Service Manual

Repairs and maintenance

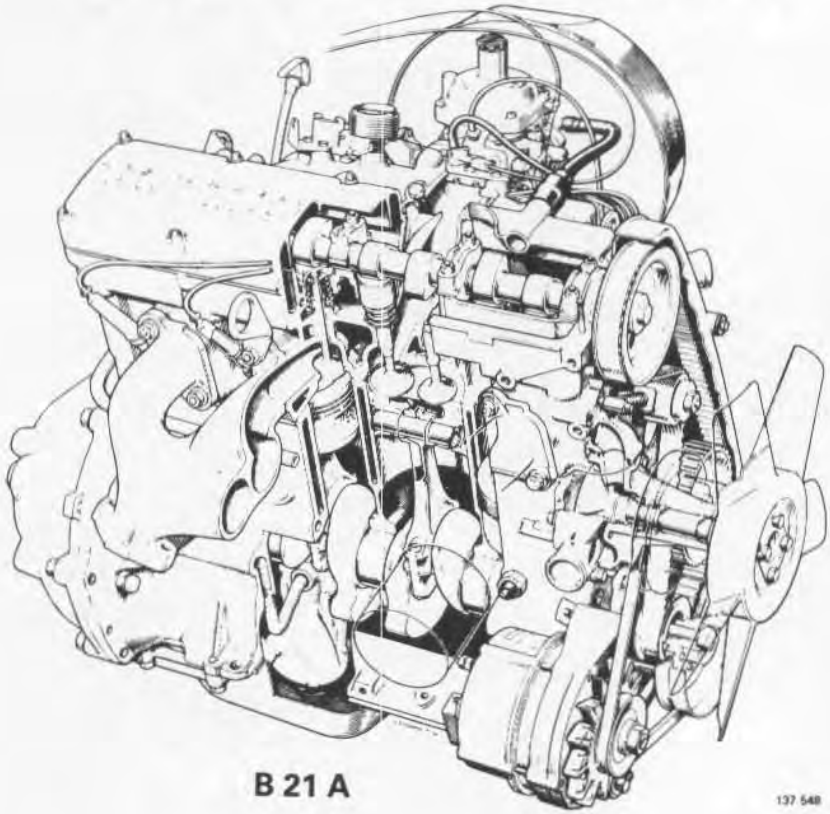
Section 2 (25–29)

Engines B 17, B19, B 21, B 23

240 1975–1985

VOLVO

B 17, B 19, B 21, B 23 engines



B 21 A

137 548

What do the designations mean?

B 21 E T

T = Turbo

A = carburetor engine,
K = carburetor engine
E = fuel injection engine
F = fuel injection engine – USA version

21 = cylinder capacity

B = petrol (gasoline)

B 21 = basic engine
B 23 = a **B 21** with larger bore and higher compression ratio
B 19 = a **B 21** with smaller bore
B 17 = a **B 19** with shorter stroke

Volvos are sold in versions adapted for different markets. These adaptations 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.

This manual covers the following engine types:

Engine type	Model year
B 17 A	1979–1984
B 19 A	1977–1984
B 19 K	1984
B 19 E	1977–1984
B 19 ET	1982–1984
B 21 A	1975–1984
B 21 E	1975–1983
B 21 ET	1981–1984
B 21 F–5[1]	1976–1984[3]
B 21 F–8[2]	1982
B 21 F–9[4]	1981–1982
B 21 FT[5]	1981–1985
B 23 A	1981–1984
B 23 E	1979–1984
B 23 F (LH-Jetronic)	1983–1984

Remarks

[1] B 21 F–5 = CI system with Bosch ignition system.
[2] B 21 F–8 = LH Jetronic injection system with Chrysler ignition system
[3] Discontinued 1982 in USA & Canada. Superseded by B 21 F–8.
[4] B 21 F–9 = CI system with Chrysler ingition.
[5] Intercooler introduced as a running change on 1984 models during the spring of 1984.

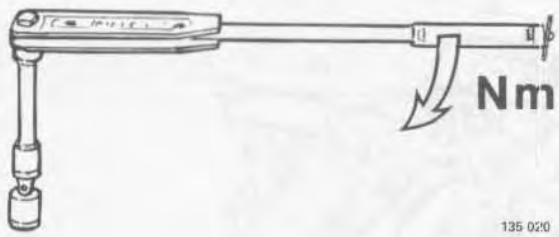
Contents

Index page 102

Order No.: TP 30163/2
This book supersedes the following service manuals:
Section 2 (25–29): Order No. TP 30163/1
Section 2 (25): Order No. TP 30296/1

TP 30163/2
6000.2.85
Printed in U.S.A.

Important information



135 020

Torques

There are two types of torques specified in this book:

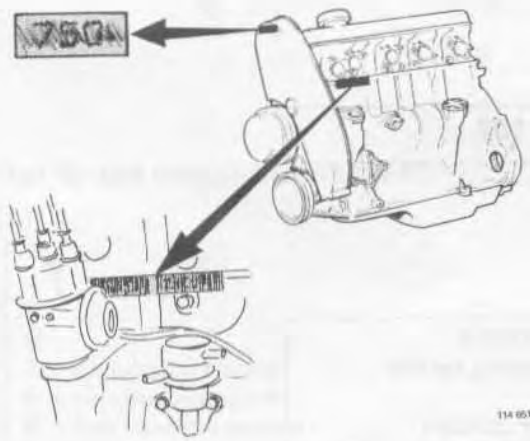
I. Tightening torque **40 Nm (30 ft lb)** = given for parts which must be tighetened with a torque wrench.

II. Torque 40 Nm (30 ft lb) = nominal value, the parts need not necessarily be tightened with a torque wrench.

The specifications section includes torque only for those parts which must be tightened with a torque wrench.

Specifications

Group 20 General



114 651

Engine type designation, serial number, and part number

You will find this engraved on a plate on the left-hand side of the engine.

1977 models –: additional plate on timing gear cover, showing last three digits of part number.

Group 25 Intake and exhaust systems

TURBO ENGINES

Charge pressure

		Checking	Setting
B 19/21 ET			
At 3,500 rpm full load	kPa	60–70	64–70
	(lb/in²)	(8.5–9.9)	(9.1–9.9)
B 21 FT without intercooler			
At 4,000 rpm full load	kPa	40–48	42–48
	(lb/in²)	(5.7–6.8)	(6.0–6.8)
B 21 FT with intercooler			
At 3,000 rpm full load	kPa	50–58	55
	(ln/in²)	(7.1–8.2)	(7.8)

Fuel enrichment

B 19/21 ET

Control pressure (warm engine) at zero charge pressure (idling)	345–375 kPa (49–53 lb/in^2)
at charge pressure 45 kPa (6.4 lb/in^2)	265–295 kPa (38–42 lb/in^2)

B 21 FT

Pressure contact blocks the Lambda-sond system at a charge pressure of	20.3 kPa (2.9 lb/in^2)

Pressure sensor

B 19/21 ET

Cut-out pressure, approx.	85–95 kPa (12.1–13.5 lb/in^2)

B 21 FT

Cut-out pressure, approx.	65–75 kPa (9.2–10.7 lb/in^2)

B 21 FT with intercooler

Cut-out pressure, approx.	100–110 kPa (14.2–15.6)

Ignition retardation

B 19/21 ET

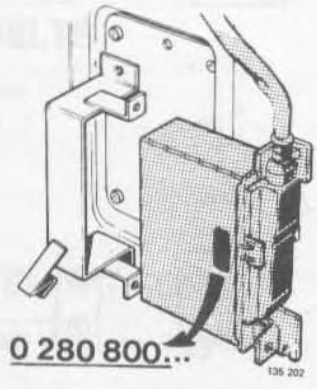
At charge pressure 30 kPa (4.3 lb/in^2)	3–7°

B 21 FT

At charge pressure 36 kPa (5.1 lb/in^2)	6–10°

LAMBDA-SOND SYSTEM

Control unit



Different control units are used depending on the year and engine type. These are identified by the number on the cover (last three figures).

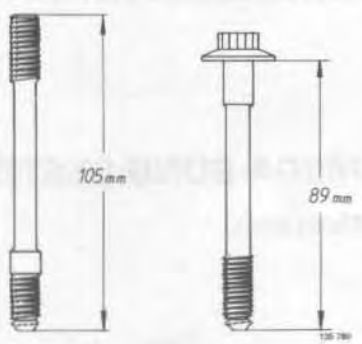
Engine design	B 212F				B 21 FT	
Model year	1977–79	1980	1981	1982–84	1981	1982–85
Control unit, Volvo number	1219143-3	1276721-6[4]	1276879-2	1306411-8	1276896-6	1306412-6
Bosch No. (last 3 figures)	...004	...021	...033	...053	...034	...052
Frequencies, disconnected Lambdasond	51–57°	51–57°	51–57°	51–57°	42–48°	42–48°
Thermal switch connected to ground[1]				54°		64–70°
Pressure differential switch connected to ground[2]						82°
Pressure switch, connected to ground[3]					64–70°	64–70°

Notes:
[1] Thermal switch introduced 1982
[2] Pressure differential switch only on B 21 FT 1984–1985
[3] Pressure switch only on turbo engines
[4] Replaced by 1276879-2 as spare part

TORQUES

	Nm	ft. lb
Lambda-sond	55	41
Apply "Never-Seez" (detail No. 1161 035-9) on all the threaded parts of the sond		
Retaining nuts, front exhaust pipe to turbo*	25	18
Retaining bolts, turbine housing*	20	15
compressor housing**	18	13
Rear housing (with wastegate)*	20	15

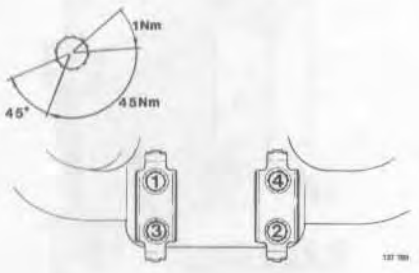
* Use anti-seize compound (part No. 1161035-9) on the bolts and nuts
** Use new bolts. In an emergency, the old bolts may be used if they are smeared with thread sealer (part No. 1161053-2).



Retaining nuts, turbocharger to manifold:

- Measure the length of the bolt, replace bolts if necessary.
  The bolts may be used as long as they are no longer than **89 mm** (3.50 in) and **105 mm** (4.13 in) respectively.
- Lubricate the threads and contact surfaces of the bolts with installing paste 1161078-9.
- Install e **new** securing plate.
- Tighten the bolts in three stages according to the illustration.

Stage I = 1 Nm (9 in lb)
II = 45 Nm (33 ft lb)
III = 45°



Group 26 Cooling system

GENERAL

Since aluminum is used in the engines, active corrosion protection is necessary in the coolant to help prevent corrosion damage.

Use genuine Volvo coolant type C **(blue-green)** diluted with clean water in proportions of 50/50. This mixture helps to prevent corrosion and frost damage.

- Never top-up the cooling system with water alone. Use genuine Volvo coolant diluted with clean water in proportions of 50/50.
- The coolant should be changed regularly since the corrosion-protective additives in the coolant lose their effectiveness in time.

Capacity, manual gearbox	9.5 litres (10 US qts)
with automatic transmission	9.3 litres (9.8 US qts)

EXPANSION TANK

The pressure valve in the cap opens at:	
excess pressure	65–85 kPa (9.2–12.1 lb/in^2)
partial vacuum	7 kPa (1.0 lb/in^2)

THERMOSTAT

	Model 1	Model 2	Model 3
Marking	82	87	97
Starts to open at	81–83°C	86–88°C	91–93°C
Fully open at	92°C	97°C	102°C

FAN BELTS

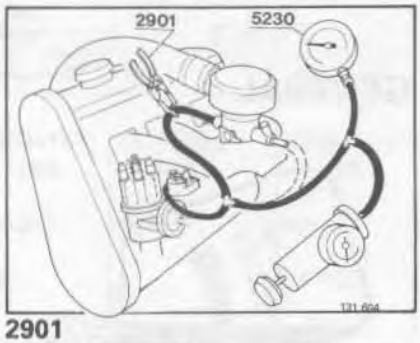
Designation	
model 1	HC 38x925
model 2	HC 38x913

TIGHTENING TORQUE

Fan bolt, self-locking for fixed fan	9 Nm (7 ft.lb)

Special tools

999	Description
2901-0	**Tongs:** for pinching hose
5011-5	**Pressure gauge:** for measuring control pressure
5015-6	**Allen Key:** for adjusting CO
5151-9	**Connection:** checking CO (Lambda-sond system)
5170-9	**Test relay:** checking the Lambda-sond system
5228-5	**Nipple:** for connecting 5011
5229-3	**Nipple:** for connecting 5011
5230-1	**Pressure gauge:** for measuring charge pressure etc.
5250-9	**Key:** removing/installing Lambda-sond.



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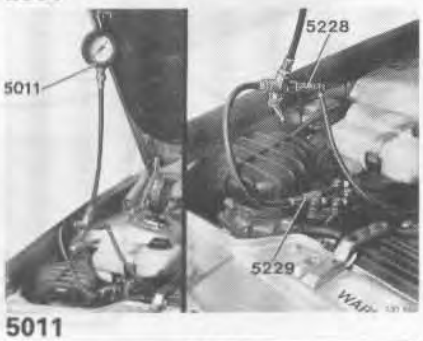
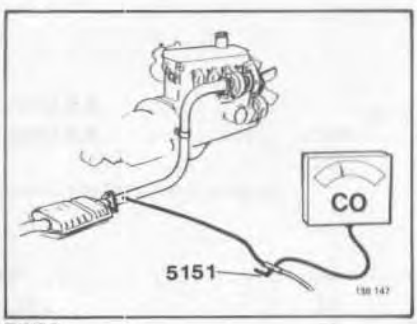


5011

5015



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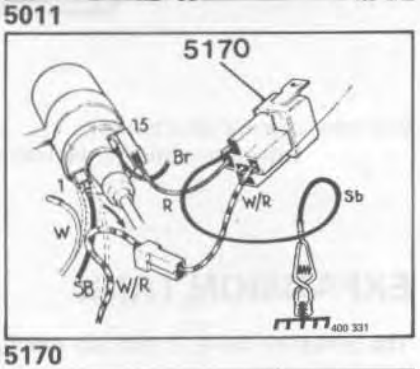

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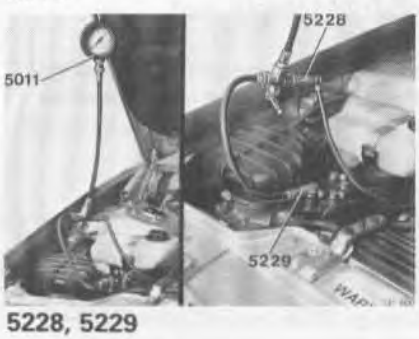
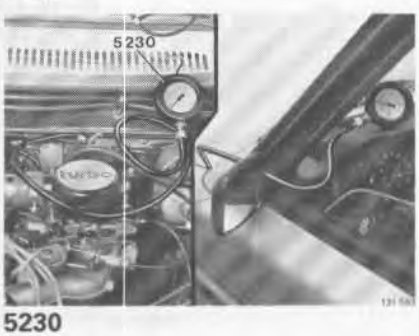
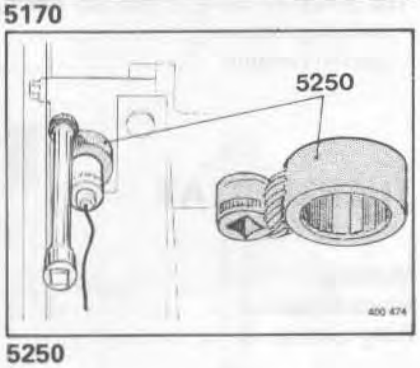


5228, 5229



5230



5250

For trouble-shooting of the Lambda-sond system the following items are also needed:

- rev counter and dwell meter, for example Volvo Mono-Tester 999 9921-1
- Ohmmeter, for example Volvo ohmdiode meter 999 9724-0
- Test lamp and voltmeter, for example Volvo Volt-Amp meter 999 6450-4.

Group 25 Intake and exhaust systems

A. Intake manifold

A engines

Removal

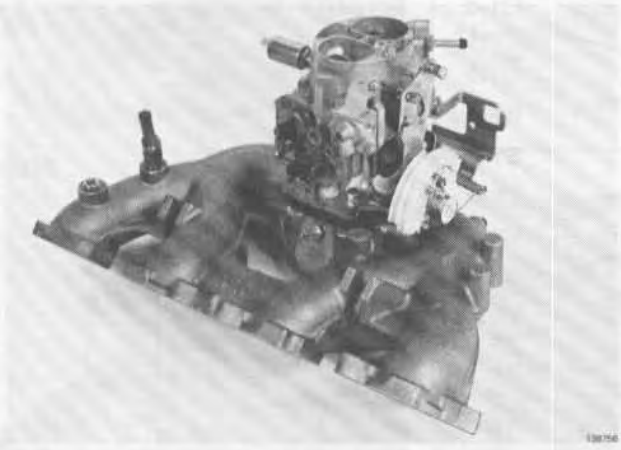
A1

Drain the coolant

The level must be below the inlet pipe.

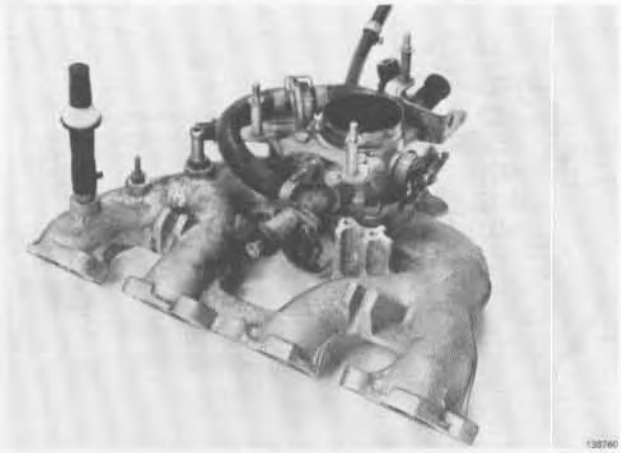
A2

Remove the inlet pipe



K engines

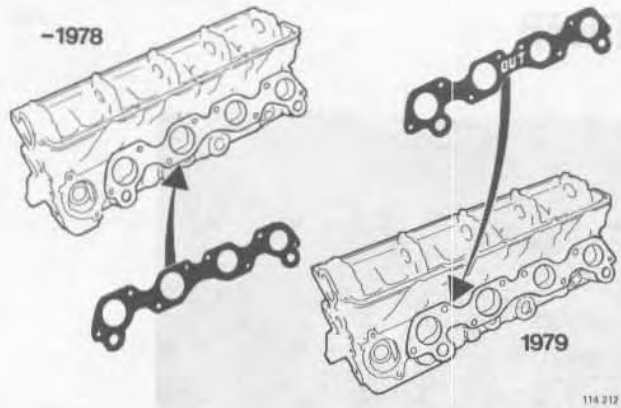
E/F engines



ET/FT engines

F engines with LH jetronic fuel system

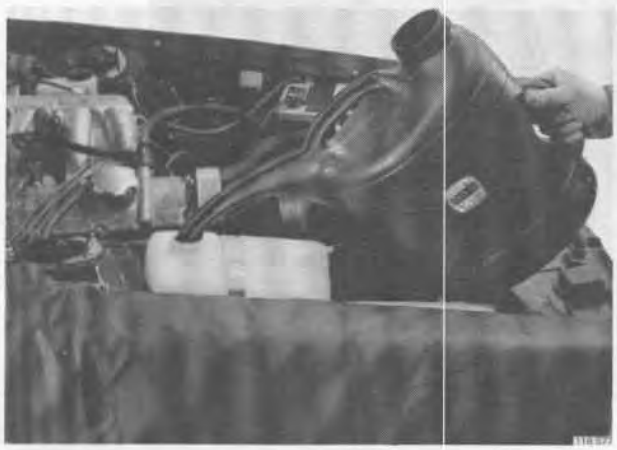
A3



Installing

Use new gaskets. **NOTE!** Early- and late-production types. The early production version is not reversible and must be fitted with the OUT marking facing outwards (see illustration). On the late production cylinder head (1979–) only a late production gasket can be used.

NOTE!
New inlet pipes of latest models have some unthreaded holes. Use self-tapping bolts in these holes.



Installing the inlet pipe

	Operation
A engines, see	A4
K engines, see	A5
E/F engines, see	A6
ET/FT engines, see	A7
F engines with LH-jetronic fuel system	A8

A9

Fill with coolant

Close the cock on the lefthand side of the engine. Fill the expansion tank up to max. with genuine Volvo coolant, diluted with clean water. Mixing proportion: 50/50.

Run the engine until warm, check for leakage and, if necessary, top up with coolant.

A engines

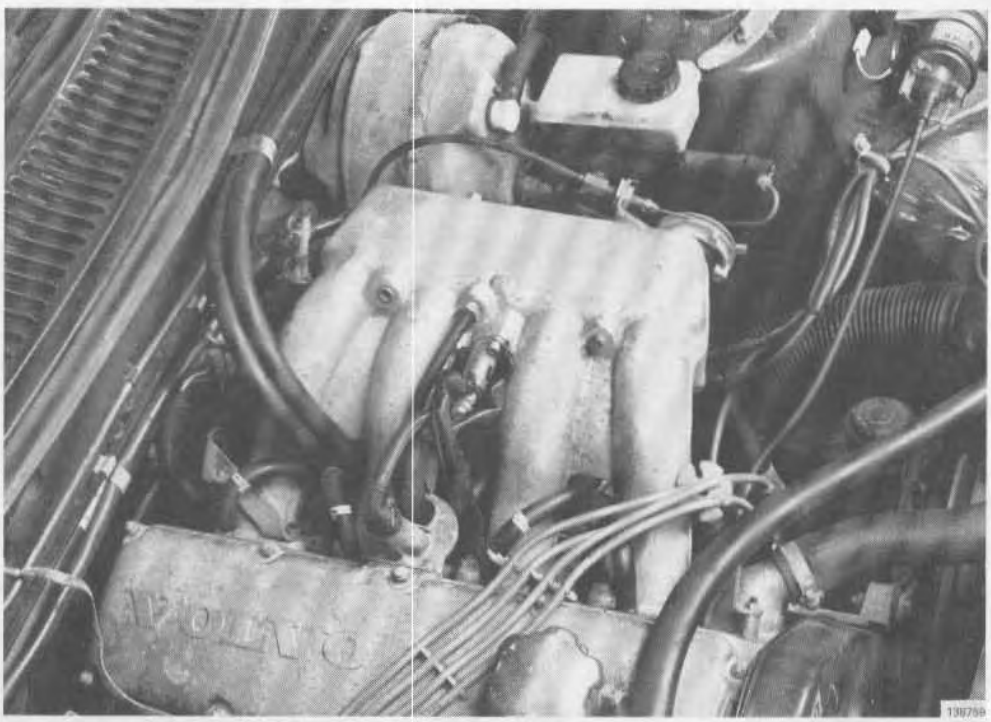
A4

K engines

A5

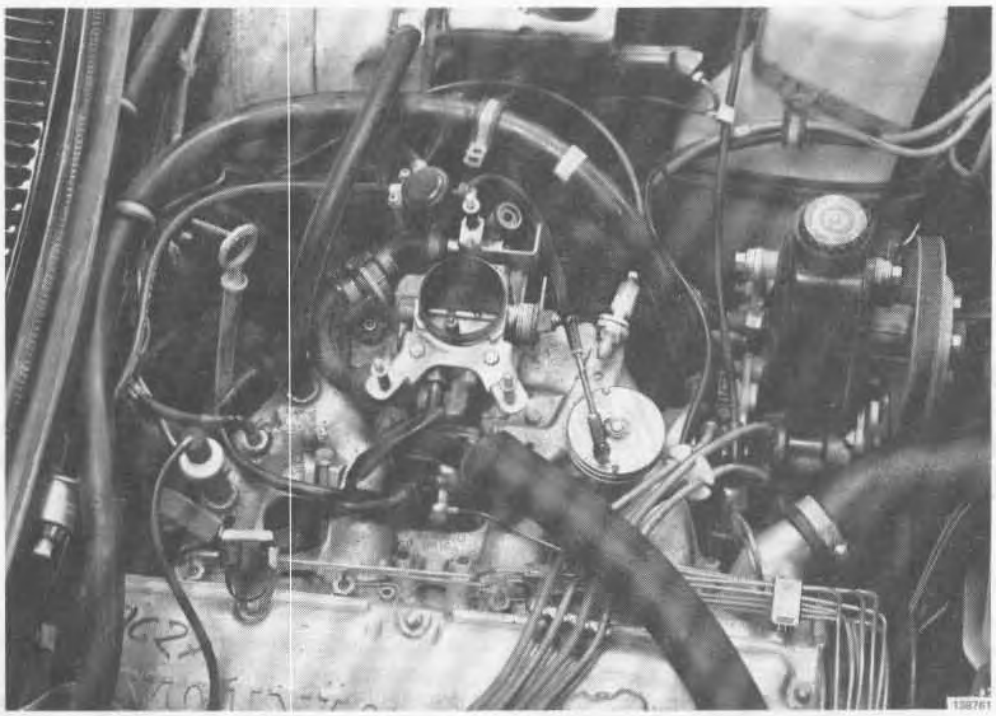
E/F engines

A6



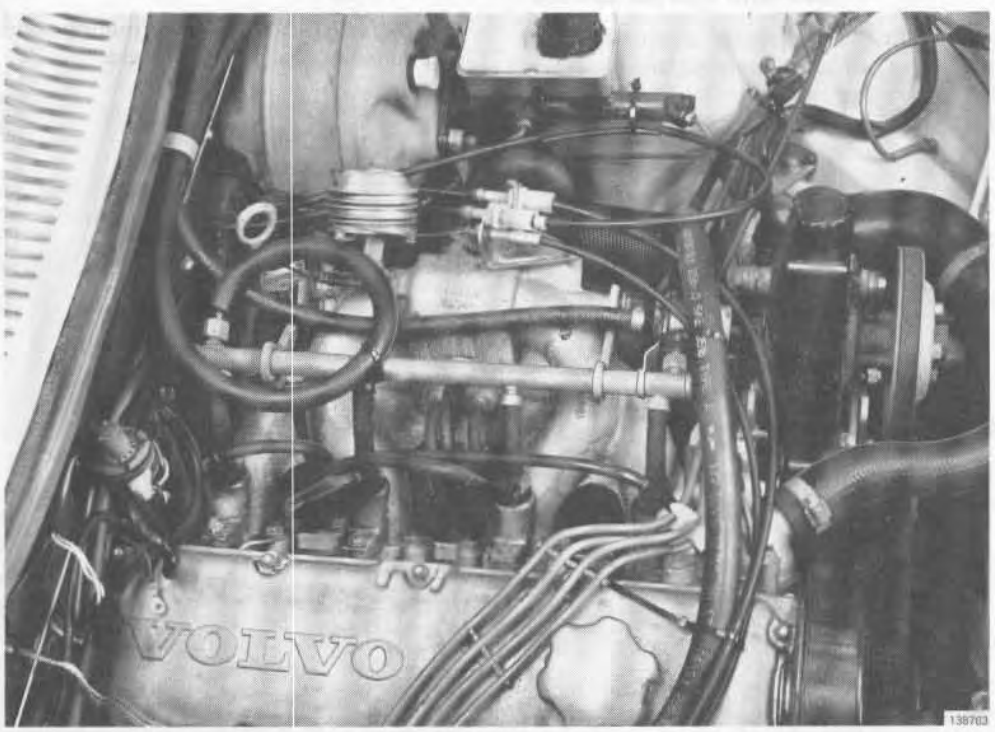
ET/FT engines

A7

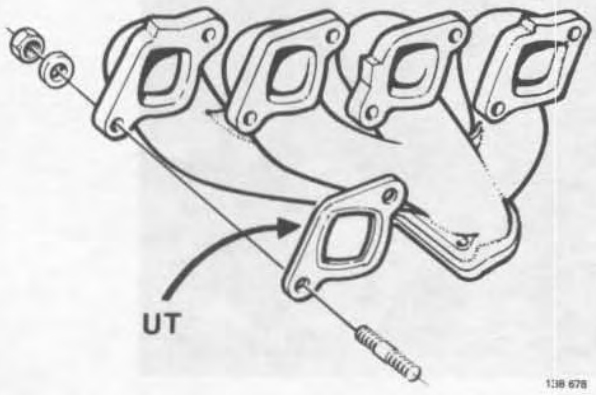


F engines with LH jetronic fuel system

A8



B. Exhaust manifold



B1

Removing

- Remove the exhaust pipe from the manifold.
- Remove the manifold from the cylinder head.

B2

Installing

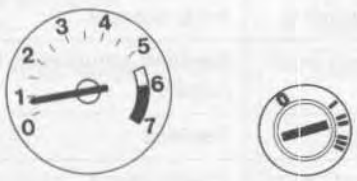
- Use new gaskets when installing. The outside of the gaskets are marked "UT".
- Install the manifold on the cylinder head.
- Install the exhaust pipe on the exhaust manifold.

B3

Turbo engines

See pages 30 and 36 for information concerning removing/installing exhaust manifold.

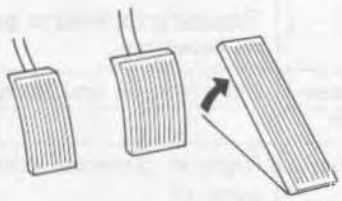
C. Turbo, important information



C1

Never race an engine directly after start

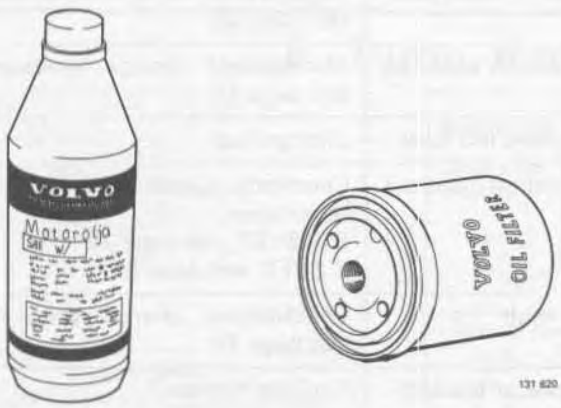
Allow it to idle for a while to ensure the turbocharger is lubricated.



C2

Allow the engine to idle before switching off

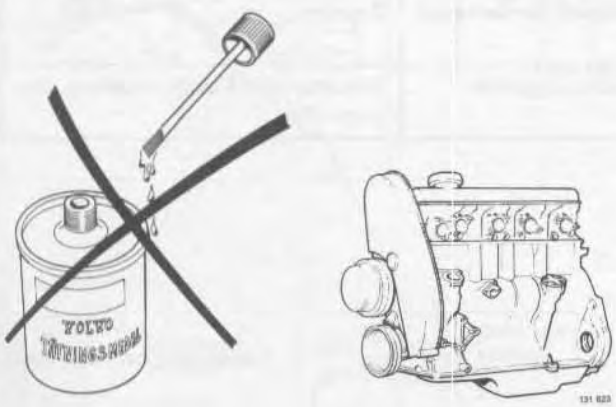
If the engine is switched off at high revs the turbocharger will rotate for a long time without lubrication. Idling for a short time before switching off also helps to reduce turbocharger temperature.



C3

Ensure oil and filter changes are carried out at the correct service intervals

The oil supply (quality and purity) is essential to the working and service life of the turbocharger. The correct grade of oil must always be used and precautions taken to prevent the ingress of dirt etc. into the oilways during servicing operations.



C4

Do not use sealers when repairing the engine

If a sealant is used it may enter the lubrication system and block the oilways to the turbocharger.

D. Turbo, trouble-shooting

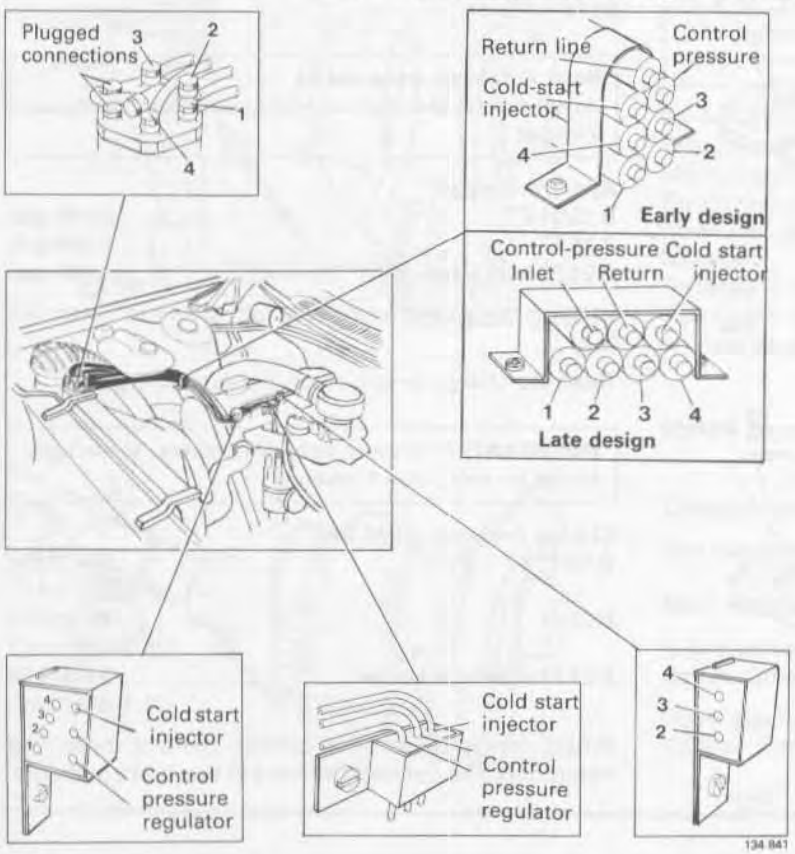
Fault *Symptom*	**Reason**	**Check/remedy**
Charge pressure too low *Low output* *Boost pressure gauge reading low*	Air cleaner clogged	Replace air cleaner insert
	Throttle control incorrectly adjusted	Adjust
	Engine fault (low compression, incorrect valve clearance, poor fuel supply)	Check and remedy as required
	Leakage between compressor housing and cylinder head or between cylinder head and turbine housing	Replace damaged gaskets, connections etc. Tighten screws, nuts, clamps
	Wastegate valve stuck in open position (fully or partly)	Replace valve with housing, see page 26
	Exhaust system partly blocked	Replace
	Charge pressure incorrectly adjusted	Check/adjust charge pressure, see page 16
	Turbocharger faulty	Replace completely or partially as necessary.
Charge pressure too high *The engine knocks at high output* *Boost pressure gauge pointer moves into red sector* *Pressure sensor cuts out (engine stops)*	Leakage in hose between compressor housing and pressure actuator	Change hose and clamps
	Pressure actuator (diaphragm) damaged	Replace pressure actuator, see page 18
	Wastegate valve stuck in closed position	Replace relief valve with housing, see page 26
	Charge pressure incorrectly adjusted	Check/adjust charge pressure, see page 16
Engine knocks	Fuel not suitable, (octane too low)	Change fuel
	Ignition setting/retardation incorrect	Check/adjust ignition setting & retardation. B19/21 ET, see page 22 B 21 FT, see page 24
	Charge pressure too high	Check/adjust charge pressure, see page 16
Metallic noise from wastegate valve	Preheating plates loose or cracked	Replace, tighten
	Housing for wastegate or exhaust pipe loose	Tighten
	Wastegate valve loose in guide	Replace valve with housing, see page 26

Continued on next page

Fault *Symptom*	Reason	Check/remedy
Noise or vibrations from turbocharger	Preheating plates loose or cracked	Replace, tighten
	Leakage in intake or exhaust system	Tighten loose connections, replace gaskets, seals etc.
	Poor lubrication of turbocharger	Check oil pressure and oil flow to turbo. If fault remains after remedial measures, replace turbo
	Imbalance on turbo shaft, turbine wheel or compressor wheel because of damage	Replace turbo
Oil leakage at turbo shaft seals *Oil smoke in exhaust gases*	Air cleaner clogged (oil leakage on inlet side gives white smoke)	Replace air cleaner insert
	Exhaust system loose or leaking	Tighten or replace system
	Excessive pressure in crankcase	Clean crankcase ventilation, see page 45 Check the crankcase ventilation hose, see page 46
	Return oil pipe clogged	Clean the return oil pipe
	Turbo shaft seals damaged	Replace turbocharger

E. Turbo, routing of fuel lines

E1

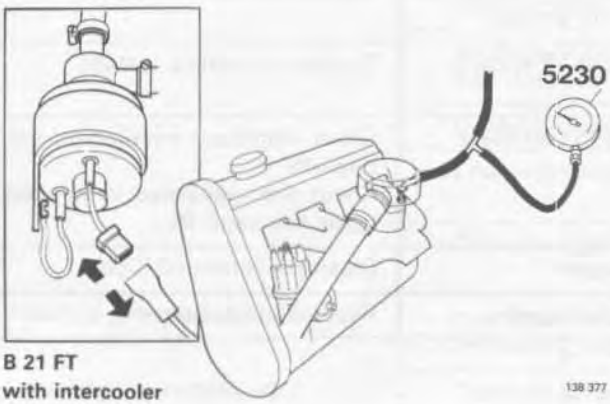


Clean the connections carefully before loosening the lines. Make sure that the lines do not rub against anything.

F. Turbo, charge pressure, checking/adjusting

Special tool: 5230

Important! Excessively high charge pressure can cause serious damage to engine.



B 21 FT with intercooler

138 377

F1

Disconnect the solenoid valve

(Applies only to B 21 FT with intercooler)

Separate the connector.

F2

Connect test equipment

Connect pressure gauge **5230** between charge air overpressure switch hose and nipple on intake manifold.

Place pressure gauge on dashboard.

F3

Run engine until warm

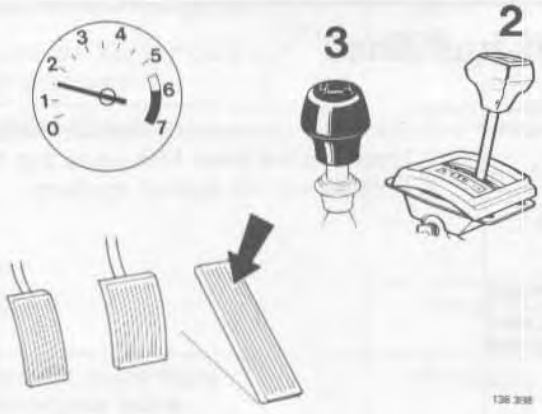
(Test drive).

F4

Measure charge pressure

Drive in third gear (second gear with automatic transmission) at approximately 1,500 rpm.

Accelerate to full throttle by depressing the accelerator pedal to floor.



138 398

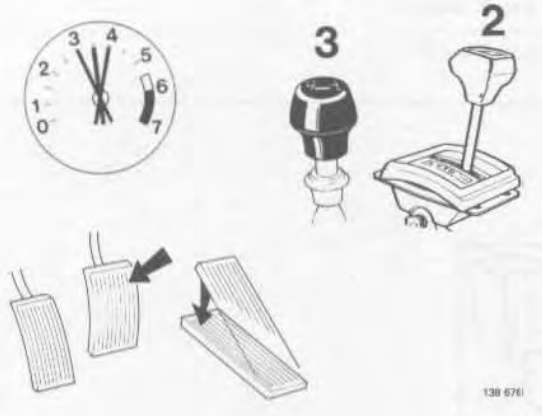
Note! Automatic transmission
Do not depress the accelerator so quickly that kick-down is engaged.

Apply brakes at:

B 19/21 ET	**3,500 rpm**
B 21 FT	**4,000 rpm**
B 21 FT with intercooler	**3,000 rpm**

keeping the accelerator pedal fully down to obtain full load.

Read the charge pressure on the pressure gauge.



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IMPORTANT! To prevent damage to brakes, do not apply brakes for more than 5 seconds.

Charge pressure must be:

B 19/21 ET	**60–70 kPa** (8.5–9.9 lb/in^2)
B 21 FT	**40–48 kPa** (5.7–6.8 lb/in^2)
B 21 FT with intercooler	**50–58 kPa** (7.1–8.2 lb/in^2)

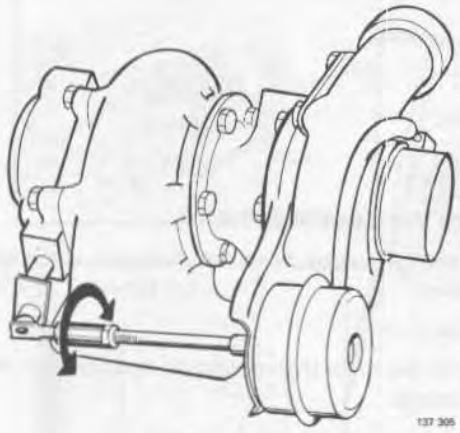
When charge pressure is correct, remove measuring equipment and connect the hose to the intake manifold.

Adjusting charge pressure

Operation F 5–9

Note! Wastegate actuator of early design cannot be adjusted. It is sealed by riveting the adjusting sleeve to the link rod. If faulty, the actuator must be replaced; see page 18.

F5



Adjust charge pressure

Remove the seal and the circlip. Adjust pressure by turning the sleeve on the link rod.

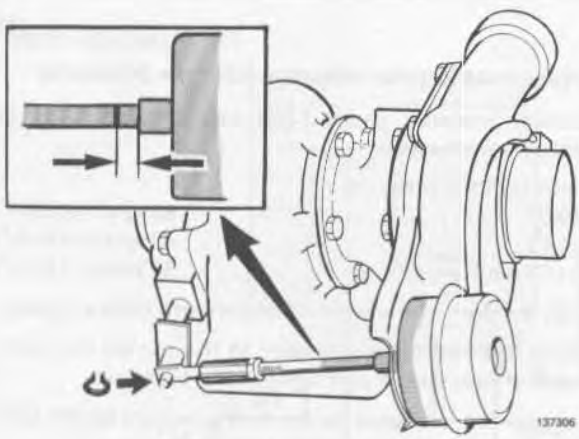
IMPORTANT! Do not turn the link rod as this may damage the diaphragm in the actuator.

One turn of the sleeve gives a pressure change of approx. 2 kPa (0.3 lb/in^2).

If the sleeve is turned:
- **in, the charge** pressure increases
- **out, the charge** pressure decreases.

B 19/21 ET ..... **64–70 kPa** (9.1–9.9 lb/in^2)
B 21 FT ..... **42–48 kPa** (6.0–6.8 lb/in^2)
B 21 FT with intercooler ..... **55 kPa** (7.8 lb/in^2)

F6



Check basic position of link rod

Link rod travel must be between 2–6 mm (0.08–0.24 in) to obtain correct operating function.

To adjust:
Disconnect rod sleeve from lever.
Mark position of rod at wastegate actuator.
Reconnect sleeve to lever.
Measure distance between mark and wastegate actuator.
Distance = **2–6 mm** (0.08–0.24 in).
If incorrect, replace wastegate actuator, see instructions on next page.

F7

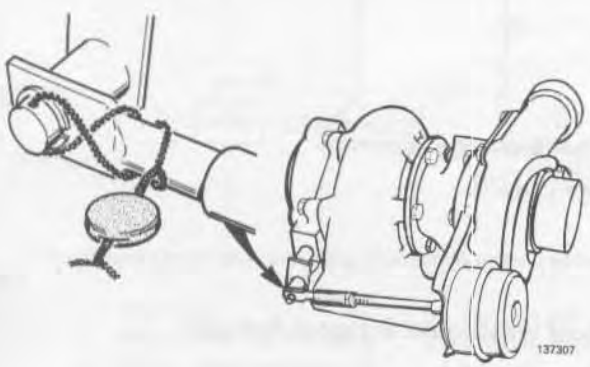
Install new circlip

F8

Check charge pressure

See page 16.

F9



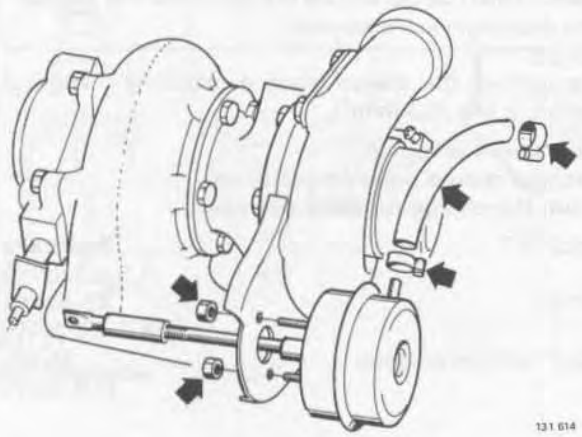
Seal wastegate actuator

It is important to wind wire tightly around the sleeve as shown. Otherwise seal will loosen due to vibrations.

Volvo anti-tamper seal tongs, part No. 9986408-4 have "Volvo" stamped on grips.

G. Turbo, replacement of wastegate actuator

Special tool: 5230



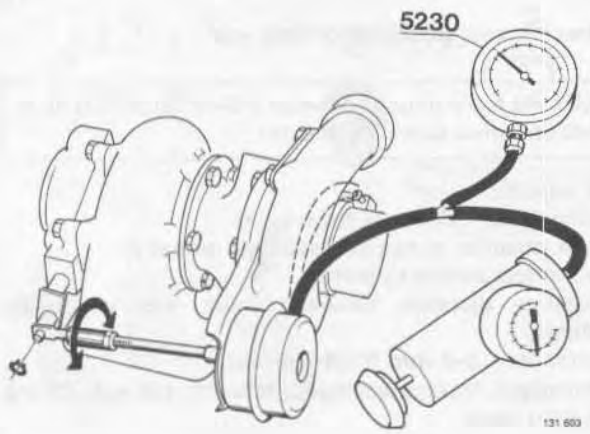
G1

Replace wastegate actuator

Check the pressure hose for damage and replace if necessary.

Use new nuts.

Do not fit the hose clamp, and do not connect the hose at this stage.



G2

Adjust wastegate actuator (charge pressure)

Connect pressure gauge 5230 and pressure tester to wastegate actuator.

Pump up to a pressure of:

B 19/21	**55 kPa** (7.8 lb/in^2)
B 21 FT	**41 kPa** (5.8 lb/in^2)
B 21 FT with intercooler	**57 kPa** (8.1 lb/in^2)

Push the arm of the wastegate forward (valve closed).

Adjust link rod to fit precisely to the pin on the lever. Install a new circlip and tighten the lock nut.

Remove the pressure gauge and pressure tester. Connect the pressure hose (hose clamp).

G3

Check charge pressure

See page 16.

G4

Seal wastegate actuator link rod

See page 17.

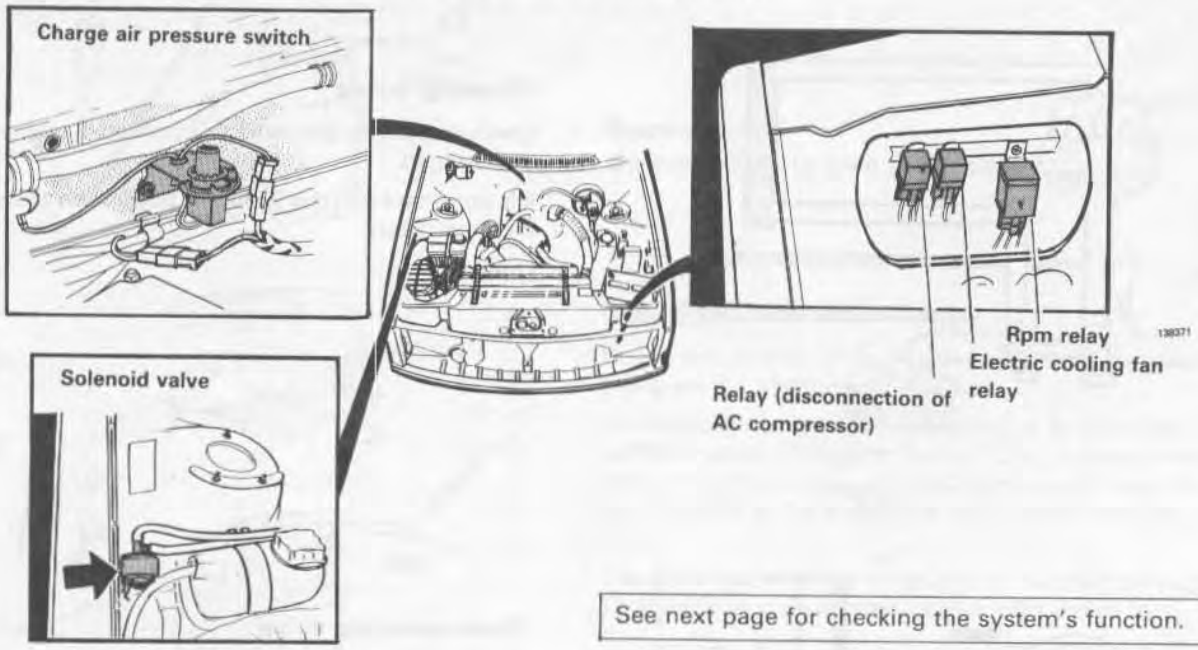
H. Control system for charge pressure

Only B 21 FT with intercooler

Special tool: 5230

Positioning of components (factory-installed intercooler)

H1

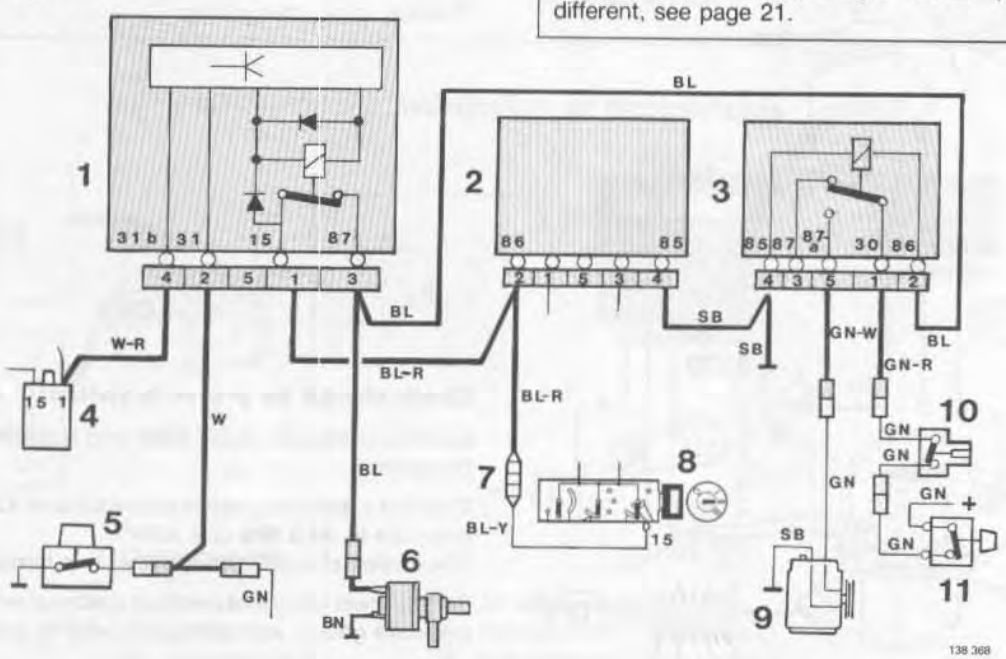


See next page for checking the system's function.

Wiring diagram

NOTE! On cars equipped with intercooler kits the electrical connections and placing of the components are different, see page 21.

H2

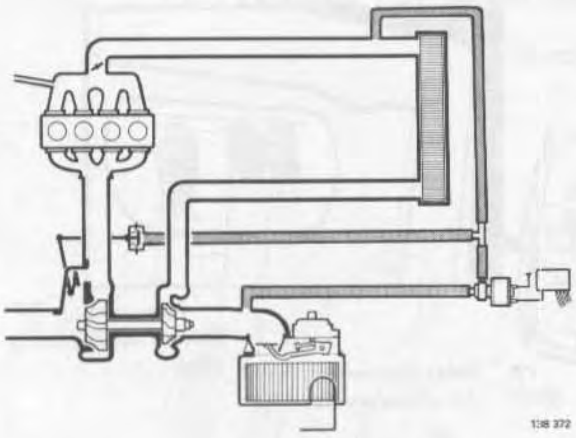


The picture shows the operating position at engine speeds exceeding 3,700 rpm and charge pressure exceeding 20 kPa (2.8 lb/in²)

1 Rpm relay
2 Electric cooling fan relay
3 Relay (disconnection of AC compressor)
4 Ignition coil
5 Charge air pressure switch
6 Solenoid valve
7 Fuse No. 13
8 Ignition
9 AC compressor
10 Low pressure switch (in dryer)
11 Switch (circuit closed)

Checking system function

Operations H3–9

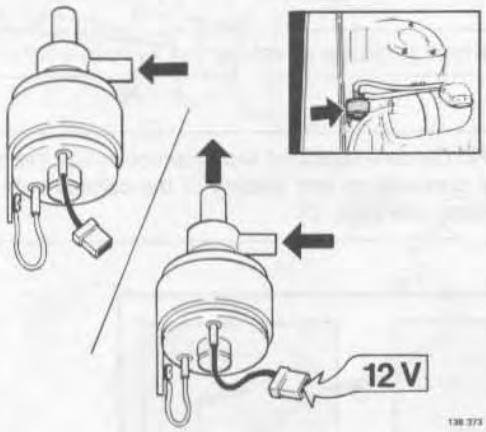


H3

Checking hoses

Check that hoses are correctly connected, clamped and undamaged.

It is important that the T-piece is positioned as shown in the illustration.



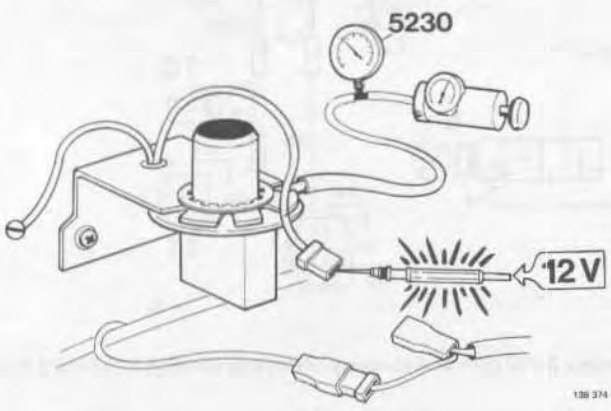
H4

Check solenoid valve

Check function of valve by blowing through it.

Normally the valve should be closed.

Connect 12 V to the valve. The valve should then open. If faulty, check the wiring.



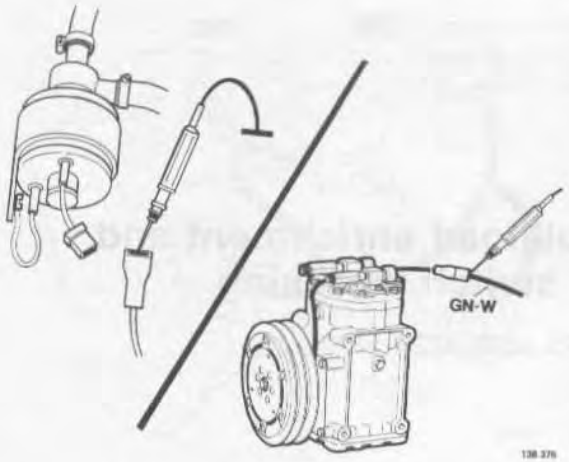
H5

Check charge air pressure switch

Connect pressure gauge **5230** and a pressure pump to the switch.

Connect a test lamp between switch and 12 V. Pump up pressure to **20.3 kPa** (2.8 lb/in^2).
The switch should then close = test lamp light up.

Remove test lamp and connect electrical wire. Leave the pressure gauge and pressure tester in position.



H6

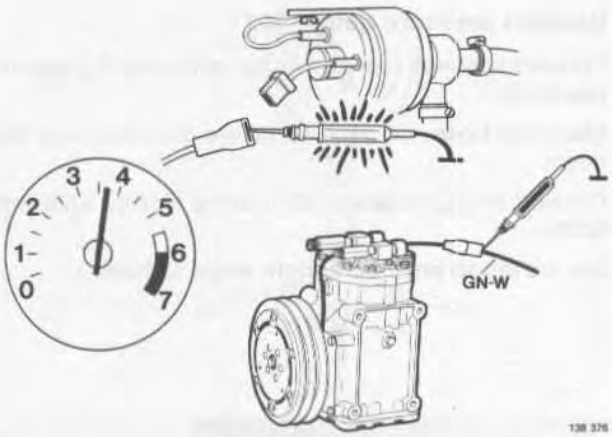
Connect test light

Connect a light at the solenoid valve, between the contact piece and frame.

Connect another light at AC compressor, between wire and frame.

H7

Start engine
Switch AC on to give max cooling



H8

Check rpm relay and AC relay

Check that charge air overpressure switch is closed; pump up the pressure if necessary.

Rev the engine. The rpm relay should be activated at approximately 3,700 rpm. The test light at the solenoid valve should light up and the AC compressor should be disconnected at the same time (the test light should go out).

If faulty, check electrical wires, see wiring diagram page 19. If the wires are in order, check with a new relay.

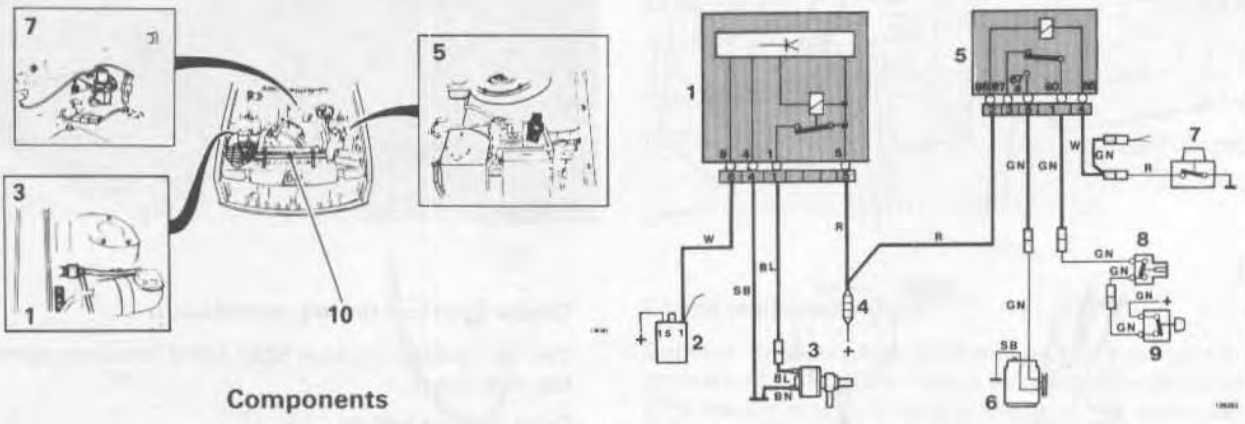
H9

Restore to original condition

Remove the instrument.
Connect electrical wire, hose.

H10

Intercooler kit; installation of components

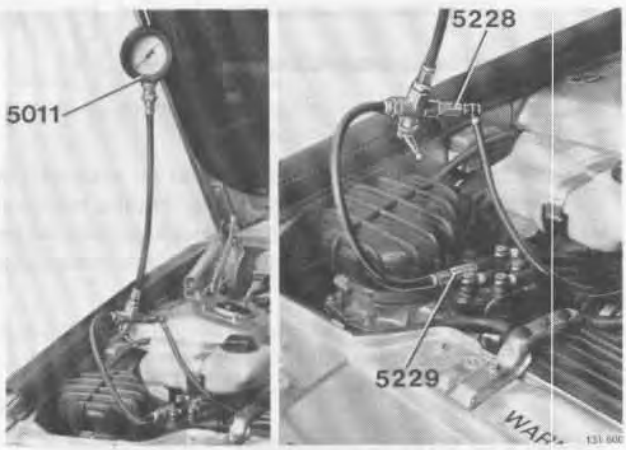


Components

1 Rpm relay
2 Ignition coil
3 Solenoid valve
4 Fuse No. 12
5 Relay (disconnection of AC compressor)
6 AC compressor
7 Charge air pressure switch
8 Low pressure switch (in dryer)
9 Switch (circuit breaker)
10 Intercooler

I. B 19/B 21 ET retardation, full load enrichment and charge air overpressure switch, checking

Special tools: 2901, 5011, 5015, 5228, 5229, 5230



I1

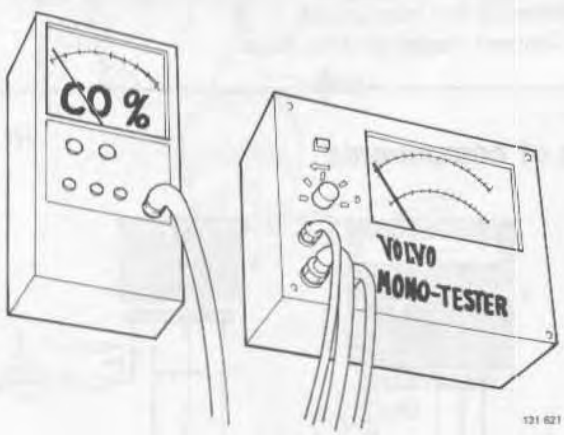
Connect pressure gauge 5011

Connect between fuel distributor and control pressure regulator.

Clean the hose connections before disconnecting the hoses.

Connect pressure gauge 5011, using nipples 5228 and 5229.

Set the tap to position 2 (right angle to hoses).



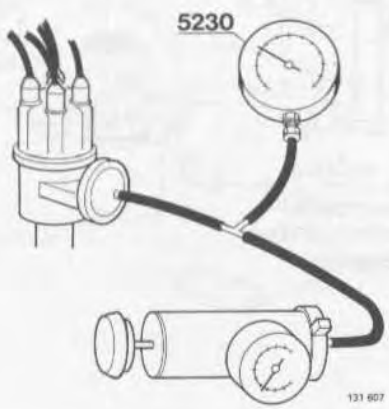
I2

Connect CO meter and Volvo Mono-Tester

(A stroboscopic timing light can be used instead of a Mono-Tester.)

I3

Start engine



I4

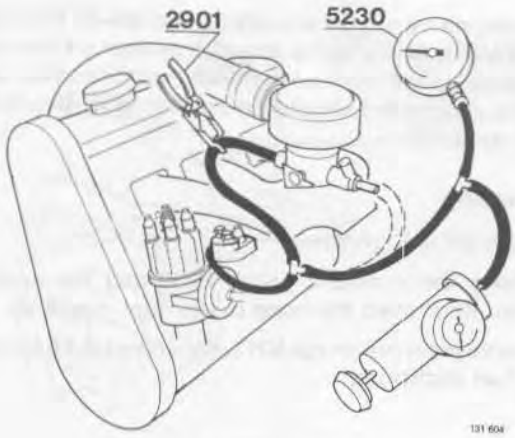
Check ignition timing retardation

Connect pressure gauge **5230** and a pressure pump to the distributor.

Read ignition setting.

Pump up to a pressure of **30 kPa** (4.3 lb/in^2).
Ignition retardation should be **3–7°**.
Remove pressure gauge and pressure pump. Reconnect hose from the distributor to the inlet manifold.

Ignition setting: **15° B.T.D.C at 11.7–13.3 rps** (700–800 rpm), hose disconnected.



I5

Check fuel enrichment

The engine must be running.

Pinch the hose between the control pressure regulator and the nipple on the inside of the inlet pipe. Use tongs **2901.**

Remove the hose from the nipple on the outside of the throttle housing. Connect pressure gauge **5230** and pressure pump.

Check that the control pressure regulator is warm by reading off pressure gauge 5011. The control pressure should be **345–375 kPa** (49–53 lb/in^2).

Pump the pressure up to **45 kPa** (6.4 lb/in^2). The control pressure should then drop to **265–295 kPa** (38–42 lb/in^2).

Remove the pressure pump, pressure gauge 5230 and tongs 2901. Reconnect the hose to the throttle hosing.

Fuel enrichment is necessary to ensure the internal cooling of the engine. If the fuel-air mixture is too lean, this will raise the combustion chamber temperature with risk of overheating.

I6

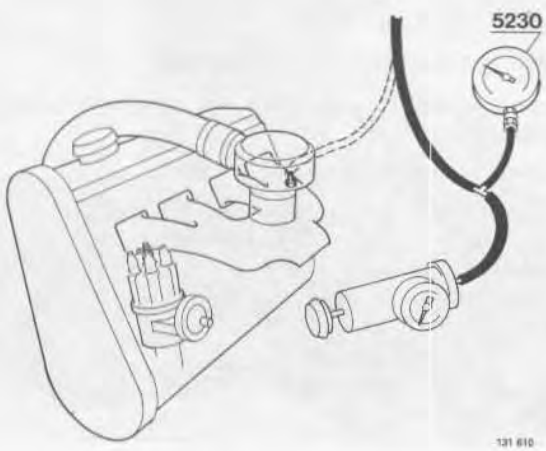
Check/adjust CO content

Use key **5015** for the adjustment.

Check value:
B 21 ET, 1983 Nordic countries and Switzerland ..... **2.5–3.5 %**
Other markets ..... **1.0–3.0 %**

Adjustment value:
B 21 ET 1983 Nordic countries and Switzerland .. **3.0 %**
Other markets ..... **2.0 %**

Idling speed ..... **15.0 rps** (900 rpm)



I7

Check pressure sensor

Connect pressure gauge 5230 and pressure pump to the hose which goes to the charge air overpressure switch. (The switch is placed on the inside of the dashboard above the pedal carrier).

Pump up the pressure until the engine stops (the switch cuts out the ground connection for the pump relay).

IMPORTANT! Do not exceed **120 kPa** (17 lb/in^2). This could damage the dashboard boost pressure gauge.

The engine must stall at a pressure of **85–95 kPa** (12.1–13.5 lb/in^2). At the same time the pointer on the boost pressure gauge must be in the red sector and the lamp on the dashboard should be on (this lamp deleted on later models).

I8

Resetting

Switch off the ignition.

Remove the pressure gauge 5230 and the pressure pump. Reconnect the hose to the inlet manifold.

Remove pressure gauge 5011. Reconnect the fuel line to the fuel distributor.

J. B 21 FT ignition retardation, full load and enrichment and charge air overpressure switch, checking

Special tool: 5230, 5015

J1

Connect CO meter and Volvo Mono-Tester

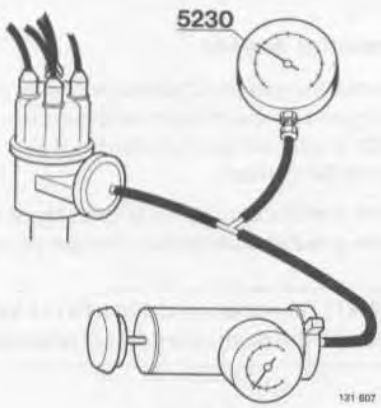
A stroboscopic timing light and a dwell meter may be used instead of the Volvo Mono-Tester.

Connect Mono-Tester to the Lambda-sond service outlet.

Connect CO meter to the outlet in the exhaust pipe in front of the catalytic converter.

J2

Start engine



J3

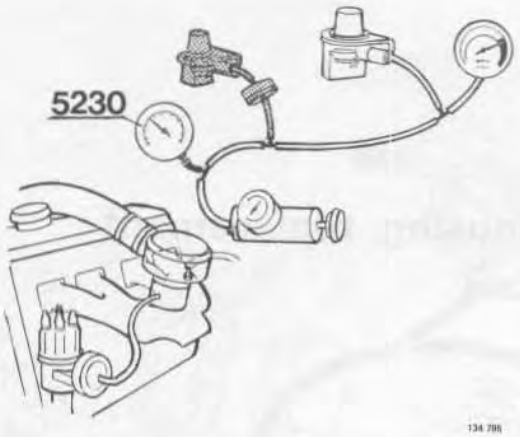
Check ignition timing retardation

Connect pressure gauge **5230** and a pressure pump to the distributor.

Read off ignition setting.

Pump up to a pressure of **36 kPa** (5.1 lb/in^2).
Ignition retardation should be **6°–10°**.
Remove the pressure gauge and pressure pump. Reconnect the hose from the distributor to the inlet manifold.

Ignition setting: **12° B.T.D.C.** at **15 rps** (900 rpm), hose disconnected.



134 795

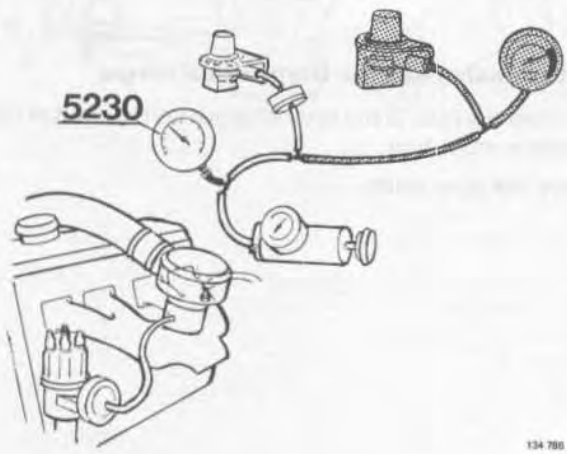
J4

Check fuel enrichment

Connect pressure gauge **5230** and pressure pump to the hose from the inlet pipe.

Engine must be running.

Pump up pressure to **20.3 kPa** (2.8 lb/in²). The dwell meter should then read **64°–70°** (overpressure switch cuts out the ground pin for Lambda-sond's control unit).



134 796

J5

Check charge air overpressure switch

Engine running.

Pump up the pressure until the engine stops (pressure sensor cuts out).

IMPORTANT! Do not exceed **120 kPa** (17 lb/in²) or dashboard pressure gauge may be damaged.

The engine should stall at a pressure of:

B 21 FT ..... **65–75 kPa** (9.2–10.7 lb/in²)

B 21 FT with intercooler ..... **100–110 kPa** (14.2–15.6 lb/in²)

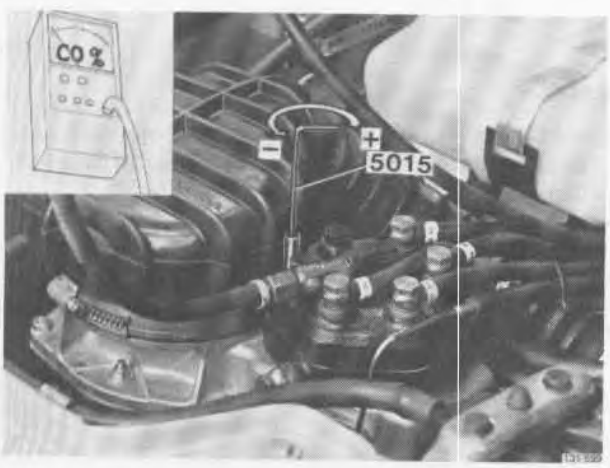
At the same time the pointer in the car's charge pressure gauge must be in the red sector and the lamp in the instrument should be on (on later models this lamp has been deleted).

131 609

J6

Switch off engine. Remove pressure gauge 5230 and pressure pump

Connect the pipe to the inlet manifold.



J7

Check/adjust CO content

Use key 5015 for adjustment.

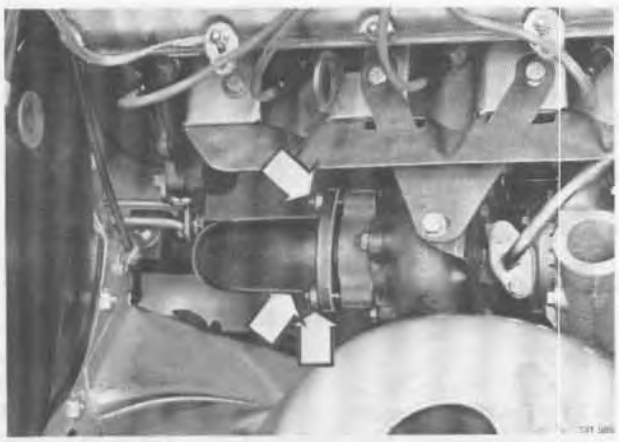
CO, check value ..... **0.7–1.3 %**

adjustment value ..... **1.0 %**

Idling speed ..... **15.0 rps** (900 rpm)

K. Turbo, wastegate with housing, replacement

Special tool: 5230

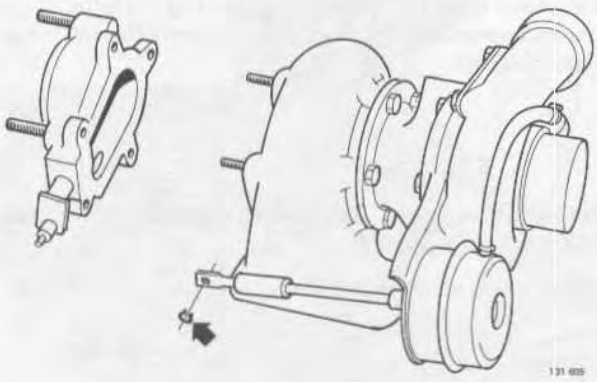


K1

Detach exhaust pipe from turbocharger

Remove the nuts at the turbocharger and the bolt at the gearbox mounting.

Move the pipe aside.



K2

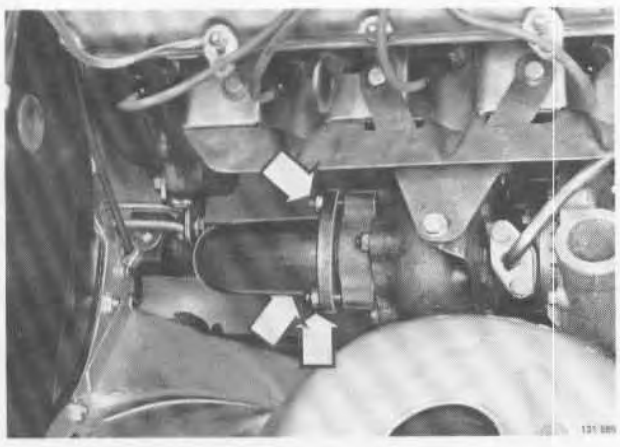
Remove:

- circlip for link rod
- wastegate and housing

K3

Check turbine housing

Check that the contact surface is smooth and that the "seat" is not burnt.

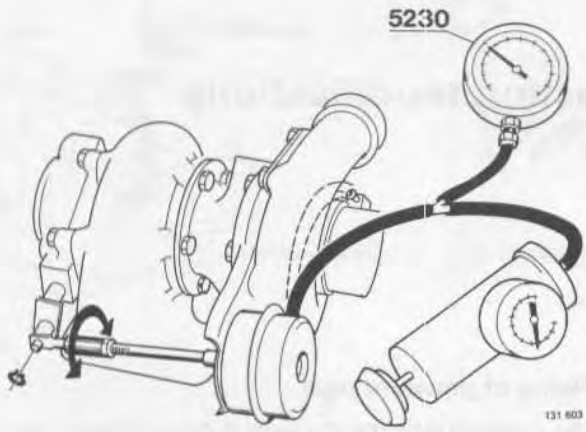


K4

Install:

- wastegate and housing. Smear the bolts with anti-seize compound.* Tighten to a torque of **20 Nm** (14 ft lbs).
- tne exhaust pipe. Smear the studs with anti-seize compound.* Tighten to a torque of **25 Nm** (18 ftlbs).
- gearbox front mounting bolt

* Part No. 1 116 035-9.



K5

Adjust wastegate actuator

Note! Wastegate actuator of previous design cannot be adjusted. It is sealed by riveting the adjusting sleeve to the link rod. If faulty, the actuator must be replaced, see page 18.

Connect pressure gauge **5230** and pressure pump to the actuator.

Pump up to a pressure of:

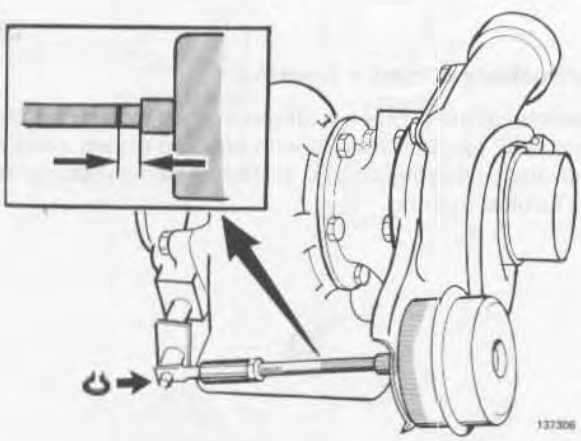
B 19/21 ET	**55 kPa** (7.8 lb/in²)
B 21 FT	**41 kPa** (5.8 lb/in²)
B 21 FT with intercooler	**57 kPa** (8.1 lb/in²)

Push the arm of the wastegate forward (closed valve).

Adjust the rod so that it fits exactly to the pin on the lever.

IMPORTANT! Do not turn the rod as this may damage the diaphragm in the actuator.

Remove the pressure gauge and pressure pump. Connect the pressure hose (hose clip).



K6

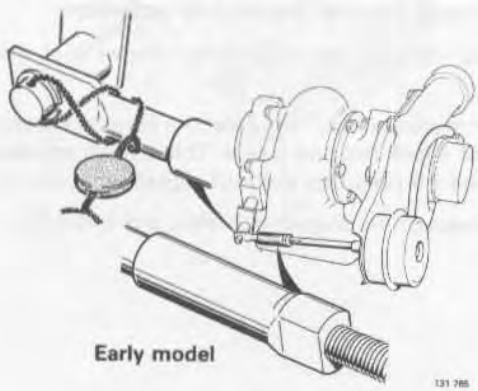
Check position of link rod

Link rod travel must be between 2–6 mm to obtain correct operating function.

To adjust:
Disconnect rod sleeve from lever.
Mark position of rod at wastegate actuator.
Reconnect sleeve to lever.
Measure distance between mark and wastegate actuator.
Distance = **2–6 mm** (0.08–0.24 in)
If incorrect, replace wastegate actuator, see instructions on page 18.

K7

Install new circlip.



Early model

K8

Check charge pressure

See page 16.

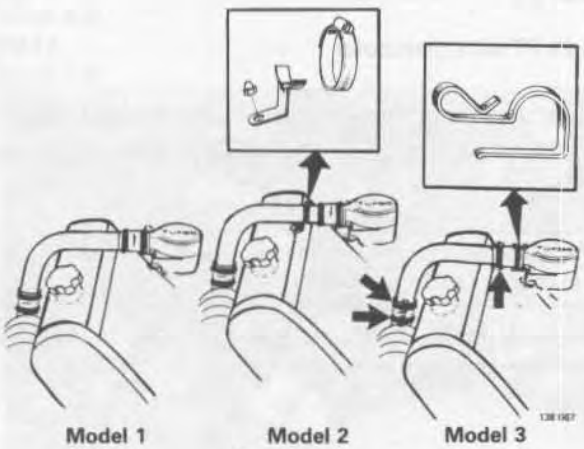
K9

Seal wastegate actuator

It is important to wind wire tightly around the sleeve as shown. Otherwise seal will loosen due to vibrations.

Volvo anti-tamper seal tongs, Part No. 9986408-4 have "Volvo" stamped on grips.

L. Turbocharger, production modifications



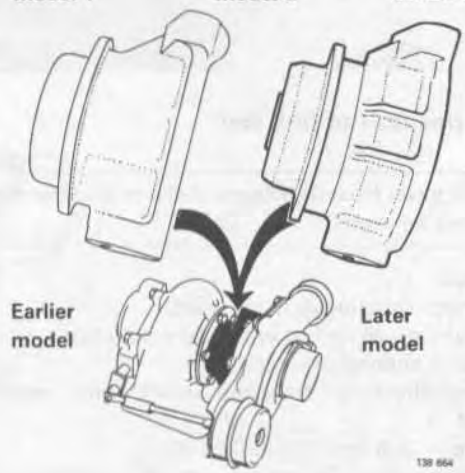
L1

Fixing of pressure pipe

The pressure pipe may be fixed in three different ways:

Model 1 Hose clips only (1981–82).
Model 2 Hose clips and a bracket between the pressure pipe and the cylinder head (1982).
Model 3 Hose clips and hoseholder (1984–).

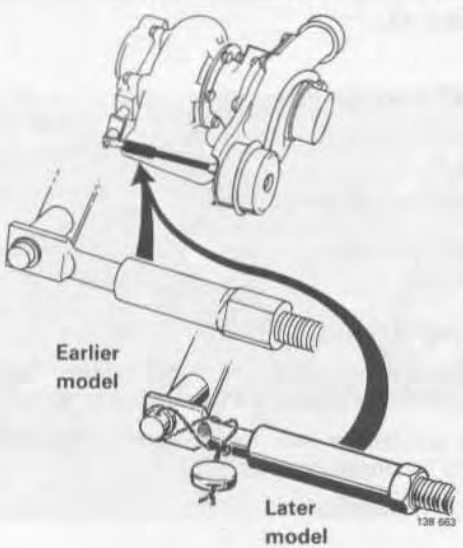
Fixing by means of holder and hoseclips replaces previous designs and may also be refitted to earlier models. See page 40.



L2

Turbocharger centre housing

The form of the centre housing was changed on models from 1982 on. This was done in order to obtain a more even heat distribution and to reduce temperatures at the turbine bearing.



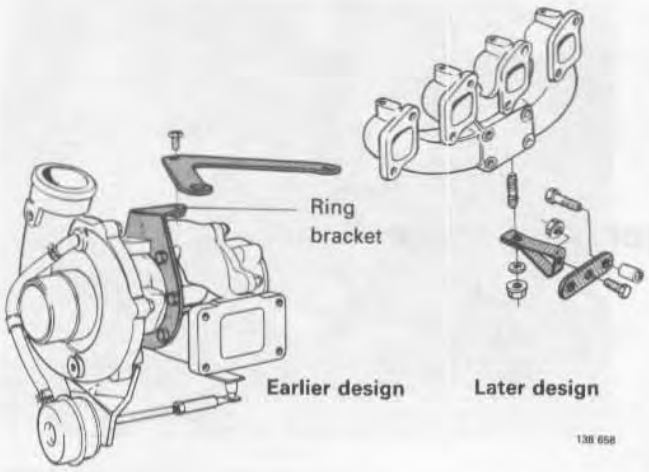
L3

Adjustment sleeve, wastegate actuator

On earlier models the adjustment sleeve is riveted to the rod.

On later models (1982– models) the sleeve is locked by means of a lock nut and a seal. This allows adjustment of the charge pressure without replacing actuator.

Adjustment of wastegate actuator, see page 16.



L4

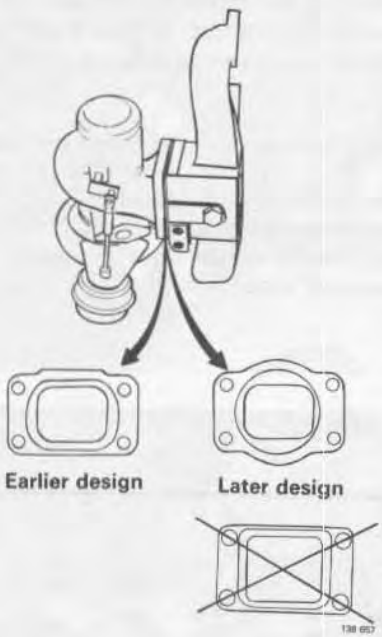
Turbocharger support bracket

Earlier models are equipped with a ring bracket and a support bracket which is connected between the turbocharger and inlet manifold.

A new type of support bracket was introduced on 1983 models. The bracket is connected between the turbocharger and cylinder block.

It is possible to install the new support bracket on earlier models (see page 41).

IMPORTANT! When fitting a new support bracket to turbochargers equipped with a ring bracket, see fig, do not detach the old support bracket. This prevents turbo-whine from being amplified by the ring bracket.



L5

Sealing flange: turbocharger to exhaust manifold

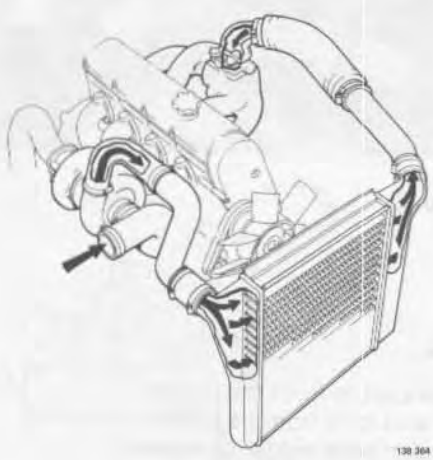
The sealing flange is one of two types.

Earlier models: sealing flange with a straight flange and gasket.

Later models: labyrinth seal (curved top of flange fits into turbocharger). The seal between the exhaust manifold and turbocharger is not installed.

This change was introduced on 1981 models.

IMPORTANT! Do not interchange components of earlier and later design.



L6

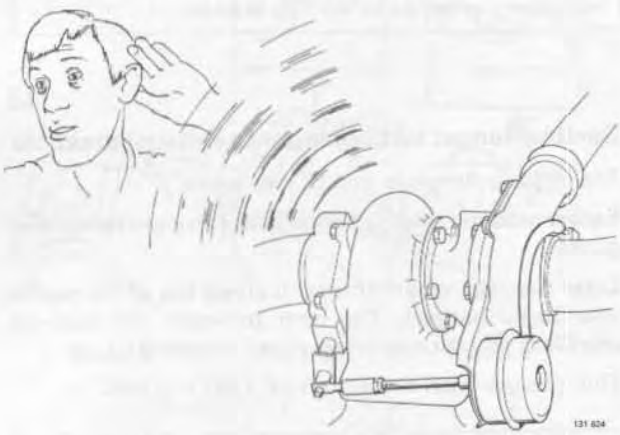
B 21 FT intercooler

Intercoolers were introduced on B 21 FT during the 1984 model year.

The major differences between B 21 FT and B 21 FT intercooler are:

- charge pressure control system (rpm relay + solenoid valve) on intercooler versions
- relay for disengagement of AC compressor on intercooler versions

M. Turbocharger, quick-check



M1

Turn off engine and listen to turbocharger. Rotating parts of turbocharger should continue to spin for a short time after the engine is shut off

If not:

Disconnect inlet hose from compressor housing and check,
- that compressor wheel rotates freely
- axial play and side play are normal
- that compressor wheel does not contact housing when pressed towards it

N. Turbocharger

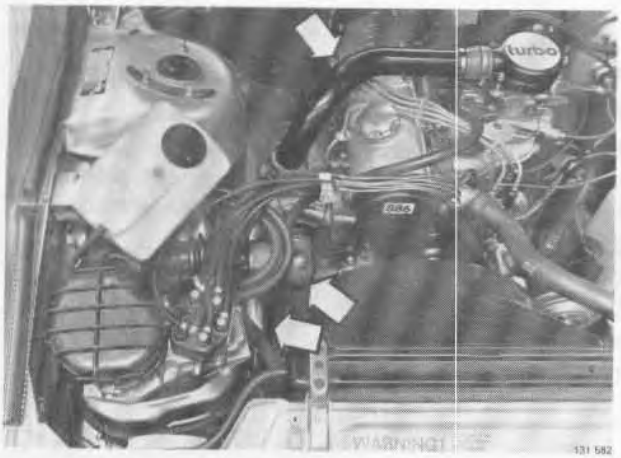
Special tool: 5230

Removal

N1

Remove:

- negative cable from the battery
- expansion tank from its holder
- expansion tank holder (3 screws)



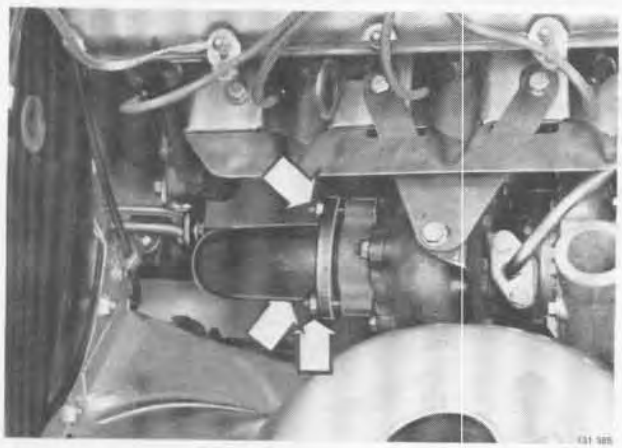
131 582

N2

Remove:

- preheating hose between the plate and air cleaner
- pipe and rubber bellows between the fuel distributor and the turbocharger. Withdraw the crankcase ventilation hose from the pipe
- pipe and connection between the turbocharger and inlet manifold, or between the turbo and the intercooler (B 21 FT with intercooler)

Cover the turbocharger inlet and outlet holes, to prevent dirt and dust entering the turbocharger.

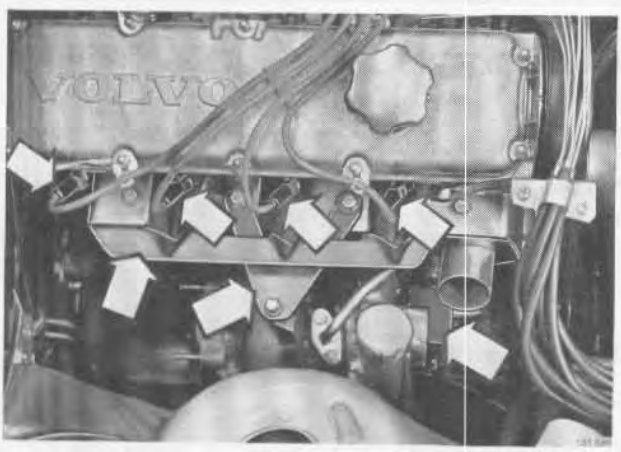


131 585

N3

Detach exhaust pipe from turbo

Push the pipe to one side.

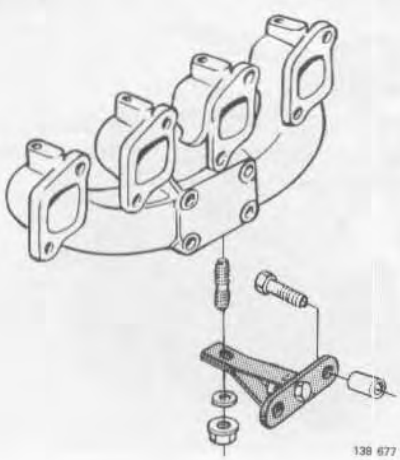


N4

Remove:

- ignition leads from spark plugs
- upper heat-guard plate
- support bracket between the turbo and the manifold (earlier design)
- lower heat-guard plate (unscrew retaining screw underneath the manifold)

- support bracket between the manifold and cylinder block (later design)



138 677

Turbocharger removal

N5

Remove oil delivery pipe and manifold retaining nuts and washers

Remove the oil pipe clamp, retaining screws on the turbo and the banjo union in the cylinder block (under the manifold). Make sure no dirt gets into the oilways.

Remove the manifold retaining nuts and washers. Let one nut remain loosely installed in order to keep the manifold in position.

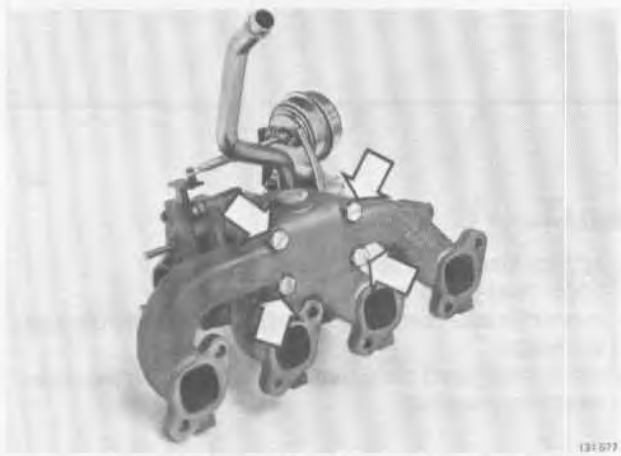
Remove the oil delivery pipe. Cover the openings on the turbo.

N6

Detach fuel distributor from air cleaner

Slacken the clamps. Move the fuel distributor and the lower section of the air cleaner up onto the righthand wheel arch (place some kind of protection on the wheel arch first).

Remove the air cleaner insert.



N7

Remove turbocharger and manifold

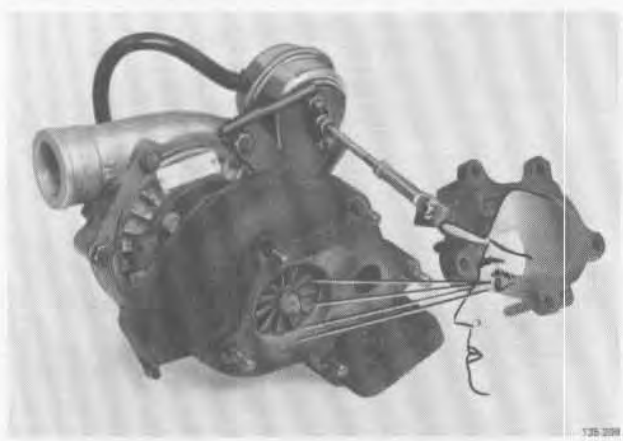
Take off the remaining retaining nut and washer.

Lift forwards and upwards.

Remove manifold gaskets and the O-ring for the oil return pipe from the cylinder block.

N8

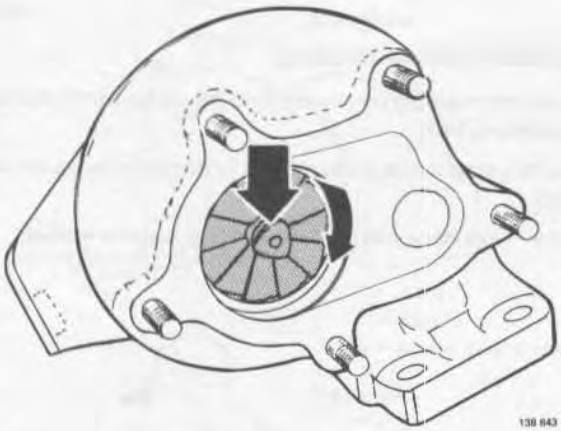
Remove turbocharger from manifold



N9

Check the axial play

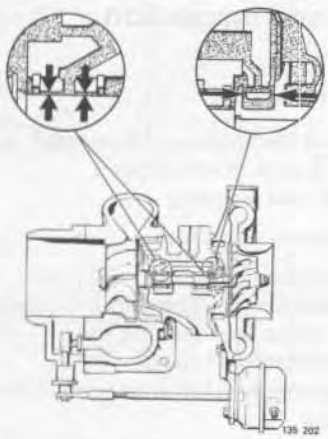
Check that the turbine and compressor wheel have not scraped against the housing and that they do not scrape when the shaft is pulled axially.



N10

Check the radial play

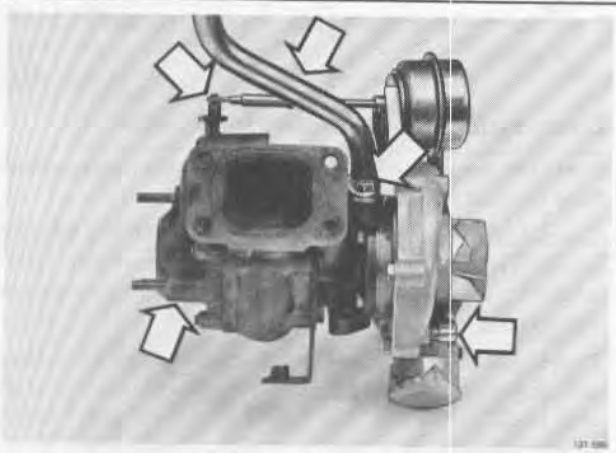
Check that the turbine and compressor wheel do not scrape in the housing when depressed sideways and turned at the same time.



Replacing turbocharger

In some cases turbochargers have been replaced unnecessarily as a result of finding play in the turbine shaft. However, since the shaft is supported by full floating bearings a certain play should always be felt when inspecting the shaft (the shaft floats on a film of oil).

If the turbocharger has been replaced as a unit:
- transfer necessary parts. Use new gaskets.
- plug all the openings in the old compressor before returning it (for repair, etc.)
- see page 36 before installing



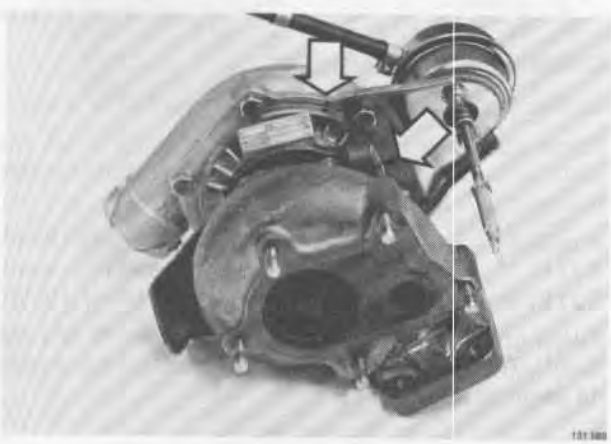
Disassembly

Note: Volvo does not recommend the dissassembly of a turbocharger in a car still covered by the New-Car Warranty.

N11

Remove:

- the pressure hose from the nipple on the compressor housing
- the return oil pipe
- the circlip on the arm of the relief valve
- the wastegate and housing



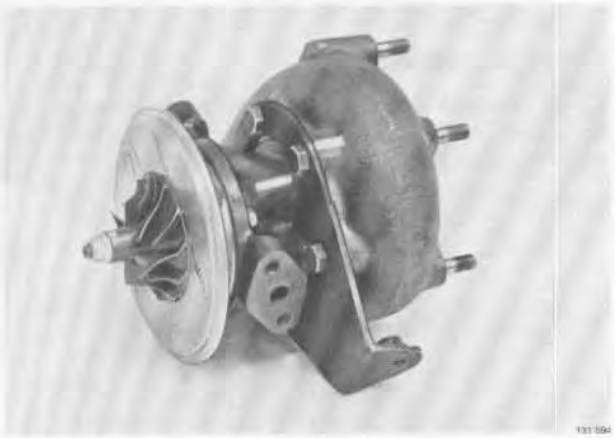
N12

Remove turbine housing

Mark the location of the turbine housing and the console for the pressure actuator. The marking must be done carefully in order to allow reinstallation of components in their original positions; otherwise, the connections between the turbo compressor and the engine will not fit correctly.

The housing must be turned in order to remove all bolts.

Note! Take care not to damage the compressor wheel.



N13

Remove turbine housing

Mark the position on the turbine housing. Mark clearly, opposite a bolt.

The housing must be turned in order to remove all the bolts.

Note! Take care not to damage the turbine wheel.

Cleaning and inspection

N14

Clean and check:

- turbine and compressor housings
- oil delivery and return pipes
- wastegate and housing

Check the above parts for:

- damage, cracks
- wear and damage (the turbine/compressor wheel does not strike the housing etc.)
- smooth contact surfaces
- burning damage to the wastegate (plate) and its contact surface
- jamming of the wastegate arm
- clean oil and air passages of constrictions

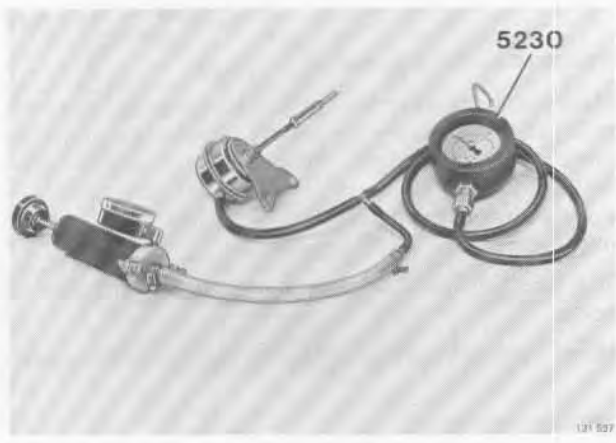
N15

Clean turbine and compressor wheels

First tape over the oilways in the bearing housing. Carefully clean the wheels to avoid damage.

Check for damage and wear. If damaged, the bearing housing must be replaced, complete with wheels. Note: under no circumstances must any attempt be made to realign the wheel blades.

Check that the shaft runs easily, does not stick etc. Note that there should always be a clearance between shaft and housing due to the construction of the floating bearings.



N16

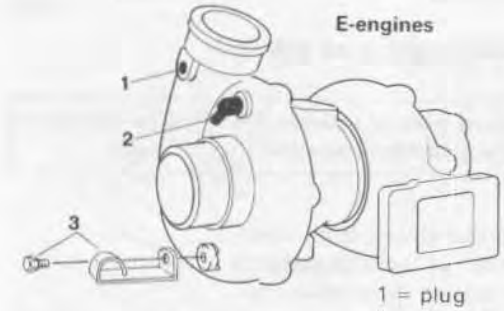
Check wastegate actuator

Connect pressure gauge **5230** and a pressure pump.

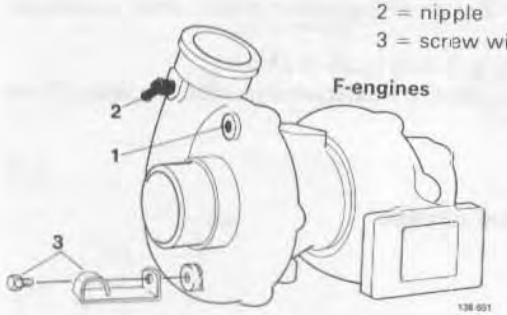
Pump up the pressure and check when the link rod starts to move. This should take place at about approximately

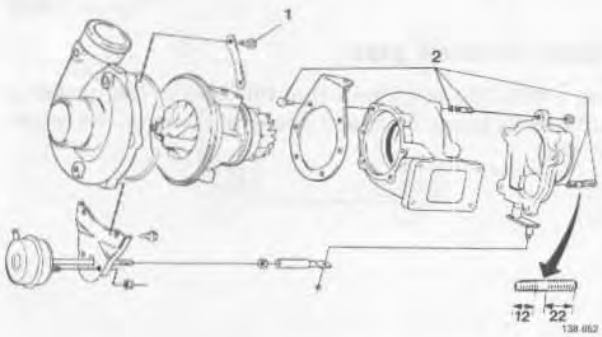
B 19/21 ET ..... **50 kPa** (7.1 lb/in^2)
B 21 FT ..... **36 kPa** (5.1 lb/in^2)
B 21 FT with intercooler ..... **52 kPa** (7.4 lb/in^2)

Pump up to a pressure of approximately **70 kPa** (9.9 lb/in^2). The pressure must remain constant for at least **10 seconds.**

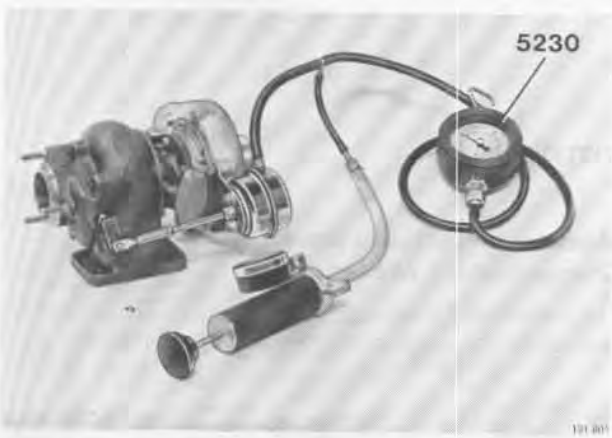


1 = plug
2 = nipple
3 = screw with clamp





Suitable tools for tightening to correct torque:
Torque wrench P.N. 1158687-2
Open ended spanner 13 mm. P.N. 1158961-1



Assembly

Take care not to damage the wheels. Use new gaskets.

With new compressor housing: *N17*

Transfer nipple, plug and screw with clamp

Use thread sealer, Part No. 1161053-2 when installing the parts.

Note! Nipple and plug location differ for the E and F engines of earlier models.
On later models different housings are used for E and F engines.

N18

Assemble turbocharger

On some bolts, thread sealer must be used, and on some, anti-seize compound. It is also important that the studs are installed correctly. If not, the charge pressure may be incorrect.

1 = Use new screws. In an emergency the old screws can be used provided these are coated with thread sealer (Part No. 1161053-2).
2 = Anti-seize compound, Part No. 1161035-9.

Assemble turbine housing and wastegate with housing. Tighten to a torque of **20 Nm** (15 ftlbs.).

Install a new gasket for the compressor housing on the bearing housing. The housings must be turned in order to install all the bolts.

Install the housings according to the alignment marks made when disassembling. Tighten all bolts evenly all around.

Tighten to the following torques:
- turbine housing **20 Nm** (15 ftlbs)
- compressor housing **18 Nm** (13 ftlbs)

N19

Adjust pressure actuator

Connect pressure gauge **5230** and pressure pump to the pressure actuator.

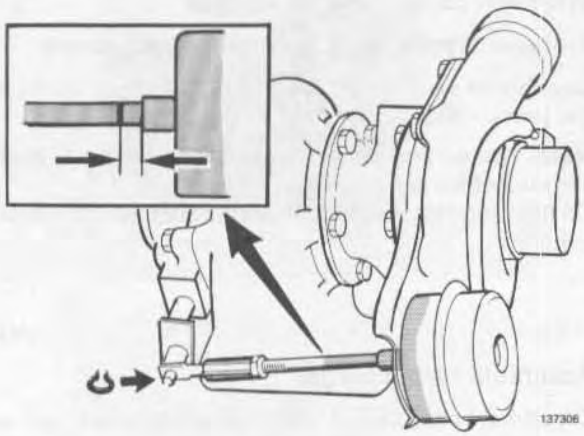
Pump up to a pressure of:
B 19/21 ET ..... **55 kPa** (7.8 lb/in²)
B 21 FT ..... **41 kPa** (5.8 lb/in²)
B 21 FT with intercooler ..... **57 kPa** (8.1 lb/in²)

Push the wastegate arm forward (closed valve).

Adjust rod so that it fits exactly on the pin on the arm.

Disconnect pressure gauge and pressure pump. Connect the hose to the compressor housing (hose clamp).

Note! Pressure actuator of earlier design cannot be adjusted. This is sealed by the sleeve being riveted to the actuator rod. If faulty, the pressure actuator must be replaced, see page 18.



N20

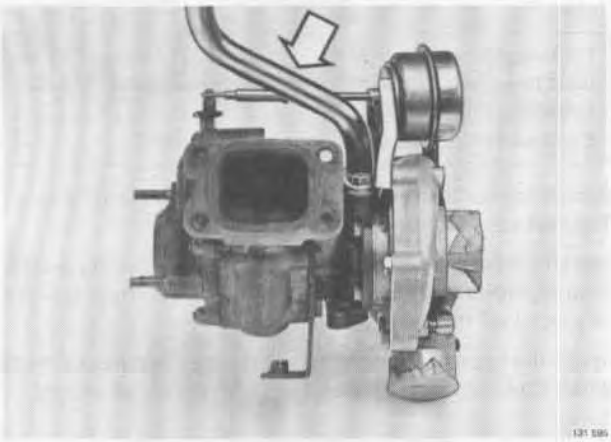
Check basic position of link rod

Link rod travel must be between 2–6 mm (0.08–0.24 in) to obtain correct operating function.

To adjust:
Disconnect rod sleeve from lever.
Mark position of rod at wastegate actuator.
Reconnect sleeve to lever.
Measure distance between mark and wastegate actuator.
Distance = **2–6 mm** (0.08–0.24 in)
If incorrect, replace wastegate actuator, see instructions on page 18.

N21

Install new circlips

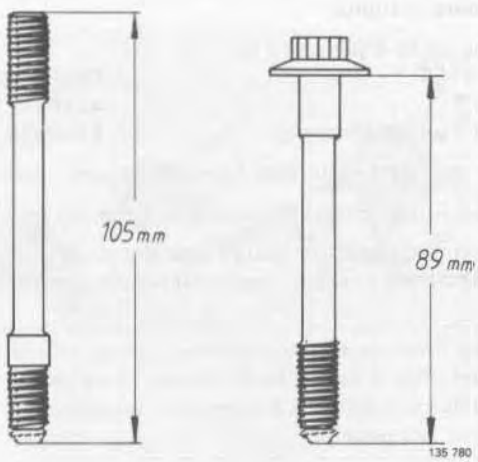


N22

Install oil return pipe

Use a new gasket. Check that the hole in the gasket is sufficiently large, i.e. that it does not constrict the return oil flow.

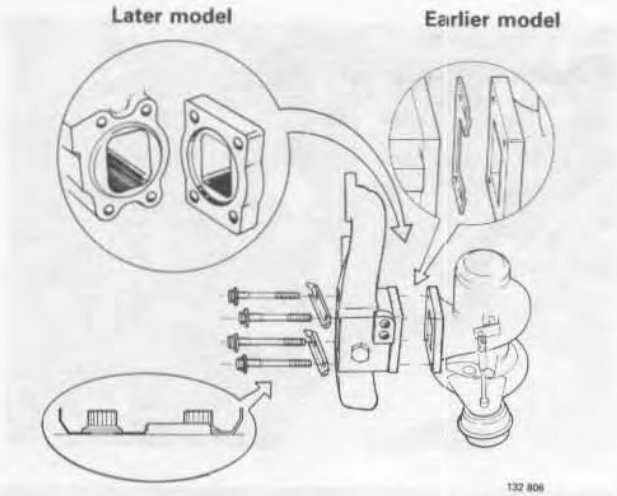
Installation



N23

Measure bolts, turbo-manifold
Change bolts if needed

The bolts may be reused provided they are not shorter than 89 mm and 105 mm (3.5 in and 4.1 in) respectively.



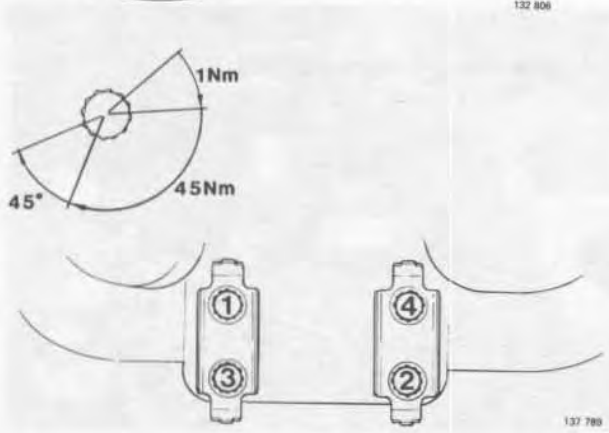
N24

Assemble turbocharger and manifold

Earlier model: Turn the gasket between manifold and turbo with the outward curve towards the turbo.

Smear the threads of the bolts and contact surfaces with assembly paste, Part No. 1161078-9. The assembly paste prevents the inner securing plate from being deformed by the frictional forces when tightening.

Install inner securing plate and bolts.

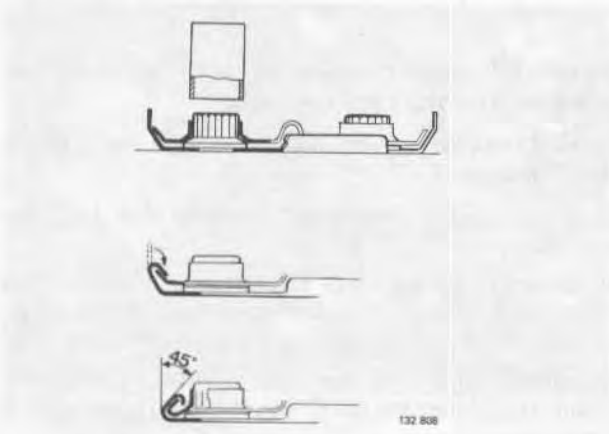


N25

Tighten bolts (nuts) with the following torque

In the following sequence and in three stages:

I **1 Nm** (9 inlb)
II **45 Nm** (33 ftlb)
III **45°**



N26

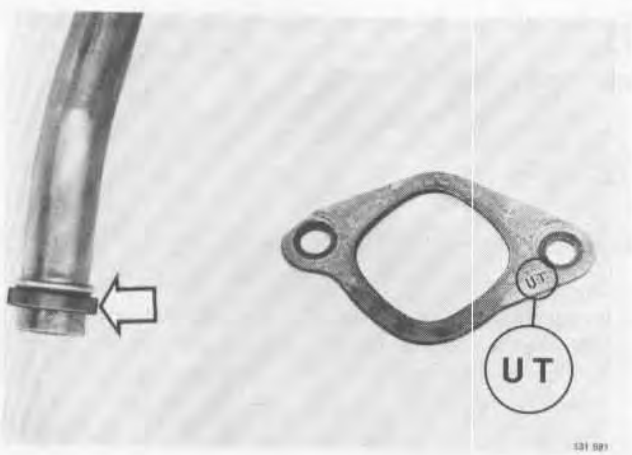
Install outer securing plate

Knock the securing plate in position. Use a hammer and sleeve.

N27

Bend in the inner securing plate

It is particularly important that the securing plate for the upper bolts is bent inwards at least 45°. This must be done because the gap between the bolts and the engine is small.



N28

Lift turbocharger with manifold into position

Install new manifold gaskets, the marking UT must face away from the engine.

Install a new O-ring on the oil return pipe. Coat the O-ring with a little grease.

Lift into position and guide the oil return pipe through the hole in the cylinder block. Ensure that the O-ring is installed properly. Install a washer and nut (new nut) to hold the turbocharger and manifold in position.

N29

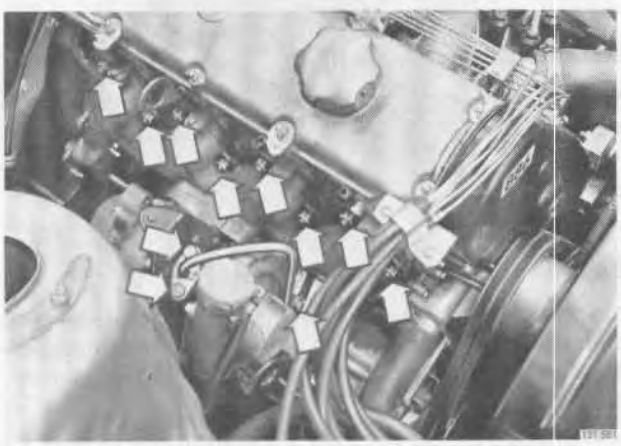
Install fuel distributor

Insert the air cleaner insert.

Bend down and secure the fuel distributor.

N30

Fill turbocharger inlet with oil



N31

Install oil delivery pipe as well as manifold washers and nuts for manifold

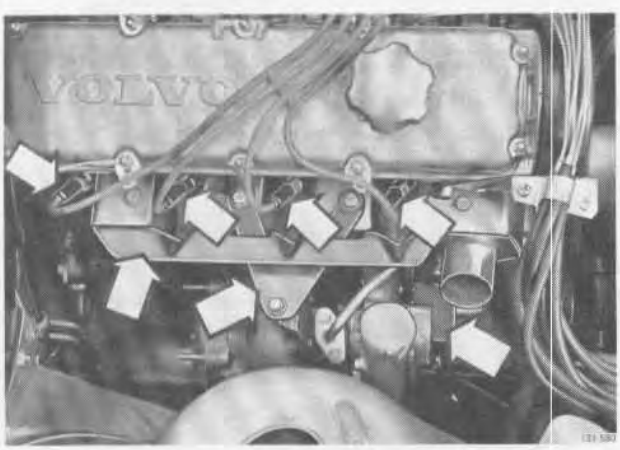
Note: Check oil delivery pipe for sludge and if necessary, clean pipe

Use new gasket for the oil delivery pipe and new manifold nuts.

Install the oil delivery pipe in position. Install the banjo union and washers, but do not tighten at this stage. Make sure no dirt gets into the pipe or onto the bolt.

Install the manifold washers and nuts. Do not forget the lifting eye. Make sure the O-ring on the oil return pipe is fitted properly.

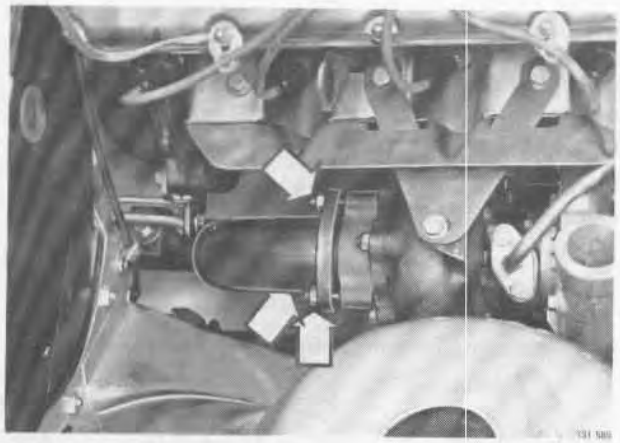
Connect the oil delivery pipe to the turbo (new seal). Tighten the banjo union in the cylinder block. Install the clamp for the oil delivery pipe.



N32

Install:

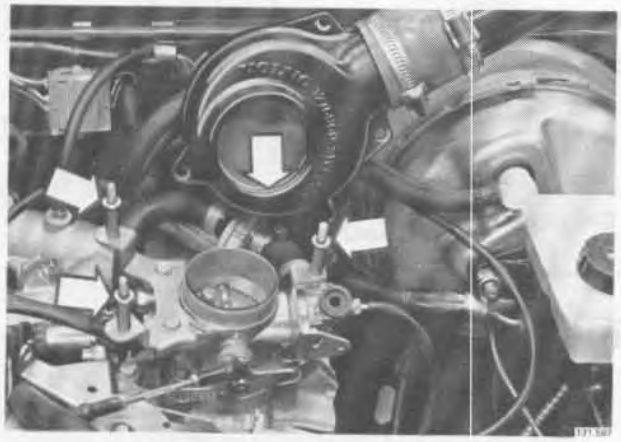
- upper heat-protection plate
- mounting bracket between manifold and turbocharger and/or the mounting bracket between the cylinder block and turbocharger (see page 29)
- sparkplug cables



N33

Install:

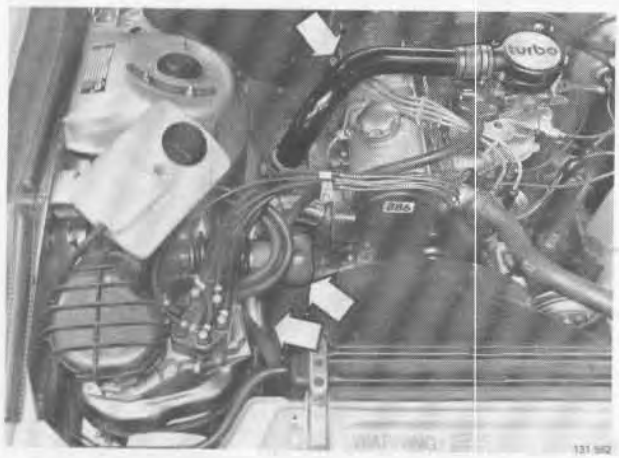
- exhaust pipe. Smear the studs with anti-seize compound. Tighten to a torque of **25 Nm** (18 ftlbs)
- transmission front mounting



N34

Check that:

- throttle housing stud washers are in position
- O-ring sits correctly and is undamaged
- connecting hoses/pipes are in a good condition and do not contain loose particles. Replace hardened or cracked hoses

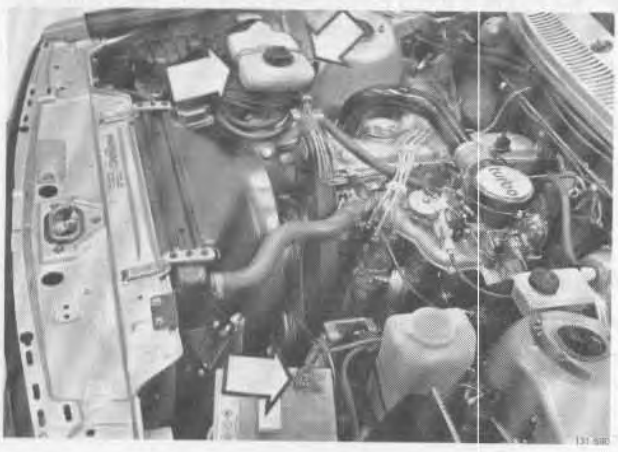


N35

Install:

- the pipe with rubber bellows between the fuel distributor and the turbo. Connect the hose for the positive crankcase ventilation
- the preheating hose between the plate and the air cleaner
- the pipe between the turbo and the inlet manifold or between the turbo and the intercooler (B 21 FT with intercooler)

Make sure that the hoses/pipes are properly installed and that the hose clamps are tightened.



N36

Install:

- holder for the expansion tank
- expansion tank
- battery cable

131 606

N37

Disconnect brown electric cable (from terminal 15) from the ignition coil. Run starter motor for approximately 30 seconds. Reconnect electric cable

Note: This is done to ensure that the turbocharger receives lubrication.

N38

Start engine and check function

Idle the engine for a moment or two before revving up.

N39

Check/adjust charge pressure

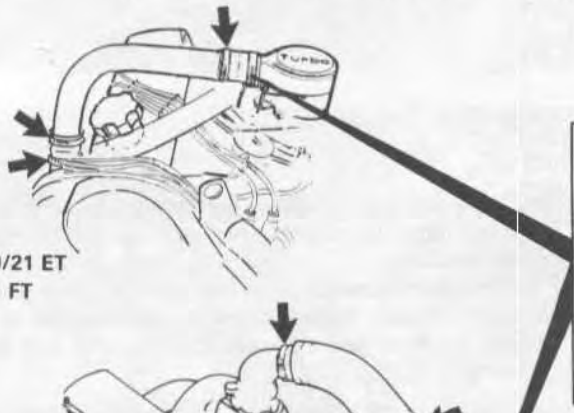
See page 16.

N40

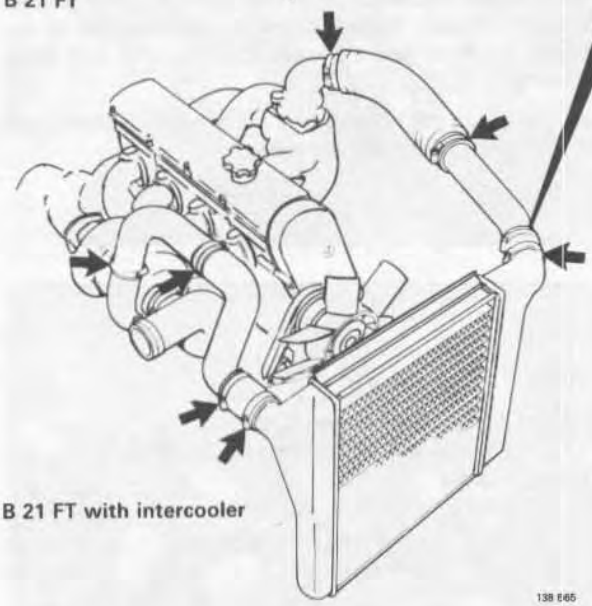
Seal wastegate actuator

See page 17.

O. Air delivery pipe, clamping

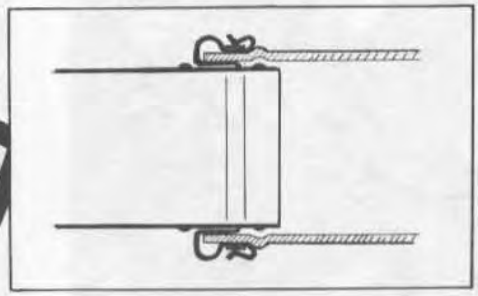


B 19/21 ET
B 21 FT



B 21 FT with intercooler

138 665



O1

- Two holders per hose clamp
- The holders to be positioned opposite each other as shown in the illustration.

IMPORTANT
When installing the holders, make sure that they do not rest against the shoulders of the pipe.

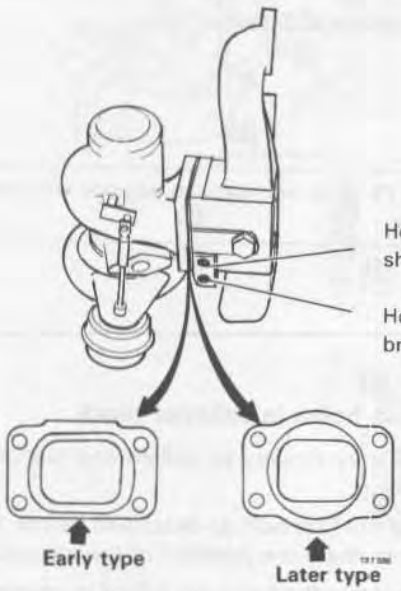
O2

Parts required when installing holders

Part	Quantity	P/N.
Holder	8	1357202-9
	16 (B 21 FT with intercooler)	

P. Installing new type of support bracket

Operations P1–11



P1

Check type of exhaust manifold and turbocharger

If the hole for the support bracket screw is already threaded, it is not necessary to order the parts shown in parentheses at the bottom of the list shown below.

If there is not a hole it will be necessary to fit a new exhaust manifold.

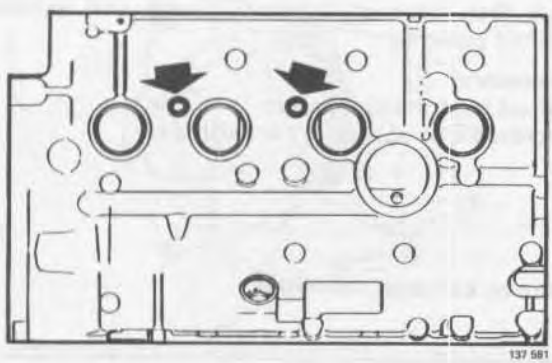
The exhaust manifold can be identified by checking the turbocharger flange facing the exhaust manifold.

- straight flange = early type
- rounded flange = late type (introduced in production in July 1981)

Required parts

Description	Part number	Qty
Support bracket	1 336 265-2	1
Stay	1 336 266-0	1
Spacer	1 257 499-2	2
Bolt, M6S M8x35	940 132-4	2
Stud, PS M8x32*	1 336 261-1	1
Bolt, M6FS M8x16	946 440-5	1
Washer	419 401-5	1
Flange nut	948 645-7	2
Exhaust manifold gasket	463 846-6	4
O-ring (oil return pipe)	1 306 264-1	1
Copper washers for delivery pipes	18 671-8	2
Gasket for above	420 475-6	1
Turbocharger bolts**	1 317 067-5	4)
Outer lock plate	1 326 586-3	2)
Inner lock plate	1 326 222-5	2)
Exhaust manifold, early type	1 336 238-9	1)
Exhaust manifold gasket, early type	1 276 689-5	1)
Exhaust manifold, late type	1 336 237-1	1)

* Stud 1336261-1 is made of a special nickel alloy and must not be exchanged for any other type of stud.
** To be replaced only as required, see operation A12.



P2

Remove and dismantle turbocharger – manifold

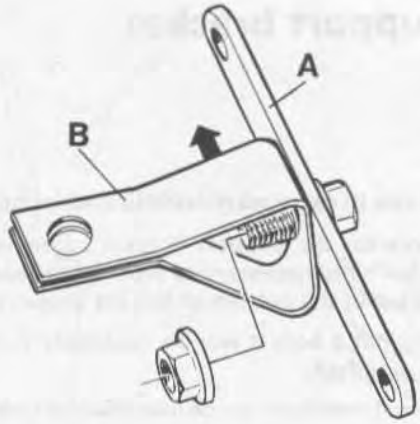
See page 30, N1–8.

Cover oilways to prevent dirt and dust entering turbocharger.

Turbocharger – manifold assembly should only be dismantled if the manifold is to be replaced.

P3

Remove exhaust manifold
Grind cast lugs flush using an emery cloth



P4

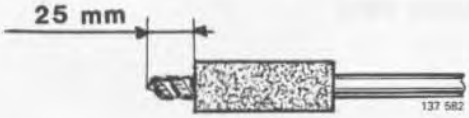
Assemble support bracket

Press "B" as far to the rear as possible when tightening.

Tightening torque 23.5 Nm (17 ftlbs).

Operations P5–9 do not apply to engines with factory-drilled holes.

P5



Drill and tap holes in cylinder block

These holes may already be drilled and tapped on recent models.

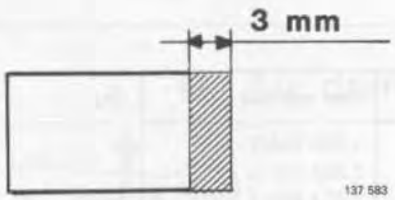
Drill and tap the first hole as described below, and use the bracket to mark the position of the second.

It is important that the holes are drilled at right angles to the face.

Mark centre of lug on cylinder block.

Drill a **4 mm** diam. centering hole. Then drill a **6.8 mm** diam. hole to a depth of **25 mm** (1.0 in). (Attach a piece of adhesive tape or hose to the drill to indicate the depth).

Tap the hole using a **M8** tap to a depth of **20 mm** (0.8 in).

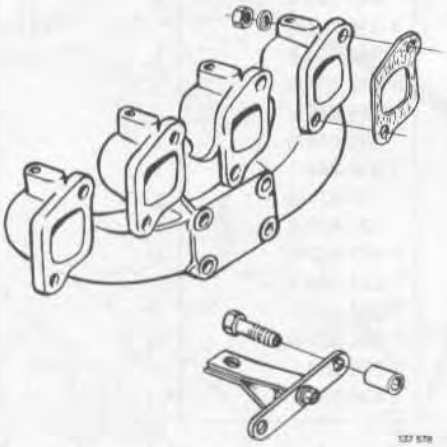


P6

Cut spacers to size

Remove 3 mm (0.1 in).

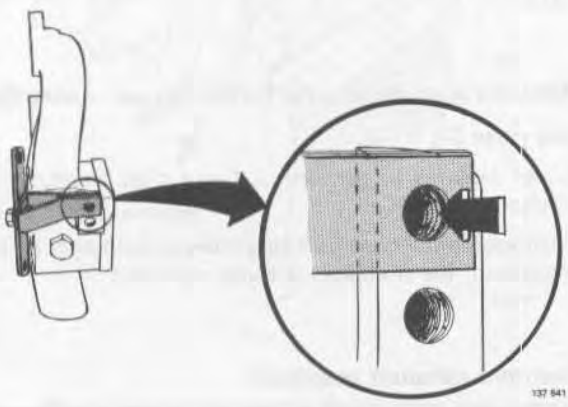
Note: This is **not** necessary on engines with factory drilled holes.



P7

Mount new exhaust manifold on engine

- Use the **old** gaskets as it is necessary to remove the manifold at a later stage, prior to final installation.
- Attach support bracket with spacers to cylinder block.



P8

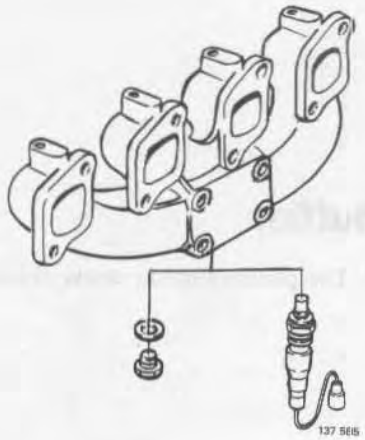
Check position

Check that holes in support bracket and exhaust manifold coincide.

If necessary:
- adjust by grinding spacers
- increase size of hole in "A" with a file

P9

Remove exhaust manifold

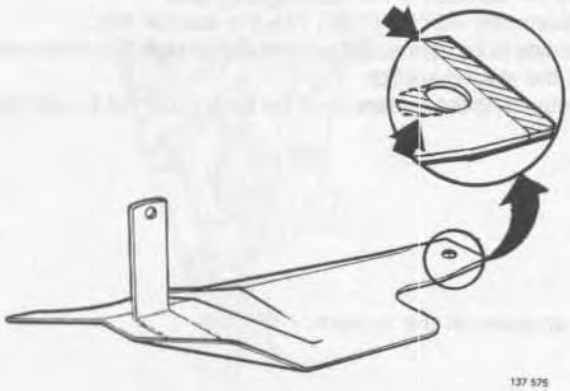


P10

Transfer following parts to new exhaust manifold

B 19/21 ET: plug and gasket
B 21 FT: Lambda-sond.

Apply assembly paste P/N 1 161035-9 to threads.



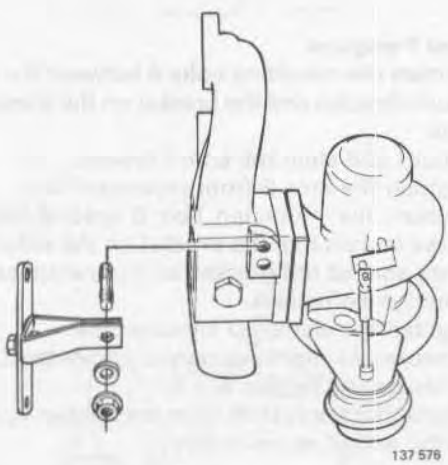
P11

Modify lower heat shield

Note! Part number for modified heat shield = 1 336060-7.

Hold shield in position and drill out rear hole to coincide with hole in exhaust manifold.

Cut rear edge of plate to allow a space for the new support bracket.

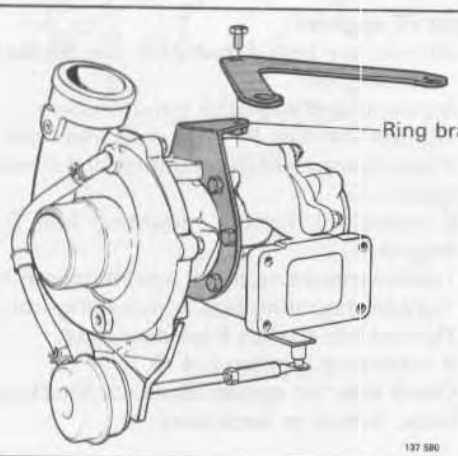


P12

Install turbocharger – manifold
Install:

- turbocharger with manifold
- support bracket
- front exhaust manifold

See page 36, and N23–40.



IMPORTANT! When fitting a new support bracket to turbochargers equipped with a ring bracket (see fig), do not detach the old support bracket. This prevents turbo whine from being amplified by the ring bracket.

Q. Exhaust pipe and muffler

Type of exhaust system fitted to vehicle depends on model and market. The pictures below show some designs.

Q1

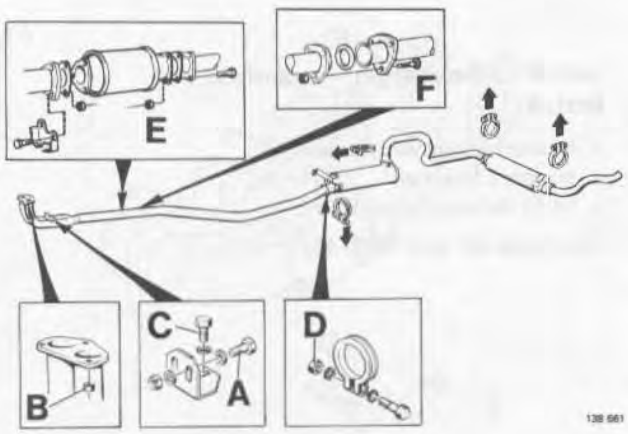
General

- Use new gaskets.
- The steel cone at the link should only be replaced if the cone is damaged.
- The exhaust pipe must project approximately 40 mm (1 ½") into the silencer box.
- The rear muffler is marked "IN" on the side to be connected to the exhaust pipe at the rear axle.
- Position the clamps on the centre of the slotted section.
- The clerance between the exhaust system and the underside of the body must not be less than 20 mm (¾").

Q2

Installing complete system

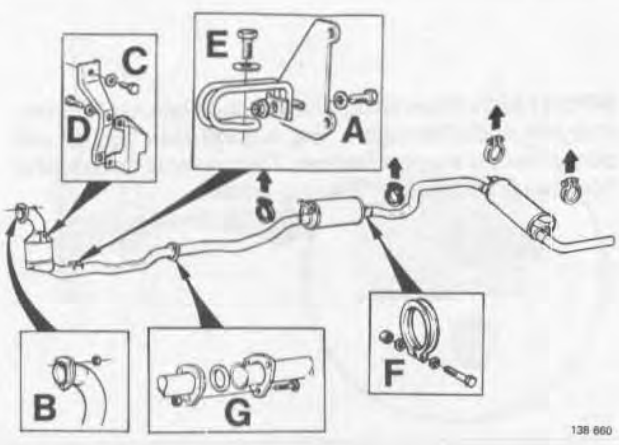
Follow the sequence below to avoid stresses in the system



138 661

A, E and F-engines

1 Loosen the mounting bolts **A** between the exhaust pipe's bracket and the bracket on the transmission box.
2 Mount and align the entire system.
3 Tighten the nuts **B** front pipe-manifold.
4 Tighten the mounting bolt **C** bracket-front pipe. Make certain that the bracket on the exhaust pipe rests against the bracket on the transmission box and tighten bolts **A**.
5 Tighten the clamps **D** silencer-pipe.
6 If necessary, tighten catalytic converter **E**.
7 If necessary, tighten link **F**.
8 Check that the system does not contact against the body. Adjust as necessary.

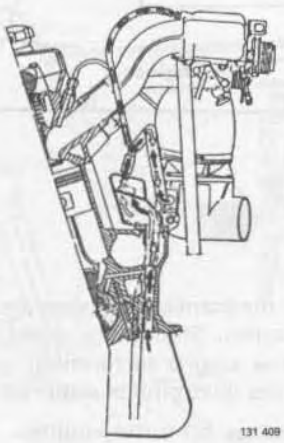


138 660

ET and FT engines

1 Loosen the bolt **A** between the bracket and the mounting iron.
2 Suspend and align the entire system.
3 Tighten the nuts **B**; front pipe-manifold.
4 If necessary, tighten mounting bolt **C** bracket-front pipe.
5 If necessary, tighten mounting bolt **D** bracket--engine.
6 Tighten mounting bolt **E** mounting iron-front pipe.
7 Tighten mounting bolt **A** mounting iron-bracket.
8 Tighten the clamps **F** silencer-pipe.
9 If necessary, tighten link **G**.
10 Check that the system does not knock against the body. Adjust as necessary.

R. Crankcase ventilation

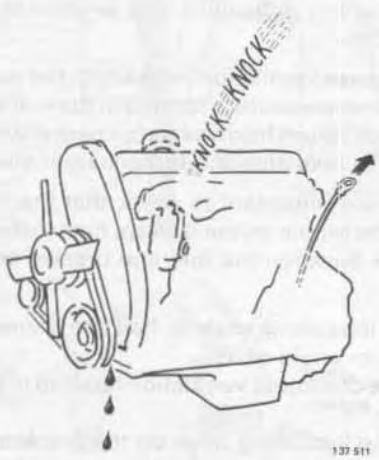


R1

Cleaning/checking

- clean/check hoses
- clean the calibrated nipple (does not apply to turbo engines)
- clean/replace flame trap (does not apply to turbo engines).

A, E, F-engines 1975–80. see page 46
Turbo engines see page 46
A, E, F-engines 1981–85 see page 47



R2

Blocked flame trap/blocked system

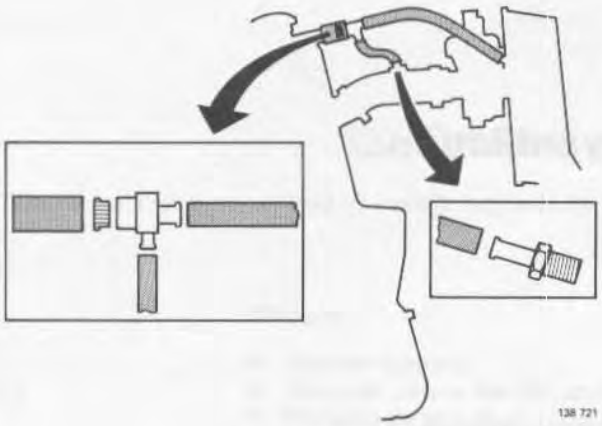
A blocked flame trap will cause the crankcase ventilation system to malfunction and result in high crankcase pressure.

Symptoms are:
- oil dipstick "jumps out" of the pipe
- oil leakage at the seals in the cylinder block
- seals need not always be replaced if they are leaking due to a blocked flame trap. Fix the flame trap, clean the engine and check whether the seals are leaking or not
- the engine knocking (change to a new flame trap if necessary).

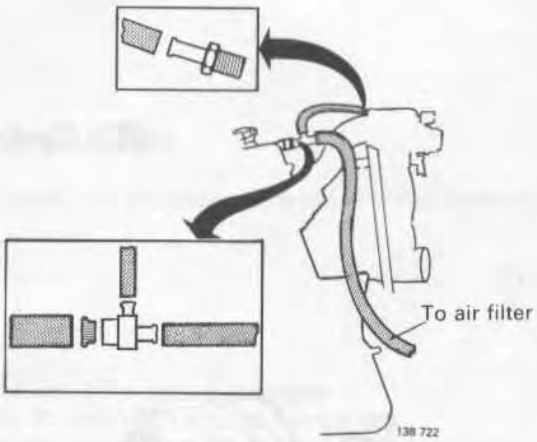
Reasons for a blocked flame trap may be:
- too long intervals between changing the engine oil
- the engine oil used is of inferior quality

R3

A, E and F-engines 1975–80



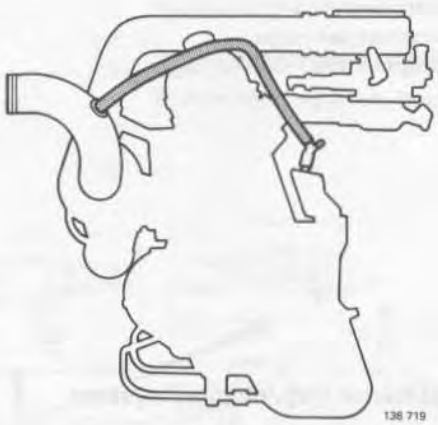
A-engines



E/F-engines

Turbo engines

R4



On turbo engines the crankcase gasses are vented "upstream" of the turbo. There is a constant negative pressure when the engine is running, so no further connection with the inlet pipe is required.

There is no flame trap on turbo engines.

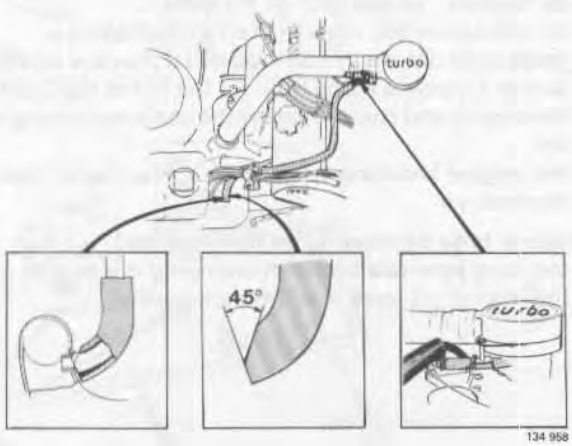
R5

Crankcase ventilation hose

An incorrectly installed crankcase ventilation hose may result in starting difficulties (the air flow sensor plate does not lift).

If the crankcase ventilation hose kinks, the result will be that a positive pressure is formed in the crankcase. This blocks the oil return from the turbocharger which in turn causes oil to leak onto the turbocharger shaft seals.

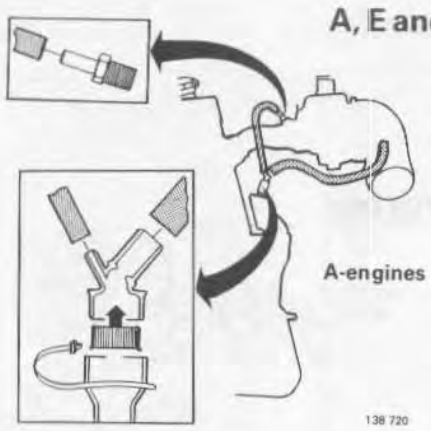
It is therefore important to check that the hose is not kinked at the nipple on the oil trap, next to the cold start injector, or between the fuel line bracket and the line elbow.

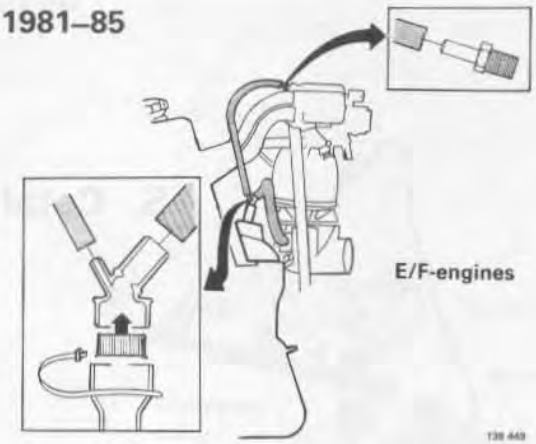


1 Cut the insulating hose to half the diameter of the hose at an angle of 45°.
2 Press the crankcase ventilation hose up to the bead in the pipe.
Install the insulating hose on the crankcase ventilation hose so that it fits tightly against the pipe.
3 Pull the crankcase ventilation hose over the cold start injector.

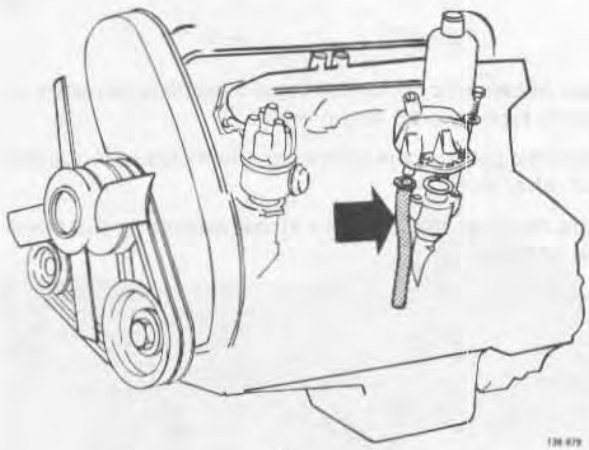
A, E and F-engines 1981–85

R6





R7

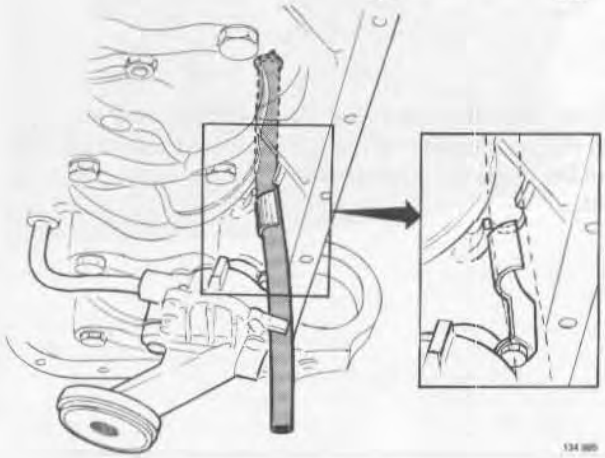


Drain hose

To ensure that the crankcase ventilation functions correctly the drain hose must be correctly installed, with the outlet underneath the oil level in the oil sump.

If the drain hose is incorrectly installed or if it is too short, it is possible that the crankcase ventilation will not function. The hose may, in addition, make contact with the crankshaft and be damaged.

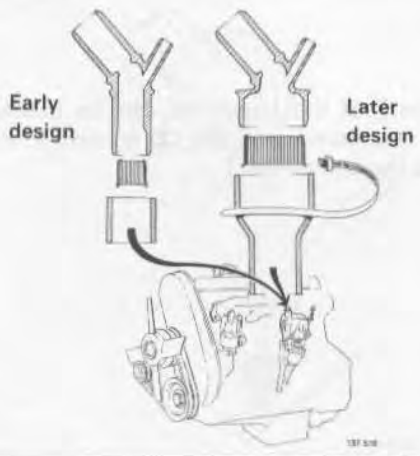
R8



When removing oil trap:

Make sure that the drain hose does not come up as well. If so, the oil sump must be removed to ensure that the hose takes up the correct position when installed.

R9



Flame trap

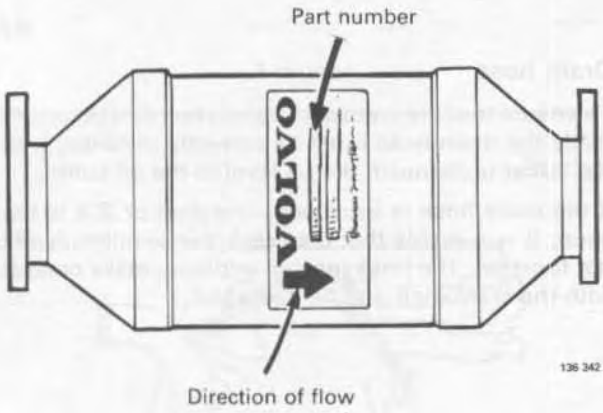
Parts of a later design were introduced on models 1983. If need be, these can also be installed on cars of an earlier model.

Flame trap of a later design has larger channels and a larger diameter than those of a previous design.

Note (Applies to both designs)

- The flame trap must be checked and, if necessary, cleaned/replaced at ordinary service intervals.
- The flame trap must be **positioned in the T-piece.**

S. Catalytic converter

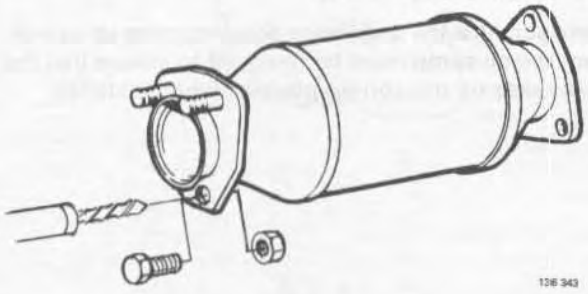


S1

Type of catalytic converter fitted to vehicle depends on engine type, model and market.

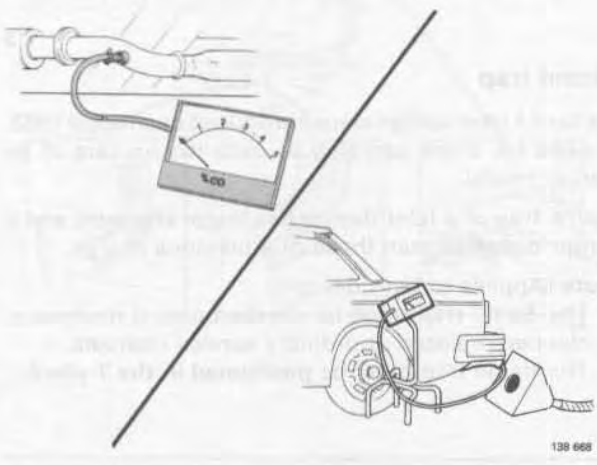
There is a plate on the converter, giving the part number and other data.

Most designs also have an arrow indicating the direction of flow.



S2

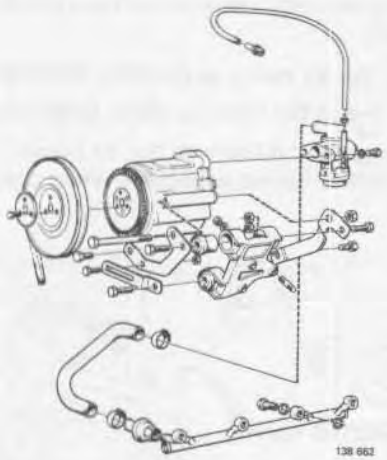
Some catalytic converters are fixed by means of a stud. Do not replace the converter if the stud is broken. Drill out the stud instead and install a through-going bolt and nut.

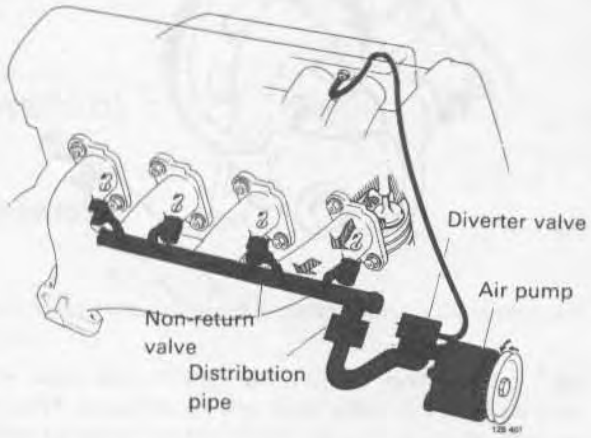


S3

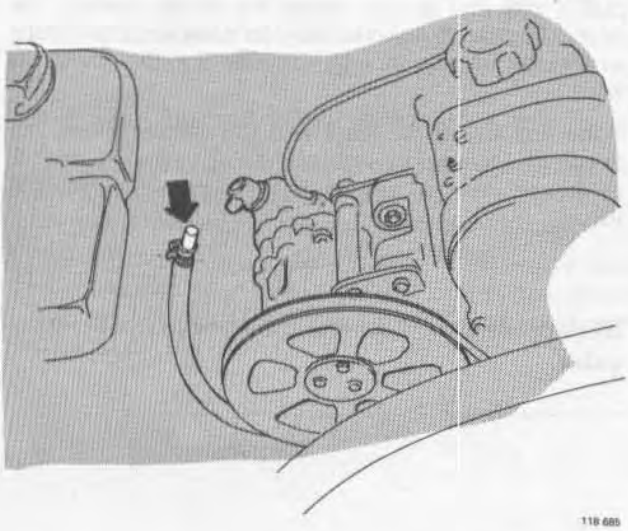
The efficiency of the converter can be checked by measuring and comparing the CO content in front of and behind the converter.

T. Air pump





IMPORTANT
- The air pump must not be dismantled or lubricated. If faulty, it must be replaced as a complete unit.
- Never block the outlet from the diverter valve because this may damage the air pump.

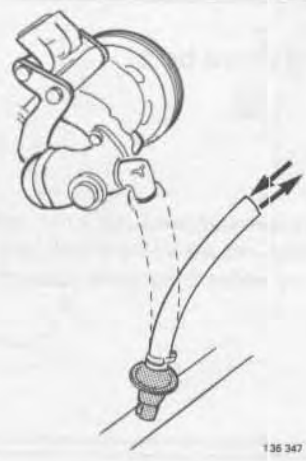


T1

General

The air pump must be disconnected and plugged when checking/adjusting the CO content, since the values will otherwise be incorrect.

IMPORTANT
Under no circumstances must the CO content be adjusted after the air pump has been connected.



Checking system function

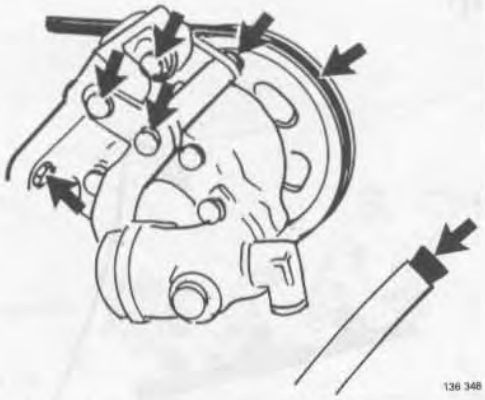
Operations T2–5.

T2

Check non-return valve

Remove the hose from the diverter valve.

Blow and suck alternately in the hose to check the function of the non-return valve.



T3

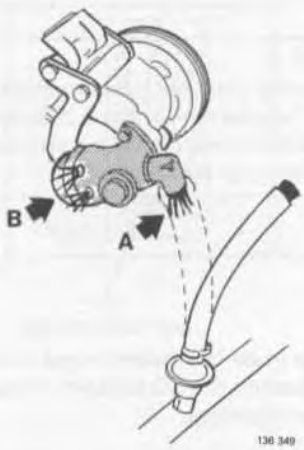
Check air pump with drive belt

Check the drive belt; it should not have cracks, be worn or damaged.

Check that the air pump is properly installed.

Plug the hose at the diverter valve (precaution).

Start the engine and listen to the air pump. The pump has a distinctive sound especially when cold.



T4

Check diverter valve

The hose from the diverter valve must be plugged.

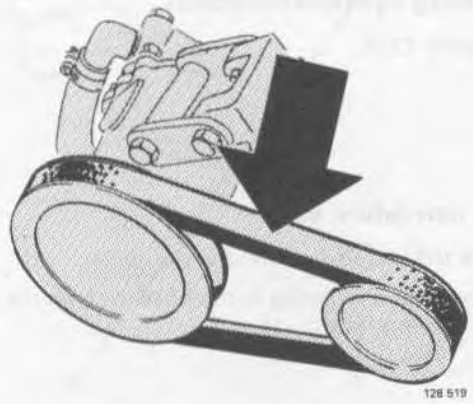
Let the engine idle. Air should now be blown out from the outlet of the diverter valve (A).

Incrase the engine speed to approximately 50 rps (3,000 rpm) and quickly release the throttle control. The air flow from outlet A should cease for a few seconds and the air should come out through the holes B in the side of the valve.

If there is any fault, check first the vacuum hose between the diverter valve and the engine's inlet pipe. If the hose is without any faults, test with a new diverter valve.

T5

Stop the engine. Connect the hose to the diverter valve

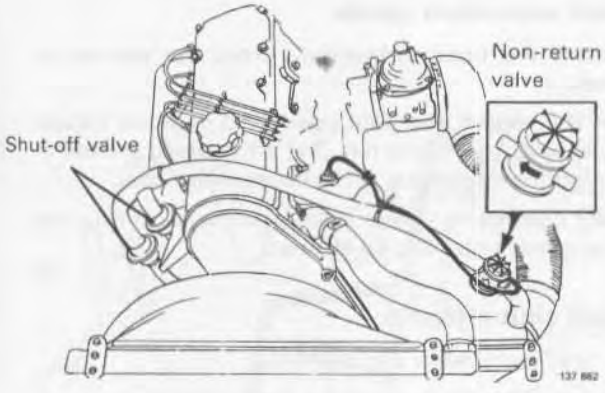


Changing drive belt

T6

If the belt is replaced because it has snapped, the function of the non-return valve must also be checked because a faulty valve may have caused the damage.

U. Pulsair system



General

U1

Only carburettor engines of later models have shut-off valves.

The valve disconnects the Pulsair system at a high negative pressure in the inlet pipe. It therefore prevents exhaust "puffs" from occurring when shifting gears and braking with the engine.

If necessary the valve can be installed on older carburettor engines, see below.

U2

Installing shut-off valve on previous models

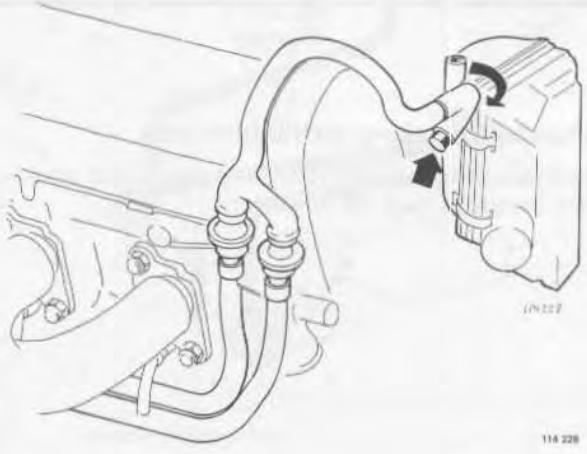
Cut the hose from the air cleaner to the Pulsair system and shorten it approximately 30 mm (1.2 in). Do this some distance away from the bend on the hose.

Push the valve into position. **Note!** The arrow must point towards the engine. Install the control hose on the valve. The length of the hose should be approximately 550 mm (22 in).

Cars with **manual transmission**:
Remove the plug from the inlet pipe and screw the nipple into position.

Cars with **automatic transmission**:
Cut existing hose to the inlet pipe. Install a T-nipple on the hose.

Connect the control hose and clamp this with tie clamps.



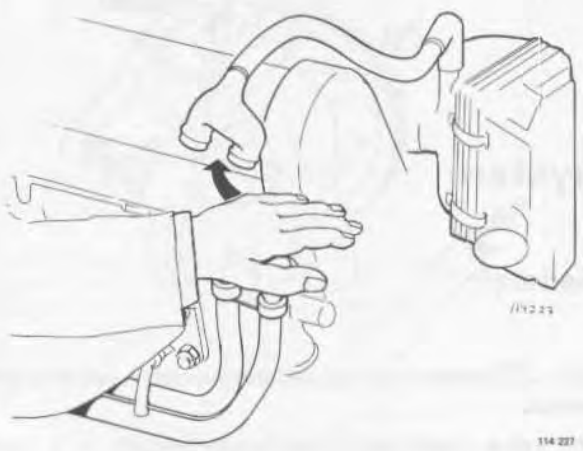
Checking/adjustment CO contact

U3

The Pulsair system must be disconnected and plugged when checking/adjusting the CO content, since the values would otherwise be incorrect.

When the system is connected the CO content should drop.

IMPORTANT
Under no circumstances must the CO content be adjusted with the Pulsair system connected.



114 227

Checking system

U4

Check that:

- all connections are tightened and not leaking
- hoses are intact

U5

Check non-return valves

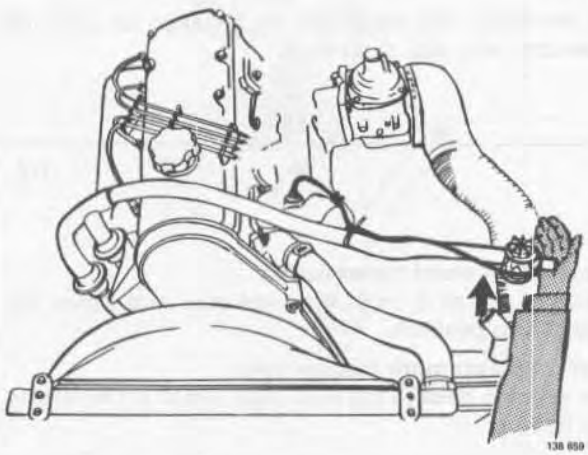
Remove the hose connections from the non-return valves.

Start the engine and hold your hand over the valves. You should be able to feel that air is being sucked in through the valves, i.e. no exhaust emissions.

Faulty non-return valves may result in backfiring, exhaust gases enter the air cleaner.

U6

Check shut-off valve



138 659

(on later carburettor engines only)

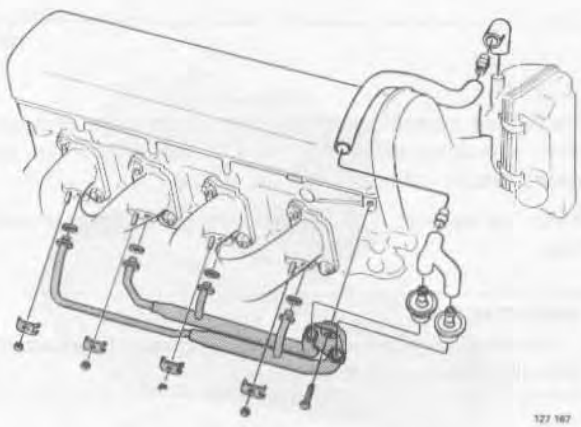
Check that the shutt-off valve is open when the engine is idling.

- remove the hose from the air filter
- cover (block) the hose with your hand. The CO content should increase
- reconnect the hose

If the valve does not open when the engine is idling the reason may be:
- faulty valve
- high negative pressure in the inlet pipe (may be caused by too large a valve clearance or too-early ignition)

When decelerating (high negative pressure in the inlet pipe) the shut-off valve should close.

If the valve does not close this may result in exhaust "puffs" when decelerating and when shifting gears.



127 167

U7

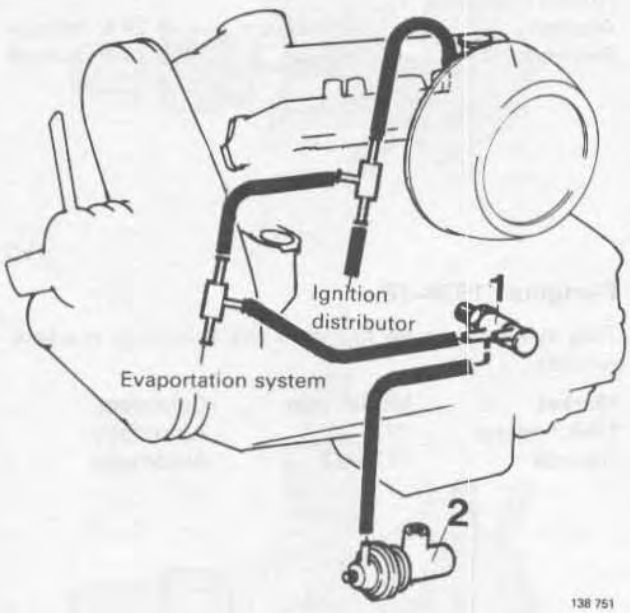
Removing/installing distribution pipe

When removing/installing the distribution pipe the exhaust manifold must be removed.

V. Exhaust recirculation (EGR)

ON/OFF system

A-engines

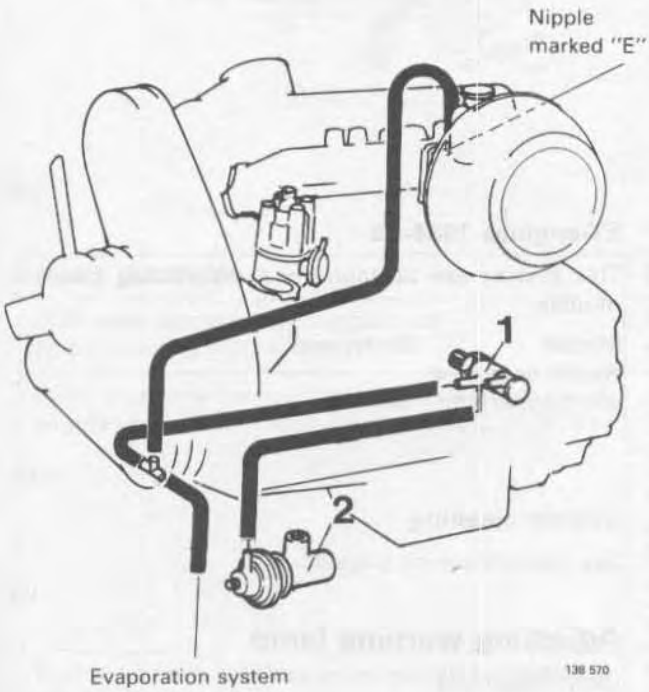


V1

1978–81

This system can be found in the following markets/ models.

Market	Model year	Comments
Canada	1978–80	Automatic
Canada	1981	Manual
Australia	1979–80	Automatic
Australia	1981	Manual
Nordic countries	1981	Manual



V2

1982–84

This system can be found in the following markets/ models:

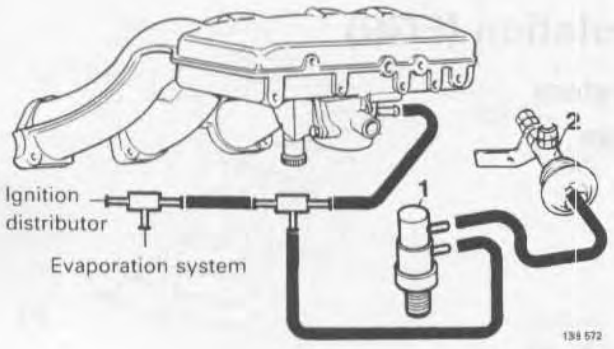
Market	Model year	Comments
Canada	1982–84	Manual
Australia	1982–84	Manual
Nordic countries	1982–84	Manual
Switzerland	1983–84	Manual

V3

Cleaning system

See instructions on page 64.

ON/OFF system
E/F and ET-engines

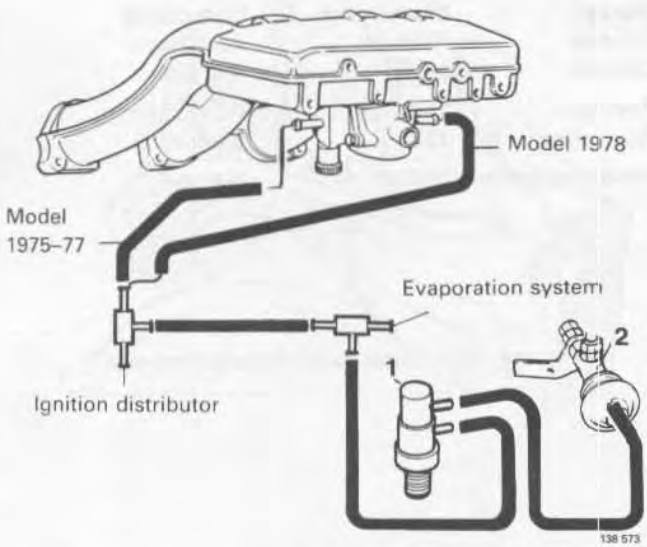


V4

E-engines 1981–84

This system can be found in the following markets/ models:

Market	Model year	Comment
Canada	1981–83	B 23 E manual
Nordic countries, Australia	1981–84	B 23 E manual
Switzerland	1983–84	B 23 E manual

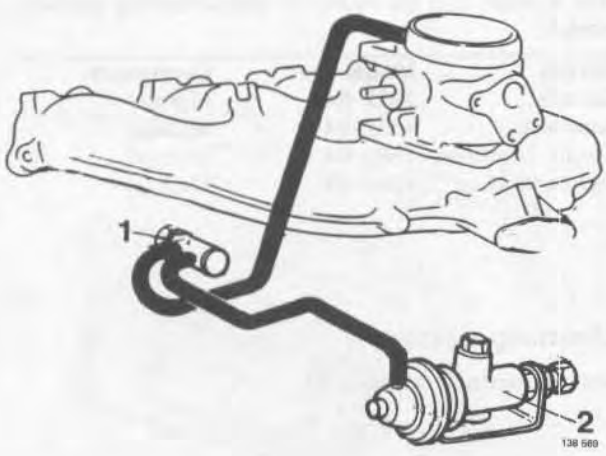


V5

F-engines 1976–78

This system can be found in the following markets/ models:

Market	Model year	Comment
USA Federal	1976	Automatic
Canada	1976–78	Automatic



V6

ET-engines 1984–85

This system can be found in the following markets/ models:

Market	Model year
Nordic countries and Switzerland	1984–85

V7

System cleaning

See instructions on page 64.

V8

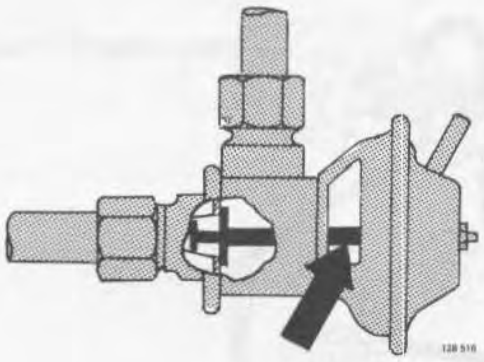
Adjusting warning lamp

(only F-engines)

See instructions on page 65.

Function test

V9



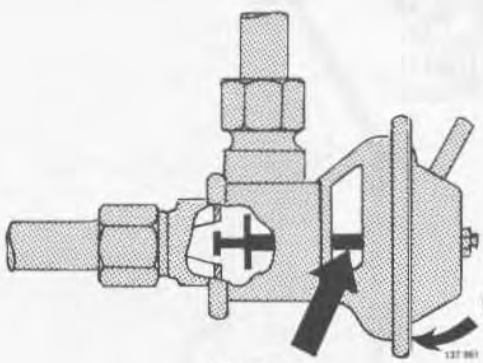
Closed

EGR valve should only open at part throttle with warm engine. To check function of valve, observe movement of link rod at different engine rpm and temperatures.

Note! It may be difficult at times to determine whether the valve closes completely. The only way to check this is to remove the pipe between the valve and the inlet manifold and to feel if the valve is leaking.

A valve which is open when the engine is idling results in uneven idling, and the engine may also stall.

V10



Open

Check that EGR valve:

- is closed at all engine rpm with cold engine, i.e., coolant temperature **below 55°C** (130°F)
- opens at part throttle with warm engine, i.e., coolant temperatures **above 60°C** (140°F)
  Vehicles with delay valve: EGR valve opens approx. 2 seconds after engine is accelerated
- closes when engine speed drops to idle

IMPORTANT
EGR valves exist in various designs (different opening pressures, flow).

Ensure that correct valve is used.

The valves are marked with Part Number.

V11

FAULT SYMPTOM	PROBABLE CAUSE/REMEDY
EGR valve opens when engine cold (coolant below 55°C = 130°F)	Defective thermostat valve. Replace. Thermostat valve must open at 55–60°C (130–140°F).
EGR valve does not open at part throttle with warm engine (coolant temperature above 60°C = 140°F)	Vacuum hoses defective, kinked or incorrectly connected.
	Thermostat valve does not open. Test by removing vacuum hose from EGR valve and blowing through hose into valve. **Note!** On vehicles with delay valve, disconnect hose after valve and check as above.
	EGR valve seized. Clean/replace valve.
EGR valve does not close when engine rpm drops to idle	EGR valve seized. Clean/replace valve.

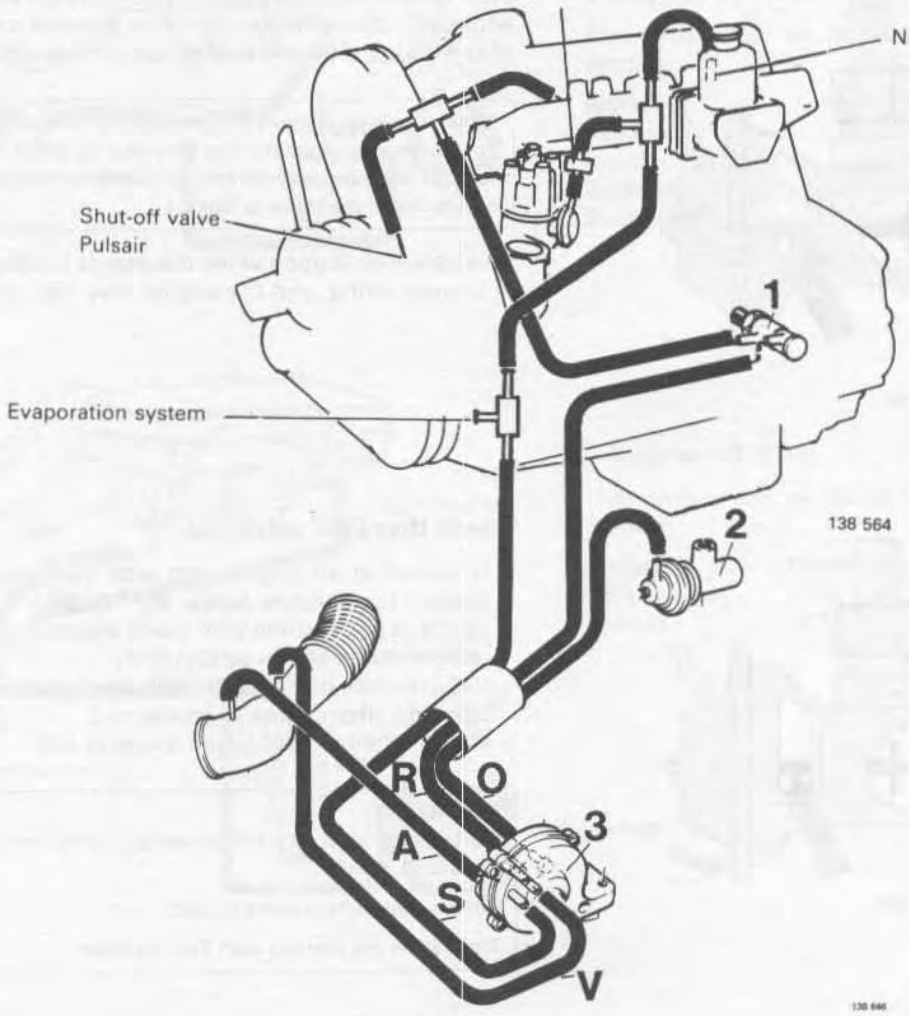
X. Exhaust recirculation (EGR)

STEPLESS System

A-engines

X1

Delay valve (only certain variations).



1981–84

This system is to be found in the following markets:

Market	Model year	Comments
Canada	1981–84	Automatic
Nordic countries	1981–84	Automatic
Australia	1981–84	Automatic
Switzerland	1983–84	Automatic

X2

Checking/trouble-shooting system

See instructions, page 12.

X3

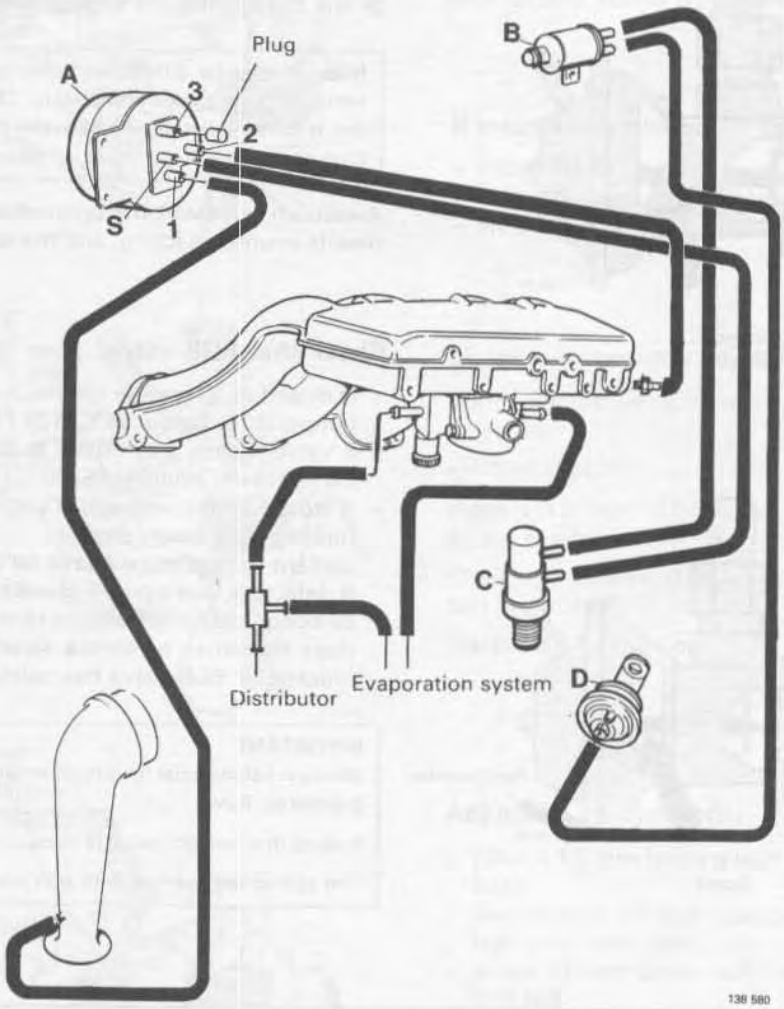
Cleaning the system

See instructions, page 64.

Y. Exhaust recirculation (EGR)

STEPLESS System type 1

F-engines



Y1

1976–77

This system is to be found in the following markets:

Market	Model year	Comments
Japan	1976–77	
USA, California	1976	Early models

Y2

Cleaning the system

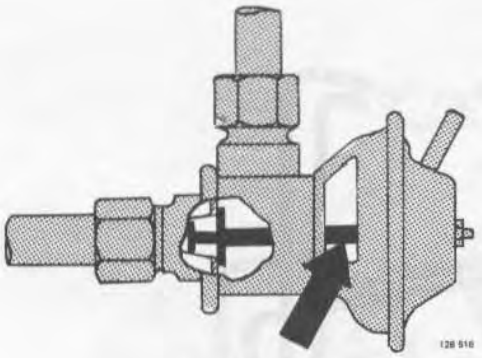
See instructions, page 64.

Y3

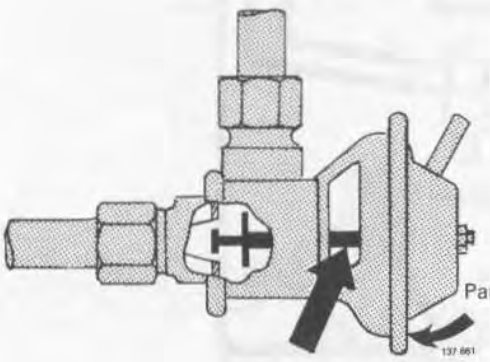
Adjusting warning lamp

See instructions, page 65.

Function check



Closed



Part number

Open

Y4

EGR valve should only open at part throttle with warm engine. To check function of valve, observe movement of link rod at different engine rpm and temperatures.

Note! It may be difficult at times to determine whether vacuum valve closes completely. The only way to check this is to remove the pipe between the valve and the inlet pipe and to feel if the valve is leaking.

A vacuum valve which is open when the engine is idling results in uneven idling, and the engine may also stall.

Y5

Check that EGR valve:

- is closed at all engine rpm with cold engine, coolant temperature **below 55°C** (130°F)
  If valve opens, thermostat is defective. Thermostat valve should open at 55–60°C (130–140°F)
- is closed at idle with warm engine and opens at part throttle with warm engine
  coolant temperature **above 60°C** (140°F).
  If defective, see trouble shooting section
- closes quickly when engine rpm drops to idle. If valve does not close or closes slowly, solenoid valve is blocked or EGR valve has seized.

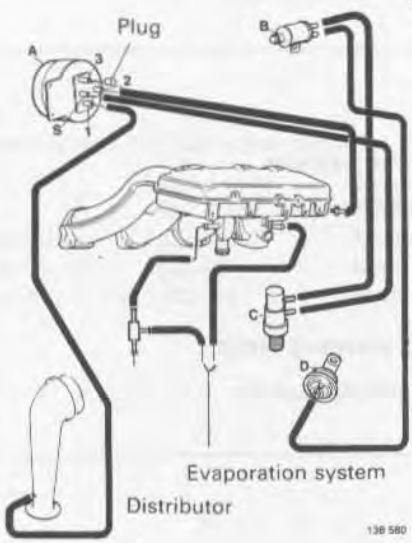
IMPORTANT
Vacuum valves exist in various designs (different opening pressures, flow).

Ensure that correct valve is used.

The valves are marked with part number.

Trouble-shooting
Defective EGR system with warm engine

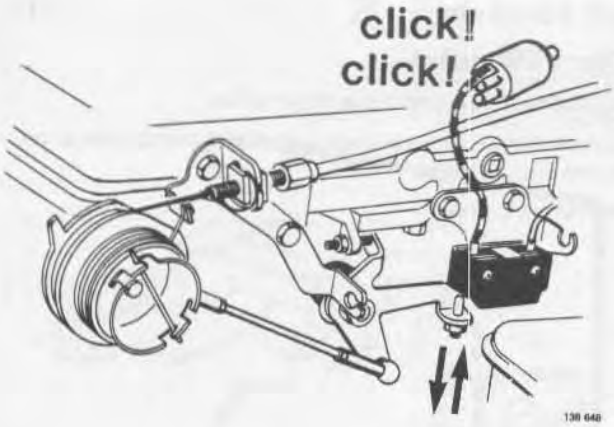
Operations Y6–14



Y6

Check hoses and connections

Check that the vacuum hoses are intact, correctly connected and that they are not pinched.



Y7

Check microswitch and solenoid valve

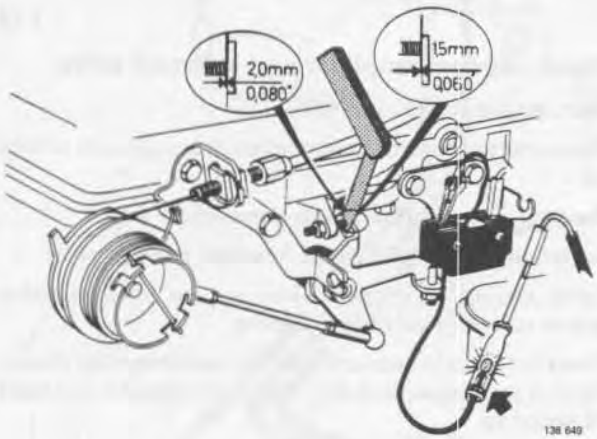
Turn on ignition.

Press microswitch to make/break circuit to solenoid. A click should sound from solenoid.

Y8

If incorrect, check:

- microswitch ground
- current supply to solenoid
- wire between microswitch and solenoid



Y9

Check microswitch adjustment

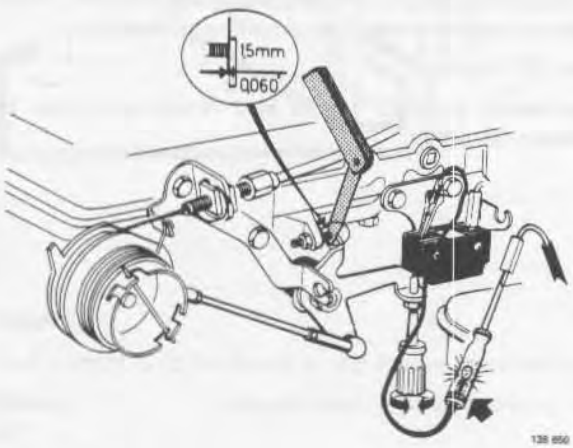
Connect a test lamp between microswitch and wire to solenoid.

Ignition should be on.

Place a **1.5 mm** (0.06 in) feeler gauge between stop screw and boss. Test lamp should **light up.**

Change to a **2 mm** (0.08 in) feeler gauge and check that test lamp is **off.**

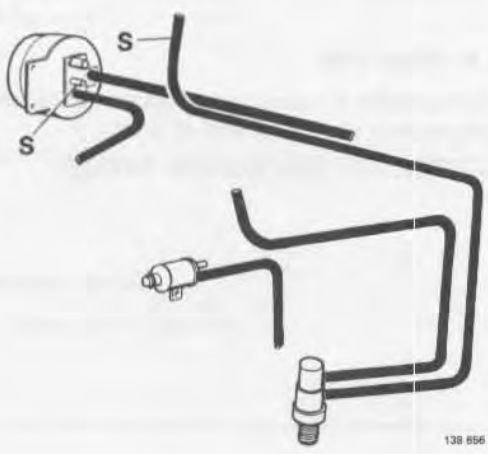
Switch off the ignition.



Y10

Adjusting microswitch:

- place a **1.5 mm** feeler gauge between stop screw and boss.
- slacken lock nut and unscrew **upper** stop screw until test lamp goes out
- screw in stop screw until lamp just lights. Tighten lock nut
- check adjustment according to Y9



Y11

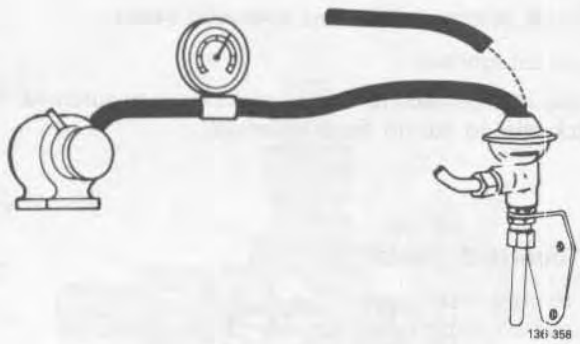
Check thermostat valve

Disconnect thermostat valve hoses from 'S' on vacuum amplifier and from solenoid valve.

Blow through valve to check that it is open. **Note!** Engine must be warm, i.e., above 60°C (140°F).

Re-connect hose to solenoid valve.

Y12



136 358

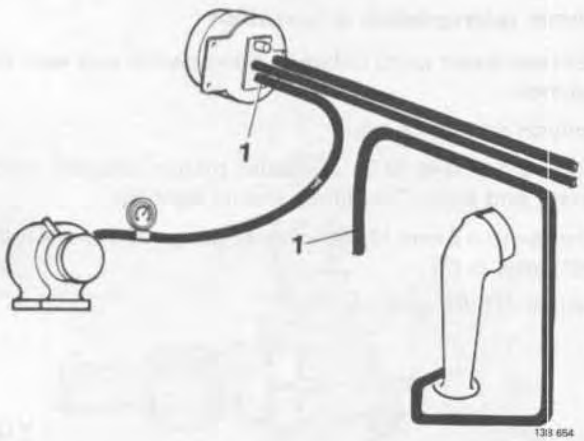
Check EGR valve

Disconnect vacuum hose from valve.

Connect hose to a vacuum pump and switch pump on. Valve should open.

Re-connect hose.

Y13



139 654

Check vacuum amplifier and solenoid valve

Start engine and run at idle.

Disconnect hose from connection 1 on vacuum amplifier.

Connect a vacuum pump to connection 1.

Switch on pump and check function of EGR valve.

Valve should be closed when engine idles. If valve opens solenoid valve is defective.

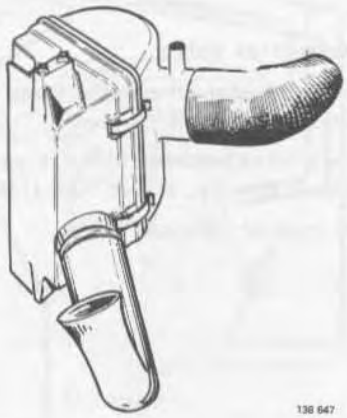
Check for leaks in vacuum amplifier and hoses by checking that pump gauge reading remains stable for at least 10 seconds.

Increase engine rpm and check that valve opens. If not, solenoid valve or vacuum amplifier is defective.

Turn off engine.

Disconnect vacuum pump and re-connect hose to vacuum amplifier.

Y14



138 647

Check air filter inlet

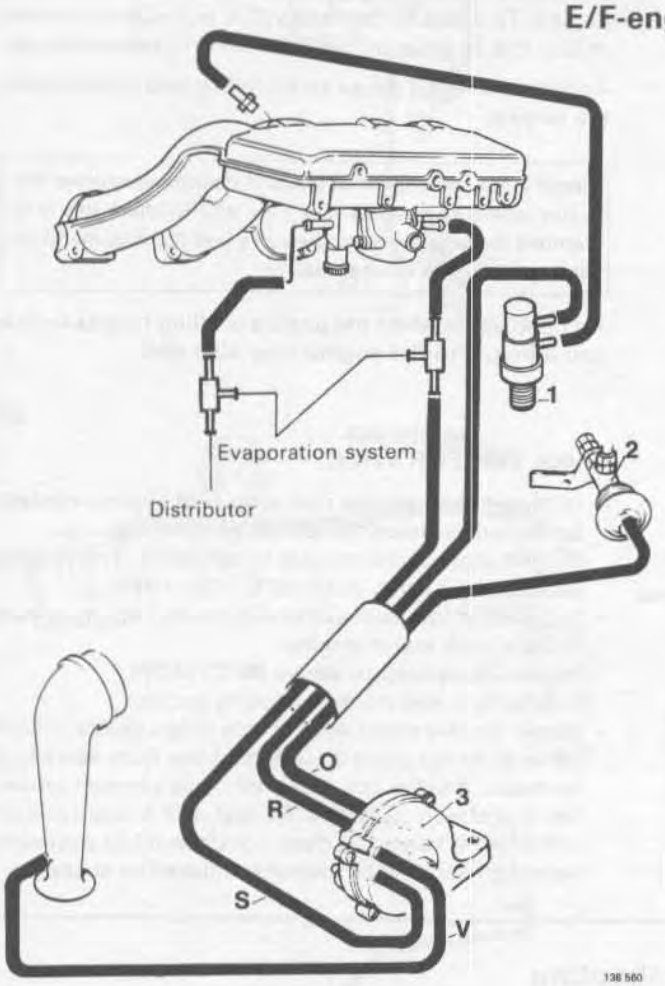
Check that air inlet is leakproof. Leaks would cause too low a depression at venturi end of inlet.

Check air filter, inlet hose and filter cartridge.

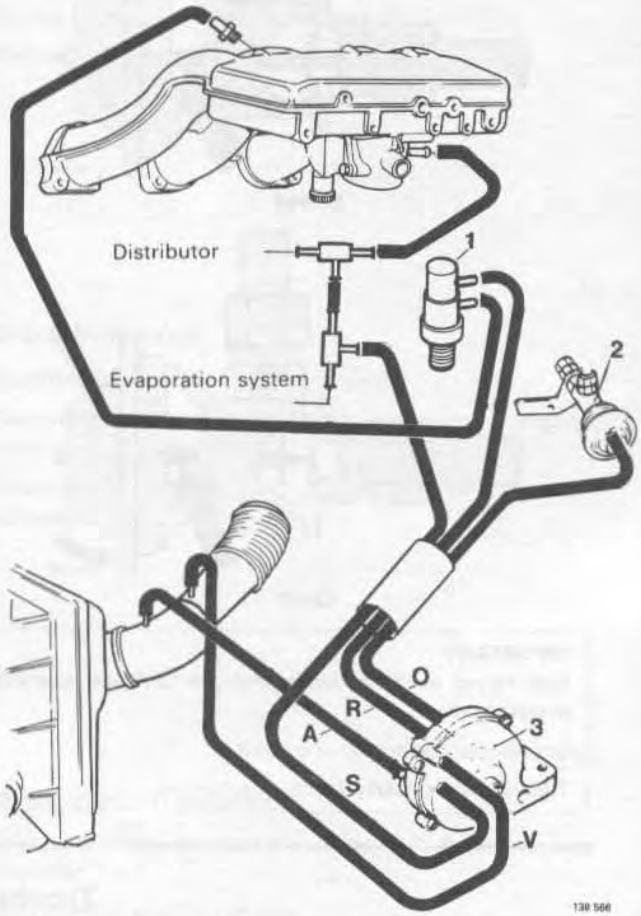
Z. Exhaust recirculation (EGR)

STEPLESS System types 2 and 3

E/F-engines



Z1



Z2

Type 2

This system is to be found in the following markets:

Market	Model year	Comments
USA		
California	1976	Late model
USA Federal	1977	

Type 3

This system is to be found in the following markets:

Market	Model year	Comments
USA Federal	1978–79	B 21 F
Canada	1981–83	B 23 E automatic
Australia	1981–84	B 23 E automatic
Nordic countries		
Switzerland	1983–84	B 23 E automatic

Z3

Cleaning system

See instructions page 64.

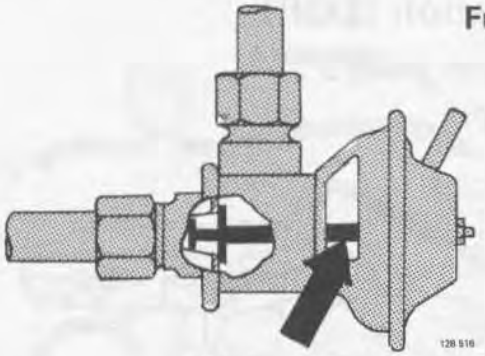
Z4

Resetting warning lamp

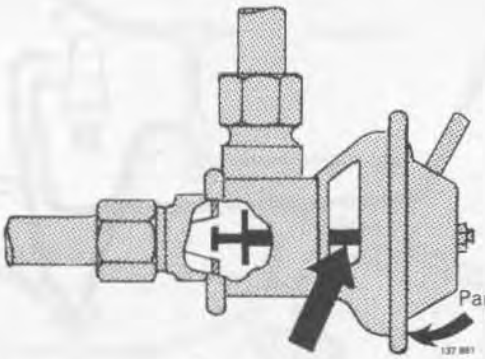
(Only F-engines)

See instructions page 65.

Function check



Closed



Open

IMPORTANT
EGR valves exist in various designs (different opening pressures, flow).

Ensure that correct valve is used.

The valves are marked with part number.

Z5

EGR valve should only open at part throttle with warm engine. To check function of valve, observe movement of link rod at different engine rpm and temperatures.

An open valve will cause erratic idling and possibly stall the engine.

Note! It may be difficult at times to determine whether the valve closes completely. The only way to check this is to remove the pipe between the valve and the inlet manifold and to feel if the valve is leaking.

An open valve when the engine is idling results in uneven idling, and the engine may also stall.

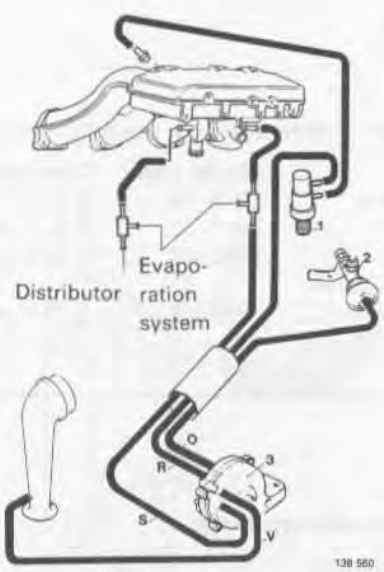
Z6

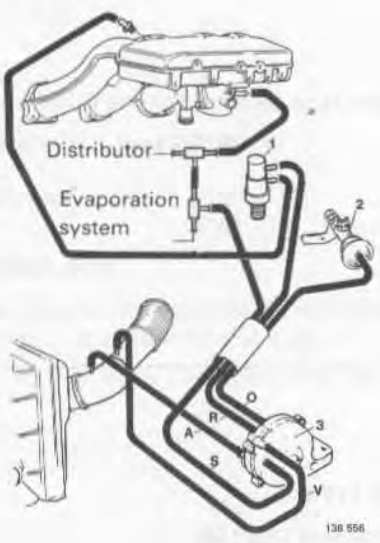
Check that EGR valve:

- is closed at all engine rpm with cold engine, coolant temperature **below 55°C** (130°F)
  If valve opens, thermostat is defective. Thermostat valve should open at 55–60°C (130–140°F)
- is closed at idle with warm engine and opens at part throttle with warm engine
  coolant temperature **above 60°C** (140°F).
  If defective, see troubleshooting section
- closes quickly when engine rpm drops to idle. If EGR valve does not close disconnect hose from valve and re-check. If valve still does not close vacuum amplifier is probably defective. Re-test with a new vacuum amplifier. If valve still does not close it has probably seized and should be cleaned/replaced as necessary.

Trouble shooting
Defective EGR system with warm engine

Operations Z7–11

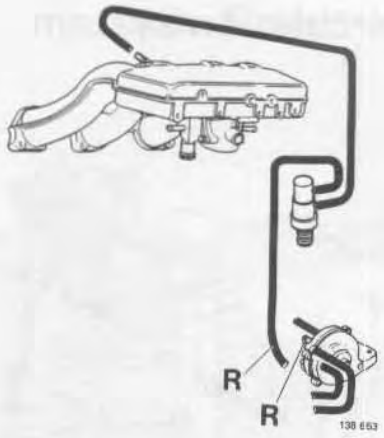




Z7

Check hoses and connections

Check that the vacuum hoses are intact, correctly connected and that they are not pinched. Check also the vacuum hoses indirectly connected to the system, such as the hose to the distributor.



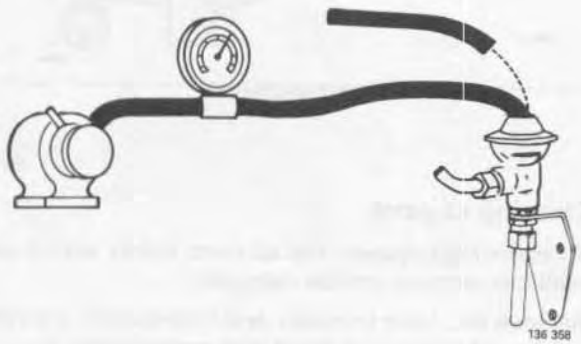
Z8

Check thermostat valve

Disconnect thermostat valve hoses from intake manifold and connection 'R' on vacuum amplifier.

Blow through valve to check that it is open. **Note!** Engine must be warm, i.e., above 60°C (140°F).

Re-connect hoses.



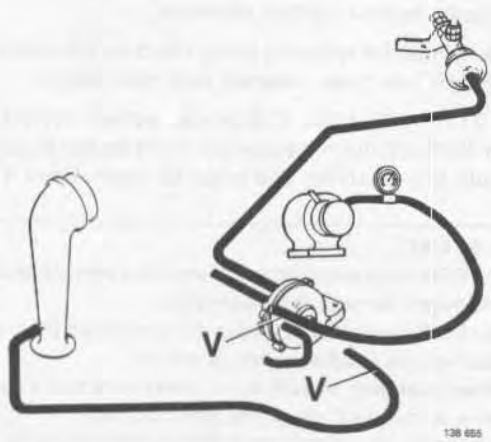
Z9

Check EGR valve

Disconnect vacuum hose from valve.

Connect hose to a vacuum pump and switch pump on. Valve should open.

Re-connect hose.



Z10

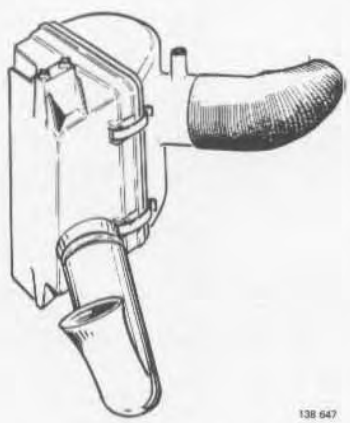
Check vacuum amplifier

Disconnect vacuum hose marked "V" from vacuum amplifier.

Start engine and run at idle.

Connect a vacuum pump to vacuum amplifier connection 'V' and start pump. EGR valve should open if vacuum amplifier is functioning correctly.

Turn off engine and re-connect hose 'V'.



Z11

Check air filter inlet

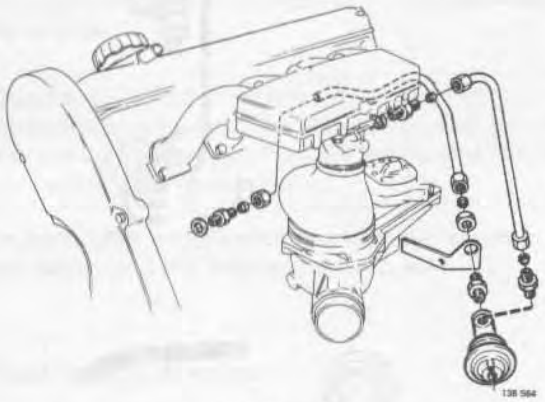
Check that air inlet is leakproof. Leaks would cause too low a depression at venturi end of inlet.

Check air filter, inlet hose and filter cartridge.

AA. Cleaning of exhaust gas recirculation system

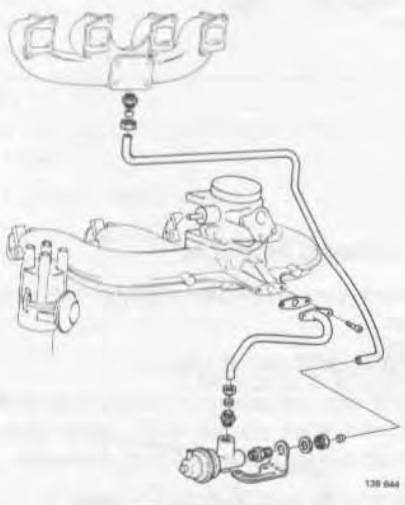
Applies to all systems

A-engines



E/F-engines

AA1



ET-engines

Cleaning of parts

To clean EGR system, tap all parts lightly with a soft mallet to remove carbon deposits.

Remove dirt from channels and nipples with a screwdriver and blow parts clean with compressed air.

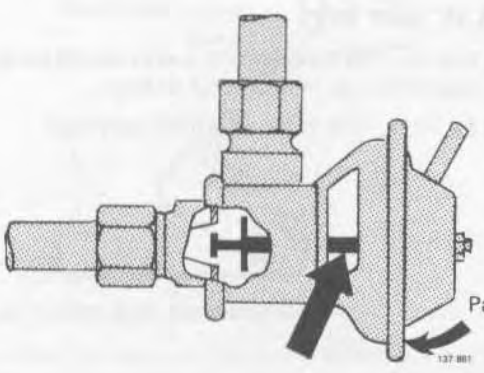
Check in particular that the valve seat in the EGR valve is completely free of carbon deposits.

On F-engines the warning lamp must be adjusted after the system has been cleaned (see next page).

On B 21 F 1976 USA California, earlier model, and Japan 1976–77 the microswitch must be set in connection with the cleaning, see page 59, operations Y7–10.

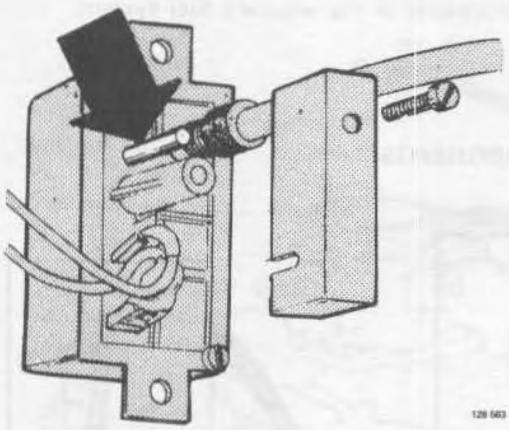
IMPORTANT

- The EGR valve must not be cleaned in a solvent because this might damage the diaphragm.
- The EGR valve must be held in the hand when cleaning. It must not be fixed in a vice or similar.
- When changing an EGR valve, make sure that a correct valve is installed; check the part number.



AB. Resetting dashboard indicator lamp

F engines only



128 563

AB1

Indicator lamp will light each time the exhaust gas recirculation system is due for service

Lamp is actuated by a switch connected to car odometer and mounted on back of speedometer.

To reset switch, remove cover (shown adjacent) and depress white push button (arrowed).

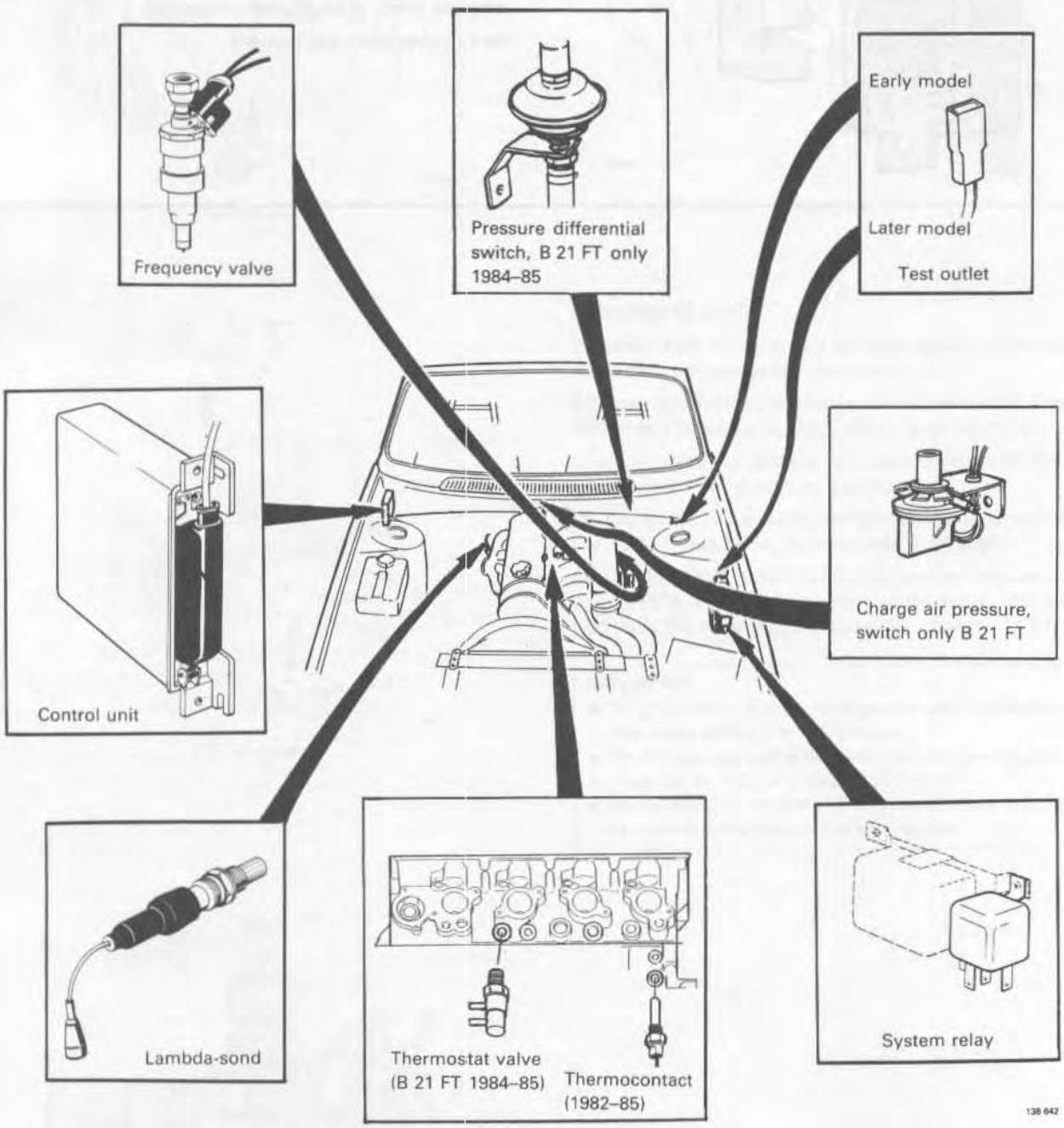
Re-fit cover after adjustment.

AC. Lambda-sond system

Applies to B 21 F/FT-engines with CI fuel injection system. Engines with LH-jetronic fuel injection system do not have separate Lambda-sond system, as it is incorporated in the engine's fuel system.

AC1

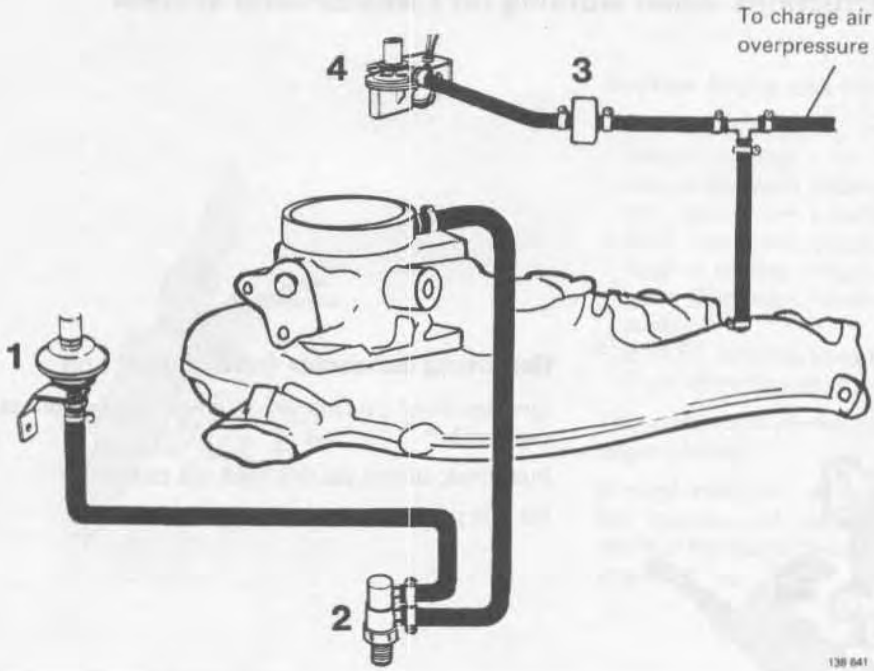
Positioning of components



Connection of vacuum hoses

For pressure differential switch and charge air pressure switch

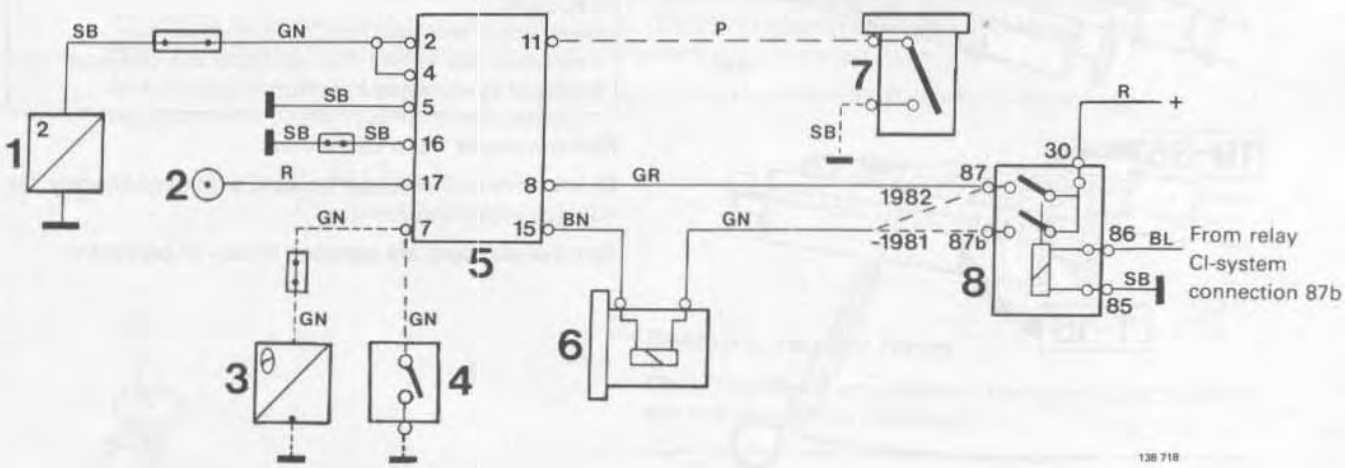
AC2



1 Pressure differential switch (B 21 FT, 1984–1985)
2 Thermostat valve
3 Delay valve (automatic only, 1982)
4 Charge air overpressure switch

AC3

Wiring diagram



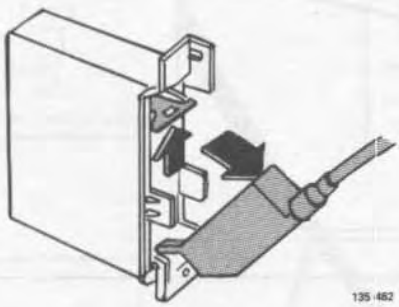
Colour coding

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

List of components

1 Lambda-sond
2 Test outlet
3 Thermal switch (1982)
4 Charge air pressure switch (only B 21 FT)
5 Control unit
6 Frequency valve
7 Pressure differential switch (B 21 FT only, 1984–1985)
8 System relay

General instructions when working on Lambda-sond system



135 482

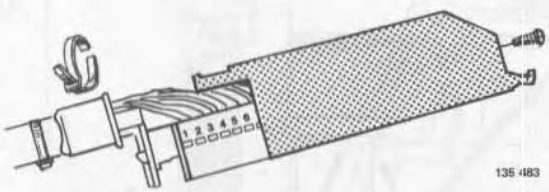
AC4

Removing connector from control unit

Ignition should be turned off when removing/installing connector.

Push lock spring up and fold out connector.

Do **not** pull connector straight out.

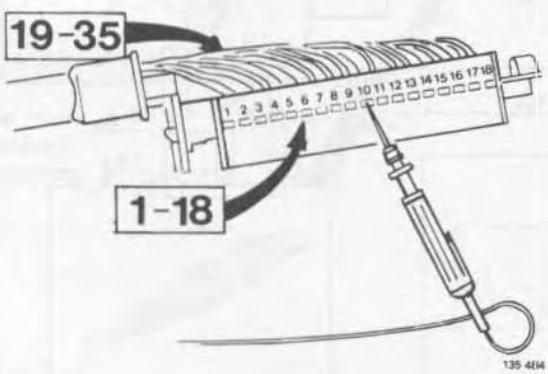


135 483

AC5

Checking terminals

CAUTION
Never check terminals from front of connector.
Experience has shown that terminals and circuit can be damaged when tested from front.



135 484

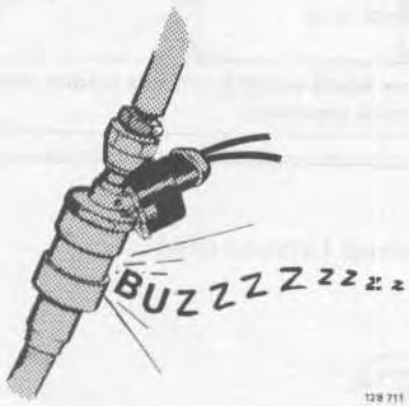
Remove cover from connector.

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

Terminal numbers are stamped in side of connector.

Fault symptoms

AC6



128 711

System faults can be:

- starting difficulties, especially with hot engine
- rough running
- rough idle with cold engine, below 15°C (60°F). This can result from a defective thermal switch
- High fuel consumption or bad driveability with cold engine (below 55°C=130°F) B 21 FT 1984–1985 engine. Can result from defective pressure differential switch
- B 21 FT: low top speed/poor performance. Can result from defective microswitch.

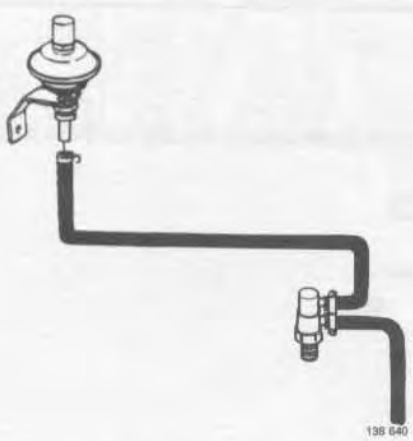
The symptoms above can of course result from other engine faults.

A rough check of the system can be performed by starting engine and listening to (feeling) the frequency valve. If the valve "buzzes" the Lambda-sond system is probably OK.

Trouble-shooting (checking) of Lambda-sond system

If possible, engine temperature should be below 15°C (50°F) when checking Lambda-sond system because it is necessary to check thermal switch when installed on vehicle.

Also, temperature must be below 50°C (120°F) when checking thermostat valve on vehicles equipped with pressure differential switch.



138 640

AC7

Checking vacuum hoses

Check that these are correctly connected and that they are not pinched or damaged.

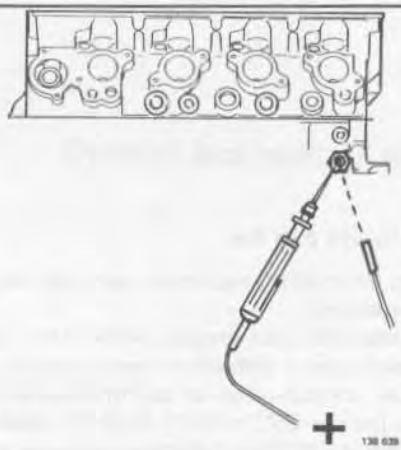
Only B 21 FT 1984–1985 *AC8*

Checking thermostat valve

Coolant temperature below 50°C (120°F).

Disconnect hose from pressure differential switch and blow in hose.

Valve should be open at temperatures below 55°C (130°F).



1982– *AC9*

Check thermal switch

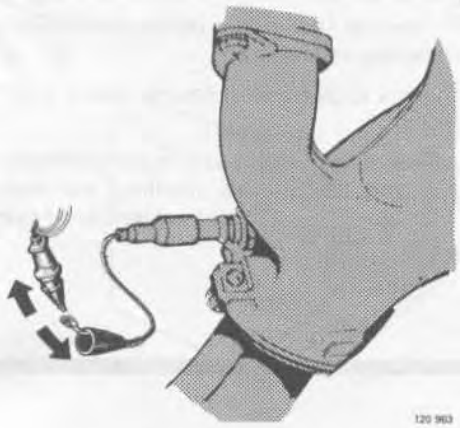
Disconnect wire from thermal switch.

Connect a test lamp between wire and a 12 V current supply.

Test lamp should **light** (switch closed) at coolant temperatures **below 15°C** (60°F) and be **off** at temperatures **above 15°C** (60°F).

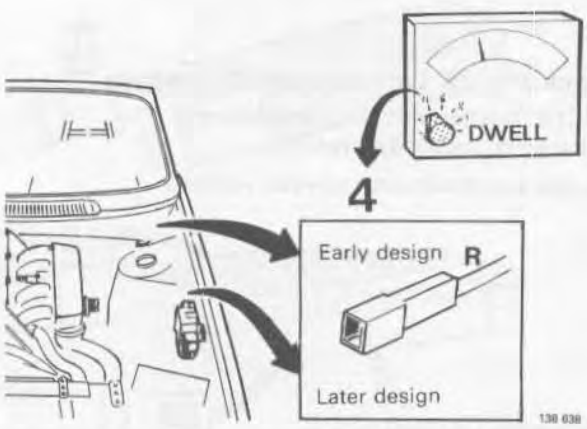
Reconnect wire.

In cases where switch function is suspect, remove switch and check separately.



AC10

Disconnect Lambda-sond



AC11

Connect a dwell meter

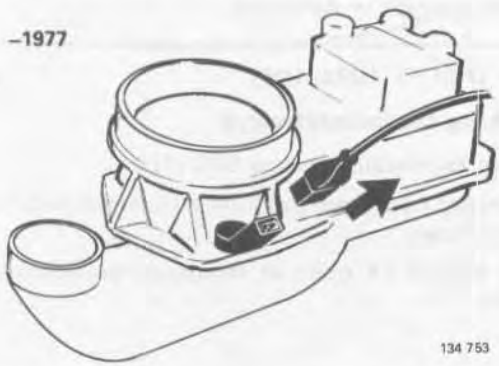
Connect red wire to test point.

Set meter to position for **4 cylinder** engine.

The dwell meter must have a measuring range of at least 70°.

Example of suitable instruments: Volvo Mono-Tester and SUN instrument of later design.

–1977

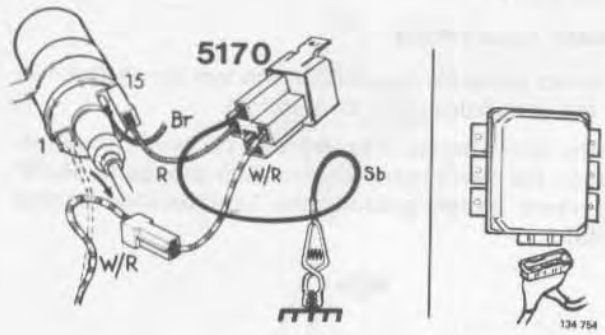


–1977 *AC12*

B 21 F

Remove the connector from the air flow meter.

1978– 1981–



1978– *AC13*

B 21 F/FT

Connect test relay 5170.

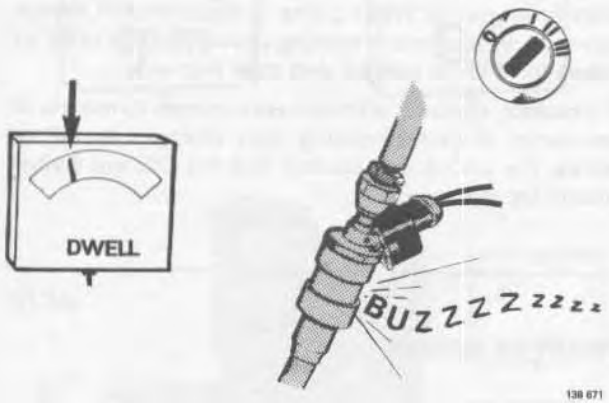
Note! On 1981 models – (except turbo) the connector should also be removed from the ignition system control unit. Be careful; do not loosen rubber seal in the connector.

AC14

Switch on the ignition

AC15

Check meter reading and listen to frequency valve



A buzzing sound should be heard from valve and meter should show:

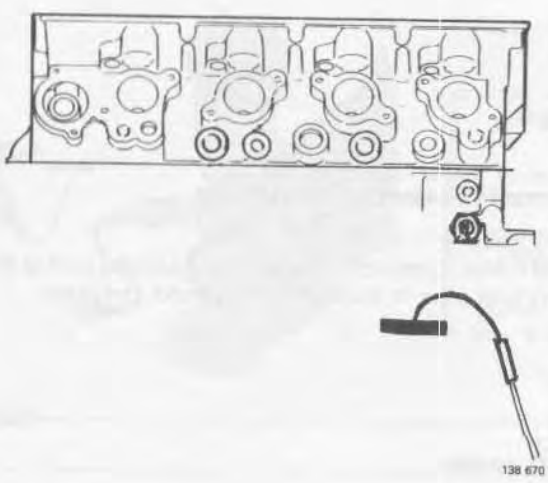
B 21 F ..... **51–57°**
B 21 FT ..... **42–48°**

Valve does not buzz and meter shows 0 → *AC27*

Valve does not buzz but meter deflects → *AC32*

Valve buzzes but meter shows 0 → probably a break in the wire to the test point

Valve buzzes but meter reading too high → *AC36*



1982 models– *AC16*

Check enrichment (cold engine)

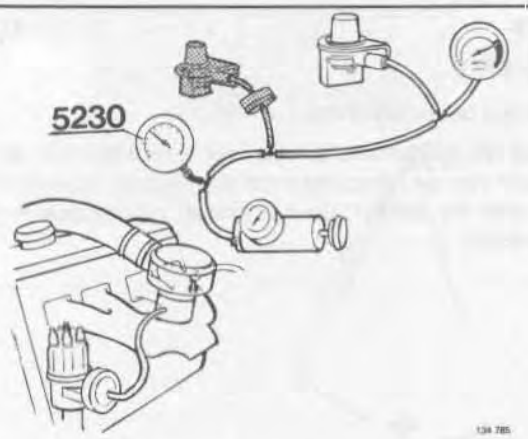
Disconnect and earth wire from thermal switch.

Dwell meter reading should change to:

B 21 F ..... **54°**
B 21 FT ..... **64–70°**

Re-connect wire.

If readings are not according to above, check wiring before testing with a new control unit.

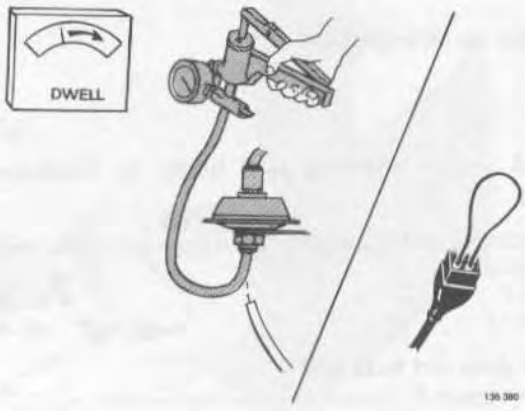


Only B 21 FT *AC17*

Check enrichment

Connect pressure gauge **5230** and test pump. Connect to the hose from the inlet manifold.

Pump up the pressure to **20.3 kPa** (2.8 lb/in^2). The reading on the dwell meter should then change to **64–70°** (pressure switch grounds the Lambda-sond control unit).



Only B 21 FT 1984–1985 *AC18*

Check acceleration enrichment

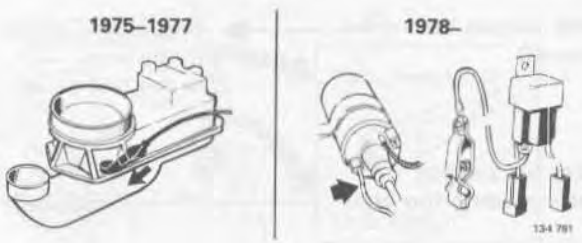
Connect a vacuum pump to pressure differential switch and start pump.

Disconnect pump. When pump is disconnected, switch closes and dwell meter reading should change to **82° or above** for a short period, and then decrease.

If incorrect, connect a bridge wire across terminals of connector. If meter reading now changes to **82° or above,** the wiring and control unit are OK, are switch should be replaced.

AC19

Switch off ignition



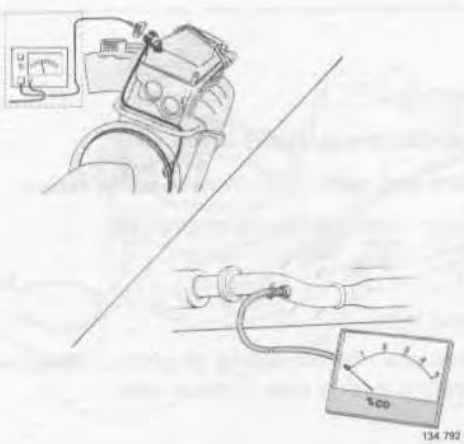
AC20

Connect wires and connector

Connect the connector to the ignition system control unit. Check that rubber seal is in place. Without the seal, water can leak in and cause oxidation etc.

1975–1977: connect connector to air flow meter.

1978–: remove test relay 5170. Connect the wire to ignition coil.



AC21

Connect measuring instrument

- rev counter
- CO meter. Connect the meter to the probe port in the exhaust pipe in front of the catalytic converter

AC22

Start engine

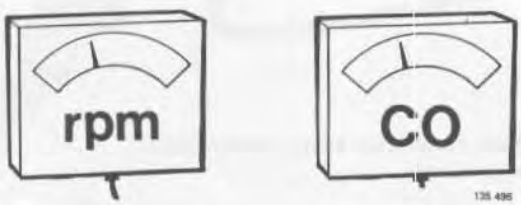
B 21 FT 1984–1985 *AC23*

Check thermostat valve

Warm-up engine and disconnect hose from pressure differential switch. Place finger over end of hose.

Thermal vacuum switch should close (i.e. no suction) at approx. **55°C** (130°F).

AC24



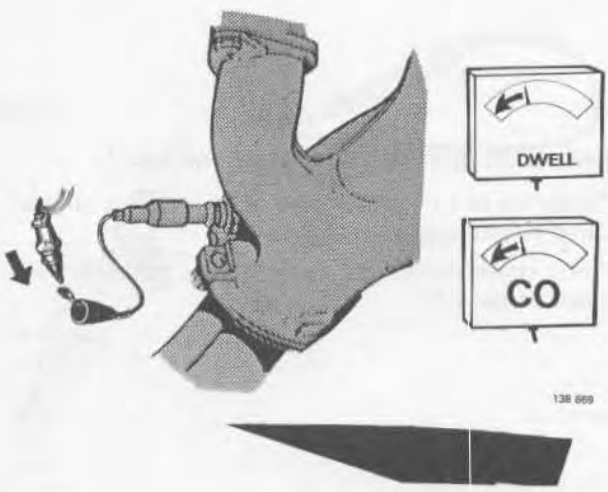
Warm-up engine

Wait at least 5 min after coolant thermostat has opened before carrying out next step.

AC25

Check idle speed and CO content

Adjust if necessary.



AC26

Check Lambda-sond function

Connect Lambda-sond to dwell meter and CO meter. Check reading.

Dwell meter reading should change slightly, usually drop when sond is connected. CO level should drop to **less than 1.0 %.**

If neither CO content nor dwell meter reading changes:

Disconnect Lambda-sond and ground the wire. CO content and dwell angle should increase.

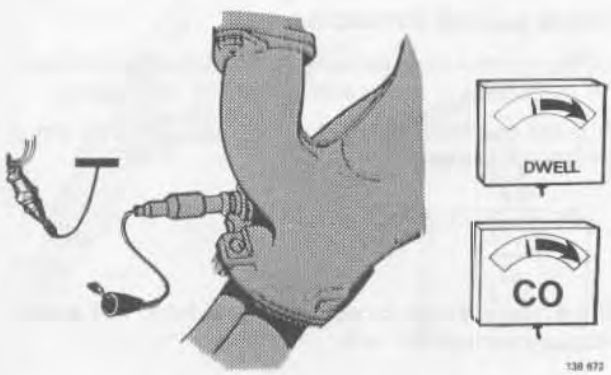
Wiring and control unit are OK if meter reading increases.

Re-test with a new Lambda-sond.

If meter reading does not change, either control unit or wiring to control unit is defective.

CO content does not change, dwell meter reading drops significantly:
This indicates a defective frequency valve. Re-test with a new valve.

CO content and dwell meter reading increase:
This indicates a defective Lambda-sond (internal short-circuit). Re-test with a new Lambda-sond.



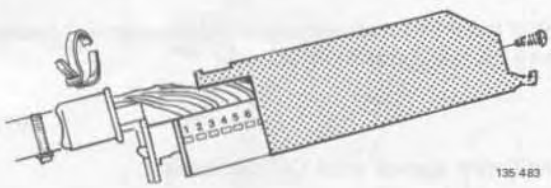
End of test

From AC15: Frequency valve does not buzz and meter shows 0

On completion of repair proceed with operation AC16 on page 71.

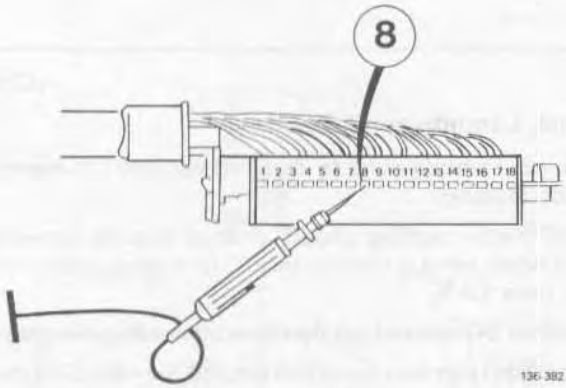
AC27

Switch off ignition



AC28

Remove connector from control unit.
Remove cover

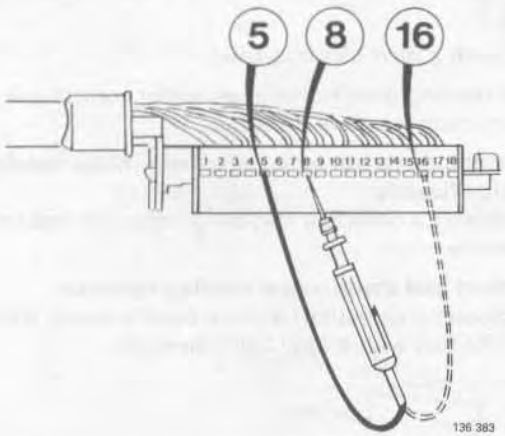


AC29

Switch on ignition. Check current supply

Connect a test lamp between terminal 8 and ground. Lamp should light.

If not, check wiring and system relay, see wiring diagram on page 67.



AC30

Check ground connections

Connect a test lamp between terminal 8 and 5, and 8 and 16 respectively. Lamp should light in both cases.

If lamp does not light, check ground connections at intake manifold.

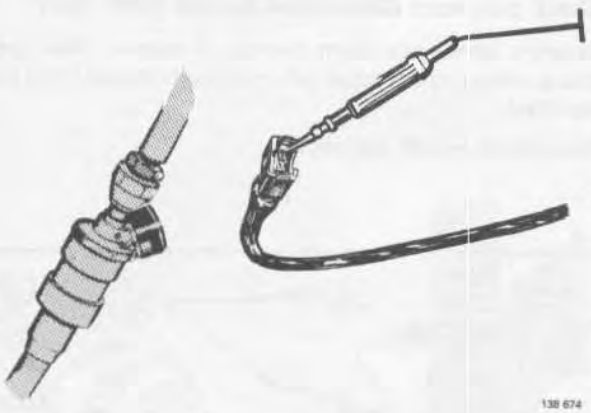
AC31

If the above steps do not indicate a fault, test system with a new control unit.

End

From AC16: Valve does not buzz but meter deflects

On completion of repair continue with operation AC16 on page 71.



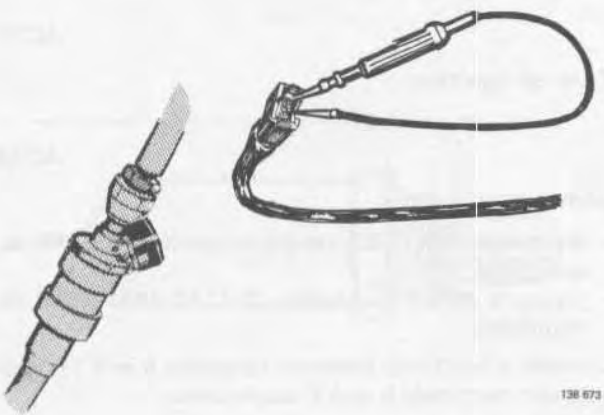
138 674

AC32

Check current supply to frequency valve

Connect a test lamp between the connector pin (green wire) and ground. Lamp should light.

If lamp does not light, check function of system relay and wiring.



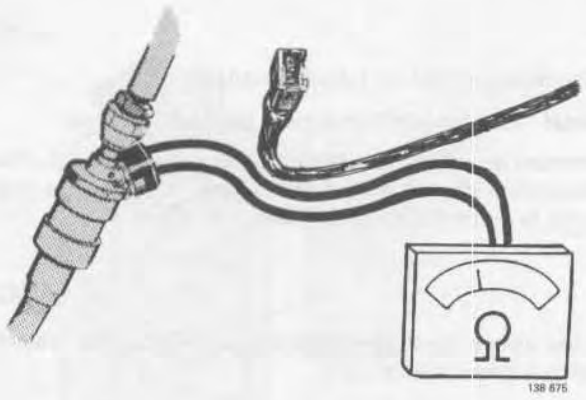
138 673

AC33

Check wire from frequency valve to control unit

Connect a test lamp between both connector pins. Lamp should light (dimly).

If lamp does not light, control unit or wiring to control unit is defective.



138 675

AC34

Measure frequency valve resistance

Use an ohmmeter.

Resistance should be **2–3 ohms**.

Replace frequency valve if incorrect.

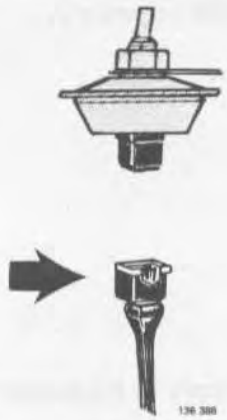
AC35

If the above steps do not indicate a fault, test system with a new control unit.

End

From AC15: Valve buzzes but meter reading is too high

On completion of repair proceed with operation AC16 on page 71.



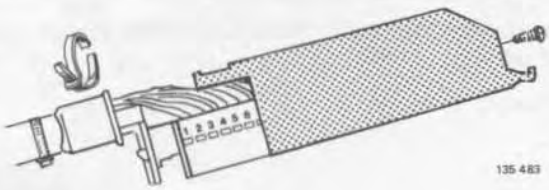
B 21 FT 1984–1985

AC36

Check pressure differential switch with relay

Remove connector from switch. If meter deflection drops, switch is defective (short-circuited) and must be replaced.

Re-connect switch connector.

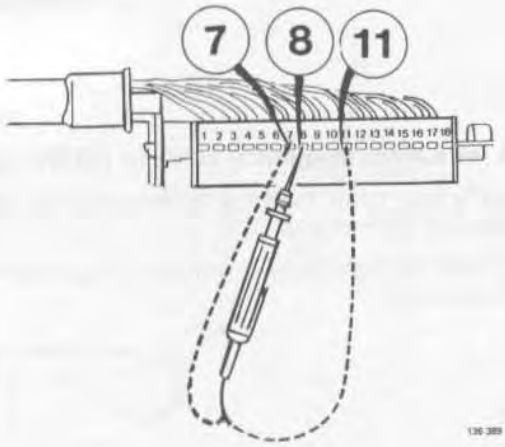


AC37

Turn off ignition

AC38

Remove connector from control unit
Remove cover



AC39

Turn on ignition

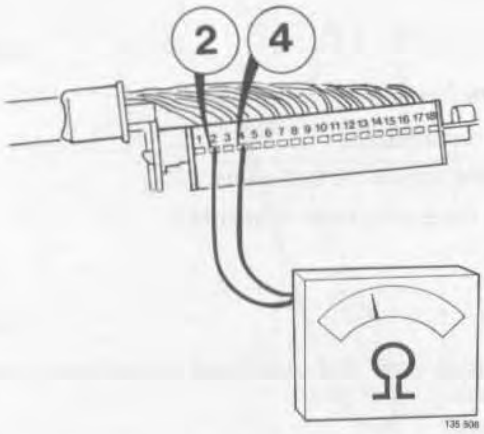
AC40

Check wiring to:

- thermal switch (1982–) and microswitch (B 21 FT) as applicable
- pressure differential switch (B 21 FT 1984–1985) as applicable

Connect a test lamp between terminals 8 and 11, and between terminals 8 and 7 respectively.

Lamp should **not** light in either case. If lamp lights, wire is short-circuited.



AC41

Checking wires to Lambda-sond

Note! The Lambda-sond must be disconnected.

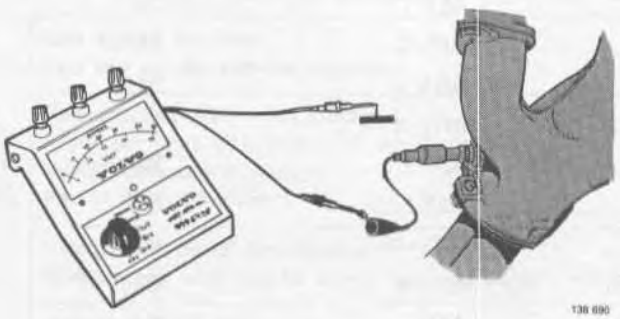
Connect an ohmmeter between terminals 2 and 4. The resistance should be infinite. If the resistance is low there is a short-circuit between the wires.

AC42

If the above steps do not indicate a fault, test system using a new control unit.

End

AD. Lambda-sond



138 690

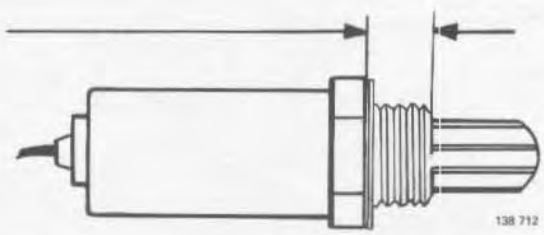
AD1

Checking Lambda-sond

As an alternative checking method, the Lambda-sond can be checked by using a voltmeter.

Run the engine warm for at least 5 minutes after the coolant thermostat has opened.

With the engine running, connect a voltmeter to the sond. The meter must give a reading (normally 0.5–0.7 V) if the sond is in order.



138 712

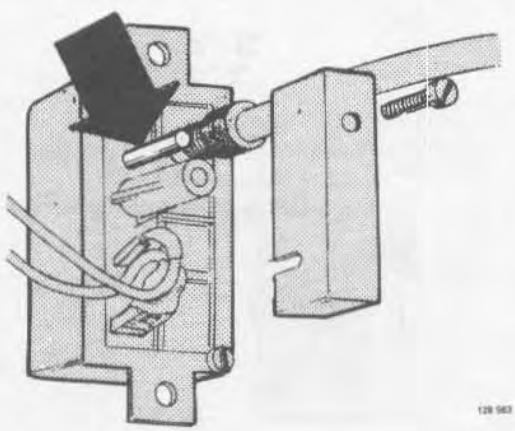
AD2

Replacing Lambda-sond

Smear bolt joint paste "Never-Seez" (P/N 1161035-9) on Lambda-sond threads. Make sure that no paste enters slot as this will inhibit function of Lambda-sond.

Torque to **55 Nm** (40 ft.lbs).

When removing/installing a sond in B 21 FT engines, use tool 5250.



128 563

AD3

Resetting dashboard indicator lamp

Indicator lamp will light each time the exhaust gas recirculation system is due for service.

Lamp is actuated by a switch connected to car odometer and mounted on back of speedometer.

To reset switch, remove cover (shown adjacent) and depress white push button (arrowed).

Re-fit cover after adjustment.

Contents

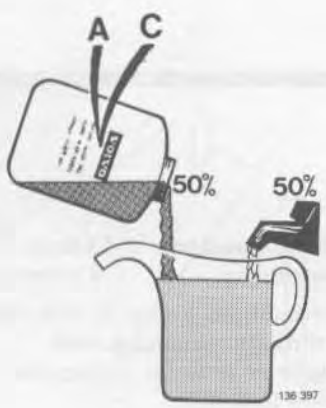
Group 26 Cooling system

AE. Fault symptoms – poor cooling

Engine overheats and/or poor operation of air conditioning

POSSIBLE CAUSE	REMEDY	OPER-ATION
Coolant leakage, opening pressure of expansion tank cap too low	Pressure-test system	AG1
Radiator blocked by e.g. insects	Clean	AH1
Air bypasses radiator	Check/adjust position	AH3
Ignition setting too low Retarded ignition increases engine combustion temperature	Check/adjust	–
CO content too low Poor mixture (low CO) increases engine combustion temperature	Check/adjust	–
Idle speed too low Too low an idle reduces cooling	Check/adjust	–
Radiator blocked with sludge Incorrect type of coolant or aged coolant Incorrect coolant mixture Fan clutch defective	Check radiator Check/drain coolant Check/adjust mixture Replace fan clutch	AH2 AF3 AF1
Incorrect type of thermostat Note engine must not be driven for long periods without thermostat	Check/replace	AI 1–3
Vehicles with AC: Idle speed compensation defective	Check/adjust	–
Electric cooling fan defective	Check/adjust	AN1–4

AF. Coolant



AF1

General

Since aluminum is used in the engines, active corrosion protection is necessary in the coolant to help prevent corrosion damage.

* Use genuine Volvo coolant diluted with **clean** water in proportions of **50/50.** This mixture helps to prevent corrosion and frost damage.

Vehicles manufactured before 1981 were filled with **type A** (red) coolant whereas vehicles manufactured after 1981 are filled with the improved **type C** (blue-green) coolant.

* See overleaf

AF2

Topping-up cooling system

Never add only water to the cooling system. Use genuine Volvo coolant diluted to a 50/50 mixture with clean water.

Two different types of coolants are in use, type A and type C. When topping up a cooling system filled with type A coolant – either use type A or add type C coolant. Note, however, that no more than 25 % of the coolant can be substituted with type C coolant. If more coolant is required the cooling system must be drained and filled afresh with type C coolant.

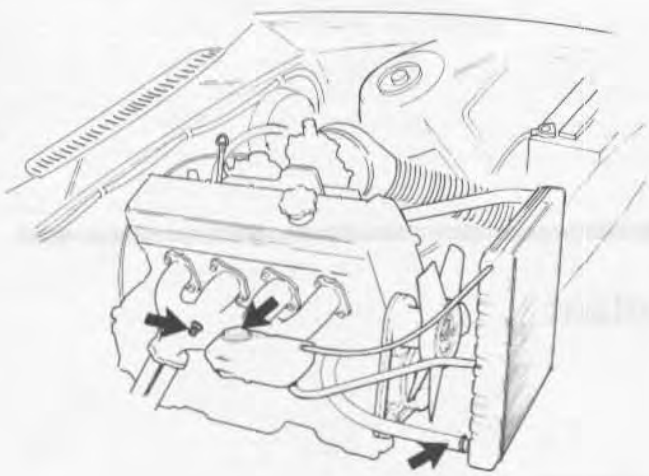
E.g. If cooling system capacity = 9.5 litres (10 US qts) no more than 2.4 litres 9 (2.50 US qts) of type C coolant can be used to top up system. (2.4 l refers to diluted coolant i.e. 50 % water + 50 % concentrated coolant).

AF3

Changing coolant

The coolant must be replaced regularly since the corrosion protection in the coolant loses effect with time.

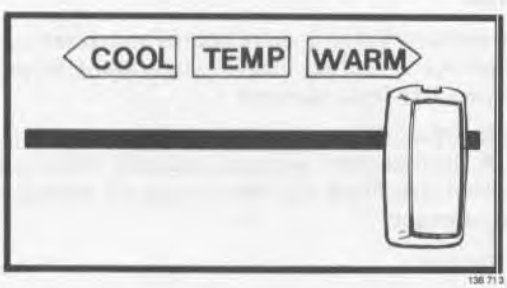
Always fill cooling system with **type C** coolant. Remember to change the decal (P/N 1 331 473-7) on the expansion tank when changing to type C coolant.



AF4

Draining

- set dashboard heater control to max. heat
- disconnect battery
- unscrew cap from expansion tank
- open drain cock on right side of cylinder block. Attach hose to cock to prevent spillages
- disconnect lower radiator hose from radiator
- close cock, re-connect lower radiator hose and battery



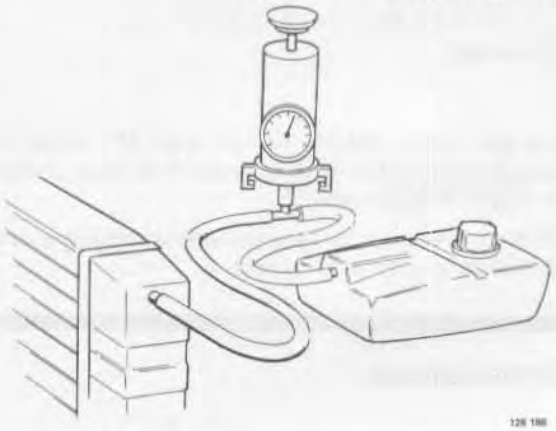
AF5

Filling coolant

Capacity with **manual gearbox** . **9.5 litres** (10.0 US qts)
automatic ..... **9.3 litres** (9.8 US qts)

- ensure heater controls are set to max heat
- add coolant through expansion tank
- warm-up engine and top up as required
- re-fit expansion tank cap.

AG. Pressure testing cooling system



AG1

Check breather hose between radiator and expansion tank. Replace hose if worn or cracked.

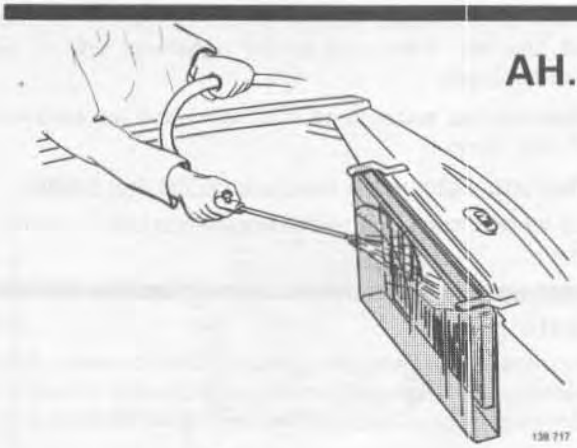
Connect pressure tester between radiator and expansion tank.

Increase pressure and check opening pressure of expansion tank cap and for leaks:

- opening pressure = **65–85 kPa** (9.2–12.0 psi)
- check that pressure does not drop noticeably during **30 seconds**.

AH. Radiator

Cleaning radiator



AH1

Remove flies, etc. from radiator grille by hosing radiator from inside as illustrated. Blow clean with compressed air.

Note! Do not spray water or blow air at too high a pressure at radiator as damage may result.

Checking radiator

AH2

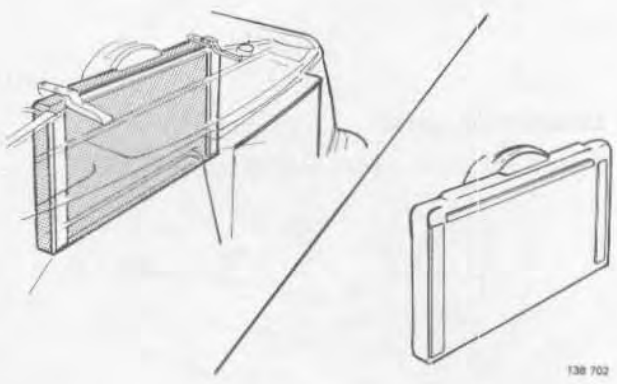
Heat up engine until thermostat opens and then for a few more minutes.

Turn off engine.

Detach fan shroud from radiator.

Check radiator with hand, warm and cold sections indicate that radiator is partly blocked.

Checking/adjusting position of radiator



AH3

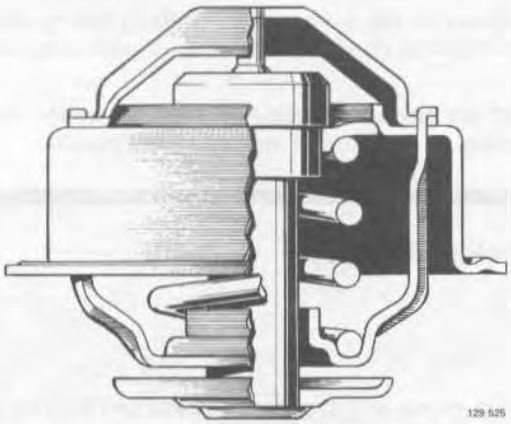
Radiator must lie flush with front panel otherwise some air will bypass radiator.

Adjust position of front panel as required.

Plastic foam can also be used to seal gap between radiator and front panel.

- 2 strips 20x50x410 mm
- 1 strip 10x25x660 mm

AI. Coolant thermostat



General

AI1

It is important that the correct type of thermostat is fitted to vehicle because it determines flow of coolant through cooling system.

Do not run engine for long periods without thermostat otherwise engine may overheat.

Replacement

AI2

Drain the coolant so that the level is below the thermostat. Use the drain cock on the righthand side of the cylinder block.

Clean contact surfaces on the thermostat housing and cylinder head.

When installing, use a new seal on the thermostat.

Top up with coolant after the engine has been warmed-up.

Testing

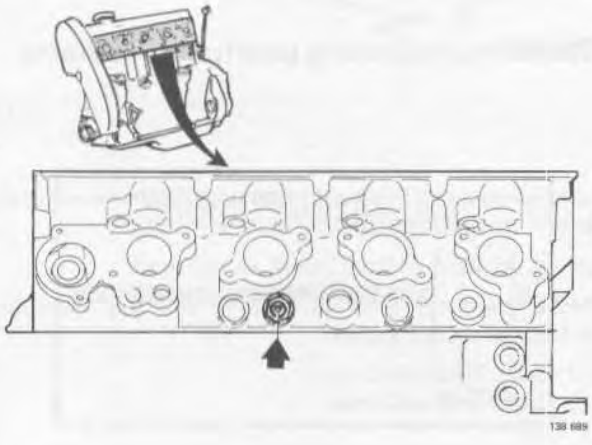
AI3

Thermostat can be tested, if required, in hot water. After reaching opening temperature (see below) it should not take longer than 2 minutes for thermostat to open fully.

Three types of thermostat are in use:

Marking	Begins opening at	Fully open at
82	81–83°C (178–181°F)	90–94°C (194–201°F)
87	86–88°C (187–190°F)	95–99°C (203–210°F)
92	91–93°C (196–199°F)	100–104°C (212–219°F)

AJ. Coolant temperature sensor



AJ1

Location of sensor

Sensor is located on left side of cylinder head.

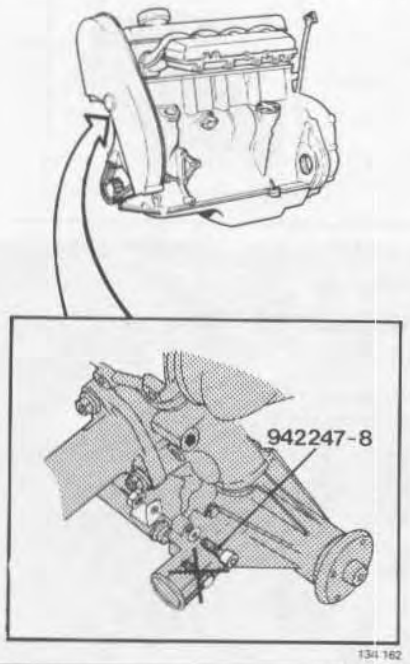
AK. Coolant pump, replacement

AK1

General

Replacement of coolant pump, rubber seals or gasket must always be preceded by pressure testing the cooling system.

Coolant pumps are often changed unnecessarily, for example when only a gasket is leaking. In the case of a leakage, the system should therefore be pressure tested (see AG1) in order to establish whether there is a leakage, and to avoid unnecessary pump replacement.

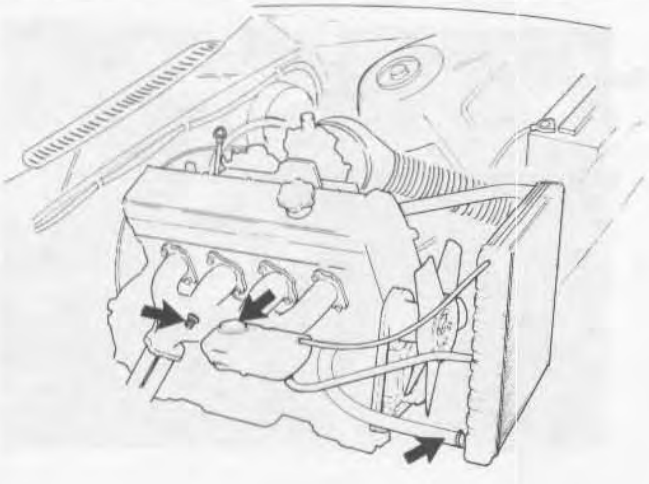


AK2

Changed mounting bolt for return pipe

The hexagonal bolt has been replaced by a different bolt, P/N. 942247-8. This has been done to make it easier to remove/install the bolt on engines with Pulsair system.

See page 85 regarding removal of hexagonal bolt on engines with Pulsair system.



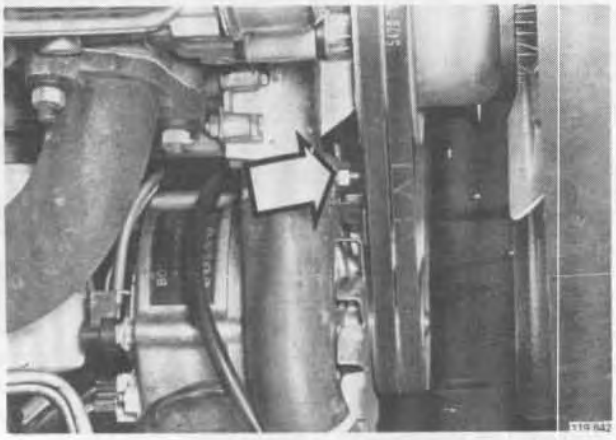
AK3

Drain the cooling system

Move the heater control to maximum heat.
Remove the cap from the expansion tank.
Open the drain cock on the righthand side of the engine block.
Disconnect the lower hose from the radiator.

AK4

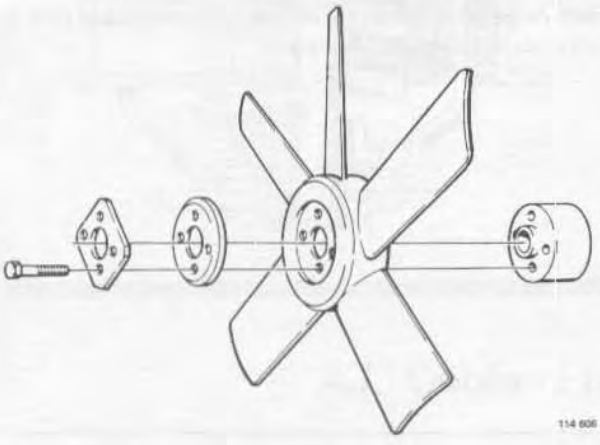
Disconnect the fan shroud and move it out of the way



AK5

Loosen alternator belts

Loosen the alternator mounting bolt and the clamp bolt.

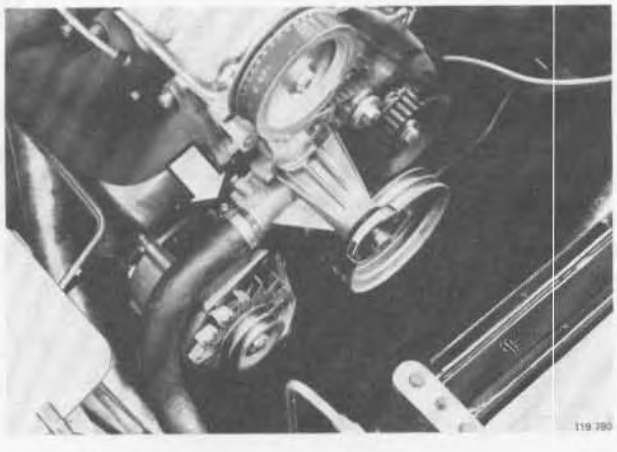


AK6

Remove the fan

NOTE! There are 3 different types of fans:

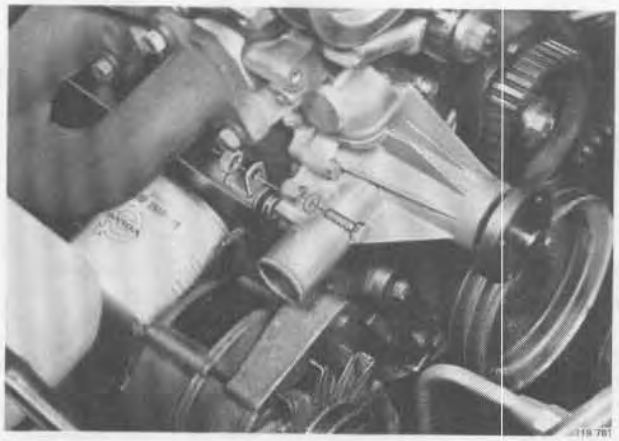
- fixed fan
- temperature-controlled clutch-type fan
- clutch-type fan



AK7

Remove:

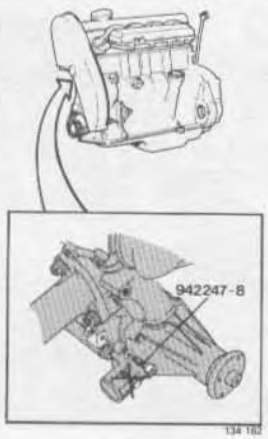
- fan shroud
- timing gear casing
- lower radiator hose from coolant pump



AK8

Loosen return pipe at the coolant pump

Remove the bolt, washer and nut.



AK9

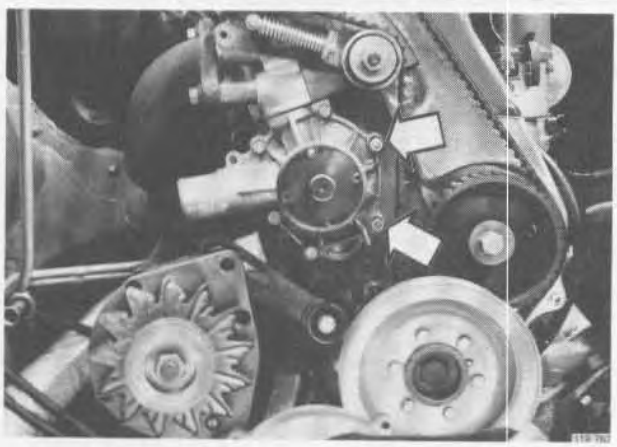
Removing hexagonal bolt on engines with Pulsair system

There are two different methods for removing the old hexagonal bolt:

Cars without block heaters
Remove the rear mounting bolt of the return pipe (rear edge of cylinder block).

Loosen and pull the coolant pump out slightly. Remove the bolt.

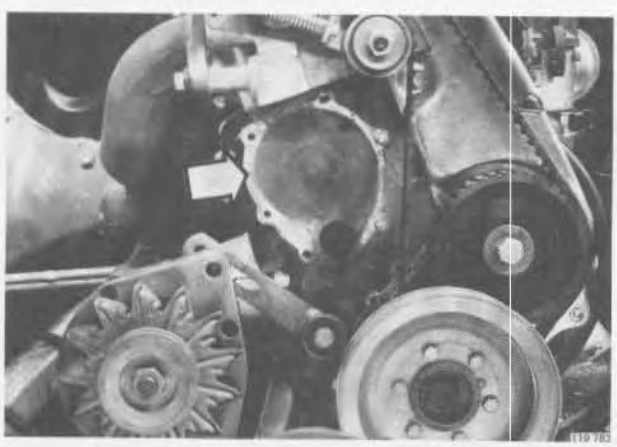
Cars with block heaters
Drill away the head of the bolt (drill Ø 8 mm).



AK10

Remove the coolant pump

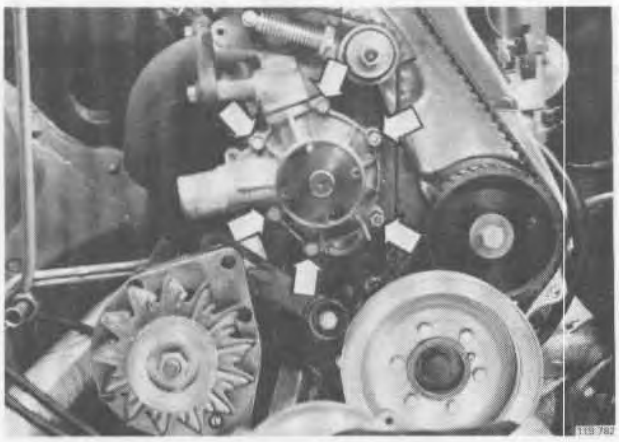
Remove all bolts, washers and nuts.



AK11

Clean gasket surface and contact surfaces

Scrape off any traces of gasket material from the block and coolant pump. Clean the rubber ring contact area on the cylinder head.



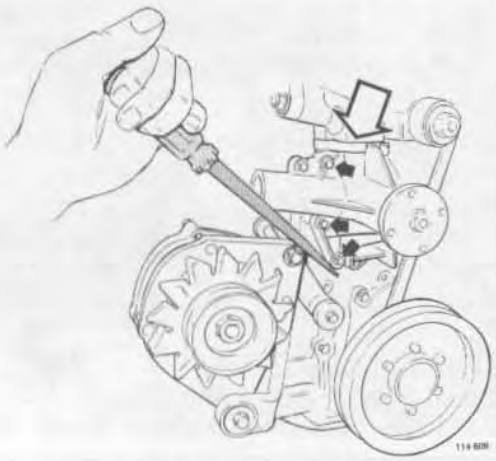
AK12

Install coolant pump

Use a new gasket between the pump and the cylinder block.

Install a new O-ring on the coolant pump.

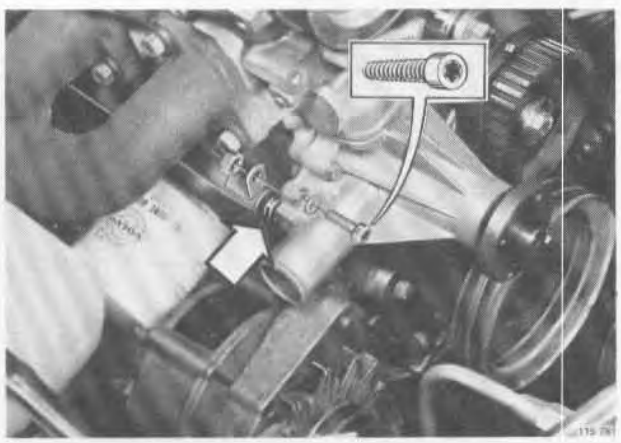
Secure the pump with the two nuts.
Make sure that the O-ring is in position and that it is not damaged. Tighten the nuts so that the pump does not slip, but can be slid upwards.



AK13

Tension the coolant pump against the cylinder head

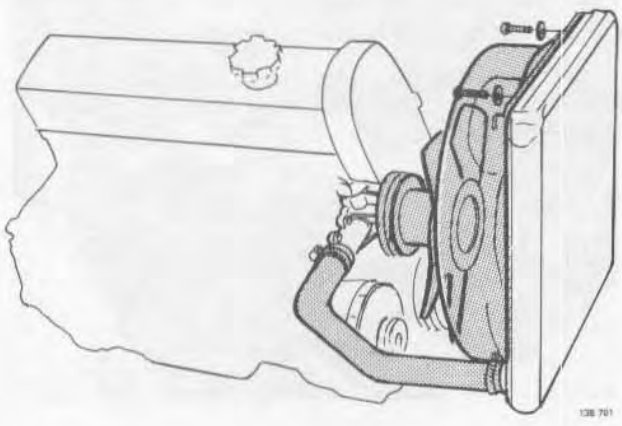
Install the remaining washers and bolts.
Tighten the bolts and nuts.



AK14

Install:

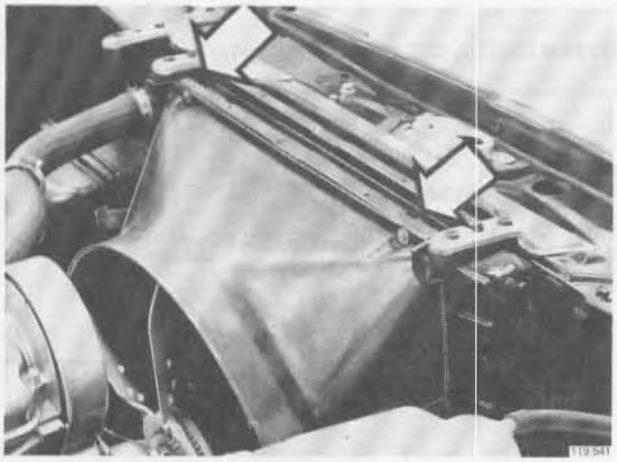
- the return pipe. **NOTE!** On cars with Pulsair system the mounting bolt of the pipe must be replaced by a bolt of the new type (see page 83),
- timing gear casing



AK15

Install:

- lower radiator hose
- fan shroud. **NOTE!** Do not tighten the pulley and the fan at this stage



AK16

Install fan shroud

AK17

Install all drive belts

Tension the belts.

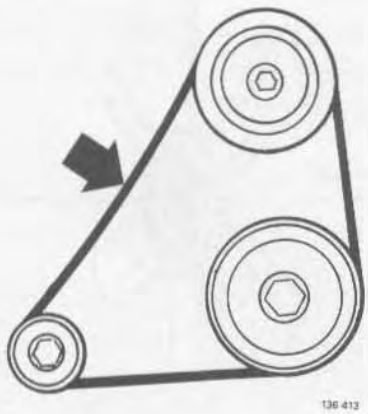
With correct tension it should be possible to deflect the belts 5–10 mm (0.2–0.4 in) halfway between the pulleys.

AK18

Fill with coolant

Close the drain cock.
Fill the expansion tank to "maximum" level.
Run the engine warm with the heater control set in hot, check that there is no leakage, and top up with coolant if required.

AL. Drive belts



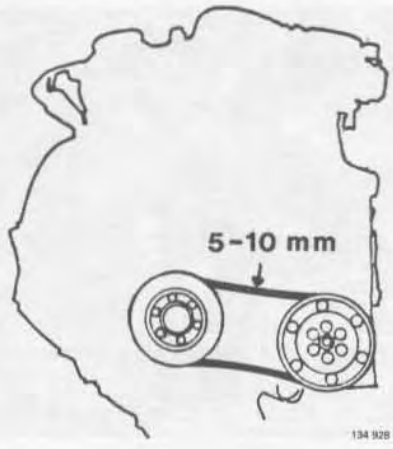
AL1

General

With correct tension it should be possible to deflect the belts 5–10 mm (0.2–0.4 in) halfway between the pulleys.

Note! When changing the alternator-fan belt, both belts must be replaced.

When adjusting the drive belt for the cooling system on cars with power steering and one drive belt, use tool 5197. See next page.



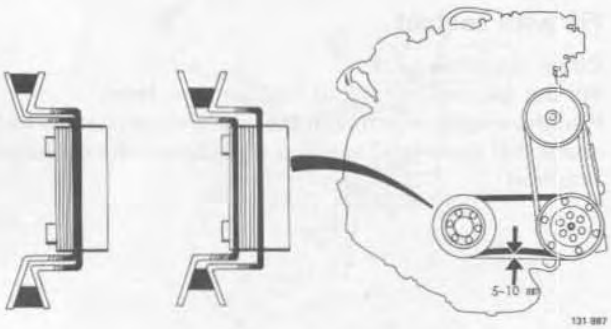
Drive belts, air conditioning

AL2

Without power steering

Tension the belt by adjusting the position of the compressor.

AL3

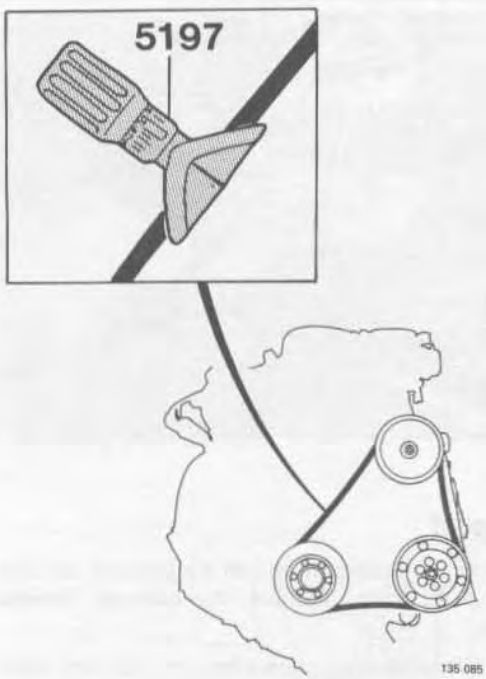


With power steering and two drive belts

Tension the belt by placing an appropriate number of shims between the two halves of the crankshaft pulleys.

One shim changes the belt tension by approximately 5 mm (0.2 in).

AL4



With power steering and one belt

Tension the belt by moving the power pump.
Check the belt tension by positioning tool 5197 against the belt between the crankshaft pulley and the pump. The belt tension should be **17–18** units.

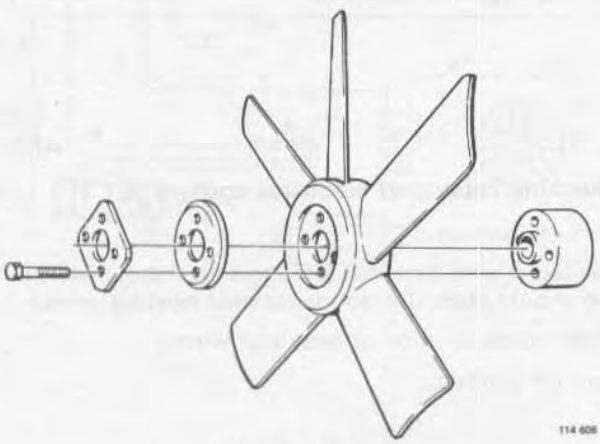
AM. Fan

Type of cooling fan fitted to vehicle depends on model year, market and engine type.

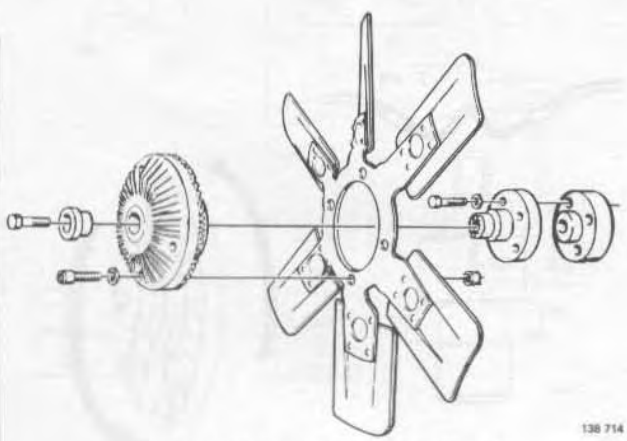
AM1

General

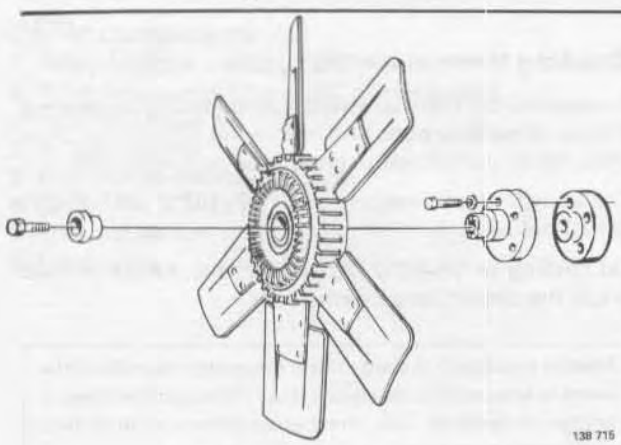
In order to gain access to the fan, the two upper securing bolts on the fan shroud must be removed and the shroud moved rearwards.



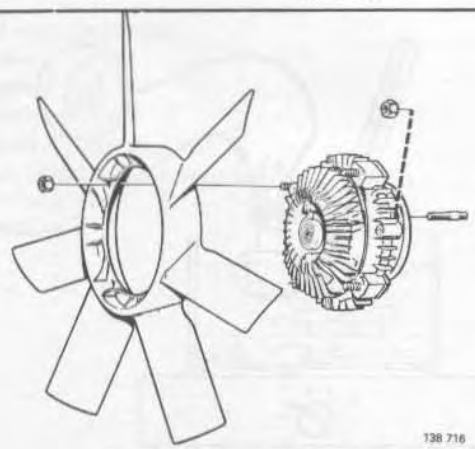
Type 1 Fixed fan



Type 2 Fan of clutch type, type 1

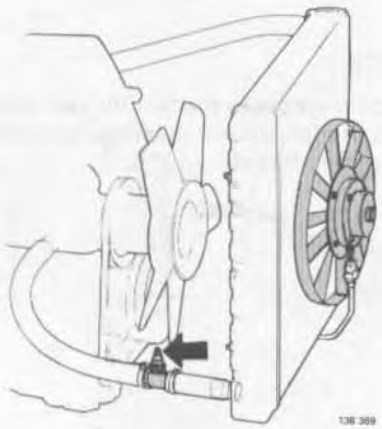


Type 3 Fan of clutch type, type 2



Type 4 Thermo-clutch type

AN. Electric cooling fan



AN1

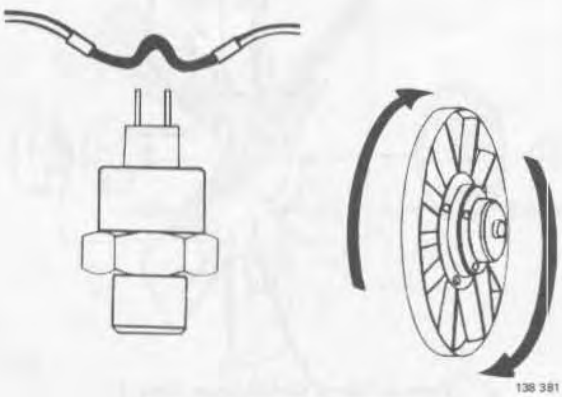
General

This fan is installed on most B 21 FT 1984–1985 with intercooler and certain cars with air conditioning (AC) intended for "hot" markets.

A thermal switch in the lower radiator hose controls the connection of the fan.

The fan is switched on when the coolant temperature is approximately +100°C (212°F) and is switched off when the temperature has dropped to approximately +95°C (203°F).

Wiring diagram on next page.



AN2

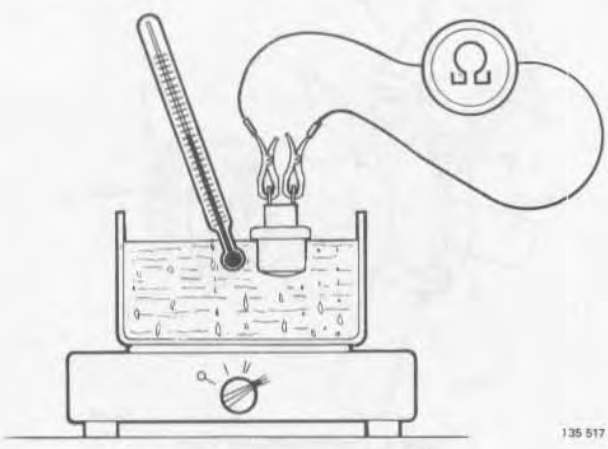
Checking relay and electrical cooling fan

Turn on ignition.

Connect a wire between terminals on thermal switch. Fan should start. (Do not disconnect existing wires.)

If not, check function of relay and wiring.

Turn off ignition.



AN3

Checking thermal switch

If required, the thermal switch can be tested by heating it in an oil bath or oven and observing the pointer of an ohm meter connected between the two terminals.

The switch should switch on at **97–102°C** (207–216°F) (small deflection).

On cooling to **97–92°C** (207–198°F) the switch should break the circuit (large deflection).

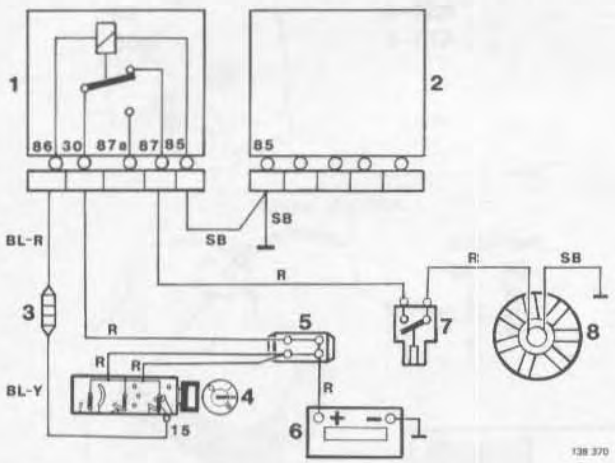
Note! If an oil bath is used to heat the switch care should be taken to ensure that the switch does not touch the sides or bottom of the bath. Also, the thermometer should be held near to the switch.

Wiring diagram

AN4

The diagrams show the position with the ignition on and coolant temperature below +100°C (212°F).

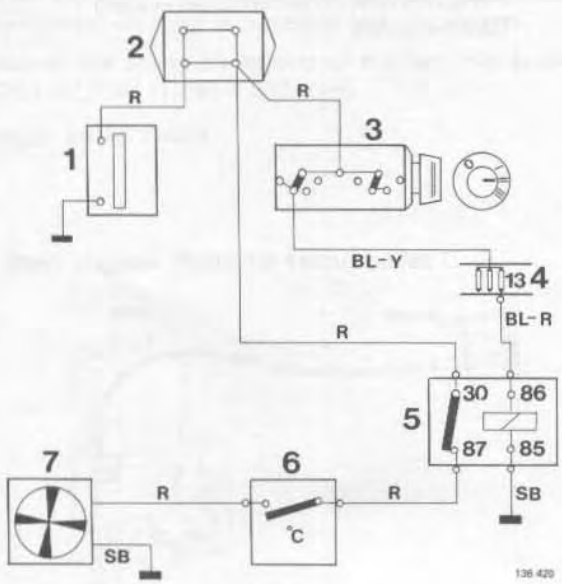
B 21 FT 1984–1985 with intercooler



List of components

1 Relay (electric cooling fan)
2 Relay (disconnection of AC compressor)
3 Fuse box (fuse No. 13)
4 Ignition switch
5 Connection (terminal board)
6 Battery
7 Thermal switch
8 Electric fan

Others



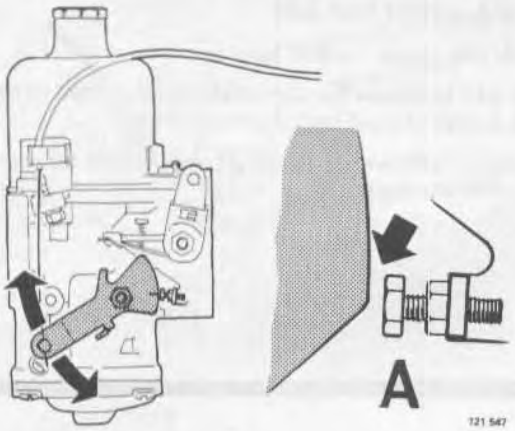
List of components

1 Battery
2 Terminal box
3 Ignition switch
4 Fuse box (fuse No. 13)
5 Relay (electrical cooling fan)
6 Thermal switch
7 Electric fan

Contents

Group 27 Engine controls

AO. Choke control, adjusting



A-engines

AO1

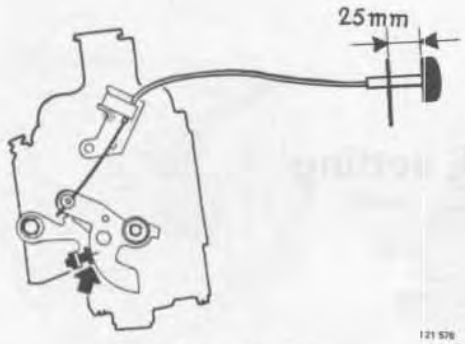
Check choke control

Ensure lever makes full sweep when choke is pulled out.

Push choke in and check that lever is in lower stop position and fast idle adjustment screw A does not contact lever. Adjust if necessary.

AO2

Connect tachometer – warm-up engine



Solex (Zenith)

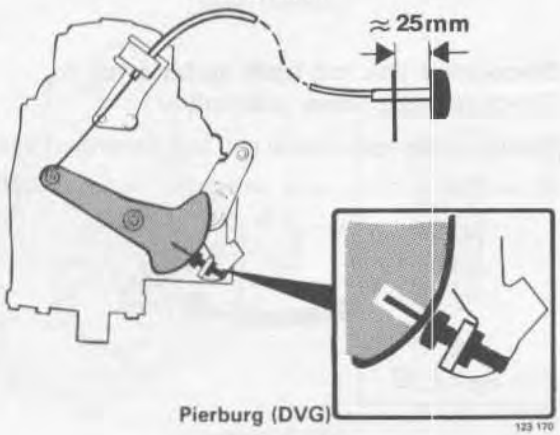
AO3

Adjust fast idle

Pull out choke (approx. 25 mm = 1.0 in) until mark (arrowed) on lever is opposite fast idle screw.

Adjust the speed by means of the fast idle screw to 20.8–22.5 r/S (1,250–1,350 rpm).

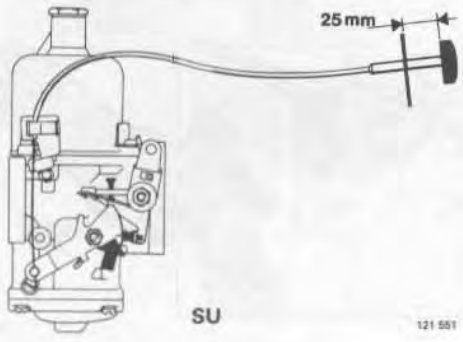
Push in the choke.



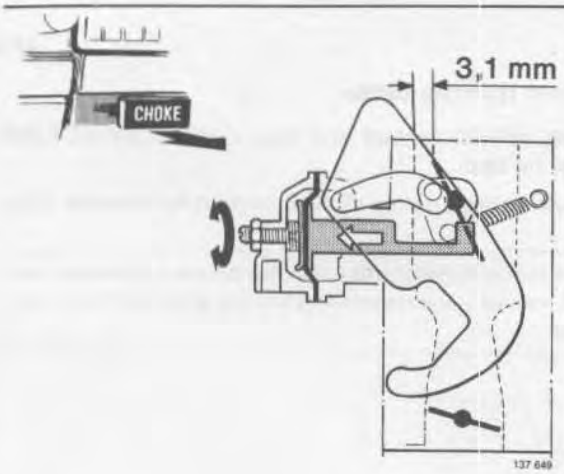
Pierburg (DVG)

AO4

Stop engine. Remove tachometer



SU



K-engines

AO5

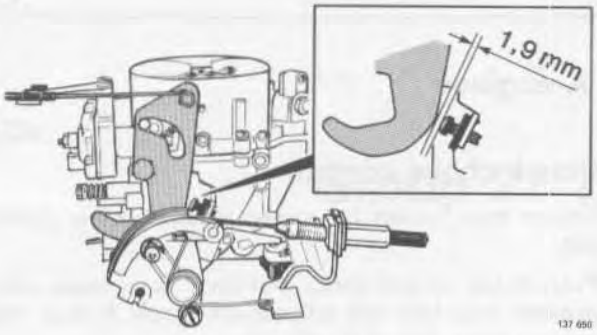
Checking/adjusting vacuum servo for choke damper

Pull out the choke control completely so that the choke damper closes.

Push the rod of the vacuum servo straight into bottom position. If the rod is pushed at an angle the values will be incorrect.

The gap between the carburettor throat and the damper must be **3.1 mm** (0.122 in). Try with a 3.0 mm (0.118 in) drill and a 3.5 mm (0.137 in) drill.

Adjust the screw on the vacuum servo.



AO6

Check/adjust fast idle

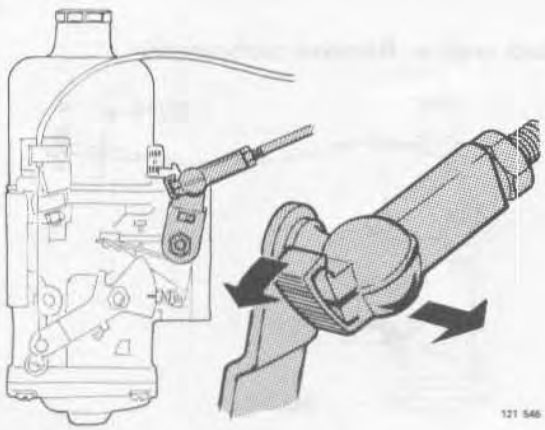
Push the choke control fully in.

The gap between the cam disk and the head of the fast idle screw should be 1.9 mm (0.07 in).

Measure gap with a feeler gauge. Adjust be means of the fast idle screw.

AP. Throttle control, setting

A-engines

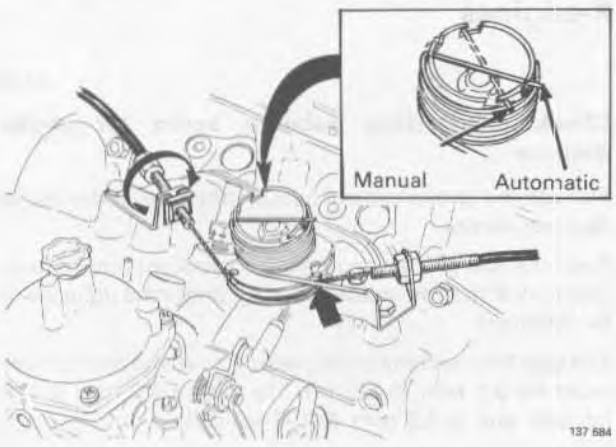


AP1

Disconnect link rod from carburettor
Check throttle valve and pulley

Detach clamp from swivel end and disconnect link rod.

Check that throttle valve and pulley move smoothly.



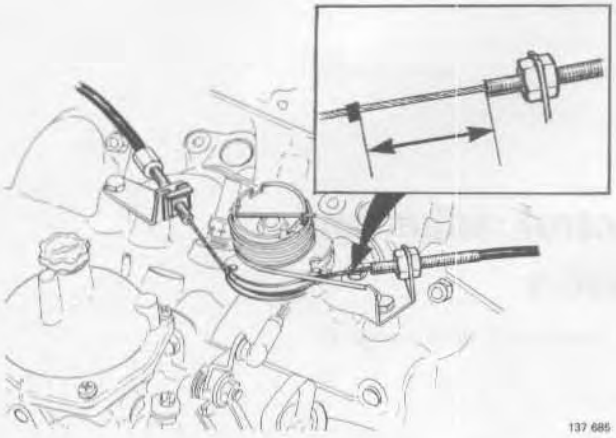
AP2

Adjust throttle cable

Pulley should contact end stop in idle position. Cable must be taut.

At full throttle pulley should contact full throttle stop.

The spring in the throttle pulley has different positions: one for manual transmission and one for automatic transmission.



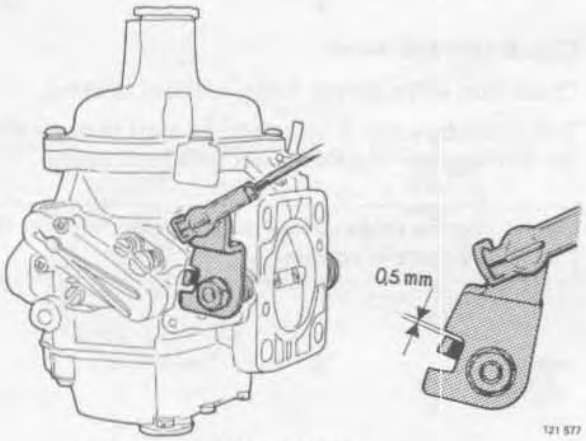
AP3

Adjust kick-down cable (automatic)

Depress accelerator fo floor. **Note!** Do not operate control by hand otherwise setting will be incorrect.

At full throttle, distance between clip on cable and cable sleeve:

BW 35 ..... **43–47 mm** (1.7–1.9 in)
BW/AW 55, AW 71 ..... **50.4–52.6 mm** (1.98–2.07 in)



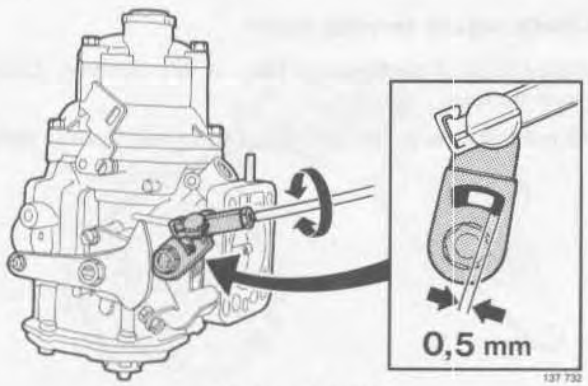
Solex (Zenith)

AP4

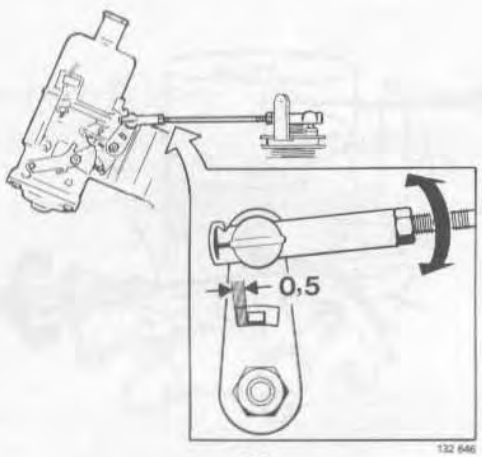
Install and adjust link rod

Push link rod in position and bend in the locking tab.

Adjust link rod so that there is a play of 0.5 mm (0.02 in) between the lifting arm and the follower of the throttle valve shaft.



Pierburg (DVG)

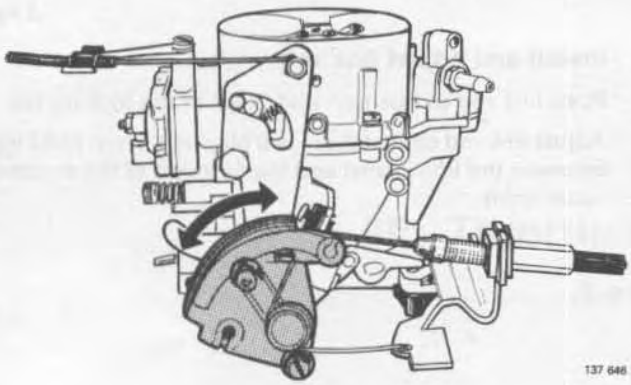


SU

AQ. Throttle control, adjusting

B 19 K

AQ1



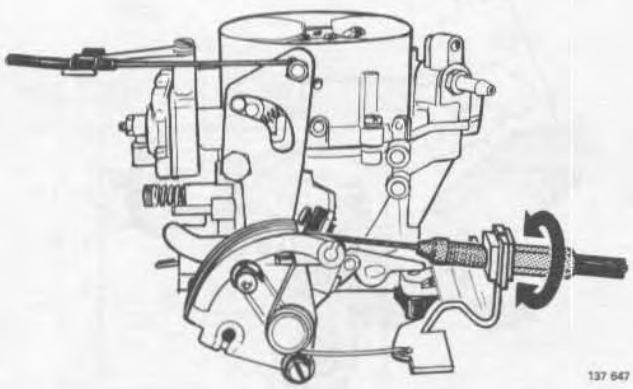
Check throttle valve

Check that valve moves freely without binding.

The secondary barrel valve should start to open when the primary barrel valve is about 2/3 rds open.

Note! That the choke control must be fully closed for the secondary valve to operate.

AQ2



Check/adjust throttle cable

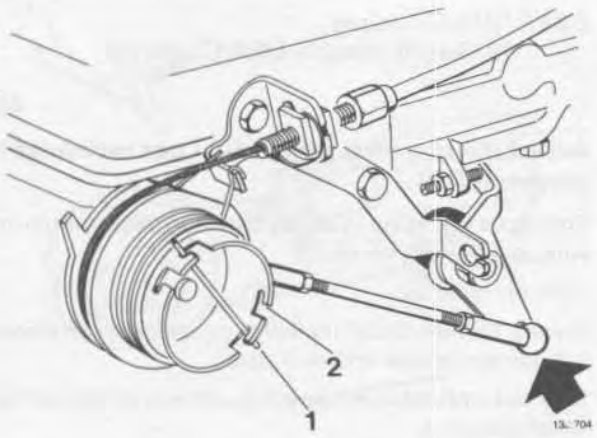
Pulley should contact end stop in idle position. Cable must be taut.

At full throttle, pulley should contact full throttle stop.

AR. Throttle control, adjusting

E/F-engines

(Engines with LH-jetronic fuel system, see page 98).



13: 704

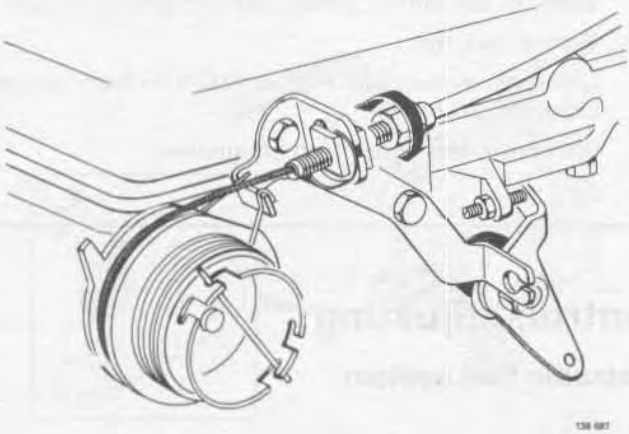
AR1

Checking throttle pulley

Disconnect the link rod.

Check that the pulley moves freely without binding.

Throttle pulley spring – 1979
Note: two different positions for spring:
– one for vehicles with automatic transmission
– one for vehicles with manual transmission



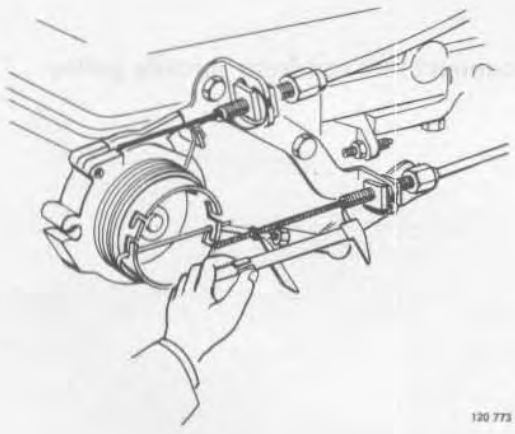
138 687

AR2

Adjust throttle cable

Pulley should contact end stop in idle position. Cable must be taut.

At full throttle pulley should contact full throttle stop.



120 773

AR3

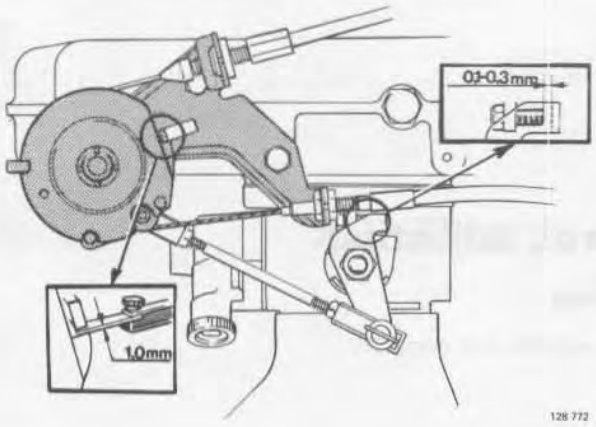
Adjust kick-down cable (automatic)

Depress accelerator to floor. **Note!** Do not operate control by hand otherwise setting will be incorrect.

At full throttle distance between clip on cable and cable sleeve:

BW 35 ..... **43–47 mm** (1.7–1.9 in)
BW/AW 55, AW 71 ..... **50.4–52.6 mm** (1.98–2.07 in)

Adjust cable at the cable sleeve if necessary.

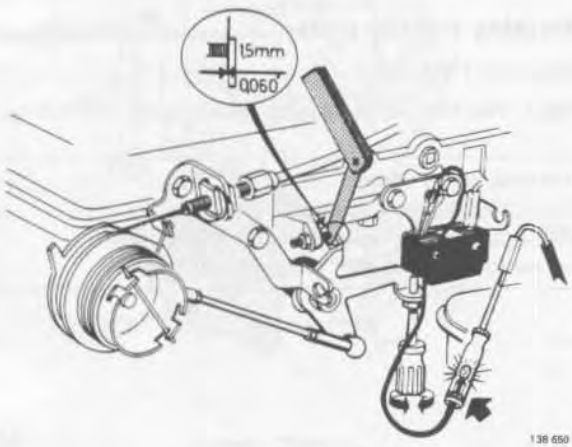


AR4

Install and adjust link rod

Install link rod.

Insert a 1 mm (0.04 in) thick feeler gauge between the throttle pulley and the stop. The play between the adjustment screw and the lifting arm should then be **0.1–0.3 mm** (0.004–0.01 in).



B 21 F 1976–77 Japan
1976 early models USA/California

AR5

Adjust microswitch for exhaust gas recirculation system (EGR)

Connect a test lamp in series between microswitch and wire to solenoid valve.

Turn on ignition.

Place a **1.5 mm** (0.039 in) feeler gauge between throttle adjustment screw and end stop.

Lock nut and unscrew **upper** adjustment screw until test lamp goes out.

Screw in adjustment screw until test lamp just lights.

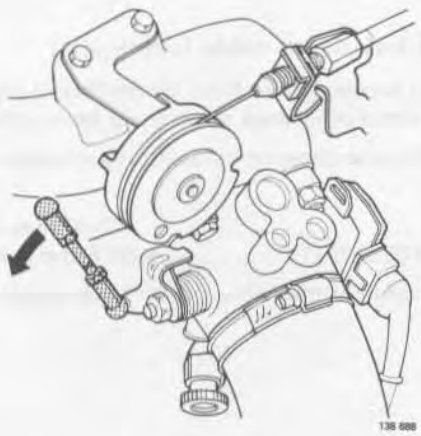
Tighten lock nut.

Check adjustment with a 2 mm (0.079 in) feeler gauge. Lamp should be off.

Disconnect test lamp. Turn off ignition.

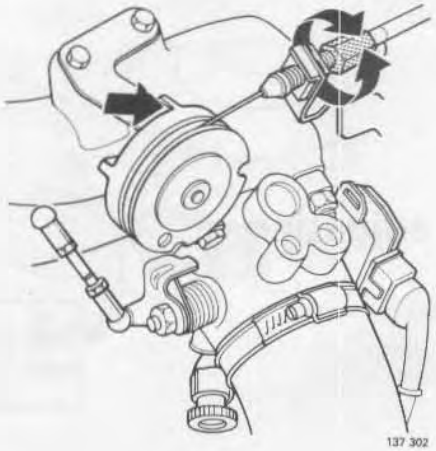
AS. Throttle control, adjusting

Engines with LH-Jetronic fuel system



AS1

Disconnect link rod from throttle pulley

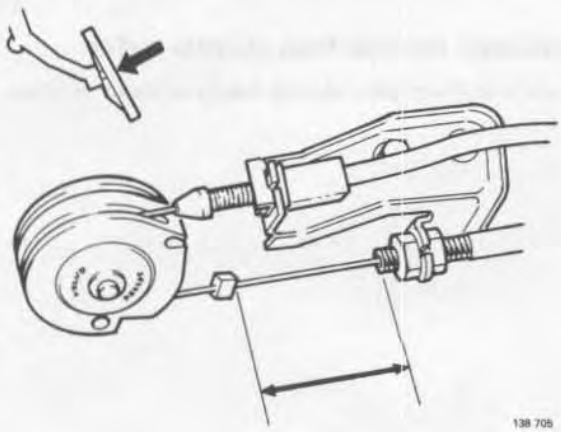


AS2

Check/adjust throttle pulley and throttle cable

Check that the pulley moves freely without binding.

Pulley should contact end stop in idle position. Cable must be taut but must not move throttle pulley. Depress accelerator pedal and check that at full throttle, pulley contacts full throttle stop.

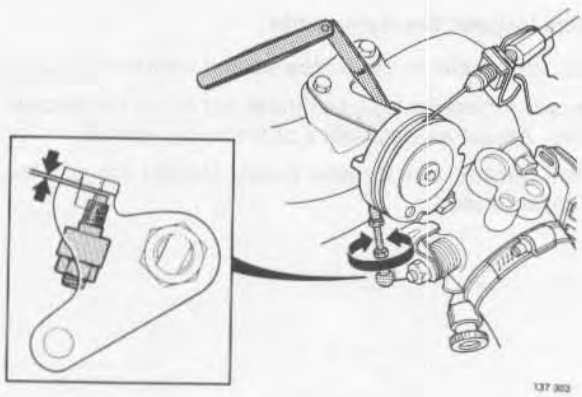


AS3

Check/adjust kick-down cable (automatic)

Depress accelerator to floor. **Note!** Do not operate control by hand otherwise setting will be incorrect.

At full throttle, distance between clip on cable and cable sleeve = **50.4–52.6 mm** (1.98–2.07 in).



AS4

Attach/adjust link rod

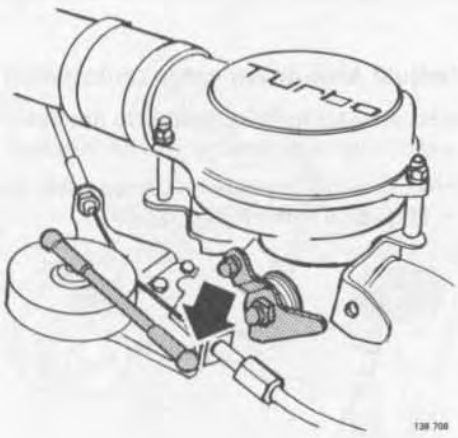
Place a **1 mm** (0.040 in) feeler gauge between pulley and idle stop.

Adjust link rod to obtain a **0.1 mm** (0.004 in) clearance between lower adjustment screw and end stop.

Remove feeler gauge.

AT. Throttle control, adjusting

Turbo engines

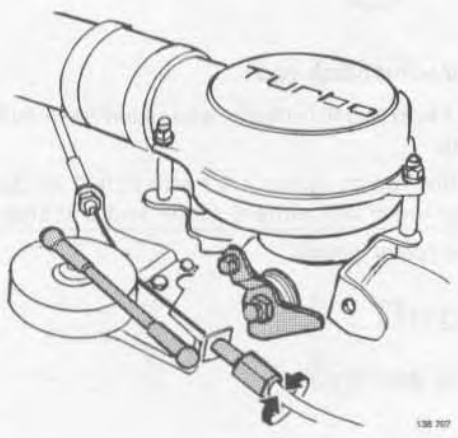


138 706

AT1

Disconnect link rod from throttle pulley

Check that the pulley moves freely without binding.



138 707

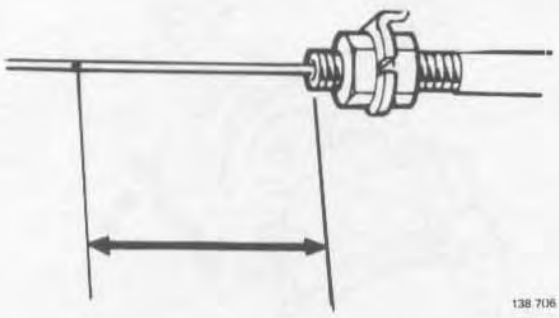
AT2

Check/adjust throttle cable

In the idle position the pulley should contact the stop.

The cable must be taut, but must not move the throttle pulley. Adjust as necessary at the cable sleeve.

At full-throttle the throttle pulley should contact the full-throttle stop.



138 708

AT3

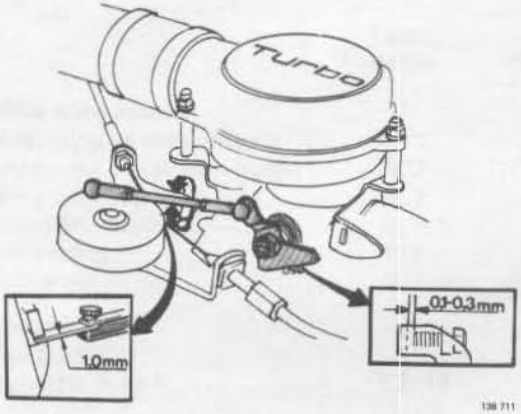
Check/adjust kick-down cable (automatic transmission)

Make a mark on the cable exactly where it enters the cable sleeve.

Press the accelerator pedal down completely. Do not turn the throttle pulley by hand otherwise the setting will be incorrect.

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

Adjust as necessary at the cable sleeve.



AT4

Installing and adjusting link rod

Install link rod.

Insert a **1 mm** (0.04 in) thick feeler gauge between the throttle pulley and the stop. The play between the adjustment screw and the lifting arm should be **0.1–0.3 mm** (0.004–0.01 in).

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