

self study programme

the k-jetronic

**description of construction
and operation**



**personnel development
and training**



Why

K-Jetronic

The K-jetronic is a further development in the field of fuel injection for four stroke engines. It is a mechanically operated injection system. The **K** before the jetronic stands for the German word **kontinuierlich**, which means continuous injection.

It offers,
through an optimal mixture formation:

- less pollutants in the exhaust emission
- an increased torque
at lower revolutions
- greater elasticity of the engine

Operation

General

The fuel

is sucked out of the fuel tank by an electrically operated fuel pump, and is passed to the metering valve and distributor via the fuel accumulator and the filter

The air required

is sucked in by the engine via the air collection box, the quantity of air is measured by the air flow meter

The metering valve and distributor

distributes the fuel requirement to each cylinder via the respective injector in accordance with the air flow measured.

Cold start - Warmig up

The cold start valve

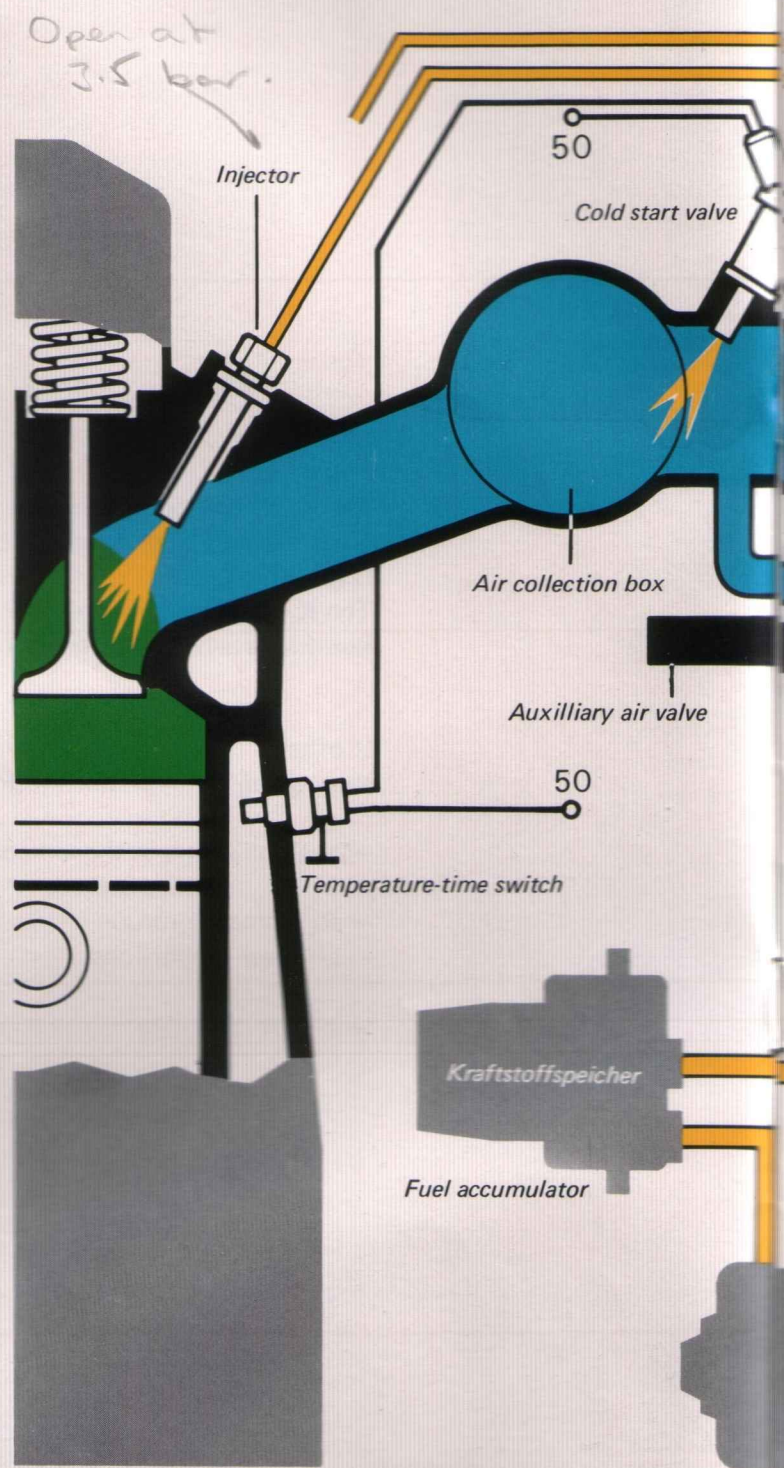
— controlled from a temperature-time switch— injects additional fuel into the air collection box during the starting operation.

Warm up valve

supplies the engine with additional fuel during the warming up phase

The auxilliary air valve

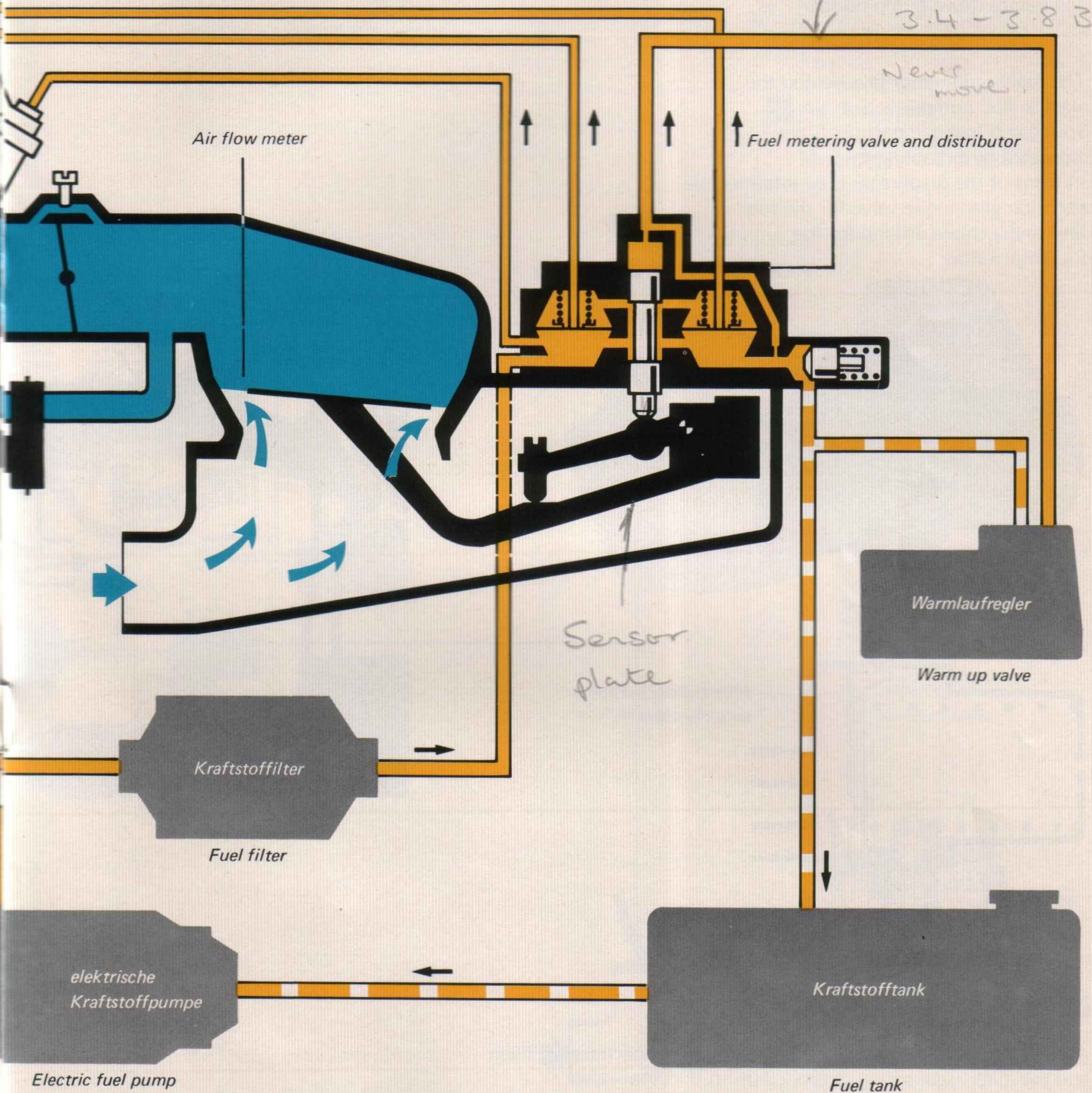
supplies the engine with additional air during the warming up phase.



Control pressure low equals rich mixture
 " " high " weak "

Controlled Pressure for cold start 3.4 - 3.8 Bar

Never move



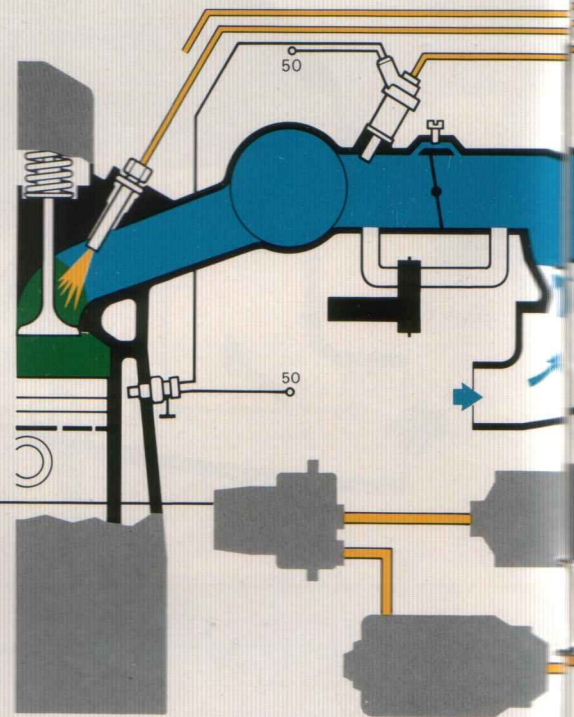
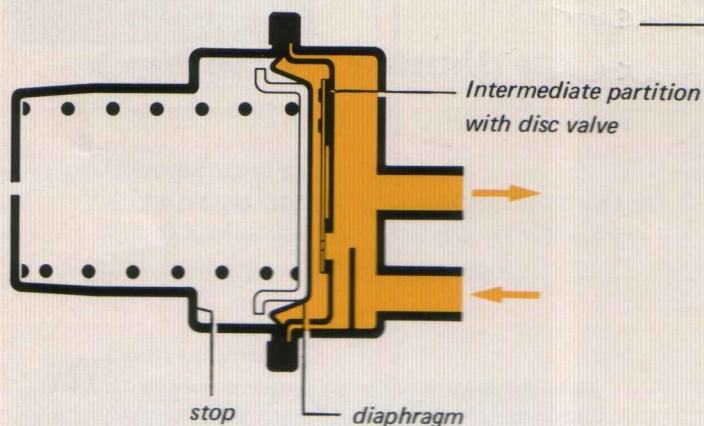
Fuel accumulator

The fuel accumulator makes good hot starting conditions possible through pressure accumulation in the system and damps down pump noises.

The fuel accumulator lays behind the electric fuel pump.

Spring and fuel compartments are separated by a diaphragm.

In front of the diaphragm is an intermediate partition with a disc valve for the fuel feed and a choke drilling for the fuel return flow.



It operates like this

After the pump has started running the fuel compartment is filled and the diaphragm spring tensioned up to the stop.


After switching off the engine the fuel remains under pressure due to the preload of the diaphragm and a fuel vapour lock is prevented.


The starting conditions are therefore improved.

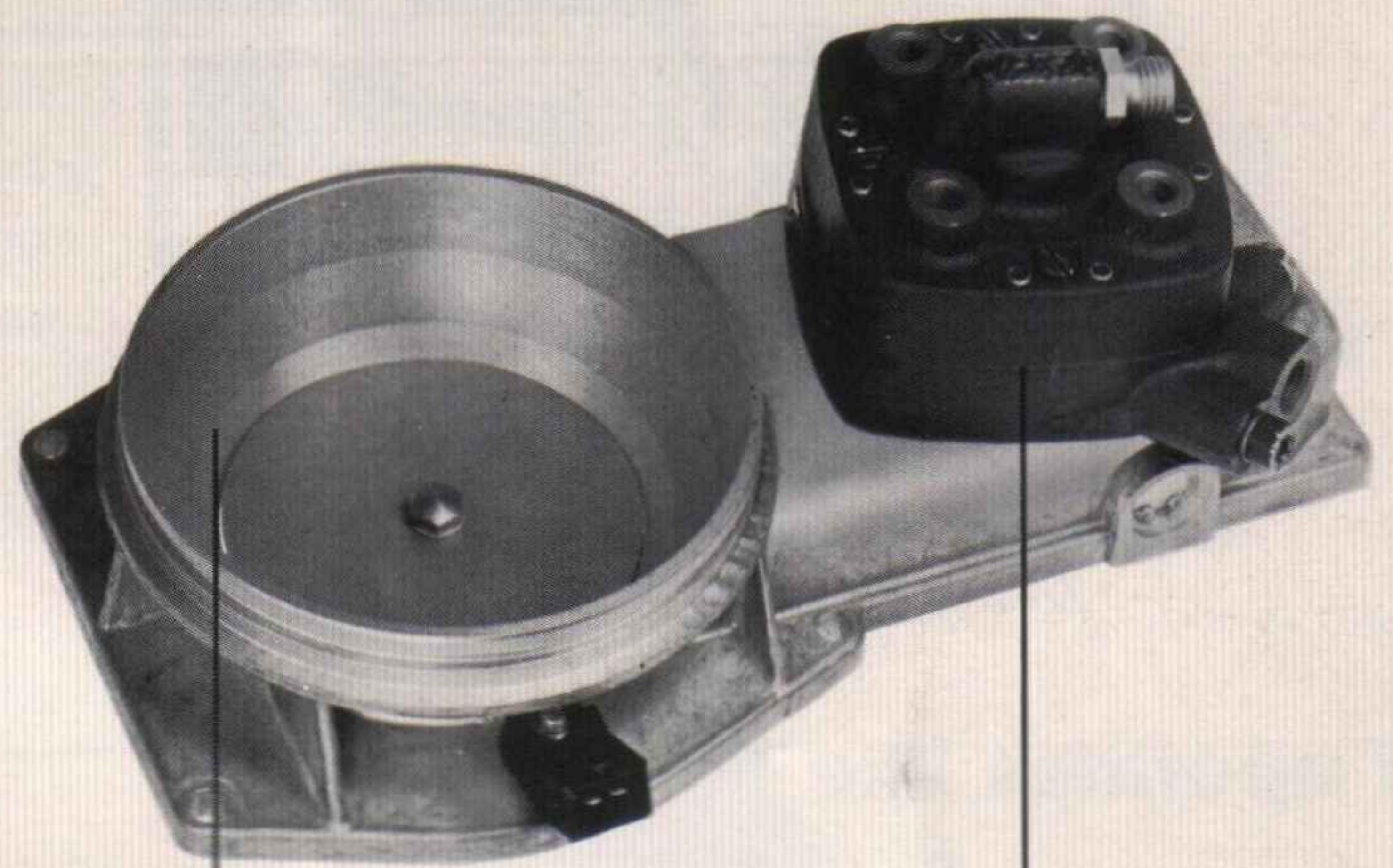
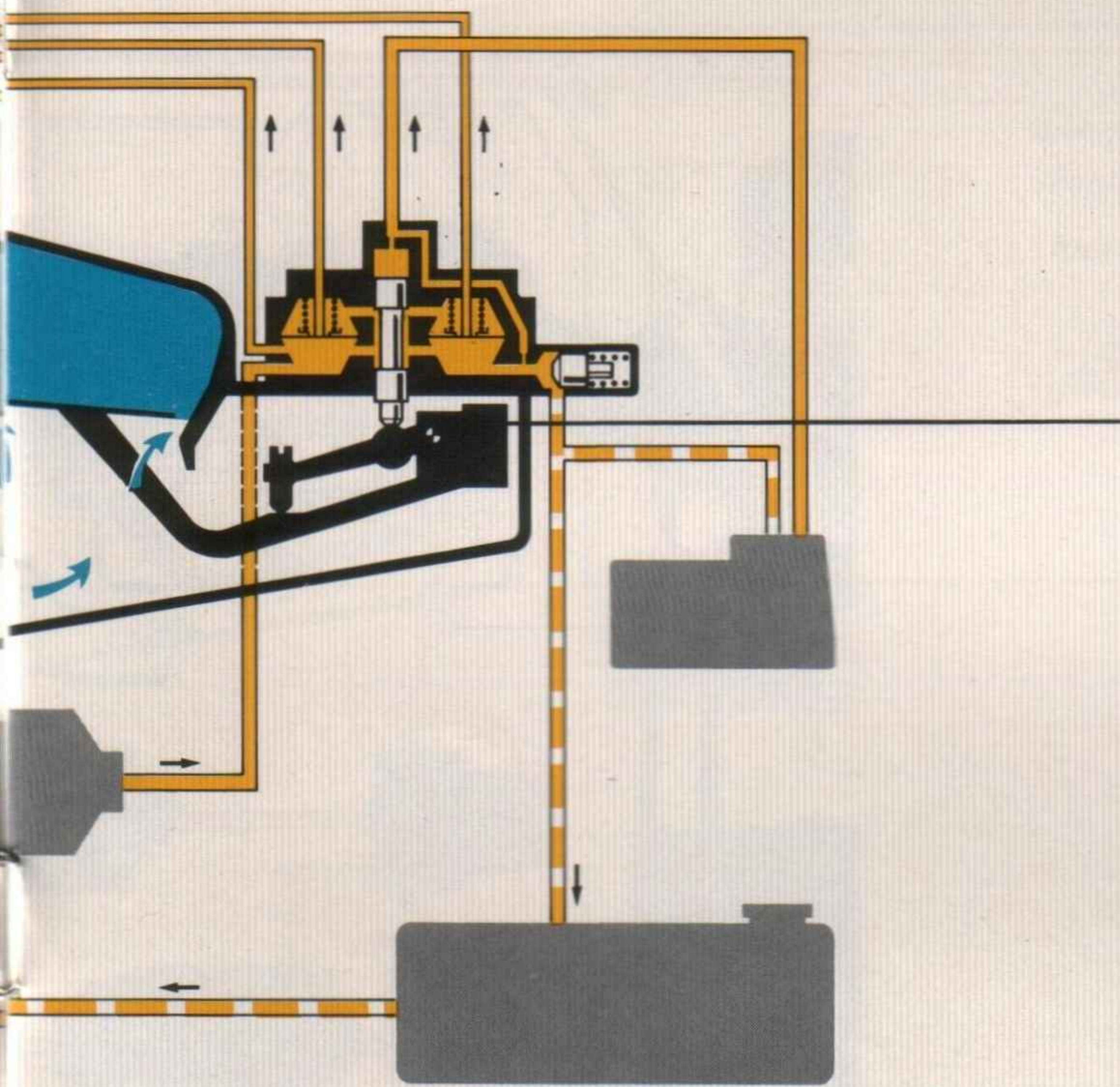
Mixture regulator

The mixture regulator provides for the required proportions of air and fuel.

It consists of:

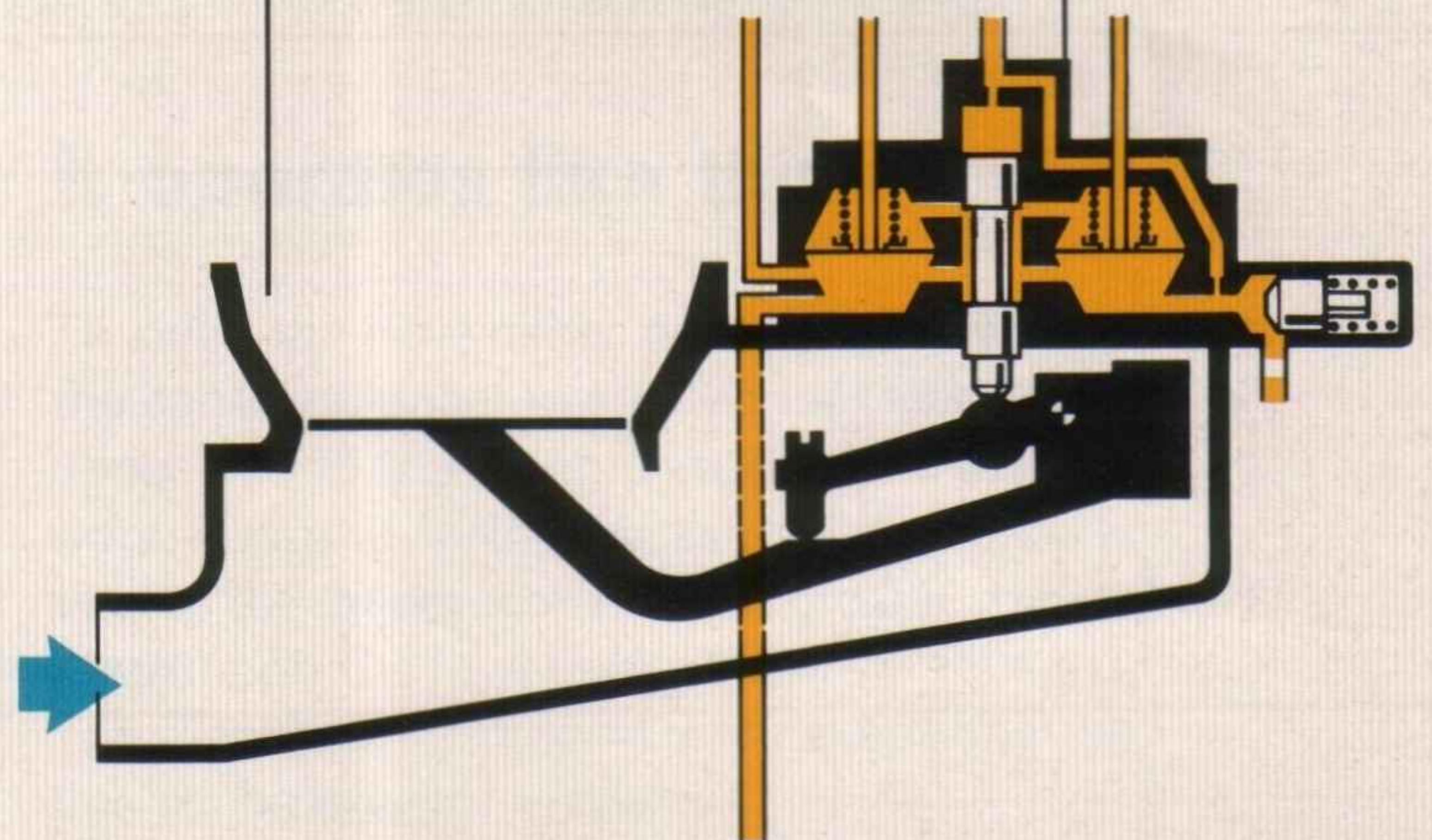
 Air flow meter

 Metering valve and distributor



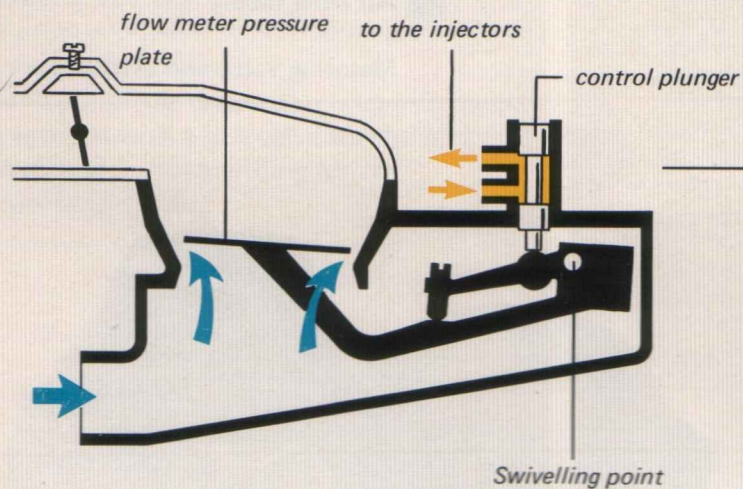
air flow meter

*metering valve
and distributor*



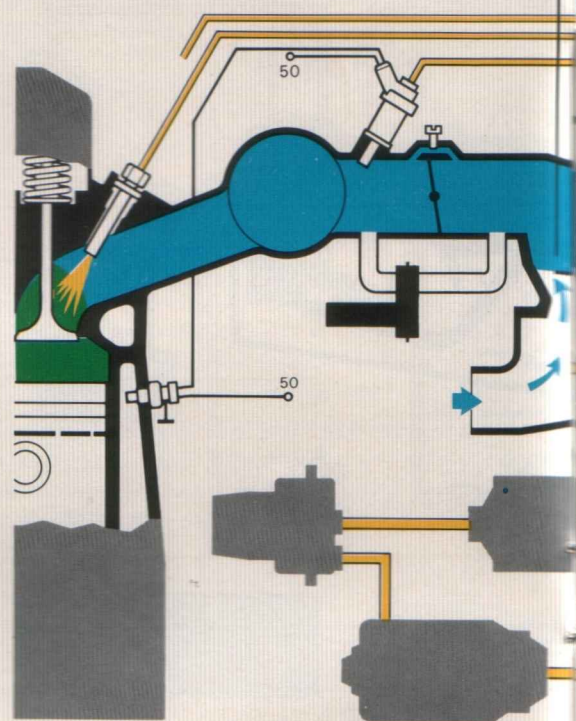
Air flow meter

The air flow meter is arranged in front of the throttle valve.



It operates like this

The flow meter pressure plate is lifted by the air sucked in by the engine, this in turn acts on a lever system which moves the control piston which determines the amount of fuel.



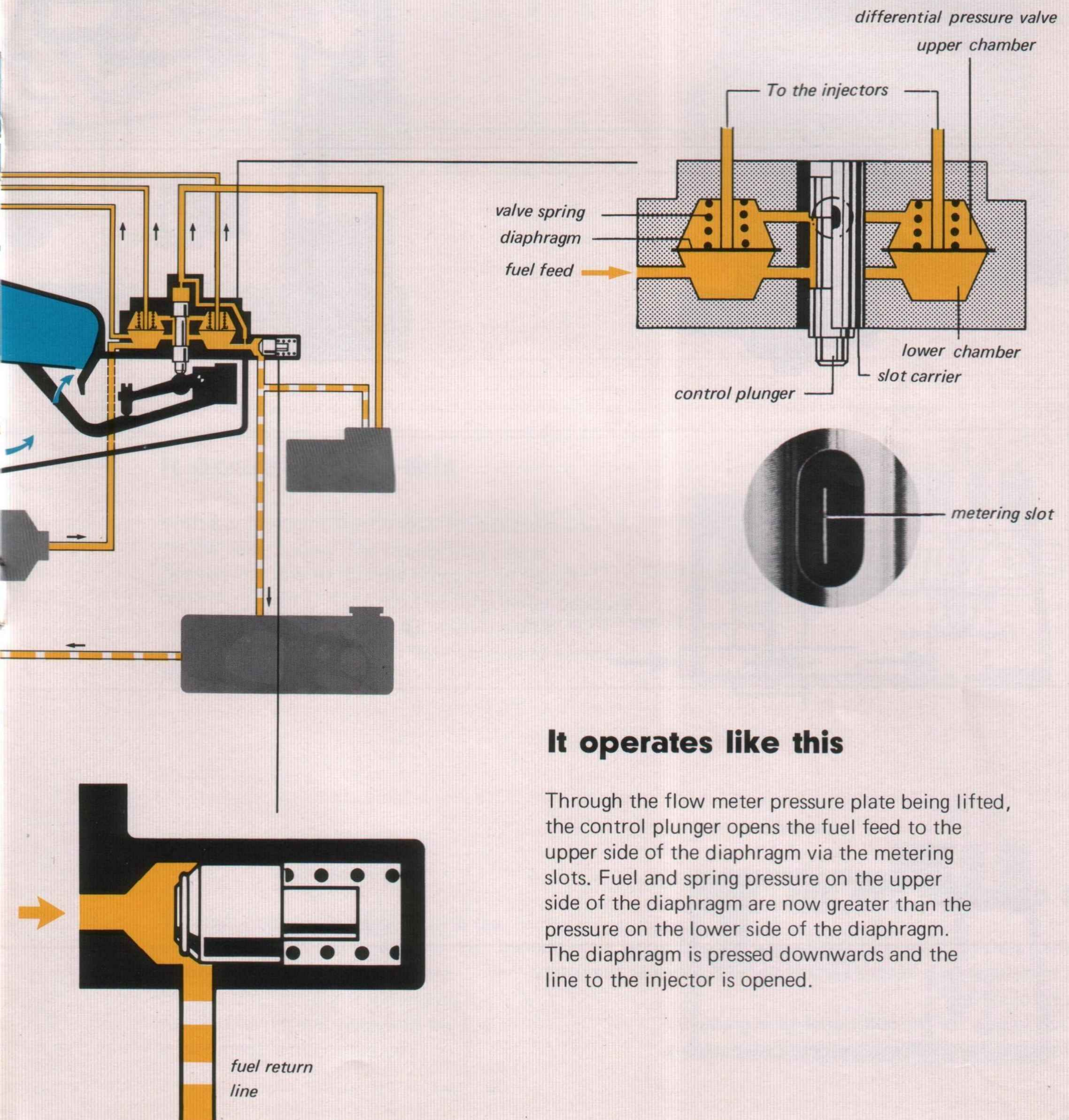
It operates like this

The fuel pressure regulator limits the pressure in the system to a laid down value, and allows the excessive fuel to flow back over a fuel return line.

Metering valve and distributor

The fuel metering valve and distributor has a differential pressure valve with an injection line and injector per cylinder. By this means the fuel is distributed evenly to the individual cylinders.

The central control plunger determines the amount of fuel which flows through.



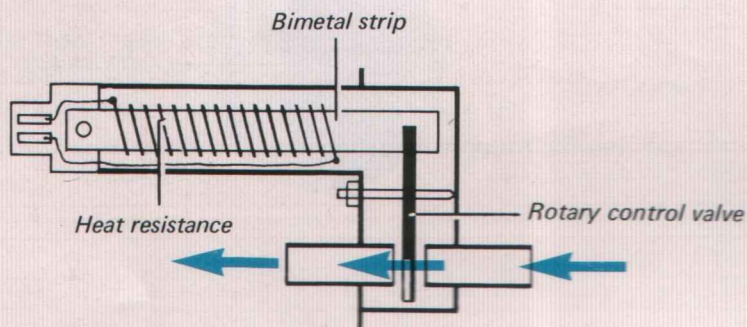
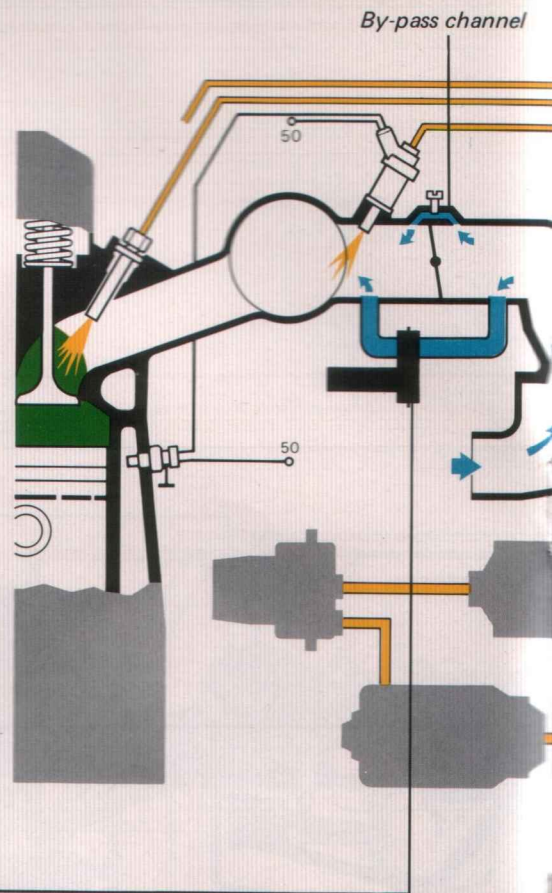
It operates like this

Through the flow meter pressure plate being lifted, the control plunger opens the fuel feed to the upper side of the diaphragm via the metering slots. Fuel and spring pressure on the upper side of the diaphragm are now greater than the pressure on the lower side of the diaphragm. The diaphragm is pressed downwards and the line to the injector is opened.

Auxilliary air valve

The auxilliary air valve provides for an increased engine speed during the warming up phase.

The additional air is also measured by the flow meter pressure plate, the control plunger is raised accordingly and thus the engine speed is increased. The throttle valve remains closed.



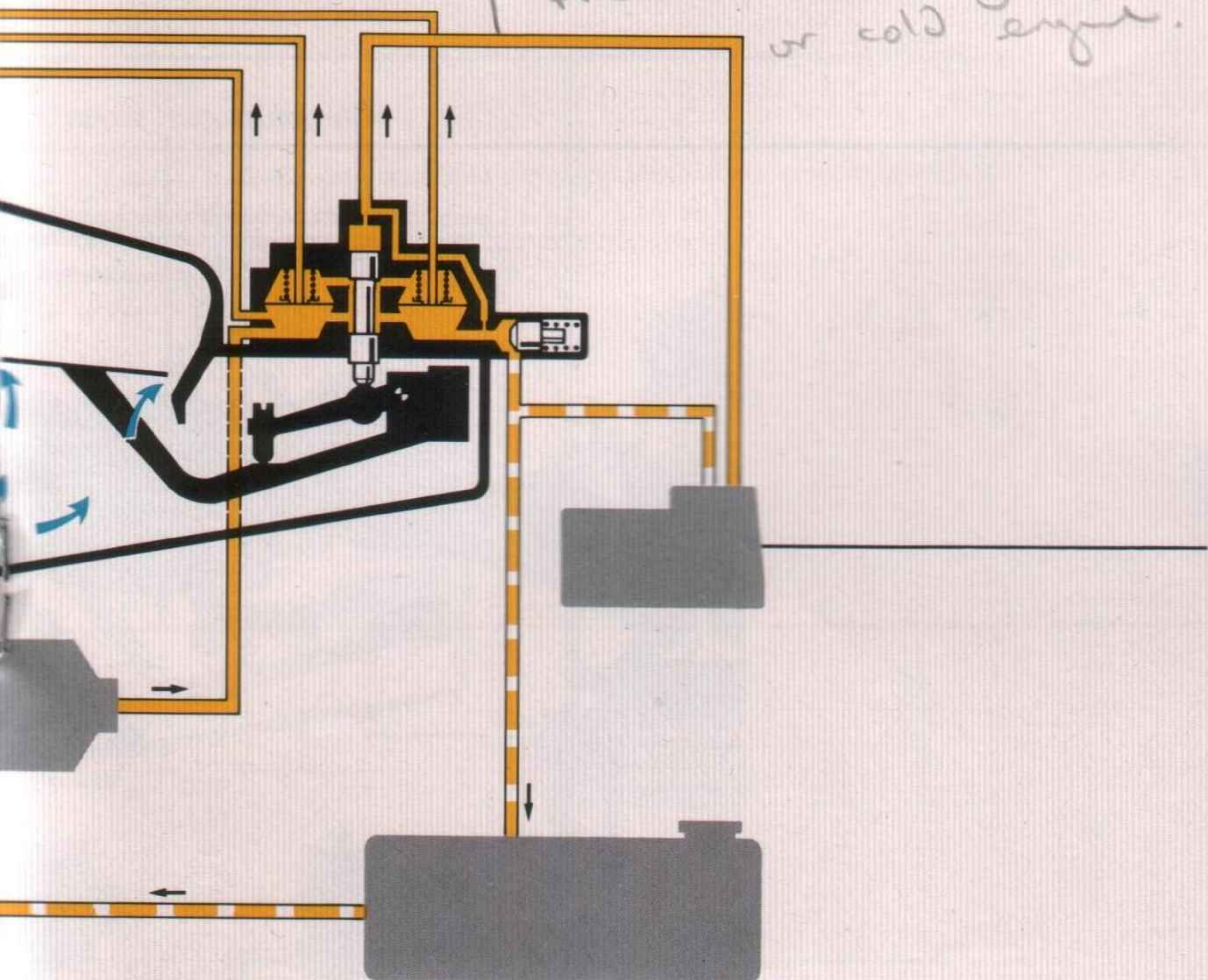
It operates like this

When starting from cold the passage for additional air is opened. A bimetal strip is heated electrically and operates the rotary control valve.

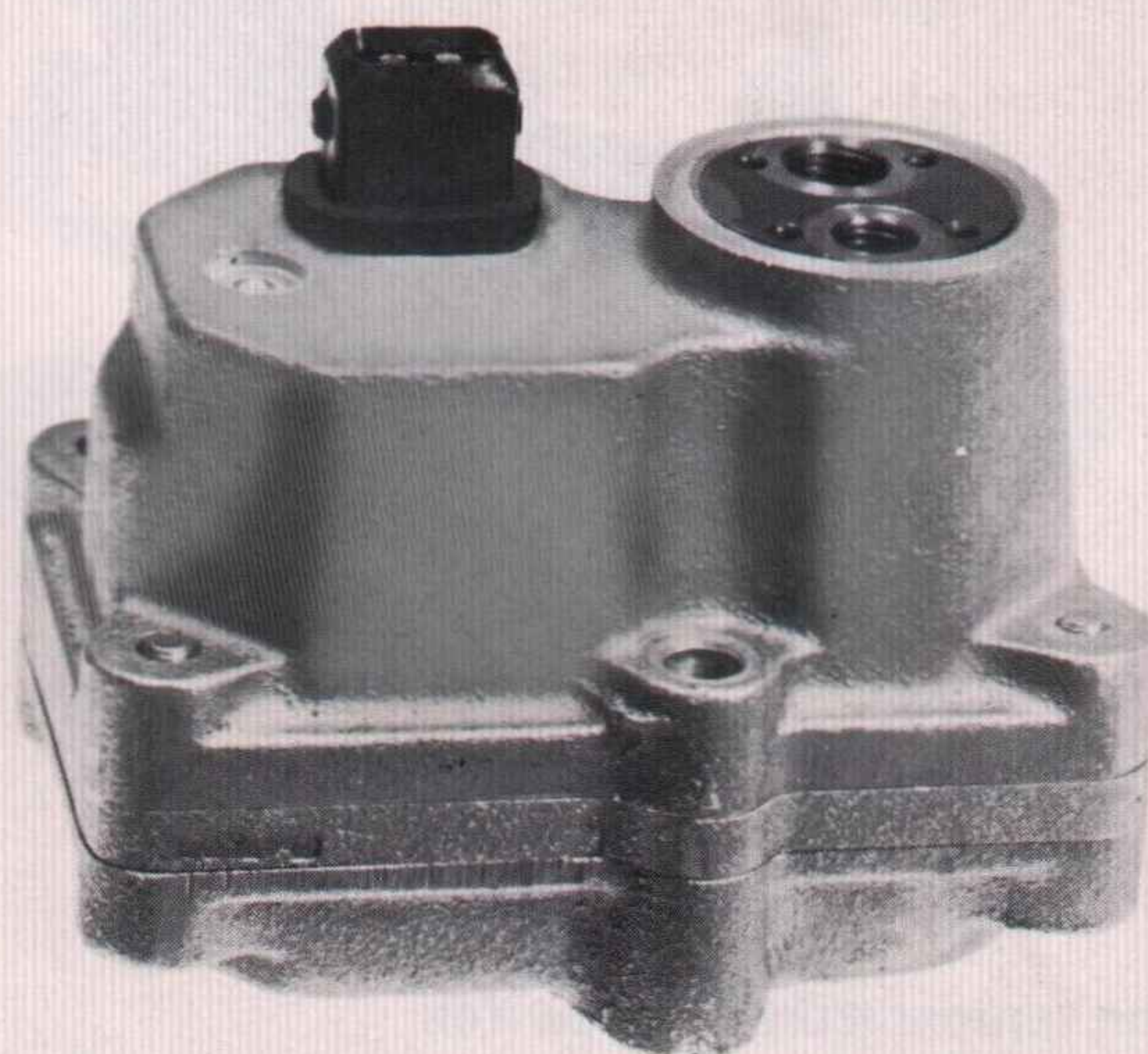
The passage for the additional air is gradually closed as the operating temperature increases.

Warm up valve

Install gauge to check system pressure + control pressure depending on hot or cold engine.

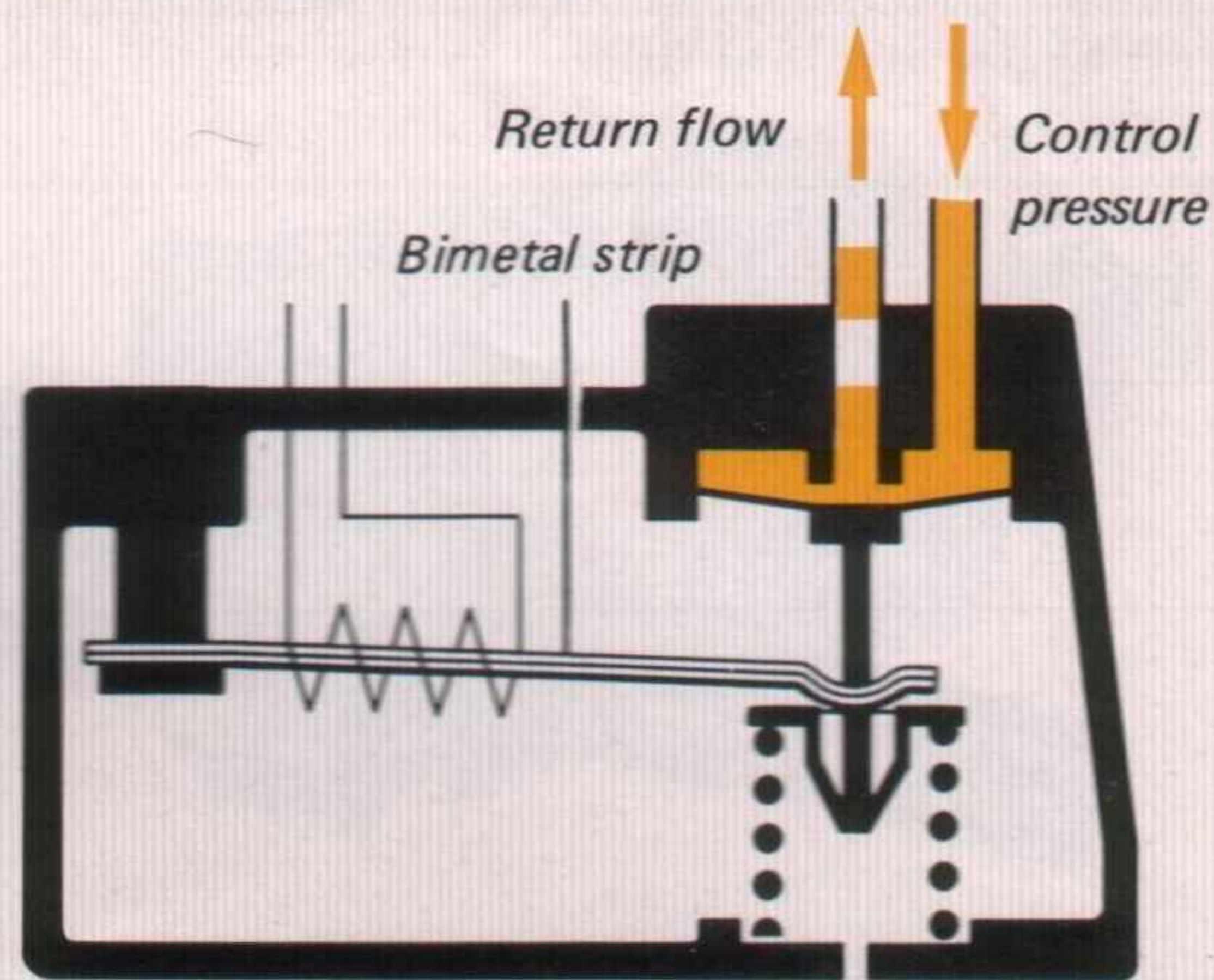


The warm up valve provides for the fuel enrichment during the warming up phase.

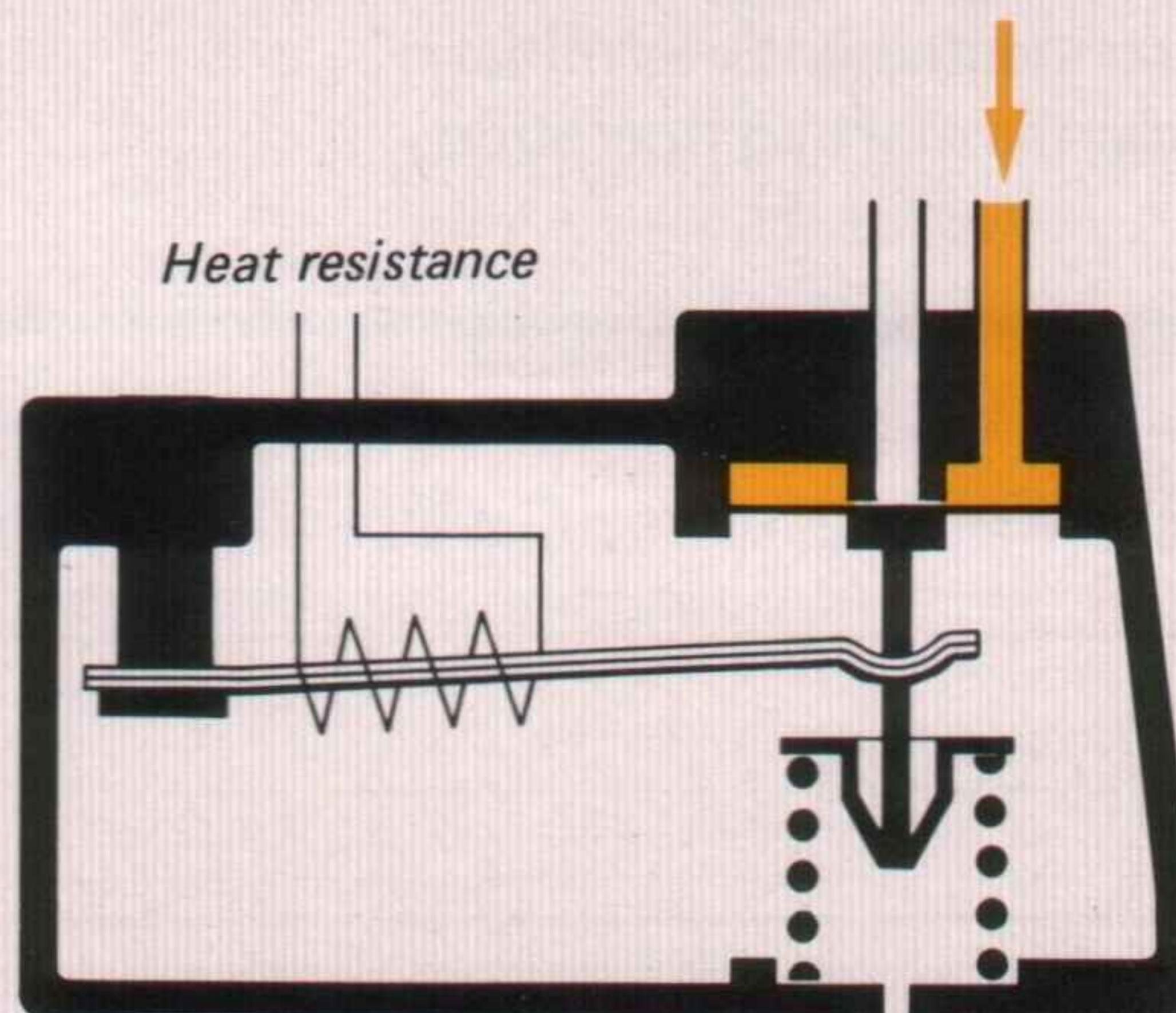


It operates like this

With a cold engine the bimetal strip presses on the valve spring. The return flow line is opened and due to this the pressure on the control plunger is reduced. The flow meter pressure plate lifts the control plunger a little higher. Now more fuel can pass to the injectors to enrich the mixture.



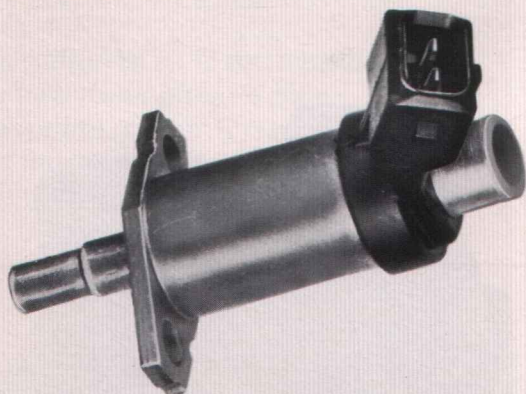
Through heating the bimetal strip the load is taken off the spring and the return flow line is slowly closed. By this time the control pressure has reached its normal value and the fuel enrichment is discontinued.



Other components

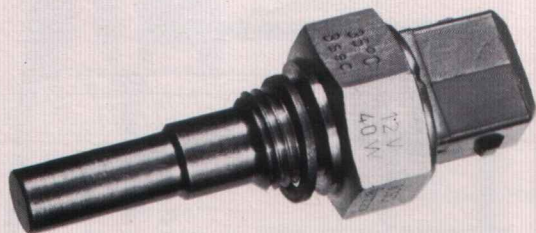
The cold start valve

- is controlled from a thermo time switch.

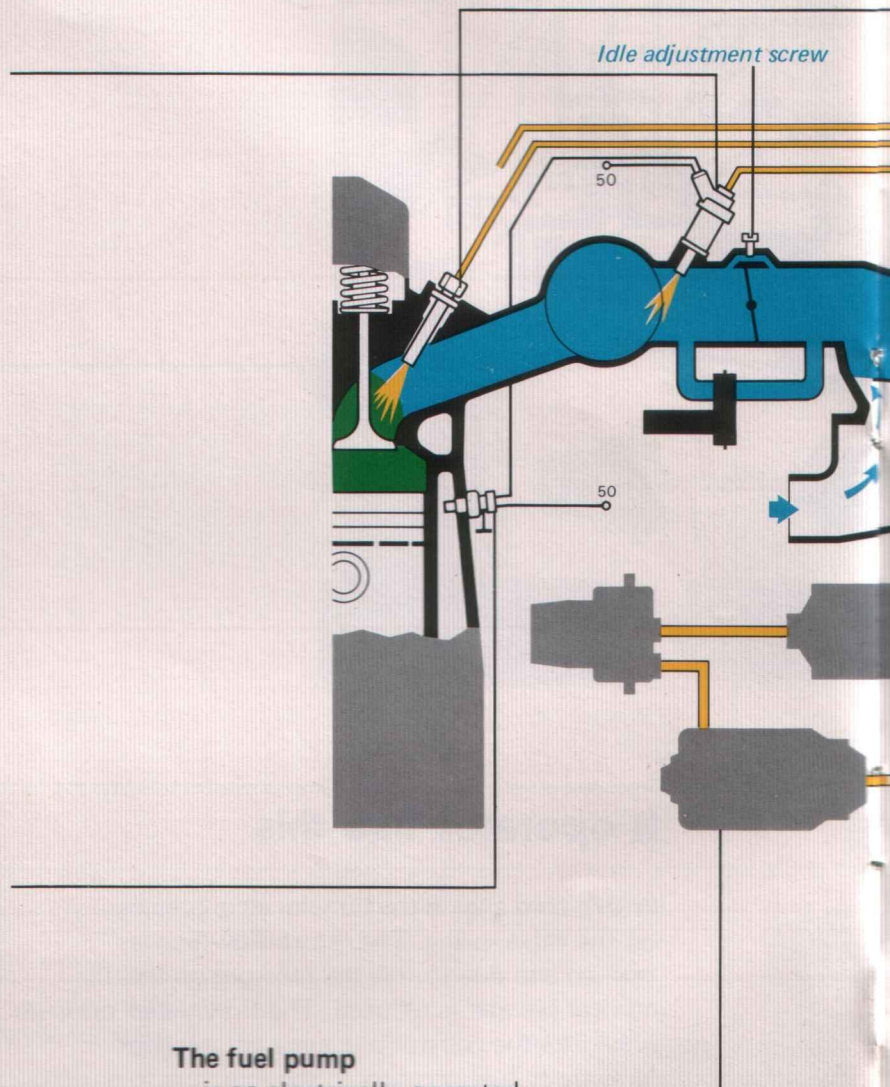


The temperature time switch

- controls the current circuit of the cold starting valve dependent on the engine temperature and the starting time

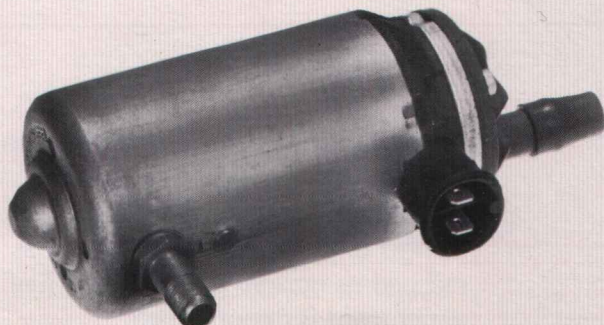


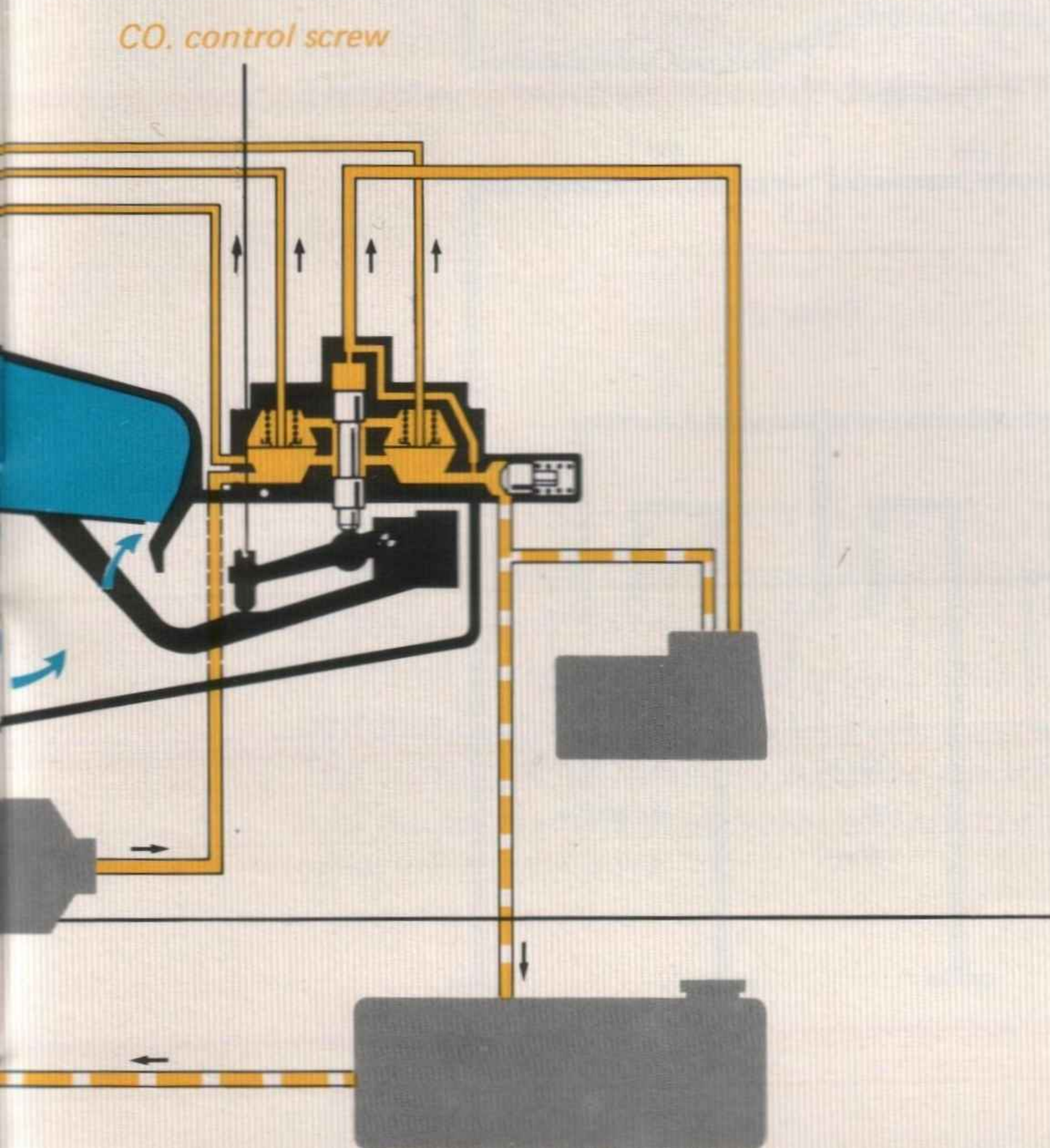
Both components are connected with terminal 50 during the starting operation.



The fuel pump

- is an electrically operated roller type pump with a pressure relief valve and a non return valve





The Injectors

- open at a predetermined pressure
- continually spray fine atomized fuel into the intake manifold in front of the inlet valves
- they are only inserted into the engine they are not screwed in.



The fuel filter

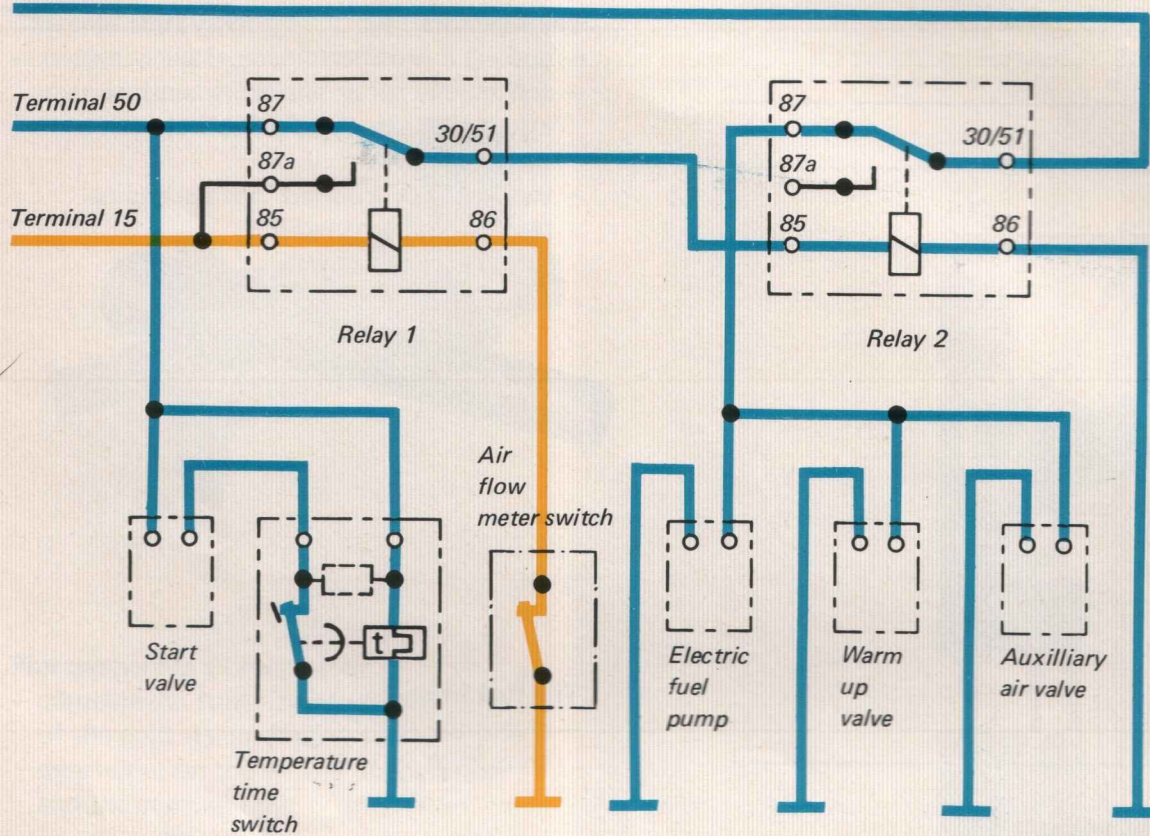
- cleans the fuel flowing through it



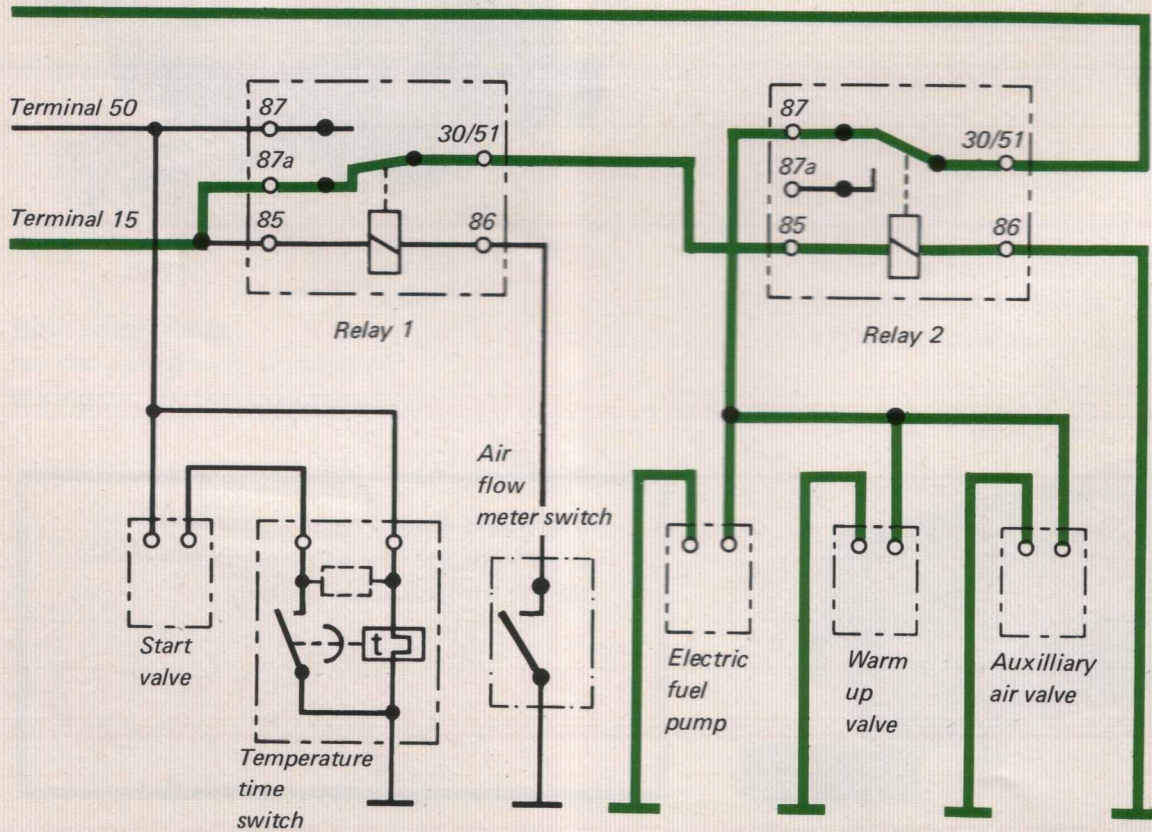
- The idling speed is set with the idle adjustment screw on the throttle valve housing.
- The CO adjustment screw is covered by a rubber grommet in the top of the metering valve and distributor.

Wiring diagram

Terminal 30



Terminal 30



Ignition switched on

Current is supplied from terminal 15 to terminal 85 of relay 1.

The circuit is closed by the switch on the air flow meter.

The relay 1 switches over and connects 87 with 30/51.

Starting

From terminal 50 the current is passed on via relay 1 to the terminal 85 of relay 2.

Terminal 86 is connected to ground, the relay 2 switches over.

The current at terminal 30 is passed on to the electrical fuel pump, the warm up valve and the throttle by-pass valve via terminal 87.

Engine runs

After the engine has started the switch on the air flow meter opens. The circuit in relay 1 is interrupted.

The relay 1 switches back to terminal 87 a.

Relay 2 still receives current from relay 1 via terminals 15 and 87 a.

Finally we have set some questions,
which should confirm,
whether you have really understood how the K-Jetronic functions.

The answers to the questions can be found on page 18.

1. The K-Jetronic is an injection system
 - a) for Diesel engines
 - b) for spark ignition engines
2. The fuel is injected by the injectors
 - a) in the manifold
 - b) in the intake port of the inlet valve
 - c) in the engine cylinder
3. The fuel is injected
 - a) during a definite working cycle
 - b) continuously
4. The task of the pressure accumulator is
 - a) accumulation of a reserve of fuel for hot starting
 - b) to hold the injection pressure constant
 - c) to prevent the formation of vapour bubbles in the system
5. The best fuel — air — mixture results
 - a) through appropriate construction of the air flow meter
 - b) through the warm up valve and the throttle by-pass valve
 - c) through a special fuel
6. The auxilliary air valve provides for
 - a) fuel enrichment
 - b) alteration to the fuel-air ratio
 - c) the rise in running speed during the warming up phase in conjunction with the warm up valve

7. Necessary for cold starting and warm up are

- a) the cold start valve
- b) the auxilliary air valve
- c) the warm up valve

8. The task of the warm up valve is

- a) to lower the control pressure from start until the operating temperature is reached (fuel enrichment)
- b) to save fuel

9. The metering of the fuel is done

- a) through the control slots in slot carrier of the metering valve and distributor
- b) through the injectors

Answers to the K-Jetronic

- | | | |
|------|------------|--------------|
| 1. b | 4. a and c | 7. a b and c |
| 2. b | 5. a | 8. a |
| 3. b | 6. c | 9. a |

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