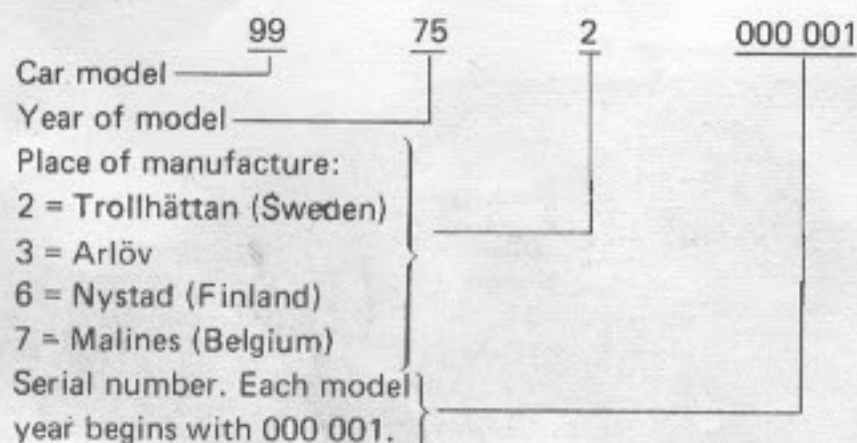


CHASSIS NUMBERS

The chassis number consists of eleven digits. The meaning of the digits is shown in the following example:



Cars made in Sweden

Trollhättan:

Model 1975: Chassis No. 99752000001–99752041733

Model 1976: Chassis No. 99762000001–99762040165

Model 1977: Chassis No. 99771000001–99771036086

Chassis No. 99772000001–99772008024

Model 1978: Chassis No. 99781000001–99781027837

Chassis No. 99782000001–99782011345

Model 1979: Chassis No. 99791000001–99791001493

Chassis No. 99792000001–99792006401

Model 1980: Chassis No. 99801

Chassis No. 99802

Arlöv:

Model 1978: Chassis No. 99783000001–99783002208

Model 1979: Chassis No. 99793000001–99793010090

Model 1980: Chassis No. 99803

Cars made in Finland

Model 1975: Chassis No. 99756000001–99756016176

Model 1976: Chassis No. 99766000001–99766018032

Model 1977: Chassis No. 99776000001–99776018461

Model 1978: Chassis No. 99786000001–99786013650

Model 1979: Chassis No. 99796000001–99796008264

Model 1980: Chassis No. 99806

Cars made in Belgium

Model 1975: Chassis No. 99757000001–99757006197

Model 1976: Chassis No. 99767000001–99767007740

Model 1977: Chassis No. 99777000001–99777004788

Model 1978: Chassis No. 99787000001–99787001800

ENGINE NUMBER

	BI	20	P01	000 001
Engine type:				
"BI"—gasoline engine, mechanical injection				
Cylinder volume in dl				
P03 Automatic transmission, USA Federal				
P04 Manual transmission, USA West				
P05 Automatic transmission, USA West				
P06 Manual transmission, USA Federal				
P03 Automatic transmission, USA Federal				
P04 Manual transmission, USA West				
P05 Automatic transmission, USA West				
P06 Manual transmission, USA Federal				
P03 Automatic transmission, USA Federal				
P04 Manual transmission, USA California				
P05 Automatic transmission, USA California				
P06 Manual transmission, USA Federal				
P03 Automatic transmission, USA Federal				
P04 Manual transmission, USA California				
P05 Automatic transmission, USA California				
P06 Automatic transmission, USA Federal				
P03 Automatic transmission, USA Federal				
P04 Manual transmission, USA California				
P06 Manual transmission, USA Federal				
P04 Manual transmission, USA "BI"				
Serial number 6 figures				

Model 1975

Model 1976

Model 1977

Model 1978

Model 1979

Model 1980

Lubricating oil, grade:
SAE 10 W 30 or 10 W 40. If no oil meeting these specifications is available, oil with a viscosity of SAE 15 W 40 or 15 W 50 may be used. (In extremely cold conditions with temperatures constantly below -4°F (-20°C) oil with viscosity rating SAE 5 W 20 or 5 W 30 should be used. Note! SAE 5 W 20 or 5 W 30 must not be used at temperatures above $+32^{\circ}\text{F}$ (0°C).

Oil volume incl. filter

Oil pump pressure-reducing valve opens at

Oil pressure warning light comes on at

Oil pressure at 2 000 rev/min (oil SAE

10 W 40 at $176^{\circ}\text{F}/80^{\circ}\text{C}$)

Oil pump:

Axial clearance between rotor and housing 0.002–0.003" (0.05–0.09 mm)

Service SE in API-system or
Ford spec. ESE–M2C–101C

3.7 US quarts (3.5 liters)

4.0–5.0 bar (kp/cm², 57–71 psi.)

0.3–0.5 bar (kp/cm², 4.2–7.1 psi.)

Min. 3.0 bar (kp/cm², 43 psi.)

FUEL SYSTEM

Components

Injection valve up to and incl. model 1979 Bosch 0 437 502 004 As from model 1980 0 437 502 012
Cold start valve Bosch 0 280 170 401

Mixture control unit:

Federal, up to and incl. model 1977,
and California, up to and incl. model
1976

Bosch 0 438 040 007

Alternative on Non-catalyst cars,
manual transmission, model 1977

Bosch 0 438 040 004

Non-catalyst cars, as from model 1978

Bosch 0 438 040 049

Catalyst cars, model 1977

Bosch 0 438 140 014

Catalyst cars, as from model 1978

Bosch 0 438 140 051

Air flow sensor:

Federal, up to and incl. model 1977,
and California, up to and incl. model
1976

Bosch 0 438 120 009

Alternative on Federal, manual trans-
mission, model 1977

Bosch 0 438 120 013

Non-catalyst cars, as from model 1978

Bosch 0 438 120 071

Catalyst cars, model 1977

Bosch 0 438 120 025

Catalyst cars, as from model 1978

Bosch 0 438 120 073

Fuel distributor:

Federal, up to and incl. model 1977,
and California, up to and incl. model
1976

Bosch 0 438 100 005

Non-catalyst cars, as from model 1978

Bosch 0 438 100 023

Catalyst cars, model 1977

Bosch 0 438 100 018

Catalyst cars, as from model 1978

Bosch 0 438 100 032

Warm up regulator:

Up to and incl. model 1976

Bosch 0 438 140 013

Non-catalyst cars, as from model
1977 (can also be installed in models
1975 and 1976)

Bosch 0 438 140 020

Catalyst cars, as from model 1978

Bosch 0 438 140 032

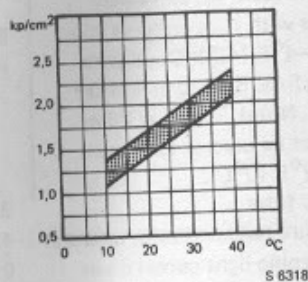
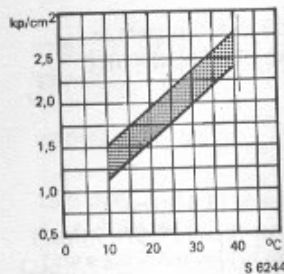
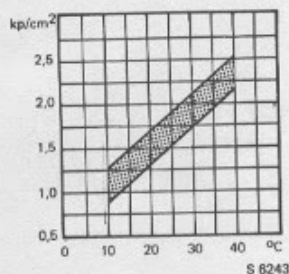
TURBO

Bosch 0 438 140 051

Test values

1. Electric fuel pump, capacity up to and incl. model 1979 as from model 1980 45.7 cu.in./30 s (750 cm³/30 s) min., measured in the return fuel line 900 cm³/30 s).

2. Control pressure, cold engine



WARM-UP REGULATOR 0 438 140 013 AND
0 438 140 020 (UP TO AND INCL. MODEL
1976 AND NON-CATALYST CARS AS FROM
MODEL 1977)

WARM-UP REGULATOR 0 438 140 032
(CATALYST CARS AS FROM MODEL 1977)

WARM-UP REGULATOR TURBO
0 430 140 051

3. Control pressure, warm engine

4. Line pressure:

Test value

Setting value

5. Leakage check:

Minimum pressure after 20 minutes
As from 1978 model

6. Injection valve:

Opening pressure up to and including
date code 828 (1978)

Opening pressure as from date code
829 (≈ 1979 model)

Opening pressure ≈ 1980
model

Maximum variation within group

7. Adjustment of idling speed:

Idling speed

CO-content:

Non catalyst up to and incl. model
19781)2)

Non catalyst as from model 19801)2)

Catalyst up to and incl. model 19792)3)

Catalyst as from model 19803)

Canada2)

3.4–3.8 bar (≈ kp/cm², 48.5–54.0 psi.)

4.5–5.1 bar (≈ kp/cm², 64.0–72.5 psi.)

4.7–4.9 bar (≈ kp/cm², 66.9–69.7 psi.)

1.0 bar (≈ kp/cm², 14.2 psi.)

1.5 bar (≈ kp/cm², 21.3 psi.)

2.5–3.6 bar (≈ kp/cm², 35.6–49.8 psi.)

2.7–3.8 bar (≈ kp/cm², 38.4–54 psi.)

3.0–4.1 bar (≈ kp/cm², 42.6–58.3 psi.)

0.6 bar (≈ kp/cm², 8.5 psi.)

875 ± 50 rev/min

1.25 ± 0.75 %

0.75 ± 0.25 %

0.75 ± 0.25
0.5 (sensor disconnected,

after catalyst)

1.0 ± 0.25 % (sensor disconnected,
before catalyst)

1.5 ± 0.5 %

- 1) Pulse air disconnected and plugged
- 2) Charcoal canister disconnected
- 3) Check value with sensor connected,
after catalyst. Max. 0.4 %

Tightening torques

Air flow sensor:

Stop bracket retaining screws

Counterweight retaining screw

Air flow sensor plate retaining screw

Fuel distributor retaining screws

Line pressure regulator screw plug

M 8 bolt

M 10 bolt

M 12 bolt

M 14 bolt

M 12 cap nut

M 14 cap nut

4.7–5.3 Nm (3.4–3.8 ft.lb., 47–53 kpcm)

4.7–5.3 Nm (3.4–3.8 ft.lb., 47–53 kpcm)

5.0–5.5 Nm (3.6–4.0 ft.lb., 50–55 kpcm)

3.2–3.8 Nm (2.3–2.7 ft.lb., 32–38 kpcm)

13–15 Nm (9.4–10.8 ft.lb., 130–150 kpcm)

10–12 Nm (7.2–8.7 ft.lb., 100–120 kpcm)

13–15 Nm (9.4–10.8 ft.lb., 130–150 kpcm)

20–24 Nm (14.4–17.4 ft.lb., 200–240 kpcm)

15–20 Nm (10.8–14.4 ft.lb., 150–200 kpcm)

15–20 Nm (10.8–14.4 ft.lb., 150–200 kpcm)

25–30 Nm (18.1–21.8 ft.lb., 250–300 kpcm)

Test results

Mechanical:

Brush spring pressure	11.3–12.8 N (41–46 oz., 1150–1300 p)
Backlash	0.014–0.024" (0.35–0.60 mm)
Distance from pinion to ring gear	0.098–0.118" (2.5–3.0 mm)
Contact reserve	0.039" (1 mm)
Axial play of rotor	0.002–0.012" (0.05–0.30 mm)
Pinion free wheel torque	0.13–0.18 Nm (1.1–1.6 in.lb., 1.3–1.8 kpcm)

Electrical:

No load, 11.5 V and 35–55 A	6,500–8,500 rev/min
Loaded, 9 V and 205–235 A	1,000–1,300 rev/min
Locked starter	6 V 325–375 A
Lowest engagement voltage for solenoid	8 V

DISTRIBUTOR

Ignition system with breaker points

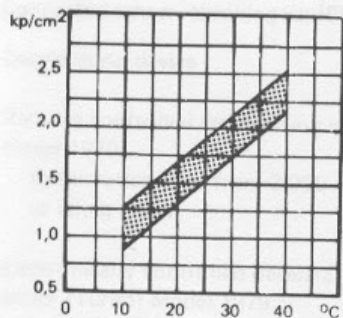
Make	Bosch
Type designation	Bosch JFU 4
Ordering No.:	
With idler shaft of steel (12-tooth gear)	Bosch 0 231 170 122
With idler shaft of cast-iron (20-tooth gear), up to and incl. model 1976	Bosch 0 231 170 158
With idler shaft of cast-iron (20-tooth gear), as from model 1977	Bosch 0 231 170 197
Capacitor	Bosch 1 237 330 280
Capacitance	0.2 μ F $\pm$ 10 %
★ Basic ignition advance, Federal, up to and incl. model 1976	14° BTDC at 800 rev/min max. and with vacuum hose disconnected
★ Basic ignition advance, California, up to and incl. model 1976	12° BTDC at 800 rev/min max. and with vacuum hose disconnected
Basic ignition advance, as from model 1977	20° BTDC at 2,000 rev/min and with vacuum hose disconnected and transmission in neutral
Basic ignition advance, Canada, manual transmission as from model 1977	20° BTDC at 2,000 rev/min and with vacuum hose disconnected
Basic ignition advance, Canada, automatic transmission, as from model 1977	23° BTDC at 2,000 rev/min and with vacuum hose disconnected and transmission in neutral
Order of firing	1–3–4–2
★ Breaker gap	0.016" (0.4 mm) min.
★ Dwell angle	50° $\pm$ 3°
Contact pressure	4.9–6.2 N (18–23 oz, 500–630 p)
Direction of rotation	Counter-clockwise
Axial play, distributor shaft	0.004–0.012" (0.10–0.30 mm)
Rotor resistance	5,000 ohm
Ignition advance curves, see Group 3.	

RATIOS MANUAL TRANSMISSION AS FROM MODEL 1975

Model	Year	Gearbox design- ation	Tires	Dyn. diam.	Wheel	Primary gear	Counter- shaft	Final drive	Total gear ratio							Speed/1000 rpm				
									1 st	2nd	3rd	4th	5th	Back	1st	2nd	3rd	4th	5th	
99	-77	Running No up to and incl.	Pirelli 155 SR 15	310	75: 4 1/2" 76-: 5"	1:1 1,00	18:33 1,83	9:35 3,89	13,9	8,1	5,4	3,9	-	14,7	8,7	14,5	21,6	30,0	-	
"	"	"	Good year 155 SR 15	305	"	"	"	"	"	"	"	"	-	"	8,6	14,3	21,2	29,6	-	
"	"	"	Pirelli, Good year 165 SR 15	312	"	"	"	"	"	"	"	"	-	"	8,8	14,6	21,7	30,2	-	
"	"	"	Pirelli, Good year 175/70HR15	306	"	"	"	"	"	"	"	"	-	"	8,6	14,3	21,3	29,6	-	
"	78	S+running No.	Pirelli 155 SR 15	310	5"	31:30 0,97	18:33 1,83	9:35 3,89	12,9	7,8	5,2	3,8	-	14,2	9,0	15,0	22,3	31,1	-	
"	"	"	Good year 155 SR 15	305	"	"	"	"	"	"	"	"	-	"	8,8	14,7	22,0	30,6	-	
"	"	"	Pirelli, Good year 165 SR 15	312	"	"	"	"	"	"	"	"	-	"	9,1	15,1	22,5	31,3	-	
"	"	"	Pirelli, Good year 175/70HR15	306	"	"	"	"	"	"	"	"	-	"	8,9	14,8	22,1	30,7	-	
99 Turbo	78	T+running No.	Pirelli, Good year 175/70HR15	306	5"	30:27 0,90	18:33 1,83	9:35 3,89	12,0	7,2	4,9	3,5	-	13,2	9,6	15,9	23,7	33,0	-	
99	79-	63441	Pirelli 153 SR 15	310	5"	31:30 0,97	18:33 1,83	9:35 3,89	12,9	7,8	5,2	3,8	-	14,2	9,0	15,0	22,3	31,1	-	
"	"	"	Good year 155 SR 15	305	"	"	"	"	"	"	"	"	-	"	"	"	"	"	-	
"	"	"	Pirelli, Good year 165 SR 15	312	"	"	"	"	"	"	"	"	-	"	"	"	"	"	-	
"	"	"	Pirelli, Good year 175/70HR15	306	"	"	"	"	"	"	"	"	-	"	"	"	"	"	-	
99 Turbo	79-	G44601	Pirelli, Good year 175/70HR15	306	5 1/2"	31:26 0,84	17:33 1,94	"	11,9	7,2	4,8	3,3	-	13,1	9,7	16,1	23,9	35,3	-	
99 Turbo	80-	G45701	Pirelli, Good year 175/70HR15	306	5 1/2"	32:25 0,78	15:34 2,27	"	12,9	7,8	5,2	3,8	3,0	14,2	8,9	14,8	22,0	30,6	37,9	

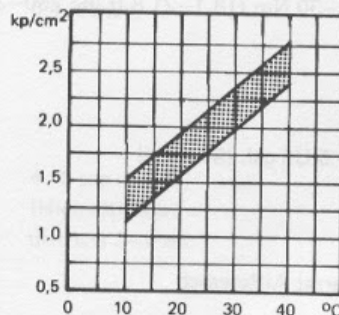
Test values

1. Electric fuel pump, capacity (900 cm³/30 s) min., measured in the return fuel line
2. Control pressure, cold engine



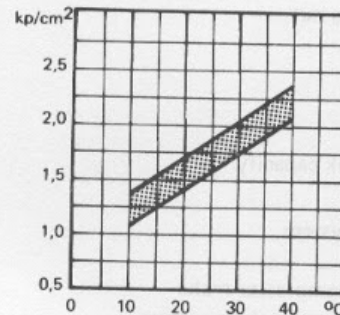
S 6243

WARM-UP REGULATOR 0 438 140 020
NON-CATALYST CARS



S 6244

WARM-UP REGULATOR 0 438 140 032
(CATALYST CARS)



S 6318

WARM-UP REGULATOR TURBO
0 438 140 051

3. Control pressure, warm engine
4. Line pressure:
 - Test value
 - Setting value
5. Leakage check:
 - Minimum pressure after 20 minutes
6. Injection valve:
 - Opening pressure, 1979 model up to date code 828
 - Opening pressure, 1979 model as from date code 829
 - Opening pressure, 1980 model
 - Maximum variation within group
7. Leakage test
8. Adjustment of idling speed:
 - Idling speed

3.4–3.8 bar ($\approx$ kp/cm², 48.5–54.0 psi.)

4.5–5.1 bar ($\approx$ kp/cm², 64.0–72.5 psi.)

4.7–4.9 bar ($\approx$ kp/cm², 66.9–69.7 psi.)

1.5 bar ($\approx$ kp/cm², 14.2 psi.)

2.5–3.6 bar ($\approx$ kp/cm², 36.0–52.0 psi)

2.7–3.8 bar ($\approx$ kp/cm², 38.0–54.0 psi)

3.0–3.8 bar ($\approx$ kp/cm², 43.0–54.0 psi)

0.6 bar ($\approx$ kp/cm², 8.5 psi.)

By a pressure of 2.4 bar ($\approx$ 33.8 psi.)

no drop should fall within 15 sec

875 $\pm$ 50 rev/min

CO value

Non-catalyst cars:

0.75 $\pm$ 0.25 %

Catalyst cars Model 1979:

0.75 $\pm$ 0.25 % (Sensor discon. After cat.)

Catalyst cars Model 1980:

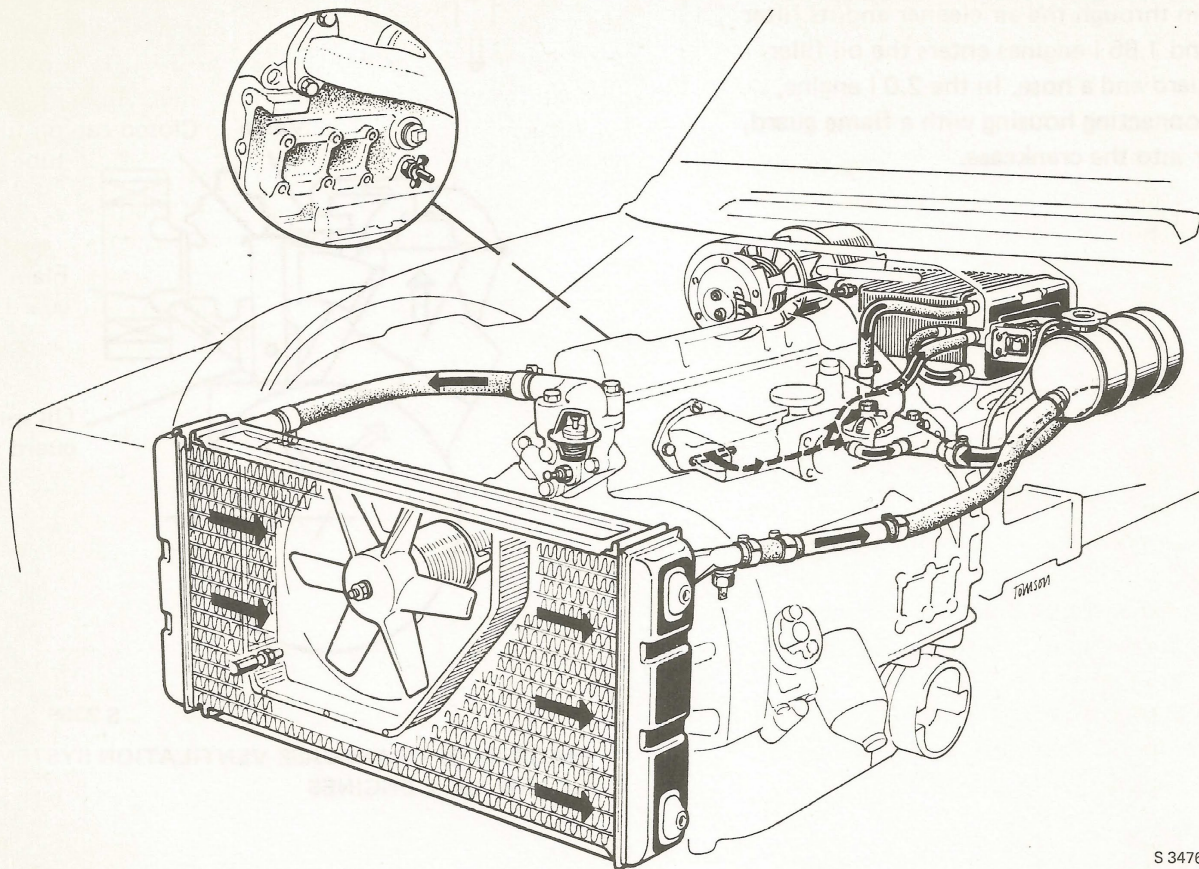
1.0 $\pm$ 0.25 % (Sensor discon. Before cat.)

Canada cars (excl. Turbo):

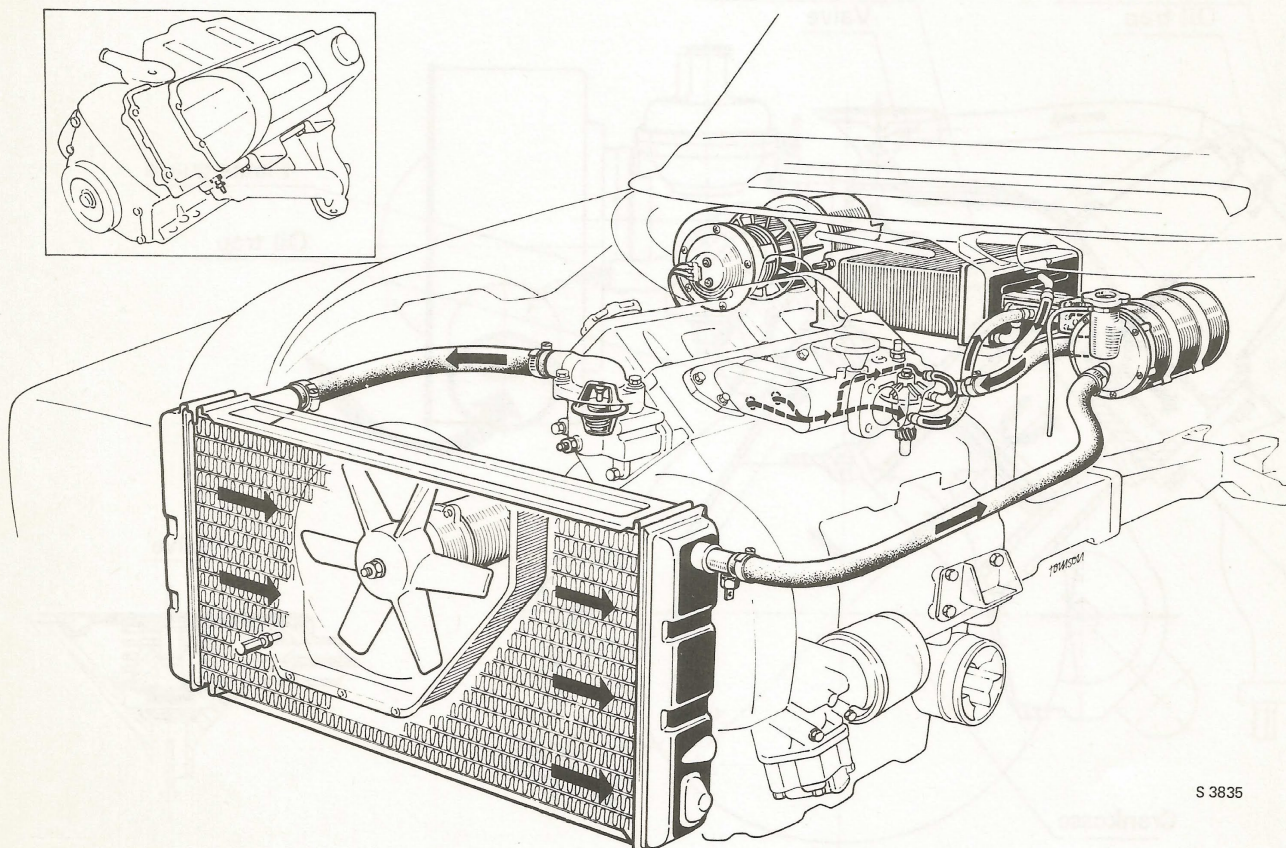
1.5 $\pm$ 0.5 %

Tightening torques

- Air flow sensor:
- Stop bracket retaining screws 4.7–5.3 Nm (3.4–3.8 ft.lb., 47–53 kpcm)
- Counterweight retaining screw 4.7–5.3 Nm (3.4–3.8 ft.lb., 47–53 kpcm)
- Air flow sensor plate retaining screw 5.0–5.5 Nm (3.6–4.0 ft.lb., 50–55 kpcm)
- Fuel distributor retaining screws 3.2–3.8 Nm (2.3–2.7 ft.lb., 32–38 kpcm)
- Line pressure regulator screw plug 13–15 Nm (9.4–10.8 ft.lb., 130–150 kpcm)



WATER CIRCULATION IN THE COOLING SYSTEM, 1.7 AND 1.85 L ENGINES, MODEL 1971—1972

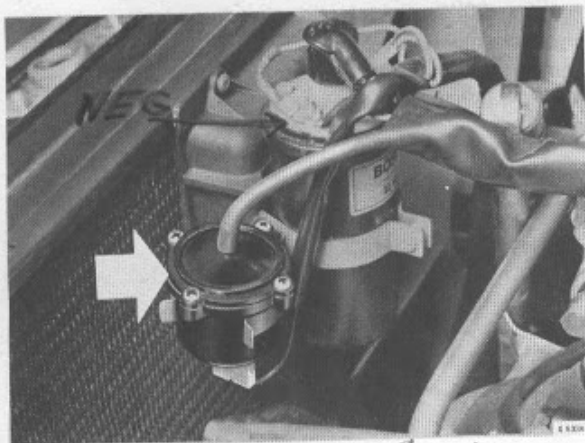


WATER CIRCULATION IN THE COOLING SYSTEM, 2.0 L ENGINE, AS FROM 1973 MODEL

Trouble	Cause	Remedy
Engine runs irregularly, one cylinder not firing, exhaust white.	One injector sticking.	Exchange.
	Connection to injector or injector coil not in order.	Check connections, exchange injector. Test with instrument EFAW 228 S 10.
Engine misfiring but not caused by ignition system.	Loose connections, main ground cable has poor connection to car body.	Check connections, tighten up ground connection.
Engine not reaching full power.	Fuel pressure too low.	Check pressure regulator.
	Pressure sensor defective.	Exchange.
	Throttle valve does not open sufficiently.	Check throttle valve.
Fuel consumption too high.	"Information" sensors or the control unit not functioning correctly or the electrical connections have too high contact resistances.	Test the system according to section 3.
	Throttle valve switch incorrectly adjusted.	Adjust with test instrument EFAW 228 S 10.
	Fuel pressure incorrect.	Check pressure regulator, if necessary exchange.
Engine hunts excessively at idle (between 1,000 and 1800 rev/min)	Hose between auxiliary air regulator and induction manifold detached or defective.	Push hose into position or replace.
	Throttle valve stop incorrectly adjusted (too wide open).	Readjust throttle valve stop.
	Idling speed set too high.	Adjust idling speed.
Engine misfires when accelerating.	Temporary enrichment device in throttle valve switch not functioning or plug incorrectly connected.	Check throttle valve switch (test instrument EFAW 228 S 10).
Too high idling speed. Idling speed cannot be adjusted.	1. Idling air system leaks.	1. Check idling air system.
	2. Small rubber sealing ring (item 32, spare parts list) under the injector leaks.	2. Replace rubber sealing ring.
	3. Throttle valve adjustment incorrect.	3. Readjust throttle valve.

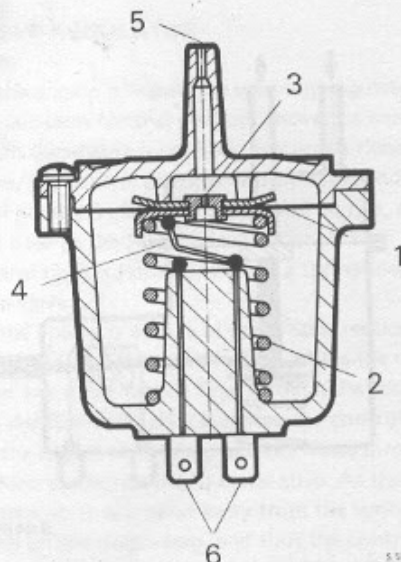
PRESSURE IMPULSE CONTACT AS FROM MODEL 1976

The pressure impulse contact gives acceleration fuel enrichment when the engine is cold. The contact is mounted beside the ignition coil and is connected to the inlet system via a vacuum hose and is electrically connected to the ignition coil and the cold start valve.



IGN WIRE Poss. side / Coil
PRESSURE IMPULSE CONTACT

The contact is actuated by the change of pressure in the inlet pipe at accelerations when the cold start valve has current for a short moment. Provided that the thermo-time switch at this point is closed (cold engine) is the engine momentarily supplied with an additional amount of fuel via the cold start valve.

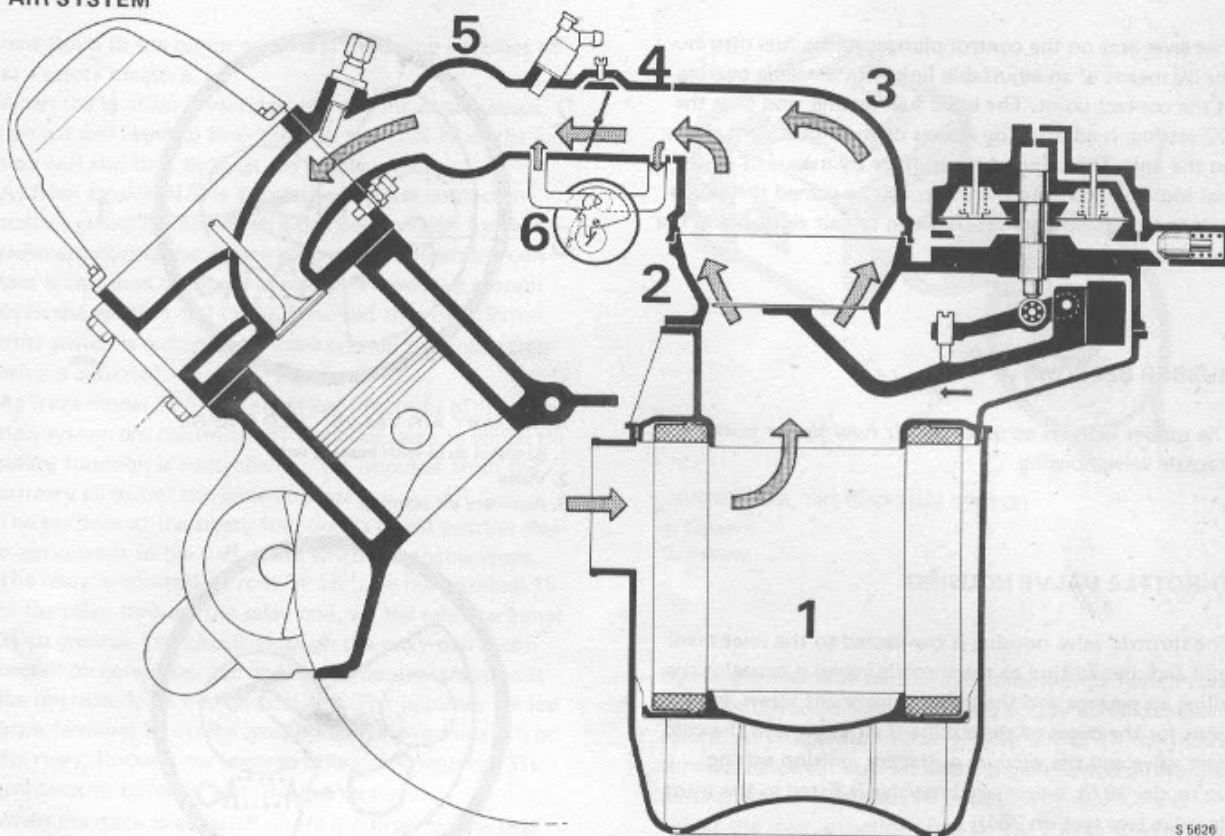


PRESSURE IMPULSE CONTACT

1. Diaphragm
2. Spring
3. Restriction
4. Spring contact arm
5. Vacuum connection
6. Electrical connections

Valve function: At constant vacuum the pressure is equal on both sides of the diaphragm depending on the restriction in the center of the diaphragm. When the vacuum is quickly decreased, the change in pressure is delayed on the underside of the diaphragm due to the restriction. This gives the result that the absolute pressure for a moment is increasing on the upper side of the diaphragm, causing the diaphragm going down, actuating the contact.

AIR SYSTEM



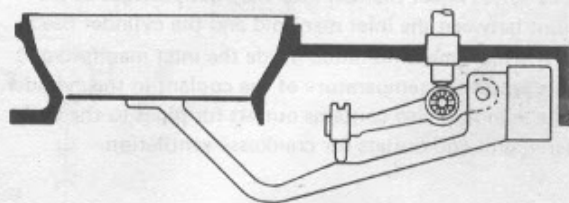
AIR SYSTEM

- | | |
|--------------------|---------------------------|
| 1. Air cleaner | 4. Throttle valve housing |
| 2. Air flow sensor | 5. Inlet manifold |
| 3. Rubber bellows | 6. Auxiliary air valve |

S 5626

AIR CLEANER

The air cleaner is fitted to a bracket mounted on the front part of the left-hand wheel housing. The air cleaner contains a paper cartridge. The air flows through the inlet pipe into the air cleaner, through the air filter and upwards to the air flow sensor which is bolted to the top of the air cleaner.



S 4483

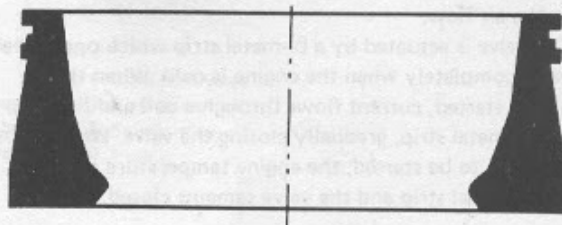
AIR FLOW SENSOR

AIR FLOW SENSOR

The air flow sensor consists of an air venturi tube in which an air flow sensor plate moves. The air flowing into the venturi from the air cleaner lifts the air flow sensor plate, allowing the air to flow through. The greater the amount of air, the higher the sensor plate will be raised.

The air flow sensor plate is fitted to a lever which is compensated by a counterweight. The lever acts on the control plunger in the fuel distributor which is pressed down by the control pressure, thus counteracting the lifting force of the air flow sensor plate.

The height to which the air flow sensor plate is raised is governed by the magnitude of the air flow. The air/fuel mixture varies with the load. The inclination of the venturi walls therefore varies in stages in order to provide a correct fuel/air mixture at all loads. Thus, the mixture is enriched at full load.



S 4484

THE AIR VENTURI OF THE AIR FLOW SENSOR

Checking

GENERAL

Before testing and fault tracing of the CI system is started, it must first be established that there are no mechanical faults in the engine and that the ignition system is functioning properly.

Scrupulous cleanliness must be observed during work on the fuel system. The surrounding area should be thoroughly cleaned before any lines are disconnected.

FUEL LEAKAGES

Check that there are not leakages at the connections and in the fuel lines. Check around the fuel tank, in the passenger compartment and in the engine compartment. New seals should be fitted to any leaking connections. Damaged fuel lines should be replaced.

Check that fuel pipes do not chafe against other objects (particularly of plastic). CONTINUOUS CHAFING against e.g. the dip stick sleeve, other fuel pipes or the throttle cable can result in damage to the fuel line.

AIR LEAKAGES

Check for leakage in the inlet system between the air flow sensor and the engine. Air leaking into the system may result in poor engine performance, owing to the fact that it by-passes the air flow sensor, causing a lean mixture.

Leakage can occur in the following places:

At the rubber bellows between the air flow sensor and the throttle valve housing.

At the gasket on the flange of the cold start valve.

At the gasket between the throttle valve housing and the inlet manifold.

At the gasket between the inlet manifold and the cylinder head.

At the hose connections on the throttle valve housing, auxiliary air valve or inlet manifold.

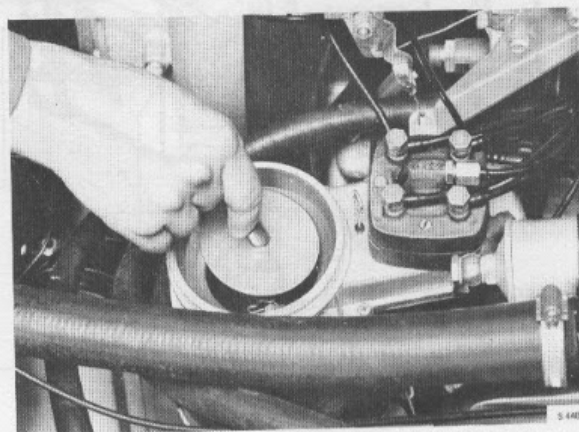
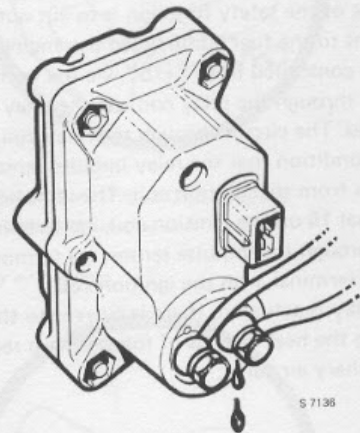
Via the crankcase ventilation hose from the oil filler cap, dip stick or valve cover gasket.

LEVER MOUNTING

Remove the rubber bellows and check the movement of the lever in the air flow sensor. As the arm is lifted, a steady resistance should be felt as a result of the damping action of the control plunger. No resistance should be felt when the arm is suddenly pushed down and is not acting on the plunger. If the air flow sensor has not been dismantled, a pair of pliers or a magnet should be used to lift the lever. If any binding is felt, the air flow sensor must be repaired.

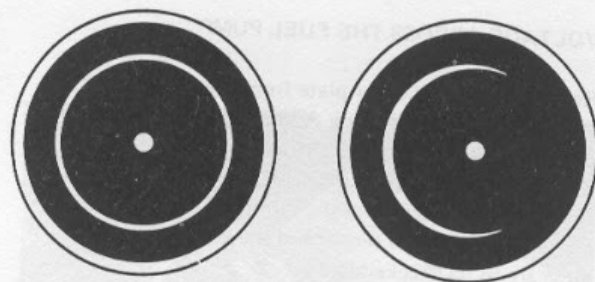
CAUTION

Due to the atomization of the fuel, there is a serious fire risk when the injection valves and cold start valve are being tested.



AIR FLOW SENSOR PLATE CLEARANCE

Check that there is uniform clearance between the edge of the air flow sensor plate and the air venturi. The correct clearance will be obtained automatically when tool 8392474 is used to mount the plate on the lever.



A

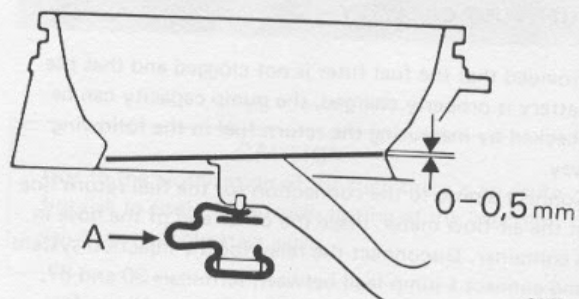
B

S 4489

SENSOR PLATE CLEARANCE

A. Correct

B. Faulty



S 4490

REST POSITION OF AIR FLOW SENSOR PLATE

To check the rest position of the air flow sensor plate, switch off the ignition (to switch off the fuel pump). This prevents fuel being injected into the cylinders if the sensor plate is lifted from its rest position. The top of the sensor plate should be level with the bottom edge of the air venturi. This is the highest permissible position for the sensor plate. A position slightly beneath the lower edge of the venturi (0.02"/0.5 mm max.) is permissible. The position should be checked in line with the lever.

Rest position adjustment is carried out by bending the loop (A) on the wire underneath the sensor plate. The air flow sensor must first be dismantled.

PERFORMANCE OF AUXILIARY AIR VALVE

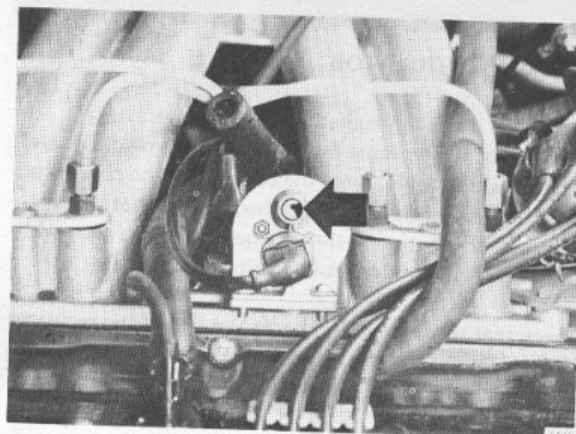
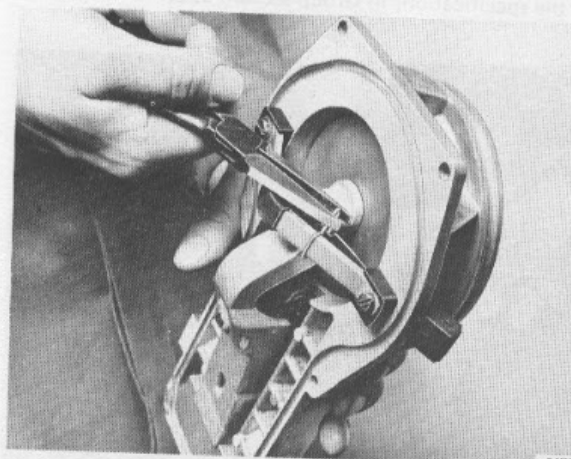
(Checking can only be carried out when the engine is cold.) Isolate the safety circuit by disconnecting the terminal on the air flow sensor.

If the "COLD ENGINE CONTROL PRESSURE" (see below) is also to be checked, the terminals on the warm-up regulator should be disconnected to prevent the bi-metal strip from warming up.

Check by means of a torch and a mirror that there is an elliptical opening in the auxiliary air valve.

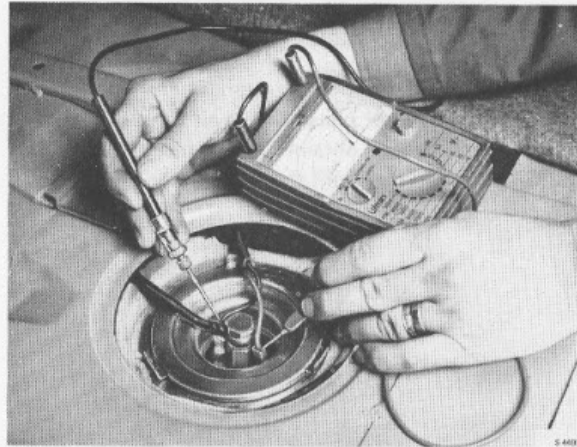
Switch on the ignition. The opening should close completely after about 5 minutes.

If the auxiliary air valve does not close, check the power supply. If no fault is found, the auxiliary air valve should be replaced.



VOLTAGE ACROSS THE FUEL PUMP

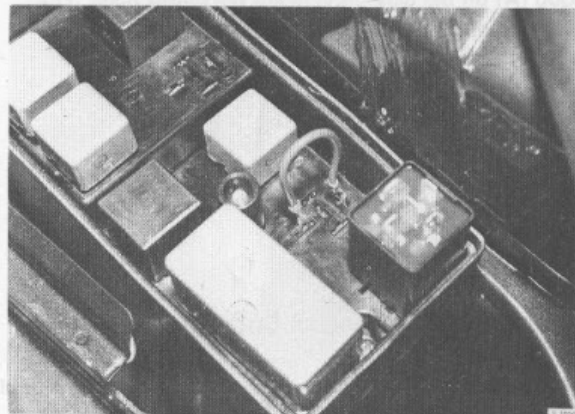
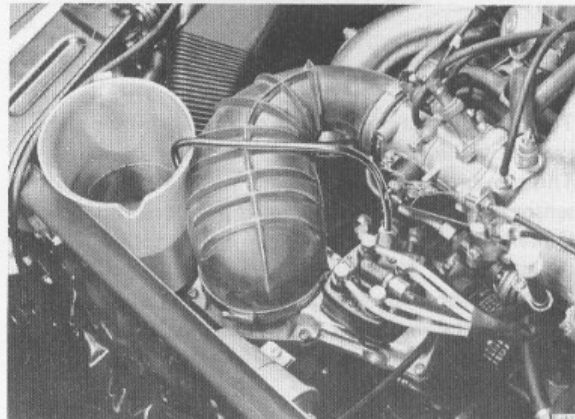
Remove the round cover plate from the top of the fuel pump (located in the trunk compartment) and measure the voltage between the positive and negative terminals when the pump is operating. The lowest permissible voltage is 11.5 V. Disconnect the terminals connecting the pump to the air flow sensor and the warm-up regulator if these are to be checked later.



FUEL PUMP CAPACITY

Provided that the fuel filter is not clogged and that the battery is properly charged, the pump capacity can be checked by measuring the return fuel in the following way.

Connect a hose to the connection for the fuel return line at the air flow meter. Place the other end of the hose in a container. Disconnect the relay for the injection system and connect a jump lead between terminals 30 and 87. Switch on the ignition and allow the pump to run for about 30 seconds. Measure the quantity of fuel (refer to the specifications in Group section 022).

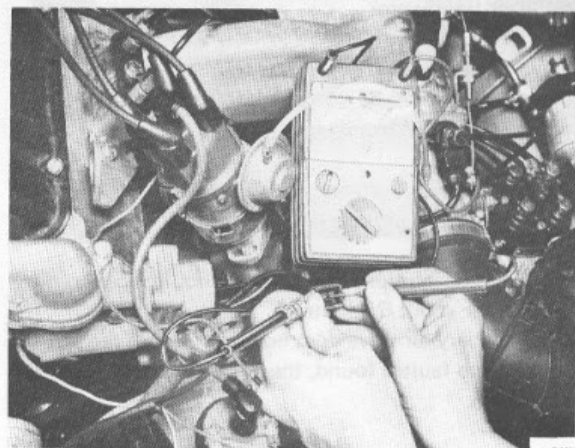


WARM-UP REGULATOR

Check the warm-up regulator line as follows:

Disconnect the terminal from the warm-up regulator and connect a voltmeter across the contacts in the connector. Ensure that the ignition is switched on and that the safety circuit connection at the air flow sensor has been withdrawn. The lowest permissible voltage is 11.5 V.

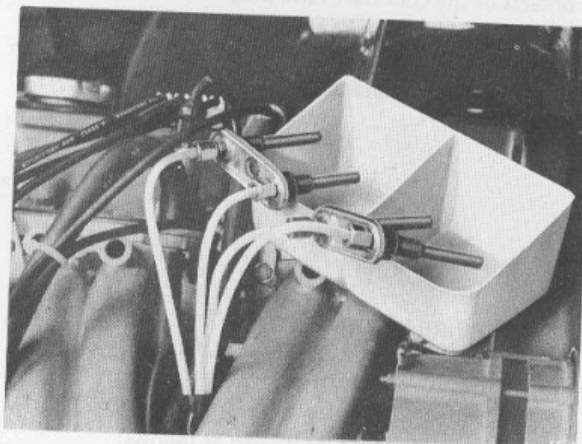
Check that there are no breaks in the coil of the regulator by connecting a buzzer or test lamp in series with the coil. If the coil is found to be damaged, the warm-up regulator should be replaced.



PERFORMANCE AND TIGHTNESS OF INJECTION VALVES

The injection valves can be checked as follows:

1. Remove the rubber bellows from the air flow sensor.
2. Unscrew the injection valves from the inlet manifold and place them in a suitable container. The fuel lines should be left connected.
3. Switch on the ignition and withdraw the safety circuit plug from the air flow sensor. This enables the fuel pump to operate.
4. Fuel atomization: Lift the lever in the air flow sensor and check the spray form emitted at the injection valves. If the atomization is poor, see under "Cleaning of injection valves" for further details.
5. Valve tightness: Switch off the ignition to obtain the rest pressure. Wipe dry the area around the injection valve nozzles. Lift the lever and check for leakage. It should not take less than 15 seconds for a drop to form. In the case of excessive leakage, see under "Cleaning of injection valves".



CAUTION

Due to the atomization of the fuel, there is an acute fire risk in conjunction with testing of the injection valves or the cold start valve.

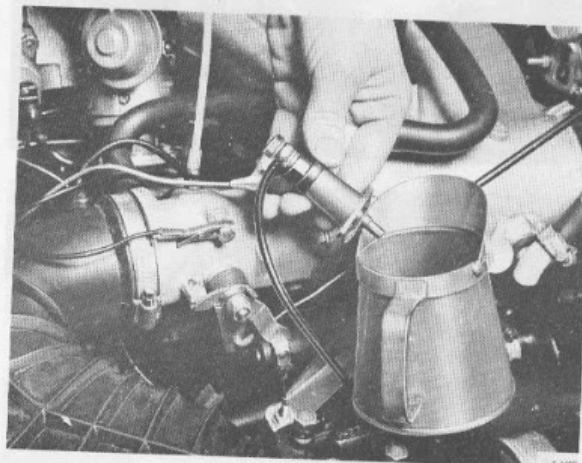
PERFORMANCE AND TIGHTNESS OF COLD START VALVE

Withdraw the plug of the cold start valve and unscrew the latter from the throttle valve housing, allowing the fuel line to remain connected.

Connect a wired plug to the cold start valve and connect the wires to the main beam terminal and body of one of the headlights.

Switch on the ignition and disconnect the electrical connection to the air flow sensor. The fuel pump is now running. Place the cold start valve in a container and have an assistant switch the headlights to main beam for a short period (30 seconds max.). Fuel should spray out of the valve during this period.

Dry the valve nozzle and let the fuel pump run for a further minute. No fuel should pass through the valve during this time.



THERMO-TIME SWITCH

When the engine temperature is below approximately 113°F (+45°C), current is allowed to flow for a certain period (depending on the temperature) while the starter motor is running.

Check that the switch closes when the engine is started by means of connecting a test lamp in series across the contacts of the cold start valve plug.

It is not possible to make a more accurate check of the cut-in time or temperature. If the condition of the switch is at all in doubt, it should be replaced.

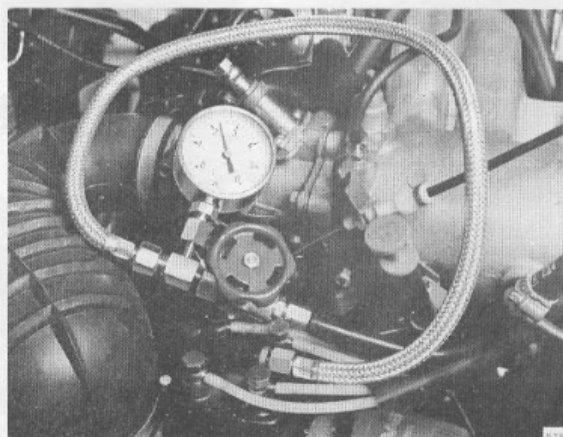
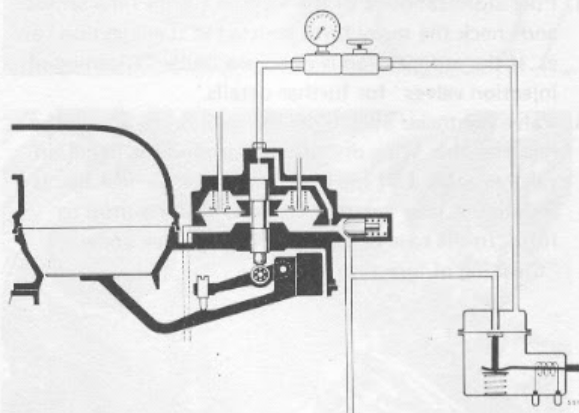
PRESSURE READING

General

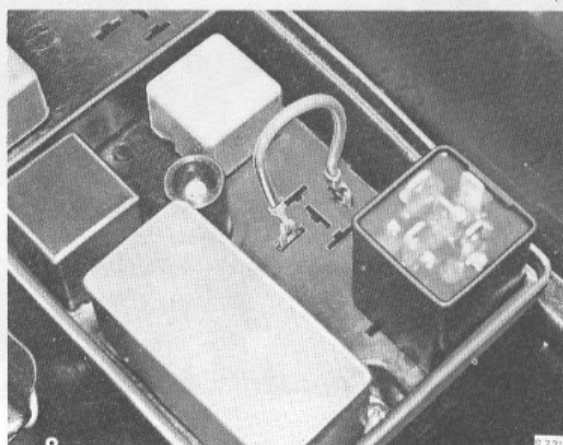
Connect pressure gauge 83 92 516 as follows:
Disconnect the control pressure line from the fuel distributor and connect the pressure gauge between the fuel distributor and the line to the control pressure regulator.

CAUTION

The safety function is governed by a pulse sensor in the pump relay which is actuated by the ignition pulses.



Disconnect the fuel pump relay and connect a jump lead across terminals 30 and 87 in the relay holder. Thus, the fuel pump will cut in as soon as the ignition is switched on.



Bleed the pressure gauge by repeated opening and closing of the valve with the pressure gauge directed downwards and the fuel pump connected.

Cold engine control pressure

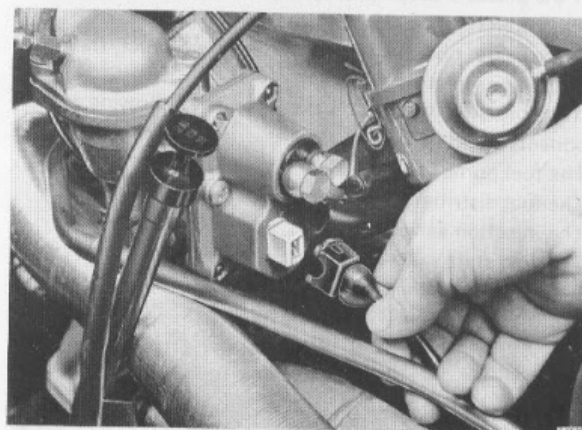
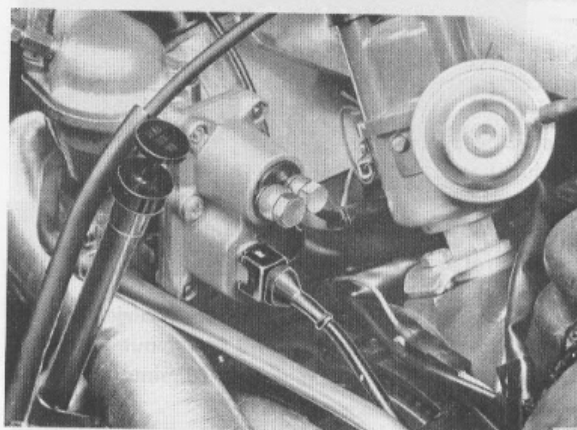
Carry out this test if poor engine performance has been experienced during cold starting and the warming up period.

The test can only be carried out when the engine is cold. The engine should not be run for a longer period of time (e.g. overnight) before the test can be carried out, to ensure that the engine is at ambient temperature. The engine must not be run before this test.

Open the valve, disconnect the plug at the warm-up regulator and switch on the ignition.

Compare the pressure gauge reading with the recommended pressure given in the temperature/pressure graph. Refer to the test values in section 022.

If the values should differ, replace the warm-up regulator.



Warm engine control pressure

Carry out this test when poor performance has been experienced when the engine is warm.

Open the valve.

Connect the warm-up regulator plug.

Leave the ignition switched on until rest pressure is present.

Refer to the test values in section 022.

If the value should differ, replace the warm-up regulator.

Line pressure

Close the valve.

Switch on the ignition.

Refer to the test values in section 022.

If the line pressure should differ from the recommended values, this may be due to:

In the case of insufficient line pressure:

Insufficient pressure from the fuel pump

Blockage of the strainer in the tank

Leakage in the fuel line

Line pressure regulator being faulty

In the case of

In the case of excessive line pressure:

Blockage of the return line

Line pressure regulator being faulty.

For adjustment of the line pressure see under "Mixture control unit, line pressure regulator".

Leakage tests on the whole system

The test should be carried out after unsatisfactory performance arising from warm-engine starting.

If the engine is cold, the bi-metal strip in the warm-up regulator must be heated and kept warm during the test.

Unplug the connector on the warm-up regulator and replace it with a plug connected directly to the battery.

Open the valve. Switch on the ignition until "warm engine control pressure" is reached, and then switch off the ignition.

Observe the pressure drop on the pressure gauge. Leakage can generally be established after 3 or 4 minutes. In cases of uncertainty, carry out the test for 20 minutes. Refer to the test values in section 022.

If the pressure drops too rapidly, the fault can be located by conducting the test with the valve closed.

If the values obtained from this test are correct, then the warm-up regulator is faulty.

If the pressure drop is still excessive, the following components could be faulty:

The fuel pump

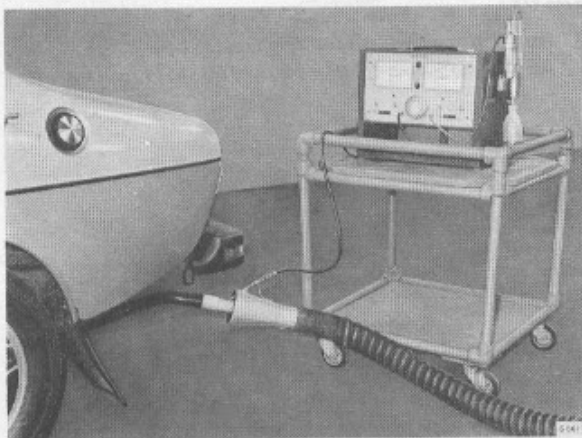
The fuel distributor

The injection valves

The cold start valve

If the O-ring of the line pressure regulator is damaged, leakage may occur. For replacement of the O-ring, see under "Mixture control unit, line pressure regulator".

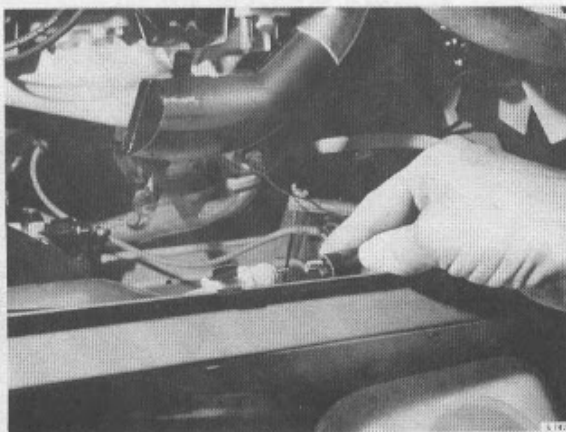
- Connect the CO meter sond to the exhaust pipe.



CO-METER CONNECTED

3. Catalyst cars model 1979:

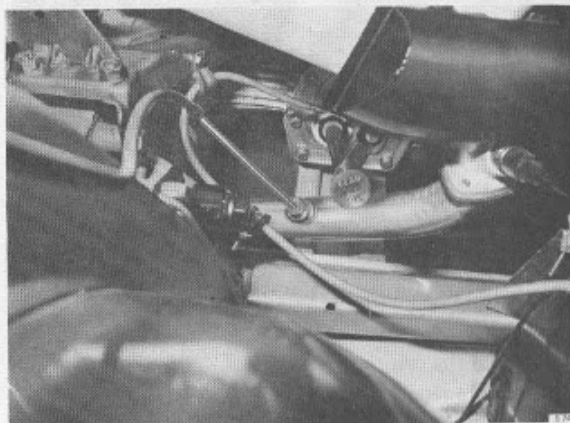
- Remove the large bore hose at the charcoal canister.
- Connect the CO-meter sond to the exhaust pipe.
- Make loose the oxygen sensor wire (the wire may not come in touch with earth).



THE OXYGEN SOND IS DISCONNECTED

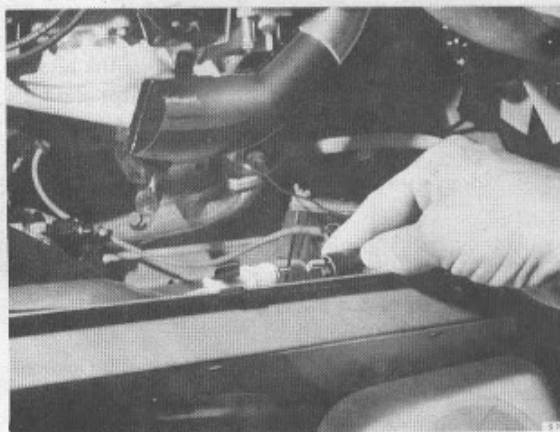
3. Catalyst cars model 1980:

- Remove the plug in the front exhaust pipe and connect the CO-meter to the pipe with the aid of connecting piece.



CO-METER CONNECTED

- Make loose the oxygen sensor wire (the wire may not come in touch with earth).



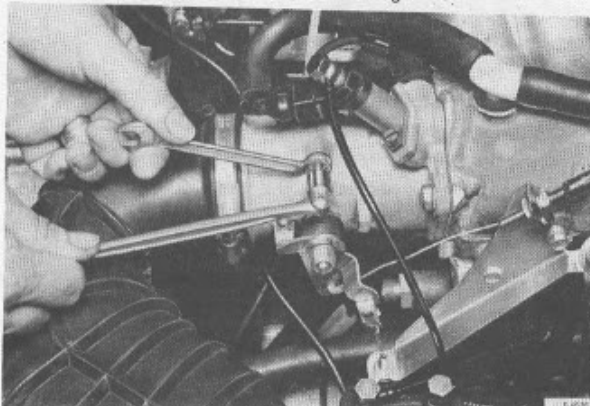
THE OXYGEN SOND IS DISCONNECTED

4. Read off and adjust the idling speed and CO-value. Before each reading, rev up the engine and then allow it to return to steady idling speed. Wait roughly 30 seconds before reading of the CO-value.

CO-setting

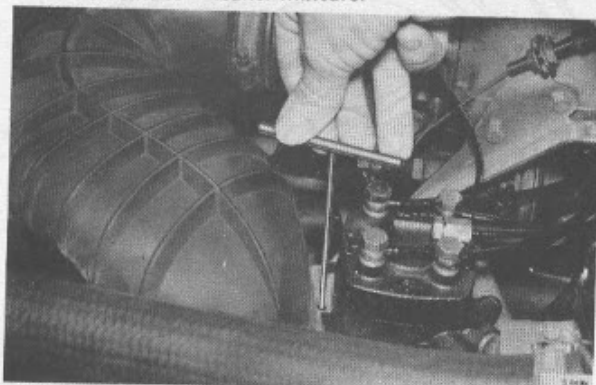
Non catalyst cars model 1978	$1.25 \pm 0.75 \%$
Non catalyst cars model 1979	$0.75 \pm 0.25 \%$
Catalyst cars model 1979	$0.75 \pm 0.25 \%$ (sensor disconn. 0.5 after catalyst)
Catalyst cars model 1980	$1.0 \pm 0.25 \%$ (sensor disconn, before catalyst)
Canada cars (excl. Turbo)	$1.5 \pm 0.5 \%$

- a) Adjust the idling speed by means of the idle adjusting screw on the throttle valve housing.



SETTING THE IDLING SPEED

- b) Adjust the CO-setting by means of the adjusting screw on the fuel distributor.
Clockwise — richer mixture.
Anticlockwise — leaner mixture.



ADJUSTING THE CO-VALUE

These adjustments effect each other, for which reason the adjustments should be carried out in steps.

5. Catalyst cars: Connect the oxygen sensor wire after the catalytic converter (as from model 1980). Move the CO-meter sond to the rear end of the exhaust pipe and fit the plug in the front exhaust pipe. The CO value measured at the rear end of the pipe should be less than 0.4 % (heated converter).

Lubricate the plug in the exhaust pipe with "NEVER SEIZE", MOLYCOTE 1000" or similar to prevent it from beeing burnt stuck.

CAUTION

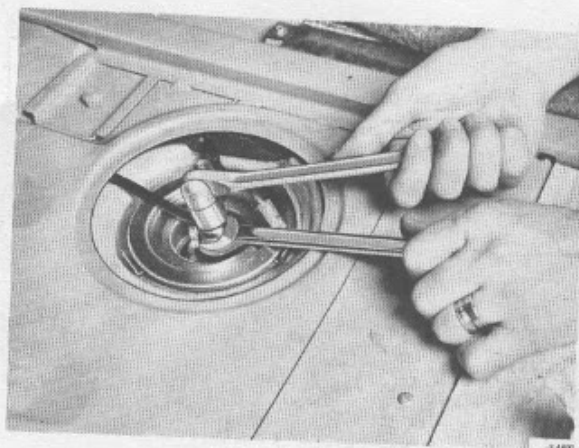
Remove the Allen key from the adjustment screw after each adjustment. If the key is left in the screw and the engine revved up the lever could be damaged.

Dismantling and assembly repairs and adjustments

FUEL PUMP

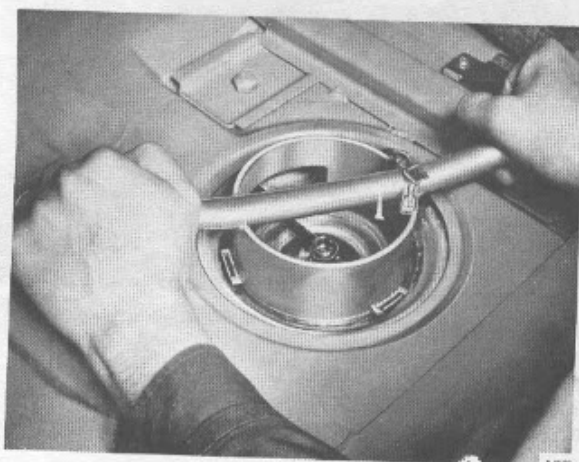
Removal, metal tank up to and including 1979 model

1. Disconnect the battery to prevent flashover and the risk of fire when the fuel tank has been opened.
2. Roll back the carpet in the trunk compartment (Saab 99 Combi Coupé: Remove the rear floor cover and floor panel in the luggage compartment), and remove the circular cover plate on top of the pump mounting.
3. Remove the rubber cover from the pump and disconnect the electric terminals at the pump.
4. Disconnect the fuel line from the pump. Hold the pump by means of an open-ended spanner when loosening the connection.

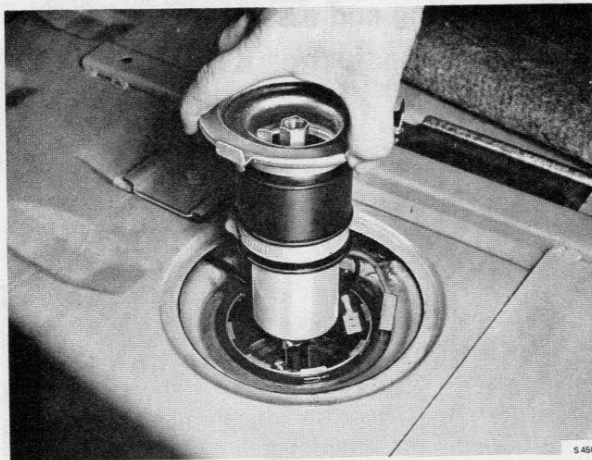


DISCONNECTING THE FUEL LINE

5. Using tool 8392433, turn the pump mounting anti-clockwise to the nearest groove, to unlock the bayonet socket. Lift out the pump unit and save the O-ring.



TURNING THE FUEL PUMP
Tool 8392433



LIFTING OUT THE FUEL PUMP

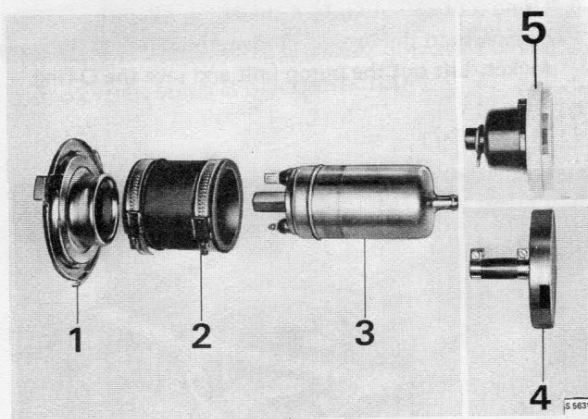
NOTE

The pump can only be removed in one position, as one of the bayonet tongues are wider than the others.

6. Suitably cover the tank opening.

Dismantling, metal tank

Release the clips and remove the splash guard and pump mounting from the pump.



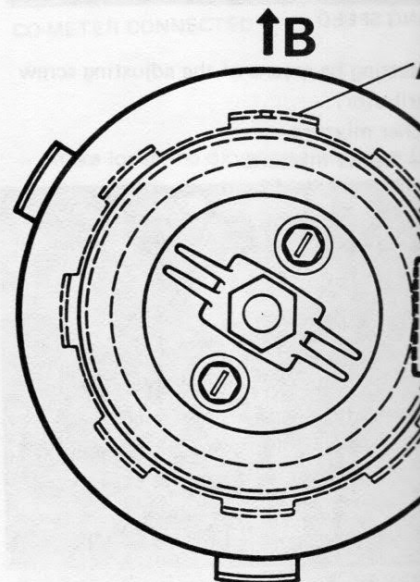
FUEL PUMP, DISMANTLED

1. Bayonet socket
2. Adapter
3. Fuel pump
4. Splash guard with suction strainer up to and incl. model 1976
5. Splash guard with suction strainer as from model 1977

Assembly, metal tank

Assemble the pump unit as shown in the Note the following:

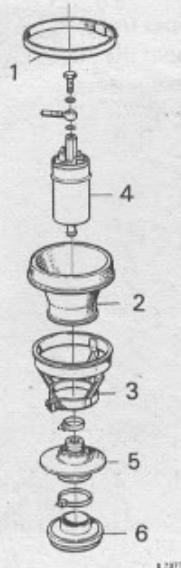
- a. Rotate the pump in the mounting so that the electric connections are in line with the wide tongue of the bayonet socket which is equipped with a locking groove. If this is neglected, the electric connections will be in the way of the fuel line.
- b. Rotate the splash guard so that the wide tongue of the bayonet socket is to the right, looking towards the front of the car. The locking groove must point towards the car.



MOUNTING POSITION OF THE SPLASH GUARD

- A. Wide bayonet tongue, equipped with a locking groove
- B. Driving direction of the car
- C. Splash guard indent

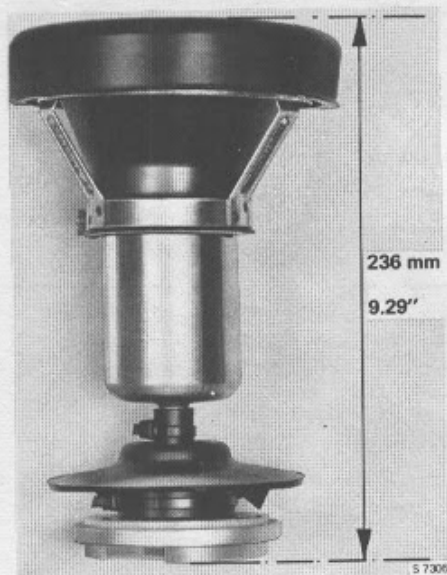
- c. The distance from the bottom of the pump mounting to the top of the pump mounting should be 10 mm).



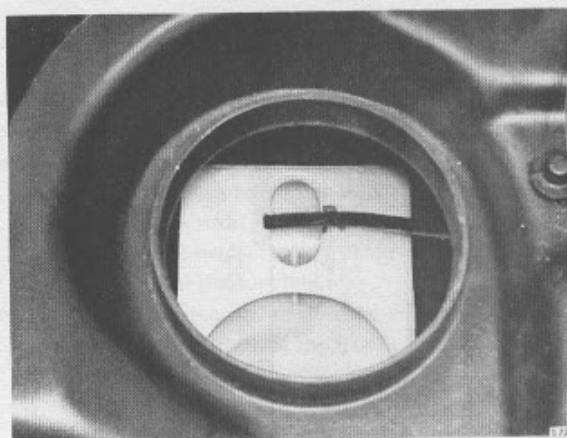
- | | |
|-------------------|---------------------|
| 1. Clamp | 5. Bellows |
| 2. Sealing collar | 6. Suction strainer |
| 3. Pump support | |
| 4. Fuel pump | |

Installation (plastic tank, 1980 model)

1. Position the pump on the mounting so that the distance between the base of the suction strainer and the upper edge of the rubber mounting is 236 mm (9.2 in.)



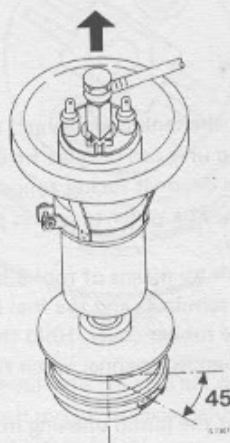
2. Check that the fuel return pipe is connected to the splash guard holder in the bottom of the fuel tank.



3. Install the pump unit in the tank as follows:

- Tilt the + electrical connection to the left (as seen from the direction of movement of the car).
- Tilt the suction strainer inlet 45° backwards to the right (as seen from the direction of movement of the car).

Removal is in the reverse order.



Line pressure regulator

The line pressure regulator is located inside the screw plug at the return line and return connection from the control pressure regulator.

The regulator comprises the following:

1. Piston with O-ring
2. Spring
3. Shims
4. Screw plug with O-ring and washer.
(The screw plug contains a shut-off valve which closes the return line from the control pressure regulator when the fuel pump is not operating. The socket head screw in the plug should not normally be removed.)

An 0.1 mm shim produces a change in pressure of 0.15 bar (kp/cm²).

Adjusting the line pressure

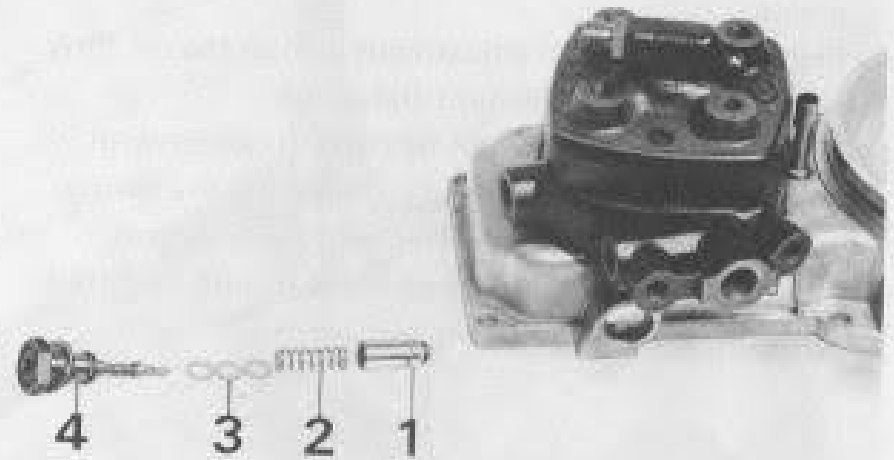
After replacement of the O-ring, the line pressure must be checked and adjusted if necessary.

The pressure can be increased by fitting additional shims and decreased by removing shims.

The shims are available in thicknesses of 0.004" and 0.020" (0.1 and 0.5 mm). An 0.004" (0.1 mm) shim produces a change in pressure of 0.15 bar (kp/cm²).

A prerequisite for measuring and adjusting the line pressure is that the fuel pump capacity is correct.

The screw plug should be tightened with a torque of 13–15 Nm (9.4–10.8 ft.lb., 130–150 kpm).

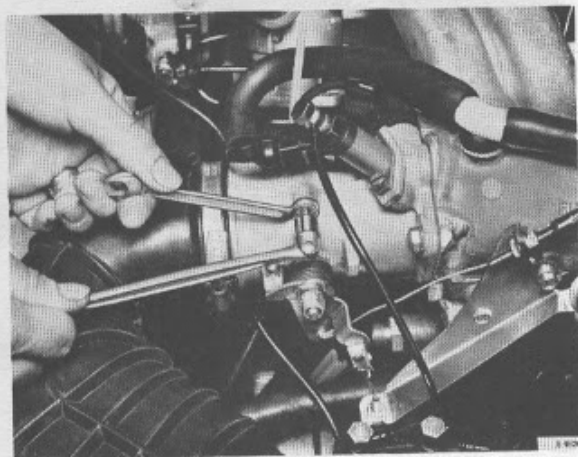


LINE PRESSURE REGULATOR

1. Piston with O-ring
2. Coil spring
3. Washers
4. Screw plug with O-ring and sealing washer
(contains a stop valve for the fuel return from the warm-up regulator/boost control circuit)

ADJUSTMENT OF IDLING SPEED

To adjust the idling speed, turn the adjustment screw on the throttle valve housing by-pass passage. Adjustment should be made in connection with setting of CO-value. See adjustment of idling speed.



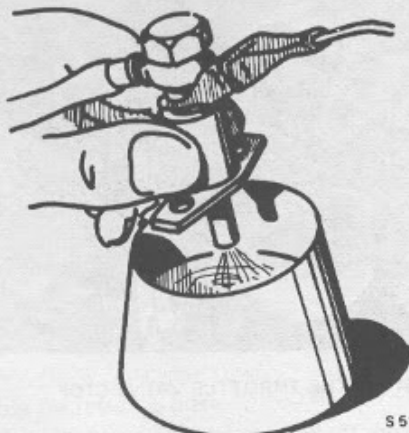
ADJUSTMENT OF IDLING SPEED

FAULT-TRACING

In the fault-tracing procedure described below it is assumed that the engine does not have any mechanical faults and that the ignition system is working properly.

Starting difficulties, cold engine

1. Check the operation of the cold start valve. Remove the valve and place it in a container. Fuel should be ejected from the valve when the starter motor is switched on and when the engine is colder than $+113^{\circ}\text{F}$ ($+45^{\circ}\text{C}$). The injection time depends on the temperature.



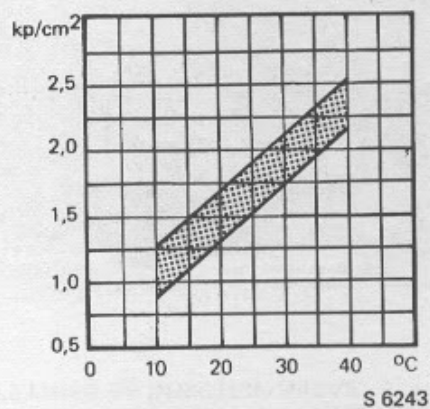
S 5199

CHECKING THE COLD START VALVE

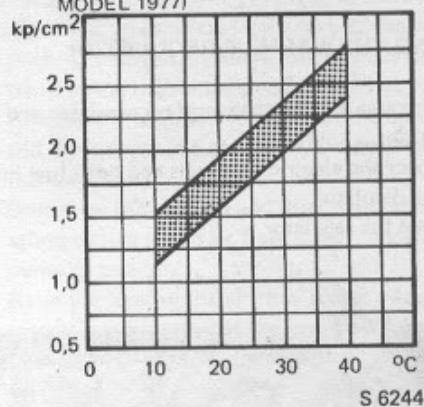
In the event of failure, check:

- The cold start valve
- The thermal time switch
- The electrical system

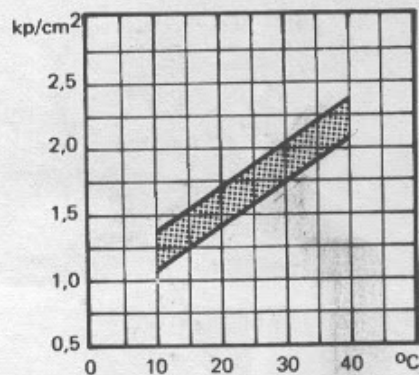
2. Measure the control pressure with the engine cold.



WARM-UP REGULATOR 0 438 140 013 AND
0 438 140 020 (UP TO AND INCL. MODEL
1976 AND NON-CATALYST CARS AS FROM
MODEL 1977)

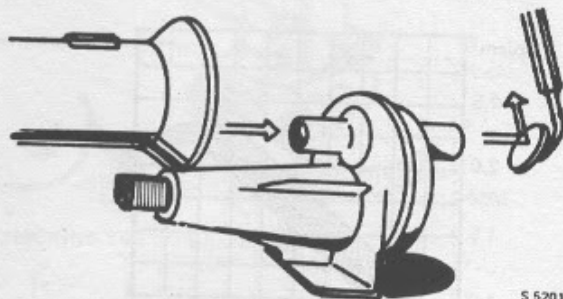


WARM-UP REGULATOR 0 438 140 032
(CATALYST CARS AS FROM MODEL 1977)



WARM-UP REGULATOR TURBO
1 0 430 140 051

3. Check that the auxiliary air valve is open when the engine is cold.



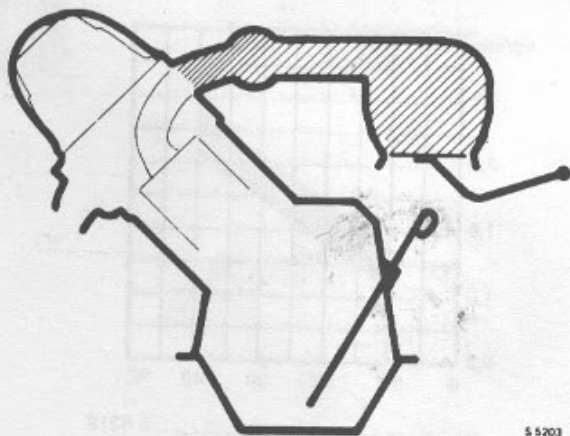
CHECKING THE AUXILIARY AIR VALVE

4. Check the CO-value (warm engine).



CHECKING THE CO-VALUE

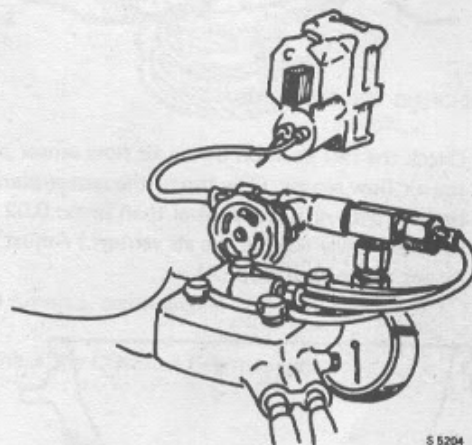
5. Check for air leakage between the air flow sensor and the engine.



CHECKING FOR LEAKING AIR

Starting difficulties, warm engine

1. Check the residual pressure in the fuel system after the engine has been switched off. Excessively low pressure when the engine is still warm can cause vaporization in the fuel lines. Check the tightness of the system. Check first with the valve open. In the event of leakage, repeat the test with the valve closed (control pressure regulator disconnected).

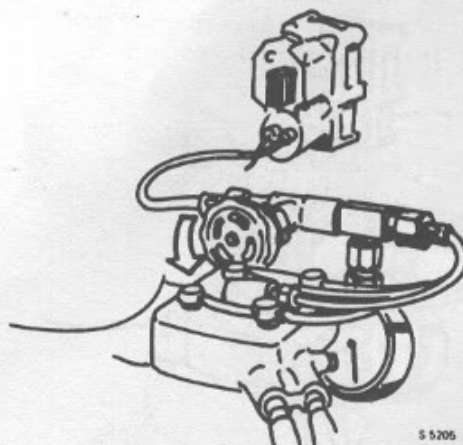


CHECKING THE FUEL PRESSURE

Possible leakage places:

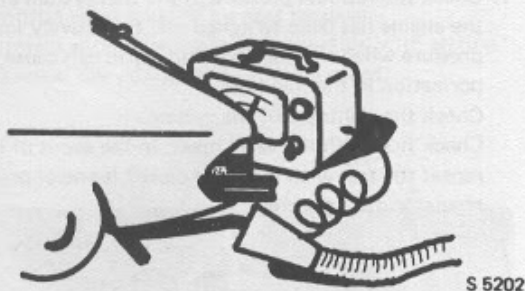
- Control pressure regulator
- Non-return valve at fuel pump
- Cold start valve
- Line pressure regulator
- Injection valves
- External leakage

2. Check the control pressure with the engine warm.



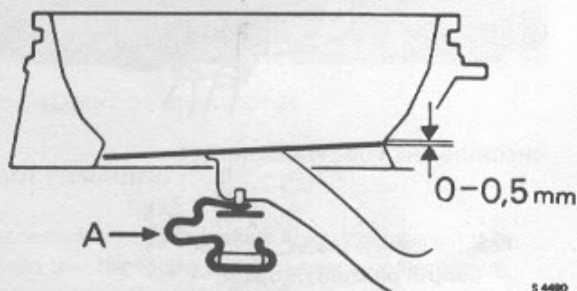
CHECKING THE CONTROL PRESSURE, WARM ENGINE

3. Check the CO-value (warm engine).



CHECKING THE CO-VALUE

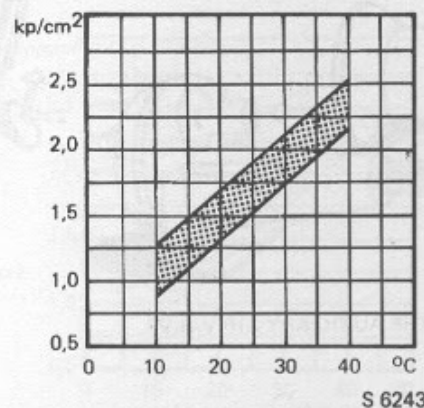
4. Check the rest position of the air flow sensor plate in the air flow sensor. (The top of the sensor plate should be level with or slightly lower than (max. 0.02 in., 0.5 mm) the lower edge of the air venturi.) Adjust by means of the wire loop (A).



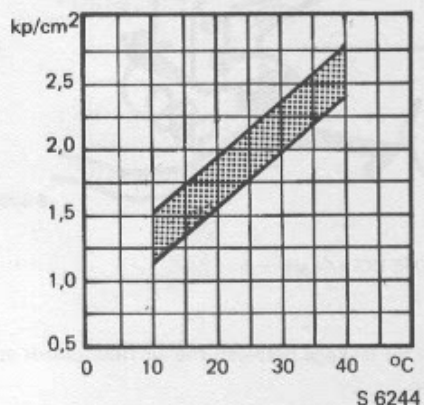
SENSOR PLATE IN REST POSITION

Poor running during the warming-up period

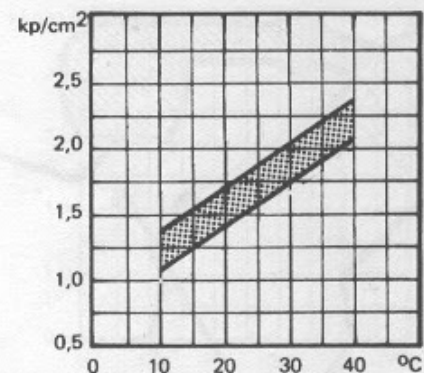
1. Check the control pressure with the engine cold. Excessive control pressure during the warming-up period produces a fuel-to-air ratio which is too lean.



WARM-UP REGULATOR 0 438 140 013 AND 0 438 140 020 (UP TO AND INCL. MODEL 1976 AND NON-CATALYST CARS AS FROM MODEL 1977)

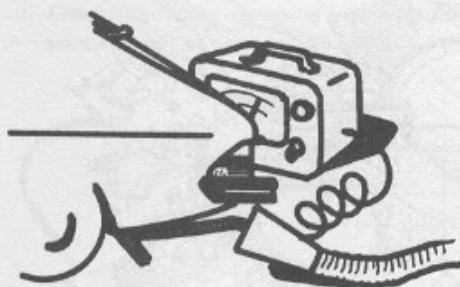


WARM-UP REGULATOR 0 438 140 032 (CATALYST CARS AS FROM MODEL 1977)



WARM-UP REGULATOR TURBO 0 430 140 051 S 6318

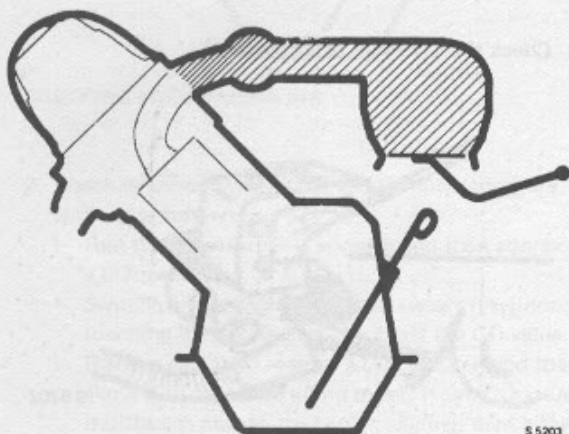
2. Check the CO-value (warm engine).



S 5202

CHECKING THE CO-VALUE

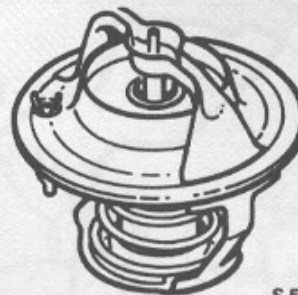
3. Check that there is no air leaking from between the air flow sensor and the engine.



S 5203

CHECKING FOR LEAKING AIR

4. Check that the warming-up period for the engine is normal by observing the temperature gauge. An abnormally long warming-up period may be caused by a faulty thermostat.

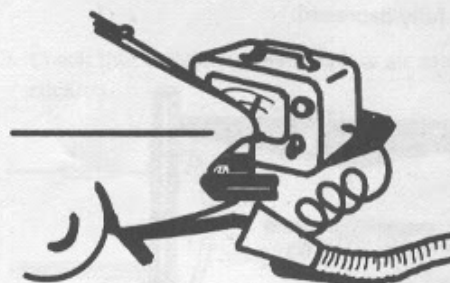


S 5207

THERMOSTAT

Poor running, warm engine

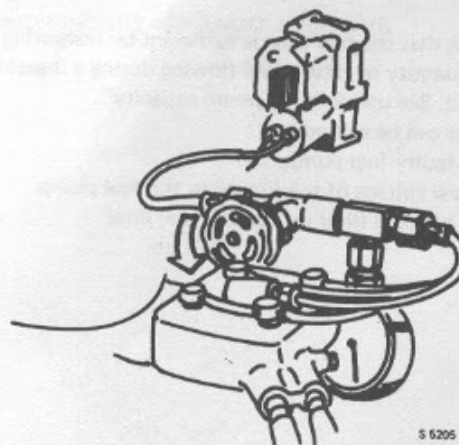
1. Check the CO-value (warm engine).



S 5202

CHECKING THE CO-VALUE

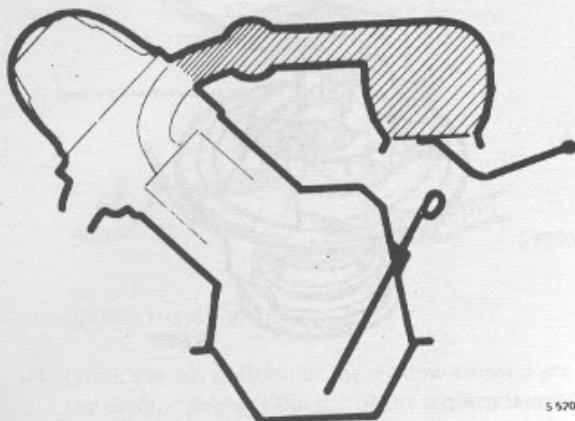
2. Check the control pressure with the engine warm.



S 5205

CHECKING THE CONTROL PRESSURE, WARM ENGINE

3. Check that there is no air leaking from between the air flow sensor and the engine.

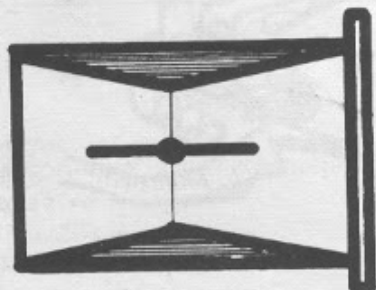


S 5203

CHECKING FOR LEAKING AIR

Poor performance, low top speed

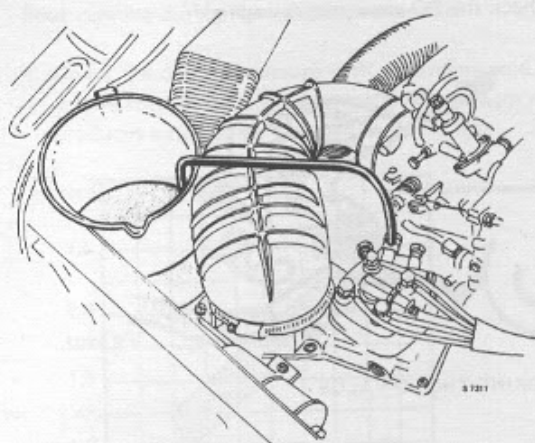
1. Check that the throttle valve opens fully when the pedal is fully depressed.



S 5206

CHECKING THE THROTTLE VALVE

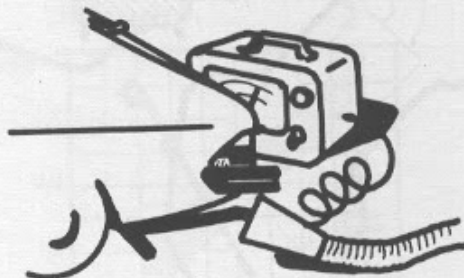
2. Check that the fuel flow is sufficient by measuring the quantity of return fuel flowing during a 3-second period. See under "Fuel pump capacity". Faults can be caused by:
 - A faulty fuel pump
 - Low voltage of the supply to the fuel pump
 - A blocked filter or blocked fuel lines



S 5201

CHECKING THE FUEL FLOW

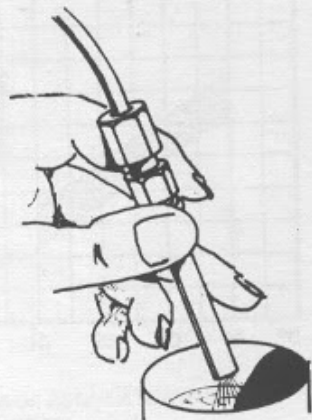
3. Check the CO-value (warm engine).



S 5202

CHECKING THE CO-VALUE

4. Check the fuel atomization of the injection valves. Deposits on the spark plugs can give an indication of poor atomization.

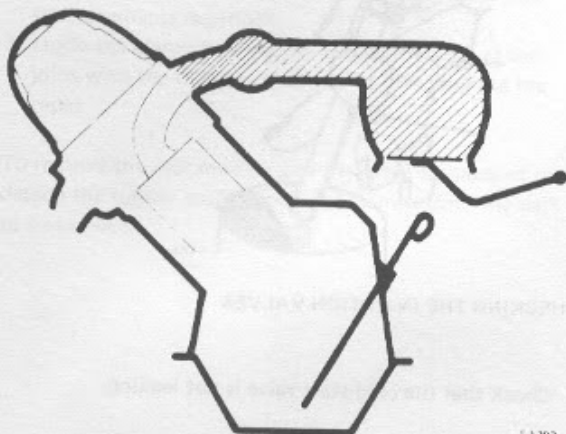


S 5209

CHECKING THE INJECTION VALVES

Irregular CO-value and idling speed, difficulty in adjusting

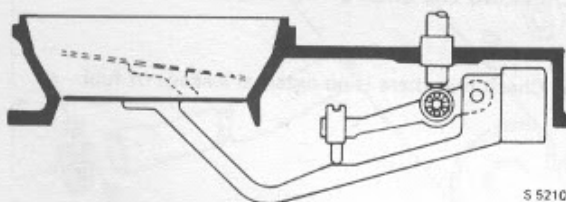
1. Check that no air is leaking from between the air flow sensor and the engine.



S 5203

CHECKING FOR LEAKING AIR

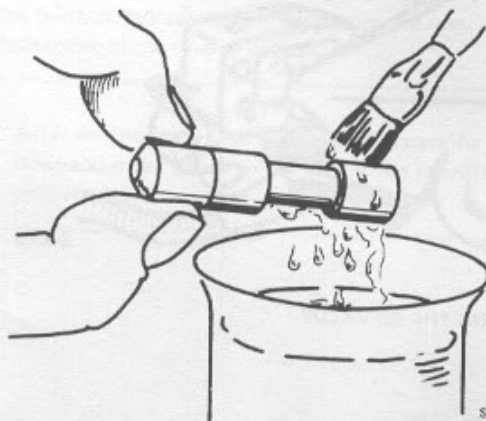
2. Check whether any parts of the air flow sensor are sticking as follows:
 - Run the engine until it is warm and then connect a CO-meter.
 - Switch off the engine and then restart it without touching the accelerator. Read off the CO-value.
 - Rev the engine to around 3.000 rev/min and then allow it to return to idling speed. If the CO-value is different now to the earlier reading, then either the control plunger or the lever is sticking. Check that the lever moves freely.



S 5210

CHECKING THE AIR FLOW SENSOR

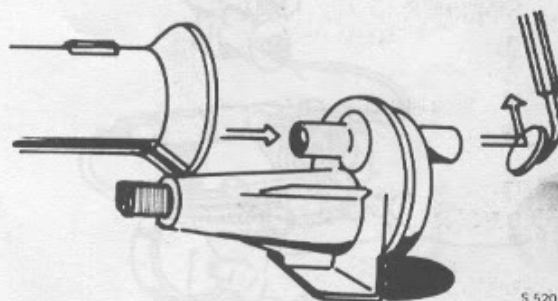
Disconnect the fuel distributor from the air flow sensor, ensuring that the control plunger does not fall out. Extract and inspect the control plunger (avoid handling the sealing surfaces). Clean the plunger in petrol, install it and mount the fuel distributor. Never dismantle the fuel distributor any further.



S 5211

CLEANING THE CONTROL PLUNGER

3. Check that the disc in the auxiliary air valve is not sticking.

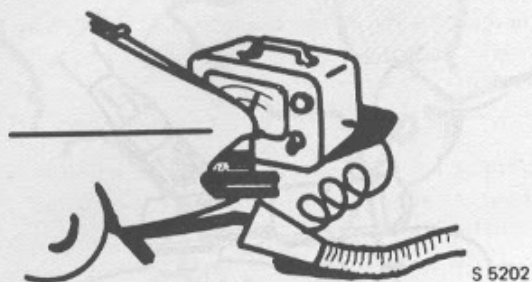


S 5201

CHECKING THE AUXILIARY AIR VALVE

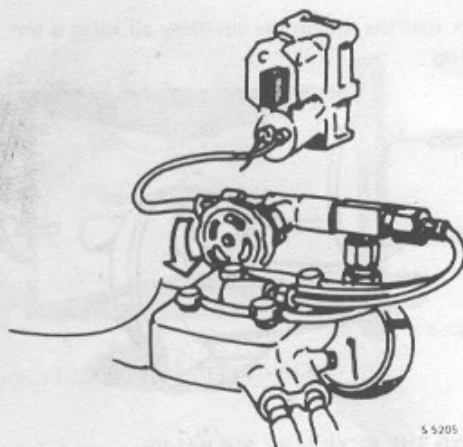
High fuel consumption

1. Check the CO-value (warm engine).



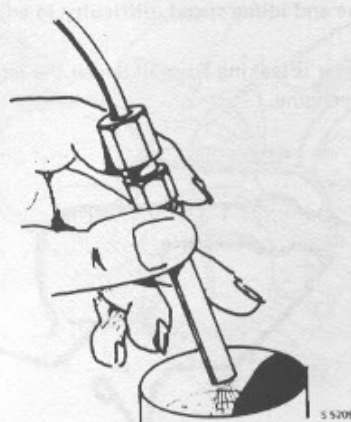
CHECKING THE CO-VALUE

2. Check the control pressure with the engine warm. Insufficient control pressure implies a fuel-to-air ratio which is too rich.



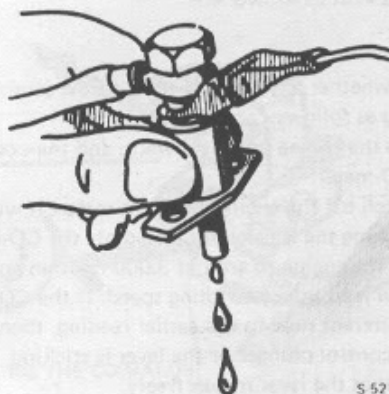
CHECKING THE CONTROL PRESSURE

3. Check that the injection valves atomize the fuel. Deposits on the spark plugs can give an indication of poor fuel atomization.



CHECKING THE INJECTION VALVES

4. Check that the cold start valve is not leaking.



CHECKING THE COLD START VALVE

5. Check that there is no external leakage of fuel.

EXHAUST EMISSION CONTROL SYSTEM

In order to meet the exhaust emission standards which apply in the USA, Saab engines have been equipped with the following:

CI-SYSTEM

See section 240.

	Canada		USA							
	Model 1979	Model 1980	Model 1975-76			Model 1977 Non catalyst	Model 1977-79 Catalyst	Model 1978-79 Non catalyst	Model 1980 Catalyst	Turbo
			Federal		California					
			M	A						
Deceleration device										X
Deceleration device, vacuum	X		X	X	X	X	X	X		
Deceleration device, dashpot		X							X	
Delay valve	X	X				X		X		
EGR on-off	X ¹⁾²⁾			X						
EGR proportional					X	X				
EGR two port	X ¹⁾³⁾	X ¹⁾						X		
Air injection					X					
Pulse air						X		X		
Catalyst and Lambda							X		X	X
Compression 7.2:1										X
Compression 8.7:1			X	X	X		X			
Compression 9.25:1	X	X				X		X	X	
ELCD-system			X	X	X	X	X	X	X	X

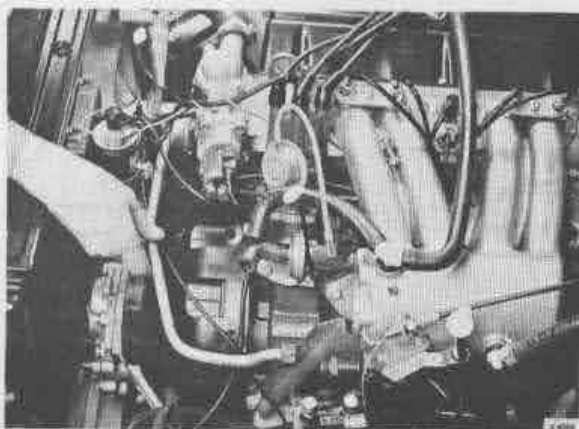
1) Only cars with automatic transmission

2) Up to and incl. model 1977

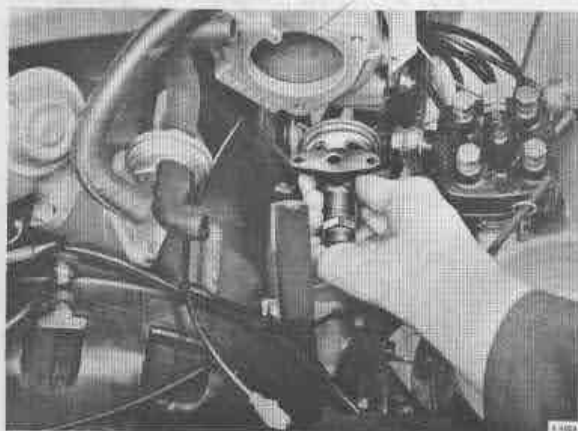
3) As from model 1978

EGR service

1. Remove the throttle valve housing, EGR crosspipe and EGR valve.

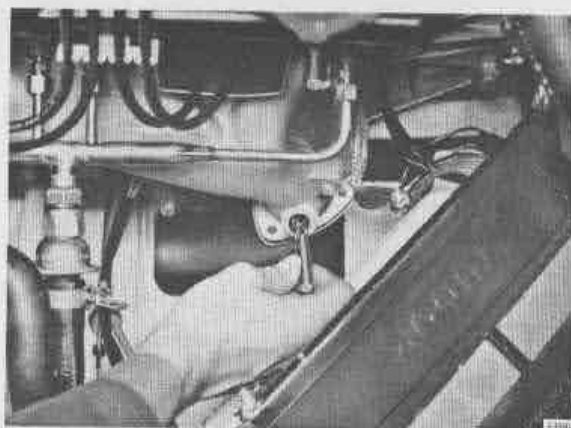


REMOVING THE EGR CROSSPIPE



REMOVING THE EGR VALVE

2. Clean the calibrated hole at the exhaust manifold by means of a drill.
EGR on-off: ϕ 0.16 in. (ϕ 4 mm)
EGR proportional: ϕ 0.39 in. (ϕ 10 mm)
EGR two port, manual transmission: ϕ 0.20 in. (ϕ 5 mm)
EGR two port, automatic transmission: ϕ 0.39 in. (ϕ 10 mm).



CLEANING THE HOLE IN THE EXHAUST MANIFOLD

3. Clean the EGR crosspipe by flushing with a suitable solvent (e.g. trichloroethylene). Pipes with thicker deposits of soot should be cleaned by means of a wire and then blown clean.
4. Clean the inlet and outlet of the EGR valve by means of a rotary wire brush. Take care not to damage the valve stem during cleaning of the outlet.

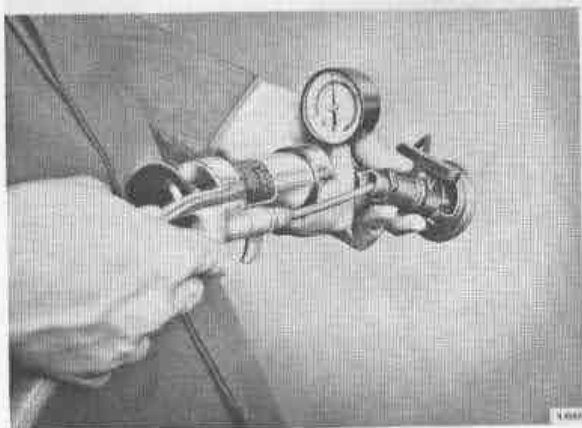


CLEANING THE INLET OF THE EGR VALVE



CLEANING THE OUTLET OF THE EGR VALVE

Flush out the valve with trichloroethylene. By means of a vacuum tester, create a vacuum in the vacuum connection to open the valve. At the same time, blow compressed air through the valve.



BLOWING THROUGH THE EGR VALVE

Check the opening and closing of the valve by means of the vacuum tester.

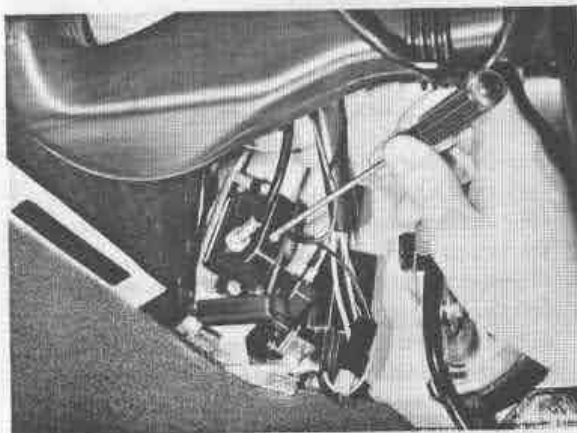
5. Clean the hole in the inlet manifold wall by means of a 0.39" (10 mm) dia. drill and remove any soot deposit which may have formed inside the manifold.



CLEANING THE HOLE IN THE INLET MANIFOLD WALL

6. Fit the EGR valve with a new gasket. Connect the hose from the PVS valve.
7. Fit the EGR crosspipe to the exhaust manifold and the EGR valve. Clamp the pipe at the throttle valve housing.
Ensure that no electric cables or hoses can come into contact with the EGR crosspipe.
8. Mount the throttle valve housing together with a new gasket and connect the rubber bellows, the vacuum hoses and throttle cable.
9. Start the engine and check that there are no leaks in the system.

10. Reset the EGR counter to zero as follows:
 - a. Remove the left-hand screen below the instrument panel.
 - b. Remove the cover of the counter and press the button.



REMOVING THE COVER OF THE COUNTER



PRESSING IN THE BUTTON

- c. Replace the cover.
- d. Fit the screen below the instrument panel.

Fault tracing

Faults in the EGR system — general

The following simple test can be carried out to ascertain whether any faults occurring arise from the EGR system: Disconnect one of the hoses to the PVS valve and check whether the fault remains. (This does not apply if the EGR valve should stick.) If the fault remains, it is probably not connected with the EGR system.

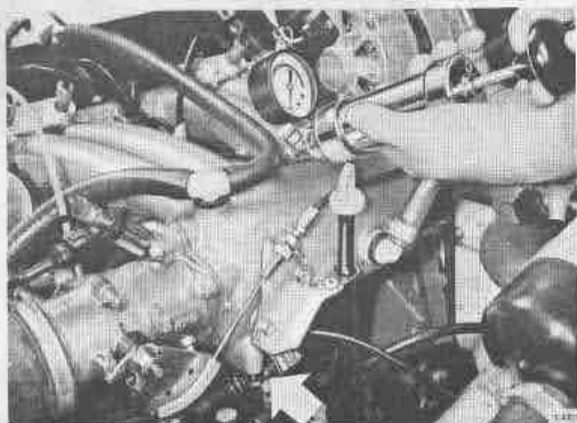
EGR valve

a. Checking valve movement:

Remove the hose between the PVS valve and the EGR valve at the connection of the former. Suck the end of the hose to create a vacuum of at least 100 mm Hg (4 inches Hg) at the EGR valve and then release the pressure suddenly. The valve should now be heard to close quite clearly. If the valve cannot be readily heard to close, it should be removed for inspection. Faulty valves should be replaced.

b. Checking the opening pressure:

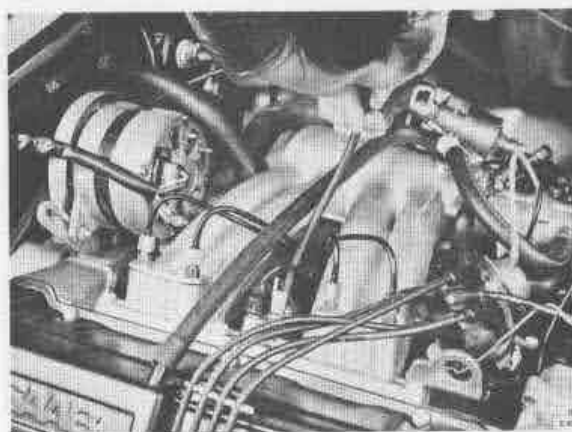
Connect a vacuum pump and gauge to the EGR valve as above. Check the reading at which the valve starts to open. The valve stem is visible in the opening between the diaphragm housing and the valve body. The opening pressure should be 60 ± 5 mm Hg (2.4 ± 0.2 inches Hg).



CHECKING THE OPENING PRESSURE
(The valve stem is visible at the arrow)

Checking the PVS valve

Check the valve by first disconnecting it and then blowing through it. When the engine is cold the valve should remain closed. When the engine is warm, the valve should open. Faulty valves should be replaced.

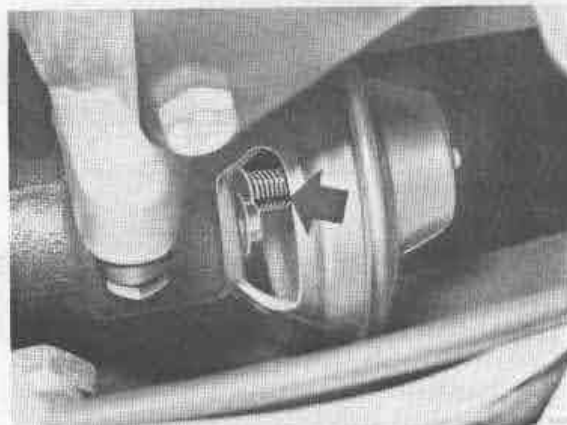


CHECKING THE PVS VALVE

Checking the cut-in speed (on-off and two port system)

1. Warm-up the engine and connect a revolution counter.
2. Rev the engine and check the opening of the EGR valve. The valve should open at fast-idling speed (see below). The valve stem is visible between the valve body and the vacuum control unit.

Type	Engine speed (fast idling) at which the valve should open
EGR on-off	Approx. 1 900 rev/min
EGR two port, manual transmission	2 600–3 200 rev/min
EGR two port, automatic transmission	2 300–2 900 rev/min

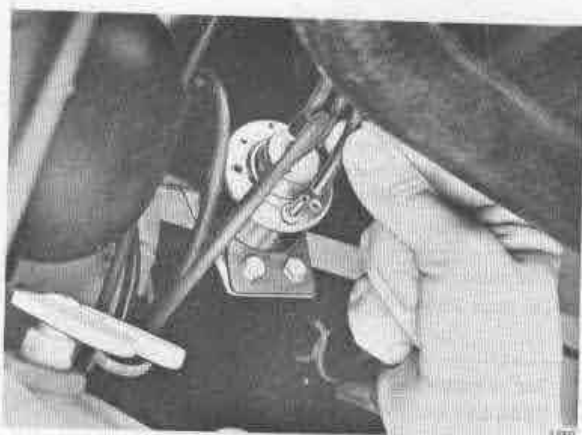


EGR VALVE STEM

Checking the vacuum signal switch (proportional system)

- a. Check to be carried out when the engine runs poorly at idling speed:

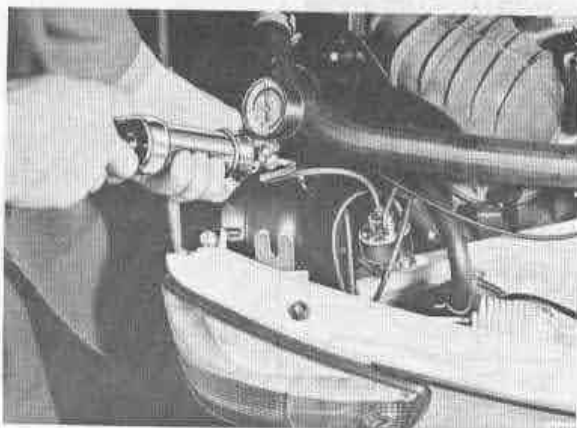
Disconnect the hose from the blue connection on the vacuum signal switch and allow the engine to idle at normal running temperature.



THE HOSE AT THE BLUE CONNECTION IS DISCONNECTED

If the engine now runs properly, reconnect the hose to the blue connection and remove the hose from the white one.

Connect a vacuum pump and gauge to the white connection and apply a vacuum of at least 300 mm Hg (12 inches Hg).

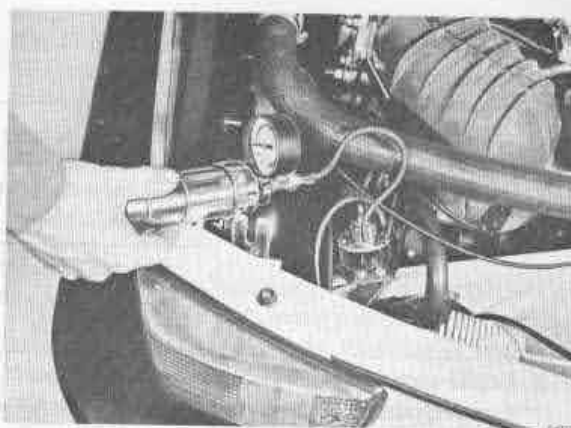


VACUUM PUMP AND GAUGE CONNECTED TO THE WHITE CONNECTION

If the engine now runs properly, the fault will be found in the hose between the vacuum signal switch and the throttle valve housing or in the throttle valve housing outlet. A vacuum of 350–450 mm Hg (14–18 inches Hg) at the outlet should be read off at an idling speed of 875 rev/min.

If the engine still runs unsatisfactorily when a vacuum of 300 mm Hg (12 inches Hg) is applied at the white outlet, the vacuum signal switch should be replaced.

- b. Measuring the signal from the vacuum signal switch: Disconnect the vacuum hose from the distributor and measure the vacuum at the blue outlet on the vacuum signal switch. Up to 2,500 ± 500 rev/min., the reading should be 0. (During the running-in of the engine, the cut-in speed can be somewhat lower.) For engine speeds in excess of this the readings should be:
- Manual transmission approx. 30 mm Hg (1.2 in. Hg)
 - Automatic transmission approx. 50 mm Hg (2 in. Hg)



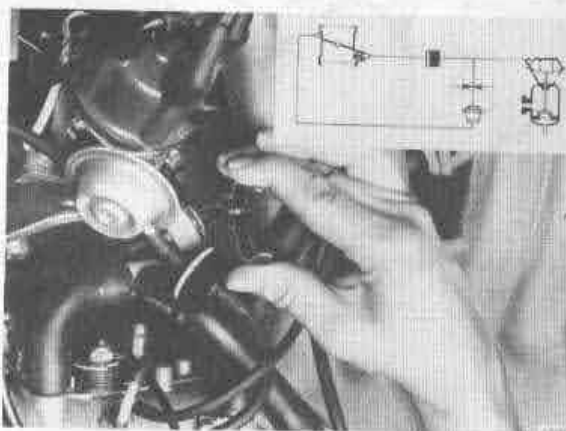
MEASURING THE SIGNAL FROM THE VACUUM SIGNAL SWITCH

Checking the amplifier (proportional system)

- a. Residual pressure, engine idling:
- Disconnect the hose from the red outlet on the vacuum signal switch and connect a vacuum tester to the hose. The readings at idling speed should be:
 - manual transmission 23–38 mm Hg (0.9–1.5 inches Hg)
 - automatic transmission 41–56 mm Hg (1.6–2.2 inches Hg)
- In the case of deviating values, the venturi tap, venturi and hoses should be checked and cleaned if necessary.

Checking the holding valve (two-port system)

1. Rev the engine to open the EGR valve completely (approx. 3 000–3 500 rev/min).
2. Clamp together the hose between the release valve and the three-way nipple in the line to the EGR valve.



CHECKING THE HOLDING VALVE

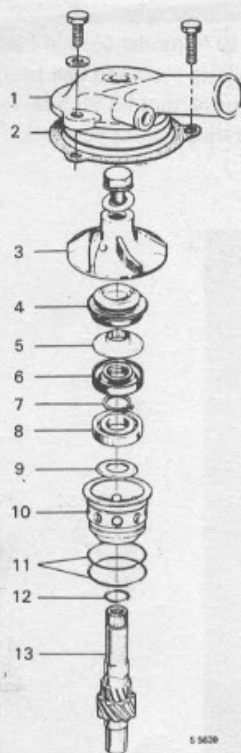
3. Let the engine drop to idling speed and check that the EGR valve remains open for an additional 6 seconds.

Checking the release valve (two-port system)

1. Rev the engine to open the EGR valve completely.
2. Let the engine drop to idling speed and check that the EGR valve closes immediately.

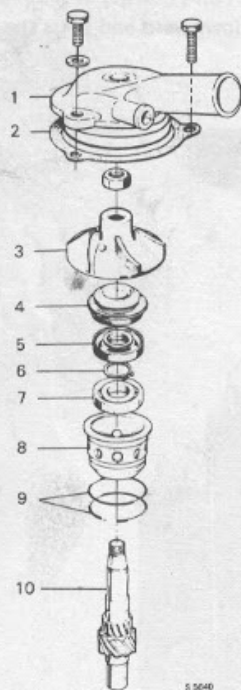
Fault tracing chart for EGR-system

Sympton	Probable fault	Fault tracing, remedy
1. Engine runs poorly or not at all at idling speed	EGR valve stuck in open position	See EGR valve (a) page 254-10
	Proportional system: Vacuum signal switch not functioning	See vacuum signal switch (a) page 254-10
2. Engine stalls when dropping from high speed to idling speed	Two-port system: Release valve not working	See release valve page 254-11
3. Engine runs unevenly at constant speed or accelerates slowly	Proportional system: Incorrect residual pressure from amplifier	See amplifier (a) page 254-11
	Proportional system: EGR valve incorrectly calibrated	See EGR valve (b) page 254-10
	Proportional system	Check that the 12 holes in the venturi tap are not clogged
4. High emissions HC	EGR valve has stuck	See EGR valve (a) page 254-10
	Proportional system: Vacuum signal switch not functioning	See vacuum signal switch (b) page 254-11
	Proportional system: Incorrect residual pressure from amplifier	See amplifier (a) page 254-11
	Proportional system: Incorrectly calibrated EGR valve	See EGR valve (b) page 254-10
	Too high a signal from amplifier	Check that the 12 holes in the venturi tap are not clogged
5. Poor driveability with cold engine	PVS valve constantly actuated	See PVS valve page 254-10



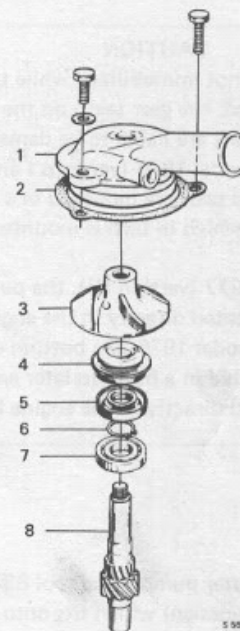
WATER PUMP, VERSION I

- | | |
|---------------------------|---------------------|
| 1. Pump cover | 8. Ball bearing |
| 2. Gasket | 9. Oil thrower ring |
| 3. Impeller | 10. Bearing housing |
| 4. Water pump seal | 11. O-rings |
| 5. Thrower | 12. Seal ring |
| 6. Seal ring | 13. Pump shaft |
| 7. Ball bearing lock ring | |



WATER PUMP, VERSION II

- | | |
|--------------------|---------------------------|
| 1. Pump cover | 6. Ball bearing lock ring |
| 2. Gasket | 7. Ball bearing |
| 3. Impeller | 8. Bearing housing |
| 4. Water pump seal | 9. O-rings |
| 5. Seal ring | 10. Pump shaft |



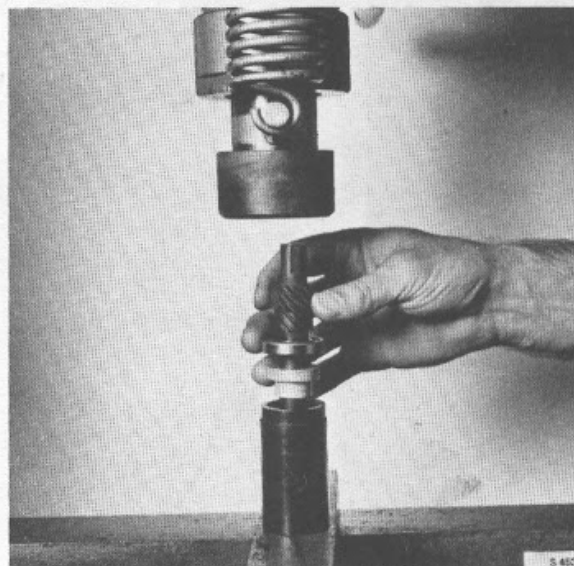
WATER PUMP, VERSION III (AS FROM MODEL 1977)

- | | |
|--------------------|---------------------------|
| 1. Pump cover | 6. Ball bearing lock ring |
| 2. Gasket | 7. Ball bearing |
| 3. Impeller | 8. Pump shaft |
| 4. Water pump seal | |
| 5. Sealing ring | |

ASSEMBLING

1. Fit the oil thrower ring (version I).
2. Press the ball bearing on to the pump shaft using tools 8390551 and:

Version I	8390569
Versions II and III	8392524

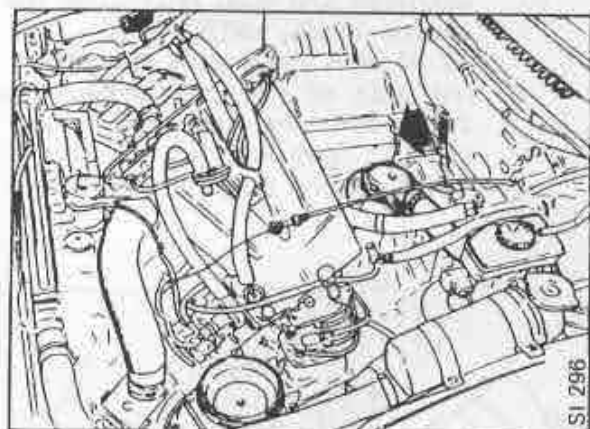
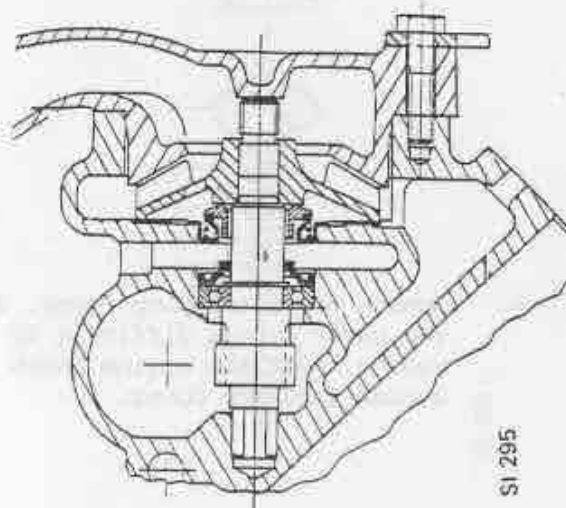


PRESSING THE BALL BEARING ONTO THE SHAFT

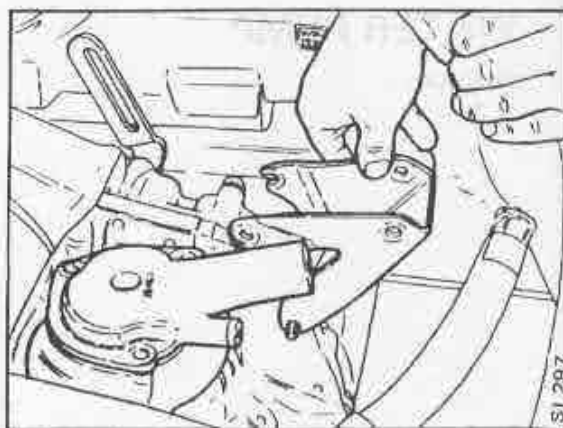
WATER PUMP

REMOVAL

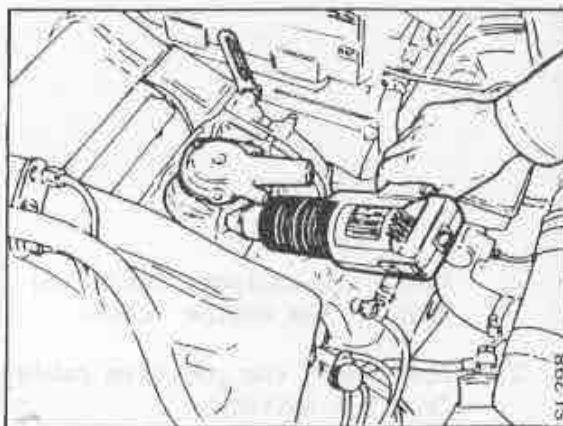
1. Drain the coolant, including that in the engine block.
2. Disconnect the positive cable from the battery.
3. Remove the alternator.
4. Remove the intake manifold. Stick a strip of tape across the intake ports in the cylinder head.



5. Disconnect the water hose from the water pump cover, release the alternator mounting and fold it down to the side.

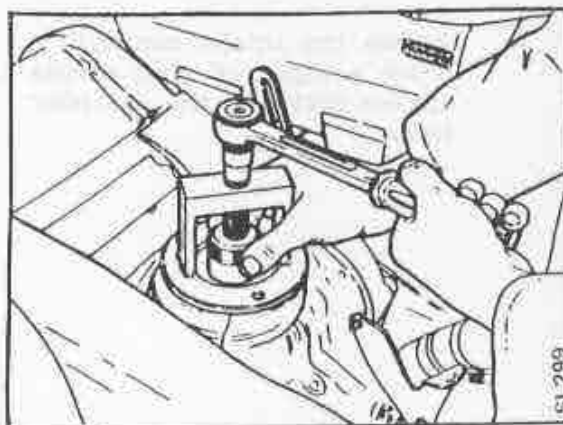


6. Remove the water pump cover. If the cover proves difficult to remove, heat the engine block around the pump cover.

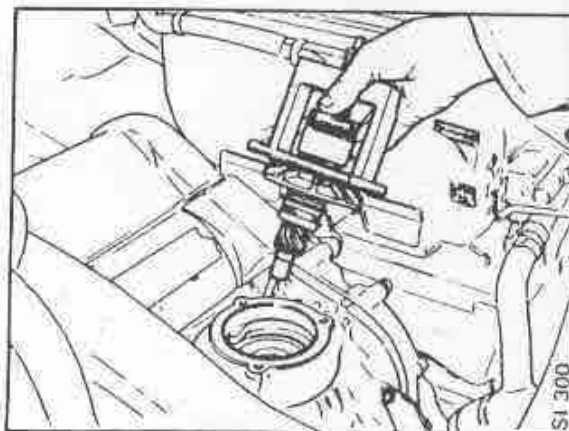


7. Remove all gasket remnants from the engine block joint face.

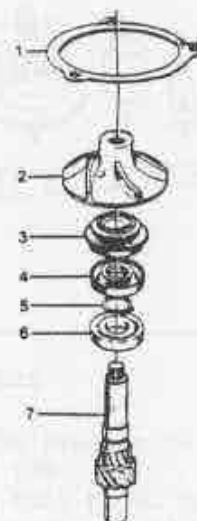
8. Withdraw the pump unit from the engine block, using tool 83 92 649. Make sure that the nut unit of the tool is threaded fully onto the pump shaft and that it does not jam the pump drive as the pump is withdrawn.



9. Clean the bearing sleeve and the recess in the engine block in which the impeller runs.



To dismantle the water pump after it has been removed (see the corresponding section in the Service Manual).



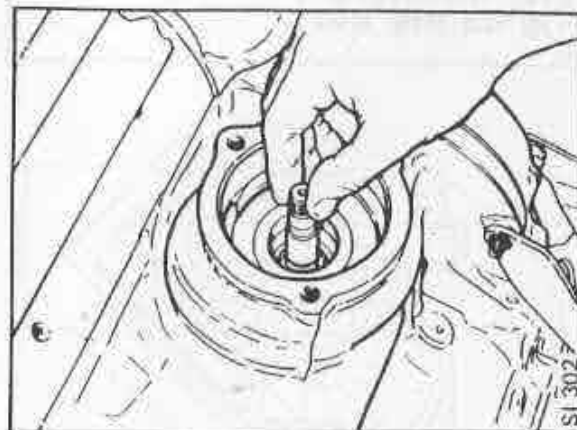
SI 301

Water pump

1. Gasket
2. Impeller
3. Water pump seal
4. Seal
5. Ball bearing circlip
6. Ball bearing
7. Pump shaft

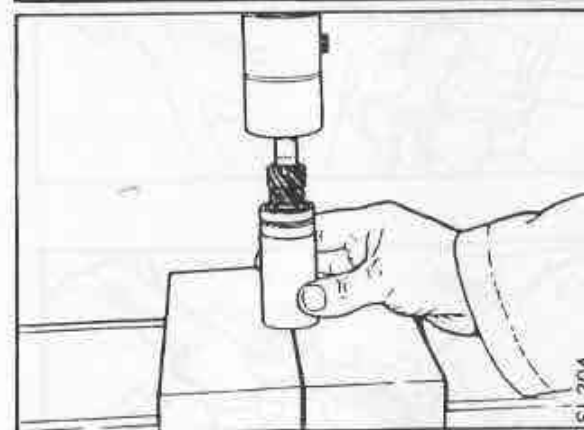
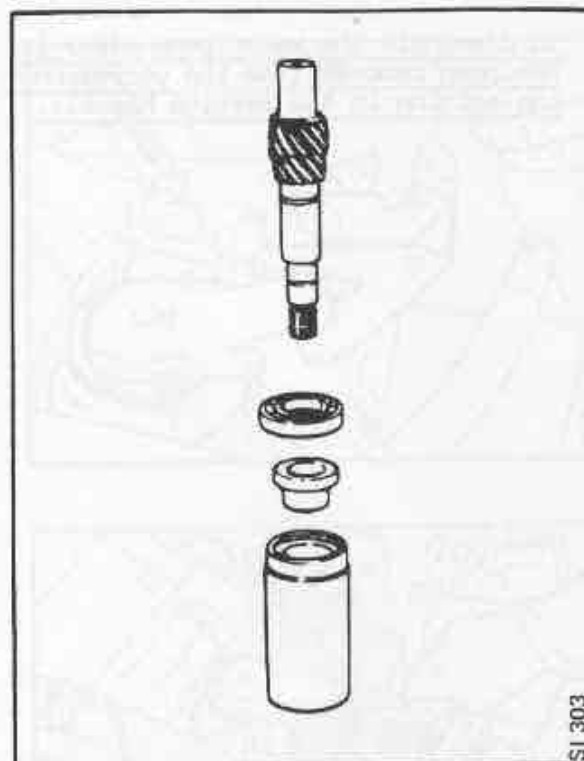
To assemble pump kit No. 83 67 674

1. Check the gear pump drive and the tail-end pump shaft bearing in the engine block. The pump shaft must not bind as it is fitted into place.

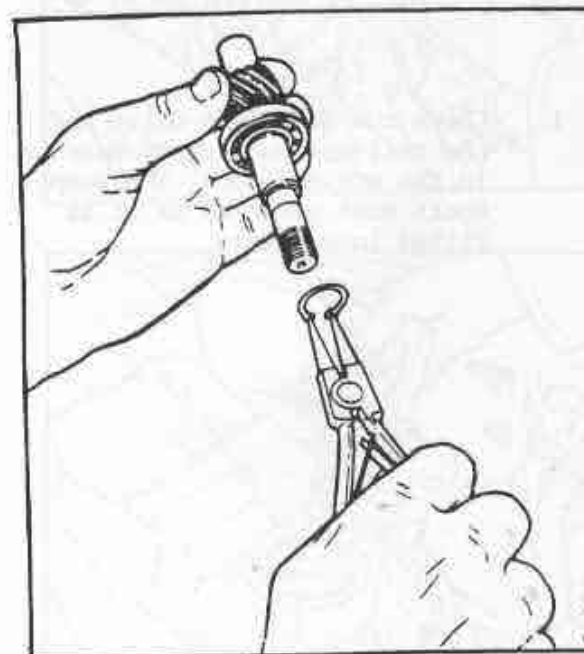


SI 302

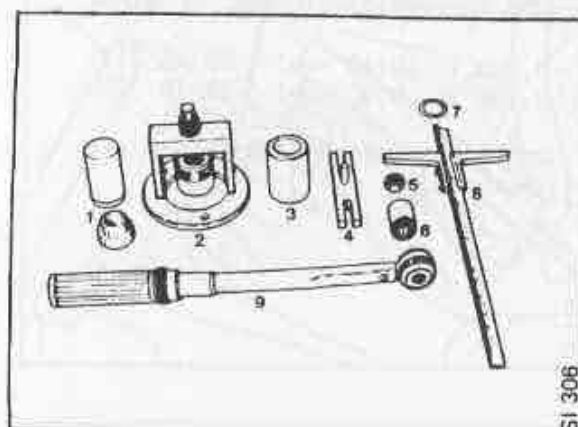
2. Press the ball bearing onto the pump shaft. Use fitting sleeves 83 90 551 and 83 92 524.



Fit the circlip into its groove in the pump shaft.



To fit the water pump

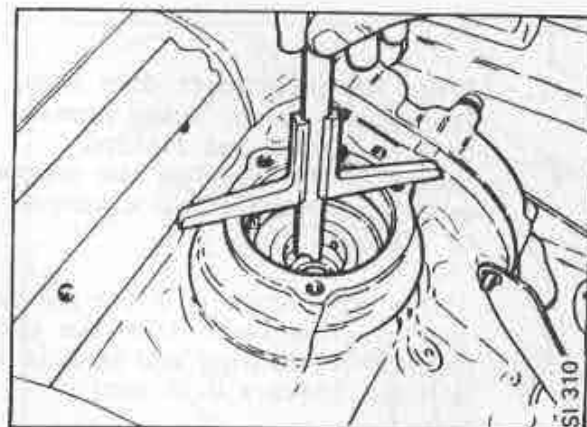


SI 306

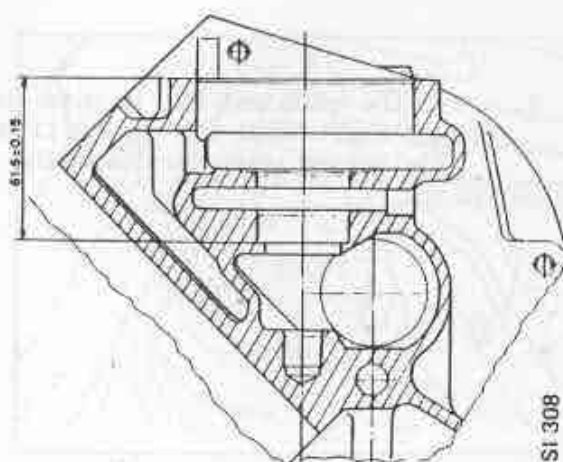
Fitting tools

1. Fitting sleeves 83 90 551 and 83 92 524
2. Press tool 83 92 649
3. Fitting sleeve 83 90 536
4. Restrainer 83 92 672
5. Nut 83 56 305
6. Sleeve
7. Shims
8. Depth vernier gauge
9. Torque wrench

1. Clean thoroughly the joint face for the pump cover, and measure the distance from the joint face down to the bearing shoulder. The dimension should be $2.42 \text{ in} \pm 0.006$ ($61.5 \pm 0.15 \text{ mm}$).



SI 310



SI 308

If the dimension is larger, fit the appropriate number of shims

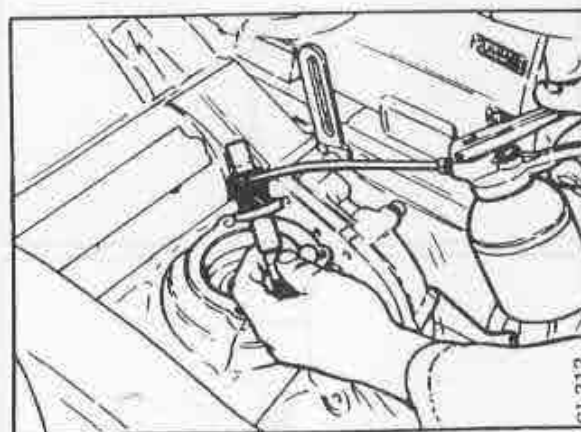
0.004 in (0.10 mm)	88 18 312
0.008 in (0.20 mm)	88 18 320

until the correct dimension is obtained.



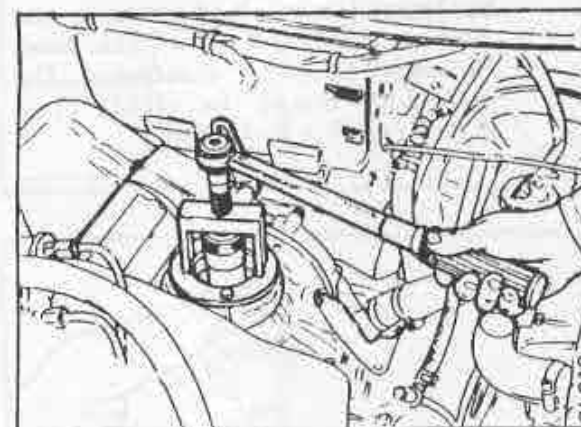
2. Oil the pump shaft teeth and journal with engine oil. Fit the pump shaft, together with the bearing and circlip, into the engine block.

Ensure that the teeth engage smoothly and that the shaft enters freely into the tail-end bearing.

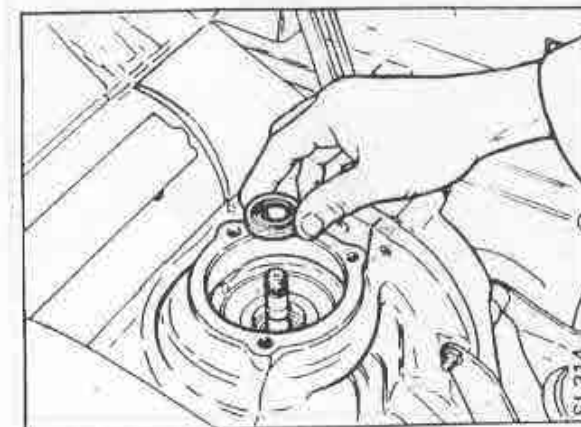


3. Press the pump shaft down into the engine block, using press tool 83 92 649 and fitting sleeve 83 90 551. Use the torque wrench and tighten to a torque of 10 Nm.

If the pump shaft is in the correct position, the depth from the joint face to the bearing will be $2.14 \text{ in} \pm 0.006$ ($54.5 \pm 0.15 \text{ mm}$).

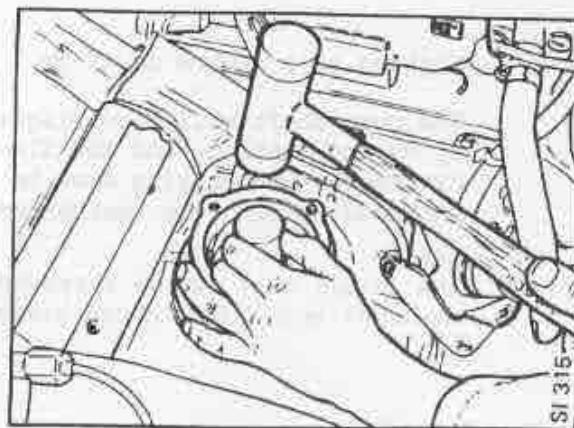


4. Oil the seal and fit it onto the pump shaft with the spring ring side facing upwards. Press the



SI 311

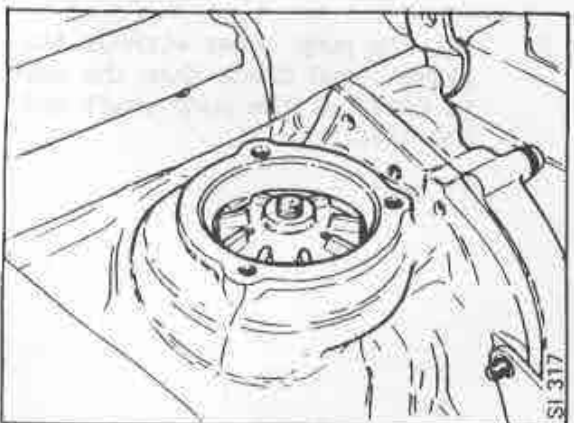
seal down onto the bearing,
using fitting sleeve 83 90 551
and a plastic mallet.



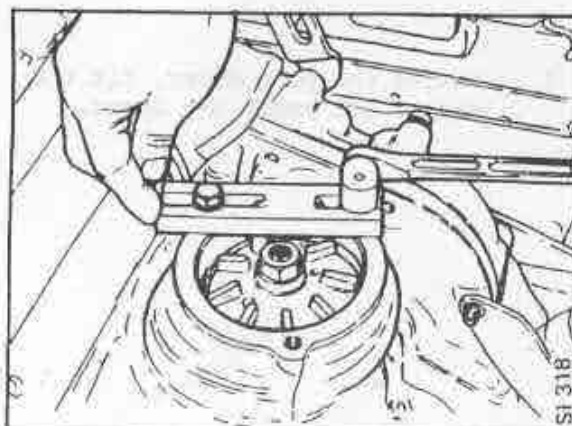
- SI 312
5. Fit the upper seal, using
fitting sleeve 83 90 536 and a
plastic mallet.



6. Fit the impeller onto the shaft



and secure it in position using
restrainer 83 92 672 and nut
83 56 305. Use the restrainer to
prevent the impeller from
rotating, so that no loads will
be applied to the teeth when the
nut is tightened. N.B. The shaft
end and nut have left-hand
threads.

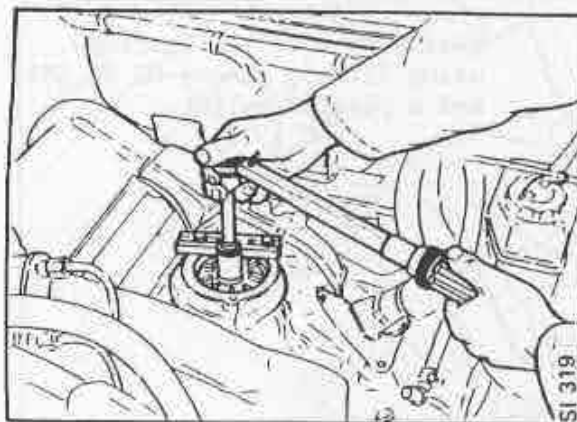


Tighten to a torque of 15 Nm.

The pump shaft will turn slightly during fitting, and the flank clearance then arising must be followed up with the restrainer.

Note:

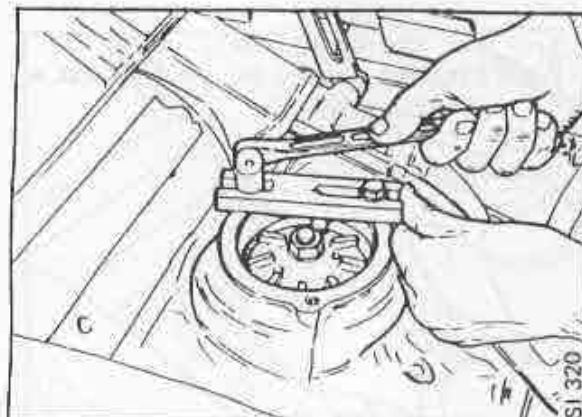
The torque must not be exceeded, the shaft is brittle and can break.



Note:

The nut must be released clockwise, and the restrainer must therefore be fitted for the opposite restraining direction.

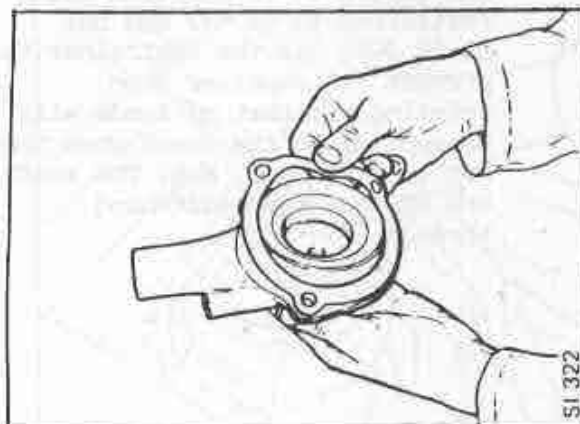
Remove the nut from the pump shaft.



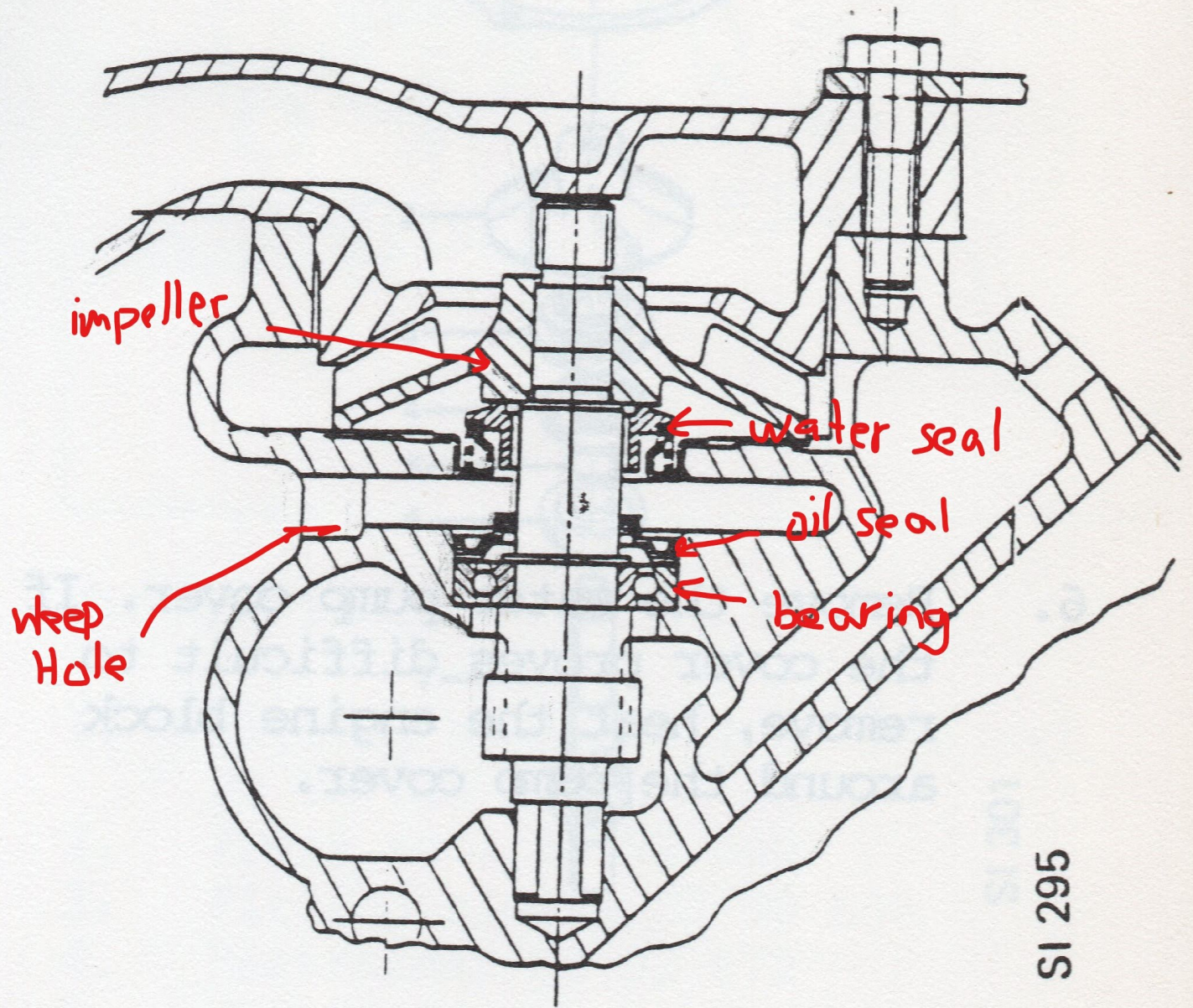
8. Fit the pump cover without its gasket, and check that the cover is clear of the pump shaft and impeller.

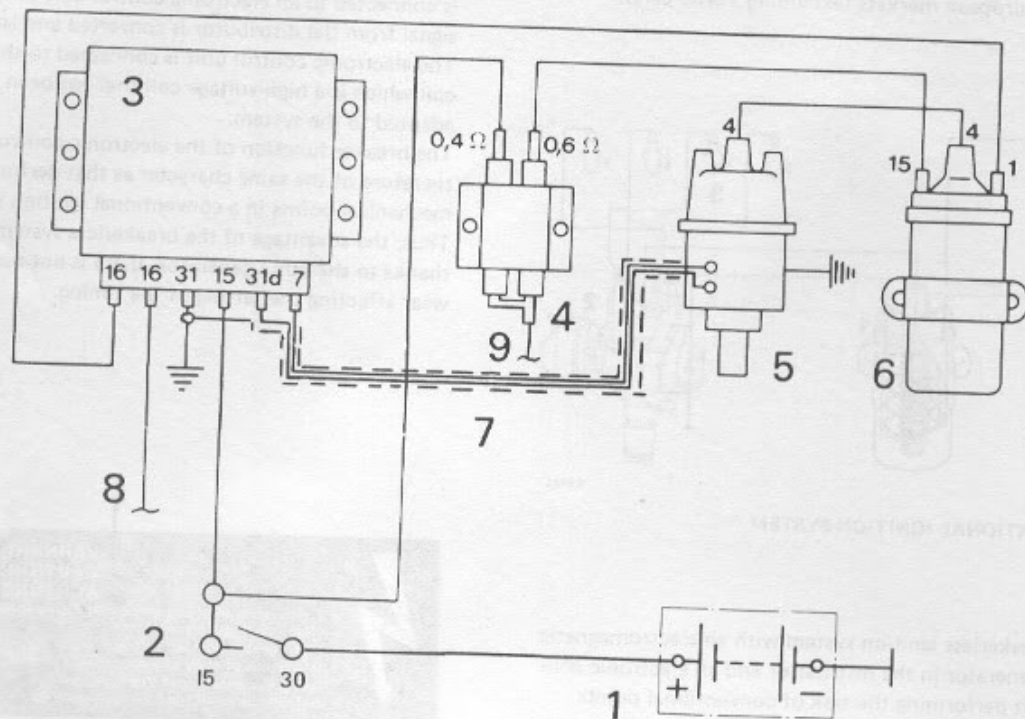


9. Remove the pump cover, fit the gasket and refit the cover.



10. Connect the hose to the pump cover.
11. Fit the alternator mounting.
12. Fit the intake manifold.
13. Fit the alternator.
14. Connect the battery cable.
15. Fill the cooling system with coolant.
16. Start the engine and let it run at idling speed until the thermostat has opened. Avoid revving-up the engine during this running-in of the new pump.





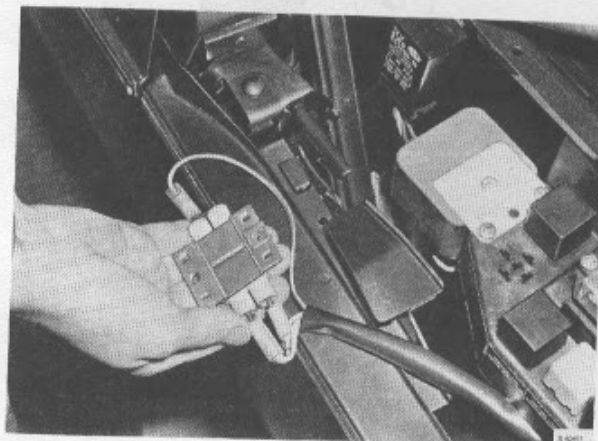
S 6306

BREAKERLESS IGNITION SYSTEM

1. Battery
2. Ignition switch
3. Electronic control unit
4. Compensating resistor
5. Distributor
6. Ignition coil
7. Screened cable
8. To fuel pump relay, tachometer and TSI socket
9. To relay terminal 87a (connected at start)



ELECTRONIC CONTROL UNIT



COMPENSATING RESISTOR

IGNITION SYSTEM

Ignition coil

General

The ignition coil is made by Bosch. It is of high-output type and requires a series resistance. When the starter is switched on, the series resistance is disconnected and battery voltage is fed direct to the ignition coil, but when the starter is switched off again, the series resistance comes into function and reduces the current to the coil. The ignition coil with series resistance is located on the left front wheel housing.

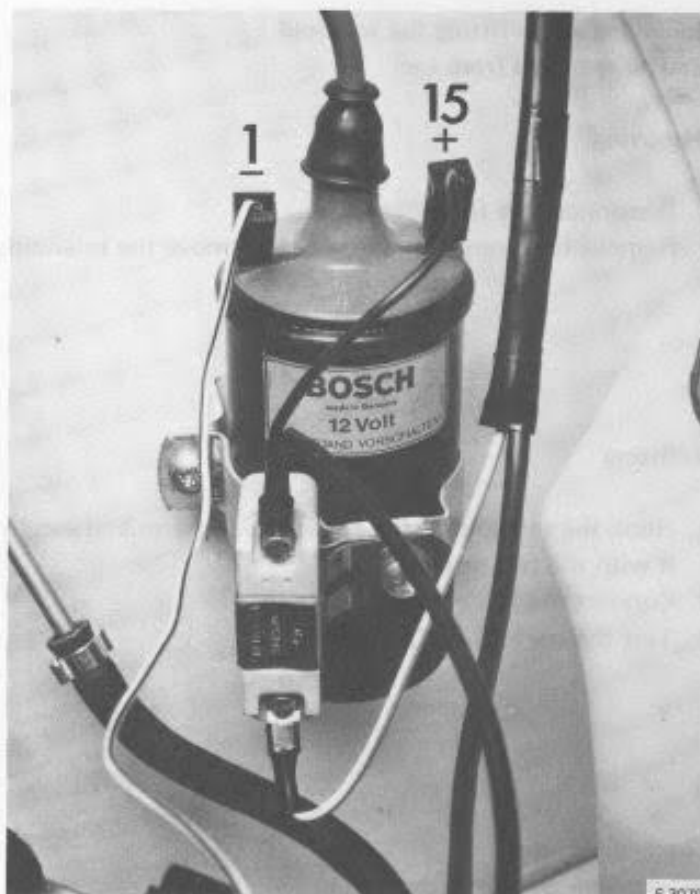
Removing and installing the ignition coil

Removing

1. Disconnect the wiring from the coil.
2. Undo the clamping screws and withdraw the coil.

Installing

1. Tighten the two screws to clamp the oil in position.
2. Connect the wiring. See fig.



IGNITION COIL AND SERIES RESISTANCE

Inspecting the ignition coil

1. Disconnect the wiring.
2. Connect test equipment and check the coil as follows:
 - a. Measure the primary winding resistance between terminals 1 and 15. Test value, see Chapter 0.
 - b. Measure coil performance in volts or spark length.
Note: Check that the breaker gap and closing angle of the distributor are correct.

NOTE

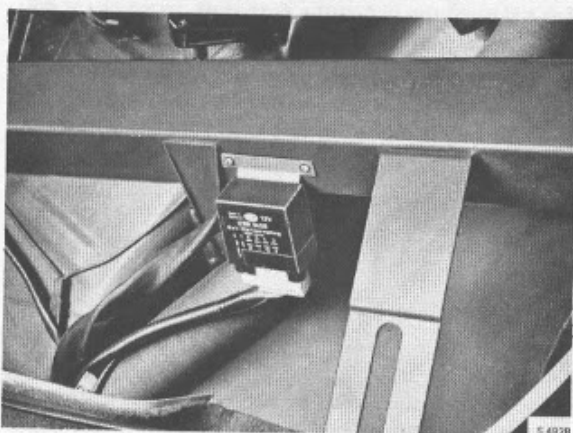
Faults, if present, can often only be detected when the coil has warmed up. In case of doubt, leave the coil connected under load on the test bench for half an hour; it should still function perfectly at the end of this time.

WARNING SYSTEM FOR UNFASTENED SEAT BELT

Up to and incl. chassis Nos. 99752026344 resp. 99757000072

A device which prevents the engine from starting and a buzzer and a warning lamp are actuated if the driver and/or the front seat passenger has not fastened his safety belt. The following components are included in the warning system:

- Buzzer — under the instrument panel
- Warning lamp — on the instrument panel
- Start inhibitor relay — next to the fuse box in the engine compartment
- Seat contact — in the driver's seat
- Seat contact — in the passenger's seat
- Belt contact — in the flap lock
- Handbrake contact — (manual transmission)
- Gear selector lever contact — (automatic transmission)
- Logic unit — under the rear seat cushion



LOGIC UNIT

The warning system is controlled through a logic unit to which all the components in the system are connected. The control circuit to the starter motor is broken when the driver or front seat passenger actuates his seat contact but has not fastened his seat belt. As soon as the belt is fastened, the starter motor is reconnected. The signals to the logic unit from the seat contact and the belt contact must be received in the right order. This prevents tampering with the system.

The buzzer sounds and the warning lamp lights up if the ignition is on and:

- a. (manual transmission) the handbrake is released
- b. (automatic transmission) the gear selector lever is moved from the "P" position

and the driver or the front seat passenger actuates his seat contact without having fastened his seat belt.

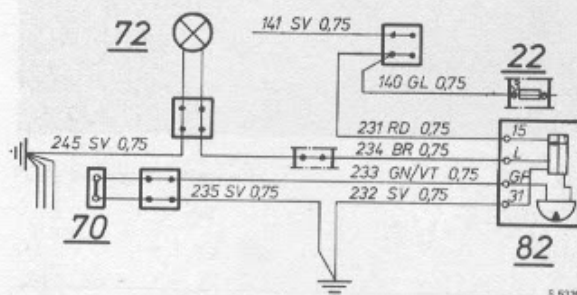
Wiring diagram, see section 371.

As from chassis Nos. 99752026345 resp. 99757000073

The warning system consists of a warning lamp and a buzzer.

The warning lamp lights if the ignition is on and the seat belt is unfastened.

The buzzer sounds 4–8 seconds if the ignition is on and the belt is unfastened.



ELECTRICAL DIAGRAM

- 22. Fuse No. 3
- 70. Seat belt contact (in the flap lock)
- 72. Warning lamp (in the instrument panel)
- 82. Logic relay with buzzer (under the rear seat)

CLUTCH CONTROL

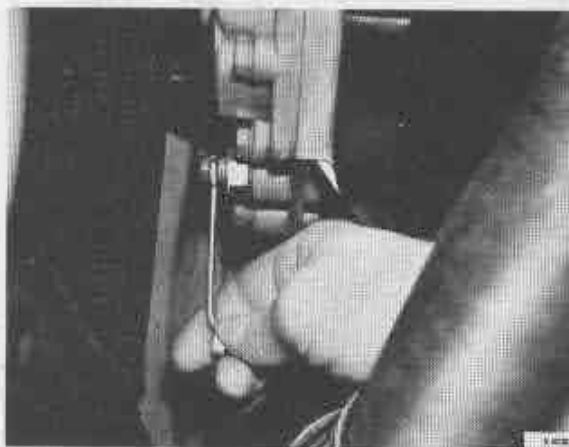
REMOVING AND INSTALLING THE CLUTCH PEDAL

1. Remove the split pin and washer and pull out the shaft bolt for the master cylinder push rod.
2. Unhook the clutch pedal return spring.
3. Remove the axle bolt and the pedal.
4. Remove the spring if necessary.
5. Lubricate the pedal bearing with chassis grease before reassembling.

Reassemble in the reverse order.

ADJUSTING CLUTCH PLAY, MODEL 1975

The clutch play, i.e. the clearance between the release bearing and the diaphragm spring, is regulated by an adjusting screw that threads into the transmission case and acts as the fulcrum of the clutch lever. The gap is increased when the screw is backed off. The gap should be checked at the outer end of the clutch lever (see illustration), where it should be $0.12 \pm 0.02''$ (3 ± 0.5 mm).



ADJUSTING THE CLUTCH PLAY

REMOVING THE RELEASE BEARING (AND CLUTCH LEVER, MODEL 1975)

To remove the release bearing or clutch lever, proceed in the same manner as when removing the clutch. The release bearing is removed together with the clutch and slave cylinder (guide sleeve).

MASTER CYLINDER

General

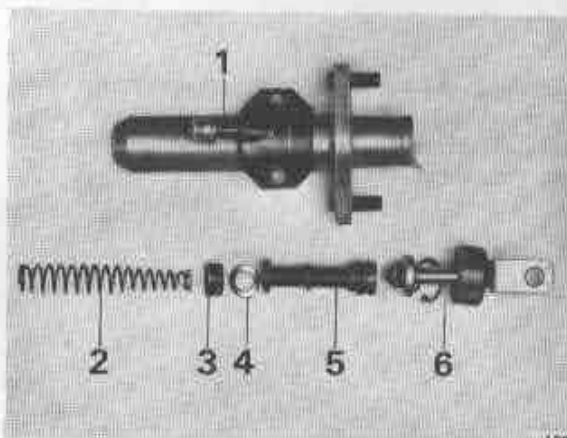
The master cylinder is placed under the servo unit and is actuated by a push rod from the clutch pedal. In the cylinder is besides the push rod, piston, piston seals and return spring. The clutch fluid container is incorporated in the brake fluid container completely separated from the brake fluid. From the container a hose leads to the clutch cylinder.

Removal

1. Detach the clamp holding the pipe from the clutch cylinder at the body and remove the pipe at the cylinder.
2. Remove the left hand screen under the instrument panel.
3. Remove the pin holding the push rod to the clutch pedal.
4. Remove the nuts inside the dash panel and remove the clutch cylinder from the engine compartment. Pull off the hose from the fluid container and hang it up so that the fluid is not coming out.

Disassembling

Pull back the sealing bellows and remove the lock ring with a pair of pliers. Take out the push rod with the washer. The piston and its seal is now visible. Remove the piston, washer, piston seal and spring. Take the seal



CLUTCH MASTER CYLINDER

- | | |
|---------------------|--|
| 1. Housing | 4. Washer |
| 2. Spring with seat | 5. Piston and rear seal |
| 3. Sealing | 6. Push rod with stop washers, lock ring and bellows |

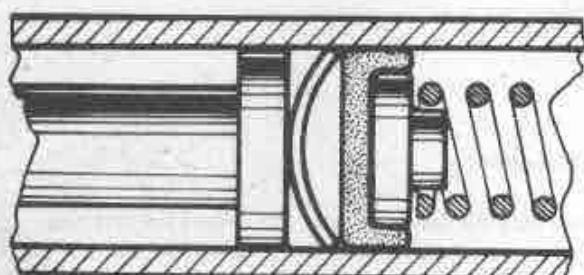
carefully off the piston. Examine the cylinder walls; if they are smooth and unscratched, new seals can be fitted, but if the surface of the cylinder bore is rough, a complete new cylinder should be installed. If the old seals on the piston are enlarged or swollen, they are probably contaminated with mineral oil; this is the most common cause of cylinder malfunction. Seals made of natural rubber are very sensitive to mineral oil, and even small quantities of oil can cause them to swell with time. If this is suspected, change all the seals and flush the system with clean hydraulic brake fluid.

Assembling

Fit the return spring with its retainer. Lubricate the piston and seals thoroughly with Girling Rubber Grease 3 and fit the packing, washer and piston with seals.

NOTE

The washer must be fitted with the convex side facing the piston (see illustration).



S 4539

CORRECT POSITION OF THE WASHER

Fit the push rod into the cylinder, followed by the washer and lock ring, which are located in the cylinder housing groove. Replace the sealing bellows or fit a new bellows if the old one is damaged.

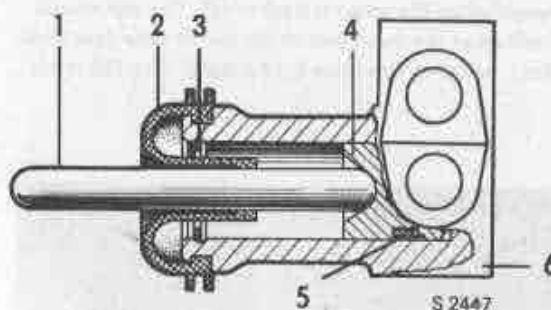
Installation

1. Connect the hose from the container to the cylinder.
2. Put the cylinder in place and install the nuts from inside the car.
3. Connect the push rod to the pedal.
4. Install the left hand screen under the instrument panel.
5. Connect the clutch pipe, fill fluid and bleed the system.

SLAVE CYLINDER, MODEL 1975

General

The slave cylinder consists of a cast-iron housing with an operating unit consisting of a push rod, lock ring and piston. A rubber cap seals the end of the push rod. The cylinder housing is provided with a bleeding nipple.



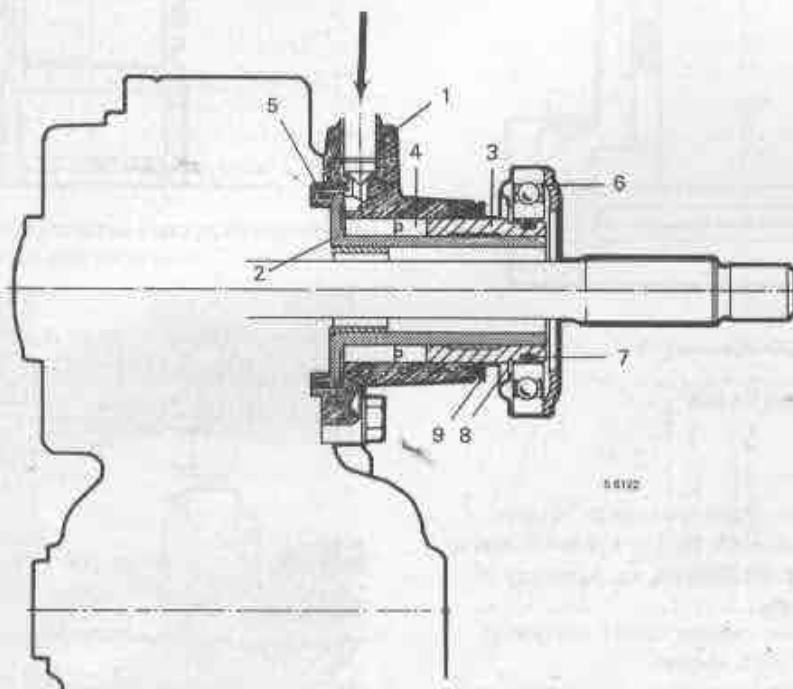
SLAVE CYLINDER, MODEL 1975

- | | |
|----------------|----------------|
| 1. Push rod | 4. Piston |
| 2. Sealing cap | 5. Piston seal |
| 3. Lock ring | 6. Housing |

SLAVE CYLINDER, AS FROM MODEL 1976

The slave cylinder is an annular hydraulic cylinder mounted inside the clutch cover and enclosing the clutch shaft. The slave cylinder consists of an outer cylinder housing and an internal sleeve, between which there is an annular piston and a lip seal. The release bearing is locked to the piston by means of an O-ring and a lock ring. When the clutch pedal is depressed, the slave cylinder piston and release bearing act directly on the diaphragm

spring of the clutch. When the pedal is released, the release bearing and pistons are returned by means of the diaphragm spring. Further return of the piston is prevented by the friction of the lip seal in the slave cylinder and by a sliding lock ring on the slave cylinder piston. This means that when the clutch pedal is in the rest position, the release bearing is in contact with the diaphragm spring. Adjustment of the clutch is automatic owing to the fact that the sliding lock ring on the piston moves along the piston in pace with the wear to the clutch lining.

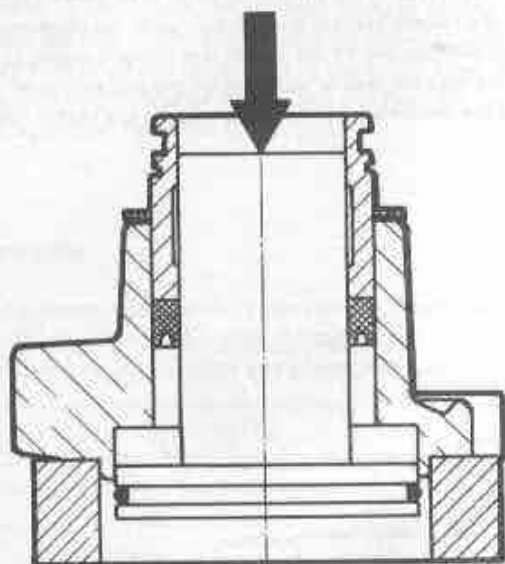


SLAVE CYLINDER, AS FROM MODEL 1976

1. Slave cylinder housing
2. Sleeve
3. Piston
4. Lip seal
5. O-ring
6. Release bearing
7. O-ring
8. Lock ring
9. Lock ring

DISMANTLING THE SLAVE CYLINDER

1. Remove the release bearing from the slave cylinder.
2. Press out the slave cylinder sleeve and remove the O-ring from the flange of the sleeve.



PRESSING OUT THE CYLINDER SLEEVE

3. Remove the piston and lip seal.

ASSEMBLY

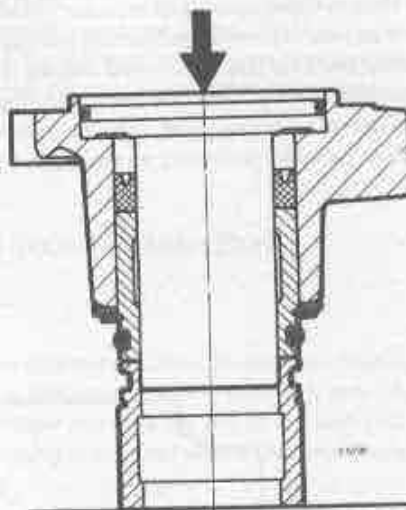
Make sure that the slave cylinder has been thoroughly cleaned. Wash the parts in brake fluid or a special cleaning fluid for hydraulic brake components, e.g. a mixture of cleaning spirit and acetone.

Thoroughly clean the slave cylinder using a mixture of 70 % cleaning spirit and 30 % acetone.

The lip seal should never be allowed to come into contact with mineral oil. Apply a thin coating of Castrol Rubber Grease to the lip seal (not in the groove) and to the piston (but not the O-ring).

1. Fit the O-ring to the flange of the sleeve.
2. Slide the lip seal onto the sleeve. Dip the flange of the sleeve in brake fluid and insert the sleeve into the cylinder. Insert the lip seal part of the way into the cylinder.

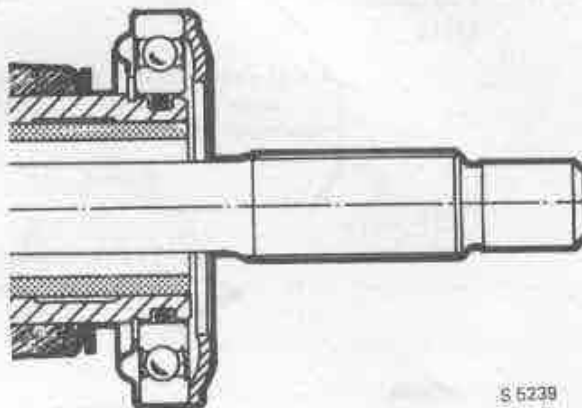
3. Guide the sleeve and the cylinder upwards by pushing in the piston. The two lock rings and the O-ring should be fitted to the piston.
4. Place the slave cylinder on a suitable support (e.g. a



PRESSING THE SLEEVE INTO THE CYLINDER

spare slave cylinder piston) and press the sleeve into the cylinder.

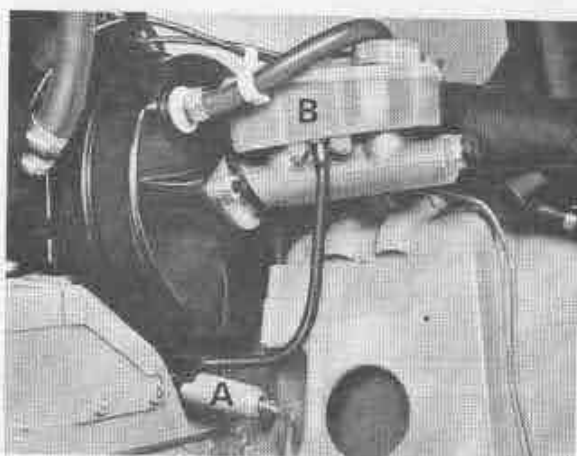
5. Fit the release bearing to the piston, ensuring that the bearing is turned the right way (see illustration).



POSITIONING THE RELEASE BEARING

BLEEDING THE MASTER AND SLAVE CYLINDER

1. Connect a hose (about 1/4" or 6 mm ID) to the slave cylinder bleeder nipple; and place the free end in a collecting vessel part-filled with hydraulic brake fluid.
2. Fill the master cylinder header tank with brake fluid.

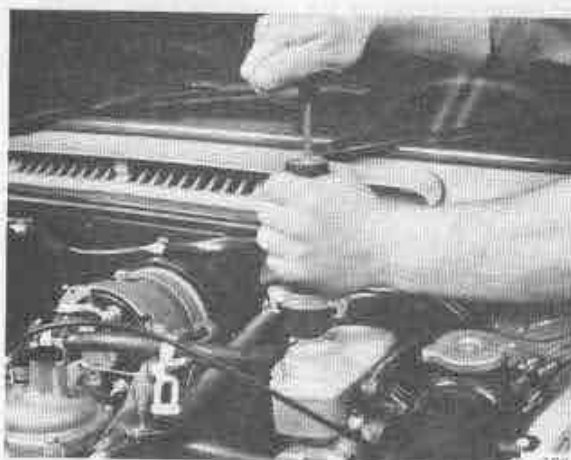


MASTER CYLINDER, CLUTCH

"A" Master cylinder, clutch

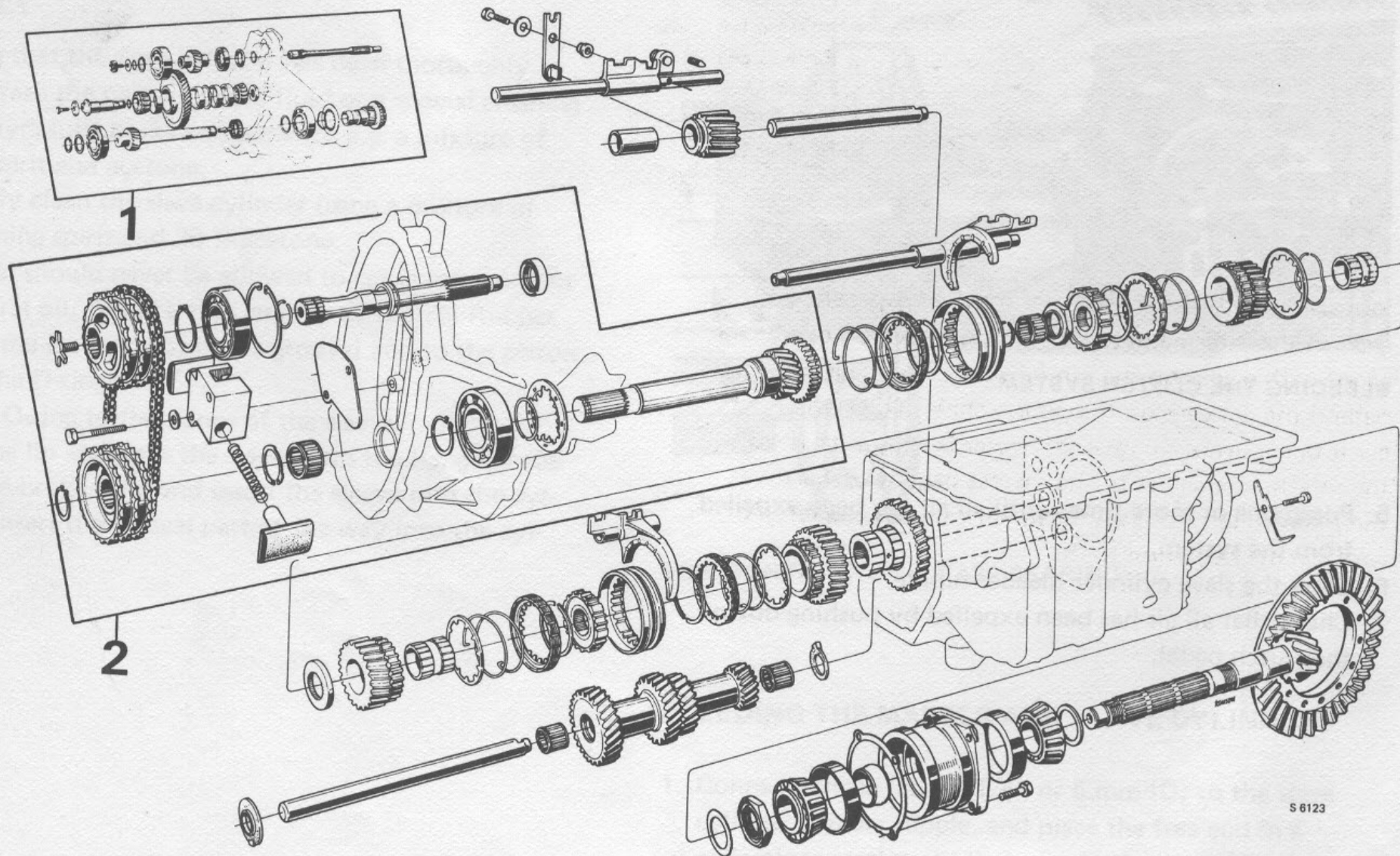
"B" Container for clutch fluid (combined with brake fluid container)

3. Open the bleeder nipple on the slave cylinder a half turn.
4. Place the coolant system tester over the filler opening of the master cylinder (see illustration).



BLEEDING THE CLUTCH SYSTEM

5. Pump one or more times until all air has been expelled from the system.
6. Close the slave cylinder bleeder nipple.
7. Check that all air has been expelled by pushing down the clutch pedal.



S 6123

TRANSMISSION, EXPLODED VIEW

1. Up to and incl. gearbox No. 817.000

2. As from gearbox No. 900001 resp. S 00001

TRANSMISSION CONTROL

Manual transmission

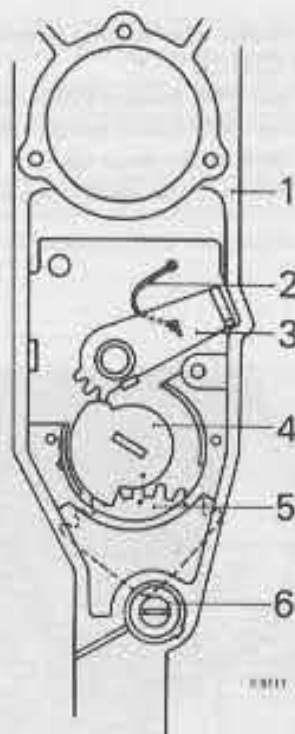
GENERAL

Gear shifting is controlled by a floor-mounted lever located between the front seats.

The gear lever is fitted with a reverse gear catch which can be released by pulling the ring-shaped handle under the lever knob upwards. The lever is made in two parts, insulated from each other by rubber bearings. The rest of the transmission control system consists of a gear lever housing recessed into the floor between the front seats and a rod that transmits gear lever movements to the gearbox.

As from model 1980 the gear position control is moved from the gear lever/housing to the gear box. Stop notches are introduced on the gear selectors for 1st, 2nd and reverse gear.

The reverse gear catch is however unchanged.



ADJUSTING GEAR POSITIONS

1. Engage reverse gear and turn the ignition key to L (Locked).
2. Move the gear lever back and forth. The gear shift rod should then have an axial movement of 3.5 ± 0.5 mm. Adjust by moving the gear lever housing forward or backward.

GEAR LEVER LOCK

1. Housing
2. Spring
3. Locking tongue
4. Cogwheel
5. Toothed segment
6. Lock cylinder

GEAR LEVER LOCK

General

The car is equipped with a combined ignition switch and gear lever lock. When the gear lever is placed in reverse and the ignition key withdrawn, the gear lever is locked. The ignition switch has the following positions:

L. Locked. Reverse gear must be engaged before the key can be turned to L, and the key can only be withdrawn in this position.

Parking lights and hazard warning lights can be switched on.

G. Garage. All lights can be switched on.

K. Drive. All electrical systems including the ignition circuit are live.

S. Start. This position has a spring-loaded return to K. The gear lever lock consists of a tongue (3) and cogwheel (4) actuated by a toothed segment (5) mounted under the lock cylinder (6). The segment turns with the lock cylinder.

IGNITION AND STARTER CONTACT

Removal

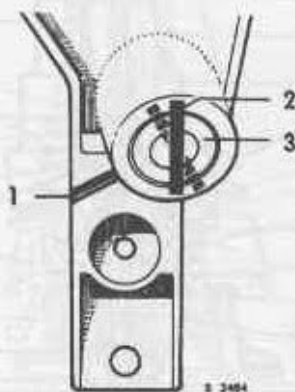
1. Disconnect the battery cable.
2. Remove the driver's seat.
3. Pull up the rubber bellows and fold back the floor carpet.
4. Remove the fixing plate between the heater ducts in front of the gear lever housing.
5. Remove the buttons from the heater controls.
6. Remove the three gear lever cover retaining screws. Lift the cover and disconnect the ignition lock warning light and electrical connections to the switch. Remove the cover.
7. Disconnect the cables from the ignition lock and reversing light switch.



S 4116

LOCK CYLINDER AND KEY

1. Key
2. Lock cylinder



S 3484

PRESSING IN THE CATCH PIN

1. Hole for catch pin
2. Key
3. Lock cylinder

Assembling

1. Turn the key in the lock cylinder to a position between the locking- and garage positions.
2. Push in the lock cylinder catch pin. Check that the toothed segment driver pins are correctly positioned to fit in the lock cylinder. Push in the lock cylinder and check that it is engaged in the toothed segment.
3. Mount the gear lever housing according to the instructions given below.

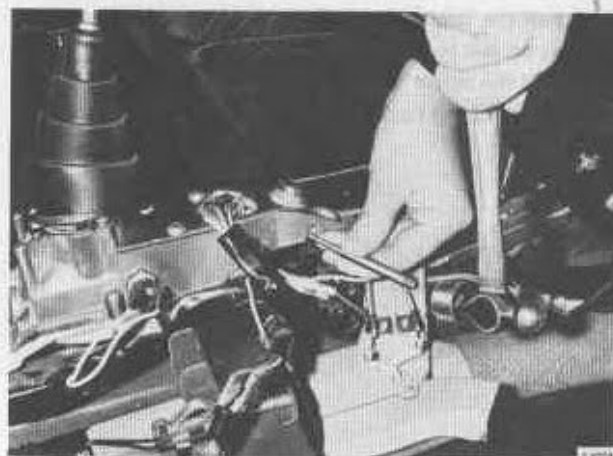
Disassembly when key is missing

If the key is missing, the lock cylinder is removed from the gear lever housing as follows:

1. Lift out the left front seat and the gear lever housing protection casing.
2. Loosen the gear lever housing retaining nuts with the aid of special tool 8391237.

3. Drill out the plug covering the hole for the lock cylinder catch pin in the gear lever housing.
4. Drive in the catch pin with the aid of a drift approx. 0.08 in. (approx. 2 mm) and remove the lock cylinder.

Before installation, plug the hole in the gear lever housing again. The plug is made of a suitable screw or rivet that is cut to a length of approx. 0.19 in. (approx. 5 mm).



THE LOCK CYLINDER CATCH PIN IS DRIVEN IN WITH THE AID OF A DRIFT

GEAR LEVER HOUSING

Dismantling

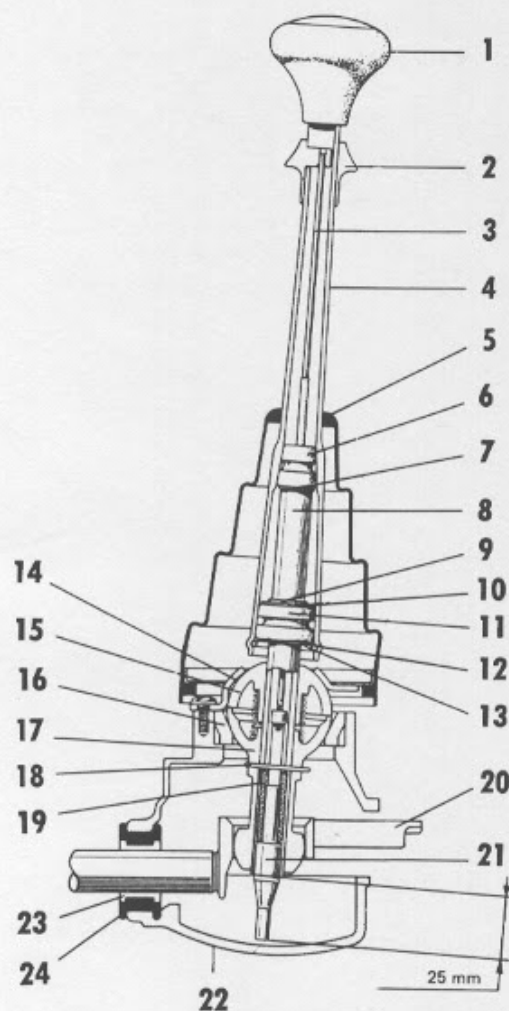
1. Disconnect the battery cables.
2. Remove the driver's seat.
3. Pull up the rubber bellows on the gear lever, fold up the floor carpet and remove one of the heater ducts from in front of the gear lever housing.
4. Remove the taper pin from the joint between the gear shift rod and the heater ducts.
5. Remove the buttons from the heater controls.
6. Remove the three gear lever cover retaining screws, raise the cover and remove the ignition lock warning lamp and electrical connections to the switch. Remove the cover.
7. Disconnect the cable from the ignition lock and reversing light switch.
8. Remove the gear lever housing retaining screws using tool 8391237 and remove the housing.

Removing the gear lever as from chassis No. 99.039.548

1. Undo the three screws under the rubber boot and remove the gear lever from the gear lever housing.
 2. Pull out the tension pin from the carrier, screw out the catch stud and remove the spring.
 3. Remove the carrier, the bearing and the cover.
 4. Knock carefully with a plastic hammer on the knob, so that it will loosen from the gear lever and remove the carrier, the catch rod and the rubber boot.
 5. Remove the lock ring, which holds the hollow lever and the gear lever together and pull out the hollow lever with its rubber bushing.
- Replace damaged or worn parts.

Assembly

1. Fit slot ring, washers and rubber bushings on the hollow lever.
2. Fit the hollow lever in the gear lever and fit the lock ring.
3. Fit rubber boot, carrier and catch rod. Put the spring into the hollow lever and screw in the catch stud 1" (25 mm) see illustration.
4. Fit cover, bearing, carrier and tension pin.
5. Press the knob on the gear lever.
6. Fit the gear lever on the gear lever housing.



S 3190

SECTION THROUGH GEAR LEVER HOUSING, AS FROM CHASSIS NOS. 99.039.548

1. Knob
2. Carrier
3. Catch rod
4. Gear lever
5. Rubber boot
6. Rubber bushing
7. Washer
8. Hollow lever
9. Slot ring
10. Washer
11. Rubber bushing
12. Washer
13. Lock ring
14. Cover
15. Bearing
16. Gear lever bearing
17. Carrier
18. Tension pin
19. Spring
20. Gear shift rod
21. Catch stud
22. Bottom part
23. Bearing
24. Rubber bushing

COIL SPRING SUSPENSION, REAR

Changing coil springs

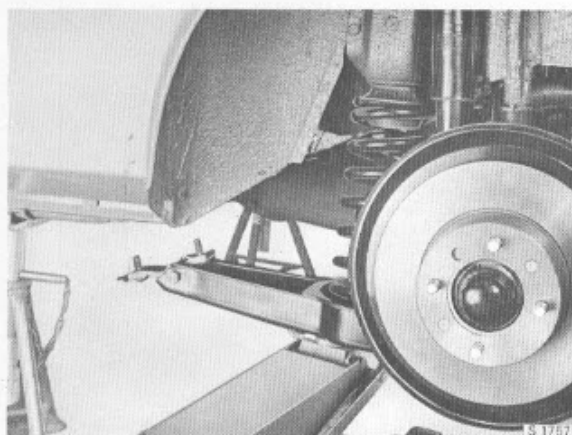
Removal

1. Apply the handbrake. Remove the rear hub cap and slacken the wheel nuts. Jack up the car and place a trestle under the side where the spring is to be removed.

CAUTION

The jack must not be placed under the rear axle, as this is liable to deform the axle.

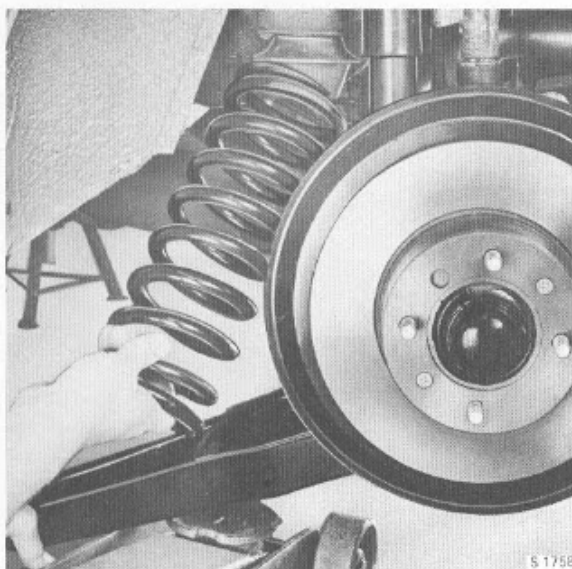
2. Take off the wheel. Apply a jack under the spring link



LOCATION OF JACK UNDER SPRING LINK

and disconnect the lower end of the shock absorber. Remove the two nuts under the rear seat that secure the front spring link bearing to the body.

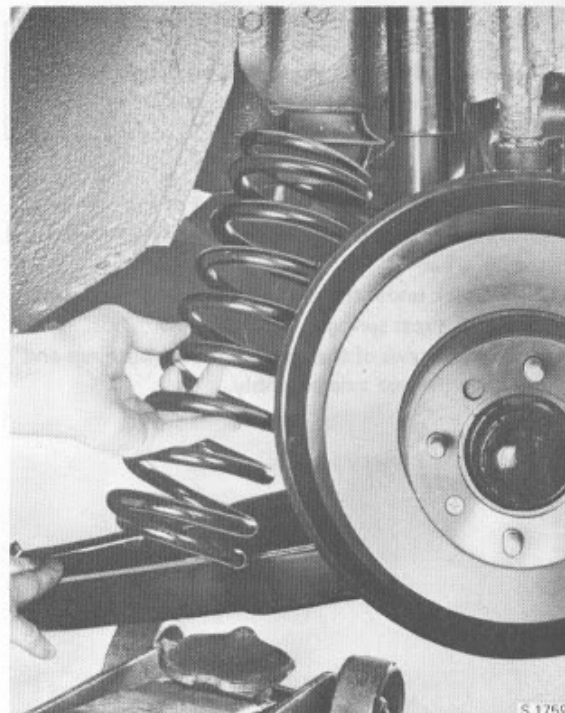
3. Lower the spring link so that the spring can be removed.



REMOVING THE REAR WHEEL COIL SPRING

Installation

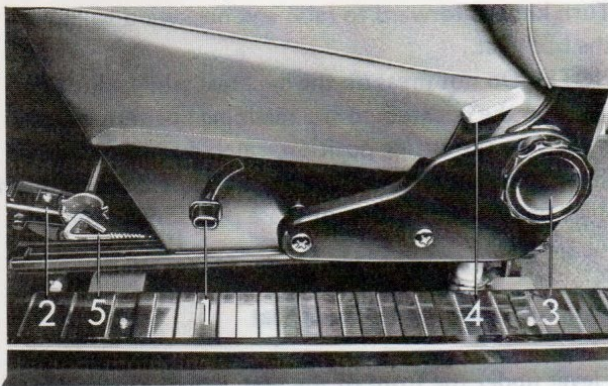
Proceed in the reverse order, making sure that the unmachined end of the spring is at the bottom and is securely located in the lower spring seat.



LOCATION OF COIL SPRING

SEATS AND CARPETING

The front seats are built up on a sheet steel frame to which the backrest is mounted. The upholstery consists of moulded rubber cushions laid on rubber sheets and covered with textile and plastic-coated fabric. Both front seats are mounted on rails to allow legroom adjustment. At the front of each pair of rails is an adjustment bolt with which the height of the seat can be adjusted (not



FRONT SEAT

1. Legroom adjustment catch
2. Vertical adjustment handle (driver's seat only)
3. Backrest angle adjusting knob
4. Backrest release (to drop backrest forward or back)
5. Catch

provided on the front passenger seat as from model 1970).

The rails are secured at the back ends by attachment hooks with two notches. The adjustment bolt can be manipulated to raise or lower the whole seat, raise the front and drop the back, or vice versa. A system of springs under the rails at the back helps to raise the seat.

Up to and incl. model 1970, the adjustment bolt is operated by a lever with a catch that is released by pulling out the lever. The new control device introduced as from model 1971 consists of a handle with a catch released by pushing in the handle.

The backrest is adjustable and can be dropped to various angles or to a full reclining position. To enable passengers to enter or leave the back seat, in the 2-door model, the front seat backrest can be dropped forward by a lever that releases the catch.

As from model 1972, the driver's seat is electrically heated. Heating elements consisting of resistance wiring and reflectors held by a plastic net is mounted in seat and backrest cushions and via a thermostat connected to the ignition lock.

The elements are switched on when the seat temperature is below 50°F (+10°C). The thermostat, mounted in the seat cushion, cuts out the current when the temperature is higher than 81°F (+27°C).

Installing and removing front seats

The front seats are installed and taken out complete with rails.

Removing

1. Release the seat by moving the adjustment bolt lever or handle to the intermediate position. As from model 1972: Disconnect the electric wiring plug under the seat.
2. Push the catches back to release the adjustment bolt. Raise the leading edge of the seat, tip it backward and disengage from the hooks at the rear.

To install the seat, proceed in the reverse order.

B. Passenger seat

Model 1969: Same procedure as for driver's seat.

As from model 1970: Release the seat by removing the retaining screws (insex screws) from the rails.

Legroom adjustment

Move the catch 1 up, (see illustration) and slide the seat forward or backward to the desired position.