Service Manual

Fault tracing **Design**

Repairs **Function**

Maintenance

TP 31361/1; 12.88

Section 2 (23)

LH-Jetronic 2.4 fuel system

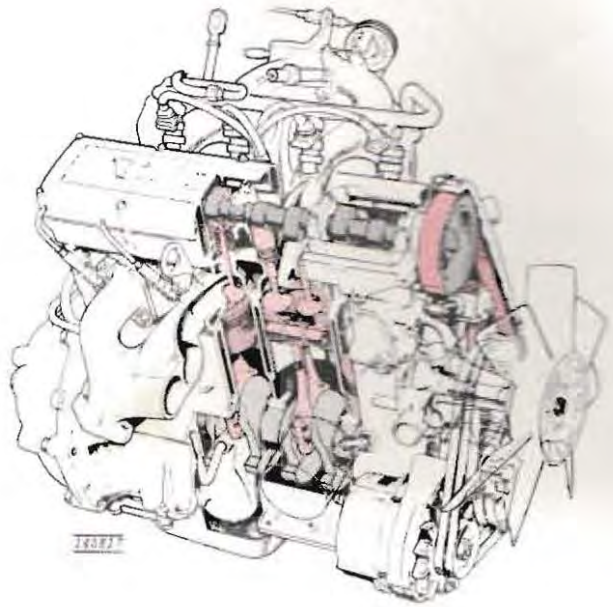
Engine B 230 F

240 1989-19..

VOLVO

Volvo Car Corporation

This manual covers the following:

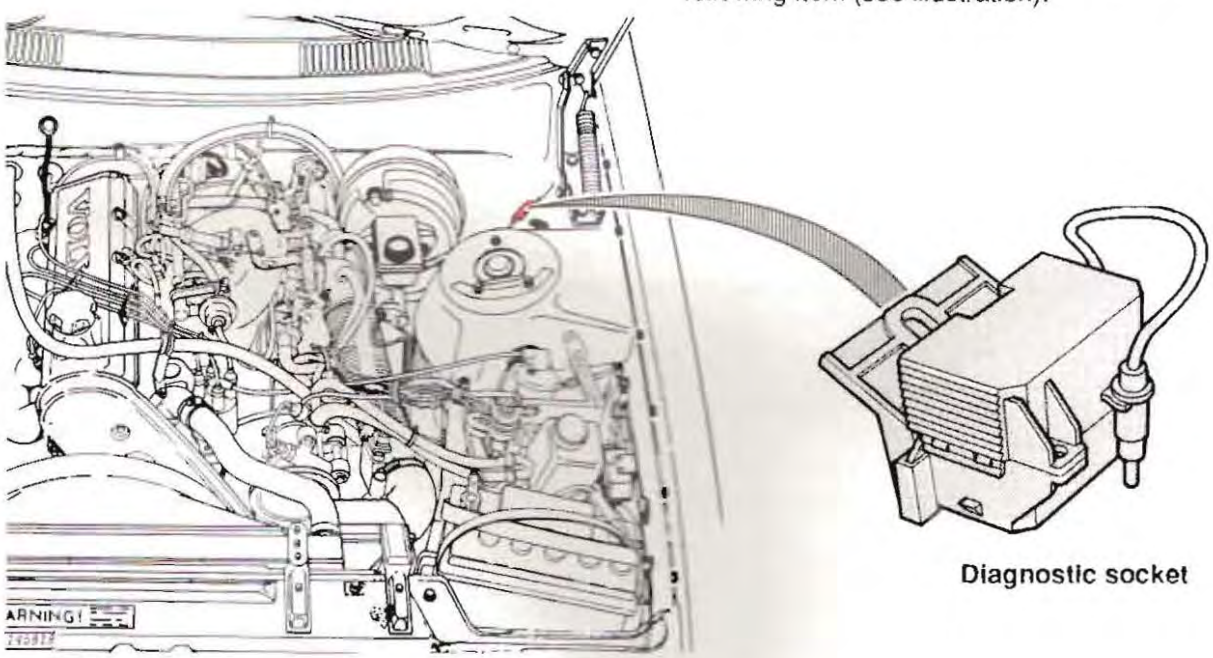


B 230 F

Gasoline engine with fuel injection and catalytic converter system.
2.3 liter cylinder volume.
Two valves per cylinder.

LH 2.4 fuel system

To identify the system with certainty, look for the following item (see illustration):



Diagnostic socket

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- System relay, fuses 16
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The first section of this manual covers the Design and Function of the fuel system. Reading it will provide the necessary background for understanding the second section - Fault tracing, Repairs and Maintenance.

Order No.: TP 31361/1

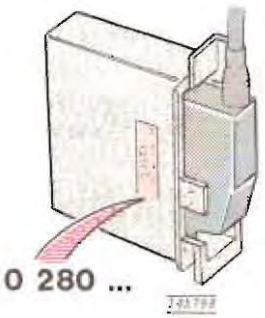
We reserve the right to make alterations

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Specifications



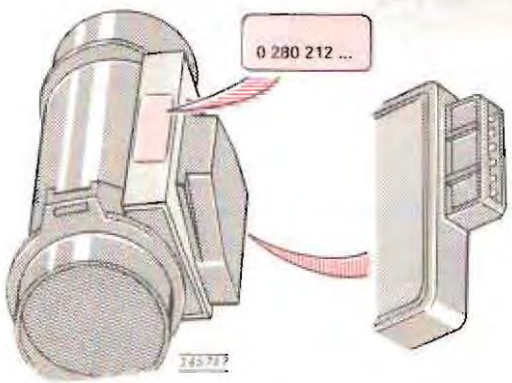
Gasoline, unleaded
Octane requirements:
- RON (Research Octane Number) 91-95
- AKI $\frac{R+M}{2}$ 87



Control unit (part numbers)

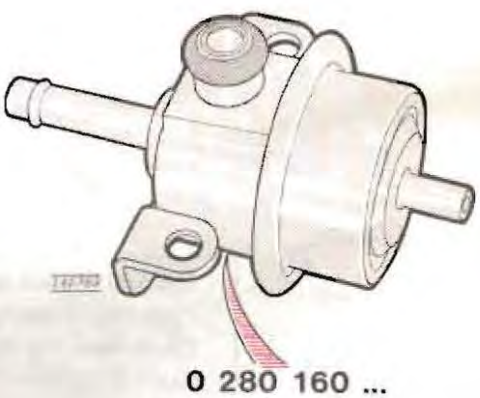
With EGR (California)
Volvo P/N 3501687-2
Bosch P/N 0 280 000 556

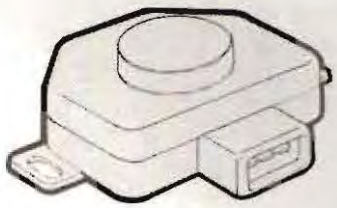
Without EGR (remainder of USA, Europe):
Volvo P/N 3517407-7
Bosch P/N 0 280 000 561



Air mass meter
Volvo P/N 3517020
Bosch P/N 0 280 212 016

Resistance between connectors
2 and 3 ..... 2.5-4.0 Ω

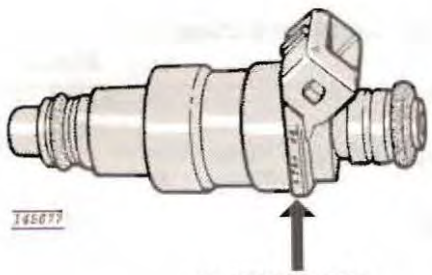




Throttle switch
Volvo P/N 3517068-7
Bosch P/N 0 280 120 325

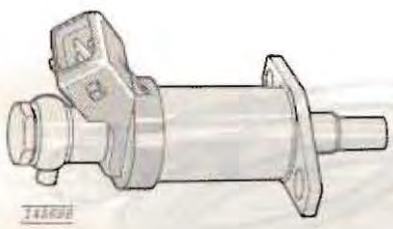
Fuel pressure regulator
Volvo P/N 3517064-6
Bosch P/N 0 280 160 294

System pressure (fuel pressure above intake manifold pressure): ..... 300 kPa (42 psi)



Injectors
- Volvo P/N 3517572-8
- Bosch P/N 0 280 150 762

Injection capacity 214 cm³/min at 300 kPa (42 psi) system pressure.
(Note: use only special equipment to test disassembled injector)



Cold start valve *(certain models)*
Volvo P/N 3517130-5
Bosch P/N 0 280 170 264

Injection capacity around 165 cm³/min.



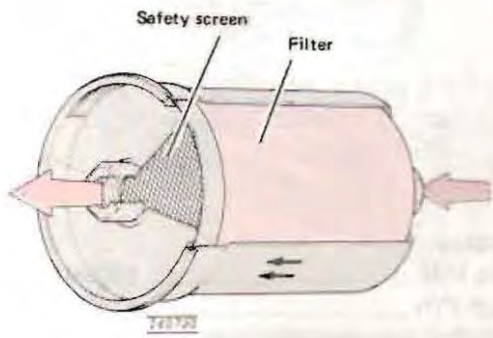
Tank pump
Volvo P/N 1389721-0
(1317671)
Current consumption ..... 3-4 amp



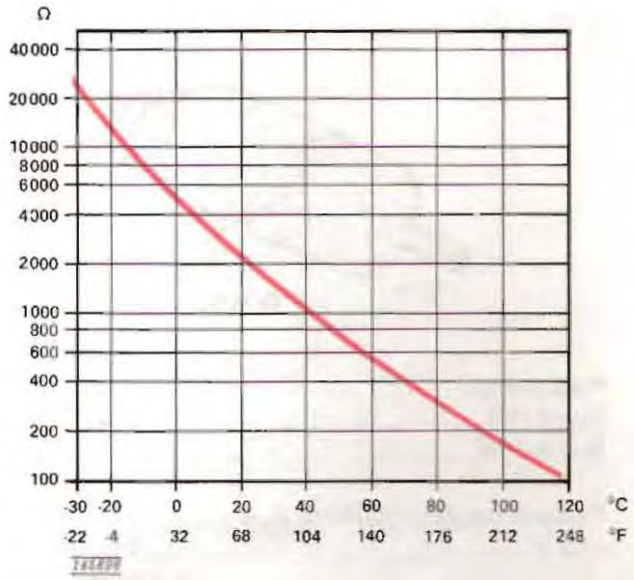
Fuel pump
Volvo P/N 1389449-8
Bosch P/N 0 580 464 039

Pump capacity at 300 kPa (42 psi) and +20°C (68°F):
- 12 V ..... 130 liters/hour
1.0 liters/30 sec
- 11 V ..... 108 liters/hour
0.8 liters/30 sec
- 10 V ..... 65 liters/hour
0.6 liters/30 sec

Current consumption at 300 kPa (42 psi), +20°C (68°F) and 12 V:
- maximum ..... 6.5 amp



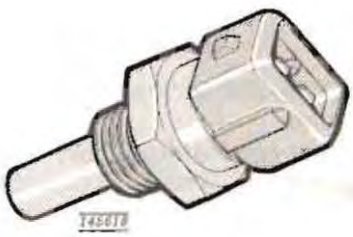
Fuel filter
Volvo P/N 1389450-6
Filters particles down to min. of: .... 0.002 mm
Tightening torque ..... 20-35 Nm (15-25 ft.lb)

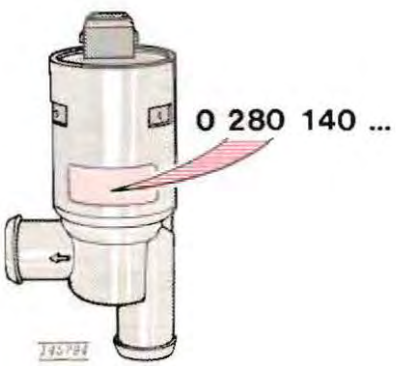


Coolant temperature sensor
- Volvo P/N 1346030-8
- Bosch P/N 0 280 130 032

Resistance in Ωs at:
-10°C (14°F) 8260-10560
+20°C (68°F) 2280-2720
+80°C (176°F) 290-364

For other values, see chart.







Idle valve
- Volvo P/N 1389618-8
- Bosch P/N 0 280 140 516

Resistance between terminals
1 and 2 ..... 8 Ω

Lambda-sond
- Volvo P/N 3501753-2
- Bosch P/N 0 258 003 034

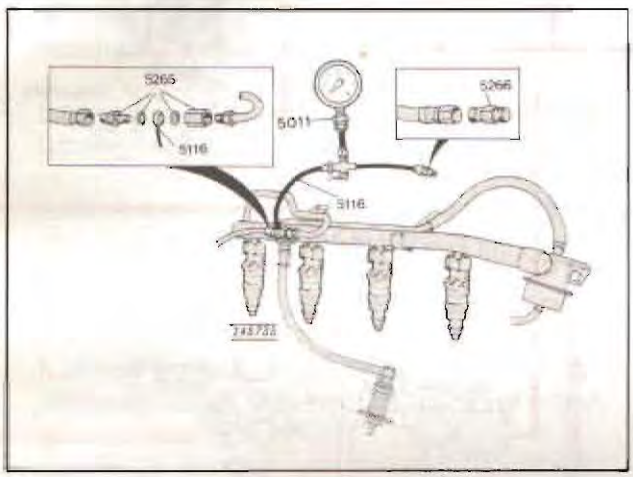
Resistance pre-heating resistor
- cold sond, +20°C (68°F) ..... 3 Ω
- hot sond, over 350°C (660°F) ..... 13 Ω

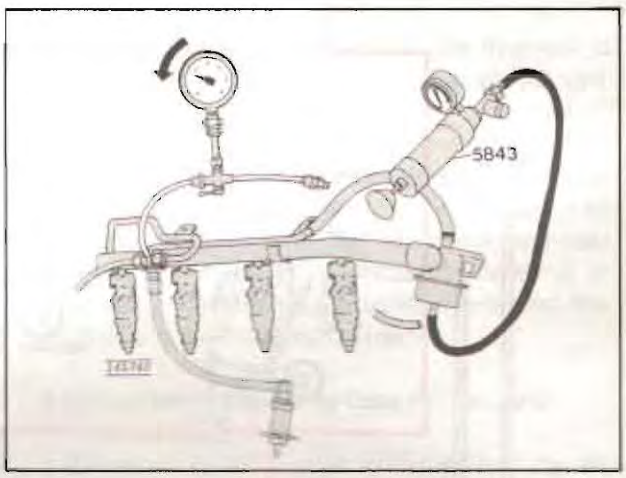
Tightening torque ..... 55 Nm (40 ft.lb)

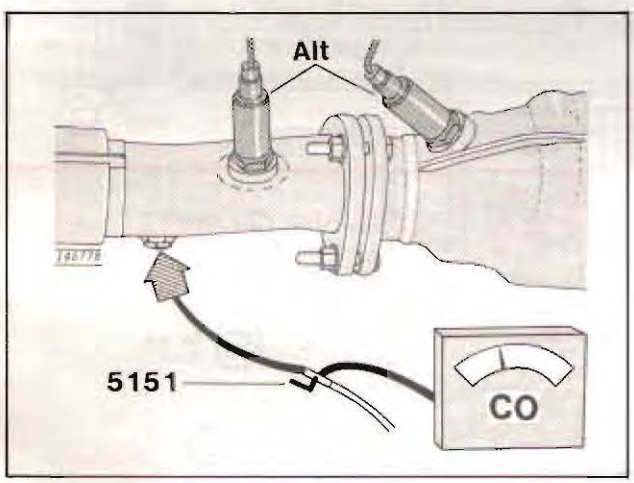
Apply "Never Seez" paste (P/N 1 161 035-9) to the threaded section of the sond.

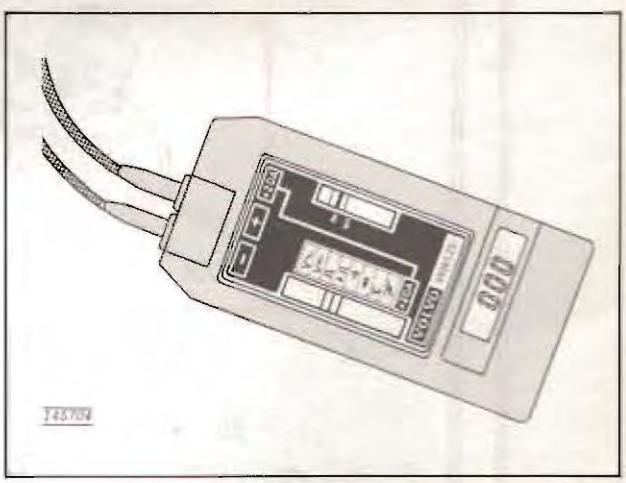
Special tools

999-	Description-use
5011-5	**Pressure gauge:** indicating fuel pressure. Used with 5116, 5265, 5266.
5116-2	**Hose:** connecting pressure gauge 5011.
5151-9	**Adaptor:** CO-meter.
5843-1	**Vacuum pump:** checking pressure regulator.
6450-4	**Volt Amp meter:** fault tracing.
6525-3	**Multimeter:** volt, amp, ohm, diode.
9724-0	**Ohm-diode meter:** fault tracing.
9921-0	**Volvo Mono-Tester:** setting ignition, idling speed.

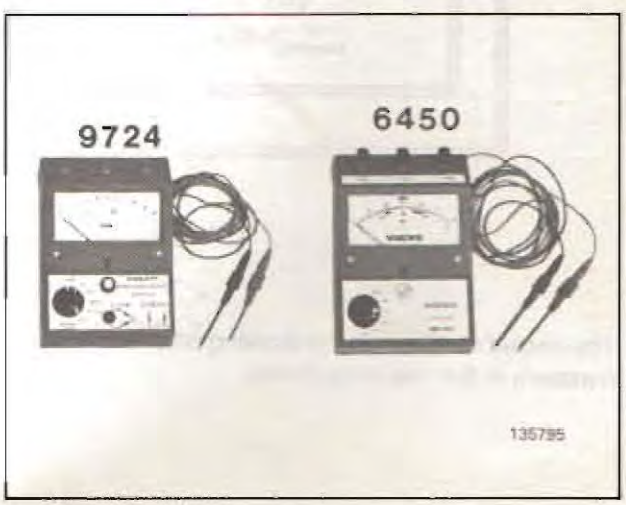






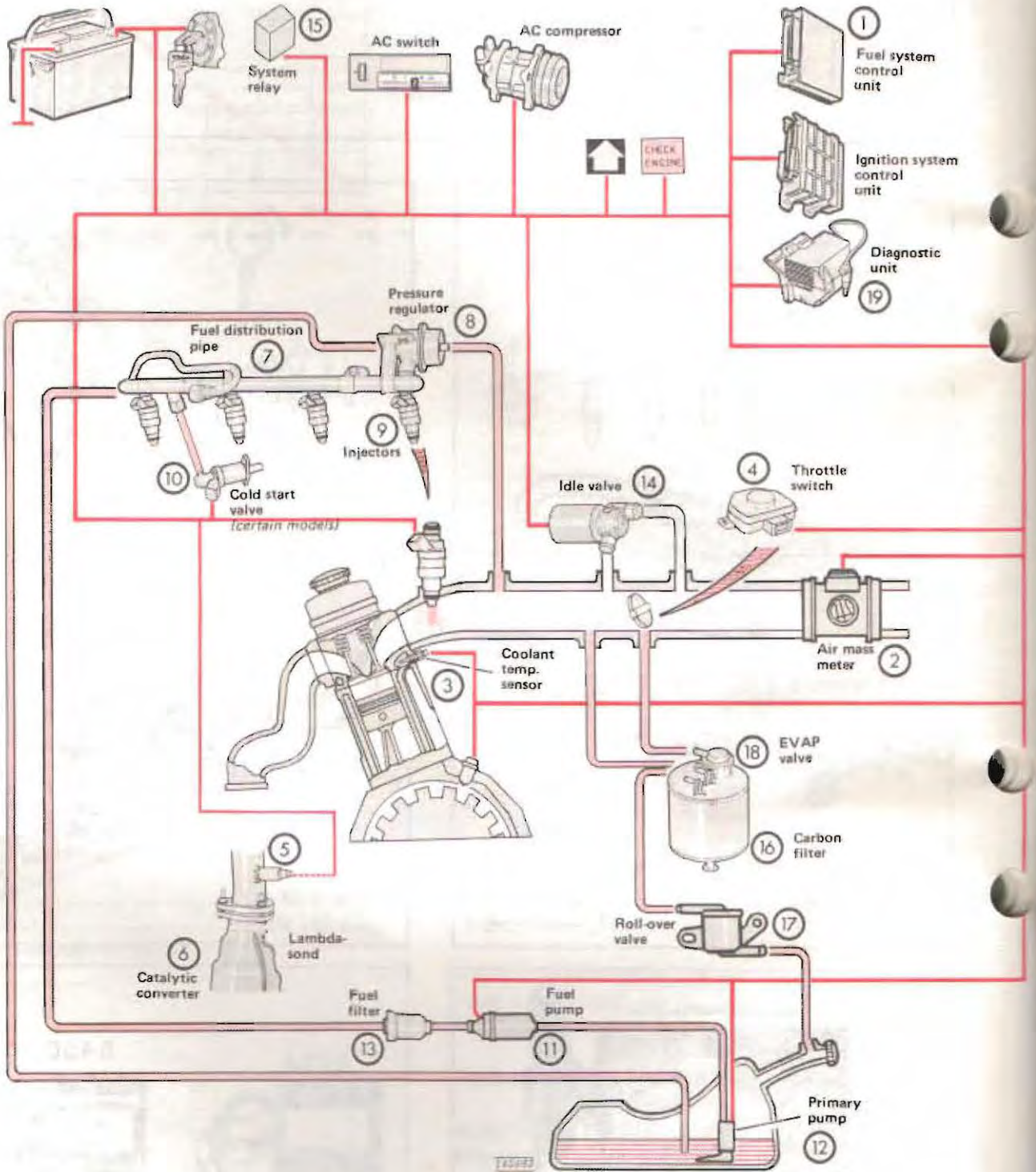






Design and Function

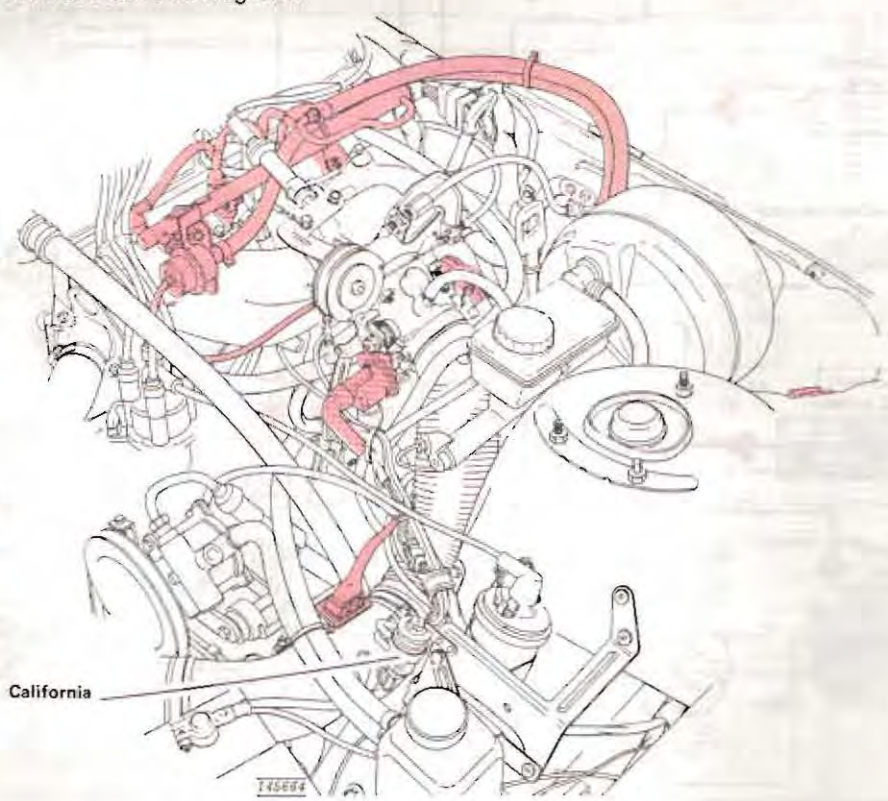
LH-Jetronic 2.4 — LH2.4



The circled numbers in the drawing refer to the same numbers in the following listing.

Characteristics of LH2.4 fuel system for Volvo 240:

- It is used together with the EZ116K ignition system.
- It is an adaptive system, being capable of multiple adjustments based on driving experience.
- It is monitored by a self-diagnostic system that lights up a warning lamp on the instrument panel. It has a memory capability of up to three fault codes (Scandinavia/USA Federal) plus seventeen additional codes (USA/California). Subsequent fault tracing can be carried out by actively utilizing the diagnostic program.
- It measures intake air mass via air mass meter supplied with a hot wire.
- It utilizes a primary pump in the fuel tank and a fuel pump with fuel filter on the fuel line to the engine.
- It works on a fuel pressure of 300 kPa (42 psi).
- It utilizes a separate cold start valve which supplies extra fuel at, or below 15°C (60°F) or colder.
- It provides a richer fuel mixture to counteract knock when the fuel system's anti-knock control system has been unsuccessful at reducing knock by adjusting downward several degrees.
- It requires no adjustment of CO because of the adaptive function.
- It has a "limp home" setting at the idle valve. In case of loss of current, the idle valve remains open to provide emergency air intake.
- In the USA: It has an integrated shift indicator related to vehicle speed and engine rpm. The indicator lamp lights up if the rpm for the next gear are higher than the pre-programmed limits.
- It uses an induction sensor on the flywheel to indicate rpm and crankshaft position via the ignition system control unit.
- It is fitted with the same model Lambda-sond as for previous LH fuel systems. The resistance of the Lambda-sond is affected by the exhaust-gas/oxygen concentration. The Lambda-sond is mounted on the exhaust manifold between the engine and the catalytic converter.
- It is fitted with a three-way catalytic converter.
- It utilizes an EVAP system to handle fuel vapors in the fuel tank.



①

Control unit

The control unit has a microprocessor that receives signals from the various sensors regarding operational conditions, evaluates them in relation to pre-programmed values and calculates the correct injector opening durations (in milli-seconds per revolution).

The control unit governs idling rpm by regulating the amount of air by-passing the throttle valve. It also controls other functions, such as the cold start valve, the fuel pump and the relay. One important function is monitoring fault tracing via the diagnostic socket.

Self-adjusting functions

The control unit is adaptive in that it adjusts its calculations according to assimilated input.

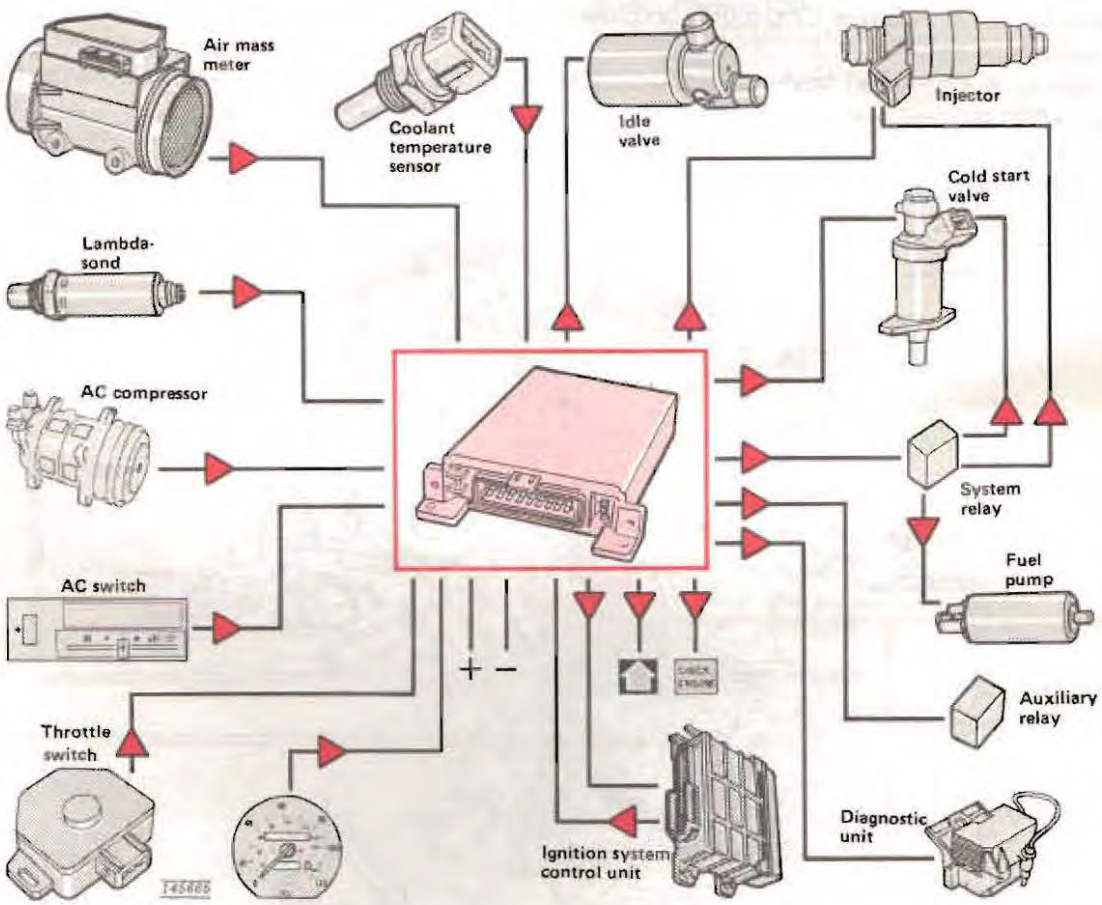
Self-adjusting idle speed regulation

In time, wear and coatings will affect the operation of the throttle valve, causing less air to enter the intake system. Instead of working from a pre-programmed value the idle valve receives a signal that is adapted to the experiences which the control unit has learned from previous driving periods.

Self-adjusting Lambda-sond

The Lambda-sond operates in a similar fashion. It senses if the fuel mixture is rich or lean and adjusts the control unit's Lambda regulator accordingly. The self-regulating mechanism keeps the control unit function at midpoint. This does away with the need to adjust the CO content and automatically compensates for the effects of tolerances and wear in the injection system.

Whenever the vehicle is started and driven, the control unit will use the value that has been learned from previous driving periods.



The control unit microprocessor receives:

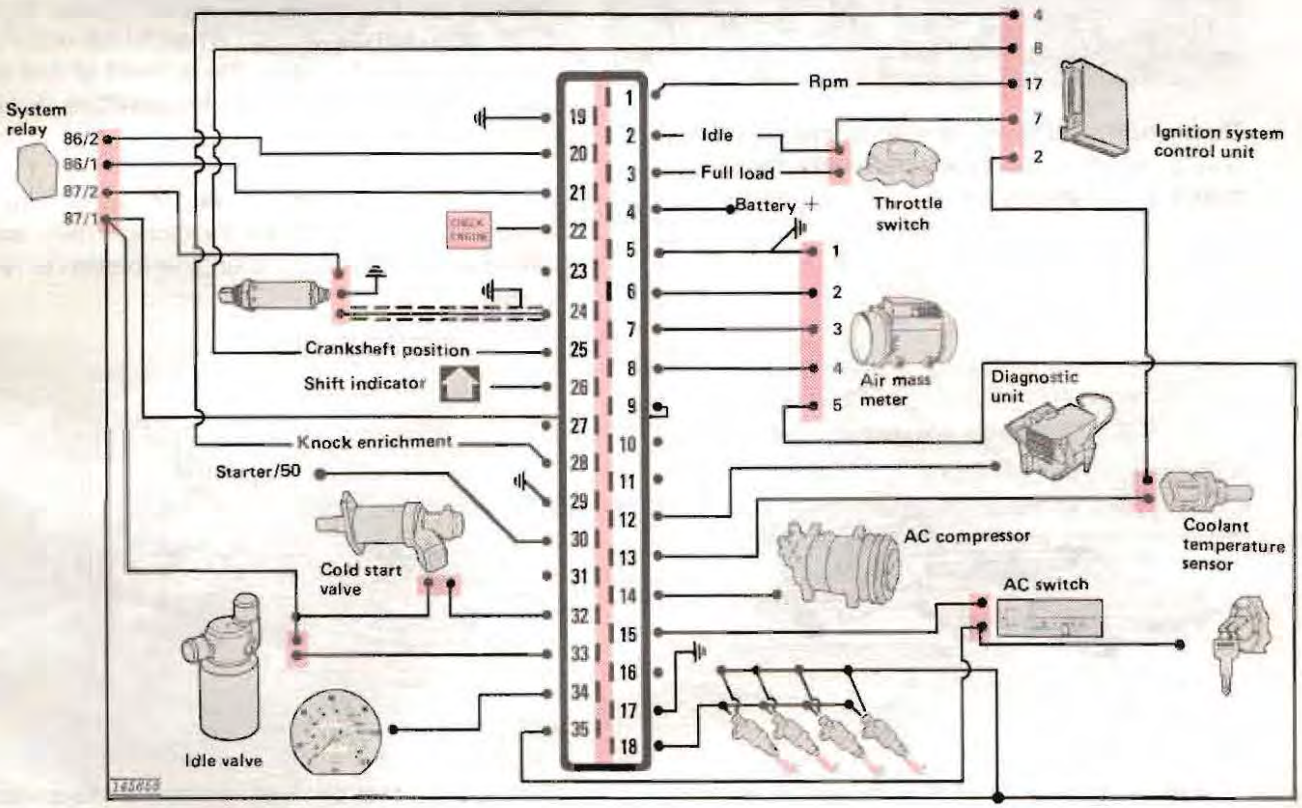
- Exhaust gas oxygen content information from the Lambda-sond.
- Rpm and crankshaft position information from the ignition system control unit. If this information is not forthcoming, the fuel system control unit will not function.
- Engine temperature information from the coolant temperature sensor.
- Engine load information from the air mass meter.
- Information from the shutter switch as to whether the throttle shutter is closed or wide open .
- Electrical system voltage from the battery current.
- The signal from the AC switch informs if it is on, and the signal from the compressor connection indicates that the compressor is operating.

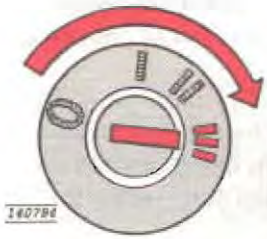
Emergency program

There is a "limp home" function provided if the signal from the air mass meter ceases for some reason, such as the hot wire burning off. A pre-programmed value is used for injection duration, allowing the vehicle to be driven slowly to the garage.

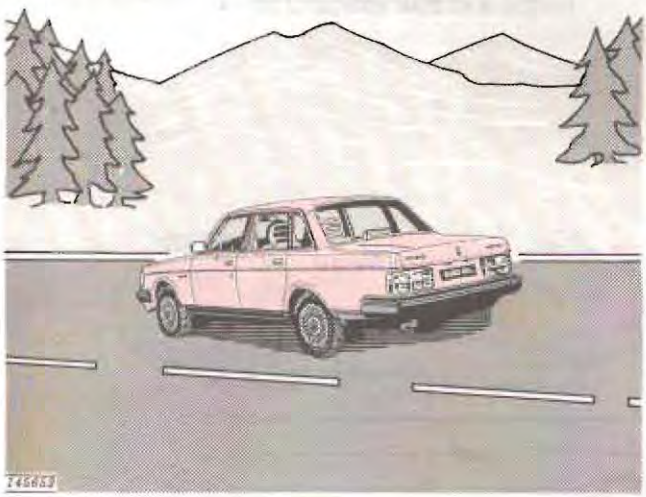
The control unit microprocessor:

- Sets the voltage of the system by grounding the system relay.
- Breaks the system relay ground if engine turns over too slowly (engine has stopped). This keeps the battery from being drained and cuts off fuel flow from the fuel pump when the engine isn't in operation.
- Grounds the injectors, which regulates opening, timing and injection duration.
- Controls air valve for constant idle speed (CIS).
- Is connected to the diagnostic unit and provides fault information about the various functions.
- Provides the ignition system control unit with load information.
- Protects against too high rpm by shutting off fuel injection until the engine has slowed down.
- USA/Canada: governs CHECK ENGINE warning lamps and shift indicator lamp.





The **start-up** program provides for two injection durations per revolution.
The cold-start valve is activated when the temperature is at -15°C (5°F) or below, and the engine speed is under approximately 900 rpm. Once the rpm exceed the pre-programmed limit, the cold-start valve is turned off.



During **normal driving** conditions, injection duration is regulated mostly with reference to signals from the air mass meter.



At full load, a richer air/fuel mixture is used to provide maximum engine power and to lessen the effects of combustion heat on the engine and the catalytic converter.



The **choke** provides a richer fuel mixture to the engine up to an engine temperature of 60°C (140°F).



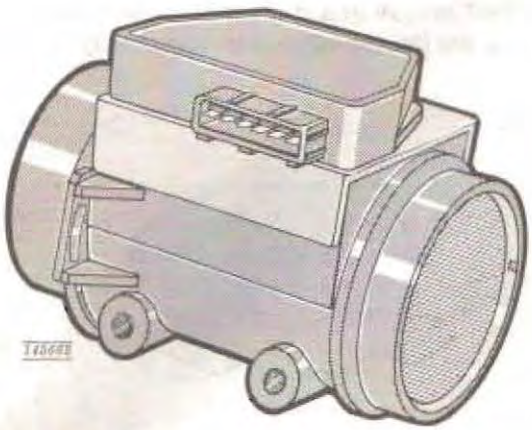
Injection duration increases during **acceleration**.

Knock enrichment provides a richer fuel mixture to counteract knock when the fuel system's anti-knock control system has been unsuccessful at reducing knock by adjusting downward several degrees on all cylinders. Knock cause high combustion temperatures. When knock occurs, the control unit increases the amount of fuel in order bring the combustion temperature down and reduce the knock.

Excess rpm is prevented via a rotation speed limiter which turns off the injectors. They are turned on again when the engine rotation is reduced.



During **deceleration**, fuel injection is discontinued above 1,800 rpm in all gears. It is resumed at 1,400 to 2,000 rpm, depending on engine temperature.



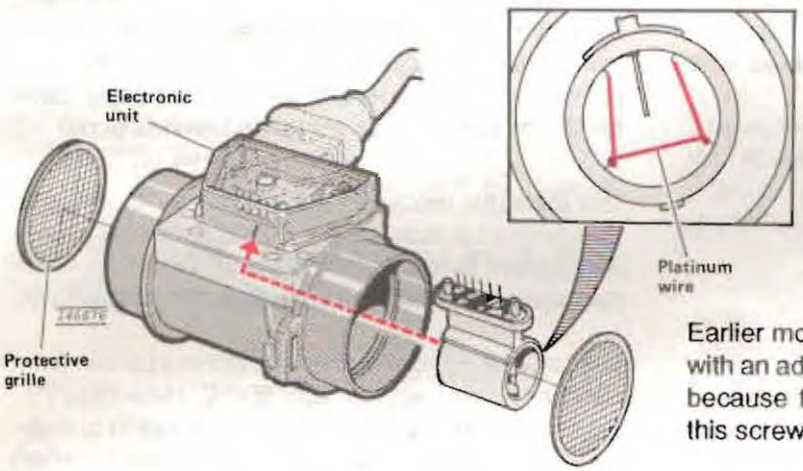
(2)

Air mass meter

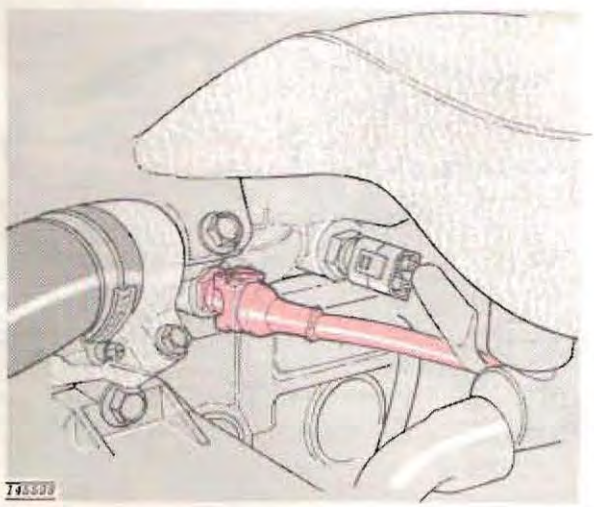
Measures engine intake air mass. Those factors which affect air density, such as temperature, humidity and pressure (altitude) etc. are taken into consideration during measurement.

The measurement sensor inside the air mass meter consists of a wire which is maintained at 120°C (250°F) (previously 100°C - (215°F)) higher than the ambient air entering the engine. As the air mass passing over the wire increases, more current is required to maintain the correct temperature. The amount of current required is used to calculate the air mass taken in.

When the engine is turned off, any dirt on the wire is burned off electrically by heating the wire to over 1000°C (1800°F). Any dirt remaining on the wire would cause it to send incorrect information to the control unit and result in an incorrect fuel/air mixture.



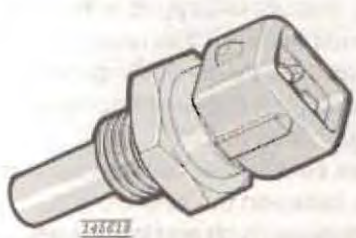
Earlier models of the air mass meter were provided with an adjustment screw for CO settings. However, because the LH2.4 Lambda-sond is self-adjusting this screw is no longer necessary.

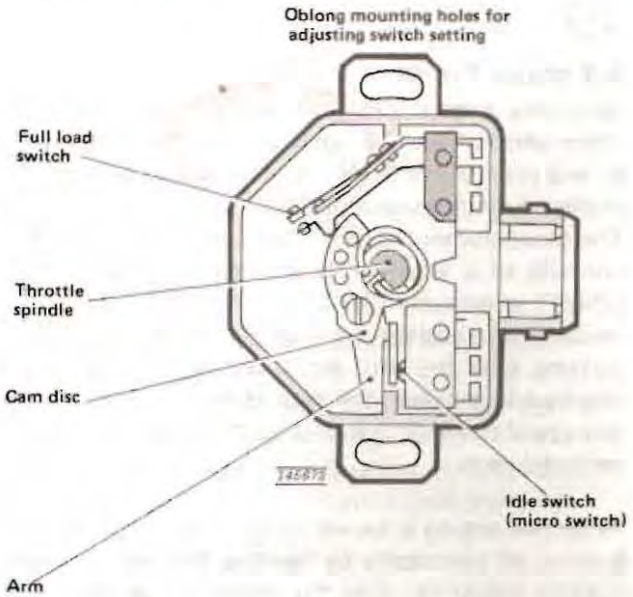


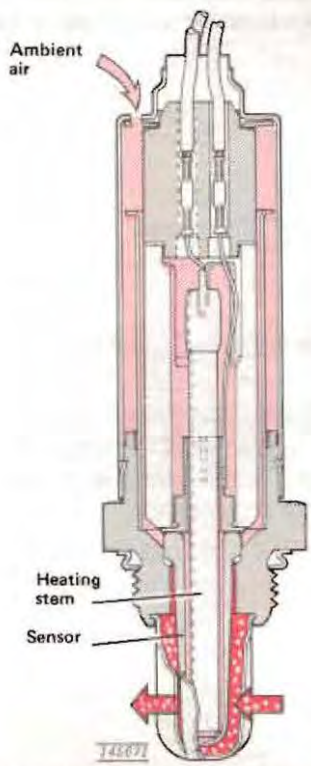
(3)

Coolant temperature sensor

Provides the control unit with information regarding the engine temperature necessary for proper adjustment of injection duration.







The exhaust gases reach the outer surface of the Lambda-sond sensor via slits in the protective sleeve. Ambient air reaches the sensor's inner surface via channels. The sensor itself consists of a platinum covered zirconium-oxide pipe.

The Lambda-sond signal strength is in direct proportion to the amount of oxygen in the exhaust gases. This depends on the air/fuel ratio. A Lambda value of 1 represents the theoretically perfect ratio. A rich mixture results in a higher voltage and a lean mixture gives the opposite result.
The current sent by the Lambda-sond to the control unit varies between 0.1 and 1.0 volt.
The shift between high and low voltage occurs when the Lambda value is at 1. The control unit uses this information to adjust the amount of fuel injected.

④

Throttle switch

Tells the fuel system and ignition system control units whether the throttle valve is closed or fully open.



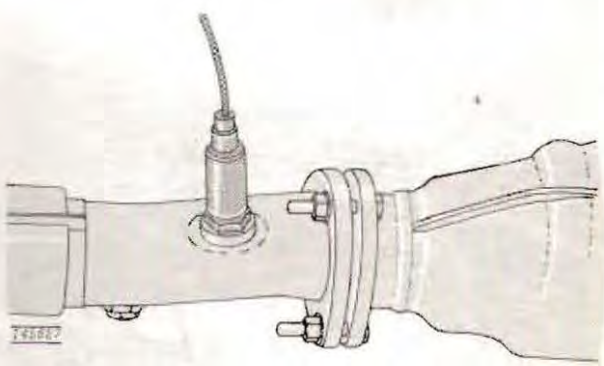
⑤

Lambda-sond

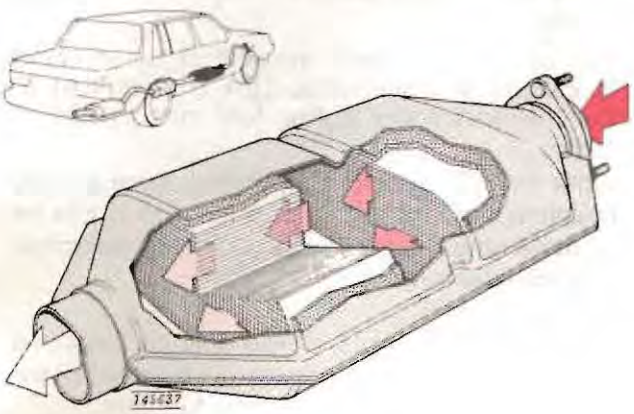
Under normal conditions, the optimum mixture ratio is 14.7kg air to 1kg fuel. The ratio is monitored by post-combustion measurement of the oxygen content in the exhaust gas using the Lambda-sond.

This particular model of Lambda-sond is known as a "comparing Lambda-sond". It produces a measureable current by comparing the amount of oxygen in the exhaust gas with the amount in the ambient air.

The Lambda-sond operates only within a certain temperature range - approx. 285-850°C, (545-1530°F). It is **electrically heated** to enable it to reach operating temperature quickly. When the ignition is turned on, current is sent to a PTC resistor (Positive Temperature Coefficient) whose resistance increases with rising temperature. Because of this system, the Lambda-sond quickly reaches correct operating temperature, even at low exhaust gas temperatures.



The Lambda-sond is mounted in the exhaust gas manifold about 15cm (6in.) in front of the catalytic converter.



The catalytic converter cleans the exhaust gases in **three ways**:

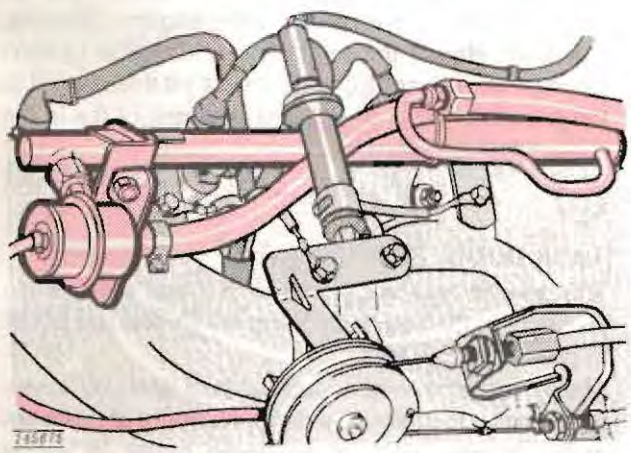
1 - by incinerating unburned hydrocarbons (HC) at high temperature, releasing the residue as steam (H_2O).
2 - by converting carbon oxide (CO) to carbon dioxide (CO_2) through oxidation.
3 - by reducing nitrogen oxides (NO_x) to gaseous nitrogen (N_2).

90 to 95% of the dangerous gases are rendered harmless.

⑦

Distribution pipe

The incoming fuel feed line, pressure regulator, injectors and cold start valve are connected to the distribution pipe.



⑥

Catalytic converter

In order to be able to operate as intended, the catalytic converter is dependent on correct information from the Lambda-sond. The air/fuel mixture must be adjusted so that fuel is completely burned in the engine prior to the exhaust gases reaching the catalytic converter.

The converter can be damaged through overheating if unburnt fuel is emitted in the exhaust where oxygen is present.

This can happen if a large amount of unburnt fuel reaches the catalytic converter prior to starting. It can also happen if there is a loose ignition cable, and a cylinder pumps unburned fuel into the exhaust.

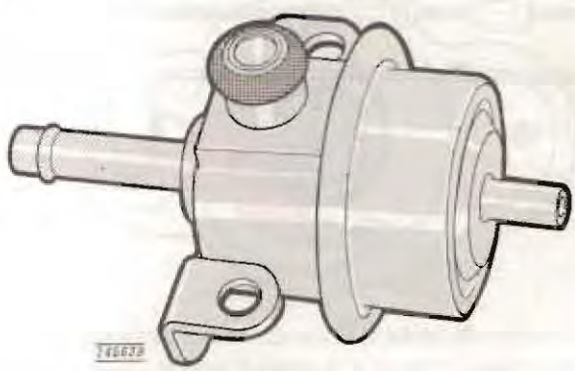
Lead in the fuel will quickly affect the Lambda-sond and cause the exhaust gas cleaning function to stop working. If this happens, the Lambda-sond will stop providing the information needed by the control unit to set the fuel mixture and the catalytic converter will then be destroyed.

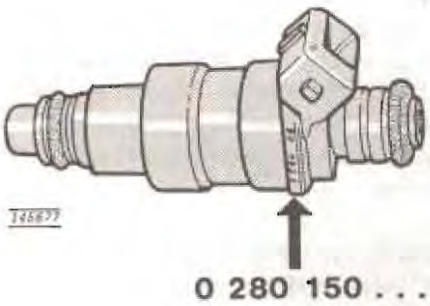
The active area is about 20,000 sq. m (215,000 sq. ft.). (California EGR converter approx. 32,000 sq. m = 345,000 sq. ft.) The precious metal content is about 2 grams (.07 oz) of platinum/rhodium.

⑧

Fuel pressure regulator

The fuel pressure regulator ensures that the fuel pressure remains constant at the injectors. Using a vacuum tube connected to the engine intake manifold, the fuel pressure is kept at 300kPa (42 psi) above (below) the intake manifold pressure. In this way the pressure over the injectors is kept constant, regardless of throttle position. The amount of fuel injected depends entirely on the injection duration. Excess fuel is returned to the fuel tank via a return pipe.





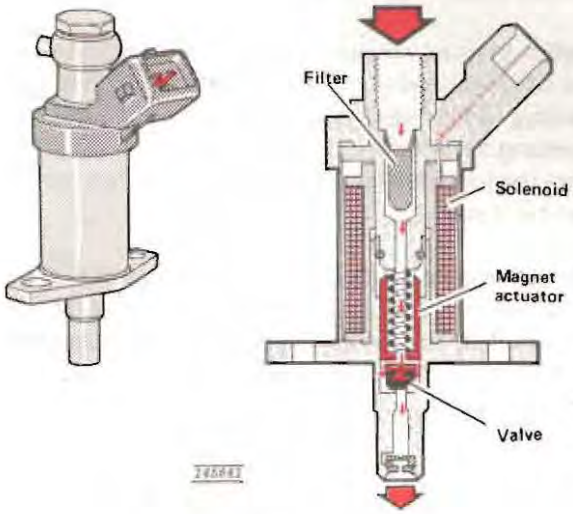
⑨ Injectors

The injector is fitted with a solenoid, a magnetic actuator and a fuel needle which opens or shuts a nozzle.

The control unit feeds current to the injectors in calculated time units. This ensures that all the injectors spray a fine fuel mist simultaneously.

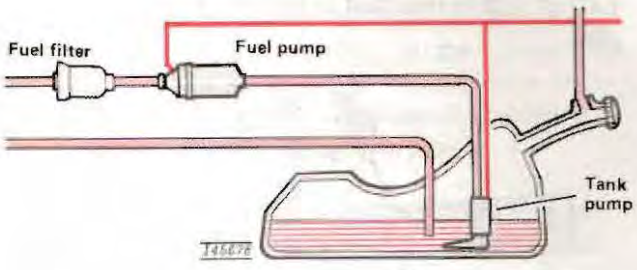
While the starter motor is operating, there are two injections per rotation. This is reduced to one for normal driving. Injection occurs in the intake manifold near the intake valves.

Disassembled injectors should only be inspected using specially designed equipment in order to minimize the risk of explosion from the fuel mist.



⑩ Cold start valve *(certain models)*

At cold start, a lot of fuel condenses on the cold surfaces in the form of droplets. Having a separate cold start valve improves cold starting. It's placed farther away from the engine block than the ordinary injectors and delivers the fuel more as a gas than as drops. The cold start valve is controlled directly by the control unit, rather than by the thermal time switch. It cuts in when the temperature is about -15°C (5°F) and when the engine rotation is below approx. 900 rpm. It cuts out permanently if the rpm exceed the permissible limit.



⑪ Fuel pump

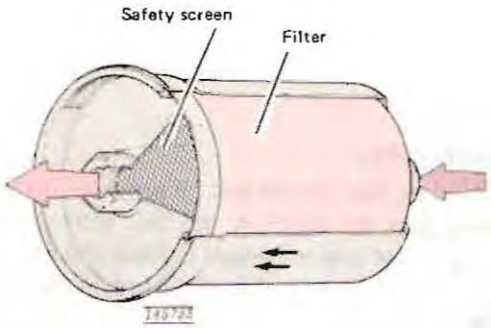
The fuel pump is an electric roller pump, cooled by the fuel which flows through it. It has a non-return valve and an overflow valve which opens if the pressure gets too high.

Both the primary pump and the fuel pump operate when either the starter motor or the engine is running. However, should the engine stop while the ignition remains on, the control unit will cut off the current to the pumps in order to eliminate the risk of fire in the event of an accident.

⑫ Tank pump (pre-pump)

The electric impeller pump in the fuel tank keeps pressure in the fuel line prior to the (main) fuel pump to prevent vapor lock.

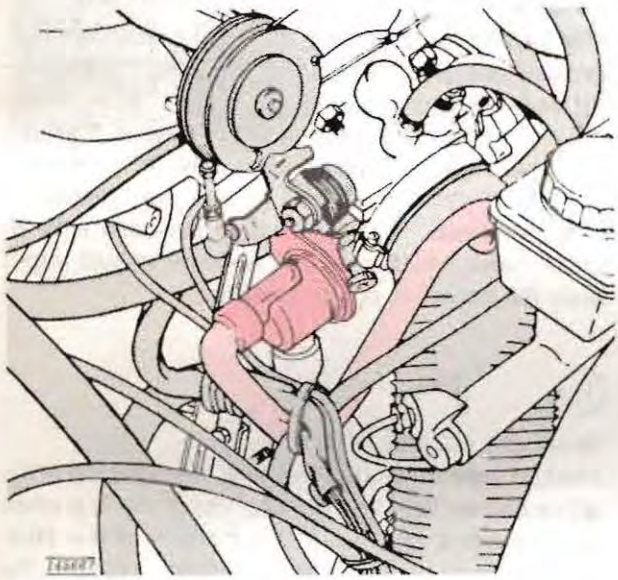
The pump has a coarse, strainer type filter and a non-return valve to maintain a certain amount of pressure in the system even if the main pump is not in operation.



(13)

Fuel filter

The fuel filter is adjacent to the fuel pump and both are mounted on a plate below the vehicle under the back seat.
It consists of a paper filter and a safety screen to catch any pieces of the paper filter which come loose.



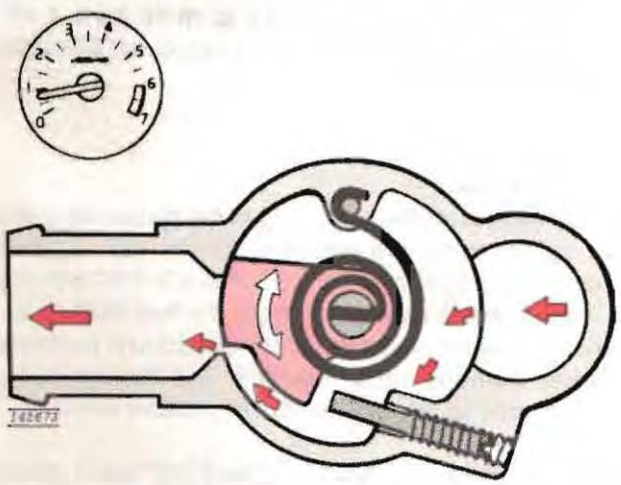
(14)

Idle valve

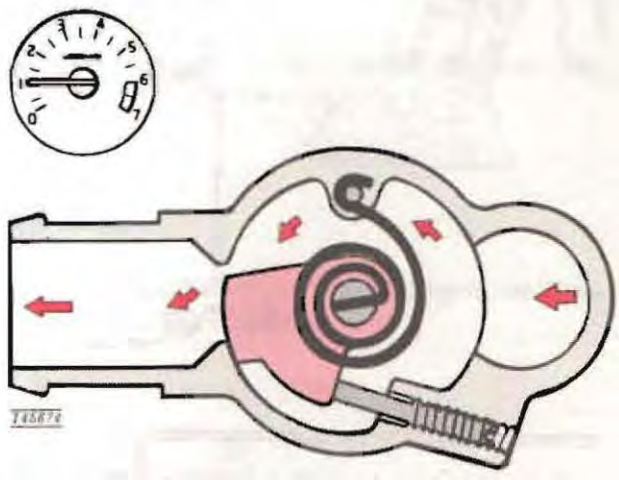
In order to set the correct air valve opening and thus achieve constant idle speed, the control unit uses information from the air mass meter regarding the amount of air entering the engine and from the ignition system control unit regarding rpm. This means that the idle valve is not affected by air leaks or a jammed throttle valve.

When the current is off, a spring sets the idle valve opening for an idle speed between 1,000 and 1,100 rpm.
Once the engine is running, the control unit ensures that the idle valve is more or less open at all rotation speeds in order to prevent the development of unnecessarily high negative pressure in the intake manifold when the throttle shutter closes suddenly during deceleration.

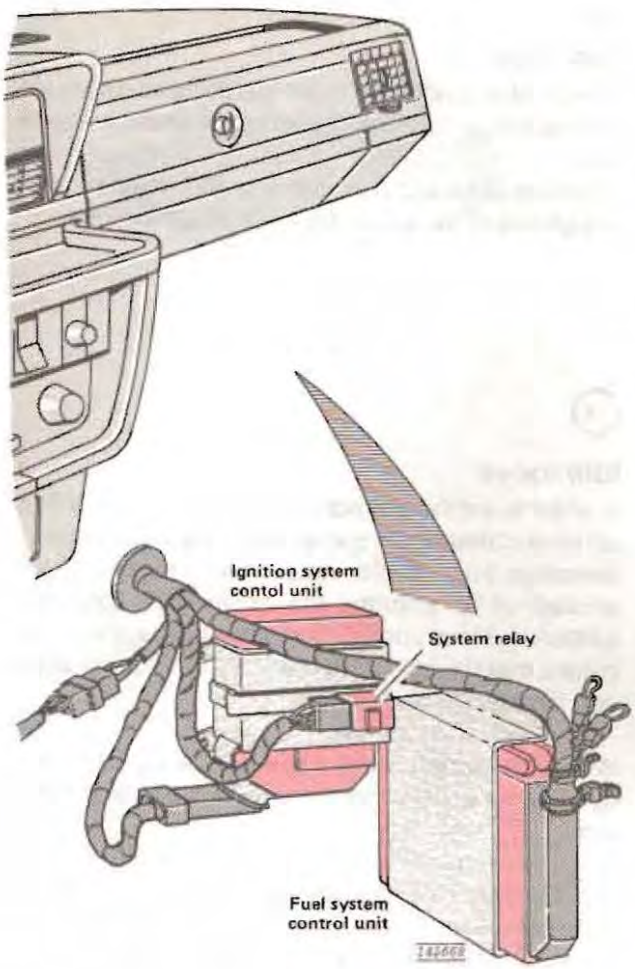
The control unit receives a signal from the AC control when the AC is turned on or off to enable it to adjust the idle valve. Signals are also sent to the control unit from the AC compressor so that the idle valve can be adjusted each time the compressor turns on or off.

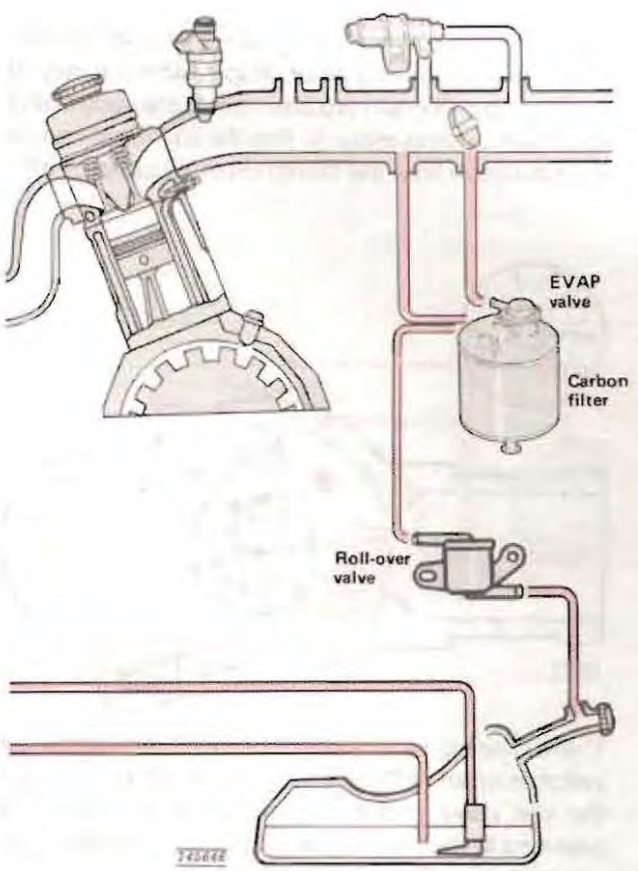


When the throttle valve switch is closed during idling, the control unit receives a signal, enabling it to send current to the air valve electric motor to keep the idle rpm at the correct level.



There is no signal to the control unit when the shutter switch is open. When driving, the control unit keeps the idle valve partially open so that the negative pressure in the intake manifold is reduced when the gas pedal is released.





(15)

System relay

Governed by the control unit, it provides current to the fuel pump, the injectors, the cold start valve, the air mass meter and to certain control unit functions. The system relay and its functions are protected by a 20 amp fuse.

Fuses

The system relay is protected by a 25 amp fuse and the tank pump by a 15 amp fuse.

Evaporative Control System (EVAP)

This system handles the gases that result from normal fuel tank evaporation, keeping them from escaping and polluting the air.

Via a hose system, the fuel vapor passes from the filler opening through a roll-over valve to a reservoir ("canister", "carbon filter"). The fuel vapor is absorbed here. The reservoir is provided with an EVAP valve which prevents leakage of fuel vapor while the engine is not in operation.

(16)

Reservoir (carbon filter)

The fuel vapors from the fuel tank enter the top of the active carbon filter and are absorbed. Air is pushed out through a channel in the bottom of the filter. Depending on temperature and other conditions, the filter can bind approx. 90 grams of fuel.

(17)

Roll-over valve

If the vehicle leans sideways at more than a 45° angle, this valve closes, helping to prevent fuel spills during accidents.

(18)

EVAP valve

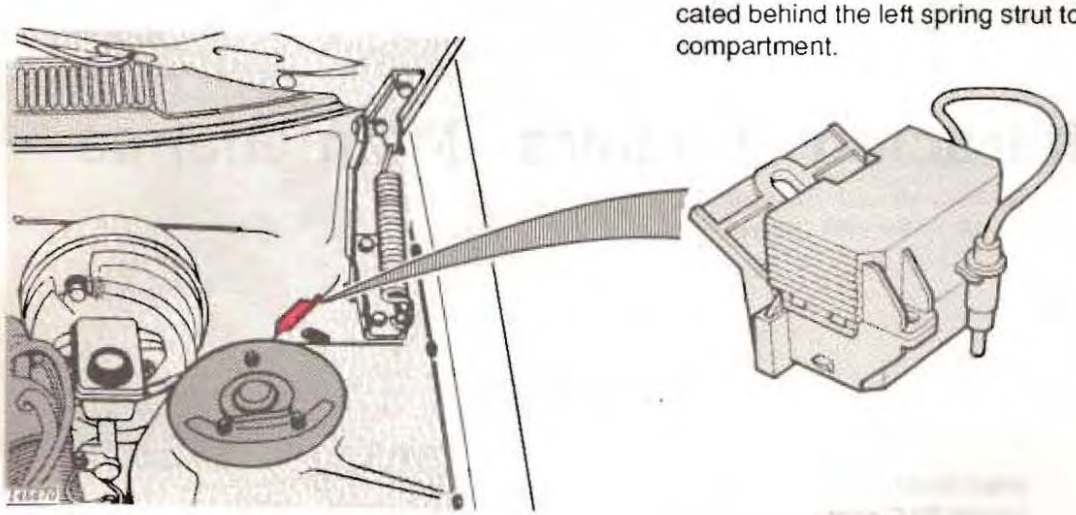
This valve is located at the top of the carbon filter and is closed when the engine is turned off. It's also closed during idling in order not to interfere with the automatic idle settings or make the fuel mixture too rich. The valve is closed using vacuum pressure taken from the intake manifold and through being connected to the throttle shutter positive terminal.

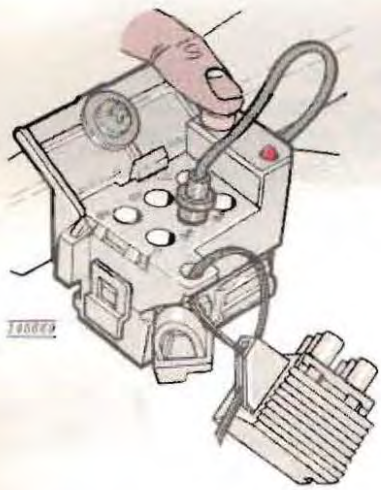
Increased engine load opens the EVAP valve, allowing fuel vapor to flow from the carbon filter into the engine intake manifold. Air is drawn in at the same time through the bottom channel. Under normal conditions, the filter is emptied of fuel in 15 to 20 minutes.

⑲

Fuel system diagnostics

The fuel system has a built-in self-diagnostic system and a functions testing system. It uses the same diagnostic socket as the ignition system and is located behind the left spring strut tower in the engine compartment.





The diagnostic system uses socket 2 for the fuel system and socket 6 for the ignition system.

There are eighteen different fault codes in the diagnostic system. It is capable of storing up to three fuel system faults.
The fuel system control unit carries out continuous checks of the following functions while the engine is running:

- The control unit's own internal functions.
- Lambda-sond and Lambda settings.
- Coolant temperature sensor.
- Air mass meter.
- Battery voltage.
- Throttle shutter.
- Ignition settings and engine rpm (through the ignition system control unit).
- Speedometer.
- Knock indicator.
- Idle speed air valve.
- Injectors.

Faults in any of these functions are registered in the diagnostic system memory.

The Design and Function of the fuel system has been described on the preceding pages. It is important to read them if you are to have a clear understanding of the next section.

Fault tracing - Repairs - Maintenance

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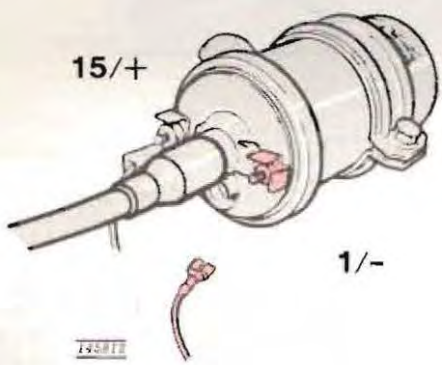
Important



Warning!

The ignition system operates at very high voltages.

Extreme care must be taken when working on the ignition system, even when removing connectors etc.



The following instructions must be followed to prevent damage to the control unit.

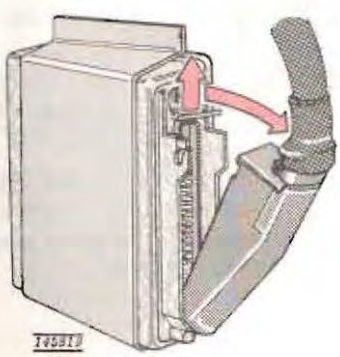
Compression test:

- disconnect wire from terminal 1 on the ignition coil (to prevent arcing affecting the electrical system's control units)
- remove connectors from injectors (to avoid flooding the engine, dilution of oil etc.)



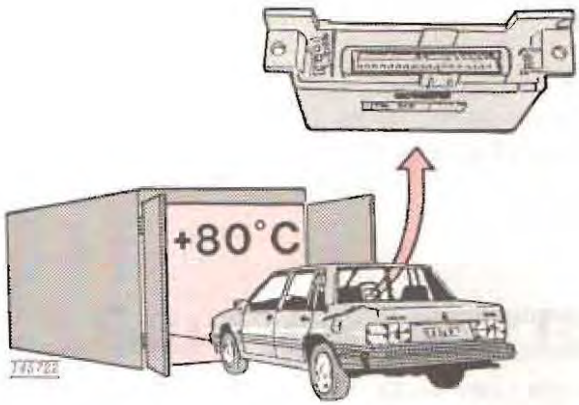
Turn off ignition when:

- connecting/disconnecting test equipment
- connecting/disconnecting control unit connector
- connecting/disconnecting leads to ignition coil and plug



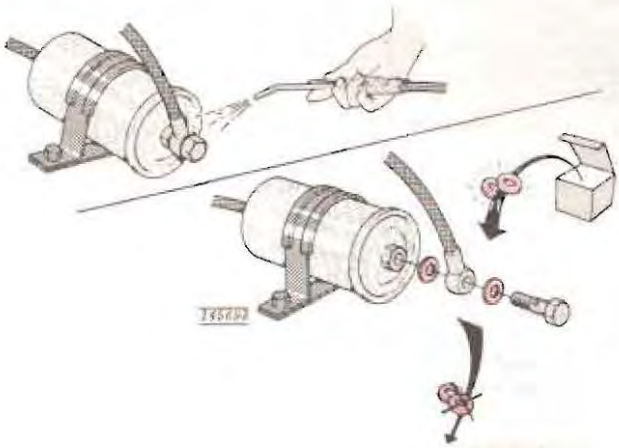
Battery:

- do not disconnect battery when the engine is running
- disconnect battery when boost charging
- do not use boost chargers with a voltage rating of more than 16V when jump starting engine.



Control unit:

- remove control unit when the vehicle is exposed to high temperatures, for example heat treatments for baking on paint. The control unit must not be exposed to a temperature in excess of 80°C (176°F)
- disconnect control unit when carrying out welding repairs
- remove control unit if welding is to be carried out near it
- do not insert a new control unit without having first checked all wiring and components. Otherwise a fault can damage the new control unit in the same way as the old.

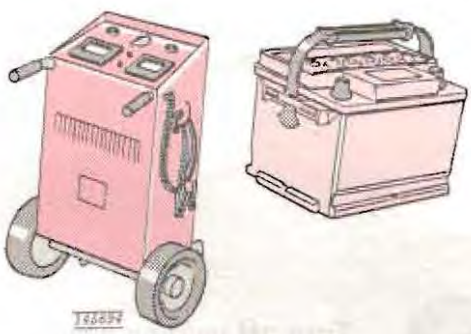


Cleanliness

The utmost cleanliness must be observed when working with the fuel system.
Clean all connections before removal

Gasket, seals

Install new gasket/seal if a fuel pipe connection is loosened.



Battery

It is important when testing the different components to ensure that the battery voltage is within specifications. If necessary, a battery charger can be connected during testing. Max. charging current: **15 A** at max. charging voltage of **16 V**.

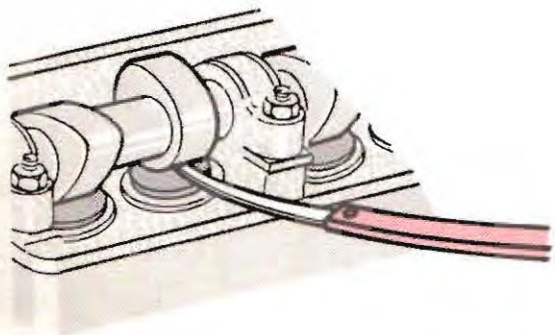


Fire hazard

Extreme care should be taken to avoid causing sparks, especially when testing injectors.

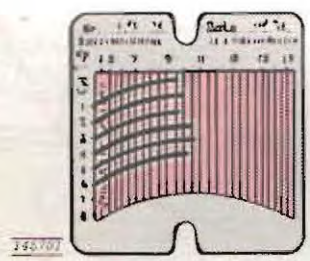
Group 20 General

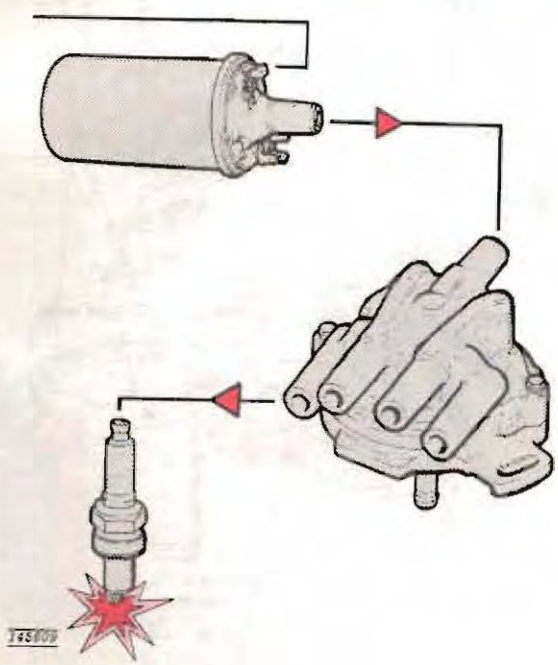
When tracing engine malfunctions always perform the following checks before carrying out any fault diagnosis of the LH-Jetronic system:



Mechanical

- compression
- valve clearance
- vacuum hoses and connections
- throttle control
- air cleaner





Electrical

- spark plugs and HT leads
- distributor cap
- all electrical connections

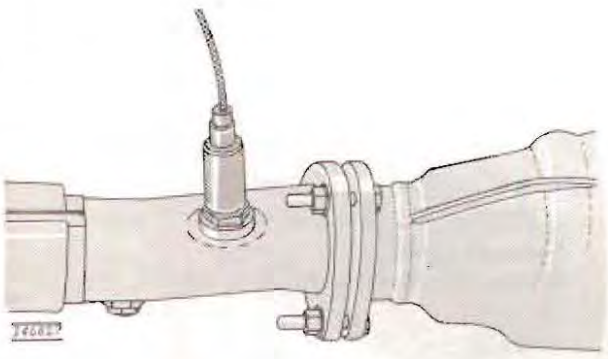
Emission controls

- crankcase ventilation
- evaporate control system

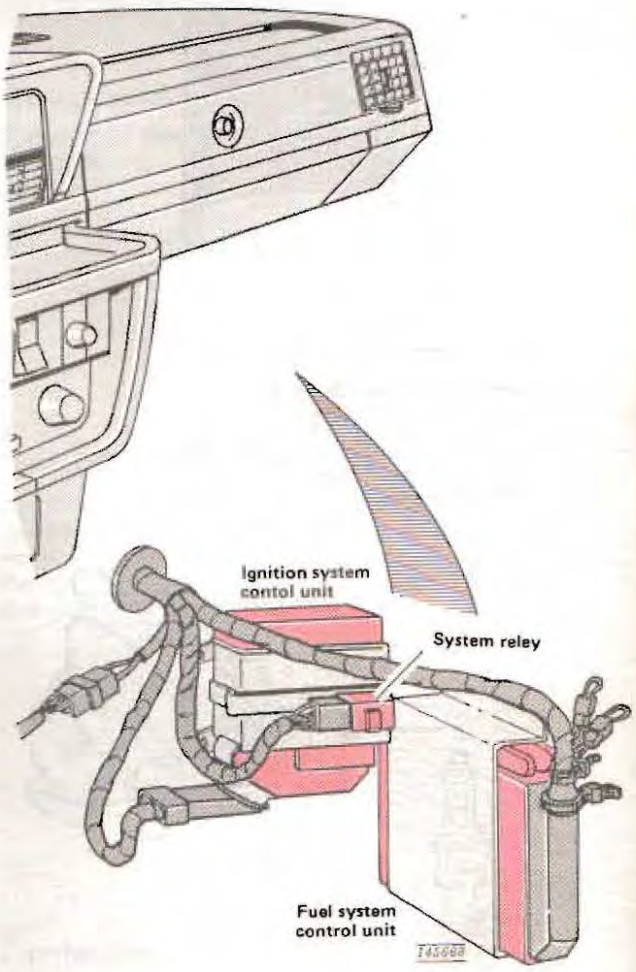
Group 23 Fuel system

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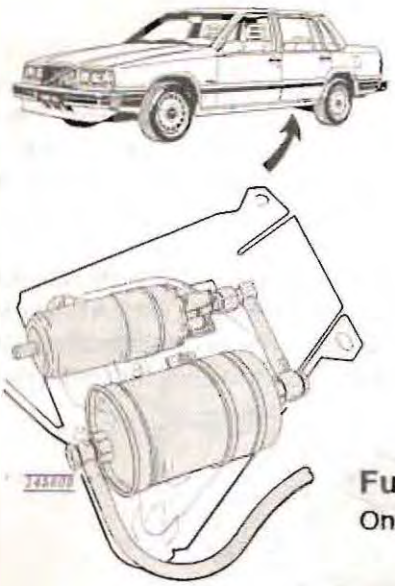
Placement of components

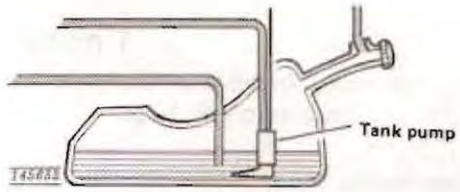


The Lambda-sond is mounted in the exhaust gas manifold about 15 cm (6 in.) in front of the catalytic converter.



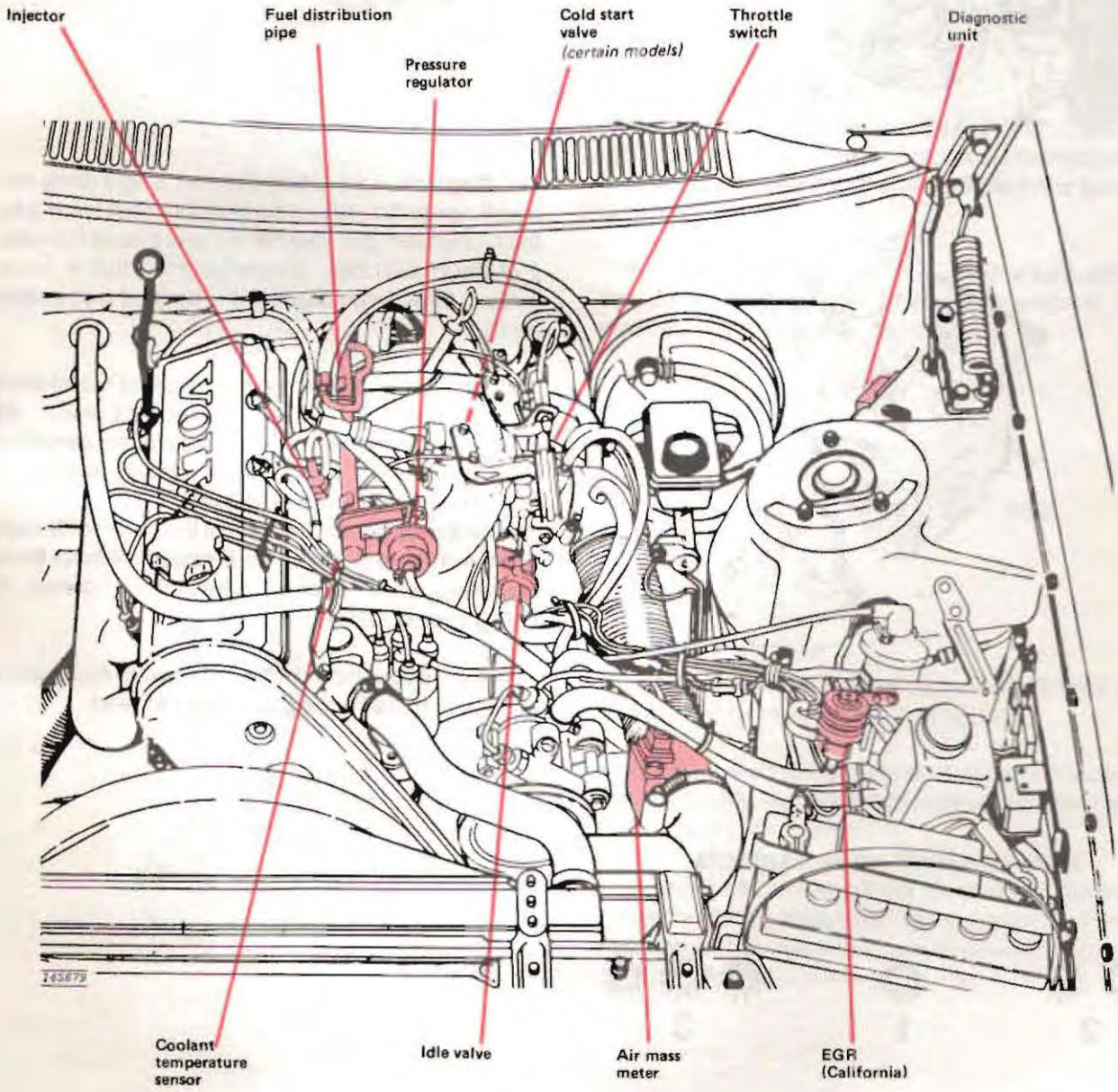
The fuel system control unit and system relay and the ignition system control unit are located inside the panel in front of the right door pillar.





Tank pump (pre-pump):
Inside fuel tank (fuel level sensor section).

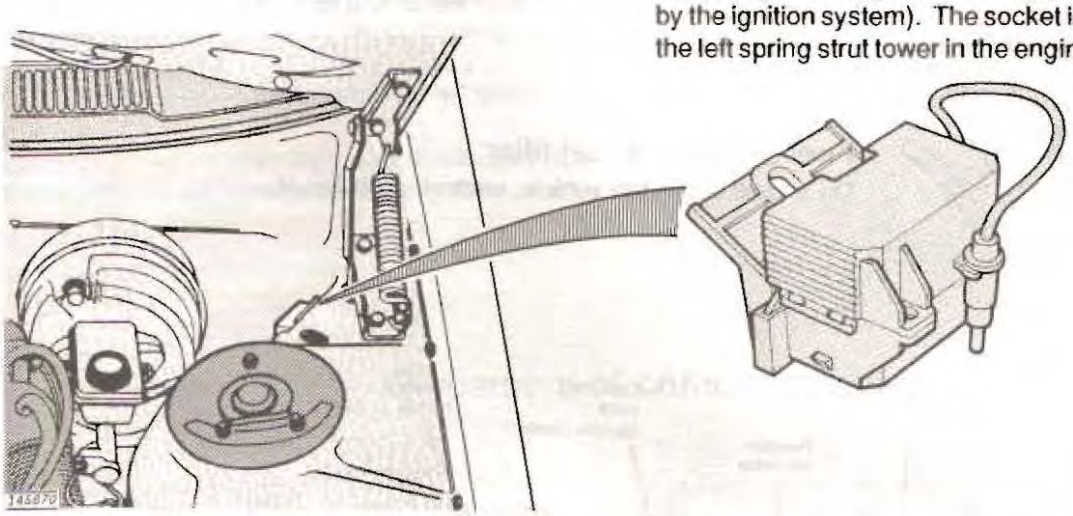
Fuel pump and fuel filter:
On a shelf below the vehicle, under the backseat.

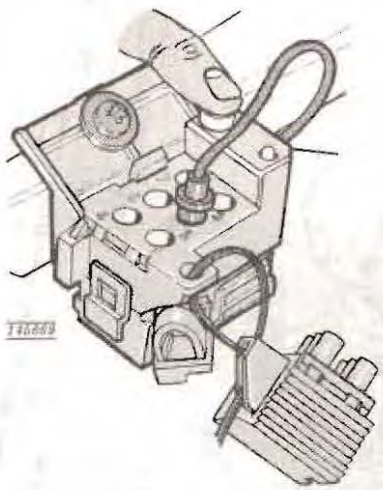


Fault tracing

The fuel system has a built-in fault tracing system. It is mounted in the control unit and has three different control functions, one to read fault codes stored in the memory and two for continuous testing of the components included in the system.

Communication with the diagnostic system is carried out through the diagnostic socket, (which is also used by the ignition system). The socket is located behind the left spring strut tower in the engine compartment.



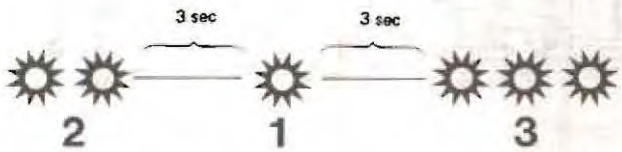


The diagnostic socket has a button, a light diode and a selector cable. When carrying out fault tracing for the fuel system, the selector cable is placed in socket 2 of the 6 available. Depressing the button once, twice or three times chooses the desired fault tracing function.

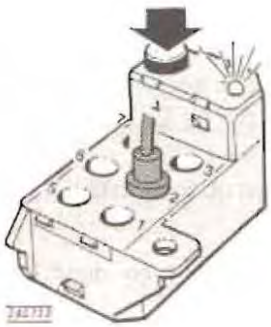
Faults stored in the memory are read via a system of flashes from the diagnostic socket light diode. All fault codes have three numbers, each one capable of ranging from 1-9. The codes relating to the fuel system range only between 1 and 4.
The fault code figure is read from the series of flashes delivered by the diode. Since the codes all have three numbers, each code requires three series of uninterrupted flashes.

There is a three second interval between each series of flashes to make the codes easy to read.

Here is a fault code example:



= fault code 213



Control function 1

The diagnostic system carries out continuous checks of the fuel system during engine operation.

Any fuel system faults are stored in the diagnostic system's memory as a fault code. The system can identify and store seventeen different fault codes. There is also a code to indicate that the fuel system is completely OK.

Up to three fault codes can be stored in the memory simultaneously.

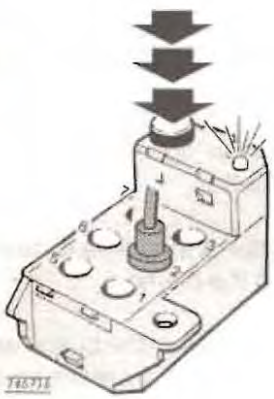
Once the engine stops, the fault codes can be read by counting the flash series at the diagnostic socket diode.



Control function 2

This function tests the various fuel system breakers. As each one is activated, functions information is provided by the diagnostic socket diode in the form of flash series.

The functions test is generally used after such activities as repairs to check that certain controls are connected and operating correctly.



Control function 3

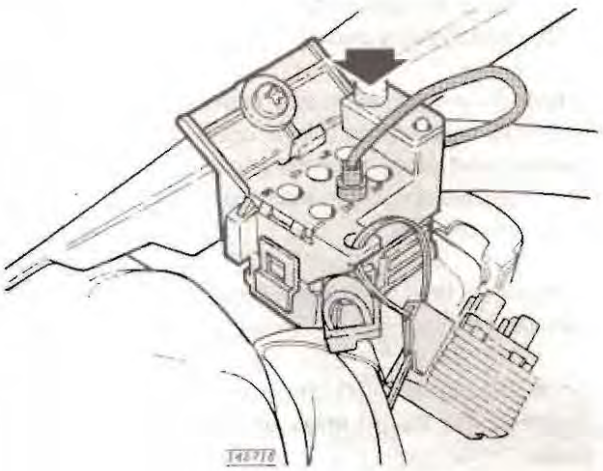
This test is carried with the engine off. It tests the adjustment functions of the fuel system.

In this case, the test consists of initiating an functions cycle whereby the diagnostic system activates certain control components.

You find out if the component is operating correctly either by placing your hand on the component or by listening for the click which occurs when the component is activated.

Control function 1

A1



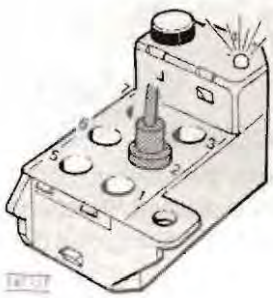
Open the diagnostic socket cover and connect the selector cable to pin no.2.



Turn on the ignition.

Enter control system 1 by depressing the button once.

Depress the button for at least 1 second, but not more than 3.



Watch the light diode and count the number of flashes in the three flash series indicating a fault code. The flash series are separated by a three second interval, making them easy to read.

Make a note of the fault codes.

If no fault codes are received by the diagnostic unit, the diode will flash 1-1-1 and the fuel system is operating correctly.

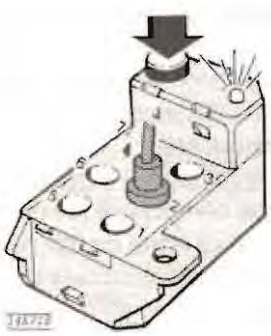
Continue at A7.



If the light diode doesn't flash when the button is depressed or if no code is flashed, refer to B1-B2, E1-E4 and E11.

A2

Check to see if any fault codes are stored in the memory.



Depress the button again. Make a note of any additional fault codes.

Depress the button a third time to see if a third fault code is stored in the memory.

If the code received when the button was depressed the first time is repeated, there are no other codes in the memory.

NOTE! The diagnostic system memory is full when it contains three fault codes. Until those three are rectified and the memory is erased, the system cannot give information on any other problems.

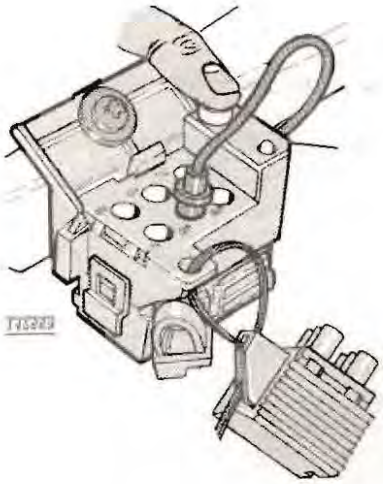
A3

The fault code key below shows the fault indication codes.
Information on how to correct the faults is in the third column.

Fault code key

1-1-1	No faults	
1-1-2	Fault in control unit	Change control unit
1-1-3	Fault in injector (Break in lead, clogged, etc.)	E17, D1-6, F1
1-2-1	Signal to/from air mass meter is faulty	E10, E27
1-2-3	Signal missing to/from coolant temperature sensor, possible grounding short	E14
1-3-1	Ignition system rpm signal missing	E8
1-3-2	Battery potential too low or too high	Check battery and charging system
1-3-3	Throttleswitch; idle setting faulty, possible grounding short	C4, E9
2-1-2	Lambda-sond signal missing or is faulty	E12, E25-27
2-1-3	Throttleswitch; full load setting faulty, possible grounding short	C4, E9
2-2-1	Lambda-sond not operating	C1, D1-6
2-2-3	Signal missing to/from idle valve	E20
2-3-1	Self-adjusting Lambda-sond not operating	C1, D1-6
2-3-2	Self-adjusting Lambda-sond not operating	C1, D1-6
2-3-3	Idle valve closed, possibly leaking air	C1, E20
3-1-1	Signal missing from speedometer	E21
3-1-2	Signal missing for knock related fuel enrichment	E19
3-2-2	Burn-off cleaning of hot wire in air mass meter not operating	E27

A4



Erasing diagnostic system memory

Once all fault codes have been read and the faults corrected, the diagnostic system memory is erased as follows:



1. Switch on the ignition.

2. Read the fault codes again.

3. Depress the button more than 5 seconds. Release the button. After 3 seconds the diode should light up.

4. While the diode is still lit: depress the button again for more than 5 seconds. After releasing the button the diode should stop shining.

A5



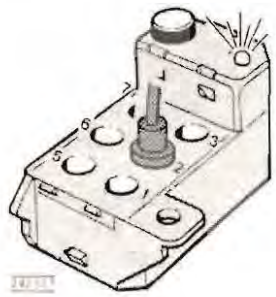
To check that the memory is erased, depress the button once for more than 1 second but not more than 3 seconds.
Flash series 1-1-1 denotes erased memory.

Start and run engine

If the engine won't start, see control function 2, **A7-8** and **A11**.
(NOTE! The throttle control does not have to be turned to full load position.)



Turn off engine



A6

Check if new fault codes have been stored in the memory



Turn on ignition.

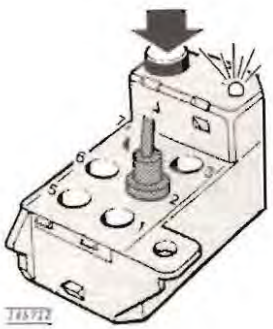
Depress the button once for more than 1 second but not more than 3 seconds.

If the flash series **1-1-1** comes up, there are no additional fault codes. Continue at **A7**.

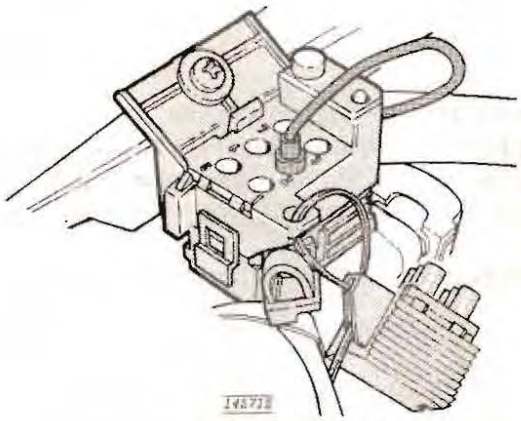
If there are more fault codes, return to **A2** and continue fault tracing.



Turn off ignition.



Control function 2



A7



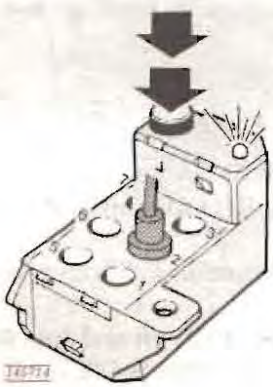
Turn on the ignition.

Open the diagnostic socket cover and connect the selector cable to pin no. 2.

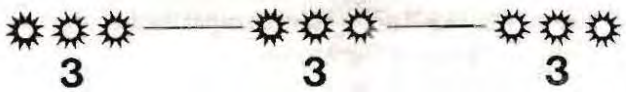


Turn the throttle control to full load position.

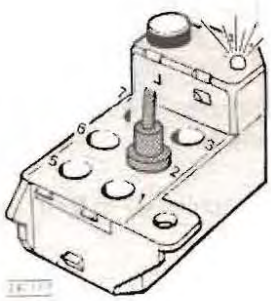
A8



Depress the button in the diagnostic socket twice.
Each time the button is depressed, it should be kept in for at least 1 second, but not more than 3.
The light diode should begin to flash.

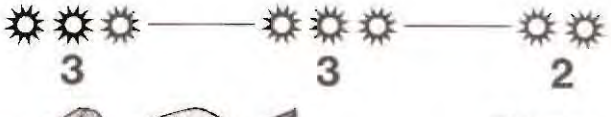


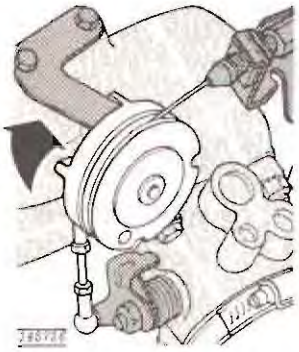
A9

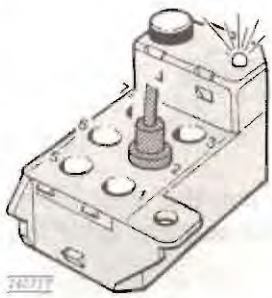


Release throttle control
If the flash series 3-3-3 comes up, the function of the shutter switch is correct in full load position.

If the light diode continues to flash rapidly, see C4 and E9.





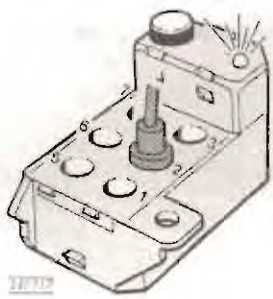


A10

Turn the throttle control slightly
If the light diode turns off and then flashes the 3-3-2 code series, the throttle shutter switch function is correct in idle position.

If the light diode continues to flash rapidly, see C4 and E9.





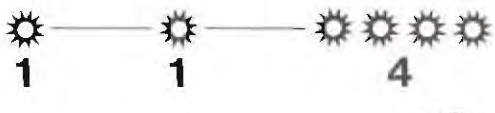
A11

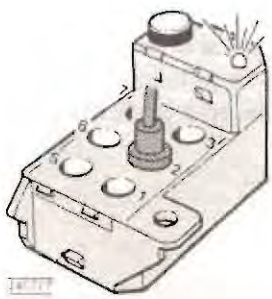
Check the rpm signal from the ignition system
Start the engine.

If the light diode turns off and then flashes the 3-3-1 code series, the rpm signal from the ignition system is correct.

If the engine won't start, run the starter motor until the diode turns off.
If the diode continues to flash rapidly the ignition system must be checked.

If the ignition system is fault free, see A13 and E1-12.





A12

Vehicles with AC

Check the on/off function of the compressor

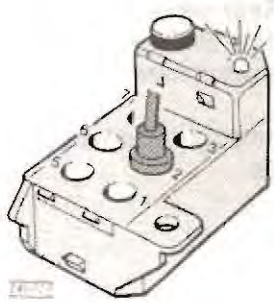
Place the AC controls in the on position.

If the light diode turns off and then flashes the 1-1-4 code series, the switch is OK.

If the light diode continues to flash rapidly, see E16.

The light diode will now return to rapid flashes prior to the AC compressor turning on.





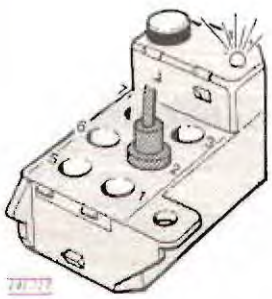
When the compressor turns on, the light diode should turn off and then flash the 1-3-4 code series.

If the light diode continues to flash rapidly, see E15.



Turn engine off.





A13

Vehicles with automatic transmission

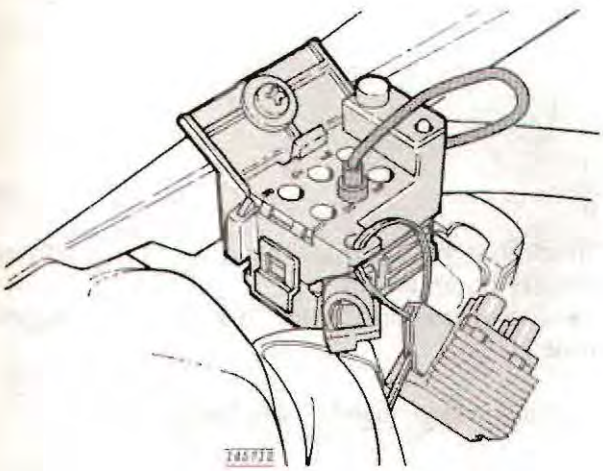
(Testing idle speed compensation.)
Depress the brake pedal. Place the gear selector lever in position D and then in position N again.
The light diode should turn off and then flash the 1-2-4 code series.

If the light diode continues to flash rapidly, see E22.



Turn engine off.

Control function 3



A14



Turn on ignition.

Open the diagnostic socket cover and connect the selector cable to pin no. 2.

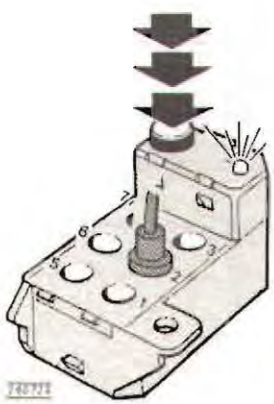
A15

Depress the button in the diagnostic socket three times.
Each time the button is depressed, it should be kept in for at least 1 second, but not more than 3.

While the light diode continues to flash with the same frequency, each of the following should begin to operate:

- Injectors
If they don't operate, but the light diode flashes, see E17.

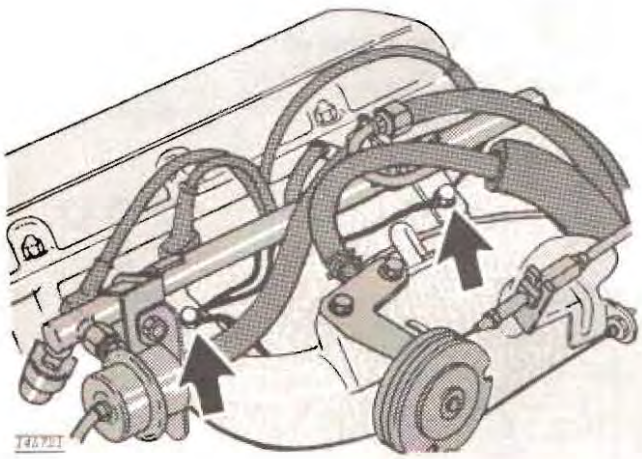
- Idle valve
If it doesn't operate, but the light diode flashes, see E20.



Complete overview of the fuel system

Functions B1-E28 constitute a complete examination of the fuel system.

Fuses, ground connections and connectors



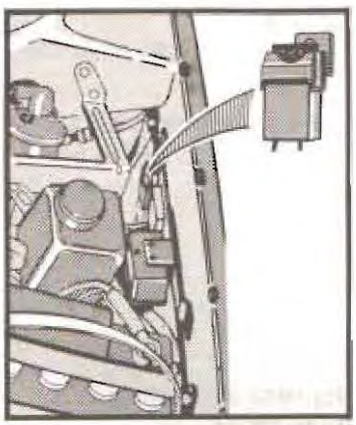
B1

Check all ground connections
Make sure the ground connections on the intake manifold make good contact.

Poor contact can be the cause of many different fault symptoms.

Check the grounding connection for the Lambda-sond at the right front mudguard.

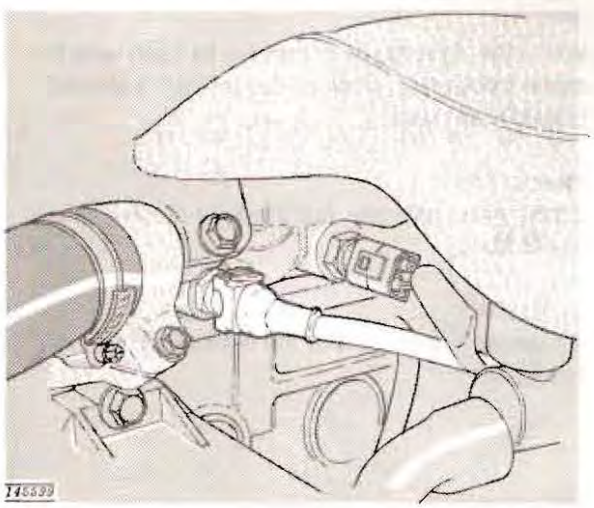




B2

Check that the fuses for the pump relay and the primary pump are OK
Pump relay fuse: In-line fuse in the engine compartment.

Tank pump fuse: fuse No. 4 in fuse box.



B3

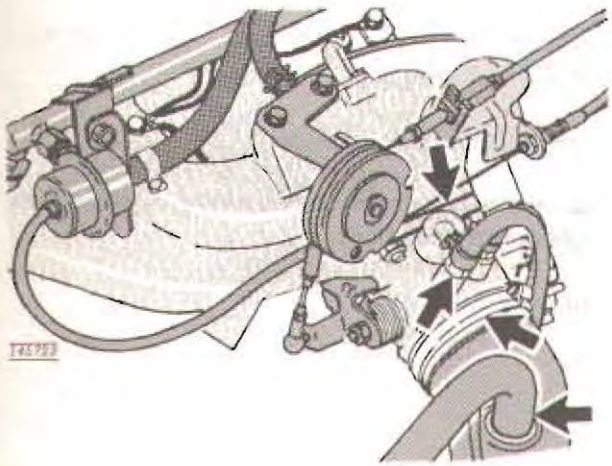
Check connectors for:
- air mass meter
- idle valve
- knock sensor
- coolant temperature sensor

Check for installation and connection.

B4

Check that the connectors are correct
Knock sensor connector = black sleeve; Coolant temperature sensor = white sleeve; Cold start valve = blue sleeve.

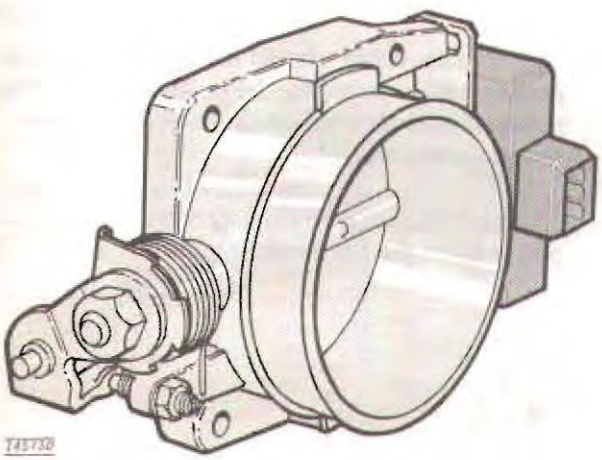
Air leaks and throttle shutter



C1

Check intake system for leaks
Intake system air leaks would make the mixture too lean.

Check:
- Intake manifold between the air filter and the manifold.
- All hoses and hose connections to the intake manifold.
- Intake manifold bolted joints and seals, throttle shutter housing, etc.



C2

Throttle housing
Check housing for dirt.

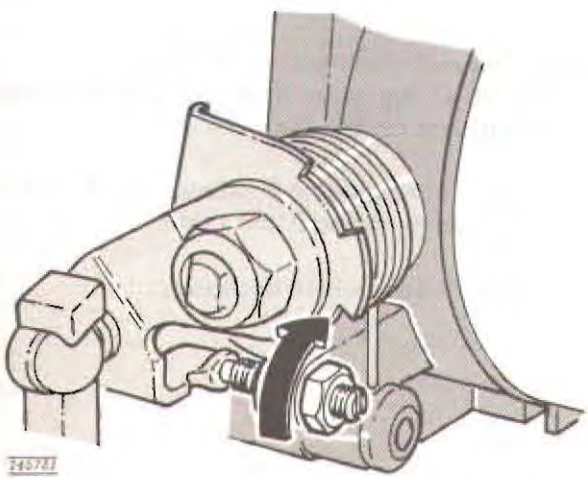
If necessary, clean throttle housing
Disconnect throttle switch connector.

Remove housing. Clean with solvent, but ensure that none enters the throttle switch.

> **Important!** A clogged, incorrectly mounted or damaged air filter will result in a dirty throttle housing.

Install throttle housing
Use new gasket.

Connect air hoses and throttle switch connector.



C3

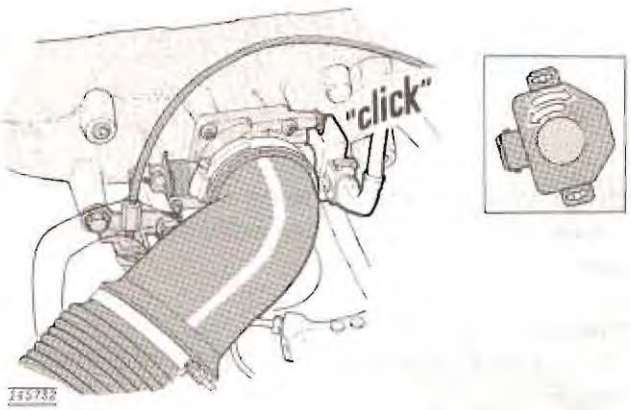
Basic throttle setting
Loosen locknut.

Loosen adjustment screw until throttle is completely closed.

Tighten adjustment screw until it just touches the linkarm. Turn a half turn further.

Tighten locknut without changing the adjustment screw position.

(It may be necessary to loosen the throttle switch before setting the throttle.)



C4

Check throttle switch setting
Open the throttle slightly and listen to the switch. There should be a click when the shutter opens (idle switch).

Adjustment:
Loosen mounting bolts (3 mm hex.)

Turn switch slightly clockwise.

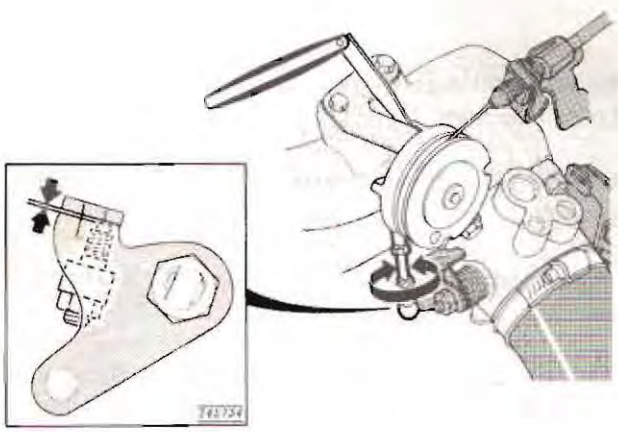
Turn switch counter-clockwise until the switch clicks. Tighten mounting bolts.

Check setting.



C5

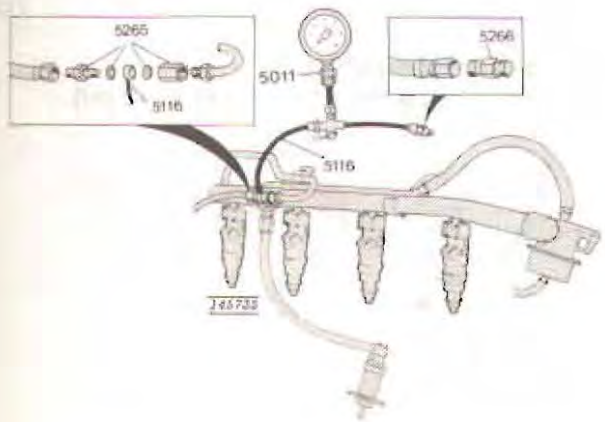
Check/adjust control pulley and throttle cable
- The control pulley should move smoothly.
- The throttle cable should be extended in idle position without affecting the pulley position. The pulley should abut the idle stop. Adjust cable where necessary.
- Depress gas pedal all the way and check that the pulley abuts the full throttle stop.



C6

Connect and check/adjust linkarm
- Install a 1 mm feeler gauge between the control pulley and the idle stop.
- The play between the throttle lever and the adjust ment screw should 0.2±0.1 mm.
- Adjust linkarm where necessary.

Fuel pump, pressure regulator and fuel lines (system pressure)





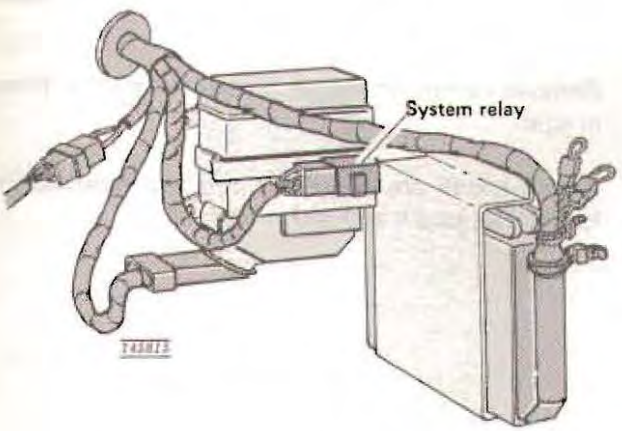
D1

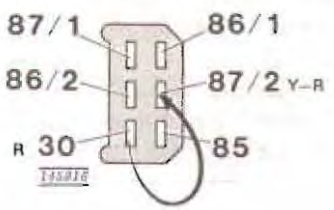
Connect pressure gauge 5011
Hold a paper towel under the fuel line to absorb any fuel spill when the fuel line is disconnected.
Connect gauge between fuel line and distribution pipe. Use hose **5116** and nipple **5265**.

Block the free end of the gauge hose with plug **5266**.

Set the gauge cock in position 1 (pointing to hose 5116).

D2





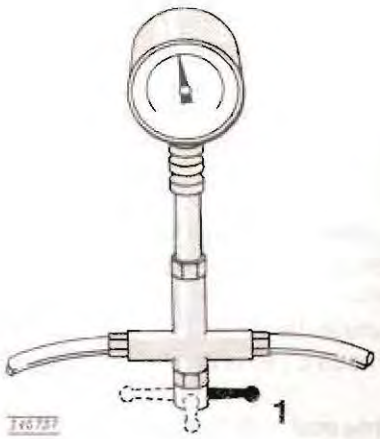
Start fuel pumps
Remove panel under right side of instrument panel.
Remove system relay.

Disconnect system relay connector. Connect an electrical lead between terminals **30** and **87/2**.

The fuel pumps should start. To check if the main fuel pump is operating, remove cap from the filler pipe and listen.

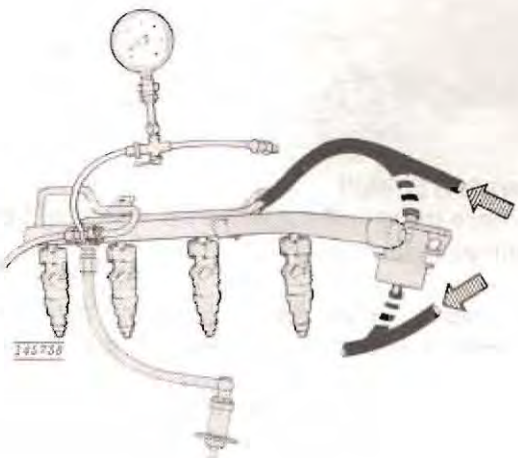
If fuel pumps don't start

- Remove lead between terminals 30 and 87/2.
- Check for voltage at terminal 30. If there is none, check lead between relay and battery.
- Connect an electrical lead between terminals **30** and 87/2 on the relay base. Pumps should now start. If not, check lead between pump and relay.
- Check lead between **87/1** and **85** for breaks. Use ohm meter or buzzer.



D3

Check system pressure
System pressure should be 300 kPa (42 psi).



Too high system pressure:
Remove lead between terminals 30 and 87/2 on the relay base.

Remove return hose from pressure regulator. Blow in the pipe.

Remove vacuum hose from pressure regulator. Blow in pipe.

If both hoses are open, the pressure regulator is faulty. Replace it and recheck pressure.



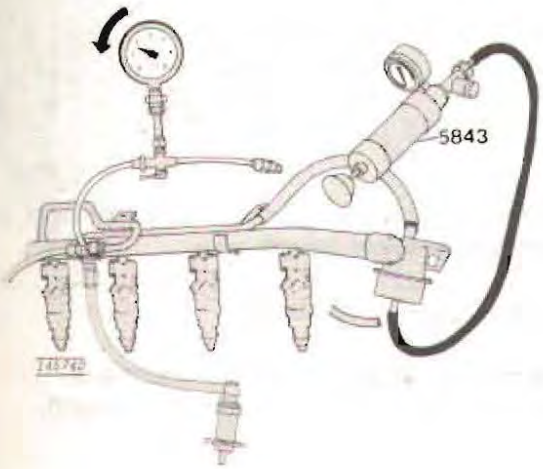
Too low system pressure:
Squeeze return hose by hand and check if pressure rises.

> **Important!** Do not allow the pressure to exceed 600 kPa (84 psi).

If the pressure **rises rapidly** the pump and hoses are OK. Replace pressure regulator and recheck pressure.

If the pressure **rises slowly**, the fuel filter, fuel pump strainer or the fuel lines are clogged or blocked.

If the pressure **doesn't rise** the fuel pump is faulty.



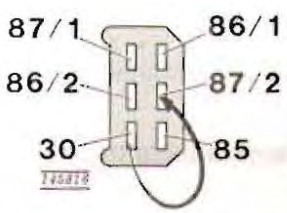
D4

Check function of pressure regulator
Connect a vacuum pump to the pressure regulator. Vacuum pump **5843** may be used.

Pump air from the regulator and check that system pressure falls.

The system pressure should fall as much as the pressure in the regulator falls.

- 300 kPa (42 psi) minus pressure drop equals system pressure.



D5

Turn off fuel pumps
Remove lead between terminals 30 and 87/2 on the relay base. Install system relay.





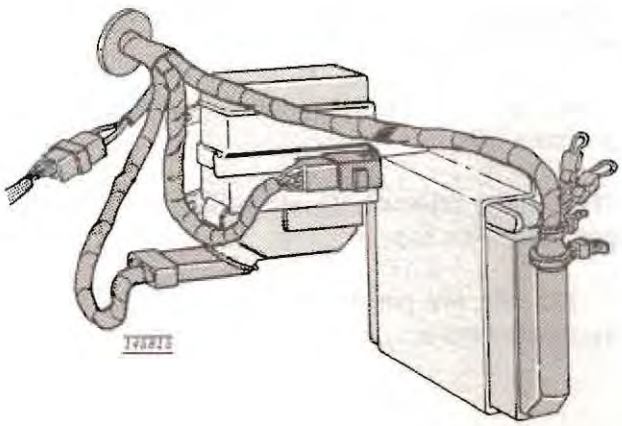
D6

Remove pressure meter 5011
Hold a paper under the fuel line to soak up any fuel which comes out when the meter is removed.

Important! Any plastic tie bands removed from the fuel lines **must** be reinstalled.

Components, electrical cables

Colour code		
SB = Black	BN = Brown	GN = Green
GR = Grey	Y = Yellow	OR = Orange
W = White	P = Pink	VO = Violet
R = Red	BL = Blue	CU = Copper



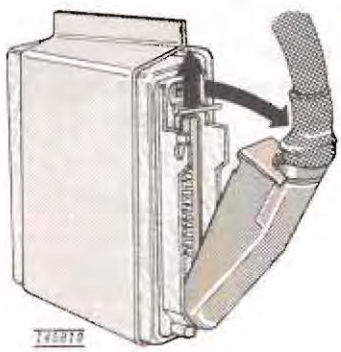
E1

Remove panels under instrument panel right side and in front of right firewall side.

Remove glove compartment.

Check control unit ground connections
They should make good contact and fit tightly.

E2



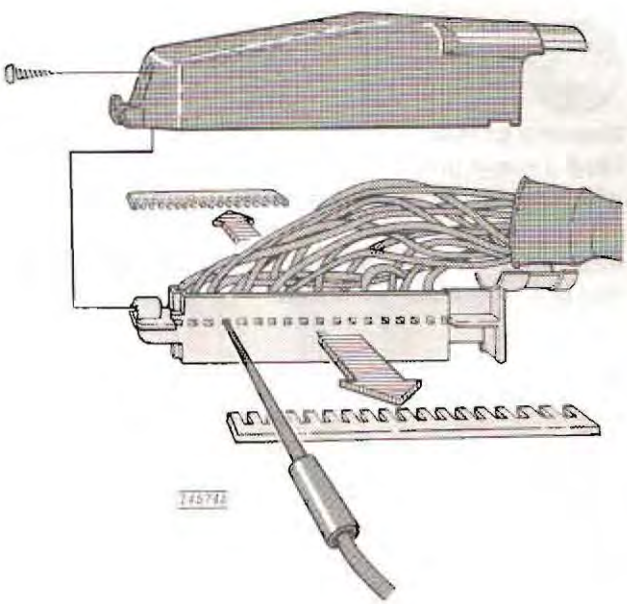


Turn off ignition

Remove control unit connector

Important! Ignition must be off before removing or installing the connector.

Press up catch and fold out connector.

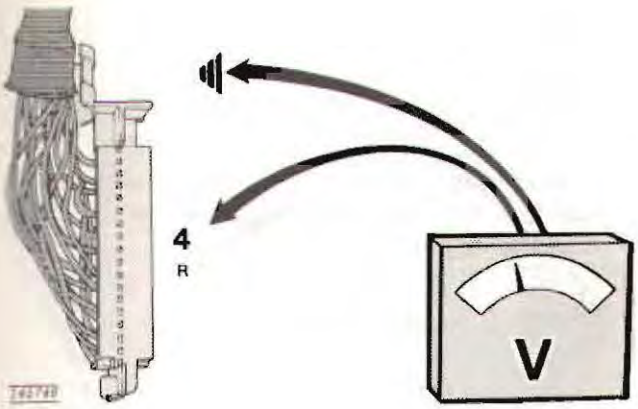


E3

Remove connector protective sleeve

Important!

- Never check connections from the front. Experience has shown that they can be damaged and any faults made worse.
- Check connections through the holes on the connector side. Don't use unnecessary strength.
- The connection numbers are printed on the connector side.

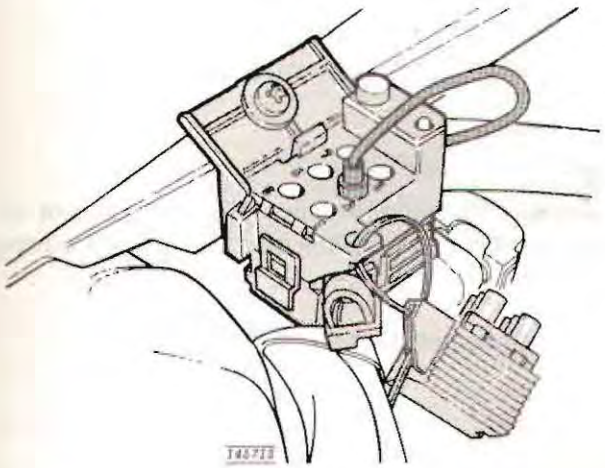


E4

Check diagnostic socket

1.
Connect voltmeter between ground and no. 4 connection on control unit connector. Reading should be 12 V.

If there is no voltage, check lead between control unit connector and fuse no. 1 (30 strip) in the electric distribution unit.

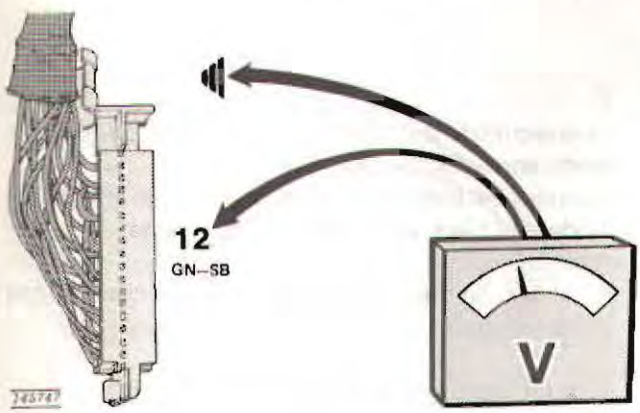


2.



Turn on ignition.

Connect selector cable to position 2 on diagnostic socket.

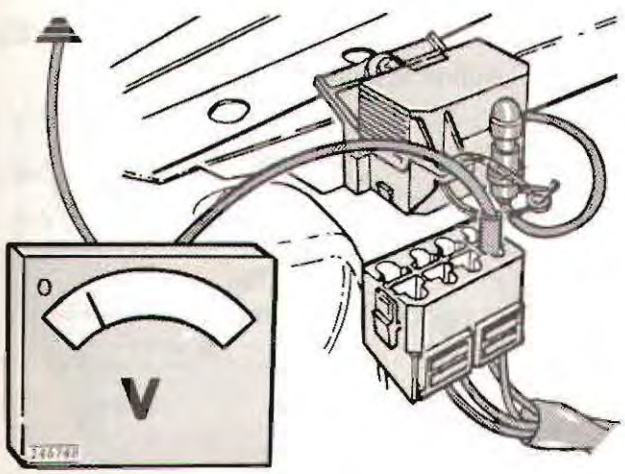


3.
Connect voltmeter between ground and no. 12 connection on control unit connector. Reading should be 12 V.

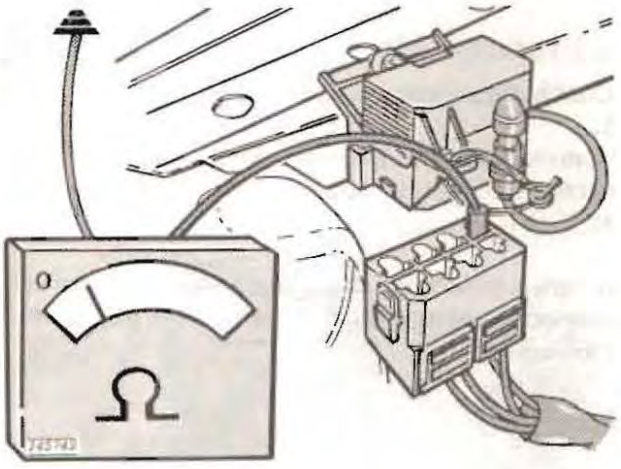
Depress button on diagnostic socket. Reading should be 0 V.

If there is no voltage at the control unit, take reading at diagnostic socket connector.

If voltmeter reading remains at 12 V when button is depressed, check diagnostic socket.

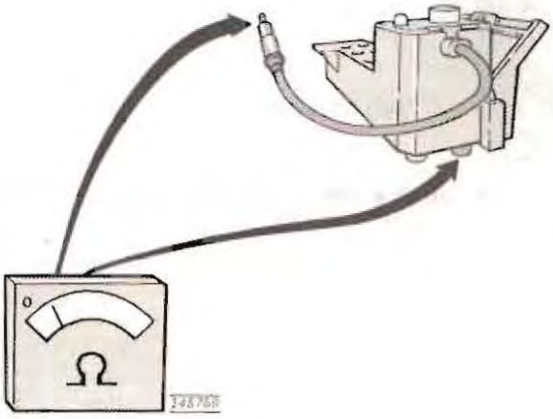


4.
Connect voltmeter between ground and red-black lead on diagnostic socket connector. Reading should be 12 V.



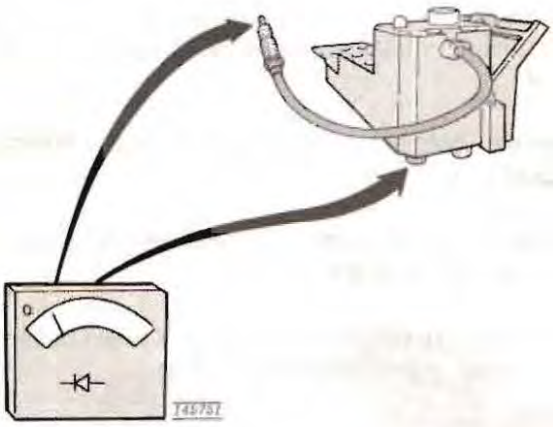
5.
Connect ohm meter between ground and brown-black lead in diagnostic socket connector. Reading should be approx. 0 Ω.

Turn off ignition.



6.
Connect ohm meter between diagnostic socket selector cable and pin under selector button. Reading should be ∞ resistance.

Depress button. Reading should be 0 Ω.



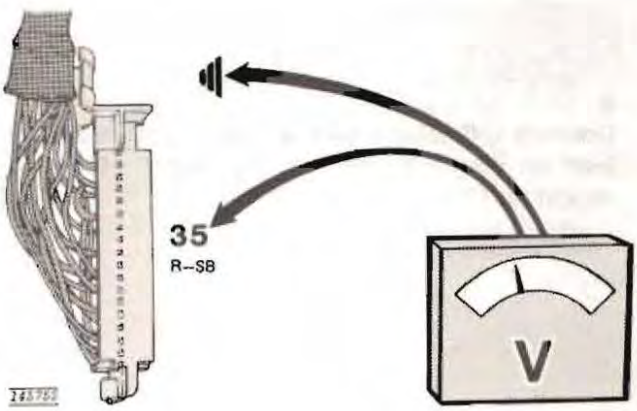
7.
Connect diode tester between diagnostic socket light diode and selector cable.
Connect red test pin on diode tester to pin under light diode and black test pin to selector cable.

A reading on the diode tester indicates correct light diode function.

With no reading, replace diagnostic socket.

E5

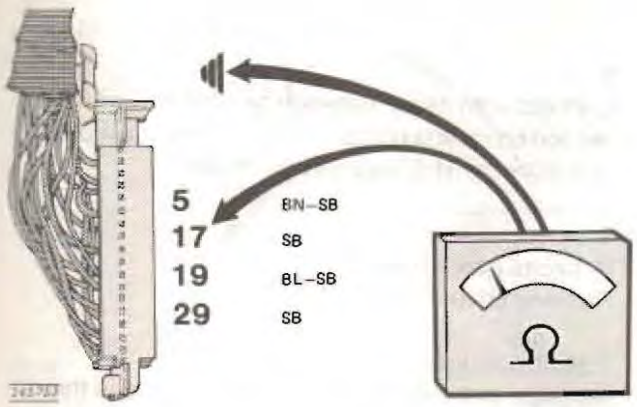
Check ignition lock voltage



Turn on ignition.

Connect voltmeter between ground and no. 35 connection on control unit connector. Reading should be 12 V.
Check that voltage exists when starter motor is running.

Turn off ignition.

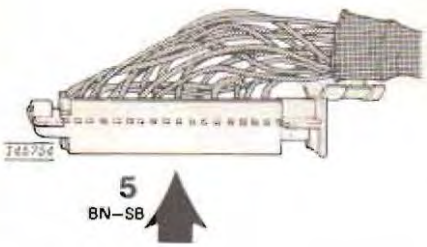


E6

Check ground connections
Connect ohm meter between ground and connections

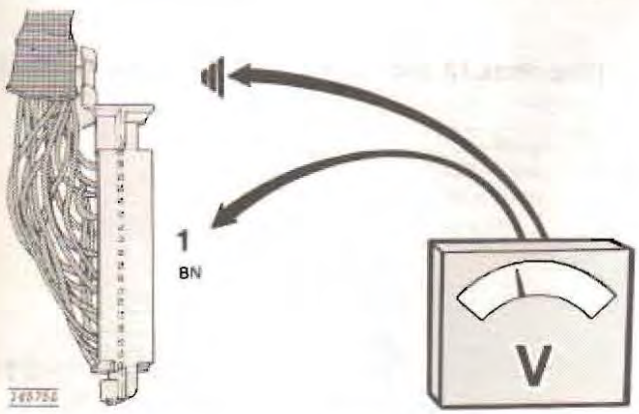
5 17 19 29

on control unit connector. Reading in all cases should be 0 Ω.
Leads are grounded to engine intake manifold.



E7

Check Lambda-sond screening lead
Should be connected to no. 5 connection on control unit connector.

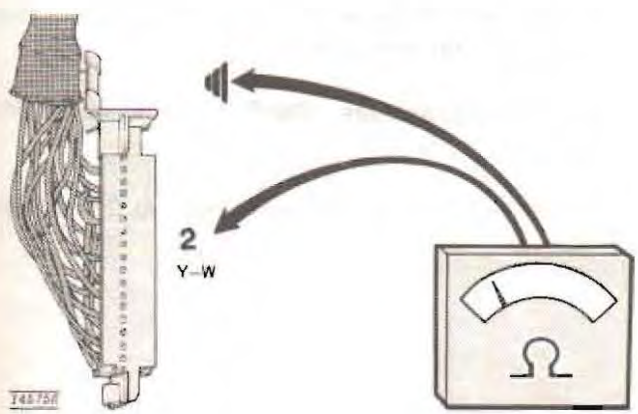


E8

Check rpm sensor lead from ignition system control unit
Connect voltmeter between ground and no. 1 connection on fuel system control unit connector.



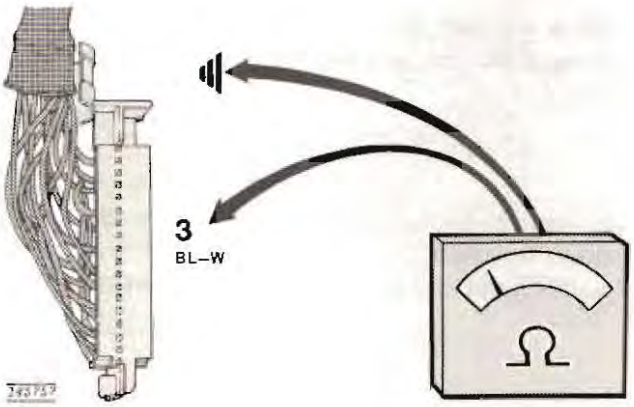
Run starter motor.
Reading = battery voltage.



E9

Check throttle switch
1.
Connect ohm meter between ground and no. 2 connection on control unit connector. Reading should be 0|Ω (switch closed).

2.
Depress gas pedal slightly.
Resistance should increase to 2-3 kohm (throttle switch opens)

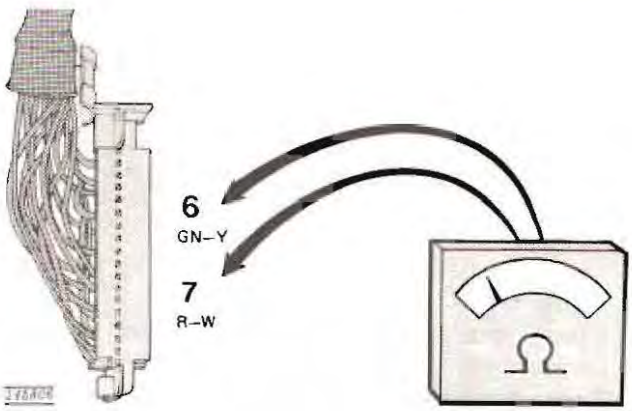


3.
Connect ohm meter between ground and no. 3 connection on control unit connector. Reading should be ∞ resistance (full load switch open).

4.
Depress gas pedal all the way
Reading should be 0 Ω.

If fault occurs:
Measure at throttle switch to see if fault is in throttle switch or in leads.

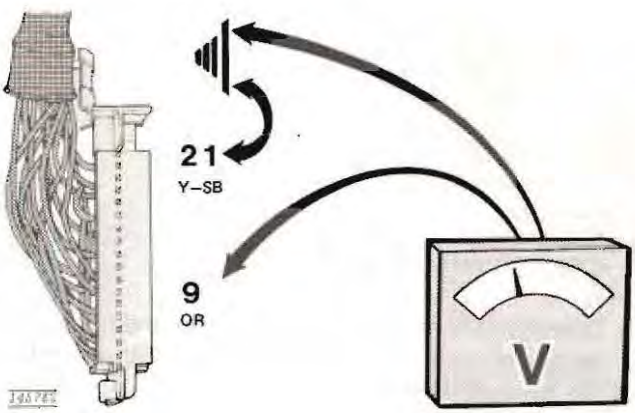
Check ground connection at intake manifold.



E10

Check air mass meter
Connect ohm meter between connections 6 and 7 on control unit connector. Reading should be 2.5-4.0 Ω.

(See also E13 and E27 for checking air mass meter.)



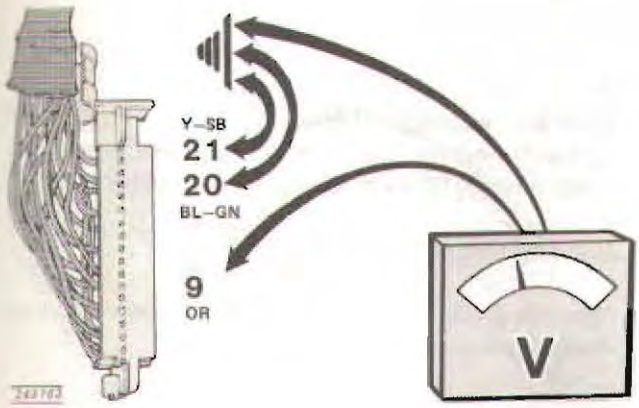
E11

Check system relay primary relay
Connect voltmeter between ground and no. 9 connection on control unit connector.

Connect lead between ground and no.21 connection on control unit connector.

Relay should activate. Reading should be battery voltage (approx. 12 V).

Do not remove ground connection to no. 21 connection.

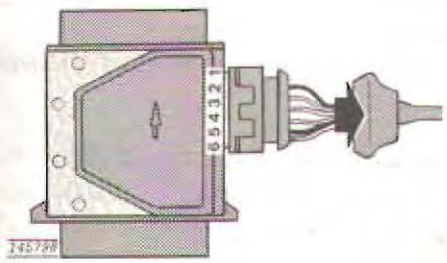


E12

Check system relay pump relay
Connect lead between ground and no. 20 connection on control unit connector.

Pump relay should close and start fuel pumps.

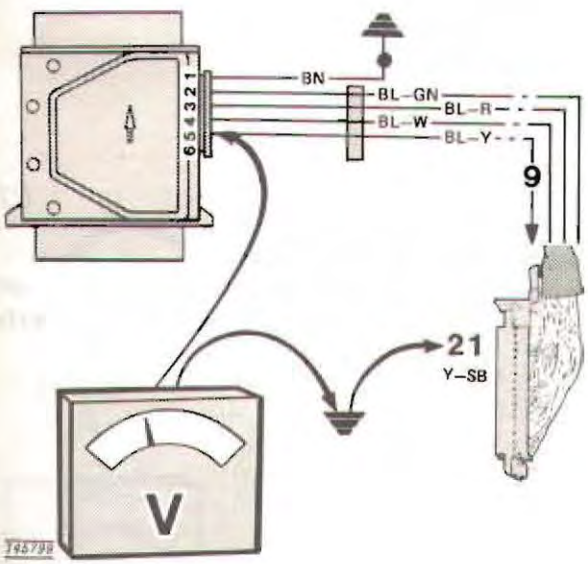
Remove ground connection from no. 20 connection, but leave connection to no. 21.



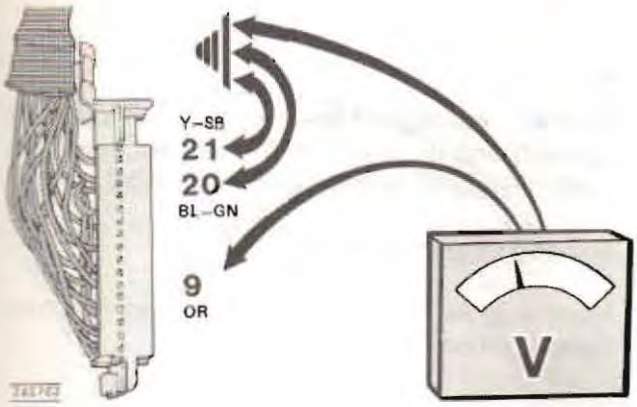
E13

Check air mass meter
1.
Remove rubber sleeve from air mass meter connector to free leads.

Colour code		
SB = Black	BN = Brown	GN = Green
GR = Grey	Y = Yellow	OR = Orange
W = White	P = Pink	VO = Violet
R = Red	BL = Blue	CU = Copper



2.
Connect voltmeter between ground and no. 5 connection on air mass meter connector. Reading should be approx. 12 V.

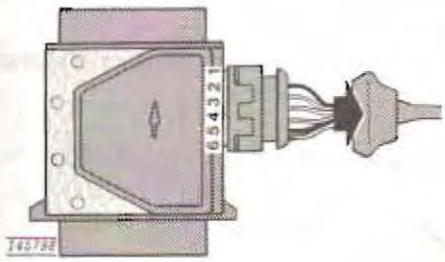


E12

Check system relay pump relay
Connect lead between ground and no. 20 connection on control unit connector.

Pump relay should close and start fuel pumps.

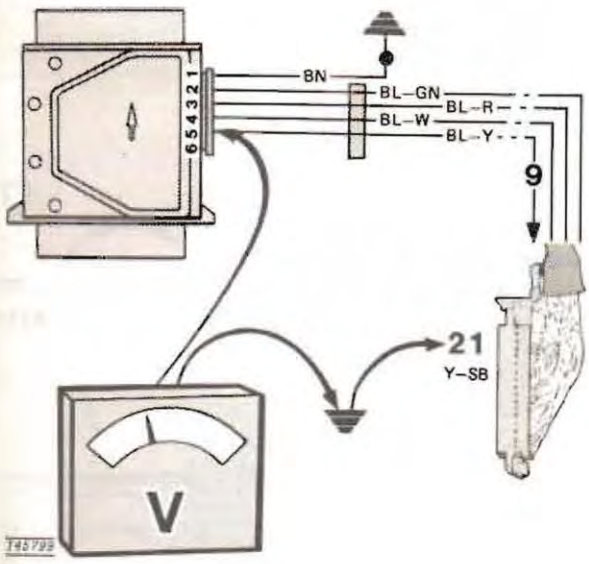
Remove ground connection from no. 20 connection, but leave connection to no. 21.



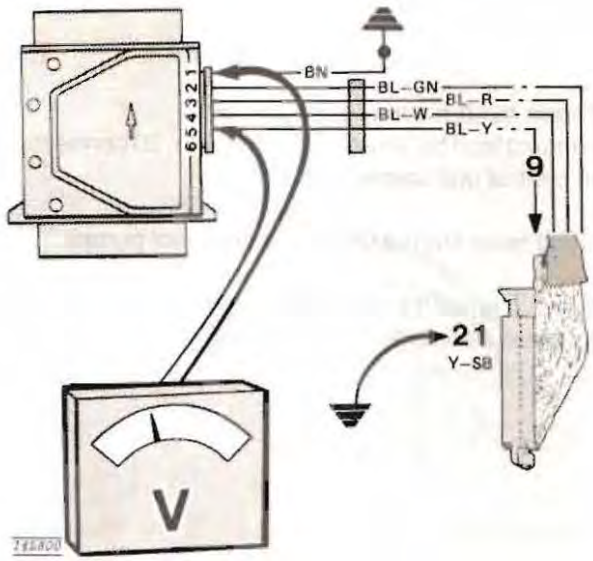
E13

Check air mass meter
1.
Remove rubber sleeve from air mass meter connector to free leads.

Colour code		
SB = Black	BN = Brown	GN = Green
GR = Grey	Y = Yellow	OR = Orange
W = White	P = Pink	VO = Violet
R = Red	BL = Blue	CU = Copper



2.
Connect voltmeter between ground and no. 5 connection on air mass meter connector. Reading should be approx. 12 V.



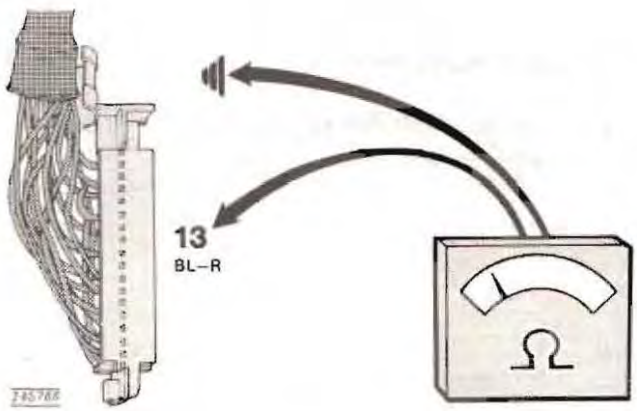
3.

Connect voltmeter between no. 1 connection (ground) and no. 5 connection (current feed from system relay) on air mass meter connector.

Reading should be approx. 12 V.

Remove ground connection to no. 21 connection on control unit connector.

E14



Check coolant temperature sensor

Connect ohm meter between ground and no. 13 connection in control unit connector.

Resistance depends on temperature. Guide line values:

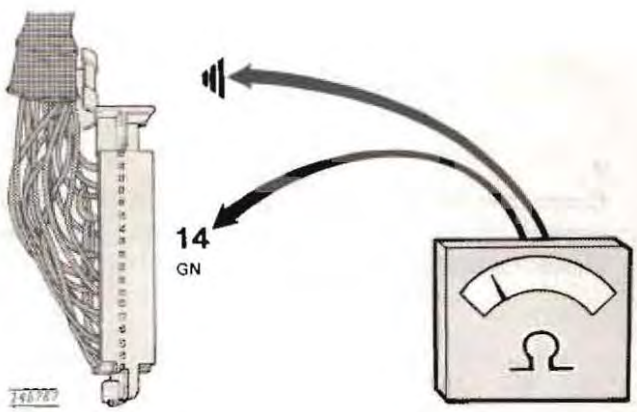
Resistance at	-10°C (14°F)	8,260- 10,560Ω
	+20°C (68°F)	2,280- 2,720Ω
	+80°C (176°F)	290- 364Ω

See Specifications for chart.

If fault occurs:

Measure at sensor to see if fault is in sensor or in leads.

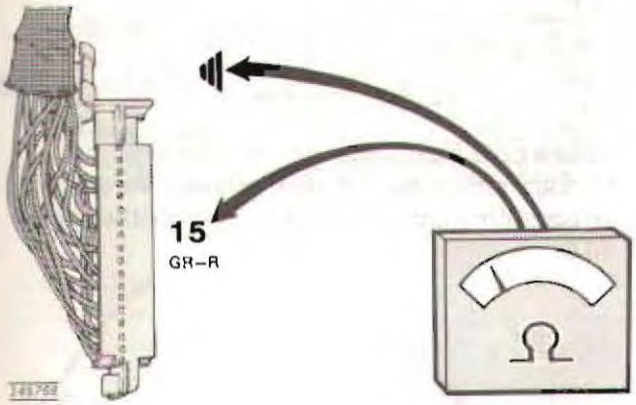
Check ground connection to intake manifold.



E15

Check lead to AC compressor

Connect ohm meter between ground and no. 14 connection on control unit connector. Reading should be 0-5Ω.



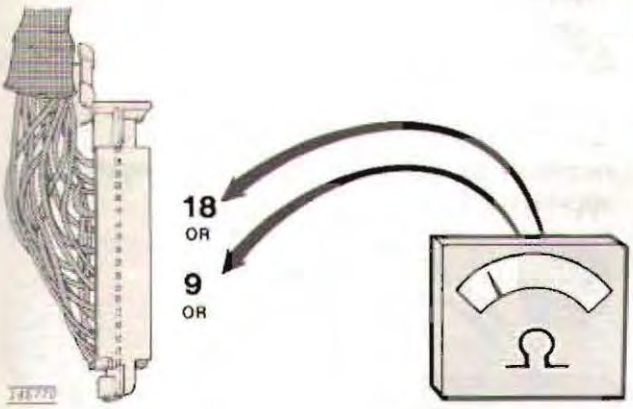
E16

Check lead from AC control unit
Connect ohm meter between ground and no. 15 connection on control unit connector.

Reading at AC off should be approx. 1 kΩ.
Reading at AC on should be approx. 10 Ω.

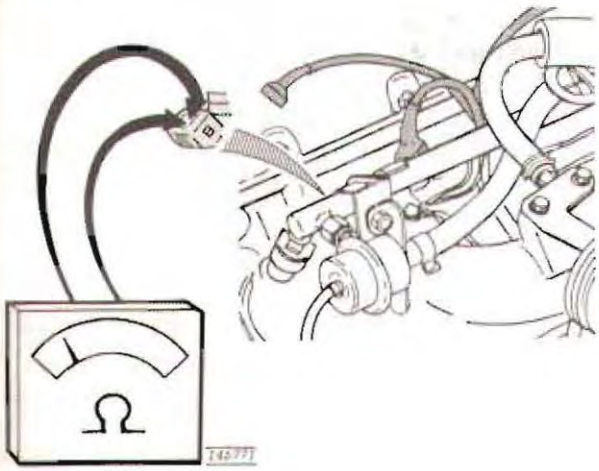
Colour code		
SB = Black	BN = Brown	GN = Green
GR = Grey	Y = Yellow	OR = Orange
W = White	P = Pink	VO = Violet
R = Red	BL = Blue	CU = Copper

E17

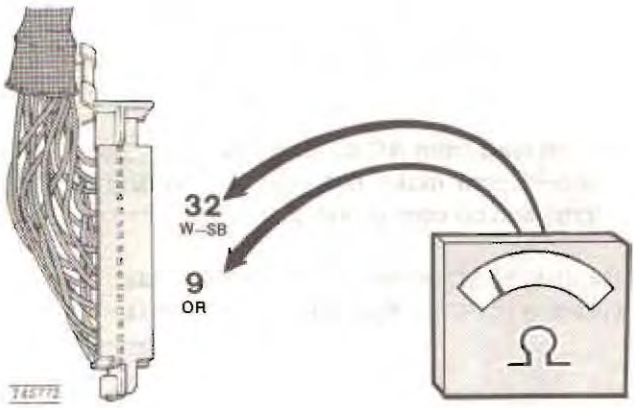


Check injectors
Connect ohm meter between connections 9 and 18 on control unit connector. Reading should be 4 Ω. If the reading is higher, current is not going through the injectors.

If resistance is:
Approx. 5.3 Ω Fault in one injector or its leads.
Approx. 8 Ω Fault in two injectors or their leads.
Approx. 16 Ω Fault in three injectors or their leads.



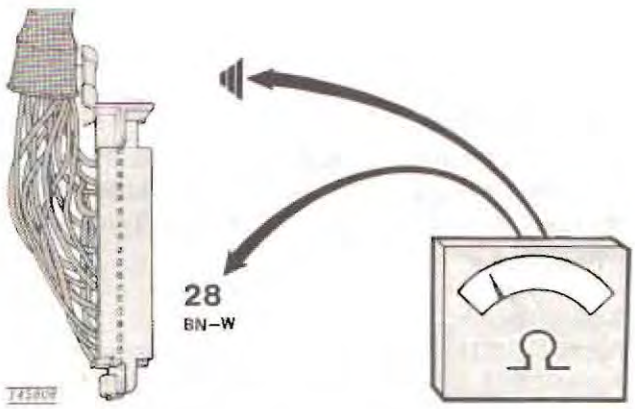
If the measured resistance is wrong:
Remove injector connectors and test them separately. Reading for individual injectors should be 16 Ω.



E18

Check cold start valve

Connect ohm meter between connections 9 and 32 on control unit connector. Reading should be approx. 10 Ω.



E19

Check knock enrichment signal from ignition system

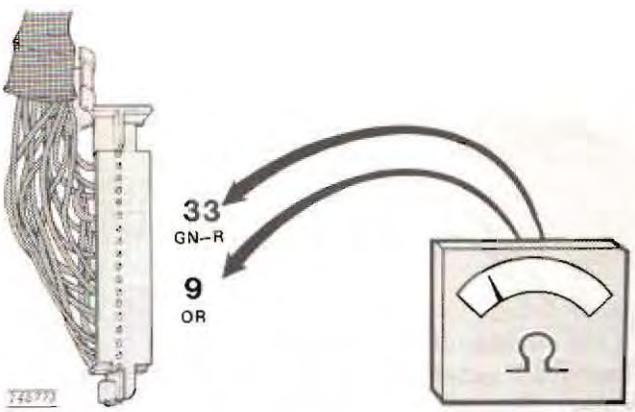


Turn on ignition.

Connect voltmeter between ground and no. 28 connection on control unit connector. Reading should be approx. 0.7 V.



Turn off ignition.

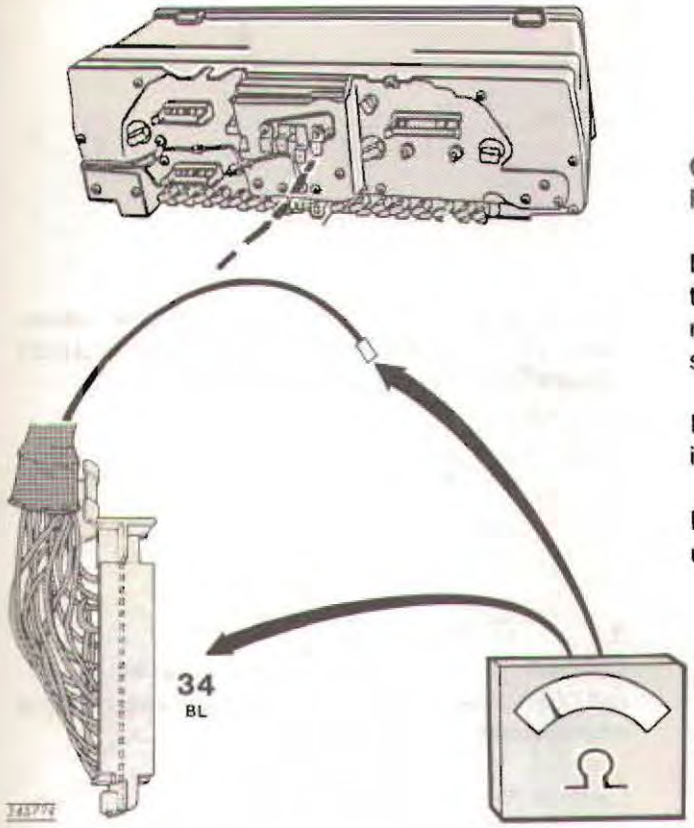


E20

Check idle valve

Connect ohm meter between connections 9 and 33 on control unit connector.

Reading should be approx. 8 Ω.



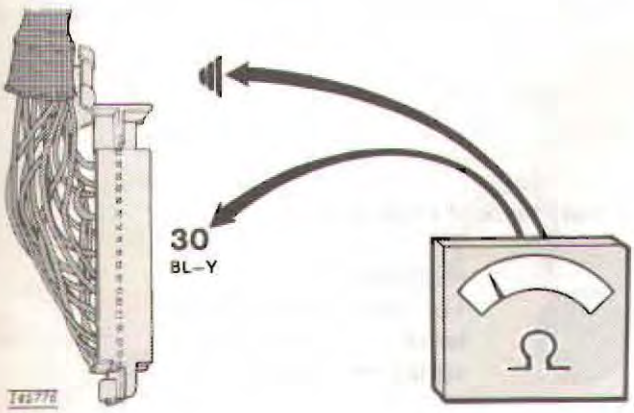
E21

Check speedometer signal
Remove panel under instrument panel on driver side.

Disconnect 12 terminal connector from speedometer. Connect ohm meter between blue (BL) cable and no. 34 connection on control unit connector. Reading should be 0 Ω.

If fault code series 3-1-1 has flashed and resistance is 0 the speedometer signal is missing.

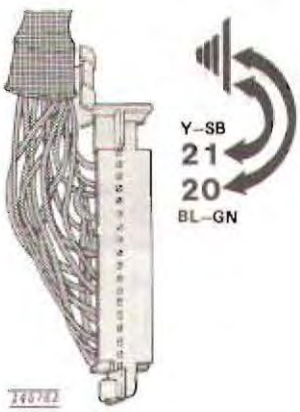
Reconnect speedometer cable and remount panel under instrument panel.



E22

Automatic transmission:
Check gear selector signal
Put gear selector in position N (Neutral). Connect ohm meter between ground and no. 30 connection on control unit connector. Reading should be 0 Ω. Move gear selector to position D (Drive). Reading should be ∞ resistance.

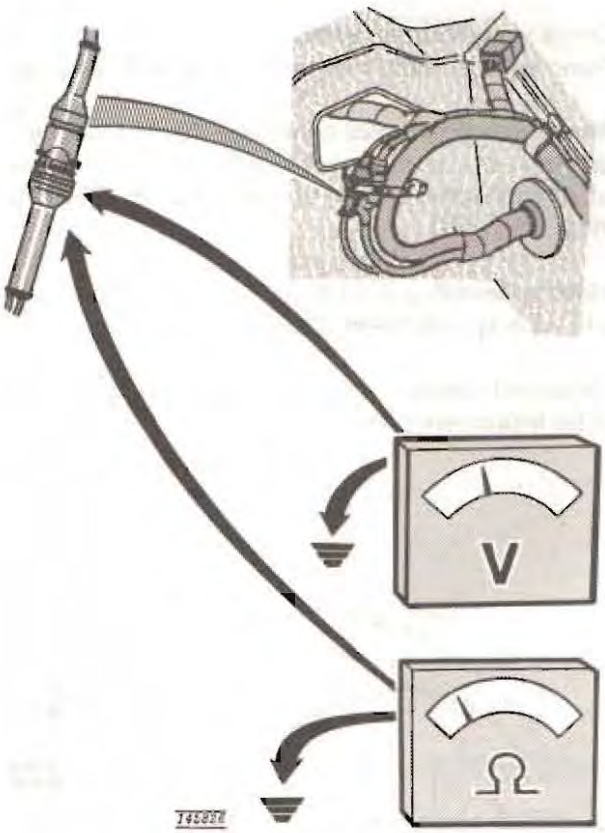
The reading should be 0 in all gears for vehicles with manual transmission.



E23

Check Lambda-sond current feed and pre-heating resistance

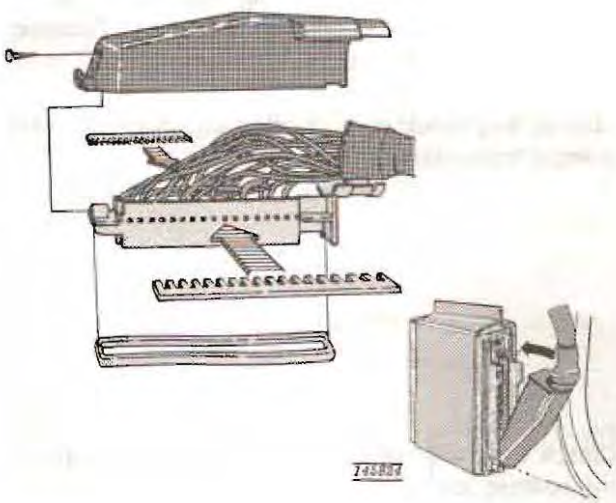
1.
Ground connections 20 and 21 on control unit connector in order to start fuel pumps.



2.
Connect voltmeter between ground and the yellow-red (Y-R) cable in the two-terminal connector at right wheel house. Reading should be 12 V.

3.
Connect ohmmeter between ground and the yellow-red (Y-R) cable in the two-terminal connector at right wheel house. .

Lambda-sond temperature:
Cold: +20°C (68°F) approx. 3 Ω.
Hot: + 350°C (660°F) approx. 13 Ω.
(Hot temperature achieved on idle with hot engine.)



E24

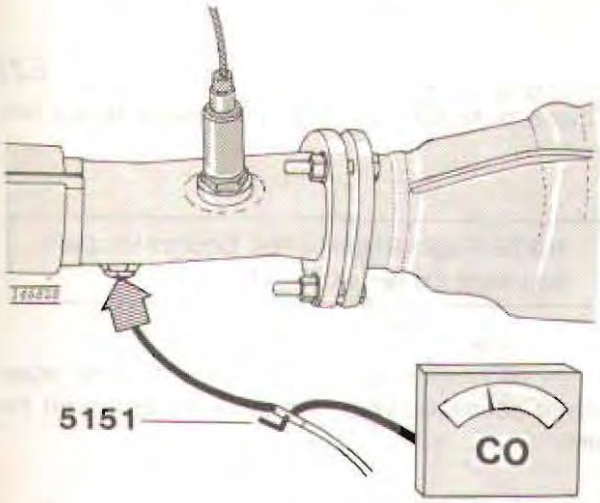
Final check of control unit



Important!
The ignition must always be off when removing/installing connector.

Connect connector. Be sure the connector's rubber gasket is reinstalled before connecting to control unit.

Start engine
If engine does not start after preceding fuel system check, test with a new control unit.

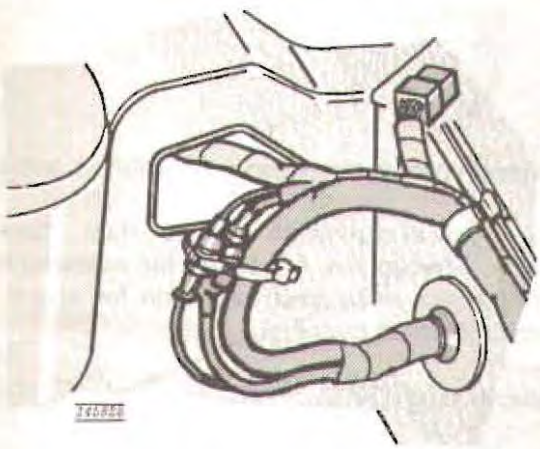


E25

Connect CO meter
Connect CO meter to CO connection on catalytic converter using 5151 connector.

Run engine
Check CO content.

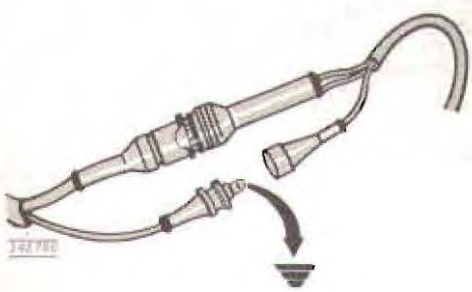
If unsatisfactory, check again after checking Lambda-sond in next step.



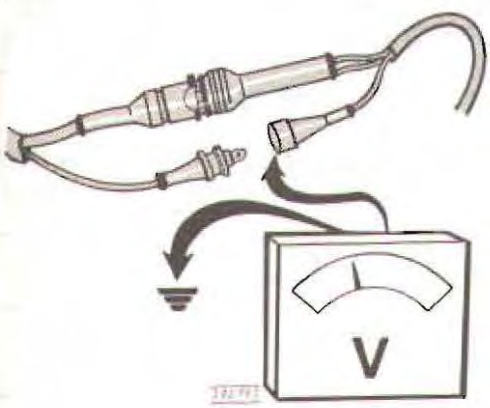
E26

Check Lambda-sond

1.
Disconnect Lambda-sond connector.



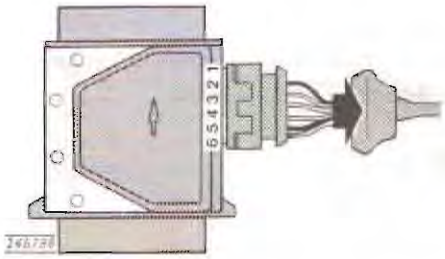
2.
Ground lead to control unit.
CO content reading should rise, indicating that control unit and its connections are OK.



3.
Connect voltmeter to Lambda-sond. Indicator should swing back and forth to show function of Lambda-sond.

(Reading at correct CO content should be approx. 0.5 V.)

Connect Lambda-sond connector.

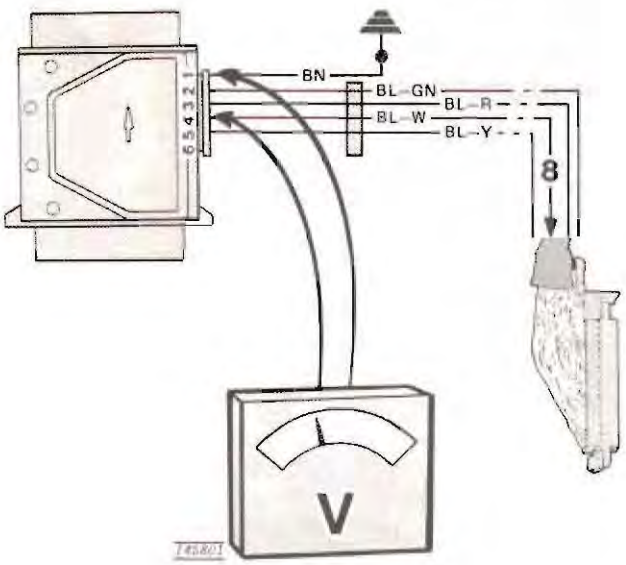


E27

Check burn-off cleaning of air mass meter hot wire

> **NOTE!** Engine must be hot. Coolant temperature must exceed 60°C (140°F).

1.
Remove protective rubber sleeve from air mass meter connector without disconnecting it from the unit.

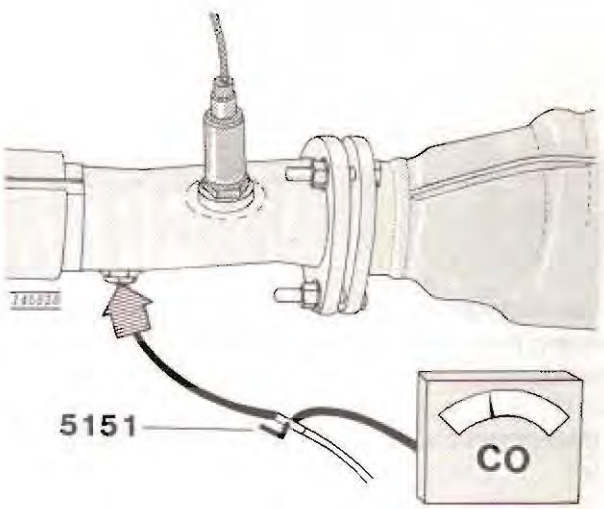


2.
Connect voltmeter between connections 1 and 4.

Rev engine to approx. 35 r/s (2,100 rpm). Turn off engine. After approx. 4 seconds, the voltmeter indicator should swing back and forth for approx. 1 second (burn-off cleaning).

Remove voltmeter.

Install rubber sleeve over connector.



E28

Check CO content

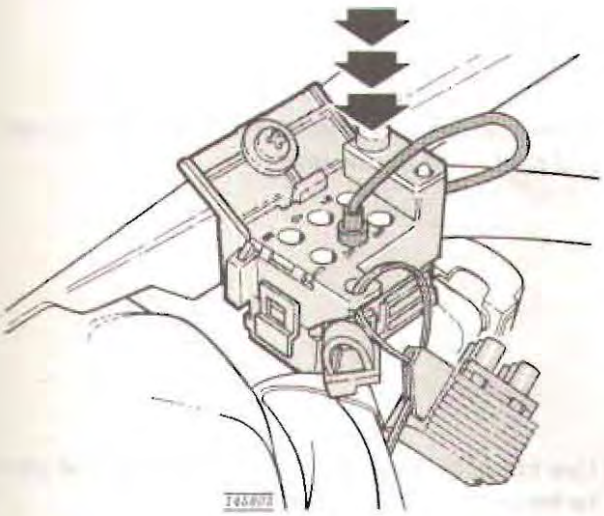
If the engine does not run satisfactorily even though no faults have been found, or if faults that have been found have been rectified, try using a new control unit.

Remove all test equipment.

Reinstall electrical distribution unit, panels, etc.

Quick check of injectors

F1



1.

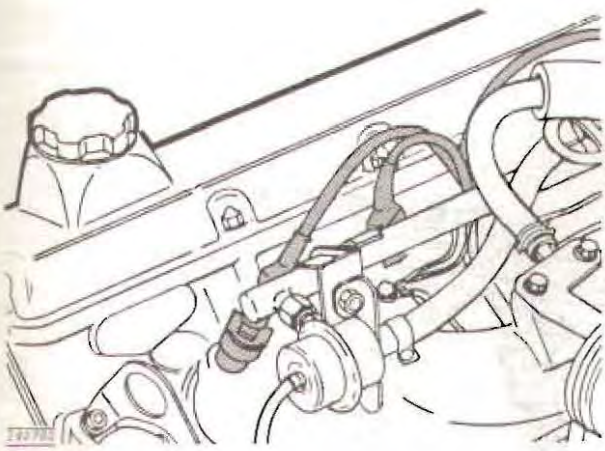


Turn on ignition

Depress diagnostic socket button three times. Each press should last for at least one second but not more than three.

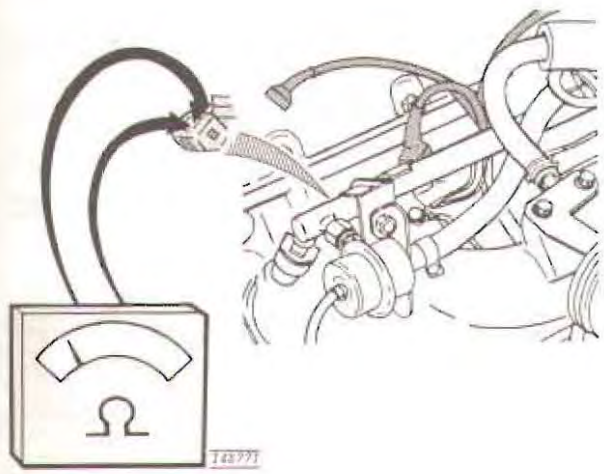
At this point the injectors will begin to operate, followed by the idle valve, etc. The diagnostic socket light diode will flash in a continuous pattern.

The control function will repeat itself until interrupted, either by turning off the ignition or by changing control function via the selector button.



2.
Listen to and feel by hand each injector to make sure they all work.

If one does not function (no click can be heard), change connector to a valve that does work. If the fault moves to one that was O.K. before then the fault is in the connector lead.



3.
If the injector still doesn't work, the fault is probably in the injector.

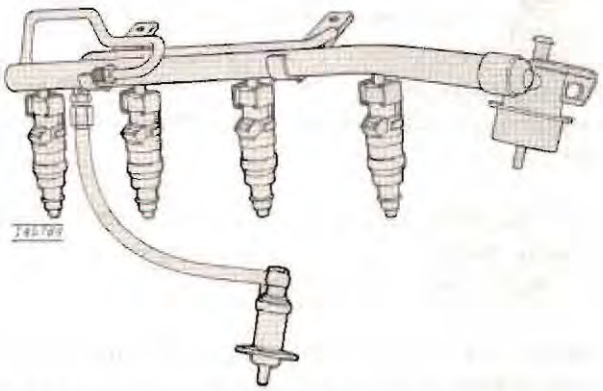
Check the injector separately by connecting an ohm meter between the injector pins.
Reading (depending somewhat on temperature) should be approx. 16Ω.

4.
Finish up



Turn off ignition and remove all equipment.

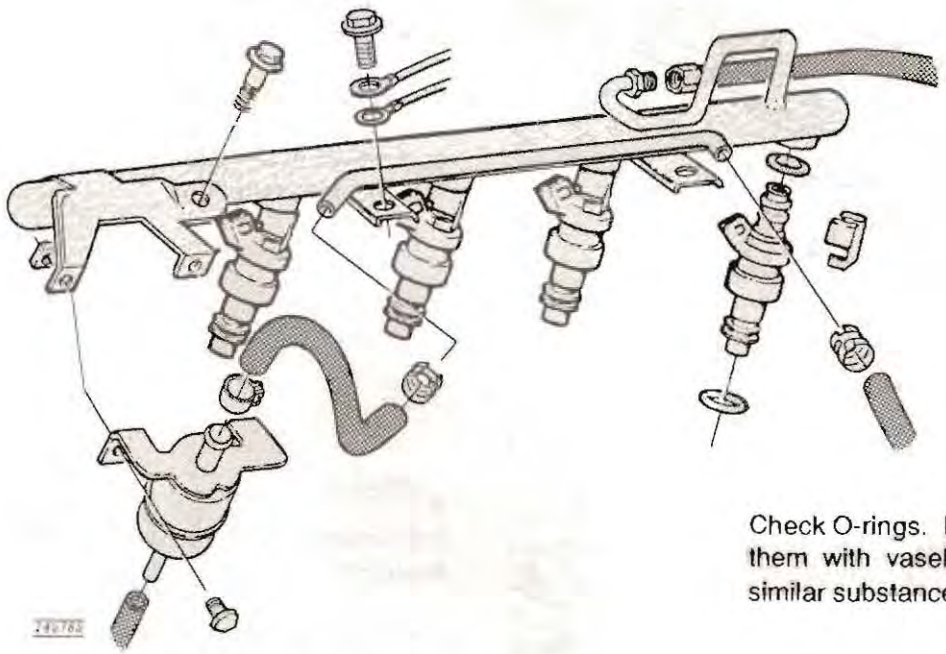
Injectors, fuel distribution pipe and pressure regulator, remove/install



Remove/install fuel distribution pipe, injectors and cold start valve as one unit.

NOTE! Check that all ground connections are correctly grounded when reconnecting them.

Use brace to loosen/tighten fuel lines and all other fasteners.



Check O-rings. Lubricate them with vaseline or a similar substance.

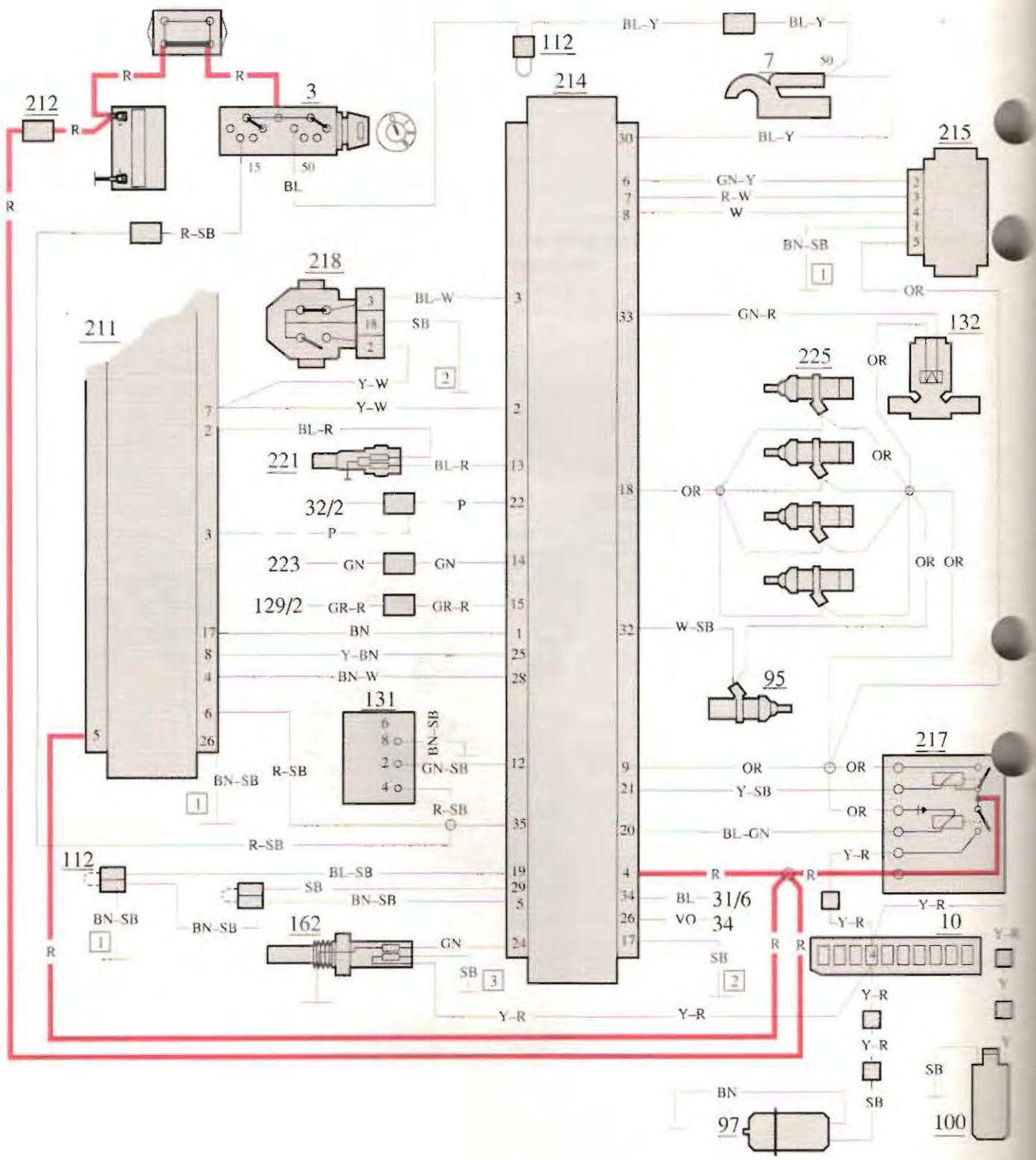
Place pressure regulator against fuel distribution pipe and bolt it to the bracket.
Check vacuum hose and return hose.

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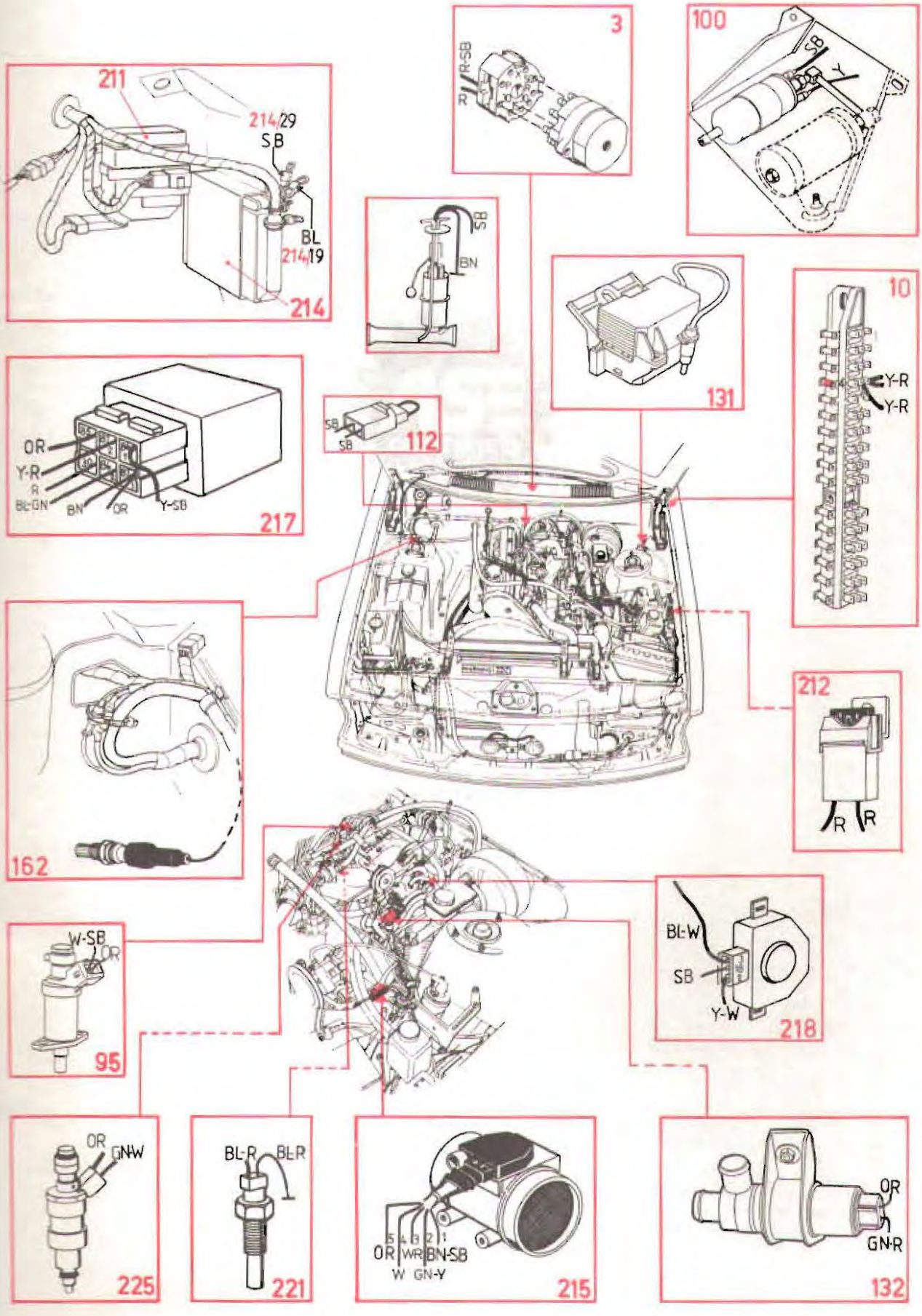
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LH-Jetronic 2.4 (B230F)

3 Ignition switch
7 Starter motor
10 Fuse box
32 Connection at instrument
95 Cold start injector
97 Tank pump
100 Fuel pump
112 Joint
129 AC Relay
131 Diagnostic unit
132 Idle valve
162 Lambda sond
211 Electronic control unit, EZ116K
212 In–line fuse
214 Electronic control unit, LH2.4
215 Air mass meter
217 Main relay
218 Throttle switch
221 Coolant temperature sensor
223 AC pressure switch
225 Injectors



LH-Jetronic 2.4 (B 230 F)



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