Service Manual

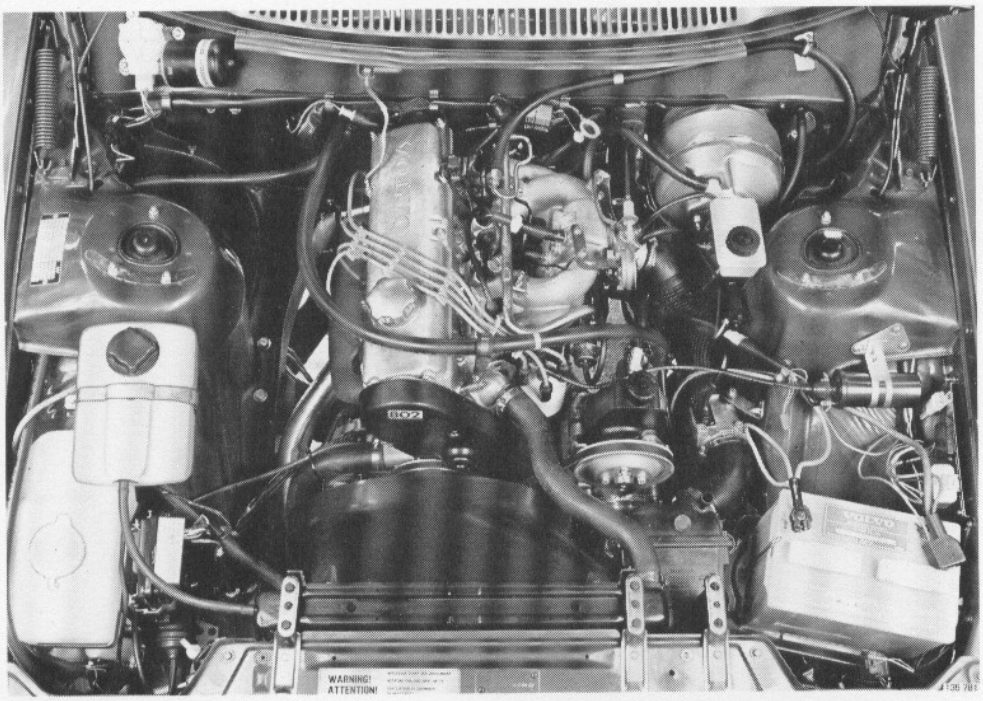
Repairs and maintenance

Section 2 (23)

Fuel System, LH-Jetronic II B23F

240 1983–19 . .

VOLVO



Engine B23F:

- only for cars intended for USA market
- introduced 1983, replaces B21F LH-Jetronic engine
- is equipped with LH-Jetronic II fuel injection system.
  Designation II stands for "second generation". System is further developed compared with the system used on B21F LH-Jetronic engine.

Volvos are sold in versions adapted for different markets. These adaptions depend on many factors including legal, taxation and market requirements.

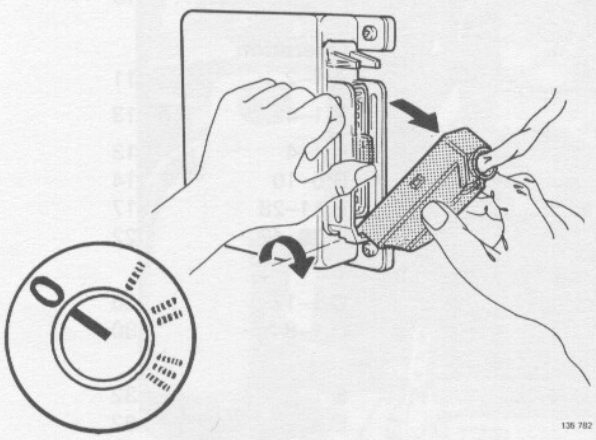
This manual may therefore show illustrations and text which do not apply to cars in your country.

TP 30427/1 US
6000. 10.82
Printed in U.S.A.

Contents

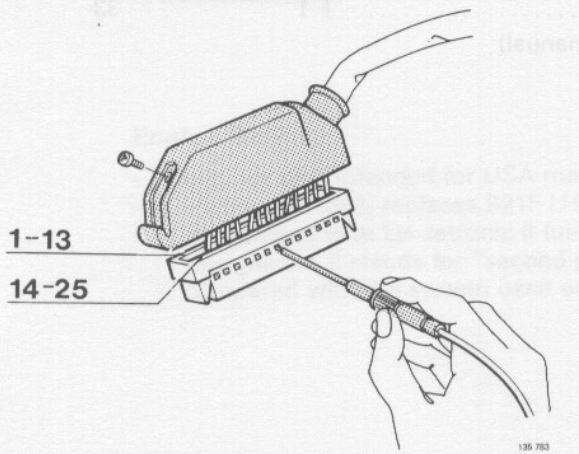
Order number: TP 30427/1

Important/Cautions

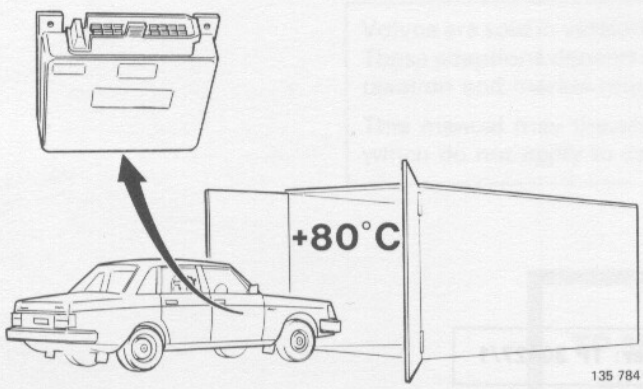


Control unit

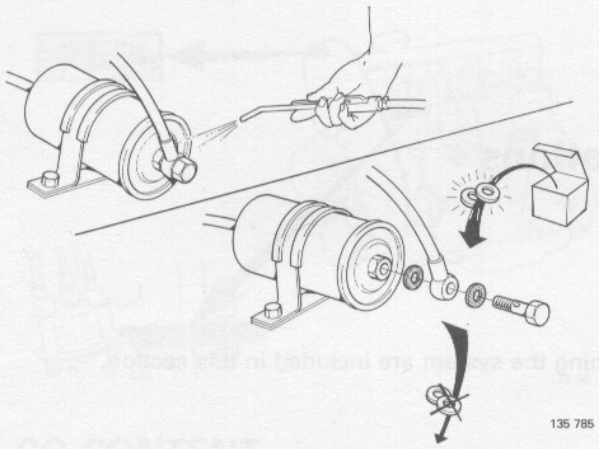
- Ignition must be switched off when connector is removed/installed.
- Do not replace control unit without checking wiring and components. A fault may otherwise damage the new control unit in the same way as the old.



- **Never** check connector terminals from front. Experience has shown that connector terminals can be damaged and cause other faults.
  Remove connector cover and check terminals through the holes in side of connector. Do not use excessive force.
  Terminal numbers are stamped on connector side.



- Remove control unit when, for example, baking paint in an oven. Control unit must not be heated over +**80°C** (176°F).



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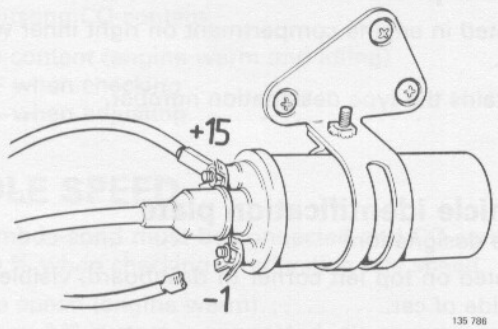
Cleanliness

Utmost cleanliness should be observed when working on system.

All fuel connections should be carefully cleaned before removal.

Gaskets, seals

Always use new gaskets/seals.



135 786

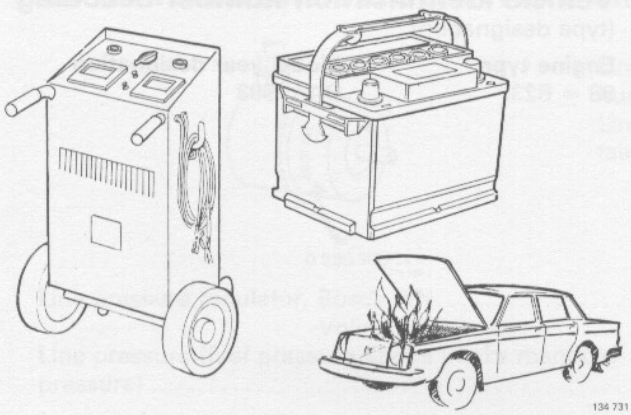
Ignition system

Ignition system must be disconnected when checking compression or performing similar work.

If ignition system is not disconnected, there is risk for arcing.

Arcing to injectors or injector wiring can damage the control unit.

Arcing to ignition coil low tension side can damage Hall IC-chip in distributor.



134 731

Battery

When checking components it is important that battery voltage is not too low.

A battery charger can be connected if necessary. Max. charging current **15 A**.

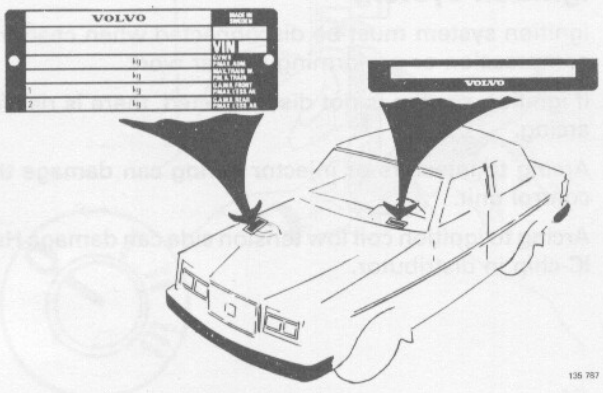
WARNING

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

Specifications

PLATES AND DECALS

Only those plates/decals which contain information concerning the system are included in this section.



Model plate

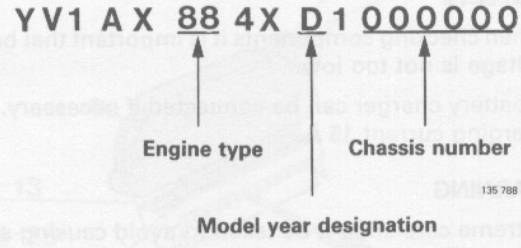
Located in engine compartment on right inner wheel-arch.

Contains the type designation number.

Vehicle identification plate

(type designation)

Located on top left corner of dashboard, visible from outside of car.

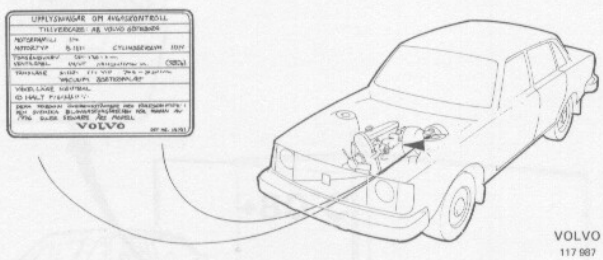


Vehicle identification number decoding

(type designation)

Engine type
88 = B23F

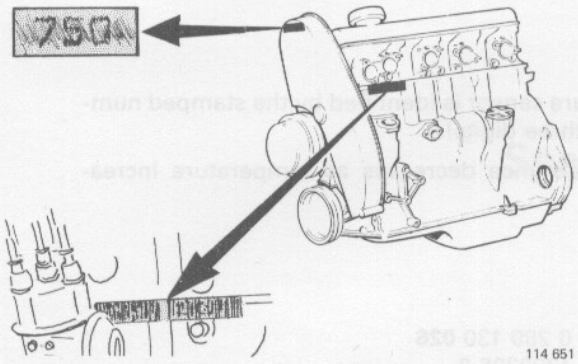
Model year designation
D = 1983



Exhaust emissions plate

Located in engine compartment on left inner wheel-arch.

Contains information on valve clearance and ignition timing.



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Engine serial and part numbers

Stamped in left side of cylinder block, behind distributor.

Decal showing last three digits of part number is attached to top of timing belt cover.

Engine identification numbers:
- manual transmission 499 802
- automatic transmission 499 803

CO-CONTENT

Lambda-sond must be disconnected when checking or adjusting CO-content.

CO-content (engine warm and idling)
- when checking ..... 0.4–0.8 %
- when adjusting ..... 0.6 %

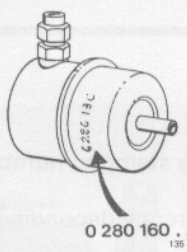
IDLE SPEED

Lambda-sond must be connected and CO-content under 1.0 % when checking or adjusting idle speed.

Idle speed (engine warm) ..... 12.5 r/s (750±20 r/min)
When A/C system is connected idle speed increases to .. 15.0 r/s (900 r/min)

135 528

LINE PRESSURE REGULATOR. LINE PRESSURE

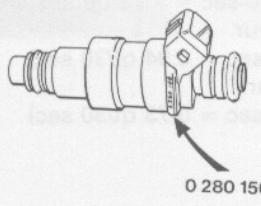


135 789

Line pressure regulator is identified by the stamped numbers (last three digits).
Line pressure regulator maintains fuel pressure at a certain level above pressure in intake manifold.

Line pressure regulator, Bosch P/N 0 280 160 **214**
Volvo P/N 1306935-6
Line pressure (fuel pressure above intake manifold pressure) ..... 250 kPa (35.5 psi)

INJECTORS

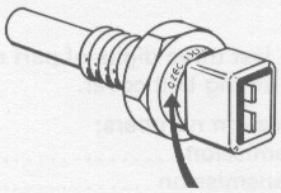


135 790

Injectors are identified by the stamped numbers (last three digits).

Injectors, Bosch P/N 0 280 150 **209**
Volvo P/N 1326427-9
Injected quantity of fuel at fuel pressure 250 kPa (35.5 psi) ..... 167 cm^3/min

TEMPERATURE SENSOR



0 280 130 . . .
135 791

Temperature sensor is identified by the stamped numbers (last three digits).

Sensor resistance decreases as temperature increases.

Temperature sensor, Bosch P/N	0 280 130 **026**
Volvo P/N	1332396-2

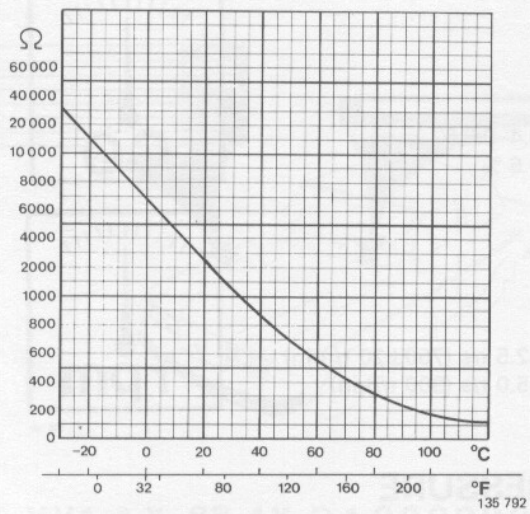
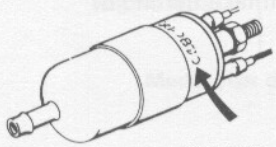


Diagram showing sensor resistance at different temperatures.

Example test values from diagram:

–10°C	9.41 kΩ (8.26–10.56 kΩ)
+20°C	2.5 kΩ (2.28–2.72 kΩ)
+80°C	0.327 kΩ (0.290–0.364 kΩ)

FUEL PUMP



0 580 464 . . .
135 793

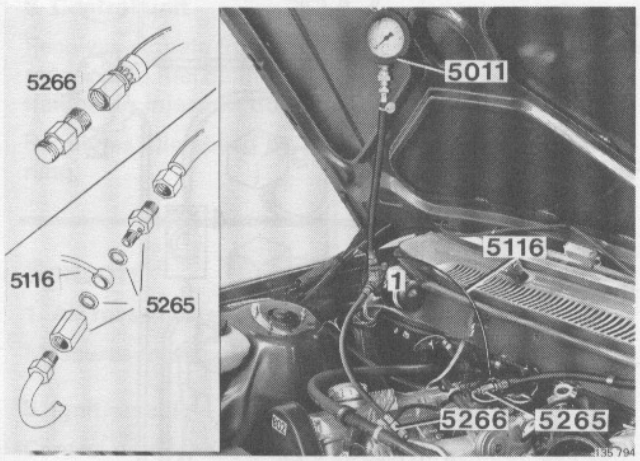
Fuel pump is identified by the stamped numbers (last three digits).
Note! Pump capacity varies greatly depending on voltage.

Fuel pump, Bosch P/N	0 580 464 **022**
Volvo P/N	1 306 932-3
Pump capacity at 300 kPa (42.6 psi), +20°C and 12V	130 liters/hour (1.08 liters/30 sec = 1.13 qt/30 sec)
11V	110 liters/hour (0.9 liter/30 sec = 0.94 qt/30 sec)
10V	85 liters/hour (0.7 liter/30 sec = 0.73 qt/30 sec)
Current consumption, max	6.5 A

TANK PUMP

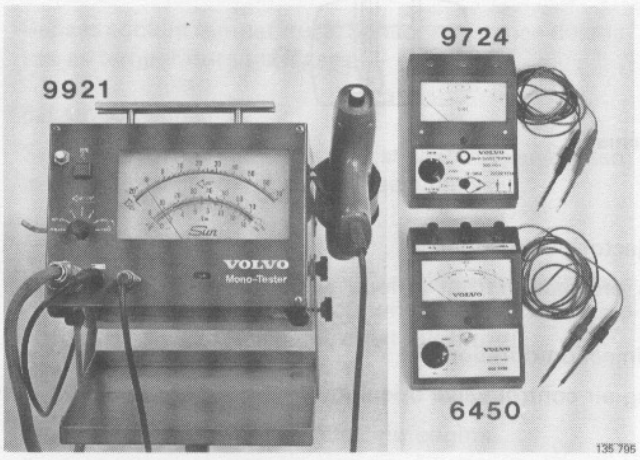
Current consumption	1–2 A

Special tools



5011, 5116, 5265, 5266

999	Description – use
5011-5	**Pressure gauge:** measurement of fuel pressure. Used with 5116, 5265 and 5266
5116-2	**Hose:** pressure gauge connector 5011
5265-7	**Nipple:** pressure gauge connector 5011
5266-5	**Plug:** to plug pressure gauge 5011

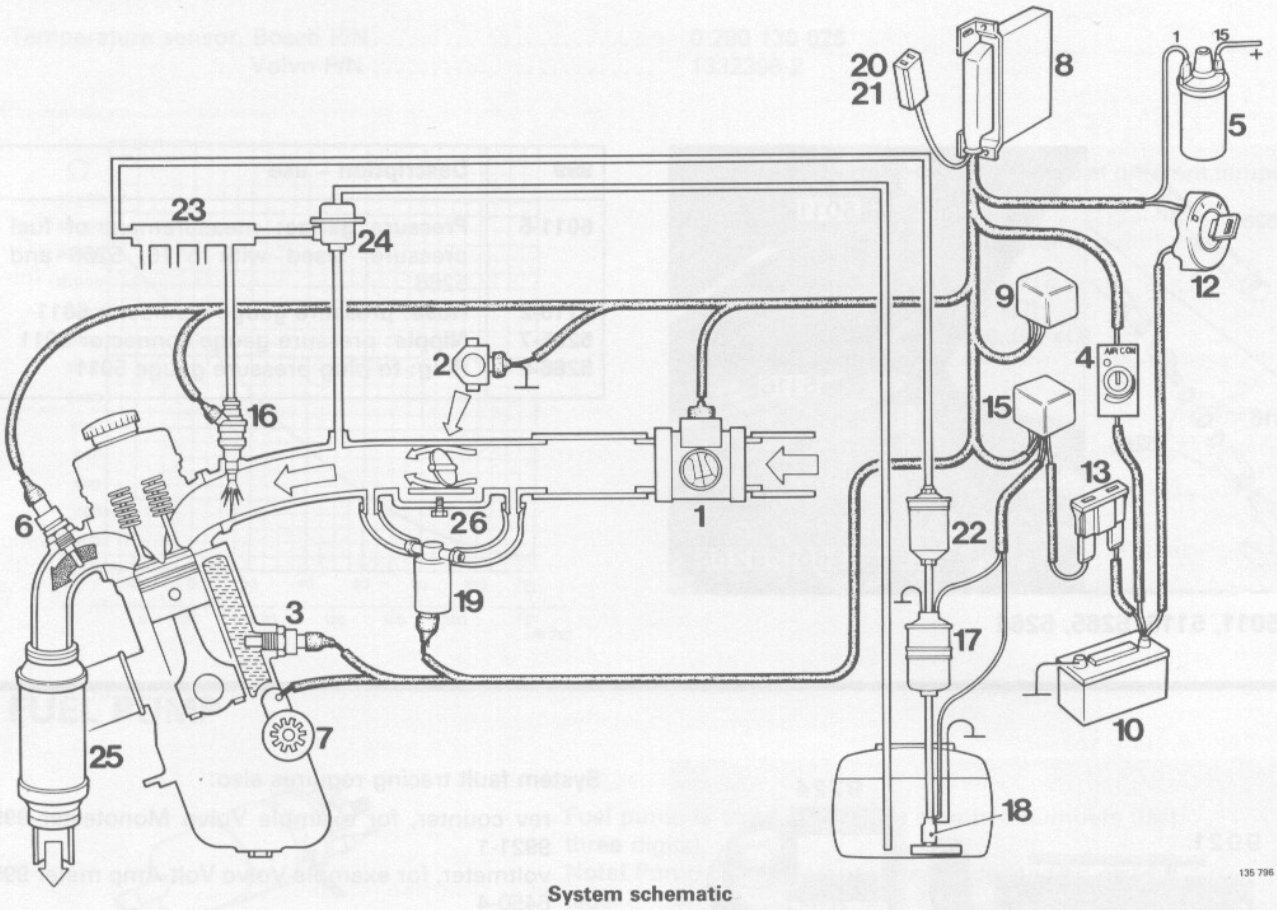


System fault tracing requires also:

- rev counter, for example Volvo Monotester 999 9921-1
- voltmeter, for example Volvo Volt-Amp meter 999 6450-4
- ohmmeter, for example Volvo Ohm-Diode meter 999 9724-0

LH-Jetronic II function

See also wiring diagram, fold-out page at end of manual.



System schematic

LH-Jetronic is an electronic system with one injector per cylinder.

System consists of a control unit which receives information from various sensors and calculates accordingly quantity of fuel injected.

Control unit regulates fuel quantity by varying injection duration.

Control unit also regulates idle speed by varying air control valve opening.

LH is an abbreviation of Luft-Hitzdracht = hot-air wire. The name comes from the fact that engine intake air flow is measured by an air mass meter consisting of an electrically heated wire.

The wire is cooled by the intake air flow. Control unit constantly regulates wire heating current so that wire maintains a constant temperature. Heating current is therefore a measure of intake air mass.

Because intake air mass (kg/h) is measured the system is not affected by ambient air pressure or temperature.

Relay

9. System relay

Provides control unit and air mass meter with current.

Control unit senses battery voltage via system relay.

15. Fuel pump relay

Provides current to injectors, fuel pump, tank pump and air control valve.

Control unit

8. Control unit

Receives signals from various sensors. Calculates corresponding fuel quantity. Regulates fuel quantity by variations in injection duration.

Regulates idle speed by varying air control valve opening.

Sensors

1. Air mass meter

Measures intake air mass.

5. Ignition coil

Control unit senses engine speed via ignition coil connection 1.

Ignition pulses give information on both engine speed and when injection should begin.

3. Temperature sensor

Senses coolant temperature. Sensor resistance decreases as temperature increases.

6. Lambda-sond

Senses oxygen content in exhaust gas. Oxygen content is a measure of combustion effectiveness.

2. Throttle valve switch

Senses throttle valve position. Throttle valve switch has two functions, a micro-switch which closes at engine idle and a switch which closes at full-throttle.

7. Starter motor

Signals control unit when starting engine.

Idling system

19. Air control valve

Bypasses air around throttle valve. Regulated by control unit.

4. Micro-switch, air conditioning (A/C)

Switch closes when A/C system engaged. Control unit then increases idle speed.

26. Idle adjustment screw

For basic setting idle speed.

Test point

20. Test point, idle speed

When test point is grounded air control valve is fixed in min. position. Intended for use when basic setting idle speed.

21. Test point, Lambda-sond

Fuel system

18. Tank pump

Pumps fuel from tank to main fuel pump and maintains fuel line to main pump under pressure. Therefore eliminates risk for vapor lock.

17. Fuel pump

Supplies system with fuel and builds-up line pressure.

22. Fuel filter

23. Injection manifold

24. Line pressure regulator

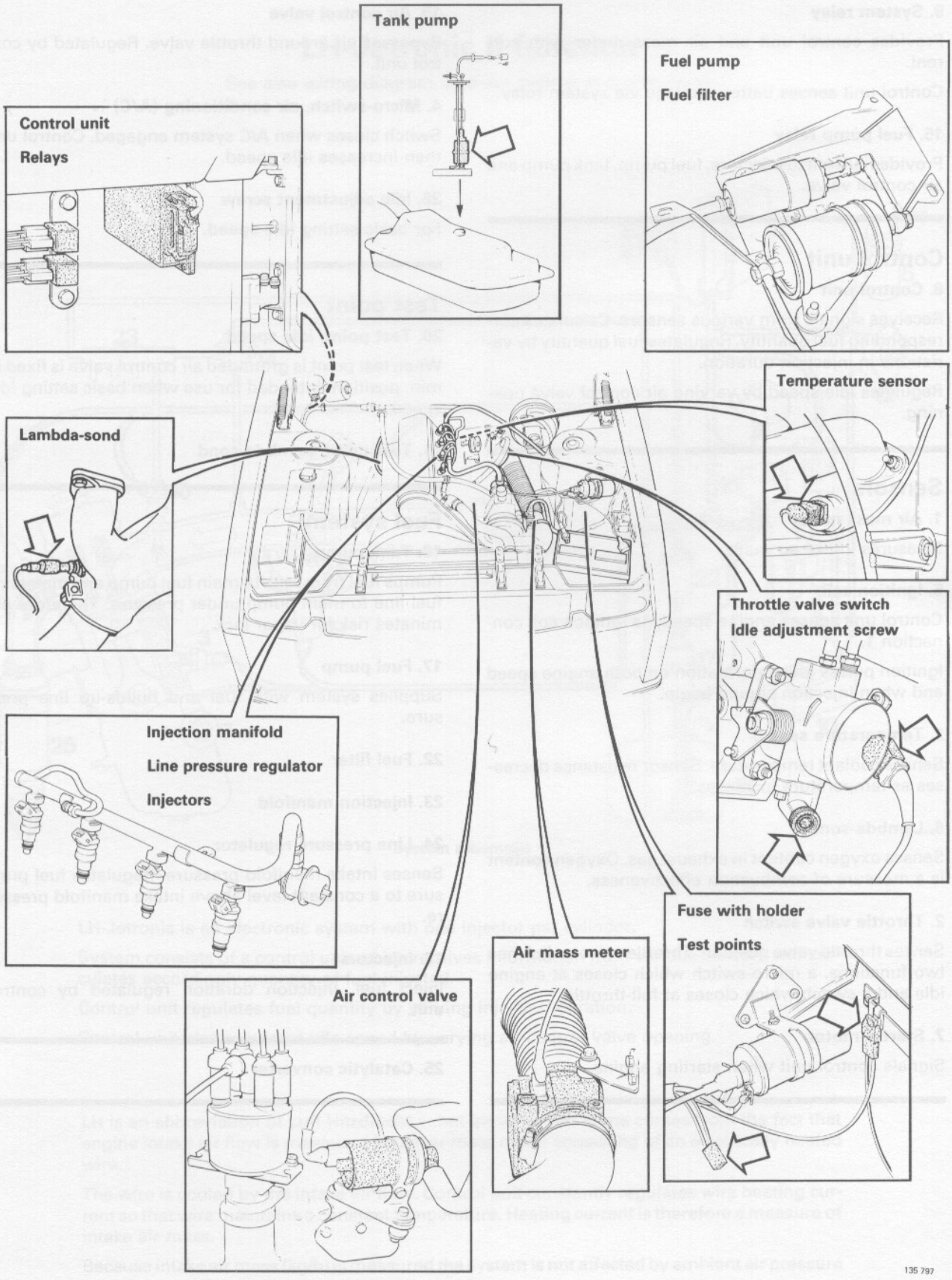
Senses intake manifold pressure. Regulates fuel pressure to a constant level above intake manifold pressure.

16. Injectors

Inject fuel. Injection duration regulated by control unit.

25. Catalytic converter

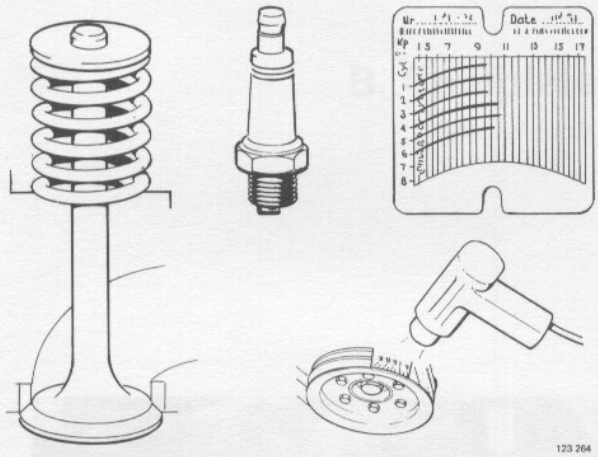
Location of components



Symptoms, probable faults/remedies

Fold out this section while performing the fault tracing procedures.

A. Fault tracing



123 264

A1

General

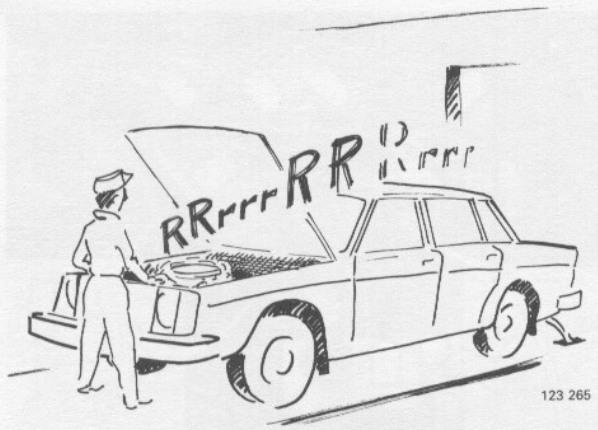
The instructions in this section apply only if engine is free from any other mechanical or electrical faults. Correct octane fuel supplied by well known companies must be used.

The following points should always be checked before following fault tracing procedures.

Mechanical
- compression
- valve clearance
- vacuum hoses and connections
- throttle control, kick-down control (auto. transmission)
- air cleaner
- intake manifold (air leakage)

Electrical
- spark plugs and HT leads
- distributor cap
- ignition coil
- timing (incl. ignition advance)
- all electrical connections

Emission controls
- crankcase ventilation
- evaporative system
- catalytic converter



123 265

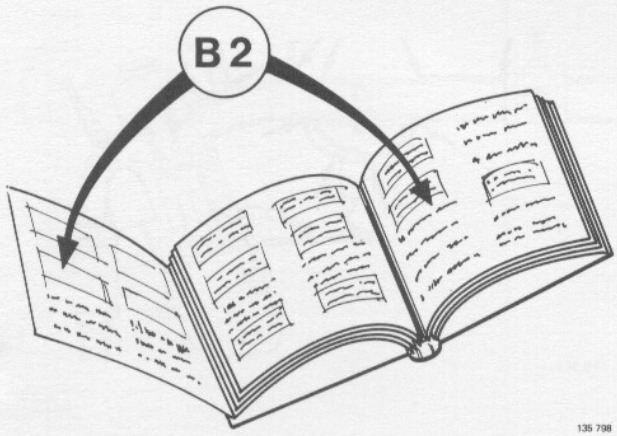
A2

Description:

Only the most common and easily detected fault symptoms are included in this section.

Perform a complete inspection of system (see page 13):

- if no faults are found when fault tracing
- if no easily detected symptoms are found
- if several components malfunction



135 798

The fold-out section overleaf contains a list of the most common symptoms and related checks:

The letter and number (e.g. B2) after each check refer to operations in the "Inspection of system".

Refer also to wiring diagram on page 35.

A1

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A2

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Engine does not start

Probable cause	Operation
Blade fuse defective	B1
No spark (ignition system)	–
Fuse no. 12, defective	–
Connectors not connected	B1
Air intake system, leakage	B2
Fuel pump, defective	B5
Line pressure, incorrect	B6–10
Poor grounds	B11–14
No current	B15
Pump/system relay, defective	B17–18
Starter motor wiring, defective	B20
Ignition coil wiring, defective	B21

Engine difficult to start (cold/warm)

Probable cause	Operation
Connectors not connected	B1
Air intake system, leakage	B2
Line pressure, incorrect	B5–10
Starter motor wiring, defective	B11–13, 20
Temperature sensor, defective	B23
Starting system function, defective	B27–29

Erratic running

Poor or no idle

Probable cause	Operation
Air intake system, leakage	B2
Injectors, defective	E1
Line pressure, incorrect	B5–10
Air mass meter, no current or ground	B11–13, 19
Air mass meter wiring, defective	B24, 27
Air mass meter, defective	B34

Excessive fuel consumption

Probable cause	Operation
Fuel leakage	–
Throttle valve switch, incorrectly adjusted	B3
Line pressure, incorrect	B5–10
Throttle valve switch, defective	B11–13, 25, 27
CO-adjustment, incorrect	C1–17

Low top speed, poor performance

Probable cause	Operation
Throttle valve incorrectly adjusted, valve does not open completely	D5
Air intake system, leakage	B2
Tank pump, defective	B5
Line pressure, incorrect	B6–10
Throttle valve switch, defective	B11–13, 25, 27
Full throttle function, incorrect	B28, 31, 37
CO-adjustment, incorrect	C1–17

Erratic idle

Probable cause	Operation
Air intake system, leakage	B2
Engine does not run on all cylinders	E1
Air control valve hose blocked/ disconnected	–
Throttle valve, loose/incorrectly adjusted	D1–8

Excessively high idle speed

Probable cause	Operation
Temperature sensor connector, loose	B1
Throttle valve switch, adjustment	B3
Temperature sensor, defective	B11–13, 23
Throttle valve switch, defective	B25, 27
Throttle control incorrectly adjusted	D1–8
Idle speed, incorrectly adjusted	C3–17

Excessively low idle speed, cold engine

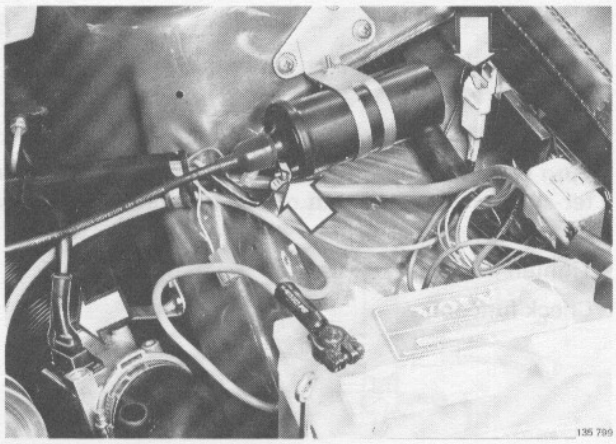
Probable cause	Operation
Fast idle function	B31, 33
Temperature sensor, defective	B11–13, 23
Air control valve, defective	B25, 27

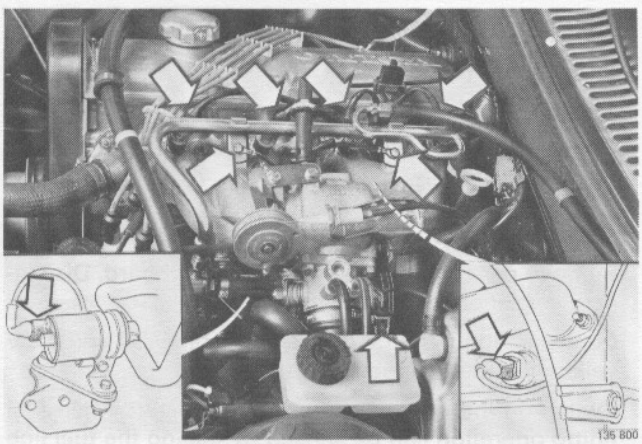
Poor acceleration, jerking

Probable cause	Operation
Acceleration enrichment, defective	B28, 34–35

B. Complete system inspection

Special tools: 5011, 5116, 5265, 5266





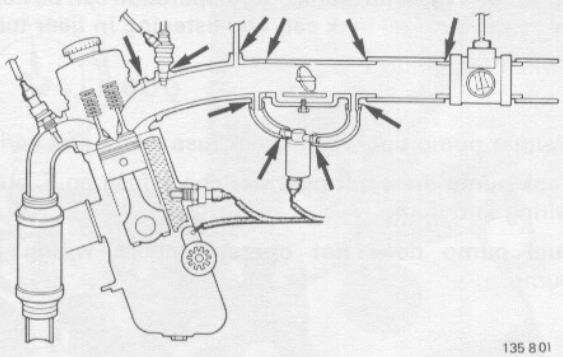
Check of fuses, connectors, grounds, air leakage, throttle valve switch

Operations B1–4

B1

Check that:

- blade fuse in engine compartment OK. Fuse should be 25A
- wire (gray) to ignition coil terminal 1 is connected
- wiring connectors for injectors, temperature sensor, air control valve, throttle valve switch and air mass meter are connected
- grounds are properly tightened and have good contact



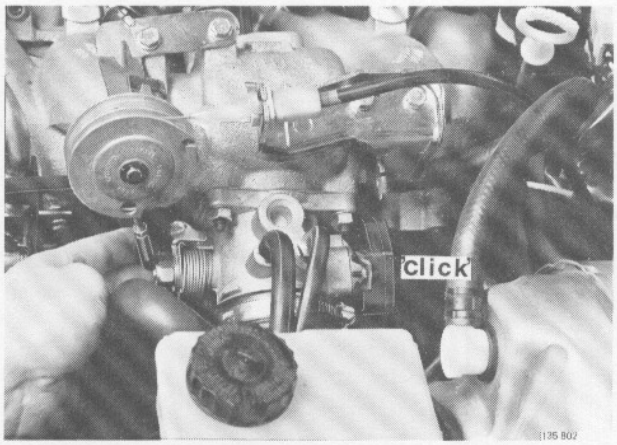
B2

Check air intake system leakage

Air leakage between air mass meter and engine means that fuel-air mixture is too lean.

Check:

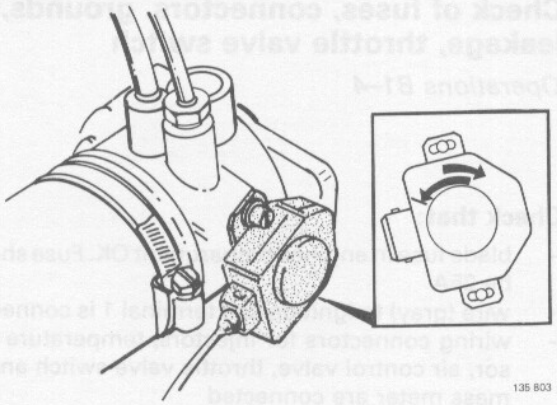
- hose between air mass meter and intake manifold
- all hoses and connections to intake manifold
- joints for intake manifold and throttle valve housing, etc.



B3

Check throttle valve switch adjustment

Open throttle valve slightly and listen to switch. A "click" (idle switch opens) should be heard immediately when throttle valve moves.



B4

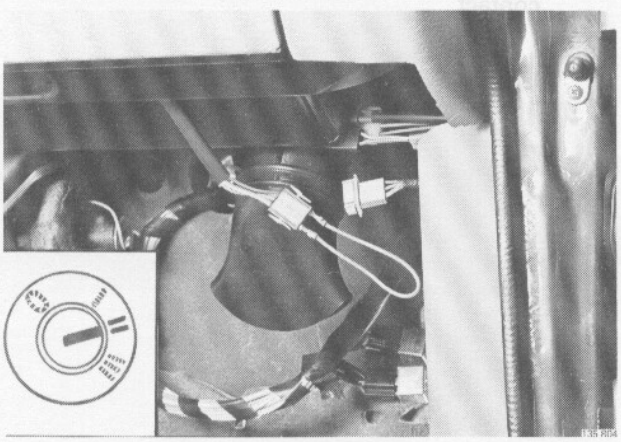
Adjustment of throttle valve switch (if required):

Loosen switch screws (inhex 3 mm).

Turn switch slightly clockwise. Then turn switch counter-clockwise to stop, but not so far that throttle valve begins to open.

Tighten screws.

Check function.



Check of pumps, line pressure, pressure regulator

Operations B5–10

B5

Check that fuel pump and tank pump function

Remove panel on right side under dashboard. Disconnect the 3-pole connector.

Connect a jumper wire between the blue/red and blue/yellow wires in connector.

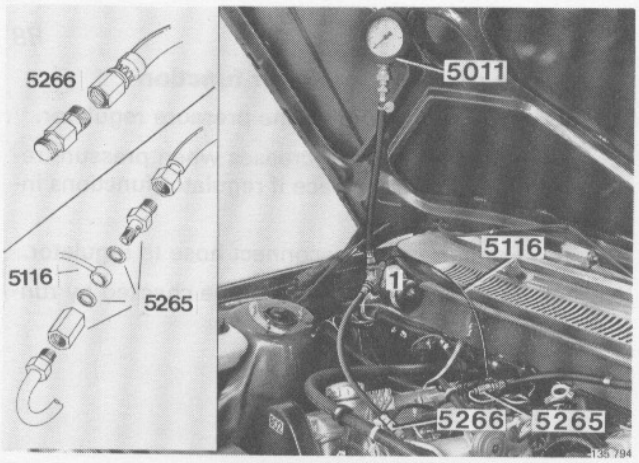
Switch on the ignition, pumps should start. Main fuel pump operation can be sensed by feeling the fuel line pulsations by hand. Tank pump operation can be heard by removing fuel tank cap and listening in filler tube.

Switch off ignition.

Neither pump operates: check fuse no 12 and wiring.

Tank pump does not operate: check fuse no 5, pump wiring and pump.

Fuel pump does not operate: check wiring and pump.



B6

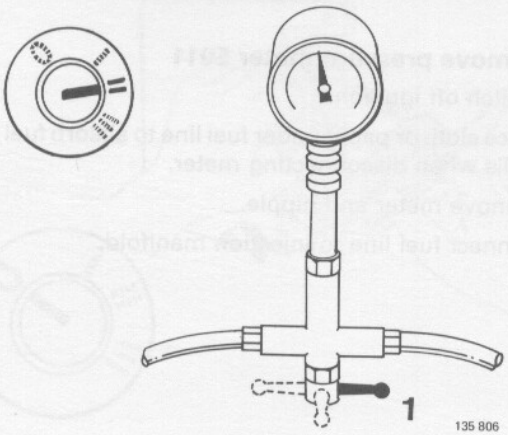
Connect pressure meter 5011

Ignition switched off.

Connect meter between fuel line and injection manifold. Use hose **5116** and nipple **5265**.

Plug unused meter hose with plug **5266**.

Move handle on 5011 to position 1.

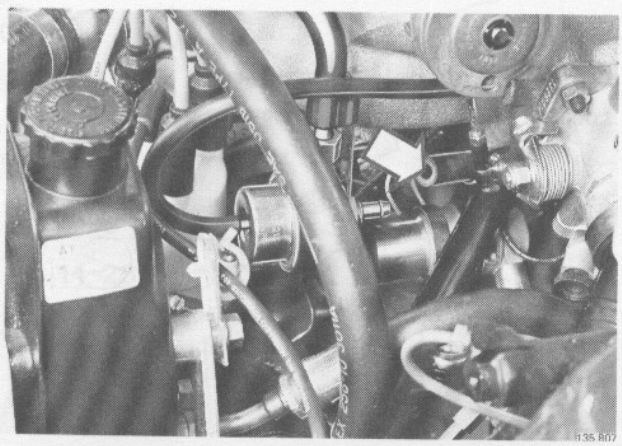


B7

Measure line pressure

Switch on ignition so fuel pumps start.

Line pressure should be **250 kPa** (35.5 psi).

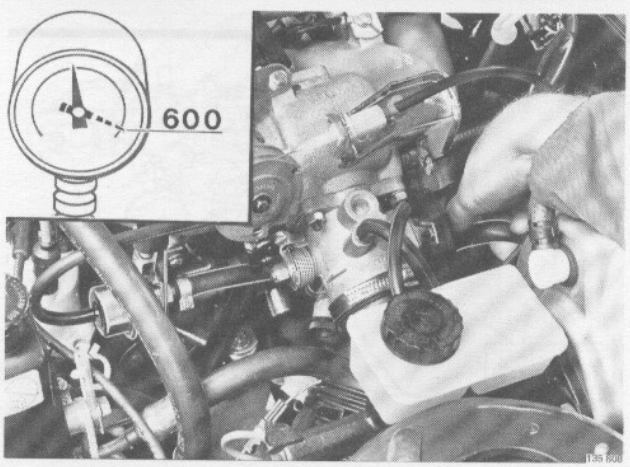


Line pressure too high:

Switch off ignition.

Disconnect fuel return line from pressure regulator and blow in line.

If line is open pressure regulator is defective. Replace regulator and measure pressure again.



Line pressure too low:

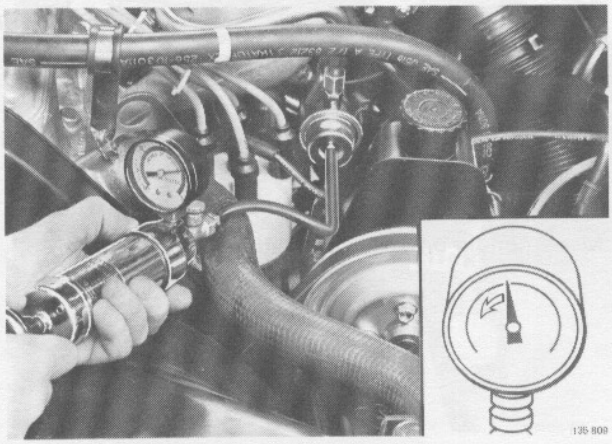
Pinch off fuel return line by hand and check if pressure rises.

CAUTION. Do not let pressure exceed 600 kPa (85.2 psi).

If pressure **quickly rises** pump and lines are OK. Replace regulator and measure pressure again.

If pressure **slowly rises** this means that fuel filter, tank pump filter or line is blocked.

If pressure **does not rise** fuel pump is defective.



B8

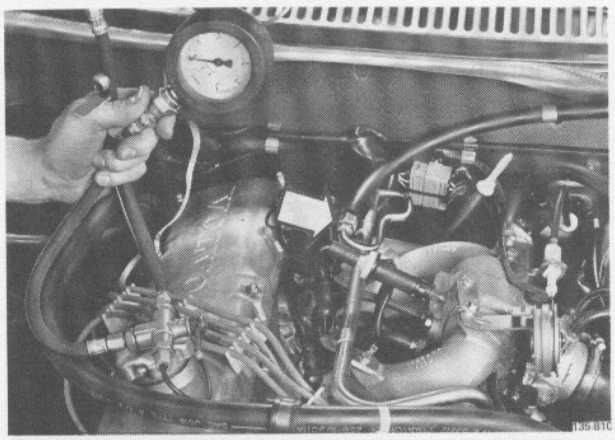
Check line pressure regulator function

Connect a vacuum pump to line pressure regulator.

Check that line pressure decreases when pressure regulator is evacuated. Replace if regulator functions incorrectly.

Remove vacuum pump, reconnect hose to regulator.

Note! Regulator function can also be checked by running engine.



B9

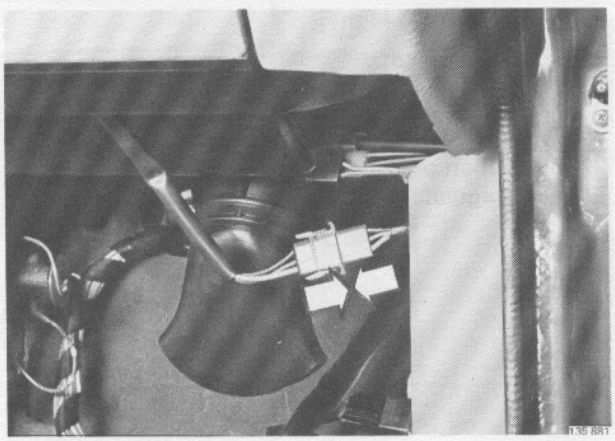
Remove pressure meter 5011

Switch off ignition.

Place cloth or paper under fuel line to absorb fuel which spills when disconnecting meter.

Remove meter and nipple.

Connect fuel line to injection manifold.



B10

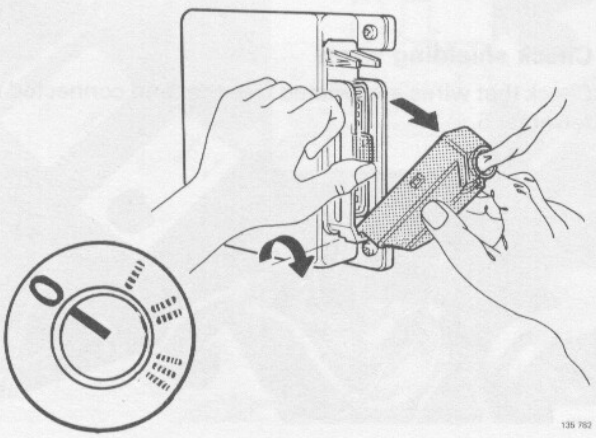
Connect three-pole connector

Located on right side under dashboard.

Check of components and wiring

Operations B11–28

Fold out wiring diagram for reference while working.



135 782

B11

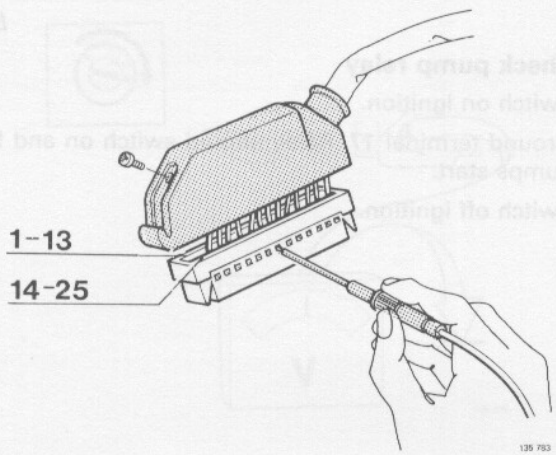
Switch off the ignition

B12

Remove panel in front of right front door

Remove connector from control unit

Push catch to side and fold out connector.



135 783

B13

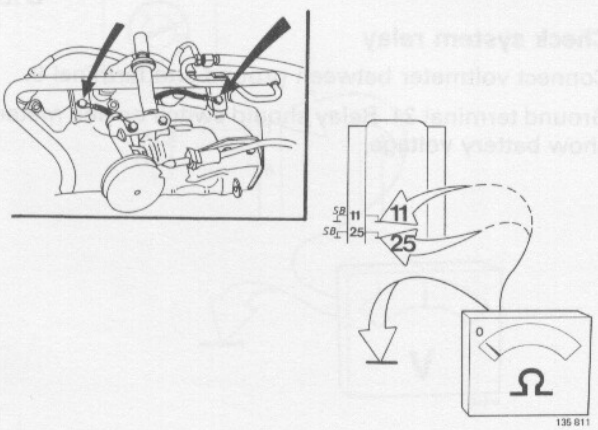
Remove connector cover

CAUTION. Never check terminals from front.

Experience has shown that terminals are easily damaged causing further faults.

Check terminals through the holes in side of connector. Do not use excessive force.

Terminal numbers are stamped on connector.

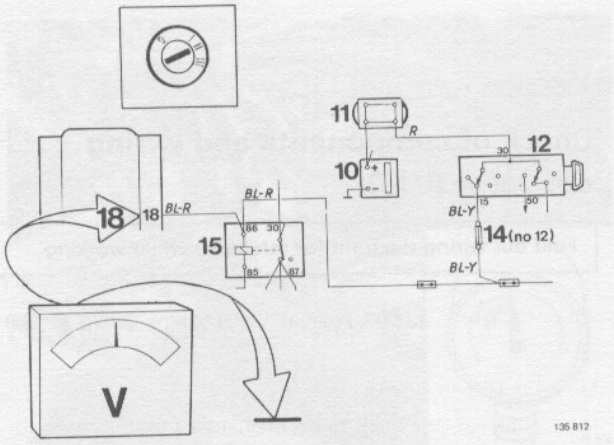


135 811

B14

Check grounds

Connect ohmmeter between ground and terminals 11, 25. Resistance should be zero for both terminals. Wires are grounded at intake manifold.



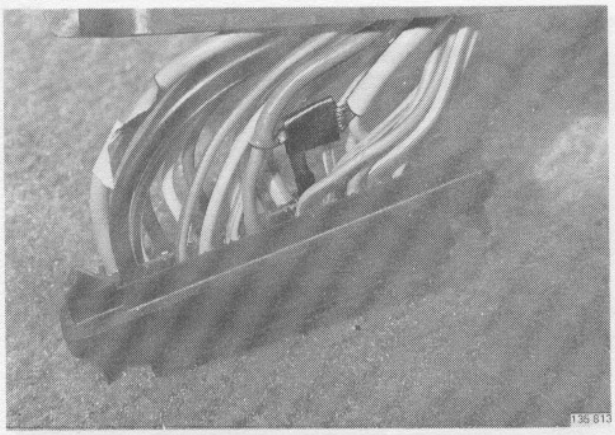
B15

Check current supply

Switch on ignition.

Connect voltmeter between ground and terminal 18. Meter should show battery voltage.

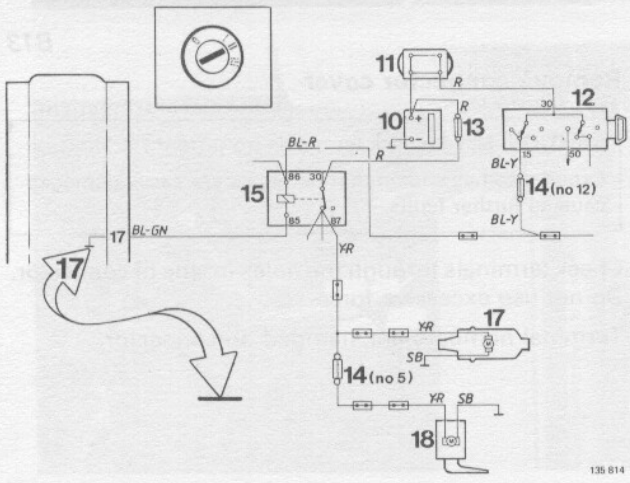
Switch off ignition.



B16

Check shielding wires

Check that wires are twisted together and connected to terminal 5.



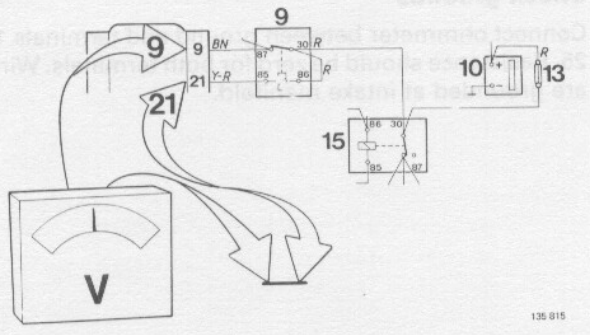
B17

Check pump relay

Switch on ignition.

Ground terminal 17. Relay should switch on and fuel pumps start.

Switch off ignition.

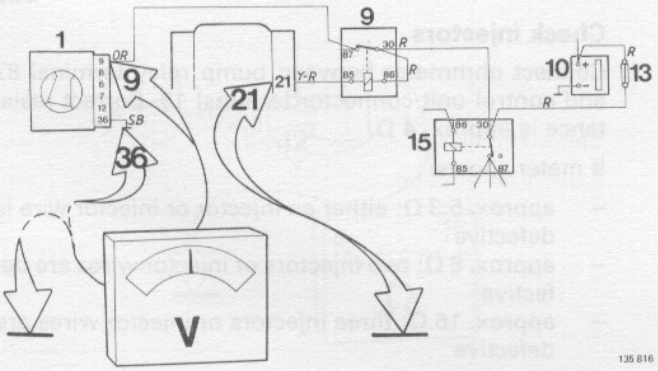


B18

Check system relay

Connect voltmeter between ground and terminal 9.

Ground terminal 21. Relay should switch on and meter show battery voltage.



B19

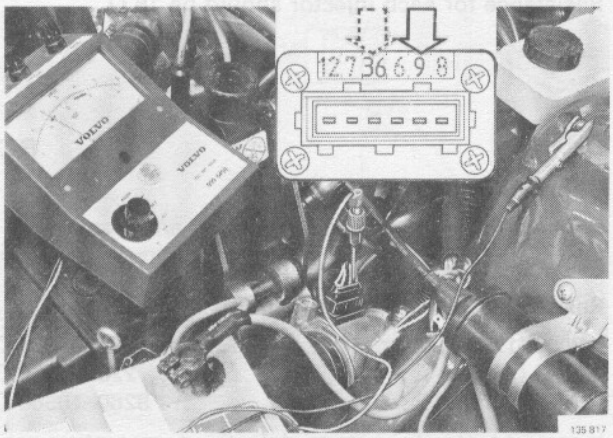
Check air mass meter current supply and ground

Ground terminal 21.

Peel back rubber boot from around air mass meter wiring connector.

Connect voltmeter between terminal 9 and ground and then between terminals 9 and 36. Meter should show battery voltage in both cases. (Air mass meter is grounded at intake manifold).

Reposition rubber boot around wiring connector.

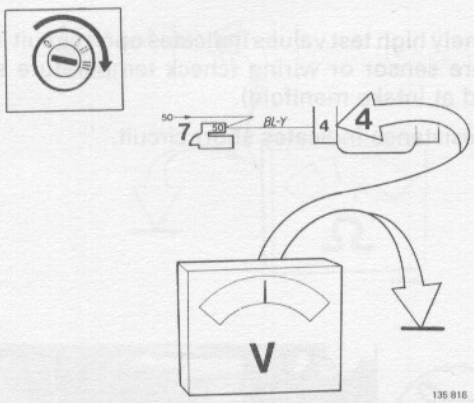


B20

Check wiring from starter motor

Connect voltmeter between ground and terminal 4.

Crank engine. Meter should show battery voltage.



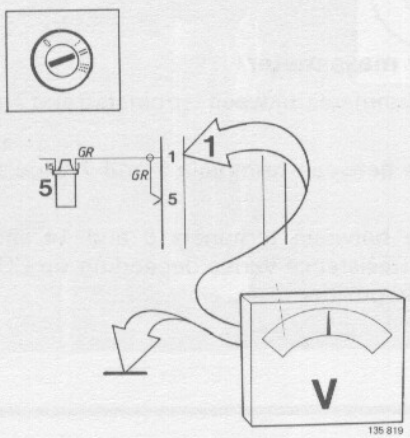
B21

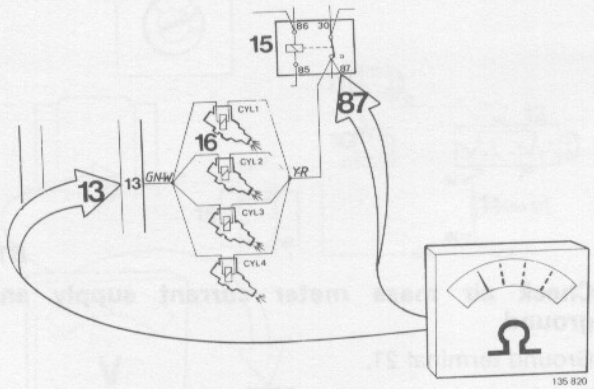
Check wiring from ignition coil

Switch on ignition.

Connect voltmeter between ground and terminal 1. Meter should deflect.

Switch off ignition.





B22

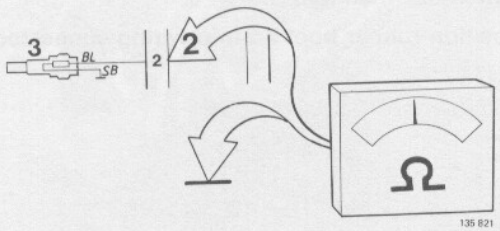
Check injectors

Connect ohmmeter between pump relay terminal 87 and control unit connector terminal 13. Correct resistance is approx. **4** Ω.

If meter shows:

- approx. 5.3 Ω: either an injector or injector wire is defective
- approx. 8 Ω: two injectors or injector wires are defective
- approx. 16 Ω: three injectors or injector wires are defective

If defective remove injector connectors and check each injector separately.
Resistance for each injector should be 16 Ω.



B23

Check temperature sensor

Connect ohmmeter between ground and terminal 2.

Resistance depends on temperature (see diagram).

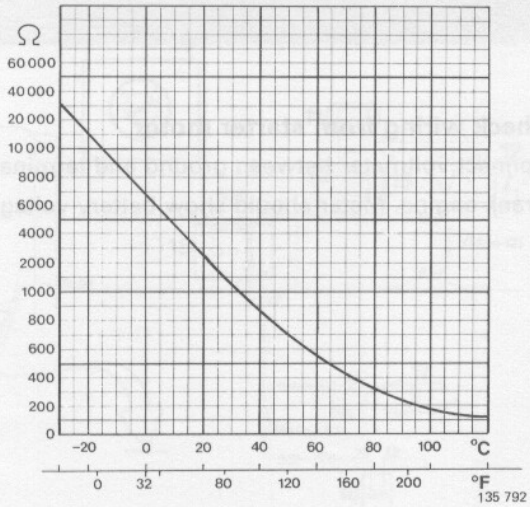
Resistance at certain temperatures:

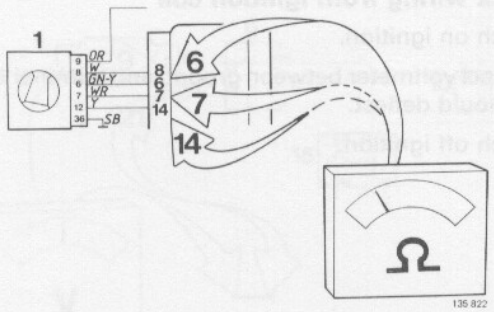
+80°C (175°F) ..... 290–364 Ω
+20°C (68°F) ..... 2280–2720 Ω
–10°C (14°F) ..... 8260–10560 Ω

Incorrect test values mean defective temperature sensor.

Extremely high test values indicates open circuit in temperature sensor or wiring (check temperature sensor ground at intake manifold).

Zero resistance indicates short circuit.





B24

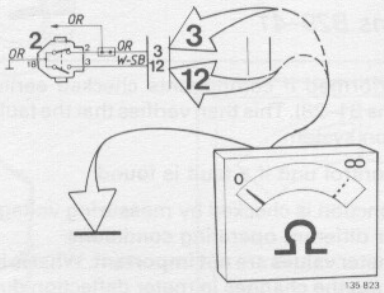
Check air mass meter

Connect ohmmeter between terminals 6 and 7 and then 6 and 14.

Resistance between terminals 6 and 7 should be 3.7 Ω.

Resistance between terminals 6 and 14 should be 0–1000 Ω (resistance varies depending on CO-adjustment screw position).

B25



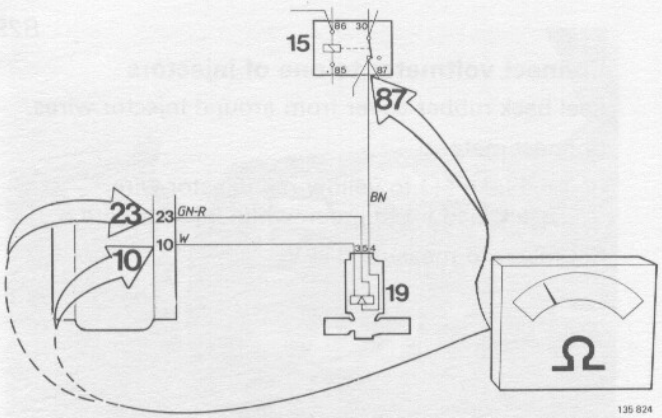
Check throttle valve switch

Connect ohmmeter between ground and terminal 3. Depress accelerator pedal. Meter should show zero resistance in idle position and infinite resistance in other positions.

Connect ohmmeter between ground and terminal 12. Depress accelerator pedal. Meter should show zero resistance in full throttle position and infinite resistance in other positions.

If incorrect, check throttle valve switch ground at intake manifold. If ground connection is OK replace throttle valve switch.

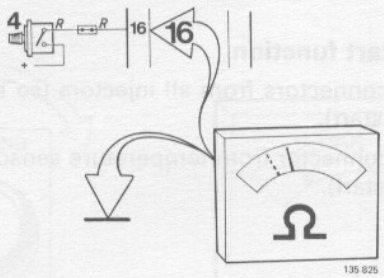
B26



Check air control valve

Connect ohmmeter between pump relay terminal 87 and control unit connector terminal 10 and then between pump relay terminal 87 and control unit connector terminal 23. Resistance should be approx. 20 Ω in both cases.

B27

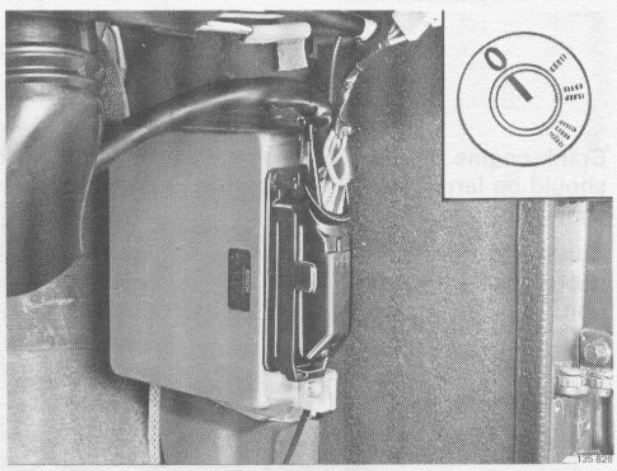


Check micro-switch for air conditioning

Connect ohmmeter between ground and terminal 16.

Turn knob on air conditioning control panel. Resistance should decrease.

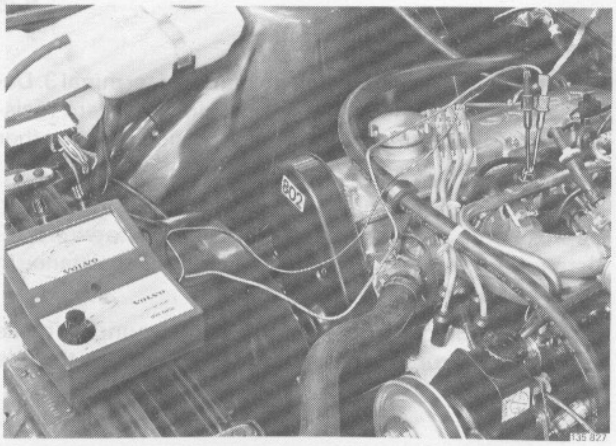
B28

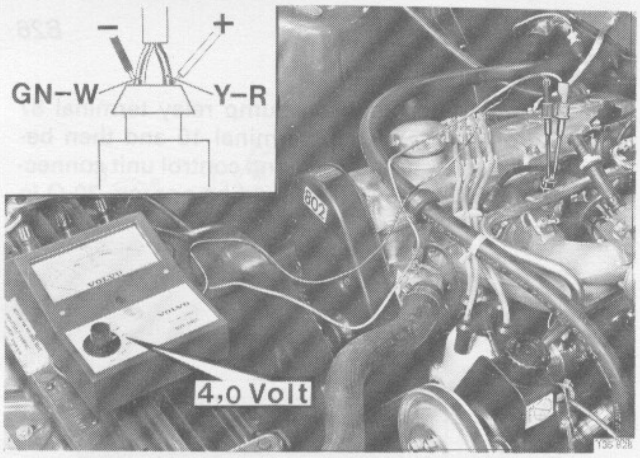


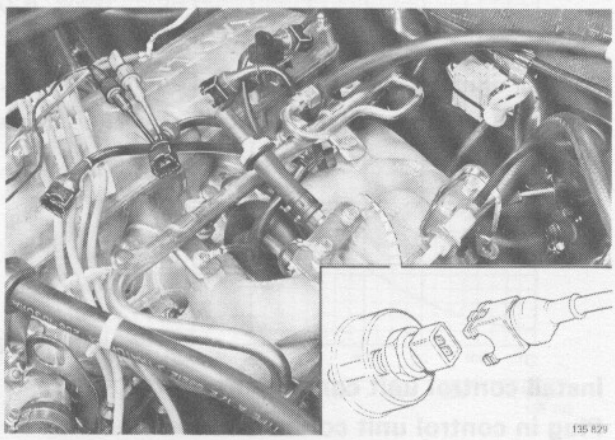
Install control unit connector cover

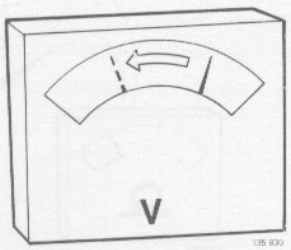
Plug in control unit connector

Ignition should be switched off.









Check of system function

Operations B29–41

To be performed if components checked earlier are OK (operations B1–28). This then verifies that the faults depend on injection system.

Replace control unit if a fault is found.

System function is checked by measuring voltage at injectors under different operating conditions.
Specific meter **values** are **not important**. What is important, however, are the changes in meter deflection during different operating conditions.

B29

Connect voltmeter to one of injectors

Peel back rubber cover from around injector wires.

Connect meter,

- red lead (+) to yellow-red injector wire
- black lead (–) to green-white injector wire.

Set meter to measure **0–4 V**.

B30

Check start function

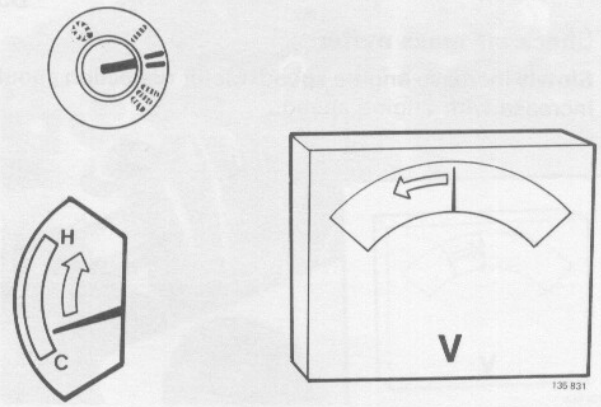
Remove connectors from all injectors (so that engine does not start).

Remove connector from temperature sensor (to simulate cold start).

Crank engine and check meter deflection. Deflection should be large when first cranking and then decrease.

Connect temperature sensor. Crank engine. Voltmeter should deflect as before but with decreased deflection.

Connect injectors.



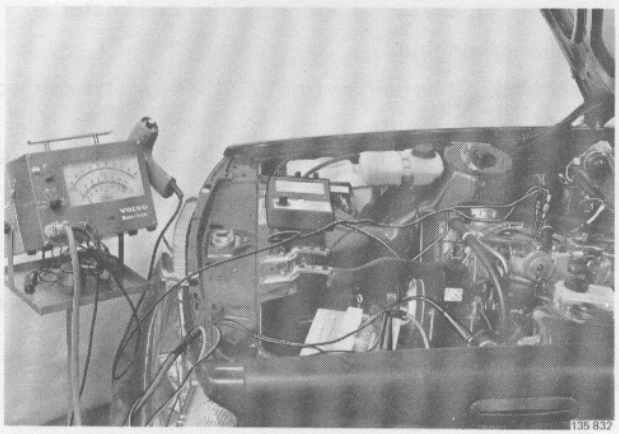
B31

Check enrichment during warm-up

Start engine.

Warm-up engine and read meter.

As engine warms up meter deflection should decrease slightly.



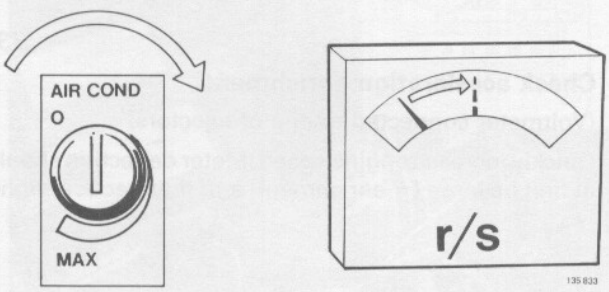
B32

Connect rev counter

Switch off engine.

Connect rev counter.

Start engine.



B33

Check idle speed

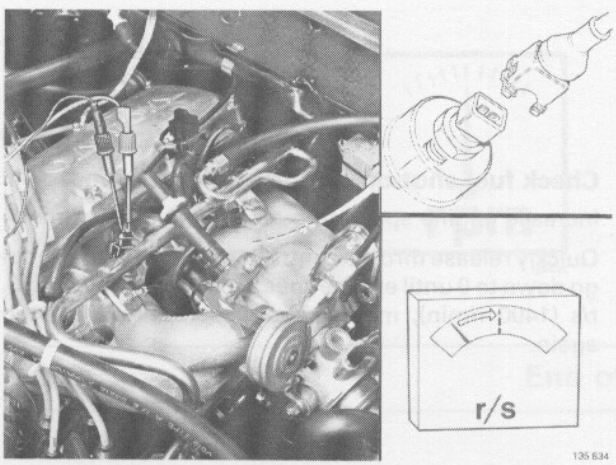
Idle speed should be **12.5 r/s** (750 r/min).

Engage air conditioning. Engine speed should increase to **15.0 r/s** (900 r/min).

Disengage air conditioning.

If engine speed does not increase: check that air control valve does not stick. Replace and test with a new air control valve.

If engine does not idle: check air mass meter, see operation B35.



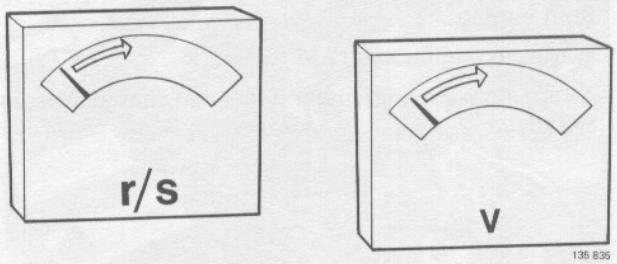
B34

Check fast idle

Remove connector from temperature sensor (simulates cold engine). Engine speed should increase to **26.7–41.7 r/s** (1600–2500 r/min).

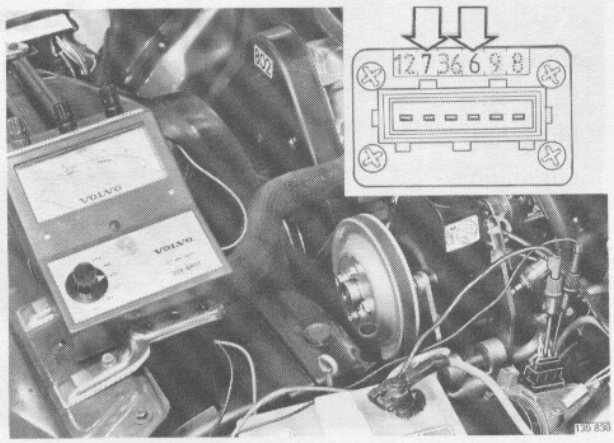
Reconnect temperature sensor. Engine speed should return to normal idle.

B35



Check air mass meter

Slowly increase engine speed. Meter deflection should increase with engine speed.



If incorrect, check voltage from air mass meter:

Switch off engine.

Peel back rubber cover from air mass meter connector.

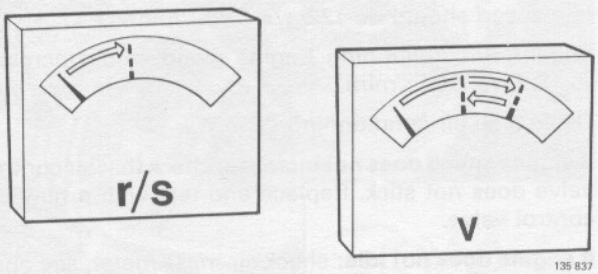
Connect voltmeter between terminal 7 (+) and terminal 6 (–).

Start engine.

Voltage should increase as engine speed increases.

Replace and test with new control unit if air mass meter is OK.

B36

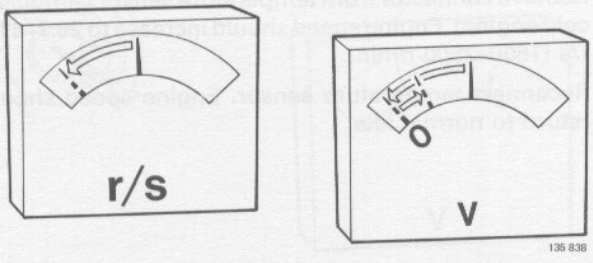


Check acceleration enrichment

(Voltmeter connected to one of injectors)

Quickly increase engine speed. Meter deflection should at first be large (= enrichment) and then reduce slightly.

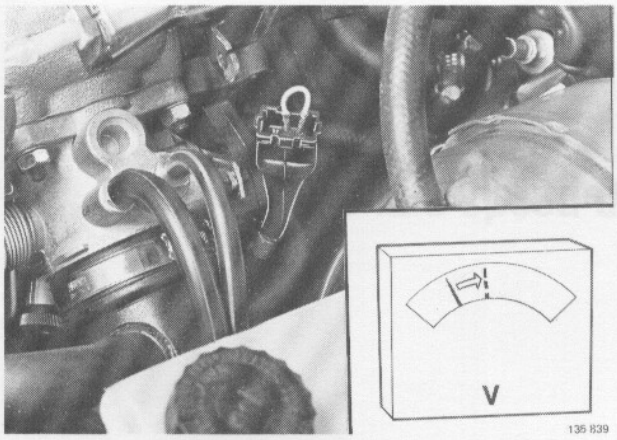
B37



Check fuel shut-off during engine braking

Increase engine speed to over 33.3 r/s (2000 r/min).

Quickly release throttle control. Meter deflection should go down to 0 until engine speed reduces to approx. 23.2 r/s (1400 r/min), meter should then show deflection again.



B38

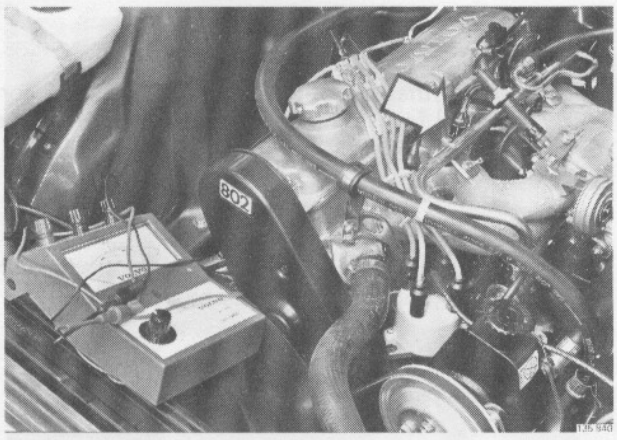
Check full throttle enrichment

Remove connector from throttle valve switch (engine speed increases slightly).

Increase engine speed to at least 58.3 r/s (3500 r/min) during check.

Connect a jumper wire between connector terminals 18 and 3. Meter deflection should increase slightly (= enrichment).

Reconnect throttle valve switch.

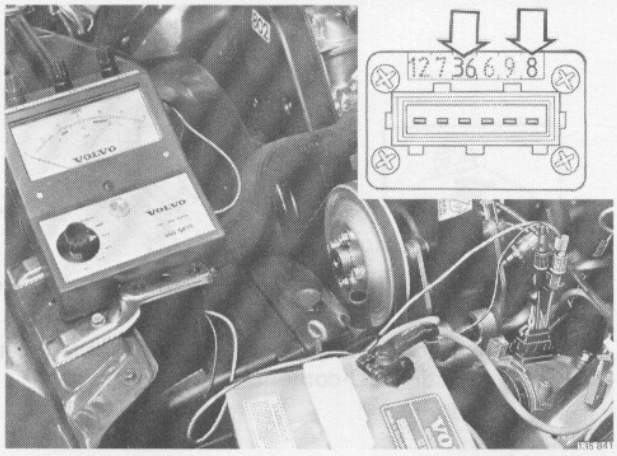


B39

Switch off engine

Remove voltmeter from injector

Reposition rubber connector cover.



B40

Check air mass meter measuring wire dirt burn-off

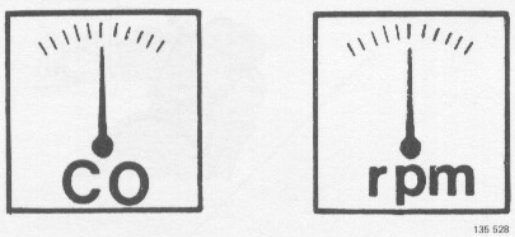
Peel back rubber cover from around air mass meter wiring connector.

Connect a voltmeter between terminals 8 (+) and 36 (–).

Start engine. Increase engine speed to over 33.3 r/s (2000 r/min).

Switch off engine. After approx. 5 seconds voltmeter should show approx. 1V for 1 second.

Remove voltmeter. Reposition rubber cover around air mass meter connector.



B41

Install panels

Under dashboard.

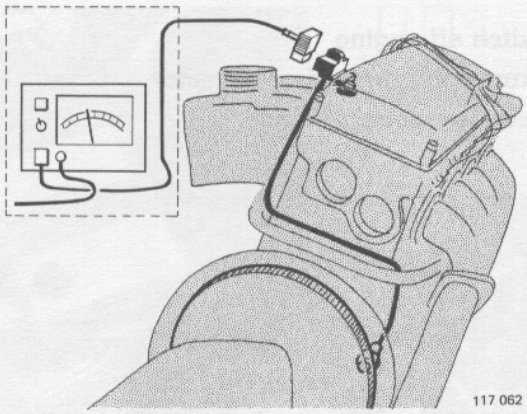
B42

Check/adjust idle speed and CO-content

See C1–17.

End of inspection

C. Idle speed and CO-content, checking/adjusting



117 062

C1

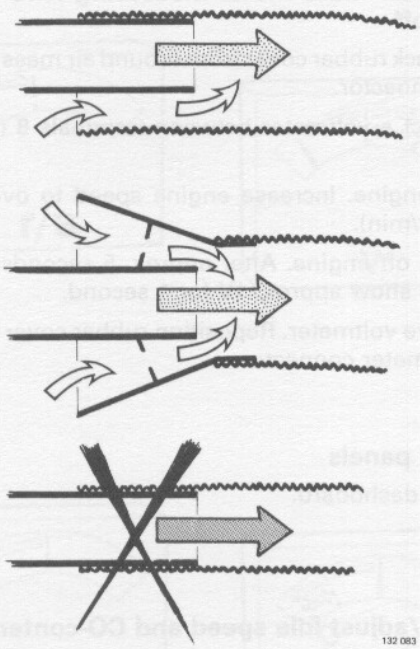
General

It is important that the other engine settings are correctly adjusted (e.g., timing) if valid results are to be obtained.

The engine should be warm and idling.

Warm-up the engine at 25 r/s (1500 r/min).

Check/adjust the CO-content approx. 5 minutes (no earlier), after the radiator thermostat has opened.



132 083

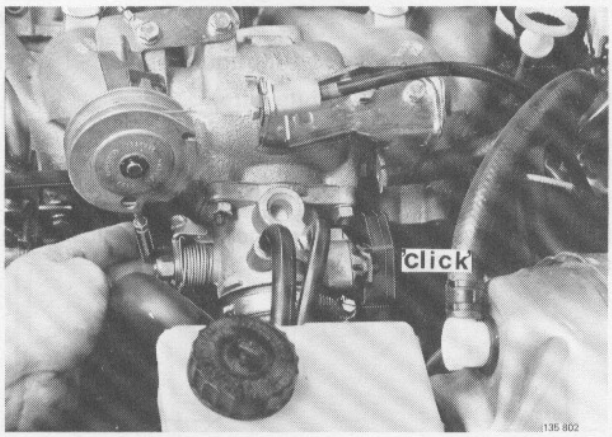
C2

Exhaust gas extraction

Use an exhaust gas extractor that fits loosely over the exhaust pipe.

Excessive extraction may yield incorrect results when checking/adjusting CO-content.

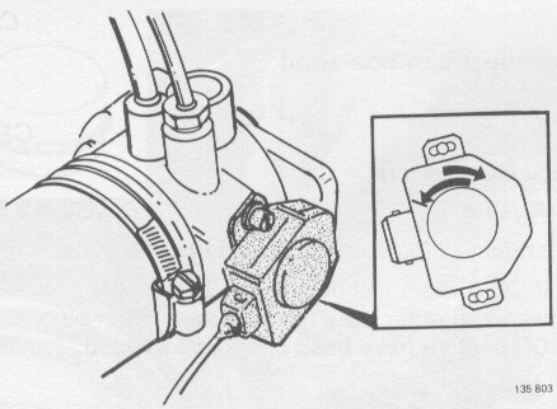
Idle speed and CO-content



C3

Check throttle valve switch adjustment

Slightly open throttle and listen to switch. A "click" (idle switch opens) should be heard immediately when throttle valve moves.



C4

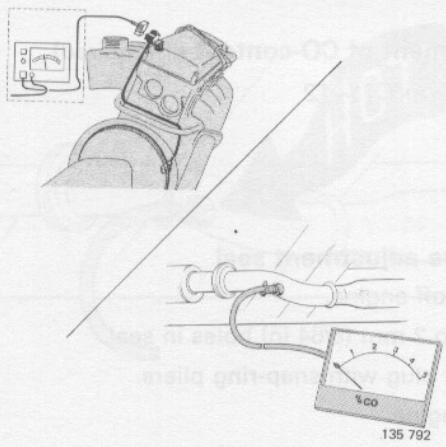
Adjustment of throttle valve switch (if required)

Loosen switch screws (inhex 3 mm).

Turn switch slightly clockwise. Then turn counter-clockwise to stop, but not so far that throttle valve begins to open.

Tighten screws.

Check function.



C5

Connect test instruments

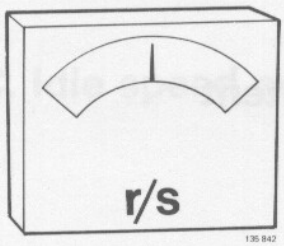
- rev counter
- CO-meter. Connect meter to nipple in exhaust pipe ahead of catalytic converter

WARNING! Connecting nipple for CO-meter may be very hot.

C6

Start and warm up engine

Idle speed, CO-content



C7

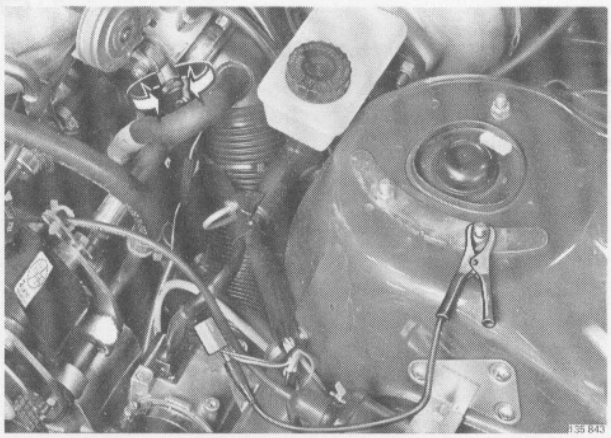
Check idle speed

Idle speed should be **12.5 r/s** (750±20 r/min).

Note! Air conditioning should be disengaged.

Adjust idle speed if required.

If idle speed varies excessively check that air control valve hoses are not blocked.



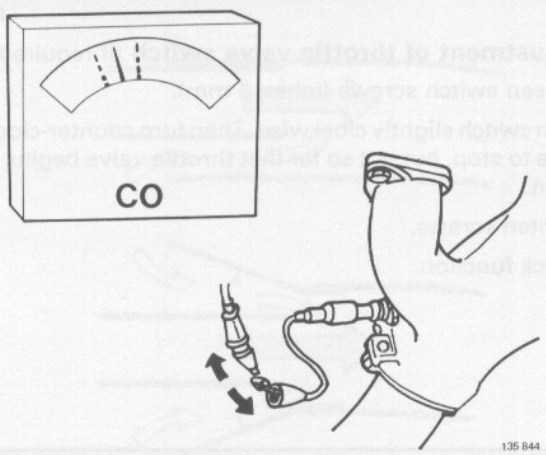
C8

Adjustment of idle speed (if required)

Ground test point (blue-white wire).

Adjust engine speed with idle screw to **12 r/s** (720 r/min). If engine speed cannot be adjusted to correct value, adjust throttle valve and control, see D1–7.

Remove test point ground. Engine speed should increase to **12.5 r/s** (750±20 r/min).



C9

Disconnect Lambda-sond

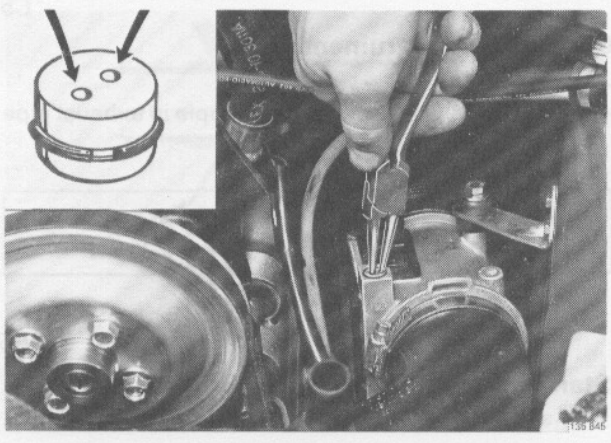
C10

Check CO-content

Check value.....**0.4–0.8 %**

Adjustment of CO-content should only be made:

- if CO-content lies outside of check value
- when all other possible causes of incorrect CO-content have been checked/corrected.



Adjustment of CO-content (if required)

Operation C11–12

C11

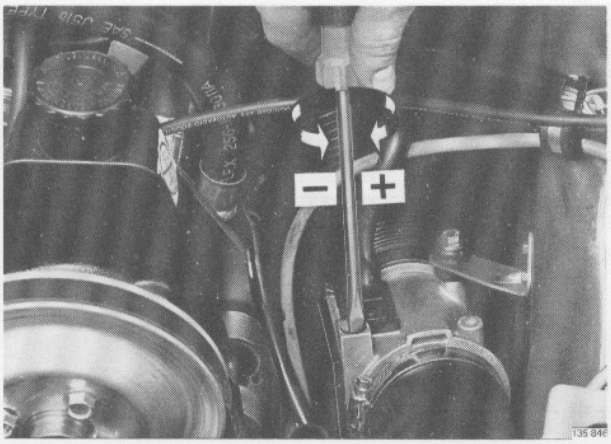
Remove adjustment seal

Switch off engine.

Drill two 2 mm (5/64 in) holes in seal.

Pull out plug with snap-ring pliers.

Start engine.



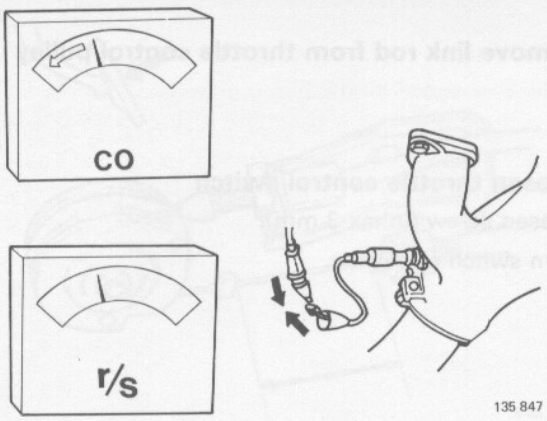
C12

Adjust CO-content

Adjustment value ..... **0.6 %**

Adjustment screw has a range of 15 turns and lacks distinct end stops.

- Turning **counter-clockwise decreases** CO-content
- Turning **clockwise increases** CO-content



135 847

C13

Connect/check Lambda-sond

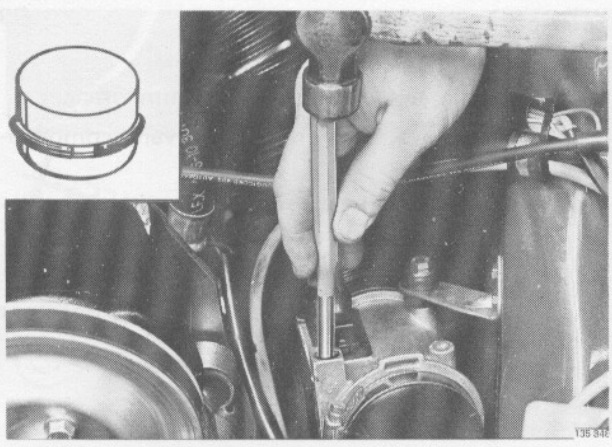
When Lambda-sond is connected CO-content should decrease.

C14

Check/adjust idle speed

Idle speed should be **12.5 r/s** (750 r/min).

Adjust if required, see C8.



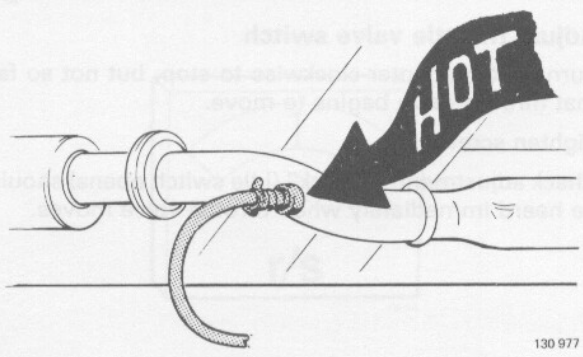
C15

Switch off engine

C16

Seal CO-adjustment (if adjustment performed)

Use a **new** plug. Tap in place.



130 977

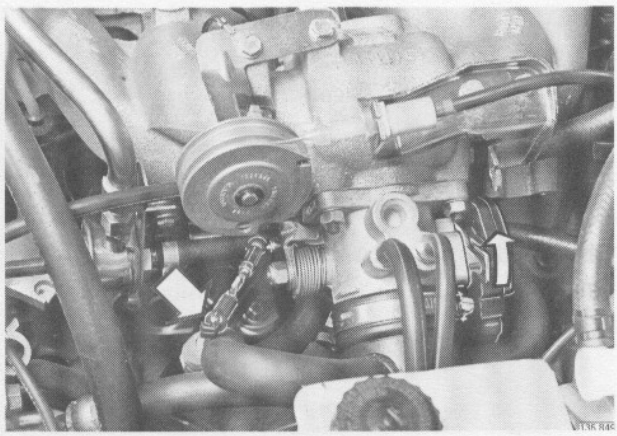
C17

Remove test meter

WARNING! Connecting nipple for CO-meter is very hot.

Install plug.

D. Throttle valve, throttle control and throttle valve switch adjustment



D1

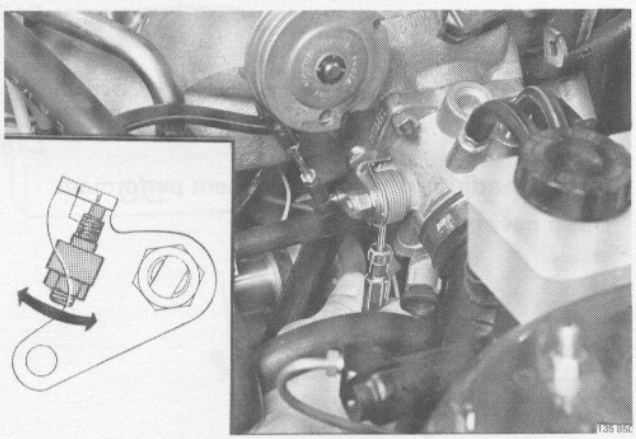
Remove link rod from throttle control pulley

D2

Loosen throttle control switch

Loosen screw (inhex 3 mm).

Turn switch clockwise.



D3

Adjust throttle valve

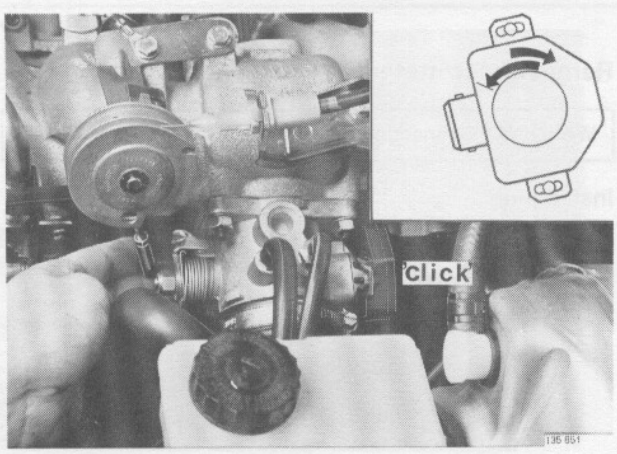
Loosen adjustment screw lock nut (8 mm wrench).

Loosen adjustment screw until throttle valve completely closes.

Tighten screw until it **just touches** throttle valve lever.

Tighten screw additionally **1/4 turn.** Tighten lock nut.

Check that throttle valve moves easily and does not bind.



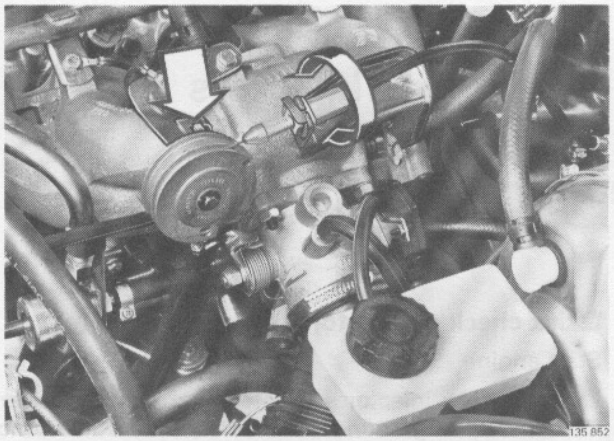
D4

Adjust throttle valve switch

Turn switch counter-clockwise to stop, but not so far that throttle valve begins to move.

Tighten screws.

Check adjustment. A "click" (idle switch opens) should be heard immediately when throttle valve moves.



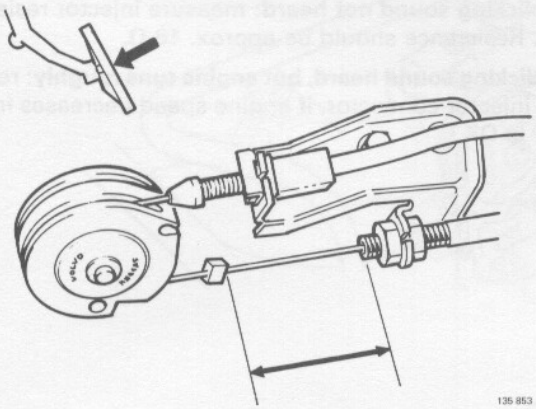
D5

Check throttle control pulley
Adjust throttle cable

Pulley should move easily without binding.

Cable should be stretched but should not influence pulley position. Pulley should touch idle stop.

Depress accelerator pedal to floor and check that throttle control pulley touches full throttle stop.

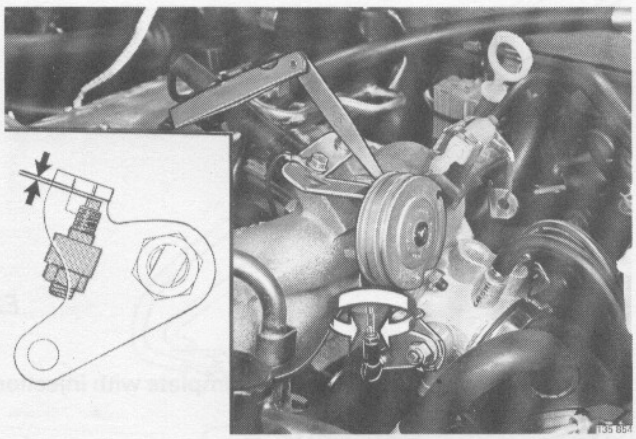


D6

Check/adjust kick-down cable (automatic transmission)

Depress accelerator pedal to floor.
Caution. Do not operate throttle control by hand as incorrect adjustment can result.

At full throttle distance from cable sheath to clip should be **50.4–52.6 mm** (1.98–2.07 in).

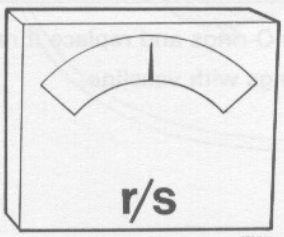


D7

Connect and adjust link rod

Position a **1 mm** thick feeler gauge between throttle control pulley and idle stop.

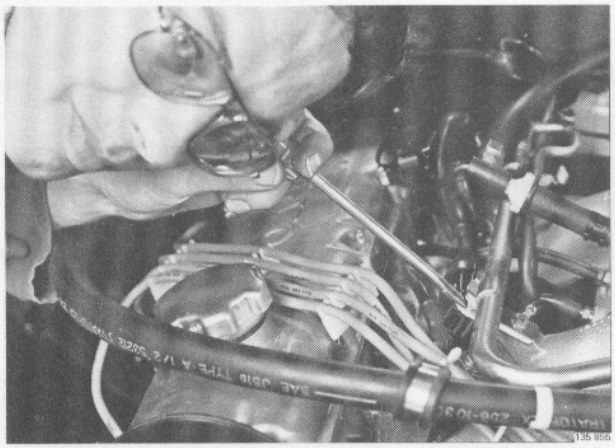
Adjust link rod so clearance between throttle valve lever and adjustment screw is **0.1 mm** (0.004 in).

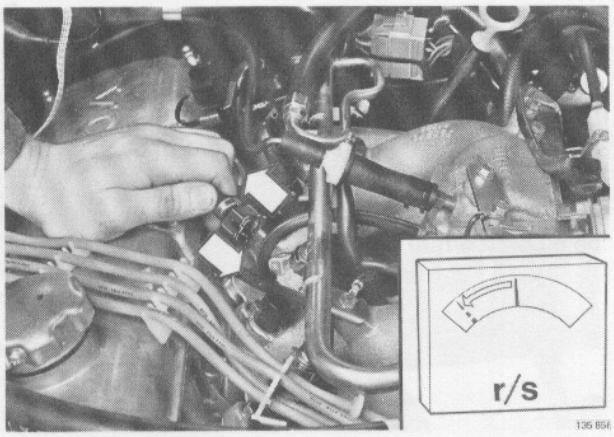


D8

Check idle speed

See C3–17.





E. Injectors

E1

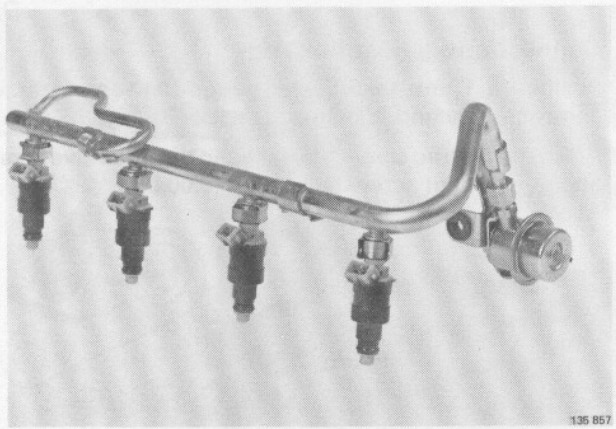
Quick check of injectors

Start engine.

Listen to each injector separately with a screwdriver. Obvious clicking sounds will be heard if valve functions.

If clicking sound not heard: measure injector resistance. Resistance should be approx. 16 Ω.

If clicking sound heard, but engine runs roughly: remove injector connector. If engine speed decreases injector is OK.



E2

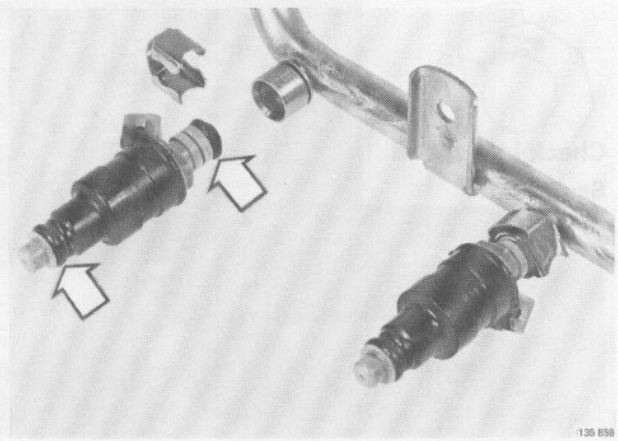
Removing/installing injectors

Injectors are removed/installed complete with injection manifold.

WARNING. Injection manifold is filled with fuel. Use extreme caution when removing injectors from injection manifold.

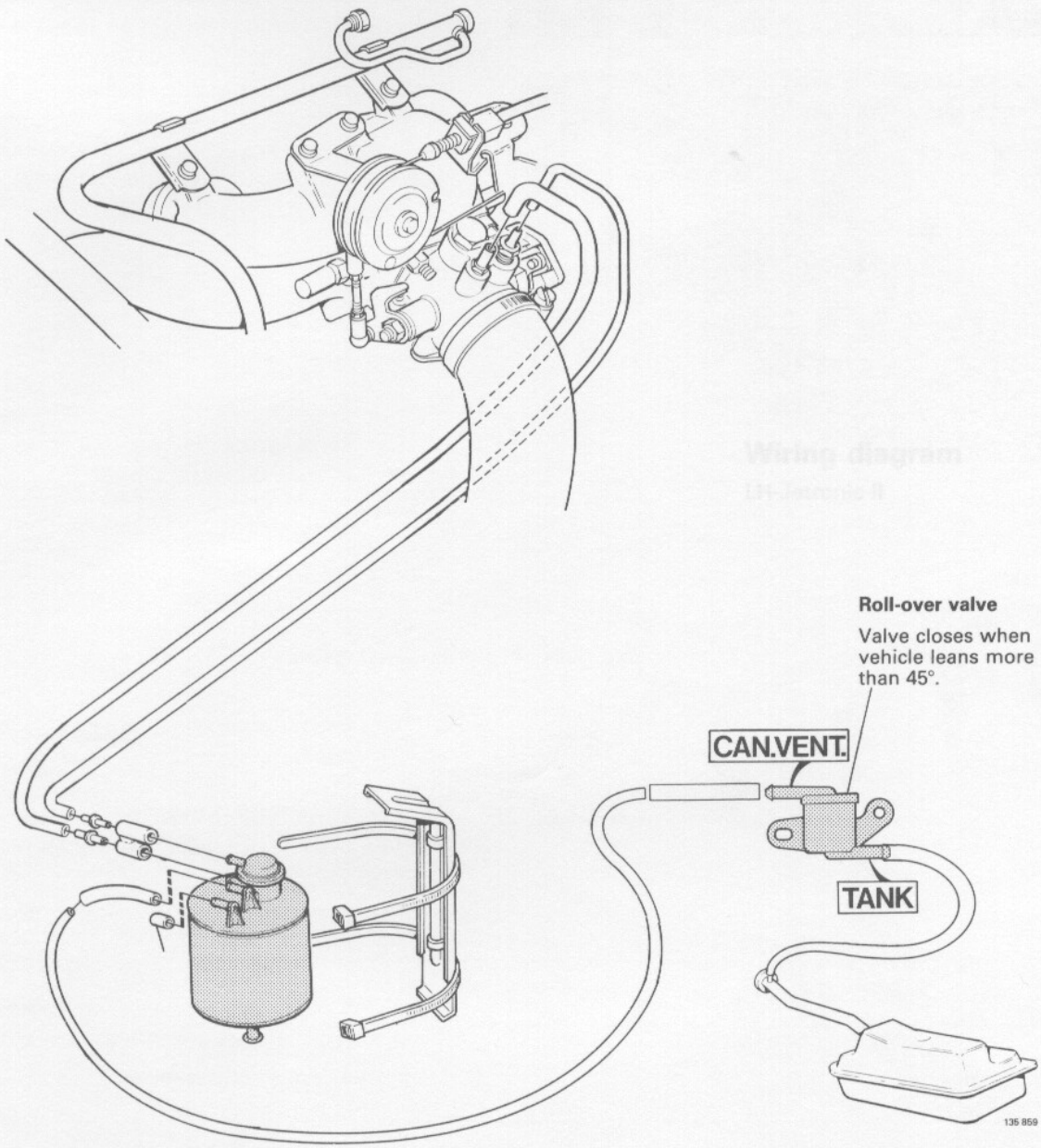
Check injector O-rings and replace if required.

Lubricate O-rings with vaseline.



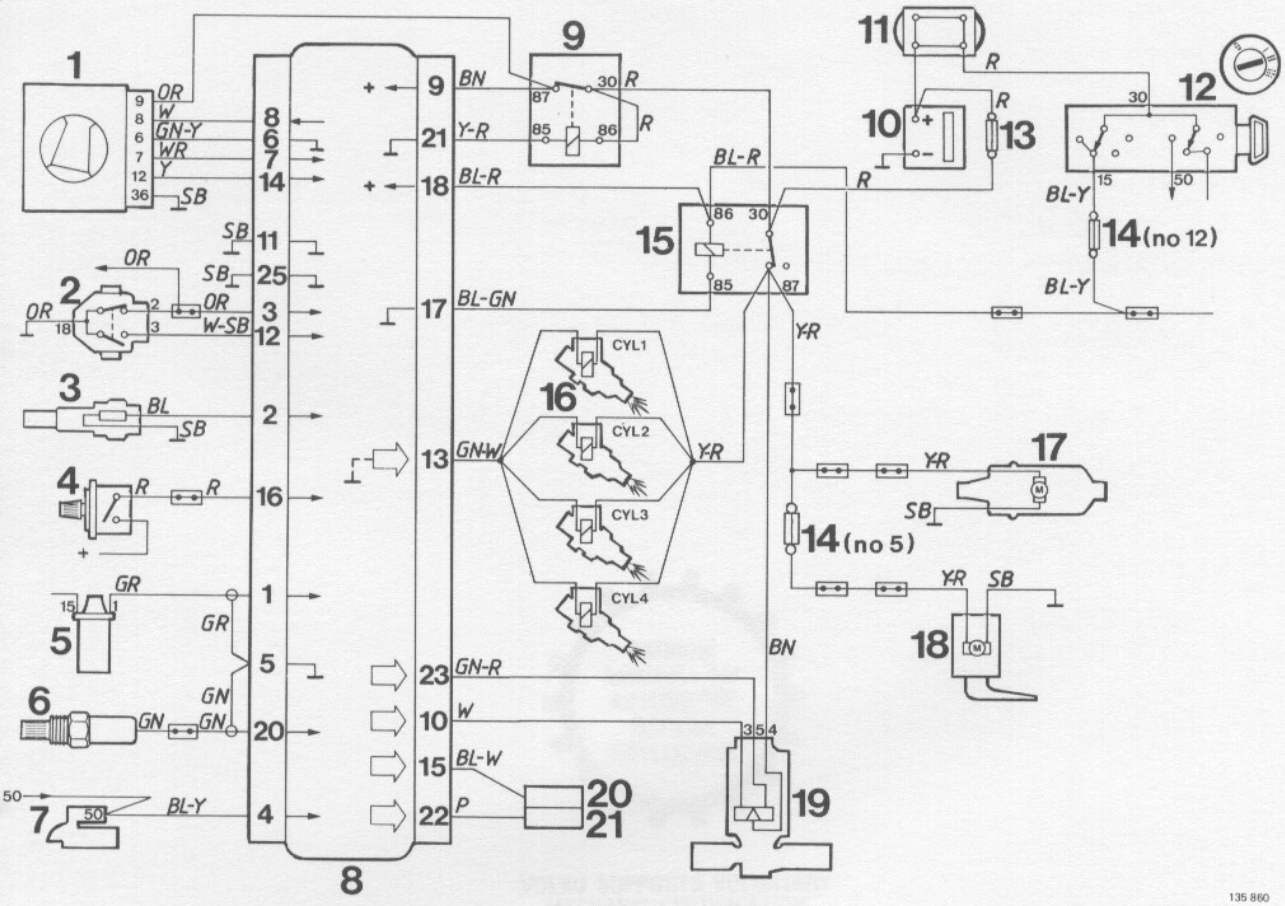
F. Evaporative system

F1



Wiring diagram

LH-Jetronic II



Wiring diagram LH-Jetronic II

Component designation:

1. Air mass meter
2. Throttle valve switch
3. Sensor, coolant temperature
4. Micro-switch, air conditioning
5. Ignition coil
6. Lambda-sond
7. Starter motor
8. Control unit
9. System relay
10. Battery
11. Junction box
12. Ignition switch
13. Fuse and holder
14. Fuse box, fuses 5 and 12
15. Pump relay
16. Injectors
17. Fuel pump
18. Tank pump
19. Air control valve
20. Test point, idle speed
21. Test point, Lambda-sond

Color code:

BL = blue
BN = brown
GN = green
GR = grey
OR = orange
P = pink
R = red
SB = black
Y = yellow
W = white

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