire in harness. Perform Verification Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,0000492 -19-03AUG11-20/38

19 Signal Wire Short To Voltage Check

1. Y5400 still disconnected.
2. On Y5400 connector, measure voltage between female sockets 3 (+) and 2 (-).
3. While monitoring voltage perform Wiggle Test.
4. Ignition ON, Engine OFF.

Is voltage always less than 5.26 V?

YES: GO TO 22

NO: GO TO 20

Continued on next page

RE42287,0000492 -19-03AUG11-21/38

Engine Control Unit (ECU) and Throttle Diagnostics

20 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform **Terminal Test** on A5501 female sockets 1, 3, 19 and 52 also on **A5502** female socket 18. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 21](#)

RE42287,0000492 -19-03AUG11-22/38

21 Continuity Check

1. Measure resistance between A5501 connector female socket 52 and Y5400 connector female socket 1.
2. Measure resistance between A5501 connector female socket 19 and Y5400 connector female socket 2.
3. Measure resistance between A5501 connector female socket 1 and Y5400 connector female socket 4.
4. Measure resistance between A5501 connector female socket 3 and Y5400 connector female socket 6.
5. Measure resistance between **A5502** connector female socket 18 and Y5400 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace EGR Valve. Perform [Verification Procedure](#).

NO: Repair mis-pin. Perform [Verification Procedure](#).

RE42287,0000492 -19-03AUG11-23/38

22 Supply Wire Short To Voltage Check

1. Y5400 still disconnected.
2. On Y5400 connector, measure voltage between female sockets 1 (+) and 2 (-).
3. In Service ADVISOR, monitor Sensor Supply #3 Voltage.
4. While monitoring voltages perform [Wiggle Test](#).
5. Ignition ON, Engine OFF.

Are both voltages always less than 5.26 V?

YES: Contact DTAC for support.

NO: [GO TO 23](#)

RE42287,0000492 -19-03AUG11-24/38

23 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform **Terminal Test** on A5501 female sockets 1, 3, 19, and 52 also on **A5502** female socket 18. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 24](#)

Continued on next page

RE42287,0000492 -19-03AUG11-25/38

24 Continuity Check

1. Measure resistance between A5501 connector female socket 52 and Y5400 connector female socket 1.
2. Measure resistance between A5501 connector female socket 19 and Y5400 connector female socket 2.
3. Measure resistance between A5501 connector female socket 1 and Y5400 connector female socket 4.
4. Measure resistance between A5501 connector female socket 3 and Y5400 connector female socket 6.
5. Measure resistance between **A5502** connector female socket 18 and Y5400 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on supply wire in harness. Perform [Verification Procedure](#).

NO: Repair mis-pin. Perform [Verification Procedure](#).

RE42287,0000492 -19-03AUG11-26/38

25 Signal Wire Short To Voltage Check

1. B5103 still disconnected.
2. On B5103 connector, measure voltage between female sockets 3 (+) and 2 (-).
3. In Service ADVISOR, monitor EGR Flow Input Voltage.
4. While monitoring voltages perform [Wiggle Test](#).
5. Ignition ON, Engine OFF.

Are both voltages always less than 0.5 V?

YES: [GO TO 28](#)

NO: [GO TO 26](#)

RE42287,0000492 -19-03AUG11-27/38

26 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform [Terminal Test](#) on A5501 female sockets 19 and 52 also on **A5502** female socket 13. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 27](#)

RE42287,0000492 -19-03AUG11-28/38

27 Continuity Check

1. Measure resistance between A5501 connector female socket 52 and B5103 connector female socket 1.
2. Measure resistance between A5501 connector female socket 19 and B5103 connector female socket 2.
3. Measure resistance between **A5502** connector female socket 13 and B5103 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace EGR Flow Sensor. Perform [Verification Procedure](#).

NO: Repair mis-pin. Perform [Verification Procedure](#).

Continued on next page

RE42287,0000492 -19-03AUG11-29/38

Engine Control Unit (ECU) and Throttle Diagnostics

28 Supply Wire Short To Voltage Check

1. B5103 still disconnected.
2. On B5103 connector, measure voltage between female sockets 1 (+) and 2 (-).
3. In Service ADVISOR, monitor Sensor Supply #3 Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 5.26 V?

YES: Contact DTAC for support.

NO: GO TO 29

RE42287,0000492 -19-03AUG11-30/38

29 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform Terminal Test on A5501 female sockets 19 and 52 also on **A5502** female socket 13. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 30

RE42287,0000492 -19-03AUG11-31/38

30 Continuity Check

1. Measure resistance between A5501 connector female socket 52 and B5103 connector female socket 1.
2. Measure resistance between A5501 connector female socket 19 and B5103 connector female socket 2.
3. Measure resistance between **A5502** connector female socket 13 and B5103 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on supply wire in harness. Perform Verification Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,0000492 -19-03AUG11-32/38

31 Wiggle Test

1. Monitor Sensor Supply #3 Voltage in Service ADVISOR.
2. Perform Wiggle Test on Y5400, B5103 (PVX only), and Y5401 (PVX only).

Does voltage ever go above 5.26 V?

YES: Repair short to voltage on supply wire. Perform Verification Procedure.

NO: GO TO 32

RE42287,0000492 -19-03AUG11-33/38

32 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
 2. Operate engine under condition where DTC became active.
- Does DTC 003511.03 become active?

YES: GO TO 2

NO: GO TO 33

Continued on next page

RE42287,0000492 -19-03AUG11-34/38

Engine Control Unit (ECU) and Throttle Diagnostics

33 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
 2. Operate engine under same conditions as when problem occurred.
- Does DTC 003511.03 become active?

YES: [GO TO 2](#)

NO: [GO TO 34](#)

RE42287,0000492 -19-03AUG11-35/38

34 Terminal Test

1. Ignition OFF, Engine OFF.
 2. Disconnect ECU connector A5501.
 3. Perform Terminal Test on A5501 connector female socket 52 and corresponding ECU male pins.
- Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: [GO TO 35](#)

RE42287,0000492 -19-03AUG11-36/38

35 Search DTAC Solutions

- Search DTAC solutions in Service ADVISOR for any known issues which may cause 003511.03.
- Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: [GO TO 36](#)

RE42287,0000492 -19-03AUG11-37/38

36 ECU Reprogram

- Search Custom Performance for possible ECU software updates.
- Is there a new version of software available?

YES: Reprogram ECU with new version of software.
Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000492 -19-03AUG11-38/38

**003511.04 — Sensor Supply #3 Voltage Out
of Range Low**

*The ECU detects a supply voltage below specification
on the ECU 5 V supply circuit.*

Continued on next page

RE42287,0000493 -19-03AUG11-1/19

Diagnostic Procedure

Troubleshooting Sequence:

003511.03

003511.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage less than 4.6 V on the Sensor Supply #3 circuit.

IMPORTANT: Verify that too many devices have not been connected to this Sensor Supply. If the load on this Sensor Supply circuit is too great, the ECU will activate a current limit shut down on this supply.

Alarm Level:

Warning

Components Using Sensor Supply #3 Voltage:

EGR Valve, Air Throttle Actuator (PVX only), EGR Flow Sensor (PVX only)

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #3 information, see [Sensor Supply #3](#) in Section 03, Group 140.

For more EGR flow sensor information, see [B5103 – EGR Flow Sensor](#) in Section 03, Group 140.

For more EGR valve information, see [Y5400 – EGR Valve](#) in Section 03, Group 140.

For more air throttle actuator information, see [Y5401 – Air Throttle Actuator](#) in Section 03, Group 140.

For air throttle actuator operation, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

For EGR valve operation, see [EGR Valve Operation](#) in Section 03, Group 135.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

B5103 – EGR Flow Sensor:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

Y5401 – Air Throttle Actuator:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

Y5400 – EGR Valve:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

ECU:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

RE42287,0000493 -19-03AUG11-2/19

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003511.03 stored?

YES: GO TO [003511.03 — Sensor Supply #3 Voltage Out of Range High](#)
NO: [GO TO 2](#)

RE42287,0000493 -19-03AUG11-3/19

2 DTC List Review

Review DTC List.

Is 003511.04 active?

YES: [GO TO 3](#)

NO: [GO TO 12](#)

RE42287,0000493 -19-03AUG11-4/19

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect one sensor that uses Sensor Supply #3 voltage.
NOTE: For a list of components that use Sensor Supply #3, see Components Using Sensor Supply #3 Voltage in this procedure.
3. Perform [Terminal Test](#) on component and connector that was disconnected.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).
NO: [GO TO 4](#)

RE42287,0000493 -19-03AUG11-5/19

4 Disconnected Component Code Check

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 003511.04 active?

YES: [GO TO 5](#)
NO: [GO TO 9](#)

RE42287,0000493 -19-03AUG11-6/19

5 Next Associated Sensor Check

Have all components that use Sensor Supply #3 voltage been disconnected?

YES: [GO TO 6](#)

NO: [GO TO 3](#) and check next associated component.

Continued on next page

RE42287,0000493 -19-03AUG11-7/19

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 52 and 19. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,0000493 -19-03AUG11-8/19

7 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 003511.04.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 003511.04 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 8

RE42287,0000493 -19-03AUG11-9/19

8 Supply Circuit Short to Ground Check

1. Ignition OFF, Engine OFF.
2. On A5501 connector, measure resistance between female socket 52 and single point ground.

Is resistances less than 100K ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000493 -19-03AUG11-10/19

9 Component Reconnected Test

1. Ignition OFF, Engine OFF.
2. Reconnect component just disconnected.
3. Ignition ON, Engine OFF
4. Refresh codes.

Is DTC 003511.04 active?

YES: Replace component just connected. Perform Verification Procedure.

NO: GO TO 10

RE42287,0000493 -19-03AUG11-11/19

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 52 and 19. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

Continued on next page

RE42287,0000493 -19-03AUG11-12/19

11 Supply Wire Short To Ground Check	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect component just connected. 3. On the harness, measure the resistance between supply wire terminal on connector just disconnected and single point ground. 4. Perform <u>Wiggle Test</u>. <p>Is measurement ever less than 100k ohms?</p>	<p>YES: Repair short to ground on supply wire in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: Replace component just disconnected. Perform <u>Verification Procedure</u>.</p> <p align="right">RE42287,0000493 -19-03AUG11-13/19</p>
12 Wiggle Test	<ol style="list-style-type: none"> 1. In Service ADVISOR, monitor Sensor Supply #3 Voltage . 2. Perform <u>Wiggle Test</u>. <p>Does voltage ever go below 4.6 V?</p>	<p>YES: Repair harness problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 13</u></p> <p align="right">RE42287,0000493 -19-03AUG11-14/19</p>
13 Read DTCs and Stored Snapshot Information	<ol style="list-style-type: none"> 1. Review Snapshot information stored from step 1. 2. Operate engine under condition where DTC became active. <p>Does DTC 003511.04 become active?</p>	<p>YES: <u>GO TO 2</u></p> <p>NO: <u>GO TO 14</u></p> <p align="right">RE42287,0000493 -19-03AUG11-15/19</p>
14 Obtain More Information	<ol style="list-style-type: none"> 1. Talk with operator who observed the problem and obtain more information about when problem occurred. 2. Operate engine under same conditions as when problem occurred. <p>Does DTC 003511.04 become active?</p>	<p>YES: <u>GO TO 2</u></p> <p>NO: <u>GO TO 15</u></p> <p align="right">RE42287,0000493 -19-03AUG11-16/19</p>
15 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector A5501. 3. Perform <u>Terminal Test</u> on A5501 connector female sockets 52 and 19. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 16</u></p> <p align="right">RE42287,0000493 -19-03AUG11-17/19</p>

Continued on next page

Engine Control Unit (ECU) and Throttle Diagnostics

16 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 17

RE42287,0000493 -19-03AUG11-18/19

17 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000493 -19-03AUG11-19/19

003512.03 — Sensor Supply #4 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 V supply #4 circuit.

RE42287,0000494 -19-03FEB11-1/11

Diagnostic Procedure

Troubleshooting Sequence: 003512.03

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 V on the Sensor Supply #4 circuit.

Alarm Level:

Warning

Components Using Sensor Supply #4 Voltage:

Primary Analog Throttle, Fan Speed Sensor (optional), PTO Speed Sensor (optional), AC High Pressure Switch (optional), Isochronous/Droop Governor Switch (optional).

NOTE: There may be other application specific devices using this sensor supply circuit. Refer to your application technical manual for other possible devices.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #4 information, see [Sensor Supply #4](#) in Section 03, Group 140.

For more analog throttle information, see [Analog Throttle](#) in Section 03, Group 140.

For more variable speed fan information, see [Y5005 — Variable Speed Fan](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and, jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [Engine Schematic 2](#)
- see [OEM Instrument Panel Schematic](#)

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex Probes:

ECU

- [JDG10460](#) – Female – Yellow/Purple
- [JDG10461](#) – Male – Yellow/Purple

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

RE42287,0000494 -19-03FEB11-2/11

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003512.03 active?

YES: [GO TO 2](#)

NO: [GO TO 4](#)

RE42287,0000494 -19-03FEB11-3/11

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform [Terminal Test](#) on ECU and A5503.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,0000494 -19-03FEB11-4/11

3 Short To Voltage Check

On the harness, measure voltage between A5503 female socket 49 (+) and single point ground (-).

Is voltage greater than 5.26 V?

YES: Repair short to supply wire in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RE42287,0000494 -19-03FEB11-5/11

4 Wiggle Test

1. Monitor Sensor Supply #4 Voltage in Service ADVISOR.
2. Perform [Wiggle Test](#) on components using Sensor Supply #4, see [Components Using Sensor Supply #4 Voltage](#) above.

Does voltage ever go above 5.26 V?

YES: Repair short to voltage on supply wire. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,0000494 -19-03FEB11-6/11

5 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
2. Operate engine under condition where DTC became active.

Does DTC 003512.03 become active?

YES: [GO TO 2](#)

NO: [GO TO 6](#)

RE42287,0000494 -19-03FEB11-7/11

6 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
2. Operate engine under same conditions as when problem occurred.

Does DTC 003512.03 become active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

Continued on next page

RE42287,0000494 -19-03FEB11-8/11

Engine Control Unit (ECU) and Throttle Diagnostics

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female socket 49. And corresponding ECU male pin.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 8

RE42287,0000494 -19-03FEB11-9/11

8 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 9

RE42287,0000494 -19-03FEB11-10/11

9 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000494 -19-03FEB11-11/11

003512.04 — Sensor Supply #4 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 V supply circuit.

RE42287,0000495 -19-02AUG11-1/22

Diagnostic Procedure

Troubleshooting Sequence:

003512.03

000091.03

003512.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage less than 4.6 V on the Sensor Supply #4 circuit.

IMPORTANT: Verify that too many devices have not been connected to this Sensor Supply. If the load on this Sensor Supply circuit is too great, the ECU will activate a current limit shut down on this supply.

Alarm Level:

Warning

Components Using Sensor Supply #4 Voltage:

Primary Analog Throttle, Fan Speed Sensor (optional), PTO Speed Sensor (optional), AC High Pressure Switch (optional), Isochronous/Droop Governor Switch (optional).

NOTE: There may be other application specific devices using this sensor supply circuit. Refer to your application technical manual for other possible devices.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #4 information, see [Sensor Supply #4](#) in Section 03, Group 140.

For more analog throttle information, see [Analog Throttle](#) in Section 03, Group 140.

For more variable speed fan information, see [Y5005 — Variable Speed Fan](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [Engine Schematic 2](#)
 - see [OEM Instrument Panel Schematic](#)
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466](#) Flex Probe Kit is used.

Flex Probes:

ECU

- [JDG10460](#) – Female – Yellow/Purple
- [JDG10461](#) – Male – Yellow/Purple

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

RE42287,0000495 -19-02AUG11-2/22

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003512.03 stored?

YES: GO TO [003512.03 — Sensor Supply #4 Voltage Out of Range High](#)
NO: [GO TO 2](#)

RE42287,0000495 -19-02AUG11-3/22

2 DTC List Review

Review DTC List.

Is 003512.04 active?

YES: [GO TO 3](#)

NO: [GO TO 14](#)

RE42287,0000495 -19-02AUG11-4/22

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect primary analog throttle connector R5000.
3. Perform [Terminal Test](#) on R5000 connector and sensor.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000495 -19-02AUG11-5/22

4 Active Code Check

1. Ignition ON, Engine OFF
2. Refresh codes.

Is DTC 003512.04 active?

YES: [GO TO 5](#)

NO: [GO TO 12](#)

RE42287,0000495 -19-02AUG11-6/22

5 Terminal Test

1. Ignition OFF, Engine OFF
2. Disconnect variable speed fan connector Y5005 if equipped.
3. Perform [Terminal Test](#) on Y5005 connector and sensor.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: No problem found. [GO TO 6](#)

NO: Not equipped. [GO TO 7](#)

RE42287,0000495 -19-02AUG11-7/22

6 Active Code Check

1. Ignition ON, Engine OFF
2. Refresh codes.

Is DTC 003512.04 active?

YES: [GO TO 7](#)

NO: [GO TO 13](#)

Continued on next page

RE42287,0000495 -19-02AUG11-8/22

Engine Control Unit (ECU) and Throttle Diagnostics

7 Terminal Test	<ol style="list-style-type: none">1. Ignition OFF, Engine OFF.2. Disconnect control panel connector X5021.3. Perform <u>Terminal Test</u> on X5021 connector female sockets M and C. And corresponding male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 8</u></p> <p>RE42287,0000495 -19-02AUG11-9/22</p>
8 Terminal Test	<ol style="list-style-type: none">1. Disconnect ECU connector A5503.2. Perform <u>Terminal Test</u> on A5503 connector female sockets 33 and 49. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 9</u></p> <p>RE42287,0000495 -19-02AUG11-10/22</p>
9 Short to Ground Check	<ol style="list-style-type: none">1. Ignition OFF, Engine OFF.2. On A5503 connector, measure resistance between female socket 49 and single point ground while performing <u>Wiggle Test</u>. <p>Is resistance ever less than 100K ohms?</p>	<p>YES: Repair short to ground in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 10</u></p> <p>RE42287,0000495 -19-02AUG11-11/22</p>
10 Wire to Wire Check	<p>On A5503, measure resistance between female socket 49 and all other female sockets in A5503 connector.</p> <p>Are any resistances less than 100k ohms?</p>	<p>YES: Repair short in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 11</u></p> <p>RE42287,0000495 -19-02AUG11-12/22</p>
11 Wire to Wire Check	<ol style="list-style-type: none">1. Disconnect all other ECU connectors.2. Measure resistance between A5503 connector female socket 49 and all other female sockets in other ECU connectors. <p>Are any resistances less than 100k ohms?</p>	<p>YES: Repair short in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 14</u></p> <p>RE42287,0000495 -19-02AUG11-13/22</p>
12 Component Reconnected Check	<ol style="list-style-type: none">1. Ignition OFF, Engine OFF2. Reconnect primary analog throttle connector R5000.3. Ignition ON, Engine OFF4. Refresh codes. <p>Is DTC 003512.04 active?</p>	<p>YES: Replace primary analog throttle potentiometer. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 15</u></p> <p>RE42287,0000495 -19-02AUG11-14/22</p>

Continued on next page

Engine Control Unit (ECU) and Throttle Diagnostics

13 Component Reconnected Check

1. Ignition OFF, Engine OFF
2. Reconnect variable speed fan connector Y5005.
3. Ignition ON, Engine OFF
4. Refresh codes.

Is DTC 003512.04 active?

YES: Replace variable speed fan actuator. Perform [Verification Procedure](#).

NO: [GO TO 15](#)

RE42287,0000495 -19-02AUG11-15/22

14 Active Code Check

1. Ignition OFF, Engine OFF
2. Reconnect all connectors and components.
3. Ignition ON, Engine OFF
4. Refresh codes.

Is DTC 003512.04 active?

YES: Replace instrument panel. Perform [Verification Procedure](#).

NO: [GO TO 15](#)

RE42287,0000495 -19-02AUG11-16/22

15 Wiggle Test

1. Ignition OFF, Engine OFF
2. Reconnect all connectors and components if not previously done.
3. Ignition ON, Engine OFF
4. In Service ADVISOR, monitor Sensor Supply #4 Voltage.
5. Perform [Wiggle Test](#).

Does voltage ever go below 4.6 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 16](#)

RE42287,0000495 -19-02AUG11-17/22

16 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
2. Operate engine under condition where DTC became active.

Does DTC 003512.04 become active?

YES: [GO TO 2](#)

NO: [GO TO 17](#)

RE42287,0000495 -19-02AUG11-18/22

17 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.

2. Operate engine under same conditions as when problem occurred.

Does DTC 003512.04 become active?

YES: [GO TO 2](#)

NO: [GO TO 18](#)

Continued on next page

RE42287,0000495 -19-02AUG11-19/22

Engine Control Unit (ECU) and Throttle Diagnostics

18 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 33 and 49. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 19

RE42287,0000495 -19-02AUG11-20/22

19 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 20

RE42287,0000495 -19-02AUG11-21/22

20 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a newer version of software available?

YES: Reprogram ECU with newer version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000495 -19-02AUG11-22/22

003513.03 — Sensor Supply #5 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 V supply #5 circuit.

RE42287,0000496 -19-03AUG11-1/13

Diagnostic Procedure

Troubleshooting Sequence: 003513.03

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 V on the Sensor Supply #5 circuit.

Alarm Level:

Warning

Components Using Sensor Supply #5 Voltage:

Secondary Analog Throttle (optional), Remote Throttle (optional).

NOTE: There may be other application specific devices using this sensor supply circuit. Refer to your application technical manual for other possible devices.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #5 information, see [Sensor Supply #5](#) in Section 03, Group 140.

For more analog throttle information, see [Analog Throttle](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and, jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 6](#)
 - see [4.5L Wiring Diagram 9](#)
 - see [Engine Schematic 2](#)
 - see [OEM Instrument Panel Schematic](#)
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466](#) Flex Probe Kit is used.

Flex Probes:

ECU

- [JDG10460](#) – Female – Yellow/Purple
- [JDG10461](#) – Male – Yellow/Purple

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

RE42287,0000496 -19-03AUG11-2/13

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003513.03 active?

YES: GO TO 2

NO: GO TO 4

RE42287,0000496 -19-03AUG11-3/13

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on ECU and A5503.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 3

RE42287,0000496 -19-03AUG11-4/13

3 Short To Voltage Check

On the harness, measure voltage between A5503 female socket 28 (+) and single point ground (-).

Is voltage greater than 5.26 V?

YES: Repair short to supply wire in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000496 -19-03AUG11-5/13

4 Throttle Short to Voltage Check

1. If applicable, move an associated throttle that uses Sensor Supply #5 to the maximum position.

NOTE: For a list of throttles that use Sensor Supply #5, see Components Using Sensor Supply #5 Voltage in this procedure.

2. Wait 5 seconds.
3. Monitor Sensor Supply #5 Voltage in Service ADVISOR.
4. Refresh codes.

Is DTC 003513.03 active or is voltage greater than 5.26 V?

YES: Repair short to voltage on throttle signal circuit. Perform Verification Procedure.

NO: GO TO 5

RE42287,0000496 -19-03AUG11-6/13

5 Next Associated

Have all throttles that use Sensor Supply #5 been checked?

YES: GO TO 6

NO: GO TO 4 and check next associated throttle.

Continued on next page

RE42287,0000496 -19-03AUG11-7/13

Engine Control Unit (ECU) and Throttle Diagnostics

6 Wiggle Test	<ol style="list-style-type: none">1. Monitor Sensor Supply #5 Voltage in Service ADVISOR.2. Perform <u>Wiggle Test</u> on components using Sensor Supply #5. <p><i>NOTE: For a list of components that use Sensor Supply #5, see Components Using Sensor Supply #5 Voltage in this procedure.</i></p> <p>Does voltage ever go above 5.26 V?</p>	<p>YES: Repair short to voltage on supply wire. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 7</u></p> <p>RE42287,0000496 -19-03AUG11-8/13</p>
7 Read DTCs and Stored Snapshot Information	<ol style="list-style-type: none">1. Review Snapshot information stored from step 1.2. Operate engine under condition where DTC became active. <p>Does DTC 003513.03 become active?</p>	<p>YES: <u>GO TO 2</u></p> <p>NO: <u>GO TO 8</u></p> <p>RE42287,0000496 -19-03AUG11-9/13</p>
8 Obtain More Information	<ol style="list-style-type: none">1. Talk with operator who observed the problem and obtain more information about when problem occurred.2. Operate engine under same conditions as when problem occurred. <p>Does DTC 003513.03 become active?</p>	<p>YES: <u>GO TO 2</u></p> <p>NO: <u>GO TO 9</u></p> <p>RE42287,0000496 -19-03AUG11-10/13</p>
9 Terminal Test	<ol style="list-style-type: none">1. Ignition OFF, Engine OFF.2. Disconnect ECU connector A5503.3. Perform <u>Terminal Test</u> on A5503 connector female socket 28. And corresponding ECU male pin. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 10</u></p> <p>RE42287,0000496 -19-03AUG11-11/13</p>
10 Search DTAC Solutions	<p>Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.</p> <p>Were any applicable DTAC solutions found?</p>	<p>YES: Perform steps found in DTAC solution. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 11</u></p> <p>RE42287,0000496 -19-03AUG11-12/13</p>
11 ECU Reprogram	<p>Search Custom Performance for possible ECU software updates.</p> <p>Is there a new version of software available?</p>	<p>YES: Reprogram ECU with new version of software. Perform <u>Verification Procedure</u>.</p> <p>NO: Contact DTAC for support.</p> <p>RE42287,0000496 -19-03AUG11-13/13</p>

003513.04 — Sensor Supply #5 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 V supply #5 circuit.

RE42287,0000497 -19-02AUG11-1/20

Diagnostic Procedure

Troubleshooting Sequence:

003513.03

003513.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage less than 4.6 V on the Sensor Supply #5 circuit.

IMPORTANT: Verify that too many devices have not been connected to this Sensor Supply. If the load on this Sensor Supply circuit is too great, the ECU will activate a current limit shut down on this supply.

Alarm Level:

Warning

Components Using Sensor Supply #5 Voltage:

Secondary Analog Throttle (optional), Remote Throttle (optional).

NOTE: There may be other application specific devices using this sensor supply circuit. Refer to your application technical manual for other possible devices

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #5 information, see [Sensor Supply #5](#) in Section 03, Group 140.

For more analog throttle information, see [Analog Throttle](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [Engine Schematic 2](#)
- see [4.5L Wiring Diagram 6](#)
- see [4.5L Wiring Diagram 9](#)
- see [OEM Instrument Panel Schematic](#) located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex Probes:

ECU

- [JDG10460](#) – Female – Yellow/Purple
- [JDG10461](#) – Male – Yellow/Purple

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

RE42287,0000497 -19-02AUG11-2/20

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003513.03 stored?

YES: GO TO [003513.03 — Sensor Supply #5 Voltage Out of Range High](#)
NO: [GO TO 2](#)

RE42287,0000497 -19-02AUG11-3/20

2 DTC List Review

Review DTC List.

Is 003513.04 active?

YES: [GO TO 3](#)

NO: [GO TO 13](#)

RE42287,0000497 -19-02AUG11-4/20

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect one sensor that uses Sensor Supply #5 voltage.
NOTE: For a list of components that use Sensor Supply #5, see [Components Using Sensor Supply #5 Voltage](#) in this procedure.
3. Perform [Terminal Test](#) on component and connector that was disconnected.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).
NO: [GO TO 4](#)

RE42287,0000497 -19-02AUG11-5/20

4 Active Code Check

1. Ignition ON, Engine OFF.
 2. Refresh codes.
- Is DTC 003513.04 active?

YES: [GO TO 5](#)
NO: [GO TO 10](#)

RE42287,0000497 -19-02AUG11-6/20

5 Next Associated Sensor Check

Have all sensors that use Sensor Supply #5 voltage been disconnected?

YES: [GO TO 6](#)

NO: [GO TO 3](#) and check next associated component.

Continued on next page

RE42287,0000497 -19-02AUG11-7/20

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect secondary analog throttle connector X5020.
3. Perform Terminal Test on sensor and X5020 connector female sockets A and C.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,0000497 -19-02AUG11-8/20

7 Active Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003513.04 active?

YES: GO TO 8

NO: Repair short to ground between X5020 connector and components using Sensor Supply #5 voltage. Perform Verification Procedure.

RE42287,0000497 -19-02AUG11-9/20

8 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5503.

3. Perform Terminal Test on A5503 connector female sockets 28 and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 9

RE42287,0000497 -19-02AUG11-10/20

9 Supply Circuit Short to Ground Check

1. Ignition OFF, Engine OFF.

2. On A5503 connector, measure resistance between female socket 28 and single point ground while performing Wiggle Test.

Is resistance ever less than 100K ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000497 -19-02AUG11-11/20

10 Component Reconnected Test

1. Ignition OFF, Engine OFF.

2. Reconnect last removed component.
3. Ignition ON, Engine OFF
4. Refresh codes.

Is DTC 003513.04 active?

YES: Replace component just connected. Perform Verification Procedure.

NO: GO TO 11

Continued on next page

RE42287,0000497 -19-02AUG11-12/20

Engine Control Unit (ECU) and Throttle Diagnostics

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 28 and 34. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,0000497 -19-02AUG11-13/20

12 Supply Wire Short To Ground Check

1. Ignition OFF, Engine OFF.
2. Disconnect component just connected.
3. On the harness, measure the resistance between supply wire terminal on connector just disconnected and single point ground.
4. Perform Wiggle Test.

Is measurement ever less than 100k ohms?

YES: Repair short to ground on supply wire in harness. Perform Verification Procedure.

NO: Replace component just disconnected. Perform Verification Procedure.

RE42287,0000497 -19-02AUG11-14/20

13 Wiggle Test

1. In Service ADVISOR, monitor Sensor Supply #5 Voltage.
2. Perform Wiggle Test.

Does voltage ever go below 4.6 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 14

RE42287,0000497 -19-02AUG11-15/20

14 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
2. Operate engine under condition where DTC became active.

Does DTC 003513.04 become active?

YES: GO TO 2

NO: GO TO 15

RE42287,0000497 -19-02AUG11-16/20

15 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
2. Operate engine under same conditions as when problem occurred.

Does DTC 003513.04 become active?

YES: GO TO 2

NO: GO TO 16

Continued on next page

RE42287,0000497 -19-02AUG11-17/20

Engine Control Unit (ECU) and Throttle Diagnostics

16 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503.
3. Perform Terminal Test on A5503 connector female sockets 28 and 34. And corresponding ECU male pin.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 17

RE42287,0000497 -19-02AUG11-18/20

17 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 18

RE42287,0000497 -19-02AUG11-19/20

18 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000497 -19-02AUG11-20/20

003514.03 — Sensor Supply #6 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 V supply #6 circuit.

RE42287,0000498 -19-03AUG11-1/29

Diagnostic Procedure

Troubleshooting Sequence:

005127.03

003514.03

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 V on the Sensor Supply #6 circuit.

Alarm Level:

Warning

Sensors Using Sensor Supply #6 Voltage:

Exhaust Filter Temperature Module, DPF Differential Pressure Sensor.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #6 information, see [Sensor Supply #6](#) in Section 03, Group 140.

For more exhaust filter temperature module information, see [B5204 — Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more DPF differential pressure sensor information, see [B5109 — DPF Differential Pressure Sensor](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and, jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 5](#)
- see [4.5L Wiring Diagram 8](#)

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

B5204 – Exhaust Filter Temperature Module:

- [JDG10460](#) – Female – Yellow/Purple
- [JDG10461](#) – Male – Yellow/Purple

B5109 – DPF Differential Pressure Sensor:

- [JDG10460](#) – Female – Yellow/Purple
- [JDG10461](#) – Male – Yellow/Purple

ECU:

- [JDG10460](#) – Female – Yellow/Purple
- [JDG10461](#) – Male – Yellow/Purple

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

RE42287,0000498 -19-03AUG11-2/29

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003514.03 active?

YES: [GO TO 2](#)

NO: [GO TO 19](#)

RE42287,0000498 -19-03AUG11-3/29

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect DPF differential pressure sensor.
3. Perform [Terminal Test](#) on DPF differential pressure sensor and B5109 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,0000498 -19-03AUG11-4/29

3 DPF Differential Pressure Sensor Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003514.03 active?

YES: [GO TO 4](#)

NO: [GO TO 10](#)

RE42287,0000498 -19-03AUG11-5/29

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect exhaust filter temperature module.
3. Perform [Terminal Test](#) on exhaust filter temperature module and B5204 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,0000498 -19-03AUG11-6/29

5 Exhaust Filter Temperature Module Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 003514.03 active?

YES: [GO TO 6](#)

NO: [GO TO 16](#)

Continued on next page

RE42287,0000498 -19-03AUG11-7/29

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU A5502.
3. Perform Terminal Test on A5502 female socket 41 and corresponding ECU male pin.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,0000498 -19-03AUG11-8/29

7 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 003514.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 003514.03 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 8

RE42287,0000498 -19-03AUG11-9/29

8 Short To Voltage Check

1. Ignition ON, Engine OFF.
2. On A5502 connector, measure voltage between female socket 41 (+) and single point ground (-).

Is measurement less than 0.5 V?

YES: GO TO 9

NO: Repair short to supply wire in harness. Perform Verification Procedure.

RE42287,0000498 -19-03AUG11-10/29

9 Wire To Wire Check

1. Ignition OFF, Engine OFF.
2. On the harness, measure the resistance between A5502 female socket 41 and all other female sockets in A5502.

Is any measurement less than 100k ohms?

YES: Repair short to supply wire in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000498 -19-03AUG11-11/29

10 Signal Wire Short To Voltage Check

1. B5109 still disconnected.
2. On B5109 connector, measure voltage between female sockets 3 (+) and 2 (-).
3. In Service ADVISOR, monitor DPF Differential Pressure Input Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 0.5 V?

YES: GO TO 13

NO: GO TO 11

Continued on next page

RE42287,0000498 -19-03AUG11-12/29

Engine Control Unit (ECU) and Throttle Diagnostics

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5502.
3. Perform Terminal Test on A5502 female sockets 3, 31 and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,0000498 -19-03AUG11-13/29

12 Continuity Check

1. Measure resistance between A5502 connector female socket 41 and B5109 connector female socket 1.
2. Measure resistance between A5502 connector female socket 31 and B5109 connector female socket 2.
3. Measure resistance between A5502 connector female socket 3 and B5109 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace DPF differential pressure sensor. Perform Verification Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,0000498 -19-03AUG11-14/29

13 Supply Wire Short To Voltage Check

1. B5109 still disconnected.
2. On B5109 connector, measure voltage between female sockets 1 (+) and 2 (-).
3. In Service ADVISOR, monitor Sensor Supply #6 Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 5.26 V?

YES: Contact DTAC for support.

NO: GO TO 14

RE42287,0000498 -19-03AUG11-15/29

14 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 female sockets 3, 31 and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 15

Continued on next page

RE42287,0000498 -19-03AUG11-16/29

15 Continuity Check

1. Measure resistance between A5502 connector female socket 41 and B5109 connector female socket 1.
2. Measure resistance between A5502 connector female socket 31 and B5109 connector female socket 2.
3. Measure resistance between A5502 connector female socket 3 and B5109 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace DPF differential pressure sensor. Perform [Verification Procedure](#).
NO: Repair mis-pin. Perform [Verification Procedure](#).

RE42287,0000498 -19-03AUG11-17/29

16 Signal Wire Short To Voltage Check

1. B5204 still disconnected.
 2. Measure the voltage between B5204 connector female sockets 4 (+) and 2 (-).
 3. While monitoring voltage perform [Wiggle Test](#).
 4. Ignition ON, Engine OFF.
- Did measurement ever read greater than 0.5 V?

YES: [GO TO 19](#)
NO: [GO TO 17](#)

RE42287,0000498 -19-03AUG11-18/29

17 Terminal Test

1. Ignition OFF, Engine OFF.
 2. Disconnect ECU connectors A5501 and A5502.
 3. Perform [Terminal Test](#) on A5502 connector female sockets 31 and 41. And associated ECU male pins. Perform [Terminal Test](#) on A5501 connector female socket 10. And associated ECU male pin.
- Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).
NO: [GO TO 18](#)

RE42287,0000498 -19-03AUG11-19/29

18 Continuity Check

1. Measure resistance between A5501 connector female socket 20 and B5204 connector female socket 3.
2. Measure resistance between A5501 connector female socket 10 and B5204 connector female socket 4.
3. Measure resistance between **A5502** connector female socket 41 and B5204 connector female socket 1.
4. Measure resistance between **A5502** connector female socket 31 and B5204 connector female socket 2.

Are all resistances less than 5 ohms?

YES: Replace exhaust filter temperature module. Perform [Verification Procedure](#).
NO: Repair mis-pin in applicable connector. Perform [Verification Procedure](#).

Continued on next page

RE42287,0000498 -19-03AUG11-20/29

19 Supply Wire Short To Voltage Check

1. B5204 still disconnected.
2. Measure the voltage between B5204 connector female sockets 1 (+) and 2 (-).
3. In Service ADVISOR, monitor Sensor Supply #6 Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Did any measurement ever read greater than 5.26 V?

YES: Repair short to voltage in harness. Replace exhaust filter temperature module. Perform Verification Procedure.

NO: GO TO 20

RE42287,0000498 -19-03AUG11-21/29

20 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform Terminal Test on A5501 connector female sockets 10 and 20 and **A5502** connector female sockets 31 and 41. And associated ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 21

RE42287,0000498 -19-03AUG11-22/29

21 Continuity Check

1. Measure resistance between A5501 connector female socket 20 and B5204 connector female socket 3.
2. Measure resistance between A5501 connector female socket 10 and B5204 connector female socket 4.
3. Measure resistance between **A5502** connector female socket 41 and B5204 connector female socket 1.
4. Measure resistance between **A5502** connector female socket 31 and B5204 connector female socket 2.

Are all resistances less than 5 ohms?

YES: Replace exhaust filter temperature module. Perform Verification Procedure.

NO: Repair mis-pin in applicable connector. Perform Verification Procedure.

RE42287,0000498 -19-03AUG11-23/29

22 Wiggle Test

1. Monitor Sensor Supply #6 Voltage in Service ADVISOR.
2. Perform Wiggle Test on B5109 and B5204.

Does voltage ever go above 5.26 V?

YES: Repair short to voltage on supply wire. Perform Verification Procedure.

NO: GO TO 23

Continued on next page

RE42287,0000498 -19-03AUG11-24/29

Engine Control Unit (ECU) and Throttle Diagnostics

23 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
2. Operate engine under condition where DTC became active.
Does DTC 003514.03 become active?

YES: [GO TO 2](#)

NO: [GO TO 24](#)

RE42287,0000498 -19-03AUG11-25/29

24 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
2. Operate engine under same conditions as when problem occurred.
Does DTC 003514.03 become active?

YES: [GO TO 2](#)

NO: [GO TO 25](#)

RE42287,0000498 -19-03AUG11-26/29

25 Terminal Test

1. Ignition OFF, Engine OFF.
 2. Disconnect ECU connector A5502.
 3. Perform [Terminal Test](#) on A5502 connector female socket 41 and corresponding ECU male pins.
- Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 26](#)

RE42287,0000498 -19-03AUG11-27/29

26 Search DTAC Solutions

- Search DTAC solutions in Service ADVISOR for any known issues which may cause 003514.03.
- Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform [Verification Procedure](#).

NO: [GO TO 27](#)

RE42287,0000498 -19-03AUG11-28/29

27 ECU Reprogram

- Search Custom Performance for possible ECU software updates.
- Is there a new version of software available?

YES: Reprogram ECU with new version of software.
Perform [Verification Procedure](#).

NO: Contact DTAC for support.

RE42287,0000498 -19-03AUG11-29/29

**003514.04 — Sensor Supply #6 Voltage Out
of Range Low**

*The ECU detects a supply voltage below specification
on the ECU 5 V supply circuit.*

Continued on next page

RE42287,0000499 -19-20MAR12-1/19

Diagnostic Procedure

Troubleshooting Sequence:

003514.03

003514.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage less than 4.6 V on the Sensor Supply #6 circuit.

IMPORTANT: Verify that too many devices have not been connected to this Sensor Supply. If the load on this Sensor Supply circuit is too great, the ECU will activate a current limit shut down on this supply.

Alarm Level:

Warning

Components Using Sensor Supply #6 Voltage:

Exhaust Filter Temperature Module, DPF Differential Pressure Sensor

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #6 information, see [Sensor Supply #6](#) in Section 03, Group 140.

For more exhaust filter temperature module information, see [B5204 — Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more DPF differential pressure sensor information, see [B5109 — DPF Differential Pressure Sensor](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 5](#)

- see [4.5L Wiring Diagram 8](#)

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex probes:

B5204 – Exhaust Filter Temperature Module:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

B5109 – DPF Differential Pressure Sensor:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

ECU:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

RE42287,0000499 -19-20MAR12-2/19

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003514.03 stored?

YES: GO TO [003514.03 — Sensor Supply #6 Voltage Out of Range High](#)
NO: [GO TO 2](#)

RE42287,0000499 -19-20MAR12-3/19

2 DTC List Review

Review DTC List.

Is 003514.04 active?

YES: [GO TO 3](#)

NO: [GO TO 12](#)

RE42287,0000499 -19-20MAR12-4/19

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect one component that uses Sensor Supply #6 voltage.
NOTE: For a list of components that use Sensor Supply #6, see [Components Using Sensor Supply #6 Voltage](#) in this procedure.
3. Perform [Terminal Test](#) on component and connector that was disconnected.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).
NO: [GO TO 4](#)

RE42287,0000499 -19-20MAR12-5/19

4 Disconnected Component Code Check

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 003514.04 active?

YES: [GO TO 5](#)
NO: [GO TO 9](#)

RE42287,0000499 -19-20MAR12-6/19

5 Next Associated Component Check

Have all components that use Sensor Supply #6 voltage been disconnected?

YES: [GO TO 6](#)

NO: [GO TO 3](#) and check next associated component.

Continued on next page

RE42287,0000499 -19-20MAR12-7/19

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 41 and 31. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,0000499 -19-20MAR12-8/19

7 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 003514.04.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 003514.04 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 8

RE42287,0000499 -19-20MAR12-9/19

8 Supply Circuit Short to Ground Check

1. Ignition OFF, Engine OFF.
2. On A5502 connector, measure resistance between female socket 41 and single point ground.

Is resistances less than 100K ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000499 -19-20MAR12-10/19

9 Component Reconnected Test

1. Ignition OFF, Engine OFF.
2. Reconnect component just disconnected.
3. Ignition ON, Engine OFF
4. Refresh codes.

Is DTC 003514.04 active?

YES: Replace component just connected. Perform Verification Procedure.

NO: GO TO 10

RE42287,0000499 -19-20MAR12-11/19

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5501 connector female sockets 41 and 31. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

Continued on next page

RE42287,0000499 -19-20MAR12-12/19

11 Supply Wire Short To Ground Check

1. Ignition OFF, Engine OFF.
2. Disconnect component just connected.
3. On the harness, measure the resistance between supply wire terminal on connector just disconnected and single point ground.
4. Perform Wiggle Test.

Is measurement ever less than 100k ohms?

YES: Repair short to ground on supply wire in harness. Perform Verification Procedure.

NO: Replace component just disconnected. Perform Verification Procedure.

RE42287,0000499 -19-20MAR12-13/19

12 Wiggle Test

1. In Service ADVISOR, monitor Sensor Supply #6 Voltage.
2. Perform Wiggle Test.

Does voltage ever go below 4.6 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 13.

RE42287,0000499 -19-20MAR12-14/19

13 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
 2. Operate engine under condition where DTC became active.
- Does DTC 003514.04 become active?

YES: GO TO 2

NO: GO TO 14

RE42287,0000499 -19-20MAR12-15/19

14 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
 2. Operate engine under same conditions as when problem occurred.
- Does DTC 003514.04 become active?

YES: GO TO 2

NO: GO TO 15

RE42287,0000499 -19-20MAR12-16/19

15 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 41 and 31. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 16

Continued on next page

RE42287,0000499 -19-20MAR12-17/19

Engine Control Unit (ECU) and Throttle Diagnostics

16 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 17

RE42287,0000499 -19-20MAR12-18/19

17 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,0000499 -19-20MAR12-19/19

005125.03 — Sensor Supply #7 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 V sensor supply #7 circuit.

RE42287,000049A -19-04FEB11-1/29

Diagnostic Procedure

Troubleshooting Sequence: 005125.03

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 V on the sensor supply #7 circuit.

Alarm Level:

Warning

Sensors Using Sensor Supply #7 Voltage:

Manifold Air Pressure Sensor, Engine Crankcase Pressure Sensor.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #7 information, see Sensor Supply #7 in Section 03, Group 140.

For more manifold air pressure sensor information, see B5104 — Manifold Air Pressure (MAP) Sensor in Section 03, Group 140.

For more engine crankcase pressure sensor information, see B5105 — Engine Crankcase Pressure Sensor in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and, jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
 - see 4.5L Wiring Diagram 3
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex Probes:

B5104 – Manifold Air Pressure (MAP) Sensor:

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

B5105 – Engine Crankcase Pressure Sensor:

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

ECU:

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

Continued on next page

RE42287,000049A -19-04FEB11-2/29

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005125.03 active?

YES: [GO TO 2](#)

NO: [GO TO 22](#)

RE42287,000049A -19-04FEB11-3/29

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect manifold air pressure sensor connector B5104.
3. Perform [Terminal Test](#) on manifold air pressure sensor and B5104 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,000049A -19-04FEB11-4/29

3 Manifold Air Pressure Sensor Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 005125.03 active?

YES: [GO TO 4](#)

NO: [GO TO 10](#)

RE42287,000049A -19-04FEB11-5/29

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine crankcase pressure sensor connector B5105
3. Perform [Terminal Test](#) on engine crankcase pressure sensor and B5105 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,000049A -19-04FEB11-6/29

5 Engine Crankcase Pressure Sensor Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 005125.03 active?

YES: [GO TO 6](#)

NO: [GO TO 16](#)

Continued on next page

RE42287,000049A -19-04FEB11-7/29

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 4, 25, 53, and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,000049A -19-04FEB11-8/29

7 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 005125.03.

1. ECU connector A5502 still disconnected.
2. Ignition ON, Engine OFF.
3. Refresh codes.

Is DTC 005125.03 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 8

RE42287,000049A -19-04FEB11-9/29

8 Short To Voltage Check

On A5502 connector, measure voltage between female socket 53 (+) and single point ground (-).

Is voltage greater than 0.5 V?

YES: Repair short to voltage on supply wire in harness. Perform Verification Procedure.

NO: GO TO 9

RE42287,000049A -19-04FEB11-10/29

9 Wire to Wire Check

1. Ignition OFF, Engine OFF.
2. On the harness, measure the resistance between A5502 female socket 53 and all other female sockets in A5502.

Are any measurements less than 100k ohms?

YES: Repair short to supply wire in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049A -19-04FEB11-11/29

10 Signal Wire Short To Voltage Check

1. B5104 still disconnected.
2. On B5104 connector, measure voltage between female sockets 3 (+) and 2 (-).
3. In Service ADVISOR, monitor Manifold Air Pressure Input Voltage.
4. While monitoring voltages, perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 0.5 V?

YES: GO TO 13

NO: GO TO 11

Continued on next page

RE42287,000049A -19-04FEB11-12/29

Engine Control Unit (ECU) and Throttle Diagnostics

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 4, 25 and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,000049A -19-04FEB11-13/29

12 Continuity Check

1. Measure resistance between A5502 connector female socket 53 and B5104 connector female socket 1.
2. Measure resistance between A5502 connector female socket 25 and B5104 connector female socket 2.
3. Measure resistance between A5502 connector female socket 4 and B5104 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace manifold air pressure sensor. Perform Verification Procedure.

NO: Repair mis-pin in A5502 connector. Perform Verification Procedure.

RE42287,000049A -19-04FEB11-14/29

13 Supply Wire Short To Voltage Check

1. B5104 still disconnected.
2. On B5104 connector, measure voltage between female sockets 1 (+) and 2 (-).
3. In Service ADVISOR, monitor Sensor Supply #7 Voltage.
4. While monitoring voltages, perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 5.26 V?

YES: Contact DTAC for support.

NO: GO TO 14

RE42287,000049A -19-04FEB11-15/29

14 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 4, 25 and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 15

Continued on next page

RE42287,000049A -19-04FEB11-16/29

15 Continuity Check

1. Measure resistance between A5502 connector female socket 53 and B5104 connector female socket 1.
2. Measure resistance between A5502 connector female socket 25 and B5104 connector female socket 2.
3. Measure resistance between A5502 connector female socket 4 and B5104 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on supply wire in harness. Perform [Verification Procedure](#).

NO: Repair mis-pin in A5502 connector. Perform [Verification Procedure](#).

RE42287,000049A -19-04FEB11-17/29

16 Signal Wire Short To Voltage Check

1. B5105 still disconnected.
2. On B5105 connector, measure voltage between female sockets 3 (+) and 2 (-).
3. In Service ADVISOR, monitor Engine Crankcase Pressure Input Voltage.
4. While monitoring voltages, perform [Wiggle Test](#).
5. Ignition ON, Engine OFF.

Are both voltages always less than 0.5 V?

YES: [GO TO 19](#)

NO: [GO TO 17](#)

RE42287,000049A -19-04FEB11-18/29

17 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform [Terminal Test](#) on A5502 connector female sockets 25, 53, and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 18](#)

RE42287,000049A -19-04FEB11-19/29

18 Continuity Check

1. Measure resistance between A5502 connector female socket 53 and B5105 connector female socket 1.
2. Measure resistance between A5502 connector female socket 25 and B5105 connector female socket 2.
3. Measure resistance between A5502 connector female socket 54 and B5105 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace engine crankcase pressure sensor. Perform [Verification Procedure](#).

NO: Repair mis-pin in A5502 connector. Perform [Verification Procedure](#).

Continued on next page

RE42287,000049A -19-04FEB11-20/29

Engine Control Unit (ECU) and Throttle Diagnostics

19 Supply Wire Short To Voltage Check

1. B5105 still disconnected.
2. On B5105 connector, measure voltage between female sockets 1 (+) and 2 (-).
3. In Service ADVISOR, monitor Sensor Supply #7 Voltage.
4. While monitoring voltages, perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 5.26 V?

YES: Contact DTAC for support.

NO: GO TO 20

RE42287,000049A -19-04FEB11-21/29

20 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 25, 53, and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 21

RE42287,000049A -19-04FEB11-22/29

21 Continuity Check

1. Measure resistance between A5502 connector female socket 53 and B5105 connector female socket 1.
2. Measure resistance between A5502 connector female socket 25 and B5105 connector female socket 2.
3. Measure resistance between A5502 connector female socket 54 and B5105 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on supply wire in harness. Perform Verification Procedure.

NO: Repair mis-pin in A5502 connector. Perform Verification Procedure.

RE42287,000049A -19-04FEB11-23/29

22 Wiggle Test

1. In Service ADVISOR, monitor Sensor Supply #7 Voltage.
2. Perform Wiggle Test on B5104 manifold air pressure sensor and B5105 engine crankcase pressure sensor.

Does voltage ever go above 5.26 V?

YES: Repair short to voltage on supply wire. Perform Verification Procedure.

NO: GO TO 23

RE42287,000049A -19-04FEB11-24/29

23 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
 2. Operate engine under condition where DTC became active.
- Does DTC 005125.03 become active?

YES: GO TO 2

NO: GO TO 24

Continued on next page

RE42287,000049A -19-04FEB11-25/29

Engine Control Unit (ECU) and Throttle Diagnostics

24 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
 2. Operate engine under same conditions as when problem occurred.
- Does DTC 005125.03 become active?

YES: [GO TO 2](#)

NO: [GO TO 25](#)

RE42287,000049A -19-04FEB11-26/29

25 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 4, 25, 53 and 54. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: [GO TO 26](#)

RE42287,000049A -19-04FEB11-27/29

26 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC 005125.03.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: [GO TO 27](#)

RE42287,000049A -19-04FEB11-28/29

27 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software.
Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049A -19-04FEB11-29/29

**005125.04 — Sensor Supply #7 Voltage Out
of Range Low**

*The ECU detects a supply voltage below specification
on the ECU 5 V sensor supply #7 circuit.*

Continued on next page

RE42287,000049B -19-04FEB11-1/19

Diagnostic Procedure

Troubleshooting Sequence:

005125.03

005125.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage less than 4.6 V on the sensor supply #7 circuit.

IMPORTANT: Verify that too many devices have not been connected to this Sensor Supply. If the load on this Sensor Supply circuit is too great, the ECU will activate a current limit shut down on this supply.

Alarm Level:

Warning

Sensors Using Sensor Supply #7 Voltage:

Manifold Air Pressure Sensor, Engine Crankcase Pressure Sensor.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #7 information, see [Sensor Supply #7](#) in Section 03, Group 140.

For more manifold air pressure sensor information, see [B5104 — Manifold Air Pressure \(MAP\) Sensor](#) in Section 03, Group 140.

For more engine crankcase pressure sensor information, see [B5105 — Engine Crankcase Pressure Sensor](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 3](#)

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Flex Probes:

B5104 – Manifold Air Pressure (MAP) Sensor:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

B5105 – Engine Crankcase Pressure Sensor:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

ECU:

- [JDG10460](#) – Female – Yellow/Purple

- [JDG10461](#) – Male – Yellow/Purple

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

RE42287,000049B -19-04FEB11-2/19

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. Perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005125.03 stored?

YES: GO TO [005125.03 — Sensor Supply #7 Voltage Out of Range High](#)
NO: [GO TO 2](#)

RE42287,000049B -19-04FEB11-3/19

2 DTC List Review

Review DTC List.

Is 005125.04 active?

YES: [GO TO 3](#)

NO: [GO TO 12](#)

RE42287,000049B -19-04FEB11-4/19

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect one sensor that uses Sensor Supply #7 voltage.
NOTE: For a list of components that use Sensor Supply #7, see Components Using Sensor Supply #7 Voltage in this procedure.
3. Perform [Terminal Test](#) on component and connector that was disconnected.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).
NO: [GO TO 4](#)

RE42287,000049B -19-04FEB11-5/19

4 Disconnected Component Code Check

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 005125.04 active?

YES: [GO TO 5](#)
NO: [GO TO 9](#)

RE42287,000049B -19-04FEB11-6/19

5 Next Associated Sensor Check

Have all sensors that use Sensor Supply #7 voltage been disconnected?

YES: [GO TO 6](#)

NO: [GO TO 3](#) and check next associated component.

Continued on next page

RE42287,000049B -19-04FEB11-7/19

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 25 and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,000049B -19-04FEB11-8/19

7 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes will appear in the next step. Disregard all codes except DTC 005125.04.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 005125.04 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 8

RE42287,000049B -19-04FEB11-9/19

8 Supply Circuit Short to Ground Check

1. Ignition OFF, Engine OFF.
2. On A5502 connector, measure resistance between female socket 53 and single point ground.

Is resistances less than 100K ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049B -19-04FEB11-10/19

9 Component Reconnected Test

1. Ignition OFF, Engine OFF.
2. Reconnect last removed component.
3. Ignition ON, Engine OFF
4. Refresh codes.

Is DTC 005125.04 active?

YES: Replace component just connected. Perform Verification Procedure.

NO: GO TO 10

RE42287,000049B -19-04FEB11-11/19

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 25 and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

Continued on next page

RE42287,000049B -19-04FEB11-12/19

11 Supply Wire Short To Ground Check

1. Ignition OFF, Engine OFF.
2. Disconnect component just connected.
3. On the harness, measure the resistance between supply wire terminal on connector just disconnected and single point ground.
4. Perform Wiggle Test.

Is measurement ever less than 100k ohms?

YES: Repair short to ground on supply wire in harness. Perform Verification Procedure.

NO: Replace component just disconnected. Perform Verification Procedure.

RE42287,000049B -19-04FEB11-13/19

12 Wiggle Test

1. In Service ADVISOR, monitor Sensor Supply #7 Voltage.
2. Perform Wiggle Test.

Does voltage ever go below 4.6 V?

YES: Repair harness problem. Perform Verification Procedure.

NO: GO TO 13

RE42287,000049B -19-04FEB11-14/19

13 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
 2. Operate engine under condition where DTC became active.
- Does DTC 005125.04 become active?

YES: GO TO 2

NO: GO TO 14

RE42287,000049B -19-04FEB11-15/19

14 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
 2. Operate engine under same conditions as when problem occurred.
- Does DTC 005125.04 become active?

YES: GO TO 2

NO: GO TO 15

RE42287,000049B -19-04FEB11-16/19

15 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 25 and 53. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 16

Continued on next page

RE42287,000049B -19-04FEB11-17/19

Engine Control Unit (ECU) and Throttle Diagnostics

16 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 17

RE42287,000049B -19-04FEB11-18/19

17 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049B -19-04FEB11-19/19

005126.03 — Sensor Supply #8 Voltage Out of Range High

The ECU detects a supply voltage above specification on the ECU 5 V sensor supply #8 circuit.

RE42287,000049C -19-03AUG11-1/29

Diagnostic Procedure

Troubleshooting Sequence: 005126.03

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage greater than 5.26 V on the sensor supply #8 circuit.

Alarm Level:

Warning

Sensors Using Sensor Supply #8 Voltage:

Engine Oil Pressure Sensor, Exhaust Manifold Pressure Sensor.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #8 information, see Sensor Supply #8 in Section 03, Group 140.

For more engine oil pressure information, see B5101 – Engine Oil Pressure Sensor in Section 03, Group 140.

For more exhaust manifold pressure information, see B5102 – Exhaust Manifold Pressure Sensor in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and, jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Engine Oil Pressure Sensor:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Exhaust Manifold Pressure Sensor:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

ECU:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

Continued on next page

RE42287,000049C -19-03AUG11-2/29

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. Perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005126.03 active?

YES: [GO TO 2](#)

NO: [GO TO 22](#)

RE42287,000049C -19-03AUG11-3/29

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect engine oil pressure sensor connector B5101.
3. Perform [Terminal Test](#) on engine oil pressure sensor and B5101 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,000049C -19-03AUG11-4/29

3 Engine Oil Pressure Sensor Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 005126.03 active?

YES: [GO TO 4](#)

NO: [GO TO 10](#)

RE42287,000049C -19-03AUG11-5/29

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect exhaust manifold pressure sensor connector B5102.
3. Perform [Terminal Test](#) on exhaust manifold pressure sensor and B5102 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,000049C -19-03AUG11-6/29

5 Exhaust Manifold Pressure Sensor Disconnected Code Check

1. Ignition ON, Engine OFF.

2. Refresh codes.

Is DTC 005126.03 active?

YES: [GO TO 6](#)

NO: [GO TO 16](#)

Continued on next page

RE42287,000049C -19-03AUG11-7/29

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 female socket 42 and corresponding ECU male pin.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,000049C -19-03AUG11-8/29

7 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes will appear in the next step. Disregard all codes except DTC 005126.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 005126.03 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 8

RE42287,000049C -19-03AUG11-9/29

8 Short To Voltage Check

1. Ignition ON, Engine OFF.
2. On A5501 connector, measure voltage between female socket 42 (+) and single point ground (-).

Is measurement less than 0.5 V?

YES: GO TO 9

NO: Repair short to supply wire in harness. Perform Verification Procedure.

RE42287,000049C -19-03AUG11-10/29

9 Wire To Wire Check

1. Ignition OFF, Engine OFF.
2. On the harness, measure the resistance between A5501 female socket 42 and all other terminals in A5501.

Is any measurement less than 100k ohms?

YES: Repair short to supply wire in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049C -19-03AUG11-11/29

10 Signal Wire Short To Voltage Check

1. B5101 still disconnected.
2. On B5101 connector, measure voltage between female sockets 3 (+) and 2 (-).
3. In Service ADVISOR, monitor Engine Oil Pressure Input Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 0.5 V?

YES: GO TO 13

NO: GO TO 11

Continued on next page

RE42287,000049C -19-03AUG11-12/29

Engine Control Unit (ECU) and Throttle Diagnostics

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform Terminal Test on A5501 female sockets 27 and 42 also on **A5502** female socket 7. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

RE42287,000049C -19-03AUG11-13/29

12 Continuity Check

1. Measure resistance between A5501 connector female socket 42 and B5101 connector female socket 1.
2. Measure resistance between A5501 connector female socket 27 and B5101 connector female socket 2.
3. Measure resistance between **A5502** connector female socket 7 and B5101 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace engine oil pressure sensor. Perform Verification Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,000049C -19-03AUG11-14/29

13 Supply Wire Short To Voltage Check

1. B5101 still disconnected.
2. On B5101 connector, measure voltage between female sockets 1 (+) and 2 (-).
3. In Service ADVISOR, monitor Sensor Supply #8 Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 5.26 V?

YES: Contact DTAC for support.

NO: GO TO 14

RE42287,000049C -19-03AUG11-15/29

14 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform Terminal Test on A5501 female sockets 27 and 42 also on **A5502** female socket 7. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 15

Continued on next page

RE42287,000049C -19-03AUG11-16/29

15 Continuity Check

1. Measure resistance between A5501 connector female socket 42 and B5101 connector female socket 1.
2. Measure resistance between A5501 connector female socket 27 and B5101 connector female socket 2.
3. Measure resistance between **A5502** connector female socket 7 and B5101 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on supply wire in harness. Perform Verification Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,000049C -19-03AUG11-17/29

16 Signal Wire Short To Voltage Check

1. B5102 still disconnected.
2. On B5102 connector, measure voltage between female sockets 3 (+) and 2 (-).
3. In Service ADVISOR, monitor Exhaust Manifold Pressure Input Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 0.5 V?

YES: GO TO 19

NO: GO TO 17

RE42287,000049C -19-03AUG11-18/29

17 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform Terminal Test on A5501 female sockets 27 and 42 also on **A5502** female socket 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 18

RE42287,000049C -19-03AUG11-19/29

18 Continuity Check

1. Measure resistance between A5501 connector female socket 42 and B5102 connector female socket 1.
2. Measure resistance between A5501 connector female socket 27 and B5102 connector female socket 2.
3. Measure resistance between **A5502** connector female socket 52 and B5102 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on signal wire in harness. Replace exhaust manifold pressure sensor. Perform Verification Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

Continued on next page

RE42287,000049C -19-03AUG11-20/29

Engine Control Unit (ECU) and Throttle Diagnostics

19 Supply Wire Short To Voltage Check

1. B5102 still disconnected.
2. On B5102 connector, measure voltage between female sockets 1 (+) and 2 (-).
3. In Service ADVISOR, monitor Sensor Supply #8 Voltage.
4. While monitoring voltages perform Wiggle Test.
5. Ignition ON, Engine OFF.

Are both voltages always less than 5.26 V?

YES: Contact DTAC for support.

NO: GO TO 20

RE42287,000049C -19-03AUG11-21/29

20 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform Terminal Test on A5501 female sockets 27 and 42 also on **A5502** female socket 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 21

RE42287,000049C -19-03AUG11-22/29

21 Continuity Check

1. Measure resistance between A5501 connector female socket 42 and B5102 connector female socket 1.
2. Measure resistance between A5501 connector female socket 27 and B5102 connector female socket 2.
3. Measure resistance between **A5502** connector female socket 52 and B5102 connector female socket 3.

Are all resistances less than 5 ohms?

YES: Repair short to voltage on supply wire in harness. Perform Verification Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,000049C -19-03AUG11-23/29

22 Wiggle Test

1. Monitor Sensor Supply #8 Voltage in Service ADVISOR.
2. Perform Wiggle Test on B5101, and B5102.

Does voltage ever go above 5.26 V?

YES: Repair short to voltage on supply wire. Perform Verification Procedure.

NO: GO TO 23

RE42287,000049C -19-03AUG11-24/29

23 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
 2. Operate engine under condition where DTC became active.
- Does DTC 005126.03 become active?

YES: GO TO 2

NO: GO TO 24

Continued on next page

RE42287,000049C -19-03AUG11-25/29

Engine Control Unit (ECU) and Throttle Diagnostics

24 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
 2. Operate engine under same conditions as when problem occurred.
- Does DTC 005126.03 become active?

YES: [GO TO 2](#)

NO: [GO TO 25](#)

RE42287,000049C -19-03AUG11-26/29

25 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female socket 42 and corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: [GO TO 26](#)

RE42287,000049C -19-03AUG11-27/29

26 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause 005126.03.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: [GO TO 27](#)

RE42287,000049C -19-03AUG11-28/29

27 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software.
Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049C -19-03AUG11-29/29

005126.04 — Sensor Supply #8 Voltage Out of Range Low

The ECU detects a supply voltage below specification on the ECU 5 V sensor supply #8 circuit.

RE42287,000049D -19-04FEB11-1/18

Diagnostic Procedure

Troubleshooting Sequence:

005126.03

005126.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage less than 4.6 V on the sensor supply #8 circuit.

Alarm Level:

Warning

Sensors Using Sensor Supply #8 Voltage:

Engine Oil Pressure Sensor, Exhaust Manifold Pressure Sensor.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #8 information, see Sensor Supply #8 in Section 03, Group 140.

For more engine oil pressure information, see B5101 — Engine Oil Pressure Sensor in Section 03, Group 140.

For more exhaust manifold pressure information, see B5102 — Exhaust Manifold Pressure Sensor in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Engine Oil Pressure Sensor:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Exhaust Manifold Pressure Sensor:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

ECU:

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

Continued on next page

RE42287,000049D -19-04FEB11-2/18

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005126.03 stored?

YES: GO TO [005126.03 — Sensor Supply #8 Voltage Out of Range High](#)
NO: [GO TO 2](#)

RE42287,000049D -19-04FEB11-3/18

2 DTC List Review

Review DTC List.

Is 005126.04 active?

YES: [GO TO 3](#)

NO: [GO TO 12](#)

RE42287,000049D -19-04FEB11-4/18

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect one sensor that uses Sensor Supply #8 voltage.
NOTE: For a list of components that use Sensor Supply #8, see [Components Using Sensor Supply #8 Voltage](#) in this procedure.
3. Perform [Terminal Test](#) on component and connector that was disconnected.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).
NO: [GO TO 4](#)

RE42287,000049D -19-04FEB11-5/18

4 Active Code Check

1. Ignition ON, Engine OFF.
 2. Refresh codes.
- Is DTC 005126.04 active?

YES: [GO TO 5](#)
NO: [GO TO 9](#)

RE42287,000049D -19-04FEB11-6/18

5 Next Associated Sensor Check

Have all sensors that use Sensor Supply #8 voltage been disconnected?

YES: [GO TO 6](#)

NO: [GO TO 3](#) and check next associated component.

Continued on next page

RE42287,000049D -19-04FEB11-7/18

Engine Control Unit (ECU) and Throttle Diagnostics

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 27 and 42. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,000049D -19-04FEB11-8/18

7 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes will appear in the next step. Disregard all codes except DTC 005126.04.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 005126.04 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 8

RE42287,000049D -19-04FEB11-9/18

8 Supply Circuit Short to Ground Check

1. Ignition OFF, Engine OFF.
2. On A5501 connector, measure resistance between female socket 42 and single point ground.

Is resistances less than 100K ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049D -19-04FEB11-10/18

9 Component Reconnected Test

1. Ignition OFF, Engine OFF.
2. Reconnect previously disconnected sensor.
3. Ignition ON, Engine OFF
4. Refresh codes.

Is DTC 005126.04 active?

YES: Replace sensor.
Perform Verification Procedure.

NO: GO TO 10

RE42287,000049D -19-04FEB11-11/18

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 27 and 42. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 11

Continued on next page

RE42287,000049D -19-04FEB11-12/18

Engine Control Unit (ECU) and Throttle Diagnostics

11 Supply Wire Short To Ground Check

1. Disconnect all associated sensors.
2. On the harness, measure the resistance between A5501 female socket 42 and single point ground.
3. Perform Wiggle Test.

Is measurement ever less than 100k ohms?

YES: Repair short to supply wire in harness. Perform Verification Procedure.

NO: Replace associated sensors. Perform Verification Procedure.

RE42287,000049D -19-04FEB11-13/18

12 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
 2. Operate engine under condition where DTC became active.
- Does DTC 005126.04 become active?

YES: GO TO 3

NO: GO TO 13

RE42287,000049D -19-04FEB11-14/18

13 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
 2. Operate engine under same conditions as when problem occurred.
- Does DTC 005126.04 become active?

YES: GO TO 3

NO: GO TO 14

RE42287,000049D -19-04FEB11-15/18

14 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female sockets 27 and 42. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 15

RE42287,000049D -19-04FEB11-16/18

15 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC you are troubleshooting.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 16

RE42287,000049D -19-04FEB11-17/18

16 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049D -19-04FEB11-18/18

**005127.03 — Sensor Supply #9 Voltage Out
of Range High**

*The ECU detects a supply voltage above specification
on the ECU 10 V sensor supply #9 circuit.*

Continued on next page

RE42287,000049E -19-20MAR12-1/24

Diagnostic Procedure

NOTE: This is a 10 V supply with two outputs on different ECU connector terminals. This regulated voltage is allowed to vary from 8.5—12.5 V.

Troubleshooting Sequence:

005127.03

When DTC is Displayed:

When the ignition is on and the error is active.

NOTE: On 12 V systems, nominal battery voltage is less than the voltage needed to set this code. To increase the battery voltage use a battery charger with the Engine OFF.

IMPORTANT: Do not run engine and use a battery charger at the same time or you may damage electronic components.

NOTE: If you are on a 24 V system, you do not need to use a battery charger.

Related Information:

The ECU detects a supply voltage greater than 12.5 V on the Sensor Supply #9 circuit.

Alarm Level:

Warning

Components Using Sensor Supply #9 Voltage:

Intake Air Sensor, Exhaust Filter Temperature Module.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #9 information, see Sensor Supply #9 in Section 03, Group 140..

For more intake air sensor information, see B5500 — Intake Air Sensor in Section 03, Group 140.

For more exhaust filter temperature module information, see B5204 — Exhaust Filter Temperature Module information, see in Section 03, Group 140.

For more information on Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
 - see 4.5L Wiring Diagram 1
 - see 4.5L Wiring Diagram 5
 - see 4.5L Wiring Diagram 8
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex Probes:

Exhaust Filter Temperature Module

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Intake Air Sensor

- JDG10233 – Female – Blue/Red
- JDG10243 – Male – Blue/Red

ECU

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Continued on next page

RE42287,000049E -19-20MAR12-2/24

Engine Control Unit (ECU) and Throttle Diagnostics

Tools:
- JT07306 – Digital Multimeter

RE42287,000049E -19-20MAR12-3/24

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, Engine running.
6. Refresh codes.

Is DTC 005127.03 active?

YES: [GO TO 2](#)

NO: [GO TO 16](#)

RE42287,000049E -19-20MAR12-4/24

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect exhaust filter temperature module connector B5204.
3. Perform [Terminal Test](#) on exhaust filter temperature module and B5204 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,000049E -19-20MAR12-5/24

3 Exhaust Filter Temperature Module Disconnected Code Check

1. If this is a 12V system, ensure that a battery charger is connected to the battery.

2. Ignition ON, engine OFF.
3. Refresh codes.

Is DTC 005127.03 active?

YES: [GO TO 4](#)

NO: [GO TO 10](#)

RE42287,000049E -19-20MAR12-6/24

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect intake air sensor connector B5500.
3. Perform [Terminal Test](#) on intake air sensor and B5500 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,000049E -19-20MAR12-7/24

Engine Control Unit (ECU) and Throttle Diagnostics

5 Intake Air Sensor Disconnected Code Check

1. If this is a 12V system, ensure that a battery charger is connected to the battery.
 2. Ignition ON, engine OFF.
 3. Refresh Codes.
- Is DTC 005127.03 active?

YES: [GO TO 6](#)

NO: [GO TO 13](#)

RE42287,000049E -19-20MAR12-8/24

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform [Terminal Test](#) on ECU connector A5501 terminals 20 and 45.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,000049E -19-20MAR12-9/24

7 ECU Disconnected Code Check

NOTE: ECU connector A5501 still disconnected. Many new codes appear in the next step. Ignore any codes but 005127.03.

1. If this is a 12V system, ensure that a battery charger is connected to the battery.
2. Ignition ON, engine OFF.
3. Refresh Codes.

Is DTC 005127.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,000049E -19-20MAR12-10/24

8 Short to Unswitched Voltage Check

1. Ignition OFF, Engine OFF.
2. Measure voltage between A5501 connector female socket 20 (+) and single point ground (-) while performing [Wiggle Test](#).
3. Measure voltage between A5501 connector female socket 45 (+) and single point ground (-) while performing [Wiggle Test](#).

Is any measurement ever greater than 0.5 V?

YES: Repair short to supply wire in harness. Perform [Verification Procedure](#).

NO: [GO TO 9](#)

RE42287,000049E -19-20MAR12-11/24

9 Wire To Wire Check

1. On the harness, measure the resistance between A5501 female socket 20 and all other female sockets in A5501.
2. On the harness, measure the resistance between A5501 female socket 45 and all other female sockets in A5501.

Is any measurement less than 100k ohms?

YES: Repair short to supply wire in harness. Perform [Verification Procedure](#).

NO: Contact DTAC for support.

Continued on next page

RE42287,000049E -19-20MAR12-12/24

10 Short to Voltage Check

NOTE: Component still disconnected.

1. If this is a 12V system, ensure that a battery charger is connected to the battery.
2. Ignition OFF, engine OFF.
3. Measure the voltage between B5204 connector female sockets 1 (+) and 2 (-) while performing Wiggle Test.
4. Measure the voltage between B5204 connector female sockets 3 (+) and 2 (-) while performing Wiggle Test.
5. Measure the voltage between B5204 connector female sockets 4 (+) and 2 (-) while performing Wiggle Test.

Did any measurement ever read greater than 12.5 V?

YES: Repair short to voltage in harness. Perform Verification Procedure.

NO: GO TO 11

RE42287,000049E -19-20MAR12-13/24

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform Terminal Test on ECU connector A5501 female sockets 10, 20 and **A5502** female sockets 31, 41. And associated ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 12

RE42287,000049E -19-20MAR12-14/24

12 Continuity Check

1. Measure resistance between A5501 connector female socket 20 and B5204 connector female socket 3.
2. Measure resistance between A5501 connector female socket 10 and B5204 connector female socket 4.
3. Measure resistance between **A5502** connector female socket 41 and B5204 connector female socket 1.
4. Measure resistance between **A5502** connector female socket 31 and B5204 connector female socket 2.

Are all resistances less than 5 ohms?

YES: Contact DTAC for support.

NO: Repair mis-pin in applicable connector. Perform Verification Procedure.

RE42287,000049E -19-20MAR12-15/24

13 Short to Voltage Check

1. Measure the voltage between B5500 connector female sockets 1 (+) and 2 (-) while performing Wiggle Test.
2. Measure the voltage between B5500 connector female sockets 3 (+) and 2 (-) while performing Wiggle Test.
3. Measure the voltage between B5500 connector female sockets 4 (+) and 2 (-) while performing Wiggle Test.

Did any measurement ever read greater than 12.5 V?

YES: Repair short to voltage in harness. Perform Verification Procedure.

NO: GO TO 14.

RE42287,000049E -19-20MAR12-16/24

Continued on next page

Engine Control Unit (ECU) and Throttle Diagnostics

14 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on ECU connector A5501 female sockets 26, 43, 44 and 45. And associated ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 15

RE42287,000049E -19-20MAR12-17/24

15 Continuity Check

1. Measure resistance between A5501 connector female socket 45 and B5500 connector female socket 1.
2. Measure resistance between A5501 connector female socket 26 and B5500 connector female socket 2.
3. Measure resistance between A5501 connector female socket 44 and B5500 connector female socket 3.
4. Measure resistance between A5501 connector female socket 43 and B5500 connector female socket 4.

Are all resistances less than 5 ohms?

YES: Contact DTAC for support.

NO: Repair mis-pin in A5501 connector. Perform Verification Procedure.

RE42287,000049E -19-20MAR12-18/24

16 Wiggle Test

1. In Service ADVISOR, monitor Sensor Supply #9 Voltage.
2. Perform Wiggle Test on B5204 and B5500.

Did the voltage ever go above 12.5 V?

YES: Repair short to voltage in harness. Perform Verification Procedure.

NO: GO TO 17

RE42287,000049E -19-20MAR12-19/24

17 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.
2. Operate engine under condition where DTC became active.

Does DTC 005127.03 become active?

YES: GO TO 2

NO: GO TO 18

RE42287,000049E -19-20MAR12-20/24

18 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.
2. Operate engine under same conditions as when problem occurred.

Does DTC 005127.03 become active?

YES: GO TO 2

NO: GO TO 19

Continued on next page

RE42287,000049E -19-20MAR12-21/24

Engine Control Unit (ECU) and Throttle Diagnostics

19 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501
3. Perform Terminal Test on A5501 connector female sockets 20 and 45. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 20

RE42287,000049E -19-20MAR12-22/24

20 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC 005127.03.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 21

RE42287,000049E -19-20MAR12-23/24

21 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049E -19-20MAR12-24/24

**005127.04 — Sensor Supply #9 Voltage Out
of Range Low**

*The ECU detects a supply voltage below specification
on the ECU 10 V supply circuit.*

Continued on next page

RE42287,000049F -19-02AUG11-1/24

Diagnostic Procedure

NOTE: This is a 10 V supply with two outputs on two different ECU connector terminals. This regulated voltage is allowed to vary from 8.5—12.5 V.

Troubleshooting Sequence:

003512.03

005127.03

005127.04

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU detects a supply voltage less than 8.5 V on the sensor supply #9 circuit.

Alarm Level:

Warning

Components Using Sensor Supply #9 Voltage:

Intake Air Sensor, Exhaust Filter Temperature Module.

NOTE: There may be other application specific devices using this sensor supply circuit. Refer to your application technical manual for other possible devices.

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more sensor supply #9 information, see Sensor Supply #9 in Section 03, Group 140..

For more intake air sensor information, see B5500 — Intake Air Sensor in Section 03, Group 140.

For more exhaust filter temperature module information, see B5204 — Exhaust Filter Temperature Module information, see in Section 03, Group 123.

For more information on the Control Unit Information and Overview test, see, Control Unit Information and Overview.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 1

- see 4.5L Wiring Diagram 5

- see 4.5L Wiring Diagram 8

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex Probes:

Exhaust Filter Temperature Module

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Intake Air Sensor

- JDG10233 – Female – Blue/Red

- JDG10243 – Male – Blue/Red

ECU

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

Continued on next page

RE42287,000049F -19-02AUG11-2/24

Engine Control Unit (ECU) and Throttle Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 005127.04 active?

YES: [GO TO 2](#)

NO: [GO TO 17](#)

RE42287,000049F -19-02AUG11-3/24

2 DTC List Review

Review DTC List.

Is 003512.03 stored?

YES: [GO TO 003512.03 — Sensor Supply #4 Voltage Out Of Range High](#)

NO: [GO TO 3](#)

RE42287,000049F -19-02AUG11-4/24

3 DTC List Review

Review DTC List.

Is 005127.03 stored?

YES: [GO TO 005127.03 — Sensor Supply #9 Voltage Out Of Range High](#)

NO: [GO TO 4](#)

RE42287,000049F -19-02AUG11-5/24

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect one component that uses Sensor Supply #9 voltage.
NOTE: For a list of components that use Sensor Supply #9, see Components Using Sensor Supply #9 Voltage in this procedure.
3. Perform [Terminal Test](#) on component and connector that was disconnected.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,000049F -19-02AUG11-6/24

5 Active Code Check

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 005127.04 active?

YES: [GO TO 6](#)

NO: [GO TO 16](#)

RE42287,000049F -19-02AUG11-7/24

6 Next Associated Sensor Check

Have all sensors that use Sensor Supply #9 voltage been disconnected?

YES: [GO TO 7](#)

NO: [GO TO 4](#) and check next associated sensor.

Continued on next page

RE42287,000049F -19-02AUG11-8/24

Engine Control Unit (ECU) and Throttle Diagnostics

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5501.
3. Perform Terminal Test on A5501 connector female socket 20 and 45. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 8

RE42287,000049F -19-02AUG11-9/24

8 ECU Disconnected Code Check

NOTE: Many new Diagnostic Trouble Codes appear in the next step. Disregard all codes except DTC 005127.04.

1. Ignition ON, Engine OFF.
2. Refresh Codes.

Is DTC 005127.04 active?

YES: Replace ECU.
Perform Verification Procedure.

NO: GO TO 9

RE42287,000049F -19-02AUG11-10/24

9 Supply Circuit Short to Ground Check

1. Measure resistance between A5501 connector female socket 20 and single point ground.
2. Measure resistance between A5501 connector female socket 45 and single point ground.

Is either resistance less than 100K ohms?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: GO TO 10

RE42287,000049F -19-02AUG11-11/24

10 Continuity Check

1. Measure resistance between A5501 connector female socket 45 and B5500 connector female socket 1.
2. Measure resistance between A5501 connector female socket 26 and B5500 connector female socket 2.
3. Measure resistance between A5501 connector female socket 44 and B5500 connector female socket 3.
4. Measure resistance between A5501 connector female socket 43 and B5500 connector female socket 4.

Are all resistances less than 5 ohms?

YES: GO TO 11

NO: Repair problem in harness. Perform Verification Procedure.

RE42287,000049F -19-02AUG11-12/24

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female socket 31 and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 12

Continued on next page

RE42287,000049F -19-02AUG11-13/24

Engine Control Unit (ECU) and Throttle Diagnostics

12 Continuity Check

1. Measure resistance between A5502 connector female socket 41 and B5204 connector female socket 1.
2. Measure resistance between A5502 connector female socket 31 and B5204 connector female socket 2.
3. Measure resistance between A5501 connector female socket 20 and B5204 connector female socket 3.
4. Measure resistance between A5501 connector female socket 10 and B5204 connector female socket 4.

Are all resistances less than 5 ohms?

YES: GO TO 13

NO: Repair problem in harness. Perform Verification Procedure.

RE42287,000049F -19-02AUG11-14/24

13 Wire to Wire Short Check

1. Measure resistance between A5501 connector female socket 20 and all other terminals in A5501 connector.
2. Measure resistance between A5501 connector female socket 45 and all other terminals in A5501 connector.

Are any measurements less than 100K ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 14

RE42287,000049F -19-02AUG11-15/24

14 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on all ECU pins in all ECU connectors.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 15

RE42287,000049F -19-02AUG11-16/24

15 Wire to Wire Short Check

1. Measure resistance between A5501 connector female socket 20 and all terminals in all ECU connectors.
2. Measure resistance between A5501 connector female socket 45 and all terminals in all ECU connectors.

Were any measurements less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049F -19-02AUG11-17/24

16 Sensor Check

1. Ignition OFF, Engine OFF
2. Reconnect previously disconnected sensor that caused DTC to go stored when it was disconnected.
3. Ignition ON, Engine OFF.
4. Refresh codes.

Is DTC 005127.04 active?

YES: Replace sensor that was just reconnected. Perform Verification Procedure.

NO: GO TO 17

Continued on next page

RE42287,000049F -19-02AUG11-18/24

Engine Control Unit (ECU) and Throttle Diagnostics

17 Intermittent Connection Check

1. In Service ADVISOR, monitor Sensor Supply #9 Voltage.

2. Perform Wiggle Test.

Does voltage ever go below 8.5 V?

YES: Repair short to ground in harness. Perform Verification Procedure.

NO: GO TO 18

RE42287,000049F -19-02AUG11-19/24

18 Read DTCs and Stored Snapshot Information

1. Review Snapshot information stored from step 1.

2. Operate engine under condition where DTC became active.

Does DTC 005127.04 become active?

YES: GO TO 2

NO: GO TO 19

RE42287,000049F -19-02AUG11-20/24

19 Obtain More Information

1. Talk with operator who observed the problem and obtain more information about when problem occurred.

2. Operate engine under same conditions as when problem occurred.

Does DTC 005127.04 become active?

YES: GO TO 2

NO: GO TO 20

RE42287,000049F -19-02AUG11-21/24

20 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5501

3. Perform Terminal Test on A5501 connector female sockets 20 and 45. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 21

RE42287,000049F -19-02AUG11-22/24

21 Search DTAC Solutions

Search DTAC solutions in Service ADVISOR for any known issues which may cause DTC 005127.04.

Were any applicable DTAC solutions found?

YES: Perform steps found in DTAC solution. Perform Verification Procedure.

NO: GO TO 22

RE42287,000049F -19-02AUG11-23/24

22 ECU Reprogram

Search Custom Performance for possible ECU software updates.

Is there a new version of software available?

YES: Reprogram ECU with new version of software. Perform Verification Procedure.

NO: Contact DTAC for support.

RE42287,000049F -19-02AUG11-24/24

**000027.03 — EGR Valve Position Signal Out
of Range High**

*The EGR valve position signal is higher than the
sensor high voltage specification.*

Continued on next page

RE42287,000054B -19-20MAR12-1/18

Diagnostic Procedure

Troubleshooting Sequence:

003511.03

003511.04

000027.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The EGR valve position sensor signal voltage to the ECU corresponds to a position greater than what is physically possible for the EGR valve position sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for EGR valve position.

Additional references:

For sensor location see [Y5400 — EGR Valve](#) in Section 03, Group 140.

For more EGR valve information, see [EGR Valve Operation](#) in Section 03, Group 135.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

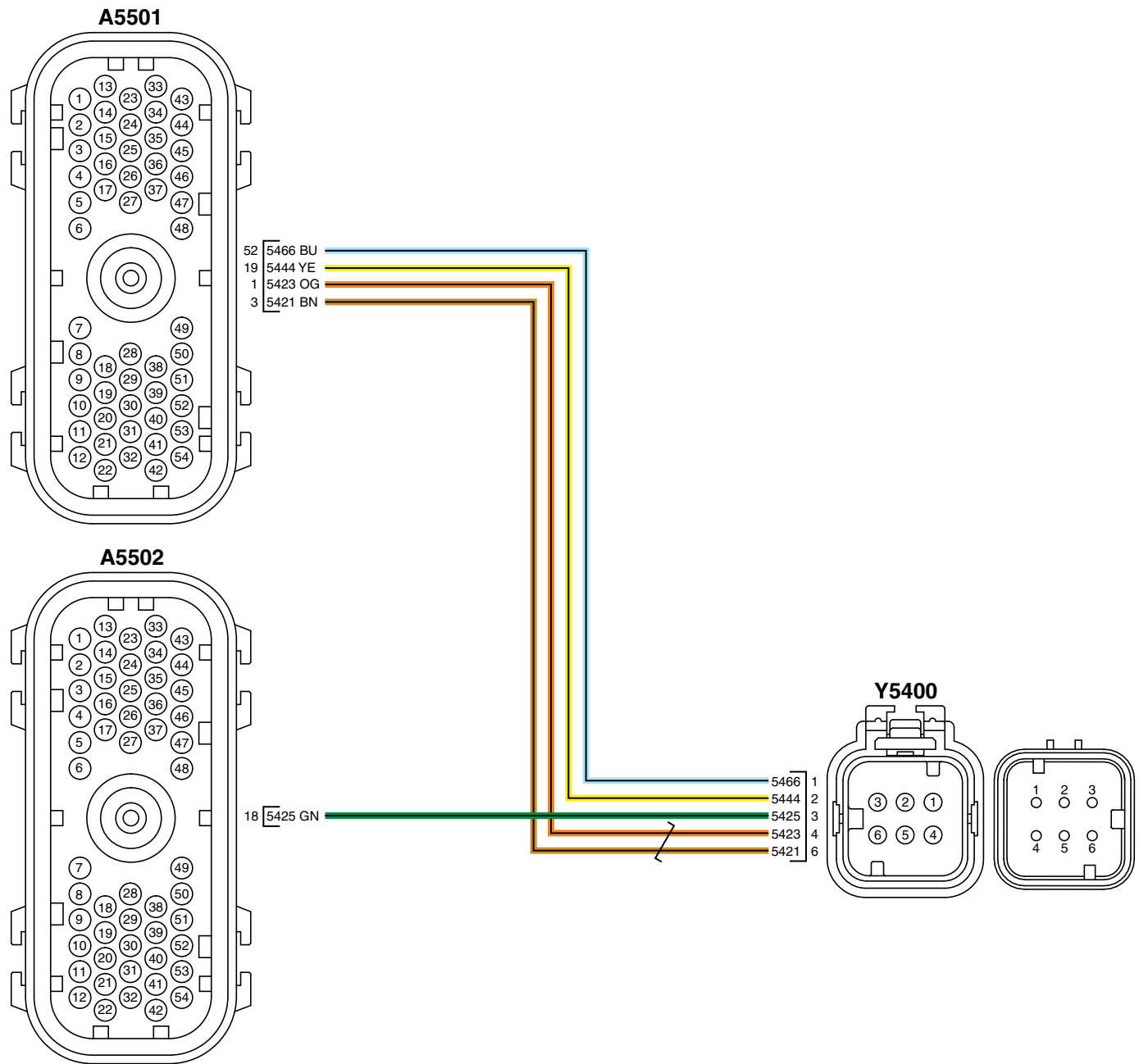
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



EGR Valve Position Sensor Wiring Diagram

A5501—52—Supply

A5501—19—Return

A5502—18—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

EGR Valve

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Continued on next page

RE42287,000054B -19-20MAR12-3/18

Tools:

- JDG10273 – Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,000054B -19-20MAR12-4/18

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003511.03 active or stored?

YES: GO TO 003511.03
— Sensor Supply #3
Voltage Out of Range High
procedure.

NO: GO TO 2

RE42287,000054B -19-20MAR12-5/18

2 Code Check

Is DTC 000027.03 active?

YES: GO TO 3

NO: GO TO 12

RE42287,000054B -19-20MAR12-6/18

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR valve connector Y5400.
3. Perform Terminal Test on EGR valve and Y5400 connector.

Were any problems found?

YES: Repair problem. GO TO 15

NO: GO TO 4

RE42287,000054B -19-20MAR12-7/18

4 Supply Circuit Check

1. Connect Diagnostic Test Box :
 - A to Y5400 connector female socket 1 (+).
 - B to Y5400 connector female socket 2 (-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Press and hold S3 on Diagnostic Test Box.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 6

NO: GO TO 5

Continued on next page

RE42287,000054B -19-20MAR12-8/18

<p>5 Circuit Check</p>	<p>Press and hold S2 and S3 on Diagnostic Test Box.</p> <p>Does voltage now remain between 4.8 and 5.2 V?</p>	<p>YES: Repair open or high resistance in return wire. <u>GO TO 15</u></p> <p>NO: Repair open or high resistance in supply wire. <u>GO TO 15</u></p> <p>RE42287,000054B -19-20MAR12-9/18</p>
<p>6 Signal Circuit Check</p>	<p>1. Ignition OFF, Engine OFF</p> <p>2. Connect Diagnostic Test Box:</p> <ul style="list-style-type: none"> • A to Y5400 connector female socket 3 (+). • B to Y5400 connector female socket 2 (-). <p>3. Set S1 to position 4 on Diagnostic Test Box.</p> <p>4. Connect multimeter to Diagnostic Test Box.</p> <p>5. Ignition ON, Engine OFF.</p> <p>6. Monitor voltage on multimeter.</p> <p>7. Perform <u>Wiggle Test</u>.</p> <p><i>NOTE: A negative voltage is less than 2.3 V.</i></p> <p>Does voltage remain between 2.3 and 2.7 V?</p>	<p>YES: <u>GO TO 10</u></p> <p>NO: Voltage greater than 2.7 V. <u>GO TO Short to Voltage Procedure.</u></p> <p>NO: Voltage less than 2.3 V. <u>GO TO 7</u></p> <p>RE42287,000054B -19-20MAR12-10/18</p>
<p>7 Open Circuit Check</p>	<p>Press and hold S2 on Diagnostic Test Box while performing <u>Wiggle Test</u>.</p> <p>Does voltage remain between 2.3 and 2.7 V?</p>	<p>YES: Repair open in return wire. <u>GO TO 15</u></p> <p>NO: <u>GO TO 8</u></p> <p>RE42287,000054B -19-20MAR12-11/18</p>
<p>8 Terminal Test</p>	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Disconnect ECU connectors A5501 and A5502.</p> <p>3. Perform <u>Terminal Test</u> on A5501 connector female sockets 52 and 19, A5502 connector female socket 18. And corresponding ECU male pins.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO 9</u></p> <p>RE42287,000054B -19-20MAR12-12/18</p>
<p>9 Continuity Check</p>	<p>1. Measure resistance between A5501 connector female socket 19 and Y5400 connector female socket 2.</p> <p>2. Measure resistance between A5502 connector female socket 18 and Y5400 connector female socket 3.</p> <p>Are both resistance measurements less than 5 ohms?</p>	<p>YES: <u>GO TO Problem Not Found Procedure.</u></p> <p>NO: Repair open wire or mis-pin in harness. <u>GO TO 15</u></p> <p>Continued on next page</p> <p>RE42287,000054B -19-20MAR12-13/18</p>

10 Software Check	<p>In Service ADVISOR, monitor EGR Valve Position Input Voltage.</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: Replace EGR Valve. In Service ADVISOR, perform EGR Valve Learn Value Reset. <u>GO TO 15</u></p> <p>NO: <u>GO TO 11</u></p>
RE42287,000054B -19-20MAR12-14/18		
11 Reprogram ECU	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see <u>Engine Control Unit (ECU) — Reprogramming Instructions</u> in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 000027.03 active?</p>	<p>YES: Replace ECU. <u>GO TO 15</u></p> <p>NO: <u>GO TO 15</u></p>
RE42287,000054B -19-20MAR12-15/18		
12 Wiggle Test	<ol style="list-style-type: none"> 1. Ignition ON, Engine OFF. 2. In Service ADVISOR, monitor EGR Valve Position Input Voltage. 3. Perform <u>Wiggle Test</u>. <p>Does sensor input voltage ever read greater than 4.9 V?</p>	<p>YES: Repair harness problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO 13</u></p>
RE42287,000054B -19-20MAR12-16/18		
13 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect EGR valve connector Y5400. 3. Perform <u>Terminal Test</u> on sensor and Y5400 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO 14</u></p>
RE42287,000054B -19-20MAR12-17/18		
14 Terminal Test	<ol style="list-style-type: none"> 1. Disconnect ECU connectors A5501 and A5502. 2. Perform <u>Terminal Test</u> on A5501 connector female sockets 19 and 52, also on A5502 connector female socket 18. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 15</u></p> <p>NO: GO TO <u>Problem Not Found Procedure</u>.</p>
RE42287,000054B -19-20MAR12-18/18		
15 Check Codes	<p>Check DTC list.</p> <p>Is DTC 003719.00 present?</p>	<p>YES: GO TO <u>Exhaust Condition Check</u> in Section 04, Group 155.</p> <p>NO: Perform <u>Verification Procedure</u>.</p>
RE42287,000054B -19-20MAR12-19/18		

**000027.04 — EGR Valve Position Signal Out
of Range Low**

*The EGR Valve position signal is lower than the
sensor low voltage specification.*

Continued on next page

RE42287,000054C -19-20MAR12-1/18

Diagnostic Procedure

Troubleshooting Sequence:

003511.03

003511.04

000027.03

000027.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The EGR valve position sensor signal voltage to the ECU corresponds to a position lower than what is physically possible for the EGR valve position sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for EGR valve position.

Additional References:

For sensor location see [Y5400 — EGR Valve Operation](#) in Section 03, Group 140.

For more EGR valve information, see [EGR Valve Operation](#) in Section 03, Group 135.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

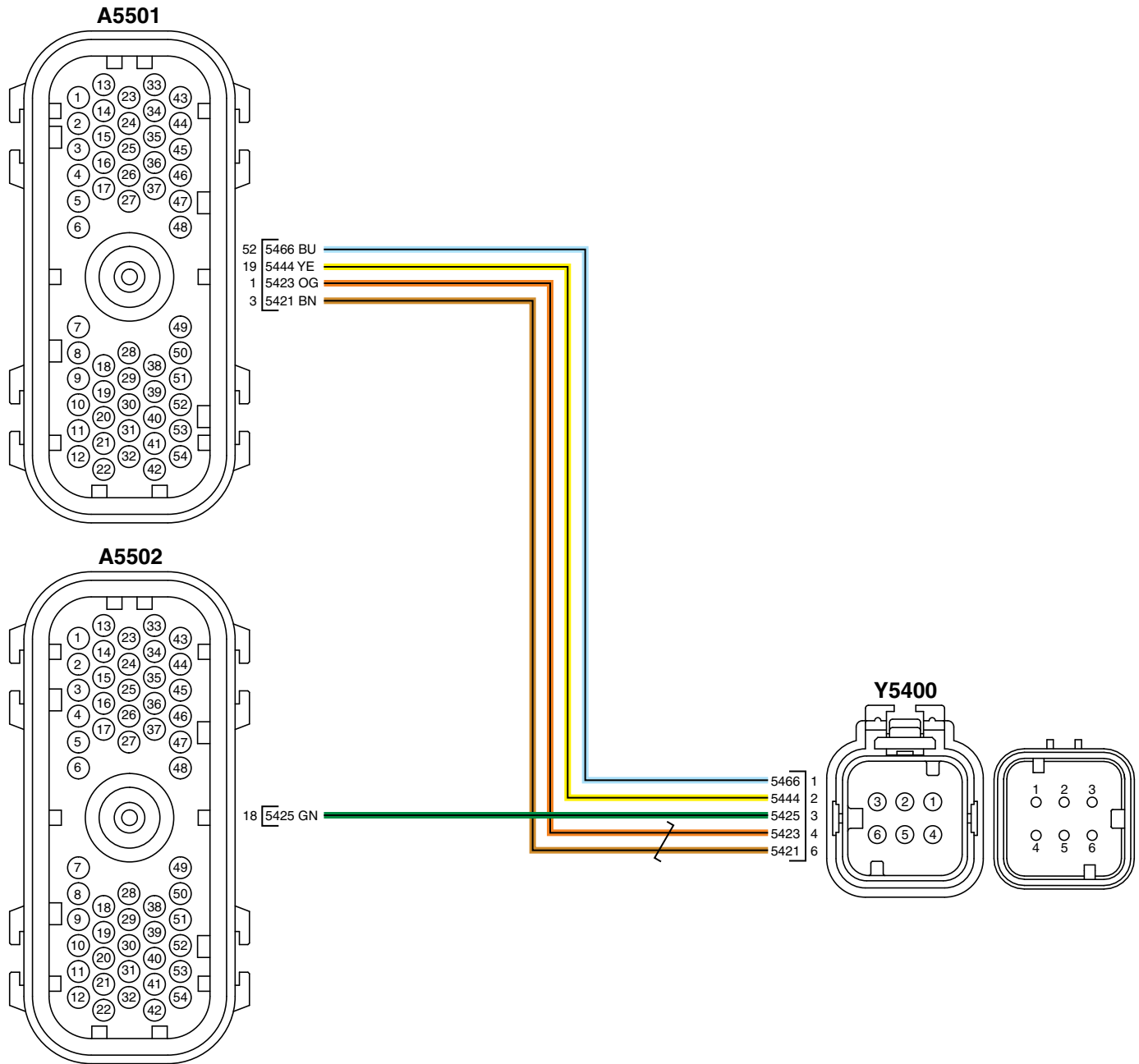
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



EGR Valve Position Sensor Wiring Diagram

A5501—52—Supply

A5501—19—Return

A5502—18—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

EGR Valve

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Continued on next page

RE42287,000054C -19-20MAR12-3/18

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RE42287,000054C -19-20MAR12-4/18

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003511.03 stored?

YES: GO TO 003511.03 — Sensor Supply #3 Voltage Out of Range High procedure.

NO: GO TO 2

RE42287,000054C -19-20MAR12-5/18

2 Code Check

Is DTC 000027.03 stored?

YES: GO TO 000027.03 — EGR Valve Position Signal Out of Range High

NO: GO TO 3

RE42287,000054C -19-20MAR12-6/18

3 Code Check

Is DTC 000027.04 active?

YES: GO TO 4

NO: GO TO 12

RE42287,000054C -19-20MAR12-7/18

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR valve connector Y5400.
3. Perform Terminal Test on EGR valve and Y5400 connector.

Were any problems found?

YES: Repair problem. GO TO 15

NO: GO TO 5

Continued on next page

RE42287,000054C -19-20MAR12-8/18

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to Y5400 connector female socket 1 (+).
 - B to Y5400 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 7

NO: GO TO 6

RE42287,000054C -19-20MAR12-9/18

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire.
GO TO 15

NO: Repair open or high resistance in supply wire.
GO TO 15

RE42287,000054C -19-20MAR12-10/18

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to Y5400 connector female socket 3 (+).
 - B to Y5400 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 8

NO: GO TO 10

RE42287,000054C -19-20MAR12-11/18

8 Software Check

In Service ADVISOR, monitor EGR Valve Position Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace EGR valve.
In Service ADVISOR,
perform EGR Valve Learn
Value Reset. GO TO 15

NO: GO TO 9

Continued on next page

RE42287,000054C -19-20MAR12-12/18

<p>9 Reprogram ECU</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see <u>Engine Control Unit (ECU) — Reprogramming Instructions</u> in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 000027.04 active?</p>	<p>YES: Replace ECU. <u>GO TO 15</u></p> <p>NO: <u>GO TO 15</u></p> <p align="right">RE42287,000054C -19-20MAR12-13/18</p>
<p>10 Terminal Test</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors A5501 and A5502. 3. Perform <u>Terminal Test</u> on ECU connector A5501 female sockets 19 and 52, also on ECU connector A5502 female socket 18. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO 11</u></p> <p align="right">RE42287,000054C -19-20MAR12-14/18</p>
<p>11 Continuity Check</p>	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 19 and Y5400 connector female socket 2. 2. Measure resistance between A5502 connector female socket 18 and Y5400 connector female socket 3. <p>Are both resistance measurements less than 5 ohms?</p>	<p>YES: Repair short to signal wire in harness. <u>GO TO 15</u></p> <p>NO: Repair open wire or mispin in harness. <u>GO TO 15</u></p> <p align="right">RE42287,000054C -19-20MAR12-15/18</p>
<p>12 Wiggle Test</p>	<ol style="list-style-type: none"> 1. In Service ADVISOR, monitor EGR Valve Position Input Voltage. 2. Perform <u>Wiggle Test</u>. <p>Does voltage ever go below 0.2 V?</p>	<p>YES: Repair harness problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO 13</u></p> <p align="right">RE42287,000054C -19-20MAR12-16/18</p>
<p>13 Terminal Test</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect EGR valve connector Y5400. 3. Perform <u>Terminal Test</u> on EGR valve and Y5400 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO 14</u></p> <p align="right">Continued on next page RE42287,000054C -19-20MAR12-17/18</p>

14 Terminal Test

1. Disconnect ECU connectors A5501 and A5502.
 2. Perform Terminal Test on A5501 connector female sockets 19 and 52, also on **A5502** connector female socket 18. And corresponding ECU male pins.
- Were any problems found?

YES: Repair problem. GO TO 15

NO: GO TO Problem Not Found Procedure.

RE42287,000054C -19-20MAR12-18/18

15 Check Codes

- Check DTC list.
- Is DTC 003719.00 present?

YES: GO TO Exhaust Condition Check in Section 04, Group 155.

NO: Perform Verification Procedure.

RE42287,000054C -19-20MAR12-19/18

000027.07 — EGR Valve Desired and Actual Position Mismatch

The EGR valve desired position at the current operating conditions does not match the actual position.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

During engine operation the EGR valve desired position cannot be reached.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see [002791.07 — EGR Valve Desired and Actual Position Mismatch During a Learn](#).

RE42287,000054D -19-27JUL11-1/1

**000051.03 — Air Throttle Actuator Position
Signal Out of Range High**

*The air throttle actuator position signal is higher than
the sensor high voltage specification.*

Continued on next page

RE42287,000054E -19-20MAR12-1/16

Diagnostic Procedure

Troubleshooting Sequence:

003511.03

000051.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The air throttle actuator position signal voltage to the ECU corresponds to a position greater than what is physically possible for the air throttle actuator position signal sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for air throttle actuator position.

Additional references:

For sensor location see Y5401 — Air Throttle Actuator in Section 03, Group 140.

For more air throttle actuator information, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

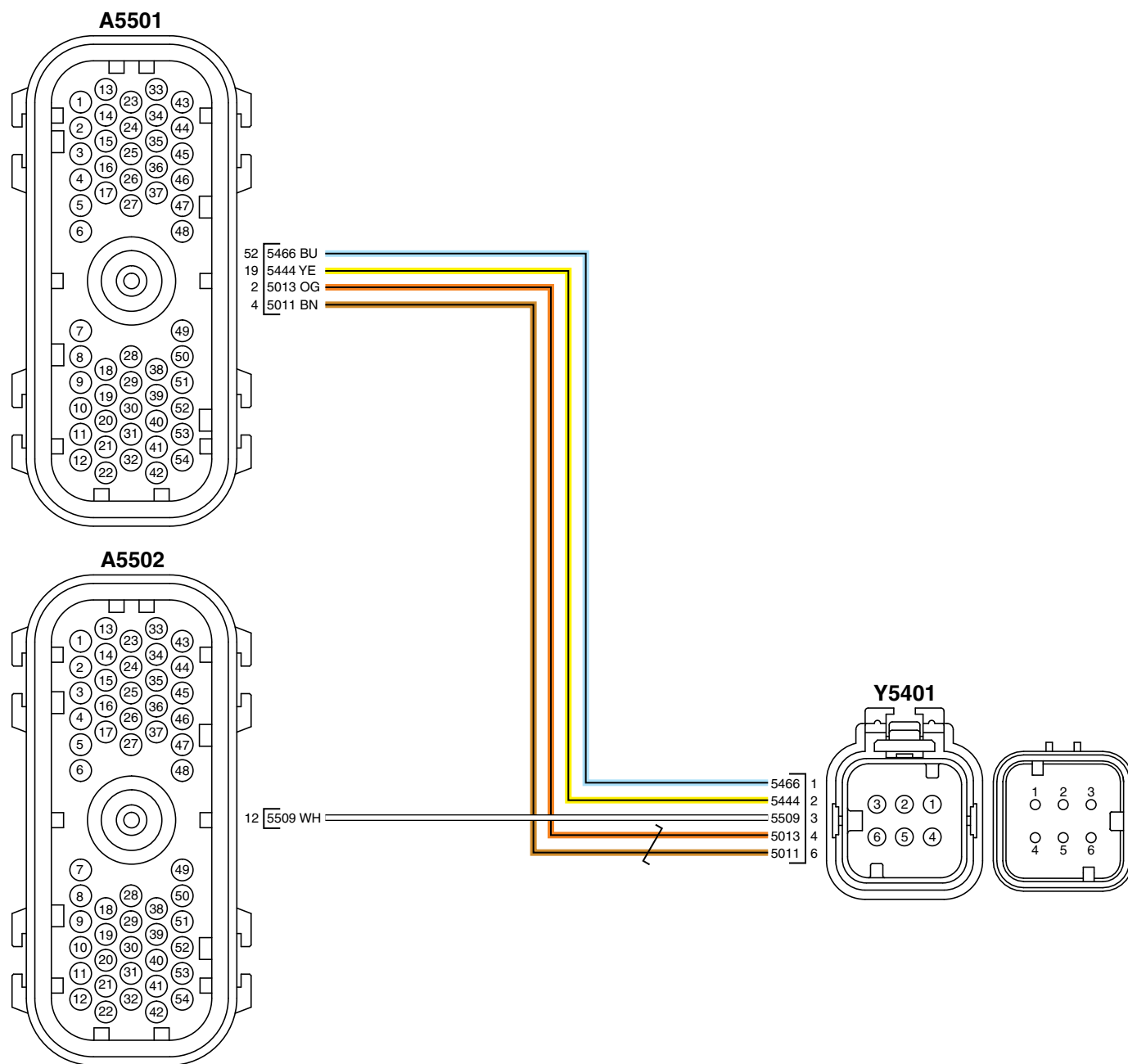
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Air Throttle Actuator Position Sensor Wiring Diagram

A5501—52—Supply

A5501—19—Return

A5502—12—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RG16747 —UN—08MAR10

Continued on next page

RE42287,000054E -19-20MAR12-3/16

Tools:

- JDG10273 – Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,000054E -19-20MAR12-4/16

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003511.03 active or stored?

YES: GO TO 003511.03 — Sensor Supply #3 Voltage Out of Range High procedure.

NO: GO TO 2

RE42287,000054E -19-20MAR12-5/16

2 Code Check

Is DTC 000051.03 active?

YES: GO TO 3

NO: GO TO 10

RE42287,000054E -19-20MAR12-6/16

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect air throttle actuator connector Y5401.
3. Perform Terminal Test on air throttle actuator and Y5401 connector.

Were any problems found?

YES: Repair problem. GO TO 13

NO: GO TO 4

RE42287,000054E -19-20MAR12-7/16

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to Y5401 connector female socket 3 (+).
 - B to Y5401 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 8

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 5

Continued on next page

RE42287,000054E -19-20MAR12-8/16

5 Open Circuit Check	<p>Press and hold S2 on Diagnostic Test Box.</p> <p>Does voltage remain between 2.3 and 2.7 V?</p>	<p>YES: Repair open or high resistance in return wire. <u>GO TO 13</u></p> <p>NO: <u>GO TO 6</u></p> <p align="right">RE42287,000054E -19-20MAR12-9/16</p>
6 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors A5501 and A5502. 3. Perform <u>Terminal Test</u> on A5501 connector female sockets 52 and 19, A5502 connector female socket 12. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 13</u></p> <p>NO: <u>GO TO 7</u></p> <p align="right">RE42287,000054E -19-20MAR12-10/16</p>
7 Continuity Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 19 and Y5401 connector female socket 2. 2. Measure resistance between A5502 connector female socket 12 and Y5401 connector female socket 3. <p>Are both resistance measurements less than 5 ohms?</p>	<p>YES: <u>GO TO Problem Not Found Procedure.</u></p> <p>NO: Repair open wire or mis-pin in harness. <u>GO TO 13</u></p> <p align="right">RE42287,000054E -19-20MAR12-11/16</p>
8 Software Check	<p>In Service ADVISOR, monitor Air Throttle Actuator Position Input Voltage.</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: Replace air throttle actuator. In Service ADVISOR, perform Air Throttle Actuator Learn Value Reset. Perform <u>Verification Procedure.</u></p> <p>NO: <u>GO TO 9</u></p> <p align="right">RE42287,000054E -19-20MAR12-12/16</p>
9 Reprogram ECU	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see <u>Engine Control Unit (ECU) — Reprogramming Instructions</u> in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 000051.03 active?</p>	<p>YES: Replace ECU. <u>GO TO 13</u></p> <p>NO: <u>GO TO 13</u></p> <p align="right">RE42287,000054E -19-20MAR12-13/16</p>
10 Wiggle Test	<ol style="list-style-type: none"> 1. Ignition ON, Engine OFF. 2. In Service ADVISOR, monitor Air Throttle Actuator Position Input Voltage. 3. Perform <u>Wiggle Test</u>. <p>Does sensor input voltage ever read greater than 4.9 V?</p>	<p>YES: Repair harness problem. <u>GO TO 13</u></p> <p>NO: <u>GO TO 11</u></p> <p align="right">RE42287,000054E -19-20MAR12-14/16</p>

Continued on next page

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect air throttle actuator connector Y5401.
3. Perform Terminal Test on sensor and Y5401 connector.

Were any problems found?

YES: Repair problem. GO TO 13

NO: GO TO 12

RE42287,000054E -19-20MAR12-15/16

12 Terminal Test

1. Disconnect ECU connectors A5501 and A5502.
2. Perform Terminal Test on A5501 connector female sockets 19 and 52, also on **A5502** connector female socket 12. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 13

NO: GO TO Problem Not Found Procedure.

RE42287,000054E -19-20MAR12-16/16

13 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO Exhaust Condition Check in Section 04, Group 155.

NO: Perform Verification Procedure.

RE42287,000054E -19-20MAR12-17/16

**000051.04 — Air Throttle Actuator Position
Signal Out of Range Low**

*The air throttle actuator position signal is lower than
the sensor low voltage specification.*

Continued on next page

RE42287,000054F -19-20MAR12-1/18

Diagnostic Procedure

Troubleshooting Sequence:

003511.03

003511.04

000051.03

000051.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The air throttle actuator position sensor signal voltage to the ECU corresponds to a position lower than what is physically possible for the air throttle actuator position sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for air throttle actuator position.

Additional References:

For sensor location see [Y5401 — Air Throttle Actuator](#) in Section 03, Group 140.

For more air throttle actuator information, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

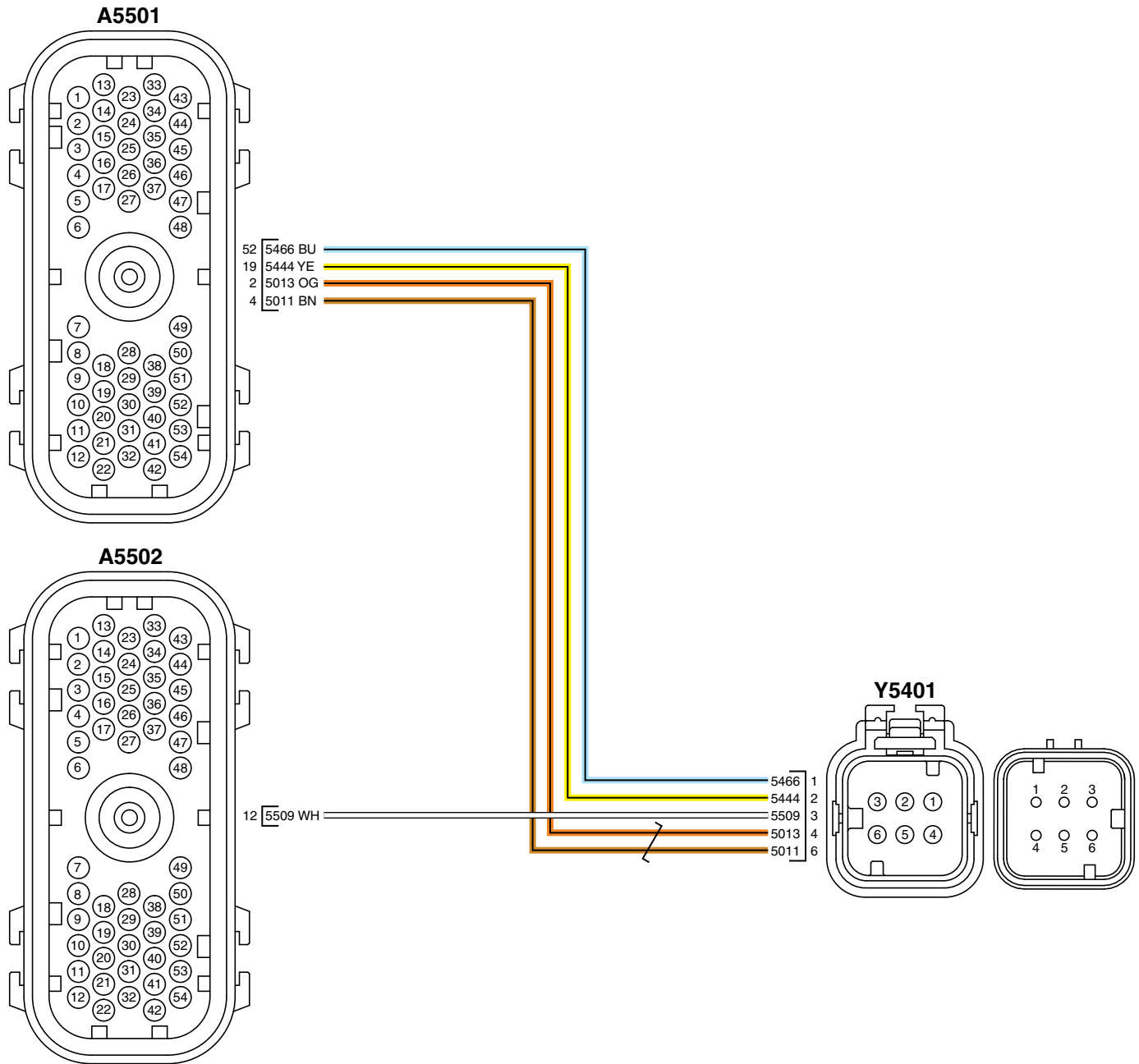
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Air Throttle Actuator Position Sensor Wiring Diagram

A5501—52—Supply

A5501—19—Return

A5502—12—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RG16747 —UN—08MAR10

Continued on next page

RE42287,000054F -19-20MAR12-3/18

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RE42287,000054F -19-20MAR12-4/18

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003511.03 stored?

YES: GO TO 003511.03
— Sensor Supply #3
Voltage Out of Range High
procedure.

NO: GO TO 2

RE42287,000054F -19-20MAR12-5/18

2 Code Check

Is DTC 000051.03 stored?

YES: GO TO 000051.03
— Air Throttle Actuator
Position Signal Out of
Range High

NO: GO TO 3

RE42287,000054F -19-20MAR12-6/18

3 Code Check

Is DTC 000051.04 active?

YES: GO TO 4

NO: GO TO 12

RE42287,000054F -19-20MAR12-7/18

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect air throttle actuator connector Y5401.
3. Perform Terminal Test on air throttle actuator and Y5401 connector.

Were any problems found?

YES: Repair problem. GO
TO 15

NO: GO TO 5

Continued on next page

RE42287,000054F -19-20MAR12-8/18

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to Y5401 connector female socket 1 (+).
 - B to Y5401 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 7

NO: GO TO 6

RE42287,000054F -19-20MAR12-9/18

6 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire.
GO TO 15

NO: Repair open or high resistance in supply wire.
GO TO 15

RE42287,000054F -19-20MAR12-10/18

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to Y5401 connector female socket 3 (+).
 - B to Y5401 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 8

NO: GO TO 10

RE42287,000054F -19-20MAR12-11/18

8 Software Check

In Service ADVISOR, monitor Air Throttle Actuator Position Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace air throttle actuator. In Service ADVISOR, perform Air Throttle Actuator Learn Value Reset. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RE42287,000054F -19-20MAR12-12/18

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 000051.04 active?

YES: Replace ECU. GO TO 15

NO: GO TO 15

RE42287,000054F -19-20MAR12-13/18

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connectors A5501 and A5502.
3. Perform Terminal Test on A5501 connector female sockets 19 and 52, and **A5502** connector female socket 12. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 15

NO: GO TO 11

RE42287,000054F -19-20MAR12-14/18

11 Continuity Check

1. Disconnect Diagnostic Test Box.
2. Measure resistance between A5502 connector female socket 12 and Y5401 connector female socket 3.

Is resistance measurement less than 5 ohms?

YES: Repair short to signal wire in harness. GO TO 15

NO: Repair open wire or mis-pin in harness. GO TO 15.

RE42287,000054F -19-20MAR12-15/18

12 Wiggle Test

1. In Service ADVISOR, monitor Air Throttle Actuator Position Input Voltage.
2. Perform Wiggle Test.

Does voltage ever go below 0.2 V?

YES: Repair harness problem. GO TO 15

NO: GO TO 13

RE42287,000054F -19-20MAR12-16/18

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect air throttle actuator connector Y5401.
3. Perform Terminal Test on air throttle actuator and Y5401 connector.

Were any problems found?

YES: Repair problem. GO TO 15

NO: GO TO 14

Continued on next page

RE42287,000054F -19-20MAR12-17/18

14 Terminal Test

1. Disconnect ECU connectors A5501 and A5502.
 2. Perform Terminal Test on A5501 connector female sockets 19 and 52, also on **A5502** connector female socket 12. And corresponding ECU male pins.
- Were any problems found?

YES: Repair problem. GO TO 15

NO: GO TO Problem Not Found Procedure.

RE42287,000054F -19-20MAR12-18/18

15 Check Codes

- Check DTC list.
- Is DTC 003719.00 present?

YES: GO TO Exhaust Condition Check in Section 04, Group 155.

NO: Perform Verification Procedure.

RE42287,000054F -19-20MAR12-19/18

000051.07 — Air Throttle Actuator Desired and Actual Position Mismatch

The air throttle actuator desired position at the current operating conditions does not match the actual position.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

During engine operation the air throttle actuator desired position cannot be reached.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see [003464.07 — Air Throttle Actuator Desired and Actual Position Mismatch During a Learn](#).

RE42287,0000550 -19-27JUL11-1/1

**000051.14 — Air Throttle Actuator and EGR
Valve Connectors Swapped**

*The ECU detects that the air throttle actuator connector
and the EGR valve connector are swapped.*

Continued on next page

RE42287,0000551 -19-20MAR12-1/6

Diagnostic Procedure

Troubleshooting Sequence:

000051.14

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The ECU detects at power up that the air throttle actuator position is closed and the EGR valve position is open.

Alarm Level:

Stop

Control Unit Response:

The ECU commands the air throttle actuator and EGR valve to an unpowered state.

Additional references:

For sensor location see [Y5401 — Air Throttle Actuator](#) in Section 03, Group 140.

For more air throttle actuator information, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

For sensor location see [Y5400 — EGR Valve](#) in Section 03, Group 140.

For more EGR valve information, see [EGR Valve Operation](#) in Section 03, Group 135.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

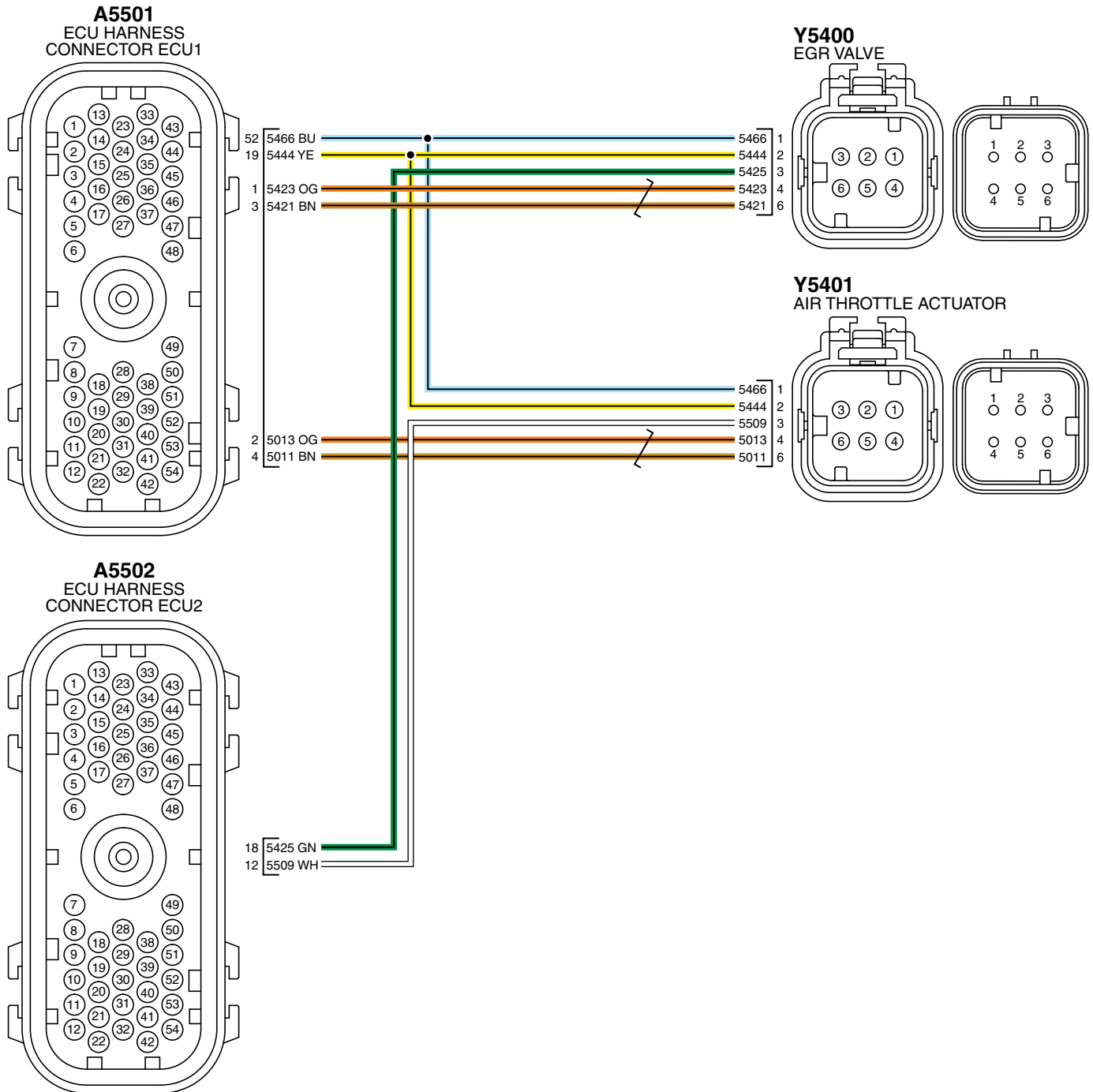
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Air Throttle Actuator and EGR Valve Wiring Diagram

A5501—52—Supply	A5501—4—Air Throttle Actuator	A5501—3—EGR Valve PWM Drive
A5501—19—Return	PWM Drive #2	#1
A5501—2—Air Throttle Actuator	A5502—12—Air Throttle Actuator	A5501—1—EGR Valve PWM Drive
PWM Drive #1	Position Signal	#2
		A5502—18—EGR Valve Position
		Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Continued on next page

RE42287,0000551 -19-20MAR12-3/6

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000551 -19-20MAR12-4/6

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000051.14 active?

YES: [GO TO 2](#)

NO: Review DTC list and continue diagnosing other DTCs that have not been addressed.

RE42287,0000551 -19-20MAR12-5/6

2 Continuity Check

1. Ignition OFF, Engine OFF.
2. Disconnect air throttle actuator connector Y5401.
3. Disconnect ECU connectors A5501 and A5502.
4. Measure resistance between A5501 connector female socket 2 and Y5401 connector female socket 4.
5. Measure resistance between A5501 connector female socket 4 and Y5401 connector female socket 6.
6. Measure resistance between A5502 connector female socket 12 and Y5401 connector female socket 3.

Are all resistance measurements less than 5 ohms?

YES: Contact DTAC for support.

NO: All measurements are greater than 5 ohms. EGR valve and air throttle actuator connectors are swapped. Swap connectors. [GO TO 3](#)

NO: Only signal wire measurement is greater than 5 ohms. Repair mis-pin with EGR valve signal terminal A5502 connector female socket 18. [GO TO 3](#)

RE42287,0000551 -19-20MAR12-6/6

3 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: [GO TO Exhaust Condition Check](#) in Section 04, Group 155.

NO: Perform [Verification Procedure](#).

RE42287,0000551 -19-20MAR12-7/6

**000641.00 — VGT Actuator Temperature
Extremely High**

*The VGT actuator temperature is much higher than
a defined threshold in the ECU.*

Continued on next page

RE42287,0000552 -19-08AUG11-1/7

Diagnostic Procedure

Trouble Shooting Sequence:

000110.15
000110.16
000110.00
000111.01
000111.17
000111.18
000641.00

When DTC is Displayed:

When the ignition is on, engine is running, and the VGT actuator reports the fault is active.

Related Information:

This code is set when the VGT actuator detects that its internal temperature is extremely high. The VGT actuator sends a message via the CAN communication system to the ECU stating that its internal temperature is extremely high and the ECU sets the fault.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

The VGT actuator remains active, and turns off the motor inside the actuator. The actuator is spring loaded and defaults to the open position when this fault occurs.

Additional References:

For VGT actuator location see Y5500 — VGT Actuator in Section 03, Group 140.

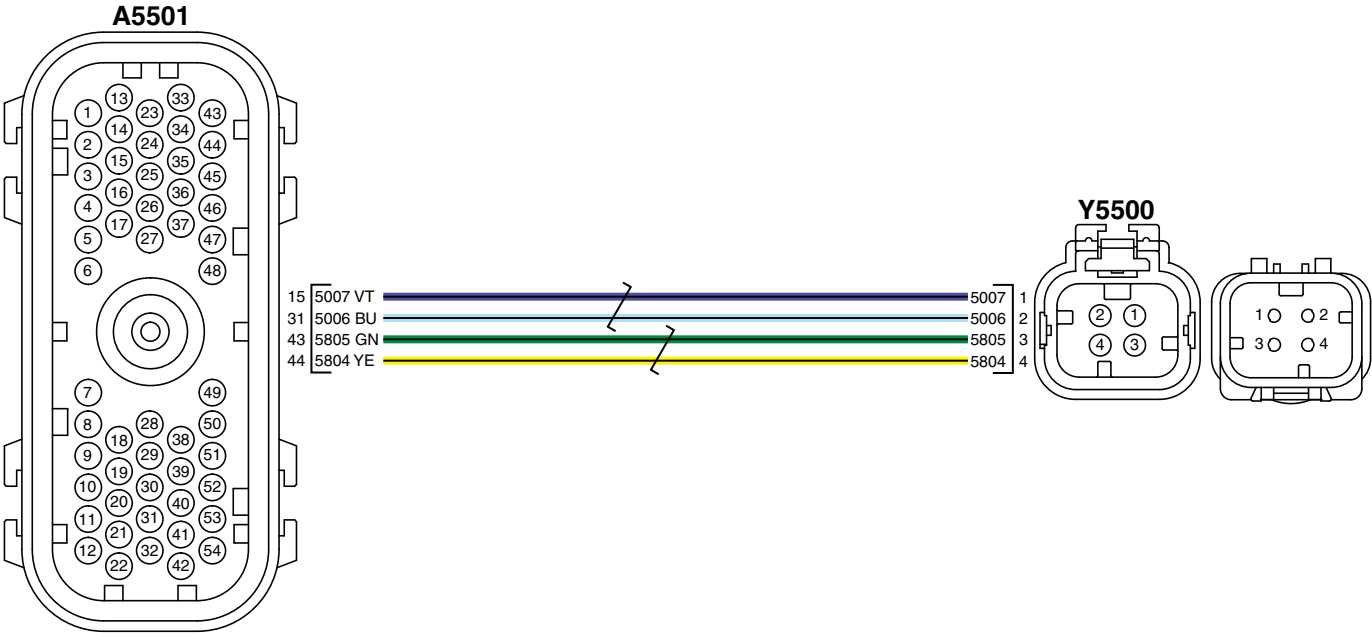
For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 1](#)
located in Section 06, Group 210.



RG17734A—UN—30NOV10

VGT Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return
A5501 – 43—CAN Low
A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

- Flex probes:
- Actuator
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple
- ECU
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple

- Tools:
- JT07306 – Digital Multimeter
 - J-35616-20 – Test Leads

RE42287,0000552 -19-08AUG11-3/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.
2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Review snapshot information to identify if any coolant system faults occurred near the time as DTC 000641.00.

Did any coolant system faults occur near the time of DTC 000641.00?

YES: Diagnose and repair cooling system problem. Perform [Verification Procedure](#).

NO: [GO TO 2](#)

Continued on next page

RE42287,0000552 -19-08AUG11-4/7

Air or Exhaust Throttle Actuator, EGR Valve, and VGT Diagnostics

2 Cooling System Check

1. Ignition OFF, Engine OFF.

2. Ensure all air is purged from cooling system and VGT actuator. See Coolant System — Air Bleeding in Section 03, Group 070.

Was air present in cooling system?

YES: Perform Verification Procedure.

NO: GO TO 3

RE42287,0000552 -19-08AUG11-5/7

3 Heat Source Check

Inspect application for possible sources of heat near the VGT actuator, such as exhaust piping.

Any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 4

RE42287,0000552 -19-08AUG11-6/7

4 DTC Check

1. Ignition ON, Engine OFF.

2. Refresh codes

Is DTC 000641.00 active?

YES: Replace VGT actuator. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure

RE42287,0000552 -19-08AUG11-7/7

000641.05 — VGT Actuator Drive Circuit Has High Resistance

The ECU has detected high resistance on the VGT actuator drive circuit.

Continued on next page

RE42287,0000553 -19-08AUG11-1/12

Diagnostic Procedure**Troubleshooting Sequence:****000641.05****When DTC is Displayed:**

When the ignition is on and the fault is active.

When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that there is a fault on the VGT actuator drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

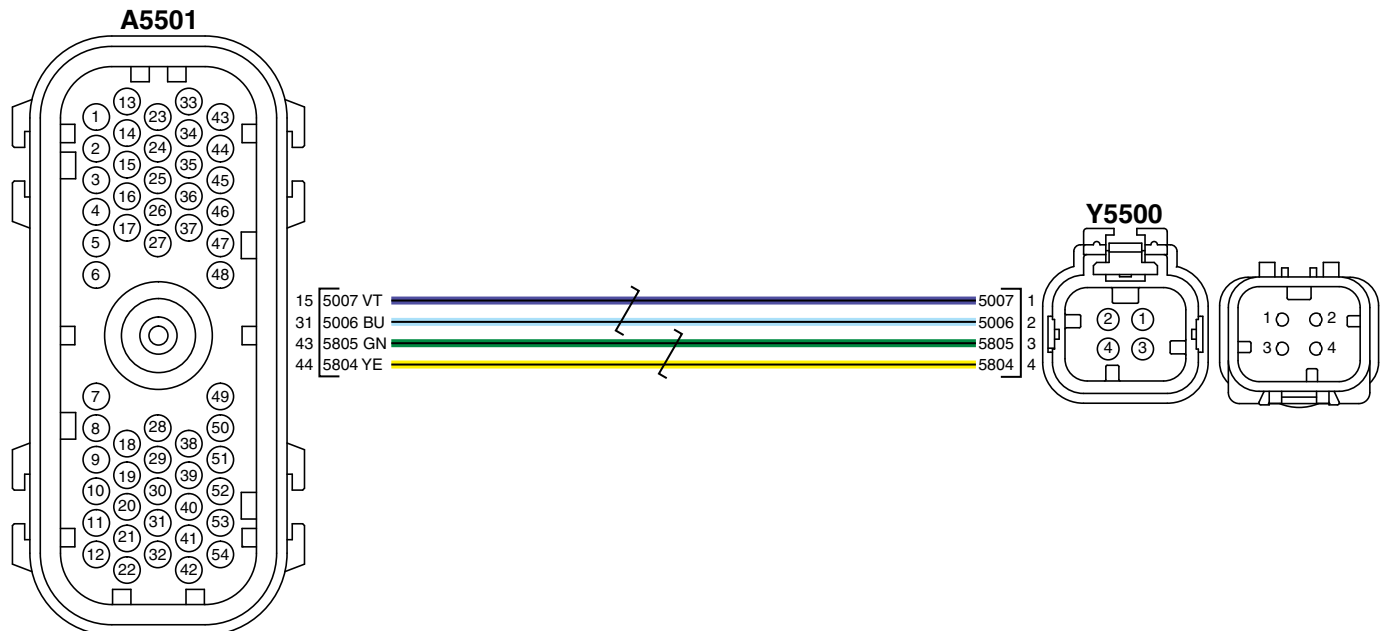
The ECU uses a default value for VGT actuator position.

Additional References:For VGT actuator location see [Y5500 — VGT Actuator](#) in Section 03, Group 140.For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.*NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.*

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



VGT Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Actuator

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Continued on next page

RE42287,0000553 -19-08AUG11-2/12

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000553 -19-08AUG11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000641.05 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

RE42287,0000553 -19-08AUG11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect VGT actuator connector Y5500.
3. Perform [Terminal Test](#) on VGT actuator and Y5500 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,0000553 -19-08AUG11-5/12

3 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000553 -19-08AUG11-6/12

4 Short to Voltage Check

1. Ignition ON, Engine OFF
2. On A5501 connector, measure voltage between female socket 15 and single point ground.

Is voltage measurement greater than 0.5 V?

YES: [GO TO Short to Voltage Procedure](#)

NO: [GO TO 5](#)

Continued on next page

RE42287,0000553 -19-08AUG11-7/12

5 Continuity Check	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF 2. Measure resistance between A5501 connector female socket 15 and Y5500 connector female socket 1. 3. Measure resistance between A5501 connector female socket 31 and Y5500 connector female socket 2. <p>Are both resistance measurements less than 5 ohms?</p>	<p>YES: <u>GO TO 6</u></p> <p>NO: Repair open or high resistance on drive wire in harness. Perform <u>Verification Procedure</u>.</p> <p align="right">RE42287,0000553 -19-08AUG11-8/12</p>
6 Continuity Check	<ol style="list-style-type: none"> 1. Reconnect ECU connector A5501. 2. Measure resistance between Y5500 connector female socket 2 and single point ground. <p>Is resistance measurement less than 5 ohms?</p>	<p>YES: Replace VGT actuator. Perform <u>Verification Procedure</u>.</p> <p>NO: Replace ECU. Perform <u>Verification Procedure</u>.</p> <p align="right">RE42287,0000553 -19-08AUG11-9/12</p>
7 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect VGT actuator connector Y5500. 3. Perform <u>Terminal Test</u> on VGT actuator and Y5500 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 8</u></p> <p align="right">RE42287,0000553 -19-08AUG11-10/12</p>
8 Terminal Test	<ol style="list-style-type: none"> 1. Disconnect ECU connector A5501. 2. Perform <u>Terminal Test</u> on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 8</u></p> <p align="right">RE42287,0000553 -19-08AUG11-11/12</p>
9 Continuity Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 15 and Y5500 connector female socket 1, while performing <u>Wiggle Test</u>. 2. Measure resistance between A5501 connector female socket 31 and Y5500 connector female socket 2, while performing <u>Wiggle Test</u>. <p>Are both resistance measurements always less than 5 ohms?</p>	<p>YES: <u>GO TO Problem Not Found Procedure</u>.</p> <p>NO: Repair wiring harness problem. Perform <u>Verification Procedure</u>.</p> <p align="right">RE42287,0000553 -19-08AUG11-12/12</p>

000641.06 — VGT Actuator Drive Circuit Has Low Resistance

The ECU has detected low resistance on the VGT actuator drive circuit.

Continued on next page

RE42287,0000554 -19-27JUL11-1/12

Diagnostic Procedure**Troubleshooting Sequence:****000641.06****When DTC is Displayed:**

When the ignition is on and the fault is active.

When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that the current to the VGT actuator is higher than expected, which indicates low resistance in the drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for VGT actuator position.

Additional References:

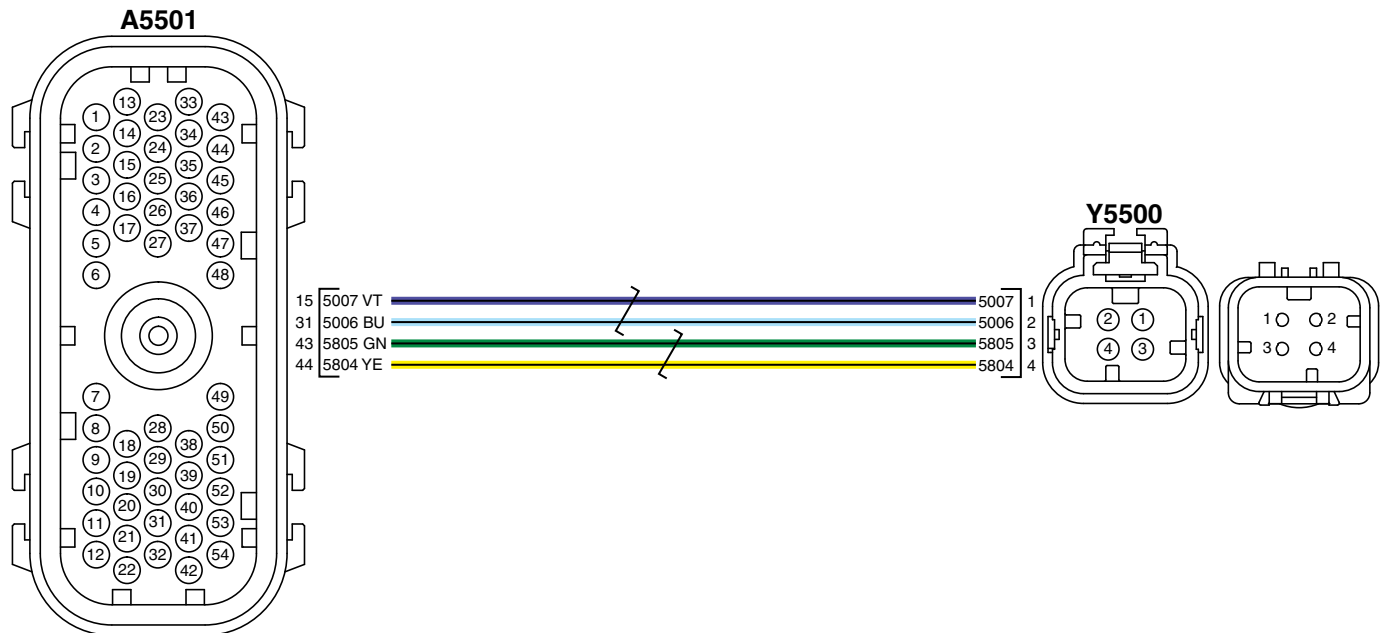
For VGT actuator location see Y5500 — VGT Actuator in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.*NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.*

For connector repair or complete wiring information:

- see Connector Repair Information Table- see 4.5L Wiring Diagram 1

located in Section 06, Group 210.



VGT Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

RG17734A —UN—30NOV10

Continued on next page

RE42287,0000554 -19-27JUL11-2/12

Flex probe:

Actuator

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000554 -19-27JUL11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000641.06 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

RE42287,0000554 -19-27JUL11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect VGT actuator connector Y5500.
3. Perform [Terminal Test](#) on VGT actuator and Y5500 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,0000554 -19-27JUL11-5/12

3 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000554 -19-27JUL11-6/12

4 Wire to Wire Check

On A5501 connector, measure resistance between female sockets 15 and single point ground.

Is resistance greater than 100k ohms?

YES: [GO TO 5](#)

NO: Repair short in wiring harness. Perform [Verification Procedure](#).

Continued on next page

RE42287,0000554 -19-27JUL11-7/12

Air or Exhaust Throttle Actuator, EGR Valve, and VGT Diagnostics

5 Wire to Wire Check

On A5501 connector, measure resistance between female sockets 15 and all other female sockets in A5501 connector.

Are any resistances less than 100k ohms?

YES: Repair short in wiring harness. Perform [Verification Procedure](#).

NO: [GO TO 6](#)

RE42287,0000554 -19-27JUL11-8/12

6 ECU Check

1. Ignition ON, Engine OFF

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000641.06 active?

YES: Replace ECU. Perform [Verification Procedure](#).

NO: Replace VGT actuator. Perform [Verification Procedure](#).

RE42287,0000554 -19-27JUL11-9/12

7 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect VGT actuator connector Y5500.

3. Perform [Terminal Test](#) on VGT actuator and Y5500 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,0000554 -19-27JUL11-10/12

8 Terminal Test

1. Disconnect ECU connector A5501.

2. Perform [Terminal Test](#) on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,0000554 -19-27JUL11-11/12

9 Wire to Wire Check

On Y5500 connector, measure resistance between female sockets 1 and single point ground while performing [Wiggle Test](#).

Is resistance measurement always greater than 100k ohms?

YES: [GO TO Problem Not Found Procedure](#).

NO: Repair short in wiring harness. Perform [Verification Procedure](#).

RE42287,0000554 -19-27JUL11-12/12

000641.07 — VGT Actuator Learn Error*The VGT actuator has failed the learn cycle on initialization.*

RE42287,0000555 -19-20MAR12-1/8

Diagnostic Procedure**Trouble Shooting Sequence:**

000641.05
000641.06
000641.12
000641.13
000641.31
000641.07

When DTC is Displayed:

When the ignition is turned on and the fault is active.

During Harness Diagnostic Mode Test and the fault is active.

Related Information:

This code is set when the ECU detects that the VGT actuator travel is not within predefined travel limits that are set by the initial calibration of the VGT actuator.

The VGT actuator travel is checked at ignition on and during Harness Diagnostic Mode Test.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For VGT actuator location see [Y5500 — VGT Actuator](#) in Section 03, Group 140.

For more information on VGT operation, see [VGT Operation](#) in Section 04, Group 160.

For more information on the Harness Diagnostic Mode Test, see [Harness Diagnostic Mode Test Instructions](#) in Section 03, Group 135.

For more information on the VGT Learn Value Reset Test, see [VGT Learn Value Reset Test Instructions](#) in Section 03, Group 135.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RE42287,0000555 -19-20MAR12-2/8

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 000641.07 active?

YES: [GO TO 2](#)

NO: [GO TO Problem Not Found Procedure](#)

Continued on next page

RE42287,0000555 -19-20MAR12-3/8

<p>2 Binding Check</p>	<p>1. Ignition OFF, Engine OFF</p> <p>⚠ CAUTION: Turbocharger, linkage, and surrounding area may be extremely hot.</p> <p>2. Disconnect linkage from VGT actuator and vane arm.</p> <p>3. Manually move VGT actuator through entire travel range checking for sticking areas along the travel.</p> <p>Any sticky areas found?</p>	<p>YES: Replace VGT actuator. In Service ADVISOR, perform VGT Learn Value Reset Test . <u>GO TO 6</u></p> <p>NO: <u>GO TO 3</u></p> <p>RE42287,0000555 -19-20MAR12-4/8</p>
<p>3 Binding Check</p>	<p>Manually move VGT vane arm through entire travel range checking for sticking areas along the travel.</p> <p>Any sticky areas found?</p>	<p>YES: Replace VGT. In Service ADVISOR, perform VGT Learn Value Reset Test . <u>GO TO 6</u></p> <p>NO: <u>GO TO 4</u></p> <p>RE42287,0000555 -19-20MAR12-5/8</p>
<p>4 Linkage Check</p>	<p>1. Ignition OFF, Engine OFF</p> <p>2. Inspect VGT actuator linkage for damage, such as being broken or bent.</p> <p>Any damage found?</p>	<p>YES: Replace VGT actuator linkage. In Service ADVISOR, perform VGT Learn Value Reset Test . <u>GO TO 6</u></p> <p>NO: <u>GO TO 5</u></p> <p>RE42287,0000555 -19-20MAR12-6/8</p>
<p>5 Movement Check</p>	<p>1. Reassemble all components.</p> <p>2. In Service ADVISOR, perform Harness Diagnostic Mode Test.</p> <p>3. Observe VGT actuator for movement.</p> <p>Does VGT actuator move through the full range of travel?</p>	<p>YES: Perform <u>Verification Procedure</u>.</p> <p>NO: Replace VGT actuator. In Service ADVISOR, perform VGT Learn Value Reset Test . <u>GO TO 6</u></p> <p>RE42287,0000555 -19-20MAR12-7/8</p>
<p>6 Check Codes</p>	<p>Check DTC list.</p> <p>Is DTC 003719.00 present?</p>	<p>YES: Perform <u>Exhaust Condition Check</u> in Section 04, Group 155.</p> <p>NO: Perform <u>Verification Procedure</u>.</p> <p>RE42287,0000555 -19-20MAR12-8/8</p>

000641.09 — VGT Actuator Loss of Communication

The ECU is indicating a CAN communication problem with the VGT actuator.

Continued on next page

RE42287,0000556 -19-20MAR12-1/14

Diagnostic Procedure**Troubleshooting Sequence:****00641.05****00641.06****00641.09****When DTC is Displayed:**

When the ignition is on and the error is active.

Related Information:

This fault indicates that the ECU is unable to communicate via CAN communication to the VGT actuator, or the VGT actuator is sending a CAN message to the ECU indicating that the VGT actuator is not receiving CAN messages from the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default value for the VGT actuator position.

The VGT actuator defaults to 25% closed as long as the actuator has power.

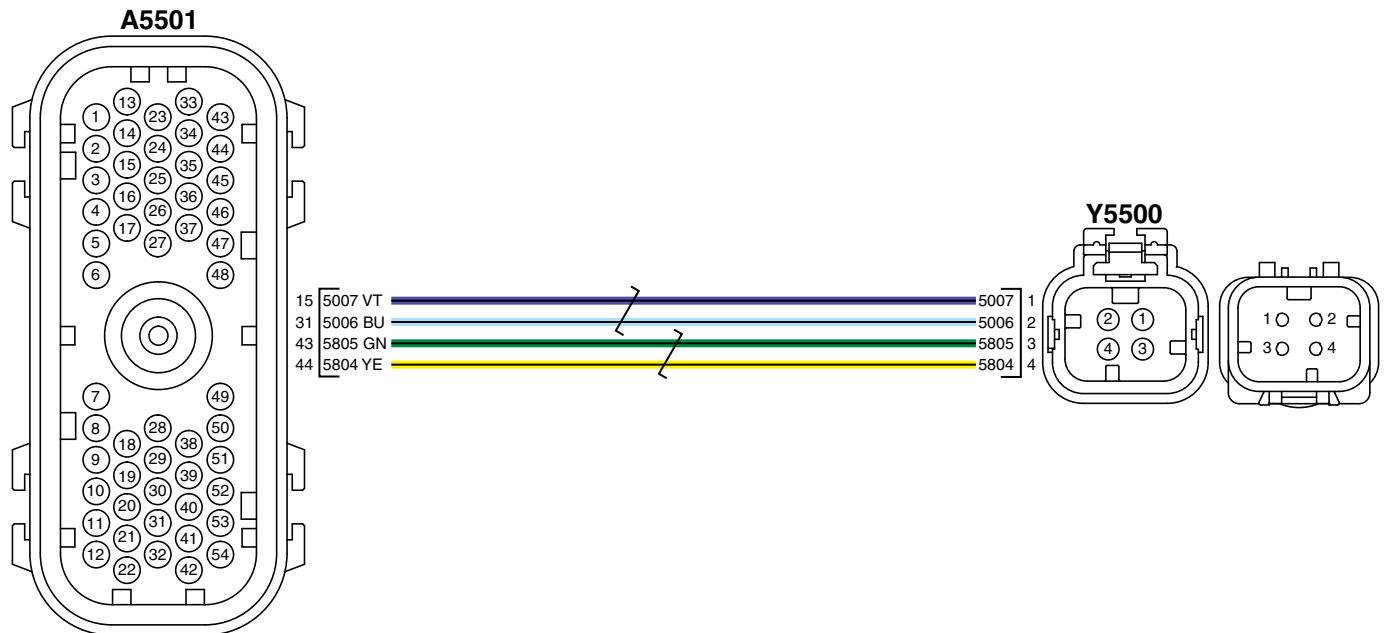
Additional References:For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.For VGT actuator location see [Y5500 — VGT Actuator](#) in Section 03, Group 140.For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



VGT Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low**A5501 – 44—CAN High**

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

RE42287,0000556 -19-20MAR12-2/14

Flex probe:

Actuator

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000556 -19-20MAR12-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Are all of the following DTCs active or stored: 000641.09, and 522494.09?

YES: GO TO [CAN Diagnostic Procedure](#).

NO: [GO TO 2](#).

RE42287,0000556 -19-20MAR12-4/14

2 Active Code Check

Is DTC 000641.09 active?

YES: [GO TO 3](#).

NO: [GO TO 10](#)

RE42287,0000556 -19-20MAR12-5/14

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect VGT actuator connector Y5500.
3. Perform [Terminal Test](#) on actuator and Y5500 connector.

Were any problems found?

YES: Repair problem. [GO TO 11](#)

NO: [GO TO 4](#)

RE42287,0000556 -19-20MAR12-6/14

4 Supply Voltage Check

1. Connect Diagnostic Test Box:
 - A to Y5500 connector female socket 1(+).
 - B to Y5500 connector female socket 2(-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Press and hold S3 on Diagnostic Test Box.
6. Monitor voltage on multimeter.
7. In Service ADVISOR monitor Unswitched Battery Voltage.

Is multimeter reading within 0.5 V of unswitched battery voltage?

YES: [GO TO 6](#)

NO: [GO TO 5](#)

Continued on next page

RE42287,0000556 -19-20MAR12-7/14

5 Return Circuit Check	<ol style="list-style-type: none"> 1. Press and hold S2 and S3 on Diagnostic Test Box. 2. In Service ADVISOR, monitor Unswitched Battery Voltage. 3. Monitor voltage on multimeter. <p>Is multimeter reading within 0.5 V of unswitched battery voltage?</p>	<p>YES: Repair high resistance in return wire. <u>GO TO 11</u></p> <p>NO: Repair high resistance in supply wire. <u>GO TO 11</u></p> <p align="right">RE42287,0000556 -19-20MAR12-8/14</p>
6 CAN Circuit Check	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF 2. Disconnect Diagnostic Test Box. 3. Ignition ON, Engine OFF. 4. On Y5500 connector, measure voltage between female socket 3(+) and 2(-). 5. On Y5500 connector, measure voltage between female socket 4(+) and 2(-). <p>Is voltage for both measurements between 1.5 and 3.5 V?</p>	<p>YES: Replace VGT actuator. <u>GO TO 11</u></p> <p>NO: <u>GO TO 7</u></p> <p align="right">RE42287,0000556 -19-20MAR12-9/14</p>
7 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector A5501. 3. Perform <u>Terminal Test</u> on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 11</u></p> <p>NO: <u>GO TO 8</u></p> <p align="right">RE42287,0000556 -19-20MAR12-10/14</p>
8 Continuity Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 44 and Y5500 connector female socket 4. 2. Measure resistance between A5501 connector female socket 43 and Y5500 connector female socket 3. <p>Are both resistances less than 5 ohms?</p>	<p>YES: <u>GO TO 9</u></p> <p>NO: Repair open in harness. <u>GO TO 11</u></p> <p align="right">RE42287,0000556 -19-20MAR12-11/14</p>
9 Harness Check	<p>Inspect harness for damage.</p> <p>Any damage found?</p>	<p>YES: Repair or replace harness. <u>GO TO 11</u></p> <p>NO: Contact DTAC for support.</p> <p align="right">RE42287,0000556 -19-20MAR12-12/14</p>
10 Wiggle Test	<ol style="list-style-type: none"> 1. Monitor DTCs in Service ADVISOR. 2. Perform <u>Wiggle Test</u>. <p>Does DTC 000641.09 become active?</p>	<p>YES: Repair harness problem. <u>GO TO 11</u></p> <p>NO: <u>GO TO Problem Not Found Procedure.</u></p> <p align="right">Continued on next page RE42287,0000556 -19-20MAR12-13/14</p>

11 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO Exhaust Condition Check in Section 04, Group 155.
NO: Perform Verification Procedure.

RE42287,0000556 -19-20MAR12-14/14

000641.12 — VGT Actuator Internal Error

The VGT actuator has detected an internal error.

Continued on next page

RE42287,0000557 -19-27JUL11-1/4

Diagnostic Procedure**Trouble Shooting Sequence:**
000641.12**When DTC is Displayed:**

When the ignition is on, or engine is running, and the VGT actuator reports the fault is active.

Related Information:

This code is set when the VGT actuator detects an internal error. The VGT actuator sends a message via the CAN communication system to the ECU stating that it has detected an internal error and the ECU sets the fault.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

The VGT actuator remains active, and turns off the motor inside the actuator. The actuator is spring loaded and defaults to the open position when this fault occurs.

Additional References:

For VGT actuator location see [Y5500 — VGT Actuator](#) in Section 03, Group 140.

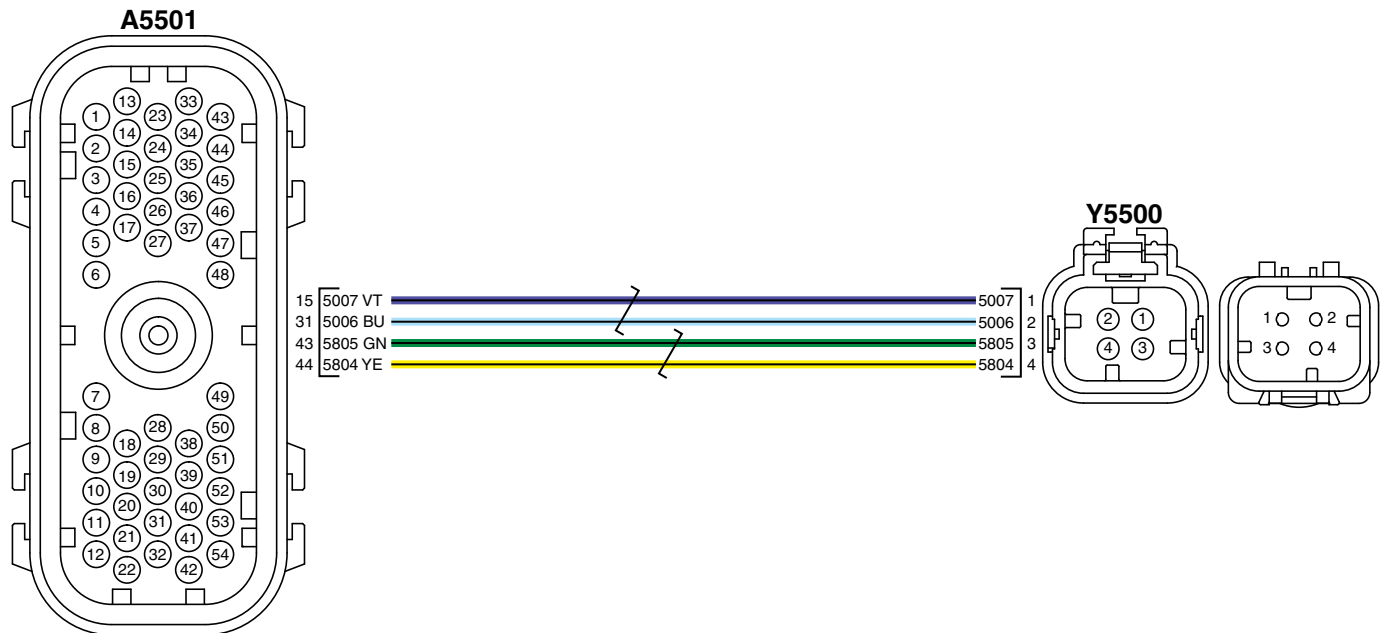
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



VGT Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

RG17734A —UN—30NOV10

Continued on next page

RE42287,0000557 -19-27JUL11-2/4

Flex probes:

Actuator

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000557 -19-27JUL11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 000641.12 active?

YES: Replace VGT actuator. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure

RE42287,0000557 -19-27JUL11-4/4

000641.13 — VGT Actuator Calibration Error

The VGT actuator has failed the calibration.

Continued on next page

RE42287,0000558 -19-20MAR12-1/8

Diagnostic Procedure**Trouble Shooting Sequence:**

000641.05
 000641.06
 000641.09
 000641.12
 000641.31
 000641.13

When DTC is Displayed:

When the ignition is turned on and the fault is active.

Related Information:

This code is set when the ECU detects that the VGT actuator travel is not within predefined travel limits during a calibration. A calibration is needed after clearing the VGT learn values

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional References:

For VGT actuator location see [Y5500 — VGT Actuator](#) in Section 03, Group 140.

For more information on VGT operation, see [VGT Operation](#) in Section 04, Group 160.

For more information on the VGT Learn Value Reset Test, see [VGT Learn Value Reset Test Instructions](#) in Section 03, Group 135.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

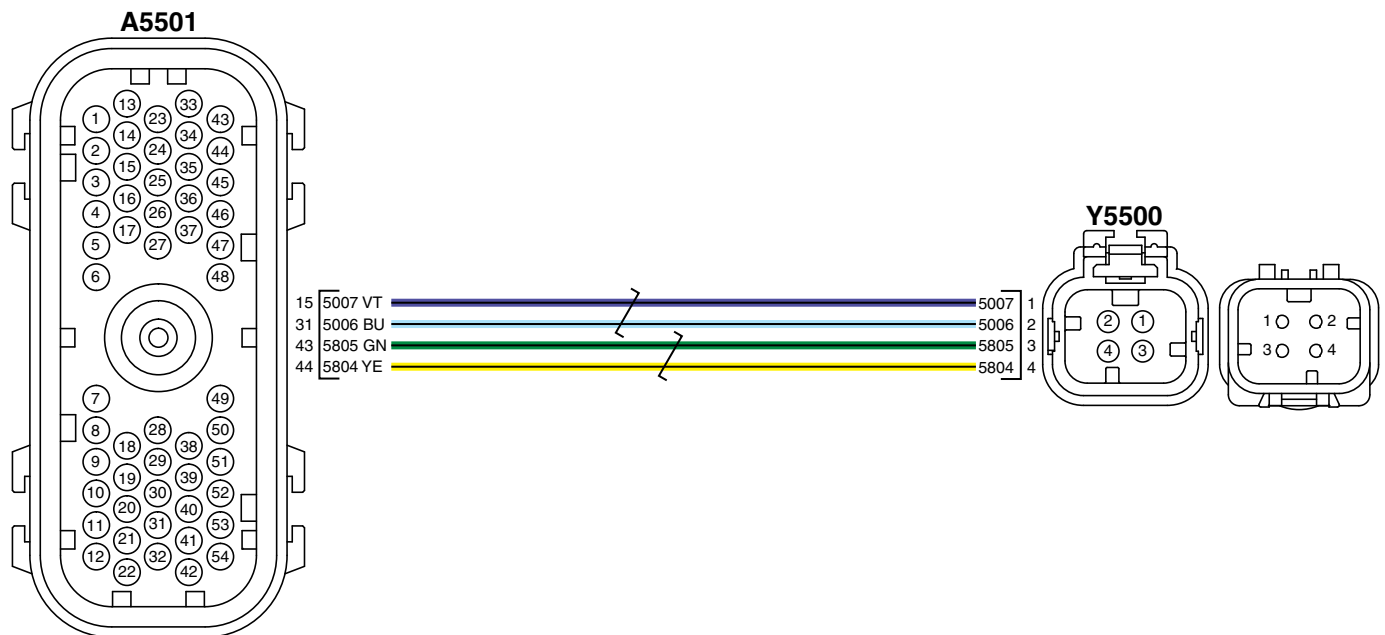
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



VGT Actuator Wiring Diagram

A5501 – 15—Supply
 A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

Continued on next page

RG17734A —UN—30NOV10
 RE42287,0000558 -19-20MAR12-2/8

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Actuator

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

- J-35616-20 – Test Leads

RE42287,0000558 -19-20MAR12-3/8

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.
6. Refresh Codes.

Is DTC 000641.13 active?

YES: GO TO 2

NO: GO TO Problem Not Found Procedure

RE42287,0000558 -19-20MAR12-4/8

2 Binding Check

1. Ignition OFF, Engine OFF

CAUTION: Turbocharger, linkage, and surrounding area may be extremely hot.

2. Disconnect linkage from VGT actuator and vane arm.
3. Manually move VGT actuator through entire travel range checking for sticking areas along the travel.

Any sticky areas found?

YES: Replace VGT actuator. In Service ADVISOR, perform VGT Learn Value Reset Test . Perform Verification Procedure.

NO: GO TO 3

RE42287,0000558 -19-20MAR12-5/8

3 Binding Check

Manually move VGT vane arm through entire travel range checking for sticking areas along the travel.

Any sticky areas found?

YES: Replace VGT. In Service ADVISOR, perform VGT Learn Value Reset Test . Perform Verification Procedure.

NO: GO TO 4

Continued on next page

RE42287,0000558 -19-20MAR12-6/8

4 Linkage Check

1. Ignition OFF, Engine OFF
2. Inspect VGT actuator linkage for damage, such as being broken or bent.

Any damage found?

YES: Replace VGT actuator linkage. In Service ADVISOR, perform VGT Learn Value Reset Test . Perform [Verification Procedure](#).

NO: [GO TO 5](#)

RE42287,0000558 -19-20MAR12-7/8

5 Movement Check

1. Reassemble all components.
2. In Service ADVISOR, perform Harness Diagnostic Mode Test.
3. Observe VGT actuator for movement.

Does VGT actuator move through the full range of travel?

YES: Perform [Verification Procedure](#).

NO: Replace VGT actuator. In Service ADVISOR, perform VGT Learn Value Reset Test . Perform [Verification Procedure](#).

RE42287,0000558 -19-20MAR12-8/8

000641.16 — VGT Actuator Temperature Moderately High

The VGT actuator temperature is moderately higher than a defined threshold in the ECU.

Diagnostic Procedure

Troubleshooting Sequence:

When DTC is Displayed:

When the ignition is on, engine is running, and the VGT actuator reports the fault is active.

Related Information:

This code is set when the VGT actuator detects that its internal temperature is moderately high. The VGT actuator sends a message via the CAN communication system to the ECU stating that its internal temperature is moderately high and the ECU sets the fault.

Alarm Level:

Warning

Control Unit Response:

For troubleshooting procedure see [000641.00 — VGT Actuator Temperature Extremely High](#)

RE42287,0000559 -19-27JUL11-1/1

**000641.31 — VGT Actuator Supply Voltage
Fault**

*The VGT actuator has detected its supply voltage
is out of range high or low.*

Continued on next page

RE42287,000055A -19-20MAR12-1/11

Diagnostic Procedure

Trouble Shooting Sequence:

000168.01
000168.16
000168.18
000641.05
000641.06
000641.12
000641.31

When DTC is Displayed:

When the ignition is on, or engine is running, and the VGT actuator reports the fault is active.

Related Information:

This code is set when the VGT actuator detects that its supply voltage from the ECU is out of range high or low. The VGT actuator sends a message via the CAN communication system to the ECU stating that its supply voltage is out of range and the ECU sets the fault.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The VGT actuator remains active, and turns off the motor inside the actuator. The actuator is spring loaded and defaults to the open position when this fault occurs.

Additional References:

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For VGT actuator location see [Y5500 — VGT Actuator](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

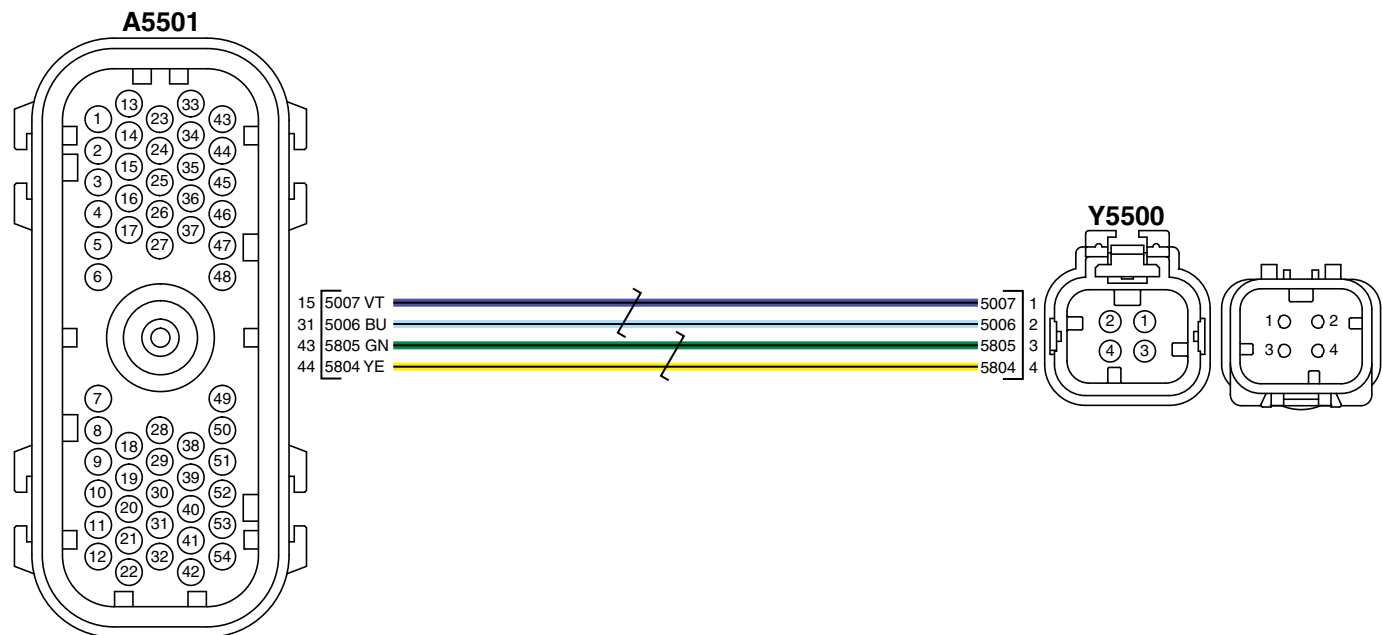
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



VGT Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return
A5501 – 43—CAN Low
A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

- Flex probes:
- Actuator
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple
- ECU
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple

- Tools:
- JDG10273 – Diagnostic Test Box
 - JT07306 – Digital Multimeter
 - J-35616-20 – Test Leads

RG17734A—UN—30NOV10

RE42287,000055A -19-20MAR12-3/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 000641.31 active?

YES: GO TO 2
NO: GO TO 3

Continued on next page

RE42287,000055A -19-20MAR12-4/11

<p>2 Actuator Check</p>	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Inspect VGT actuator tag and identify if it is a 12 volt or 24 volt actuator.</p> <p><i>NOTE: If the tag is not legible. It may be necessary to document the part number of the actuator and validate if it is a 12 volt or 24 volt actuator in your parts catalog.</i></p> <p>3. Identify if the system voltage of your application is a 12 volt or 24 volt system.</p> <p>Does the VGT actuator voltage and the applications system voltage match correctly?</p>	<p>YES: <u>GO TO 3</u></p> <p>NO: Install correct VGT actuator. <u>GO TO 8</u></p> <p>RE42287,000055A -19-20MAR12-5/11</p>
<p>3 Charging System Check</p>	<p>1. Check battery terminals and battery state of charge.</p> <p>2. Ignition ON, engine running.</p> <p>3. Check charging system for proper operation.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 8</u></p> <p>NO: <u>GO TO 4</u></p> <p>RE42287,000055A -19-20MAR12-6/11</p>
<p>4 Terminal Test</p>	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Disconnect VGT actuator connector Y5500.</p> <p>3. Perform <u>Terminal Test</u> on VGT actuator and Y5500 connector.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 8</u></p> <p>NO: <u>GO TO 5</u></p> <p>RE42287,000055A -19-20MAR12-7/11</p>
<p>5 Circuit Check</p>	<p>1. Connect Diagnostic Test Box :</p> <ul style="list-style-type: none"> • A to Y5500 connector female socket 1 (+). • B to Y5500 connector female socket 2 (-). <p>2. Set S1 to position 1 on Diagnostic Test Box.</p> <p>3. Connect multimeter to Diagnostic Test Box.</p> <p>4. Ignition ON, Engine OFF.</p> <p>5. In Service ADVISOR, monitor Unswitched Battery Voltage.</p> <p>6. Press and hold S3 on Diagnostic Test Box.</p> <p>7. Monitor voltage on multimeter.</p> <p>Is reading on multimeter within +/- 0.5 V of unswitched battery voltage?</p>	<p>YES: Replace VGT actuator. <u>GO TO 8</u></p> <p>NO: <u>GO TO 6</u></p> <p>RE42287,000055A -19-20MAR12-8/11</p>
<p>6 Terminal Test</p>	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Disconnect ECU connector A5501.</p> <p>3. Perform <u>Terminal Test</u> on A5501 female sockets 15, 31, 43, and 44. And corresponding ECU male pins.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 8</u></p> <p>NO: <u>GO TO 7</u></p> <p>Continued on next page</p> <p>RE42287,000055A -19-20MAR12-9/11</p>

7 Continuity Check

1. Disconnect Diagnostic Test Box.
2. Measure resistance between A5501 connector female socket 15 and Y5500 connector female socket 1.
3. Measure resistance between A5501 connector female socket 31 and Y5500 connector female socket 2.

Are both resistances less than 5 ohms?

YES: Contact DTAC for support.

NO: Repair high resistance or open in harness. Perform [Verification Procedure](#).

RE42287,000055A -19-20MAR12-10/11

8 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO [Exhaust Condition Check](#) in Section 04, Group 155.

NO: Perform [Verification Procedure](#).

RE42287,000055A -19-20MAR12-11/11

002659.02 — EGR Flow Signal Invalid

The ECU detects that there is a mismatch in the temperature and pressure based models used in the EGR flow measurement system.

Continued on next page

BK34394,0001B5E -19-08JUN12-1/16

Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with an SPN of 00027
Any DTC with an SPN of 00051
Any DTC with an SPN of 00105
Any DTC with an SPN of 00107
Any DTC with an SPN of 00109
Any DTC with an SPN of 00110
Any DTC with an SPN of 00412
Any DTC with an SPN of 01639
Any DTC with an SPN of 02630
Any DTC with an SPN of 02791
Any DTC with an SPN of 03464
Any DTC with an SPN of 03465

002659.03

002659.04

002659.14

002659.15

002659.17

002659.02

When DTC is Displayed:

When the ignition is on, engine is running, and the fault is active. Engine coolant temperature must be a minimum of 80° C (176° F), EGR temperature must be a minimum of 105° C (221° F), and EGR must also be flowing.

Related Information:

The EGR Flow measurement system uses inputs from several sensors to calculate EGR flow. A problem with any of these sensors or circuits could cause this DTC to be displayed.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for EGR flow.

Additional references:

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For sensor location see B5103 — EGR Flow Sensor in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

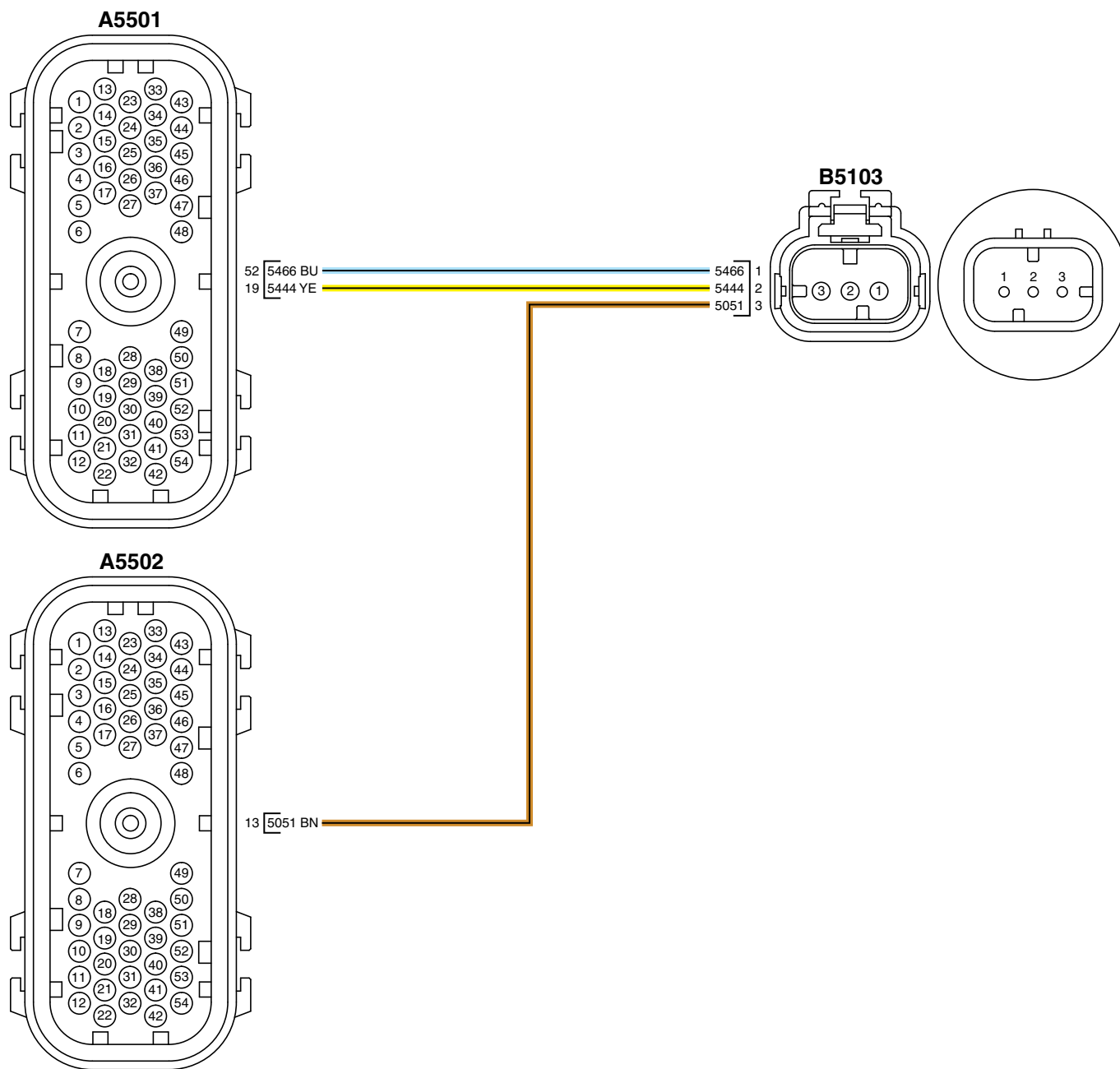
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



EGR Flow Sensor Wiring Diagram

A5501—52—Supply

A5501—19—Return

A5502—13—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16721 —UN—22DEC09

Continued on next page

BK34394,0001B5E -19-08JUN12-3/16

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

BK34394,0001B5E -19-08JUN12-4/16

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Are any of the codes within the Troubleshooting Sequence active or stored?

YES: GO TO the troubleshooting procedure for the active or stored DTCs within the list.

NO: GO TO 2

BK34394,0001B5E -19-08JUN12-5/16

2 EGR Leak Check

1. Ignition OFF, Engine OFF.

2. Inspect EGR system for leaks.

Any leaks found?

YES: Repair problem. GO TO 13

NO: GO TO 3

BK34394,0001B5E -19-08JUN12-6/16

3 Engine Model Check

Is there are venturi in the EGR system?

YES: GO TO 4

NO: Perform Carbon Removal Procedure on EGR Valve. GO TO 13

BK34394,0001B5E -19-08JUN12-7/16

4 Check EGR Flow Sensor

1. Remove EGR flow sensor from venturi.
2. Inspect sensor pressure ports for restrictions.
3. Inspect O-rings for damage.

Were any problems found?

YES: Repair problem. GO TO 13

NO: GO TO 5

BK34394,0001B5E -19-08JUN12-8/16

5 Terminal Test

1. Disconnect EGR flow sensor connector B5103.
2. Perform Terminal Test on sensor and B5103 connector.

Were any problems found?

YES: Repair problem. GO TO 13

NO: GO TO 6

Continued on next page

BK34394,0001B5E -19-08JUN12-9/16

6 Supply Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5103 connector female socket 1 (+).
 - B to B5103 connector female socket 2 (-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Ignition ON, Engine OFF.
 5. Press and hold S3 on Diagnostic Test Box.
 6. Monitor voltage on multimeter.
 7. Perform Wiggle Test.
- Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 8
NO: GO TO 7

BK34394,0001B5E -19-08JUN12-10/16

7 Open or High Resistance Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
 2. Monitor voltage on multimeter.
- Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire.
GO TO 13
NO: Repair open or high resistance in supply wire.
GO TO 13

BK34394,0001B5E -19-08JUN12-11/16

8 Signal Circuit Check

1. Ignition ON, Engine OFF.
 2. Connect Diagnostic Test Box :
 - A to B5103 connector female socket 3 (+).
 - B to B5103 connector female socket 2 (-).
 3. Set S1 to position 9 on Diagnostic Test Box.
 4. Connect multimeter to Diagnostic Test Box.
 5. Ignition ON, Engine OFF.
 6. Monitor voltage on multimeter.
 7. Perform Wiggle Test.
- NOTE: A negative voltage is less than 2.3 V.*
- Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 11
NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure. GO TO 13
NO: Voltage less than 2.3 V. GO TO 9

BK34394,0001B5E -19-08JUN12-12/16

9 Terminal Test

1. Ignition OFF, Engine OFF.
 2. Disconnect Diagnostic Test Box.
 3. Disconnect ECU connector A5501 and A5502.
 4. Perform Terminal Test on A5501 connector female sockets 52 and 19, A5502 connector female socket 13. And corresponding ECU male pins.
- Were any problems found?

YES: Repair problem. GO TO 13
NO: GO TO 10

Continued on next page

BK34394,0001B5E -19-08JUN12-13/16

10 Continuity Check	<p>Measure the resistance between A5502 connector female socket 13 and B5103 connector female socket 3.</p> <p>Is resistance less than 5 ohms?</p>	<p>YES: Repair short to signal wire in harness. GO TO 13</p> <p>NO: Repair high resistance in harness. GO TO 13</p>
11 Software Check	<p>In Service ADVISOR, monitor EGR Flow Input Voltage.</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: Replace sensor. GO TO 13</p> <p>NO: GO TO 12</p>
12 Reprogram ECU	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160. 3. Ignition ON, Engine OFF. 4. With Diagnostic Test Box connected and S1 set to position 9. 5. In Service ADVISOR, monitor EGR Flow Input Voltage. <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: GO TO 13</p> <p>NO: Replace ECU. GO TO 13</p>
13 Check Codes	<p>Check DTC list.</p> <p>Is DTC 003719.00 present?</p>	<p>YES: GO TO Exhaust Condition Check in Section 04, Group 155.</p> <p>NO: Perform Verification Procedure.</p>

**002659.03 — EGR Flow Signal Out of Range
High**

*The EGR flow signal exceeds the sensor high
voltage specification.*

Continued on next page

RE42287,000055B -19-20MAR12-1/16

Diagnostic Procedure

Troubleshooting Sequence:

003511.03

002659.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The EGR flow sensor signal voltage to the ECU corresponds to a pressure higher than what is physically possible for the EGR flow sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for EGR flow.

Additional references:

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For sensor location see B5103 — [EGR Flow Sensor](#) in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

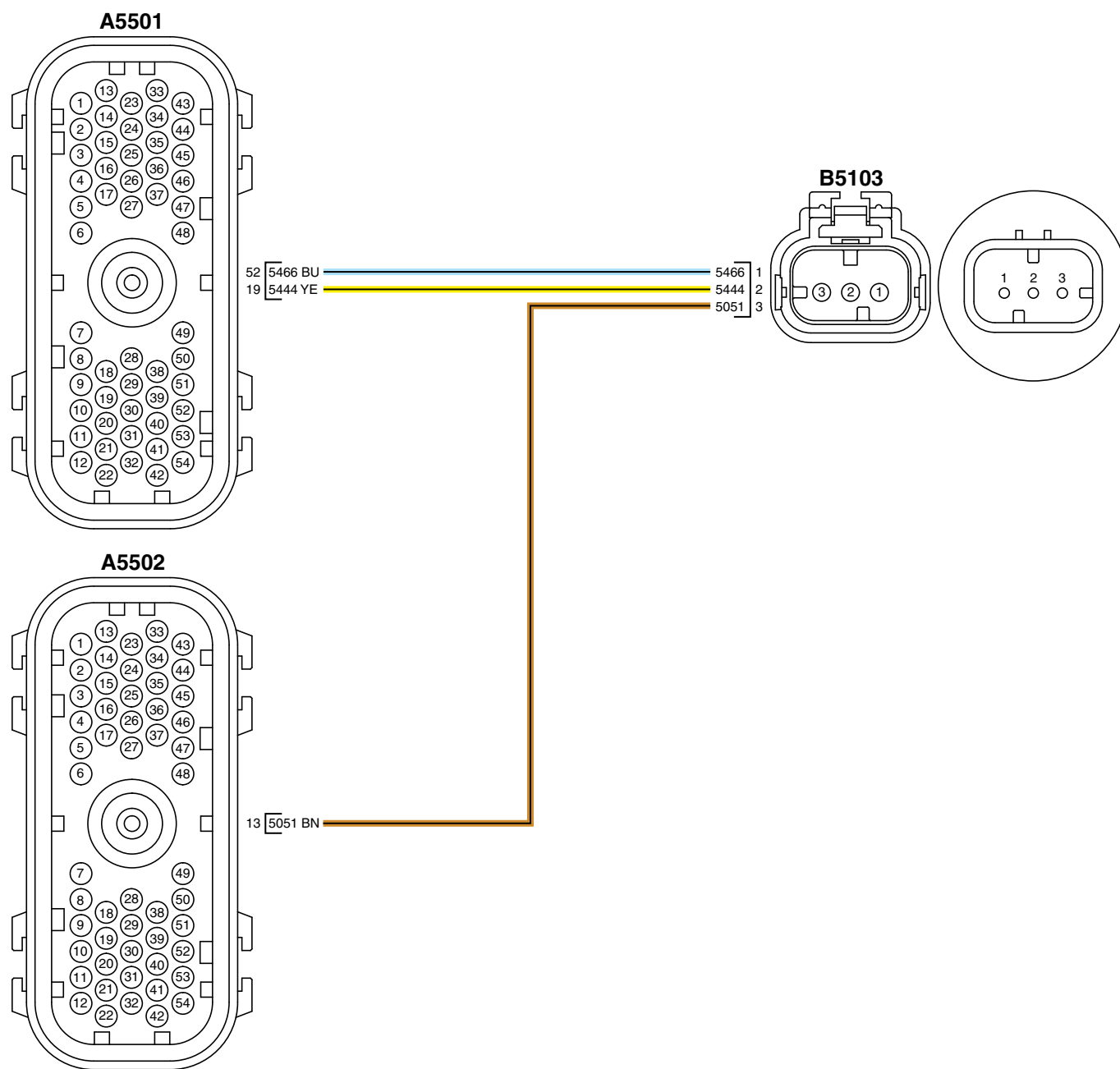
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



EGR Flow Sensor Wiring Diagram

A5501—52—Supply

A5501—19—Return

A5502—13—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16721 —UN—22DEC09

Continued on next page

RE42287,000055B -19-20MAR12-3/16

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,000055B -19-20MAR12-4/16

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003511.03 active or stored?

YES: GO TO 003511.03 — Sensor Supply #3 Voltage Out of Range High procedure.

NO: GO TO 2

RE42287,000055B -19-20MAR12-5/16

2 Code Check

Is DTC 002659.03 active?

YES: GO TO 3

NO: GO TO 10

RE42287,000055B -19-20MAR12-6/16

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR flow sensor connector B5103.
3. Perform Terminal Test on sensor and B5103 connector.

Were any problems found?

YES: Repair problem. GO TO 13

NO: GO TO 4

RE42287,000055B -19-20MAR12-7/16

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5103 connector female socket 3 (+).
 - B to B5103 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 8

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 5

Continued on next page

RE42287,000055B -19-20MAR12-8/16

5 Open Circuit Check	<p>Press and hold S2 on Diagnostic Test Box while performing <u>Wiggle Test</u>.</p> <p>Does voltage remain between 2.3 and 2.7 V?</p>	<p>YES: Repair open in return wire. <u>GO TO 13</u></p> <p>NO: <u>GO TO 6</u></p> <p align="right">RE42287,000055B -19-20MAR12-9/16</p>
6 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector A5501 and A5502. 3. Perform <u>Terminal Test</u> on A5501 connector female sockets 52 and 19, A5502 connector female socket 13. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 13</u></p> <p>NO: <u>GO TO 7</u></p> <p align="right">RE42287,000055B -19-20MAR12-10/16</p>
7 Continuity Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 19 and B5103 connector female socket 2. 2. Measure resistance between A5502 connector female socket 13 and B5103 connector female socket 3. <p>Are both resistance measurements less than 5 ohms?</p>	<p>YES: <u>GO TO Problem Not Found Procedure.</u></p> <p>NO: Repair mis-pin. <u>GO TO 13</u></p> <p align="right">RE42287,000055B -19-20MAR12-11/16</p>
8 Software Check	<p>In Service ADVISOR, monitor EGR Flow Input Voltage.</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: Replace EGR flow sensor. <u>GO TO 13</u></p> <p>NO: <u>GO TO 9</u></p> <p align="right">RE42287,000055B -19-20MAR12-12/16</p>
9 Reprogram ECU	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see <u>Engine Control Unit (ECU) — Reprogramming Instructions</u> in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 002659.03 active?</p>	<p>YES: Replace ECU. <u>GO TO 13</u></p> <p>NO: <u>GO TO 13</u></p> <p align="right">RE42287,000055B -19-20MAR12-13/16</p>
10 Wiggle Test	<ol style="list-style-type: none"> 1. Ignition ON, Engine OFF. 2. In Service ADVISOR, monitor EGR Flow Input Voltage. 3. Perform <u>Wiggle Test</u>. <p>Does sensor input voltage ever read greater than 4.9 V?</p>	<p>YES: Repair harness problem. <u>GO TO 13</u></p> <p>NO: <u>GO TO 11</u></p> <p align="right">RE42287,000055B -19-20MAR12-14/16</p>

Continued on next page

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR flow sensor connector B5103.
3. Perform Terminal Test on sensor and B5103 connector.

Were any problems found?

YES: Repair problem. GO TO 13

NO: GO TO 12

RE42287,000055B -19-20MAR12-15/16

12 Terminal Test

1. Disconnect ECU connectors A5501 and A5502.
2. Perform Terminal Test on A5501 connector female sockets 52 and 19, **A5502** connector female socket 13. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 13

NO: GO TO Problem Not Found Procedure.

RE42287,000055B -19-20MAR12-16/16

13 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO Exhaust Condition Check in Section 04, Group 155.

NO: Perform Verification Procedure.

RE42287,000055B -19-20MAR12-17/16

**002659.04 — EGR Flow Signal Out of Range
Low**

*The EGR flow signal is lower than the sensor
low voltage specification.*

Continued on next page

RE42287,000055C -19-20MAR12-1/18

Diagnostic Procedure

Troubleshooting Sequence:

003511.03

003511.04

002659.03

002659.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The EGR flow sensor signal voltage to the ECU corresponds to a pressure lower than what is physically possible for the EGR flow sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for EGR flow.

Additional References:

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For sensor location see [B5103 — EGR Flow Sensor](#) in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

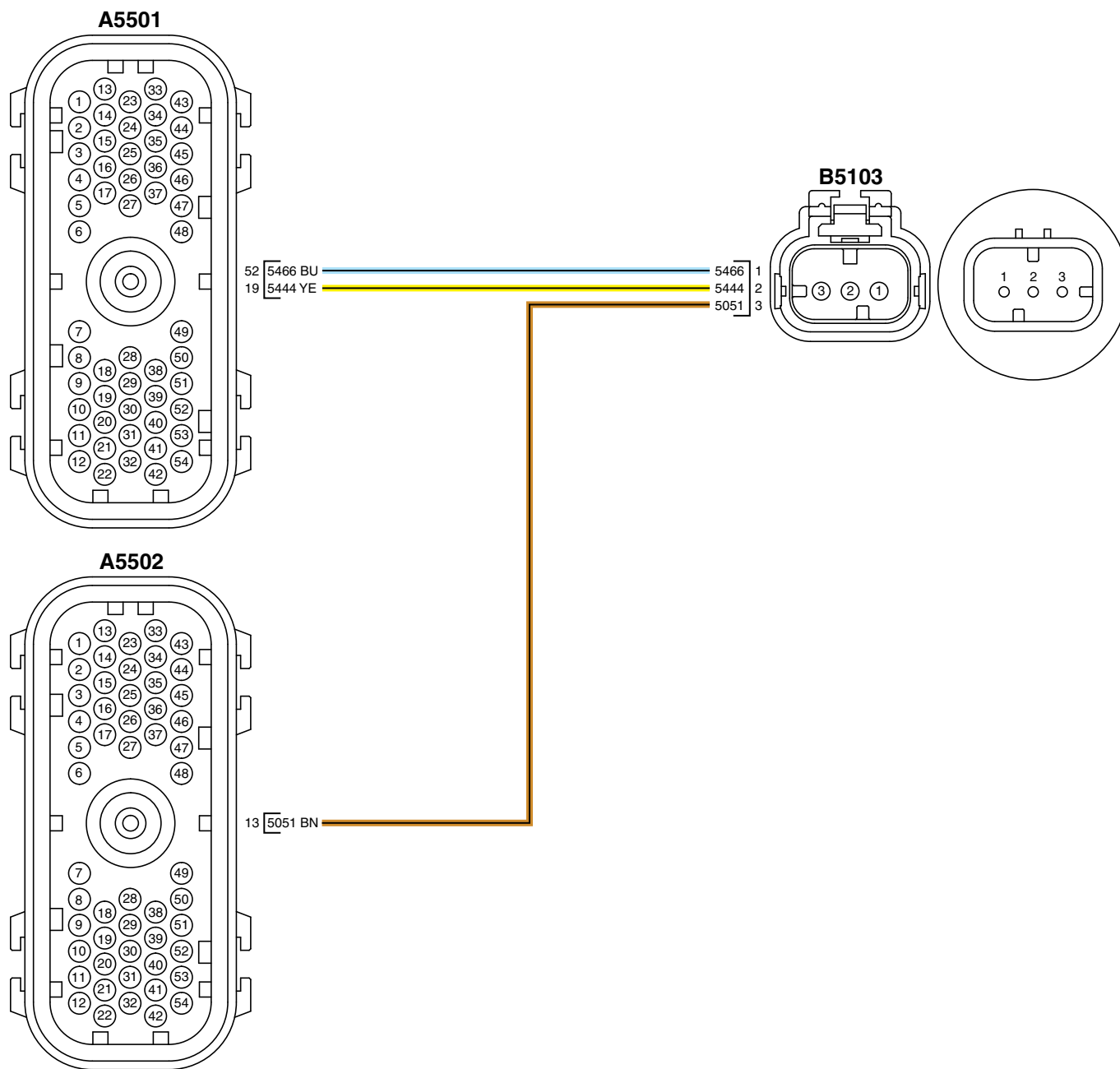
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



EGR Flow Sensor Wiring Diagram

A5501—52—Supply

A5501—19—Return

A5502—13—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16721 —UN—22DEC09

Continued on next page

RE42287,000055C -19-20MAR12-3/18

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 – Test Leads

RE42287,000055C -19-20MAR12-4/18

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003511.03 stored?

YES: GO TO 003511.03
— Sensor Supply #3
Voltage Out of Range High
procedure.

NO: GO TO 2

RE42287,000055C -19-20MAR12-5/18

2 Code Check

Is DTC 002659.03 stored?

YES: GO TO 002659.03
— EGR Flow Signal Out of
Range High procedure.

NO: GO TO 3

RE42287,000055C -19-20MAR12-6/18

3 Code Check

Is DTC 002659.04 active?

YES: GO TO 4

NO: GO TO 12

RE42287,000055C -19-20MAR12-7/18

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR flow sensor connector B5103.
3. Perform Terminal Test on sensor and B5103 connector.

Were any problems found?

YES: Repair problem. GO
TO 15

NO: GO TO 5

Continued on next page

RE42287,000055C -19-20MAR12-8/18

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5103 connector female socket 1 (+).
 - B to B5103 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 7

NO: GO TO 6

RE42287,000055C -19-20MAR12-9/18

6 Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire.

GO TO 15

NO: Repair open or high resistance in supply wire.

GO TO 15

RE42287,000055C -19-20MAR12-10/18

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5103 connector female socket 3 (+).
 - B to B5103 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 8

NO: GO TO 10

RE42287,000055C -19-20MAR12-11/18

8 Software Check

In Service ADVISOR, monitor EGR Flow Input Signal.

Is voltage between 2.3 and 2.7 V?

YES: Replace EGR flow sensor. GO TO 15

NO: GO TO 9

Continued on next page

RE42287,000055C -19-20MAR12-12/18

<p>9 Reprogram ECU</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see <u>Engine Control Unit (ECU) — Reprogramming Instructions</u> in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 002659.04 active?</p>	<p>YES: Replace ECU. <u>GO TO 15</u></p> <p>NO: <u>GO TO 15</u></p> <p align="right">RE42287,000055C -19-20MAR12-13/18</p>
<p>10 Terminal Test</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector A5501 and A5502. 3. Perform <u>Terminal Test</u> on A5501 connector female sockets 52 and 19, A5502 connector female socket 13. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO 11</u></p> <p align="right">RE42287,000055C -19-20MAR12-14/18</p>
<p>11 Continuity Check</p>	<p>Measure resistance between A5502 connector female socket 13 and B5103 connector female socket 3.</p> <p>Is resistance less than 5 ohms?</p>	<p>YES: Repair short to signal wire in harness. <u>GO TO 15</u></p> <p>NO: Repair open or mispin in harness. <u>GO TO 15</u></p> <p align="right">RE42287,000055C -19-20MAR12-15/18</p>
<p>12 Wiggle Test</p>	<ol style="list-style-type: none"> 1. In Service ADVISOR, monitor EGR Flow Input Voltage. 2. Perform <u>Wiggle Test</u>. <p>Does voltage ever go below 0.2 V?</p>	<p>YES: Repair harness problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO 13</u></p> <p align="right">RE42287,000055C -19-20MAR12-16/18</p>
<p>13 Terminal Test</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect EGR flow sensor connector B5103. 3. Perform <u>Terminal Test</u> on sensor and B5103 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO 14</u></p> <p align="right">RE42287,000055C -19-20MAR12-17/18</p>
<p>14 Terminal Test</p>	<ol style="list-style-type: none"> 1. Disconnect ECU connector A5501 and A5502. 2. Perform <u>Terminal Test</u> on A5501 connector female sockets 52 and 19, A5502 connector female socket 13. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 15</u></p> <p>NO: <u>GO TO Problem Not Found Procedure.</u></p> <p align="right">RE42287,000055C -19-20MAR12-18/18</p>

15 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO [Exhaust Condition Check](#) in Section 04, Group 155.

NO: Perform [Verification Procedure](#).

RE42287,000055C -19-20MAR12-19/18

002659.14 — EGR Flow Signal Error*There is an indicated fault in the EGR system.*

RE42287,000055D -19-28MAR12-1/5

Diagnostic Procedure**Troubleshooting Sequence:**

002791.07
 002791.13
 000105.00
 000105.16
 000105.15
 000412.00
 000412.16
 000412.15
 002659.15
 002659.17
 002659.14

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The EGR flow signal error diagnostic trouble code is information to the operator that the ECU has detected a fault in the EGR system and is derating the engine by limiting the maximum amount of fuel available to the engine. This code will only set as a result of another DTC setting.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional references:For sensor location see B5103 — [EGR Flow Sensor](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RE42287,000055D -19-28MAR12-2/5

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs will be cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Are there any DTCs other than 003719.00, 003719.13, 003719.15 or 003719.16 active or stored?

YES: Troubleshoot those DTC(s). Then [GO TO 2](#)

NO: [GO TO 2](#)

Continued on next page

RE42287,000055D -19-28MAR12-3/5

2 Reprogram ECU

Search Custom Performance for ECU software updates.

Is a new version of software available?

YES: Reprogram ECU with newest version of software. Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,000055D -19-28MAR12-4/5

3 Review Stored Snapshot Information

Review Snapshot information stored from step 1, see [Snapshot Instructions](#) in Section 04, Group 160

Is 2659.14 and 1569.31 the only stored or active code?

YES: Open Report Only DTAC case.

NO: Perform [Verification Procedure](#).

RE42287,000055D -19-28MAR12-5/5

002659.15 — EGR Flow Signal Moderately High

EGR flow has been detected with the EGR valve closed.

Continued on next page

RE42287,000055E -19-20MAR12-1/14

Diagnostic Procedure

Troubleshooting Sequence:

002791.07

002791.13

000027.07

002659.15

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

EGR flow is determined by a differential pressure measurement made by the EGR Flow sensor and by a differential temperature based model. This code sets when EGR flow is detected with the EGR valve closed.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional references:

For sensor location see B5103 — [EGR Flow Sensor](#) in Section 03, Group 140.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

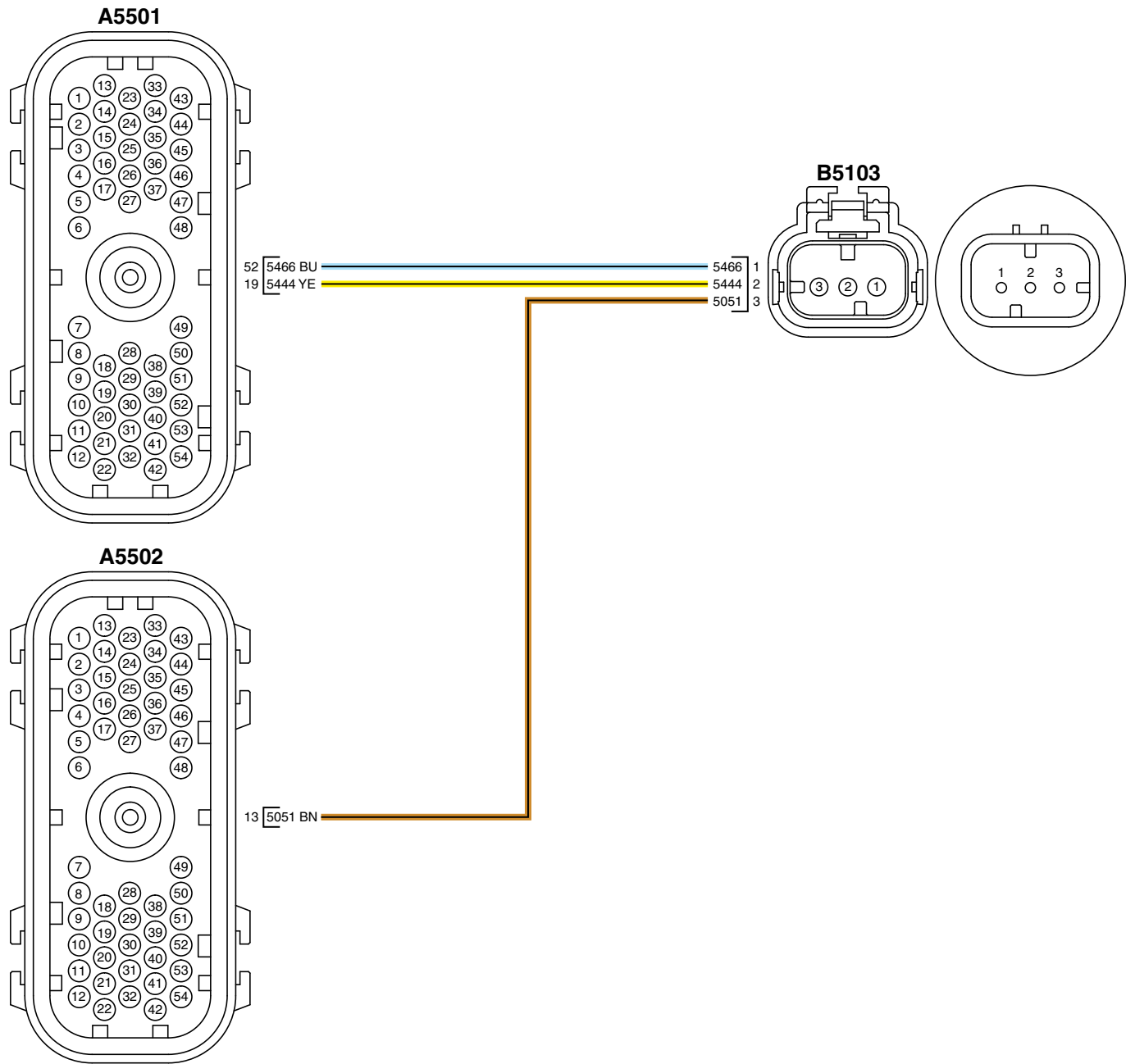
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



EGR Flow Sensor Wiring Diagram

A5501—52—Supply

A5501—19—Return

A5502—13—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16721 —UN—22DEC09

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RE42287,000055E -19-20MAR12-3/14

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,000055E -19-20MAR12-4/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Are any of the codes within the Troubleshooting Sequence active or stored?

YES: GO TO troubleshooting procedure for active or stored DTCs within list.

NO: GO TO 2

RE42287,000055E -19-20MAR12-5/14

2 Check EGR Valve

NOTE: For EGR valve removal instructions, see EGR Valve — Removal in Section 02, Group 080 earlier in this manual.

1. Ignition OFF, engine OFF.
2. Remove EGR valve.
3. Check for stuck open or broken EGR valve.
4. Inspect intake and exhaust passages and plugs for damage which would permit EGR flow to bypass EGR valve.

Were any problems found?

YES: Repair problem or replace EGR valve. GO TO 11

NO: Reinstall EGR valve. GO TO 3

RE42287,000055E -19-20MAR12-6/14

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR flow sensor connector B5103.
3. Perform Terminal Test on sensor and B5103 connector.

Were any problems found?

YES: Repair problem. GO TO 11

NO: GO TO 4

Continued on next page

RE42287,000055E -19-20MAR12-7/14

4 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5103 connector female socket 1 (+).
 - B to B5103 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 6

NO: GO TO 5

RE42287,000055E -19-20MAR12-8/14

5 Open or High Resistance Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire.

GO TO 11

NO: Repair open or high resistance in supply wire.

GO TO 11

RE42287,000055E -19-20MAR12-9/14

6 Signal Circuit Check

1. Ignition ON, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5103 connector female socket 3 (+).
 - B to B5103 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 9

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 7

RE42287,000055E -19-20MAR12-10/14

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Disconnect ECU connector A5501 and A5502.
4. Perform Terminal Test on A5501 connector female sockets 52 and 19, **A5502** connector female socket 13. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 11

NO: GO TO 8

Continued on next page

RE42287,000055E -19-20MAR12-11/14

8 Continuity Check

Measure resistance between A5502 connector female socket 13 and B5103 connector female socket 3.

Is resistance measurement less than 5 ohms?

YES: Repair short to signal wire in harness. [GO TO 11](#)

NO: Repair high resistance in harness. [GO TO 11](#)

RE42287,000055E -19-20MAR12-12/14

9 Software Check

In Service ADVISOR, monitor EGR Flow Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace EGR flow sensor. [GO TO 11](#)

NO: [GO TO 10](#)

RE42287,000055E -19-20MAR12-13/14

10 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
3. Ignition ON, Engine OFF.
4. Diagnostic Test Box still connected and S1 is set to position 9.
5. In Service ADVISOR, monitor EGR Flow Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: [GO TO 11](#)

NO: Replace ECU. [GO TO 11](#)

RE42287,000055E -19-20MAR12-14/14

11 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: [GO TO Exhaust Condition Check](#) in Section 04, Group 155.

NO: Perform [Verification Procedure](#).

RE42287,000055E -19-20MAR12-15/14

002659.17 — EGR Flow Signal Moderately Low

EGR flow has not been detected with the EGR valve open.

Continued on next page

RE42287,000055F -19-27JUL11-11/13

Diagnostic Procedure

Troubleshooting Sequence:

002791.07

002791.13

000027.07

002659.17

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

EGR flow is determined by a differential pressure measurement made by the EGR flow sensor and by a differential temperature based model. This code sets when EGR flow is not detected with the EGR valve open.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional references:

For sensor location see B5103 — EGR Flow Sensor in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

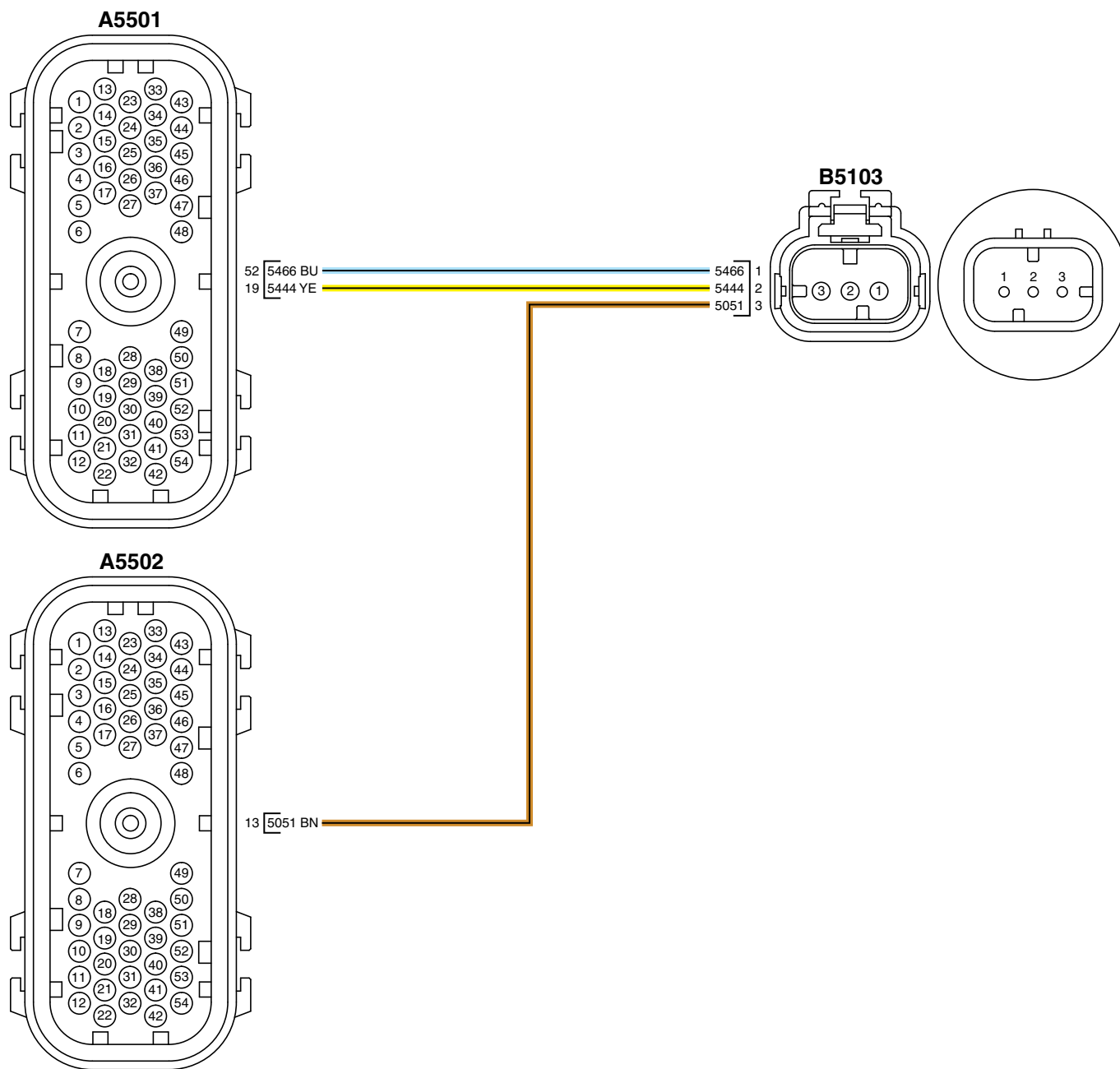
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



EGR Flow Sensor Wiring Diagram

A5501—52—Supply

A5501—19—Return

A5502—13—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16721 —UN—22DEC09

Continued on next page

RE42287,000055F -19-27JUL11-3/13

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,000055F -19-27JUL11-4/13

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Are any of the codes within the Troubleshooting Sequence active or stored?

YES: GO TO troubleshooting procedure for active or stored DTCs within list.

NO: GO TO 2

RE42287,000055F -19-27JUL11-5/13

2 Check EGR Valve

NOTE: For EGR valve removal instructions, see EGR Valve — Removal in Section 02, Group 080 earlier in this manual.

1. Ignition OFF, engine OFF.
2. Remove EGR valve.
3. Check for stuck or broken EGR valve.
4. Inspect EGR cooler for EGR restrictions and fouling.

Were any problems found?

YES: Repair problem. Perform Verification procedure.

NO: Reinstall EGR valve. GO TO 3

RE42287,000055F -19-27JUL11-6/13

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR flow sensor connector B5103.
3. Perform Terminal Test on sensor and B5103 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 4

Continued on next page

RE42287,000055F -19-27JUL11-7/13

4 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5103 connector female socket 1 (+).
 - B to B5103 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 6

NO: GO TO 5

RE42287,000055F -19-27JUL11-8/13

5 Open or High Resistance Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

RE42287,000055F -19-27JUL11-9/13

6 Signal Circuit Check

1. Ignition ON, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5103 connector female socket 3 (+).
 - B to B5103 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 9

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 7

Continued on next page

RE42287,000055F -19-27JUL11-10/13

<p>7 Terminal Test</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Disconnect ECU connector A5501 and A5502. 4. Perform <u>Terminal Test</u> on A5501 connector female sockets 52 and 19, A5502 connector female socket 13. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 8</u></p> <p>RE42287,000055F -19-27JUL11-11/13</p>
<p>8 Continuity Check</p>	<p>Measure resistance between A5502 connector female socket 13 and B5103 connector female socket 3.</p> <p>Is resistance measurement less than 5 ohms?</p>	<p>YES: Repair short to signal wire in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: Repair high resistance in harness. Perform <u>Verification Procedure</u>.</p> <p>RE42287,000055F -19-27JUL11-12/13</p>
<p>9 Software Check</p>	<p>In Service ADVISOR, monitor EGR Flow Input Voltage.</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: Replace sensor. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 10</u></p> <p>RE42287,000055F -19-27JUL11-13/13</p>
<p>10 Reprogram ECU</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Reprogram ECU. For more information, see <u>Engine Control Unit (ECU) — Reprogramming Instructions</u> in Section 04, Group 160. 3. Ignition ON, Engine OFF. 4. With Diagnostic Test Box still connected and S1 is set to position 9. 5. In Service ADVISOR, monitor EGR Flow Input Voltage. <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: Perform <u>Verification Procedure</u>.</p> <p>NO: Replace ECU. Perform <u>Verification Procedure</u>.</p> <p>RE42287,000055F -19-27JUL11-14/13</p>

002791.05 — EGR Valve Drive Circuit Fault

The ECU has detected a fault on the EGR valve drive circuit.

Continued on next page

RE42287,0000560 -19-20MAR12-1/17

Diagnostic Procedure

Troubleshooting Sequence:

002791.05

When DTC is Displayed:

When the ignition is on, engine is running, and the EGR valve is commanded to a position with the fault active.
When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that there is a fault on the EGR valve drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for EGR valve position.

Additional references:

For component location, see Y5400 — EGR Valve in Section 03, Group 140.

For more EGR valve information, see EGR Valve Operation in Section 03, Group 135.

For more information on the Exhaust Condition Check, see Exhaust Condition Check in Section 04, Group 155.

For more information on the Wiggle Test, see Wiggle Test in Section 04, Group 155.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

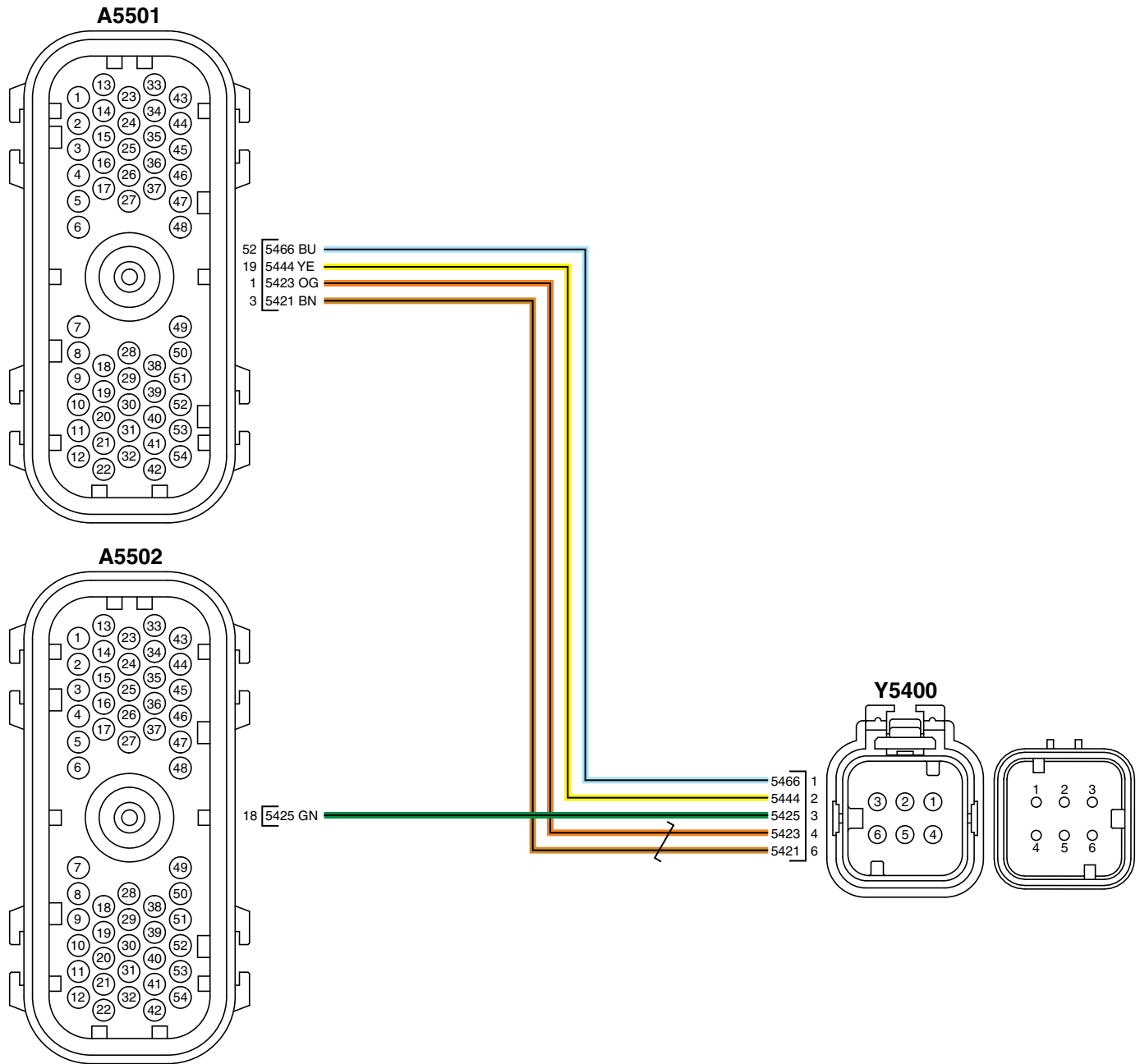
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.



RG16748—UN—08MAR10

EGR Valve Wiring Diagram

A5501—52—Supply
A5501—19—Return

A5501—1—Drive (-)
A5501—3—Drive (+)

A5502—18—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Continued on next page

RE42287,0000560 -19-20MAR12-3/17

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000560 -19-20MAR12-4/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 002791.05 active?

YES: GO TO 2

NO: GO TO 9

RE42287,0000560 -19-20MAR12-5/17

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR valve connector Y5400.
3. Perform Terminal Test on EGR valve and Y5400 connector.

Were any problems found?

YES: Repair problem.

PGO TO 14

NO: GO TO 3

RE42287,0000560 -19-20MAR12-6/17

3 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform Terminal Test on A5501 connector female sockets 1, 3, 19, and 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 14

NO: GO TO 4

RE42287,0000560 -19-20MAR12-7/17

4 Short to Voltage Check

1. Ignition ON, Engine OFF.
2. Measure voltage between Y5400 connector female sockets 4 (+) and single point ground.
3. Measure voltage between Y5400 connector female sockets 6 (+) and single point ground.

Are both measurements less than 0.5 V?

YES: GO TO 5

NO: Repair drive wire short to voltage in harness. GO TO 14

Continued on next page

RE42287,0000560 -19-20MAR12-8/17

5 Continuity Check

1. Ignition OFF, Engine OFF.
2. Measure resistance between A5501 connector female socket 1 and Y5400 connector female socket 4.
3. Measure resistance between A5501 connector female socket 3 and Y5400 connector female socket 6.

Are both resistance measurements less than 5 ohms?

YES: GO TO 6

NO: Repair drive wire open or high resistance in harness. GO TO 14.

RE42287,0000560 -19-20MAR12-9/17

6 Short to Ground Check

1. Measure resistance between Y5400 connector female socket 4 and single point ground.
2. Measure resistance between Y5400 connector female socket 6 and single point ground.

Is either measurement less than 100k ohms?

YES: Repair drive wire short to ground in harness. GO TO 14

NO: GO TO 7

RE42287,0000560 -19-20MAR12-10/17

7 Wire to Wire Check

1. Measure resistance between A5501 connector female socket 1 and all other sockets in A5501.
2. Measure resistance between A5501 connector female socket 3 and all other sockets in A5501.

Is any measurement less than 100k ohms?

YES: Repair drive wire short in harness. GO TO 14

NO: GO TO 8

RE42287,0000560 -19-20MAR12-11/17

8 Replace EGR Valve

1. Replace EGR valve.
 2. Reconnect ECU connector A5501.
 3. Ignition ON, Engine OFF.
- NOTE: Ignore any EGR Valve codes except for DTC 002791.05.*
4. In Service ADVISOR, perform EGR Valve Learn Value Reset.

Is DTC 002791.05 active?

YES: Replace ECU. GO TO 14

NO: GO TO 14

RE42287,0000560 -19-20MAR12-12/17

9 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR valve connector Y5400.
3. Perform Terminal Test on EGR valve and Y5400 connector.

Were any problems found?

YES: Repair problem. GO TO 14

NO: GO TO 10

Continued on next page

RE42287,0000560 -19-20MAR12-13/17

10 Terminal Test	<ol style="list-style-type: none"> 1. Disconnect ECU connector A5501. 2. Perform <u>Terminal Test</u> on A5501 connector female sockets 1, 3, 19, and 52. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 14</u></p> <p>NO: <u>GO TO 11</u></p> <p align="right">RE42287,0000560 -19-20MAR12-14/17</p>
11 Continuity Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 1 and Y5400 connector female socket 4, while performing <u>Wiggle Test</u>. 2. Measure resistance between A5501 connector female socket 3 and Y5400 connector female socket 6, while performing <u>Wiggle Test</u>. <p>Are both resistance measurements always less than 5 ohms?</p>	<p>YES: <u>GO TO 12</u></p> <p>NO: Repair problem. <u>GO TO 14</u></p> <p align="right">RE42287,0000560 -19-20MAR12-15/17</p>
12 Short to Ground Check	<ol style="list-style-type: none"> 1. Measure resistance between Y5400 connector female socket 4 and single point ground, while performing <u>Wiggle Test</u>. 2. Measure resistance between Y5400 connector female socket 6 and single point ground, while performing <u>Wiggle Test</u>. <p>Is either measurement ever less than 100k ohms?</p>	<p>YES: Repair drive wire short to ground in harness. <u>GO TO 14</u></p> <p>NO: <u>GO TO 13</u></p> <p align="right">RE42287,0000560 -19-20MAR12-16/17</p>
13 Wire to Wire Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 1 and all other sockets in A5501, while performing <u>Wiggle Test</u>. 2. Measure resistance between A5501 connector female socket 3 and all other sockets in A5501, while performing <u>Wiggle Test</u>. <p>Is any measurement ever less than 100k ohms?</p>	<p>YES: Repair drive wire short to ground in harness. <u>GO TO 14</u>.</p> <p>NO: <u>GO TO Problem Not Found Procedure</u>.</p> <p align="right">RE42287,0000560 -19-20MAR12-17/17</p>
14 Check Codes	<p>Check DTC list.</p> <p>Is DTC 003719.00 present?</p>	<p>YES: GO TO <u>Exhaust Condition Check</u> in Section 04, Group 155.</p> <p>NO: Perform <u>Verification Procedure</u>.</p> <p align="right">RE42287,0000560 -19-20MAR12-18/17</p>

002791.06 — EGR Valve Drive Circuit Has Low Resistance

The ECU has detected low resistance on the EGR valve drive circuit.

Continued on next page

RE42287,0000561 -19-27JUL11-1/11

Diagnostic Procedure

Troubleshooting Sequence:

002791.06

When DTC is Displayed:

When the ignition is on, engine is running, and the EGR valve is commanded to a position with the fault active.
When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that the current to the EGR valve is higher than expected, which indicates low resistance in the drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for EGR valve position.

Additional references:

For component location, see [Y5400 — EGR Valve](#) in Section 03, Group 140.

For more EGR valve information, see [EGR Valve Operation](#) in Section 03, Group 135.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

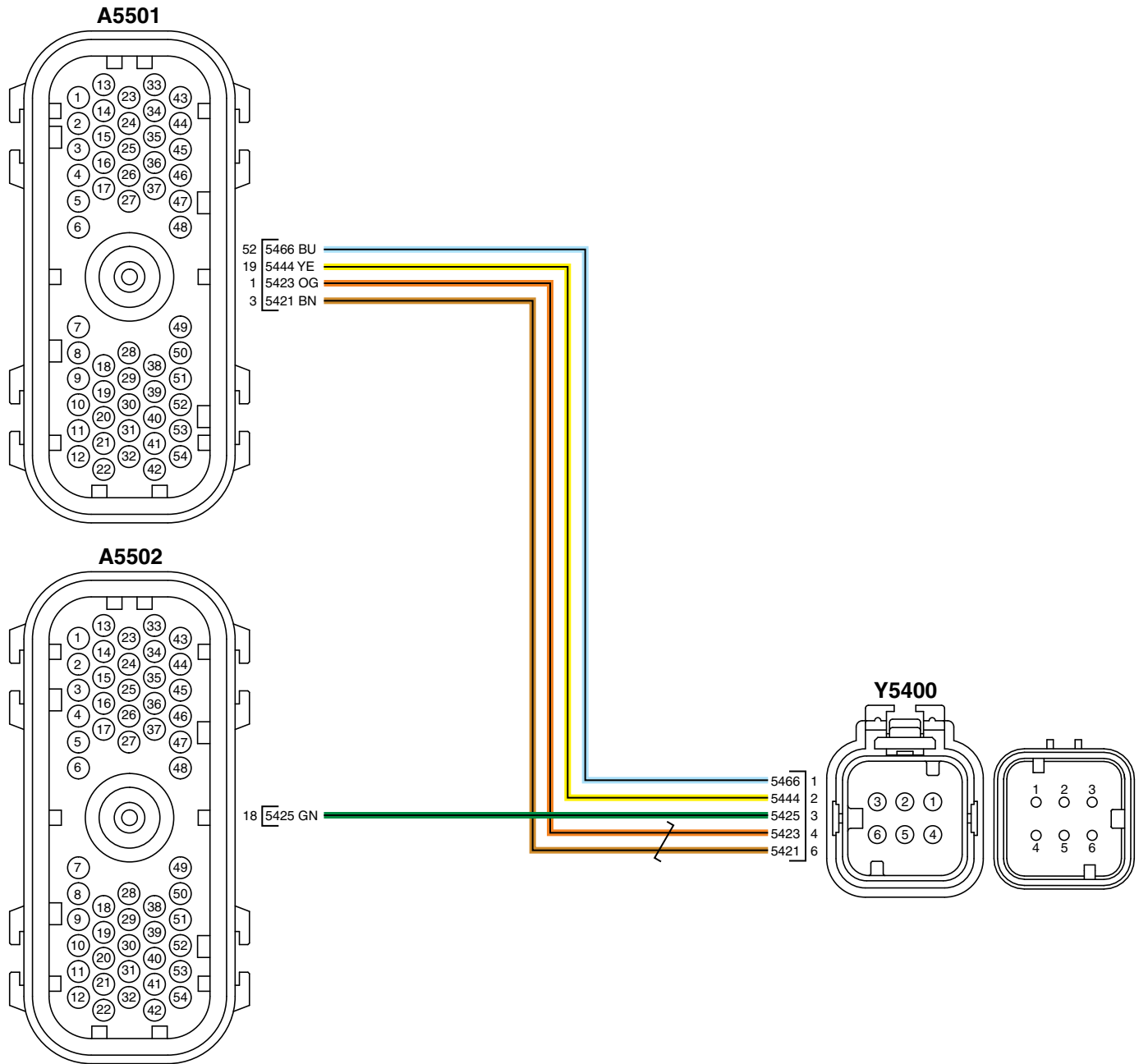
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



RG16748—UN—08MAR10

EGR Valve Wiring Diagram

A5501—52—Supply
A5501—19—Return

A5501—1—Drive (-)
A5501—3—Drive (+)

A5502—18—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Continued on next page

RE42287,0000561 -19-27JUL11-3/11

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000561 -19-27JUL11-4/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 002791.06 active?

YES: [GO TO 2](#)

NO: [GO TO 6](#)

RE42287,0000561 -19-27JUL11-5/11

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR valve connector Y5400.
3. Perform [Terminal Test](#) on EGR valve and Y5400 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,0000561 -19-27JUL11-6/11

3 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 1, 3, 19, and 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000561 -19-27JUL11-7/11

4 Wire to Wire Check

On A5501 connector, measure resistance between female sockets 1 and 3.

Is resistance greater than 100k ohms?

YES: [GO TO 5](#)

NO: Repair short in wiring harness. Perform [Verification Procedure](#).

RE42287,0000561 -19-27JUL11-8/11

5 Replace EGR Valve

1. Replace EGR valve.
 2. Ignition ON, Engine OFF.
- NOTE: Ignore any EGR Valve codes except for DTC 002791.06.*
3. In Service ADVISOR, perform EGR Valve Learn Value Reset.

Is DTC 002791.06 active?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

Continued on next page

RE42287,0000561 -19-27JUL11-9/11

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect EGR valve connector Y5400.
3. Perform Terminal Test on EGR valve and Y5400 connector.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 7

RE42287,0000561 -19-27JUL11-10/11

7 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform Terminal Test on A5501 connector female sockets 1, 3, 19, and 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO 8

RE42287,0000561 -19-27JUL11-11/11

8 Wire to Wire Check

On A5501 connector, measure resistance between female sockets 1 and 3 while performing Wiggle Test.

Is resistance measurement always greater than 100k ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair short in wiring harness. Perform Verification Procedure.

RE42287,0000561 -19-27JUL11-12/11

**002791.07 — EGR Valve Desired and Actual
Position Mismatch During a Learn**

*The ECU has detected the EGR valve is not reaching the
desired position that is commanded by the ECU.*

Continued on next page

RE42287,0000562 -19-20MAR12-1/13

Diagnostic Procedure

Troubleshooting Sequence:

002791.05

002791.06

002791.07

When DTC is Displayed:

When the ignition is on, engine is running, and the EGR valve is commanded to a position when the fault is active.

When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected the EGR valve is not reaching the desired position that is commanded by the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for EGR valve position.

Additional references:

For component location, see [Y5400 — EGR Valve](#) in Section 03, Group 140.

For more EGR valve information, see [EGR Valve Operation](#) in Section 03, Group 135.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

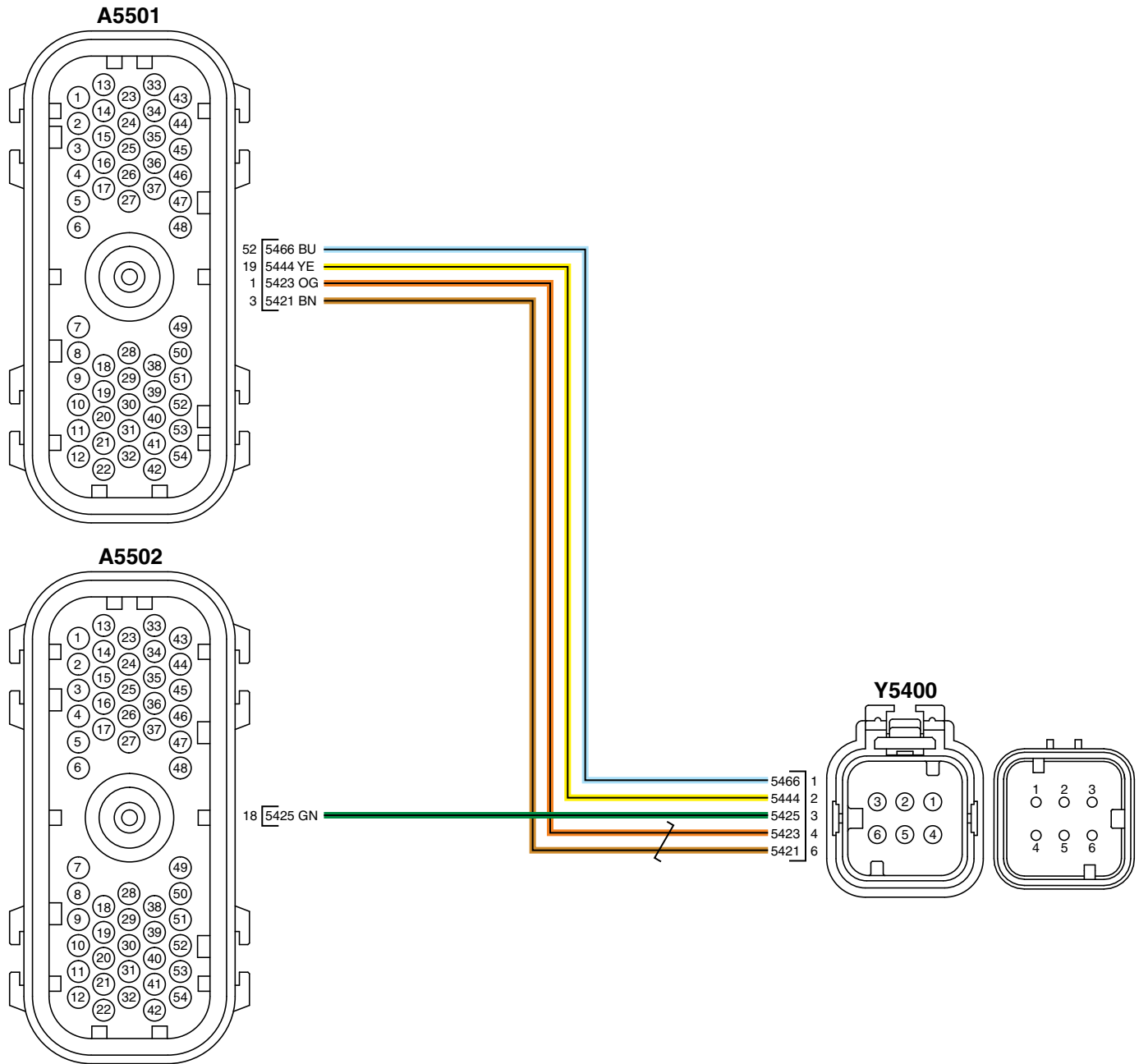
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



RG16748—UN—08MAR10

EGR Valve Wiring Diagram

A5501—52—Supply
A5501—19—Return

A5501—1—Drive (-)
A5501—3—Drive (+)

A5502—18—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

EGR Valve

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Continued on next page

RE42287,0000562 -19-20MAR12-3/13

Tools:

- JDG10273 – Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000562 -19-20MAR12-4/13

1 Store Snapshot Information and Terminal Test

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect EGR valve connector Y5400.
7. Perform Terminal Test on EGR valve and Y5400 connector.

Were any problems found?

YES: Repair problem. GO TO 10

NO: GO TO 2

RE42287,0000562 -19-20MAR12-5/13

2 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to Y5400 connector female socket 1 (+).
 - B to Y5400 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 3

NO: GO TO 6

RE42287,0000562 -19-20MAR12-6/13

3 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to Y5400 connector female socket 3 (+).
 - B to Y5400 connector female socket 2 (-).
3. Set S1 to position 4 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 4

NO: GO TO 8

Continued on next page

RE42287,0000562 -19-20MAR12-7/13

<p>4 Software Check</p>	<p>In Service ADVISOR, monitor EGR Valve Position Input Voltage.</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: <u>GO TO 5</u></p> <p>NO: <u>GO TO 7</u></p> <p align="right">RE42287,0000562 -19-20MAR12-8/13</p>
<p>5 Clean EGR Valve</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Perform <u>Carbon Removal Procedure</u> on EGR valve. 3. Reconnect EGR valve connector Y5400. <p>⚠ CAUTION: Pinch hazard. Keep hands away from valve when ignition is ON to avoid injury.</p> <ol style="list-style-type: none"> 4. Ignition ON, Engine OFF. 5. In Service ADVISOR, perform Harness Diagnostic Mode Test. <p>Is DTC 002791.07 active?</p>	<p>YES: Replace EGR valve. <u>GO TO 10</u></p> <p>NO: Reinstall EGR valve. <u>GO TO 10</u></p> <p align="right">RE42287,0000562 -19-20MAR12-9/13</p>
<p>6 Circuit Check</p>	<ol style="list-style-type: none"> 1. Press and hold both S2 and S3 buttons on Diagnostic Test Box. 2. Monitor voltage on multimeter. <p>Does voltage now remain between 4.8 and 5.2 V?</p>	<p>YES: Repair open or high resistance in return wire. <u>GO TO 10</u></p> <p>NO: Repair open or high resistance in supply wire. <u>GO TO 10</u></p> <p align="right">RE42287,0000562 -19-20MAR12-10/13</p>
<p>7 Reprogram ECU</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see <u>Engine Control Unit (ECU) — Reprogramming Instructions</u> in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 002791.07 active?</p>	<p>YES: Replace ECU. <u>GO TO 10</u></p> <p>NO: <u>GO TO 10</u></p> <p align="right">RE42287,0000562 -19-20MAR12-11/13</p>
<p>8 Terminal Test</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors A5501 and A5502. 3. Perform <u>Terminal Test</u> on A5501 connector female sockets 19 and 52, and on A5502 connector female socket 18. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 10</u></p> <p>NO: <u>GO TO 9</u></p> <p align="center">Continued on next page</p> <p align="right">RE42287,0000562 -19-20MAR12-12/13</p>

9 Continuity Check

Measure resistance between A5502 connector female socket 18 and Y5400 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. [GO TO 10](#)

NO: Repair open, high resistance, or mis-pin in harness. [GO TO 10](#)

RE42287,0000562 -19-20MAR12-13/13

10 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO [Exhaust Condition Check](#) in Section 04, Group 155.

NO: Perform [Verification Procedure](#).

RE42287,0000562 -19-20MAR12-14/13

002791.13 — EGR Valve Calibration Error

The ECU has detected the EGR valve is not reaching the desired position that is commanded by the ECU.

Continued on next page

RE42287,0000563 -19-27JUL11-1/5

Diagnostic Procedure

Troubleshooting Sequence:

002791.07

002791.13

When DTC is Displayed:

When the ignition is on, engine is running, and the EGR valve is commanded to a position when the fault is active.
When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected the EGR valve is not reaching the desired position that is commanded by the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for EGR valve position.

Additional references:

For component location, see [Y5400 — EGR Valve](#) in Section 03, Group 140.

For more EGR valve information, see [EGR Valve Operation](#) in Section 03, Group 135.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

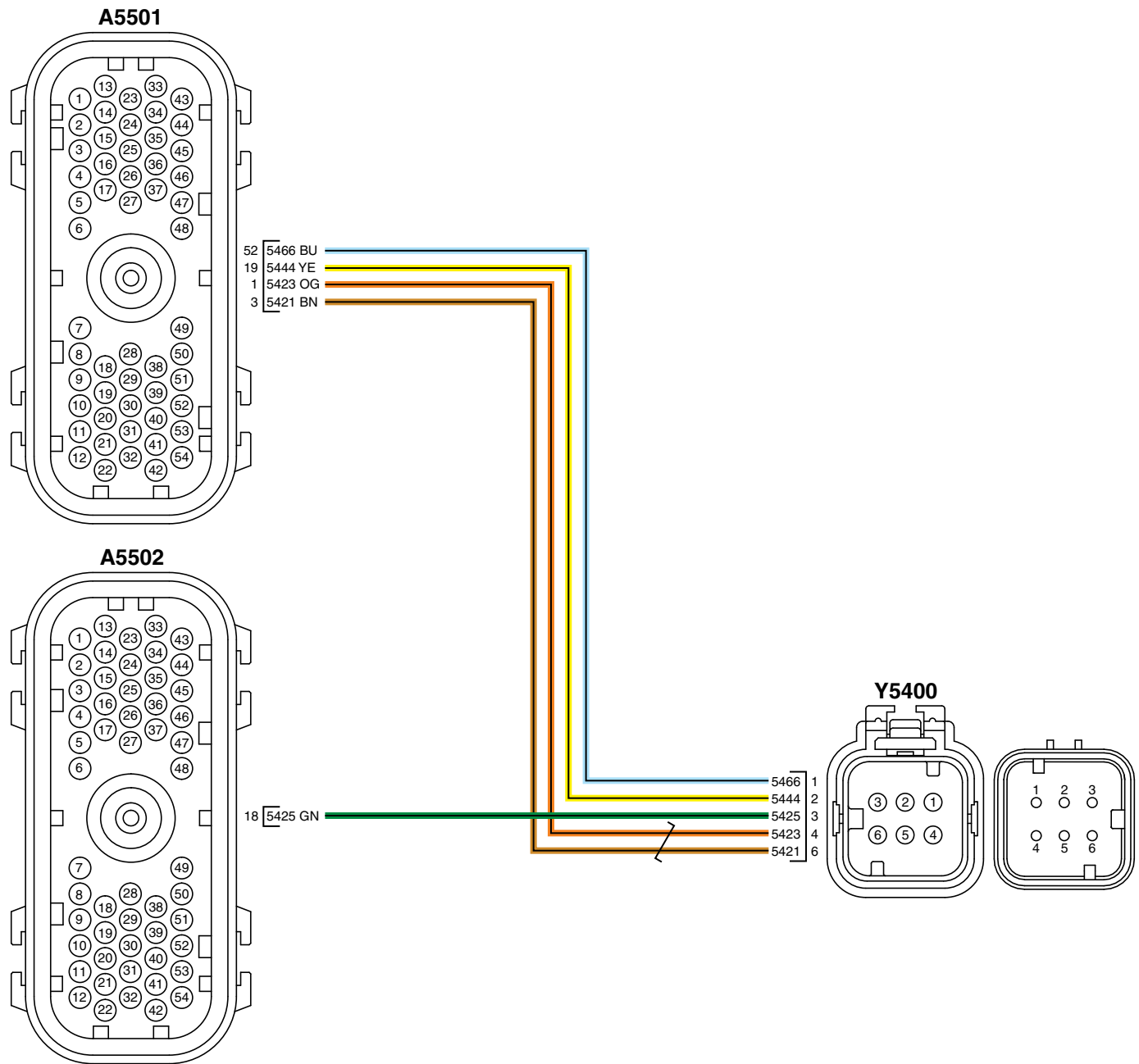
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



EGR Valve Wiring Diagram

A5501—52—Supply
A5501—19—Return

A5501—1—Drive (-)
A5501—3—Drive (+)

A5502—18—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

EGR Valve

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RG16748 —UN—08MAR10

Continued on next page

RE42287,0000563 -19-27JUL11-3/5

Tools:

- JDG10273 – Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000563 -19-27JUL11-4/5

1 Store Snapshot Information and Terminal Test

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect EGR valve connector Y5400.
7. Perform [Terminal Test](#) on EGR valve and Y5400 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,0000563 -19-27JUL11-5/5

2 Clean EGR Valve

1. Perform [Carbon Removal Procedure](#) on EGR valve.
2. Reconnect EGR valve connector Y5400.



CAUTION: Pinch hazard. Keep hands away from valve when ignition is ON to avoid injury.

3. Ignition ON, Engine OFF.
4. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 002791.13 active?

YES: Replace EGR valve. Perform [Verification Procedure](#).

NO: Reinstall EGR valve. Perform [Verification Procedure](#).

RE42287,0000563 -19-27JUL11-6/5

**002795.07 — VGT Vane Desired and Actual
Position Mismatch**

*The ECU has detected that the VGT actuator is not
achieving the desired position command from the ECU.*

Continued on next page

RE42287,0000564 -19-20MAR12-1/8

Diagnostic Procedure

Trouble Shooting Sequence:

000641.00
000641.05
000641.06
000641.07
000641.09
000641.12
000641.13
000641.16
000641.31
002795.07

When DTC is Displayed:

When the ignition is on, engine is running, and the fault is active.

Related Information:

This code is set when the ECU detects that the VGT actuator is not traveling to, or maintaining the position commanded by the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional References:

For VGT actuator location see Y5500 — VGT Actuator in Section 03, Group 140.

For more information on VGT operation, see [VGT Operation](#) in Section 04, Group 160.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on the Harness Diagnostic Mode Test, see [Harness Diagnostic Mode Test Instructions](#) in Section 03, Group 135.

For more information on the VGT Learn Value Reset Test, see [VGT Learn Value Reset Test Instructions](#) in Section 03, Group 135.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



A5501 – 15—Supply **A5501 – 43—CAN Low** **A5501 – 44—CAN High**
A5501 – 31—Return

RE42287.0000564 -19-20MAR12-3/8

RE42287,0000564 -19-20MAR12-4/8

<p>2 Binding Check</p>	<p>1. Ignition OFF, Engine OFF</p> <p>⚠ CAUTION: Turbocharger, linkage, and surrounding area may be extremely hot.</p> <p>2. Disconnect linkage from VGT actuator and vane arm.</p> <p>3. Manually move VGT actuator through entire travel range checking for sticking areas along the travel.</p> <p>Any sticky areas found?</p>	<p>YES: Replace VGT actuator. In Service ADVISOR, perform VGT Learn Value Reset Test . <u>GO TO 5</u></p> <p>NO: <u>GO TO 3</u></p> <p>RE42287,0000564 -19-20MAR12-5/8</p>
<p>3 Binding Check</p>	<p>Manually move VGT vane arm through entire travel range checking for sticking areas along the travel.</p> <p>Any sticky areas found?</p>	<p>YES: Replace VGT. In Service ADVISOR, perform VGT Learn Value Reset Test . <u>GO TO 5</u></p> <p>NO: <u>GO TO 4</u></p> <p>RE42287,0000564 -19-20MAR12-6/8</p>
<p>4 Linkage Check</p>	<p>1. Ignition OFF, Engine OFF</p> <p>2. Inspect VGT actuator linkage for damage, such as being broken or bent.</p> <p>Any damage found?</p>	<p>YES: Replace VGT actuator linkage. In Service ADVISOR, perform VGT Learn Value Reset Test . <u>GO TO 5</u></p> <p>NO: <u>GO TO Problem Not Found Procedure.</u></p> <p>RE42287,0000564 -19-20MAR12-7/8</p>
<p>5 Check Codes</p>	<p>Check DTC list.</p> <p>Is DTC 003719.00 present?</p>	<p>YES: <u>GO TO Exhaust Condition Check</u> in Section 04, Group 155.</p> <p>NO: Perform <u>Verification Procedure.</u></p> <p>RE42287,0000564 -19-20MAR12-8/8</p>

**003464.05 — Air Throttle Actuator Drive
Circuit Fault**

*The ECU has detected a fault on the air throttle
actuator drive circuit.*

Continued on next page

RE42287,0000565 -19-27JUL11-1/16

Diagnostic Procedure

Troubleshooting Sequence:

003464.05

When DTC is Displayed:

When the ignition is on, engine is running, and the air throttle actuator is commanded to a position with the fault active.
When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that there is a fault on the air throttle drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for air throttle actuator position.

Additional references:

For component location, see Y5401 — Air Throttle Actuator in Section 03, Group 140.

For more air throttle actuator information, see Air Throttle Actuator Operation in Section 03, Group 135.

For more information on the Air Throttle Actuator Learned Value Reset Test, see Air Throttle Actuator Learn Value Reset Test Instructions in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

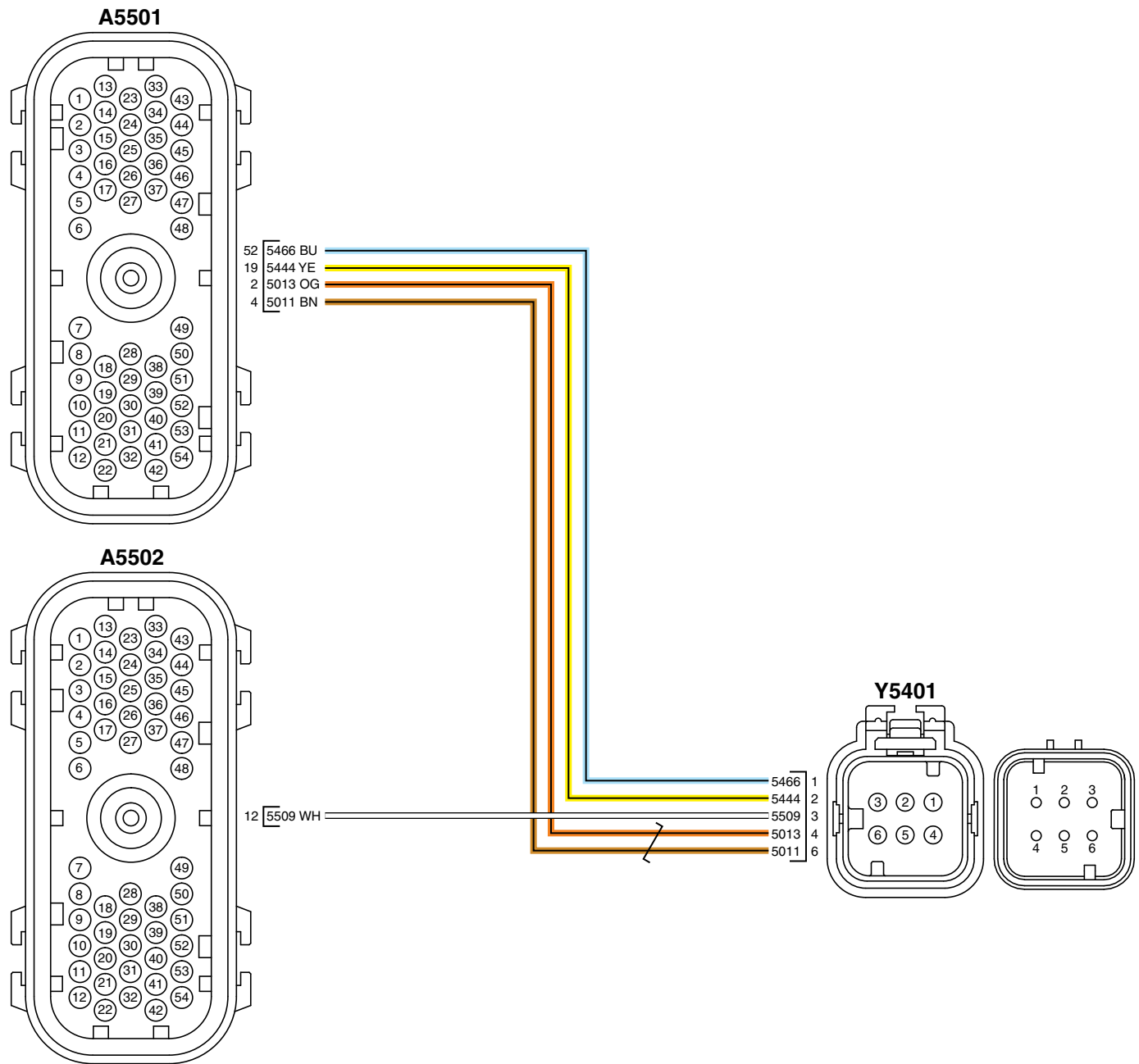
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 4

located in Section 06, Group 210.



Air Throttle Actuator Wiring Diagram

A5501—52—Supply
A5501—19—Return

A5501—2—Drive (-)
A5501—4—Drive (+)

A5502—12—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

Air Throttle Actuator

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16747 —UN—08MAR10

Continued on next page

RE42287,0000565 -19-27JUL11-3/16

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000565 -19-27JUL11-4/16

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 003464.05 active?

YES: [GO TO 2](#)

NO: [GO TO 9](#)

RE42287,0000565 -19-27JUL11-5/16

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect air throttle actuator connector Y5401.
3. Perform [Terminal Test](#) on air throttle actuator and Y5401 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,0000565 -19-27JUL11-6/16

3 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 2, 4, 19, and 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000565 -19-27JUL11-7/16

4 Short to Voltage Check

1. Ignition ON, Engine OFF.
2. Measure voltage between Y5401 connector female sockets 4 (+) and single point ground (-).
3. Measure voltage between Y5401 connector female sockets 6 (+) and single point ground (-).

Are both measurements less than 0.5 V?

YES: [GO TO 5](#)

NO: Repair drive wire short to voltage in harness.
Perform [Verification Procedure](#).

Continued on next page

RE42287,0000565 -19-27JUL11-8/16

5 Continuity Check	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Measure resistance between A5501 connector female socket 2 and Y5401 connector female socket 4. 3. Measure resistance between A5501 connector female socket 4 and Y5401 connector female socket 6. <p>Are both resistance measurements less than 5 ohms?</p>	<p>YES: <u>GO TO 6</u></p> <p>NO: Repair drive wire open or high resistance in harness. Perform <u>Verification Procedure</u>.</p> <p>RE42287,0000565 -19-27JUL11-9/16</p>
6 Short to Ground Check	<ol style="list-style-type: none"> 1. Measure resistance between Y5401 connector female socket 4 and single point ground. 2. Measure resistance between Y5401 connector female socket 6 and single point ground. <p>Is either measurement less than 100k ohms?</p>	<p>YES: Repair drive wire short to ground in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 7</u></p> <p>RE42287,0000565 -19-27JUL11-10/16</p>
7 Wire to Wire Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 2 and all other sockets in A5501. 2. Measure resistance between A5501 connector female socket 4 and all other sockets in A5501. <p>Is any measurement less than 100k ohms?</p>	<p>YES: Repair drive wire short in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 8</u></p> <p>RE42287,0000565 -19-27JUL11-11/16</p>
8 Replace Air Throttle Actuator	<ol style="list-style-type: none"> 1. Replace air throttle actuator. 2. Reconnect ECU connector A5501. 3. Ignition ON, Engine OFF. <p><i>NOTE: Ignore any air throttle actuator codes except for DTC 003464.05.</i></p> <ol style="list-style-type: none"> 4. In Service ADVISOR, perform Air Throttle Actuator Learn Value Reset. <p>Is DTC 003464.05 active?</p>	<p>YES: Replace ECU. Perform <u>Verification Procedure</u>.</p> <p>NO: Perform <u>Verification Procedure</u>.</p> <p>RE42287,0000565 -19-27JUL11-12/16</p>
9 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect air throttle actuator connector Y5401. 3. Perform <u>Terminal Test</u> on air throttle actuator and Y5401 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 10</u></p> <p>Continued on next page</p> <p>RE42287,0000565 -19-27JUL11-13/16</p>

10 Terminal Test	<ol style="list-style-type: none"> 1. Disconnect ECU connector A5501. 2. Perform <u>Terminal Test</u> on A5501 connector female sockets 2, 4, 19, and 52. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 11</u></p> <p align="right">RE42287,0000565 -19-27JUL11-14/16</p>
11 Continuity Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 2 and Y5401 connector female socket 4, while performing <u>Wiggle Test</u>. 2. Measure resistance between A5501 connector female socket 4 and Y5401 connector female socket 6, while performing <u>Wiggle Test</u>. <p>Are both resistance measurements always less than 5 ohms?</p>	<p>YES: <u>GO TO 12</u></p> <p>NO: Repair problem. Perform <u>Verification Procedure</u>.</p> <p align="right">RE42287,0000565 -19-27JUL11-15/16</p>
12 Short to Ground Check	<ol style="list-style-type: none"> 1. Measure resistance between Y5401 connector female socket 4 and single point ground, while performing <u>Wiggle Test</u>. 2. Measure resistance between Y5401 connector female socket 6 single point ground, while performing <u>Wiggle Test</u>. <p>Is either measurement ever less than 100k ohms?</p>	<p>YES: Repair drive wire short to ground in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 13</u></p> <p align="right">RE42287,0000565 -19-27JUL11-16/16</p>
13 Wire to Wire Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 2 and all other sockets in A5501, while performing <u>Wiggle Test</u>. 2. Measure resistance between A5501 connector female socket 4 and all other sockets in A5501, while performing <u>Wiggle Test</u>. <p>Is any measurement ever less than 100k ohms?</p>	<p>YES: Repair drive wire short in harness. <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO Problem Not Found Procedure</u>.</p> <p align="right">RE42287,0000565 -19-27JUL11-17/16</p>

**003464.06 — Air Throttle Actuator Drive
Circuit Has Low Resistance**

*The ECU has detected low resistance on the air
throttle actuator drive circuit.*

Continued on next page

RE42287,0000566 -19-27JUL11-1/11

Diagnostic Procedure

Troubleshooting Sequence:

003464.06

When DTC is Displayed:

When the ignition is on, engine is running, and the air throttle actuator is commanded to a position with the fault active.
When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that the current to the air throttle actuator is higher than expected, which indicates low resistance in the drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU uses a default value for air throttle actuator position.

Additional references:

For component location, see [Y5401 — Air Throttle Actuator](#) in Section 03, Group 140.

For more air throttle actuator information, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

For more information on the Air Throttle Actuator Learned Value Reset Test, see [Air Throttle Actuator Learn Value Reset Test Instructions](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

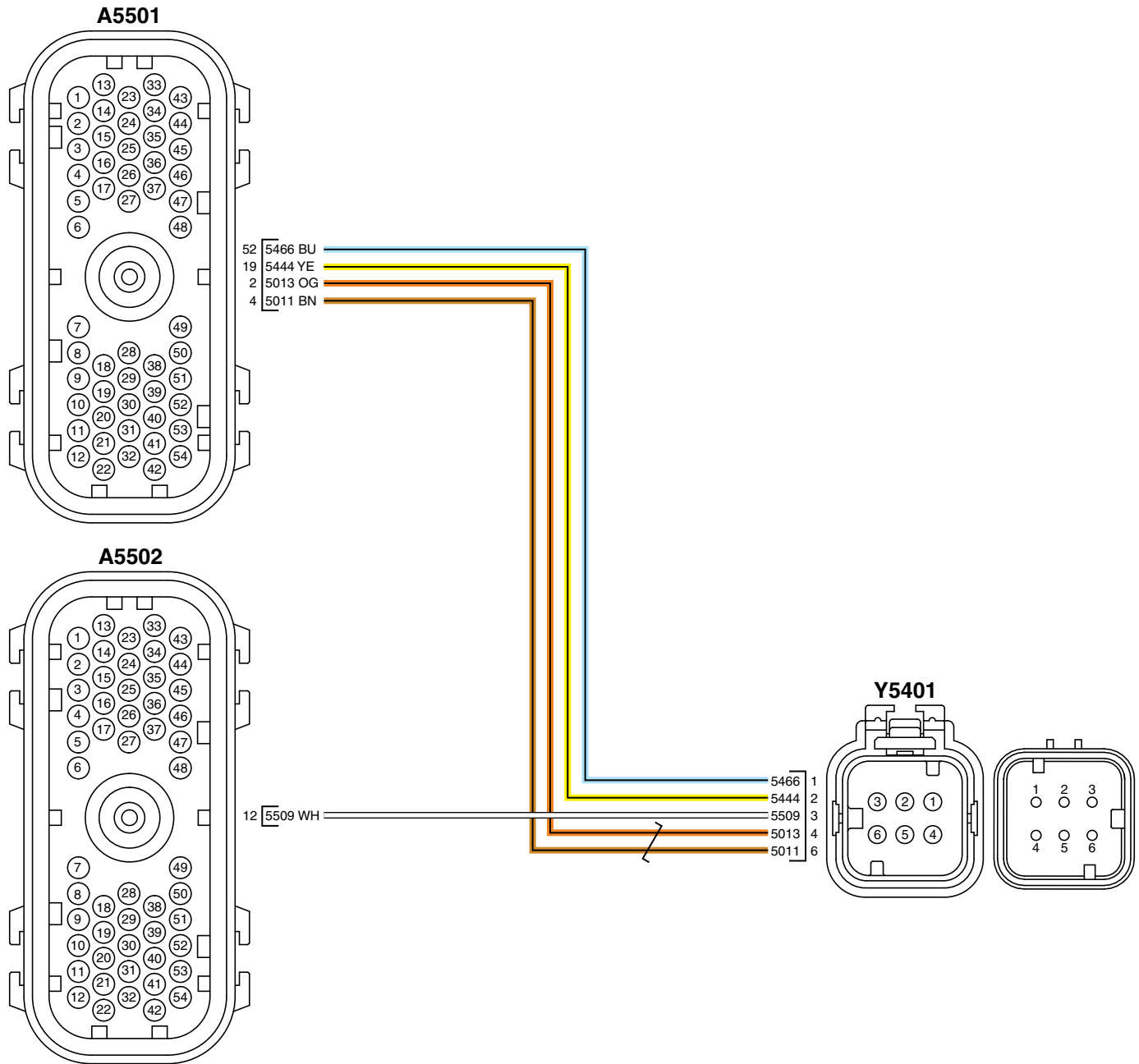
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Air Throttle Actuator Wiring Diagram

A5501—52—Supply
A5501—19—Return

A5501—2—Drive (-)
A5501—4—Drive (+)

A5502—12—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

Air Throttle Actuator

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16747 —UN—08MAR10

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RE42287,0000566 -19-27JUL11-3/11

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000566 -19-27JUL11-4/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 003464.06 active?

YES: [GO TO 2](#)

NO: [GO TO 6](#)

RE42287,0000566 -19-27JUL11-5/11

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect air throttle actuator connector Y5401.
3. Perform [Terminal Test](#) on air throttle actuator and Y5401 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

RE42287,0000566 -19-27JUL11-6/11

3 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 2, 4, 19, and 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000566 -19-27JUL11-7/11

4 Wire to Wire Check

On A5501 connector, measure resistance between female sockets 2 and 4.

Is resistance greater than 100k ohms?

YES: [GO TO 5](#)

NO: Repair short in wiring harness. Perform [Verification Procedure](#).

Continued on next page

RE42287,0000566 -19-27JUL11-8/11

5 Replace Air Throttle Actuator

1. Replace air throttle actuator.
 2. Ignition ON, Engine OFF.
- NOTE: Ignore any air throttle actuator codes except for DTC 003464.06.*
3. In Service ADVISOR, perform Air Throttle Actuator Learn Value Reset.

Is DTC 003464.06 active?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

RE42287,0000566 -19-27JUL11-9/11

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect air throttle actuator connector Y5401.
3. Perform [Terminal Test](#) on air throttle actuator and Y5401 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 7](#)

RE42287,0000566 -19-27JUL11-10/11

7 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 2, 4, 19, and 52. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 8](#)

RE42287,0000566 -19-27JUL11-11/11

8 Wire to Wire Check

On A5501 connector, measure resistance between female sockets 2 and 4 while performing [Wiggle Test](#).

Is resistance measurement always greater than 100k ohms?

YES: [GO TO Problem Not Found Procedure](#).

NO: Repair short in wiring harness. Perform [Verification Procedure](#).

RE42287,0000566 -19-27JUL11-12/11

003464.07 — Air Throttle Actuator Desired and Actual Position Mismatch During a Learn

The ECU has detected the air throttle actuator is not reaching the desired position that is commanded by the ECU.

Continued on next page

RE42287,0000567 -19-20MAR12-1/13

Diagnostic Procedure

Troubleshooting Sequence:

003464.05

003464.06

003464.07

When DTC is Displayed:

When the ignition is on, engine is running, and the air throttle actuator is commanded to a position when the fault is active.

When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected the air throttle actuator is not reaching the desired position that is commanded by the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for air throttle actuator position.

Additional references:

For component location, see [Y5401 — Air Throttle Actuator](#) in Section 03, Group 140.

For more air throttle actuator information, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on the Air Throttle Actuator Learned Value Reset Test, see [Air Throttle Actuator Learn Value Reset Test Instructions](#) in Section 04, Group 160.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

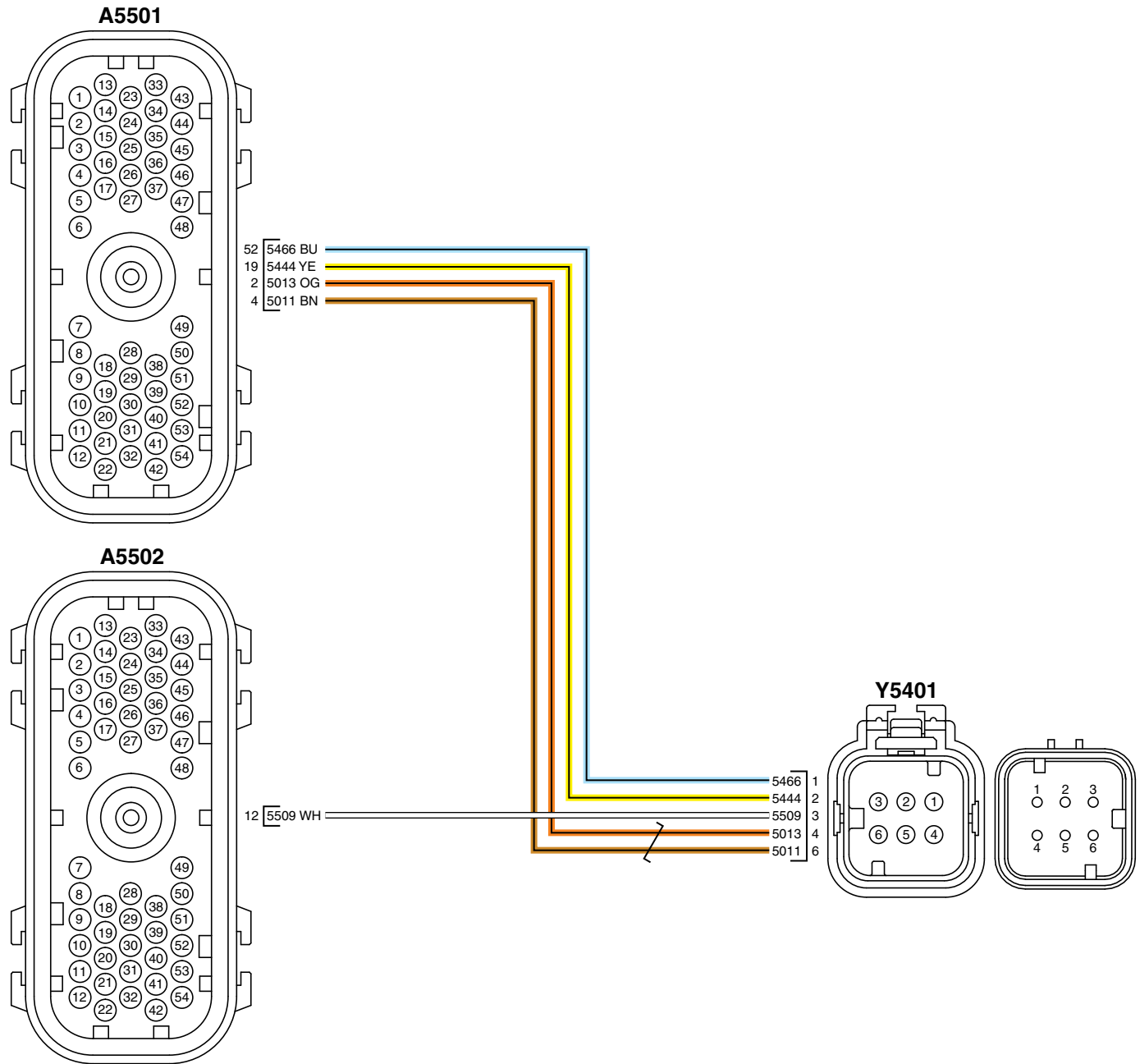
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Air Throttle Actuator Wiring Diagram

A5501—52—Supply
A5501—19—Return

A5501—2—Drive (-)
A5501—4—Drive (+)

A5502—12—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

Air Throttle Actuator

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16747 —UN—08MAR10

Continued on next page

RE42287,0000567 -19-20MAR12-3/13

Tools:

- JDG10273 – Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000567 -19-20MAR12-4/13

1 Store Snapshot Information and Terminal Test

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect air throttle actuator connector Y5401.
7. Perform Terminal Test on air throttle actuator and Y5401 connector.

Were any problems found?

YES: Repair problem. GO TO 10

NO: GO TO 2

RE42287,0000567 -19-20MAR12-5/13

2 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to Y5401 connector female socket 1 (+).
 - B to Y5401 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 3

NO: GO TO 6

RE42287,0000567 -19-20MAR12-6/13

3 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to Y5401 connector female socket 3 (+).
 - B to Y5401 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 4

NO: GO TO 8

Continued on next page

RE42287,0000567 -19-20MAR12-7/13

4 Software Check	<p>In Service ADVISOR, monitor Air Throttle Actuator Position Input Voltage.</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: GO TO 5</p> <p>NO: GO TO 7</p> <p align="right">RE42287,0000567 -19-20MAR12-8/13</p>
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5 Clean Air Throttle Actuator	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Perform Carbon Removal Procedure on air throttle actuator. 3. Reconnect air throttle actuator connector Y5401. <p>⚠ CAUTION: Pinch hazard. Keep hands away from actuator when ignition is ON to avoid injury.</p> <ol style="list-style-type: none"> 4. Ignition ON, Engine OFF. 5. In Service ADVISOR, perform Harness Diagnostic Mode Test. <p>Is DTC 003464.07 active?</p>	<p>YES: Replace air throttle actuator. GO TO 10</p> <p>NO: Reinstall air throttle actuator. GO TO 10</p> <p align="right">RE42287,0000567 -19-20MAR12-9/13</p>
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6 Circuit Check	<ol style="list-style-type: none"> 1. Press and hold both S2 and S3 buttons on Diagnostic Test Box. 2. Monitor voltage on multimeter. <p>Does voltage now remain between 4.8 and 5.2 V?</p>	<p>YES: Repair open or high resistance in return wire. GO TO 10</p> <p>NO: Repair open or high resistance in supply wire. GO TO 10</p> <p align="right">RE42287,0000567 -19-20MAR12-10/13</p>
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7 Reprogram ECU	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 003464.07 active?</p>	<p>YES: Replace ECU. GO TO 10</p> <p>NO: GO TO 10</p> <p align="right">RE42287,0000567 -19-20MAR12-11/13</p>
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8 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors A5501 and A5502. 3. Perform Terminal Test on A5501 connector female sockets 19 and 52, and on A5502 connector female socket 12. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. GO TO 10</p> <p>NO: GO TO 9</p> <p align="right">Continued on next page RE42287,0000567 -19-20MAR12-12/13</p>
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9 Continuity Check

Measure resistance between A5502 connector female socket 12 and Y5401 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. [GO TO 10](#)

NO: Repair open, high resistance, or mis-pin in harness. [GO TO 10](#)

RE42287,0000567 -19-20MAR12-13/13

10 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO [Exhaust Condition Check](#) in Section 04, Group 155.

NO: Perform [Verification Procedure](#).

RE42287,0000567 -19-20MAR12-14/13

003464.13 — Air Throttle Actuator Calibration Error

The ECU has detected the air throttle actuator is not reaching the desired position that is commanded by the ECU.

Continued on next page

RE42287,0000568 -19-28JUL11-1/5

Diagnostic Procedure

Troubleshooting Sequence:

003464.07

003464.13

When DTC is Displayed:

When the ignition is on, engine is running, and the air throttle actuator is commanded to a position when the fault is active.
When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected the air throttle actuator is not reaching the desired position that is commanded by the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for air throttle actuator position.

Additional references:

For component location, see [Y5401 — Air Throttle Actuator](#) in Section 03, Group 140.

For more air throttle actuator information, see [Air Throttle Actuator Operation](#) in Section 03, Group 135.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

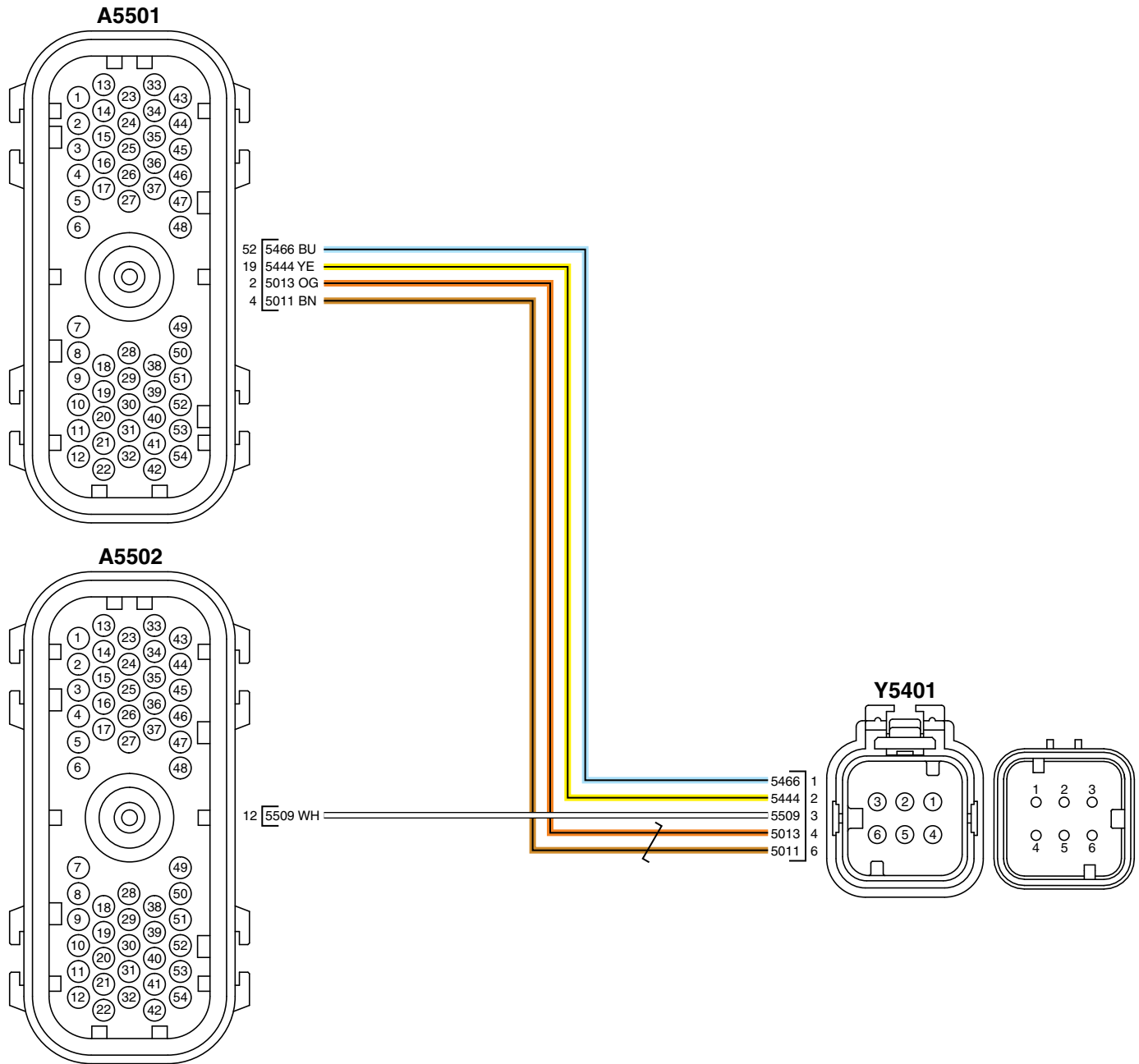
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Air Throttle Actuator Wiring Diagram

A5501—52—Supply
A5501—19—Return

A5501—2—Drive (-)
A5501—4—Drive (+)

A5502—12—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

Air Throttle Actuator

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16747 —UN—08MAR10

Continued on next page

RE42287,0000568 -19-28JUL11-3/5

Tools:

- JDG10273 – Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,0000568 -19-28JUL11-4/5

1 Store Snapshot Information and Terminal Test

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect air throttle actuator connector Y5401.
7. Perform [Terminal Test](#) on air throttle actuator and Y5401 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,0000568 -19-28JUL11-5/5

2 Clean Air Throttle Actuator

1. Ignition OFF, Engine OFF.
2. Perform [Carbon Removal Procedure](#) on air throttle actuator.
3. Reconnect air throttle actuator connector Y5401.

⚠ CAUTION: Pinch hazard. Keep hands away from actuator when ignition is ON to avoid injury.

4. Ignition ON, Engine OFF.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 003464.13 active?

YES: Replace air throttle actuator. Perform [Verification Procedure](#).

NO: Reinstall air throttle actuator. Perform [Verification Procedure](#).

RE42287,0000568 -19-28JUL11-6/5

**003465.00 — Exhaust Throttle Actuator
Temperature Extremely High**

*The Exhaust Throttle actuator temperature
is extremely high.*

Continued on next page

DN22556,0000140 -19-05AUG11-1/7

Diagnostic Procedure

Trouble Shooting Sequence:

000110.15
000110.16
000110.00
000111.01
000111.17
000111.18
003465.00

When DTC is Displayed:

When the ignition is on, engine is running, and the Exhaust Throttle actuator reports the fault is active.

Related Information:

This code is set when the Exhaust Throttle actuator detects that its internal temperature is extremely high. The Exhaust Throttle actuator sends a message via the CAN communication system to the ECU stating that its internal temperature is extremely high and the ECU sets the fault.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

The Exhaust Throttle actuator remains active, and turns off the motor inside the actuator. The actuator is spring loaded and defaults to the open position when this fault occurs.

Additional References:

For Exhaust Throttle actuator location see Y5500 — [Exhaust Throttle Actuator](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

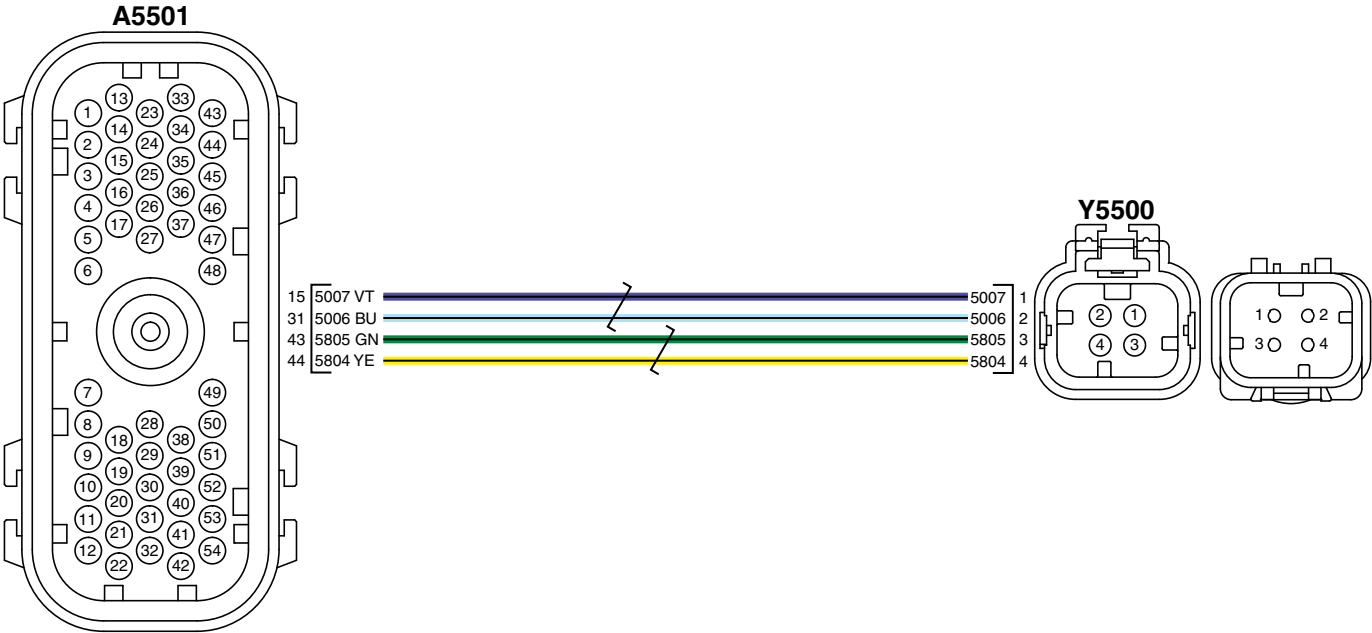
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Exhaust Throttle Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return
A5501 – 43—CAN Low
A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

- Flex probes:
- Actuator
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple
- ECU
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple

- Tools:
- JT07306 – Digital Multimeter
 - J-35616-20 – Test Leads

DN22556,0000140 -19-05AUG11-3/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.
2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Review snapshot information to identify if any coolant system faults occurred near the time as DTC 003465.00.

Did any coolant system faults occur near the time of DTC 003465.00?

YES: Diagnose and repair cooling system problem. Perform [Verification Procedure](#).

NO: [GO TO 2](#)

Continued on next page

DN22556,0000140 -19-05AUG11-4/7

2 Cooling System Check

1. Ignition OFF, Engine OFF.

2. Ensure all air is purged from cooling system and Exhaust Throttle actuator. See Coolant System — Air Bleeding in Section 03, Group 070.

Was air present in cooling system?

YES: Perform Verification Procedure.

NO: GO TO 3

DN22556,0000140 -19-05AUG11-5/7

3 Heat Source Check

Inspect application for possible sources of heat near the Exhaust Throttle actuator, such as exhaust piping.

Any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 4

DN22556,0000140 -19-05AUG11-6/7

4 DTC Check

1. Ignition ON, Engine OFF.

2. Refresh codes

Is DTC 003465.00 active?

YES: Replace Exhaust Throttle actuator. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure

DN22556,0000140 -19-05AUG11-7/7

**003465.05 — Exhaust Throttle Actuator Drive
Circuit Has High Resistance**

*The ECU has detected a fault on the Exhaust
Throttle actuator drive circuit.*

Continued on next page

DN22556,0000141 -19-28JUL11-1/12

Diagnostic Procedure**Troubleshooting Sequence:**
003465.05**When DTC is Displayed:**

When the ignition is on and the fault is active.

When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that there is a fault on the Exhaust Throttle actuator drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for Exhaust Throttle actuator position.

Additional References:

For Exhaust Throttle actuator location see Y5500 — Exhaust Throttle Actuator in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

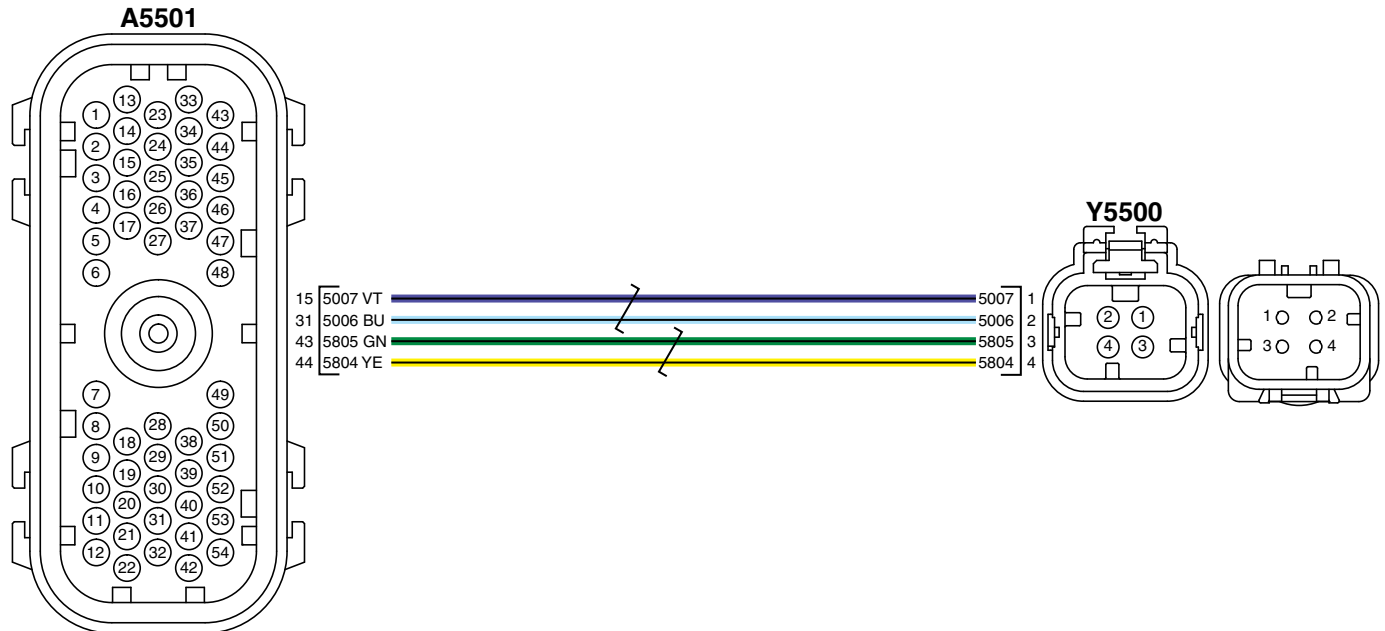
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 1

located in Section 06, Group 210.



Exhaust Throttle Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probe:

Actuator

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Continued on next page

DN22556.0000141 -19-28JUL11-2/12

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

DN22556,0000141 -19-28JUL11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 003465.05 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

DN22556,0000141 -19-28JUL11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect Exhaust Throttle actuator connector Y5500.
3. Perform [Terminal Test](#) on Exhaust Throttle actuator and Y5500 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

DN22556,0000141 -19-28JUL11-5/12

3 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

DN22556,0000141 -19-28JUL11-6/12

4 Short to Voltage Check

1. Ignition ON, Engine OFF
2. On A5501 connector, measure voltage between female socket 15 and single point ground.

Is voltage measurement greater than 0.5 V?

YES: [GO TO Short to Voltage Procedure](#)

NO: [GO TO 5](#)

Continued on next page

DN22556,0000141 -19-28JUL11-7/12

5 Continuity Check	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF 2. Measure resistance between A5501 connector female socket 15 and Y5500 connector female socket 1. 3. Measure resistance between A5501 connector female socket 31 and Y5500 connector female socket 2. <p>Are both resistance measurements less than 5 ohms?</p>	<p>YES: <u>GO TO 6</u></p> <p>NO: Repair open or high resistance on drive wire in harness. Perform <u>Verification Procedure</u>.</p> <p align="right">DN22556,0000141 -19-28JUL11-8/12</p>
6 Continuity Check	<ol style="list-style-type: none"> 1. Reconnect ECU connector A5501. 2. Measure resistance between Y5500 connector female socket 2 and single point ground. <p>Is resistance measurement less than 5 ohms?</p>	<p>YES: Replace Exhaust Throttle actuator. Perform <u>Verification Procedure</u>.</p> <p>NO: Replace ECU. Perform <u>Verification Procedure</u>.</p> <p align="right">DN22556,0000141 -19-28JUL11-9/12</p>
7 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Exhaust Throttle actuator connector Y5500. 3. Perform <u>Terminal Test</u> on Exhaust Throttle actuator and Y5500 connector. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 8</u></p> <p align="right">DN22556,0000141 -19-28JUL11-10/12</p>
8 Terminal Test	<ol style="list-style-type: none"> 1. Disconnect ECU connector A5501. 2. Perform <u>Terminal Test</u> on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 8</u></p> <p align="right">DN22556,0000141 -19-28JUL11-11/12</p>
9 Continuity Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 15 and Y5500 connector female socket 1, while performing <u>Wiggle Test</u>. 2. Measure resistance between A5501 connector female socket 31 and Y5500 connector female socket 2, while performing <u>Wiggle Test</u>. <p>Are both resistance measurements always less than 5 ohms?</p>	<p>YES: <u>GO TO Problem Not Found Procedure</u>.</p> <p>NO: Repair wiring harness problem. Perform <u>Verification Procedure</u>.</p> <p align="right">DN22556,0000141 -19-28JUL11-12/12</p>

**003465.06 — Exhaust Throttle Actuator Drive
Circuit Has Low Resistance**

*The ECU has detected low resistance on the Exhaust
Throttle actuator drive circuit.*

Continued on next page

DN22556,0000142 -19-08AUG11-1/12

Diagnostic Procedure**Troubleshooting Sequence:****0003465.06****When DTC is Displayed:**

When the ignition is on and the fault is active.

When the ignition is on, during the Harness Diagnostic Mode Test with the fault active.

Related Information:

The ECU has detected that the current to the Exhaust Throttle actuator is higher than expected, which indicates low resistance in the drive circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for Exhaust Throttle actuator position.

Additional References:

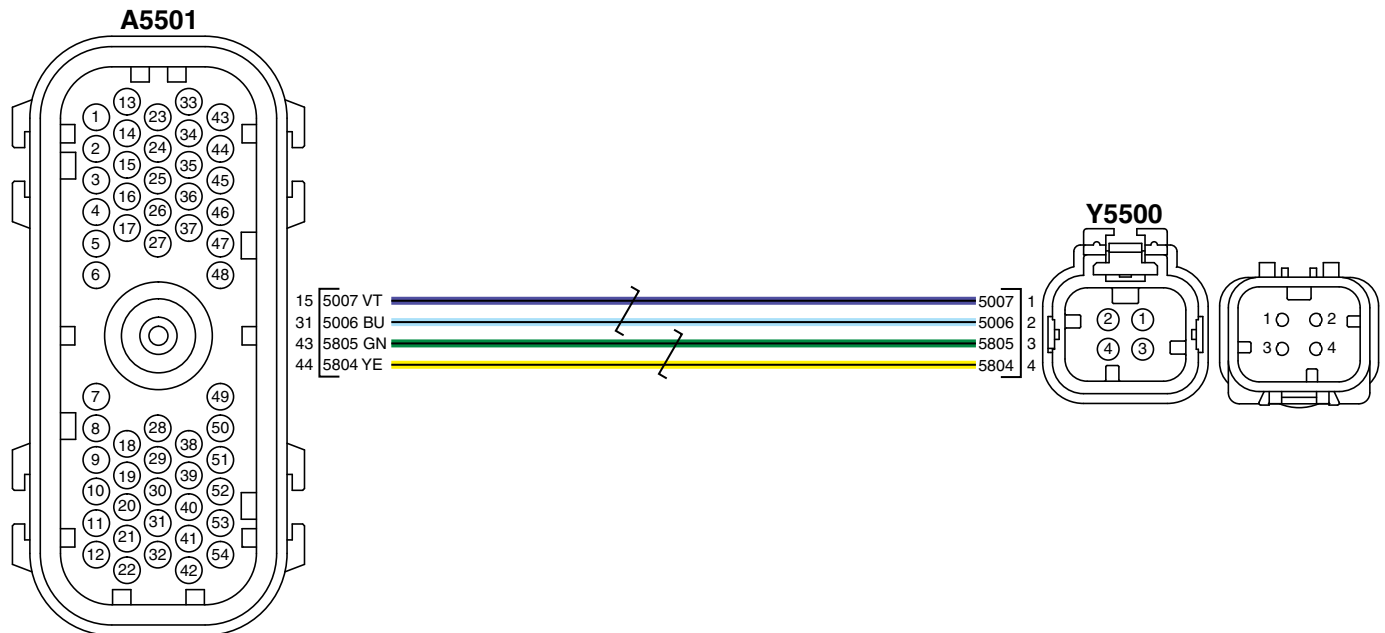
For Exhaust Throttle actuator location see Y5500 — Exhaust Throttle Actuator in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.*NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.*

For connector repair or complete wiring information:

- see Connector Repair Information Table- see 4.5L Wiring Diagram 1

located in Section 06, Group 210.

*Exhaust Throttle Actuator Wiring Diagram*A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

RG17734A —UN—30NOV10

Continued on next page

DN22556,0000142 -19-08AUG11-2/12

Flex probe:

Actuator

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

DN22556,0000142 -19-08AUG11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 0003465.06 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

DN22556,0000142 -19-08AUG11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect Exhaust Throttle actuator connector Y5500.
3. Perform [Terminal Test](#) on Exhaust Throttle actuator and Y5500 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

DN22556,0000142 -19-08AUG11-5/12

3 Terminal Test

1. Disconnect ECU connector A5501.
2. Perform [Terminal Test](#) on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

DN22556,0000142 -19-08AUG11-6/12

4 Wire to Wire Check

On A5501 connector, measure resistance between female sockets 15 and single point ground.

Is resistance greater than 100k ohms?

YES: [GO TO 5](#)

NO: Repair short in wiring harness. Perform [Verification Procedure](#).

Continued on next page

DN22556,0000142 -19-08AUG11-7/12

<p>5 Wire to Wire Check</p>	<p>On A5501 connector, measure resistance between female sockets 15 and all other female sockets in A5501 connector.</p> <p>Are any resistances less than 100k ohms?</p>	<p>YES: Repair short in wiring harness. Perform Verification Procedure.</p> <p>NO: GO TO 6</p> <p align="right">DN22556,0000142 -19-08AUG11-8/12</p>
<p>6 ECU Check</p>	<p>1. Ignition ON, Engine OFF</p> <p>2. In Service ADVISOR, perform Harness Diagnostic Mode Test.</p> <p>Is DTC 0003465.06 active?</p>	<p>YES: Replace ECU. Perform Verification Procedure.</p> <p>NO: Replace Exhaust Throttle actuator. Perform VGT or Exhaust Throttle Learn Value Reset Test. Perform Verification Procedure.</p> <p align="right">DN22556,0000142 -19-08AUG11-9/12</p>
<p>7 Terminal Test</p>	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Disconnect Exhaust Throttle actuator connector Y5500.</p> <p>3. Perform Terminal Test on Exhaust Throttle actuator and Y5500 connector.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 8</p> <p align="right">DN22556,0000142 -19-08AUG11-10/12</p>
<p>8 Terminal Test</p>	<p>1. Disconnect ECU connector A5501.</p> <p>2. Perform Terminal Test on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 9</p> <p align="right">DN22556,0000142 -19-08AUG11-11/12</p>
<p>9 Wire to Wire Check</p>	<p>On Y5500 connector, measure resistance between female sockets 1 and single point ground while performing Wiggle Test.</p> <p>Is resistance measurement always greater than 100k ohms?</p>	<p>YES: GO TO Problem Not Found Procedure.</p> <p>NO: Repair short in wiring harness. Perform Verification Procedure.</p> <p align="right">DN22556,0000142 -19-08AUG11-12/12</p>

**003465.07 — Exhaust Throttle Actuator
Learn Error**

*The Exhaust Throttle actuator has failed the learn
cycle on initialization.*

Continued on next page

DN22556,0000143 -19-20MAR12-1/9

Diagnostic Procedure

Trouble Shooting Sequence:

003465.05
003465.06
003465.12
003465.13
003465.31
003465.07

When DTC is Displayed:

When the ignition is turned on and the fault is active.
During Harness Diagnostic Mode Test and the fault is active.

Related Information:

This code is set when the ECU detects that the Exhaust Throttle actuator travel is not within predefined travel limits that are set by the initial calibration of the Exhaust Throttle actuator.
The Exhaust Throttle actuator travel is checked at ignition on and during Harness Diagnostic Mode Test.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For Exhaust Throttle actuator location see [Y5500 — Exhaust Throttle Actuator](#) in Section 03, Group 140.

For more information on Exhaust Throttle operation, see [Exhaust Throttle Operation](#) in Section 04, Group 160.

For more information on the Harness Diagnostic Mode Test, see [Harness Diagnostic Mode Test Instructions](#) in Section 03, Group 135.

For more information on the Exhaust Throttle Learn Value Reset Test, see [Exhaust Throttle Learn Value Reset Test Instructions](#) in Section 03, Group 135.

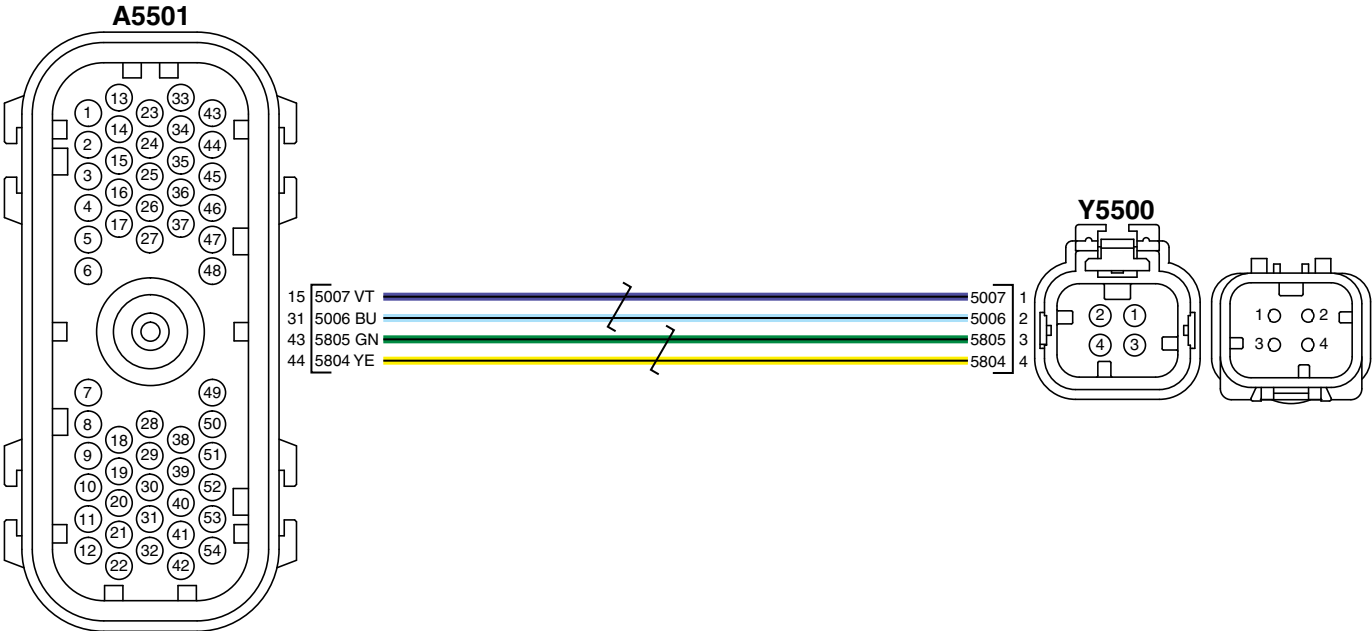
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Exhaust Throttle Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return
A5501 – 43—CAN Low
A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

- Flex probes:
- Actuator
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple
- ECU
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple

- Tools:
- JT07306 – Digital Multimeter
 - J-35616-20 – Test Leads

DN22556,0000143 -19-20MAR12-3/9

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Is DTC 003465.07 active?

YES: [GO TO 2](#)

NO: [GO TO Problem Not Found Procedure](#)

Continued on next page

DN22556,0000143 -19-20MAR12-4/9

<p>2 Binding Check</p>	<p>1. Ignition OFF, Engine OFF</p> <p>⚠ CAUTION: Turbocharger, linkage, and surrounding area may be extremely hot.</p> <p>2. Disconnect linkage from Exhaust Throttle actuator and vane arm.</p> <p>3. Manually move Exhaust Throttle actuator through entire travel range checking for sticking areas along the travel.</p> <p>Any sticky areas found?</p>	<p>YES: Replace Exhaust Throttle actuator. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . GO TO 6</p> <p>NO: GO TO 3</p> <p>DN22556,0000143 -19-20MAR12-5/9</p>
<p>3 Binding Check</p>	<p>Manually move Exhaust Throttle vane arm through entire travel range checking for sticking areas along the travel.</p> <p>Any sticky areas found?</p>	<p>YES: Replace Exhaust Throttle. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . GO TO 6</p> <p>NO: GO TO 4</p> <p>DN22556,0000143 -19-20MAR12-6/9</p>
<p>4 Linkage Check</p>	<p>1. Ignition OFF, Engine OFF</p> <p>2. Inspect Exhaust Throttle actuator linkage for damage, such as being broken or bent.</p> <p>Any damage found?</p>	<p>YES: Replace Exhaust Throttle actuator linkage. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . GO TO 6</p> <p>NO: GO TO 5</p> <p>DN22556,0000143 -19-20MAR12-7/9</p>
<p>5 Movement Check</p>	<p>1. Reassemble all components.</p> <p>2. In Service ADVISOR, perform Harness Diagnostic Mode Test.</p> <p>3. Observe VGT actuator for movement.</p> <p>Does VGT actuator move through the full range of travel?</p>	<p>YES: Perform Verification Procedure.</p> <p>NO: Replace VGT actuator. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . GO TO 6</p> <p>DN22556,0000143 -19-20MAR12-8/9</p>
<p>6 Check Codes</p>	<p>Check DTC list.</p> <p>Is DTC 003719.00 present?</p>	<p>YES: Perform Exhaust Condition Check in Section 04, Group 155.</p> <p>NO: Perform Verification Procedure.</p> <p>DN22556,0000143 -19-20MAR12-9/9</p>

**003465.09 — Exhaust Throttle Actuator Loss
of Communication**

*The ECU is indicating a CAN communication problem
with the Exhaust Throttle actuator.*

Continued on next page

DN22556,0000144 -19-10AUG12-1/14

Diagnostic Procedure**Troubleshooting Sequence:****03465.05****03465.06****03465.09****When DTC is Displayed:**

When the ignition is on and the error is active.

Related Information:

This fault indicates that the ECU is unable to communicate via CAN communication to the Exhaust Throttle actuator, or the Exhaust Throttle actuator is sending a CAN message to the ECU indicating that the Exhaust Throttle actuator is not receiving CAN messages from the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default value for the Exhaust Throttle actuator position.

The Exhaust Throttle actuator defaults to open as long as the actuator has power.

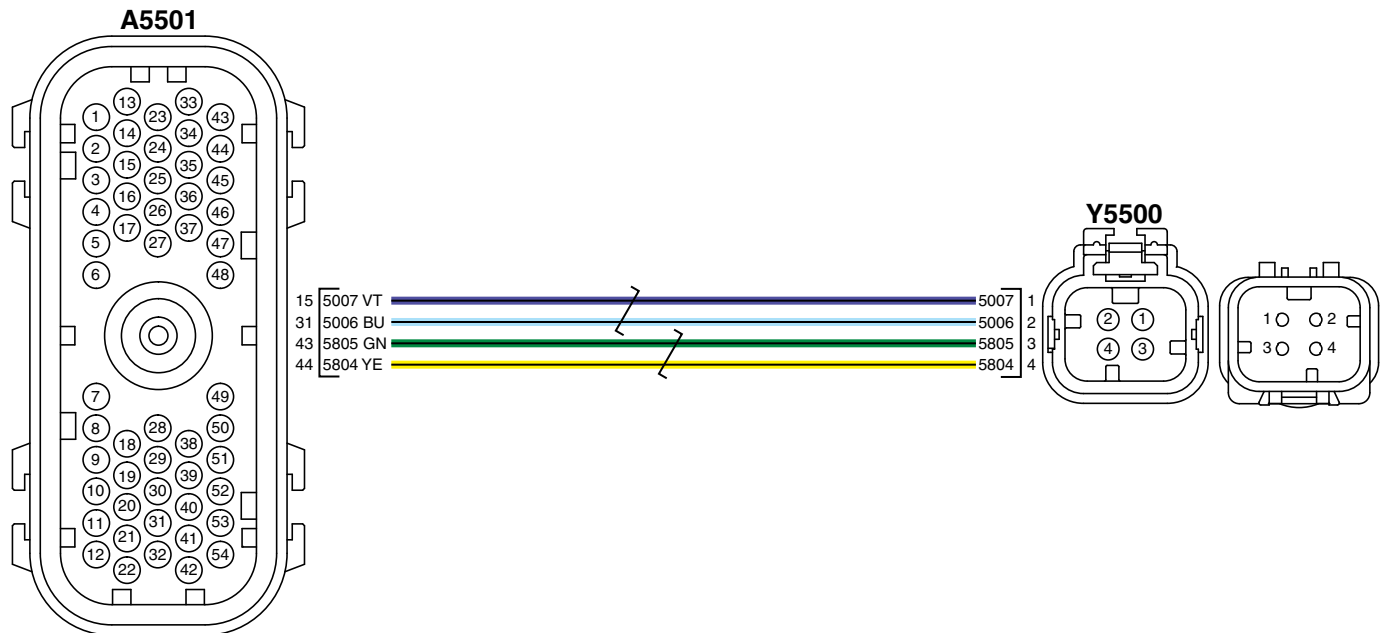
Additional References:For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.For Exhaust Throttle actuator location see [Y5500 — Exhaust Throttle Actuator](#) in Section 03, Group 140.For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.

*Exhaust Throttle Actuator Wiring Diagram*

A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low**A5501 – 44—CAN High**

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Continued on next page

DN22556,0000144 -19-10AUG12-2/14

Flex probe:

Actuator

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

DN22556,0000144 -19-10AUG12-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Are both of the following DTCs active or stored: 003465.09, 522494.09?

YES: GO TO CAN Diagnostic Procedure.

NO: GO TO 2.

DN22556,0000144 -19-10AUG12-4/14

2 Active Code Check

Is DTC 003465.09 active?

YES: GO TO 3.

NO: GO TO 10

DN22556,0000144 -19-10AUG12-5/14

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect Exhaust Throttle actuator connector Y5500.
3. Perform Terminal Test on actuator and Y5500 connector.

Were any problems found?

YES: Repair problem. GO TO 11

NO: GO TO 4

DN22556,0000144 -19-10AUG12-6/14

4 Supply Voltage Check

1. Connect Diagnostic Test Box:
 - A to Y5500 connector female socket 1(+).
 - B to Y5500 connector female socket 2(-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Press and hold S3 on Diagnostic Test Box.
6. Monitor voltage on multimeter.
7. In Service ADVISOR monitor Unswitched Battery Voltage.

Is multimeter reading within 0.5 V of unswitched battery voltage?

YES: GO TO 6

NO: GO TO 5

Continued on next page

DN22556,0000144 -19-10AUG12-7/14

5 Return Circuit Check	<ol style="list-style-type: none"> 1. Press and hold S2 and S3 on Diagnostic Test Box. 2. In Service ADVISOR, monitor Unswitched Battery Voltage. 3. Monitor voltage on multimeter. <p>Is multimeter reading within 0.5 V of unswitched battery voltage?</p>	<p>YES: Repair high resistance in return wire. <u>GO TO 11</u></p> <p>NO: Repair high resistance in supply wire. <u>GO TO 11</u></p>
		<p align="right">DN22556,0000144 -19-10AUG12-8/14</p>
6 CAN Circuit Check	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF 2. Disconnect Diagnostic Test Box. 3. Ignition ON, Engine OFF. 4. On Y5500 connector, measure voltage between female socket 3(+) and 2(-). 5. On Y5500 connector, measure voltage between female socket 4(+) and 2(-). <p>Is voltage for both measurements between 1.5 and 3.5 V?</p>	<p>YES: Replace Exhaust Throttle actuator. <u>GO TO 11</u></p> <p>NO: <u>GO TO 7</u></p>
		<p align="right">DN22556,0000144 -19-10AUG12-9/14</p>
7 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connector A5501. 3. Perform <u>Terminal Test</u> on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. <u>GO TO 11</u></p> <p>NO: <u>GO TO 8</u></p>
		<p align="right">DN22556,0000144 -19-10AUG12-10/14</p>
8 Continuity Check	<ol style="list-style-type: none"> 1. Measure resistance between A5501 connector female socket 44 and Y5500 connector female socket 4. 2. Measure resistance between A5501 connector female socket 43 and Y5500 connector female socket 3. <p>Are both resistances less than 5 ohms?</p>	<p>YES: <u>GO TO 9</u></p> <p>NO: Repair open in harness. <u>GO TO 11</u></p>
		<p align="right">DN22556,0000144 -19-10AUG12-11/14</p>
9 Harness Check	<p>Inspect harness for damage.</p> <p>Any damage found?</p>	<p>YES: Repair or replace harness. <u>GO TO 11</u></p> <p>NO: Contact DTAC for support.</p>
		<p align="right">DN22556,0000144 -19-10AUG12-12/14</p>
10 Wiggle Test	<ol style="list-style-type: none"> 1. Monitor DTCs in Service ADVISOR. 2. Perform <u>Wiggle Test</u>. <p>Does DTC 003465.09 become active?</p>	<p>YES: Repair harness problem. <u>GO TO 11</u></p> <p>NO: <u>GO TO Problem Not Found Procedure.</u></p>
	<p align="center">Continued on next page</p>	<p align="right">DN22556,0000144 -19-10AUG12-13/14</p>

11 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO [Exhaust Condition Check](#) in Section 04, Group 155.
NO: Perform [Verification Procedure](#).

DN22556,0000144 -19-10AUG12-14/14

**003465.12 — Exhaust Throttle Actuator
Internal Error**

*The Exhaust Throttle actuator has detected
an internal error.*

Continued on next page

DN22556,0000145 -19-27JUL11-1/4

Diagnostic Procedure**Trouble Shooting Sequence:**
003465.12**When DTC is Displayed:**

When the ignition is on, or engine is running, and the Exhaust Throttle actuator reports the fault is active.

Related Information:

This code is set when the Exhaust Throttle actuator detects an internal error. The Exhaust Throttle actuator sends a message via the CAN communication system to the ECU stating that it has detected an internal error and the ECU sets the fault.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

The Exhaust Throttle actuator remains active, and turns off the motor inside the actuator. The actuator is spring loaded and defaults to the open position when this fault occurs.

Additional References:

For Exhaust Throttle actuator location see Y5500 — Exhaust Throttle Actuator in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

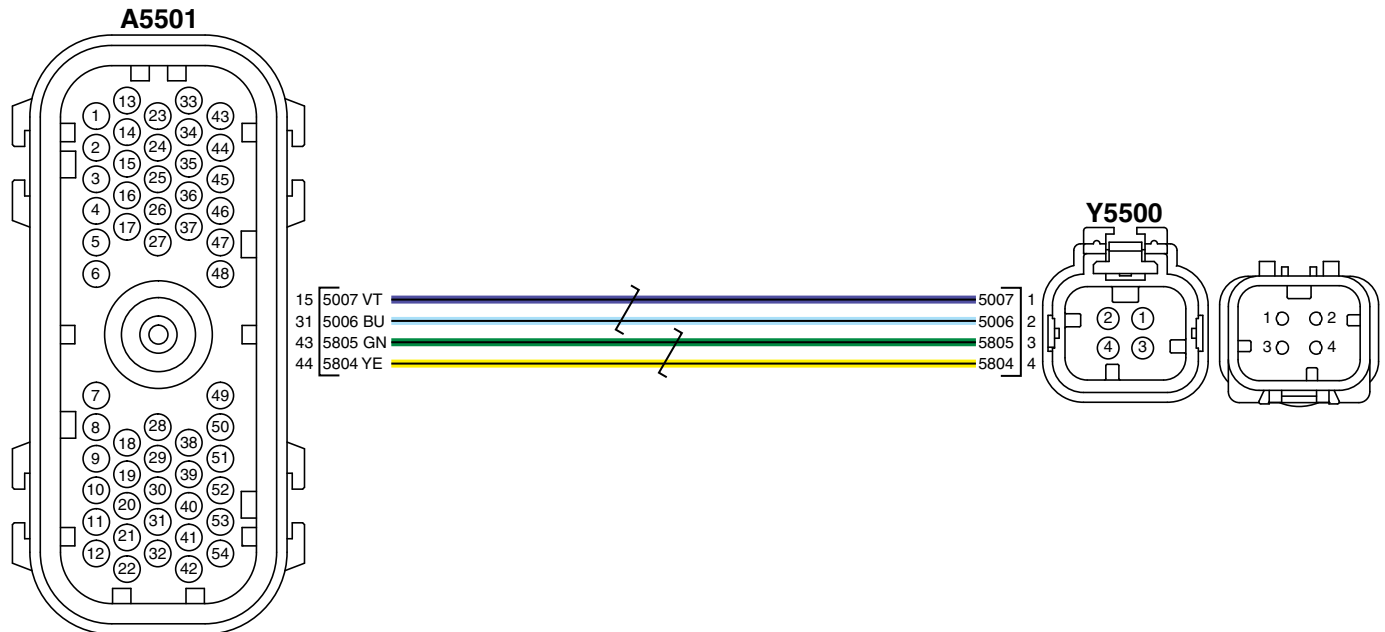
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see 4.5L Wiring Diagram 1

located in Section 06, Group 210.



Exhaust Throttle Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Continued on next page

DN22556,0000145 -19-27JUL11-2/4

Flex probes:

Actuator

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

DN22556,0000145 -19-27JUL11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 003465.12 active?

YES: Replace Exhaust Throttle actuator. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure

DN22556,0000145 -19-27JUL11-4/4

**003465.13 — Exhaust Throttle Actuator
Calibration Error**

The Exhaust Throttle actuator has failed the calibration.

Continued on next page

DN22556,0000146 -19-20MAR12-1/8

Diagnostic Procedure**Trouble Shooting Sequence:**

003465.05

003465.06

003465.09

003465.12

003465.31

003465.13

When DTC is Displayed:

When the ignition is turned on and the fault is active.

Related Information:

This code is set when the ECU detects that the Exhaust Throttle actuator travel is not within predefined travel limits during a calibration. A calibration is needed after clearing the Exhaust Throttle learn values

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional References:

For Exhaust Throttle actuator location see [Y5500 — Exhaust Throttle Actuator](#) in Section 03, Group 140.

For more information on Exhaust Throttle operation, see [Exhaust Throttle Operation](#) in Section 04, Group 160.

For more information on the Exhaust Throttle Learn Value Reset Test, see [Exhaust Throttle Learn Value Reset Test Instructions](#) in Section 03, Group 135.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

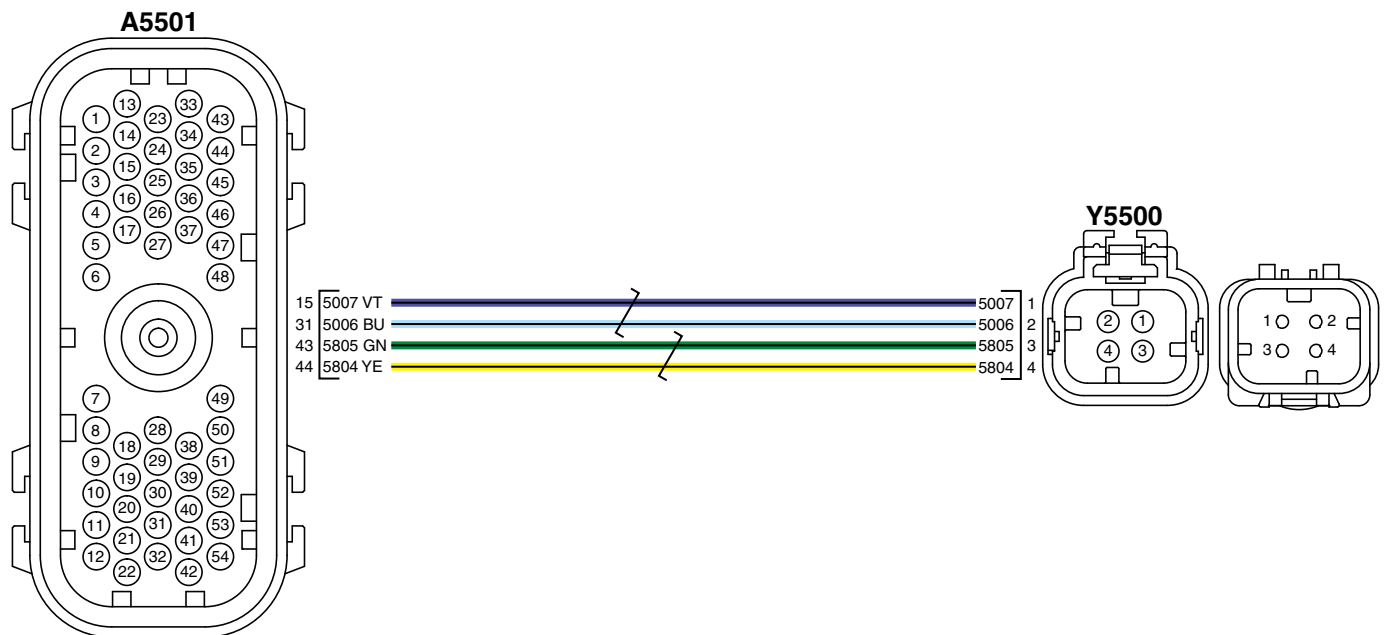
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Exhaust Throttle Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

Continued on next page

DN22556,0000146 -19-20MAR12-2/8

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Actuator

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple

- JDG10461 – Male – Yellow/Purple

Tools:

- JT07306 – Digital Multimeter

- J-35616-20 – Test Leads

DN22556,0000146 -19-20MAR12-3/8

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.
6. Refresh Codes.

Is DTC 003465.13 active?

YES: GO TO 2

NO: GO TO Problem Not Found Procedure

DN22556,0000146 -19-20MAR12-4/8

2 Binding Check

1. Ignition OFF, Engine OFF

CAUTION: Turbocharger, linkage, and surrounding area may be extremely hot.

2. Disconnect linkage from Exhaust Throttle actuator and vane arm.
3. Manually move Exhaust Throttle actuator through entire travel range checking for sticking areas along the travel.

Any sticky areas found?

YES: Replace Exhaust Throttle actuator. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . Perform Verification Procedure.

NO: GO TO 3

DN22556,0000146 -19-20MAR12-5/8

3 Binding Check

Manually move Exhaust Throttle vane arm through entire travel range checking for sticking areas along the travel.

Any sticky areas found?

YES: Replace Exhaust Throttle. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . Perform Verification Procedure.

NO: GO TO 4

DN22556,0000146 -19-20MAR12-6/8

Continued on next page

4 Linkage Check

1. Ignition OFF, Engine OFF

2. Inspect Exhaust Throttle actuator linkage for damage, such as being broken or bent.

Any damage found?

YES: Replace Exhaust Throttle actuator linkage. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . Perform [Verification Procedure](#).

NO: [GO TO 5](#)

DN22556,0000146 -19-20MAR12-7/8

5 Movement Check

1. Reassemble all components.

2. In Service ADVISOR, perform Harness Diagnostic Mode Test.

3. Observe Exhaust Throttle actuator for movement.

Does the Exhaust Throttle actuator move through the full range of travel?

YES: Perform [Verification Procedure](#).

NO: Replace Exhaust Throttle actuator. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . Perform [Verification Procedure](#).

DN22556,0000146 -19-20MAR12-8/8

003465.16 — Exhaust Throttle Actuator Temperature Moderately High

The Exhaust Throttle actuator temperature is moderately higher than a defined threshold in the ECU.

Diagnostic Procedure

Troubleshooting Sequence:

When DTC is Displayed:

When the ignition is on, engine is running, and the Exhaust Throttle actuator reports the fault is active.

Related Information:

This code is set when the Exhaust Throttle actuator detects that its internal temperature is moderately high. The Exhaust Throttle actuator sends a message via the CAN communication system to the ECU stating that its internal temperature is moderately high and the ECU sets the fault.

Alarm Level:

Warning

Control Unit Response:

For troubleshooting procedure see [003465.00 — Exhaust Throttle Actuator Temperature Extremely High](#)

DN22556,0000147 -19-02AUG11-1/1

**003465.31 — Exhaust Throttle Actuator
Supply Voltage Fault**

*The Exhaust Throttle actuator has detected its supply
voltage is out of range high or low.*

Continued on next page

DN22556,0000148 -19-08AUG11-1/11

Diagnostic Procedure

Trouble Shooting Sequence:

000168.01
000168.16
000168.18
003465.05
003465.06
003465.12
003465.31

When DTC is Displayed:

When the ignition is on, or engine is running, and the Exhaust Throttle actuator reports the fault is active.

Related Information:

This code is set when the Exhaust Throttle actuator detects that its supply voltage from the ECU is out of range high or low. The Exhaust Throttle actuator sends a message via the CAN communication system to the ECU stating that its supply voltage is out of range and the ECU sets the fault.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The Exhaust Throttle actuator remains active, and turns off the motor inside the actuator. The actuator is spring loaded and defaults to the open position when this fault occurs.

Additional References:

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For Exhaust Throttle actuator location see [Y5500 — Exhaust Throttle Actuator](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

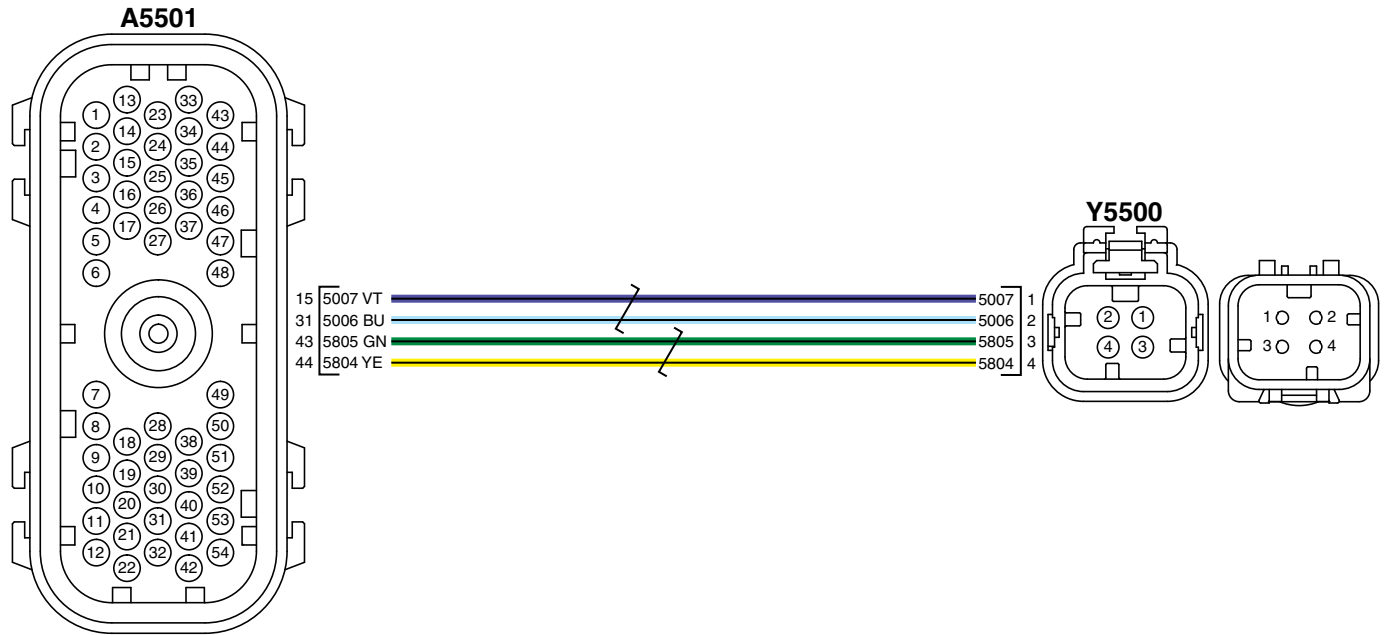
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Exhaust Throttle Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Actuator

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

ECU

- JDG10460 – Female – Yellow/Purple
- JDG10461 – Male – Yellow/Purple

Tools:

- JDG10273 – Diagnostic Test Box
- JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

DN22556,0000148 -19-08AUG11-3/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 003465.31 active?

YES: GO TO 2

NO: GO TO 3

Continued on next page

DN22556,0000148 -19-08AUG11-4/11

<p>2 Actuator Check</p>	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Inspect Exhaust Throttle actuator tag and identify if it is a 12 volt or 24 volt actuator.</p> <p><i>NOTE: If the tag is not legible. It may be necessary to document the part number of the actuator and validate if it is a 12 volt or 24 volt actuator in your parts catalog.</i></p> <p>3. Identify if the system voltage of your application is a 12 volt or 24 volt system.</p> <p>Does the Exhaust Throttle actuator voltage and the applications system voltage match correctly?</p>	<p>YES: GO TO 3</p> <p>NO: Install correct Exhaust Throttle actuator. GO TO 8</p> <p>DN22556,0000148 -19-08AUG11-5/11</p>
<p>3 Charging System Check</p>	<p>1. Check battery terminals and battery state of charge.</p> <p>2. Ignition ON, engine running.</p> <p>3. Check charging system for proper operation.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. GO TO 8</p> <p>NO: GO TO 4</p> <p>DN22556,0000148 -19-08AUG11-6/11</p>
<p>4 Terminal Test</p>	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Disconnect Exhaust Throttle actuator connector Y5500.</p> <p>3. Perform Terminal Test on Exhaust Throttle actuator and Y5500 connector.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. GO TO 8</p> <p>NO: GO TO 5</p> <p>DN22556,0000148 -19-08AUG11-7/11</p>
<p>5 Circuit Check</p>	<p>1. Connect Diagnostic Test Box :</p> <ul style="list-style-type: none"> • A to Y5500 connector female socket 1 (+). • B to Y5500 connector female socket 2 (-). <p>2. Set S1 to position 1 on Diagnostic Test Box.</p> <p>3. Connect multimeter to Diagnostic Test Box.</p> <p>4. Ignition ON, Engine OFF.</p> <p>5. In Service ADVISOR, monitor Unswitched Battery Voltage.</p> <p>6. Press and hold S3 on Diagnostic Test Box.</p> <p>7. Monitor voltage on multimeter.</p> <p>Is reading on multimeter within +/- 0.5 V of unswitched battery voltage?</p>	<p>YES: Replace Exhaust Throttle actuator. GO TO 8</p> <p>NO: GO TO 6</p> <p>DN22556,0000148 -19-08AUG11-8/11</p>
<p>6 Terminal Test</p>	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Disconnect ECU connector A5501.</p> <p>3. Perform Terminal Test on A5501 female sockets 15, 31, 43, and 44. And corresponding ECU male pins.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. GO TO 8</p> <p>NO: GO TO 7</p> <p>Continued on next page</p> <p>DN22556,0000148 -19-08AUG11-9/11</p>

7 Continuity Check

1. Disconnect Diagnostic Test Box.
2. Measure resistance between A5501 connector female socket 15 and Y5500 connector female socket 1.
3. Measure resistance between A5501 connector female socket 31 and Y5500 connector female socket 2.

Are both resistances less than 5 ohms?

YES: Contact DTAC for support.

NO: Repair high resistance or open in harness. Perform Verification Procedure.

DN22556,0000148 -19-08AUG11-10/11

8 Check Codes

Refresh codes

Is DTC 003719.00 active or stored?

YES: GO TO Exhaust Condition Check in Section 04, Group 155.

NO: Perform Verification Procedure.

DN22556,0000148 -19-08AUG11-11/11

**003673.07 — Exhaust Throttle Actuator
Desired and Actual Position Mismatch**

*The ECU has detected that the Exhaust Throttle actuator is
not achieving the desired position command from the ECU.*

Continued on next page

DN22556,0000149 -19-05AUG11-1/7

Diagnostic Procedure

Trouble Shooting Sequence:

003465.00
003465.05
003465.06
003465.07
003465.09
003465.12
003465.13
003465.16
003465.31
003673.07

When DTC is Displayed:

When the ignition is on, engine is running, and the fault is active.

Related Information:

This code is set when the ECU detects that the Exhaust Throttle actuator is not traveling to, or maintaining the position commanded by the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional References:

For Exhaust Throttle actuator location see Y5500 — [Exhaust Throttle Actuator](#) in Section 03, Group 140.

For more information on Exhaust Throttle operation, see [Exhaust Throttle Operation](#) in Section 04, Group 160.

For more information on the Harness Diagnostic Mode Test, see [Harness Diagnostic Mode Test Instructions](#) in Section 03, Group 135.

For more information on the Exhaust Throttle Learn Value Reset Test, see [Exhaust Throttle Learn Value Reset Test Instructions](#) in Section 03, Group 135.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

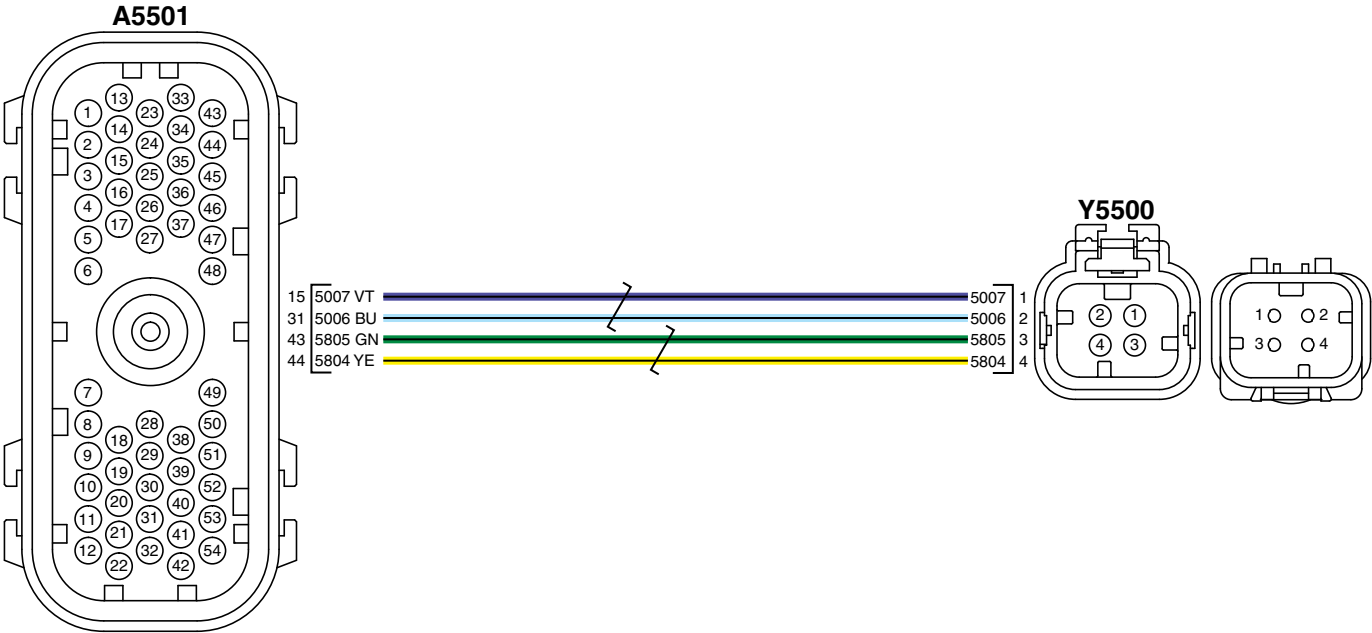
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 1](#)

located in Section 06, Group 210.



Exhaust Throttle Actuator Wiring Diagram

A5501 – 15—Supply
A5501 – 31—Return
A5501 – 43—CAN Low
A5501 – 44—CAN High

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

- Flex probes:
- Actuator
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple
- ECU
- JDG10460 – Female – Yellow/Purple
 - JDG10461 – Male – Yellow/Purple

- Tools:
- JT07306 – Digital Multimeter
 - J-35616-20 – Test Leads

DN22556,0000149 -19-05AUG11-3/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.
2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. In Service ADVISOR, perform Harness Diagnostic Mode Test.

Are any DTCs with an SPN of 003465 active or stored?

YES: GO TO diagnostic procedure for that DTC.
NO: GO TO 2

Continued on next page

DN22556,0000149 -19-05AUG11-4/7

2 Binding Check

1. Ignition OFF, Engine OFF



CAUTION: Turbocharger, linkage, and surrounding area may be extremely hot.

2. Disconnect linkage from Exhaust Throttle actuator and vane arm.
3. Manually move Exhaust Throttle actuator through entire travel range checking for sticking areas along the travel.

Any sticky areas found?

YES: Replace Exhaust Throttle actuator. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . Perform [Verification Procedure](#).

NO: [GO TO 3](#)

DN22556,0000149 -19-05AUG11-5/7

3 Binding Check

Manually move Exhaust Throttle vane arm through entire travel range checking for sticking areas along the travel.

Any sticky areas found?

YES: Replace Exhaust Throttle. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . Perform [Verification Procedure](#).

NO: [GO TO 4](#)

DN22556,0000149 -19-05AUG11-6/7

4 Linkage Check

1. Ignition OFF, Engine OFF
2. Inspect Exhaust Throttle actuator linkage for damage, such as being broken or bent.

Any damage found?

YES: Replace Exhaust Throttle actuator linkage. In Service ADVISOR, perform Exhaust Throttle Learn Value Reset Test . Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

DN22556,0000149 -19-05AUG11-7/7

**003673.31 — Exhaust Throttle Position
Invalid**

*The ECU is indicating an invalid position or a CAN
communication problem with the Exhaust Throttle actuator.*

Continued on next page

BL90236,000032E -19-10AUG12-1/14

Diagnostic Procedure**Troubleshooting Sequence:**

003465.05
 003465.06
 003465.09
 003673.31

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

This fault indicates that the ECU is unable to communicate via CAN communication to the Exhaust Throttle actuator, or the Exhaust Throttle actuator is sending a CAN message to the ECU indicating that the Exhaust Throttle actuator is not receiving CAN messages from the ECU.

Alarm Level:

Warning

Control Unit Response:

The ECU uses a default value for the Exhaust Throttle actuator position.
 The Exhaust Throttle actuator defaults to open as long as the actuator has power.

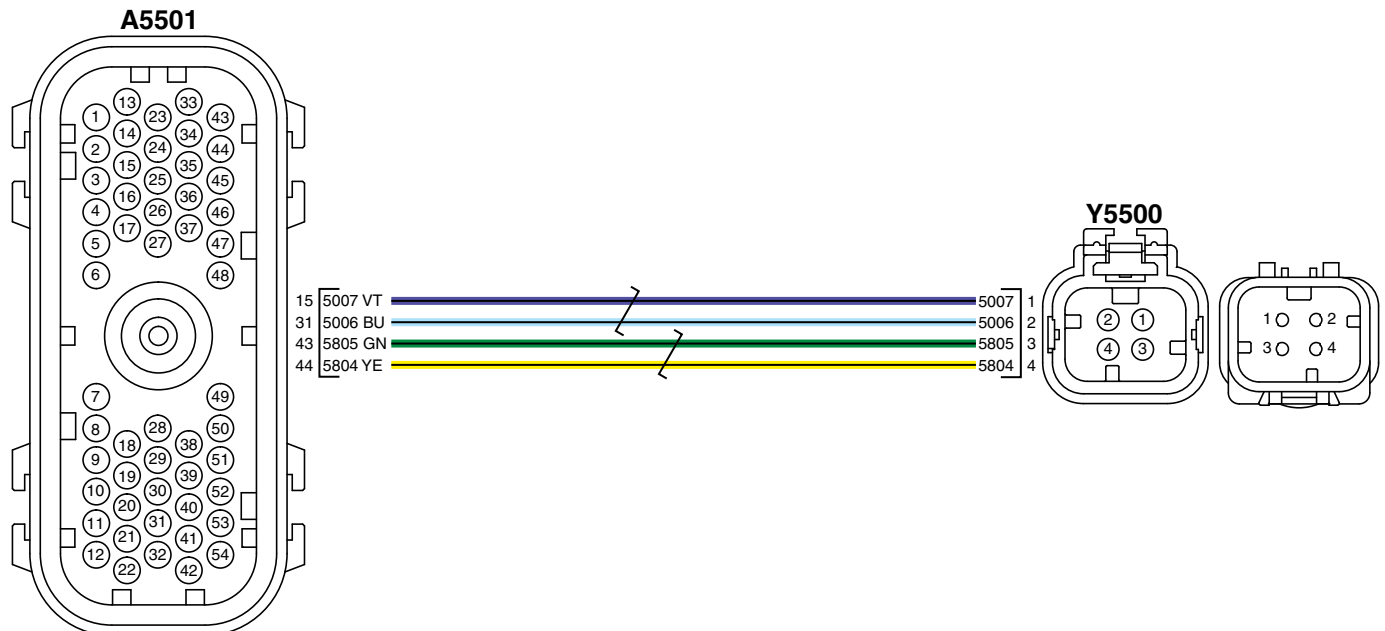
Additional References:

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.
 For Exhaust Throttle actuator location see [Y5500 — Exhaust Throttle Actuator](#) in Section 03, Group 140.
 For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.
 For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 1](#)
- located in Section 06, Group 210.



Exhaust Throttle Actuator Wiring Diagram

A5501 – 15—Supply
 A5501 – 31—Return

A5501 – 43—CAN Low

A5501 – 44—CAN High

Continued on next page

BL90236,000032E -19-10AUG12-2/14

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probe:

Actuator

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

BL90236,000032E -19-10AUG12-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Are the following DTCs active or stored: 003465.09, 003673.31, 522494.09?

YES: GO TO [CAN Diagnostic Procedure](#).

NO: [GO TO 2](#).

BL90236,000032E -19-10AUG12-4/14

2 Active Code Check

Is DTC 003673.31 active?

YES: [GO TO 3](#).

NO: [GO TO 10](#)

BL90236,000032E -19-10AUG12-5/14

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect Exhaust Throttle actuator connector Y5500.
3. Perform [Terminal Test](#) on actuator and Y5500 connector.

Were any problems found?

YES: Repair problem. [GO TO 11](#)

NO: [GO TO 4](#)

Continued on next page

BL90236,000032E -19-10AUG12-6/14

4 Supply Voltage Check

1. Connect Diagnostic Test Box:
 - A to Y5500 connector female socket 1(+).
 - B to Y5500 connector female socket 2(-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Ignition ON, Engine OFF.
 5. Press and hold S3 on Diagnostic Test Box.
 6. Monitor voltage on multimeter.
 7. In Service ADVISOR monitor Unswitched Battery Voltage.
- Is multimeter reading within 0.5 V of unswitched battery voltage?

YES: [GO TO 6](#)
NO: [GO TO 5](#)

BL90236,000032E -19-10AUG12-7/14

5 Return Circuit Check

1. Press and hold S2 and S3 on Diagnostic Test Box.
 2. In Service ADVISOR, monitor Unswitched Battery Voltage.
 3. Monitor voltage on multimeter.
- Is multimeter reading within 0.5 V of unswitched battery voltage?

YES: Repair high resistance in return wire. [GO TO 11](#)
NO: Repair high resistance in supply wire. [GO TO 11](#)

BL90236,000032E -19-10AUG12-8/14

6 CAN Circuit Check

1. Ignition OFF, Engine OFF
 2. Disconnect Diagnostic Test Box.
 3. Ignition ON, Engine OFF.
 4. On Y5500 connector, measure voltage between female socket 3(+) and 2(-).
 5. On Y5500 connector, measure voltage between female socket 4(+) and 2(-).
- Is voltage for both measurements between 1.5 and 3.5 V?

YES: Replace Exhaust Throttle actuator. [GO TO 11](#)
NO: [GO TO 7](#)

BL90236,000032E -19-10AUG12-9/14

7 Terminal Test

1. Ignition OFF, Engine OFF.
 2. Disconnect ECU connector A5501.
 3. Perform Terminal Test on A5501 connector female sockets 15, 31, 43, and 44. And corresponding ECU male pins.
- Were any problems found?

YES: Repair problem. [GO TO 11](#)
NO: [GO TO 8](#)

BL90236,000032E -19-10AUG12-10/14

8 Continuity Check

1. Measure resistance between A5501 connector female socket 44 and Y5500 connector female socket 4.
 2. Measure resistance between A5501 connector female socket 43 and Y5500 connector female socket 3.
- Are both resistances less than 5 ohms?

YES: [GO TO 9](#)
NO: Repair open in harness. [GO TO 11](#)

Continued on next page

BL90236,000032E -19-10AUG12-11/14

9 Harness Check

Inspect harness for damage.

Any damage found?

YES: Repair or replace harness. GO TO 11

NO: Contact DTAC for support.

BL90236,000032E -19-10AUG12-12/14

10 Wiggle Test

1. Monitor DTCs in Service ADVISOR.

2. Perform Wiggle Test.

Does DTC 003673.31 become active?

YES: Repair harness problem. GO TO 11

NO: GO TO Problem Not Found Procedure.

BL90236,000032E -19-10AUG12-13/14

11 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO Exhaust Condition Check in Section 04, Group 155.

NO: Perform Verification Procedure.

BL90236,000032E -19-10AUG12-14/14

VGT and Fuel Dosing Calculated Values Diagnostics

**001180.00 — Calculated VGT Turbine Inlet
Temperature Extremely High**

*The calculated VGT turbine inlet temperature
is extremely high.*

Continued on next page

RE42287,000050D -19-05OCT11-1/20

Diagnostic Procedure**Troubleshooting Sequence:**

000111.01
 000111.17
 000111.18
 000110.00
 000110.03
 000110.04
 000412.00
 000412.03
 000412.04
 002630.00
 002630.03
 002630.04
 002630.15
 002630.16
 001209.03
 001209.03
 001209.04
 000102.03
 000102.04
 000108.02
 003464.13
 000051.07
 002791.13
 000027.07
 002795.07
 000102.07
 001209.02
 002659.07
 002659.14
 002659.17
 001639.18
 001639.01
 000105.15
 000105.16
 000105.00
 000102.07
 000107.15
 000107.16
 000107.00
 000107.18
 000157.17
 000157.18
 000157.01
 000157.16
 001180.00

When DTC is Displayed:

When the ignition is on, engine running, and the error is active.

Related Information:

The ECU calculates that the VGT turbine inlet temperature is greater than a programmed value.

There is no physical VGT turbine inlet temperature sensor. The calculated VGT turbine inlet temperature, or exhaust temperature, mostly depends on air/fuel ratio and manifold air temperature. Engine speed, MAP, and fuel rail pressure also are inputs into the calculation. This DTC may be caused by any condition that limits intake air flow including intake air restrictions, charge air (boost) leaks, or turbocharger problems. The DTC may also be caused by problems that result in the engine consuming less fuel than what is calculated by the ECU.

Alarm Level:

Warning

Continued on next page

RE42287,000050D -19-05OCT11-2/20

Control Unit Response:

The ECU derates the engine.

Additional References:

For air intake and exhaust system operation information, see [Air Intake and Exhaust System Operation - PVX](#) in Section 03, Group 135.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For fuel system operation information, see [Electronic Fuel System](#) in Section 03, Group 130.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

IMPORTANT: Thoroughly clean all fuel lines, fittings, and components prior to making any disconnections or connections to prevent debris from entering the fuel system, which can damage engine and components.

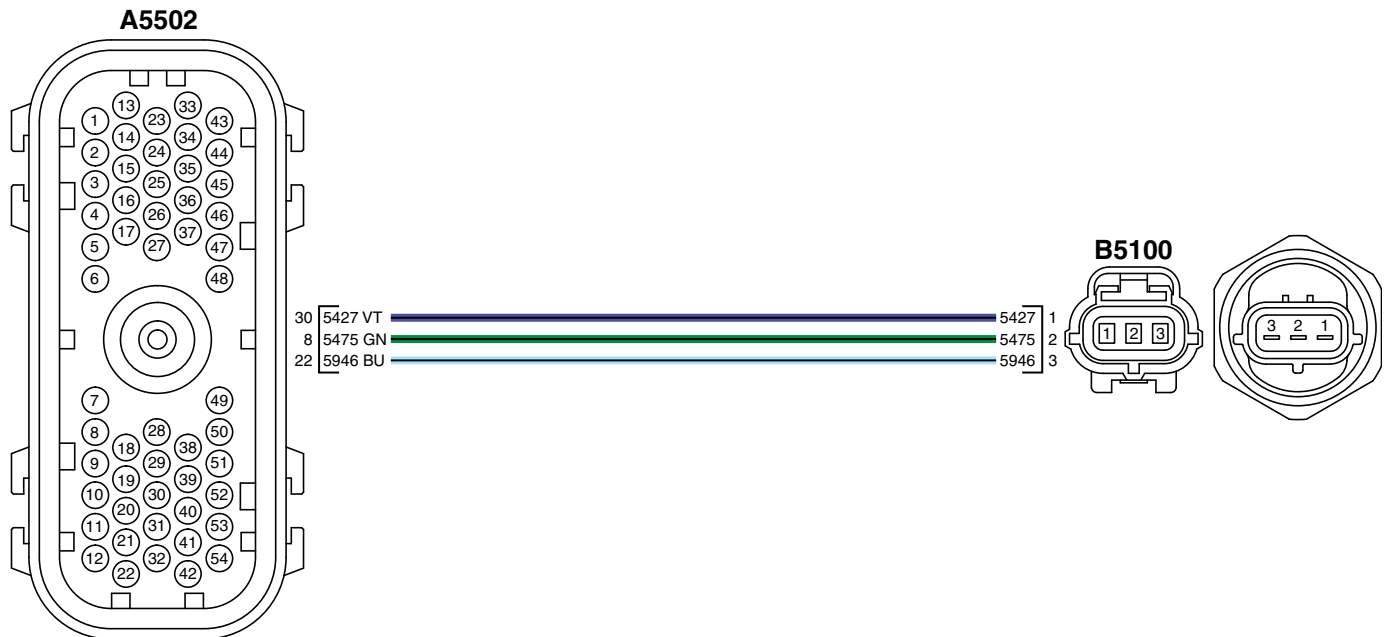
NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table

- see [4.5L Wiring Diagram 4](#)

located in Section 06, Group 210.



Fuel Rail Pressure Sensor Wiring Diagram

A5502 — 22—Supply

A5502 — 30—Return

A5502 — 8—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

RE42287,000050D -19-05OCT11-3/20

RG16743 —UN—22DEC09

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RE42287,000050D -19-05OCT11-4/20

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Perform Preliminary Checks for:
 - Plugged air filter
 - Charge air cooler for external airflow obstructions
 - Loose fan belt
 - Listen for major exhaust leak or boost leaks.
 - Fan shroud for damage
 - EGR flow sensor venturi for loose bracket

Are any problems found?

YES: Repair problem. GO TO 16

NO: GO TO 2

RE42287,000050D -19-05OCT11-5/20

2 Manifold Air Pressure Check

1. Ignition ON, engine running.
2. Apply a load to the engine.
3. In Service ADVISOR, monitor Manifold Air Pressure — Actual and Manifold Air Pressure — Estimate.

Data Point	Value
Manifold Air Pressure — Estimated	
Manifold Air Pressure — Actual	

Does the estimated value ever exceed the actual value by 21 kPa (0.2 bar) (3 psi) as the engine speed and/or load is changed?

YES: GO TO 4

NO: GO TO 3

RE42287,000050D -19-05OCT11-6/20

3 Check for Exhaust Restriction

Check for any restrictions in the exhaust piping or exhaust filter.

Were any problems found?

YES: Repair problem. GO TO 16

NO: GO TO 7

Continued on next page

RE42287,000050D -19-05OCT11-7/20

4 Check for Charge Air Leaks

1. Apply soapy solution to all intake joints.
2. Ignition ON, engine running.
3. Apply a load to the engine.
4. Listen for leaks and watch for soap bubbles that indicate leaks.

Were any leaks found?

YES: Repair problem. GO TO 16

NO: GO TO 5

RE42287,000050D -19-05OCT11-8/20

5 Charge Air Cooler Test

Perform Charge Air Cooler Test. See Charge Air Cooler Test in Section 04, Group 155.

Were any problems found?

YES: Replace Charge Air Cooler. GO TO 16

NO: GO TO 6

RE42287,000050D -19-05OCT11-9/20

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
3. Ignition ON, engine running.
4. Apply a load to the engine.
5. Refresh Codes.

Is DTC 001180.00 active?

YES: Only 001180.00 is active. Contact DTAC.

YES: 001180.00 is active along with other DTCs. Troubleshoot other DTCs first.

NO: GO TO 16

RE42287,000050D -19-05OCT11-10/20

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fuel rail pressure sensor connector B5100.
3. Perform Terminal Test on sensor and B5100 connector.

Were any problems found?

YES: Repair problem. GO TO 16

NO: GO TO 8

RE42287,000050D -19-05OCT11-11/20

8 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5100 connector female socket 3 (+).
 - B to B5100 connector female socket 1 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 10

NO: GO TO 9

Continued on next page

RE42287,000050D -19-05OCT11-12/20

9 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.

2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire.
GO TO 16

NO: Repair open or high resistance in supply wire.
GO TO 16

RE42287,000050D -19-05OCT11-13/20

10 Signal Circuit Check

1. Ignition OFF, Engine OFF

2. Connect Diagnostic Test Box :

- A to B5100 connector female socket 2 (+).
- B to B5100 connector female socket 1 (-).

3. Set S1 to position 3 on Diagnostic Test Box.

4. Connect multimeter to Diagnostic Test Box.

5. Ignition ON, Engine OFF.

6. Monitor voltage on multimeter.

7. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 11

NO: GO TO 13

RE42287,000050D -19-05OCT11-14/20

11 Software Check

In Service ADVISOR, monitor Fuel Rail Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 15

NO: GO TO 12

RE42287,000050D -19-05OCT11-15/20

12 Reprogram ECU

1. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.

2. Ignition ON, Engine OFF.

3. With Diagnostic Test Box still connected and S1 is set to position 3.

4. In Service ADVISOR, monitor Fuel Rail Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 16

NO: Replace ECU. GO TO 16

RE42287,000050D -19-05OCT11-16/20

13 Terminal Test

1. Ignition OFF, Engine OFF

2. Disconnect Diagnostic Test Box.

3. Disconnect ECU connector A5502.

4. Perform Terminal Test on A5502 connector female sockets 8, 22, and 30. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 16

NO: GO TO 14

Continued on next page

RE42287,000050D -19-05OCT11-17/20

VGT and Fuel Dosing Calculated Values Diagnostics

14 Continuity Check

Measure resistance between A5502 connector female socket 8 and B5100 connector female socket 2.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. [GO TO 16](#)

NO: Repair high resistance, open, or mis-pin in harness. [GO TO 16](#)

RE42287,000050D -19-05OCT11-18/20

15 Check for Fuel Restrictions

Check for fuel restrictions between the high pressure common-rail and the injectors.

IMPORTANT: If injector feed tubes and lines are loosened, they must be replaced.

Were any problems found?

YES: Repair problem. [GO TO 16](#)

NO: Replace fuel rail pressure sensor. [GO TO 16](#)

RE42287,000050D -19-05OCT11-19/20

16 Check Codes

Check DTC list.

Is DTC 003719.00 present?

YES: GO TO [Exhaust Condition Check](#) in Section 04, Group 155.

NO: Perform [Verification Procedure](#).

RE42287,000050D -19-05OCT11-20/20

001180.16 — Calculated VGT Turbine Inlet Temperature Moderately High

The Calculated VGT Turbine Inlet Temperature is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The Calculated VGT Turbine Inlet Temperature is moderately higher than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of three minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 001180.00 – Calculated VGT Turbine Inlet Temperature Extremely High.

RE42287,000050E -19-24JUL11-1/1

**002790.16 — Calculated VGT Compressor
Outlet Temperature Moderately High**

*The calculated VGT Compressor Outlet Temperature
is moderately high for the current engine
operating conditions.*

Continued on next page

RE42287,000050F -19-24JUL11-1/10

Diagnostic Procedure**Troubleshooting Sequence:**

000110.00
 000110.03
 000110.04
 000110.15
 000110.16
 000103.00
 000103.02
 000103.05
 000107.00
 000107.15
 000107.16
 001209.03
 001209.04
 000102.03
 000102.04
 000108.02
 003464.13
 000051.07
 002791.13
 000027.07
 002795.07
 000102.07
 001209.07
 002659.14
 002659.17
 001639.18
 001639.01
 002790.16

When DTC is Displayed:

When the engine is running and the fault is detected.

Related Information:

The calculated VGT Compressor Outlet Temperature is moderately high for the current engine operating conditions.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

Additional references:

For more temperature sensor information, see [Measuring Temperature](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Engine Schematic 1](#)
- see [4.5L Engine Schematic 2](#)

located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RE42287,000050F -19-24JUL11-3/10

1 Read DTCs and Store Snapshot Information

1. Ignition ON, Engine OFF.

2. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.

4. In Service ADVISOR, perform Control Unit Information and Overview test.

Has engine been off for 8 hours or more?

YES: GO TO 2

NO: GO TO 3

RE42287,000050F -19-24JUL11-4/10

2 Monitor Sensors

In Service ADVISOR, monitor the following data points:

- Manifold Air Temperature
- EGR Temperature
- Charge Air Cooler Outlet Temperature

Are all temperatures within 6 °C (10 °F) of each other?

YES: GO TO 3

NO: Manifold Air Temperature, EGR Temperature, or Charge Air Cooler Outlet Temperature are not within 6 °C (10 °F) of each other. GO TO DTC procedure for sensor and perform as though DTC is active. Manifold Air Temperature DTC is 000105.00, Charge Air Cooler Outlet Temperature DTC is 002630.00 and EGR Temperature DTC is 000412.00.

Continued on next page

RE42287,000050F -19-24JUL11-5/10

3 Preliminary Checks

1. Ignition OFF, Engine OFF.
2. Check the following items for possible problems:
 - Extremely high altitude
 - Extremely high ambient temperature
 - Plugged air filter
 - Charge air cooler external obstructions
 - Fan shroud for damage
 - Loose fan belt
 - EGR flow sensor bracket loose
3. Ignition ON, engine running.
4. Listen for major exhaust leak, boost leak, or EGR system leak.

Were any problems found?

YES: Repair Problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,000050F -19-24JUL11-6/10

4 Recreate Problem Conditions

1. If possible, run engine under operating conditions where code set. See Snapshot data for conditions.

2. Refresh codes

Were you able to recreate the conditions without the DTC becoming active?

YES: Recreated conditions and DTC did not become active. Perform [Verification Procedure](#).

NO: Could not recreate conditions or recreated conditions but DTC still became active. [GO TO 5](#)

RE42287,000050F -19-24JUL11-7/10

5 More Items That Can Cause Problem

Check the following items for possible problems:

- Internal charge air cooler plugging
- Turbo vanes sticking
- Damaged VGT turbocharger
- Fan speed low
- Plugged EGR cooler or piping
- Air Throttle restriction
- Exhaust restriction
- Boost leak - physical check (pressure check system, bubble test)

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

Continued on next page

RE42287,000050F -19-24JUL11-8/10

6 Monitor Sensors

1. If you were able to perform step 2, skip this step and [GO TO 7](#)

2. Ignition OFF, Engine OFF.
3. Reconnect all components and connectors.
4. Let engine sit for at least 8 hours.
5. Ignition ON, Engine OFF.
6. In Service ADVISOR, monitor the following data points:

- Manifold Air Temperature
- EGR Temperature
- Charge Air Cooler Outlet Temperature

Are all temperatures within 6 °C (10 °F) of each other?

YES: [GO TO 7](#)

NO: Manifold Air Temperature, EGR Temperature, or Charge Air Cooler Outlet Temperature are not within 6 °C (10 °F) of each other. [GO TO](#) DTC procedure for sensor and perform as though DTC is active. Manifold Air Temperature DTC is 000105.00, Charge Air Cooler Outlet Temperature DTC is 00263.00 and EGR Temperature DTC is 000412.00.

RE42287,000050F -19-24JUL11-9/10

7 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Verify problem that brought you to this step is still present.

Is problem still active?

YES: Contact DTAC for support.

NO: Perform [Verification Procedure](#).

RE42287,000050F -19-24JUL11-10/10

**003719.00 — Calculated Soot Level
Extremely High**

*The calculated DPF soot level indicates that the soot
level in the DPF is extremely high.*

Continued on next page

RE42287,0000510 -19-05AUG11-1/16

Diagnostic Procedure**Troubleshooting Sequence:**

Any code that inhibits regeneration/exhaust filter cleaning. For more information, see [Regeneration Failure — Possible Causes](#) in Section 04, Group 160.

003719.13

003719.00

When DTC is Displayed:

When the engine is running and the problem is detected.

Related Information:

There are three different soot models used to calculate soot level within the DPF. There is a time based model, a mass balance based model, and a DPF delta pressure based model. One or more of these models is indicating that the soot level within the DPF is extremely high.

Using Service ADVISOR, a DPF Service Recovery procedure is required when the calculated soot level within the DPF is extremely high. For more information on DPF Service Recovery, see [Service Regeneration Instructions](#) in Section 04, Group 160.

If using only the diagnostic gauge, an Exhaust Filter Service Recovery procedure may be able to be used when the calculated soot level within the DPF is extremely high. For more information on [Exhaust Filter Service Recovery](#), see [Diagnostic Gauge — Exhaust Filter Service Recovery Instructions](#) in Section 04, Group 160.

NOTE: Some applications may use different operator interfaces or diagnostic gauges. To determine if the Exhaust Filter Service Recovery procedure is available for your application, see the application Operator's Manual and Technical Manual.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

Additional References:

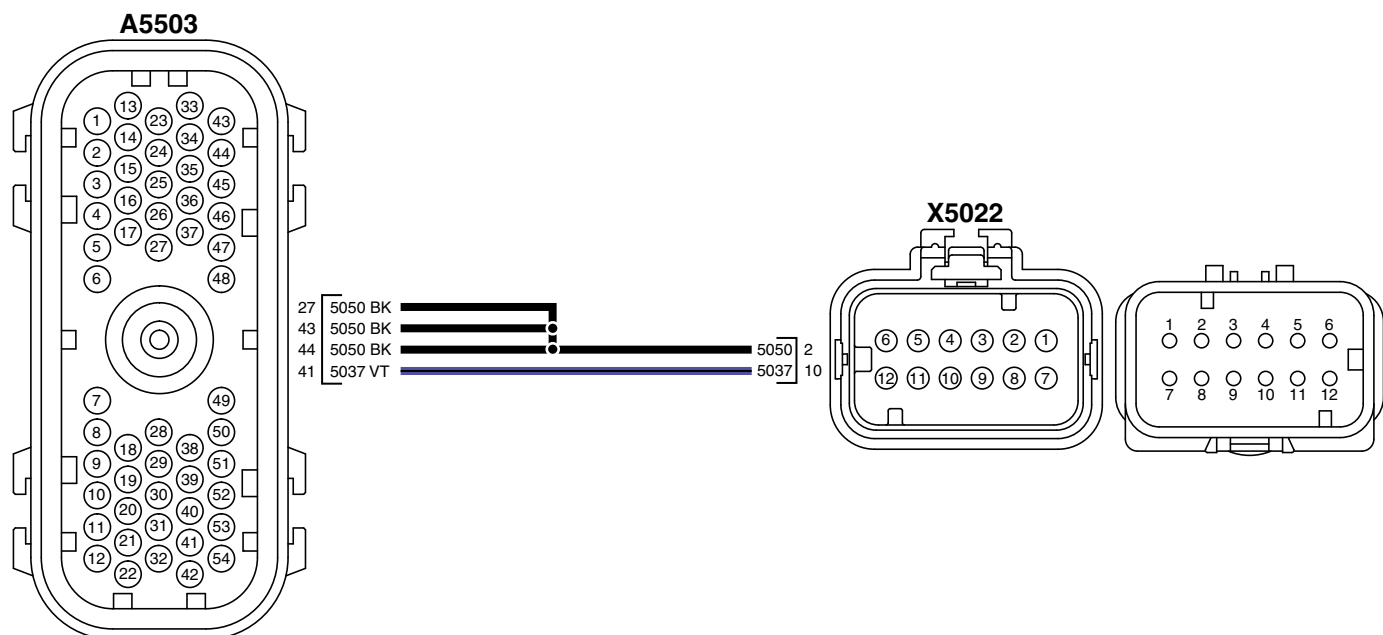
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

For more information on Service Regeneration test, see [Service Regeneration Instructions](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 7](#)
 - see [4.5L Wiring Diagram 11](#)
- located in Section 06, Group 210.



Regeneration Connector Wiring Diagram

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466 Flex Probe Kit** is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RE42287,0000510 -19-05AUG11-3/16

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Monitor the Exhaust Filter Cleaning Inhibit Status in the snapshot information.

Does status read "Not Inhibited"?

YES: [GO TO 2](#)

NO: [GO TO 3](#)

RE42287,0000510 -19-05AUG11-4/16

2 Service Regeneration

1. Ignition ON, Engine Running.
2. In Service ADVISOR, perform Service Regeneration test.

Does Service Regeneration complete successfully?

YES: Talk to operator about application usage and Exhaust Filter Cleaning process.

NO: [GO TO 13](#)

Continued on next page

RE42287,0000510 -19-05AUG11-5/16

VGT and Fuel Dosing Calculated Values Diagnostics

3 Monitor Status	<p>1. Enable Exhaust Filter Cleaning using mechanical rocker switch or diagnostic gauge.</p> <p><i>NOTE: Some applications may use different operator interfaces or diagnostic gauges. For more information on enabling/disabling Exhaust Filter Cleaning, see the application Operator's Manual.</i></p> <p>2. In Service ADVISOR, monitor Exhaust Filter Cleaning Inhibit Status.</p> <p>Does status read "Not Inhibited"?</p>	<p>YES: GO TO 4</p> <p>NO: GO TO 5</p>
RE42287,0000510 -19-05AUG11-6/16		
4 Service Regeneration	<p>1. Ignition ON, Engine Running.</p> <p>2. In Service ADVISOR, perform Service Regeneration test.</p> <p>Does Service Regeneration complete successfully?</p>	<p>YES: Talk to operator about application usage and Exhaust Filter Cleaning process.</p> <p>NO: GO TO 13</p>
RE42287,0000510 -19-05AUG11-7/16		
5 Switch Type Check	<p>Determine what type of switch the application uses to inhibit exhaust filter cleaning.</p> <p><i>NOTE: See the application Operator's Manual for more information.</i></p> <p>Does the application use a mechanical rocker switch to inhibit exhaust filter cleaning?</p>	<p>YES: GO TO 8</p> <p>NO: GO TO 6</p>
RE42287,0000510 -19-05AUG11-8/16		
6 Diagnostic Gauge Check	<p><i>NOTE: If your application uses a display other than the diagnostic gauge, see the application Operator's Manual for the corresponding display information.</i></p> <p>1. Ignition ON, Engine OFF.</p> <p>2. Monitor diagnostic gauge display.</p> <p>Does diagnostic gauge display "NO DATA" or is screen blank?</p>	<p>YES: GO TO ECU Does Not Communicate with Powerview. After correcting problem, perform Service Regeneration test.</p> <p>NO: GO TO 7</p>
RE42287,0000510 -19-05AUG11-9/16		
7 Communication Check	<p>1. Using diagnostic gauge, inhibit exhaust filter cleaning.</p> <p>2. In Service ADVISOR, monitor Exhaust Filter Cleaning Inhibit Status.</p> <p>Does status read "Inhibited"?</p>	<p>YES: Verify ECU programming trim options. Contact DTAC for support.</p> <p>NO: Replace diagnostic gauge. Perform Service Regeneration test.</p>
RE42287,0000510 -19-05AUG11-10/16		
8 Inhibit Switch Circuit Check	<p>1. Inhibit exhaust filter cleaning using mechanical rocker switch,</p> <p>2. In Service ADVISOR, monitor Exhaust Filter Cleaning Inhibit Status.</p> <p>Does status read "Inhibited"?</p>	<p>YES: Contact DTAC for support.</p> <p>NO: GO TO 9</p>
RE42287,0000510 -19-05AUG11-11/16		

Continued on next page

VGT and Fuel Dosing Calculated Values Diagnostics

9 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Regeneration Connector X5022 3. Perform <u>Terminal Test</u> on connector X5022 female sockets 10 and 2. And on connector X5022 corresponding male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Service Regeneration test.</p> <p>NO: <u>GO TO 10</u></p> <p style="text-align: right;">RE42287,0000510 -19-05AUG11-12/16</p>
10 Terminal Test	<ol style="list-style-type: none"> 1. Disconnect ECU connector A5503. 2. Perform <u>Terminal Test</u> on A5503 connector female sockets 41 and 43. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Service Regeneration test.</p> <p>NO: <u>GO TO 11</u></p> <p style="text-align: right;">RE42287,0000510 -19-05AUG11-13/16</p>
11 Continuity Check	<ol style="list-style-type: none"> 1. Measure resistance between A5503 connector female socket 41 and X5022 connector female socket 10. 2. Measure resistance between A5503 connector female socket 43 and X5022 connector female socket 2. <p>Are both resistances less than 5 ohms?</p>	<p>YES: Repair open or high resistance in harness. Perform Service Regeneration test.</p> <p>NO: <u>GO TO 12</u></p> <p style="text-align: right;">RE42287,0000510 -19-05AUG11-14/16</p>
12 Continuity Check	<ol style="list-style-type: none"> 1. Ensure Exhaust Filter Cleaning Inhibit mechanical rocker switch is in the "Not Inhibited" position. 2. Measure resistance between X5022 connector male terminals 2 and 10. <p>Is resistance less than 5 ohms?</p>	<p>YES: Contact DTAC for support.</p> <p>NO: Repair open or high resistance in circuit. Perform Service Regeneration test.</p> <p style="text-align: right;">RE42287,0000510 -19-05AUG11-15/16</p>
13 Monitor DTCs	<p>Refresh DTCs.</p> <p>Are there any DTCs other than 003719.00 active or stored?</p>	<p>YES: Troubleshoot those DTCs.</p> <p>NO: Contact DTAC for support.</p> <p style="text-align: right;">RE42287,0000510 -19-05AUG11-16/16</p>

**003719.10 — Calculated Soot Loading Rate
of Change Abnormal**

*The calculated DPF soot loading rate is
higher than expected.*

Continued on next page

AS58880,000117B -19-06FEB12-1/13

Diagnostic Procedure**Troubleshooting Sequence:**

Any other DTC's, active or stored.

When DTC is Displayed:

When the engine is running and the problem is detected.

Related Information:

There are three different soot models used to calculate soot level within the DPF. There is a time based model, a mass balance based model, and a DPF delta pressure based model. One or more of these models is indicating that the rate of soot loading within the DPF is abnormal.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

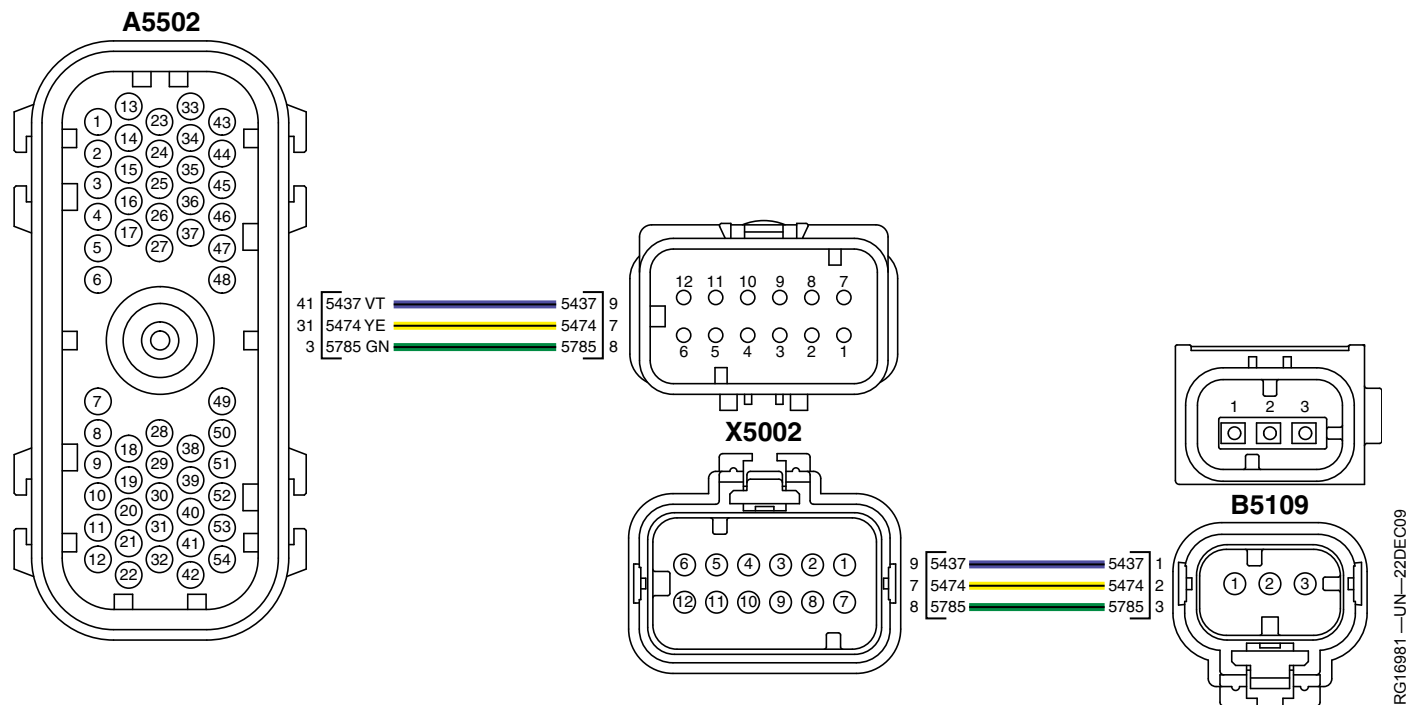
Additional References:

For sensor location see [B5109 — DPF Differential Pressure Sensor](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.



DPF Differential Pressure Sensor Wiring Diagram

A5502—41—Supply

A5502—31—Return

A5502—3—Signal

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 5](#)
 - see [4.5L Wiring Diagram 8](#)
- located in Section 06, Group 210.

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from [JDG10466 Flex Probe Kit](#) is used.

Continued on next page

AS58880,000117B -19-06FEB12-2/13

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

AS58880,000117B -19-06FEB12-3/13

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor DPF Differential Pressure After Last Regeneration

Is DPF Differential Pressure After Last Regeneration less than 1 kPa (0.145 psi)?

YES: Download latest ECU software payload. For more information, see [Payload File — Downloading Instructions](#) in Section 04, Group 160. **GO TO 2**

NO: **GO TO 3**

AS58880,000117B -19-06FEB12-4/13

2 Software Check

1. Ignition ON, Engine OFF.

2. In Service ADVISOR, monitor DPF Differential Pressure After Last Regeneration again.

Is DPF Differential Pressure After Last Regeneration still less than 1 kPa (.145 psi)?

YES: Contact DTAC for support.

NO: **GO TO 3**

AS58880,000117B -19-06FEB12-5/13

3 Check Codes

Are there any DTC's active or stored with SPN 3251 and SPN 2659?

YES: GO TO the troubleshooting procedure for that DTC .

NO: **GO TO 4**

Continued on next page

AS58880,000117B -19-06FEB12-6/13

4 Software Check

1. Ignition ON, engine running for 3 minutes.

YES: GO TO 5

2. In Service ADVISOR, monitor:

NO: Perform Exhaust Condition Check.

Data Point	Value
DPF Soot Load - Differential Pressure Based	
DPF Soot Load - Fuel Based	
DPF Soot Load - Time Based	

Are all 3 parameters below a value of 3?

AS58880,000117B -19-06FEB12-7/13

5 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect DPF differential pressure sensor connector B5109.

3. Perform Terminal Test on sensor and B5109 connector.

YES: Repair problem. Perform Verification Procedure.

Were any problems found?

NO: GO TO 6

AS58880,000117B -19-06FEB12-8/13

6 Signal Circuit Check

1. Connect Diagnostic Test Box :

- A to B5109 connector female socket 3 (+).
- B to B5109 connector female socket 2 (-).

2. Set S1 to position 9 on Diagnostic Test Box.

3. Connect multimeter to Diagnostic Test Box.

4. Ignition ON, Engine OFF.

5. Monitor voltage on multimeter.

6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

YES: GO TO 10

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

Does voltage remain between 2.3 and 2.7 V?

NO: Voltage less than 2.3 V. GO TO 7

AS58880,000117B -19-06FEB12-9/13

7 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing Wiggle Test.

YES: Repair open in return wire. Perform Verification Procedure.

Does voltage remain between 2.3 and 2.7 V?

NO: GO TO 8

AS58880,000117B -19-06FEB12-10/13

8 Terminal Test

1. Ignition OFF, Engine OFF.

2. Disconnect ECU connector A5502.

3. Perform Terminal Test on A5502 connector female sockets 3, 31 and 41. And corresponding ECU male pins.

YES: Repair problem. Perform Verification Procedure.

Were any problems found?

NO: GO TO 9

Continued on next page

AS58880,000117B -19-06FEB12-11/13

VGT and Fuel Dosing Calculated Values Diagnostics

9 Continuity Check

1. Measure the resistance between A5502 connector female socket 31 and B5109 connector female socket 2.
2. Measure the resistance between A5502 connector female socket 3 and B5109 connector female socket 3.

Are both resistance measurements less than 5 ohms?

YES: Contact DTAC for assistance.

NO: Repair mis-pin.
Perform [Verification Procedure](#).

AS58880,000117B -19-06FEB12-12/13

10 Software Check

In Service ADVISOR, monitor DPF Differential Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: Contact DTAC for assistance.

AS58880,000117B -19-06FEB12-13/13

003719.13 — Excessive DPF Recovery Attempts

The ECU has determined that the number of DPF recovery attempts without an active regeneration has exceeded a limit inside the ECU.

RE42287,0000511 -19-24JUL11-1/5

Diagnostic Procedure**Troubleshooting Sequence:**

Any code that inhibits regeneration/exhaust filter cleaning. For more information, see [Regeneration Failure — Possible Causes](#) in Section 04, Group 160.

003719.13**When DTC is Displayed:**

When the ignition is on, engine is running and the fault is active.

Related Information:

The ECU has determined that the number of DPF recovery attempts without an active regeneration has exceeded a limit inside the ECU.

Using Service ADVISOR, a DPF Service Recovery procedure is required when the calculated soot level within the DPF is extremely high. For more information on DPF Service Recovery, see [Service Regeneration Instructions](#) in Section 04, Group 160.

Alarm Level:

Warning

Control Unit Response:

The ECU inhibits active regenerations.
The ECU derates the engine.

Additional references:

For more information on aftertreatment operation, see [Aftertreatment System Operation](#) in Section 03, Group 137.

For more information on exhaust filter operation, see [Exhaust Filter Operation](#) in Section 03, Group 137.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RE42287,0000511 -19-24JUL11-2/5

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.

Are any DTCs in the Troubleshooting Sequence list active or stored?

YES: Diagnose active codes first, then diagnose stored codes.

NO: [GO TO 2](#)

RE42287,0000511 -19-24JUL11-3/5

2 Service Regeneration

1. Ignition ON, Engine Running.
2. In Service ADVISOR, perform Service Regeneration test.

Does Service Regeneration complete successfully?

YES: Talk to operator about application usage and Exhaust Filter Cleaning process.

NO: [GO TO 3](#)

Continued on next page

RE42287,0000511 -19-24JUL11-4/5

3 Monitor DTCs

Refresh DTCs.

YES: Troubleshoot those DTCs.

Are there any DTCs other than 003719.00 OR 003719.13 active or stored?

NO: Contact DTAC for support.

RE42287,0000511 -19-24JUL11-5/5

003719.15 — Calculated Soot Level Slightly High

The calculated DPF soot level is slightly higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The calculated soot level is slightly higher than expected at the operating conditions that set the DTC.

The operator may get a warning to increase engine load, enable exhaust filter cleaning or perform a manual regeneration.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see [003719.00 — Calculated Soot Level Extremely High](#).

RE42287,0000512 -19-24JUL11-1/1

003719.16 — Calculated Soot Level Moderately High

The calculated DPF soot level is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The calculated soot level is moderately higher than expected at the operating conditions that set the DTC. A manual regeneration can be attempted by the operator.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine.

For troubleshooting procedure see [003719.00 — Calculated Soot Level Extremely High](#).

RE42287,0000513 -19-25JUL11-1/1

003720.15 — Calculated Ash Level Slightly High

The calculated ash level is slightly higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The calculated ash level is slightly higher than expected at the operating conditions that set the DTC.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see

[003720.16—Calculated Ash Level Moderately High](#).

RE42287,0000514 -19-25JUL11-1/1

003720.16 — Calculated Ash Level Moderately High

The calculated ash level is moderately higher than expected.

RE42287,0000515 -19-05AUG11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

003251.04
003251.03
003251.02
003251.00
003720.16

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The calculated ash level is moderately high at the operating conditions that set the DTC. This is the second notification to the operator that the DPF ash load is getting too high.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain the engine operating conditions.

Additional References:

For more DPF ash information, see [Exhaust Filter Operation](#) in Section 03, Group 137.

RE42287,0000515 -19-05AUG11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.

Are any DTCs in the Troubleshooting Sequence, other than 003720.16, stored?

YES: Work stored codes in order of Troubleshooting Sequence.

NO: Replace DPF. In Service ADVISOR, perform DPF Calibration.

RE42287,0000515 -19-05AUG11-3/3

003936.00 — Calculated Unintended Combustibles in DPF Extremely High

The ECU has detected multiple times that the temperature differential between the DOC outlet and DPF outlet indicates unintended combustibles within the DPF.

RE42287,0000516 -19-03MAY12-1/5

Diagnostic Procedure**Troubleshooting Sequence:**

001322.31
000651.06
000652.06
000653.06
000654.06
003246.12
004766.16
005018.15
003936.00

When DTC is Displayed:

When the engine is running, a regeneration is not in progress, and the problem is detected.

Related Information:

The ECU has detected multiple times that the temperature differential between the DOC outlet and DPF outlet indicates unintended combustibles within the DPF.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

Additional References:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

RE42287,0000516 -19-03MAY12-2/5

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.

Has engine been off for 8 hours?

YES: GO TO 2

NO: GO TO 3

Continued on next page

RE42287,0000516 -19-03MAY12-3/5

2 Temperature Comparison

1. In Service ADVISOR, monitor DOC Inlet Temperature.
2. In Service ADVISOR, monitor DOC Outlet Temperature.
3. In Service ADVISOR, monitor DPF Outlet Temperature.

Are all three measurements within 16 °C (29 °F) of each other?

YES: Perform Exhaust Condition Check.

NO: Replace exhaust filter temperature module. Perform Exhaust Condition Check.

RE42287,0000516 -19-03MAY12-4/5

3 Temperature Comparison

1. Ignition OFF, Engine OFF.

⚠ CAUTION: Wait until exhaust filter is cool enough to touch to avoid burning or injury.

2. Remove exhaust filter temperature sensors from exhaust filter assembly.
3. Allow the temperature sensors to hang freely in the air without the sensor ends touching anything and as close to each other as possible.
4. Ignition ON, Engine OFF.
5. In Service ADVISOR, monitor DOC Inlet Temperature.
6. In Service ADVISOR, monitor DOC Outlet Temperature.
7. In Service ADVISOR, monitor DPF Outlet Temperature.
8. Allow all three temperature measurements to stabilize.

Are all three measurements within 16 °C (29 °F) of each other?

YES: Reinstall sensors. Perform Exhaust Condition Check.

NO: Replace exhaust filter temperature module. Perform Exhaust Condition Check.

RE42287,0000516 -19-03MAY12-5/5

003936.15 — Calculated Unintended Combustibles In DPF Slightly High

The calculated unintended combustible level is slightly higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The calculated unintended combustible level is slightly higher than expected at the operating conditions that set the DTC.

Alarm Level:
Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 003936.00 — Calculated Unintended Combustibles In DPF Extremely High.

RE42287,0000517 -19-26JUL11-1/1

003936.16 — Calculated Unintended Combustibles In DPF Moderately High

The calculated unintended combustible level is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The calculated unintended combustible level is moderately higher than expected at the operating conditions that set the DTC.

Alarm Level:
Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 003936.00 — Calculated Unintended Combustibles In DPF Extremely High.

RE42287,0000518 -19-09MAR11-1/1

005018.00 — Calculated Unintended Combustibles in DOC Extremely High

The ECU has detected multiple times that the temperature differential between the DOC inlet and DOC outlet indicates unintended combustibles within the DOC.

RE42287,0000519 -19-03MAY12-1/5

Diagnostic Procedure**Troubleshooting Sequence:**

001322.31
000651.06
000652.06
000653.06
000654.06
003246.12
004766.16
005018.15
005018.00

When DTC is Displayed:

When the engine is running, a regeneration is not in progress, and the problem is detected.

Related Information:

The ECU has detected multiple times that the temperature differential between the DOC inlet and DOC outlet indicates unintended combustibles within the DOC.

Alarm Level:

Stop

Control Unit Response:

The ECU derates the engine.

Additional References:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

RE42287,0000519 -19-03MAY12-2/5

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
 3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
 4. In Service ADVISOR, perform Control Unit Information and Overview test.
- Has engine been off for 8 hours?

YES: [GO TO 2](#)

NO: [GO TO 3](#)

Continued on next page

RE42287,0000519 -19-03MAY12-3/5

2 Temperature Comparison

1. In Service ADVISOR, monitor DOC Inlet Temperature.
2. In Service ADVISOR, monitor DOC Outlet Temperature.
3. In Service ADVISOR, monitor DPF Outlet Temperature.

Are all three measurements within 16 °C (29 °F) of each other?

YES: Perform Exhaust Condition Check.

NO: Replace exhaust filter temperature module. Perform Exhaust Condition Check.

RE42287,0000519 -19-03MAY12-4/5

3 Temperature Comparison

1. Ignition OFF, Engine OFF.

CAUTION: Wait until exhaust filter is cool enough to touch to avoid burning or injury.

2. Remove exhaust filter temperature sensors from exhaust filter assembly.
3. Allow the temperature sensors to hang freely in the air without the sensor ends touching anything and as close to each other as possible.
4. Ignition ON, Engine OFF.
5. In Service ADVISOR, monitor DOC Inlet Temperature.
6. In Service ADVISOR, monitor DOC Outlet Temperature.
7. In Service ADVISOR, monitor DPF Outlet Temperature.
8. Allow all three temperature measurements to stabilize.

Are all three measurements within 16 °C (29 °F) of each other?

YES: Reinstall sensors. Perform Exhaust Condition Check.

NO: Replace exhaust filter temperature module. Perform Exhaust Condition Check.

RE42287,0000519 -19-03MAY12-5/5

005018.15 — Calculated Unintended Combustibles In DOC Slightly High

The calculated unintended combustible level is slightly higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The calculated unintended combustible level is slightly higher than expected at the operating conditions that set the DTC.

Alarm Level:
Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 005018.00 — Calculated Unintended Combustibles In DOC Extremely High.

RE42287,000051A -19-26JUL11-1/1

005018.16 — Calculated Unintended Combustibles In DOC Moderately High

The calculated unintended combustible level is moderately higher than expected.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The calculated unintended combustible level is moderately higher than expected at the operating conditions that set the DTC.

Alarm Level:
Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 005018.00 — Calculated Unintended Combustibles In DOC Extremely High.

RE42287,000051B -19-26JUL11-1/1

Fuel Dosing Aftertreatment System Diagnostics

Group 168

003246.00 — DPF Outlet Temperature Extremely High

The exhaust filter temperature module has detected an extremely high DPF outlet temperature.

RE42287,000051C -19-26JUL11-1/5

Diagnostic Procedure

Troubleshooting Sequence:

003246.12
003936.00
003936.15
003936.16
004766.16
005018.00
005018.15
005018.16
005298.01
003246.00

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU has received a message from the exhaust filter temperature module indicating that the exhaust filter temperature module has detected an extremely high DPF Outlet Temperature.

Alarm Level:

Stop

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU inhibits purges and regenerations from occurring.

Additional references:

For more Exhaust Filter Temperature Module information, see [B5204 – Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

RE42287,000051C -19-26JUL11-2/5

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.

Has engine been off for 8 hours?

YES: [GO TO 2](#)

NO: [GO TO 3](#)

Continued on next page

RE42287,000051C -19-26JUL11-3/5

2 Temperature Comparison

1. In Service ADVISOR, monitor DOC Inlet Temperature.
2. In Service ADVISOR, monitor DOC Outlet Temperature.
3. In Service ADVISOR, monitor DPF Outlet Temperature.

Are all three measurements within 16 °C (29 °F) of each other?

YES: Perform Exhaust Condition Check.

NO: Replace exhaust filter temperature module. Perform Exhaust Condition Check.

RE42287,000051C -19-26JUL11-4/5

3 Temperature Comparison

1. Ignition OFF, Engine OFF.

⚠ CAUTION: Wait until exhaust filter is cool enough to touch to avoid burning or injury.

2. Remove exhaust filter temperature sensors from exhaust filter assembly.
3. Allow the temperature sensors to hang freely in the air without the sensor ends touching anything and as close to each other as possible.
4. Ignition ON, Engine OFF.
5. In Service ADVISOR, monitor DOC Inlet Temperature.
6. In Service ADVISOR, monitor DOC Outlet Temperature.
7. In Service ADVISOR, monitor DPF Outlet Temperature.
8. Allow all three temperature measurements to stabilize.

Are all three measurements within 16 °C (29 °F) of each other?

YES: Reinstall temperature sensors. Perform Exhaust Condition Check.

NO: Replace exhaust filter temperature module. Perform Exhaust Condition Check.

RE42287,000051C -19-26JUL11-5/5

003246.12 — DPF Outlet Temperature Error

The Exhaust Filter Temperature Module has detected a problem with measuring DPF Outlet Temperature.

RE42287,000051D -19-30MAY12-1/12

Diagnostic Procedure

Troubleshooting Sequence: 003246.12

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU has received a message from the exhaust filter temperature module indicating that the exhaust filter temperature module has detected an error with measuring DPF Outlet Temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU inhibits purges and regenerations from occurring.

Additional references:

For more Exhaust Filter Temperature Module information, see [B5204 – Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RE42287,000051D -19-30MAY12-2/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Inspect for:
 - Broken or loose clamps, or holes in exhaust filter.
 - DPF Outlet Temperature Sensor loose or not installed in exhaust filter.

Were any problems found?

YES: Repair Problem. [GO TO 7](#)

NO: [GO TO 2](#)

RE42287,000051D -19-30MAY12-3/12

2 Check for active DTCs

1. Ignition ON, Engine OFF.
2. Refresh DTCs.

Were any DTCs with SPN 004766; 004765; 003246 active?

YES: Replace Exhaust Filter Temperature Module. [GO TO 7](#)

NO: [GO TO 3](#)

Continued on next page

RE42287,000051D -19-30MAY12-4/12

Fuel Dosing Aftertreatment System Diagnostics

3 Inspect Exhaust Filter Temperature Module	<p>Inspect the wiring between the Exhaust Filter Temperature Module and the DOC Outlet Temperature Sensor, DPF Outlet Temperature Sensor, and DOC Inlet Temperature Sensor.</p> <p><i>NOTE: Look for evidence of pinched, frayed, or melted wires</i></p> <p>Were any problems found?</p>	<p>YES: Replace Exhaust Filter Temperature Module. <u>GO TO 7</u></p> <p>NO: <u>GO TO 4</u></p> <p>RE42287,000051D -19-30MAY12-5/12</p>
4 Check Exhaust Filter Temperature Module	<ol style="list-style-type: none">1. Key ON, Engine OFF.2. In Service Advisor, monitor DOC Outlet Temperature .3. In Service Advisor, monitor DPF Outlet Temperature .4. In Service Advisor, monitor DOC Inlet Temperature5. Perform <u>Wiggle Test</u> while monitoring temperatures in step 2, 3 and 4. <p>Did any temperature read Invalid?</p>	<p>YES: Replace Exhaust Filter Temperature Module. <u>GO TO 7</u></p> <p>NO: <u>GO TO 5</u></p> <p>RE42287,000051D -19-30MAY12-6/12</p>
5 Review Snapshot Information	<p>Review Snapshot Information recorded in step 1.</p> <p>Was the engine coolant temperature greater than 85 °C (185 °F) when DTCs 004766.12, 4765.12 or 3246.12 became active?</p>	<p>YES: <u>GO TO 7</u></p> <p>NO: <u>GO TO 6</u></p> <p>RE42287,000051D -19-30MAY12-7/12</p>
6 Check Engine Coolant Temperature	<p>Perform <u>Engine Coolant Temperature Below Normal</u> procedure in Section 04—Group 150.</p> <p><i>NOTE: Operating the engine at slow idle for extended periods in cold ambient temperatures cause combustibles to build up in the exhaust filter. The ECU periodically closes the air throttle to raise the temperature in the DOC to burn off combustibles. If the engine coolant is less than 60 °C (140 °F), the ECU cannot close the air throttle.</i></p> <p>Were any problems found?</p>	<p>YES: Repair Problem. <u>GO TO 7</u></p> <p>NO: <u>GO TO 7</u></p> <p>RE42287,000051D -19-30MAY12-8/12</p>
7 Check for New ECU Software	<p>Search Custom Performance for ECU software updates.</p> <p>Is new software available?</p>	<p>YES: Reprogram ECU with new version of software. If Required In Service ADVISOR, perform Service Regeneration.</p> <p>NO: <u>GO TO 8</u></p> <p>Continued on next page</p> <p>RE42287,000051D -19-30MAY12-9/12</p>

Fuel Dosing Aftertreatment System Diagnostics

8 Perform Exhaust Management Test

1. See Perform Exhaust Management Test Instructions in Section 04—Group 160.

2. Perform Exhaust Management Test

Did Exhaust Management Test indicate unintended combustibles were detected?

YES: Troubleshoot DTCs with SPN 005018 or 003696.

NO: GO TO 9

RE42287,000051D -19-30MAY12-10/12

9 Check Results of Exhaust Management Test

Did the engine pass the Exhaust Management Test?

YES: Contact DTAC.

NO: Run Exhaust Management Test again. If engine does not pass Exhaust Management Test GO TO 10

RE42287,000051D -19-30MAY12-11/12

10 Low Engine Coolant Temperature

Monitor engine coolant temperature while performing Exhaust Management Test.

Was engine coolant temperature greater than 60 °C (140 °F)?

YES: Contact DTAC

NO: Engine coolant temperature **Less Than Normal** GO TO 6

If no problem is found contact DTAC.

RE42287,000051D -19-30MAY12-12/12

**003251.00 — DPF Differential Pressure
Signal Not Responding**

*The DPF Differential Pressure Sensor is not responding
or the ECU has detected an exhaust flow and DPF
differential pressure correlation problem.*

Continued on next page

RE42287,000051E -19-05AUG11-1/14

Diagnostic Procedure

Troubleshooting Sequence:

003514.03
003514.04
003251.03
003251.04
004795.31
003251.00

When DTC is Displayed:

When the engine is running in a transient speed condition and the problem is detected.

Related Information:

The DPF Differential Pressure Sensor is not responding or the ECU has detected an exhaust flow and differential pressure correlation problem.

NOTE: This DTC can be caused by extreme cold conditions where moisture has frozen in a line. The DTC clears once the line thaws.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For sensor location see B5109 — DPF Differential Pressure Sensor in Section 03, Group 140.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

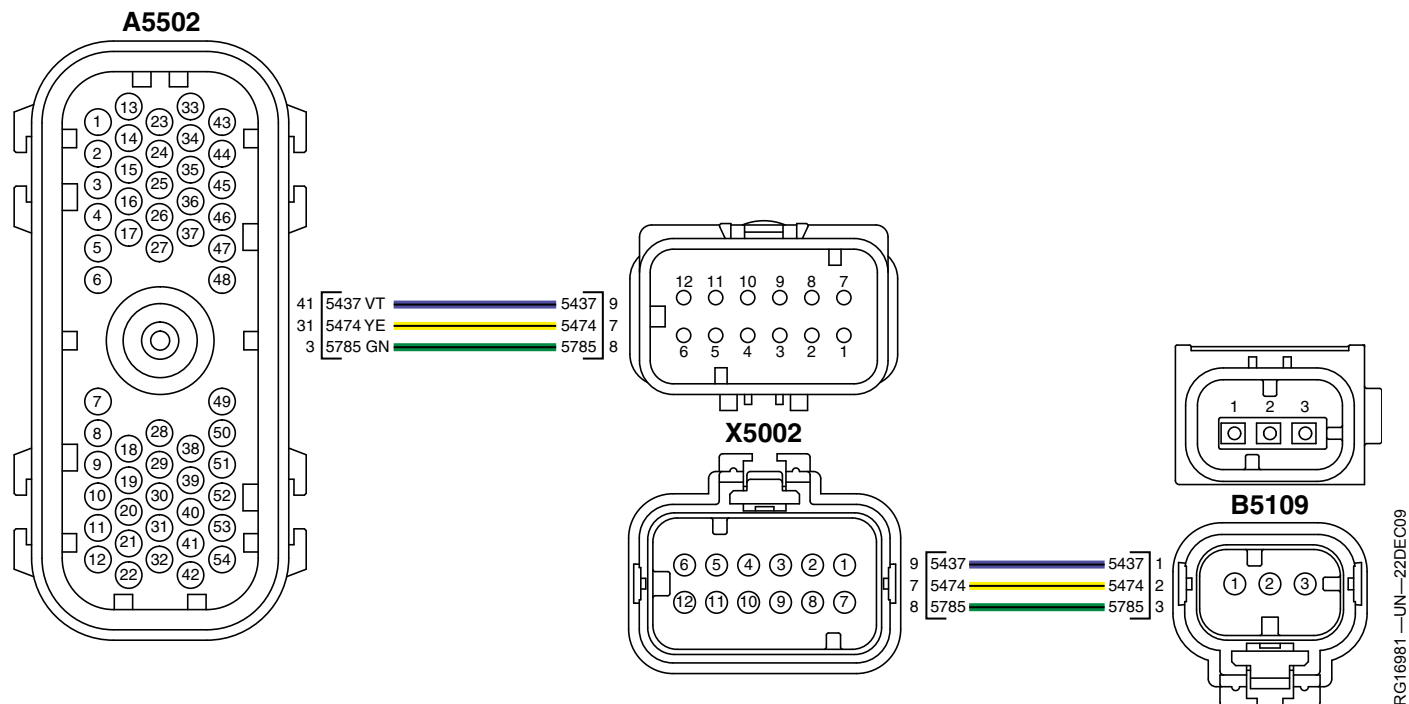
For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 5](#)
 - see [4.5L Wiring Diagram 8](#)
- located in Section 06, Group 210.



DPF Differential Pressure Sensor Wiring Diagram

A5502—41—Supply

A5502—31—Return

A5502—3—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box
- JT07306 — Digital Multimeter
- J-35616-20 — Test Leads

RE42287,000051E -19-05AUG11-3/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Visually inspect DPF Differential Pressure Sensor lines for loose connection or damage.

NOTE: This DTC can be caused by extreme cold conditions where moisture has frozen in a line. The DTC clears once the line thaws.

Any problems found?

YES: Repair problem. [GO TO 11](#)

NO: [GO TO 2](#)

Continued on next page

RE42287,000051E -19-05AUG11-4/14

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect DPF differential pressure sensor connector B5109.
3. Perform Terminal Test on sensor and B5109 connector.

Were any problems found?

YES: Repair problem. GO TO 11

NO: GO TO 3

RE42287,000051E -19-05AUG11-5/14

3 Supply Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5109 connector female socket 1(+).
 - B to B5109 connector female socket 2 (-).
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Press and hold S3 on Diagnostic Test Box.
7. Perform Wiggle Test.

Does voltage remain between 4.8 V and 5.2 V?

YES: GO TO 5

NO: Voltage greater than 5.2 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 4.8 V. GO TO 4

RE42287,000051E -19-05AUG11-6/14

4 Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.
3. Perform Wiggle Test.

Does voltage now remain between 4.8 V and 5.2 V?

YES: Repair open, high resistance, or short in return wire. Perform Exhaust Condition Check.

NO: Repair open, high resistance, or short in supply wire. Perform Exhaust Condition Check.

RE42287,000051E -19-05AUG11-7/14

5 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5109 connector female socket 3 (+).
 - B to B5109 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 V and 2.7 V?

YES: GO TO 9

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 6

Continued on next page

RE42287,000051E -19-05AUG11-8/14

Fuel Dosing Aftertreatment System Diagnostics

6 Open Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.
3. Perform Wiggle Test.

Does voltage remain between 2.3 V and 2.7 V?

YES: Repair open or short on return wire in harness.

GO TO 11

NO: GO TO 7

RE42287,000051E -19-05AUG11-9/14

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 3, 31 and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. GO TO 11

NO: GO TO 8

RE42287,000051E -19-05AUG11-10/14

8 Continuity Check

Measure the resistance between A5502 connector female socket 3 and B5109 connector female socket 3.

Is resistance measurement less than 5 ohms?

YES: Repair short to ground on signal wire in harness. GO TO 11

NO: Repair high resistance on signal wire in harness. GO TO 11

RE42287,000051E -19-05AUG11-11/14

9 Software Check

In Service ADVISOR, monitor DPF Differential Pressure Input Voltage.

Is voltage between 2.3 V and 2.7 V?

YES: Replace DPF differential pressure sensor. GO TO 11

NO: GO TO 10

RE42287,000051E -19-05AUG11-12/14

10 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine running.
6. Allow Engine Coolant Temperature to reach at least 75 °C (167 °F).
7. Operate engine at slow idle for 10 seconds.
8. Move throttle to fast idle.
9. Operate engine at fast idle for 10 seconds.

Is DTC 003251.00 or 003251.02 active?

YES: Replace ECU. GO TO 11

NO: Perform Exhaust Condition Check.

Continued on next page

RE42287,000051E -19-05AUG11-13/14

11 Verify Problem

1. Ignition OFF, Engine OFF
2. Reconnect all connectors and components.
3. Ignition ON, Engine running.
4. Allow Engine Coolant Temperature to reach at least 75 °C (167 °F).
5. Operate engine at slow idle for 10 seconds.
6. Move throttle to fast idle.
7. Operate engine at fast idle for 10 seconds.

Is DTC 003251.00 or 003251.02 active?

YES: GO TO [Problem Not Found Procedure](#)

NO: Perform [Exhaust Condition Check](#).

RE42287,000051E -19-05AUG11-14/14

003251.02 — DPF Differential Pressure Signal Invalid

The ECU has detected an exhaust flow and DPF delta pressure relationship problem.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running in a transient speed condition and the problem is detected.

Related Information:

The ECU has detected an exhaust flow and delta pressure relationship problem.

NOTE: This DTC can be caused by extreme cold conditions where moisture has frozen in a line. DTC clears once line thaws.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see 003251.00 — DPF Differential Pressure Signal Not Responding.

RE42287,000051F -19-26JUL11-1/1

**003251.03 — DPF Differential Pressure
Signal Out of Range High**

*The DPF differential pressure signal exceeds the
sensor high voltage specification.*

Continued on next page

RE42287,0000520 -19-04AUG11-1/15

Diagnostic Procedure

Troubleshooting Sequence:

003514.03

003251.03

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The DPF differential pressure sensor signal voltage to the ECU corresponds to a pressure higher than what is physically possible for the DPF differential pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for DPF differential pressure.

Additional references:

For sensor location see B5109 — DPF Differential Pressure Sensor in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

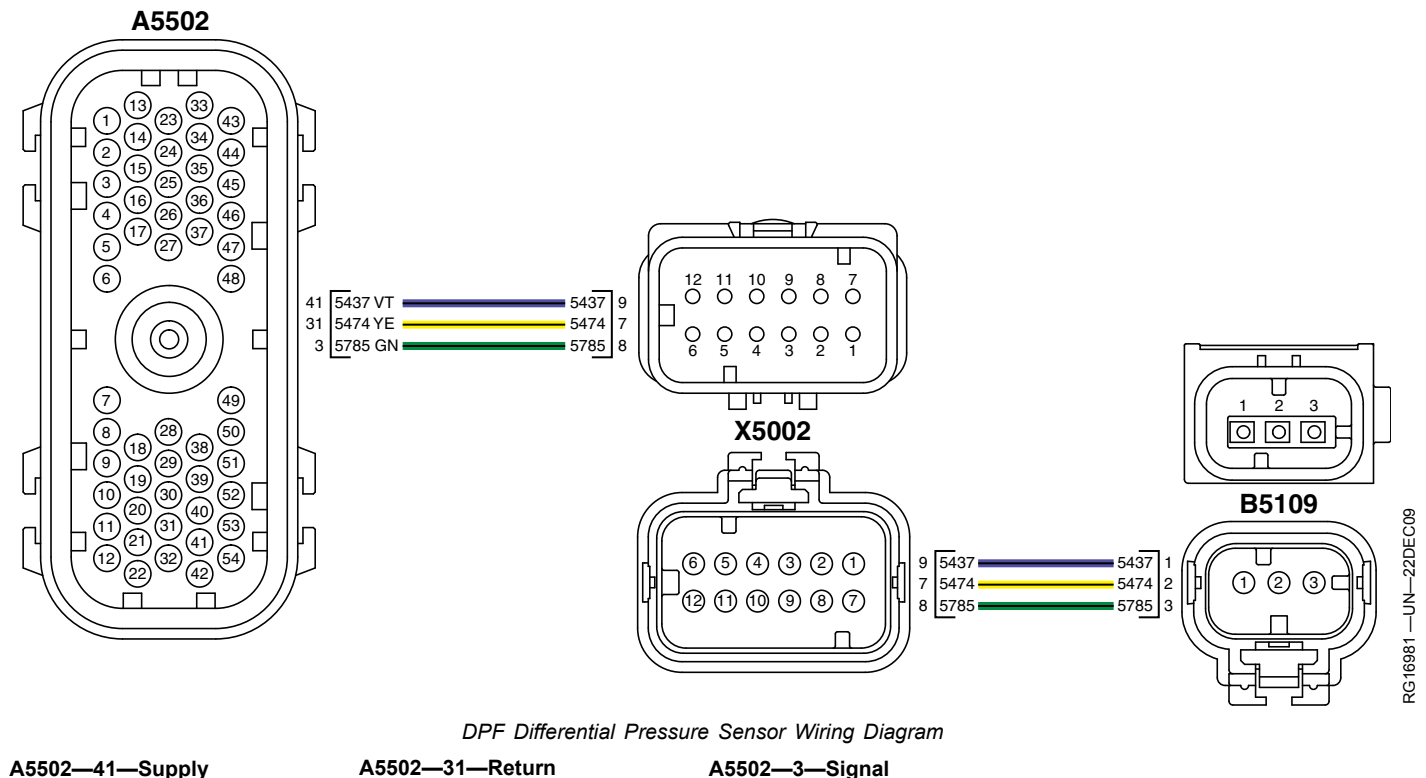
For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 5](#)

- see [4.5L Wiring Diagram 8](#)

located in Section 06, Group 210.



Continued on next page

RE42287,0000520 -19-04AUG11-2/15

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

- J-35616-20 — Test Leads

RE42287,0000520 -19-04AUG11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003514.03 active or stored?

YES: GO TO [003514.03](#)
— [Sensor Supply #6](#)
[Voltage Out of Range High](#)
procedure.

NO: [GO TO 2](#)

RE42287,0000520 -19-04AUG11-4/15

2 Code Check

Is DTC 003251.03 active?

YES: [GO TO 3](#)

NO: [GO TO 10](#)

RE42287,0000520 -19-04AUG11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect DPF differential pressure sensor connector B5109.
3. Perform [Terminal Test](#) on sensor and B5109 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification](#)
[Procedure](#).

NO: [GO TO 4](#)

Continued on next page

RE42287,0000520 -19-04AUG11-6/15

Fuel Dosing Aftertreatment System Diagnostics

4 Signal Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5109 connector female socket 3 (+).
 - B to B5109 connector female socket 2 (-).
2. Set S1 to position 9 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

NOTE: A negative voltage is less than 2.3 V.

Does voltage remain between 2.3 and 2.7 V?

YES: GO TO 8

NO: Voltage greater than 2.7 V. GO TO Short to Voltage Procedure.

NO: Voltage less than 2.3 V. GO TO 5

RE42287,0000520 -19-04AUG11-7/15

5 Open Circuit Check

Press and hold S2 on Diagnostic Test Box while performing Wiggle Test.

Does voltage remain between 2.3 and 2.7 V?

YES: Repair open in return wire. Perform Verification Procedure.

NO: GO TO 6

RE42287,0000520 -19-04AUG11-8/15

6 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform Terminal Test on A5502 connector female sockets 3, 31 and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

RE42287,0000520 -19-04AUG11-9/15

7 Continuity Check

1. Measure the resistance between A5502 connector female socket 31 and B5109 connector female socket 2.
2. Measure the resistance between A5502 connector female socket 3 and B5109 connector female socket 3.

Are both resistance measurements less than 5 ohms?

YES: GO TO Problem Not Found Procedure.

NO: Repair mis-pin. Perform Verification Procedure.

RE42287,0000520 -19-04AUG11-10/15

8 Software Check

In Service ADVISOR, monitor DPF Differential Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RE42287,0000520 -19-04AUG11-11/15

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 003251.03 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,0000520 -19-04AUG11-12/15

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor DPF Differential Pressure Input Voltage.
3. Perform [Wiggle Test](#).

Does sensor input voltage ever read greater than 4.9 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RE42287,0000520 -19-04AUG11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect DPF differential pressure sensor connector B5109.
3. Perform [Terminal Test](#) on sensor and B5109 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 12](#)

RE42287,0000520 -19-04AUG11-14/15

12 Terminal Test

1. Disconnect ECU connector A5502.
2. Perform [Terminal Test](#) on A5502 connector female sockets 3, 31, and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO Problem Not Found Procedure](#).

RE42287,0000520 -19-04AUG11-15/15

**003251.04 — DPF Differential Pressure
Signal Out of Range Low**

*The DPF differential pressure signal is lower than
the sensor low voltage specification.*

Continued on next page

RE42287,0000521 -19-08AUG11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

003514.03
003514.04
003251.03
003251.04

When DTC is Displayed:

When the ignition is on, and the fault is active.

Related Information:

The DPF differential pressure sensor signal voltage to the ECU corresponds to a pressure lower than what is physically possible for the DPF differential pressure sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU uses a default value for DPF differential pressure .

Additional References:

For sensor location see [B5109 — DPF Differential Pressure Sensor](#) in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

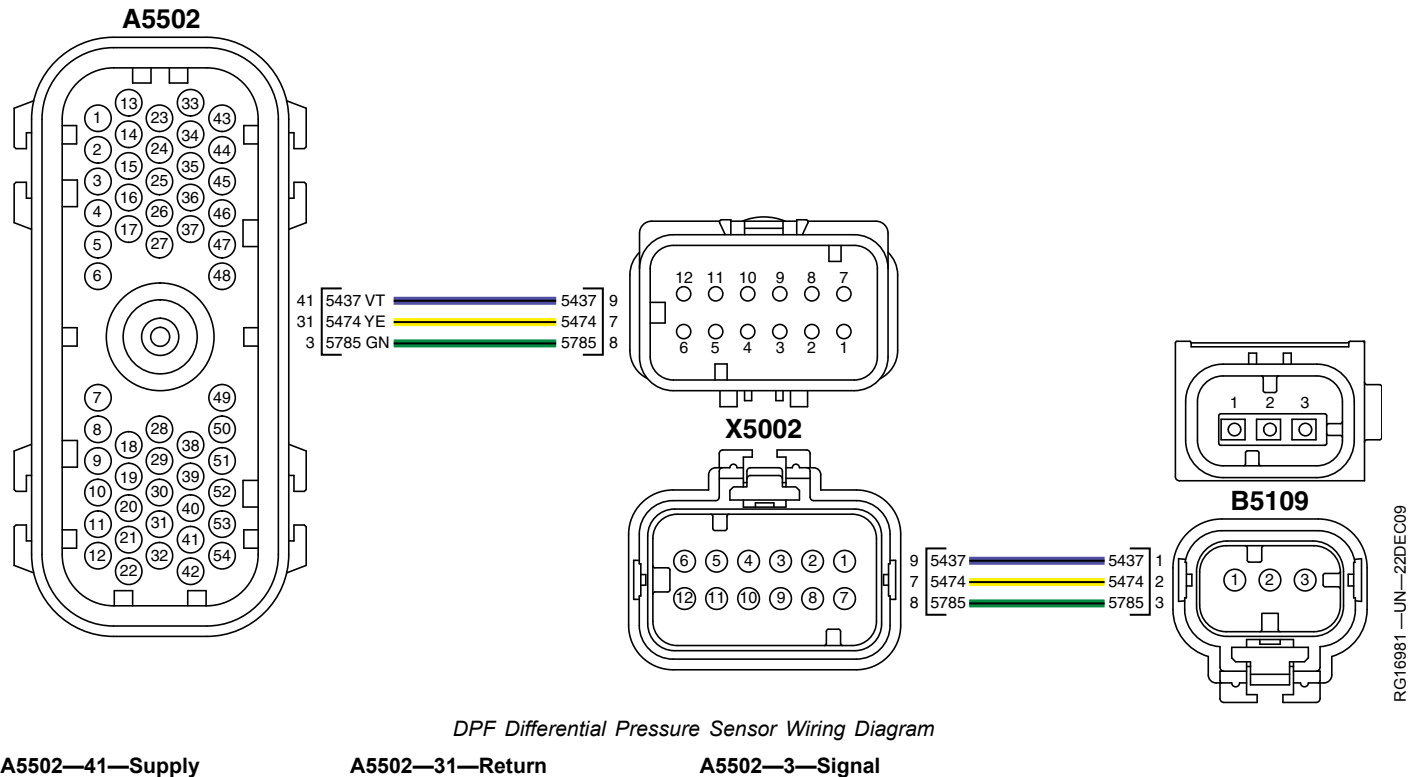
For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 5](#)

- see [4.5L Wiring Diagram 8](#)

located in Section 06, Group 210.



Continued on next page

RE42287,0000521 -19-08AUG11-2/17

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

- J-35616-20 — Test Leads

RE42287,0000521 -19-08AUG11-3/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 003514.04 stored?

YES: GO TO [003514.04 — Sensor Supply #6 Voltage Out of Range Low](#) procedure.

NO: [GO TO 2](#)

RE42287,0000521 -19-08AUG11-4/17

2 Code Check

Is DTC 003251.03 stored?

YES: GO TO [003251.03 — DPF Differential Pressure Signal Out of Range High](#) procedure.

NO: [GO TO 3](#)

RE42287,0000521 -19-08AUG11-5/17

3 Code Check

Is DTC 003251.04 active?

YES: [GO TO 4](#)

NO: [GO TO 12](#)

RE42287,0000521 -19-08AUG11-6/17

4 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect DPF differential pressure sensor connector B5109.
3. Perform [Terminal Test](#) on sensor and B5109 connector.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

RE42287,0000521 -19-08AUG11-7/17

5 Supply Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5109 connector female socket 1 (+).
 - B to B5109 connector female socket 2 (-).
3. Set S1 to position 1 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 7

NO: GO TO 6

RE42287,0000521 -19-08AUG11-8/17

6 Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
2. Monitor voltage on multimeter.

Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

RE42287,0000521 -19-08AUG11-9/17

7 Signal Circuit Check

1. Ignition OFF, Engine OFF.
2. Connect Diagnostic Test Box :
 - A to B5109 connector female socket 3 (+).
 - B to B5109 connector female socket 2 (-).
3. Set S1 to position 9 on Diagnostic Test Box.
4. Connect multimeter to Diagnostic Test Box.
5. Ignition ON, Engine OFF.
6. Monitor voltage on multimeter.
7. Perform Wiggle Test.

Is voltage between 2.3 and 2.7 V?

YES: GO TO 8

NO: GO TO 10

RE42287,0000521 -19-08AUG11-10/17

8 Software Check

In Service ADVISOR, monitor DPF Differential Pressure Input Voltage.

Is voltage between 2.3 and 2.7 V?

YES: Replace sensor. Perform Verification Procedure.

NO: GO TO 9

Continued on next page

RE42287,0000521 -19-08AUG11-11/17

9 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 003251.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

RE42287,0000521 -19-08AUG11-12/17

10 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5502.
3. Perform [Terminal Test](#) on A5502 connector female sockets 3, 31, and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 11](#)

RE42287,0000521 -19-08AUG11-13/17

11 Continuity Check

Measure resistance between A5502 connector female socket 3 and B5109 connector female socket 3.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mispin in harness. Perform [Verification Procedure](#).

RE42287,0000521 -19-08AUG11-14/17

12 Wiggle Test

1. In Service ADVISOR, monitor DPF Differential Pressure Input Voltage.
2. Perform [Wiggle Test](#).

Does voltage ever go below 0.2 V?

YES: Repair harness problem. Perform [Verification Procedure](#).

NO: [GO TO 13](#)

RE42287,0000521 -19-08AUG11-15/17

13 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect DPF Differential Pressure sensor connector B5109.
3. Perform [Terminal Test](#) on sensor and B5109 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 14](#)

Continued on next page

RE42287,0000521 -19-08AUG11-16/17

14 Terminal Test

1. Disconnect ECU connector A5502.

2. Perform Terminal Test on A5502 connector female sockets 3, 31, and 41. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

RE42287,0000521 -19-08AUG11-17/17

**003251.07 — DPF Differential Pressure
Signal Mismatch**

*The DPF Differential Pressure Sensor is not responding
or the ECU has detected an exhaust flow and DPF
differential pressure correlation problem.*

Continued on next page

BK34394,0001B62 -19-19OCT11-1/4

Diagnostic Procedure

Troubleshooting Sequence:

003514.03

003514.04

003251.03

003251.04

004795.31

003251.00

When DTC is Displayed:

When the engine is running in a transient speed condition and the problem is detected.

Related Information:

The DPF Differential Pressure Sensor is not responding or the ECU has detected an exhaust flow and differential pressure correlation problem.

NOTE: This DTC can be caused by extreme cold conditions where moisture has frozen in a line. The DTC clears once the line thaws.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Additional References:

For sensor location see B5109 — DPF Differential Pressure Sensor in Section 03, Group 140.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

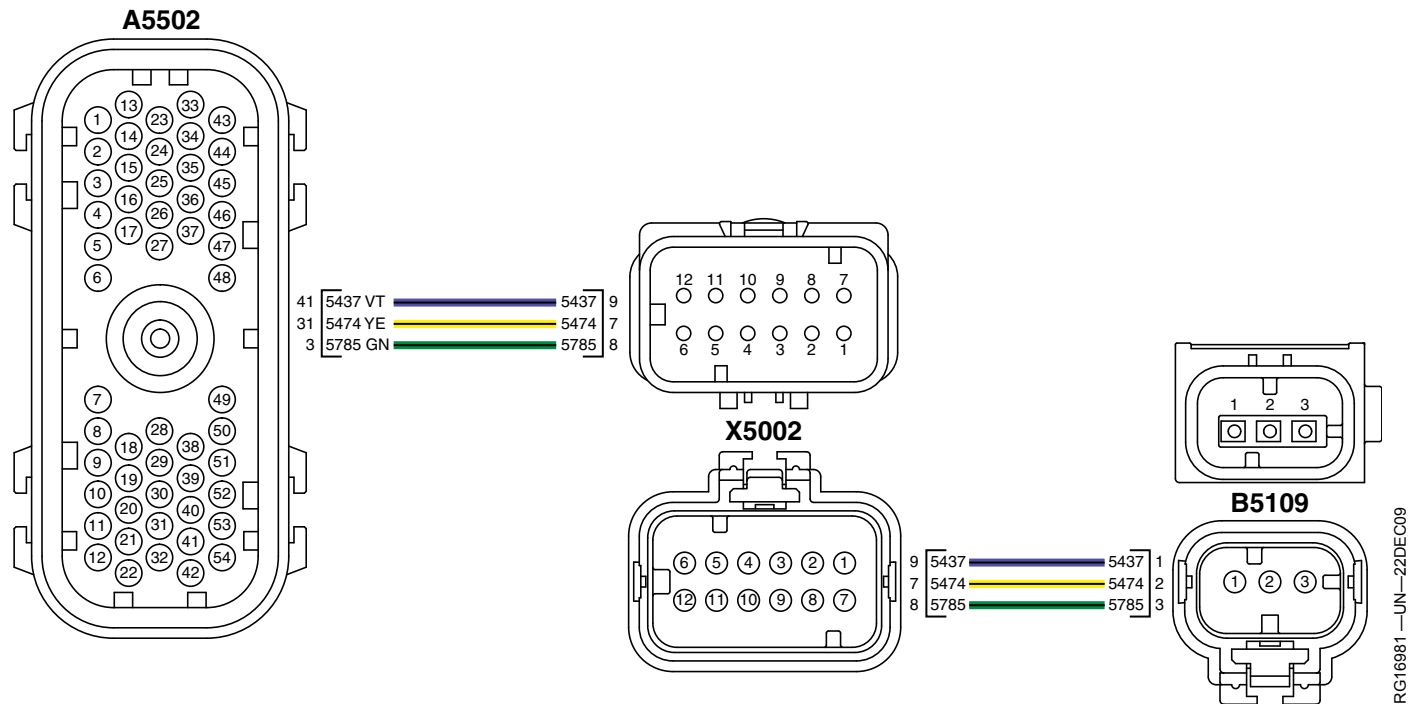
For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)

- see [4.5L Wiring Diagram 5](#)

- see [4.5L Wiring Diagram 8](#)

located in Section 06, Group 210.



DPF Differential Pressure Sensor Wiring Diagram

A5502—41—Supply A5502—31—Return A5502—3—Signal

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

- Flex probes:
- Sensor
- JDG10460 — Female — Yellow/Purple
 - JDG10461 — Male — Yellow/Purple
- ECU
- JDG10460 — Female — Yellow/Purple
 - JDG10461 — Male — Yellow/Purple

- Tools:
- JDG10273 — Diagnostic Test Box
 - JT07306 — Digital Multimeter
 - J-35616-20 — Test Leads

BK34394,0001B62 -19-19OCT11-3/4

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.
- NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.*
2. Ignition ON, Engine OFF.
 3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
 4. In Service ADVISOR perform Control Unit Information and Overview test.
 5. Visually inspect DPF Differential Pressure Sensor lines for loose connection or damage.
- NOTE: This DTC can be caused by extreme cold conditions where moisture has frozen in a line. The DTC clears once the line thaws.*
- Any problems found?

YES: Repair problem. [GO TO 11](#)

NO: [GO TO 2](#)

BK34394,0001B62 -19-19OCT11-4/4

004765.00 — DOC Inlet Temperature Extremely High

The Exhaust Filter Temperature Module has detected a problem with measuring DOC inlet temperature.

BK34394,0001B63 -19-19OCT11-1/3

Diagnostic Procedure

Troubleshooting Sequence: 004765.12

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU has received a message from the exhaust filter temperature module indicating that the exhaust filter temperature module has detected an error with measuring DOC Inlet Temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU inhibits purges and regenerations from occurring.

Additional references:

For more Exhaust Filter Temperature Module information, see [B5204 – Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

BK34394,0001B63 -19-19OCT11-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Inspect for:
 - Broken or loose clamps, or holes in exhaust filter.
 - DOC Inlet Temperature Sensor loose or not installed in exhaust filter.

Were any problems found?

YES: Repair Problem.
Perform [Service Regeneration](#).

NO: Replace Exhaust Filter Temperature Module. Perform [Service Regeneration](#).

BK34394,0001B63 -19-19OCT11-3/3

004765.12 — DOC Inlet Temperature Error

The Exhaust Filter Temperature Module has detected a problem with measuring DOC inlet temperature.

RE42287,0000522 -19-30MAY12-1/6

Diagnostic Procedure

Troubleshooting Sequence: 004765.12

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU has received a message from the exhaust filter temperature module indicating that the exhaust filter temperature module has detected an error with measuring DOC Inlet Temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU inhibits purges and regenerations from occurring.

Additional references:

For more Exhaust Filter Temperature Module information, see [B5204 – Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RE42287,0000522 -19-30MAY12-2/6

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Inspect for:
 - Broken or loose clamps, or holes in exhaust filter.
 - DOC Inlet Temperature Sensor loose or not installed in exhaust filter.

Were any problems found?

YES: Repair Problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

RE42287,0000522 -19-30MAY12-3/6

2 Check for active DTCs

1. Ignition ON, Engine OFF.
2. Refresh DTCs.

Were any DTCs with SPN 004766; 004765; 003246 active?

YES: Replace Exhaust Filter Temperature Module.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

Continued on next page

RE42287,0000522 -19-30MAY12-4/6

Fuel Dosing Aftertreatment System Diagnostics

3 Inspect Exhaust Filter Temperature Module

Inspect the wiring between the Exhaust Filter Temperature Module and the DOC Outlet Temperature Sensor, DPF Outlet Temperature Sensor, and DOC Inlet Temperature Sensor.

NOTE: Look for evidence of pinched, frayed, or melted wires

Were any problems found?

YES: Replace Exhaust Filter Temperature Module. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

RE42287,0000522 -19-30MAY12-5/6

4 Check Exhaust Filter Temperature Module

1. Key ON, Engine OFF.
2. In Service Advisor, monitor DOC Outlet Temperature .
3. In Service Advisor, monitor DPF Outlet Temperature .
4. In Service Advisor, monitor DOC Inlet Temperature
5. Perform [Wiggle Test](#) while monitoring temperatures in step 2, 3 and 4.

Did any temperature read **Invalid**?

YES: Replace Exhaust Filter Temperature Module. Perform [Verification Procedure](#).

NO: Contact DTAC

RE42287,0000522 -19-30MAY12-6/6

004766.12 — DOC Outlet Temperature Error

The Exhaust Filter Temperature Module has detected a problem with the DOC Outlet Temperature sensor.

RE42287,0000523 -19-30MAY12-1/12

Diagnostic Procedure

Troubleshooting Sequence: 004766.12

When DTC is Displayed:

When the ignition is on and the error is active.

Related Information:

The ECU has received a message from the exhaust filter temperature module indicating that the exhaust filter temperature module has detected an error with measuring DOC Outlet Temperature.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.
The ECU inhibits purges and regenerations from occurring.

Additional references:

For more Exhaust Filter Temperature Module information, see [B5204 – Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RE42287,0000523 -19-30MAY12-2/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Inspect for:
 - Broken or loose clamps, or holes in exhaust filter.
 - DOC Outlet Temperature Sensor loose or not installed in exhaust filter.

Were any problems found?

YES: Repair Problem. [GO TO 7](#)

NO: [GO TO 2](#)

RE42287,0000523 -19-30MAY12-3/12

2 Check for active DTCs

1. Ignition ON, Engine OFF.

2. Refresh DTCs.

Were any DTCs with SPN 004766; 004765; 003246 active?

YES: Replace Exhaust Filter Temperature Module. [GO TO 7](#)

NO: [GO TO 3](#)

Continued on next page

RE42287,0000523 -19-30MAY12-4/12

Fuel Dosing Aftertreatment System Diagnostics

3 Inspect Exhaust Filter Temperature Module	<p>Inspect the wiring between the Exhaust Filter Temperature Module and the DOC Outlet Temperature Sensor, DPF Outlet Temperature Sensor, and DOC Inlet Temperature Sensor.</p> <p><i>NOTE: Look for evidence of pinched, frayed, or melted wires</i></p> <p>Were any problems found?</p>	<p>YES: Replace Exhaust Filter Temperature Module. <u>GO TO 7</u></p> <p>NO: <u>GO TO 4</u></p> <p>RE42287,0000523 -19-30MAY12-5/12</p>
4 Check Exhaust Filter Temperature Module	<ol style="list-style-type: none">1. Key ON, Engine OFF.2. In Service Advisor, monitor DOC Outlet Temperature .3. In Service Advisor, monitor DPF Outlet Temperature .4. In Service Advisor, monitor DOC Inlet Temperature5. Perform <u>Wiggle Test</u> while monitoring temperatures in step 2, 3 and 4. <p>Did any temperature read Invalid?</p>	<p>YES: Replace Exhaust Filter Temperature Module. <u>GO TO 7</u></p> <p>NO: <u>GO TO 5</u></p> <p>RE42287,0000523 -19-30MAY12-6/12</p>
5 Review Snapshot Information	<p>Review Snapshot Information recorded in step 1.</p> <p>Was the engine coolant temperature greater than 85 °C (185 °F) when DTCs 004766.12, 4765.12 or 3246.12 became active?</p>	<p>YES: <u>GO TO 7</u></p> <p>NO: <u>GO TO 6</u></p> <p>RE42287,0000523 -19-30MAY12-7/12</p>
6 Check Engine Coolant Temperature	<p>Perform <u>Engine Coolant Temperature Below Normal</u> procedure in Section 04—Group 150.</p> <p><i>NOTE: Operating the engine at slow idle for extended periods in cold ambient temperatures cause combustibles to build up in the exhaust filter. The ECU periodically closes the air throttle to raise the temperature in the DOC to burn off combustibles. If the engine coolant is less than 60 °C (140 °F), the ECU cannot close the air throttle.</i></p> <p>Were any problems found?</p>	<p>YES: Repair Problem. <u>GO TO 7</u></p> <p>NO: <u>GO TO 7</u></p> <p>RE42287,0000523 -19-30MAY12-8/12</p>
7 Check for New ECU Software	<p>Search Custom Performance for ECU software updates.</p> <p>Is new software available?</p>	<p>YES: Reprogram ECU with new version of software. If Required In Service ADVISOR, perform Service Regeneration.</p> <p>NO: <u>GO TO 8</u></p> <p>Continued on next page</p> <p>RE42287,0000523 -19-30MAY12-9/12</p>

Fuel Dosing Aftertreatment System Diagnostics

8 Perform Exhaust Management Test

1. See Perform Exhaust Management Test Instructions in Section 04—Group 160.

2. Perform Exhaust Management Test

Did Exhaust Management Test indicate unintended combustibles were detected?

YES: Troubleshoot DTCs with SPN 005018 or 003696.

NO: GO TO 9

RE42287,0000523 -19-30MAY12-10/12

9 Check Results of Exhaust Management Test

Did the engine pass the Exhaust Management Test?

YES: Contact DTAC.

NO: Run Exhaust Management Test again. If engine does not pass Exhaust Management Test GO TO 10

RE42287,0000523 -19-30MAY12-11/12

10 Low Engine Coolant Temperature

Monitor engine coolant temperature while performing Exhaust Management Test.

Was engine coolant temperature greater than 60 °C (140 °F)?

YES: Contact DTAC

NO: Engine coolant temperature **Less Than Normal** GO TO 6

If no problem is found contact DTAC.

RE42287,0000523 -19-30MAY12-12/12

004766.15 — DOC Outlet Temperature Slightly High

The ECU has detected that the DOC outlet temperature is moderately high.

BK34394,0001B64 -19-19OCT11-1/3

Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 000027
Any DTC with SPN 000051
Any DTC with SPN 000102
Any DTC with SPN 000103
Any DTC with SPN 000105
Any DTC with SPN 000108
Any DTC with SPN 000412
Any DTC with SPN 001172
Any DTC with SPN 001176
Any DTC with SPN 001209
Any DTC with SPN 002659
Any DTC with SPN 002630
Any DTC with SPN 002795

522494.09

004766.12

003936.00

003936.15

003936.16

005018.00

005018.15

005018.16

004766.16

When DTC is Displayed:

When the ignition is on, engine is running and regeneration is occurring.

Related Information:

The ECU has detected that the DOC outlet temperature is higher than expected during a regeneration. The ECU performs the diagnostics for this fault during a regeneration while the engine is being operated in a transient condition.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU inhibits purges and regenerations from occurring during the key cycle the fault became active.

Additional References:

For more exhaust filter temperature module information, see [B5204 – Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

Continued on next page

BK34394,0001B64 -19-19OCT11-2/3

❶ Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.

4. In Service ADVISOR, perform Control Unit Information and Overview test.

Has engine been off for 8 hours?

YES: [GO TO 2](#)

NO: [GO TO 3](#)

BK34394,0001B64 -19-19OCT11-3/3

004766.16 — DOC Outlet Temperature Moderately High

The ECU has detected that the DOC outlet temperature is moderately high.

RE42287,0000524 -19-05AUG11-1/5

Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 000027
Any DTC with SPN 000051
Any DTC with SPN 000102
Any DTC with SPN 000103
Any DTC with SPN 000105
Any DTC with SPN 000108
Any DTC with SPN 000412
Any DTC with SPN 001172
Any DTC with SPN 001176
Any DTC with SPN 001209
Any DTC with SPN 002659
Any DTC with SPN 002630
Any DTC with SPN 002795

522494.09

004766.12

003936.00

003936.15

003936.16

005018.00

005018.15

005018.16

004766.16

When DTC is Displayed:

When the ignition is on, engine is running and regeneration is occurring.

Related Information:

The ECU has detected that the DOC outlet temperature is higher than expected during a regeneration. The ECU performs the diagnostics for this fault during a regeneration while the engine is being operated in a transient condition.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU inhibits purges and regenerations from occurring during the key cycle the fault became active.

Additional References:

For more exhaust filter temperature module information, see [B5204 – Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

Continued on next page

RE42287,0000524 -19-05AUG11-2/5

Fuel Dosing Aftertreatment System Diagnostics

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.

4. In Service ADVISOR, perform Control Unit Information and Overview test.

Has engine been off for 8 hours?

YES: [GO TO 2](#)

NO: [GO TO 3](#)

RE42287,0000524 -19-05AUG11-3/5

2 Temperature Comparison

1. In Service ADVISOR, monitor DOC Inlet Temperature.

2. In Service ADVISOR, monitor DOC Outlet Temperature.

3. In Service ADVISOR, monitor DPF Outlet Temperature.

Are all three measurements within 16 °C (29 °F) of each other?

YES: Perform [Exhaust Condition Check](#).

NO: Replace exhaust filter temperature module. Perform [Exhaust Condition Check](#).

RE42287,0000524 -19-05AUG11-4/5

3 Temperature Comparison

1. Ignition OFF, Engine OFF.



CAUTION: Wait until exhaust filter is cool enough to touch to avoid burning or injury.

2. Remove exhaust filter temperature sensors from exhaust filter assembly.
3. Allow the temperature sensors to hang freely in the air without the sensor ends touching anything and as close to each other as possible.
4. Ignition ON, Engine OFF.
5. In Service ADVISOR, monitor DOC Inlet Temperature.
6. In Service ADVISOR, monitor DOC Outlet Temperature.
7. In Service ADVISOR, monitor DPF Outlet Temperature.
8. Allow all three temperature measurements to stabilize.

Are all three measurements within 16 °C (29 °F) of each other?

YES: Perform [Exhaust Condition Check](#).

NO: Replace exhaust filter temperature module. Perform [Exhaust Condition Check](#).

RE42287,0000524 -19-05AUG11-5/5

004766.17 — DOC Outlet Temperature Slightly Low

The ECU has detected that the DOC outlet temperature is slightly low.

Diagnostic Procedure

When DTC is Displayed:

When the engine is running and the error is active.

Related Information:

The DOC outlet temperature signal is slightly lower than expected at the operating conditions that set the DTC.

The engine must be running for a minimum of 3 minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

For troubleshooting procedure see, [004766.18 — DOC Outlet Temperature Moderately Low](#).

RE42287,0000525 -19-26JUL11-1/1

004766.18 — DOC Outlet Temperature Moderately Low

The ECU has detected that the DOC outlet temperature is moderately Low.

RE42287,0000526 -19-06AUG11-1/6

Diagnostic Procedure

Troubleshooting Sequence:

Any DTC with SPN 000051

Any DTC with SPN 002795

004765.12

004766.12

005298.01

522494.09

004766.18

When DTC is Displayed:

When the ignition is on, engine is running and regeneration is occurring.

Related Information:

The ECU has detected that the DOC outlet temperature is lower than expected during a regeneration.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU inhibits purges and regenerations from occurring during the key cycle the fault became active.

Additional references:

For more exhaust filter temperature module information, see [B5204 – Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more aftertreatment system operation information, see [Aftertreatment System Operation](#) in Section 03, Group 137.

For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 4, Group 160.

For more exhaust filter operation information, see [Exhaust Filter Operation](#) in Section 03, Group 137.

For more information on Exhaust Temperature Management Test, see [Exhaust Temperature Management Test Instructions](#) in Section 4, Group 160.

For more information on DOC Calibration, see [DOC Calibration — Instructions](#) in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

For more information on the Service Regeneration test, see [Service Regeneration](#) in Section 04, Group 160.

Tools:

[JDG11100](#) — Flexible Borescope

RE42287,0000526 -19-06AUG11-2/6

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
 3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
 4. In Service ADVISOR, perform Control Unit Information and Overview test.
- Has engine been off for 8 hours?

YES: [GO TO 2](#)

NO: [GO TO 3](#)

Continued on next page

RE42287,0000526 -19-06AUG11-3/6

Fuel Dosing Aftertreatment System Diagnostics

2 Temperature Comparison


1. In Service ADVISOR, monitor DOC Inlet Temperature.
 2. In Service ADVISOR, monitor DOC Outlet Temperature.
 3. In Service ADVISOR, monitor DPF Outlet Temperature.
- Are all three measurements within 16 °C (29 °F) of each other?

YES: GO TO 4

NO: Replace exhaust filter temperature module. Perform [Exhaust Condition Check](#).

RE42287,0000526 -19-06AUG11-4/6

3 Temperature Comparison

1. Ignition OFF, Engine OFF.
-  **CAUTION:** Wait until exhaust filter is cool enough to touch to avoid burning or injury.
2. Remove exhaust filter temperature sensors from exhaust filter assembly.
 3. Allow the temperature sensors to hang freely in the air without the sensor ends touching anything and as close to each other as possible.
 4. Ignition ON, Engine OFF.
 5. In Service ADVISOR, monitor DOC Inlet Temperature.
 6. In Service ADVISOR, monitor DOC Outlet Temperature.
 7. In Service ADVISOR, monitor DPF Outlet Temperature.
 8. Allow all three temperature measurements to stabilize.
- Are all three measurements within 16 °C (29 °F) of each other?

YES: GO TO 4

NO: Replace exhaust filter temperature module. Perform [Exhaust Condition Check](#).

RE42287,0000526 -19-06AUG11-5/6

4 Exhaust Inspection

Thoroughly inspect the exhaust system for any signs of leaks.

Were any leaks found?

YES: Repair exhaust leaks. Perform [Exhaust Condition Check](#).

NO: Perform [Exhaust Condition Check](#).

RE42287,0000526 -19-06AUG11-6/6

004795.13 — Exhaust Filter Calibration Fault

The ECU detects an incorrect calibration code has been entered into the ECU.

RE42287,0000527 -19-26JUL11-1/7

Diagnostic Procedure**Troubleshooting Sequence:****004795.13****When DTC is Displayed:**

When the ignition is on and the error is active or during an exhaust filter (DOC or DPF) calibration event.

Related Information:

The ECU detects an incorrect exhaust filter calibration code has been entered into the ECU. Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine speed.

Additional References:

For more exhaust filter information, see [Exhaust Filter Operation](#) in Section 03, Group 137.

RE42287,0000527 -19-26JUL11-2/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 004795.13 active?

YES: [GO TO 2](#)**NO:** [GO TO 5](#)

RE42287,0000527 -19-26JUL11-3/7

2 Verify Correct Information Typed In

Verify that the DOC or DPF information displayed in the Control Unit Information and Overview Test matches the information on the part data sheet.

Does the data match?

YES: [GO TO 3](#)

NO: Perform applicable calibration (DOC Calibration or DPF Calibration).

RE42287,0000527 -19-26JUL11-4/7

3 Verify Correct Part

Verify that you have the correct part for the engine.

Was the correct part installed?

YES: [GO TO 4](#)

NO: Install correct part. Perform applicable calibration (DOC Calibration or DPF Calibration).

Continued on next page

RE42287,0000527 -19-26JUL11-5/7

Fuel Dosing Aftertreatment System Diagnostics

4 ECU Reprogram

Check to see if there is a software update for the engine.

Was a software update available?

YES: Download engine payload and reprogram ECU. Perform [Verification Procedure](#).

NO: Contact DTAC.

RE42287,0000527 -19-26JUL11-6/7

5 Clear DTCs

1. Clear DTCs.
2. Ignition OFF, Engine OFF for at least 90 seconds.
3. Ignition ON, Engine OFF.
4. Refresh codes.

Is DTC 004795.13 active?

YES: GO TO 2

NO: Perform [Verification Procedure](#).

RE42287,0000527 -19-26JUL11-7/7

004795.31 — DPF Missing

The ECU detects the DPF is missing.

Continued on next page

RE42287,0000528 -19-06AUG11-1/11

Diagnostic Procedure

Troubleshooting Sequence:

003251.03
003251.04
004795.31

When DTC is Displayed:

When the engine is running and the ECU detects lower DPF Differential Pressure than expected.

Related Information:

Engine performance may be dramatically affected. The engine may also be out of emissions compliance.

Alarm Level:

Warning

Control Unit Response:

The ECU derates the engine power.

Additional References:

Additional references:

For sensor location see [B5109 — DPF Differential Pressure Sensor](#) in Section 03, Group 140.

For more pressure sensor information, see [Measuring Pressure](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

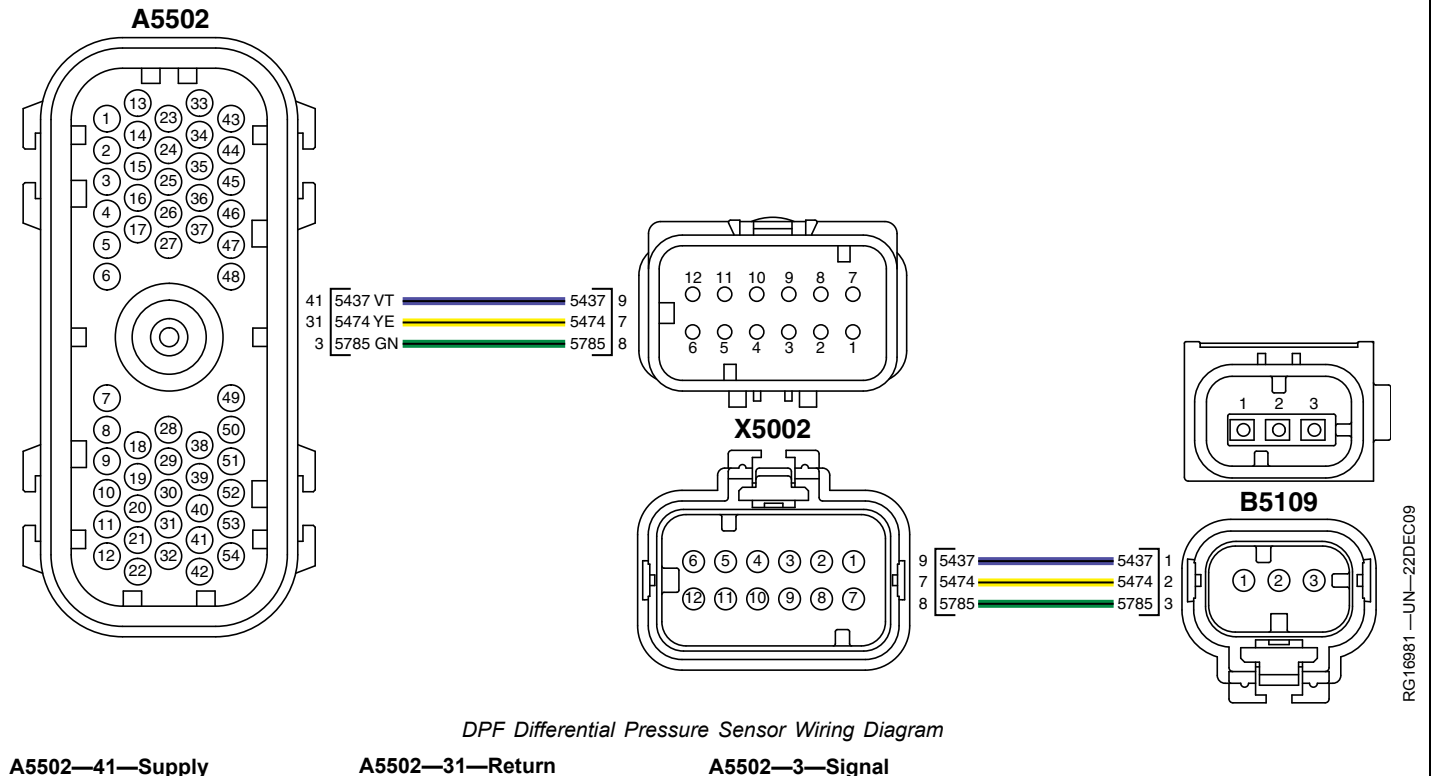
For more information on the Exhaust Condition Check, see [Exhaust Condition Check](#) in Section 04, Group 155.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 5](#)
 - see [4.5L Wiring Diagram 8](#)
- located in Section 06, Group 210.



Continued on next page

RE42287,0000528 -19-06AUG11-2/11

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.

Flex probe:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

- J-35616-20 — Test Leads

RE42287,0000528 -19-06AUG11-3/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Inspect DPF for loose clamps and DPF differential pressure sensor inlet and outlet lines for looseness or damage.

Any problems found?

YES: Repair problem. GO TO 2

NO: GO TO 3

RE42287,0000528 -19-06AUG11-4/11

2 Test for DTC

1. Ignition ON, Engine running at low idle for 60 seconds.
2. Move throttle to high idle for 60 seconds.
3. Move throttle to low idle for 60 seconds.
4. Repeat steps 2 and 3 at least seven times.

Is DTC 004795.31 active?

YES: GO TO 3

NO: Perform Exhaust Condition Check.

RE42287,0000528 -19-06AUG11-5/11

3 Smoke Test

NOTE: While performing the following steps watch for evidence of smoke coming out of the exhaust.

1. Ignition ON, Engine running at low idle for 60 seconds.
2. Move throttle to high idle for 60 seconds.
3. Move throttle to low idle for 60 seconds.

Is black smoke seen coming out of the exhaust?

YES: Perform Exhaust Condition Check.

NO: GO TO 4

Continued on next page

RE42287,0000528 -19-06AUG11-6/11

<p>4 Supply Circuit Check</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Connect Diagnostic Test Box : <ul style="list-style-type: none"> • A to B5109 connector female socket 1 (+). • B to B5109 connector female socket 2 (-). 3. Set S1 to position 1 on Diagnostic Test Box. 4. Connect multimeter to Diagnostic Test Box. 5. Ignition ON, Engine OFF. 6. Press and hold S3 on Diagnostic Test Box. 7. Monitor voltage on multimeter. 8. Perform <u>Wiggle Test</u>. <p>Does voltage remain between 4.8 and 5.2 V?</p>	<p>YES: <u>GO TO 6</u></p> <p>NO: <u>GO TO 5</u></p> <p align="right">RE42287,0000528 -19-06AUG11-7/11</p>
<p>5 Open or High Resistance Circuit Check</p>	<ol style="list-style-type: none"> 1. Press and hold both S2 and S3 buttons on Diagnostic Test Box. 2. Monitor voltage on multimeter. <p>Does voltage now remain between 4.8 and 5.2 V?</p>	<p>YES: Repair open or high resistance in return wire. Perform <u>Aftertreatment Verification Procedure</u>.</p> <p>NO: Repair open or high resistance in supply wire. Perform <u>Aftertreatment Verification Procedure</u>.</p> <p align="right">RE42287,0000528 -19-06AUG11-8/11</p>
<p>6 Signal Circuit Check</p>	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Connect Diagnostic Test Box : <ul style="list-style-type: none"> • A to B5109 connector female socket 3 (+). • B to B5109 connector female socket 2 (-). 3. Set S1 to position 9 on Diagnostic Test Box. 4. Connect multimeter to Diagnostic Test Box. 5. Ignition ON, Engine OFF. 6. Monitor voltage on multimeter. 7. Perform <u>Wiggle Test</u>. <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: <u>GO TO 7</u></p> <p>NO: Repair high resistance in harness. Perform <u>Aftertreatment Verification Procedure</u>.</p> <p align="right">RE42287,0000528 -19-06AUG11-9/11</p>
<p>7 Software Check</p>	<p>In Service ADVISOR, monitor DPF Differential Pressure Input Voltage .</p> <p>Is voltage between 2.3 and 2.7 V?</p>	<p>YES: Replace sensor. In Service ADVISOR, perform Service Regeneration.</p> <p>NO: <u>GO TO 8</u></p> <p align="right">Continued on next page RE42287,0000528 -19-06AUG11-10/11</p>

8 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160.
5. Ignition ON, Engine running at low idle for 60 seconds.
6. Move throttle to high idle for 60 seconds.
7. Move throttle to low idle for 60 seconds.

Is DTC 004795.31 active?

YES: Contact DTAC for support.

NO: Perform Aftertreatment Verification Procedure.

RE42287,0000528 -19-06AUG11-11/11

005298.01 — DOC Efficiency Extremely Low

The ECU has detected that the DOC efficiency is extremely low.

RE42287,0000529 -19-26JUL11-1/6

Diagnostic Procedure

Troubleshooting Sequence:

004766.12
004766.16
003246.00
003246.12
005018.00
005018.15
005018.16
003936.00
003936.15
003936.16
005298.01

When DTC is Displayed:

When the ignition is on, engine running, and the fault is detected near the end of an active regeneration.

Related Information:

The ECU receives messages from the exhaust filter temperature module indicating the temperatures of the aftertreatment inlet and outlets. Near the end of an active regeneration, the ECU compares the DPF outlet temperature to the DOC outlet temperature.

Once this code becomes active, it remains active until the problem is corrected.

NOTE: The fault can be caused by running fuel with too high of sulfur content. Refer to your operators manual to ensure the correct fuel is being used.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

The ECU inhibits purges and regenerations from occurring.

Additional references:

For more Exhaust Filter Temperature Module information, see [B5204 – Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more aftertreatment system operation information, see [Aftertreatment System Operation](#) in Section 03, Group 137.

For more exhaust filter operation information, see [Exhaust Filter Operation](#) in Section 03, Group 137.

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

RE42287,0000529 -19-26JUL11-2/6

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.

Has engine been off for 8 hours?

YES: [GO TO 2](#)

NO: [GO TO 3](#)

Continued on next page

RE42287,0000529 -19-26JUL11-3/6

Fuel Dosing Aftertreatment System Diagnostics

2 Temperature Comparison


1. In Service ADVISOR, monitor DOC Inlet Temperature.
 2. In Service ADVISOR, monitor DOC Outlet Temperature.
 3. In Service ADVISOR, monitor DPF Outlet Temperature.
- Are all three measurements within 16 °C (29 °F) of each other?

YES: GO TO 4

NO: Replace exhaust filter temperature module. Perform Exhaust Condition Check.

RE42287,0000529 -19-26JUL11-4/6

3 Temperature Comparison

1. Ignition OFF, Engine OFF.
-  **CAUTION:** Wait until exhaust filter is cool enough to touch to avoid burning or injury.
2. Remove exhaust filter temperature sensors from exhaust filter assembly.
 3. Allow the temperature sensors to hang freely in the air without the sensor ends touching anything and as close to each other as possible.
 4. Ignition ON, Engine OFF.
 5. In Service ADVISOR, monitor DOC Inlet Temperature.
 6. In Service ADVISOR, monitor DOC Outlet Temperature.
 7. In Service ADVISOR, monitor DPF Outlet Temperature.
 8. Allow all three temperature measurements to stabilize.
- Are all three measurements within 16 °C (29 °F) of each other?

YES: GO TO 4

NO: Replace exhaust filter temperature module. Perform Exhaust Condition Check.

RE42287,0000529 -19-26JUL11-5/6

4 Age Check

In Service ADVISOR, monitor DOC End of Life.

Is DOC End of Life set to True?

YES: Replace DOC. In Service ADVISOR, perform DOC Calibration. In Service ADVISOR, perform Clear Aftertreatment Latched DTC test. In Service ADVISOR, perform Service Regeneration test.

NO: Perform Exhaust Condition Check.

RE42287,0000529 -19-26JUL11-6/6

005298.18 — DOC Efficiency Moderately Low

This is a Stored Only code that is currently being used for engineering purposes only. No troubleshooting required. Work off all other codes.

RE42287,000052A -19-26JUL11-1/1

**522495.09 — Exhaust Filter Temperature
Module Loss of Communication**

*The ECU has not detected communication with the
exhaust filter temperature module.*

Continued on next page

RE42287,000052B -19-07AUG11-1/17

Diagnostic Procedure

Troubleshooting Sequence:

003514.04
003514.03
005127.03
005127.04
522495.09

When DTC is Displayed:

When the ignition is on and the error is active.

NOTE: On 12 V systems, nominal battery voltage is less than the voltage needed to set this code. To increase the battery voltage use a battery charger with the Engine OFF.

IMPORTANT: Do not run engine and use a battery charger at the same time or you may damage electronic components.

NOTE: If you are on a 24 V system, you do not need to use a battery charger.

Related Information:

The ECU has not detected communication with the exhaust filter temperature module.

Alarm Level:

Warning

Control Unit Response:

The ECU tries to maintain proper operating conditions.

Active regenerations are inhibited.

Additional References:

For more intake air information, see [B5204 — Exhaust Filter Temperature Module](#) in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see [Using Diagnostic Test Box](#) in Section 04, Group 160.

For more information on performing Service Regeneration, see [Service Regeneration Instructions](#) in Section 04, Group 160.

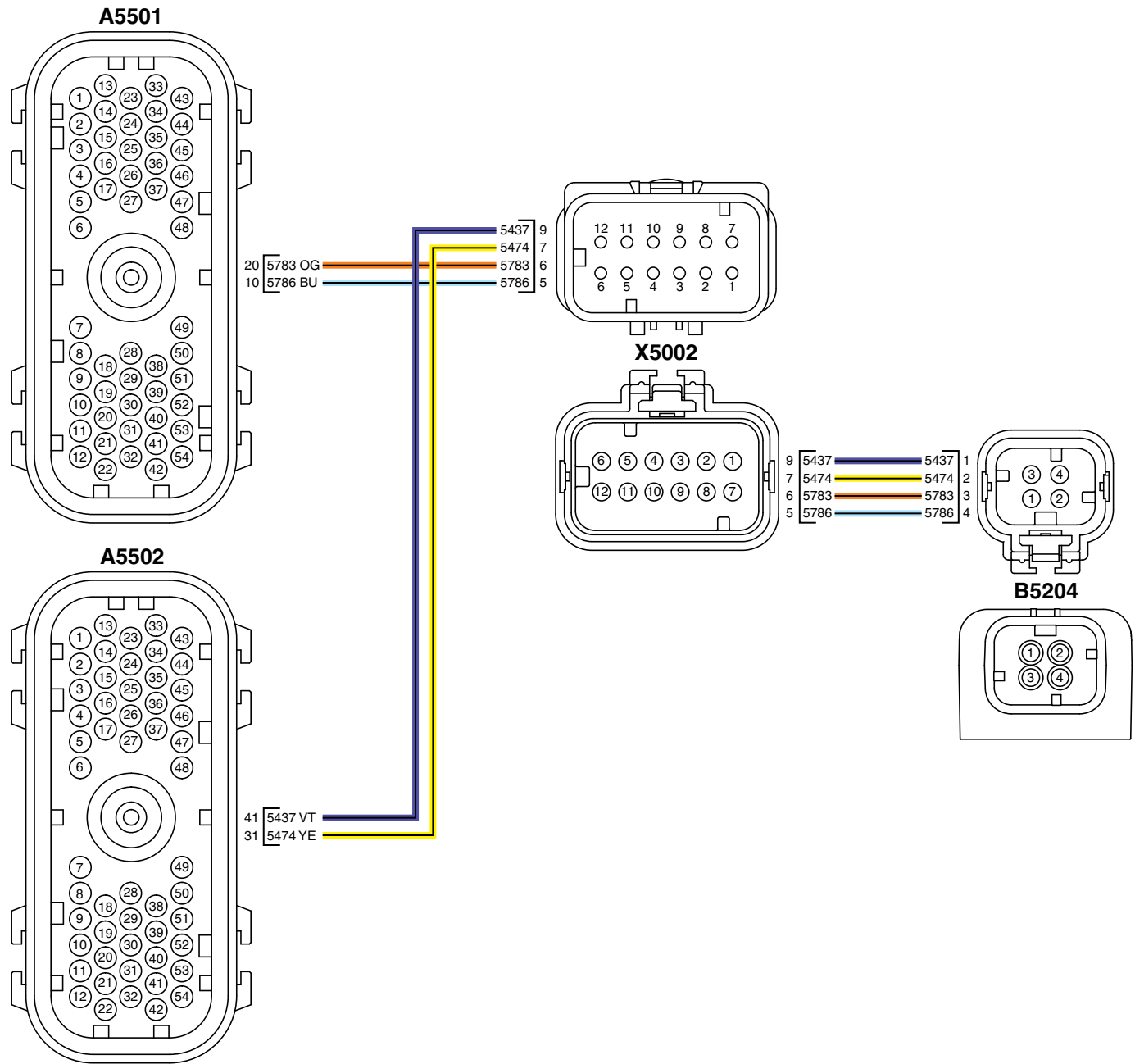
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 5](#)
- see [4.5L Wiring Diagram 8](#)

located in Section 06, Group 210.



Exhaust Filter Temperature Module Wiring Diagram

A5502—41—+5 V Supply

A5502—31—Return

A5501—10—Signal

A5501—20—+10 V Supply

IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from **JDG10466** Flex Probe Kit is used.

Flex probe:

- Exhaust Filter Temperature Module
- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

RG16980 —UN—22DEC09

Continued on next page

RE42287,000052B -19-07AUG11-3/17

Fuel Dosing Aftertreatment System Diagnostics

Tools:
JT07306 – Digital Multimeter
- J-35616-20 – Test Leads

RE42287,000052B -19-07AUG11-4/17

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is 522495.09 active?

YES: GO TO 2

NO: GO TO 12

RE42287,000052B -19-07AUG11-5/17

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect exhaust filter temperature module connector B5204.
3. Perform Terminal Test on sensor and B5204 connector.

Were any problems found?

YES: Repair problem. In Service ADVISOR, perform Service Regeneration.

NO: GO TO 3

RE42287,000052B -19-07AUG11-6/17

3 +10 Volt Supply Check

1. Connect Diagnostic Test Box:
 - A to B5204 connector female socket 3(+)
 - B to B5204 connector female socket 2(-)
2. Set S1 to position 1 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. If this is a 12V system, ensure that a battery charger is connected to the battery.
5. Ignition ON, Engine OFF.
6. Press and hold S3 on Diagnostic Test Box.
7. Monitor voltage on multimeter.
8. Perform Wiggle Test.

Does voltage remain between 9 and 12 V?

YES: GO TO 4

NO: Voltage is less than 9 V. GO TO 9

NO: Voltage is greater than 12 V. GO TO 10

Continued on next page

RE42287,000052B -19-07AUG11-7/17

Fuel Dosing Aftertreatment System Diagnostics

4 +5 Volt Supply Check	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF 2. Connect Diagnostic Test Box: <ul style="list-style-type: none"> • A to B5204 connector female socket 1(+) • B to B5204 connector female socket 2(-) 3. Set S1 to position 1 on Diagnostic Test Box. 4. Connect multimeter to Diagnostic Test Box. 5. Ignition ON, Engine OFF. 6. Press and hold S3 on Diagnostic Test Box. 7. Monitor voltage on multimeter. 8. Perform <u>Wiggle Test</u>. <p>Does voltage remain between 4.8 and 5.2 V?</p>	<p>YES: <u>GO TO 5</u></p> <p>NO: Repair open or high resistance in +5 V supply wire. In Service ADVISOR, perform Service Regeneration.</p> <p style="text-align: right;">RE42287,000052B -19-07AUG11-8/17</p>
5 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect ECU connectors A5501 and A5502. 3. Perform <u>Terminal Test</u> on A5501 connector female sockets 10 and 20, and A5502 connector female sockets 31 and 41. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. In Service ADVISOR, perform Service Regeneration.</p> <p>NO: <u>GO TO 6</u></p> <p style="text-align: right;">RE42287,000052B -19-07AUG11-9/17</p>
6 Wire to Wire Short Check	<p>On A5501 connector, measure resistance between female socket 10 and all other terminals A5501 connector.</p> <p>Any resistances less than 100k ohms?</p>	<p>YES: Repair short in harness. In Service ADVISOR, perform Service Regeneration.</p> <p>NO: <u>GO TO 7</u></p> <p style="text-align: right;">RE42287,000052B -19-07AUG11-10/17</p>
7 Wire to Wire Short Check	<ol style="list-style-type: none"> 1. Disconnect all other ECU connectors. 2. On A5501 connector, measure resistance between female socket 10 and all other terminals in all other ECU connectors. <p>Any resistances less than 100k ohms?</p>	<p>YES: Repair short in harness. In Service ADVISOR, perform Service Regeneration.</p> <p>NO: <u>GO TO 8</u></p> <p style="text-align: right;">RE42287,000052B -19-07AUG11-11/17</p>
8 Short to Ground Check	<p>Measure resistance between A5501 female socket 10 and single point ground.</p> <p>Is resistance less than 100k ohms?</p>	<p>YES: Repair short to ground in harness. In Service ADVISOR, perform Service Regeneration.</p> <p>NO: Replace exhaust filter temperature module. In Service ADVISOR, perform Service Regeneration.</p> <p style="text-align: right;">RE42287,000052B -19-07AUG11-12/17</p>

Continued on next page

Fuel Dosing Aftertreatment System Diagnostics

9 Sensor Ground Check

1. If this is a 12V system, ensure that a battery charger is connected to the battery.
2. With Diagnostic Test Box still connected press and hold switches S2 and S3.
3. Monitor voltage on multimeter.

Is voltage between 9 and 12 V?

YES: Repair open or high resistance in return wire. In Service ADVISOR, perform Service Regeneration.

NO: repair open or high resistance in supply wire. In Service ADVISOR, perform Service Regeneration.

RE42287,000052B -19-07AUG11-13/17

10 Unswitched Voltage Check

1. Ignition OFF, Engine OFF.

NOTE: Wait 90 seconds for ECU to shut down before making measurement.

NOTE: Terminals 45 and 20 are tied together inside the ECU.

2. Measure voltage between:

- A5501 female socket 45 and A5502 female socket 2.
- A5501 female socket 20 and A5502 female socket 2.

Is voltage between 0.0 and 0.2 V?

YES: GO TO 11

NO: Repair short to unswitched battery voltage on +10 V supply wire. In Service ADVISOR, perform Service Regeneration.

RE42287,000052B -19-07AUG11-14/17

11 Wire to Wire Short Check

1. Disconnect all ECU connectors.

2. On A5501 connector, measure resistance between female socket 20 and all other terminals in all ECU connectors.

Any resistances less than 100k ohms?

YES: Repair problem. In Service ADVISOR, perform Service Regeneration.

NO: Contact DTAC

RE42287,000052B -19-07AUG11-15/17

12 Review DTC list

Review DTC List.

Is 522494.09 stored?

YES: GO TO 13

NO: GO TO 14

RE42287,000052B -19-07AUG11-16/17

13 Review DTC list

Review DTC List.

Is either DTC 005127.03 or 005127.04 stored?

YES: Replace ECU. In Service ADVISOR, perform Service Regeneration.

NO: Troubleshoot DTC that is stored.

RE42287,000052B -19-07AUG11-17/17

14 Wiggle Test

1. Ignition ON, Engine OFF.
2. Monitor DTCs in Service ADVISOR.
3. Perform Wiggle Test.

Does DTC 522495.09 become active?

YES: Repair harness problem. In Service ADVISOR, perform Service Regeneration.

NO: GO TO Problem Not Found Procedure.

RE42287,000052B -19-07AUG11-18/17

**000137.00 — Auxiliary Gauge Pressure
Reading Extremely High**

*For diagnostic procedures, please see your
application technical manual.*

BK34394,00011E0 -19-27JUL11-1/1

**000137.01 — Auxiliary Gauge Pressure
Reading Extremely Low**

*For diagnostic procedures, please see your
application technical manual.*

DN22556,0000134 -19-27JUL11-1/1

000158.01 — Battery Voltage Extremely Low

For diagnostic procedures, please see your application
technical manual.

RK80614,0000006 -19-20JUL12-1/1

000160.02 — Primary Shaft Speed Invalid

*For diagnostic procedures, please see your
application technical manual.*

DN22556,0000135 -19-27JUL11-1/1

000237.02 — VIN Security Data Invalid

*For diagnostic procedures, please see your
application technical manual.*

BK34394,00011E1 -19-25FEB11-1/1

**000237.13 — VIN Option Code Security Data
Conflict**

*For diagnostic procedures, please see your
application technical manual.*

BK34394,00011E2 -19-25FEB11-1/1

000237.31 — VIN Security Data Missing

*For diagnostic procedures, please see your
application technical manual.*

BK34394,00011E3 -19-25FEB11-1/1

**000443.00 — Auxiliary Gauge Pressure #2
Reading Extremely High**

*For diagnostic procedures, please see your
application technical manual.*

DN22556,0000136 -19-27JUL11-1/1

**000443.01 — Auxiliary Gauge Pressure #2
Reading Extremely Low**

*For diagnostic procedures, please see your
application technical manual.*

DN22556,0000137 -19-27JUL11-1/1

**000640.11 — External Engine Protection
Activated**

*For troubleshooting procedures, please see the
application troubleshooting manual.*

BK34394,00011E4 -19-30MAR11-1/1

000640.31 — External Derate Activated

For troubleshooting procedures, please see the application troubleshooting manual.

BK34394,00011E5 -19-30MAR11-1/1

**000647.03 — Engine Fan Drive Circuit
Shorted to Voltage**

*For diagnostic procedures, please see your
application technical manual.*

DN22556,0000138 -19-27JUL11-1/1

000647.05 — Engine Fan Drive Circuit Has High Resistance

The ECU has detected that the fan drive circuit has high resistance.

Continued on next page

BK34394,00011E6 -19-02AUG11-1/12

Diagnostic Procedure

Troubleshooting Sequence: 000647.05

When DTC is Displayed:

When the ignition is on, engine is running, and the fault is active.

Related Information:

The ECU has detected that the fan drive circuit has high resistance.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain proper operating conditions.

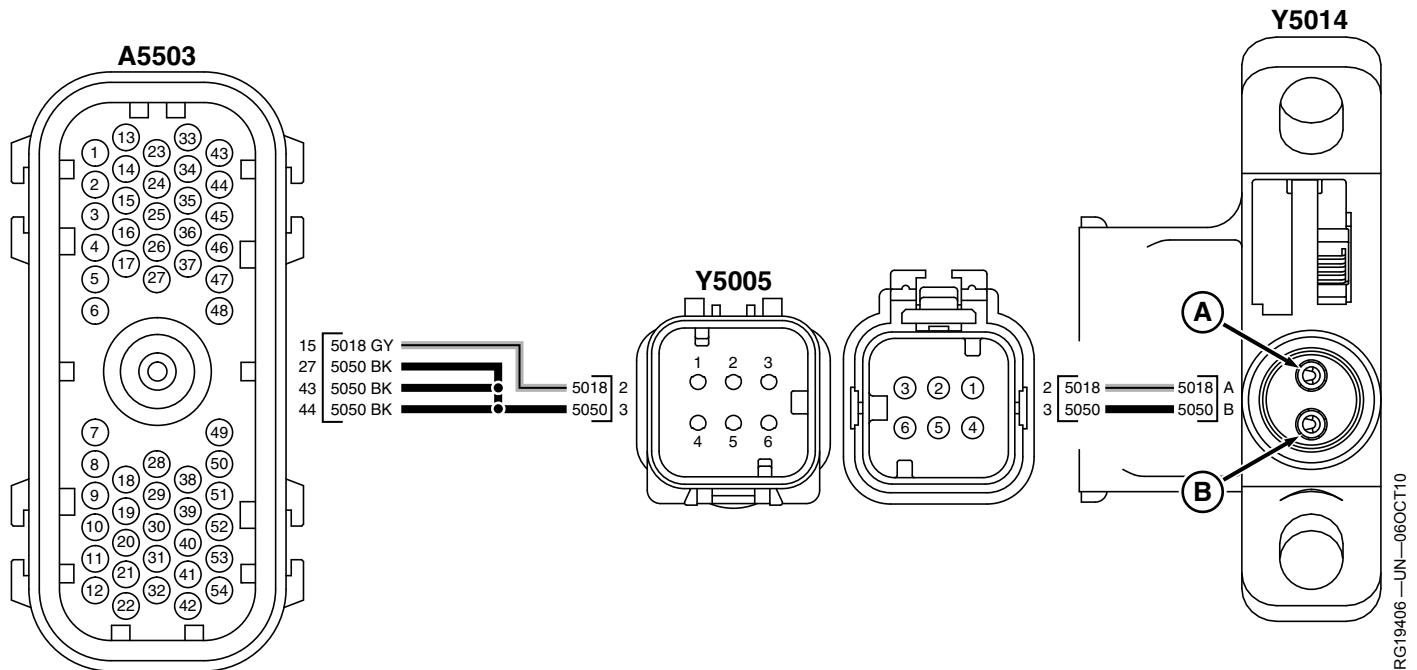
Additional references:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 7](#)
- located in Section 06, Group 210.



Fan Drive Wiring Diagram

A5503—15—Fan Clutch Control A5503—43—Battery Negative A—Fan Clutch Control
A5503—27—Battery Negative A5503—44—Battery Negative B—Battery Negative

IMPORTANT: Do not force probes into connector terminals or damage will result. Use [JDG10466 Flex Probe Kit](#) to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

Continued on next page

BK34394,00011E6 -19-02AUG11-2/12

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

BK34394,00011E6 -19-02AUG11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs are cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 000647.05 active?

YES: GO TO 2

NO: GO TO [Problem Not Found Procedure](#)

BK34394,00011E6 -19-02AUG11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect variable speed fan connector Y5014.
3. Perform [Terminal Test](#) on sensor and Y5014 connector.

Were any problems found?

YES: Replace harness containing Y5014 and Y5005 connectors. Perform [Verification Procedure](#).

NO: [GO TO 3](#)

BK34394,00011E6 -19-02AUG11-5/12

3 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform [Terminal Test](#) on A5503 connector female sockets 15, 27, 43, and 44. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

BK34394,00011E6 -19-02AUG11-6/12

4 Continuity Check

Measure the resistance between A5503 connector female socket 15 and Y5014 connector female socket A.

Is resistance less than 5 ohms?

YES: [GO TO 5](#)

NO: [GO TO 6](#)

Continued on next page

BK34394,00011E6 -19-02AUG11-7/12

Application Diagnostics

5 Continuity Check	<p>Measure the resistance between A5503 connector female socket 27 and Y5014 connector female socket B.</p> <p>Measure the resistance between A5503 connector female socket 43 and Y5014 connector female socket B.</p> <p>Measure the resistance between A5503 connector female socket 44 and Y5014 connector female socket B.</p> <p>Are all resistances less than 5 ohms?</p>	<p>YES: Replace fan solenoid. Perform Verification Procedure.</p> <p>NO: GO TO 8</p>
6 Terminal Test	<p>1. Disconnect connector Y5005.</p> <p>2. Perform Terminal Test on male and female terminals of Y5005 connector.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 7</p>
7 Continuity Check	<p>Measure the resistance between Y5005 connector female socket 2 and Y5014 connector female socket A.</p> <p>Is resistance less than 5 ohms?</p>	<p>YES: Repair open or high resistance on signal wire in harness between A5503 and Y5005 connectors. Perform Verification Procedure.</p> <p>NO: Replace harness containing Y5014 and Y5005 connectors. Perform Verification Procedure.</p>
8 Terminal Test	<p>1. Disconnect connector Y5005.</p> <p>2. Perform Terminal Test on male and female terminals of Y5005 connector.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 9</p>
9 Continuity Check	<p>Measure the resistance between Y5005 connector female socket 3 and Y5014 connector female socket B.</p> <p>Is resistance less than 5 ohms?</p>	<p>YES: Repair open or high resistance on return wire in harness between A5503 and Y5005 connectors. Perform Verification Procedure.</p> <p>NO: Replace harness containing Y5014 and Y5005 connectors. Perform Verification Procedure.</p>

000647.06 — Engine Fan Drive Circuit Has Low Resistance

The ECU has detected that the fan drive circuit has low resistance.

Continued on next page

BK34394,00011E7 -19-11MAY11-1/13

Diagnostic Procedure**Troubleshooting Sequence:**
000647.06**When DTC is Displayed:**

When the ignition is on, engine is running, and the fault is active.

Related Information:

The ECU has detected that the fan drive circuit has low resistance.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain proper operating conditions.

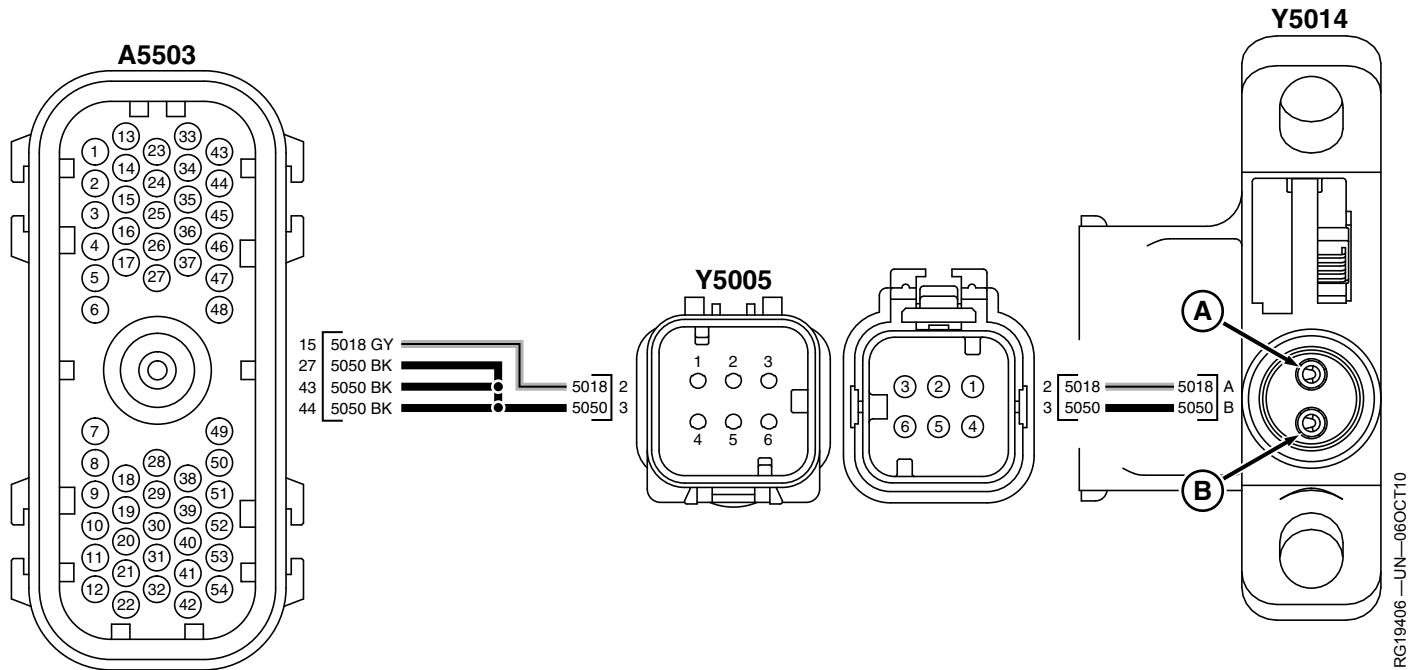
Additional references:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 7](#)
- located in Section 06, Group 210.



Fan Drive Wiring Diagram

A5503—15—Fan Clutch Control A5503—43—Battery Negative A—Fan Clutch Control
A5503—27—Battery Negative A5503—44—Battery Negative B—Battery Negative

IMPORTANT: Do not force probes into connector terminals or damage will result. Use [JDG10466 Flex Probe Kit](#) to make measurements in connectors. This will ensure that terminal damage does not occur.

Flex probes:

Sensor

- [JDG10460](#) — Female — Yellow/Purple
- [JDG10461](#) — Male — Yellow/Purple

Continued on next page

BK34394,00011E7 -19-11MAY11-2/13

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

BK34394,00011E7 -19-11MAY11-3/13

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
 3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
 4. In Service ADVISOR, perform Control Unit Information and Overview test.
 5. Ignition ON, Engine running.
 6. Refresh codes.
- Is DTC 000647.06 active?

YES: GO TO 2**NO:** GO TO [Problem Not Found Procedure](#)

BK34394,00011E7 -19-11MAY11-4/13

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect variable speed fan connector Y5014.
3. Perform [Terminal Test](#) on sensor and Y5014 connector.

Were any problems found?

YES: Replace harness containing Y5014 and Y5005 connectors. Perform [Verification Procedure](#).

NO: [GO TO 3](#)

BK34394,00011E7 -19-11MAY11-5/13

3 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform [Terminal Test](#) on A5503 connector female sockets 15, 27, 43, and 44. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure](#).

NO: [GO TO 4](#)

BK34394,00011E7 -19-11MAY11-6/13

4 Short to Ground Check

On Y5014 connector, measure resistance between:

- female socket A and single point ground.
- female socket B and single point ground.

Is resistance less than 100k ohms for either measurement?

YES: [GO TO 5](#)**NO:** [GO TO 7](#)

Continued on next page

BK34394,00011E7 -19-11MAY11-7/13

Application Diagnostics

5 Terminal Test	<p>1. Disconnect connector Y5005.</p> <p>2. Perform <u>Terminal Test</u> on male and female terminals of Y5005 connector.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 6</u></p>
6 Short to Ground Check	<p>On Y5014 connector, measure resistance between:</p> <ul style="list-style-type: none"> • female socket A and single point ground. • female socket B and single point ground. <p>Is resistance less than 100k ohms for either measurement?</p>	<p>YES: Replace harness containing Y5014 and Y5005 connectors. Perform <u>Verification Procedure</u>.</p> <p>NO: Repair short in harness between Y5005 and A5503 connectors. Perform <u>Verification Procedure</u>.</p>
7 Terminal Test	<p>1. Disconnect connector Y5005.</p> <p>2. Perform <u>Terminal Test</u> on male and female terminals of Y5005 connector.</p> <p>Were any problems found?</p>	<p>YES: Repair problem. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 8</u></p>
8 Wire to Wire Check	<p>On Y5005 connector, measure resistance between female socket 2 and all other female sockets in Y5005 connector.</p> <p>Are any resistances less than 100k ohms?</p>	<p>YES: Replace harness containing Y5014 and Y5005 connectors. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 9</u></p>
9 Wire to Wire Check	<p>On A5503 connector, measure resistance between female socket 15 and all other sockets in A5503 connector.</p> <p>Are any resistances less than 100k ohms?</p>	<p>YES: Repair short in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: <u>GO TO 10</u></p>
10 Wire to Wire Short Check	<p>1. Disconnect ECU connectors A5501 and A5502.</p> <p>2. On A5503 connector, measure resistance between female socket 15 and all other sockets in ECU harness connectors A5501 and A5502.</p> <p>Are any measurements less than 100k ohms?</p>	<p>YES: Repair short to signal wire in harness. Perform <u>Verification Procedure</u>.</p> <p>NO: Contact DTAC for support.</p>

**000647.07 — Engine Fan Speed Decrease
Circuit Fault**

*The ECU has detected that the fan drive circuit
has high resistance.*

Continued on next page

BK34394,00011E8 -19-02AUG11-1/8

Diagnostic Procedure**Troubleshooting Sequence:**
000647.07**When DTC is Displayed:**

When the ignition is on, engine is running, and the fault is active.

Related Information:

The ECU has detected that the fan drive circuit has high resistance.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain proper operating conditions.

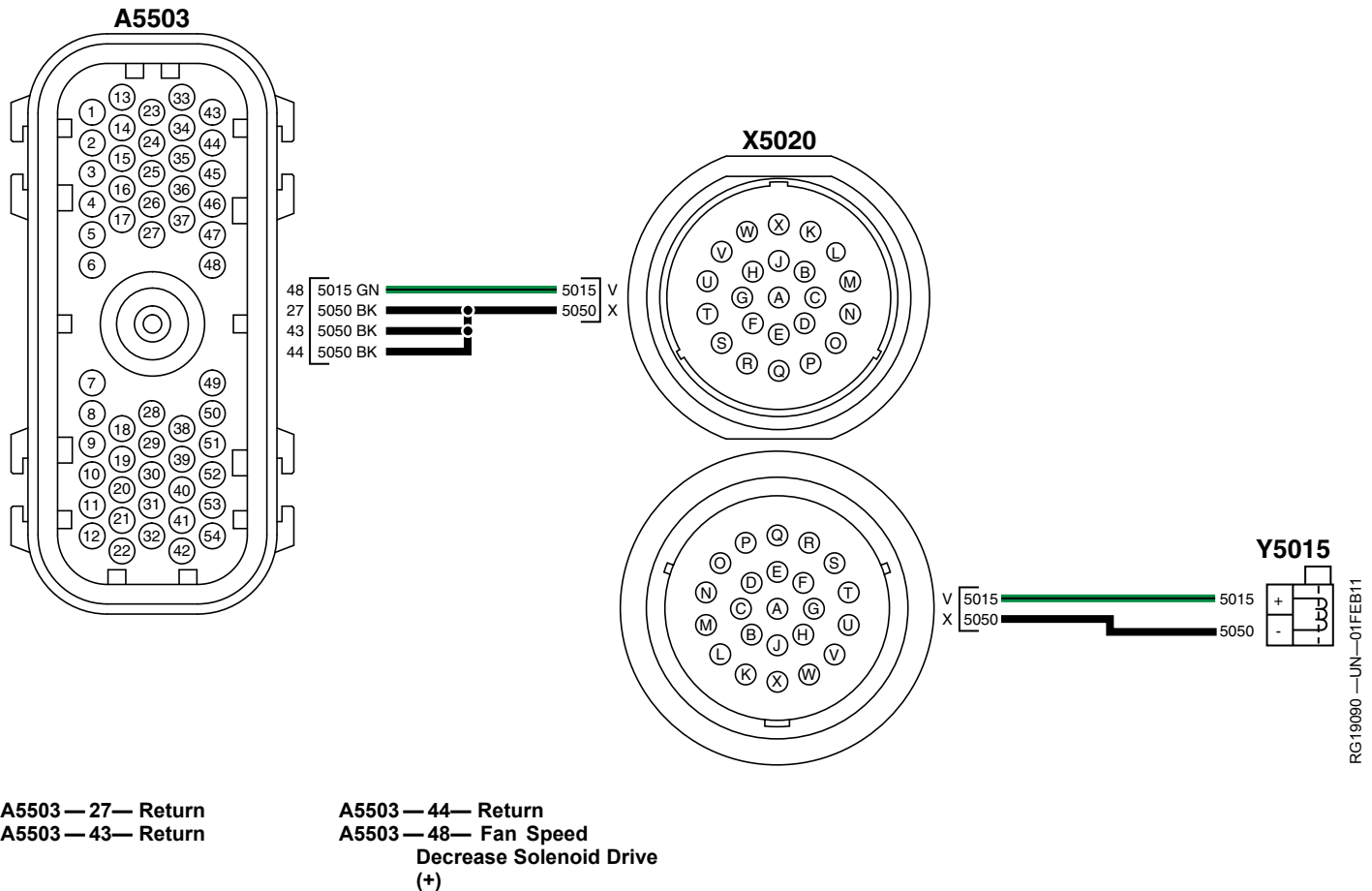
Additional references:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [Engine Schematic 2](#)
 - see [4.5L Wiring Diagram 9](#)
- located in Section 06, Group 210.



IMPORTANT: Do not force probes into connector terminals or damage will result. Use [JDG10466 Flex Probe Kit](#) to make measurements in connectors. This will ensure that terminal damage does not occur.

Continued on next page

BK34394,00011E8 -19-02AUG11-2/8

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

BK34394,00011E8 -19-02AUG11-3/8

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs are cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 000647.07 active?

YES: [GO TO 2](#)

NO: [GO TO Problem Not Found Procedure](#)

BK34394,00011E8 -19-02AUG11-4/8

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect fan speed decreasing solenoid connector Y5015.
3. Perform [Terminal Test](#) on solenoid and Y5015 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

BK34394,00011E8 -19-02AUG11-5/8

3 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform [Terminal Test](#) on A5503 connector female sockets 27, 43, 44, and 48. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

BK34394,00011E8 -19-02AUG11-6/8

4 Continuity Check

Measure the resistance between A5503 connector female socket 48 and Y5015 connector female socket (+).

Is resistance less than 5 ohms?

YES: [GO TO 5](#)

NO: Repair open or high resistance on signal wire in harness. Perform [Verification Procedure](#).

Continued on next page

BK34394,00011E8 -19-02AUG11-7/8

5 Continuity Check

Measure the resistance between A5503 connector female socket 27 and Y5015 connector female socket (-).

Measure the resistance between A5503 connector female socket 43 and Y5015 connector female socket (-).

Measure the resistance between A5503 connector female socket 44 and Y5015 connector female socket (-).

Are all resistances less than 5 ohms?

YES: Replace fan solenoid. Perform [Verification Procedure](#).

NO: Repair open or high resistance in return wire. Perform [Verification Procedure](#).

BK34394,00011E8 -19-02AUG11-8/8

000695.19 — Unapproved Engine Speed Request

For troubleshooting procedures, please see the application troubleshooting manual.

BK34394,00011E9 -19-31MAR11-1/1

**000876.05 — A/C System Drive Circuit Has
High Resistance**

*For diagnostic procedures, please see your
application technical manual.*

DN22556,0000139 -19-27JUL11-1/1

000876.06 — A/C System Drive Circuit Has Low Resistance

For diagnostic procedures, please see your application technical manual.

DN22556,000013A -19-27JUL11-1/1

000970.31 — External Shutdown Commanded

The ECU received an external shutdown command.

Continued on next page

BK34394,00011EA -19-02AUG11-1/11

Diagnostic Procedure**Troubleshooting Sequence:**
000970.31**When DTC is Displayed:**

When the ECU receives an external shutdown command.

Related Information:

The external (auxiliary) shutdown is configured in the Trim Options. It can be either a normally open or normally closed switch.

Alarm Level:

Stop

Control Unit Response:

The ECU will shutdown the engine as the external shutdown timer expires.

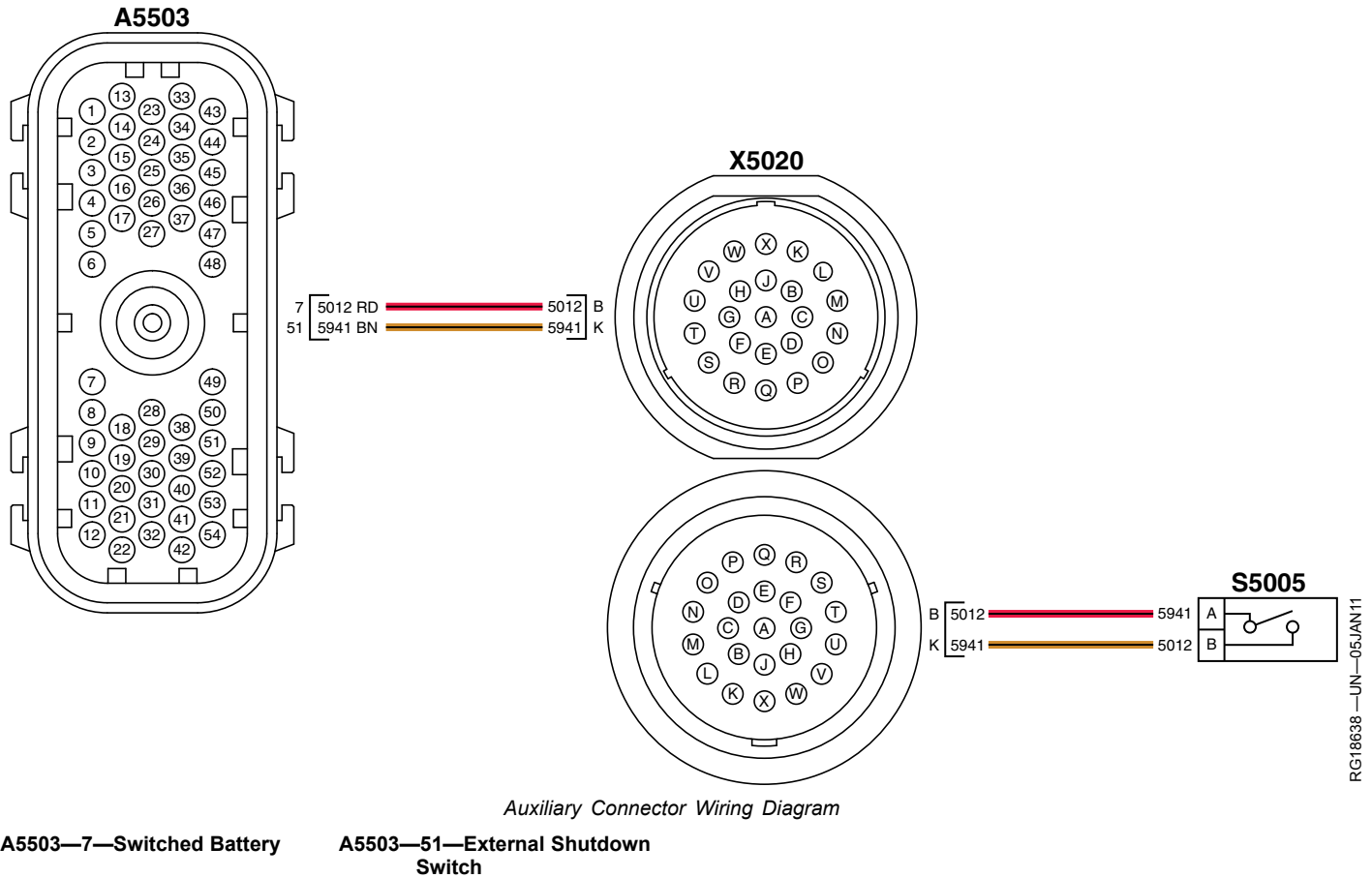
Additional References:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 9](#) located in Section 06, Group 210.



IMPORTANT: Do not force probes into connector terminals or damage will result. Use [JDG10466 Flex Probe Kit](#) to make measurements in connectors. This will ensure that terminal damage does not occur.

Continued on next page

BK34394,00011EA -19-02AUG11-2/11

Flex probes:

Auxiliary Connector

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

BK34394,00011EA -19-02AUG11-3/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine running or cranking.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000970.31 active?

YES: [GO TO 2](#)

NO: [GO TO Problem Not Found Procedure.](#)

BK34394,00011EA -19-02AUG11-4/11

2 Check Condition That Set Switch

1. Ignition OFF, Engine OFF.

2. Refer to application manual to find what device is connected to external shutdown switch.
3. Inspect device for parameter that may have caused external shutdown switch to be activated. Depending on application, this may be wiring, mechanical linkage, or an environmental condition.

Was a possible problem or operating point found that could cause the external shutdown switch to be activated?

YES: Repair problem. Perform [Verification Procedure.](#)

NO: [GO TO 3](#)

BK34394,00011EA -19-02AUG11-5/11

3 Terminal Test

1. Disconnect Auxiliary connector X5020.

2. Perform [Terminal Test](#) on X5020 connector female sockets B and K. And corresponding male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure.](#)

NO: [GO TO 4](#)

BK34394,00011EA -19-02AUG11-6/11

4 Terminal Test

1. Disconnect ECU connector A5503.

2. Perform [Terminal Test](#) on A5503 connector female sockets 7 and 51. And corresponding male pins.

Were any problems found?

YES: Repair problem. Perform [Verification Procedure.](#)

NO: [GO TO 5](#)

BK34394,00011EA -19-02AUG11-7/11

Continued on next page

5 Open Circuit Check

1. Measure resistance between A5503 connector female socket 7 and X5020 connector female socket B while performing Wiggle Test.
 2. Measure resistance between A5503 connector female socket 51 and X5020 connector female socket K while performing Wiggle Test.
- Are both resistances less than 5 ohms?

YES: GO TO 6

NO: Repair open or high resistance in harness. Perform Verification Procedure.

BK34394,00011EA -19-02AUG11-8/11

6 Short to Ground Check

1. On A5503 connector, measure resistance between female socket 7 and single point ground while performing Wiggle Test.
 2. On A5503 connector, measure resistance between female socket 51 and single point ground while performing Wiggle Test.
- Are both measurements always greater than 100k ohms?

YES: GO TO 7

NO: Repair short to ground. Perform Verification Procedure.

BK34394,00011EA -19-02AUG11-9/11

7 Wire to Wire Short Check

1. Disconnect battery.
 2. On A5503 connector, measure the resistance between female socket 51 and all other sockets in A5503 connector.
- Are any measurements less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 8

BK34394,00011EA -19-02AUG11-10/11

8 Wire to Wire Short Check

1. Disconnect all other ECU connectors.
 2. On the harness, measure the resistance between female socket 51 in ECU connector A5503 to all other terminals in all other ECU connectors.
- Are any measurements less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: Replace external shutdown switch. Perform Verification Procedure.

BK34394,00011EA -19-02AUG11-11/11

000971.31 — External Derate Commanded

The ECU received an external derate command.

Continued on next page

BK34394,00011EB -19-02AUG11-1/12

Diagnostic Procedure**Troubleshooting Sequence:**
000971.31**When DTC is Displayed:**

When the ECU receives an external derate command.

Related Information:

The external (auxiliary) shutdown is configured in the Trim Options. It can be either a normally open or normally closed switch.

Alarm Level:

Warning

Control Unit Response:

The ECU will derate the engine.

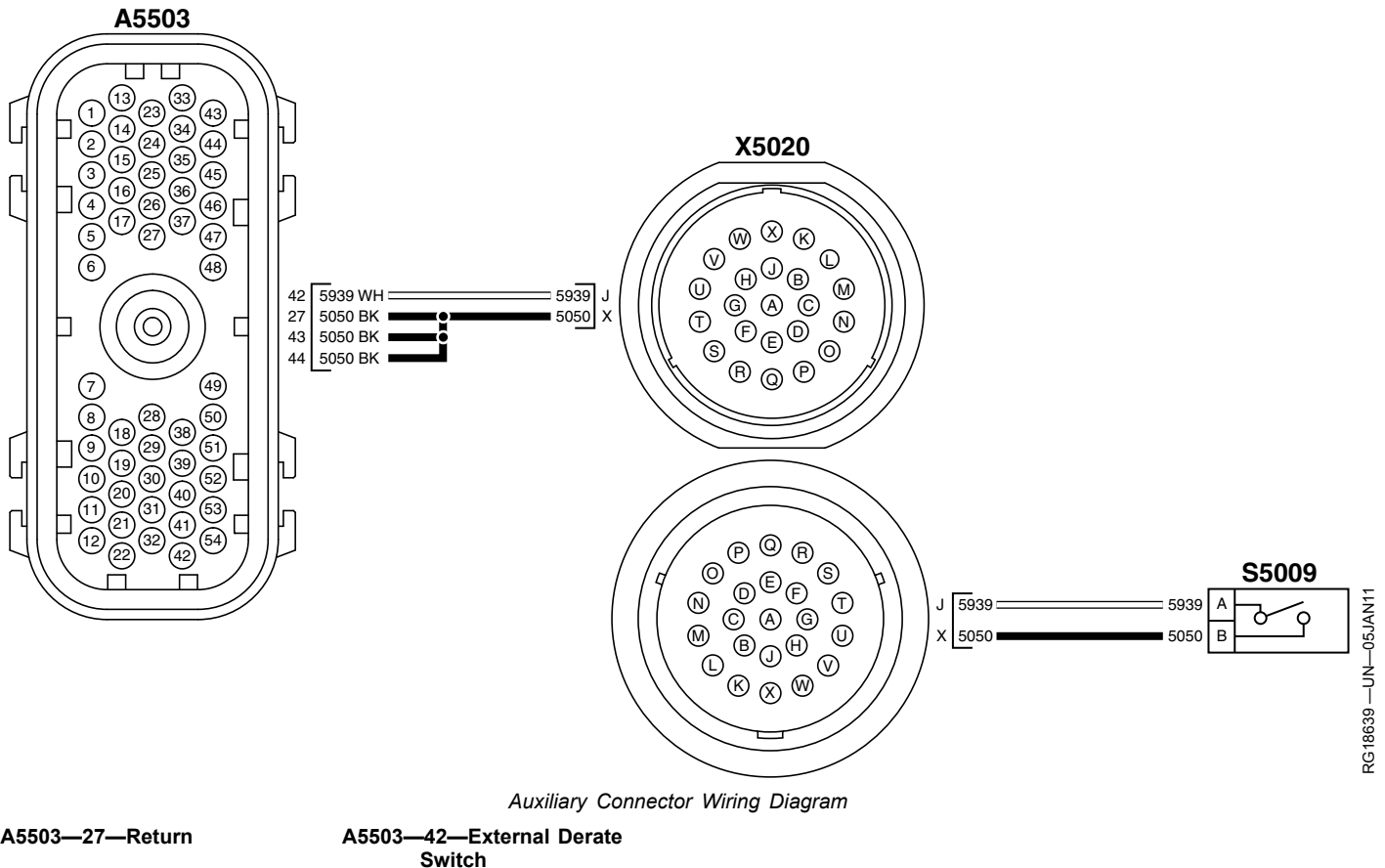
Additional References:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
 - see [4.5L Wiring Diagram 9](#)
- located in Section 06, Group 210.



RG18639—UN—05JAN11

IMPORTANT: Do not force probes into connector terminals or damage will result. Use **JDG10466 Flex Probe Kit** to make measurements in connectors. This will ensure that terminal damage does not occur.

Continued on next page

BK34394,00011EB -19-02AUG11-2/12

Flex probes:

Auxiliary Connector

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

BK34394,00011EB -19-02AUG11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine running.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 000971.31 active?

YES: [GO TO 2](#)

NO: [GO TO Problem Not Found Procedure.](#)

BK34394,00011EB -19-02AUG11-4/12

2 Check Condition That Set Switch

1. Ignition OFF, Engine OFF.

2. Refer to application manual to find what device is connected to external derate switch.

3. Inspect device for parameter that may have caused external derate switch to be activated. Depending on application, this may be wiring, mechanical linkage, or an environmental condition.

Was a possible problem or operating point found that could cause the external derate switch to be activated?

YES: Repair problem.
Perform [Verification Procedure.](#)

NO: [GO TO 3](#)

BK34394,00011EB -19-02AUG11-5/12

3 Terminal Test

1. Disconnect external derate switch connector S5009.

2. Perform [Terminal Test](#) on S5009 connector and switch.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure.](#)

NO: [GO TO 4](#)

BK34394,00011EB -19-02AUG11-6/12

4 Terminal Test

1. Disconnect ECU connector A5503.

2. Perform [Terminal Test](#) on A5503 connector female sockets 27, 42, 43, and 44. And corresponding male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure.](#)

NO: [GO TO 5](#)

BK34394,00011EB -19-02AUG11-7/12

Continued on next page

Application Diagnostics

5 Open Circuit Check

1. Measure resistance between A5503 connector female socket 27 and S5009 connector female socket B while performing Wiggle Test.
2. Measure resistance between A5503 connector female socket 43 and S5009 connector female socket B while performing Wiggle Test.
3. Measure resistance between A5503 connector female socket 44 and S5009 connector female socket B while performing Wiggle Test.
4. Measure resistance between A5503 connector female socket 42 and S5009 connector female socket A while performing Wiggle Test.

Do all resistances remain less than 5 ohms?

YES: GO TO 6

NO: Repair open or high resistance in harness. Perform Verification Procedure.

BK34394,00011EB -19-02AUG11-8/12

6 Short to Ground Check

On A5503 connector, measure resistance between female socket 42 and single point ground while performing Wiggle Test.

Is measurement always greater than 100k ohms?

YES: GO TO 7

NO: Repair short to ground. Perform Verification Procedure.

BK34394,00011EB -19-02AUG11-9/12

7 Wire to Wire Short Check

1. Disconnect battery.
2. On A5503 connector, measure the resistance between female socket 42 and all other sockets in A5503 connector.

Are any measurements less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 8

BK34394,00011EB -19-02AUG11-10/12

8 Wire to Wire Short Check

1. Disconnect all other ECU connectors.
2. On the harness, measure the resistance between female socket 42 in ECU connector A5503 to all other terminals in all other ECU connectors.

Are any measurements less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: GO TO 9

BK34394,00011EB -19-02AUG11-11/12

9 Terminal Test

1. Disconnect Auxiliary connector X5020.
2. Perform Terminal Test on X5020 connector female sockets X and J. And corresponding male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: Replace external derate switch. Perform Verification Procedure.

BK34394,00011EB -19-02AUG11-12/12

001069.31 — Calculated Tire Size Is Out Of Range

For diagnostic procedures, please see your application technical manual.

DN22556,000013B -19-28JUL11-1/1

001110.31 — Engine Protection System Activated

For troubleshooting procedures, please see the application troubleshooting manual.

BK34394,00011EC -19-31MAR11-1/1

001321.05 — Engine Starter Solenoid Lockout Relay Circuit Has High Resistance

The ECU has detected a fault on the starter solenoid lockout relay circuit.

Continued on next page

BK34394,00011ED -19-02AUG11-1/14

Diagnostic Procedure**Troubleshooting Sequence:**
001321.05**When DTC is Displayed:**

When the ignition is on, engine is cranking.

Related Information:

The ECU has detected a fault on the engine starter solenoid lockout relay circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU drive + and drive - circuits will be left on until the problem is repaired or a key cycle occurs.

Additional References:

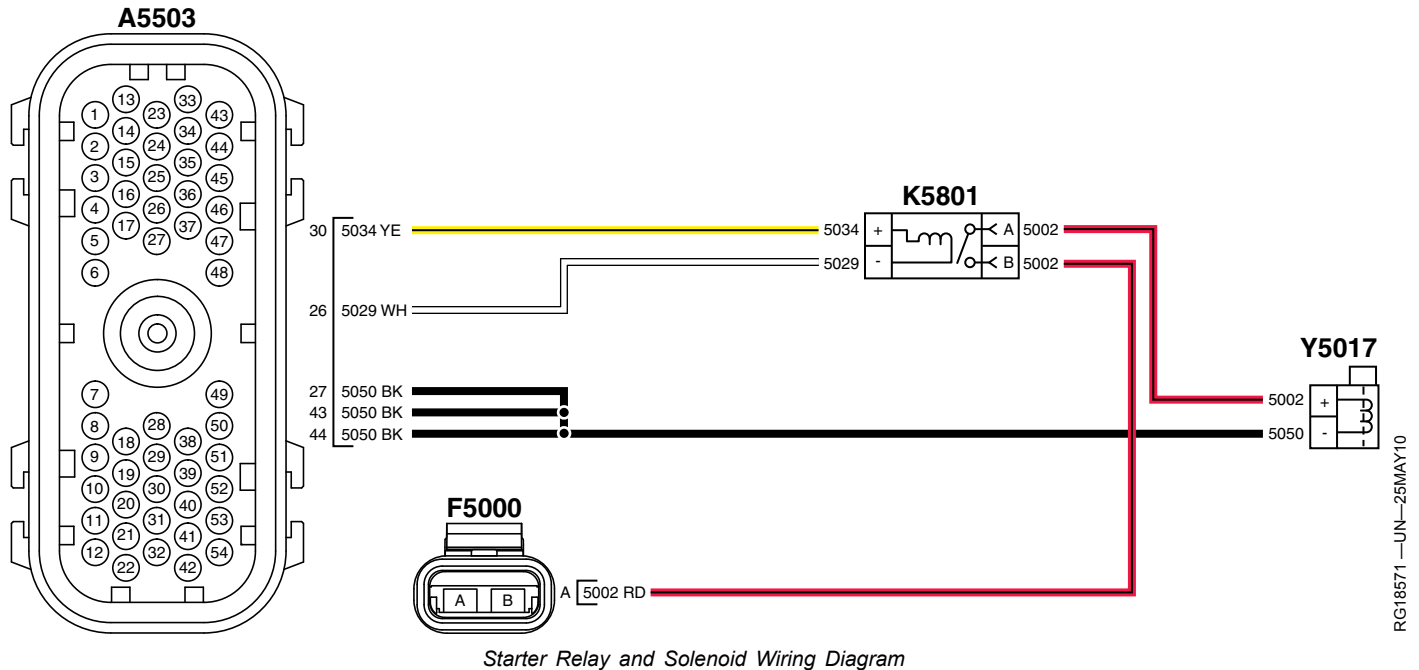
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 7](#)
- see [4.5L Wiring Diagram 8](#)
- see [4.5L Wiring Diagram 11](#)

located in Section 06, Group 210.



Starter Relay and Solenoid Wiring Diagram

A5503—30—Relay Drive +
A5503—26—Relay Drive -

A5503—27—Battery Negative
A5503—43—Battery Negative

A5503—44—Battery Negative
K5801—Starter Relay

Y5017—Starter Solenoid

Tools:

- JT07306 – Digital Multimeter

Continued on next page

BK34394,00011ED -19-02AUG11-2/14

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition ON, engine cranking.
6. Refresh codes.

Is DTC 001321.05 active?

YES: [GO TO 2](#)

NO: [GO TO 8](#)

BK34394,00011ED -19-02AUG11-3/14

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Inspect all K5801 starter relay connections for corrosion.
3. Disconnect yellow and white wires from relay.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

BK34394,00011ED -19-02AUG11-4/14

3 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform [Terminal Test](#) on A5503 connector female sockets 30 and 26. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 4](#)

BK34394,00011ED -19-02AUG11-5/14

4 Short to Voltage Check

1. Ignition ON, Engine OFF.
2. Measure the voltage between A5503 connector female sockets 30 (+) and single point ground.
3. Measure the voltage between A5503 connector female sockets 26 (+) and single point ground.

Are both measurements less than 0.5 volts?

YES: [GO TO 5](#)

NO: Repair drive wire short to voltage in harness.
Perform [Verification Procedure](#).

Continued on next page

BK34394,00011ED -19-02AUG11-6/14

5 Continuity Check

1. Ignition OFF, Engine OFF.
2. Measure the resistance between A5503 connector female socket 30 and end of yellow wire 5034.
3. Measure the resistance between A5503 connector female socket 26 and end of white wire 5029.

Are both resistance measurements less than 5 ohms?

YES: GO TO 6

NO: Repair drive wire open, high resistance, or mis-pin in harness. Perform Verification Procedure.

BK34394,00011ED -19-02AUG11-7/14

6 Short to Ground Check

1. Measure the resistance between A5503 connector female sockets 30 and single point ground.
2. Measure the resistance between A5503 connector female sockets 26 and single point ground.

Is either measurement less than 100k ohms?

YES: Repair drive wire short to ground in harness. Perform Verification Procedure.

NO: GO TO 7

BK34394,00011ED -19-02AUG11-8/14

7 Wire to Wire Check

1. Measure the resistance between A5503 connector female socket 30 and all other sockets in A5503.
2. Measure the resistance between A5503 connector female socket 26 and all other sockets in A5503.

Is any measurement less than 100k ohms?

YES: Repair drive wire short in harness. Perform Verification Procedure.

NO: Replace starter relay. Perform Verification Procedure.

BK34394,00011ED -19-02AUG11-9/14

8 Terminal Test

1. Ignition OFF, Engine OFF.
2. Inspect all K5801 starter relay connections for corrosion.
3. Disconnect yellow and white wires from relay.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 9

BK34394,00011ED -19-02AUG11-10/14

9 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 30 and 26. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 10

Continued on next page

BK34394,00011ED -19-02AUG11-11/14

10 Continuity Check

1. Measure the resistance between A5503 connector female socket 30 and end of yellow wire 5034, while performing Wiggle Test.
2. Measure the resistance between A5503 connector female socket 26 and end of white wire 5029., while performing Wiggle Test.

Are both resistance measurements always less than 5 ohms?

YES: GO TO 11

NO: Repair problem.
Perform Verification Procedure.

BK34394,00011ED -19-02AUG11-12/14

11 Short to Ground Check

1. Measure the resistance between A5503 connector female socket 30 and single point ground, while performing Wiggle Test.
2. Measure the resistance between A5503 connector female socket 26 and single point ground, while performing Wiggle Test.

Is either measurement ever less than 100k ohms?

YES: Repair drive wire short to ground in harness.
Perform Verification Procedure.

NO: GO TO 12

BK34394,00011ED -19-02AUG11-13/14

12 Wire to Wire Check

1. Measure the resistance between A5503 connector female socket 30 and all other sockets in A5503, while performing Wiggle Test.
2. Measure the resistance between A5503 connector female socket 26 and all other sockets in A5503, while performing Wiggle Test.

Is any measurement ever less than 100k ohms?

YES: Repair drive wire short to ground in harness.
Verification Procedure.

NO: GO TO Problem Not Found Procedure.

BK34394,00011ED -19-02AUG11-14/14

001321.06 — Engine Starter Solenoid Lockout Relay Circuit Has Low Resistance

The ECU has detected low resistance on the starter solenoid lockout relay drive circuit.

Continued on next page

BK34394,00011EE -19-04AUG11-1/7

Diagnostic Procedure

Troubleshooting Sequence: 001321.06

When DTC is Displayed:

When the ignition is on, engine is cranking or during Harness Diagnostic Mode Test.

Related Information:

The ECU has detected a fault on the engine starter solenoid lockout relay circuit.

Alarm Level:

Warning

Control Unit Response:

The ECU drive + and drive - circuits will be shut off.

Additional References:

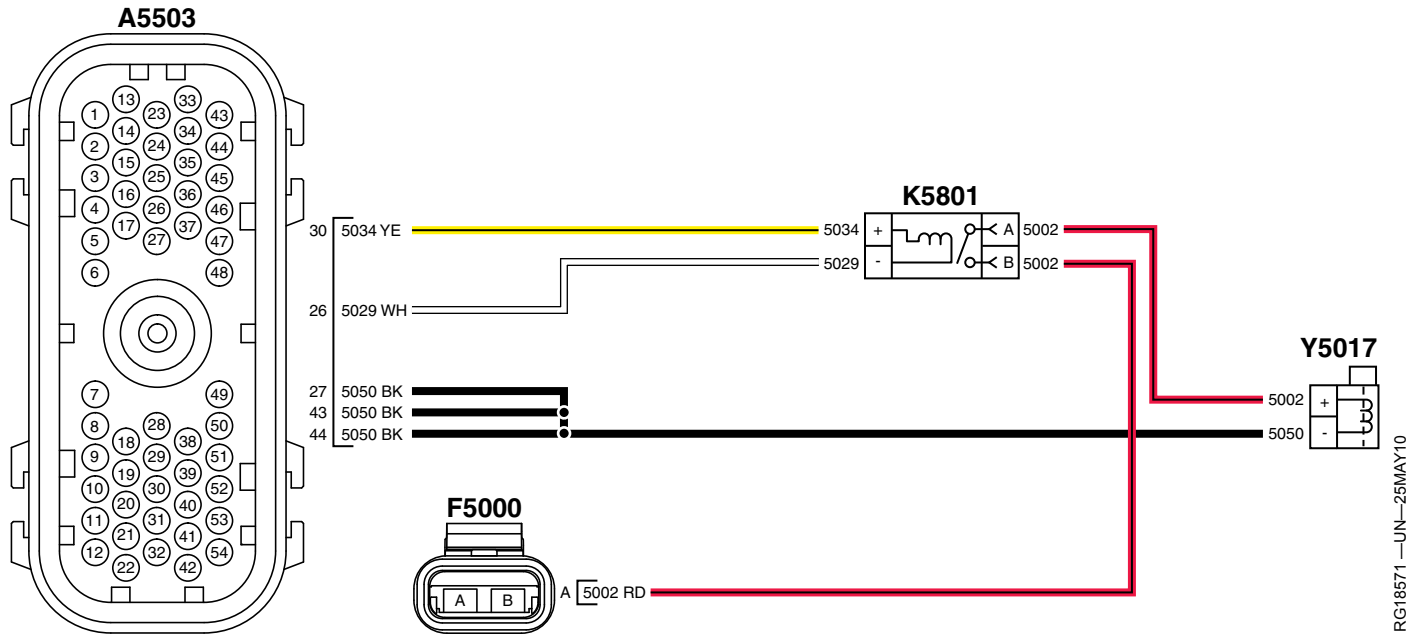
For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and jumper connectors do not apply to all applications.

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)
- see [4.5L Wiring Diagram 7](#)
- see [4.5L Wiring Diagram 8](#)
- see [4.5L Wiring Diagram 11](#)

located in Section 06, Group 210.



Starter Relay and Solenoid Wiring Diagram

A5503—30—Relay Drive +
A5503—26—Relay Drive -

A5503—27—Battery Negative
A5503—43—Battery Negative

A5503—44—Battery Negative
K5801—Starter Relay

Y5017—Starter Solenoid

Tools:

- JT07306 – Digital Multimeter

Continued on next page

BK34394,00011EE -19-04AUG11-2/7

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Ignition OFF, Engine OFF.
6. Disconnect starter relay connector K5801.
7. Perform [Terminal Test](#) on K5801 connector and relay.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 2](#)

BK34394,00011EE -19-04AUG11-3/7

2 Terminal Test

1. Disconnect ECU connector A5503.

2. Perform [Terminal Test](#) on A5503 connector female sockets 30 and 26. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

BK34394,00011EE -19-04AUG11-4/7

3 Wire to Wire Check

On A5503 connector, measure resistance between female sockets 30 and 26.

Is resistance greater than 100k ohms?

YES: [GO TO 4](#)

NO: Repair drive wire short in harness. Perform [Verification Procedure](#).

BK34394,00011EE -19-04AUG11-5/7

4 Short Check

1. On A5503 connector, measure resistance between female sockets 30 and single point ground.
2. On A5503 connector, measure resistance between female sockets 26 and single point ground.

Are any resistances less than 100k ohms?

YES: Repair short in harness. Perform [Verification Procedure](#).

NO: Replace starter relay.
[GO TO 5](#)

BK34394,00011EE -19-04AUG11-6/7

5 Verification Check

1. Reconnect all components and connectors.
2. Ignition ON, engine running.
3. Monitor DTCs

Is DTC 001321.06 active?

YES: Contact DTAC for more support.

NO: Perform [Verification Procedure](#)

BK34394,00011EE -19-04AUG11-7/7

001321.16 — Engine Starter Engaged for Too Long

The ECU has detected the starter has been engaged for too long.

BK34394,00011EF -19-20FEB12-1/3

Diagnostic Procedure

Troubleshooting Sequence:

000168.01
000168.18
000970.31
000640.11
001321.31
001321.05
001321.06
001347.01
001347.18
001347.05
001347.06
000611.04
000612.04
000651.05
000652.05
000653.05
000654.05
000651.06
000652.06
000653.06
000654.06
001321.16

When DTC is Displayed:

When the ignition is in start position, engine is cranking and the fault is active.
When the ignition is on, engine off, and the fault is active.

Related Information:

The ECU has detected the starter has been engaged for too long.

Alarm Level:

Warning

Control Unit Response:

The ECU will prevent the starter from being engaged for 60 seconds.
The fault code will go from active to stored after the starter has been inactive for 60 seconds.

Additional references:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

BK34394,00011EF -19-20FEB12-2/3

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. In Service ADVISOR, monitor Fuel Rail Pressure - Actual and verify it is below 4 MPa. (725 psi.)
6. In Service ADVISOR, perform Harness Diagnostic Mode Test .

Are any codes active?

YES: Diagnose any DTCs that became active.

NO: GO TO [Engine Cranks and will Not Start](#) for diagnostics.

BK34394,00011EF -19-20FEB12-3/3

001321.31 — Engine Speed Zero with Starter Solenoid Energized

The ECU has detected the engine is not responding to the start signal.

BK34394,00011F0 -19-08APR11-1/7

Diagnostic Procedure

Troubleshooting Sequence:

000640.11
000970.31
001321.31

When DTC is Displayed:

When the ignition is on, engine is cranking.

Related Information:

The ECU controlled engine starter relay is getting energized and the engine is not cranking.

Alarm Level:

Warning

Additional references:

For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.

Tools:

- [JT07306](#) – Digital Multimeter

Continued on next page

BK34394,00011F0 -19-08APR11-2/7

1 Read DTCs and Store Snapshot Information	<p>1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.</p> <p><i>NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.</i></p> <p>2. Ignition ON, Engine OFF.</p> <p>3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.</p> <p>4. In Service ADVISOR, perform Control Unit Information and Overview test.</p> <p>5. In Service ADVISOR, monitor Unswitched Battery Voltage.</p> <p>6. Put the key in the start position while you monitor Unswitched Battery Voltage.</p> <p>Did the voltage decrease by 1.5 volts for a 12 Volt system, or 3 volts for a 24 Volt system, as you attempted to crank the engine?</p>	<p>YES: GO TO 3</p> <p>NO: GO TO 2</p>
BK34394,00011F0 -19-08APR11-3/7		
2 Load Test Batteries	<p>1. Ignition OFF, Engine OFF.</p> <p>2. Load Test Batteries.</p> <p>Do batteries pass the load test?</p>	<p>YES: Check for internal starter problem. Check for hydro-locked or seized engine.</p> <p>NO: Recharge or replace batteries. Perform Verification Procedure.</p>
BK34394,00011F0 -19-08APR11-4/7		
3 Check Starter Solenoid Control Circuit	<p>Hold key switch in start position while you monitor voltage between starter solenoid "S" terminal and Single Point Ground.</p> <p>Is the voltage within 2 volts of unswitched battery voltage while attempting to crank engine?</p>	<p>YES: GO TO 4</p> <p>NO: Repair wiring problem between starter relay and starter solenoid. Perform Verification Procedure.</p>
BK34394,00011F0 -19-08APR11-5/7		
4 Check Starter Cables	<p>Hold key switch in start position while you monitor voltage between the starter solenoid battery terminal and the starter solenoid ground terminal.</p> <p>Is the voltage within 2 volts of unswitched battery voltage while attempting to crank engine?</p>	<p>YES: GO TO 5</p> <p>NO: Repair open or high resistance in starter cables. Perform Verification Procedure.</p>
BK34394,00011F0 -19-08APR11-6/7		
5 ECU Reprogram	<p>Search Custom Performance for ECU software updates.</p> <p>Is a new version of software available?</p>	<p>YES: Reprogram ECU with newest version of software. Perform Verification Procedure.</p> <p>NO: Replace starter. Perform Verification Procedure.</p>
BK34394,00011F0 -19-08APR11-7/7		

**001550.05 — Air Conditioner Compressor
Current Low**

*For troubleshooting procedures, please see the
application troubleshooting manual.*

BK34394,00011F1 -19-31MAR11-1/1

**001550.06 — Air Conditioner Compressor
Current High**

*For troubleshooting procedures, please see the
application troubleshooting manual.*

BK34394,00011F2 -19-31MAR11-1/1

**001638.03 — Hydraulic Oil Temperature
Signal Out of Range High**

*The hydraulic oil temperature signal exceeds the
sensor high voltage specification.*

Continued on next page

BK34394,00011F3 -19-02AUG11-1/12

Diagnostic Procedure**Troubleshooting Sequence:**
001638.03**When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The hydraulic oil temperature sensor signal voltage to the ECU corresponds to a temperature higher than what is physically possible for the hydraulic oil temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain proper operating conditions.

Additional References:

For more temperature sensor information, see Measuring Temperature in Section 03, Group 140.

For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.

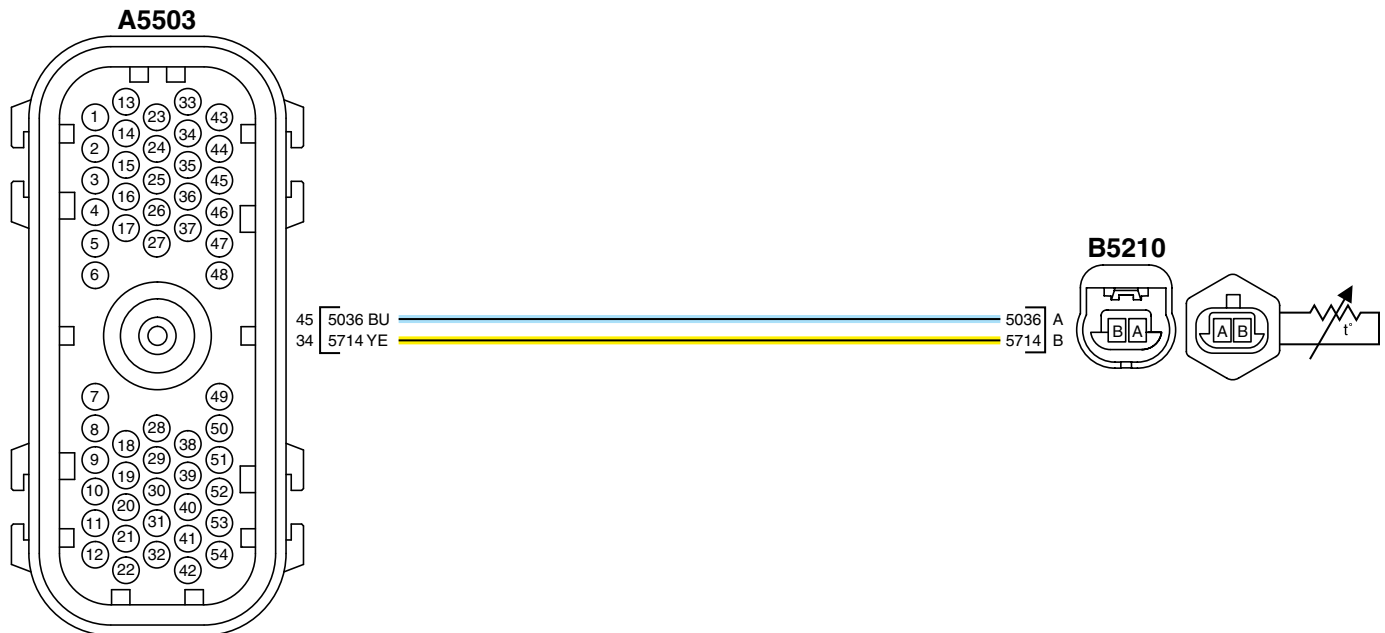
For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
- see 4.5L Wiring Diagram 6
- see 4.5L Wiring Diagram 9

located in Section 06, Group 210.



Hydraulic Oil Temperature Sensor Wiring Diagram

A5503—45—Signal

A5503—34—Return

IMPORTANT: Do not force probes into connector terminals or damage will result. Use **JDG10466 Flex Probe Kit** to make measurements in connectors. This will ensure that terminal damage does not occur.

RG18632 —UN—26AUG10

Continued on next page

BK34394,00011F3 -19-02AUG11-2/12

Flex probes:

Sensor

- JDG10456 — Female — Blue/Orange

- JDG10467 — Male — Blue/Orange

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

BK34394,00011F3 -19-02AUG11-3/12

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared Snapshot information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh Codes.

Is DTC 001638.03 active?

YES: [GO TO 2](#)

NO: [GO TO 7](#)

BK34394,00011F3 -19-02AUG11-4/12

2 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect hydraulic oil temperature sensor connector B5210.
3. Perform [Terminal Test](#) on sensor and B5210 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 3](#)

BK34394,00011F3 -19-02AUG11-5/12

3 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5210 connector female socket A (+).
 - B to B5210 connector female socket B (-).
2. Set S1 to position 8 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform [Wiggle Test](#).

Does voltage remain between 2.3 and 2.7 volts?

YES: [GO TO 4](#)

NO: Voltage greater than 2.7 volts. [GO TO Short to Voltage Procedure](#).

NO: Voltage less than 2.3 volts. [GO TO 6](#)

BK34394,00011F3 -19-02AUG11-6/12

4 Software Check

In Service ADVISOR, monitor ECU A5503-45 Input Voltage.

Is voltage between 2.3 and 2.7 volts?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 5](#)

Continued on next page

BK34394,00011F3 -19-02AUG11-7/12

5 Reprogram ECU	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect Diagnostic Test Box. 3. Reconnect all connectors and components. 4. Reprogram ECU. For more information, see Engine Control Unit (ECU) — Reprogramming Instructions in Section 04, Group 160. 5. Ignition ON, Engine OFF. 6. Refresh codes. <p>Is DTC 001638.03 active?</p>	<p>YES: Replace ECU. Perform Verification Procedure.</p> <p>NO: Perform Verification Procedure.</p>
BK34394,00011F3 -19-02AUG11-8/12		
6 Open Circuit Check	<p>Press and hold S2 on Diagnostic Test Box while performing Wiggle Test.</p> <p>Does voltage now remain between 2.3 and 2.7 volts?</p>	<p>YES: Repair open in return wire. Perform Verification Procedure.</p> <p>NO: Repair open in signal wire. Perform Verification Procedure.</p>
BK34394,00011F3 -19-02AUG11-9/12		
7 Wiggle Test	<ol style="list-style-type: none"> 1. In Service ADVISOR, monitor ECU A5503-45 Input Voltage. 2. Perform Wiggle Test. <p>Does sensor input voltage ever read greater than 4.9 volts?</p>	<p>YES: Repair harness problem. Perform Verification Procedure.</p> <p>NO: GO TO 8</p>
BK34394,00011F3 -19-02AUG11-10/12		
8 Terminal Test	<ol style="list-style-type: none"> 1. Ignition OFF, Engine OFF. 2. Disconnect the hydraulic oil temperature sensor connector B5210. 3. Perform Terminal Test on sensor and connector B5210. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO 9</p>
BK34394,00011F3 -19-02AUG11-11/12		
9 Terminal Test	<ol style="list-style-type: none"> 1. Disconnect ECU connector A5503. 2. Perform Terminal Test on A5503 connector female sockets 34 and 45. And corresponding ECU male pins. <p>Were any problems found?</p>	<p>YES: Repair problem. Perform Verification Procedure.</p> <p>NO: GO TO Problem Not Found Procedure.</p>
BK34394,00011F3 -19-02AUG11-12/12		

**001638.04 — Hydraulic Oil Temperature
Signal Out of Range Low**

*The hydraulic oil temperature signal is lower than
the sensor low voltage specification.*

Continued on next page

BK34394,00011F4 -19-02AUG11-1/15

Diagnostic Procedure**Troubleshooting Sequence:****001638.03****001638.04****When DTC is Displayed:**

When the ignition is on, and the fault is active.

Related Information:

The hydraulic oil temperature sensor signal voltage to the ECU corresponds to a temperature lower than what is physically possible for the hydraulic oil temperature sensor.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain proper operating conditions.

Additional References:

For more temperature sensor information, see Measuring Temperature in Section 03, Group 140.

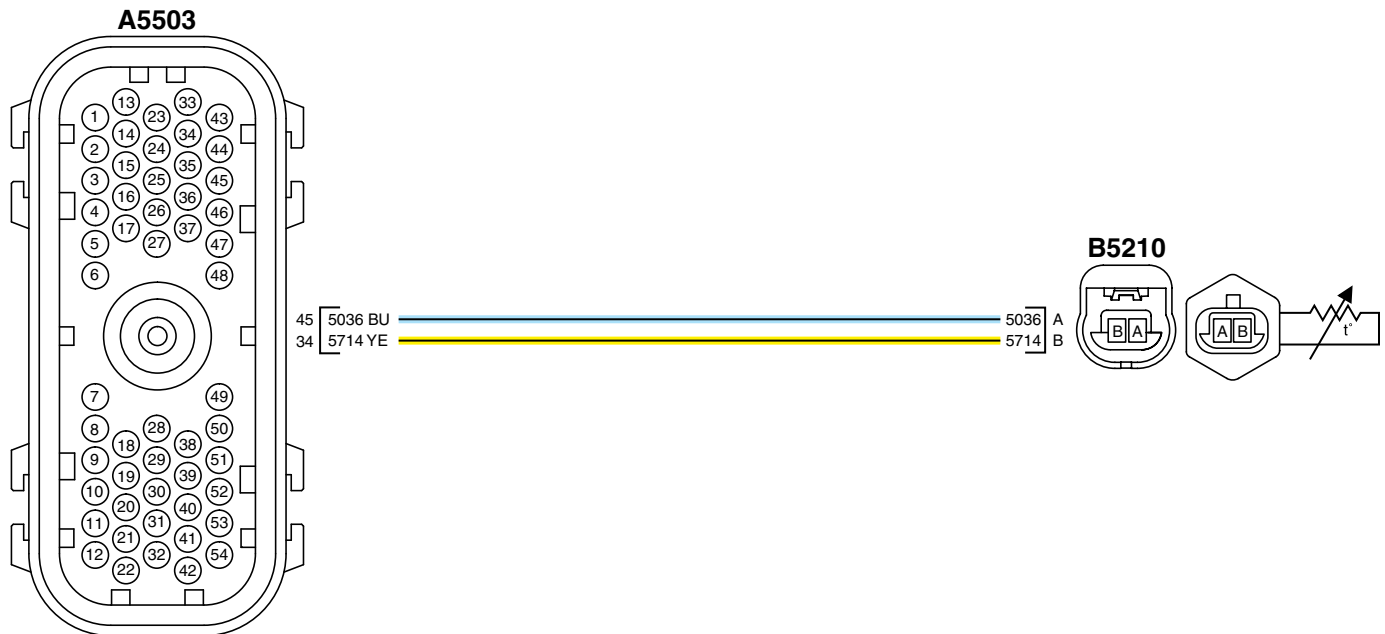
For more information on how to use Diagnostic Test Box, see Using Diagnostic Test Box in Section 04, Group 160.

For more information on the Control Unit Information and Overview test, see Control Unit Information and Overview in Section 04, Group 160.

NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.

For connector repair or complete wiring information:

- see Connector Repair Information Table
 - see 4.5L Wiring Diagram 6
 - see 4.5L Wiring Diagram 9
- located in Section 06, Group 210.



Hydraulic Oil Temperature Sensor Wiring Diagram

A5503—45—Signal**A5503—34—Return**

IMPORTANT: Do not force probes into connector terminals or damage will result. Use **JDG10466 Flex Probe Kit** to make measurements in connectors. This will ensure that terminal damage does not occur.

RG18632—UN—26AUG10

Continued on next page

BK34394,00011F4 -19-02AUG11-2/15

Flex probes:

Sensor

- JDG10456 — Female — Blue/Orange

- JDG10467 — Male — Blue/Orange

ECU

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

Tools:

- JDG10273 — Diagnostic Test Box

- JT07306 — Digital Multimeter

BK34394,00011F4 -19-02AUG11-3/15

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see Connecting to Service ADVISOR in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see Snapshot Instructions in Section 04, Group 160.
4. In Service ADVISOR, perform Control Unit Information and Overview test.
5. Refresh codes.

Is DTC 001638.03 a stored code?

YES: GO TO 001638.03 —
Hydraulic Oil Temperature
Signal Out of Range High.

NO: GO TO 2

BK34394,00011F4 -19-02AUG11-4/15

2 Code Check

Is DTC 001638.04 active?

YES: GO TO 3

NO: GO TO 10

BK34394,00011F4 -19-02AUG11-5/15

3 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect hydraulic oil temperature sensor connector B5210.
3. Perform Terminal Test on sensor and B5210 connector.

Were any problems found?

YES: Repair problem.
Perform Verification
Procedure.

NO: GO TO 4

BK34394,00011F4 -19-02AUG11-6/15

4 Circuit Check

1. Connect Diagnostic Test Box :
 - A to B5210 connector female socket A (+).
 - B to B5210 connector female socket B (-).
2. Set S1 to position 8 on Diagnostic Test Box.
3. Connect multimeter to Diagnostic Test Box.
4. Ignition ON, Engine OFF.
5. Monitor voltage on multimeter.
6. Perform Wiggle Test.

Does voltage remain between 2.3 and 2.7 volts?

YES: GO TO 5

NO: GO TO 7

Continued on next page

BK34394,00011F4 -19-02AUG11-7/15

5 Software Check

In Service ADVISOR, monitor ECU A5503-45 Input Voltage.

Is voltage between 2.3 and 2.7 volts?

YES: Replace sensor.
Perform [Verification Procedure](#).

NO: [GO TO 6](#)

BK34394,00011F4 -19-02AUG11-8/15

6 Reprogram ECU

1. Ignition OFF, Engine OFF.
2. Disconnect Diagnostic Test Box.
3. Reconnect all connectors and components.
4. Reprogram ECU. For more information, see [Engine Control Unit \(ECU\) — Reprogramming Instructions](#) in Section 04, Group 160.
5. Ignition ON, Engine OFF.
6. Refresh codes.

Is DTC 001638.04 active?

YES: Replace ECU.
Perform [Verification Procedure](#).

NO: Perform [Verification Procedure](#).

BK34394,00011F4 -19-02AUG11-9/15

7 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect ECU connector A5503 .
3. Perform [Terminal Test](#) on A5503 connector female sockets 34 and 45. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: [GO TO 8](#)

BK34394,00011F4 -19-02AUG11-10/15

8 Harness Check

NOTE: Many new error codes will appear in the next step. Disregard all DTCs except 001638.03.

1. Ignition ON, Engine OFF.
2. Refresh codes.

Is DTC 001638.03 active?

YES: [GO TO 9](#)

NO: Replace ECU.
Perform [Verification Procedure](#).

BK34394,00011F4 -19-02AUG11-11/15

9 Continuity Check

Measure resistance between A5503 connector female socket 45 and B5210 connector female socket A.

Is resistance less than 5 ohms?

YES: Repair short to signal wire in harness. Perform [Verification Procedure](#).

NO: Repair open or mis-pin in harness. Perform [Verification Procedure](#).

Continued on next page

BK34394,00011F4 -19-02AUG11-12/15

Application Diagnostics

10 Wiggle Test

1. Ignition ON, Engine OFF.
2. In Service ADVISOR, monitor ECU A5503-45 Input Voltage.
3. Perform Wiggle Test.

Does voltage ever go below 0.2 volts?

YES: Repair short to ground on signal wire. Perform Verification Procedure.

NO: GO TO 11

BK34394,00011F4 -19-02AUG11-13/15

11 Terminal Test

1. Ignition OFF, Engine OFF.
2. Disconnect hydraulic oil temperature sensor connector B5210 .
3. Perform Terminal Test on sensor and B5210 connector.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 12

BK34394,00011F4 -19-02AUG11-14/15

12 Terminal Test

1. Disconnect ECU connector A5503.
2. Perform Terminal Test on A5503 connector female sockets 34 and 45. And corresponding ECU male pins.

Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO Problem Not Found Procedure.

BK34394,00011F4 -19-02AUG11-15/15

001639.01 — Fan Speed Signal Extremely Low

The ECU has detected that the fan speed is extremely low.

Continued on next page

BK34394,00011F5 -19-24OCT11-1/11

Diagnostic Procedure**Troubleshooting Sequence:****000647.05****001639.01****When DTC is Displayed:**

When the ignition is on, engine is running, and the fault is active.

Related Information:

The ECU has detected that the fan speed is extremely low.

Alarm Level:

Warning

Control Unit Response:

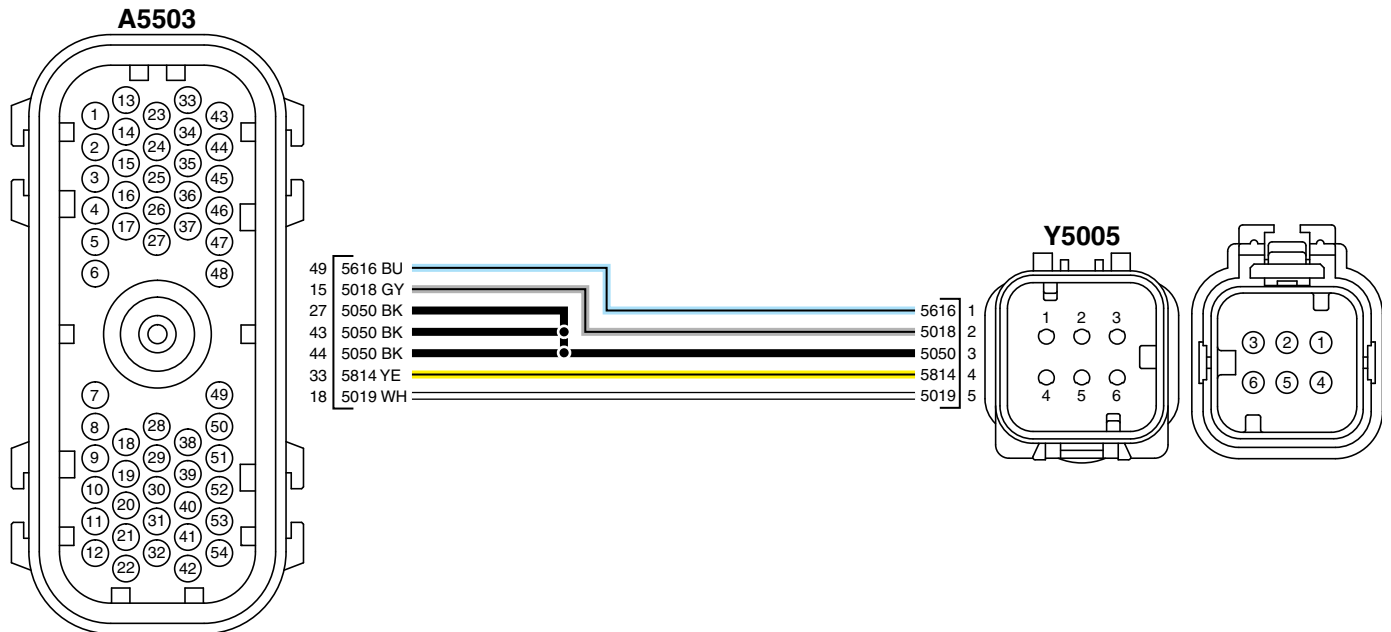
The ECU tries to maintain proper operating conditions.

Additional references:For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.*NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.*

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)- see [4.5L Wiring Diagram 7](#)

located in Section 06, Group 210.

*Fan Drive Wiring Diagram***A5503—49—Supply****A5503—27—Battery Negative****A5503—44—Battery Negative****A5503—18—Speed Signal****A5503—15—Fan Clutch Control****A5503—43—Battery Negative****A5503—33—Return****IMPORTANT: Terminal damage occurs if anything other than the specified flex probe from JDG10466 Flex Probe Kit is used.**

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RG18604 —UN—27MAY10

Continued on next page

BK34394,00011F5 -19-24OCT11-2/11

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

BK34394,00011F5 -19-24OCT11-3/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
 3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
 4. In Service ADVISOR perform Control Unit Information and Overview test.
 5. Ignition ON, engine running.
 6. Refresh codes.
- Is DTC 001639.01 active?

YES: GO TO 2

NO: GO TO [Problem Not Found Procedure](#)

BK34394,00011F5 -19-24OCT11-4/11

2 Preliminary Checks

1. Ignition OFF, Engine OFF.
2. Inspect the following items if applicable to application:
 - Check for loose fan speed sensor or mounting bracket.
 - Check for rounded or damaged bolt heads that hold the fan onto the back of the clutch.
 - Check engine oil level and pressure.
 - Clean cooling package for maximum air flow.
 - Check fan belt condition.
 - Check condition of sheave return spring.
 - Check sheave alignment to determine bearing condition.
 - Check for excessive sheave wear.
 - Check for electrical connections at speed sensor and solenoid coils.
 - Check overall condition of wiring.
 - Check for oil leakage (lines or actuating cylinder).
 - Check for coolant leakage.
 - Check that actuating cylinder bleed screw is seated and locknut is securely tightened.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: GO TO 3

BK34394,00011F5 -19-24OCT11-5/11

3 Terminal Test

1. Disconnect variable speed fan connector Y5005.
2. Perform [Terminal Test](#) on sensor and Y5005 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: GO TO 3

Continued on next page

BK34394,00011F5 -19-24OCT11-6/11

4 Supply Circuit Check

1. Connect Diagnostic Test Box :
 - A to Y5005 connector female socket 1 (+).
 - B to Y5005 connector female socket 4 (-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Ignition ON, Engine OFF.
 5. Press and hold S3 on Diagnostic Test Box.
 6. Monitor voltage on multimeter.
 7. Perform Wiggle Test.
- Does voltage remain between 4.8 and 5.2 V?

YES: GO TO 6

NO: GO TO 5

BK34394,00011F5 -19-24OCT11-7/11

5 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
 2. Monitor voltage on multimeter.
- Does voltage now remain between 4.8 and 5.2 V?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

BK34394,00011F5 -19-24OCT11-8/11

6 Terminal Test

1. Disconnect ECU connector A5503.
 2. Perform Terminal Test on A5503 connector female sockets 18, 33, and 49. And corresponding ECU male pins.
- Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

BK34394,00011F5 -19-24OCT11-9/11

7 Continuity Check

- Measure the resistance between A5503 connector female socket 18 and Y5005 connector female socket 5.
- Is resistance less than 5 ohms?

YES: GO TO 8

NO: Repair open or high resistance on signal wire in harness. Perform Verification Procedure.

BK34394,00011F5 -19-24OCT11-10/11

8 Continuity Check

- Measure the resistance between A5503 connector female socket 18 and all other female sockets in A5503.
- Are any resistances less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: Replace speed sensor. Perform Verification Procedure.

BK34394,00011F5 -19-24OCT11-11/11

001639.16 — Fan Speed Signal Moderately High

The fan speed signal indicates to the ECU that the fan speed is moderately high.

Continued on next page

BK34394,00011F6 -19-24OCT11-1/11

Diagnostic Procedure**Troubleshooting Sequence:****000647.05****001639.16****When DTC is Displayed:**

When the ignition is on, engine is running, and the fault is active.

Related Information:

The fan speed signal indicates to the ECU that the fan speed is moderately high.

Alarm Level:

Warning

Control Unit Response:

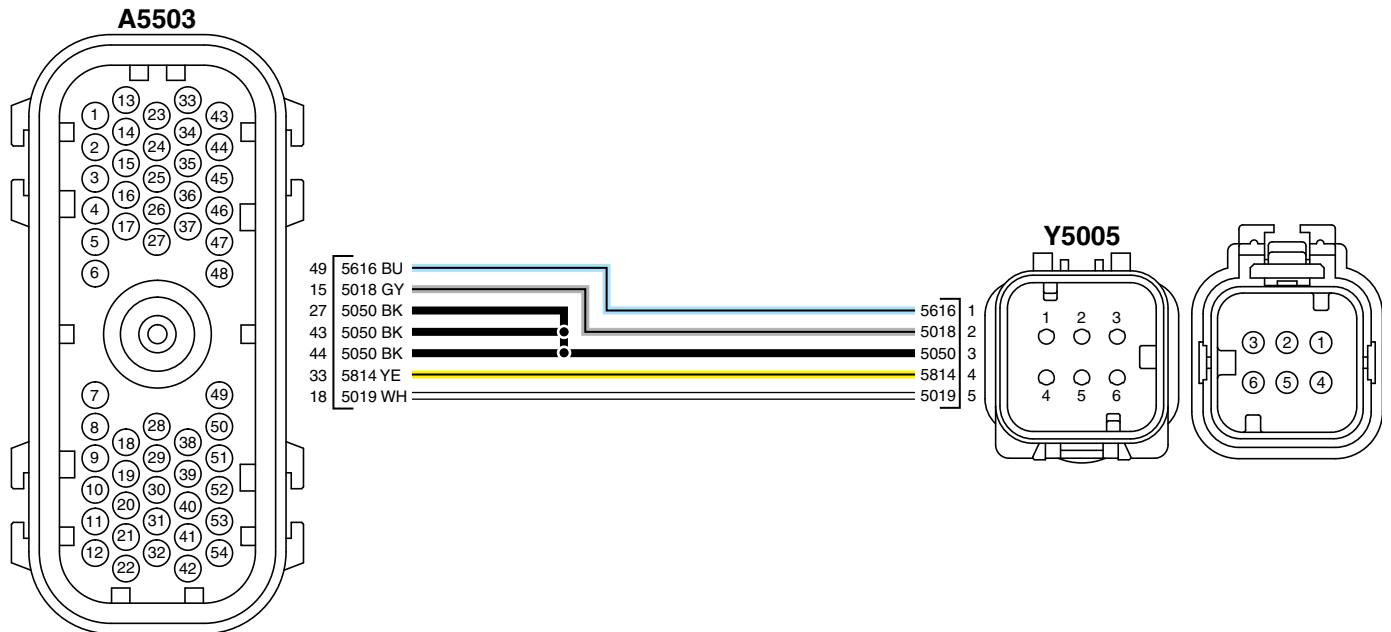
The ECU will try to maintain proper operating conditions.

Additional references:For more information on the Control Unit Information and Overview test, see [Control Unit Information and Overview](#) in Section 04, Group 160.*NOTE: The wiring diagrams provided are for a typical John Deere supplied OEM harness. Wire number, colors, and interconnects do not apply to all applications.*

For connector repair or complete wiring information:

- see [Connector Repair Information Table](#)- see [4.5L Wiring Diagram 7](#)

located in Section 06, Group 210.



Fan Drive Wiring Diagram

A5503—49—Supply**A5503—27—Battery Negative****A5503—44—Battery Negative****A5503—18—Speed Signal****A5503—15—Fan Clutch Control****A5503—43—Battery Negative****A5503—33—Return****IMPORTANT: Do not force probes into connector terminals or damage will result. Use JDG10466 Flex Probe Kit to make measurements in connectors. This will ensure that terminal damage does not occur.**

Flex probes:

Sensor

- JDG10460 — Female — Yellow/Purple

- JDG10461 — Male — Yellow/Purple

RG18604 —UN—27MAY10

Continued on next page

BK34394,00011F6 -19-24OCT11-2/11

ECU

- JDG10460 — Female — Yellow/Purple
- JDG10461 — Male — Yellow/Purple

Tools:

- JT07306 — Digital Multimeter

BK34394,00011F6 -19-24OCT11-3/11

1 Read DTCs and Store Snapshot Information

1. Connect Service ADVISOR, see [Connecting to Service ADVISOR](#) in Section 04, Group 160.

NOTE: When DTCs are cleared, Snapshot Information for ALL DTCs is cleared.

2. Ignition ON, Engine OFF.
3. If any DTCs have snapshot capture or snapshot recording information, save the information. For instructions on saving and using snapshot information, see [Snapshot Instructions](#) in Section 04, Group 160.
4. In Service ADVISOR perform Control Unit Information and Overview test.
5. Ignition ON, engine running.
6. Refresh codes.

Is DTC 001639.16 active?

YES: GO TO 2

NO: GO TO [Problem Not Found Procedure](#)

BK34394,00011F6 -19-24OCT11-4/11

2 Preliminary Checks

1. Ignition OFF, Engine OFF.

2. Inspect the following items if applicable to application:

- Check engine oil level and pressure.
- Clean cooling package for maximum air flow.
- Check fan belt condition.
- Check condition of sheave return spring.
- Check sheave alignment to determine bearing condition.
- Check for excessive sheave wear.
- Check for electrical connections at speed sensor and solenoid coils.
- Check overall condition of wiring.
- Check for oil leakage (lines or actuating cylinder).
- Check for coolant leakage.
- Check that actuating cylinder bleed screw is seated and locknut is securely tightened.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: GO TO 3

BK34394,00011F6 -19-24OCT11-5/11

3 Terminal Test

1. Disconnect variable speed fan connector Y5005.

2. Perform [Terminal Test](#) on sensor and Y5005 connector.

Were any problems found?

YES: Repair problem.
Perform [Verification Procedure](#).

NO: GO TO 3

Continued on next page

BK34394,00011F6 -19-24OCT11-6/11

4 Supply Circuit Check

1. Connect Diagnostic Test Box :
 - A to Y5005 connector female socket 1 (+).
 - B to Y5005 connector female socket 4 (-).
 2. Set S1 to position 1 on Diagnostic Test Box.
 3. Connect multimeter to Diagnostic Test Box.
 4. Ignition ON, Engine OFF.
 5. Press and hold S3 on Diagnostic Test Box.
 6. Monitor voltage on multimeter.
 7. Perform Wiggle Test.
- Does voltage remain between 4.8 and 5.2 volts?

YES: GO TO 6

NO: GO TO 5

BK34394,00011F6 -19-24OCT11-7/11

5 Open or High Resistance Circuit Check

1. Press and hold both S2 and S3 buttons on Diagnostic Test Box.
 2. Monitor voltage on multimeter.
- Does voltage now remain between 4.8 and 5.2 volts?

YES: Repair open or high resistance in return wire. Perform Verification Procedure.

NO: Repair open or high resistance in supply wire. Perform Verification Procedure.

BK34394,00011F6 -19-24OCT11-8/11

6 Terminal Test

1. Disconnect ECU connector A5503.
 2. Perform Terminal Test on A5503 connector female sockets 18, 33, and 49. And corresponding ECU male pins.
- Were any problems found?

YES: Repair problem. Perform Verification Procedure.

NO: GO TO 7

BK34394,00011F6 -19-24OCT11-9/11

7 Continuity Check

- Measure the resistance between A5503 connector female socket 18 and Y5005 connector female socket 5.
- Is resistance less than 5 ohms?

YES: GO TO 8

NO: Repair open or high resistance on signal wire in harness. Perform Verification Procedure.

BK34394,00011F6 -19-24OCT11-10/11

8 Continuity Check

- Measure the resistance between A5503 connector female socket 18 and all other female sockets in A5503.
- Are any resistances less than 100k ohms?

YES: Repair short in harness. Perform Verification Procedure.

NO: Replace speed sensor. Perform Verification Procedure.

BK34394,00011F6 -19-24OCT11-11/11

001639.18 — Fan Speed Signal Moderately Low

The fan speed signal is moderately lower than expected.

Diagnostic Procedure

When DTC is Displayed:

When the ignition is on, engine is running, and the fault is active.

Related Information:

The fan speed signal is moderately lower than expected at the operating conditions that set the DTC.
The engine must be running for a minimum of three minutes for DTC to become active.

Alarm Level:

Warning

Control Unit Response:

The ECU will try to maintain proper operating conditions.

For troubleshooting procedure see [001639.01 — Fan Speed Signal Extremely Low](#).

BK34394,00011F7 -19-11MAY11-1/1

003353.31 — Alternator Excitation Fault

*For diagnostic procedures, please see your
application technical manual.*

BK34394,00014F5 -19-27JUL11-1/1

003587.05 — Ether Control Circuit Has High Resistance

For diagnostic procedures, please see your application technical manual.

BK34394,00014F6 -19-28JUL11-1/1

003587.06 — Ether Control Circuit Has Low Resistance

For diagnostic procedures, please see your application technical manual.

BK34394,00014F7 -19-28JUL11-1/1

**003711.14 — Exhaust Temperature
Management Failure Without Load**

*For troubleshooting procedures please see the
application troubleshooting manual.*

BK34394,00014F8 -19-25FEB11-1/1

**003711.31 — Exhaust Temperature
Management Failure With Load**

*For troubleshooting procedures please see the
application troubleshooting manual.*

BK34394,00014F9 -19-11MAY11-1/1

**520956.05 — Battery Cutoff Relay Drive
Circuit Has High Resistance**

*For diagnostic procedures, please see your
application technical manual.*

DN22556,000013C -19-27JUL11-1/1

**520956.06 — Battery Cutoff Relay Drive
Circuit Has Low Resistance**

*For diagnostic procedures, please see your
application technical manual.*

DN22556,000013D -19-27JUL11-1/1

**521192.11 — Unable to Initiate Immobilizer
Authentication**

*For troubleshooting procedures please see the
application troubleshooting manual.*

BK34394,00014FA -19-27JUL11-1/1

**521214.09 — Immobilizer Authentication
Timed Out**

*For troubleshooting procedures please see the
application troubleshooting manual.*

BK34394,00014FB -19-28JUL11-1/1

**521214.14 — Immobilizer Authentication
Response Incorrect**

*For troubleshooting procedures please see the
application troubleshooting manual.*

BK34394,00014FC -19-28JUL11-1/1

**523744.09 — A/C Clutch Status Message Not
Received**

*For troubleshooting procedures please see the
application troubleshooting manual.*

BK34394,00014FD -19-27JUL11-1/1

002002.09 — No CAN Message Received From Source Address 2

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00011F8 -19-28MAR11-1/1

002002.14 — Incorrect CAN Message Received From Source Address 2

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00011F9 -19-28MAR11-1/1

002002.19 — Communication Error with Source Address 2

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00011FA -19-28MAR11-1/1

002003.09 — No CAN Message Received From Source Address 3

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00011FB -19-28MAR11-1/1

002003.14 — Incorrect CAN Message Received From Source Address 3

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00011FC -19-28MAR11-1/1

002003.19 — Communication Error with Source Address 3

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00011FD -19-28MAR11-1/1

002004.09 — No CAN Message Received From Source Address 4

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00011FE -19-28MAR11-1/1

002004.14 — Incorrect CAN Message Received From Source Address 4

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00011FF -19-28MAR11-1/1

002004.19 — Communication Error with Source Address 4

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001200 -19-28MAR11-1/1

002005.09 — No CAN Message Received From Source Address 5

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001201 -19-28MAR11-1/1

002005.14 — Incorrect CAN Message Received From Source Address 5

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001202 -19-28MAR11-1/1

002005.19 — Communication Error with Source Address 5

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001203 -19-28MAR11-1/1

002006.09 — No CAN Message Received From Source Address 6

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001204 -19-28MAR11-1/1

002006.14 — Incorrect CAN Message Received From Source Address 6

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001205 -19-28MAR11-1/1

002006.19 — Communication Error with Source Address 6

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001206 -19-28MAR11-1/1

002007.09 — No CAN Message Received From Source Address 7

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001207 -19-28MAR11-1/1

002007.14 — Incorrect CAN Message Received From Source Address 7

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001208 -19-28MAR11-1/1

002007.19 — Communication Error with Source Address 7

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001209 -19-28MAR11-1/1

002008.09 — No CAN Message Received From Source Address 8

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000120A -19-28MAR11-1/1

002008.14 — Incorrect CAN Message Received From Source Address 8

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000120B -19-28MAR11-1/1

002008.19 — Communication Error with Source Address 8

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000120C -19-28MAR11-1/1

002009.09 — No CAN Message Received From Source Address 9

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000120D -19-28MAR11-1/1

002009.14 — Incorrect CAN Message Received From Source Address 9

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000120E -19-28MAR11-1/1

002009.19 — Communication Error with Source Address 9

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000120F -19-28MAR11-1/1

002010.09 — No CAN Message Received From Source Address 10

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001210 -19-28MAR11-1/1

002010.14 — Incorrect CAN Message Received From Source Address 10

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001211 -19-28MAR11-1/1

002010.19 — Communication Error with Source Address 10

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001212 -19-28MAR11-1/1

002011.09 — No CAN Message Received From Source Address 11

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001213 -19-28MAR11-1/1

002011.14 — Incorrect CAN Message Received From Source Address 11

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001214 -19-28MAR11-1/1

002011.19 — Communication Error with Source Address 11

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001215 -19-28MAR11-1/1

002012.09 — No CAN Message Received From Source Address 12

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001216 -19-28MAR11-1/1

002012.14 — Incorrect CAN Message Received From Source Address 12

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001217 -19-28MAR11-1/1

002012.19 — Communication Error with Source Address 12

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001218 -19-28MAR11-1/1

002013.09 — No CAN Message Received From Source Address 13

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001219 -19-29MAR11-1/1

002013.14 — Incorrect CAN Message Received From Source Address 13

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000121A -19-29MAR11-1/1

002013.19 — Communication Error with Source Address 13

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000121B -19-29MAR11-1/1

002014.09 — No CAN Message Received From Source Address 14

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000121C -19-29MAR11-1/1

002014.14 — Incorrect CAN Message Received From Source Address 14

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000121D -19-29MAR11-1/1

002014.19 — Communication Error with Source Address 14

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000121E -19-29MAR11-1/1

002015.09 — No CAN Message Received From Source Address 15

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000121F -19-29MAR11-1/1

002015.14 — Incorrect CAN Message Received From Source Address 15

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001220 -19-29MAR11-1/1

002015.19 — Communication Error with Source Address 15

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001221 -19-29MAR11-1/1

002016.09 — No CAN Message Received From Source Address 16

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001222 -19-29MAR11-1/1

002016.14 — Incorrect CAN Message Received From Source Address 16

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001223 -19-29MAR11-1/1

002016.19 — Communication Error with Source Address 16

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001224 -19-29MAR11-1/1

002017.09 — No CAN Message Received From Source Address 17

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001225 -19-29MAR11-1/1

002017.14 — Incorrect CAN Message Received From Source Address 17

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001226 -19-29MAR11-1/1

002017.19 — Communication Error with Source Address 17

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001227 -19-29MAR11-1/1

002018.09 — No CAN Message Received From Source Address 18

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001228 -19-29MAR11-1/1

002018.14 — Incorrect CAN Message Received From Source Address 18

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001229 -19-29MAR11-1/1

002018.19 — Communication Error with Source Address 18

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000122A -19-29MAR11-1/1

002019.09 — No CAN Message Received From Source Address 19

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000122B -19-29MAR11-1/1

002019.14 — Incorrect CAN Message Received From Source Address 19

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000122C -19-29MAR11-1/1

002019.19 — Communication Error with Source Address 19

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000122D -19-29MAR11-1/1

002020.09 — No CAN Message Received From Source Address 20

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000122E -19-29MAR11-1/1

002020.14 — Incorrect CAN Message Received From Source Address 20

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000122F -19-29MAR11-1/1

002020.19 — Communication Error with Source Address 20

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001230 -19-29MAR11-1/1

002021.09 — No CAN Message Received From Source Address 21

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001231 -19-29MAR11-1/1

002021.14 — Incorrect CAN Message Received From Source Address 21

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001232 -19-29MAR11-1/1

002021.19 — Communication Error with Source Address 21

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001233 -19-29MAR11-1/1

002022.09 — No CAN Message Received From Source Address 22

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001234 -19-28MAR11-1/1

002022.14 — Incorrect CAN Message Received From Source Address 22

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001235 -19-28MAR11-1/1

002022.19 — Communication Error with Source Address 22

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001236 -19-28MAR11-1/1

002023.09 — No CAN Message Received From Source Address 23

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001237 -19-28MAR11-1/1

002023.14 — Incorrect CAN Message Received From Source Address 23

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001238 -19-28MAR11-1/1

002023.19 — Communication Error with Source Address 23

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001239 -19-28MAR11-1/1

002024.09 — No CAN Message Received From Source Address 24

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000123A -19-28MAR11-1/1

002024.14 — Incorrect CAN Message Received From Source Address 24

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000123B -19-28MAR11-1/1

002024.19 — Communication Error with Source Address 24

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000123C -19-28MAR11-1/1

002025.09 — No CAN Message Received From Source Address 25

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000123D -19-28MAR11-1/1

002025.14 — Incorrect CAN Message Received From Source Address 25

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000123E -19-28MAR11-1/1

002025.19 — Communication Error with Source Address 25

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000123F -19-28MAR11-1/1

002026.09 — No CAN Message Received From Source Address 26

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001240 -19-28MAR11-1/1

002026.14 — Incorrect CAN Message Received From Source Address 26

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001241 -19-28MAR11-1/1

002026.19 — Communication Error with Source Address 26

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001242 -19-28MAR11-1/1

002027.09 — No CAN Message Received From Source Address 27

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001243 -19-28MAR11-1/1

002027.14 — Incorrect CAN Message Received From Source Address 27

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001244 -19-28MAR11-1/1

002027.19 — Communication Error with Source Address 27

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001245 -19-28MAR11-1/1

002028.09 — No CAN Message Received From Source Address 28

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001246 -19-28MAR11-1/1

002028.14 — Incorrect CAN Message Received From Source Address 28

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001247 -19-28MAR11-1/1

002028.19 — Communication Error with Source Address 28

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001248 -19-28MAR11-1/1

002029.09 — No CAN Message Received From Source Address 29

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001249 -19-28MAR11-1/1

002029.14 — Incorrect CAN Message Received From Source Address 29

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000124A -19-28MAR11-1/1

002029.19 — Communication Error with Source Address 29

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000124B -19-28MAR11-1/1

002030.09 — No CAN Message Received From Source Address 30

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000124C -19-28MAR11-1/1

002030.14 — Incorrect CAN Message Received From Source Address 30

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000124D -19-28MAR11-1/1

002030.19 — Communication Error with Source Address 30

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000124E -19-28MAR11-1/1

002031.09 — No CAN Message Received From Source Address 31

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000124F -19-28MAR11-1/1

002031.14 — Incorrect CAN Message Received From Source Address 31

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001250 -19-28MAR11-1/1

002031.19 — Communication Error with Source Address 31

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001251 -19-28MAR11-1/1

002032.09 — No CAN Message Received From Source Address 32

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001252 -19-28MAR11-1/1

002032.14 — Incorrect CAN Message Received From Source Address 32

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001253 -19-28MAR11-1/1

002032.19 — Communication Error with Source Address 32

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001254 -19-28MAR11-1/1

002033.09 — No CAN Message Received From Source Address 33

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001255 -19-28MAR11-1/1

002033.14 — Incorrect CAN Message Received From Source Address 33

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001256 -19-28MAR11-1/1

002033.19 — Communication Error with Source Address 33

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001257 -19-28MAR11-1/1

002034.09 — No CAN Message Received From Source Address 34

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001258 -19-28MAR11-1/1

002034.14 — Incorrect CAN Message Received From Source Address 34

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001259 -19-28MAR11-1/1

002034.19 — Communication Error with Source Address 34

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000125A -19-28MAR11-1/1

002035.09 — No CAN Message Received From Source Address 35

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000125B -19-28MAR11-1/1

002035.14 — Incorrect CAN Message Received From Source Address 35

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000125C -19-28MAR11-1/1

002035.19 — Communication Error with Source Address 35

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000125D -19-28MAR11-1/1

002036.09 — No CAN Message Received From Source Address 36

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000125E -19-28MAR11-1/1

002036.14 — Incorrect CAN Message Received From Source Address 36

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000125F -19-28MAR11-1/1

002036.19 — Communication Error with Source Address 36

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001260 -19-28MAR11-1/1

002037.09 — No CAN Message Received From Source Address 37

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001261 -19-28MAR11-1/1

002037.14 — Incorrect CAN Message Received From Source Address 37

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001262 -19-28MAR11-1/1

002037.19 — Communication Error with Source Address 37

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001263 -19-28MAR11-1/1

002038.09 — No CAN Message Received From Source Address 38

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001264 -19-28MAR11-1/1

002038.14 — Incorrect CAN Message Received From Source Address 38

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001265 -19-28MAR11-1/1

002038.19 — Communication Error with Source Address 38

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001266 -19-28MAR11-1/1

002039.09 — No CAN Message Received From Source Address 39

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001267 -19-28MAR11-1/1

002039.14 — Incorrect CAN Message Received From Source Address 39

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001268 -19-28MAR11-1/1

002039.19 — Communication Error with Source Address 39

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001269 -19-28MAR11-1/1

002040.09 — No CAN Message Received From Source Address 40

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000126A -19-28MAR11-1/1

002040.14 — Incorrect CAN Message Received From Source Address 40

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000126B -19-28MAR11-1/1

002040.19 — Communication Error with Source Address 40

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000126C -19-28MAR11-1/1

002041.09 — No CAN Message Received From Source Address 41

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000126D -19-28MAR11-1/1

002041.14 — Incorrect CAN Message Received From Source Address 41

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000126E -19-28MAR11-1/1

002041.19 — Communication Error with Source Address 41

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000126F -19-28MAR11-1/1

002042.09 — No CAN Message Received From Source Address 42

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001270 -19-28MAR11-1/1

002042.14 — Incorrect CAN Message Received From Source Address 42

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001271 -19-28MAR11-1/1

002042.19 — Communication Error with Source Address 42

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001272 -19-28MAR11-1/1

002043.09 — No CAN Message Received From Source Address 43

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001273 -19-28MAR11-1/1

002043.14 — Incorrect CAN Message Received From Source Address 43

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001274 -19-28MAR11-1/1

002043.19 — Communication Error with Source Address 43

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001275 -19-28MAR11-1/1

002044.09 — No CAN Message Received From Source Address 44

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001276 -19-28MAR11-1/1

002044.14 — Incorrect CAN Message Received From Source Address 44

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001277 -19-28MAR11-1/1

002044.19 — Communication Error with Source Address 44

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001278 -19-28MAR11-1/1

002045.09 — No CAN Message Received From Source Address 45

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001279 -19-28MAR11-1/1

002045.14 — Incorrect CAN Message Received From Source Address 45

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000127A -19-28MAR11-1/1

002045.19 — Communication Error with Source Address 45

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000127B -19-28MAR11-1/1

002046.09 — No CAN Message Received From Source Address 46

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000127C -19-28MAR11-1/1

002046.14 — Incorrect CAN Message Received From Source Address 46

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000127D -19-28MAR11-1/1

002046.19 — Communication Error with Source Address 46

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000127E -19-28MAR11-1/1

002047.09 — No CAN Message Received From Source Address 47

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000127F -19-28MAR11-1/1

002047.14 — Incorrect CAN Message Received From Source Address 47

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001280 -19-28MAR11-1/1

002047.19 — Communication Error with Source Address 47

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001281 -19-28MAR11-1/1

002048.09 — No CAN Message Received From Source Address 48

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001282 -19-28MAR11-1/1

002048.14 — Incorrect CAN Message Received From Source Address 48

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001283 -19-28MAR11-1/1

002048.19 — Communication Error with Source Address 48

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001284 -19-28MAR11-1/1

002049.09 — No CAN Message Received From Source Address 49

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001285 -19-28MAR11-1/1

002049.14 — Incorrect CAN Message Received From Source Address 49

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001286 -19-28MAR11-1/1

002049.19 — Communication Error with Source Address 49

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001287 -19-28MAR11-1/1

002050.09 — No CAN Message Received From Source Address 50

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001288 -19-28MAR11-1/1

002050.14 — Incorrect CAN Message Received From Source Address 50

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001289 -19-28MAR11-1/1

002050.19 — Communication Error with Source Address 50

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000128A -19-28MAR11-1/1

002051.09 — No CAN Message Received From Source Address 51

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000128B -19-28MAR11-1/1

002051.14 — Incorrect CAN Message Received From Source Address 51

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000128C -19-28MAR11-1/1

002051.19 — Communication Error with Source Address 51

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000128D -19-28MAR11-1/1

002052.09 — No CAN Message Received From Source Address 52

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000128E -19-28MAR11-1/1

002052.14 — Incorrect CAN Message Received From Source Address 52

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000128F -19-28MAR11-1/1

002052.19 — Communication Error with Source Address 52

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001290 -19-28MAR11-1/1

002053.09 — No CAN Message Received From Source Address 53

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001291 -19-28MAR11-1/1

002053.14 — Incorrect CAN Message Received From Source Address 53

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001292 -19-28MAR11-1/1

002053.19 — Communication Error with Source Address 53

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001293 -19-28MAR11-1/1

002054.09 — No CAN Message Received From Source Address 54

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001294 -19-28MAR11-1/1

002054.14 — Incorrect CAN Message Received From Source Address 54

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001295 -19-28MAR11-1/1

002054.19 — Communication Error with Source Address 54

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001296 -19-28MAR11-1/1

002055.09 — No CAN Message Received From Source Address 55

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001297 -19-28MAR11-1/1

002055.14 — Incorrect CAN Message Received From Source Address 55

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001298 -19-28MAR11-1/1

002055.19 — Communication Error with Source Address 55

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001299 -19-28MAR11-1/1

002056.09 — No CAN Message Received From Source Address 56

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000129A -19-28MAR11-1/1

002056.14 — Incorrect CAN Message Received From Source Address 56

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000129B -19-28MAR11-1/1

002056.19 — Communication Error with Source Address 56

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000129C -19-28MAR11-1/1

002057.09 — No CAN Message Received From Source Address 57

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000129D -19-28MAR11-1/1

002057.14 — Incorrect CAN Message Received From Source Address 57

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000129E -19-28MAR11-1/1

002057.19 — Communication Error with Source Address 57

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000129F -19-28MAR11-1/1

002058.09 — No CAN Message Received From Source Address 58

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012A0 -19-28MAR11-1/1

002058.14 — Incorrect CAN Message Received From Source Address 58

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012A1 -19-28MAR11-1/1

002058.19 — Communication Error with Source Address 58

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012A2 -19-28MAR11-1/1

002059.09 — No CAN Message Received From Source Address 59

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012A3 -19-28MAR11-1/1

002059.14 — Incorrect CAN Message Received From Source Address 59

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012A4 -19-28MAR11-1/1

002059.19 — Communication Error with Source Address 59

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012A5 -19-28MAR11-1/1

002060.09 — No CAN Message Received From Source Address 60

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012A6 -19-28MAR11-1/1

002060.14 — Incorrect CAN Message Received From Source Address 60

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012A7 -19-28MAR11-1/1

002060.19 — Communication Error with Source Address 60

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012A8 -19-28MAR11-1/1

002061.09 — No CAN Message Received From Source Address 61

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012A9 -19-28MAR11-1/1

002061.14 — Incorrect CAN Message Received From Source Address 61

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012AA -19-28MAR11-1/1

002061.19 — Communication Error with Source Address 61

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012AB -19-28MAR11-1/1

002062.09 — No CAN Message Received From Source Address 62

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012AC -19-28MAR11-1/1

002062.14 — Incorrect CAN Message Received From Source Address 62

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012AD -19-28MAR11-1/1

002062.19 — Communication Error with Source Address 62

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012AE -19-28MAR11-1/1

002063.09 — No CAN Message Received From Source Address 63

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012AF -19-28MAR11-1/1

002063.14 — Incorrect CAN Message Received From Source Address 63

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012B0 -19-28MAR11-1/1

002063.19 — Communication Error with Source Address 63

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012B1 -19-28MAR11-1/1

002064.09 — No CAN Message Received From Source Address 64

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012B2 -19-28MAR11-1/1

002064.14 — Incorrect CAN Message Received From Source Address 64

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012B3 -19-28MAR11-1/1

002064.19 — Communication Error with Source Address 64

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012B4 -19-28MAR11-1/1

002065.09 — No CAN Message Received From Source Address 65

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012B5 -19-28MAR11-1/1

002065.14 — Incorrect CAN Message Received From Source Address 65

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012B6 -19-28MAR11-1/1

002065.19 — Communication Error with Source Address 65

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012B7 -19-28MAR11-1/1

002066.09 — No CAN Message Received From Source Address 66

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012B8 -19-28MAR11-1/1

002066.14 — Incorrect CAN Message Received From Source Address 66

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012B9 -19-28MAR11-1/1

002066.19 — Communication Error with Source Address 66

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012BA -19-28MAR11-1/1

002067.09 — No CAN Message Received From Source Address 67

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012BB -19-28MAR11-1/1

002067.14 — Incorrect CAN Message Received From Source Address 67

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012BC -19-28MAR11-1/1

002067.19 — Communication Error with Source Address 67

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012BD -19-28MAR11-1/1

002068.09 — No CAN Message Received From Source Address 68

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012BE -19-28MAR11-1/1

002068.14 — Incorrect CAN Message Received From Source Address 68

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012BF -19-28MAR11-1/1

002068.19 — Communication Error with Source Address 68

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012C0 -19-28MAR11-1/1

002069.09 — No CAN Message Received From Source Address 69

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012C1 -19-28MAR11-1/1

002069.14 — Incorrect CAN Message Received From Source Address 69

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012C2 -19-28MAR11-1/1

002069.19 — Communication Error with Source Address 69

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012C3 -19-28MAR11-1/1

002070.09 — No CAN Message Received From Source Address 70

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012C4 -19-28MAR11-1/1

002070.14 — Incorrect CAN Message Received From Source Address 70

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012C5 -19-28MAR11-1/1

002070.19 — Communication Error with Source Address 70

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012C6 -19-02MAY11-1/1

002071.09 — No CAN Message Received From Source Address 71

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012C7 -19-28MAR11-1/1

002071.14 — Incorrect CAN Message Received From Source Address 71

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012C8 -19-28MAR11-1/1

002071.19 — Communication Error with Source Address 71

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012C9 -19-28MAR11-1/1

002072.09 — No CAN Message Received From Source Address 72

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012CA -19-28MAR11-1/1

002072.14 — Incorrect CAN Message Received From Source Address 72

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012CB -19-28MAR11-1/1

002072.19 — Communication Error with Source Address 72

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012CC -19-28MAR11-1/1

002072.09 — No CAN Message Received From Source Address 72

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012CD -19-28MAR11-1/1

002072.14 — Incorrect CAN Message Received From Source Address 72

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012CE -19-28MAR11-1/1

002072.19 — Communication Error with Source Address 72

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012CF -19-28MAR11-1/1

002073.09 — No CAN Message Received From Source Address 73

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012D0 -19-28MAR11-1/1

002073.14 — Incorrect CAN Message Received From Source Address 73

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012D1 -19-28MAR11-1/1

002073.19 — Communication Error with Source Address 73

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012D2 -19-28MAR11-1/1

002074.09 — No CAN Message Received From Source Address 74

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012D3 -19-28MAR11-1/1

002074.14 — Incorrect CAN Message Received From Source Address 74

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012D4 -19-28MAR11-1/1

002074.19 — Communication Error with Source Address 74

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012D5 -19-28MAR11-1/1

002075.09 — No CAN Message Received From Source Address 75

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012D6 -19-28MAR11-1/1

002075.14 — Incorrect CAN Message Received From Source Address 75

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012D7 -19-28MAR11-1/1

002075.19 — Communication Error with Source Address 75

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012D8 -19-28MAR11-1/1

002076.09 — No CAN Message Received From Source Address 76

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012D9 -19-28MAR11-1/1

002076.14 — Incorrect CAN Message Received From Source Address 76

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012DA -19-28MAR11-1/1

002076.19 — Communication Error with Source Address 76

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012DB -19-28MAR11-1/1

002077.09 — No CAN Message Received From Source Address 77

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012DC -19-28MAR11-1/1

002077.14 — Incorrect CAN Message Received From Source Address 77

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012DD -19-28MAR11-1/1

002077.19 — Communication Error with Source Address 77

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012DE -19-28MAR11-1/1

002078.09 — No CAN Message Received From Source Address 78

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012DF -19-28MAR11-1/1

002078.14 — Incorrect CAN Message Received From Source Address 78

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012E0 -19-28MAR11-1/1

002078.19 — Communication Error with Source Address 78

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012E1 -19-28MAR11-1/1

002079.09 — No CAN Message Received From Source Address 79

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012E2 -19-28MAR11-1/1

002079.14 — Incorrect CAN Message Received From Source Address 79

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012E3 -19-28MAR11-1/1

002079.19 — Communication Error with Source Address 79

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012E4 -19-28MAR11-1/1

002080.09 — No CAN Message Received From Source Address 80

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012E5 -19-28MAR11-1/1

002080.14 — Incorrect CAN Message Received From Source Address 80

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012E6 -19-28MAR11-1/1

002080.19 — Communication Error with Source Address 80

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012E7 -19-28MAR11-1/1

002081.09 — No CAN Message Received From Source Address 81

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012E8 -19-28MAR11-1/1

002081.14 — Incorrect CAN Message Received From Source Address 81

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012E9 -19-28MAR11-1/1

002081.19 — Communication Error with Source Address 81

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012EA -19-28MAR11-1/1

002082.09 — No CAN Message Received From Source Address 82

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012EB -19-28MAR11-1/1

002082.14 — Incorrect CAN Message Received From Source Address 82

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012EC -19-28MAR11-1/1

002082.19 — Communication Error with Source Address 82

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012ED -19-28MAR11-1/1

002083.09 — No CAN Message Received From Source Address 83

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012EE -19-28MAR11-1/1

002083.14 — Incorrect CAN Message Received From Source Address 83

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012EF -19-28MAR11-1/1

002083.19 — Communication Error with Source Address 83

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012F0 -19-28MAR11-1/1

002084.09 — No CAN Message Received From Source Address 84

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012F1 -19-28MAR11-1/1

002084.14 — Incorrect CAN Message Received From Source Address 84

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012F2 -19-28MAR11-1/1

002084.19 — Communication Error with Source Address 84

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012F3 -19-28MAR11-1/1

002085.09 — No CAN Message Received From Source Address 85

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012F4 -19-28MAR11-1/1

002085.14 — Incorrect CAN Message Received From Source Address 85

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012F5 -19-28MAR11-1/1

002085.19 — Communication Error with Source Address 85

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012F6 -19-28MAR11-1/1

002086.09 — No CAN Message Received From Source Address 86

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012F7 -19-29MAR11-1/1

002086.14 — Incorrect CAN Message Received From Source Address 86

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00012F8 -19-29MAR11-1/1

002086.19 — Communication Error with Source Address 86

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00012F9 -19-29MAR11-1/1

002087.09 — No CAN Message Received From Source Address 87

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00012FA -19-28MAR11-1/1

002087.14 — Incorrect CAN Message Received From Source Address 87

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012FB -19-28MAR11-1/1

002087.19 — Communication Error with Source Address 87

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012FC -19-28MAR11-1/1

002088.09 — No CAN Message Received From Source Address 88

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00012FD -19-28MAR11-1/1

002088.14 — Incorrect CAN Message Received From Source Address 88

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00012FE -19-28MAR11-1/1

002088.19 — Communication Error with Source Address 88

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00012FF -19-28MAR11-1/1

002089.09 — No CAN Message Received From Source Address 89

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001300 -19-28MAR11-1/1

002089.14 — Incorrect CAN Message Received From Source Address 89

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001301 -19-28MAR11-1/1

002089.19 — Communication Error with Source Address 89

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001302 -19-28MAR11-1/1

002090.09 — No CAN Message Received From Source Address 90

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001303 -19-28MAR11-1/1

002090.14 — Incorrect CAN Message Received From Source Address 90

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001304 -19-28MAR11-1/1

002090.19 — Communication Error with Source Address 90

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001305 -19-28MAR11-1/1

002091.09 — No CAN Message Received From Source Address 91

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001306 -19-28MAR11-1/1

002091.14 — Incorrect CAN Message Received From Source Address 91

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001307 -19-28MAR11-1/1

002091.19 — Communication Error with Source Address 91

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001308 -19-28MAR11-1/1

002092.09 — No CAN Message Received From Source Address 92

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001309 -19-28MAR11-1/1

002092.14 — Incorrect CAN Message Received From Source Address 92

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000130A -19-28MAR11-1/1

002092.19 — Communication Error with Source Address 92

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000130B -19-28MAR11-1/1

002093.09 — No CAN Message Received From Source Address 93

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000130C -19-28MAR11-1/1

002093.14 — Incorrect CAN Message Received From Source Address 93

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000130D -19-28MAR11-1/1

002093.19 — Communication Error with Source Address 93

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000130E -19-28MAR11-1/1

002094.09 — No CAN Message Received From Source Address 94

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000130F -19-28MAR11-1/1

002094.14 — Incorrect CAN Message Received From Source Address 94

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001310 -19-28MAR11-1/1

002094.19 — Communication Error with Source Address 94

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001311 -19-28MAR11-1/1

002095.09 — No CAN Message Received From Source Address 95

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001312 -19-28MAR11-1/1

002095.14 — Incorrect CAN Message Received From Source Address 95

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001313 -19-28MAR11-1/1

002095.19 — Communication Error with Source Address 95

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001314 -19-28MAR11-1/1

002096.09 — No CAN Message Received From Source Address 96

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001315 -19-28MAR11-1/1

002096.14 — Incorrect CAN Message Received From Source Address 96

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001316 -19-28MAR11-1/1

002096.19 — Communication Error with Source Address 96

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001317 -19-28MAR11-1/1

002097.09 — No CAN Message Received From Source Address 97

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001318 -19-28MAR11-1/1

002097.14 — Incorrect CAN Message Received From Source Address 97

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001319 -19-28MAR11-1/1

002097.19 — Communication Error with Source Address 97

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000131A -19-28MAR11-1/1

002098.09 — No CAN Message Received From Source Address 98

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000131B -19-28MAR11-1/1

002098.14 — Incorrect CAN Message Received From Source Address 98

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000131C -19-28MAR11-1/1

002098.19 — Communication Error with Source Address 98

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000131D -19-28MAR11-1/1

002099.09 — No CAN Message Received From Source Address 99

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000131E -19-28MAR11-1/1

002099.14 — Incorrect CAN Message Received From Source Address 99

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000131F -19-28MAR11-1/1

002099.19 — Communication Error with Source Address 99

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001320 -19-28MAR11-1/1

002100.09 — No CAN Message Received From Source Address 100

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001321 -19-28MAR11-1/1

002100.14 — Incorrect CAN Message Received From Source Address 100

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001322 -19-28MAR11-1/1

002100.19 — Communication Error with Source Address 100

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001323 -19-28MAR11-1/1

002101.09 — No CAN Message Received From Source Address 101

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001324 -19-28MAR11-1/1

002101.14 — Incorrect CAN Message Received From Source Address 101

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001325 -19-28MAR11-1/1

002101.19 — Communication Error with Source Address 101

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001326 -19-28MAR11-1/1

002102.09 — No CAN Message Received From Source Address 102

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001327 -19-28MAR11-1/1

002102.14 — Incorrect CAN Message Received From Source Address 102

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001328 -19-28MAR11-1/1

002102.19 — Communication Error with Source Address 102

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001329 -19-28MAR11-1/1

002103.09 — No CAN Message Received From Source Address 103

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000132A -19-28MAR11-1/1

002103.14 — Incorrect CAN Message Received From Source Address 103

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000132B -19-28MAR11-1/1

002103.19 — Communication Error with Source Address 103

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000132C -19-28MAR11-1/1

002104.09 — No CAN Message Received From Source Address 104

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000132D -19-28MAR11-1/1

002104.14 — Incorrect CAN Message Received From Source Address 104

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000132E -19-28MAR11-1/1

002104.19 — Communication Error with Source Address 104

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000132F -19-28MAR11-1/1

002105.09 — No CAN Message Received From Source Address 105

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001330 -19-28MAR11-1/1

002105.14 — Incorrect CAN Message Received From Source Address 105

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001331 -19-28MAR11-1/1

002105.19 — Communication Error with Source Address 105

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001332 -19-28MAR11-1/1

002106.09 — No CAN Message Received From Source Address 106

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001333 -19-28MAR11-1/1

002106.14 — Incorrect CAN Message Received From Source Address 106

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001334 -19-28MAR11-1/1

002106.19 — Communication Error with Source Address 106

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001335 -19-28MAR11-1/1

002107.09 — No CAN Message Received From Source Address 107

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001336 -19-28MAR11-1/1

002107.14 — Incorrect CAN Message Received From Source Address 107

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001337 -19-28MAR11-1/1

002107.19 — Communication Error with Source Address 107

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001338 -19-02MAY11-1/1

002108.09 — No CAN Message Received From Source Address 108

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001339 -19-28MAR11-1/1

002108.14 — Incorrect CAN Message Received From Source Address 108

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000133A -19-28MAR11-1/1

002108.19 — Communication Error with Source Address 108

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000133B -19-28MAR11-1/1

002109.09 — No CAN Message Received From Source Address 109

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000133C -19-28MAR11-1/1

002109.14 — Incorrect CAN Message Received From Source Address 109

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000133D -19-28MAR11-1/1

002109.19 — Communication Error with Source Address 109

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000133E -19-30MAR11-1/1

002110.09 — No CAN Message Received From Source Address 110

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000133F -19-30MAR11-1/1

002110.14 — Incorrect CAN Message Received From Source Address 110

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001340 -19-02MAY11-1/1

002110.19 — Communication Error with Source Address 110

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001341 -19-28MAR11-1/1

002111.09 — No CAN Message Received From Source Address 111

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001342 -19-02MAY11-1/1

002111.14 — Incorrect CAN Message Received From Source Address 111

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001343 -19-02MAY11-1/1

002111.19 — Communication Error with Source Address 111

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001344 -19-02MAY11-1/1

002112.09 — No CAN Message Received From Source Address 112

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001345 -19-02MAY11-1/1

002112.14 — Incorrect CAN Message Received From Source Address 112

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001346 -19-02MAY11-1/1

002112.19 — Communication Error with Source Address 112

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001347 -19-02MAY11-1/1

002113.09 — No CAN Message Received From Source Address 113

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001348 -19-02MAY11-1/1

002113.14 — Incorrect CAN Message Received From Source Address 113

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001349 -19-02MAY11-1/1

002113.19 — Communication Error with Source Address 113

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000134A -19-02MAY11-1/1

002114.09 — No CAN Message Received From Source Address 114

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000134B -19-02MAY11-1/1

002114.14 — Incorrect CAN Message Received From Source Address 114

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000134C -19-02MAY11-1/1

002114.19 — Communication Error with Source Address 114

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000134D -19-02MAY11-1/1

002115.09 — No CAN Message Received From Source Address 115

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000134E -19-02MAY11-1/1

002115.14 — Incorrect CAN Message Received From Source Address 115

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000134F -19-02MAY11-1/1

002115.19 — Communication Error with Source Address 115

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001350 -19-02MAY11-1/1

002116.09 — No CAN Message Received From Source Address 116

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001351 -19-02MAY11-1/1

002116.14 — Incorrect CAN Message Received From Source Address 116

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001352 -19-02MAY11-1/1

002116.19 — Communication Error with Source Address 116

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001353 -19-02MAY11-1/1

002117.09 — No CAN Message Received From Source Address 117

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001354 -19-02MAY11-1/1

002117.14 — Incorrect CAN Message Received From Source Address 117

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001355 -19-02MAY11-1/1

002117.19 — Communication Error with Source Address 117

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001356 -19-02MAY11-1/1

002118.09 — No CAN Message Received From Source Address 118

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001357 -19-02MAY11-1/1

002118.14 — Incorrect CAN Message Received From Source Address 118

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001358 -19-28MAR11-1/1

002118.19 — Communication Error with Source Address 118

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001359 -19-02MAY11-1/1

002119.09 — No CAN Message Received From Source Address 119

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000135A -19-02MAY11-1/1

002119.14 — Incorrect CAN Message Received From Source Address 119

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000135B -19-02MAY11-1/1

002119.19 — Communication Error with Source Address 119

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000135C -19-02MAY11-1/1

002120.09 — No CAN Message Received From Source Address 120

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000135D -19-02MAY11-1/1

002120.14 — Incorrect CAN Message Received From Source Address 120

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000135E -19-02MAY11-1/1

002120.19 — Communication Error with Source Address 120

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000135F -19-02MAY11-1/1

002121.09 — No CAN Message Received From Source Address 121

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001360 -19-02MAY11-1/1

002121.14 — Incorrect CAN Message Received From Source Address 121

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001361 -19-02MAY11-1/1

002121.19 — Communication Error with Source Address 121

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001362 -19-02MAY11-1/1

002122.09 — No CAN Message Received From Source Address 122

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001363 -19-02MAY11-1/1

002122.14 — Incorrect CAN Message Received From Source Address 122

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001364 -19-02MAY11-1/1

002122.19 — Communication Error with Source Address 122

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001365 -19-02MAY11-1/1

002123.09 — No CAN Message Received From Source Address 123

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001366 -19-02MAY11-1/1

002123.14 — Incorrect CAN Message Received From Source Address 123

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001367 -19-02MAY11-1/1

002123.19 — Communication Error with Source Address 123

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001368 -19-02MAY11-1/1

002124.09 — No CAN Message Received From Source Address 124

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001369 -19-02MAY11-1/1

002124.14 — Incorrect CAN Message Received From Source Address 124

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000136A -19-28MAR11-1/1

002124.19 — Communication Error with Source Address 124

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000136B -19-28MAR11-1/1

002125.09 — No CAN Message Received From Source Address 125

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000136C -19-02MAY11-1/1

002125.14 — Incorrect CAN Message Received From Source Address 125

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000136D -19-02MAY11-1/1

002125.19 — Communication Error with Source Address 125

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000136E -19-02MAY11-1/1

002126.09 — No CAN Message Received From Source Address 126

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000136F -19-02MAY11-1/1

002126.14 — Incorrect CAN Message Received From Source Address 126

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001370 -19-02MAY11-1/1

002126.19 — Communication Error with Source Address 126

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001371 -19-02MAY11-1/1

002127.09 — No CAN Message Received From Source Address 127

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001372 -19-02MAY11-1/1

002127.14 — Incorrect CAN Message Received From Source Address 127

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001373 -19-02MAY11-1/1

002127.19 — Communication Error with Source Address 127

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001374 -19-02MAY11-1/1

002128.09 — No CAN Message Received From Source Address 128

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001375 -19-02MAY11-1/1

002128.14 — Incorrect CAN Message Received From Source Address 128

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001376 -19-02MAY11-1/1

002128.19 — Communication Error with Source Address 128

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001377 -19-02MAY11-1/1

002129.09 — No CAN Message Received From Source Address 129

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001378 -19-02MAY11-1/1

002129.14 — Incorrect CAN Message Received From Source Address 129

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001379 -19-02MAY11-1/1

002129.19 — Communication Error with Source Address 129

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000137A -19-02MAY11-1/1

002130.09 — No CAN Message Received From Source Address 130

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000137B -19-28MAR11-1/1

002130.14 — Incorrect CAN Message Received From Source Address 130

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000137C -19-02MAY11-1/1

002130.19 — Communication Error with Source Address 130

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000137D -19-02MAY11-1/1

002131.09 — No CAN Message Received From Source Address 131

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000137E -19-02MAY11-1/1

002131.14 — Incorrect CAN Message Received From Source Address 131

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000137F -19-02MAY11-1/1

002131.19 — Communication Error with Source Address 131

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001380 -19-02MAY11-1/1

002132.09 — No CAN Message Received From Source Address 132

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001381 -19-02MAY11-1/1

002132.14 — Incorrect CAN Message Received From Source Address 132

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001382 -19-02MAY11-1/1

002132.19 — Communication Error with Source Address 132

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001383 -19-02MAY11-1/1

002133.09 — No CAN Message Received From Source Address 133

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001384 -19-02MAY11-1/1

002133.14 — Incorrect CAN Message Received From Source Address 133

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001385 -19-02MAY11-1/1

002133.19 — Communication Error with Source Address 133

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001386 -19-02MAY11-1/1

002134.09 — No CAN Message Received From Source Address 134

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001387 -19-02MAY11-1/1

002134.14 — Incorrect CAN Message Received From Source Address 134

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001388 -19-02MAY11-1/1

002134.19 — Communication Error with Source Address 134

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001389 -19-02MAY11-1/1

002135.09 — No CAN Message Received From Source Address 135

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000138A -19-02MAY11-1/1

002135.14 — Incorrect CAN Message Received From Source Address 135

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000138B -19-02MAY11-1/1

002135.19 — Communication Error with Source Address 135

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000138C -19-02MAY11-1/1

002136.09 — No CAN Message Received From Source Address 136

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000138D -19-02MAY11-1/1

002136.14 — Incorrect CAN Message Received From Source Address 136

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000138E -19-02MAY11-1/1

002136.19 — Communication Error with Source Address 136

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000138F -19-02MAY11-1/1

002137.09 — No CAN Message Received From Source Address 137

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001390 -19-28MAR11-1/1

002137.14 — Incorrect CAN Message Received From Source Address 137

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001391 -19-02MAY11-1/1

002137.19 — Communication Error with Source Address 137

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001392 -19-02MAY11-1/1

002138.09 — No CAN Message Received From Source Address 138

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001393 -19-02MAY11-1/1

002138.14 — Incorrect CAN Message Received From Source Address 138

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001394 -19-02MAY11-1/1

002138.19 — Communication Error with Source Address 138

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001395 -19-02MAY11-1/1

002139.09 — No CAN Message Received From Source Address 139

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001396 -19-02MAY11-1/1

002139.14 — Incorrect CAN Message Received From Source Address 139

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001397 -19-02MAY11-1/1

002139.19 — Communication Error with Source Address 139

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001398 -19-02MAY11-1/1

002140.09 — No CAN Message Received From Source Address 140

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001399 -19-02MAY11-1/1

002140.14 — Incorrect CAN Message Received From Source Address 140

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000139A -19-02MAY11-1/1

002140.19 — Communication Error with Source Address 140

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000139B -19-02MAY11-1/1

002141.09 — No CAN Message Received From Source Address 141

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000139C -19-02MAY11-1/1

002141.14 — Incorrect CAN Message Received From Source Address 141

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000139D -19-02MAY11-1/1

002141.19 — Communication Error with Source Address 141

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000139E -19-02MAY11-1/1

002142.09 — No CAN Message Received From Source Address 142

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000139F -19-02MAY11-1/1

002142.14 — Incorrect CAN Message Received From Source Address 142

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00013A0 -19-02MAY11-1/1

002142.19 — Communication Error with Source Address 142

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00013A1 -19-02MAY11-1/1

002143.09 — No CAN Message Received From Source Address 143

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013A2 -19-02MAY11-1/1

002143.14 — Incorrect CAN Message Received From Source Address 143

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013A3 -19-02MAY11-1/1

002143.19 — Communication Error with Source Address 143

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013A4 -19-02MAY11-1/1

002144.09 — No CAN Message Received From Source Address 144

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013A5 -19-02MAY11-1/1

002144.14 — Incorrect CAN Message Received From Source Address 144

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013A6 -19-02MAY11-1/1

002144.19 — Communication Error with Source Address 144

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013A7 -19-02MAY11-1/1

002145.09 — No CAN Message Received From Source Address 145

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013A8 -19-02MAY11-1/1

002145.14 — Incorrect CAN Message Received From Source Address 145

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013A9 -19-02MAY11-1/1

002145.19 — Communication Error with Source Address 145

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013AA -19-02MAY11-1/1

002146.09 — No CAN Message Received From Source Address 146

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013AB -19-02MAY11-1/1

002146.14 — Incorrect CAN Message Received From Source Address 146

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013AC -19-02MAY11-1/1

002146.19 — Communication Error with Source Address 146

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013AD -19-02MAY11-1/1

002147.09 — No CAN Message Received From Source Address 147

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013AE -19-02MAY11-1/1

002147.14 — Incorrect CAN Message Received From Source Address 147

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013AF -19-02MAY11-1/1

002147.19 — Communication Error with Source Address 147

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013B0 -19-02MAY11-1/1

002148.09 — No CAN Message Received From Source Address 148

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013B1 -19-02MAY11-1/1

002148.14 — Incorrect CAN Message Received From Source Address 148

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00013B2 -19-02MAY11-1/1

002148.19 — Communication Error with Source Address 148

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00013B3 -19-02MAY11-1/1

002149.09 — No CAN Message Received From Source Address 149

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013B4 -19-02MAY11-1/1

002149.14 — Incorrect CAN Message Received From Source Address 149

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00013B5 -19-02MAY11-1/1

002149.19 — Communication Error with Source Address 149

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00013B6 -19-02MAY11-1/1

002150.09 — No CAN Message Received From Source Address 150

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013B7 -19-02MAY11-1/1

002150.14 — Incorrect CAN Message Received From Source Address 150

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013B8 -19-02MAY11-1/1

002150.19 — Communication Error with Source Address 150

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013B9 -19-02MAY11-1/1

002151.09 — No CAN Message Received From Source Address 151

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013BA -19-02MAY11-1/1

002151.14 — Incorrect CAN Message Received From Source Address 151

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013BB -19-02MAY11-1/1

002151.19 — Communication Error with Source Address 151

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013BC -19-02MAY11-1/1

002152.09 — No CAN Message Received From Source Address 152

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013BD -19-02MAY11-1/1

002152.14 — Incorrect CAN Message Received From Source Address 152

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013BE -19-02MAY11-1/1

002152.19 — Communication Error with Source Address 152

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013BF -19-02MAY11-1/1

002153.09 — No CAN Message Received From Source Address 153

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013C0 -19-02MAY11-1/1

002153.14 — Incorrect CAN Message Received From Source Address 153

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013C1 -19-02MAY11-1/1

002153.19 — Communication Error with Source Address 153

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013C2 -19-02MAY11-1/1

002154.09 — No CAN Message Received From Source Address 154

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013C3 -19-02MAY11-1/1

002154.14 — Incorrect CAN Message Received From Source Address 154

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013C4 -19-02MAY11-1/1

002154.19 — Communication Error with Source Address 154

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013C5 -19-02MAY11-1/1

002155.09 — No CAN Message Received From Source Address 155

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013C6 -19-02MAY11-1/1

002155.14 — Incorrect CAN Message Received From Source Address 155

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013C7 -19-02MAY11-1/1

002155.19 — Communication Error with Source Address 155

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013C8 -19-02MAY11-1/1

002156.09 — No CAN Message Received From Source Address 156

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013C9 -19-02MAY11-1/1

002156.14 — Incorrect CAN Message Received From Source Address 156

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013CA -19-02MAY11-1/1

002156.19 — Communication Error with Source Address 156

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013CB -19-02MAY11-1/1

002157.09 — No CAN Message Received From Source Address 157

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013CC -19-02MAY11-1/1

002157.14 — Incorrect CAN Message Received From Source Address 157

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013CD -19-02MAY11-1/1

002157.19 — Communication Error with Source Address 157

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013CE -19-02MAY11-1/1

002158.09 — No CAN Message Received From Source Address 158

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013CF -19-02MAY11-1/1

002158.14 — Incorrect CAN Message Received From Source Address 158

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013D0 -19-02MAY11-1/1

002158.19 — Communication Error with Source Address 158

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013D1 -19-02MAY11-1/1

002159.09 — No CAN Message Received From Source Address 159

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013D2 -19-02MAY11-1/1

002159.14 — Incorrect CAN Message Received From Source Address 159

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013D3 -19-02MAY11-1/1

002159.19 — Communication Error with Source Address 159

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013D4 -19-02MAY11-1/1

002160.09 — No CAN Message Received From Source Address 160

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013D5 -19-02MAY11-1/1

002160.14 — Incorrect CAN Message Received From Source Address 160

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013D6 -19-02MAY11-1/1

002160.19 — Communication Error with Source Address 160

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013D7 -19-02MAY11-1/1

002161.09 — No CAN Message Received From Source Address 161

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013D8 -19-02MAY11-1/1

002161.14 — Incorrect CAN Message Received From Source Address 161

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013D9 -19-02MAY11-1/1

002161.19 — Communication Error with Source Address 161

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013DA -19-02MAY11-1/1

002162.09 — No CAN Message Received From Source Address 162

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013DB -19-02MAY11-1/1

002162.14 — Incorrect CAN Message Received From Source Address 162

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00013DC -19-02MAY11-1/1

002162.19 — Communication Error with Source Address 162

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00013DD -19-02MAY11-1/1

002163.09 — No CAN Message Received From Source Address 163

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013DE -19-02MAY11-1/1

002163.14 — Incorrect CAN Message Received From Source Address 163

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00013DF -19-02MAY11-1/1

002163.19 — Communication Error with Source Address 163

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00013E0 -19-02MAY11-1/1

002164.09 — No CAN Message Received From Source Address 164

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013E1 -19-02MAY11-1/1

002164.14 — Incorrect CAN Message Received From Source Address 164

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013E2 -19-02MAY11-1/1

002164.19 — Communication Error with Source Address 164

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013E3 -19-02MAY11-1/1

002165.09 — No CAN Message Received From Source Address 165

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013E4 -19-02MAY11-1/1

002165.14 — Incorrect CAN Message Received From Source Address 165

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013E5 -19-02MAY11-1/1

002165.19 — Communication Error with Source Address 165

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013E6 -19-02MAY11-1/1

002166.09 — No CAN Message Received From Source Address 166

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013E7 -19-02MAY11-1/1

002166.14 — Incorrect CAN Message Received From Source Address 166

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013E8 -19-02MAY11-1/1

002166.19 — Communication Error with Source Address 166

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013E9 -19-02MAY11-1/1

002167.09 — No CAN Message Received From Source Address 167

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013EA -19-02MAY11-1/1

002167.14 — Incorrect CAN Message Received From Source Address 167

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013EB -19-02MAY11-1/1

002167.19 — Communication Error with Source Address 167

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013EC -19-02MAY11-1/1

002168.09 — No CAN Message Received From Source Address 168

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013ED -19-02MAY11-1/1

002168.14 — Incorrect CAN Message Received From Source Address 168

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013EE -19-02MAY11-1/1

002168.19 — Communication Error with Source Address 168

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013EF -19-02MAY11-1/1

002169.09 — No CAN Message Received From Source Address 169

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013F0 -19-02MAY11-1/1

002169.14 — Incorrect CAN Message Received From Source Address 169

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00013F1 -19-02MAY11-1/1

002169.19 — Communication Error with Source Address 169

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00013F2 -19-02MAY11-1/1

002170.09 — No CAN Message Received From Source Address 170

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013F3 -19-02MAY11-1/1

002170.14 — Incorrect CAN Message Received From Source Address 170

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00013F4 -19-02MAY11-1/1

002170.19 — Communication Error with Source Address 170

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00013F5 -19-02MAY11-1/1

002171.09 — No CAN Message Received From Source Address 171

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00013F6 -19-02MAY11-1/1

002171.14 — Incorrect CAN Message Received From Source Address 171

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013F7 -19-02MAY11-1/1

002171.19 — Communication Error with Source Address 171

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013F8 -19-02MAY11-1/1

002172.09 — No CAN Message Received From Source Address 172

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013F9 -19-02MAY11-1/1

002172.14 — Incorrect CAN Message Received From Source Address 172

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013FA -19-02MAY11-1/1

002172.19 — Communication Error with Source Address 172

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013FB -19-02MAY11-1/1

002173.09 — No CAN Message Received From Source Address 173

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013FC -19-02MAY11-1/1

002173.14 — Incorrect CAN Message Received From Source Address 173

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00013FD -19-02MAY11-1/1

002173.19 — Communication Error with Source Address 173

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00013FE -19-02MAY11-1/1

002174.09 — No CAN Message Received From Source Address 174

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00013FF -19-02MAY11-1/1

002174.14 — Incorrect CAN Message Received From Source Address 174

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001400 -19-02MAY11-1/1

002174.19 — Communication Error with Source Address 174

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001401 -19-02MAY11-1/1

002175.09 — No CAN Message Received From Source Address 175

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001402 -19-02MAY11-1/1

002175.14 — Incorrect CAN Message Received From Source Address 175

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001403 -19-02MAY11-1/1

002175.19 — Communication Error with Source Address 175

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001404 -19-02MAY11-1/1

002176.09 — No CAN Message Received From Source Address 176

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001405 -19-02MAY11-1/1

002176.14 — Incorrect CAN Message Received From Source Address 176

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001406 -19-02MAY11-1/1

002176.19 — Communication Error with Source Address 176

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001407 -19-02MAY11-1/1

002177.09 — No CAN Message Received From Source Address 177

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001408 -19-02MAY11-1/1

002177.14 — Incorrect CAN Message Received From Source Address 177

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001409 -19-02MAY11-1/1

002177.19 — Communication Error with Source Address 177

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000140A -19-02MAY11-1/1

002178.09 — No CAN Message Received From Source Address 178

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000140B -19-02MAY11-1/1

002178.14 — Incorrect CAN Message Received From Source Address 178

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000140C -19-02MAY11-1/1

002178.19 — Communication Error with Source Address 178

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000140D -19-02MAY11-1/1

002179.09 — No CAN Message Received From Source Address 179

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000140E -19-02MAY11-1/1

002179.14 — Incorrect CAN Message Received From Source Address 179

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000140F -19-02MAY11-1/1

002179.19 — Communication Error with Source Address 179

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001410 -19-02MAY11-1/1

002180.09 — No CAN Message Received From Source Address 180

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001411 -19-02MAY11-1/1

002180.14 — Incorrect CAN Message Received From Source Address 180

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001412 -19-02MAY11-1/1

002180.19 — Communication Error with Source Address 180

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001413 -19-02MAY11-1/1

002181.09 — No CAN Message Received From Source Address 181

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001414 -19-02MAY11-1/1

002181.14 — Incorrect CAN Message Received From Source Address 181

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001415 -19-02MAY11-1/1

002181.19 — Communication Error with Source Address 181

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001416 -19-02MAY11-1/1

002182.09 — No CAN Message Received From Source Address 182

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001417 -19-02MAY11-1/1

002182.14 — Incorrect CAN Message Received From Source Address 182

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001418 -19-02MAY11-1/1

002182.19 — Communication Error with Source Address 182

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001419 -19-02MAY11-1/1

002183.09 — No CAN Message Received From Source Address 183

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000141A -19-02MAY11-1/1

002183.14 — Incorrect CAN Message Received From Source Address 183

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000141B -19-02MAY11-1/1

002183.19 — Communication Error with Source Address 183

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000141C -19-02MAY11-1/1

002184.09 — No CAN Message Received From Source Address 184

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000141D -19-02MAY11-1/1

002184.14 — Incorrect CAN Message Received From Source Address 184

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000141E -19-02MAY11-1/1

002184.19 — Communication Error with Source Address 184

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000141F -19-02MAY11-1/1

002185.09 — No CAN Message Received From Source Address 185

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001420 -19-02MAY11-1/1

002185.14 — Incorrect CAN Message Received From Source Address 185

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001421 -19-02MAY11-1/1

002185.19 — Communication Error with Source Address 185

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001422 -19-02MAY11-1/1

002186.09 — No CAN Message Received From Source Address 186

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001423 -19-02MAY11-1/1

002186.14 — Incorrect CAN Message Received From Source Address 186

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001424 -19-02MAY11-1/1

002186.19 — Communication Error with Source Address 186

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001425 -19-02MAY11-1/1

002187.09 — No CAN Message Received From Source Address 187

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001426 -19-02MAY11-1/1

002187.14 — Incorrect CAN Message Received From Source Address 187

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001427 -19-02MAY11-1/1

002187.19 — Communication Error with Source Address 187

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001428 -19-02MAY11-1/1

002188.09 — No CAN Message Received From Source Address 188

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001429 -19-02MAY11-1/1

002188.14 — Incorrect CAN Message Received From Source Address 188

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000142A -19-02MAY11-1/1

002188.19 — Communication Error with Source Address 188

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000142B -19-02MAY11-1/1

002189.09 — No CAN Message Received From Source Address 189

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000142C -19-02MAY11-1/1

002189.14 — Incorrect CAN Message Received From Source Address 189

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000142D -19-02MAY11-1/1

002189.19 — Communication Error with Source Address 189

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000142E -19-02MAY11-1/1

002190.09 — No CAN Message Received From Source Address 190

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000142F -19-02MAY11-1/1

002190.14 — Incorrect CAN Message Received From Source Address 190

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001430 -19-02MAY11-1/1

002190.19 — Communication Error with Source Address 190

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001431 -19-02MAY11-1/1

002191.09 — No CAN Message Received From Source Address 191

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001432 -19-02MAY11-1/1

002191.14 — Incorrect CAN Message Received From Source Address 191

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001433 -19-02MAY11-1/1

002191.19 — Communication Error with Source Address 191

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001434 -19-02MAY11-1/1

002192.09 — No CAN Message Received From Source Address 192

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001435 -19-02MAY11-1/1

002192.14 — Incorrect CAN Message Received From Source Address 192

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001436 -19-02MAY11-1/1

002192.19 — Communication Error with Source Address 192

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001437 -19-02MAY11-1/1

002193.09 — No CAN Message Received From Source Address 193

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001438 -19-02MAY11-1/1

002193.14 — Incorrect CAN Message Received From Source Address 193

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001439 -19-02MAY11-1/1

002193.19 — Communication Error with Source Address 193

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000143A -19-02MAY11-1/1

002194.09 — No CAN Message Received From Source Address 194

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000143B -19-02MAY11-1/1

002194.14 — Incorrect CAN Message Received From Source Address 194

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000143C -19-02MAY11-1/1

002194.19 — Communication Error with Source Address 194

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000143D -19-02MAY11-1/1

002195.09 — No CAN Message Received From Source Address 195

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000143E -19-02MAY11-1/1

002195.14 — Incorrect CAN Message Received From Source Address 195

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000143F -19-02MAY11-1/1

002195.19 — Communication Error with Source Address 195

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001440 -19-02MAY11-1/1

002196.09 — No CAN Message Received From Source Address 196

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001441 -19-02MAY11-1/1

002196.14 — Incorrect CAN Message Received From Source Address 196

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001442 -19-02MAY11-1/1

002196.19 — Communication Error with Source Address 196

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001443 -19-02MAY11-1/1

002197.09 — No CAN Message Received From Source Address 197

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001444 -19-02MAY11-1/1

002197.14 — Incorrect CAN Message Received From Source Address 197

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001445 -19-02MAY11-1/1

002197.19 — Communication Error with Source Address 197

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001446 -19-02MAY11-1/1

002198.09 — No CAN Message Received From Source Address 198

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001447 -19-02MAY11-1/1

002198.14 — Incorrect CAN Message Received From Source Address 198

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001448 -19-02MAY11-1/1

002198.19 — Communication Error with Source Address 198

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001449 -19-02MAY11-1/1

002199.09 — No CAN Message Received From Source Address 199

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000144A -19-02MAY11-1/1

002199.14 — Incorrect CAN Message Received From Source Address 199

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000144B -19-02MAY11-1/1

002199.19 — Communication Error with Source Address 199

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000144C -19-02MAY11-1/1

002200.09 — No CAN Message Received From Source Address 200

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000144D -19-02MAY11-1/1

002200.14 — Incorrect CAN Message Received From Source Address 200

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000144E -19-02MAY11-1/1

002200.19 — Communication Error with Source Address 200

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000144F -19-02MAY11-1/1

002201.09 — No CAN Message Received From Source Address 201

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001450 -19-02MAY11-1/1

002201.14 — Incorrect CAN Message Received From Source Address 201

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001451 -19-02MAY11-1/1

002201.19 — Communication Error with Source Address 201

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001452 -19-02MAY11-1/1

002201.09 — No CAN Message Received From Source Address 201

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001453 -19-02MAY11-1/1

002201.14 — Incorrect CAN Message Received From Source Address 201

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001454 -19-02MAY11-1/1

002201.19 — Communication Error with Source Address 201

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001455 -19-02MAY11-1/1

002202.09 — No CAN Message Received From Source Address 202

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001456 -19-02MAY11-1/1

002202.14 — Incorrect CAN Message Received From Source Address 202

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001457 -19-02MAY11-1/1

002202.19 — Communication Error with Source Address 202

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001458 -19-02MAY11-1/1

002203.09 — No CAN Message Received From Source Address 203

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001459 -19-02MAY11-1/1

002203.14 — Incorrect CAN Message Received From Source Address 203

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000145A -19-02MAY11-1/1

002203.19 — Communication Error with Source Address 203

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000145B -19-02MAY11-1/1

002204.09 — No CAN Message Received From Source Address 204

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000145C -19-02MAY11-1/1

002204.14 — Incorrect CAN Message Received From Source Address 204

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000145D -19-02MAY11-1/1

002204.19 — Communication Error with Source Address 204

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000145E -19-02MAY11-1/1

002205.09 — No CAN Message Received From Source Address 205

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000145F -19-02MAY11-1/1

002205.14 — Incorrect CAN Message Received From Source Address 205

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001460 -19-02MAY11-1/1

002205.19 — Communication Error with Source Address 205

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001461 -19-02MAY11-1/1

002206.09 — No CAN Message Received From Source Address 206

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001462 -19-02MAY11-1/1

002206.14 — Incorrect CAN Message Received From Source Address 206

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001463 -19-02MAY11-1/1

002206.19 — Communication Error with Source Address 206

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001464 -19-02MAY11-1/1

002207.09 — No CAN Message Received From Source Address 207

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001465 -19-02MAY11-1/1

002207.14 — Incorrect CAN Message Received From Source Address 207

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001466 -19-02MAY11-1/1

002207.19 — Communication Error with Source Address 207

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001467 -19-03MAY11-1/1

002208.09 — No CAN Message Received From Source Address 208

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001468 -19-03MAY11-1/1

002208.14 — Incorrect CAN Message Received From Source Address 208

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001469 -19-03MAY11-1/1

002208.19 — Communication Error with Source Address 208

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000146A -19-03MAY11-1/1

002209.09 — No CAN Message Received From Source Address 209

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000146B -19-03MAY11-1/1

002209.14 — Incorrect CAN Message Received From Source Address 209

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000146C -19-03MAY11-1/1

002209.19 — Communication Error with Source Address 209

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000146D -19-03MAY11-1/1

002210.09 — No CAN Message Received From Source Address 210

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000146E -19-03MAY11-1/1

002210.14 — Incorrect CAN Message Received From Source Address 210

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000146F -19-03MAY11-1/1

002210.19 — Communication Error with Source Address 210

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000147D -19-03MAY11-1/1

002211.09 — No CAN Message Received From Source Address 211

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000147I -19-03MAY11-1/1

002211.14 — Incorrect CAN Message Received From Source Address 211

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000147Z -19-03MAY11-1/1

002211.19 — Communication Error with Source Address 211

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001473 -19-03MAY11-1/1

002212.09 — No CAN Message Received From Source Address 212

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001474 -19-03MAY11-1/1

002212.14 — Incorrect CAN Message Received From Source Address 212

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001475 -19-03MAY11-1/1

002212.19 — Communication Error with Source Address 212

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001476 -19-03MAY11-1/1

002213.09 — No CAN Message Received From Source Address 213

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001477 -19-03MAY11-1/1

002213.14 — Incorrect CAN Message Received From Source Address 213

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001478 -19-03MAY11-1/1

002213.19 — Communication Error with Source Address 213

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001479 -19-03MAY11-1/1

002214.09 — No CAN Message Received From Source Address 214

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000147A -19-03MAY11-1/1

002214.14 — Incorrect CAN Message Received From Source Address 214

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000147B -19-03MAY11-1/1

002214.19 — Communication Error with Source Address 214

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000147C -19-03MAY11-1/1

002215.09 — No CAN Message Received From Source Address 215

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000147D -19-03MAY11-1/1

002215.14 — Incorrect CAN Message Received From Source Address 215

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000147E -19-03MAY11-1/1

002215.19 — Communication Error with Source Address 215

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000147F -19-03MAY11-1/1

002216.09 — No CAN Message Received From Source Address 216

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001480 -19-03MAY11-1/1

002216.14 — Incorrect CAN Message Received From Source Address 216

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001481 -19-03MAY11-1/1

002216.19 — Communication Error with Source Address 216

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001482 -19-03MAY11-1/1

002217.09 — No CAN Message Received From Source Address 217

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001483 -19-03MAY11-1/1

002217.14 — Incorrect CAN Message Received From Source Address 217

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001484 -19-03MAY11-1/1

002217.19 — Communication Error with Source Address 217

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001485 -19-03MAY11-1/1

002218.09 — No CAN Message Received From Source Address 218

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001486 -19-03MAY11-1/1

002218.14 — Incorrect CAN Message Received From Source Address 218

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001487 -19-03MAY11-1/1

002218.19 — Communication Error with Source Address 218

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,0001488 -19-03MAY11-1/1

002219.09 — No CAN Message Received From Source Address 219

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001489 -19-03MAY11-1/1

002219.14 — Incorrect CAN Message Received From Source Address 219

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000148A -19-03MAY11-1/1

002219.19 — Communication Error with Source Address 219

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000148B -19-03MAY11-1/1

002220.09 — No CAN Message Received From Source Address 220

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000148C -19-03MAY11-1/1

002220.14 — Incorrect CAN Message Received From Source Address 220

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000148D -19-03MAY11-1/1

002220.19 — Communication Error with Source Address 220

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,000148E -19-03MAY11-1/1

002221.09 — No CAN Message Received From Source Address 221

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,000148F -19-03MAY11-1/1

002221.14 — Incorrect CAN Message Received From Source Address 221

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001490 -19-03MAY11-1/1

002221.19 — Communication Error with Source Address 221

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001491 -19-03MAY11-1/1

002222.09 — No CAN Message Received From Source Address 222

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001492 -19-03MAY11-1/1

002222.14 — Incorrect CAN Message Received From Source Address 222

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001493 -19-03MAY11-1/1

002222.19 — Communication Error with Source Address 222

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001494 -19-03MAY11-1/1

002223.09 — No CAN Message Received From Source Address 223

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,0001495 -19-03MAY11-1/1

002223.14 — Incorrect CAN Message Received From Source Address 223

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,0001496 -19-03MAY11-1/1

002223.19 — Communication Error with Source Address 223

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,0001497 -19-03MAY11-1/1

002224.09 — No CAN Message Received From Source Address 224

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,0001498 -19-03MAY11-1/1

002224.14 — Incorrect CAN Message Received From Source Address 224

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,0001499 -19-03MAY11-1/1

002224.19 — Communication Error with Source Address 224

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000149A -19-03MAY11-1/1

002225.09 — No CAN Message Received From Source Address 225

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000149B -19-03MAY11-1/1

002225.14 — Incorrect CAN Message Received From Source Address 225

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,000149C -19-03MAY11-1/1

002225.19 — Communication Error with Source Address 225

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,000149D -19-03MAY11-1/1

002226.09 — No CAN Message Received From Source Address 226

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,000149E -19-03MAY11-1/1

002226.14 — Incorrect CAN Message Received From Source Address 226

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,000149F -19-03MAY11-1/1

002226.19 — Communication Error with Source Address 226

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014A0 -19-03MAY11-1/1

002227.09 — No CAN Message Received From Source Address 227

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014A1 -19-03MAY11-1/1

002227.14 — Incorrect CAN Message Received From Source Address 227

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014A2 -19-03MAY11-1/1

002227.19 — Communication Error with Source Address 227

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014A3 -19-03MAY11-1/1

002228.09 — No CAN Message Received From Source Address 228

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014A4 -19-03MAY11-1/1

002228.14 — Incorrect CAN Message Received From Source Address 228

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014A5 -19-03MAY11-1/1

002228.19 — Communication Error with Source Address 228

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014A6 -19-03MAY11-1/1

002229.09 — No CAN Message Received From Source Address 229

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014A7 -19-03MAY11-1/1

002229.14 — Incorrect CAN Message Received From Source Address 229

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014A8 -19-03MAY11-1/1

002229.19 — Communication Error with Source Address 229

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014A9 -19-03MAY11-1/1

002230.09 — No CAN Message Received From Source Address 230

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014AD -19-03MAY11-1/1

002230.14 — Incorrect CAN Message Received From Source Address 230

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014AE -19-03MAY11-1/1

002230.19 — Communication Error with Source Address 230

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014AF -19-03MAY11-1/1

002231.09 — No CAN Message Received From Source Address 231

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014B0 -19-03MAY11-1/1

002231.14 — Incorrect CAN Message Received From Source Address 231

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00014B1 -19-03MAY11-1/1

002231.19 — Communication Error with Source Address 231

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00014B2 -19-03MAY11-1/1

002232.09 — No CAN Message Received From Source Address 232

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014B3 -19-03MAY11-1/1

002232.14 — Incorrect CAN Message Received From Source Address 232

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00014B4 -19-03MAY11-1/1

002232.19 — Communication Error with Source Address 232

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00014B5 -19-03MAY11-1/1

002233.09 — No CAN Message Received From Source Address 233

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014B6 -19-03MAY11-1/1

002233.14 — Incorrect CAN Message Received From Source Address 233

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014B7 -19-03MAY11-1/1

002233.19 — Communication Error with Source Address 233

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014B8 -19-28MAR11-1/1

002234.09 — No CAN Message Received From Source Address 234

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014B9 -19-03MAY11-1/1

002234.14 — Incorrect CAN Message Received From Source Address 234

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014BA -19-03MAY11-1/1

002234.19 — Communication Error with Source Address 234

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014BB -19-03MAY11-1/1

002235.09 — No CAN Message Received From Source Address 235

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014BC -19-03MAY11-1/1

002235.14 — Incorrect CAN Message Received From Source Address 235

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014BD -19-03MAY11-1/1

002235.19 — Communication Error with Source Address 235

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014BE -19-03MAY11-1/1

002236.09 — No CAN Message Received From Source Address 236

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014BF -19-03MAY11-1/1

002236.14 — Incorrect CAN Message Received From Source Address 236

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014C0 -19-03MAY11-1/1

002236.19 — Communication Error with Source Address 236

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014C1 -19-03MAY11-1/1

002237.09 — No CAN Message Received From Source Address 237

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014C2 -19-03MAY11-1/1

002237.14 — Incorrect CAN Message Received From Source Address 237

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014C3 -19-03MAY11-1/1

002237.19 — Communication Error with Source Address 237

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014C4 -19-03MAY11-1/1

002238.09 — No CAN Message Received From Source Address 238

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014C5 -19-03MAY11-1/1

002238.14 — Incorrect CAN Message Received From Source Address 238

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00014C6 -19-03MAY11-1/1

002238.19 — Communication Error with Source Address 238

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00014C7 -19-03MAY11-1/1

002239.09 — No CAN Message Received From Source Address 239

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014C8 -19-03MAY11-1/1

002239.14 — Incorrect CAN Message Received From Source Address 239

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00014C9 -19-03MAY11-1/1

002239.19 — Communication Error with Source Address 239

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00014CA -19-03MAY11-1/1

002240.09 — No CAN Message Received From Source Address 240

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014CB -19-03MAY11-1/1

002240.14 — Incorrect CAN Message Received From Source Address 240

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014CC -19-03MAY11-1/1

002240.19 — Communication Error with Source Address 240

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014CD -19-03MAY11-1/1

002241.09 — No CAN Message Received From Source Address 241

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014CE -19-03MAY11-1/1

002241.14 — Incorrect CAN Message Received From Source Address 241

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014CF -19-03MAY11-1/1

002241.19 — Communication Error with Source Address 241

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014D0 -19-03MAY11-1/1

002242.09 — No CAN Message Received From Source Address 242

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014D1 -19-03MAY11-1/1

002242.14 — Incorrect CAN Message Received From Source Address 242

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014D2 -19-03MAY11-1/1

002242.19 — Communication Error with Source Address 242

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014D3 -19-03MAY11-1/1

002243.09 — No CAN Message Received From Source Address 243

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014D4 -19-03MAY11-1/1

002243.14 — Incorrect CAN Message Received From Source Address 243

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014D5 -19-03MAY11-1/1

002243.19 — Communication Error with Source Address 243

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014D6 -19-03MAY11-1/1

002244.09 — No CAN Message Received From Source Address 244

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014D7 -19-03MAY11-1/1

002244.14 — Incorrect CAN Message Received From Source Address 244

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014D8 -19-03MAY11-1/1

002244.19 — Communication Error with Source Address 244

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014D9 -19-03MAY11-1/1

002245.09 — No CAN Message Received From Source Address 245

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014DA -19-03MAY11-1/1

002245.14 — Incorrect CAN Message Received From Source Address 245

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00014DB -19-03MAY11-1/1

002245.19 — Communication Error with Source Address 245

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00014DC -19-03MAY11-1/1

002246.09 — No CAN Message Received From Source Address 246

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014DD -19-03MAY11-1/1

002246.14 — Incorrect CAN Message Received From Source Address 246

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00014DE -19-03MAY11-1/1

002246.19 — Communication Error with Source Address 246

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00014DF -19-03MAY11-1/1

002247.09 — No CAN Message Received From Source Address 247

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014E0 -19-03MAY11-1/1

002247.14 — Incorrect CAN Message Received From Source Address 247

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014E1 -19-03MAY11-1/1

002247.19 — Communication Error with Source Address 247

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014E2 -19-03MAY11-1/1

002248.09 — No CAN Message Received From Source Address 248

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014E3 -19-03MAY11-1/1

002248.14 — Incorrect CAN Message Received From Source Address 248

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014E4 -19-03MAY11-1/1

002248.19 — Communication Error with Source Address 248

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014E5 -19-03MAY11-1/1

002249.09 — No CAN Message Received From Source Address 249

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014E6 -19-03MAY11-1/1

002249.14 — Incorrect CAN Message Received From Source Address 249

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014E7 -19-03MAY11-1/1

002249.19 — Communication Error with Source Address 249

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014E8 -19-03MAY11-1/1

002250.09 — No CAN Message Received From Source Address 250

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014E9 -19-03MAY11-1/1

002250.14 — Incorrect CAN Message Received From Source Address 250

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014EA -19-03MAY11-1/1

002250.19 — Communication Error with Source Address 250

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014EB -19-03MAY11-1/1

002251.09 — No CAN Message Received From Source Address 251

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See CAN Message Not Received in Section 04, Group 155.

BK34394,00014EC -19-03MAY11-1/1

002251.14 — Incorrect CAN Message Received From Source Address 251

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See CAN Message Received Is Incorrect in Section 04, Group 155.

BK34394,00014ED -19-03MAY11-1/1

002251.19 — Communication Error with Source Address 251

The ECU received an error message from another control unit.

Diagnostic Procedure

See CAN Message Received Error in Section 04, Group 155.

BK34394,00014EE -19-03MAY11-1/1

002252.09 — No CAN Message Received From Source Address 252

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014EF -19-03MAY11-1/1

002252.14 — Incorrect CAN Message Received From Source Address 252

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00014F0 -19-03MAY11-1/1

002252.19 — Communication Error with Source Address 252

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00014F1 -19-03MAY11-1/1

002253.09 — No CAN Message Received From Source Address 253

The ECU did not receive a CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Not Received](#) in Section 04, Group 155.

BK34394,00014F2 -19-03MAY11-1/1

002253.14 — Incorrect CAN Message Received From Source Address 253

The ECU received an incorrect CAN message from another control unit.

Diagnostic Procedure

See [CAN Message Received Is Incorrect](#) in Section 04, Group 155.

BK34394,00014F3 -19-03MAY11-1/1

002253.19 — Communication Error with Source Address 253

The ECU received an error message from another control unit.

Diagnostic Procedure

See [CAN Message Received Error](#) in Section 04, Group 155.

BK34394,00014F4 -19-03MAY11-1/1

Section 05
Other Materials

Contents

Page

Group 180—Lubricants, Sealants, and Other Materials	
Other Materials.....	05-180-1

Other Materials

Listed below are sealants which have been tested and are used by the John Deere factory to control leakage and assure hardware retention. ALWAYS use the following recommended sealants when assembling your John Deere Diesel Engine to assure quality performance.

LOCTITE® thread sealants are designed to perform to sealing standards with machine oil residue present. If excessive machine oil or poor cleanliness quality exists, clean with solvent. Refer to John Deere Merchandise and Parts Sales Manual for ordering information.

Adhesives:

SCOTCH-GRIP® EC1099

- PM37532 118 ml (4 oz)

LOCTITE® 277

- PM38656, 36 ml (1.2 oz) tube

Silicon

- RTV clear silicon 80 ml (2.7 oz) tube
- RTV clear silicon 190 ml (6.4 oz) can
- RTV clear silicon 300 ml (10.1 oz) cartridge

Anti seize:

NEVER-SEEZ®

- PT569 (TY24811), 0.31 kg (0.68 lb)

LOCTITE® Copper

- PM37562, 0.5 kg (16 oz)
- PM37616, 20 gr (0.64) Stick

Bearing Mounts:

LOCTITE® 680 Retaining Compound, green)

- PM37485, 36 ml. (1.2 oz) bottle

Gasket Sealants:

LOCTITE® 30516— Gasket Sealant (blue)

- PM37559, 50 ml (4 oz)

Scotch-Grip is a trademark of 3M Co.

LOCTITE® 17430— Gasket Sealant (blue)

- PM38657, 50 ml (4 oz)

Grease:

Special-Purpose HD Moly Grease (High Temperature)

- TY6333, 397 kg (14 oz) (cartridge)
- TY22017, 15.9 kg (35 lb) (can)

Lubricants:

Plus 50 II engine oil

- TY26669, 0.95 L (1 qt) bottle

Break-in Plus oil

- TY26661, 3.78 L (1 gal) bottle
- TY26663, 18.9 L (5 gal) bottle
- TY26662, 208 L (55 gal) drum

Valve Lube

- AR44402, 0.95 L (1 qt) can

Lubricating Soap:

308 Lubricating Soap

- AR54759, 0.95L (1 qt) bottle

Thread lockers and Sealers

LOCTITE® 242 — Thread Lock & Sealer (Medium Strength, blue)

- PM37418, 6 ml (0.2 oz) tube
- PM37477, 36 ml (1.2 oz) bottle

LOCTITE® 243— Thread Lock & Sealer (Medium Strength, blue)

- PM1330799, 6 ml (0.2 oz) tube
- PM1330906, 36 ml (1.2 oz) tube

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BK34394,0001B57 -19-29JUN11-1/1

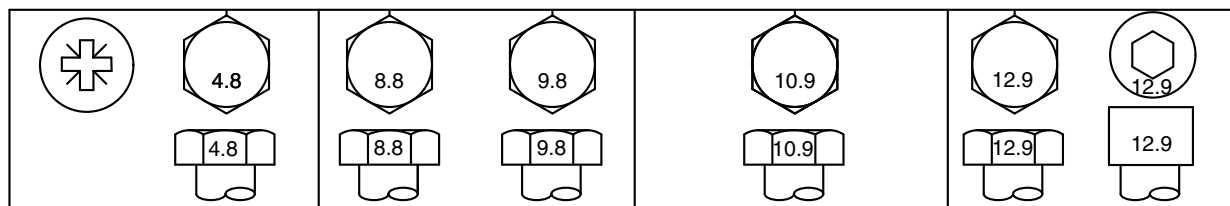
Section 06 Specifications

Contents

	Page		Page
Group 200—Repair and General OEM Specifications		OEM Instrument Panel	
Metric Bolt and Screw Torque		Schematic.....	06-210-37
Values.....	06-200-1	Wire Splice Location Diagrams	06-210-40
Unified Inch Bolt and Screw Torque			
Values.....	06-200-2		
Group 20 — Cylinder Head and			
Valves.....	06-200-3		
Group 30 — Cylinder Block, Liners,			
Pistons and Rods	06-200-6		
Group 40 — Crankshaft, Main			
Bearings and Flywheel	06-200-9		
Group 50 — Camshaft, Balancing			
Shaft, and Timing Gear Train	06-200-11		
Group 60 — Lubrication System	06-200-13		
Group 70 — Cooling System.....	06-200-14		
Group 80 — Air Intake and Exhaust			
System.....	06-200-16		
Group 90 — Electronic Fuel			
System.....	06-200-20		
Group 100 — OEM Starting and			
Charging Systems	06-200-21		
Group 110 — Electrical Engine			
Control.....	06-200-22		
Group 115 — After-treatment			
Devices.....	06-200-23		
Group 210—Diagnostic Specifications			
4.5L Engine Schematic 1.....	06-210-1		
4.5L Engine Schematic 2.....	06-210-5		
4.5L Wiring Diagram 1.....	06-210-8		
4.5L Wiring Diagram 2.....	06-210-10		
4.5L Wiring Diagram 3.....	06-210-12		
4.5L Wiring Diagram 4.....	06-210-14		
4.5L Wiring Diagram 5.....	06-210-16		
4.5L Wiring Diagram 6.....	06-210-18		
4.5L Wiring Diagram 7.....	06-210-20		
4.5L Wiring Diagram 8.....	06-210-22		
4.5L Wiring Diagram 9.....	06-210-24		
4.5L Wiring Diagram 10.....	06-210-26		
4.5L Wiring Diagram 11	06-210-28		
Connector Repair Information			
Table	06-210-29		
EGR Temperature Sensor			
Characteristics.....	06-210-31		
Engine Coolant Temperature			
and Fuel Temperature Sensor			
Characteristics.....	06-210-32		
Manifold Air Temperature Sensor			
and Charge Air Cooler Outlet			
Air Temperature Sensor			
Characteristics.....	06-210-33		
OEM Engines - Derate			
Specifications	06-210-34		

Metric Bolt and Screw Torque Values

TS1670 —UN—01MAY03



Bolt or Screw	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated ^a		Dry ^b		Lubricated ^a		Dry ^b		Lubricated ^a		Dry ^b		Lubricated ^a		Dry ^b	
Size	N·m	lb.-in.	N·m	lb.-in.	N·m	lb.-in.	N·m	lb.-in.	N·m	lb.-in.	N·m	lb.-in.	N·m	lb.-in.	N·m	lb.-in.
M6	4.7	42	6	53	8.9	79	11.3	100	13	115	16.5	146	15.5	137	19.5	172
									N·m	lb.-ft.	N·m	lb.-ft.	N·m	lb.-ft.	N·m	lb.-ft.
M8	11.5	102	14.5	128	22	194	27.5	243	32	23.5	40	29.5	37	27.5	47	35
			N·m	lb.-ft.	N·m	lb.-ft.	N·m	lb.-ft.								
M10	23	204	29	21	43	32	55	40	63	46	80	59	75	55	95	70
	N·m	lb.-ft.														
M12	40	29.5	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	46	80	59	120	88	150	110	175	130	220	165	205	150	260	190
M16	100	74	125	92	190	140	240	175	275	200	350	255	320	235	400	300
M18	135	100	170	125	265	195	330	245	375	275	475	350	440	325	560	410
M20	190	140	245	180	375	275	475	350	530	390	675	500	625	460	790	580
M22	265	195	330	245	510	375	650	480	725	535	920	680	850	625	1080	800
M24	330	245	425	315	650	480	820	600	920	680	1150	850	1080	800	1350	1000
M27	490	360	625	460	950	700	1200	885	1350	1000	1700	1250	1580	1160	2000	1475
M30	660	490	850	625	1290	950	1630	1200	1850	1350	2300	1700	2140	1580	2700	2000
M33	900	665	1150	850	1750	1300	2200	1625	2500	1850	3150	2325	2900	2150	3700	2730
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2770	4750	3500

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For stainless steel fasteners or for nuts on U-bolts, see the tightening instructions for the specific application. Tighten plastic insert or crimped steel type lock nuts by turning the nut to the dry torque shown in the chart, unless different instructions are given for the specific application.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class. Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

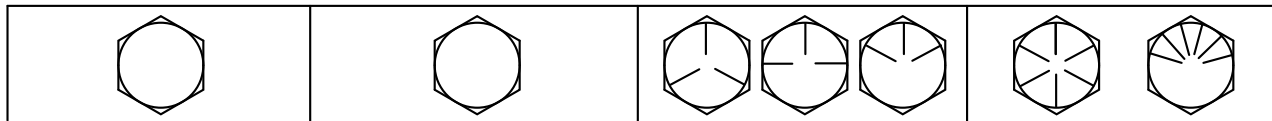
^a"Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C zinc flake coating.

^b"Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B zinc flake coating.

MK41968,0000116 -19-12AUG11-1/1

Unified Inch Bolt and Screw Torque Values

TS1671 —UN—01MAY03



Bolt or Screw	SAE Grade 1				SAE Grade 2 ^a				SAE Grade 5, 5.1 or 5.2				SAE Grade 8 or 8.2			
	Lubricated ^b		Dry ^c		Lubricated ^b		Dry ^c		Lubricated ^b		Dry ^c		Lubricated ^b		Dry ^c	
Size	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in	N·m	lb-in
1/4	3.7	33	4.7	42	6	53	7.5	66	9.5	84	12	106	13.5	120	17	150
													N·m	lb-ft	N·m	lb-ft
5/16	7.7	68	9.8	86	12	106	15.5	137	19.5	172	25	221	28	20.5	35	26
									N·m	lb-ft	N·m	lb-ft				
3/8	13.5	120	17.5	155	22	194	27	240	35	26	44	32.5	49	36	63	46
			N·m	lb-ft	N·m	lb-ft	N·m	lb-ft								
7/16	22	194	28	20.5	35	26	44	32.5	56	41	70	52	80	59	100	74
	N·m	lb-ft														
1/2	34	25	42	31	53	39	67	49	85	63	110	80	120	88	155	115
9/16	48	35.5	60	45	76	56	95	70	125	92	155	115	175	130	220	165
5/8	67	49	85	63	105	77	135	100	170	125	215	160	240	175	305	225
3/4	120	88	150	110	190	140	240	175	300	220	380	280	425	315	540	400
7/8	190	140	240	175	190	140	240	175	490	360	615	455	690	510	870	640
1	285	210	360	265	285	210	360	265	730	540	920	680	1030	760	1300	960
1-1/8	400	300	510	375	400	300	510	375	910	670	1150	850	1450	1075	1850	1350
1-1/4	570	420	725	535	570	420	725	535	1280	945	1630	1200	2050	1500	2600	1920
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2140	1580	2700	2000	3400	2500
1-1/2	990	730	1250	930	990	730	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For plastic insert or crimped steel type lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application. Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Replace fasteners with the same or higher grade. If higher grade fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

^aGrade 2 applies for hex cap screws (not hex bolts) up to 6 in (152 mm) long. Grade 1 applies for hex cap screws over 6 in (152 mm) long, and for all other types of bolts and screws of any length.

^b"Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C zinc flake coating.

^c"Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B zinc flake coating.

MK41968,0000117 -19-12AUG11-1/1

Group 20 — Cylinder Head and Valves

Item	Measurement	Specification
Cylinder Head Cap Screws	Initial Torque	100 N•m (74 lb.-ft.)
Cylinder Head Cap Screws	Second Torque	155 N•m (114 lb.-ft.)
Cylinder Head Cap Screws	Verify Torque	155 N•m (114 lb.-ft.)
Cylinder Head Cap Screws	Torque Turn	90° (+5°/-5°)
Cylinder Head Flatness	Maximum Acceptable Out-of-Flat for Entire Length or Width	0.08 mm (0.003 in.)
	Maximum Acceptable Out-of-Flat for Every 150 mm (5.90 in.)	0.03 mm (0.001 in.)
New Cylinder Head	Thickness	104.87—105.13 mm (4.129—4.139 in.)
	Minimum Acceptable Thickness	104.24 mm (4.104 in.)
	Combustion Face Surface Finish (Surface Grind Only) (Ra)	0.7—3.2 micrometers (31—125 micro-in.)
	Maximum Wave Depth	0.012 mm (0.0005 in.)
	Maximum Material Removal for Resurfacing	0.76 mm (0.030 in.)
Glow Plugs	Torque	15 N•m (11 lb.-ft.)
Glow Plug Bus Bar Mounting Screws	Torque	15 N•m (11 lb.-ft.)
OCV Pressure Relief Valve	Torque	30 N•m (22 lb.-ft.)
Baffle-to-Rocker Arm Cover Cap Screw	Torque	10 N•m (89 lb.-in.)
Rocker Arm Cover-to-Cylinder Head Cap Screw	Torque	11 N•m (97 lb.-in.)
Inlet Tube Cap Screw	Torque	15 N•m (133 lb.-in.)
Spring	Compressed Height	23 mm @ 18—27 N (0.90 in. @ 4.04—6.07 lb-force)
Shaft	OD	19.998—20.038 mm (0.787—0.789 in.)
	Wear Limit	19.988 mm (0.787 in.)
Rocker Arm Bore	ID	20.065—20.091 mm (0.790—0.793 in.)
	Wear Limit	20.098 mm (0.791 in.)
Cap Screw on Front End Clamp	Torque	30 N•m (22 lb.-ft.)
Cap Screw on Rear End Clamp	Torque	60 N•m (44 lb.-ft.)
Rocker Arm Shaft Strap Cap Screws - 5 —	Torque	60 N•m (44 lb.-ft.)
Intake Valve Clearance (Rocker Arm-to-Valve Bridge With Engine Cold)	Clearance	0.46 mm (0.018 in.)
Exhaust Valve Clearance (Rocker Arm-to-Valve Bridge With Engine Cold)	Clearance	0.53 mm (0.021 in.)
Valve Adjusting Screw Lock Nut	Torque	27 N•m (20 lb.-ft.)

Continued on next page

MK41968,0000118 -19-23AUG11-1/3

Item	Measurement	Specification
Valve Face (Intake and Exhaust)	Angle	29.5° ± 0.25°
Intake Valves	Lift	9.37—9.77 mm (0.369—0.385 in.)
	Wear Limit	9.05 mm (0.356 in.)
Exhaust Valves	Lift	9.78—10.18 mm (0.385—0.401 in.)
	Wear Limit	9.46 mm (0.372 in.)
Intake Valve Stem	Diameter	6.987—7.013 mm (0.2750—0.2761 in.)
Exhaust Valve Stem	Diameter	6.974—7.000 mm (0.2745—0.2756 in.)
Intake Valve Head	Diameter	36.37—36.63 mm (1.432—1.442 in.)
Exhaust Valve Head	Diameter	35.37—35.63 mm (1.392—1.402 in.)
Valve Stem	Roundness	0.005 mm (0.0002 in.) maximum permissible
Intake Valves	Recess in Cylinder Head	1.02—1.52 mm (0.04—0.06 in.)
	Wear Limit	2.02 mm (0.08 in.)
Exhaust Valve	Recess in Cylinder Head	0.81—1.31 mm (0.032—0.052 in.)
	Wear Limit	1.81 mm (0.071 in.)
Intake and Exhaust Valves	Maximum Variation for a Pair of Valves (Per Cylinder)	0.3 mm (0.01 in.)
Valve Guide Protrusion	Height	15.6—16.6 mm (0.614—0.654 in.)
Valve Guide Bore (New)	ID	7.028—7.042 mm (0.277—0.278 in.)
Intake Valve Guide-to-Valve Stem (New)	Clearance	0.015—0.085 mm (0.0006—0.003 in.)
Exhaust Valve Guide-to-Valve Stem (New)	Clearance	0.028—0.068 mm (0.001—0.003 in.)
Intake and Exhaust Valve Guide-to-Valve Stem (Wear Limit)	Clearance	0.15 mm (0.0059 in.)
Valve Seat	Angle	30° ± 0.5° from horizontal
	Maximum Seat Circular Runout	0.08 mm (0.003 in.)
Valve Seat	Width	1.50—2.00 mm (0.059—0.079 in.)
Intake Valve Seat Insert	OD	37.487—37.513 mm. (1.486—1.477 in.)
Exhaust Valve Seat Insert	OD	36.487—36.513 mm. (1.436—1.438 in.)
Intake Valve Seat Insert	ID	30.37—30.63 mm. (1.195—1.204 in.)
Exhaust Valve Seat Insert	ID	28.37—28.63 mm. (1.116—1.127 in.)
Valve Seat	Angle	30° ± 0.5° from horizontal
	Maximum Seat Circular Runout	0.08 mm (0.003 in.)
Valve Spring Tension	At 28.1 mm (1.11 in.) Compressed Height (Valve Open)	471 — 519 N (105.88—116.68 lb-force)

Continued on next page

MK41968,0000118 -19-23AUG11-2/3

Repair and General OEM Specifications

Item	Measurement	Specification
Valve Spring Tension	At 38.3 mm (1.51 in.) Compressed Height (Valve Close)	248 — 272 N (55.75—61.15 lb-force)

MK41968,0000118 -19-23AUG11-3/3

Group 30 — Cylinder Block, Liners, Pistons and Rods

Item	Measurement	Specification
Rod Bearing Bore-to-Piston Pin Bushing Bore (Center-to-Center)	Measurement	202.95—203.05 mm (7.990—7.994 in.)
Connecting Rod Cap Screws	Torque Turn	58 N•m (43 lb.-ft.) plus additional 90-100° turn clock-wise
Connecting Rod Bore (Without Bearing Inserts)	ID	82.677—82.703 mm (3.2549—3.2560 in.)
Connecting Rod Bore	Maximum Permissible Out-of-Round	0.01 mm (0.0003 in.)
Crankshaft Journal	OD	77.800—77.826 mm (3.0629—3.0640 in.)
Connecting Rod Cap Screws	Torque	58 N•m (43 lb.-ft.) and 1/4 Turn (90 — 100°) After Initial Torque
Assembled Rod Bearing	ID	77.876—77.927 mm (3.0659—3.0679 in.)
Connecting Rod Bearing-to-Journal (New Parts)	Oil Clearance	0.025 — 0.103 mm (0.001 — 0.0041 in.)
	Wear Limit	0.152 mm (0.0060 in.)
Connecting Rod Cap Screws	Torque-Turn	58 N•m (43 lb.-ft.) and 1/4 Turn (90 — 100°) After Initial Torque
Connecting Rod Bearings	Oil Clearance	0.025 — 0.103 mm (0.001 — 0.0041 in.)
Connecting Rod Cap Screws	Initial Torque	58 N•m (43 lb.-ft.)
Connecting Rod Cap Screws	Torque-Turn	1/4 Turn (90—100°) After Initial Torque
Connecting Rod Large Pin Bore (Bushing Removed)	ID	46.025—46.051 mm (1.8120—1.8130 in.)
Cylinder Block Flange Counter-bore	Depth	5.952—5.988 mm (0.2343—0.2357 in.)
M14 X 1.5 Plug	Torque	35 N•m (26 lb.-ft.)
M18 X 1.5 Plug	Torque	45 N•m (33 lb.-ft.)
1/8"-27 Plug	Torque	20 N•m (15 lb.-ft.)
3/8"-18 Plug	Torque	45 N•m (33 lb.-ft.)
1 5/8"-12 Plug	Torque	85N•m (63 lb.-ft.)
M22 x 1.5 Plug	Torque	67 N•m (49 lb.-ft.)
Crankshaft Main Bearing	Bore ID without Bearing	84.455—84.481 mm (3.3250—3.3260 in.)
Camshaft Follower	Bore ID in Block	31.70—31.75 mm (1.248—1.250 in.)
	Follower OD	31.61—31.64 mm (1.245—1.246 in.)
	Follower-to-Bore Clearance	0.06—0.13 mm (0.002—0.005 in.)
Camshaft Bore in Block, Front No. 1 (Without Bushing)	ID	59.961—59.987 mm (2.3607—2.3617 in.)
Camshaft Bore in Block, Front No. 1 (With Bushing)	ID	55.961—55.987 mm (2.2031—2.2042 in.)

Continued on next page

MK41968,0000119 -19-23AUG11-1/3

Item	Measurement	Specification
Camshaft Bore in Block (All Except No. 1)	ID	55.986—56.012 mm (2.2042—2.2052 in.)
Camshaft Journal-to-Bushing (No. 1 Bore With Bushing)	Oil Clearance	0.050 - 0.128 mm (0.002—0.005 in.)
Camshaft Journal-to-Bushing (All Except No. 1)	Oil Clearance	0.088—0.140 mm (0.0035—0.0055 in.)
Maximum Acceptable Out-of-Flat, Entire Length or Width (Used)	Measurement	0.08 mm (0.003 in.)
Maximum Acceptable Out-of-Flat (Any 150 mm [5.90 in.] Length)	Measurement	0.025 mm (0.001 in.)
Top Deck (Surface Grind Only)	Surface Finish	0.8—3.2 micrometers (28—125 micro-in.)
Top Deck Surface Finish	Maximum Wave Depth	0.012 mm (0.0005 in.)
Main Bearing Bore Centerline-to-Cylinder Block Top Deck	Distance	337.896—337.972 mm (13.3029—13.3059 in.)
Cylinder Liner Flange Counterbore	Depth in Block	5.952—5.988 mm (0.2343—0.2357 in.)
Cylinder Liner Flange	Thickness	6.022—6.058 mm (0.2371—0.2385 in.)
Cylinder Liner	Height above Block	0.030—0.100 mm (0.001—0.004 in.)
	Maximum Permissible Height Difference at Nearest Point of Two Adjacent Liners, or Within a Single Liner	0.1 mm (0.004 in.)
Cylinder Liner	Thickness	2.49 - 3.36 mm (0.098—0.132 in.)
Cylinder Liner Packing Step	Dimension	7.713 - 8.177 mm (0.303—0.321 in.)
Connecting Rod Cap Screws	Torque	58 N•m (43 lb.-ft.) +90° Turn
Piston Cooling Nozzle Cap Screw	Torque	17 N•m (12 lb.-ft.)
Piston Cooling Orifice	Torque	11 N•m (8 lb-ft)
Piston	Height (Measured from Center of Pin Bore to Top of Piston)	72.175—72.225 mm (2.841—2.843 in.)
Piston Pin	OD	41.271—41.277 mm (1.610—1.612 in.)
Piston Pin Bore	ID	41.287—41.293 mm (1.6254—1.6257 in.)
Piston Pin	OD	41.271—41.277 mm (1.624—1.625 in.)
Pin Bushing	ID	41.3—41.326 mm (1.6259—1.6270 in.)
Connecting Rod Pin-to-Bushing	Oil Clearance	0.016—0.036 mm (0.0006—0.0014 in.)
	Bushing Wear Limit	0.050 mm (0.002 in.)
Bushing Centering Inside the Connecting Rod Bore	Maximum Distance	1.5 mm (.06 in.)
Rod Bearing Bore-to-Piston Pin Bore (Center-to-Center)	Measurement	202.95 — 203.05 mm (7.99 — 7.994 in.)

Continued on next page

MK41968,0000119 -19-23AUG11-2/3

Item	Measurement	Specification
Piston	Protrusion	0.57—0.81 mm (0.022—0.031 in.)
Piston Skirt, at 11 mm [0.433 in.] from bottom of piston	Diameter	106.381—106.399 mm (4.188—4.189 in.)
Piston Skirt, at 11 mm [0.433 in.] from bottom of piston	Diameter	106.381—106.399 mm (4.188—4.189 in.)
Cylinder Liner	ID	106.48 - 106.52 mm (4.192 - 4.194 in.)
Cylinder Liner (Top or Bottom)	Maximum Out-of-Round	0.025 mm (0.0009 in.)
Cylinder Liner	Maximum Taper	0.1 mm (0.004 in.)
Piston-to-Liner Clearance (Measured at Bottom of Piston Skirt)	Clearance	0.081—0.139 mm (0.0031—0.0054 in.)

MK41968,0000119 -19-23AUG11-3/3

Group 40 — Crankshaft, Main Bearings and Flywheel

Item	Measurement	Specification
Crankshaft Main Bearing-to-Journal —	Oil Clearance	0.041—0.109 mm (0.0016—0.0043 in.)
Crankshaft	End Play	0.03—0.36 mm (0.001—0.014 in.)
Crankshaft Main Journal (Standard)	OD	79.324—79.350 mm (3.1229—3.1240 in.)
Crankshaft Rod Journal OD (Standard)	OD	77.800—77.826 mm (3.0629—3.0640 in.)
Crankshaft Main Journal [0.25 mm (0.010 in.) Undersize]	OD	79.074—79.100 mm (3.1131—3.1141 in.)
Crankshaft Rod Journal [0.25 mm (0.010 in.) Undersize]	OD	77.550—77.576 mm (3.0531—3.0541 in.)
Main and Connecting Rod Journal	Surface Finish (AA)	Lap 0.20 µm (8 AA)
Thrust Surface	Surface Finish (AA)	Lap 0.40 µm (16 AA)
Thrust Bearing Journal	Width	38.952—39.028 mm (1.5335—1.5365 in.)
Main Journal Maximum Runout (Concentricity) Relative to No. 1 and No.7 (6.8 L) or No. 1 and No. 5 (4.5 L) Journals	Concentricity	0.05 mm (0.0019 in.)
Main Journal Maximum Runout (Concentricity) Between Adjacent Journals	Concentricity	0.025 mm (0.0009 in.)
8 Cap Screws — Main Bearing Caps	Torque	20 N•m (15 lb.-ft.)
2 Cap Screws — Thrust Bearing Cap	Torque	20 N•m (15 lb.-ft.)
Crankshaft	End Play	0.03 — 0.36 mm (.001 — .014 in.)
Main and Thrust Bearing Cap Screws -10-	Torque Turn	40 N•m (30 lb-ft) plus additional 60° turn.
Auxiliary Drive Pulley-to-Crankshaft Pulley	Torque	73 N•m (53.8 lb.-ft.)
Main Bearing Caps — Torque	Torque	40 N•m (30 lb-ft) plus an additional 60° turn.
Crankshaft Main Bearing Bore — without bearings	ID	84.455 — 84.481 mm (3.325 — 3.326 in.)
Crankshaft Main Bearing Bore Centerline to Cylinder Block Top Deck	Distance	337.896 — 337.972 (13.3029 — 13.3059 in.)
Crankshaft Main Thrust Bearing Journal (New)	Width	38.952—39.028 mm (1.5335—1.5365 in.)
Crankshaft Main Thrust Bearing	Overall Width	38.79—38.87 mm (1.527—1.530 in.)
Crankshaft Thrust Bearing-to-Journal	Oil Clearance	0.0889—0.2413 mm (0.0035—0.0095 in.)

Continued on next page

MK41968,000011A -19-23AUG11-1/2

Item	Measurement	Specification
Cap Screw — Crankshaft Pulley to Crankshaft	Torque	500 N•m (370 lb.-ft.)
Cap Screw — Crankshaft Pulley to Crankshaft	Torque	500 N•m (370 lb.-ft.)
Flywheel Mounting Cap Screws (Dry)	Torque	138 N•m (102 lb.-ft.)
Flywheel Mounting Cap Screws (Lubricated)	Torque	110 N•m (81 lb.-ft.)
Flywheel Face Flatness	Maximum Variation	0.23 mm (0.009 in.)
Flywheel Face Flatness	Maximum Variation per 25 mm (1.0 in.) of Travel	0.013 mm (0.0005 in.)
Flywheel Housing to Cylinder Block	Torque	125 N•m (92 lb.-ft.)
Plastic Plug — Mag Pickup	Torque	20 N•m (15 lb.-ft.)
Pipe Plug — .500 in.NPT	Torque	45 N•m (33 lb.-ft.)
Flywheel Bearing Bore Concentricity	Maximum Variation	0.127 mm (0.005 in.)
Crankshaft Main Bearing	ID	79.391—79.433 mm (3.1256—3.1273 in.)
Crankshaft Main Journal	OD	79.324—79.350 mm (3.1229—3.1240 in.)
Crankshaft Rod Journal	OD	77.800—77.826 mm (3.0629—3.0640 in.)
Crankshaft Main Bearing-to-Journal	Oil Clearance	0.041—0.109 mm (0.0016—0.0043 in.)
Crankshaft Main or Rod Journal	Maximum Taper	0.025 mm (0.0010 in.)
Crankshaft Main or Rod Journal	Maximum Out-of-Round	0.05 mm (0.0020 in.)
Tube Mounting Capscrews	Torque	15 N•m (11 lb.-ft.)
OCV Filter Housing Mounting Capcrews	Torque	70 N•m (52 lb.-ft.)
Oil Drain Check Valve	Torque	50 N•m (37 lb.-ft.)
OCV Filter Oil Drain Hose P-clamp	Torque	52 N•m (38 lb.-ft.)

MK41968,000011A -19-23AUG11-2/2

Group 50 — Camshaft, Balancing Shaft, and Timing Gear Train

Item	Measurement	Specification
Balancer Shaft Thrust Plate Cap Screws—	Torque	40 N•m (30 lb.-ft.)
Balancer Shaft Removable Weights (Dual Cap Screw Weights)—	Torque	40 N•m (30 lb.-ft.)
Balancer Shaft —	End Play	0.05—0.26 mm (0.002—0.010 in.)
Balancer Shaft Bushing (New)	ID	40.177—40.237 mm (1.5818—1.5841 in.)
Balancer Shaft Journal	OD	40.135—40.161 mm (1.5801—1.5811 in.)
Balancer Shaft Journal-to-Bushing	Oil Clearance	0.016—0.102 mm (0.0006—0.0040 in.)
Cylinder Block Bore for Balancer Shaft Bushing	ID	43.262—43.288 mm (1.7032—1.7042 in.)
Oil Pump Drive Gear Staked Nut	Torque	50 N•m (37 lb.-ft.)
Lower Idler Gear Cap Screw (Lubricated Threads)	Torque	70 N•m (53 lb.-ft.)
Balancer Shaft Thrust Plate-to-Gear	Clearance	0.05—0.26 mm (0.002—0.010 in.)
Balancer Shaft Thrust Plate (New)	Thickness	2.92—3.08 mm (0.114—0.121 in.)
Camshaft thrust plate cap screws	Torque	40 N•m (30 lb.-ft.)
Camshaft	End Play	0.09—0.24 mm (0.0035—0.0094 in.)
	Wear Limit	0.038 mm (0.015 in.)
Upper Idler Gear Cap Screw	Torque	70 N•m (52 lb.-ft.)
Auxiliary Drive Cover Plate	Torque	55 N•m (41 lb.-ft.)
Camshaft Journal	Diameter	55.872—55.898 mm (2.1997—2.2007 in.)
Cylinder Block Bore, Front No. 1 in Block (Without Bushing)	Diameter	59.961—59.987 mm (2.3607—2.3617 in.)
Cylinder Block Bore, Front No. 1 in Block (With Bushing)	Diameter	55.948—56.000 mm (2.2026—2.2047 in.)
Cylinder Block Bore, All Except No. 1	Diameter	55.986—56.012 mm (2.2042—2.2052 in.)
Camshaft Journal-to-Bushing, No. 1 Bore (With Bushing)	Oil Clearance	0.050—0.128 mm (0.0019—0.005 in.)
Camshaft Journal-to-Cylinder Block Bore, All Except No. 1 Bore	Oil Clearance	0.088—0.140 mm (0.0035—0.0055 in.)
Camshaft Intake Lobe	Height	6.07—6.33 mm (0.239—0.249 in.)
Camshaft Exhaust Lobe	Height	6.13—6.39 mm (0.241—0.252 in.)
Camshaft Tthrust Plate	Clearance	0.093—0.243 mm (0.0036—0.0095 in.)
Front Plate Countersunk TORX Screws (1 to 5)	Torque	25 N•m (18 lb.-ft.)
Front Plate Threaded Studs (6 to 14)	Torque	35 N•m (26 lb.-ft.)

Continued on next page

MK41968,000011B -19-23AUG11-1/2

Item	Measurement	Specification
Front Plate Flat TORX Screw (15)	Torque	35 N•m (26 lb.-ft.)
Upper Idler Gear	End Play	0.045 — 0.155mm (0.0017 — 0.0060 in.).
Lower Idler Gear	End Play	0.07 — 0.33 mm (0.003 — 0.013 in.)
Lower Idler Gear Bushing Bore	Diameter	44.489—44.539 mm (1.7515—1.7535 in.)
Lower Idler Gear Hub	Diameter	44.437—44.463 mm (1.7495—1.7505 in.)
Lower Idler Gear Bushing-to-Hub	Clearance	0.026—0.102 mm (0.0010—0.0040 in.)
Lower Idler Gear Bore	Width	15.92—16.08 mm (0.6268—0.6331 in.)
Lower Idler Hub	Width	16.15—16.25 mm (0.6358—0.6398)
Lower Idler Gear Cap Screw	Torque	70 N•m (52 lb.-ft.)
Timing Gear Cover-to-Engine Front Plate	Torque	35 N•m (26 lb.-ft.)
Auxiliary Gear Drive Cover Plate-to-Timing Gear Cover	Torque	55 N•m (41 lb.-ft.)
Wiring Harness Clamps-to-Timing Gear Cover	Torque	15 N•m (13 lb.-ft.)
Plug to Access High-Pressure Pump Gear-to-Timing Gear Cover	Torque	60 N•m (44 lb.-ft.)
Camshaft Gear-to-Upper Idler Gear (A)	Backlash	0.03—0.64 mm (0.001—0.025 in.)
High-Pressure Pump Gear-to-Upper Idler Gear (B)	Backlash	0.09—0.55 mm (0.003—0.022 in.)
Upper Idler Gear-to-Crankshaft Gear (C)	Backlash	0.09—0.55 mm (0.003—0.022 in.)
Crankshaft Gear-to-Lower Idler Gear (D)	Backlash	0.07—0.60 mm (0.003—0.024 in.)
Oil Pump Gear-to-Lower Idler Gear (E)	Backlash	0.08—0.60 mm (0.003—0.024 in.)
Camshaft-to-Auxiliary Drive (Not Shown)	Backlash	0.05—0.68 mm (0.002—0.027 in.)
Upper Idler Gear Bore	Diameter	92.732—92.762 mm (3.6509—3.6520 in.)
Upper Idler Gear Hub	Diameter	92.687—92.707 mm (3.6491—3.6499 in.)
	Oil Clearance	0.025—0.075 mm (0.001—0.003)
Upper Idler Gear	Width	23.975—24.025 mm (0.9439—0.9459 in.)
Upper Idler Gear Hub	Width	24.11 — 24.13 mm (0.9492 — 0.9499 in.)

MK41968,000011B -19-23AUG11-2/2

Group 60 — Lubrication System

Item	Measurement	Specification
Oil Cooler-to-Housing Allen Head Cap Screws	Torque	12 N•m (106 lb.-in.)
Oil Cooler Elbow Adapter Cap Screws	Torque	35 N•m (26 lb.-ft.)
Oil Cooler Cover Cap Screws	Torque	35 N•m (26 lb.-ft.)
Oil Fill Adapter Cap Screws	Torque	35 N•m (26 lb.-ft.)
Oil Pan Cap Screws	Torque	35 N•m (26 lb.-ft.)
Oil Pan Drain Valve (Stamped Steel Pan)	Torque	50 N•m (37 lb.-ft.)
Oil Pan Drain Valve (Cast Pan)	Torque	50 N•m (37 lb.-ft.)
Oil Pan Drain Plugs (Stamped Steel Pan)	Torque	40 N•m (30 lb.-ft.)
Oil Pan Drain Plugs (Cast Pan)	Torque	48 N•m (35 lb.-ft.)
Oil Pump Drive Gear “Staked” Nut	Torque	50 N•m (37 lb.-ft.)
Oil Pump-to-Front Plate and Oil Pump Pick-Up Tube Cap Screws	Torque	35 N•m (26 lb.-ft.)
Oil Pump Lower Idler Gear Cap Screw (Lubricated Threads)	Torque	70 N•m (53 lb.-ft.)

MK41968,000011C -19-23AUG11-1/1

Group 70 — Cooling System

Item	Measurement	Specification
Belt Tensioner Cap Screw	Torque	50 N•m (37 lb.-ft.)
Belt Tensioner Support Cap Screw (F)	Torque	35 N•m (26 lb.-ft.)
Belt Tensioner Support Cap Screw (I)	Torque	73 N•m (59 lb.-ft.)
Belt Tensioner Cap Screw	Torque	50 N•m (37 lb.-ft.)
Belt Tensioner — Arm Travel	Turn	71° minimum
Belt Tensioner	Spring Tension	18.3—22.3 N•m (162—198 lb.-in.) at 30 deg. from free arm position
Coolant Heater Lock Nut	Torque	35 N•m (26 lb.-ft.)
Coolant Pump-to-Timing Cover Cap Screws	Torque	16 N•m (142 lb.-in.)
Coolant Pump Inlet Elbow Cap Screws	Torque	35 N•m (26 lb.-ft.)
Coolant Pump Pulley Cap Screws	Torque	15 N•m (133 lb.-in.)
Fan-to-Fan Hub/Pulley	Torque	47 N•m (35 lb.-ft.)
Fan Drive Cap Screw	Torque	70 N•m (52 lb.-ft.)
Fan Drive Cap Screw	Torque	70 N•m (52 lb.-ft.)
Fan Drive Cap Screw	Torque	70 N•m (52 lb.-ft.)
Fan Drive Cap Screw	Torque	70 N•m (52 lb.-ft.)
Fan Drive Cap Screw	Torque	70 N•m (52 lb.-ft.)
Fan Drive Cap Screw	Torque	70 N•m (52 lb.-ft.)
Fan Drive Cap Screw	Torque	70 N•m (52 lb.-ft.)
Fan Drive Cap Screw	Torque	70 N•m (52 lb.-ft.)
Cap Screws (C)	Torque	70 N•m (52 lb.-ft.)
Thermostat	Opening Temperature — Nominal	85° C (185° F)
Engine Coolant Temperature — Normal Operating Conditions	Temperature	83.5° — 95° C (183° — 203° F)
Engine Coolant	Temperature — Fully Open Nominal	97° C (207° F)
M12 fitting with O-ring	Torque	21 N•m (15 lb.-ft.)
M10 fitting with O-ring	Torque	21 N•m (15 lb.-ft.)
Vent Fitting	Torque	20 N•m (15 lb.-ft.)
Thermostat Housing Socket Cap-screws (6)	Torque	70 N•m (52 lb.-ft.)
By-pass Tube Clamps	Torque	35 N•m (26 lb.-ft.)
Venturi Coolant Return Line Cap Screw	Torque	25 N•m (18 lb.-ft.)
EGR Cooler Coolant Return Tube Cap Screw	Torque	25 N•m (18 lb.-ft.)

Continued on next page

MK41968,000011D -19-23AUG11-1/2

Repair and General OEM Specifications

Item	Measurement	Specification
EGR Cooler Coolant Return Hose Clamps	Torque	11 N•m (8 lb.-ft.)

MK41968,000011D -19-23AUG11-2/2

Group 80 — Air Intake and Exhaust System

Item	Measurement	Specification
Air Inlet Pipe/Throttle Actuator-to-Intake Manifold	Torque	25 N•m (18 lb.-ft.)
Wiring Harness Bracket Cap Screw	Torque	25 N•m (18 lb.-ft.)
Exhaust Throttle Flange Cap Screws-to-Exhaust Manifold	Torque	37 N•m (27 lb.-ft.)
Exhaust Throttle-to-Turbocharger	Torque	70 N•m (52 lb.-ft.)
Coolant Line Nuts-to-Exhaust Throttle Actuator	Torque	23 N•m (17 lb.-ft.)
Coolant Line Clamps-to-Rocker Arm Cover	Torque	15 N•m (11 lb.-ft.)
Adapter Fitting-to-Actuator	Torque	20 N•m (15 lb.-ft.)
Coolant Return Line-to-Adapter Fitting	Torque	23 N•m (17 lb.-ft.)
Adapter Fitting-to-Thermostat Housing	Torque	20 N•m (15 lb.-ft.)
Coolant Return Line-to-Adapter Fitting	Torque	23 N•m (17 lb.-ft.)
Coolant Return Line Clamp-to-Rocker Arm Cover	Torque	15 N•m (11 lb.-ft.)
Adapter Fitting-to-Actuator	Torque	20 N•m (15 lb.-ft.)
Coolant Supply Line-to-Adapter Fitting	Torque	23 N•m (17 lb.-ft.)
Adapter Fitting-to-Cylinder Block	Torque	20 N•m (15 lb.-ft.)
Coolant Supply Line-to-Adapter Fitting	Torque	23 N•m (17 lb.-ft.)
Coolant Supply Line Clamp-to-Rocker Arm Cover	Torque	15 N•m (11 lb.-ft.)
EGR Cooler Coolant Return Tube	Torque	25 N•m (18 lb.-ft.)
Hose-to-Thermostat Housing	Torque	11 N•m (8 lb.-ft.)
EGR Cooler Outlet Tube	Torque	35 N•m (26 lb.-ft.)
EGR Cooler Clamp Assembly	Torque	40 N•m (30 lb.-ft.)
EGR Cooler Bracket-to-Engine	Torque	73 N•m (54 lb.-ft.)
Fuel Supply Line Clamp-to-EGR Cooler Bracket	Torque	37 N•m (27 lb.-ft.)
EGR Cooler Gas Inlet Pipe (Both Ends)	Torque	20 N•m (15 lb.-ft.)
EGR Flow Sensor-to-Venturi	Torque	25 N•m (18 lb.-ft.)
EGR Flow Venturi-to-Fuel Filter Bracket	Torque	35 N•m (26 lb.-ft.)
EGR Flow Venturi-to-Intake Manifold	Torque	35 N•m (26 lb.-ft.)
Venturi Inlet Pipe at Both Ends	Torque	35 N•m (26 lb.-ft.)

Continued on next page

MK41968,000011E -19-28OCT11-1/4

Item	Measurement	Specification
Coolant Supply Line Fitting-to-Venturi	Torque	15 N•m (11 lb.-ft.)
Coolant Supply Line (Both Ends)	Torque	13 N•m (10 lb.-ft.)
Coolant Return Line Fitting-to-Venturi	Torque	15 N•m (11 lb.-ft.)
Coolant Return Line (Both Ends)	Torque	13 N•m (10 lb.-ft.)
EGR Valve Bracket-to-Engine	Torque	35 N•m (26 lb.-ft.)
EGR Pipe-to-EGR Cooler	Torque	35 N•m (26 lb.-ft.)
Venturi Inlet Pipe-to-Venturi	Torque	35 N•m (26 lb.-ft.)
EGR Valve-to-Bracket	Torque	35 N•m (26 lb.-ft.)
Heat Shield-to-EGR Valve	Torque	15 N•m (11 lb.-ft.)
Exhaust Manifold Studs-to-Cylinder Head	Torque	25 N•m (18 lb.-ft.)
Exhaust Manifold-to-Cylinder Head (First Pass)	Torque	15 N•m (11 lb.-ft.)
Exhaust Manifold-to-Cylinder Head (Second Pass)	Torque	50 N•m (37 lb.-ft.)
Exhaust Gas Pressure Sensor Fitting-to-Exhaust Manifold	Torque	25 N•m (18 lb.-ft.)
Sensor Bracket-to-Rocker Arm Cover	Torque	15 N•m (11 lb.-ft.)
Sensor Line-to-Bracket	Torque	25 N•m (18 lb.-ft.)
Sensor Line (Both Ends)	Torque	20 N•m (15 lb.-ft.)
Venturi-to-Intake Manifold	Torque	35 N•m (26 lb.-ft.)
Intake Manifold-to-Engine	Torque	73 N•m (54 lb.-ft.)
Manifold Air Temperature Sensor	Torque	17 N•m (12 lb.-ft.)
Manifold Air Pressure Sensor	Torque	18 N•m (13 lb.-ft.)
Intake Manifold-to-Engine	Torque	73 N•m (54 lb.-ft.)
EGR Valve Outlet Pipe-to-Intake Manifold	Torque	35 N•m (26 lb.-ft.)
Air Inlet Pipe-to-Intake Manifold	Torque	25 N•m (18 lb.-ft.)
Reed Stop	Gap	2.4—3.2 mm (0.094—0.126 in.)
Turbocharger Shaft	Axial bearing end play	0.064—0.114 mm (0.0025—0.0045 in.)
Actuator Nut	Torque	13.5 N•m (10 lb.-ft.)
Coolant Return Line Clamp-to-Rocker Arm Cover	Torque	6 N•m (4 lb.-ft.)
Coolant Return Line Clamp-to-Actuator	Torque	25 N•m (18 lb.-ft.)
2-Piece Clamp-to-Actuator Coolant Lines	Torque	15 N•m (11 lb.-ft.)
Coolant Return Line Fitting-to-Thermostat Housing	Torque	25 N•m (18 lb.-ft.)

Continued on next page

MK41968,000011E -19-28OCT11-2/4

Item	Measurement	Specification
Coolant Return Line-to-Thermostat Housing Fitting	Torque	25 N•m (18 lb.-ft.)
Coolant Supply Line Clamp-to-Actuator	Torque	25 N•m (18 lb.-ft.)
2-Piece Clamp-to-Actuator Coolant Lines	Torque	15 N•m (11 lb.-ft.)
Coolant Return Line Clamp-to-Rocker Arm Cover	Torque	6 N•m (4 lb.-ft.)
Actuator Coolant Supply Line Fitting-to-Cylinder Block	Torque	30 N•m (22 lb.-ft.)
Actuator Coolant Supply Line-to-Adapter Fitting	Torque	25 N•m (18 lb.-ft.)
Actuator Linkage-to-Turbocharger Arm	Torque	8.5 N•m (75 lb.-in.)
Actuator Linkage-to-Actuator Arm	Torque	10.5 N•m (93 lb.-in.)
Turbocharger (VGT)-to-Exhaust Manifold	Torque	70 N•m (52 lb.-ft.)
Oil Drain Line Adapter Fitting-to-Cylinder Block	Torque	67 N•m (49 lb.-ft.)
Oil Drain Line-to-Turbocharger	Torque	25 N•m (18 lb.-ft.)
2-Piece Clamp-to-Turbocharger Oil Supply and Oil Drain Lines	Torque	15 N•m (11 lb.-ft.)
Clamps on Drain Hose	Torque	6 N•m (4 lb.-ft.)
Oil Supply Line Adapter Fitting-to-Cylinder Block	Torque	20 N•m (15 lb.-ft.)
Oil Supply Line-to-Turbocharger	Torque	25 N•m (18 lb.-ft.)
Oil Supply Line-to-Cylinder Block Adapter Fitting	Torque	24 N•m (18 lb.-ft.)
2-Piece Clamp-to-Turbocharger Oil Supply and Oil Drain Lines	Torque	15 N•m (11 lb.-ft.)
Speed Sensor-to-Turbocharger	Torque	14 N•m (10 lb.-ft.)
Turbocharger	Actuator End Play	0.05—0.056 mm (0.002—0.022 in.)
Stud Length	Length	23 mm (0.90 in.)
Stud Length	Length	72 mm (2.83 in.)
Turbocharger (Wastegate) to Exhaust Manifold	Torque	70 N•m (52 lb.-ft.)
Turbocharger (Wastegate) to Exhaust Throttle Actuator	Torque	70 N•m (52 lb.-ft.)
Exhaust Throttle Actuator to Exhaust Manifold	Torque	35 N•m (27 lb.-ft...)
Actuator Coolant Lines to Rocker Arm Cover	Torque	15 N•m (11 lb.-ft.)

Continued on next page

MK41968,000011E -19-28OCT11-3/4

Item	Measurement	Specification
Oil Drain Line Adapter Fitting-to-Cylinder Block	Torque	67 N•m (49 lb.-ft.)
Oil Drain Line-to-Turbocharger	Torque	25 N•m (18 lb.-ft.)
2-Piece Clamp-to-Turbocharger Oil Supply and Oil Drain Lines	Torque	15 N•m (11 lb.-ft.)
Clamps on Drain Hose	Torque	6 N•m (4 lb.-ft.)
Oil Supply Line Adapter Fitting-to-Cylinder Block	Torque	20 N•m (15 lb.-ft.)
Oil Supply Line-to-Cylinder Block Adapter Fitting	Torque	23 N•m (17 lb.-ft.)
Oil Supply Line Adapter Fitting-to-Turbocharger	Torque	25 N•m (18 lb.-ft.)
Oil Supply Line-to-Turbocharger	Torque	23 N•m (17 lb.-ft.)
2-Piece Clamp-to-Turbocharger Oil Supply and Oil Drain Lines	Torque	15 N•m (11 lb.-ft.)

MK41968,000011E -19-28OCT11-4/4

Group 90 — Electronic Fuel System

Item	Measurement	Specification
Injector Clamp Screw	Torque	5 N•m (48 lb.-in.)
Injector Clamp Screw	Torque	37 N•m (27 lb.-ft.)
Flow Damper-to-Fuel Rail	Initial Torque	30 N•m (22 lb.-ft.)
Fuel Filters Bracket-to-Engine	Torque	50 N•m (37 lb.-ft.)
Wiring Harness Bracket-to-Fuel Filters Bracket	Torque	37 N•m (27 lb.-ft.)
Wiring Harness Clamp-to-Bracket	Torque	20 N•m (15 lb.-ft.)
HPCR Flanged Hex Head Screws	Torque	63 N•m (46 lb.-ft.)
HPCR Flanged Hex Head Screws	Torque	63 N•m (46 lb.-ft.)
Pump-To-Rail High Pressure Fuel Line	Torque	23 N•m (17 lb.-ft.)
	Torque Turn	60°
P-clamp Cap Screw	Torque	37 N•m (27 lb.-ft.)
Leak-off Line Nuts	Torque	16 N•m (12 lb.-ft.)
Leak-off Line Nuts	Torque	16 N•m (12 lb.-ft.)
High-Pressure Pump-to-Adapter Plate	Torque	35 N•m (26 lb.-ft.)
High-Pressure Pump Gear Nut	Torque	105 N•m (78 lb.-ft.)
Camshaft Position Sensor-to-Adapter Plate	Torque	14 N•m (10 lb.-ft.)
Pump-To-Rail High Pressure Fuel Line	Torque	23 N•m (17 lb.-ft.)
	Torque Turn	60°
Three-Way Fitting	Torque	25 N•m (19 lb.-ft.)
P-Clamp Cap Screw	Torque	37 N•m (27 lb.-ft.)
Leak-off Line Nuts	Torque	16 N•m (12 lb.-ft.)
Adapter Plate-to-Engine Front Plate	Torque	35 N•m (26 lb.-ft.)
Elbow Fitting	Torque	25 N•m (19 lb.-ft.)
Supply Line Nut	Torque	16 N•m (12 lb.-ft.)
Plug to Access Gear Timing Mark	Torque	60 N•m (44 lb.-ft.)
Injection Line Nut-to-Cylinder Head	Torque	30 N•m (23 lb.-ft.)
	Torque Turn	60°
Injection Line Nut-to-Fuel Rail	Torque	30 N•m (23 lb.-ft.)
	Torque Turn	60°
HPCR Flanged Hex Head Screws	Torque	63 N•m (46 lb.-ft.)
Injector Wiring Harness Carrier-to-Rocker Arm Shaft Clamps/Carrier	Torque	12 N•m (106 lb.-in.)
Injector Wiring Harness-to-Injector	Torque	2 N•m (18 lb.-in.)

Continued on next page

MK41968,000011F -19-23AUG11-1/2

Item	Measurement	Specification
Inlet and Outlet Fitting-to-Fuel Transfer Pump	Torque	10 N•m (7 lb.-ft.)
Transfer Pump Cap Screw	Torque	30 N•m (22 lb.-ft.)
Primary Fuel Filter Assembly Cap Screws	Torque	50 N•m (37 lb.-ft.)
Pressure Limiter-to-Fuel Rail	Initial Torque	30 N•m (22 lb.-ft.)
P-Clamp Cap Screw	Torque	37 N•m (28 lb.-ft.)
Leak-off Line Nuts	Torque	16 N•m (12 lb.-ft.)
Leak-off Line Nuts	Torque	16 N•m (12 lb.-ft.)
Secondary Fuel Filter to Bracket Cap Screws	Torque	35 N•m (26 lb.-ft.)
Secondary Fuel Filter-to-Bracket	Torque	50 N•m (37 lb.-ft.)
M12 Adapter on the Secondary Filter	Torque	16 N•m (12 lb.-ft.)
M14 Elbow on the Secondary Filter	Torque	16 N•m (12 lb.-ft.)
M10 Adapter on the Low Pressure Fuel Pump	Torque	10 N•m (7 lb.-ft.)
Supply Line Nuts	Torque	8 N•m (6 lb.-ft.) — for Dry Sleeves
	Torque	13 N•m (10 lb.-ft.) — for Wet Sleeves
Fuel Temperature Sensor to Secondary Fuel Filter Header	Torque	17 N•m (13 lb.-ft.)
Fuel Pressure Sensor to Fuel Filter Header	Torque	25 N•m (19 lb.-ft.)
Cap Screw—Wiring Harness Bracket	Torque	25 N•m (19 lb.-ft.)
Suction Control Valve-to-Pump housing	Torque	9 N•m (80 lb.-in.)

MK41968,000011F -19-23AUG11-2/2

Group 100 — OEM Starting and Charging Systems

Item	Measurement	Specification
Alternator Mounting Screw	Torque	50 N•m (37 lb.-ft.)
Positive Terminal Nut	Torque	12.5 N•m (9 lb.-ft.)
Ring Terminal Stud	Torque	4 N•m (3 lb.-ft.)
Starter Motor Cap Screws	Torque	50 N•m (37 lb.-ft.)
Jump Start Protection Cover Nut	Torque	12 N•m (9 lb.-ft.)

MK41968,0000120 -19-23AUG11-1/1

Group 110 — Electrical Engine Control

Item	Measurement	Specification
Camshaft Position Sensor-to-Mounting Plate	Torque	14 N•m (10 lb.-ft.)
Charge Air Cooler Outlet Temperature Sensor-to-Air Inlet Pipe	Torque	17 N•m (12 lb.-ft.)
Crankshaft Position Sensor-to-Timing Gear Cover	Torque	14 N•m (10 lb.-ft.)
EGR Flow Sensor Cap Screws	Torque	25 N•m (18 lb.-ft.)
EGR Temperature Sensor	Torque	30 N•m (22 lb.-ft.)
ECU-to-Engine block	Torque	35 N•m (26 lb.-ft.)
Engine and Vehicle Harness Connector-to-ECU	Torque	7 N•m (62 lb.-in.)
Engine Coolant Temperature Sensor-to-Thermostat Housing	Torque	25 N•m (18 lb.-ft.)
Engine Crankcase Pressure Sensor-to-Cylinder Block	Torque	25 N•m (18 lb.-ft.)
Engine Oil Pressure Sensor-to-Cylinder Block	Torque	7 N•m (62 lb.-in.)
Exhaust Manifold Pressure Sensor	Torque	18 N•m (13 lb.-ft.)
Fuel Rail Pressure Sensor-to-Fuel Rail	Initial Torque	15 N•m (11 lb.-ft.)
	Torque Turn	38°
Fuel Temperature Sensor-to-Fuel Manifold	Torque	17 N•m (12 lb.-ft.)
Intake Air Sensor Cap Screws	Torque	10 N•m (7 lb.-ft.)
Manifold Air Pressure Sensor	Torque	18 N•m (13 lb.-ft.)
Manifold Air Temperature Sensor	Torque	17 N•m (12 lb.-ft.)
Low-Pressure Fuel Pressure Sensor-to-Fuel Manifold	Torque	25 N•m (18 lb.-ft.)
Water-in-Fuel Sensor-to-Primary Fuel Filter	Torque	8.2 N•m (6 lb.-ft.)
Wiring Harness Mounting Bracket Cap Screws (B) and (C)	Torque	40 N•m (30 lb.-ft.)
Wiring Harness Mounting Bracket Cap Screw	Torque	40 N•m (30 lb.-ft.)
Wiring Harness Mounting Bracket Nut	Torque	20 N•m (15 lb.-ft.)
Wiring Harness Mounting Bracket Nut	Torque	20 N•m (15 lb.-ft.)
Wiring Harness Mounting Bracket Nut	Torque	20 N•m (15 lb.-ft.)
Wiring Harness P-Clamp Cap Screw	Torque	20 N•m (15 lb.-ft.)
Wiring Harness P-Clamp Cap Screw	Torque	20 N•m (15 lb.-ft.)

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MK41968,0000121 -19-23AUG11-1/2

Item	Measurement	Specification
Wiring Harness P-Clamp Nut	Torque	20 N•m (15 lb.-ft.)
ECU Connector	Torque	7 N•m (62 in.-ft.)
Wiring Harness P-Clamp Cap Screw	Torque	20 N•m (15 lb.-ft.)
Wiring Harness P-Clamp Cap Screw	Torque	20 N•m (15 lb.-ft.)
Wiring Harness P-Clamp Cap Screw	Torque	20 N•m (15 lb.-ft.)
Wiring Harness P-Clamp Cap Screw	Torque	20 N•m (15 lb.-ft.)
Install Engine Wiring Harness	Torque	20 N•m (15 lb.-ft.)
Install Engine Wiring Harness	Torque	20 N•m (15 lb.-ft.)
Install Engine Wiring Harness	Torque	20 N•m (15 lb.-ft.)
Bracket	Torque	20 N•m (15 lb.-ft.)
Spacer	Torque	20 N•m (15 lb.-ft.)
Front Plate	Torque	63 N•m (47 lb.-ft.)

MK41968,0000121 -19-23AUG11-2/2

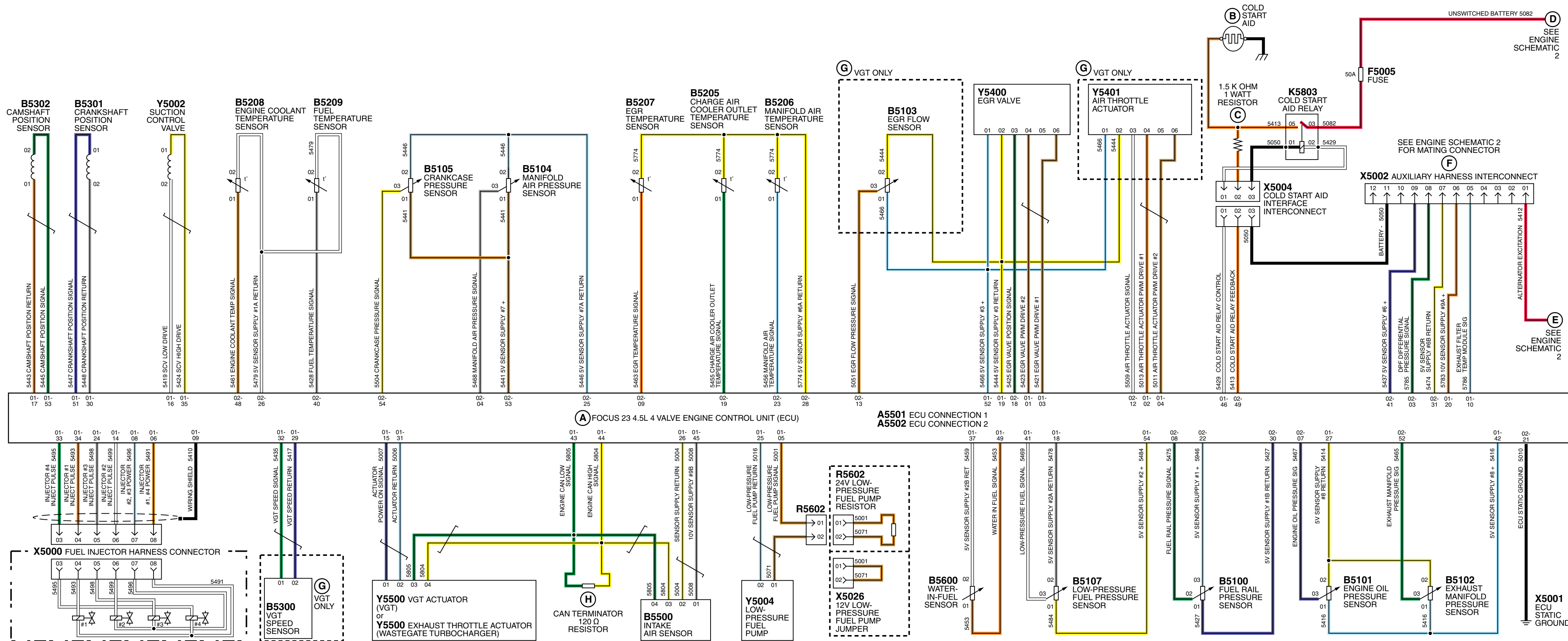
Group 115 — After-treatment Devices

Item	Measurement	Specification
Clamp Joint	Torque	20 N•m (15 lb.-ft.)
Clamp Joint	Torque	20 N•m (15 lb.-ft.)
Cap Screws -5-	Torque	125 N•m (92 lb.-ft.)
	Torque	70 N•m (52 lb.-ft.)
Nuts	Torque	100 N•m (74 lb.-ft.)
Cap Screws	Torque	100 N•m (74 lb.-ft.)
Cap Screws -2-	Torque	70 N•m (52 lb.-ft.)
Cap Screw -strap-	Torque	35 N•m (26 lb.-ft.)
Cap Screw	Torque	100 N•m (74 lb.-ft.)
Nut	Torque	39 N•m (29 lb.-ft.) max
Clamp Nuts	Torque	20 N•m (15 lb.-ft.)
Stainless Steel Cap Screws -3-	Torque	70 N•m (52 lb.-ft.)
Cap Screws -4-	Torque	70 N•m (52 lb.-ft.)
Clamp Nuts	Torque	20 N•m (15 lb.-ft.)

MK41968,0000122 -19-23AUG11-1/1

4.5L Engine Schematic 1

RG19879A —UN—17AUG11



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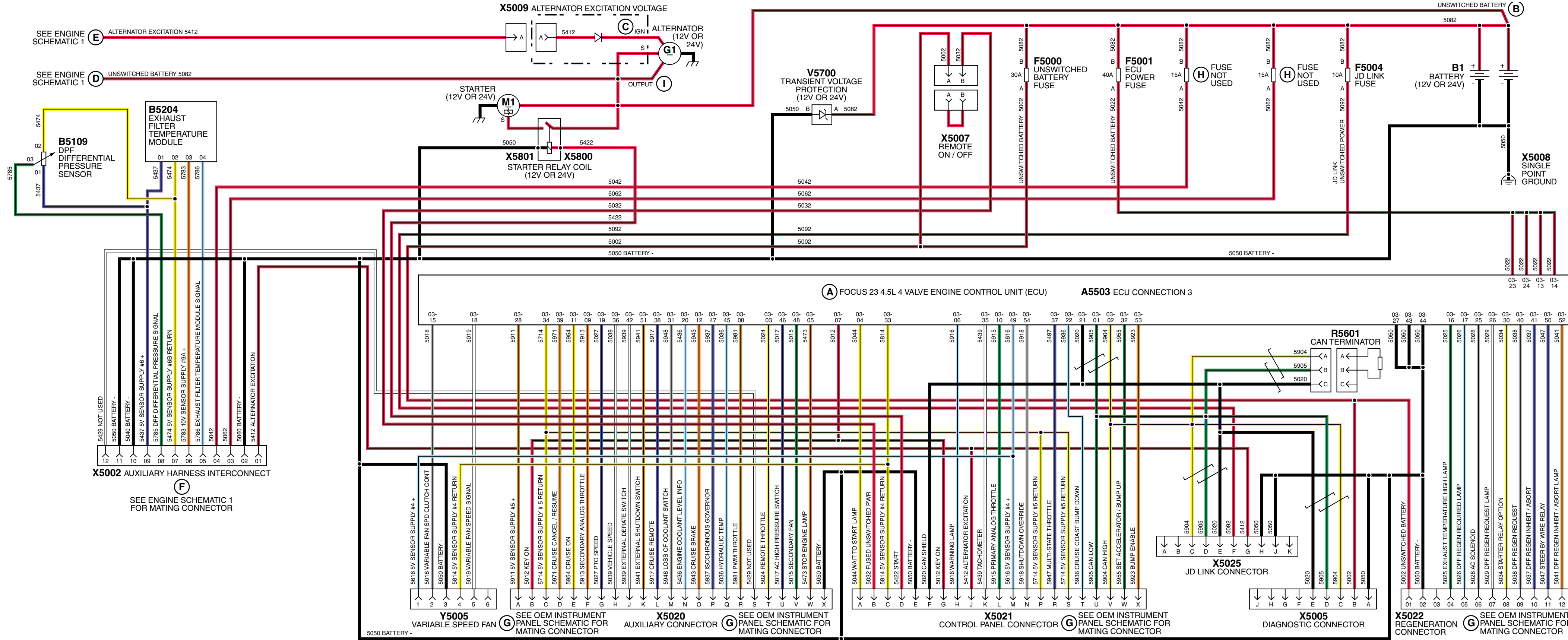
BK34394,00002E5 -19-17AUG11-1/2

A—Focus 23 4.5L 4 Valve Engine Control Unit	A5501-32—[5435 Green] VGT Speed Signal	A5502-19—[5455 Green] Charge Air Cooler Outlet Temperature Signal	B5207—EGR Temperature Sensor
A5501—ECU Connection ECU 1	A5501-33—[5495 Green] Injector #4 Inject Pulse	A5502-21—[5010 Black] ECU Static Ground	B5208—Engine Coolant Temperature Sensor
A5501-1—[5423 Orange] EGR Valve PWM Drive #2	A5501-34—[5493 Orange] Injector #1 Inject Pulse	A5502-22—[5946 Blue] 5 Volt Sensor Supply #1 Positive	B5209—Fuel Temperature Sensor
A5501-2—[5013 Orange] Air Throttle Actuator PWM Drive #1	A5501-35—[5424 Yellow] Suction Control Valve High Drive	A5502-23—[5456 Blue] Manifold Air Temperature Signal	B5300—VGT Speed Sensor
A5501-3—[5421 Brown] EGR Valve PWM Drive #1	A5501-37—[5459 White] 5V Sensor Supply #2B Return	A5502-25—[5446 Blue] 5 Volt Sensor Supply #7A Return	B5301—Crankshaft Position Sensor
A5501-4—[5011 Brown] Air Throttle Actuator PWM Drive #2	A5501-41—[5469 White] Low-Pressure Fuel Signal	A5502-26—[5479 White] 5V Sensor Supply #1A Return	B5302—Camshaft Position Sensor
A5501-5—[5001 Brown] Low-Pressure Fuel Pump Signal	A5501-42—[5416 Blue] 5 Volt Sensor Supply #8 Positive	A5502-28—[5774 Yellow] 5 Volt Sensor Supply #6A Return	B5500—Intake Air Sensor
A5501-6—[5491 Brown] Injector #1 & #4, Power	A5501-43—[5805 Green] Engine CAN Low Signal	A5502-30—[5427 Violet] 5 Volt Sensor Supply #1B Return	B5600—Water-In-Fuel Sensor
A5501-8—[5496 Blue] Injector #2 & #3, Power	A5501-44—[5804 Yellow] Engine CAN High Signal	A5502-31—[5474 Yellow] 5 Volt Sensor Supply #6B Return	C—1.5 kilo-ohm 1 Watt Resistor
A5501-9—[5410 Black] Wiring Shield	A5501-45—[5008 Gray] 10V Sensor Supply #9B Positive	A5502-40—[5428 Gray] Fuel Temperature Signal	D—See Engine Schematic 2
A5501-10—[5786 Blue] Exhaust Filter Temperature Module Signal	A5501-46—[5429 White] Cold Start Aid Relay Control	A5502-41—[5437 Violet] 5 Volt Sensor Supply #6 Positive	E—See Engine Schematic 2
A5501-14—[5499 White] Injector #2 Inject Pulse	A5501-49—[5453 Orange] Water-In-Fuel Signal	A5502-48—[5461 Brown] Engine Coolant Temperature Signal	F—See Engine Schematic 2 For Mating Connector
A5501-15—[5007 Violet] Actuator Power On Signal	A5501-51—[5447 Violet] Crankshaft Position Signal	A5502-49—[5413 Orange] Cold Start Aid Relay Feedback	F5005—Fuse (50 Amp)
A5501-16—[5419 White] Suction Control Valve Low Drive	A5501-52—[5466 Blue] 5V Sensor Supply #3 Positive	A5502-52—[5465 Green] Exhaust Manifold Pressure Signal	G—VGT Only
A5501-17—[5443 Orange] Camshaft Position Return	A5501-53—[5445 Green] Camshaft Position Signal	A5502-53—[5441 Brown] 5 Volt Sensor Supply #7 Positive	H—CAN Terminator 120 Ohm Resistor
A5501-18—[5478 Gray] 5 Volt Sensor Supply #2A Return	A5501-54—[5484 Yellow] 5V Sensor Supply #2 Positive	A5502-54—[5504 Yellow] Crankcase Pressure Signal	K5803—Cold Start Aid Relay Connector
A5501-19—[5444 Yellow] 5V Sensor Supply #3 Return	A5502—ECU Connection ECU 2	B—Cold Start Aid	K5803-3—[5082 Red] Unswitched Battery
A5501-20—[5783 Orange] 10V Sensor Supply #9A Positive	A5502-3—[5785 Green] DPF Differential Pressure Signal	B5100—Fuel Rail Pressure Sensor	R5602—24 Volt Low-Pressure Fuel Pump Resistor
A5501-24—[5498 Gray] Injector #3 Inject Pulse	A5502-4—[5468 Gray] Manifold Air Pressure Signal	B5101—Engine Oil Pressure Sensor	X5000—Fuel Injector Harness Connector
A5501-25—[5016 Blue] Low-Pressure Fuel Pump Return	A5502-7—[5467 Violet] Engine Oil Pressure Signal	B5102—Exhaust Manifold Pressure Sensor	X5001—ECU Static Ground
A5501-26—[5004 Yellow] Sensor Supply Return	A5502-8—[5475 Green] Fuel Rail Pressure Sensor Signal	B5103—EGR Flow Sensor	X5002—Auxiliary Harness Interconnect
A5501-27—[5414 Yellow] 5 Volt Sensor Supply #8 Return	A5502-9—[5463 Orange] EGR Temperature Signal	B5104—Manifold Air Pressure Sensor	X5002-1—[5412 Red] Alternator Excitation
A5501-29—[5417 Violet] VGT Speed Return	A5502-12—[5509 White] Air Throttle Actuator Signal	B5105—Crankcase Pressure Sensor	X5002-11—[5050 Black] Battery Negative
A5501-30—[5448 Gray] Crankshaft Position Return	A5502-13—[5051 Brown] EGR Flow Pressure Signal	B5107—Low-Pressure Fuel Pressure Sensor	X5004—Cold Start Aid Interface Interconnect
A5501-31—[5006 Blue] Actuator Return	A5502-18—[5425 Green] EGR Valve Position Signal	B5205—Charge Air Cooler Outlet Temperature Sensor	Y5002—Suction Control Valve
		B5206—Manifold Air Temperature Sensor	Y5004—Low-Pressure Fuel Pump
			Y5004-1—[5071 Brown] Low-Pressure Fuel Pump Signal
			X5026—12 Volt Low-Pressure Fuel Pump Jumper
			Y5400—EGR Valve
			Y5401—Air Throttle Actuator
			Y5500—VGT Actuator (VGT)
			Y5500—Exhaust Throttle Actuator (Wastegate Turbocharger)

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4.5L Engine Schematic 2

RG19880 —UN—07JUL11



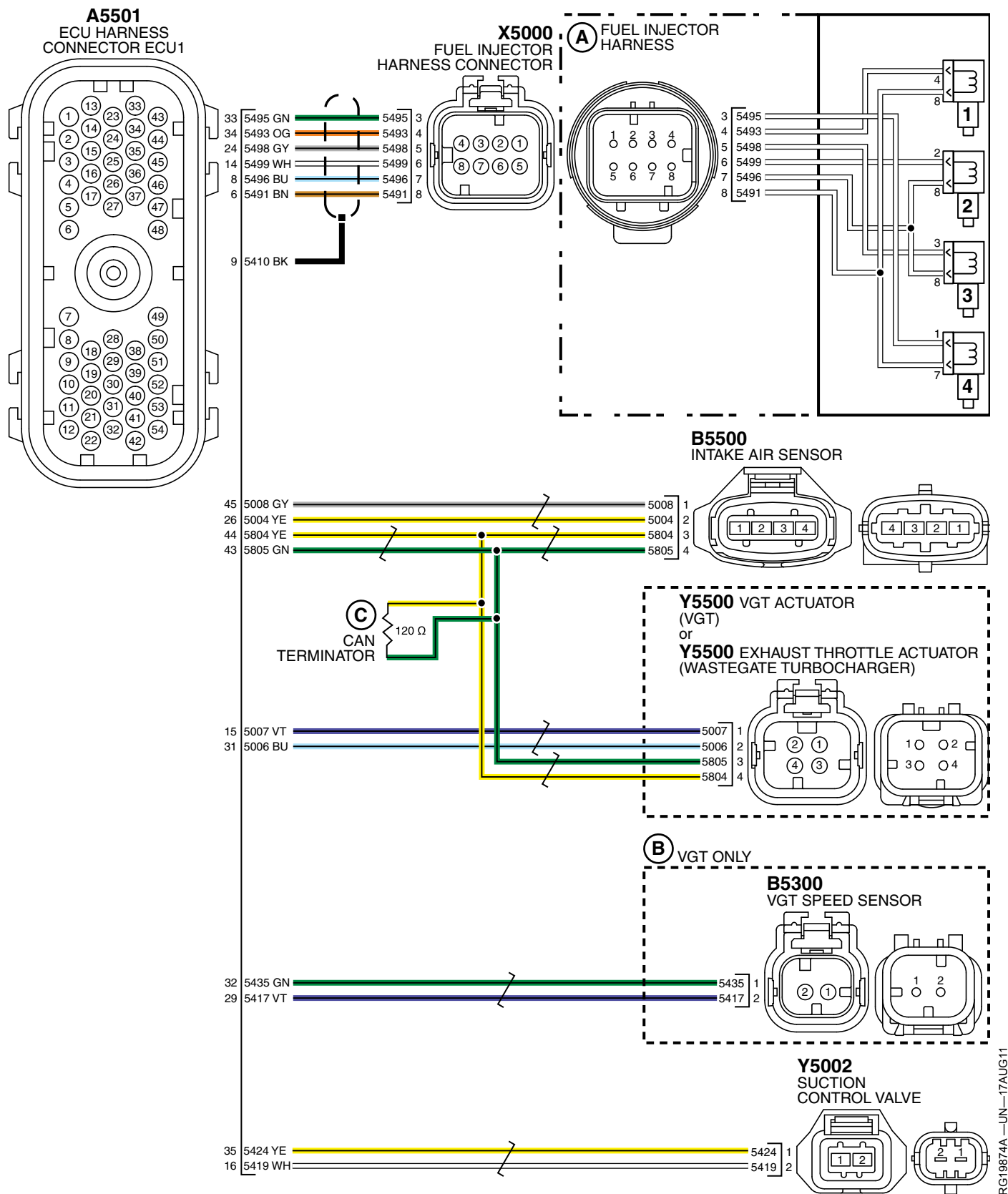
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BK53208,0000015 -19-09AUG11-1/2

A—Focus 23 4.5L 4 Valve Engine Control Unit (ECU)	A5503-24—[5022 Red] Unswitched Battery	A5503-48—[5015 Green] Secondary Fan	X5002-3—[5062 Red]
A5503—ECU Connection 3	A5503-25—[5028 Gray] AC Solenoid	A5503-49—[5616 Blue] 5 Volt Sensor Supply #4	X5002-4—[5042 Red]
A5503-1—[5905 Green] CAN Low	A5503-26—[5029 White] DPF Regen Request Lamp	A5503-50—[5047 Violet] Steer By Wire Relay	X5002-5—[5786 Blue] Exhaust Filter Temperature Module Signal
A5503-2—[5904 Yellow] CAN High	A5503-27—[5050 Black] Battery Negative	A5503-51—[5941 Brown] External Shutdown Switch	X5002-6—[5783 Orange] 10V Sensor Supply #9A
A5503-3—[5024 Yellow] Remote Throttle	A5503-28—[5911 Brown] 5 Volt Sensor Supply #5	A5503-52—[5041 Brown] DPF Regen Inhibit/Abort Lamp	X5002-7—[5474 Yellow] 5 Volt Sensor Supply #6B
A5503-4—[5044 Yellow] Wait To Start Lamp	A5503-29—[5034 Yellow] Starter Relay Option	A5503-53—[5923 Orange] Bump Enable	X5002-8—[5785 Green] DPF Differential Pressure Signal
A5503-5—[5473 Orange] Stop Engine Lamp	A5503-30—[5948 Gray] Loss of Coolant Switch	A5503-54—[5918 Gray] Shutdown Override	X5002-9—[5437 Violet] 5 Volt Sensor Supply #6
A5503-6—[5916 Blue] Warning Lamp	A5503-31—[5955 Green] Set Accelerator/Bump Up	B—[5082 Red] Unswitched Battery	X5002-10—[5040 Black] Battery Negative
A5503-7—[5012 Red] Key On	A5503-32—[5814 Yellow] 5 Volt Sensor Supply #4 Return	B1—Battery (12 or 24 Volt)	X5002-11—[5050 Black] Battery Negative
A5503-8—[5981 Brown] PWM Throttle	A5503-33—[5714 Yellow] 5 Volt Sensor Supply #5 Return	B5109—DPF Differential Pressure Sensor	X5002-12—[5429 White] Not Used
A5503-9—[5913 Orange] Secondary Analog Throttle	A5503-34—[5439 White] Tachometer	B5204—Exhaust Filter Temperature Module	X5005—Diagnostic Connector
A5503-10—[5915 Green] Primary Analog Throttle	A5503-35—[5039 White] Vehicle Speed	C—Ignition	X5007—Remote On/Off
A5503-11—[5954 Yellow] Cruise On	A5503-36—[5497 Violet] Multi-State Throttle	D—See Engine Schematic 1	X5008—Single Point Ground
A5503-12—[5943 Orange] Cruise Brake	A5503-37—[5917 Violet] Cruise Remote	E—See Engine Schematic 1	X5009—Alternator Excitation Voltage
A5503-13—[5022 Red] Unswitched Battery	A5503-38—[5971 Brown] Cruise Cancel/Resume	F—See Engine Schematic 1 For Mating Connector	X5020—Auxiliary Connector
A5503-14—[5022 Red] Unswitched Battery	A5503-39—[5038 Gray] DPF Regen Request	F5000—Unswitched Battery Fuse (30 Amp)	X5021—Control Panel Connector
A5503-15—[5018 Gray] Variable Fan Speed Clutch Control	A5503-40—[5037 Violet] DPF Regen Inhibit/Abort	F5001—ECU Power Fuse (40 Amp)	X5021-B—[5032 Red] Fused Unswitched Power
A5503-16—[5025 Green] Exhaust Temperature High Lamp	A5503-41—[5939 White] External Derate Switch	F5004—JD Link Fuse (10 Amp)	X5021-D—[5032 Red] Start
A5503-17—[5026 Blue] DPF Regen Required Lamp	A5503-42—[5050 Black] Battery Negative	G—See OEM Instrument Panel Schematic for Mating Connector	X5022—Regeneration Connector
A5503-18—[5019 White] Variable Fan Speed Signal	A5503-43—[5036 Blue] Hydraulic Temperature	G1—Alternator (12 or 24 Volt)	X5022-1—[5002 Red] Unswitched Battery
A5503-19—[5027 Violet] PTO Speed	A5503-44—[5017 Violet] AC High Pressure Switch	H—Fuse Not Used	X5025—JD Link Connector
A5503-20—[5436 Blue] Engine Coolant Level Information	A5503-45—[5937 Violet] Isochronous Governor	I—Alternator Output	X5025-F—JD Link Unswitched Power
A5503-21—[5020 Black] CAN Shield		M1—Starter (12 or 24 Volt)	X5800—Starter Relay Coil (12 or 24 Volt)
A5503-22—[5936 Blue] Cruise Coast / Bump Down		R5601—CAN Terminator	X5801—Starter Relay Coil (12 or 24 Volt)
A5503-23—[5022 Red] Unswitched Battery		V5700—Transient Voltage Protection (12 or 24 Volt)	Y5005—Variable Fan Speed
		X5002—Auxiliary Harness Interconnect	
		X5002-1—[5412 Red] Alternator Excitation	
		X5002-2—[5060 Black] Battery Negative	

BK53208,0000015 -19-09AUG11-2/2

4.5L Wiring Diagram 1



RG19874A —UN—17AUG11

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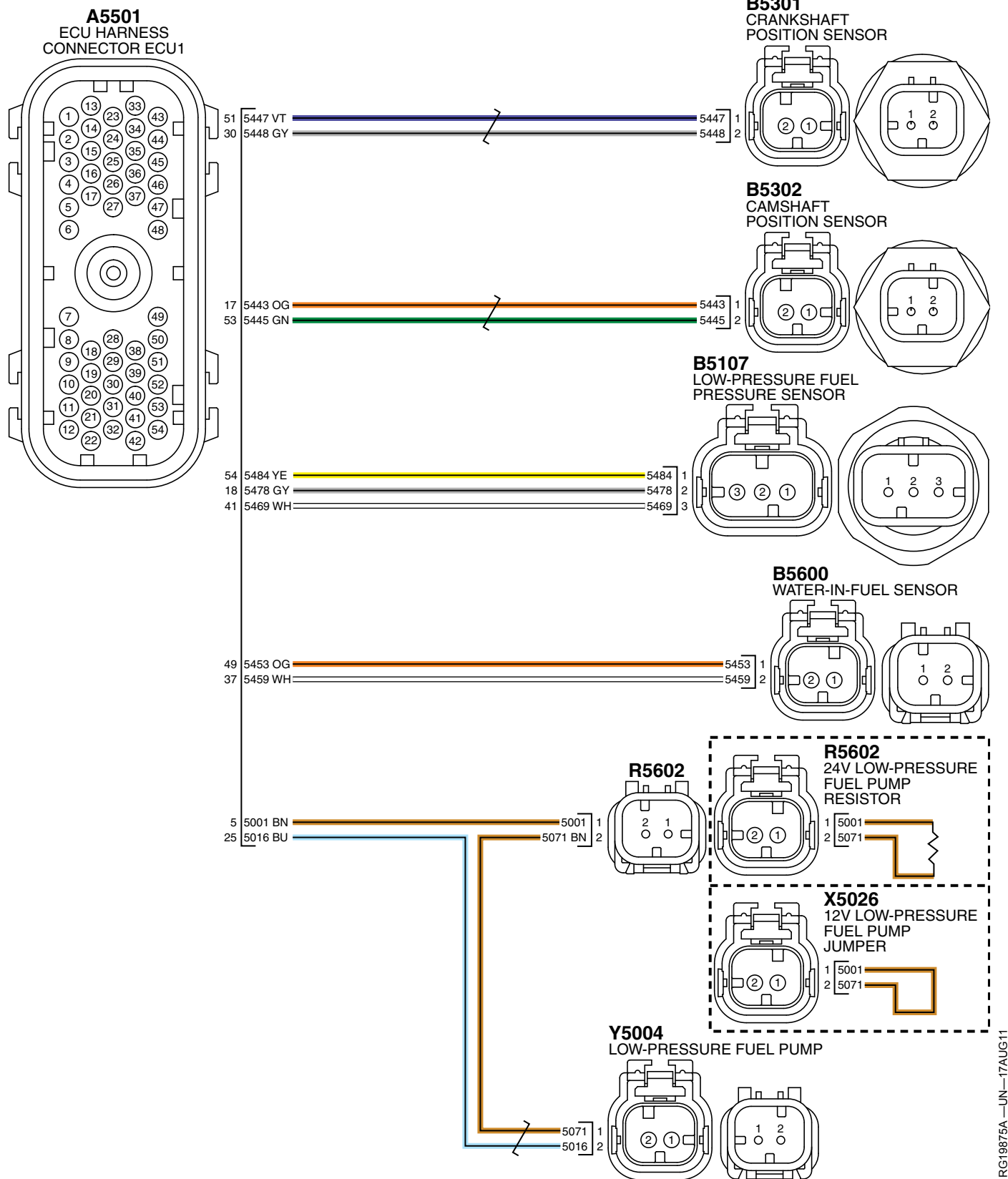
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Diagnostic Specifications

A—Fuel Injector Harness	A5501-17—[5443 Orange] Camshaft Position Return	A5501-32—[5435 Green] VGT Speed Signal	B—VGT Only
A5501—ECU Harness Connector ECU 1	A5501-18—[5478 Gray] 5 Volt Sensor Supply #2A Return	A5501-33—[5495 Green] Injector #4 Inject Pulse	B5300—VGT Speed Sensor
A5501-6—[5491 Brown] Injector #1 & #4, Power	A5501-19—[5444 Yellow] 5V Sensor Supply #3 Return	A5501-34—[5493 Orange] Injector #1 Inject Pulse	B5500—Intake Air Sensor
A5501-8—[5496 Blue] Injector #2 & #3, Power	A5501-24—[5498 Gray] Injector #3 Inject Pulse	A5501-35—[5424 Yellow] Suction Control Valve High Drive	C—CAN Terminator 120 Ohm Resistor
A5501-9—[5410 Black] Wiring Shield	A5501-26—[5004 Yellow] Sensor Supply Return	A5501-43—[5805 Green] Engine CAN Low Signal	X5000—Fuel Injector Harness Connector
A5501-14—[5499 White] Injector #2 Inject Pulse	A5501-29—[5417 Violet] VGT Speed Return	A5501-44—[5804 Yellow] Engine CAN High Signal	Y5002—Suction Control Valve
A5501-15—[5007 Violet] Actuator Power On Signal	A5501-31—[5006 Blue] Actuator Return	A5501-45—[5008 Gray] 10V Sensor Supply #9B Positive	Y5500—VGT Actuator (VGT)
A5501-16—[5419 White] Suction Control Valve Low Drive			Y5500—Exhaust Throttle Actuator (Waste Gate Turbocharger)

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4.5L Wiring Diagram 2



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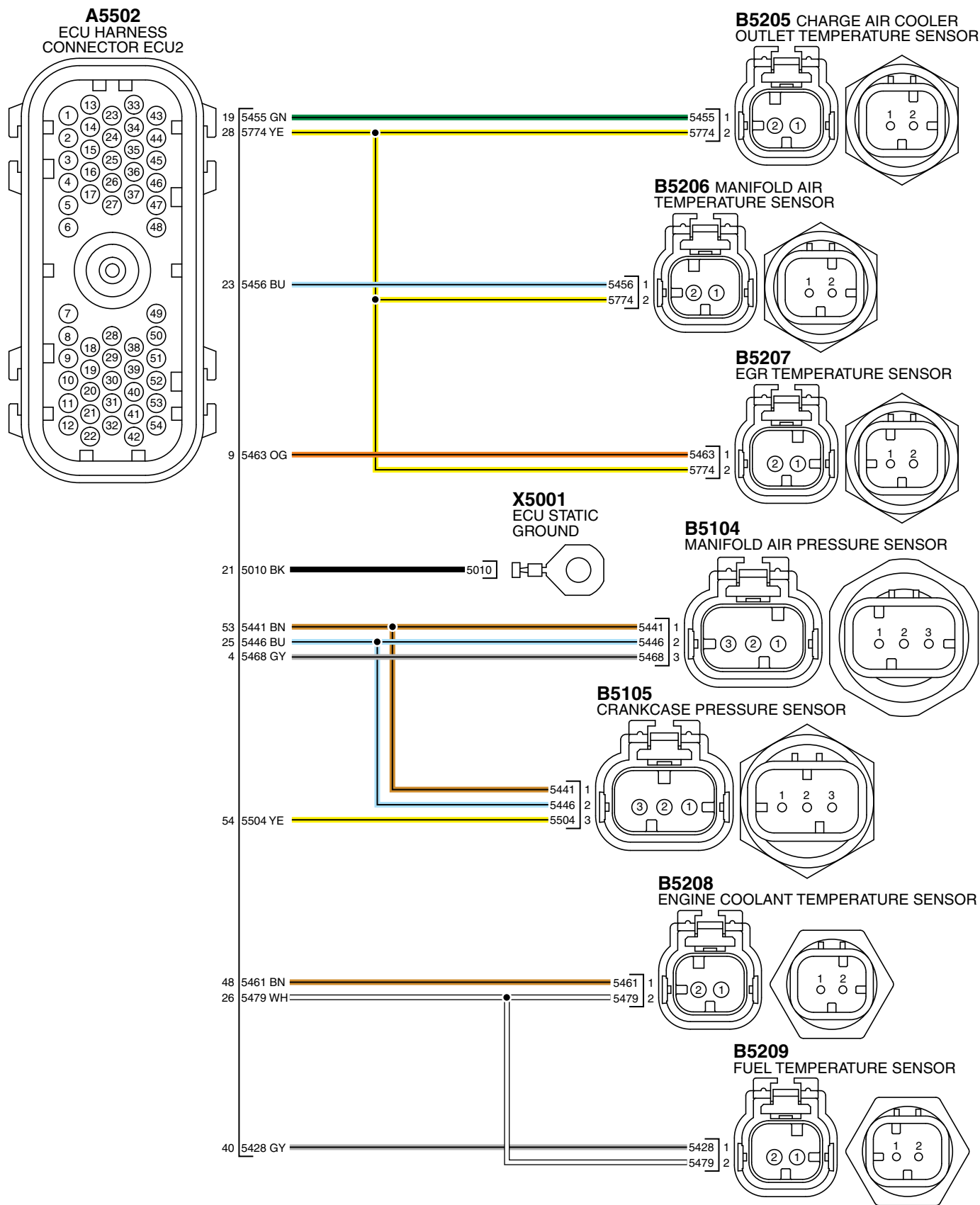
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Diagnostic Specifications

A5501—ECU Harness Connector ECU 1	A5501-30—[5448 Gray] Crankshaft Position Return	A5501-53—[5445 Green] Camshaft Position Signal	R5602-2—[5071 Brown] Low-Pressure Fuel Pump Signal
A5501-5—[5001 Brown] Low-Pressure Fuel Pump Signal	A5501-37—[5459 White] 5V Sensor Supply #2B	A5501-54—[5484 Yellow] 5V Sensor Supply #2 Positive	X5026—12 Volt Low-Pressure Fuel Pump Jumper
A5501-17—[5443 Orange] Camshaft Position Return	A5501-41—[5469 White] Low-Pressure Fuel Signal	B5107—Low-Pressure Fuel Pressure Sensor	Y5004—Low-Pressure Fuel Pump
A5501-18—[5478 Gray] 5 Volt Sensor Supply #2A	A5501-49—[5453 Orange] Water-In-Fuel Signal	B5301—Crankshaft Position Sensor	Y5004-1—[5071 Brown] Low-Pressure Fuel Pump Signal
A5501-25—[5016 Blue] Low-Pressure Fuel Pump Return	A5501-51—[5447 Violet] Crankshaft Position Signal	B5302—Camshaft Position Sensor	
		B5600—Water-In-Fuel Sensor	
		R5602—24 Volt Low-Pressure Fuel Pump Resistor	

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4.5L Wiring Diagram 3



RG19876—UN—21JAN11

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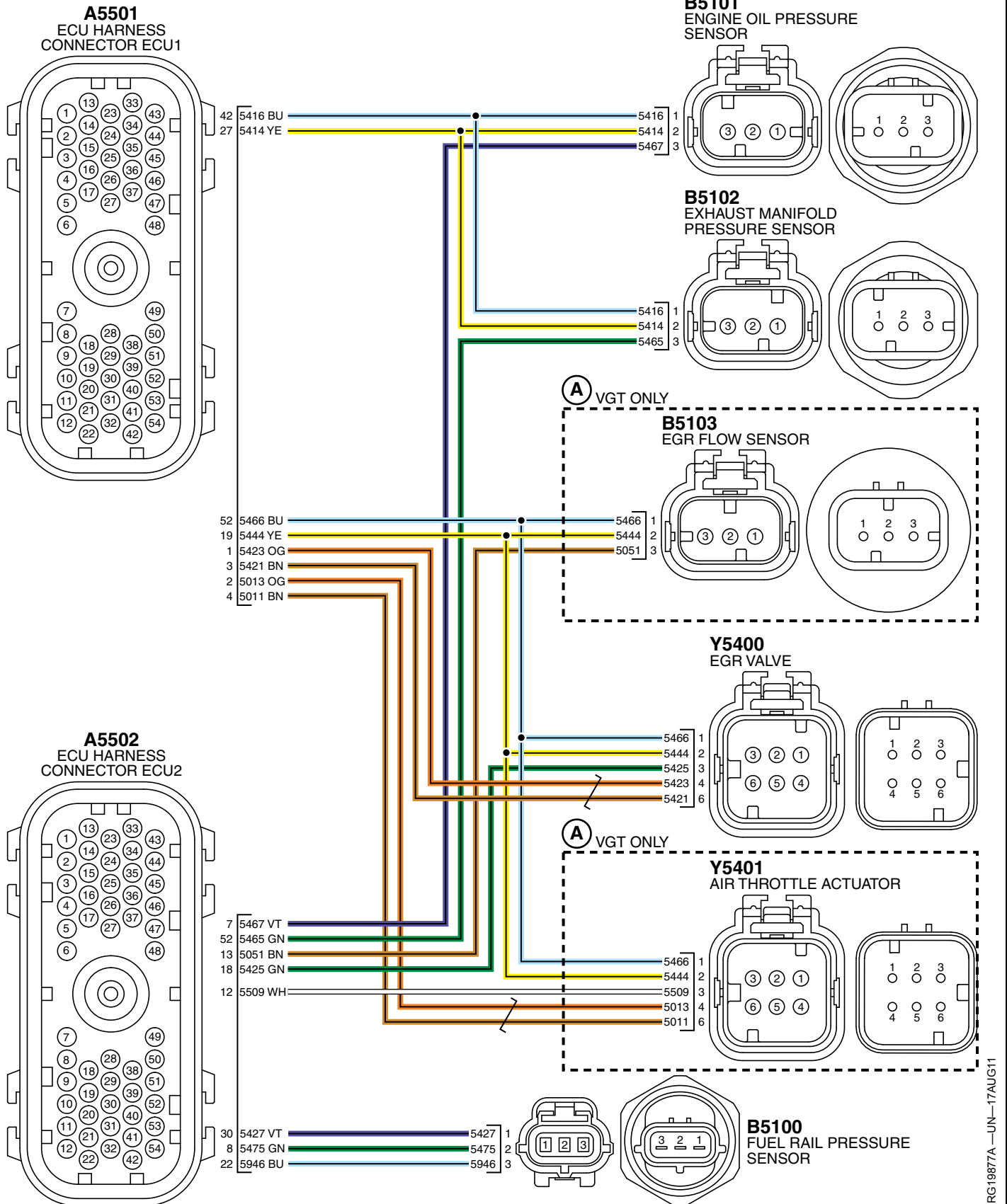
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Diagnostic Specifications

A5502—ECU Harness Connector ECU 2	A5502-23—[5456 Blue] Manifold Air Temperature Signal	A5502-48—[5461 Brown] Engine Coolant Temperature Signal	B5206—Manifold Air Temperature Sensor
A5502-4—[5468 Gray] Manifold Air Pressure Signal	A5502-25—[5446 Blue] 5 Volt Sensor Supply #7A	A5502-53—[5441 Brown] 5 Volt Sensor Supply #7 Positive	B5207—EGR Temperature Sensor
A5502-9—[5463 Orange] EGR Temperature Signal	A5502-26—[5479 White] 5V Sensor Supply #1A	A5502-54—[5504 Yellow] Crankcase Pressure Signal	B5208—Engine Coolant Temperature Sensor
A5502-19—[5455 Green] Charge Air Cooler Outlet Temperature Signal	A5502-28—[5774 Yellow] 5 Volt Sensor Supply #6A	B5104—Manifold Air Pressure Sensor	B5209—Fuel Temperature Sensor
A5502-21—[5010 Black] ECU Static Ground	A5502-40—[5428 Gray] Fuel Temperature Signal	B5105—Crankcase Pressure Sensor	X5001—ECU Static Ground
		B5205—Charge Air Cooler Outlet Temperature Sensor	

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4.5L Wiring Diagram 4



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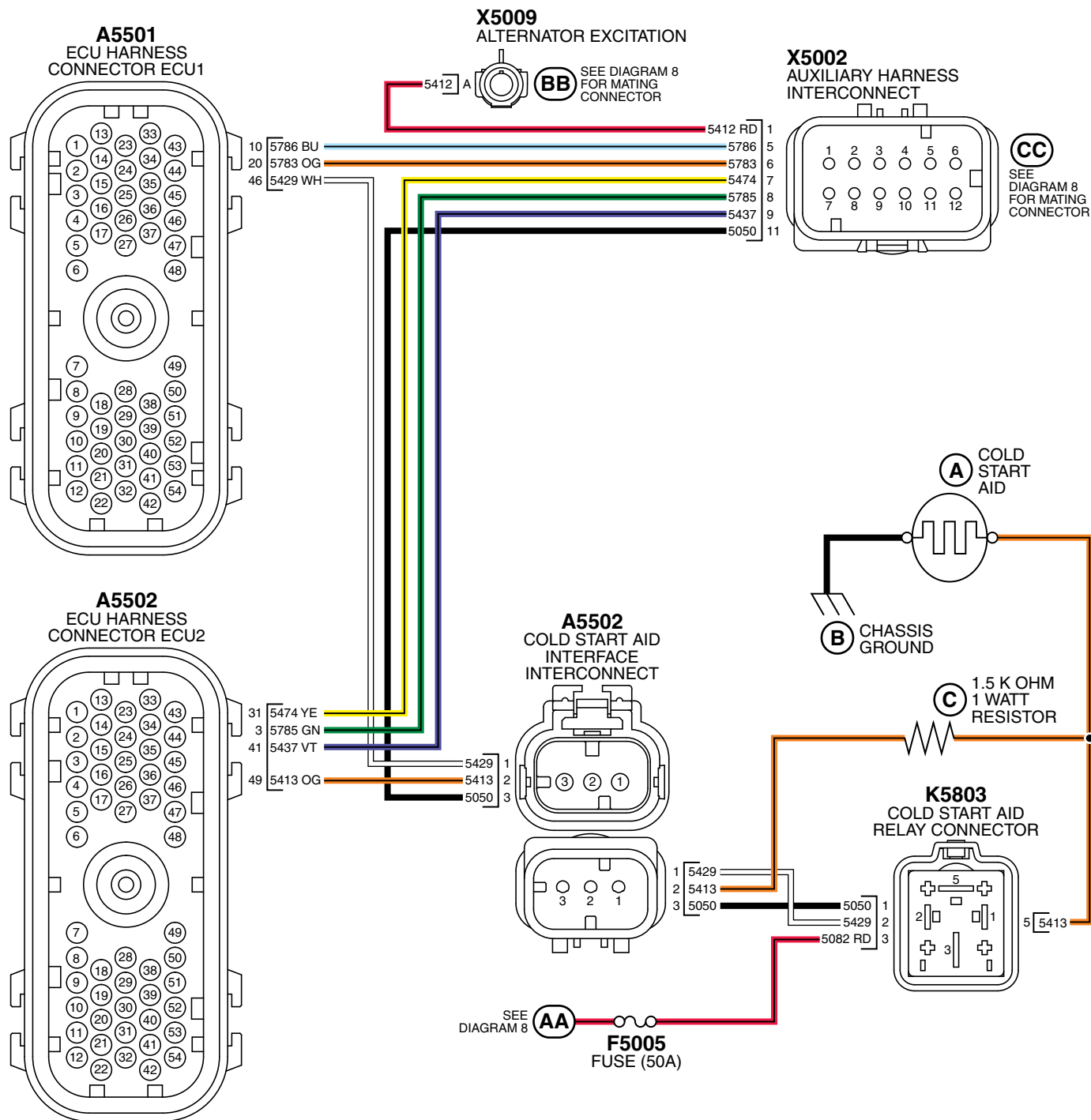
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Diagnostic Specifications

A—VGT Only	A5501-27—[5414 Yellow] 5 Volt Sensor Supply #8 Return	A5502-12—[5509 White] Air Throttle Actuator Signal	B5100—Fuel Rail Pressure Sensor
A5501—ECU Harness Connector ECU 1	A5501-42—[5416 Blue] 5 Volt Sensor Supply #8 Positive	A5502-13—[5051 Brown] EGR Flow Pressure Signal	B5101—Engine Oil Pressure Sensor
A5501-1—[5423 Orange] EGR Valve PWM Drive #2	A5501-52—[5466 Blue] 5V Sensor Supply #3 Positive	A5502-18—[5425 Green] EGR Valve Position Signal	B5102—Exhaust Manifold Pressure Sensor
A5501-2—[5013 Orange] Air Throttle Actuator PWM Drive #1	A5502—ECU Harness Connector ECU 2	A5502-22—[5946 Blue] 5 Volt Sensor Supply #1 Positive	B5103—EGR Flow Sensor
A5501-3—[5421 Brown] EGR Valve PWM Drive #1	A5502-7—[5467 Violet] Engine Oil Pressure Signal	A5502-30—[5427 Violet] 5 Volt Sensor Supply #1B Return	Y5400—EGR Valve
A5501-4—[5011 Brown] Air Throttle Actuator PWM Drive #2	A5502-8—[5475 Green] Fuel Rail Pressure Sensor Signal	A5502-52—[5465 Green] Exhaust Manifold Pressure Signal	
A5501-19—[5444 Yellow] 5V Sensor Supply #3 Return			

BK53208,000001A -19-17AUG11-2/2

4.5L Wiring Diagram 5



RG19878 —UN—12JUL11

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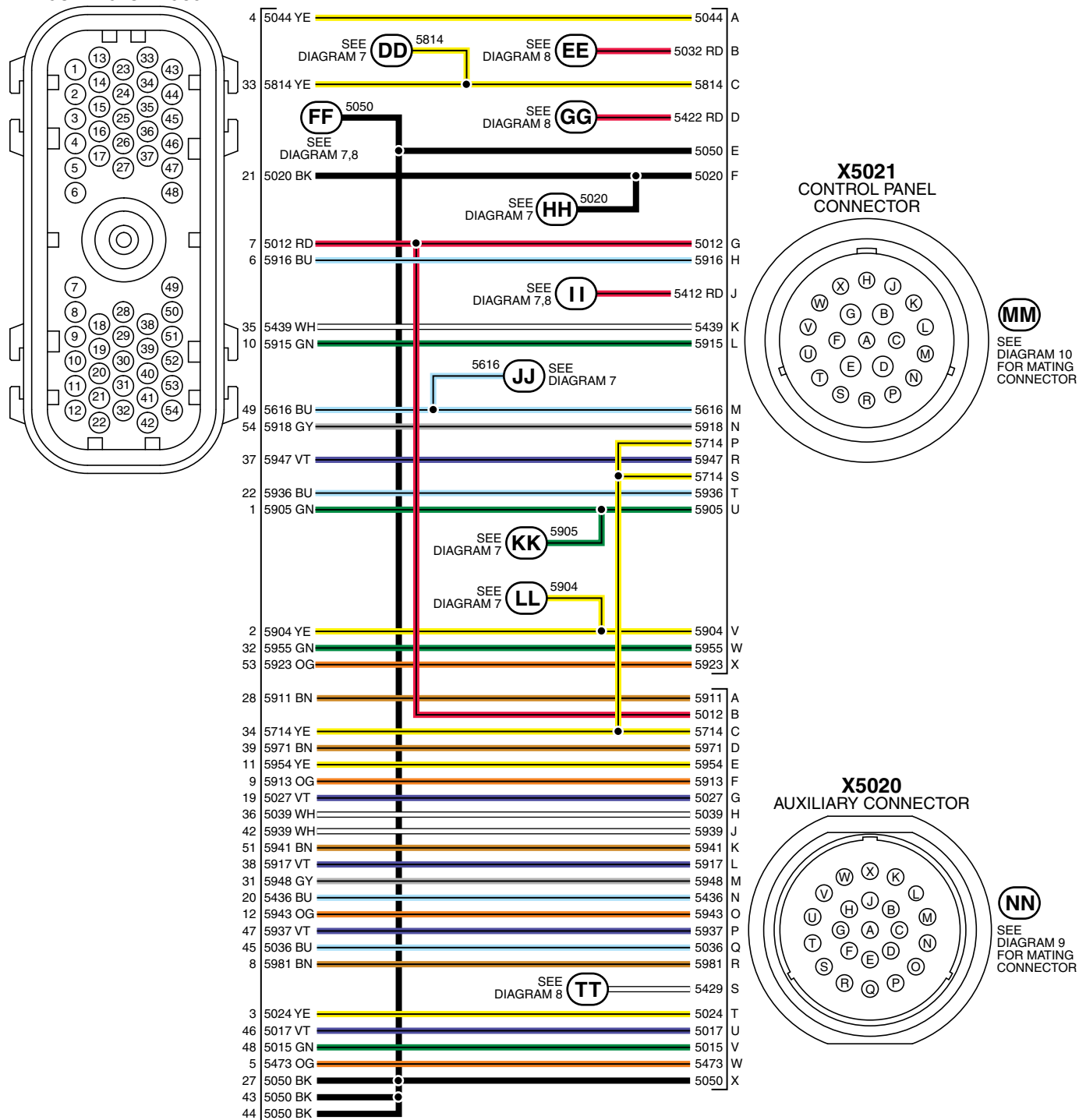
Diagnostic Specifications

A—Cold Start Aid	A5502—ECU Harness Connector	B—Chassis Ground	X5002-1—[5412 Red] Alternator Excitation
AA—See Diagram 8	ECU 2	BB—See Diagram 8 For Mating Connector	X5002-11—[5050 Black] Battery Negative
A5501—ECU Harness Connector ECU 1	A5502-3—[5785 Green] DPF Differential Pressure Signal	C—1.5 kilo-ohm 1 Watt Resistor	X5004—Cold Start Aid Interface Interconnect
A5501-10—[5786 Blue] Exhaust Filter Temperature Module Signal	A5502-31—[5474 Yellow] 5 Volt Sensor Supply #6B Return	CC—See Diagram 8 For Mating Connector	X5009—Alternator Excitation
A5501-20—[5783 Orange] 10V Sensor Supply #9A Positive	A5502-41—[5437 Violet] 5 Volt Sensor Supply #6 Positive	F5005—Fuse (50 Amp)	
A5501-46—[5429 White] Cold Start Aid Relay Control	A5502-49—[5413 Orange] Cold Start Aid Relay Feedback	K5803—Cold Start Aid Relay Connector	
		K5803-3—[5082 Red] Unswitched Battery	
		X5002—Auxiliary Harness Interconnect	

BK53208,000001B -19-12JUL11-2/2

4.5L Wiring Diagram 6

A5503



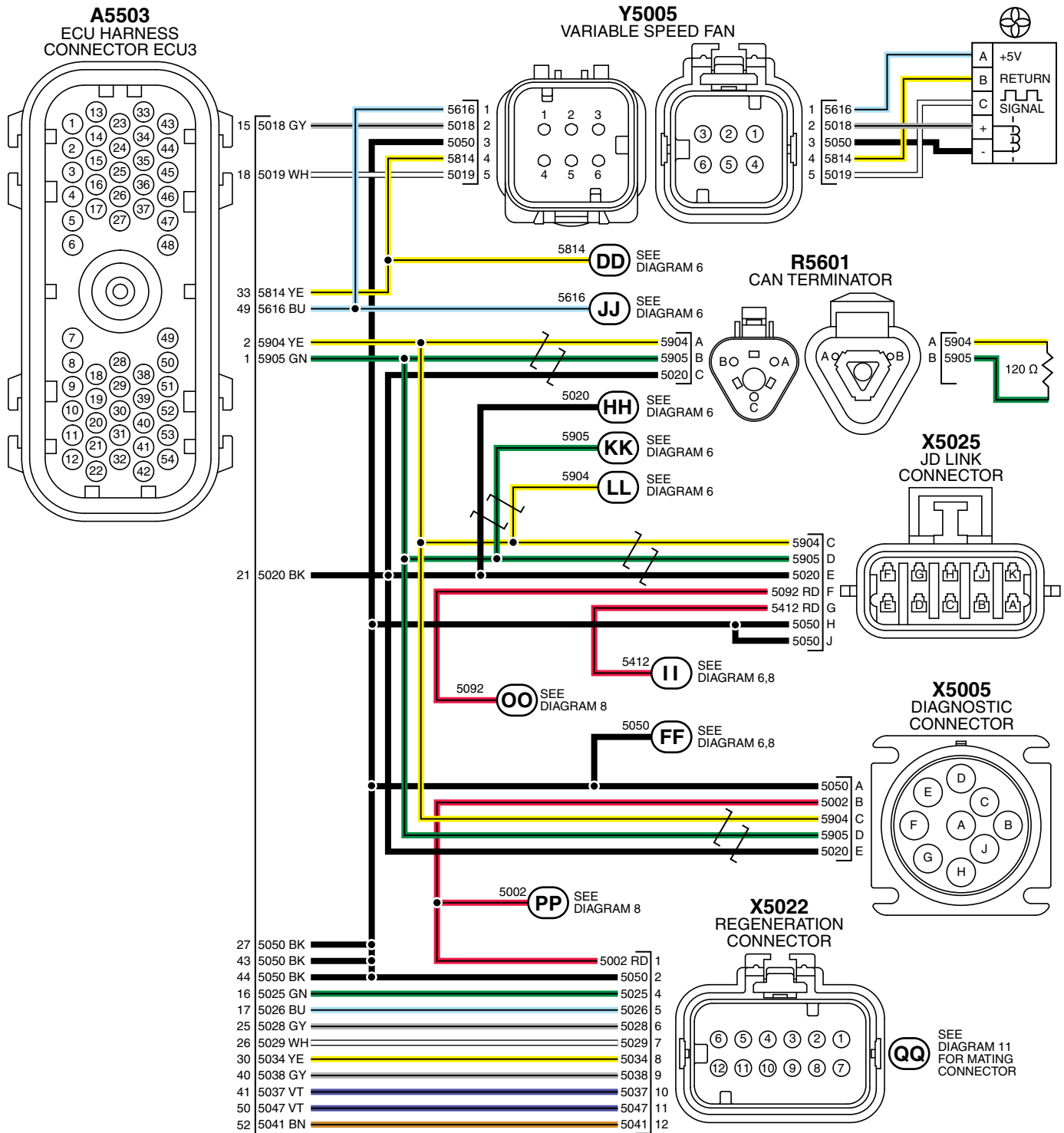
RG19575 —UN—12JUL11

Diagnostic Specifications

A5503—ECU Harness Connector ECU3	A5503-21—[5020 Black] CAN Shield	A5503-39—[5971 Brown] Cruise Cancel/Resume	DD—See Diagram 7
A5503-1—[5905 Green] CAN Low	A5503-22—[5936 Blue] Cruise Coast/Bump Down	A5503-42—[5939 White] External Derate Switch	EE—See Diagram 8
A5503-2—[5904 Yellow] CAN High	A5503-27—[5050 Black] Battery Negative	A5503-43—[5050 Black] Battery Negative	FF—See Diagram 7,8
A5503-3—[5024 Yellow] Remote Throttle	A5503-28—[5911 Brown] 5 Volt Sensor Supply #5 Positive	A5503-44—[5050 Black] Battery Negative	GG—See Diagram 8
A5503-4—[5044 Yellow] Wait To Start Lamp	A5503-31—[5948 Gray] Loss of Coolant Switch	A5503-45—[5036 Blue] Hydraulic Temperature	HH—See Diagram 7
A5503-5—[5073 Orange] Stop Engine Lamp	A5503-32—[5955 Green] Set Accelerator/Bump Up	A5503-46—[5017 Violet] AC High Pressure Switch	II— See Diagram 7,8
A5503-6—[5916 Blue] Warning Lamp	A5503-33—[5814 Yellow] 5 Volt Sensor Supply #4 Return	A5503-47—[5937 Violet] Isochronous Governor	JJ— See Diagram 7
A5503-7—[5012 Red] Key On	A5503-34—[5714 Yellow] 5 Volt Sensor Supply #5 Return	A5503-48—[5015 Green] Secondary Fan	KK—See Diagram 7
A5503-8—[5981 Brown] PWM Throttle	A5503-35—[5439 White] Tachometer	A5503-49—[5616 Blue] 5 Volt Sensor Supply #4 Positive	LL—See Diagram 7
A5503-9—[5913 Orange] Secondary Analog Throttle	A5503-36—[5039 White] Vehicle Speed	A5503-51—[5941 Brown] External Shutdown Switch	MM—See Diagram 10 For Mating Connector
A5503-10—[5915 Green] Primary Analog Throttle	A5503-37—[5947 Violet] Multi-State Throttle	A5503-53—[5923 Orange] Bump Enable	NN—See Diagram 9 For Mating Connector
A5503-11—[5954 Yellow] Cruise On	A5503-38—[5917 Violet] Cruise Remote	A5503-54—[5918 Gray] Shutdown Override	TT—See Diagram 8
A5503-12—[5943 Orange] Cruise Brake			X5020—Auxiliary Connector
A5503-19—[5027 Purple] PTO Speed			X5020-S—[5429 White] Not Used
A5503-20—[5436 Blue] Engine Coolant Level Information			X5021—Control Panel Connector
			X5021-B—[5032 Red] Fused Unswitched Power
			X5021-D—[5422 Red] Start
			X5021-J—[5412 Red] Alternator Excitation

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4.5L Wiring Diagram 7



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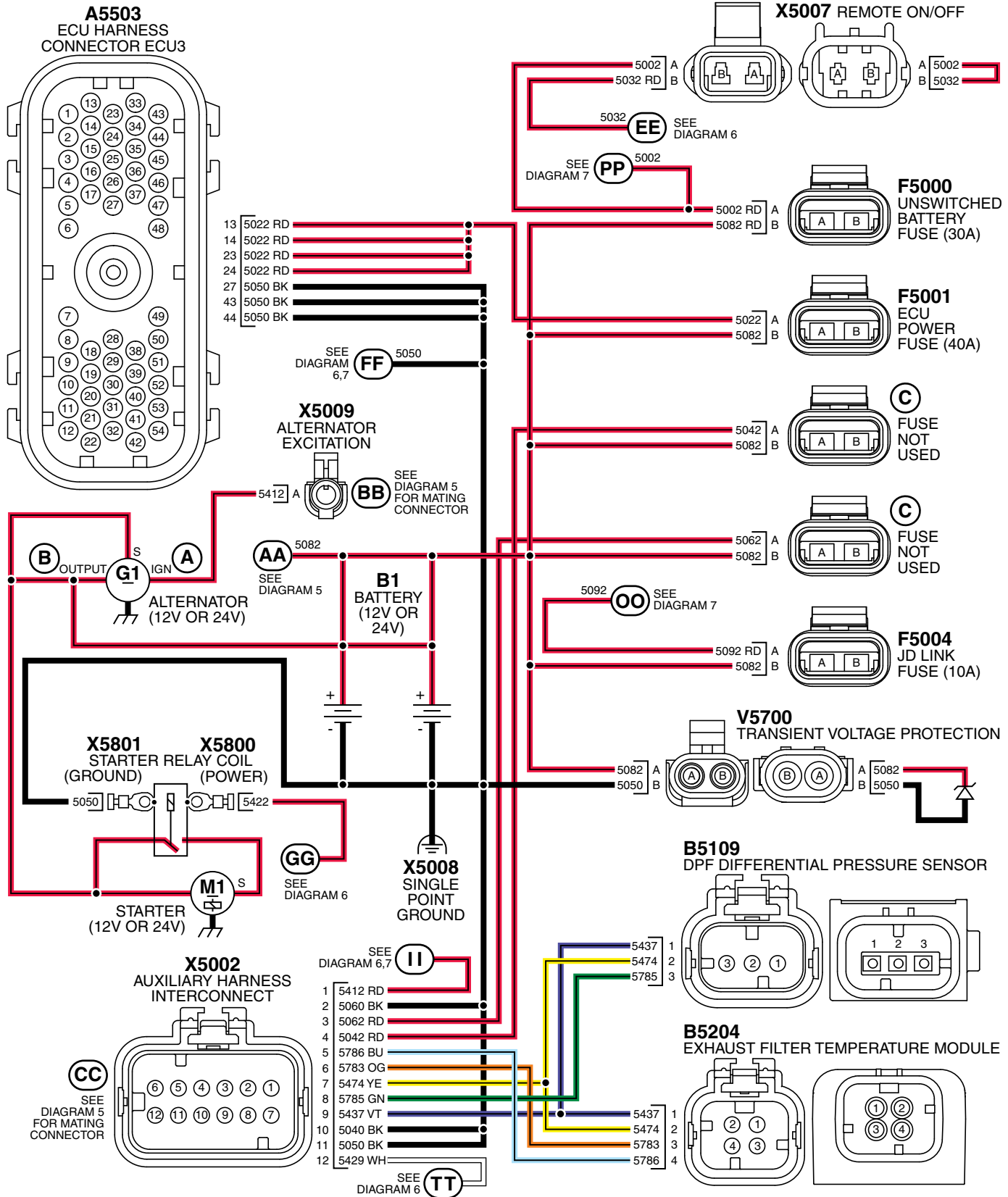
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Diagnostic Specifications

A5503—ECU Harness Connector ECU3	A5503-26—[5029 White] DPF Regen Request Lamp	A5503-49—[5616 Blue] 5 Volt Sensor Supply #4 Positive	R5601—CAN Terminator
A5503-1—[5905 Green] CAN Low	A5503-27—[5050 Black] Battery Negative	A5503-50—[5047 Violet] Steer By Wire Relay	X5005—Diagnostic Connector
A5503-2—[5904 Yellow] CAN High	A5503-30—[5034 Yellow] Starter Relay Option	A5503-52—[5041 Brown] DPF Regen Inhibit/Abort Lamp	X5022—Regeneration Connector
A5503-15—[5018 Gray] Variable Fan Speed Clutch Control	A5503-33—[5814 Yellow] 5 Volt Sensor Supply #4 Return	DD—See Diagram 6	X5022-1—[5002 Red] Unswitched Battery
A5503-16—[5025 Green] Exhaust Temperature High Lamp	A5503-40—[5038 Gray] DPF Regen Request	FF—See Diagram 6, 8	X5025—JD Link Connector
A5503-17—[5026 Blue] DPF Regen Required Lamp	A5503-41—[5037 Violet] DPF Regen Inhibit/Abort	HH—See Diagram 6	X5025-F—[5092 Red] JD Link Unswitched Power
A5503-18—[5019 White] Variable Fan Speed Signal	A5503-43—[5050 Black] Battery Negative	II—See Diagram 6, 8	X5025-G—[5412 Red] Alternator Excitation
A5503-21—[5020 Black] CAN Shield	A5503-44—[5050 Black] Battery Negative	JJ—See Diagram 6	Y5005—Variable Speed Fan
A5503-25—[5028 Gray] AC Solenoid		KK—See Diagram 6	
		LL—See Diagram 6	
		OO—See Diagram 8	
		PP—See Diagram 8	
		QQ—See Diagram 11 For Mating Connector	

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4.5L Wiring Diagram 8



RG19577 -UN-12JUL11

Continued on next page

BK53208,000001E -19-12JUL11-1/2

Diagnostic Specifications

A—IGN	B5109—DPF Differential Pressure Sensor	II— See Diagram 6,7	X5002-8—[5785 Green] DPF Differential Pressure Signal
AA—See Diagram 5	B5204—Exhaust Filter Temperature Module	M1—Starter (12V or 24V)	X5002-9—[5437 Violet] 5 Volt Sensor Supply #6 Positive
A5503—ECU Harness Connector ECU3	C—Fuse Not Used	OO—See Diagram 7	X5002-10—[5040 Black] Battery Negative
A5503-13—[5022 Red] Unswitched Battery	CC—See Diagram 5 for Mating Connector	PP—See Diagram 7	X5002-11—[5050 Black] Battery Negative
A5503-14—[5022 Red] Unswitched Battery	EE—See Diagram 6	TT— See Diagram 6	X5002-12—[5429 White] Not Used
A5503-23—[5022 Red] Unswitched Battery	FF— See Diagram 6,7	V5700—Transient Voltage Protector	X5007—Remote On/Off Unswitched Power
A5503-24—[5022 Red] Unswitched Battery	F5000—Unswitched Battery Fuse (30A)	X5002—Auxiliary Connector	X5008—Single Point Ground
A5503-27—[5050 Black] Battery Negative	F5000-A—[5002 Red] Unswitched Battery	X5002-1—[5412 Red] Alternator Excitation	X5800—Starter Relay Coil (Power)
A5503-43—[5050 Black] Battery Negative	F5000-B—[5082 Red] Unswitched Battery	X5002-2—[5060 Black] Battery Negative	X5801—Starter Relay Coil (Ground)
A5503-44—[5050 Black] Battery Negative	F5001—ECU Power Fuse (40A)	X5002-3—[5062 Red]	
B—Alternator Output	F5004—JD Link Fuse (10A)	X5002-4—[5042 Red]	
BB—See Diagram 5 for Mating Connector	F5004-A—JD Link Unswitched Power	X5002-5—[5786 Blue] Exhaust Filter Temperature Module Signal	
B1—Battery (12V or 24V)	GG—See Diagram 6	X5002-6—[5783 Orange] 10V Sensor Supply #9A Positive	
	G1—Alternator (12V or 24V)	X5002-7—[5474 Yellow] 5 Volt Sensor Supply #6B Return	

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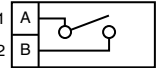
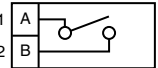
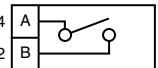
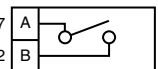
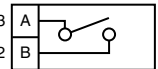
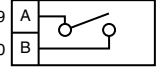
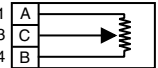
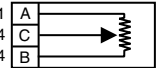
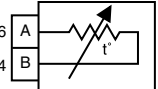
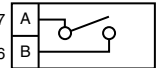
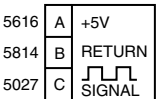
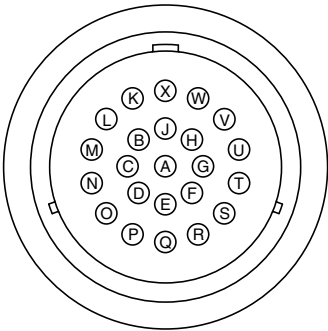
4.5L Wiring Diagram 9

H5000

STOP ENGINE LAMP

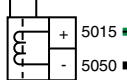
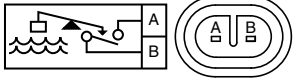
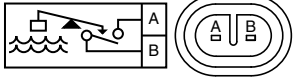
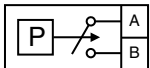
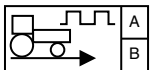


A 5473
B 5012

S5005 EXTERNAL SHUTDOWN SWITCH**S5003** CRUISE CANCEL / RESUME SWITCH**S5004** CRUISE ON SWITCH**S5006** REMOTE CRUISE SWITCH**S5007** CRUISE BRAKE SWITCH**S5009** EXTERNAL DERATE SWITCH**R5001** SECONDARY ANALOG THROTTLE**R5002** REMOTE THROTTLE**B5210** HYDRAULIC TEMPERATURE SENSOR**S5008** DROP / ISCOCHRONUS GOVERNOR SWITCH**P5300** PTO SPEED**X5020** AUXILIARY CONNECTOR

SEE DIAGRAM 6 FOR MATING CONNECTOR

A 5911 BN
B 5012 RD
C 5714 YE
D 5971 BN
E 5954 YE
F 5913 OG
G 5027 VT
H 5039 WH
J 5939 WH
K 5941 BN
L 5917 VT
M 5948 GY
N 5436 BU
O 5943 OG
P 5937 VT
Q 5036 BU
R 5981 BN
T 5024 YE
U 5017 VT
V 5015 GN
W 5473 OG
X 5050 BK

Y5015 SECONDARY FAN**U5000** PWM THROTTLE**S5002** ENGINE COOLANT LEVEL INFORMATION SWITCH**S5001** ENGINE COOLANT LEVEL ALARM SWITCH**S5100** AC HIGH PRESSURE SWITCH**P5301** VEHICLE SPEED

5616 (RR) SEE DIAGRAM 10

5814 (SS) SEE DIAGRAM 10

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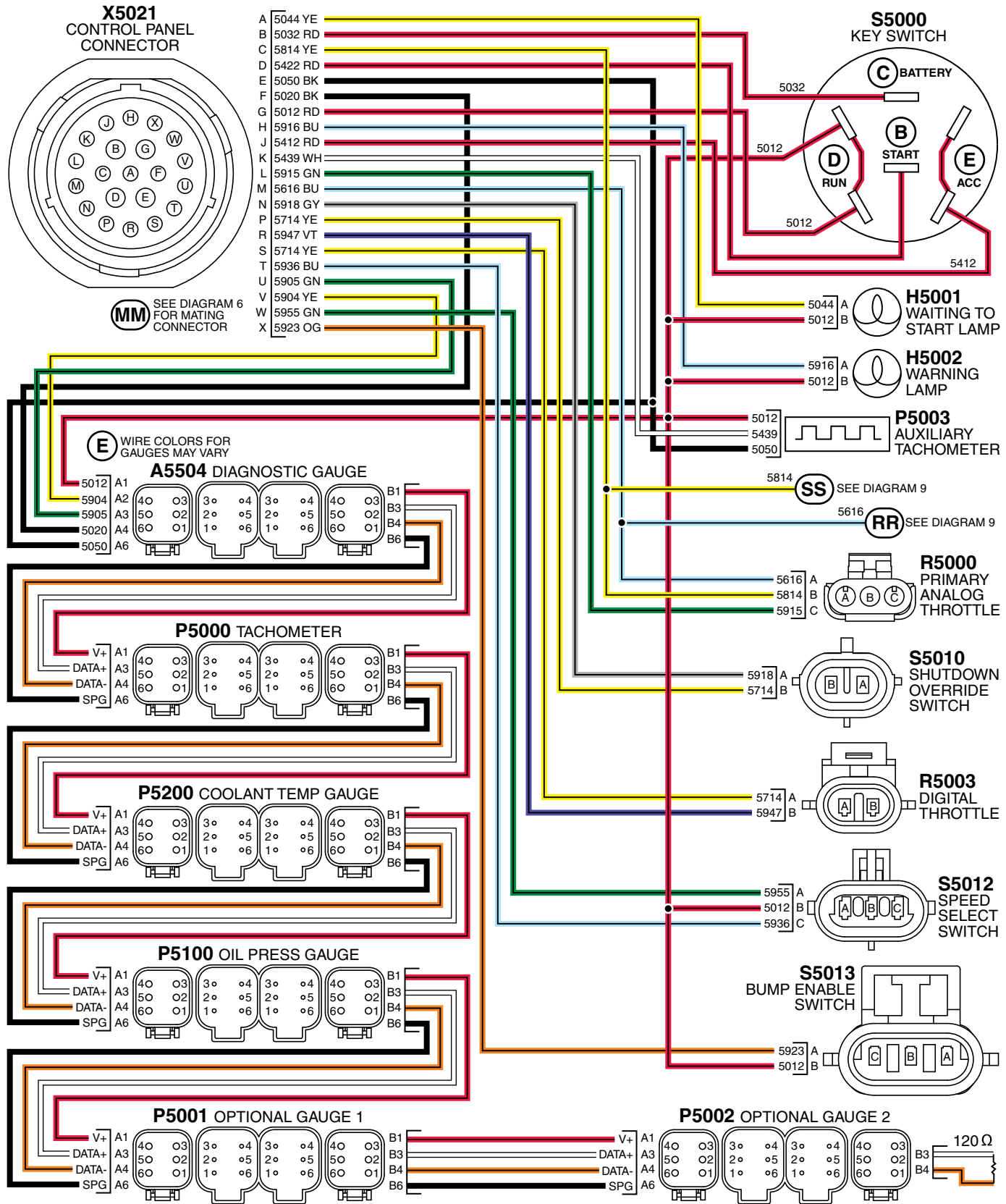
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Diagnostic Specifications

B5210—Hydraulic Temperature Sensor	S5006—Remote Cruise Switch	X5020-F—[5913 Orange] Secondary Analog Throttle	X5020-Q—[5036 Blue] Hydraulic Temperature Sensor
H5000—Stop Engine Lamp	S5007—Cruise Brake Switch		X5020-R—[5981 Brown] PWM Throttle
NN—See Diagram 6 for Mating Connector	S5008—Drop/Isochronous Governor Switch	X5020-G—[5027 Violet] PTO Speed	X5020-T—[5024 Yellow] Remote Throttle
P5300—PTO Speed	S5009—External Derate Switch	X5020-H—[5039 White] Vehicle Speed	X5020-U—[5017 Violet] AC High Pressure Switch
P5301—Vehicle Speed	S5100—AC High Pressure Switch	X5020-J—[5939 White] External Derate Switch	X5020-V—[5015 Green] Secondary Fan
RR—See Diagram 10	U5000—PWM Throttle	X5020-K—[5941 Brown] External Shutdown Switch	X5020-W—[5473 Orange] Stop Engine Lamp
R5001—Secondary Analog Throttle	X5020—Auxiliary Connector	X5020-L—[5917 Violet] Cruise Remote	X5020-X—[5050 Black] Battery Negative
R5002—Remote Throttle	X5020-A—[5911 Brown] 5 Volt Sensor Supply #5 Positive	X5020-M—[5948 Gray] Loss of Coolant Switch	Y5015—Secondary Fan Solenoid
SS—See Diagram 10	X5020-B—[5012 Red] Key On	X5020-N—[5436 Blue] Engine Coolant Level Information	
S5001—Engine Coolant Level Alarm Switch	X5020-C—[5714 Yellow] 5 Volt Sensor Supply #5 Return	X5020-O—[5943 Orange] Cruise Brake	
S5002—Engine Coolant Information Switch	X5020-D—[5971 Brown] Cruise Cancel/Resume	X5020-P—[5937 Violet] Isochronous Governor	
S5003—Cruise Cancel/Resume Switch	X5020-E—[5954 Yellow] Cruise On		
S5004—Cruise On Switch			
S5005—External Shutdown Switch			

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4.5L Wiring Diagram 10



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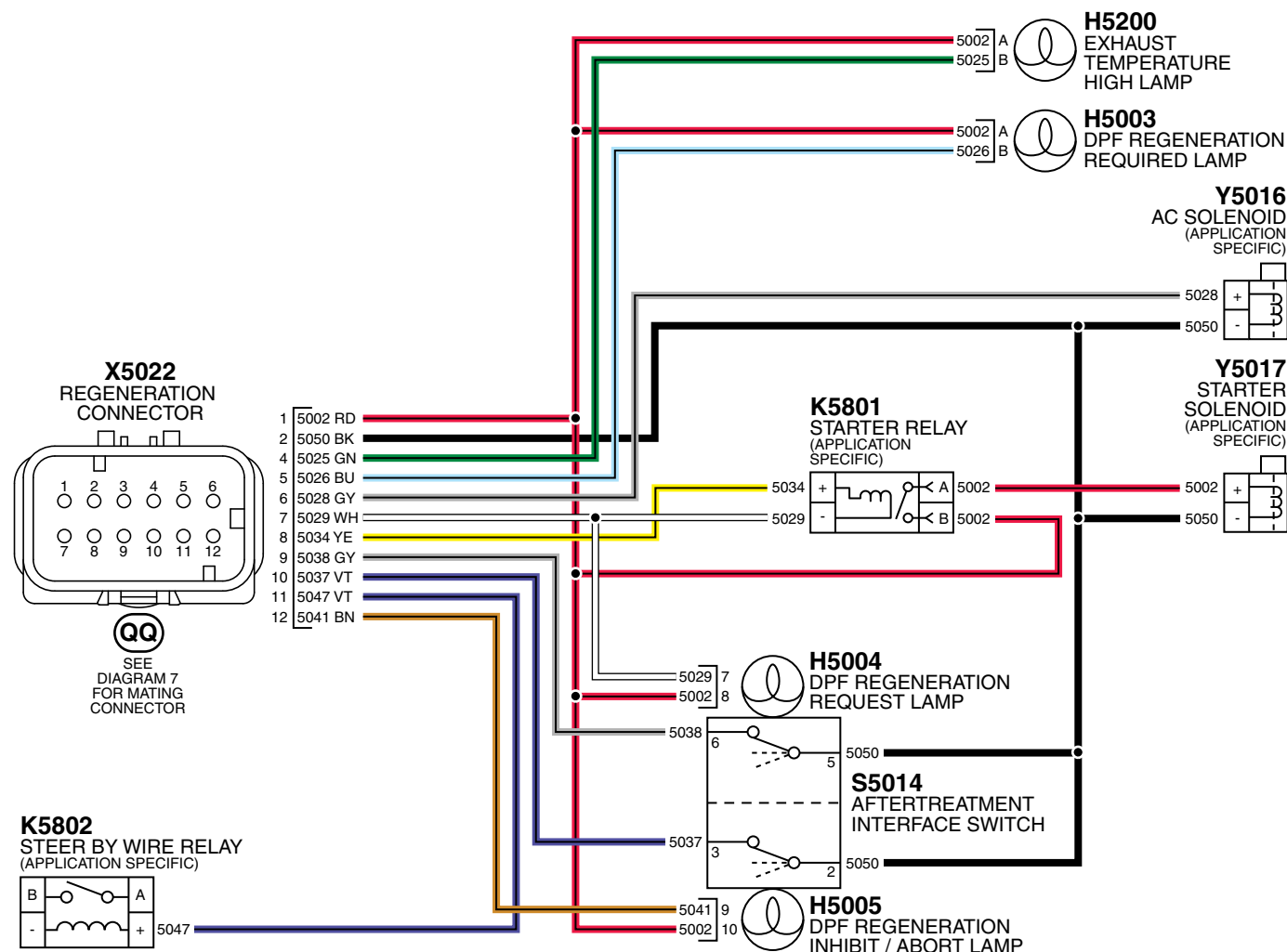
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Diagnostic Specifications

A—Wire Colors For Gauges May Vary	P5003—Auxiliary Tachometer	X5021-C—[5814 Yellow] 5 Volt Sensor Supply #4 Return	X5021-P—[5714 Yellow] 5 Volt Sensor Supply #5 Return
A5504—Diagnostic Gauge	P5100—Oil Pressure Gauge	X5021-D—[5422 Red] Start	X5021-R—[5947 Violet] Multi-State Throttle
A5504-B1—[Red] Voltage Positive	P5200—Coolant Temperature Gauge	X5021-E—[5050 Black] Battery Negative	X5021-S—[5714 Yellow] 5 Volt Sensor Supply #5 Return
A5504-B3—[White] Data Positive	RR—See Diagram 9	X5021-F—[5020 Black] CAN Shield	X5021-T—[5936 Blue] Cruise/Coast Bump Down
A5504-B4—[Orange] Data Negative	R5000—Primary Analog Throttle	X5021-G—[5012 Red] Key On	X5021-U—[5905 Green] CAN Low
A5504-B6—[Black] Single Point Ground	R5003—Digital Throttle	X5021-H—[5916 Blue] Warning Lamp	X5021-V—[5904 Yellow] CAN High
B—Start	SS—See Diagram 9	X5021-J—[5412 Red] Alternator Excitation	X5021-W—[5955 Green] Set Accelerator/Bump Up
C—Battery	S5000—Key Switch	X5021-K—[5439 White] Tachometer	X5021-X—[5923 Orange] Bump Enable
D—Run	S5010—Shutdown Override Switch	X5021-L—[5915 Green] Primary Analog Throttle	
E—Accessory	S5012—Speed Select Switch	X5021-M—[5616 Blue] 5 Volt Sensor Supply #4 Positive	
H5001—Waiting to Start Lamp	S5013—Bump Enable Switch	X5021-N—[5918 Gray] Shutdown Override	
H5002—Warning Lamp	X5021—Control Panel Connector		
MM—See Diagram 6 for Mating Connector	X5021-A—[5044 Yellow] Wait to Start Lamp		
P5000—Tachometer	X5021-B—[5032 Red] Fused Unswitched Power		
P5001—Optional Gauge 1			
P5002—Optional Gauge 2			

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4.5L Wiring Diagram 11



H5003—DPF Regeneration
Required Lamp
H5004—DPF Regeneration
Request Lamp
H5005—DPF Regeneration
Inhibit/Abort Lamp
H5200—Exhaust Temperature
High Lamp
K5801—Starter Relay
(Application Specific)
K5802—Steer By Wire Relay
(Application Specific)

QQ—See Engine Schematic 7 For
Mating Connector
S5014—Aftertreatment Interface
Switch
X5022—Regeneration Connector
X5022-1—[5002 Red] Unswitched
Battery
X5022-2—[5050 Black] Battery
Negative
X5022-4—[5025 Green] Exhaust
Temperature High Lamp

X5022-5—[5026 Blue] DPF
Regeneration Required
Lamp
X5022-6—[5028 Gray] AC
Solenoid
X5022-7—[5029 White] DPF
Regeneration Request
Lamp
X5022-8—[5034 Yellow] Starter
Relay Option
X5022-9—[5038 Gray] DPF
Regeneration Request
X5022-10—[5037 Violet]
DPF Regeneration
Inhibit/Abort

X5022-11—[5047 Violet] Steer By
Wire Relay
X5022-12—[5041 Brown]
DPF Regeneration
Inhibit/Abort Lamp
Y5016—AC Solenoid (Application
Specific)
Y5017—Starter Solenoid
(Application Specific)

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Connector Repair Information Table

Table for connector and terminal information.

Sensor/Device	Ref. Def.	Terminal Type	Connector P/N	Sec. Lock P/N	Terminal P/N	Seal P/N	Plug P/N
ECU Harness Connector ECU1	A5501	Socket	RE538503		57M10321		
ECU Harness Connector ECU1	A5501	Socket	RE538503		57M10319		
ECU Harness Connector ECU1	A5501		RE538503				57M9814
ECU Harness Connector ECU2	A5502	Socket	RE538504		57M10321		
ECU Harness Connector ECU2	A5502	Socket	RE538504		57M10319		
ECU Harness Connector ECU2	A5502		RE538504				57M9814
ECU Harness Connector ECU3	A5503	Socket	RE538505		57M10321		
ECU Harness Connector ECU3	A5503	Socket	RE538505		57M10319		
ECU Harness Connector ECU3	A5503		RE538505				57M9814
Fuel Rail Pressure Sensor	B5100	Socket	57M8407	57M8417	57M8402	57M7833	
Engine Oil Pressure Sensor	B5101	Socket	57M9782		57M10321		
Exhaust Manifold Pressure Sensor	B5102	Socket	57M9781		57M10321		
EGR Flow Sensor	B5103	Socket	57M9780		57M10321		
Intake Manifold Pressure Sensor	B5104	Socket	57M9781		57M10321		
Crankcase Pressure Sensor	B5105	Socket	57M9783		57M10321		
Inlet Fuel Pressure Sensor	B5107	Socket	57M9780		57M10321		
DPF Differential Pressure Sensor	B5109	Socket	57M9780		57M10321		
Exhaust Filter Temperature Module	B5204	Socket	57M9817		57M10321		
Charge Air Cooler Outlet Air Temperature Sensor	B5205	Socket	57M9773		57M10321		
Manifold Air Temperature Sensor	B5206	Socket	57M9773		57M10321		
EGR Temperature Sensor	B5207	Socket	57M9774		57M10321		
Engine Coolant Temperature Sensor	B5208	Socket	57M9773		57M10321		
Fuel Temperature Sensor	B5209	Socket	57M9774		57M10321		
VGT Speed Sensor	B5300	Socket	57M9775		57M10321		
Crankshaft Position Sensor	B5301	Socket	57M9775		57M10321		
Camshaft Position Sensor	B5302	Socket	57M9775		57M10321		
Intake Air Sensor	B5500	Socket	57M9144		57M9831	57M9149	
Water-In-Fuel Sensor	B5600	Socket	57M9772		57M10321		
Water-In-Fuel Sensor Dust Cap	B5600A	Socket	57M9776				57M9814
Un-switched Fused Power	F5000	Socket	R104570		R104571		
Un-switched Fused Power Dust Cap	F5000A	Socket	57M8487				
ECU Power Fuse	F5001	Socket	57M8600		R104571		
ECU Power Fuse Dust Cap	F5001A	Socket	57M8487				
Transfer Pump Fuse	F5002	Socket	57M8267		R104933		
Transfer Pump Fuse Dust Cap	F5002A	Socket	57M8487				
JD Link 10 Amp Fuse	F5004	Socket	57M8267		57M7579		
JD Link 10 Amp Fuse	F5004	Socket	57M8267		R104933		
JD Link 10 Amp Fuse Dust Cap	F5004A	Socket	57M8487				
CAN Terminator Connector	R5601	Socket	57M8637	57M8221	57M8261		
Low-Pressure Fuel Pump Resistor	R5602	Pin	57M9776		57M10320		
Transient Voltage Protection	V5700		RE12363		R78060	57M9218	
Transient Voltage Dust Cap	V5700A		R78053				R78064
Fuel Injector Harness	X5000	Socket	57M9792		57M10321		
Fuel Injector Harness	X5000		57M9792				57M9814
ECU Static Ground	X5001		57M9535		57M9535		
Auxiliary Harness Interconnect	X5002		57M9804		57M10322		
Auxiliary Harness Interconnect	X5002		57M9804		57M10320		
Auxiliary Harness Interconnect	X5002		57M9804				57M9814

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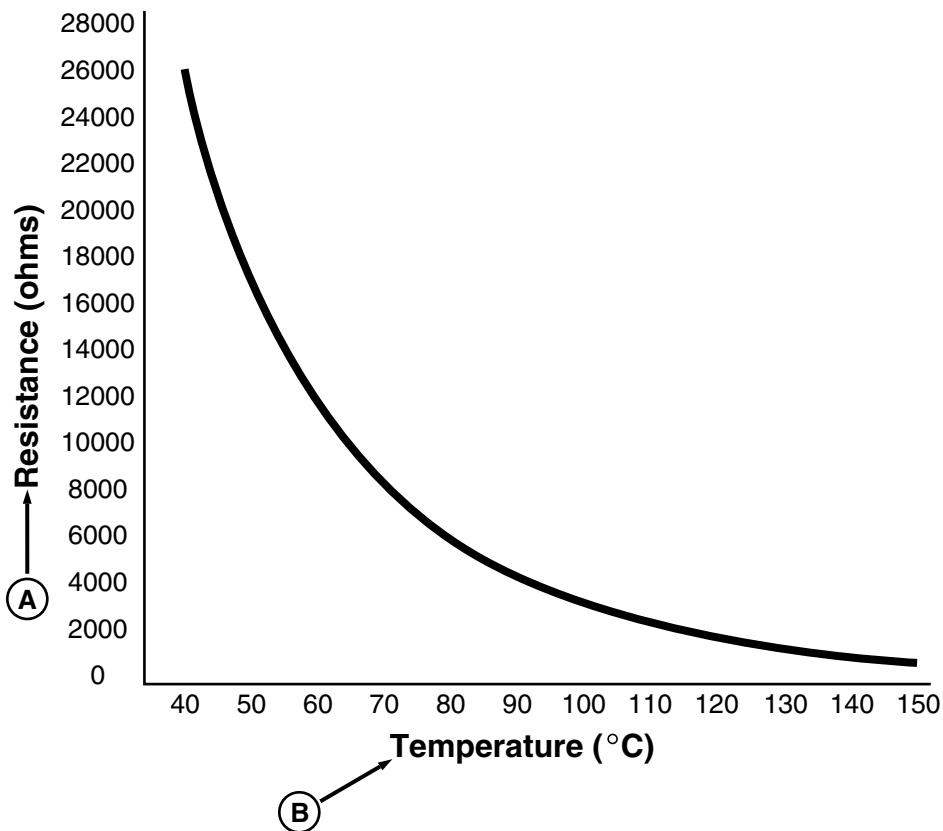
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Diagnostic Specifications

Auxiliary Harness Interconnect	X5002	Socket	57M9800		57M10321		
Auxiliary Harness Interconnect	X5002	Socket	57M9800		57M10319		
Cold Start Aid Interface Interconnect	X5004		57M9780		57M10321		
CAN Diagnostic Connector	X5005	Pin	57M7919		57M8262		
CAN Diagnostic Connector	X5005		57M7919				R78069
Remote On/Off	X5007	Pin	57M7304	57M7306	57M7527	57M9216	
Alternator Excitation	X5009	Pin	R78052		R78061	57M9218	
Alternator Excitation Dust Cap	X5009A		RE12362				R78064
Auxiliary Connector	X5020	Pin	57M7750		N282069		
Auxiliary Connector	X5020	Pin	57M7750		N282068		
Auxiliary Connector Dust Cap	X5020A	Pin	57M7749				R78069
Control Panel Connector	X5021	Socket	57M8112		57M7546		
Control Panel Connector	X5021	Socket	57M8112		57M8569		
Regeneration Connector	X5022	Socket	57M9801		57M10321		
Regeneration Connector	X5022		57M9801				57M9814
Regeneration Connector Dust Cap	X5022A	Socket	57M9805				57M9814
JD Link Connector	X5025	Socket	57M7262	Packard-12176336	R104846	57M9215 or 57M7258	57M7259
JD Link Dust Cap	X5025A		57M7265		57M8907		57M7259
Suction Control Valve	Y5002	Socket	57M9828		57M9831	57M9149	
Low-Pressure Fuel Pump	Y5004	Socket	57M9775		57M10319		
Low-Pressure Fuel Pump	Y5004A	Socket	57M9779				57M9814
Variable Speed Fan Drive	Y5005	Pin	57M9789		57M10322		
Variable Speed Fan Drive	Y5005		57M9789				57M9814
Variable Speed Fan Dust Cap	Y5005A		57M9786				57M9814
EGR Valve	Y5400	Socket	57M9786		57M10321		
EGR Valve	Y5400		57M9786				57M9814
Air Throttle Actuator	Y5401	Socket	57M9786		57M10321		
Air Throttle Actuator	Y5401		57M9786				57M9814
VGT Actuator	Y5500	Socket	57M9817		57M10319		
VGT Actuator	Y5500		57M9817		57M10321		
Starter Relay Coil (Pwr)	X5800	Socket	57M7547		57M7547		
Starter Relay Coil (Gnd)	X5801	Socket	57M7547		57M7547		

BK34394,0001B49 -19-30JUN11-2/2

EGR Temperature Sensor Characteristics



A—Resistance (ohms)
B—Temperature (degrees Celsius)

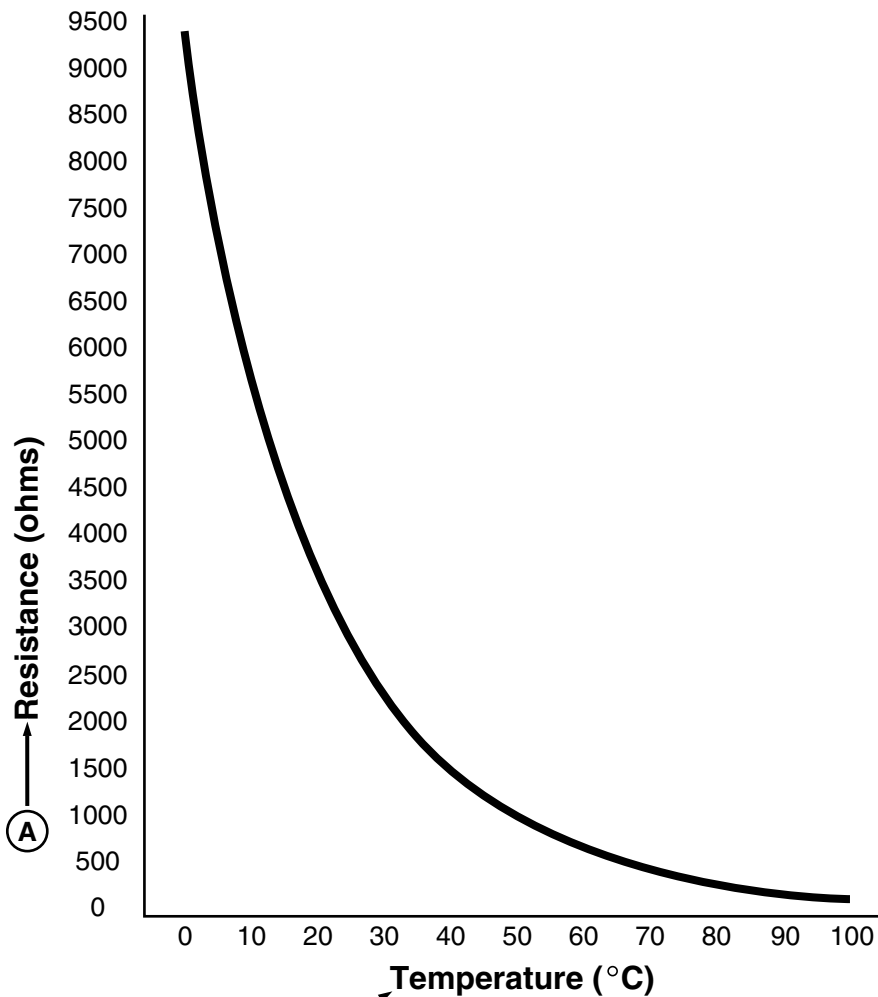
C—Temperature (degrees Fahrenheit)

TEMP (°C)	TEMP (°F)	RESISTANCE (OHMS)
40	104	26065
45	113	21358
50	122	17599
55	131	14579
60	140	12140
65	149	10159
70	158	8541
75	167	7214
80	176	6120
85	185	5213
90	194	4459
95	203	3829
100	212	3300
105	221	2854
110	230	2478
115	239	2158
120	248	1886
125	257	1653
130	266	1453
135	275	1281
140	284	1133
145	293	1004
150	302	892.8

RG15345A —UN—03OCT08

BK34394,0000E60 -19-14DEC10-1/1

Engine Coolant Temperature and Fuel Temperature Sensor Characteristics



TEMP (°C)	TEMP (°F)	RESISTANCE (OHMS)
0	32	9399
5	41	7263
10	50	5658
15	59	4441
20	68	3511
25	77	2795
30	86	2240
35	95	1806
40	104	1465
45	113	1195
50	122	980.3
55	131	808.8
60	140	670.9
65	149	559.4
70	158	468.7
75	167	394.6
80	176	333.8
85	185	283.5
90	194	241.8
95	203	207.1
100	212	178.0

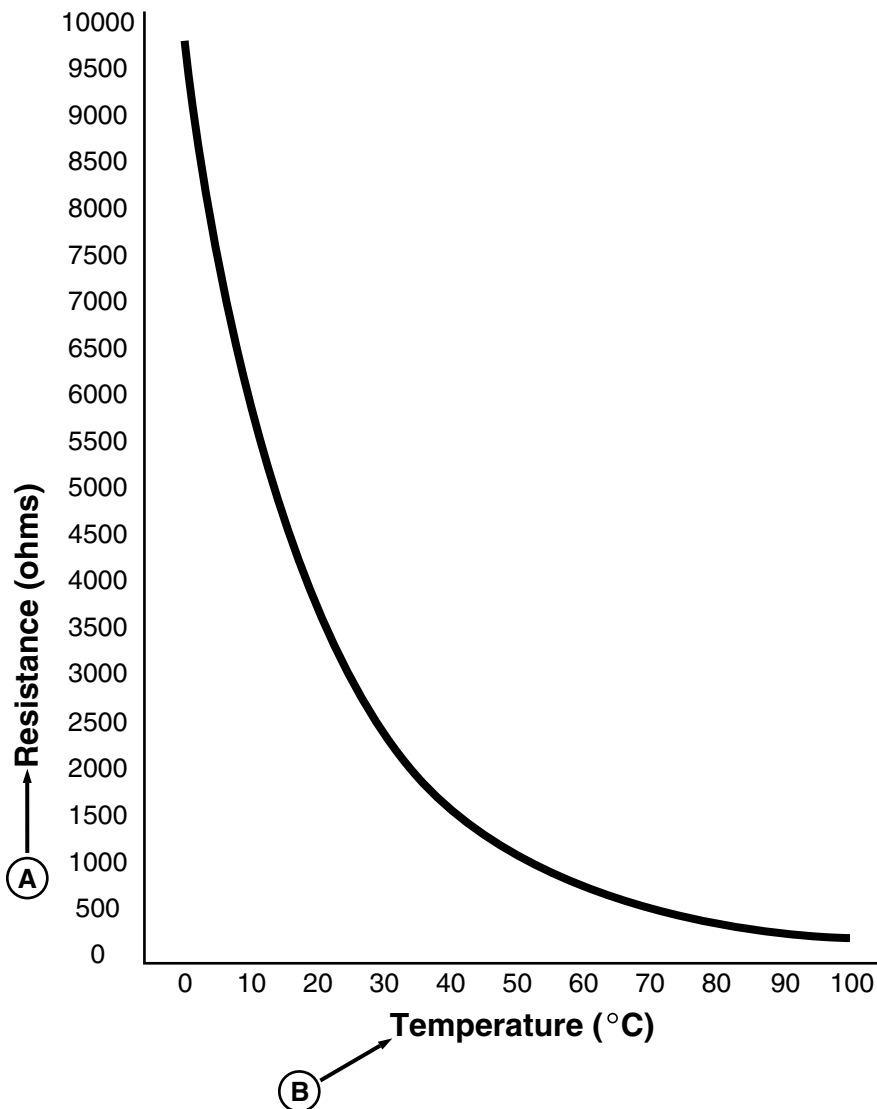
A—Resistance (ohms)
B—Temperature (degrees Celsius)

C—Temperature (degrees Fahrenheit)

RG15346A—UN—03OCT08

RG40049,00007CD -19-14DEC10-1/1

Manifold Air Temperature Sensor and Charge Air Cooler Outlet Air Temperature Sensor Characteristics



TEMP (°C)	TEMP (°F)	RESISTANCE (OHMS)
0	32	9795
5	41	7616
10	50	5970
15	59	4712
20	68	3747
25	77	3000
30	86	2417
35	95	1959
40	104	1598
45	113	1311
50	122	1081
55	131	895.9
60	140	746.4
65	149	624.9
70	158	525.6
75	167	444.4
80	176	377.4
85	185	321.7
90	194	275.3
95	203	236.6
100	212	204.0

A—Resistance (ohms)
B—Temperature (degrees Celsius)

C—Temperature (degrees Fahrenheit)

RG15347A—UN—03OCT08

RG40049,00007CC -19-15DEC10-1/1

OEM Engines - Derate Specifications

NOTE: The **PEAK POWER LEVEL** of an application is identified on the Emissions Information Label located near the valve cover. See **INFORMATION RELATIVE TO EMISSIONS REGULATIONS** in section 01, Group 001.

Shown below are parameters and values that the Engine Control Unit (ECU) uses to determine if an engine must be derated.

--Parameter	SPN-FMI	Value that Triggers Fault	Derate Limit (% Power or RPM)
Aftertreatment Diesel Oxidation Catalyst System	005018.00 005018.16	Turbo Seals Failure, Injector Misfire, Leaking Dosing Nozzle, Leaking Coolant	50%
Aftertreatment System Condition Monitoring	004795.13	Correct DPF Not Installed	1200 rpm
Air Filter Differential Pressure	000107.00	Air Filter Restriction Switch Active	60%
Air Filter Differential Pressure	000107.16	Air Filter Restriction Switch Active	20%
Charged Air Cooler Outlet Temperature	002630.16	89.5°C (193°F)	20%
Charged Air Cooler Outlet Temperature	002630.00	91°C (196°F)	60%
Coolant Level	000111.01	Low Coolant	50% Shutdown after 30 seconds
Coolant Pressure	000109.18	N/A	20%
Coolant Pressure	000109.01	N/A	50%
Coolant Temperature	000110.16	114°C (237°F)	20%
Coolant Temperature	000110.00	116°C (241°F)	60% Shutdown after 30 seconds
Crankcase Pressure	000101.00	5kPa (1psi)	50%
Crankshaft Sensor Faults	000637.02 000637.08 000637.10	Noise, Invalid Pattern, or Missing Pulse	50%
Diesel Particulate Filter	004795.31	Missing DPF, Lines Are Broken Open	50%
Diesel Particulate Filter	003936.00 003936.16	Turbo Seals Failure, Injector Misfire, Leaking Dosing Nozzle, Leaking Coolant	50%
Diesel Particulate Filter (DPF) Soot Loading	003719.10	Excessive Ash Loading, Engine Misfire, Smoke, DOC Outlet Temperature	50%
Engine Control Unit (ECU) Power Outlet Supply	003597.01	Internal ECU Failure	1200 rpm
Engine Control Unit (ECU) Temperature	001136.00	145°C (293°F)	1200 rpm
Exhaust Gas Pressure	001209.03 001209.04	Out of Range Code Detected	50%
Exhaust Gas Pressure	001209.07	Model and Sensor Mismatch	20%
Exhaust Gas Recirculation (EGR) Mass Flow Rate	002659.02	EGR Delta P Sensor Failure, EGR Venturi Coking, or EGR Cooler Fouling	20%
Exhaust Gas Recirculation (EGR) Mass Flow Rate	002659.03 002659.04	Out of Range Code Detected	50%
Exhaust Gas Recirculation (EGR) Mass Flow Rate	002659.14 002659.15 002659.17	Venturi or Delta P Lines Restricted, Sensor Failure, Swapped Delta T Sensors, EGR Flow Error	20%
Exhaust Gas Recirculation (EGR) Temperature	000412.15	230°C (446°F)	5%
Exhaust Gas Recirculation (EGR) Temperature	000412.16	240°C (464°F)	20%
Exhaust Gas Recirculation (EGR) Temperature	000412.00	250°C (482°F)	60%
Exhaust Gas Recirculation (EGR) Valve Position	000027.03 000027.04	Out of Range Code Detected	20%
Exhaust Gas Recirculation (EGR) Valve Position	000027.07	EGR Position Mismatch	20%
Exhaust Throttle	003465.12 003465.13	Internal Sensor Error, Minimum Span Values Not met	50%
Exhaust Throttle Temperature	003465.00	145°C (293°F)	20%
Fuel Delivery Pressure	000094.18	-25kPa (4psi) for Greater Than 5 Seconds	20%

Continued on next page

BL90236,000031C -19-17JUL12-1/3

Diagnostic Specifications

Fuel Pump Pressuring Assembly	001347.01	Low Rail Pressure Mismatch and Filtered Rail Pressure is Less Than 25MPa (3626psi)	50%
Fuel Temperature	000174.00	75°C (167°F)	20% Shutdown after 30 seconds
Injector Cylinder #1	000651.02 000651.13	Part Number or QR/Calibration String Invalid	1200 rpm
Injector Cylinder #2	000652.02 000652.13	Part Number or QR/Calibration String Invalid	1200 rpm
Injector Cylinder #3	000653.02 000653.13	Part Number or QR/Calibration String Invalid	1200 rpm
Injector Cylinder #4	000654.02 000654.13	Part Number or QR/Calibration String Invalid	1200 rpm
Injector Metering Rail Pressure	000157.01	20MPa	50%
Injector Metering Rail Pressure	000157.03 000157.04	Out of Range Code Detected	50%
Intake Manifold #1 Pressure	000102.00	165kPa (24psi) — PWX Engine 230kPa (33psi) — PSX Engine N/A — PVX Engine	50%
Intake Manifold #1 Pressure	000102.03 000102.04	Out of Range Code Detected	20%
Intake Manifold #1 Pressure	000102.07	Invalid Pressure	20%
Intake Manifold #1 Pressure	000102.16	160kPa (23psi) — PWX Engine 235kPa (34psi) — PSX Engine N/A — PVX Engine	20%
Intake Manifold Temperature	000105.16	121°C (250°F)	20%
Intake Manifold Temperature	000105.00	123°C (253°F)	60% Shutdown after 30 seconds
Intake Manifold Temperature	000105.03 000105.04	Out of Range Code Detected	20%
Oil Pressure	000100.18	Less than 32kPa (5psi) @ 775 rpm Less than 112kPa (16psi) @ 1500 rpm Less than 191kPa (28psi) @ 2500 rpm	20%
Oil Pressure	000100.01	Less than 25kPa (4psi) @ 775 rpm Less than 97kPa (14psi) @ 1500 rpm Less than 176kPa (26psi) @ 2500 rpm	60% Shutdown after 30 seconds
Particulate Trap Outlet Gas Temperature	003246.00	815°C (1499°F)	50%
Particulate Trap Soot Load Percentage	003719.00	Soot at Service Regeneration Level	50%
Particulate Trap Soot Load Percentage	003719.16	Soot at Active Regeneration Level	50%
RPM Variation	001322.31	N/A	50%
Throttle Position	000051.03 000051.04	Out of Range Code Detected	20%
Throttle Position	000051.07	Throttle Position Mismatch	20%
Throttle Position	000051.14	Throttle Connectors Swapped	50%
Turbocharger 1 Turbine Inlet Temperature	001180.16	730°C (1346°F)	5%
Turbocharger 1 Turbine Inlet Temperature	001180.00	750°C (1382°F)	50%
Turbocharger Compressor Outlet Temperature	002790.16	260°C (500°F)	50%
Turbocharger Speed	000103.00	160,000 rpm — PSX and PWX Engine 155,000 rpm — PVX Engine	50%
Variable Geometry Turbocharger	000641.12 000641.13	Sensor Error, or Minimum Span Value Not Met	50%
Variable Geometry Turbo (VGT) Actuator Position	002795.07	VGT Actuator Not Responding or Out of Adjustment	50%
Variable Geometry Turbo (VGT) Actuator Position	002795.31 003673.31	Communication Loss	20%
Variable Geometry Turbo (VGT) Actuator Position	003673.07	See All Other Turbo Related Faults	50%
Variable Geometry Turbo (VGT) Actuator Temperature	000641.00	135°C (275°F)	20%

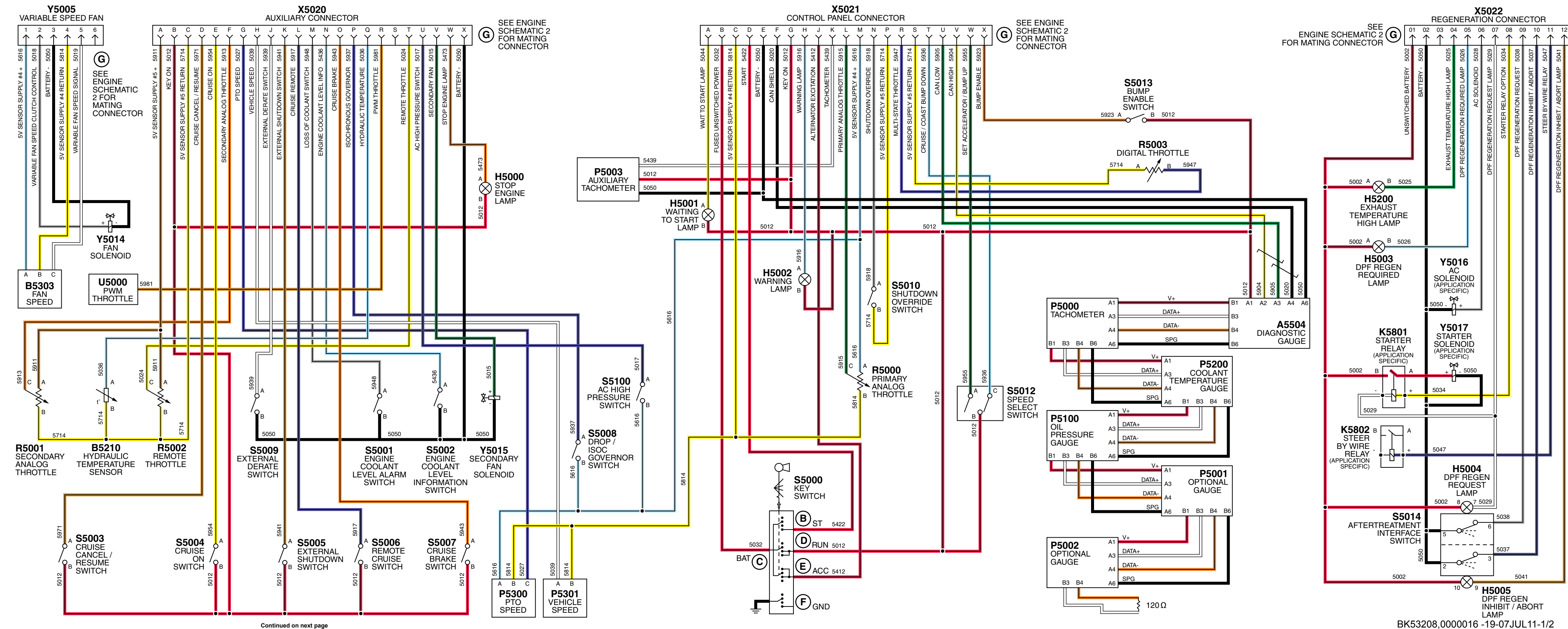
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BL90236,000031C -19-17JUL12-2/3

Diagnostic Specifications

Water-In-Fuel	000097.16	Water Detected	50%
Water-In-Fuel	000097.00	Water Detected	50% Shutdown after 30 seconds

BL90236,000031C -19-17JUL12-3/3

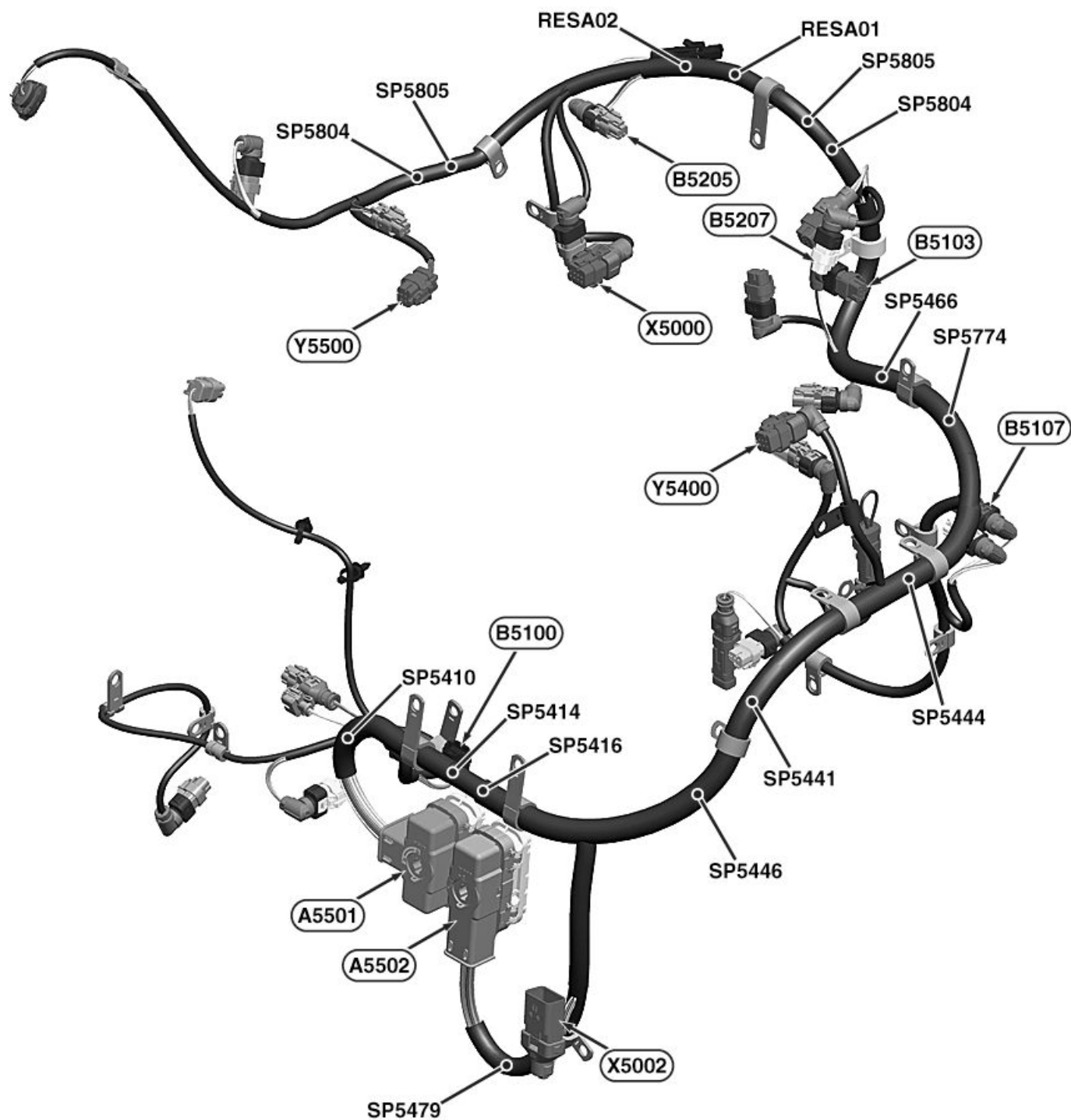


A5504—Diagnostic Gauge	S5004—Cruise On Switch	X5020-R—[5981 Brown] PWM Throttle	X5021-X—[5923 Orange] Bump Enable
A5504-B1—[Red] Voltage Positive	S5005—External Shutdown Switch	X5020-T—[5024 Yellow] Remote Throttle	X5022—Regeneration Connector
A5504-B3—[White] Data Positive	S5006—Remote Cruise Switch	X5020-U—[5017 Violet] AC High Pressure Switch	X5022-1—[5002 Red] Unswitched Battery
A5504-B4—[Orange] Data Return	S5007—Cruise Brake Switch	X5020-V—[5015 Green] Secondary Fan	X5022-2—[5050 Black] Battery Negative
A5504-B6—[Black] Single Point Ground	S5008—Drop/Isochronous Governor Switch	X5020-W—[5473 Orange] Stop Engine Lamp	X5022-4—[5025 Green] Exhaust Temperature High Lamp
B—Start	S5009—External Derate Switch	X5020-X—[5050 Black] Battery Negative	X5022-5—[5026 Blue] DPF Regeneration Required Lamp
B5303—Fan Speed	S5010—Shutdown Override Switch	X5021—Control Panel Connector	X5022-6—[5028 Gray] AC Solenoid
B5210—Hydraulic Temperature Sensor	S5012—Speed Select Switch	X5021-A—[5044 Yellow] Wait to Start Lamp	X5022-7—[5026 Blue] DPF Regeneration Request Lamp
C—Battery	S5013—Bump Enable Switch	X5021-B—[5032 Red] Fused Unswitched Power	X5022-8—[5034 Yellow] Starter Relay Option
D—Run	S5014—Aftertreatment Interface Switch	X5021-C—[5814 Yellow] 5 Volt Sensor Supply #4 Return	X5022-9—[5038 Gray] DPF Regeneration Request
E—Accessory	S5100—AC High Pressure Switch	X5021-D—[5422 Red] Start	X5022-10—[5037 Violet] DPF Regeneration Inhibit/Abort
F—Ground	U5000—PWM Throttle	X5021-E—[5050 Black] Battery Negative	X5022-11—[5047 Violet] Steer By Wire Relay
G—See Engine Schematic 2 For Mating Connector	X5020—Auxiliary Connector	X5021-F—[5020 Black] CAN Shield	X5022-12—[5041 Brown] DPF Regeneration Inhibit/Abort Lamp
H5000—Stop Engine Lamp	X5020-A—[5911 Brown] 5 Volt Sensor Supply #5 Positive	X5021-G—[5012 Red] Key On	Y5005—Variable Speed Fan
H5001—Waiting to Start Lamp	X5020-B—[5012 Red] Key On	X5021-H—[5916 Blue] Warning Lamp	Y5005-1—[5616 Blue] 5 Volt Sensor Supply #4 Positive
H5002—Warning Lamp	X5020-C—[5714 Yellow] 5 Volt Sensor Supply #5 Return	X5021-J—[5412 Red] Alternator Excitation	Y5005-2—[5018 Gray] Variable Fan Speed Clutch Control
H5003—DPF Regeneration Required Lamp	X5020-D—[5971 Brown] Cruise Cancel/Resume	X5021-K—[5439 White] Tachometer	Y5005-3—[5050 Black] Battery Negative
H5004—DPF Regeneration Request Lamp	X5020-E—[5954 Yellow] Cruise On	X5021-L—[5915 Green] Primary Analog Throttle	Y5005-4—[5814 Yellow] 5 Volt Sensor Supply #4 Return
H5005—DPF Regeneration Inhibit/Abort Lamp	X5020-F—[5913 Orange] Secondary Analog Throttle	X5021-M—[5616 Blue] 5 Volt Sensor Supply #4 Positive	Y5005-5—[5019 White] Variable Fan Speed Signal
H5200—Exhaust Temperature High Lamp	X5020-G—[5027 Violet] PTO Speed	X5021-N—[5918 Gray] Shutdown Override	Y5014—Fan Solenoid
K5801—Starter Relay (Application Specific)	X5020-H—[5039 White] Vehicle Speed	X5021-P—[5714 Yellow] 5 Volt Sensor Supply #5 Return	Y5015—Secondary Fan Solenoid
K5802—Steer By Wire Relay (Application Specific)	X5020-I—[5939 White] External Derate Switch	X5021-R—[5947 Violet] Multi-State Throttle	Y5016—AC Solenoid (Application Specific)
P5000—Tachometer	X5020-J—[5941 Brown] External Shutdown Switch	X5021-S—[5714 Yellow] 5 Volt Sensor Supply #5 Return	Y5017—Starter Solenoid (Application Specific)
P5001—Optional Gauge 1	X5020-K—[5941 Brown] External Shutdown Switch	X5021-T—[5936 Blue] Cruise/Coast Bump Down	
P5002—Optional Gauge 2	X5020-L—[5917 Violet] Cruise Remote	X5021-U—[5905 Green] CAN Low	
P5003—Auxiliary Tachometer	X5020-M—[5948 Gray] Loss of Coolant Switch	X5021-V—[5904 Yellow] CAN High	
P5100—Oil Pressure Gauge	X5020-N—[5436 Blue] Engine Coolant Level Information	X5021-W—[5955 Green] Set Accelerator/Bump Up	
P5200—Coolant Temperature Gauge	X5020-O—[5943 Orange] Cruise Brake		
P5300—PTO Speed	X5020-P—[5937 Violet] Isochronous Governor		
P5301—Vehicle Speed	X5020-Q—[5036 Blue] Hydraulic Temperature Sensor		
R5000—Primary Analog Throttle			
R5001—Secondary Analog Throttle			
R5002—Remote Throttle			
R5003—Digital Throttle			
S5000—Key Switch			
S5001—Engine Coolant Level Alarm Switch			
S5002—Engine Coolant Level Information Switch			
S5003—Cruise Cancel/Resume Switch			

BK53208,0000016 -19-07JUL11-2/2

Wire Splice Location Diagrams

NOTE: The harness diagrams provided are for a typical John Deere supplied OEM harness. Splice locations may not apply to all applications.



Splice Locations for Engine Wire Harness RE549103, Option Code 84BT

RG20174—UN—19JUL11

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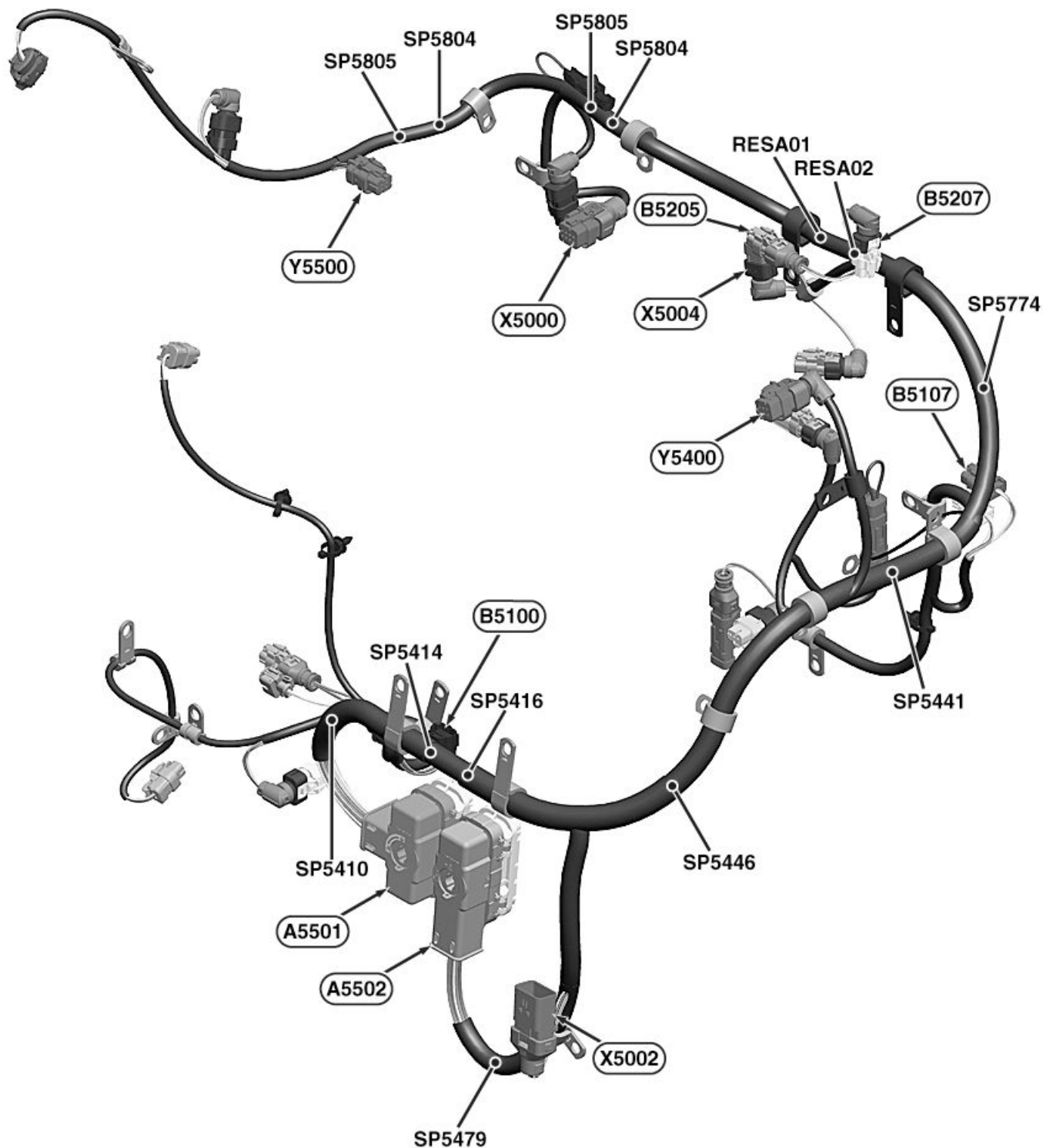
BK53208,0000023 -19-20JUL11-1/5

Diagnostic Specifications

A5501—ECU Harness Connector ECU1	B5205—Charge Air Cooler Outlet Temperature Sensor Connector	SP5410—Splice 5410	SP5805—Splice 5805 (2)
A5502—ECU Harness Connector ECU2	B5207—EGR Temperature Sensor Connector	SP5414—Splice 5414	X5000—Fuel Injector Harness Connector
B5100—Fuel Rail Pressure Sensor Connector	RESA01—Engine CAN Terminating Resistor	SP5416—Splice 5416	X5002—Auxiliary Harness Interconnect
B5103—EGR Flow Sensor Connector	Splice	SP5441—Splice 5441	Y5400—EGR Valve Connector
B5107—Low-Pressure Fuel Pressure Sensor Connector	RESA02—Engine CAN Terminating Resistor	SP5444—Splice 5444	Y5500—VGT Actuator Connector
	Splice	SP5446—Splice 5446	
		SP5466—Splice 5466	
		SP5479—Splice 5479	
		SP5774—Splice 5774	
		SP5804—Splice 5804 (2)	

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BK53208,0000023 -19-20JUL11-2/5



Splice Locations for Engine Wire Harness RE549104, Option Code 84BY

RG20175—UN—19JUL11

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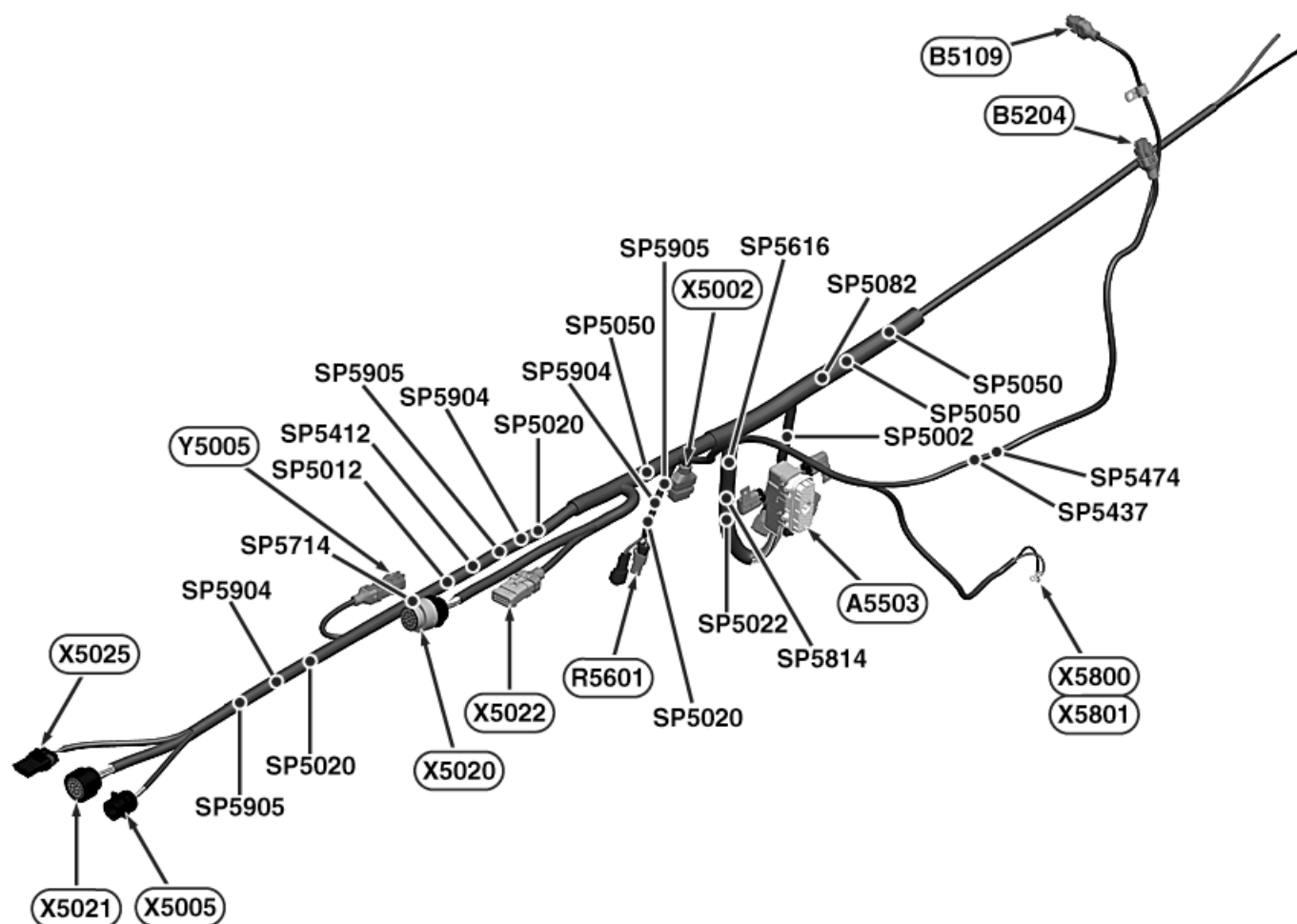
BK53208,0000023 -19-20JUL11-3/5

Diagnostic Specifications

A5501—ECU Harness Connector ECU1	B5207—EGR Temperature Sensor Connector	SP5441—Splice 5441	X5004—Cold Start Aid Interface Interconnect
A5502—ECU Harness Connector ECU2	RESA01—Engine CAN Terminating Resistor	SP5446—Splice 5446	Y5400—EGR Valve Connector
B5100—Fuel Rail Pressure Sensor Connector	RESA02—Engine CAN Terminating Resistor	SP5479—Splice 5479	Y5500—VGT Actuator Connector
B5107—Low-Pressure Fuel Pressure Sensor Connector	SP5410—Splice 5410	SP5774—Splice 5774	
B5205—Charge Air Cooler Outlet Temperature Sensor Connector	SP5414—Splice 5414	SP5804—Splice 5804 (2)	
	SP5416—Splice 5416	SP5805—Splice 5805 (2)	
		X5000—Fuel Injector Harness Connector	
		X5002—Auxiliary Harness Interconnect	

Continued on next page

BK53208,0000023 -19-20JUL11-4/5



Splice Locations for OEM Control Panel Wire Harness RE549105, Option Codes 918R and 918T

A5503—ECU Harness Connector	SP5020—Splice 5020 (3)	SP5814—Splice 5814	X5022—Regeneration Connector
ECU3	SP5022—Splice 5022	SP5904—Splice 5904 (3)	X5025—JDLink Connector
B5109—DPF Differential Pressure	SP5050—Splice 5050 (3)	SP5905—Splice 5905 (3)	X5800—Starter Relay Coil
Sensor Connector	SP5082—Splice 5082	X5002—Auxiliary Harness	(Power)
B5204—Exhaust Filter	SP5412—Splice 5412	Interconnect	X5801—Starter Relay Coil
Temperature Module	SP5437—Splice 5437	X5005—Diagnostic Connector	(Ground)
Connector	SP5474—Splice 5474	X5020—Auxiliary Connector	Y5005—Variable Speed Fan
R5601—CAN Terminator	SP5616—Splice 5616	X5021—Control Panel Connector	Connector
Connector	SP5714—Splice 5714		
SP5002—Splice 5002			
SP5012—Splice 5012			

RG20176—UN—19JUL11

BK53208,0000023 -19-20JUL11-5/5

Index

	Page		Page
A		B	
Actuator		Balancer Shaft	
Definition of.....	--6	End Play.....	02-050-2
After-treatment Devices		Inspection	
Specifications.....	06-200-23	Measurement	02-050-4
Aftertreatment System		Installation.....	02-050-1
Component Location Diagram 1	03-137-1	Lower Idler Gear	
Theory of Operation.....	03-137-1	Timing.....	02-050-5
Aftertreatment Verification Procedure.....	04-155-1	Removal.....	02-050-3
Air Intake and Exhaust System		Balancer Shaft Bushing	
Component Location Diagram 1	03-135-1	Removal and Installation.....	02-050-7
Component Location Diagram 2	03-135-2	Balancer Shaft Gear	
Component Location Diagram 3	03-135-3	Check and Replace.....	02-050-8
Component Location Diagram 4	03-135-4	Balancer Shaft Thrust Plate	
Component Location Diagram 5		Measure Clearance	
PWX engines.....	03-135-5	Thickness	02-050-9
Component Location Diagram 6		BAP	
PSX Engine	03-135-6	Definition of	--6
Specifications.....	06-200-16	Barometric air pressure	
Air Intake System - PSX		Definition of	--6
Theory of Operation.....	03-135-11	Barometric Air Pressure Sensor	
Air Intake System - PVX		Theory of Operation	03-140-20
Theory of Operation.....	03-135-7	Battery Handling, Safety	
Air Intake System - PWX		Safety, Battery Handling	01-000-6
Theory of Operation.....	03-135-9	Belt	
Air intake system, check.....	02-010-1	Wear Check	02-070-1
Air Throttle		Belt Tensioner	
Theory of Operation.....	03-135-12	Installation.....	02-070-1
Air throttle actuator		Removal.....	02-070-2
Installation.....	02-080-1	Spring Tension Check.....	02-070-3
Removal.....	02-080-2	Blow-By	
Air Throttle Actuator		Test	04-155-16
Cleaning		BlueTooth	04-160-3
Carbon Removal Procedure.....	04-155-12, 04-160-1	Bolt and screw torque values	
Component Information	03-140-42	Metric	06-200-1
Alternator		Boost	
Installation.....	02-100-1	Definition of	--6
Removal.....	02-100-3	Break-in Plus engine oil.....	01-002-5
Analog		Break-in, engine	
Definition of	--6	Guidelines	02-010-4
Analog Throttle		Perform break-in	02-010-8
Theory of Operation.....	03-140-1		
Application		C	
Definition of	--6	CAC	
Auxiliary drive (Camshaft gear-driven)		Definition of	--6
replacement	02-040-6	Calibration	
Auxiliary drive (Crankshaft belt-driven)		DOC	04-160-59
removal	02-040-6	DPF.....	04-160-60
Auxiliary drive cover (Camshaft gear-driven)		Electronic Injector	04-160-69
installation.....	02-050-15	Calibrations	
removal	02-050-15	EGR Valve Learn Value Reset.....	04-160-62
		camshaft	
		Journal	
		Measurement	02-050-16

Continued on next page

	Page		Page
Camshaft		Clear Aftertreatment Latched DTC	
Bushing		Test Instructions	04-160-2
Replacement	02-050-13	Cold Start Aid	
Inspection	02-050-14	Theory of Operation	03-135-13
Installation	02-050-9	Combination throttle	
Lobes		Description	03-140-22
Lift measurement	02-050-17	Schematic	03-140-22
Removal	02-050-10	Throttle range	03-140-22
Thrust plate		Commercial engine designation	01-001-4
Measure clearance and thickness	02-050-17	Component location	
Timing Check	04-155-3	Diagram 1	02-110-2
Visual inspection	02-050-11	Component Location	
Camshaft and upper idler gear		Diagram 2	02-110-3
timing	02-050-11	Diagram 3	02-110-5
Camshaft position sensor		Diagram 4	02-110-7
Installation	02-110-9	Diagram 5	02-110-8
Removal	02-110-9	Component location diagram	
Camshaft Position Sensor		Cooling system	03-123-1
Theory of Operation	03-140-18	Component Location Diagrams	
Camshaft, Balancing Shaft, and Timing		Engine Sectional View	03-120-1
Gear Train		Compression Test	
Specifications	06-200-11	Engine Test Instructions	04-160-8
CAN		Connecting Rod	
Definition of	--6	Cap Screws Torque-Turn	02-030-7
Theory of Operation	03-140-22	Connecting Rod and Cap	
CAN Diagnostics Procedure	04-155-4	Inspection	02-030-4
CAN Message Not Received	04-155-9	Connecting Rod Bearings	
CAN Message Received Error	04-155-10	Rod and Crankshaft in Engine	
CAN Message Received Is Incorrect	04-155-11	Inspection and Measurement	02-030-6
Charge air cooler		Connecting Rod Pin Bore	
Definition of	--6	Cleaning and Inspection	02-030-7
Charge Air Cooler		Connecting Rods	
Test	04-155-13	General Information	02-030-3
Charge air cooler outlet air temperature		Preliminary Checks	02-030-15
sensor		Connecting Rods Bearing	
Characteristics	06-210-33	Inspection and Measurement	02-030-5
Charge Air Cooler Outlet Air Temperature		Connecting Rods Center-to-center Bore	
Sensor		Measurement	02-030-2
Theory of Operation	03-140-10	Connecting to Service ADVISOR	
Charge air cooler outlet temperature sensor		BlueTooth	04-160-3
Installation	02-110-10	Connector Repair Information Table	06-210-29
Removal	02-110-10	Connectors, electrical	
Check		General information	02-112-1
Engine cranking speed	04-155-20	Control Unit Information and Overview	04-160-5
Engine oil pressure	04-155-21	Controller Area Network	
Turbocharger oil seal leak	04-155-55	Bus	03-140-22
Circuit malfunctions		Definition of	--6
Locations	04-160-65	Theory of Operation	03-140-22
Troubleshooting	04-160-63	Wiring harness connection	03-140-22
Circuit Power		Coolant	
Definition of	--6	Additional information	01-002-11
Clean		Diesel engine	01-002-8
Air Throttle Actuator		John Deere Cool-Gard II Coolant	
Carbon Removal Procedure	04-155-12, 04-160-1	Extender	01-002-10
EGR Valve		Supplemental additives	01-002-8
Carbon Removal Procedure	04-155-12, 04-160-1	Testing	01-002-9
		Warm temperature climates	01-002-9
		Coolant Heater	
		Servicing	02-070-4

Continued on next page

	Page		Page
Coolant Pump		Crankshaft, Main Bearings and Flywheel	
Visual Inspection.....	02-070-5	Specifications.....	06-200-9
Coolant Pump Assembly		Cruise control operation	
Installation.....	02-070-6	Cancel/Resume function.....	03-140-23
Removal.....	02-070-9	Engine speed.....	03-140-23
Cooling system		Secondary.....	03-140-23
Check and service.....	02-010-1	Cylinder block	
Component location diagram.....	03-123-1	Complete Dis-assembly.....	02-030-13
Diagnostics		Tear Down.....	02-030-13
Coolant in oil or oil in coolant.....	04-150-3	Cylinder Block	
Coolant leaking from Weep Hole.....	04-150-3	Cleaning and Inspection.....	02-030-8
Coolant system loses pressure.....	04-150-3	Final Assembly.....	02-030-1
EGR cooler leaking.....	04-150-16	Measurement.....	02-030-12
Fuel in coolant.....	04-150-45	Cylinder Block O-rings	
Pressure Test.....	04-155-15	Installation.....	02-030-14
Test.....	04-155-15	Cylinder Block Top Deck	
Theory.....	03-123-2	Cleaning and Inspection.....	02-020-1
Cooling System		Cylinder Block, Liners, Pistons and Rods	
Deaeration.....	02-070-12	Specifications.....	06-200-6
Specifications.....	06-200-14	Cylinder Cutout Test.....	04-160-6
CoolScan.....	01-002-7	Cylinder Electronic Compression Test	
Crankcase Pressure		Engine Test Instructions.....	04-160-8
Test.....	04-155-16	Cylinder head	
Crankcase vent system		Gasket construction and diagnostics.....	03-120-4
Check.....	02-010-2	Cylinder Head	
Crankshaft		Cleaning.....	02-020-1
End play, check.....	02-040-1	Inspection.....	02-020-1
Grinding guidelines.....	02-040-10	Installation.....	02-020-2
Grinding specifications.....	02-040-1	Removal.....	02-020-14
Inspect.....	02-040-2	Thickness Measurement.....	02-020-19
Install.....	02-040-3	Cylinder head (four-valve head)	
Journals, measure.....	02-040-11	Check flatness.....	02-020-1
Main bearing ID, measure.....	02-040-11	Cylinder Head and Valves	
Removal.....	02-040-5	Specifications.....	06-200-3, 06-200-20
Thrust journal and bearing, measure.....	02-040-17	Cylinder Head Gasket	
Timing Check.....	04-155-3	Inspection.....	02-020-20
Crankshaft Front Oil Seal		Cylinder Liner	
Installation.....	02-040-8	Cleaning.....	02-030-15
Removal.....	02-040-7	Installation.....	02-030-16
Crankshaft Main Bearing Cap		Cylinder Liner Flange	
Installation.....	02-040-12	Measurement.....	02-030-21
Oil Clearance Check.....	02-040-13	Cylinder liners	
Removal.....	02-040-14	Install packing and O-rings.....	02-030-22
Crankshaft position sensor		Cylinder Liners	
Installation.....	02-110-11	O-ring Bore	
Removal.....	02-110-11	Cleaning.....	02-030-22
Crankshaft Position Sensor		Removal.....	02-030-17
Definition of.....	--6	Standout Measurement.....	02-030-19
Theory of Operation.....	03-140-17	Troubleshooting Guide.....	02-030-15
Crankshaft Pulley		Visual Inspection.....	02-030-20
Installation.....	02-040-19	Cylinder Misfire Test.....	04-160-12
Removal.....	02-040-21		
Crankshaft Rear Oil Seal			
Installation.....	02-040-14		
Removal.....	02-040-16		
Crankshaft Timing Wheel			
Installation.....	02-040-18		
Removal.....	02-040-18		

D

Data parameter description	
Service ADVISOR.....	04-160-14
Data points used in Service ADVISOR.....	04-160-14
Definition of Terms.....	--6
Derate.....	03-140-28

Continued on next page

	Page		Page
Determining Engine Speed and Piston Position	03-140-23	000101.16	04-163-42
Diagnostic gauge		000102.00	04-162-1
Clearing stored codes	04-160-28	000102.03	04-162-6
Exhaust Filter Service Recovery	04-160-22	000102.04	04-162-11
Viewing active codes	04-160-19	000102.07	04-162-16
Viewing data parameters	04-160-20	000102.16	04-162-22
Viewing stored codes	04-160-29	000103.00	04-162-23
Diagnostic Instructions and Information		000103.02	04-162-27
Air Throttle Actuator Learn Value Reset		000103.05	04-162-32
Test Instructions	04-160-1	000105.00	04-162-37
Diagnostic Test Box		000105.03	04-162-42
Using Diagnostic Test Box	04-160-31	000105.04	04-162-46
Diagnostic Trouble Code		000105.15	04-162-51
Definition of	--6	000105.16	04-162-52
Diagnostic Trouble Code (DTC)		000107.00	04-162-53
Group Locator	04-160-36, 04-160-46	000107.15	04-162-56
Diagnostic Trouble Codes (DTCs)		000107.16	04-162-57
Clearing stored codes	04-160-57	000108.02	04-165-42
Diagnostic gauge		000108.07	04-165-44
Clearing stored codes	04-160-28	000110.00	04-163-43
Viewing active codes	04-160-19	000110.03	04-163-49
Viewing data parameters	04-160-20	000110.04	04-163-53
Viewing stored codes	04-160-29	000110.15	04-163-58
SPN/FMI		000110.16	04-163-59
000027.03	04-166-1	000110.17	04-163-60
000027.04	04-166-7	000111.01	04-163-61
000027.07	04-166-14	000111.07	04-163-65
000028.03	04-165-1	000111.17	04-163-71
000028.04	04-165-6	000111.18	04-163-76
000028.14	04-165-12	000137.00	04-178-1
000029.03	04-165-13	000137.01	04-178-2
000029.04	04-165-19	000157.01	04-164-38
000029.14	04-165-26	000157.03	04-164-41
000051.03	04-166-15	000157.04	04-164-46
000051.04	04-166-21	000157.16	04-164-52
000051.07	04-166-28	000157.17	04-164-55
000051.14	04-166-29	000157.18	04-164-56
000091.03	04-165-27	000158.01	04-178-2
000091.04	04-165-33	000158.12	04-165-46
000091.09	04-165-40	000160.02	04-178-3
000091.14	04-165-41	000168.01	04-165-48
000094.03	04-164-1	000168.16	04-165-55
000094.04	04-164-6	000168.18	04-165-59
000094.16	04-164-12	000174.00	04-164-57
000094.17	04-164-16	000174.03	04-164-62
000094.18	04-164-17	000174.04	04-164-67
000097.00	04-164-22	000174.16	04-164-72
000097.03	04-164-28	000189.31	04-165-60
000097.04	04-164-32	000190.00	04-161-1
000097.16	04-164-37	000190.16	04-161-2
000100.01	04-163-1	000237.02	04-178-3
000100.02	04-163-7	000237.13	04-178-4
000100.03	04-163-13	000237.31	04-178-5
000100.04	04-163-19	000412.00	04-162-58
000100.18	04-163-26	000412.03	04-162-63
000101.00	04-163-27	000412.04	04-162-67
000101.03	04-163-32	000412.15	04-162-72
000101.04	04-163-37	000412.16	04-162-73
		000443.00	04-178-6

Continued on next page

	Page		Page
000443.01	04-178-7	000876.06	04-178-25
000611.03	04-164-73	000970.31	04-178-25
000611.04	04-164-78	000971.31	04-178-28
000612.03	04-164-83	000974.03	04-165-66
000612.04	04-164-88	000974.04	04-165-72
000629.11	04-165-61	001069.31	04-178-32
000629.12	04-165-63	001110.31	04-178-32
000629.13	04-165-65	001136.00	04-165-79
000636.02	04-161-3	001136.02	04-165-82
000636.05	04-161-7	001136.16	04-165-83
000636.06	04-161-10	001172.12	04-162-94
000636.08	04-161-16	001176.07	04-162-96
000636.10	04-161-20	001176.12	04-162-99
000637.02	04-161-26	001180.00	04-167-1
000637.05	04-161-30	001180.16	04-167-8
000637.06	04-161-34	001209.03	04-162-102
000637.07	04-161-40	001209.04	04-162-108
000637.08	04-161-44	001209.07	04-162-114
000637.10	04-161-48	001321.05	04-178-32
000640.11	04-178-8	001321.06	04-178-36
000640.31	04-178-9	001321.16	04-178-39
000641.00	04-166-33	001321.31	04-178-40
000641.05	04-166-37	001322.31	04-161-53
000641.06	04-166-41	001347.01	04-164-149
000641.07	04-166-45	001347.05	04-164-152
000641.09	04-166-47	001347.06	04-164-158
000641.12	04-166-52	001347.16	04-164-163
000641.13	04-166-55	001347.18	04-164-166
000641.16	04-166-58	001550.05	04-178-42
000641.31	04-166-59	001550.06	04-178-43
000647.03	04-178-10	001569.31	04-165-84
000647.05	04-178-11	001638.03	04-178-44
000647.06	04-178-15	001638.04	04-178-48
000647.07	04-178-19	001639.01	04-178-53
000651.02	04-164-93	001639.16	04-178-57
000651.05	04-164-95	001639.18	04-178-61
000651.06	04-162-79, 04-164-100	002002.09	04-179-1
000651.13	04-164-105	002002.14	04-179-1
000651.18	04-164-106	002002.19	04-179-1
000652.02	04-164-107	002003.09	04-179-1
000652.05	04-164-109	002003.14	04-179-1
000652.06	04-164-114	002003.19	04-179-1
000652.13	04-164-119	002004.09	04-179-1
000652.18	04-164-120	002004.14	04-179-2
000653.02	04-164-121	002004.19	04-179-2
000653.05	04-164-123	002005.09	04-179-2
000653.06	04-164-128	002005.14	04-179-2
000653.13	04-164-133	002005.19	04-179-2
000653.18	04-164-134	002006.09	04-179-2
000654.02	04-164-135	002006.14	04-179-2
000654.05	04-164-137	002006.19	04-179-3
000654.06	04-164-142	002007.09	04-179-3
000654.13	04-164-147	002007.14	04-179-3
000654.18	04-164-148	002007.19	04-179-3
000676.03	04-162-84	002008.09	04-179-3
000676.05	04-162-74	002008.14	04-179-3
000676.14	04-162-89	002008.19	04-179-3
000695.19	04-178-23	002009.09	04-179-4
000876.05	04-178-24	002009.14	04-179-4

Continued on next page

	Page		Page
002009.19	04-179-4	002029.14	04-179-12
002010.09	04-179-4	002029.19	04-179-12
002010.14	04-179-4	002030.09	04-179-13
002010.19	04-179-4	002030.14	04-179-13
002011.09	04-179-4	002030.19	04-179-13
002011.14	04-179-5	002031.09	04-179-13
002011.19	04-179-5	002031.14	04-179-13
002012.09	04-179-5	002031.19	04-179-13
002012.14	04-179-5	002032.09	04-179-13
002012.19	04-179-5	002032.14	04-179-14
002013.09	04-179-5	002032.19	04-179-14
002013.14	04-179-5	002033.09	04-179-14
002013.19	04-179-6	002033.14	04-179-14
002014.09	04-179-6	002033.19	04-179-14
002014.14	04-179-6	002034.09	04-179-14
002014.19	04-179-6	002034.14	04-179-14
002015.09	04-179-6	002034.19	04-179-15
002015.14	04-179-6	002035.09	04-179-15
002015.19	04-179-6	002035.14	04-179-15
002016.09	04-179-7	002035.19	04-179-15
002016.14	04-179-7	002036.09	04-179-15
002016.19	04-179-7	002036.14	04-179-15
002017.09	04-179-7	002036.19	04-179-15
002017.14	04-179-7	002037.09	04-179-16
002017.19	04-179-7	002037.14	04-179-16
002018.09	04-179-7	002037.19	04-179-16
002018.14	04-179-8	002038.09	04-179-16
002018.19	04-179-8	002038.14	04-179-16
002019.09	04-179-8	002038.19	04-179-16
002019.14	04-179-8	002039.09	04-179-16
002019.19	04-179-8	002039.14	04-179-17
002020.09	04-179-8	002039.19	04-179-17
002020.14	04-179-8	002040.09	04-179-17
002020.19	04-179-9	002040.14	04-179-17
002021.09	04-179-9	002040.19	04-179-17
002021.14	04-179-9	002041.09	04-179-17
002021.19	04-179-9	002041.14	04-179-17
002022.09	04-179-9	002041.19	04-179-18
002022.14	04-179-9	002042.09	04-179-18
002022.19	04-179-9	002042.14	04-179-18
002023.09	04-179-10	002042.19	04-179-18
002023.14	04-179-10	002043.09	04-179-18
002023.19	04-179-10	002043.14	04-179-18
002024.09	04-179-10	002043.19	04-179-18
002024.14	04-179-10	002044.09	04-179-19
002024.19	04-179-10	002044.14	04-179-19
002025.09	04-179-10	002044.19	04-179-19
002025.14	04-179-11	002045.09	04-179-19
002025.19	04-179-11	002045.14	04-179-19
002026.09	04-179-11	002045.19	04-179-19
002026.14	04-179-11	002046.09	04-179-19
002026.19	04-179-11	002046.14	04-179-20
002027.09	04-179-11	002046.19	04-179-20
002027.14	04-179-11	002047.09	04-179-20
002027.19	04-179-12	002047.14	04-179-20
002028.09	04-179-12	002047.19	04-179-20
002028.14	04-179-12	002048.09	04-179-20
002028.19	04-179-12	002048.14	04-179-20
002029.09	04-179-12	002048.19	04-179-21

Continued on next page

	Page		Page
002049.09	04-179-21	002068.19	04-179-29
002049.14	04-179-21	002069.09	04-179-29
002049.19	04-179-21	002069.14	04-179-29
002050.09	04-179-21	002069.19	04-179-30
002050.14	04-179-21	002070.09	04-179-30
002050.19	04-179-21	002070.14	04-179-30
002051.09	04-179-22	002070.19	04-179-30
002051.14	04-179-22	002071.09	04-179-30
002051.19	04-179-22	002071.14	04-179-30
002052.09	04-179-22	002071.19	04-179-30
002052.14	04-179-22	002072.09	04-179-31
002052.19	04-179-22	002072.14	04-179-31
002053.09	04-179-22	002072.19	04-179-31
002053.14	04-179-23	002073.09	04-179-31
002053.19	04-179-23	002073.14	04-179-32
002054.09	04-179-23	002073.19	04-179-32
002054.14	04-179-23	002074.09	04-179-32
002054.19	04-179-23	002074.14	04-179-32
002055.09	04-179-23	002074.19	04-179-32
002055.14	04-179-23	002075.09	04-179-32
002055.19	04-179-24	002075.14	04-179-32
002056.09	04-179-24	002075.19	04-179-33
002056.14	04-179-24	002076.09	04-179-33
002056.19	04-179-24	002076.14	04-179-33
002057.09	04-179-24	002076.19	04-179-33
002057.14	04-179-24	002077.09	04-179-33
002057.19	04-179-24	002077.14	04-179-33
002058.09	04-179-25	002077.19	04-179-33
002058.14	04-179-25	002078.09	04-179-34
002058.19	04-179-25	002078.14	04-179-34
002059.09	04-179-25	002078.19	04-179-34
002059.14	04-179-25	002079.09	04-179-34
002059.19	04-179-25	002079.14	04-179-34
002060.09	04-179-25	002079.19	04-179-34
002060.14	04-179-26	002080.09	04-179-34
002060.19	04-179-26	002080.14	04-179-35
002061.09	04-179-26	002080.19	04-179-35
002061.14	04-179-26	002081.09	04-179-35
002061.19	04-179-26	002081.14	04-179-35
002062.09	04-179-26	002081.19	04-179-35
002062.14	04-179-26	002082.09	04-179-35
002062.19	04-179-27	002082.14	04-179-35
002063.09	04-179-27	002082.19	04-179-36
002063.14	04-179-27	002083.09	04-179-36
002063.19	04-179-27	002083.14	04-179-36
002064.09	04-179-27	002083.19	04-179-36
002064.14	04-179-27	002084.09	04-179-36
002064.19	04-179-27	002084.14	04-179-36
002065.09	04-179-28	002084.19	04-179-36
002065.14	04-179-28	002085.09	04-179-37
002065.19	04-179-28	002085.14	04-179-37
002066.09	04-179-28	002085.19	04-179-37
002066.14	04-179-28	002086.09	04-179-37
002066.19	04-179-28	002086.14	04-179-37
002067.09	04-179-28	002086.19	04-179-37
002067.14	04-179-29	002087.09	04-179-37
002067.19	04-179-29	002087.14	04-179-38
002068.09	04-179-29	002087.19	04-179-38
002068.14	04-179-29	002088.09	04-179-38

Continued on next page

	Page		Page
002088.14	04-179-38	002108.09	04-179-46
002088.19	04-179-38	002108.14	04-179-47
002089.09	04-179-38	002108.19	04-179-47
002089.14	04-179-38	002109.09	04-179-47
002089.19	04-179-39	002109.14	04-179-47
002090.09	04-179-39	002109.19	04-179-47
002090.14	04-179-39	002110.09	04-179-47
002090.19	04-179-39	002110.14	04-179-47
002091.09	04-179-39	002110.19	04-179-48
002091.14	04-179-39	002111.09	04-179-48
002091.19	04-179-39	002111.14	04-179-48
002092.09	04-179-40	002111.19	04-179-48
002092.14	04-179-40	002112.09	04-179-48
002092.19	04-179-40	002112.14	04-179-48
002093.09	04-179-40	002112.19	04-179-48
002093.14	04-179-40	002113.09	04-179-49
002093.19	04-179-40	002113.14	04-179-49
002094.09	04-179-40	002113.19	04-179-49
002094.14	04-179-41	002114.09	04-179-49
002094.19	04-179-41	002114.14	04-179-49
002095.09	04-179-41	002114.19	04-179-49
002095.14	04-179-41	002115.09	04-179-49
002095.19	04-179-41	002115.14	04-179-50
002096.09	04-179-41	002115.19	04-179-50
002096.14	04-179-41	002116.09	04-179-50
002096.19	04-179-42	002116.14	04-179-50
002097.09	04-179-42	002116.19	04-179-50
002097.14	04-179-42	002117.09	04-179-50
002097.19	04-179-42	002117.14	04-179-50
002098.09	04-179-42	002117.19	04-179-51
002098.14	04-179-42	002118.09	04-179-51
002098.19	04-179-42	002118.14	04-179-51
002099.09	04-179-43	002118.19	04-179-51
002099.14	04-179-43	002119.09	04-179-51
002099.19	04-179-43	002119.14	04-179-51
002100.09	04-179-43	002119.19	04-179-51
002100.14	04-179-43	002120.09	04-179-52
002100.19	04-179-43	002120.14	04-179-52
002101.09	04-179-43	002120.19	04-179-52
002101.14	04-179-44	002121.09	04-179-52
002101.19	04-179-44	002121.14	04-179-52
002102.09	04-179-44	002121.19	04-179-52
002102.14	04-179-44	002122.09	04-179-52
002102.19	04-179-44	002122.14	04-179-53
002103.09	04-179-44	002122.19	04-179-53
002103.14	04-179-44	002123.09	04-179-53
002103.19	04-179-45	002123.14	04-179-53
002104.09	04-179-45	002123.19	04-179-53
002104.14	04-179-45	002124.09	04-179-53
002104.19	04-179-45	002124.14	04-179-53
002105.09	04-179-45	002124.19	04-179-54
002105.14	04-179-45	002125.09	04-179-54
002105.19	04-179-45	002125.14	04-179-54
002106.09	04-179-46	002125.19	04-179-54
002106.14	04-179-46	002126.09	04-179-54
002106.19	04-179-46	002126.14	04-179-54
002107.09	04-179-46	002126.19	04-179-54
002107.14	04-179-46	002127.09	04-179-55
002107.19	04-179-46	002127.14	04-179-55

Continued on next page

	Page		Page
002127.19	04-179-55	002147.14	04-179-63
002128.09	04-179-55	002147.19	04-179-63
002128.14	04-179-55	002148.09	04-179-64
002128.19	04-179-55	002148.14	04-179-64
002129.09	04-179-55	002148.19	04-179-64
002129.14	04-179-56	002149.09	04-179-64
002129.19	04-179-56	002149.14	04-179-64
002130.09	04-179-56	002149.19	04-179-64
002130.14	04-179-56	002150.09	04-179-64
002130.19	04-179-56	002150.14	04-179-65
002131.09	04-179-56	002150.19	04-179-65
002131.14	04-179-56	002151.09	04-179-65
002131.19	04-179-57	002151.14	04-179-65
002132.09	04-179-57	002151.19	04-179-65
002132.14	04-179-57	002152.09	04-179-65
002132.19	04-179-57	002152.14	04-179-65
002133.09	04-179-57	002152.19	04-179-66
002133.14	04-179-57	002153.09	04-179-66
002133.19	04-179-57	002153.14	04-179-66
002134.09	04-179-58	002153.19	04-179-66
002134.14	04-179-58	002154.09	04-179-66
002134.19	04-179-58	002154.14	04-179-66
002135.09	04-179-58	002154.19	04-179-66
002135.14	04-179-58	002155.09	04-179-67
002135.19	04-179-58	002155.14	04-179-67
002136.09	04-179-58	002155.19	04-179-67
002136.14	04-179-59	002156.09	04-179-67
002136.19	04-179-59	002156.14	04-179-67
002137.09	04-179-59	002156.19	04-179-67
002137.14	04-179-59	002157.09	04-179-67
002137.19	04-179-59	002157.14	04-179-68
002138.09	04-179-59	002157.19	04-179-68
002138.14	04-179-59	002158.09	04-179-68
002138.19	04-179-60	002158.14	04-179-68
002139.09	04-179-60	002158.19	04-179-68
002139.14	04-179-60	002159.09	04-179-68
002139.19	04-179-60	002159.14	04-179-68
002140.09	04-179-60	002159.19	04-179-69
002140.14	04-179-60	002160.09	04-179-69
002140.19	04-179-60	002160.14	04-179-69
002141.09	04-179-61	002160.19	04-179-69
002141.14	04-179-61	002161.09	04-179-69
002141.19	04-179-61	002161.14	04-179-69
002142.09	04-179-61	002161.19	04-179-69
002142.14	04-179-61	002162.09	04-179-70
002142.19	04-179-61	002162.14	04-179-70
002143.09	04-179-61	002162.19	04-179-70
002143.14	04-179-62	002163.09	04-179-70
002143.19	04-179-62	002163.14	04-179-70
002144.09	04-179-62	002163.19	04-179-70
002144.14	04-179-62	002164.09	04-179-70
002144.19	04-179-62	002164.14	04-179-71
002145.09	04-179-62	002164.19	04-179-71
002145.14	04-179-62	002165.09	04-179-71
002145.19	04-179-63	002165.14	04-179-71
002146.09	04-179-63	002165.19	04-179-71
002146.14	04-179-63	002166.09	04-179-71
002146.19	04-179-63	002166.14	04-179-71
002147.09	04-179-63	002166.19	04-179-72

Continued on next page

	Page		Page
002167.09	04-179-72	002186.19	04-179-80
002167.14	04-179-72	002187.09	04-179-80
002167.19	04-179-72	002187.14	04-179-80
002168.09	04-179-72	002187.19	04-179-81
002168.14	04-179-72	002188.09	04-179-81
002168.19	04-179-72	002188.14	04-179-81
002169.09	04-179-73	002188.19	04-179-81
002169.14	04-179-73	002189.09	04-179-81
002169.19	04-179-73	002189.14	04-179-81
002170.09	04-179-73	002189.19	04-179-81
002170.14	04-179-73	002190.09	04-179-82
002170.19	04-179-73	002190.14	04-179-82
002171.09	04-179-73	002190.19	04-179-82
002171.14	04-179-74	002191.09	04-179-82
002171.19	04-179-74	002191.14	04-179-82
002172.09	04-179-74	002191.19	04-179-82
002172.14	04-179-74	002192.09	04-179-82
002172.19	04-179-74	002192.14	04-179-83
002173.09	04-179-74	002192.19	04-179-83
002173.14	04-179-74	002193.09	04-179-83
002173.19	04-179-75	002193.14	04-179-83
002174.09	04-179-75	002193.19	04-179-83
002174.14	04-179-75	002194.09	04-179-83
002174.19	04-179-75	002194.14	04-179-83
002175.09	04-179-75	002194.19	04-179-84
002175.14	04-179-75	002195.09	04-179-84
002175.19	04-179-75	002195.14	04-179-84
002176.09	04-179-76	002195.19	04-179-84
002176.14	04-179-76	002196.09	04-179-84
002176.19	04-179-76	002196.14	04-179-84
002177.09	04-179-76	002196.19	04-179-84
002177.14	04-179-76	002197.09	04-179-85
002177.19	04-179-76	002197.14	04-179-85
002178.09	04-179-76	002197.19	04-179-85
002178.14	04-179-77	002198.09	04-179-85
002178.19	04-179-77	002198.14	04-179-85
002179.09	04-179-77	002198.19	04-179-85
002179.14	04-179-77	002199.09	04-179-85
002179.19	04-179-77	002199.14	04-179-86
002180.09	04-179-77	002199.19	04-179-86
002180.14	04-179-77	002200.09	04-179-86
002180.19	04-179-78	002200.14	04-179-86
002181.09	04-179-78	002200.19	04-179-86
002181.14	04-179-78	002201.09	04-179-86, 04-179-87
002181.19	04-179-78	002201.14	04-179-86, 04-179-87
002182.09	04-179-78	002201.19	04-179-87
002182.14	04-179-78	002202.09	04-179-87
002182.19	04-179-78	002202.14	04-179-87
002183.09	04-179-79	002202.19	04-179-87
002183.14	04-179-79	002203.09	04-179-88
002183.19	04-179-79	002203.14	04-179-88
002184.09	04-179-79	002203.19	04-179-88
002184.14	04-179-79	002204.09	04-179-88
002184.19	04-179-79	002204.14	04-179-88
002185.09	04-179-79	002204.19	04-179-88
002185.14	04-179-80	002205.09	04-179-88
002185.19	04-179-80	002205.14	04-179-89
002186.09	04-179-80	002205.19	04-179-89
002186.14	04-179-80	002206.09	04-179-89

Continued on next page

	Page		Page
002206.14	04-179-89	002226.09	04-179-97
002206.19	04-179-89	002226.14	04-179-98
002207.09	04-179-89	002226.19	04-179-98
002207.14	04-179-89	002227.09	04-179-98
002207.19	04-179-90	002227.14	04-179-98
002208.09	04-179-90	002227.19	04-179-98
002208.14	04-179-90	002228.09	04-179-98
002208.19	04-179-90	002228.14	04-179-98
002209.09	04-179-90	002228.19	04-179-99
002209.14	04-179-90	002229.09	04-179-99
002209.19	04-179-90	002229.14	04-179-99
002210.09	04-179-91	002229.19	04-179-99
002210.14	04-179-91	002230.09	04-179-99
002210.19	04-179-91	002230.14	04-179-99
002211.09	04-179-91	002230.19	04-179-99
002211.14	04-179-91	002231.09	04-179-100
002211.19	04-179-91	002231.14	04-179-100
002212.09	04-179-91	002231.19	04-179-100
002212.14	04-179-92	002232.09	04-179-100
002212.19	04-179-92	002232.14	04-179-100
002213.09	04-179-92	002232.19	04-179-100
002213.14	04-179-92	002233.09	04-179-100
002213.19	04-179-92	002233.14	04-179-101
002214.09	04-179-92	002233.19	04-179-101
002214.14	04-179-92	002234.09	04-179-101
002214.19	04-179-93	002234.14	04-179-101
002215.09	04-179-93	002234.19	04-179-101
002215.14	04-179-93	002235.09	04-179-101
002215.19	04-179-93	002235.14	04-179-101
002216.09	04-179-93	002235.19	04-179-102
002216.14	04-179-93	002236.09	04-179-102
002216.19	04-179-93	002236.14	04-179-102
002217.09	04-179-94	002236.19	04-179-102
002217.14	04-179-94	002237.09	04-179-102
002217.19	04-179-94	002237.14	04-179-102
002218.09	04-179-94	002237.19	04-179-102
002218.14	04-179-94	002238.09	04-179-103
002218.19	04-179-94	002238.14	04-179-103
002219.09	04-179-94	002238.19	04-179-103
002219.14	04-179-95	002239.09	04-179-103
002219.19	04-179-95	002239.14	04-179-103
002220.09	04-179-95	002239.19	04-179-103
002220.14	04-179-95	002240.09	04-179-103
002220.19	04-179-95	002240.14	04-179-104
002221.09	04-179-95	002240.19	04-179-104
002221.14	04-179-95	002241.09	04-179-104
002221.19	04-179-96	002241.14	04-179-104
002222.09	04-179-96	002241.19	04-179-104
002222.14	04-179-96	002242.09	04-179-104
002222.19	04-179-96	002242.14	04-179-104
002223.09	04-179-96	002242.19	04-179-105
002223.14	04-179-96	002243.09	04-179-105
002223.19	04-179-96	002243.14	04-179-105
002224.09	04-179-97	002243.19	04-179-105
002224.14	04-179-97	002244.09	04-179-105
002224.19	04-179-97	002244.14	04-179-105
002225.09	04-179-97	002244.19	04-179-105
002225.14	04-179-97	002245.09	04-179-106
002225.19	04-179-97	002245.14	04-179-106

Continued on next page

	Page		Page
002245.19	04-179-106	003464.13	04-166-134
002246.09	04-179-106	003465.00	04-166-138
002246.14	04-179-106	003465.05	04-166-142
002246.19	04-179-106	003465.06	04-166-146
002247.09	04-179-106	003465.07	04-166-150
002247.14	04-179-107	003465.09	04-166-154
002247.19	04-179-107	003465.12	04-166-159
002248.09	04-179-107	003465.13	04-166-162
002248.14	04-179-107	003465.16	04-166-165
002248.19	04-179-107	003465.31	04-166-166
002249.09	04-179-107	003509.03	04-165-85
002249.14	04-179-107	003509.04	04-165-90
002249.19	04-179-108	003510.03	04-165-94
002250.09	04-179-108	003510.04	04-165-98
002250.14	04-179-108	003511.03	04-165-103
002250.19	04-179-108	003511.04	04-165-113
002251.09	04-179-108	003512.03	04-165-119
002251.14	04-179-108	003512.04	04-165-122
002251.19	04-179-108	003513.03	04-165-127
002252.09	04-179-109	003513.04	04-165-130
002252.14	04-179-109	003514.03	04-165-135
002252.19	04-179-109	003514.04	04-165-142
002253.09	04-179-109	003587.05	04-178-63
002253.14	04-179-109	003587.06	04-178-64
002253.19	04-179-109	003597.01	04-164-179
002630.00	04-162-121	003673.31	04-166-175
002630.03	04-162-126	003711.14	04-178-65
002630.04	04-162-130	003711.31	04-178-65
002630.15	04-162-135	003719.00	04-167-14
002630.16	04-162-136	003719.10	04-167-19
002659.02	04-166-64	003719.13	04-167-24
002659.03	04-166-70	003719.15	04-167-26
002659.04	04-166-76	003719.16	04-167-27
002659.14	04-166-82	003720.15	04-167-28
002659.15	04-166-83	003720.16	04-167-29
002659.17	04-166-88	003936.00	04-167-30
002790.16	04-167-9	003936.15	04-167-32
002791.05	04-166-94	003936.16	04-167-33
002791.06	04-166-100	004490.12	04-162-137
002791.07	04-166-105	004765.00	04-168-27
002791.13	04-166-111	004765.12	04-168-28
002795.07	04-166-115, 04-166-171	004766.12	04-168-30
002797.03	04-164-169	004766.15	04-168-33
002797.05	04-164-170	004766.16	04-168-35
002797.06	04-164-172	004766.17	04-168-37
002798.03	04-164-174	004766.18	04-168-38
002798.05	04-164-175	004795.13	04-168-40
002798.06	04-164-177	004795.31	04-168-42
003246.00	04-168-1	005018.00	04-167-34
003246.12	04-168-3	005018.15	04-167-36
003251.00	04-168-6	005018.16	04-167-37
003251.02	04-168-12	005125.03	04-165-148
003251.03	04-168-13	005125.04	04-165-155
003251.04	04-168-18	005126.03	04-165-161
003251.07	04-168-24	005126.04	04-165-168
003353.31	04-178-62	005127.03	04-165-172
003464.05	04-166-119	005127.04	04-165-179
003464.06	04-166-125	005298.01	04-168-47
003464.07	04-166-129	005298.18	04-168-49

Continued on next page

	Page		Page
520956.05	04-178-66	Digital Throttle	
520956.06	04-178-67	Theory of Operation	03-140-24
521192.11	04-178-68	Dipstick Tube and Dipstick	
521214.09	04-178-69	Installation	02-060-1
521214.14	04-178-70	Removal	02-060-2
522494.09	04-162-140	DOC	
522495.09	04-168-50	Definition of	--6
523744.09	04-178-70	DOC Calibration	
SPN/FMI vs. 2-Digit codes	04-160-57	Instructions	04-160-59
Diagnostics		Downloading Payload Files	
CAN Diagnostics Procedure	04-155-4	Service ADVISOR	04-160-79, 04-160-80
Communication malfunctions		DPF	
ECU does not communicate with		Definition of	--6
Service ADVISOR	04-150-8	DPF Calibration	
Coolant system malfunctions		Instructions	04-160-60
Coolant in oil or oil in coolant	04-150-3	DPF Differential Pressure Sensor	
Coolant leaking from weep hole	04-150-3	Theory of Operation	03-140-9
Coolant system loses pressure	04-150-3	Drain Intervals for Diesel Engine Coolant	
EGR cooler leaking	04-150-16	Diesel Engine Coolant, Drain	
Cooling system malfunctions		Intervals	01-002-10
Fuel in coolant	04-150-45	DTC	
Exhaust System		Definition of	--6
Exhaust Condition Check	04-155-21		
Fuel system			
Excessive fuel consumption	04-150-41		
High-pressure fuel system check	04-155-32		
Low-pressure fuel system check	04-155-43		
Fuel System Bleeding	04-155-30		
Lubrication system malfunctions			
Excessive oil carryover			
Blow By	04-150-42		
Excessive oil consumption	04-150-43		
Fuel in oil	04-150-46		
Observable			
Abnormal engine noise	04-150-1		
Engine Coolant Temperature Below			
Normal	04-150-17		
Engine cranks and will not start	04-150-20		
Engine does not develop full power	04-150-26		
Engine emits excessive black or gray			
exhaust smoke	04-150-31		
Engine emits excessive blue exhaust			
smoke	04-150-32		
Engine emits excessive white exhaust			
smoke	04-150-33		
Engine misfires/runs irregularly	04-150-34		
Engine will not crank	04-150-38		
Throttle Does Not Respond	04-150-48		
Diesel fuel	01-002-1, 01-002-3		
Diesel fuel, testing			
Testing Diesel Fuel	01-002-2		
Diesel Oxidation Catalyst			
Definition of	--6		
Diesel Particulate Filter			
Definition of	--6		
Maintenance and Service	02-115-1		
Digital			
Definition of	--6		
Digital multimeter, how to use	04-160-59		

E

ECT	
Definition of	--6
ECU	
Definition of	--6
ECU Does Not Communicate with	
Powerview	04-150-4
ECU does not program with Service	
ADVISOR	04-150-16
ECU Information	04-160-5
ECU Temperature Sensor	
Function of	03-140-27
Location of	03-140-27
Effect of Cold Weather on Diesel Engines	
Diesel Engines, Cold Weather Effect	01-002-4
EGR	
Definition of	--6
EGR coolant return tube	
Installation	02-080-3
Removal	02-080-3
EGR cooler	
Installation	02-080-4
Removal	02-080-5
EGR Cooler	
Test	04-155-19
Theory of Operation	03-135-14
EGR cooler bracket	
Installation	02-080-6
Removal	02-080-7
EGR cooler das inlet pipe	
Installation	02-080-8
EGR cooler gas inlet pipe	
Removal	02-080-9
EGR flow sensor	
Removal	02-110-13

Continued on next page

	Page		Page
EGR Flow Sensor		Electronic Injectors	
Installation.....	02-110-12	Cleaning	
Theory of Operation.....	03-140-4	In Engine	02-090-1
EGR flow sensor (PVX Engine)		Installation.....	02-090-2
Installation.....	02-080-9	Removal.....	02-090-3
Removal.....	02-080-10	Emission Regulations.....	01-001-3
EGR flow venturi assembly (PVX Engine)		Emissions	
Installation.....	02-080-11	Label	01-001-4
Removal.....	02-080-12	End of Line	
EGR temperature sensor		Definition of.....	--6
Characteristics	06-210-31	Engine	
EGR Temperature sensor		Break-in guidelines	02-010-4
Installation.....	02-110-13	Break-in, perform	02-010-8
Removal.....	02-110-14	Cleaning.....	02-010-3
EGR Temperature Sensor		Cooling system theory	03-123-2
Theory of Operation.....	03-140-12	Engine identification plate	01-001-1
EGR valve		General operation	03-120-2
Installation.....	02-080-13	General operation — continued.....	03-120-3
EGR Valve		Lifting procedure	02-010-7
Cleaning		Lubrication system theory	03-126-2
Carbon Removal Procedure.....	04-155-12, 04-160-1	Option code label.....	01-001-2
Component Information	03-140-41	Overhaul guidelines	02-010-4
Removal.....	02-080-14	Repair stand.....	02-010-4
Theory of Operation.....	03-135-14	Repair stand adapters.....	02-010-6
EGR Valve Learn Value Reset		Repair stand mounting.....	02-010-8
Test Instructions.....	04-160-62	Repair stand safety.....	02-010-9
EI		Serial number plate.....	01-001-1
Definition of.....	--6	Timing	
Electrical circuit		Camshaft to Crankshaft.....	04-155-3
Diagnosis	04-160-63	Tune-up recommendations	02-010-5
Malfunctions.....	04-160-63	Engine compression pressure	
Troubleshooting	04-160-63	Test	04-155-50
Electrical Circuit		Engine control unit	
Electrical Circuit Concepts	04-160-63	Temperature sensor	03-140-27
Electrical Circuit Concepts.....	04-160-63	Engine Control Unit	
Electrical Connectors		Definition of.....	--6
Terminal Test.....	04-155-53	ECU System Operation.....	03-140-25
Electrical Engine Control		Programming Options.....	04-160-85
Specifications.....	06-200-22	Reprogramming	04-160-70
Electrical Noise — Possible Causes		Engine control unit (ECU)	
Electrical Noise	04-160-68	Maintenance	02-110-16
Electrical system		Engine control Unit (ECU)	
Check.....	02-010-2	Removal.....	02-110-15, 02-110-17
Electronic control system		Engine control unit temperature sensor.....	03-140-27
Governor modes	03-140-29	Engine Coolant Level Alarm Switch	
Terminology.....	--6	Theory of Operation	03-140-32
Electronic Fuel System		Engine Coolant Level Information Switch	
Component Location Diagram 1	03-130-1	Theory of Operation	03-140-33
Component Location Diagram 2	03-130-2	Engine Coolant Temperature	
Component Location Diagram 3	03-130-3	Definition of.....	--6
Component Location Diagram 4	03-130-4	Engine coolant temperature sensor	
Electronic Injector		Characteristics	06-210-32
Calibration.....	04-160-69	Installation.....	02-110-18
Definition of.....	--6	Removal.....	02-110-18
Theory of Operation.....	03-130-9	Engine Coolant Temperature Sensor	
Electronic Injector Calibration.....	04-160-69	Theory of Operation.....	03-140-13
		Engine crankcase pressure sensor	
		Installation.....	02-110-19
		Removal.....	02-110-19

Continued on next page

	Page		Page
Engine Crankcase Pressure Sensor		Cleaning	02-115-9
Component Information	03-140-6	Disposal	02-115-9
Engine cranking speed		Handling	02-115-4
Check	04-155-20	Piping	
Engine cranks and will not start	04-150-20	Installation	02-115-10
Engine derate	03-140-28	Removal	02-115-16
Engine Derate and Shutdown Protection		Tear Down and Inspection	02-115-5
Engine derate	03-140-28	Theory of Operation	03-137-2
Engine protection	03-140-28	Exhaust Filter Cleaning Failure	
Engine shutdown	03-140-28	Failed Exhaust Filter Cleaning	04-160-81
External derate	03-140-28	Exhaust Filter Temperature Module	
External shutdown	03-140-28	Theory of Operation	03-140-9
Shutdown override	03-140-28	Exhaust gas recirculation	
Engine derate protection		Component view	02-080-15
With shutdown	03-140-28	Exhaust Gas Recirculation	
Without shutdown	03-140-28	Definition of	--6
Engine does not develop full power	04-150-26	Exhaust manifold	
Engine emits excessive black or gray		Installation	02-080-16
exhaust smoke	04-150-31	Removal	02-080-18
Engine emits excessive blue exhaust		Exhaust manifold pressure sensor	
smoke	04-150-32	Installation	02-110-21
Engine emits excessive white exhaust		Removal	02-110-21
smoke	04-150-33	Exhaust Manifold Pressure Sensor	
Engine Hours		Theory of Operation	03-140-3
Updating	04-160-70	Exhaust Smoke	
Engine identification plate	01-001-1	Black	04-150-31, 04-150-32
Engine misfires/runs irregularly	04-150-34	Gray	04-150-31, 04-150-32
Engine oil	01-002-5	White	04-150-33
Break-In Plus	01-002-5	Exhaust system	
Engine oil pressure		Check	02-010-3
Check	04-155-21	Exhaust System - PSX	
Engine oil pressure sensor		Theory of Operation	03-135-11
Installation	02-110-20	Exhaust System - PVX	
Removal	02-110-20	Theory of Operation	03-135-7
Engine Oil Pressure Sensor		Exhaust System - PWX	
Theory of Operation	03-140-2	Theory of Operation	03-135-9
Engine Overspeed Verification Test	04-160-70	Exhaust Temperature Management Test	
Engine Sectional View		Instructions	04-160-71
Component Location Diagrams	03-120-1	Exhaust Throttle	
Engine shutdown		Theory of Operation	03-135-15
Engine derate with	03-140-28	Exhaust throttle actuator	
External	03-140-28	Coolant return line	
Override	03-140-28	Installation	02-080-23
Engine Test Instructions		Removal	02-080-24
Clear Aftertreatment Latched DTC	04-160-2	Coolant supply line	
Cylinder Electronic Compression		Installation	02-080-25
Test	04-160-8	Removal	02-080-26
View Non-Clearable DTCs	04-160-86	Exhaust Throttle Actuator	
Engine will not crank	04-150-38	Component Information	03-140-43
EOL		Exhaust throttle assembly with flat flange	
Definition of	--6	Installation	02-080-19
ETM		Removal	02-080-21
Test Instructions	04-160-71	Exhaust throttle assembly with V-band clamp	
Exhaust Filter		Installation	02-080-20
Ash Handling and Disposal	02-115-3	Exhaust throttle assembly with V-Band	
Assemble	02-115-2	clamp	
Brackets		Removal	02-080-22
Installation	02-115-10		
Removal	02-115-16		

Continued on next page

	Page		Page
Exhaust System		Removal.....	02-090-6
Diagnostics		Fuel Injector Harness	
Exhaust Condition Check.....	04-155-21	Theory of Operation.....	03-140-37
External Derate		Fuel Injector Sleeve	
Enable.....	03-140-28	Removal.....	02-020-21
Input.....	03-140-28	Fuel Injector Sleeves	
Rate.....	03-140-28	Installation.....	02-020-22
External shutdown		Fuel Rail Cap and Plug Kit.....	04-155-28
Override at engine start.....	03-140-28	Fuel rail pressure sensor	
Override shutdown time.....	03-140-28	Installation.....	02-110-22
Timer.....	03-140-28	Removal.....	02-110-23
		Fuel Rail Pressure Sensor	
		Theory of Operation.....	03-140-1
		Fuel system	
		Air in fuel check.....	04-155-2
		Components.....	02-090-8
		Diagnostics	
		Excessive fuel consumption.....	04-150-41
		High-pressure fuel system check.....	04-155-32
		Low-pressure fuel system check.....	04-155-43
		Fuel leak off line restriction check	
		Fuel restriction.....	04-155-29
		General information.....	02-090-9
		Relieve pressure.....	02-090-10
		Supply quality check	
		Fuel quality.....	04-155-30
		Fuel System Bleeding.....	04-155-30
		Fuel temperature sensor	
		Characteristics.....	06-210-32
		Installation.....	02-110-23
		Removal.....	02-110-24
		Fuel Temperature Sensor	
		Theory of Operation.....	03-140-14
		G	
		General Engine Operation.....	03-120-2
		Glow Plug	
		Installation.....	02-020-23
		Removal.....	02-020-25
		Glow plug bore	
		cleaning and inspection.....	02-020-25
		Governor droop mode	
		Function of.....	03-140-29
		Isochronous droop.....	03-140-29
		Normal droop.....	03-140-29
		Grease.....	01-002-6
		H	
		H-Bridge	
		Definition of.....	--6
		Hardware torque values	
		Metric.....	06-200-1
		Harness Diagnostic Mode Test.....	04-160-71
		Harness Diagnostics Test	
		Harness Diagnostics Mode Test	
		Test, Harness Diagnostic Mode.....	04-160-71

Continued on next page

	Page		Page
Head gasket joint construction and operation.....	03-120-4	Fuel Injector Sleeves	02-020-22
Head, Cylinder		Glow Plug.....	02-020-23
Cleaning and Inspection	02-020-1	High-Pressure Common-Rail (HPCR).....	02-090-10
High-Pressure Common Rail (HPCR)		High-Pressure Fuel Pump.....	02-090-17
Theory of Operation		High-Pressure Injection Lines	02-090-21
HPCR	03-130-11	Injector Wiring Harness	02-090-24
High-Pressure Common-Rail		Mechanical Fuel Transfer Pump	02-090-25
Definition of.....	--6	Oil Fill Adapter	02-060-7
High-Pressure Common-Rail (HPCR)		Oil Filter Bypass Valve	02-060-8
Installation.....	02-090-10	Oil Pressure Regulating Valve	02-060-11
Removal.....	02-090-13	Open Crankcase Vent System.....	02-040-28
High-pressure fuel pump		Piston and Connecting Rod Assembly.....	02-030-25
Disassembling and reassembling	02-090-16	Piston Cooling Orifices.....	02-030-29
High-Pressure Fuel Pump		Piston Pin Bushing.....	02-030-33
Installation.....	02-090-17	Pistons Rings	02-030-36
Removal.....	02-090-20	Pressure Limiter.....	02-090-27
Theory of Operation	03-130-12	Primary Fuel Filter Assembly.....	02-090-30
High-Pressure Fuel System		Rocker Arm Shaft Carrier Assembly	02-020-38
Theory of Operation.....	03-130-13	Secondary Fuel Filter Assembly	02-090-32
High-Pressure Injection Lines		Suction Control Valve.....	02-090-35
Installation.....	02-090-21	Thermostat Housing.....	02-070-24
Removal.....	02-090-23	Thermostats.....	02-070-22
High-Pressure Washing electrical components including wiring harness connectors	02-112-1	Valve Guides.....	02-020-54
HPCR		Valve Seat Insert.....	02-020-59
Definition of.....	--6	Instructions	
		Internal Data Monitor — Instructions	04-160-73
		Load Profile Information Test	04-160-77
		Instrument panel (OEM)	
		Clearing stored codes	04-160-28
		Exhaust Filter Service Recovery	04-160-22
		Viewing active codes	04-160-19
		Viewing parameters	04-160-20
		Viewing stored codes	04-160-29
		Intake Air Sensor	
		Installation.....	02-110-24
		Removal.....	02-110-25
		Theory of Operation	03-140-19
		Intake manifold (PVX engine)	
		Installation.....	02-080-29
		Removal.....	02-080-30
		Intake manifold (PWX engine)	
		Installation.....	02-080-31
		Removal.....	02-080-32
		Internal Data Monitor — Instructions	
		Instructions.....	04-160-73
		J	
		J1939	
		Definition of	--6
		JDCP	
		Definition of	--6
		JDPS	
		Definition of	--6
		John Deere Custom Performance Program	
		Definition of	--6

Continued on next page

	Page		Page
L		MAP Sensor	
Label		Theory of Operation	03-140-5
Option codes	01-001-2	MAT	
Load Profile Information Test		Definition of	--6
Instructions	04-160-77	MAT sensor	
Low power		Characteristics	06-210-33
Engine does not develop full power	04-150-26	MAT Sensor	
Low-pressure fuel pressure sensor		Theory of Operation	03-140-11
Installation	02-110-27	Measurement	
Removal	02-110-28	Piston	
Low-Pressure Fuel Pressure Sensor		Skirt	02-030-36
Theory of Operation	03-140-8	Piston Height	02-030-30
Low-Pressure Fuel Pump		Piston Protrusion	02-030-35
Component Information	03-140-39	Piston to Liner Clearance	02-030-37
Theory of Operation	03-130-5	Measuring	
Low-Pressure Fuel System		Pressure	03-140-30
Theory of Operation	03-130-6, 03-130-15	Speed	03-140-30
Lower idler gear		Temperature	03-140-30
Check and replace components	02-050-20	Measuring Temperature	
Installation	02-050-21	ECU Temperature Sensor	03-140-27
Lubricant		Mechanical	
Mixing	01-002-7	Low-Pressure Fuel Pump	
Lubricant Storage		Theory of Operation	03-130-14
Storage, Lubricant	01-002-6	Mechanical Fuel Transfer Pump	
Lubricants, Safety		Installation	02-090-25
Safety, Lubricants	01-002-7	Removal	02-090-26
Lubrication system		Meter zero	
Diagnostics		Definition of	--6
Excessive Oil Carryover	04-150-42	Meter, how to use	04-160-59
Excessive oil Consumption	04-150-43	Metric bolt and screw torque values	06-200-1
Fuel in oil	04-150-46	Mis-pin	
Theory	03-126-2	Definition of	--6
Lubrication System		Misfires	
Specifications	06-200-13	Engine runs irregularly	04-150-34
Lubricity of diesel fuel	01-002-2	Mixing lubricants	01-002-7
		Multimeter, how to use	04-160-59
M		N	
Main Bearing Cap		Noise	
Line Bore Specifications	02-040-13	Abnormal	04-150-1
Removal	02-040-14	O	
Main bearings		OEM Starting and Charging Systems	
Measure	02-040-11	Specifications	06-200-21
Manifold Air Pressure		Ohmmeter, how to use	04-160-59
Definition of	--6	Oil	
Manifold Air Pressure (MAP) sensor		Engine	01-002-5
Installation	02-110-25	Oil and Filter Service Intervals, Engine	01-002-6
Removal	02-110-26	Oil carryover	
Manifold Air Temperature		Blow-By	04-150-42
Definition of	--6	Oil consumption	04-150-43
Manifold Air Temperature (MAT) sensor		Oil Cooler	
Installation	02-110-26	Installation	02-060-3
Removal	02-110-27	Removal and Inspection	02-060-4
Manifold air temperature sensor		Oil Fill Adapter	
Characteristics	06-210-33	Installation	02-060-7
MAP		Removal	02-060-7
Definition of	--6		

Continued on next page

	Page		Page
Oil Filter		Piston and Connecting Rod Assembly	
Installation.....	02-060-3	Assemble	02-030-24
Removal and Inspection	02-060-4	Installation.....	02-030-25
Oil Filter Bypass Valve		Removal.....	02-030-26
Removal.....	02-060-8	Tear Down.....	02-030-28
Oil filters.....	01-002-6	Piston Cooling Orifices	
Oil Fiter Bypass Valve		Cleaning and Inspection	02-030-28
Installation.....	02-060-8	Installation.....	02-030-29
Oil Pan		Removal.....	02-030-30
Installation.....	02-060-9	Piston Pin and Bore	
Removal.....	02-060-10	Inspection.....	02-030-31
Oil pressure		Piston Pin Bushing	
Check.....	04-155-21	Installation.....	02-030-33
Oil Pressure Regulating Valve		Removal.....	02-030-34
Installation.....	02-060-11	Piston Protrusion	
Removal.....	02-060-11	Measurement.....	02-030-35
Oil Pump		Piston-to-liner clearance	
Installation.....	02-060-12	Measurement.....	02-030-37
Oil Pump and Tubes		Pistons	
Remove.....	02-060-14	Cleaning.....	02-030-23
Oilscan.....	01-002-7	Piston-to-liner clearance, measure-	
OOR		ment	02-030-37
Definition of.....	--6	Pistons Rings	
OORH		Installation.....	02-030-36
Definition of.....	--6	Power	
OORL		Engine does not develop full power	04-150-26
Definition of.....	--6	Pressure	
Open Crankcase Vent System		Measuring	03-140-30
Installation.....	02-040-28	Pressure Limiter	
Open Crankcase Ventilation Pressure Relief		Installation.....	02-090-27
Valve		Removal.....	02-090-29
Maintenance	02-020-26	Primary Fuel Filter	
Open Crankcase Ventilation System		Theory of Operation	03-130-8, 03-130-17
Inspection.....	02-040-28	Primary Fuel Filter Assembly	
Removal.....	02-040-30	Installation.....	02-090-30
Option code label.....	01-001-2	Removal.....	02-090-31
Other Materials	05-180-1	Printing Calibration Results	04-160-72
Out-of-Range		Printing from Service ADVISOR	
Definition of.....	--6	Calibration Results	
Out-of-Range High		Interactive Test Results	04-160-72
Definition of.....	--6	Printing Interactive Test Results	04-160-72
Out-of-Range Low		Problem Not Found Procedure.....	04-155-51
Definition of.....	--6	Procedure	
Output		Fuel Rail Cap and Plug Kit.....	04-155-28
Definition of.....	--6	Programming ECU	04-160-70
		Downloading Payload Files	
		Service ADVISOR	04-160-79, 04-160-80
		Programming Options.....	04-160-85
		Pulse Width Modulation	
		Definition of.....	--6
		Pulse-width-modulated Throttle (PWM)	
		Description	
		Schematic.....	03-140-31
		Push rods	
		Clean and inspect	02-020-26
		PWM	
		Definition of	--6

Continued on next page

	Page		Page
R		Removal.....	02-020-31
RAM		Rocker Arm Cover Vent Hose	
Definition of.....	--6	Inspection.....	02-020-34
Record of Changes.....	--2	Rocker Arm Shaft Assembly	
Reed valve		Inspect and Assemble.....	02-020-34
Inspection.....	02-080-33	Tear Down.....	02-020-37
Regeneration Abort Source Identification		Rocker Arm Shaft Carrier	
Test		Inspection.....	02-020-38
Instructions.....	04-160-80	Rocker Arm Shaft Carrier Assembly	
Regeneration Failure.....	04-160-81	Installation.....	02-020-38
Related Manuals.....	--5		
Removal		S	
Belt Tensioner.....	02-070-2	Safety precautions, repair stand	
Coolant Pump Assembly.....	02-070-9	mounting.....	02-010-9
Crankshaft.....	02-040-5	Safety, Avoid High-Pressure Fluids	
Crankshaft Rear Oil Seal.....	02-040-16	Avoid High-Pressure Fluids.....	01-000-1
Crankshaft Timing Wheel.....	02-040-18	Safety, Handle Fuel Safely, Avoid Fires	
Cylinder Head.....	02-020-14	Avoid Fires, Handle Fuel Safely.....	01-000-5
Cylinder Liners.....	02-030-17	SDS	
Dipstick Tube and Dipstick.....	02-060-2	Definition of.....	--6
Electronic Injectors.....	02-090-3	Secondary Fuel Filter	
Fan Assembly.....	02-070-13	Theory of Operation.....	03-130-8, 03-130-17
Fan Drive Assembly.....	02-070-20	Secondary fuel filter assembly	
Feed Tubes.....	02-090-23	Removal.....	02-090-34
Flow Damper.....	02-090-5	Secondary Fuel Filter Assembly	
Flywheel Housing.....	02-040-26	Installation.....	02-090-32
Fuel Injector Sleeve.....	02-020-21	Self-Calibration	
Glow Plug.....	02-020-25	Calibration	
High-Pressure Common-Rail		Analog throttle input range.....	03-140-37
(HPCR).....	02-090-13	Sensor	
High-Pressure Fuel Pump.....	02-090-20	Camshaft position	
High-Pressure Injection Lines.....	02-090-23	Installation.....	02-110-9
Injector Wiring Harness.....	02-090-25	Removal.....	02-110-9
Mechanical Fuel Transfer Pump.....	02-090-26	Charge air cooler outlet temperature	
Oil Fill Adapter.....	02-060-7	Installation.....	02-110-10
Oil Filter Bypass Valve.....	02-060-8	Removal.....	02-110-10
Oil Pan.....	02-060-10	Crankshaft position	
Piston and Connecting Rod		Installation.....	02-110-11
Assembly.....	02-030-26	Removal.....	02-110-11
Piston Cooling Orifices.....	02-030-30	Definition of.....	--6
Piston Pin Bushing.....	02-030-34	Engine coolant temperature	
Pressure Limiter.....	02-090-29	Installation.....	02-110-18
Rocker Arm Cover.....	02-020-31	Removal.....	02-110-18
Suction Control Valve.....	02-090-36	Engine crankcase pressure	
Thermostat.....	02-070-23	Installation.....	02-110-19
Thermostat Housing.....	02-070-29	Engine crankcase pressure sensor	
Valve Guides.....	02-020-55	Removal.....	02-110-19
Valve Seat Inserts.....	02-020-60	Engine oil pressure	
Removal,		Installation.....	02-110-20
Oil Pressure Regulating Valve.....	02-060-11	Removal.....	02-110-20
Repair stand mounting safety.....	02-010-9	Fuel temperature	
Reprogramming ECU.....	04-160-70	Installation.....	02-110-23
Downloading Payload Files		Removal.....	02-110-24
Service ADVISOR.....	04-160-79, 04-160-80	Low-pressure fuel pressure	
Rocker Arm Cover		Installation.....	02-110-27
Inspection.....	02-020-27	Removal.....	02-110-28
Installation.....	02-020-27	Water-in-fuel (WIF)	
		Removal.....	02-110-29

Continued on next page

	Page		Page
Water-in-fuel (WIF) Sensor		Socket	
Installation	02-110-28	Definition of	--6
Sensors		Software Delivery System	
Measuring pressure	03-140-30	Definition of	--6
Measuring Pressure		Software Files	
Barometric Air Pressure	03-140-20	Reprogramming ECU	
DPF Differential Pressure	03-140-9	Service ADVISOR	04-160-79, 04-160-80
Engine Oil Pressure	03-140-2	Specifications	
Exhaust Manifold Pressure	03-140-3	4.5L Engine Schematic 1	06-210-1
Fuel Rail Pressure	03-140-1	4.5L Engine Schematic 2	06-210-5
Low-Pressure Fuel - Actual		4.5L Wiring Diagram 1	06-210-8
Pressure	03-140-8	4.5L Wiring Diagram 10	06-210-26
MAP Sensor	03-140-5	4.5L Wiring Diagram 11	06-210-28
Measuring speed	03-140-30	4.5L Wiring Diagram 2	06-210-10
Measuring Speed		4.5L Wiring Diagram 3	06-210-12
Camshaft Speed	03-140-18	4.5L Wiring Diagram 4	06-210-14
Crankshaft Speed	03-140-17	4.5L Wiring Diagram 5	06-210-16
Turbocharger Speed		4.5L Wiring Diagram 6	06-210-18
VGT Speed	03-140-15	4.5L Wiring Diagram 7	06-210-20
Measuring temperature	03-140-30	4.5L Wiring Diagram 8	06-210-22
ECU temperature	03-140-27	4.5L Wiring Diagram 9	06-210-24
Measuring Temperature		After-treatment Devices	06-200-23
Charge Air Cooler Outlet Air		Air Intake and Exhaust System	06-200-16
Temperature	03-140-10	Camshaft, Balancing Shaft, and Timing	
EGR Temperature	03-140-12	Gear Train	06-200-11
Engine Coolant Temperature	03-140-13	Cooling System	06-200-14
Fuel Temperature	03-140-14	Crankshaft, Main Bearings and	
Manifold Air Temperature	03-140-11	Flywheel	06-200-9
Serial number plate	01-001-1	Cylinder Block, Liners, Pistons and	
Service ADVISOR		Rods	06-200-6
Calibrations		Cylinder Head and Valves	06-200-3
EGR Valve Learn Value Reset	04-160-62	Electrical Engine Control	06-200-22
Data points used in	04-160-14	Electronic Fuel System	06-200-20
Downloading Payload Files	04-160-79, 04-160-80	Lubrication System	06-200-13
ECU does not communicate with Service		OEM Engines	
ADVISOR	04-150-8	Engine Derates	06-210-34
ECU does not program with Service		OEM Instrument Panel Schematic	06-210-37
ADVISOR	04-150-16	OEM Starting and Charging Systems	06-200-21
Tests		Wire Splice Location Diagrams	06-210-40
Clear Aftertreatment Latched DTC	04-160-2	Speed	
Cylinder Cutout Test	04-160-6	Measuring	03-140-30
Cylinder Electronic Compression		Speed governing	03-140-29
Test	04-160-8	SPN	
Cylinder Misfire Test	04-160-12	Definition of	--6
EGR Valve Clean Test	04-160-62	Starter Motor	
Fuel Rail Cap and Plug Kit	04-155-28	Installation	02-100-4
VGT Learn Value Reset	04-160-86	Removal	02-100-5
View Non-Clearable DTCs	04-160-86	Storing fuel	01-002-1
Service codes		Suction Control Valve	
Viewing active codes	04-160-19	Definition of	--6
Viewing data parameters	04-160-20	Installation	02-090-35
Viewing stored codes	04-160-29	Removal	02-090-36
Service Regeneration Instructions	04-160-82	Theory of Operation	03-140-38
Service, Engine Oil and Filter Interval	01-002-6	Suspect Parameter Number	
Short to Voltage Procedure	04-155-51	Definition of	--6
Snapshot			
Snapshot Instructions	04-160-83		

Continued on next page

	Page		Page
T			
TDC		Sensor Supply #2	03-140-34
Definition of	--6	Sensor Supply #3	03-140-35
Tear Down		Sensor Supply #4	03-140-35
Piston and Connecting Rod		Sensor Supply #5	03-140-35
Assembly	02-030-28	Sensor Supply #6	03-140-35
Temperature		Sensor Supply #7	03-140-35
Measuring	03-140-30	Sensor Supply #8	03-140-36
Terminal Test	04-155-53	Sensor Supply #9	03-140-36
Terminology		VGT Speed Sensor	03-140-15
Definition of Terms	--6	Water-In-Fuel Sensor	03-140-20
Test		Electronic Control System Theory of	
Clear Aftertreatment Latched DTC	04-160-2	Operation	
Cylinder Cutout Test	04-160-6	24V Low-Pressure Fuel Pump	
Cylinder Electronic Compression		Resistor	03-140-31
Test	04-160-8	Air Throttle Actuator	03-140-42
Cylinder Misfire Test	04-160-12	CAN Throttle	03-140-21
EGR Valve Clean Test	04-160-62	Combination Throttle	03-140-22
Engine compression pressure	04-155-50	Controller Area Network	03-140-22
VGT Learn Value Reset	04-160-86	Cruise Control Theory of Operation	03-140-23
View Non-Clearable DTCs	04-160-86	EGR Valve	03-140-41
Test Instructions		Engine Control Unit (ECU) System	
Air Throttle Actuator Learn Value Reset		Operation	03-140-25
Test Instructions	04-160-1	Engine Control Unit (ECU) Temperature	
EGR Valve Learn Value Reset	04-160-62	Sensor	03-140-27
VGT Learn Value Reset	04-160-86	Engine Crankcase Pressure	
Tests		Sensor	03-140-6
Harness Diagnostic Mode Test	04-160-71	Engine Derate and Shutdown	
Theory of Operation		Protection	03-140-28
ECU System Operation	03-140-25	Exhaust Throttle Actuator	03-140-43
Electronic Control System		Fuel Injector Harness	03-140-37
Analog Throttle	03-140-1	Governor Droop Mode Selection	03-140-29
Barometric Air Pressure Sensor	03-140-20	Low-Pressure Fuel Pump	03-140-39
Camshaft Position Sensor	03-140-18	Measuring Pressure	03-140-30
Charge Air Cooler Outlet Air		Measuring Speed	03-140-30
Temperature Sensor	03-140-10	Measuring Temperature	03-140-30
Crankshaft Position Sensor	03-140-17	Pulse-Width-Modulated (PWM)	
Digital Throttle	03-140-24	Throttle	03-140-31
DPF Differential Pressure Sensor	03-140-9	Self-Calibration	03-140-37
EGR Flow Sensor	03-140-4	Suction Control Valve	03-140-38
EGR Temperature Sensor	03-140-12	Throttle Adjustments	03-140-36
Engine Coolant Level Alarm Switch	03-140-32	Throttle Offset	03-140-36
Engine Coolant Level Information		Variable Speed Fan	03-140-40
Switch	03-140-33	VGT Actuator	03-140-44
Engine Coolant Temperature		Sensor	
Sensor	03-140-13	ECU temperature	03-140-27
Engine Oil Pressure Sensor	03-140-2	Thermostat	
Exhaust Filter Temperature Module	03-140-9	Removal	02-070-23
Exhaust Manifold Pressure Sensor	03-140-3	Testing	02-070-24
Fuel Rail Pressure Sensor	03-140-1	Thermostat Housing	
Fuel Temperature Sensor	03-140-14	Installation	02-070-24
Intake Air Sensor	03-140-19	Removal	02-070-29
Low-Pressure Fuel Pressure		Thermostats	
Sensor	03-140-8	Installation	02-070-22
MAP Sensor	03-140-5	Throttle	
MAT Sensor	03-140-11	Analog	03-140-1
Sensor Supply #1	03-140-34	CAN	03-140-21
		Combination	03-140-22
		Digital	03-140-24
		Pulse-width-modulated (PWM)	03-140-31

Continued on next page

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Continued on next page

	Page		Page
Removal.....	02-080-43	Removal.....	02-080-62
VGT Turbocharger actuator coolant supply line		Wastegate Turbocharger Oil Supply Line	
Installation.....	02-080-44	Installation.....	02-080-63
Removal.....	02-080-45	Removal.....	02-080-64
VGT Turbocharger actuator linkage		Water-In-Fuel	
Installation.....	02-080-46	Definition of.....	--6
Removal.....	02-080-47	Water-in-fuel (WIF) Sensor	
VGT Turbocharger Oil Drain Line		Installation.....	02-110-28
Installation.....	02-080-50	Removal.....	02-110-29
Removal.....	02-080-51	Water-In-Fuel Sensor	
VGT Turbocharger Oil Supply Line		Theory of Operation.....	03-140-20
Installation.....	02-080-52	White Exhaust Smoke.....	04-150-33
Removal.....	02-080-53	WIF	
VGT Turbocharger speed sensor		Definition of.....	--6
Installation.....	02-080-54	Wiggle Test	
Removal.....	02-080-54	Intermittent Diagnostics.....	04-155-57
View Non-Clearable DTCs		Wiring harness	
Test Instructions.....	04-160-86	Installation.....	02-110-29
Voltmeter, how to use.....	04-160-59	Removal.....	02-110-39
		Routing.....	02-110-1

W

Wastegate Turbocharger Oil Drain Line	
Installation.....	02-080-61

