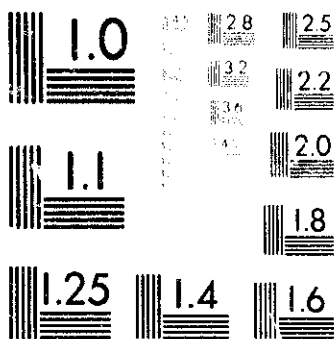


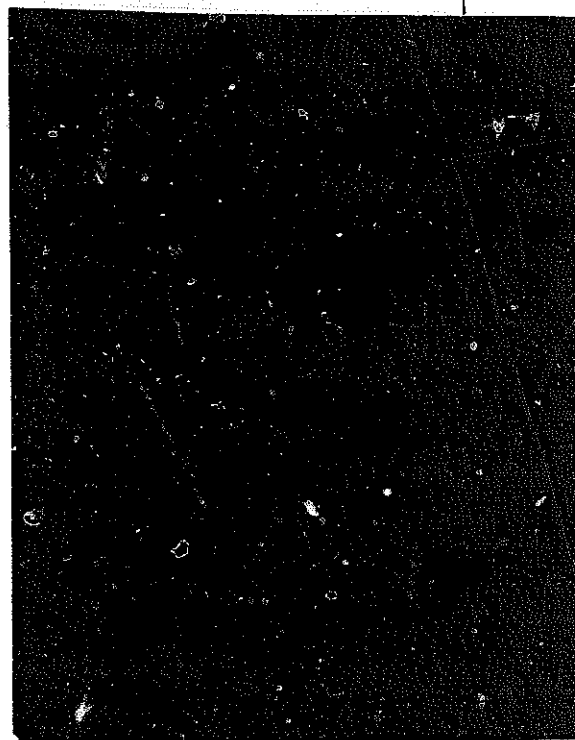


Testvorlage für die Mikroverfilmung



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

7	Kodak-Mikrofilm KODAK-MIKROFILM	0.25 mm
8	Kodak-Mikrofilm KODAK-MIKROFILM	0.35 mm
9p	Kodak-Mikrofilm KODAK-MIKROFILM	0.35 mm
10p	Kodak-Mikrofilm KODAK-MIKROFILM	0.25 mm
	Kodak-Mikrofilm KODAK-MIKROFILM	0.35 mm
	Kodak-Mikrofilm KODAK-MIKROFILM	0.5 mm
	Kodak-Mikrofilm KODAK-MIKROFILM	0.7 mm
11p	Kodak-Mikrofilm KODAK-MIKROFILM	1.0 mm
12p	Kodak-Mikrofilm KODAK-MIKROFILM	
13p	Kodak-Mikrofilm KODAK-MIKROFILM	
14p	Kodak-Mikrofilm KODAK-MIKROFILM	



07.3

07.3 Mechanically controlled gasoline injection system (CIS A)

Designation	Type and reason for change	Installation	Job No.
Fuel pump	Fuel connections and electrical connections modified.	November 1975 starting chassis end No. 000346	285
Hot start unit	Hot start magnet, hot start relay and temperature sensor are no longer available. These parts are no longer carried in spare parts stock.	No longer available December 1975 Installed up to chassis end No. 000420	—
Contour hose clamps	To prevent slipping of contour hose between auxiliary air valve and idle speed air distributor.	February 1976 starting chassis end No. 000752	Programmed repairs 07.3
Warm-up compensator	Modified fastening of warm-up compensator		
Control pressure line	Steel control pressure line with internal Tecalan hollow body (formerly Tecalan control pressure line).	August 1976 starting chassis end No. 001501	240
Repair set for system pressure regulator	O-ring vulcanized on push-up valve.	February 1977	210
Sealing for mixture controller	Sealing between mixture controller and air guide housing with Hylomar or Curil K 2 (formerly gasket).	April 1977 starting chassis end No. 002640	200
Fuel pump	Dia. of intake connection enlarged to 13 mm (formerly 10 mm).	March 1977 starting chassis end No. 002468	285
Fuel distributor	Sheet metal lock for control piston.	April 1977	205
Vacuum retard adjustment	Connection for vacuum retard adjustment has been removed from throttle valve housing to contour hose between auxiliary air valve and idle speed air distributor.	September 1977 starting chassis end No. 003385	Programmed repairs 07.3
Leak line pressure damper	Leak line is no longer connected to idle speed air duct, but to contour hose of engine breather.		

Fuel pump assembly	Improved cold start by additional pressure compensating valve. The pressure reservoir is now connected in front of fuel filter.	February 1979 starting chassis end No. 005693	282
Check valve on fuel pump	Subsequent installation in the event of internal leaks on fuel pump.		283
Fuel distributor	In the event of repairs, only light-alloy fuel distributors will be used from now on.		205
Fuel pump noise	Subsequent installation of fuel filter with damper and diaphragm damper.		Programmed repairs 07.3
Suction damper between fuel pump and fuel tank	Suction damper made of stainless material.	October 1978 starting chassis end No. 005040	
Strainer in inflow connection of fuel distributor	Mesh width reduced from 50 μ to 20 μ .	February 1979 starting chassis end No. 005750	Programmed repairs 07.3
Compression spring above control piston in fuel distributor	For still further improvement of through-flow following a cold start, a compression spring has been installed above control piston in fuel distributor in addition to pressure relief valve. As a result, the control piston cannot be lifted in the direction of full load with the engine stopped.	May 1979	205
Contour ring on regulator piston of system pressure regulator	Regulator piston in system pressure regulator is provided with a contour ring.	May 1979	210

07.3-100 Adjustment of idle speed

Testing and adjusting data

Standard version

Idle speed	580-620/min
Idle speed emission value	1-2 % CO

National version

Identification: Information label in national language on cross member in front of radiator.
Adjust engines according to data on respective emission information label.

Model year	Idle speed 1/min	Idle speed emission value % CO without air injection Measuring point: exhaust back- pressure line between power steering pump and lefthand exhaust manifold
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Information label: color code silver

1979/80	600	1.0-2.5
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Information label: color code Federal black, California yellow

1977	600	Federal and California 0.2-2.0 Federal high altitudes 0.2-1.2
1978/79	600	Federal and California 0.5-2.0

Special tools

Screwdriver 3 mm with tommy handle for
adjusting idle speed emission value



000 589 14 11 30

Putler



123 589 05 33 00

Installer



123 589 00 15 00

Oil telethermometer

116 589 27 21 00

Conventional testers and accessories

CO measuring instrument, revolution counter

Digital tester

e.g. Bosch, MOT 001.03

Note

Do not adjust idle speed when engine is too hot, e.g. immediately after a fast drive or after measuring output on dynamometer.

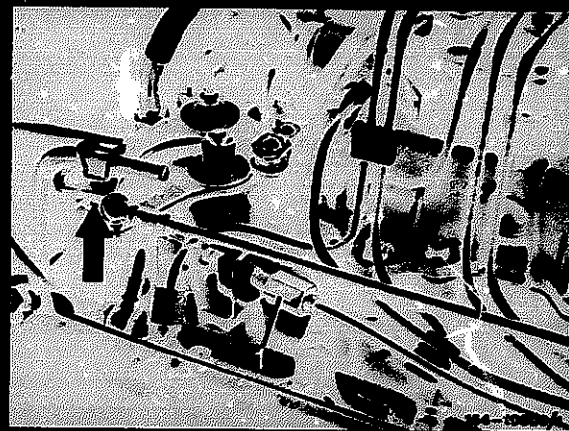
Adjusting

- 1 Disengage air conditioning or automatic climate control. Move selector lever into position "P".
- 2 Remove air cleaner.
- 3 Connect test instruments: revolution counter, CO measuring instrument, digital tester, oil telethermometer.
- 4 Run engine to 75–85 °C oil temperature.
- 5 Check intake system for leaks. For this purpose, spray all sealing points with Iso-Oktan DIN 51756 or benzine.

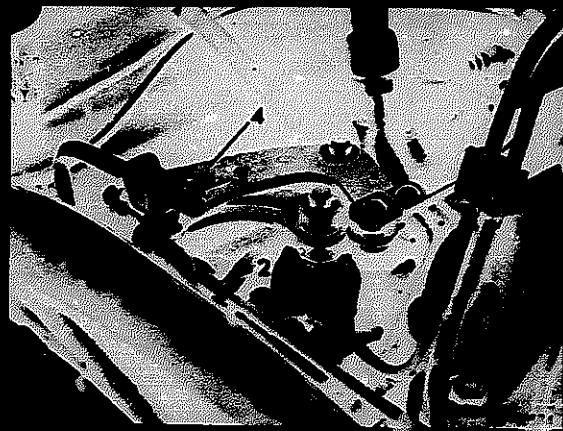
Attention:

Do not use conventional fuel for spraying (unhealthy vapors). Pay attention to fire hazard and do not spray on red-hot parts or parts of ignition system.

6 Check whether Bowden wire for cruise control/Tempomat rests free of tension against regulating lever (arrow). Adjust by means of adjusting nut (1), if required.



7 Check whether roller (3) in slotted lever (4) rests free of tension against end stop. Adjust by means of connecting rod (2), if required.



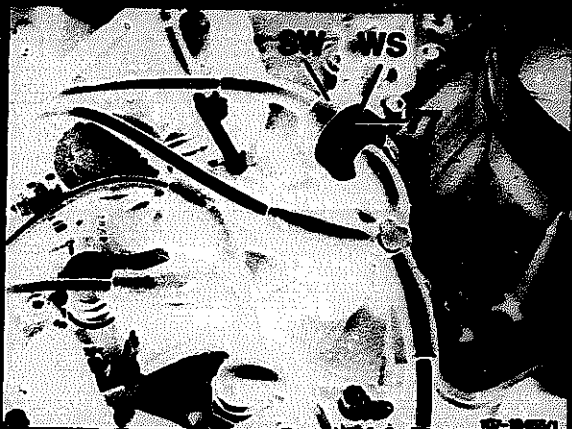
8 Set engine to specified speed by means of idle speed air screw (arrow).



9 Check idle speed emission value.

(AUS) 1979/80

Check idle speed emission value **without** air injection. For this purpose, pull blue/purple vacuum line from black housing member of time delay valve (77) and close time delay valve.



sw = black
ws = white

USA 1977-1979

Check idle speed emission value **without air injection**.
For this purpose, null blue/purple vacuum line (arrow)
from blue thermostatic valve (61) and close connection on
thermostatic valve. Air injection is thus switched off.

Pull off connecting hose (arrow) of measuring point
(exhaust backpressure line).

Connect CO measuring instrument and exhaust back-
pressure line by means of a hose.

10. Adjust idle speed emission value.
Unscrew closing plug (arrow) for this purpose.

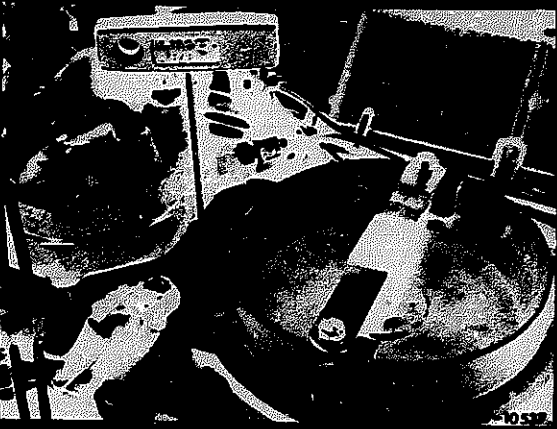
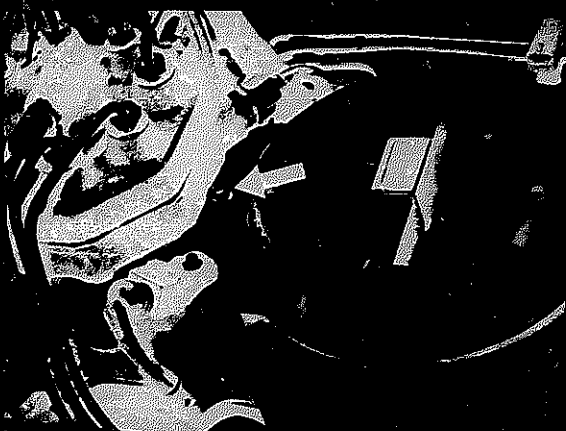
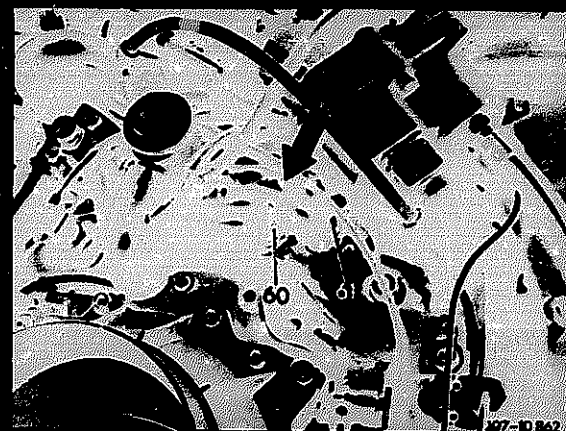
Attention!

On vehicles manufactured after 1.10.1976 remove
safety plug first.

Insert Allen wrench through bore into idle speed
mixture control screw and adjust emission value by
turning screw.

Turning counterclockwise → leaner
Turning clockwise → richer

Close bore for closing plug. Accelerate for a short
moment and check idle speed emission value and
readjust, if required.



Following adjustment, on vehicles manufactured after 1.10.1976, install a blue safety plug (arrow), part No. 000 997 59 86.



11 Mount air cleaner. Check idle speed and idle speed emission value once again and readjust, if required.

(AUS) and (USA) version

Remove air cleaner once again and plug back vacuum line for (USA) version on thermostatic valve and for (AUS) version on time delay valve.

12 Engage selector lever in driving position, switch on air conditioning, turn power steering to full lock, engine should run smoothly. Readjust speed, if required.



Testing and adjusting values

Standard version

Idle speed	580-620/min
Idle speed emission value	1-2 % CO

National version

Identification: Information label in national language on cross member in front of radiator.
Adjust engines according to data of respective emission information label.

Model year	Idle speed 1/min	Idle speed emission value % CO without air injection Measuring point: exhaust back- pressure line between power steering pump and lefthand exhaust manifold
------------	------------------	--



Information label: color code silver

1979/80	600	1.0-2.5
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Information label: color code Federal black, California yellow

1977	600	Federal and California 0.2-2.0 Federal high altitudes 0.2-1.2
1978/79	600	Federal and California 0.5-2.0

Battery voltages

Rest potential	12.2 V
Starting voltage min.	10 V

Transistorized ignition system TSZ 4

Voltage at terminal 15	approx. 4.5 V
Voltage at terminal 1	0.5–2.0 V
Series resistor bypass (when starting)	10 V

Special tools

Screwdriver 3 mm with tommy handle for readjusting idle speed emission value



11004-7807

000 589 14 11 00

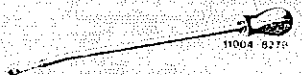
Puller



11004-9204

123 589 05 33 00

Installer



11004-9271

123 589 00 15 00

Oil telethermometer



116 589 27 21 00

Conventional testers and accessories

CO measuring instrument, revolution counter

Digital tester

e.g. Bosch, MOT 001.03

Note

With light-alloy fuel distributor, removal of air cleaner for adjustment of emission value at idle is no longer necessary.

Do not adjust idle speed when engine is too hot e.g. immediately following a fast drive or after measuring output on dynamometer.

Regulation

- 1 Disengage air conditioning or automatic climate control. Move selector lever into position "P".
- 2 Remove air cleaner.

3 Check engine regulating linkage for easy operation and wear. Grease all bearing points and ball sockets.

4 Perform full throttle checkup from inside vehicle (20–300).

5 Connect testers: CO measuring instrument, revolution counter, stroboscope, oscilloscope, digital tester, oil telethermometer.

6 Evaluate oscilloscope display.

7 Check firing point and adjust, if required. Check centrifugal and vacuum ignition adjustment (15–100).

8 Check battery voltages.

Note: The voltmeter connection remains unchanged during tests a) and b).

a) Rest potential

Connect voltmeter to battery while paying attention to polarity and read voltage. Nominal value 12.2 volts.

b) Starting voltage

Pull plug of transmitter for ignition distributor on switching unit (green cable) or plug protective plug, part No. 102 589 u2 21 00 on diagnosis socket.

Actuate starter for a short moment while reading voltage. Nominal value min. 10 volts. If nominal value is not attained, test battery, charge or renew, if required.



9 Voltages on ignition coil.

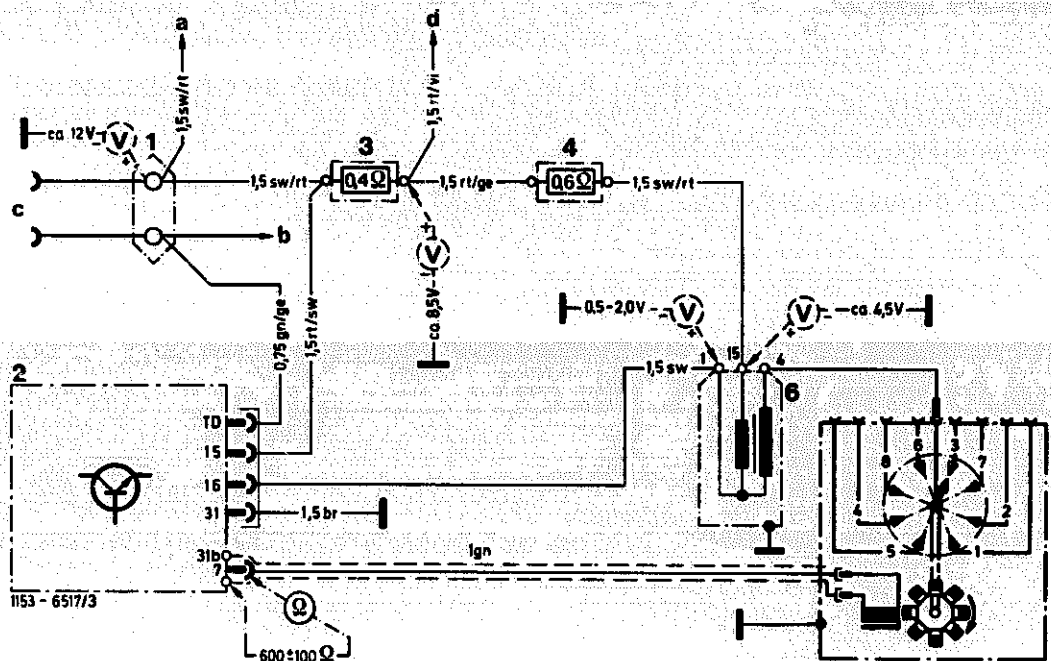
Voltage test on terminal 15 of ignition coil. For this purpose, disconnect positive cable of voltmeter from battery and connect to terminal 15 of ignition coil.

Switch on ignition and read voltage. Nominal value approx. 4.5 volts.

Disconnect positive cable of voltmeter from terminal 15 and connect to terminal 1 of ignition coil.

Switch on ignition and read voltage. Nominal value 0.5–2.0 volts.

Check series resistor bypass, for this purpose start engine and read voltage during starting procedure. Nominal value 10 volts.



Wiring diagram breakerless transistorized ignition TSZ 4 with test values

1 Double cable connector

2 Switching unit

3 Series resistor 0.4 ohm

4 Series resistor 0.6 ohm

5 Ignition distributor with transmitter top

6 Ignition coil

a Ignition starting switch

b Instrument cluster, revolution counter

c Diagnosis socket

d Terminal 16 starter

Color code

br = brown

ge = yellow

gn = green

rt = red

sw = black

10 Check intake system for leaks. For this purpose, spray all sealing parts with Iso-Oktan DIN 51756 or benzine.

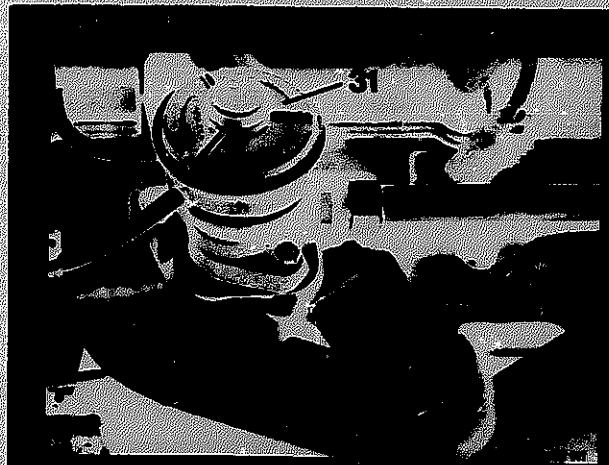
Attention!

Do not use conventional fuel for spraying (unhealthy vapors). Pay attention to inflammability and do not spray on red-hot parts or components of ignition system.

11 Check EGR (AUS) and (USA) version vehicles only).

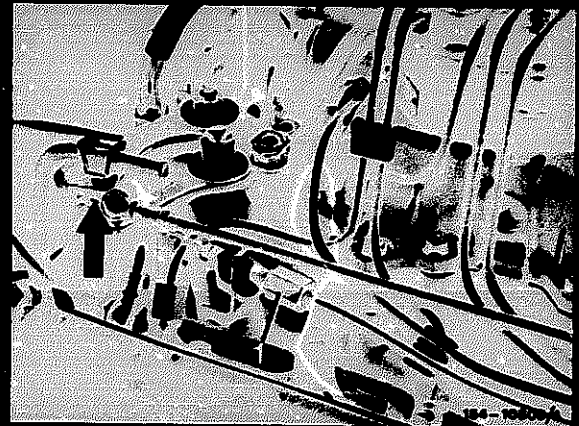
Pull brown vacuum line from EGR valve (31), plug on test hose and energize with vacuum. If engine runs clearly worse, renew EGR valve.

Check activation, if required (refer to Repair instructions "Exhaust gas (AUS) (USA) 1977-1980").



12 Run engine to 75-85 °C oil temperature.

13 Check whether Bowden wire for cruise control/Tempomat rests free of tension against regulating lever. Adjust by means of adjusting screw (1), if required.

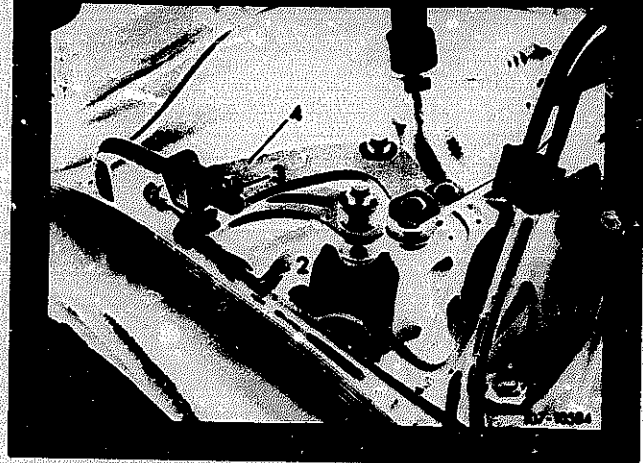


14 Disconnect connecting rod (arrow) on guide lever. Check whether throttle valve rests against idle speed stop.

Re-engage connecting rod free of tension, set to 104 mm length, if required.



15 Check whether roller (3) in guide lever (4) rests free of tension against end stop. Adjust by means of connecting rod (2), if required.



16 Set to specified speed by means of idle speed air screw (arrow).

17 Check idle speed emission value.

(AUS) 1979/80

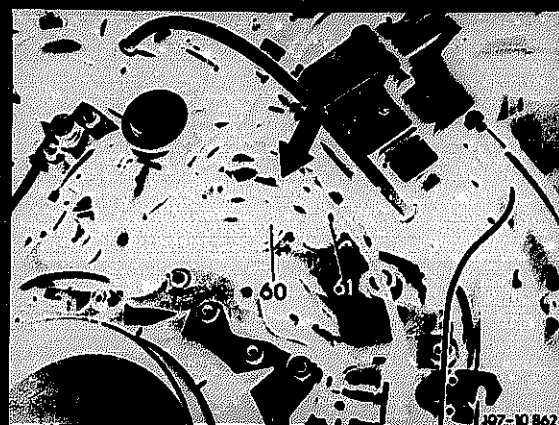
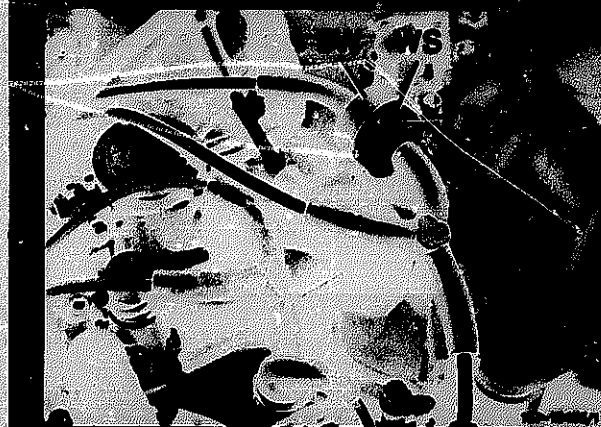
Check idle speed emission value **without air injection**. For this purpose, pull blue/purple vacuum line on black housing member of time delay valve (77) and close time delay valve.

(USA) 1977-1979

Check idle speed emission value **without air injection**. For this purpose, pull blue/purple vacuum line (arrow) from blue thermostatic valve (61) and close connection on thermostatic valve. This will disconnect air injection.

Pull off connecting hose (arrow) of measuring point (exhaust backpressure line).

Connect CO measuring instrument and exhaust backpressure line by means of a hose.



18 Adjust idle speed emission value.

Unscrew closing plug (arrow) for this purpose.

Attention!

On vehicles manufactured after 1.10.1976 remove safety plug first.

Insert Allen wrench through bore into idle speed mixture controlling screw and adjust emission value by turning screw.

Turning counterclockwise = leaner

Turning clockwise = richer

Close bore for closing plug. Accelerate for a short moment, check idle speed emission value and readjust, if required.

Upon adjustment, on vehicles manufactured after 1.10.1976, install a blue safety plug (arrow), part No. 000.997.59.86.

19 Mount air cleaner. Check idle speed and idle speed emission value once again and readjust, if required.

(AUS) and (USA) version

Remove air cleaner once again and plug back vacuum line for (USA) version on thermostatic valve, for (AUS) version on time delay valve.

20 Engage selector lever in driving position, switch on air conditioning, turn power steering to full lock, engine should run smoothly. Adjust speed, if required.



Test values

Standard version and (AUS)

System pressure at idle with engine cold or at operating temperature	5.0–5.6 bar gauge pressure
Control pressure at idle with engine at operating temperature	Warm-up compensator stabilized 3.4–3.8 bar gauge pressure at 530 mbar intake manifold vacuum ¹⁾
	Full load enrichment at idle (vacuum hose pulled off) 2.8–3.2 bar gauge pressure
Control pressure according to ambient temperature at idle with engine cold	min. 0.5 bar gauge pressure (refer to diagram)

¹⁾ If the control pressure is not attained, check intake manifold vacuum (refer to section "Checking control pressure at idle with engine at operating temperature").

National version

(USA)

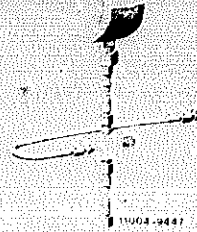
Identification: 1977/78 Information label Federal black, California yellow
1979 Information label black

Model year	System pressure at idle with engine cold or at operating temperature	Control pressure at idle with engine at operating temperature	
		Warm-up compensator stabilized at 530 mbar intake manifold vacuum ¹⁾	Full load enrichment at idle (vacuum hose pulled off)
1977 Federal and California	5.0–5.6	3.4–3.8	3.0–3.4
1977 Federal high altitudes		3.6–4.0	3.2–3.6
1978		3.4–3.8	3.0–3.4
1979			2.8–3.2

¹⁾ If the control pressure is not attained, check intake manifold vacuum (refer to section "Checking control pressure at idle with engine at operating temperature").

Special tools

Pressure measuring device



102 589 00 21 00

Clamp for hose lines



000 589 40 37 00

Conventional tools

Voltmeter, ohmmeter

Screwdriver element 992—T 30

e.g. Hazet, D—5630 Remscheid

Note

Prior to working on injection system, check ignition timing, spark plugs and idle speed adjustment.

Perform leak test only in the event of complaints about hot starting.

After stopping engine, the fuel pressure should amount to 2.5 bar gauge pressure after 30 minutes.

Visual checkup

- 1 Remove air cleaner.
- 2 Check all fuel connections for leaks.

3 Check for easy operation of adjusting lever (1) in air flow sensor and of control piston (2) in fuel distributor.

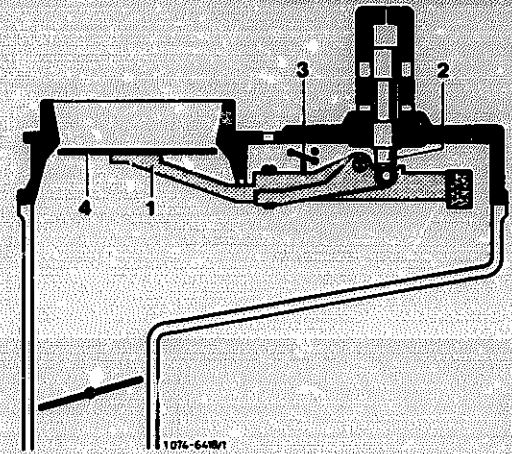
For this purpose, pull plug from safety switch (3), switch on ignition for a short moment to establish control pressure. Push air flow sensor plate (4) manually in downward direction.

Uniform resistance should be felt across entire path. No resistance should be felt during fast upward movement, since the slowly following control piston lifts off from adjusting lever. If the upward movement is slow, the control piston should closely follow.

4 Check control piston in fuel distributor visually for leaks.

Push air flow sensor plate for a short moment completely down and hold in this position, no fuel should then show up in air guide housing.

If fuel emerges, replace fuel distributor (07.3-205).



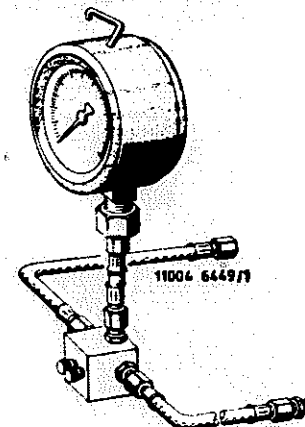
Connecting pressure measuring device

Pressure measuring device remains connected for all other pressure measurements.

Connect hose line of connection "A or 1" to control pressure circuit.

The pressure measuring device 102 589 00 21 00 is now only provided with a valve screw on three-way valve.

To relieve sealing rings, keep valve screw or valve screws always open. Connections of three-way valve are numbered.



Pressure measuring device: 1st version

Connection 1 - Hose line on fuel distributor

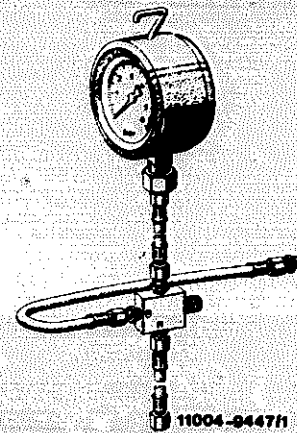
Connection 2 - Hose line on pressure gauge

Connection 3 - Hose line on released control pressure line

Pressure measuring device 2nd version

Connection A = Hose line on fuel distributor

Connection B = Hose line on released control pressure line



1 Connect pressure measuring device to warm-up compensator (air cleaner mounted).

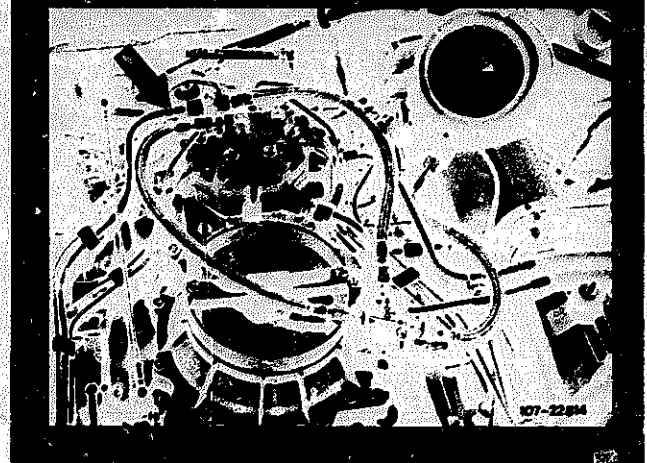
Unscrew control pressure line (arrow) on warm-up compensator. Catch fuel with a rag.

Connect hose line with double thread connection from connection "1 or A" to control pressure line. Screw connecting line from connection "3 or B" to warm-up compensator.



2 Unscrew control pressure line (arrow) on fuel distributor. Catch fuel with a rag.

Connect hose line from connection "1 or A" to fuel distributor and connect hose line from connection "3 or B" to control pressure line (arrow).



Checking control pressure at idle in cold engine

3 Open valve screw or valve screws on pressure measuring device.

4 Run engine at idle and immediately read control pressure.

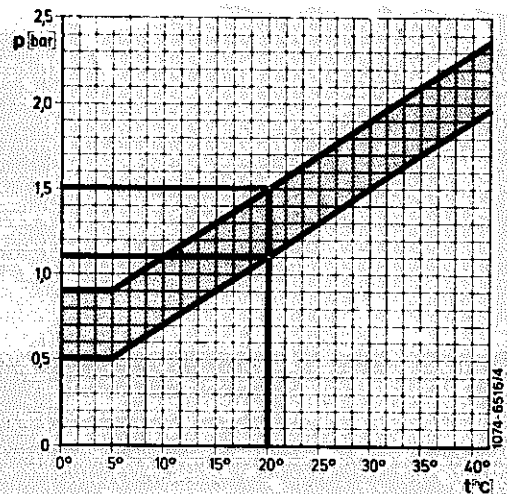
Take nominal pressure according to ambient temperature from control pressure diagram. If the nominal value is not attained, read condition system pressure regulator (07.3-210), or check input strainer in warm-up compensator. Replace warm-up compensator, if required.

Example:

Standard version and (AUS) (USA) 1977/78

Warm-up compensator with Bosch end No. 010
Ambient temperature $+20^{\circ}\text{C}$ = 1.1–1.5 bar gauge pressure.
Stabilizing time at $+20^{\circ}\text{C}$ 3–6 minutes.

Note: Check stabilizing time of warm-up compensator.
Read initial control pressure at $+20^{\circ}\text{C}$. Stabilizing time at 3.4 bar gauge pressure should be within tolerance.
Electrical consumers switched off, minimum voltage 11.5 volts.

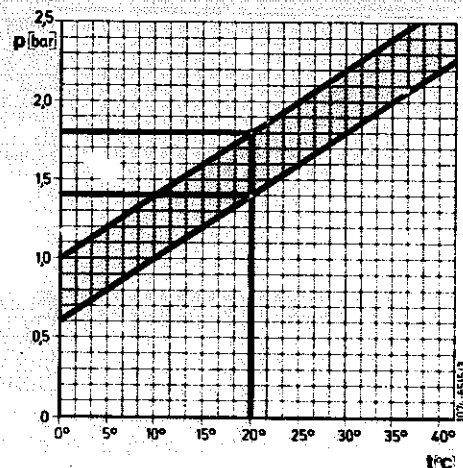


(USA) Federal high altitudes 1977

Warm-up compensator with Bosch end No. 042. For replacement order from Bosch or for tourist vehicles install warm-up compensator with Bosch end No. 010. Following return to (USA) changeover to warm-up compensator Bosch end No. 042 is required.

(AUS) (USA) starting 1979

Warm-up compensator with Bosch end No. 060.
Ambient temperature $+20^{\circ}\text{C}$ = control pressure 1.4–1.8 bar gauge pressure.



Checking system pressure at idle with engine cold or at operating temperature

5 Close valve screw on pressure measuring device.
On pressure measuring device with 2 valve screws, close valve screw on connection 3.

6 System pressure should amount to 5.0–5.6 bar gauge pressure.

7 If the system pressure of 5.0–5.6 bar gauge pressure is not attained, perform the following tests:

- a) Check delivery capacity of fuel pump (07.3–130).
- b) Recondition system pressure regulator. (07.3–210).
- c) Check fuel return flow line for passage.

8 Re-open valve screw.

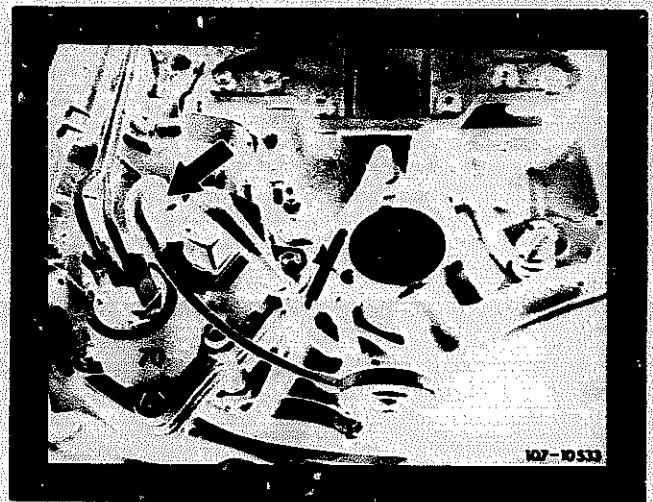
Checking control pressure at idle with engine at operating temperature

9 Open both valve screws or valve screw on pressure measuring device.

10 Control pressure should increase to 3.4–3.8 bar gauge pressure (warm-up compensator stabilized).

If the control pressure of 3.4–3.8 bar gauge pressure is not attained, perform the following checkups:

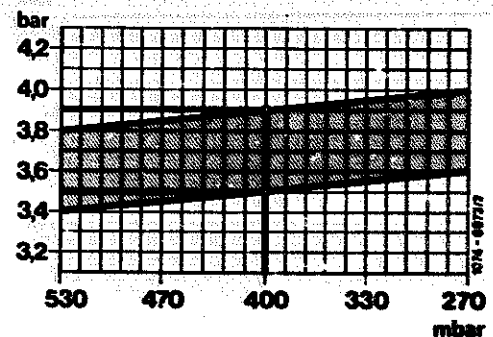
- a) Check intake manifold vacuum. For this purpose, pull off vacuum hose (arrow) on warm-up compensator and attach T-fitting for pressure gauge.



Read intake manifold vacuum and transfer to vacuum diagram.

Example:

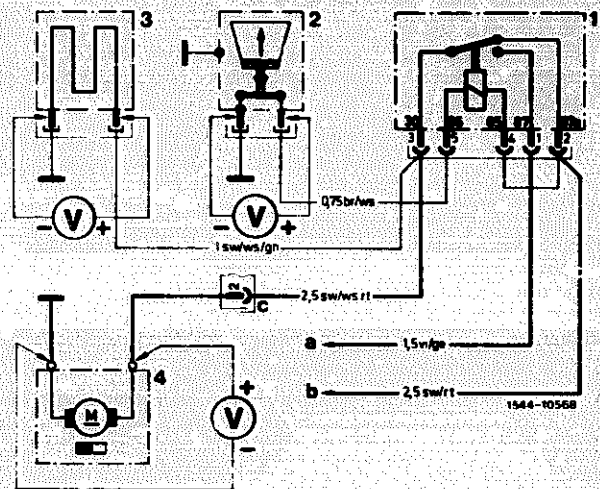
Intake manifold vacuum 400 mbar = 3.5–3.9 bar gauge pressure.



b) Test voltage on warm-up compensator with engine running. Pull electrical connection from warm-up compensator and test voltage. Minimum voltage 13.5 volts (without consumers).

c) Test heater coil with an ohmmeter. Replace warm-up compensator in the event of an interruption.

- 1 Fuel pump relay
- 2 Safety switch — air flow sensor plate
- 3 Warm-up compensator
- 4 Fuel pump
- a Terminal 50 (starting)
- b Terminal 15/54 (ignition)
- c Plug connection: 14-point tail lamp unit harness



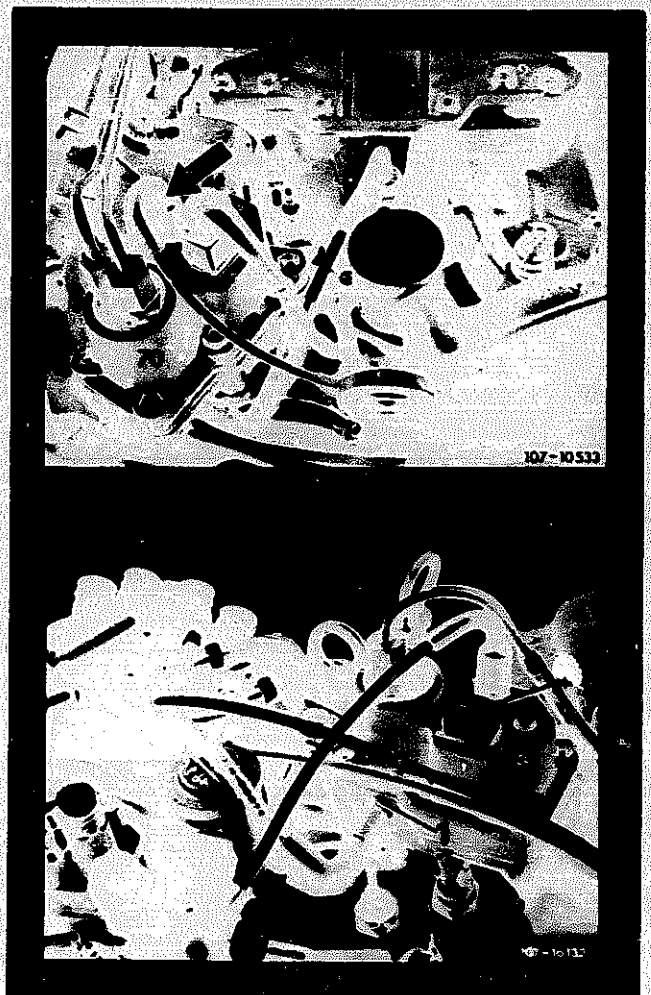
d) If the control pressure is above 3.8 bar gauge pressure, recondition system pressure regulator (07.3-210).

11 Check full load enrichment. For this purpose, pull vacuum hose (arrow) from warm-up compensator, control pressure should drop to 2.8–3.2 bar gauge pressure.

If full load enrichment is not attained, renew warm-up compensator.

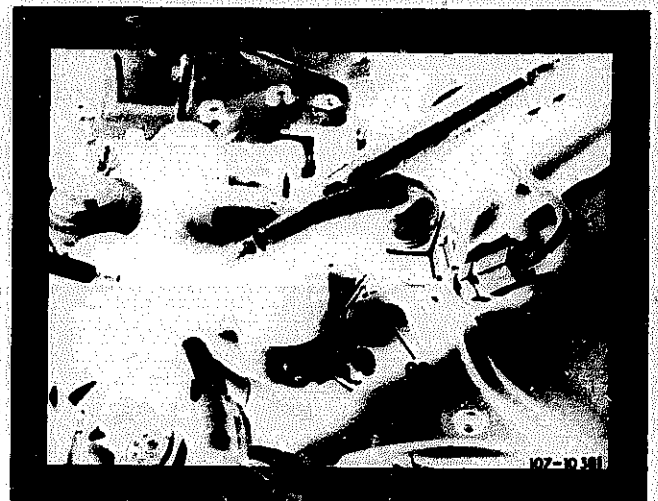
AUS USA 1979

Connection (1) for full load enrichment has been moved to intermediate plate. Connection (2) serves for venting. For this reason, pull off vacuum hose at connection (1) for checking full load enrichment.



Checking fuel distributor and fuel pump for leaks

- 12 Stop engine.
- 13 If the control pressure drops immediately to 0 bar gauge pressure, replace check valve on fuel pump or subsequently install.
- 14 If the control pressure drops slowly, unscrew fuel return line on fuel distributor. Fuel will emerge in the event of a leak on regulator piston or pressure compensating valve. If there is more than one drop in five seconds, recondition system pressure regulator or pressure compensating valve (07.3-210).
- 15 Check fuel reservoir for leaks (not included in time rate). For this purpose, pinch leak line between fuel reservoir and intake damper.
- 16 Loosen leak line on intake damper and pull off. Loosen clamp, pressureless leaking is permissible. Replace fuel reservoir, if required (07.3-270).
- 17 Check cold starting valve (98) for leaks. For this purpose, remove cold starting valve (07.3-125 section "Checking for leaks").
- 18 Close pressure measuring device while catching fuel with a rag.
- 19 Connect fuel lines, run engine once again and check all fuel connections for leaks.



Test values

System pressure at idle with engine cold or at operating temperature		5.0–5.6 bar gauge pressure
Control pressure at idle with engine at operating temperature	Warm-up compensator stabilized	3.4–3.8 bar gauge pressure at 530 mbar ¹⁾
	Full load enrichment at idle (vacuum hose pulled off)	2.8–3.2 bar gauge pressure
Control pressure according to ambient temperature at idle with engine cold		min. 0.5 bar gauge pressure (refer to diagram)
Starting voltage		10 V

1) If the control pressure is not attained, check intake manifold vacuum (refer to section "Checking control pressure at idle with engine at operating temperature").

Special tool

Pressure measuring device

102 589 00 21 00

**Conventional tools**

Voltmeter and ohmmeter

Revolution counter

Checking

- 1 Pull cable plug from warm-up compensator and from cold starting valve.

2 Checking starting voltage

Connect voltmeter to battery paying attention to polarity.

Pull cable 4 from ignition coil. Operate starter for a short moment while reading voltage. Nominal value 10 volts. If nominal value is not attained, test battery, charge or replace, if required.

3 Check air flow sensor plate and control piston for easy operation, check fuel pressures and for internal leaks, as well as stabilizing time of warm-up compensator (07.3–120).

4 Checking cold starting valve for function and leaks

5 Pull cable plug from safety switch on mixture controller, from warm-up compensator and from cold starting valve.

6 Remove cold starting valve (98) with fuel line connected.

7 Hold cold starting valve in a container.

Checking for function

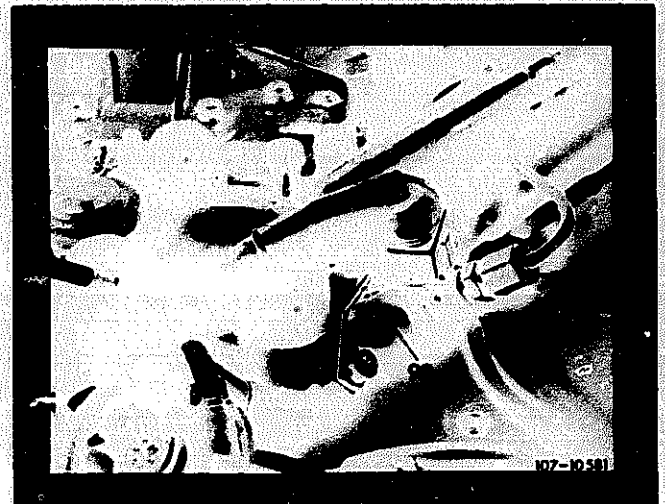
8 Switch on ignition.

9 Connect cold starting valve with separate cable to B + and ground. Cold starting valve should eject in shape of cone.

Attention!

Connect cable first to cold starting valve so that no sparking occurs.

No separate cable need be used below + 15 °C, plug on cable instead and pull cable plug from safety switch.



Checking for leaks

10 Loosen separate cable connection on cold starting valve. Dry cold starting valve on nozzle. No drops should form.

11 Switch off ignition.

12 Mount cold starting valve with new gasket.

13 Connect cable plug again to safety switch and to cold starting valve.

Checking thermo time switch

The cold starting valve is actuated by closed thermo time switch only at coolant temperatures below $+15^{\circ}\text{C}$.

The actuating time increases with decreasing temperature and attains approx. 12 seconds at -20°C .

Testing below $+15^{\circ}\text{C}$ coolant temperature

14 Connect voltmeter to connection of cold starting valve.

15 Actuate starter. Depending on coolant temperature, voltmeter should then indicate 10 volts for a given period.

The switching time increases with decreasing temperature by approx. 1.5 seconds per 5°C .

e.g. $+15^{\circ}\text{C} = 0$ seconds
 $+10^{\circ}\text{C} = 1.5$ seconds

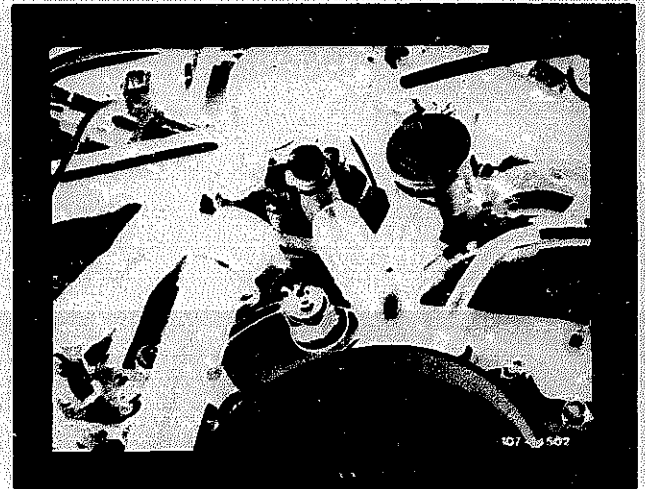
It is recommended to test thermo time switch additionally with an ohmmeter for this test.

Test value **below** $+15^{\circ}\text{C}$:

Connection G-ground = approx. 48 ohm

Connection W-ground = approx. 0 ohm

(contacts in switch closed).



Testing above + 15 °C coolant temperature

Above + 15 °C coolant temperature the thermo time switch can be tested only by means of an ohmmeter. For this purpose, pull plug from thermo time switch.

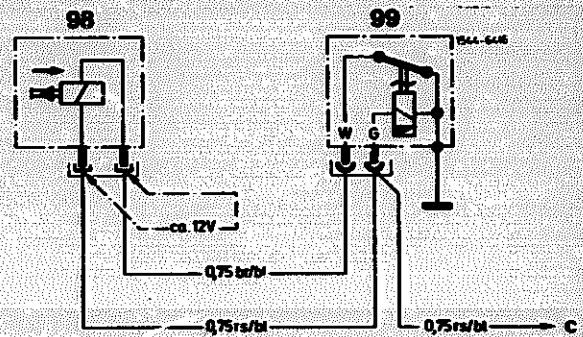
Test values above + 15 °C:

Connection G-ground = approx. 62 ohm

Connection W-ground = approx. 270 ohm
(contacts in switch open).

Re-insert plug.

98 Cold starting valve
99 Thermo time switch
C To terminal 50



Checking shutoff point of auxiliary air valve

16 Following cold start, the engine speed should amount to approx. 800–1000/min. Speed will then increase to approx. 1200–1300/min, and will drop to normal idle speed at approx. 70 °C.

17 Stop engine. Disconnect pressure measuring device, while catching fuel with a rag.

18 Connect fuel lines, run engine once again and check all fuel connections for leaks.

07.3-130 Checking delivery capacity of fuel pump

Test values

Voltage at fuel pump min.

11.5 V

Delivery volume min.

1 liter/40 seconds

Special tool

Clamp for fuel hose



000 589 40 37 00

Conventional tools

Voltmeter, measuring glass or measuring cup (min. 1 liter), stop watch

Self-made fuel hose

Fuel hose

500 mm long

Tube with sealing cone

Coupling nut

M 14 x 1.5

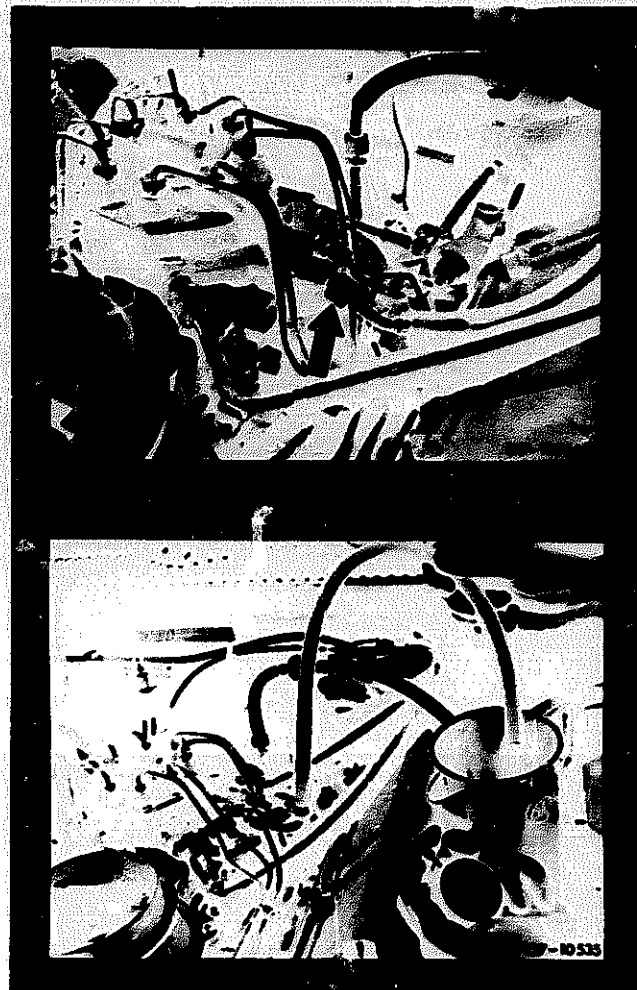
Checking

1 Check delivery capacity of fuel pump during fuel return flow. For this purpose, unscrew fuel return hose (arrow) on fuel distributor.

2 Screw self-made fuel hose to fuel distributor and hold into measuring glass or cup.

3 Switch on ignition.

4 Pull cable plug from safety switch on mixture controller and put cable plug back again after 30 seconds.



5 If the delivery volume is less than 1 liter/40 seconds, check the following items:

- a) Check voltage at fuel pump. Nominal value = min. 11.5 volts.
- b) Check strainer in feed connection of fuel distributor for passage.
- c) Check fuel lines for restrictions (squeezed lines).
- d) Pinch leak line between fuel reservoir and intake damper. Check delivery once again. If specified delivery volume is attained, replace fuel reservoir.
- e) Renew fuel filter.

6 If delivery volume is still too low, replace fuel pump.

7 Connect fuel return hose.

Test values

Injection valves		Bosch No. 0 437 502 010
Opening pressure	with new injection valves	3.5–4.1 bar gauge pressure
	with used injection valves min.	3.0 bar gauge pressure

Tightening torques

	Nm
Injection lines on fuel distributor (reference value)	10–12
Injection lines on injection valves (reference value)	10–15

Conventional test instruments and accessories

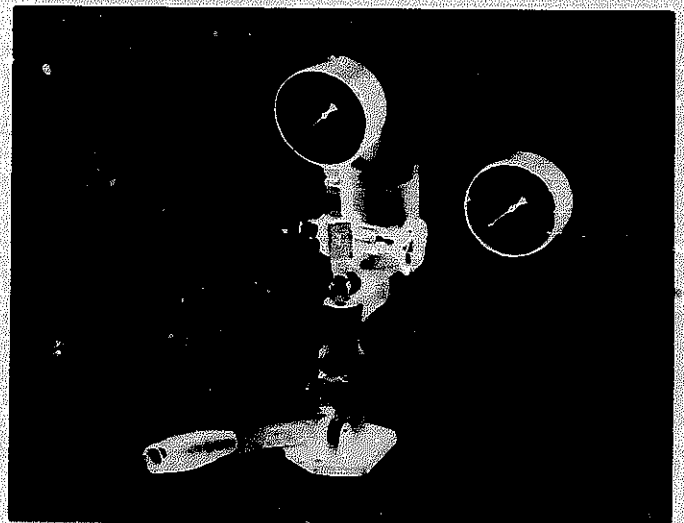
Valve tester Bosch KD–JE 7452	Bosch order designation KD–JE 7452
Nozzle tester EF EP 60 H ¹⁾	Bosch No. 0 684 200 700
Pressure gauge 0–6 bar gauge pressure, housing dia. = 100 mm Grade class 1.0	Bosch No. 1 687 231 000
Pipe line	Bosch No. 1 680 750 001

¹⁾ Corresponds with former nozzle testers. For testing injection valves, the specified pressure gauge or pressure gauge of pressure measuring device 100 589 13 21 00 is required.

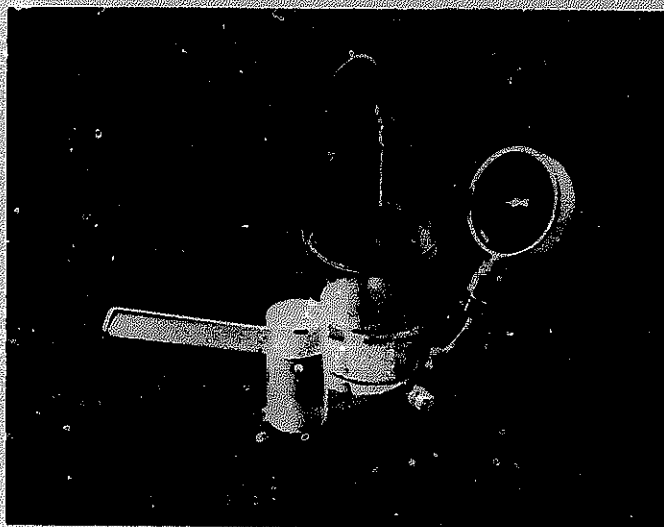
Note

The nozzle or valve tester is used for testing opening pressure, for buzzing tests, for evaluating jet and to test injection valves for leaks.

Prior to starting with injection valve test, fill container of tester and bleed unit. For testing, use kerosene only.



Replace injection valves which are exceeding tolerance. Injection valves can be individually replaced within a set.



Remove injection valves for testing (07.3-215).

1 Coarse leak test:

- a) Connect removed injection valves to tester. Bleed pressure line with shutoff valve and coupling nut opened. Then tighten coupling nut.
- b) With shutoff valve opened, slowly operate hand lever (4 s/stroke) and build up pressure to max. 1.5 bar gauge pressure. If a leak on injection valve shows up, replace injection valve.

2 Check opening pressure.

Close shutoff valve. Flush injection valve by moving hand lever several times back and forth fast.

Open shutoff valve and check opening pressure by slowly moving hand lever back and forth.

3 Precision leak test:

Close shutoff valve. Flush injection valve by moving hand lever several times back and forth fast, open shutoff valve and increase pressure slowly to 0.5 bar gauge pressure below previously determined opening pressure and hold. No drop should show up on injection valve within 15 seconds.

4 Buzzing test, evaluation of jet:

Close shutoff valve and flush by moving lever several times back and forth (0.5 s/stroke). Then reduce lever speed to approx. 1 s/stroke. Valve should now buzz. No drop should show up at mouth of valve. No cord-like jet should show up. One-sided, atomized jet formation within a total spray angle of approx. 35° is permitted.

Damaged injection valves

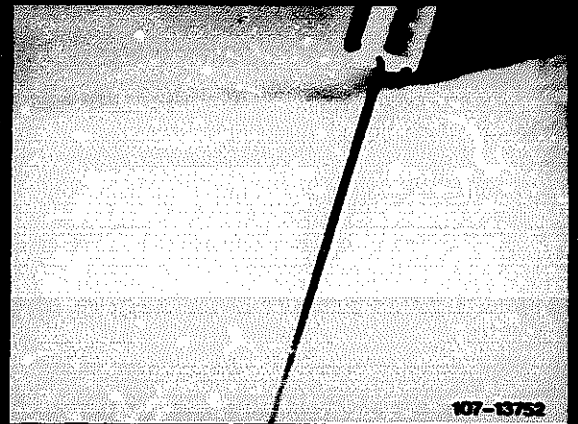
Drop formation

Cord-like jet

Spreading jet

Good injection valves

Good jet preparation



Slightly one-sided atomization



107-13755

Test values

Load range	Air flow sensor plate fixed at approx. . . . cc/min	Max. Dissipation in cc/min
------------	---	----------------------------

With grey-iron fuel distributor

Idle	6	1.2
Partial load	30	6.0
Full load	100	10.0

With light-alloy fuel distributor

Idle	6	0.8
Partial load	30	4.0
Full load	100	10.0

Conventional Bosch testers and accessories

Designation	Order designation
Fuel distribution reference unit	KDJE-P 300
Tester carriage ¹⁾	M 200/2 or KDJE-W 100

¹⁾ If tester carriage is not used for fuel distribution reference unit, an additional angle plate is required. The plate can be self-made or obtained from a Bosch representative.

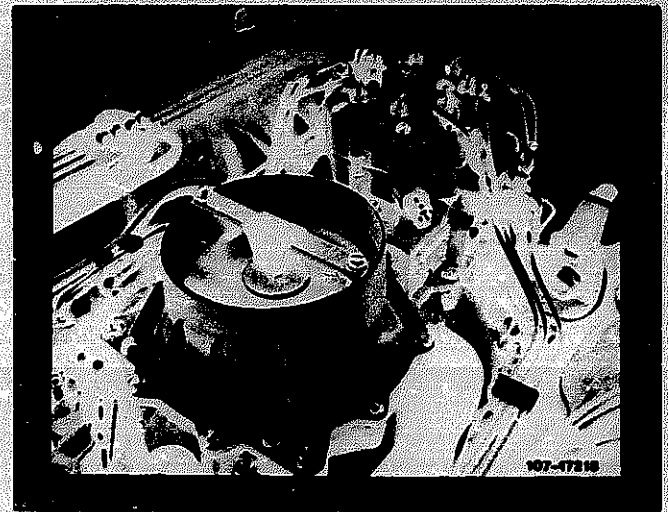
Note

A fuel distribution reference unit is available for testing fuel distributor in vehicle. The unit serves to measure the individual amounts of fuel which the fuel distributor dispenses to the injection valves. Measurements are made with engine stopped. Operating conditions (idle, partial or full load¹⁾) are simulated and set on air flow sensor plate by means of an adjusting device.

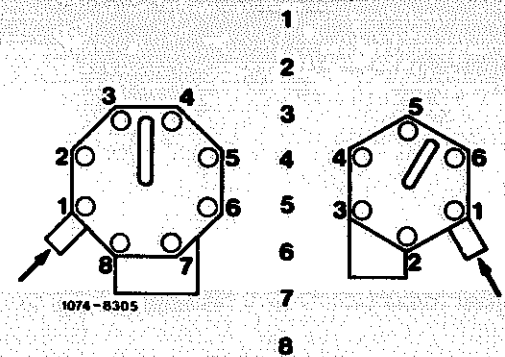


Testing

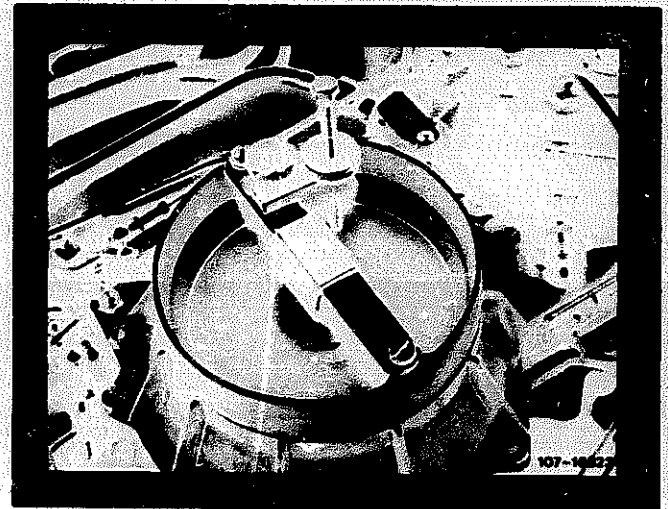
- 1 Set up fuel distribution reference unit horizontally adjacent to vehicle (tool or tester carriage).
- 2 Remove air cleaner.
- 3 Unscrew injection lines on fuel distributor and loosen at injection valves, unscrew, if required.



- 4 Connect connecting lines of fuel distribution reference unit to fuel distributor (sequence according to Fig.) and plug fuel return line into filler neck of fuel tank.



- 5 Clamp adjusting device for fixing air flow sensor plate to stop bracket of air funnel.



- 6 Switch on ignition.
- 7 Deflect air flow sensor plate and pushbuttons 1 to 8 for venting unit individually for a short moment.
- 8 Keep one button pushed, deflect air flow sensor plate with adjusting device and locate at a flow rate of 6 cc/min (idle).
- 9 Push remaining buttons, read individual flow rates and enter on data sheet.

Note: Orders for data sheets, print No. 800.99.472.00 should be mailed by service establishments and representatives in the Federal Republic of Germany with punch cards to the "Drucksachen-Zentrallager" in Stuttgart-Untertürkheim, and by the general representative in export countries to "ZKD/F 2", Stuttgart-Untertürkheim. Data sheets are supplied in blocks of 50 sheets each.

10 Calculate difference between lowest and highest flow rate and compare with tolerance value (refer to test values).

11 For partial and full load, fix air flow sensor plate as described under item 8 at a flow rate of 30 cc/min or 100 cc/min. Then also calculate difference between lowest and highest flow rate and compare with tolerance value.

12 If the dispersion is outside tolerance, exchange fuel distributor.

13 Run engine and check all fuel connections for leaks.

14 Adjust idle speed (07.3-100).

Function

The fuel pump relay for voltage supply of fuel pump has two functions:

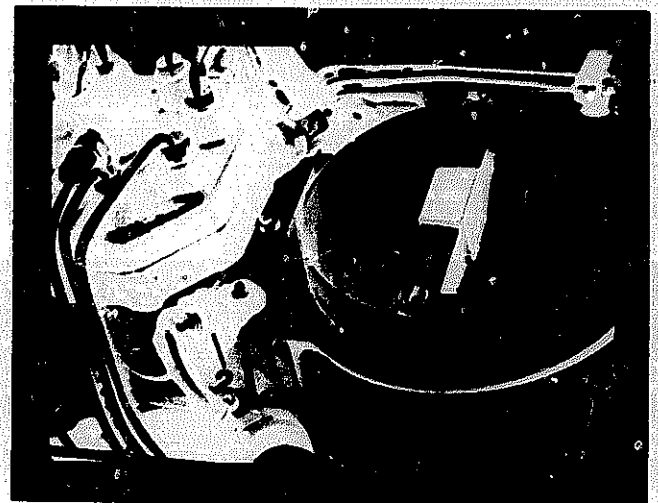
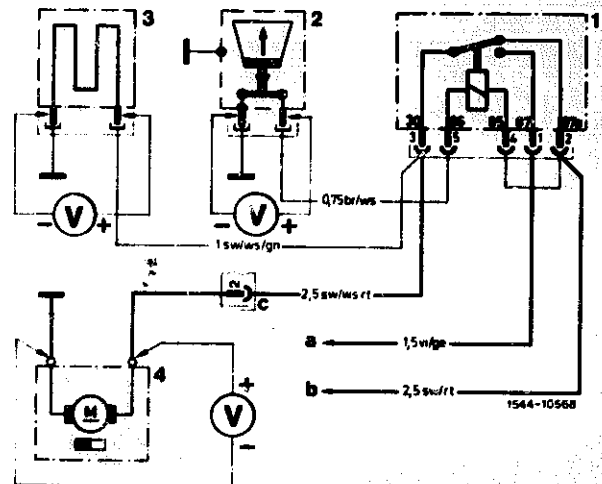
1. Activation of fuel pump when starting and with engine running.

The warm-up compensator is also activated in parallel with fuel pump.

2. Switching off fuel pump following activation of fuel pump relay by safety switch.

With the air flow sensor plate closed, the safety switch (2) connects ground to jack 5 (terminal 86) of fuel pump relay (1). This will switch relay in such a manner that the fuel pump (4) can be activated only via terminal 50 (starting voltage). As soon as the air flow sensor plate is lifted, the safety switch opens and the fuel pump relay switches. The fuel pump is now supplied with voltage via terminal 15/54.

- 1 Fuel pump relay
- 2 Safety switch air flow sensor plate
- 3 Warm-up compensator
- 4 Fuel pump
- a Terminal (50) (starting)
- b Terminal 15/54 (ignition)
- c Plug connection 14-point tail lamp unit harness

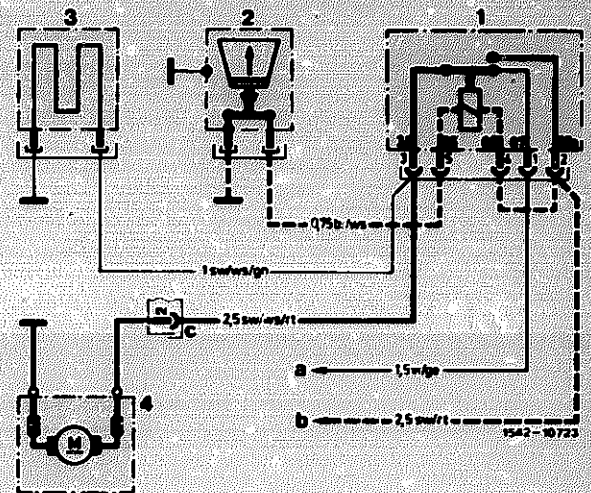


Activation of fuel pump when starting and with engine running

a) Ignition switched on

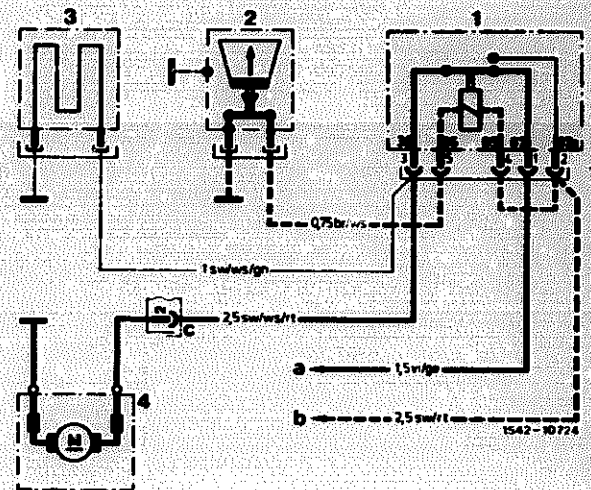
Fuel pump not running.

- 1 Fuel pump relay
- 2 Safety switch air flow sensor plate
- 3 Warm-up compensator
- 4 Fuel pump
- a Terminal 50 (starting)
- b Terminal 15/54 (ignition)
- c Plug connection 14-point tail lamp unit harness
- Working current circuit
- - - Control current circuit

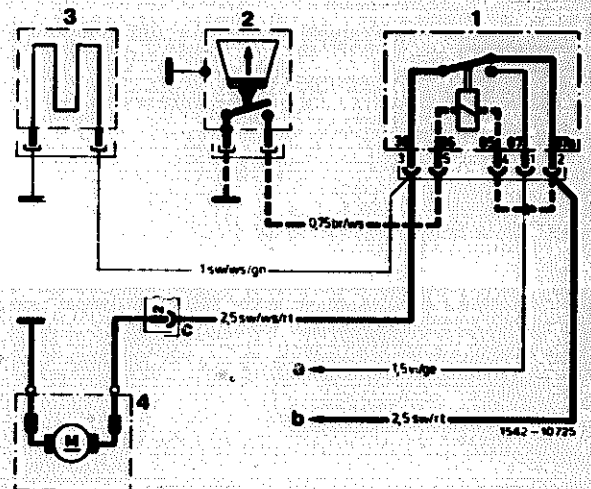


b) Starting procedure

Fuel pump running.



c) Engine and fuel pump running.



Conventional tester

Voltmeter

Testing

- 1 Remove air cleaner.
- 2 Switch on ignition and push air flow sensor plate for a short moment down. When air flow sensor plate is actuated, fuel should audibly inject.

If yes, fuel pump and safety switch are in order.

If no, perform test program.

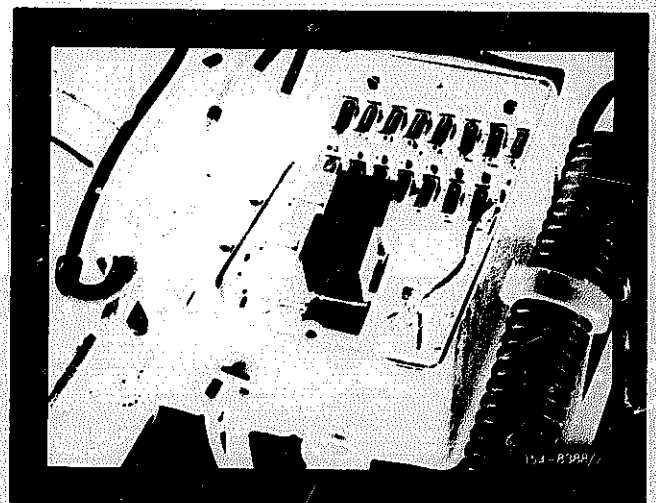
Attention!

If air flow sensor plate is actuated several times or for an extended period there is a risk of the engine stopping under influence of excessive enrichment.

Layout of fuel pump relay.

The fuel pump relay is mounted in fuse box.

The cable harness for fuel pump relay is identified with the number 21.

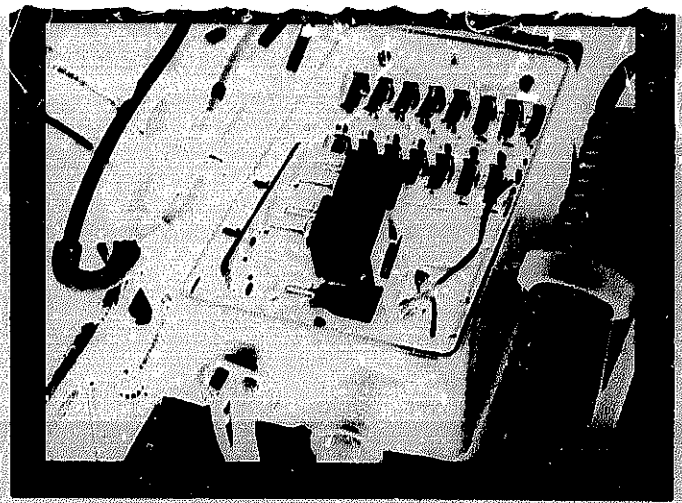


Checking activation of fuel pump relay

Remove fuel pump relay. Switch on ignition. Connect negative cable of voltmeter to vehicle ground. Measure voltage with positive cable of voltmeter at jack 2 (terminal 87a) and jack 4 (terminal 85) of coupler.

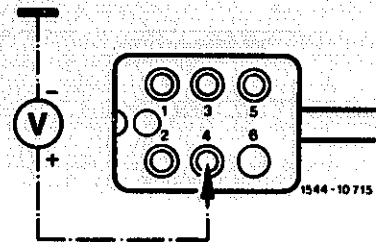
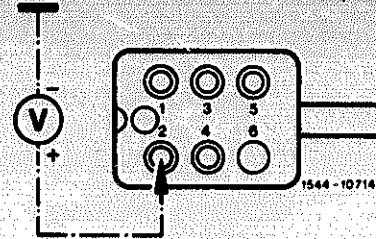
approx. 12 volts

0 volt



Check black/red line (terminal 15/54) for interruption.

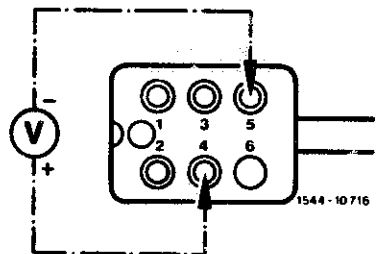
Repair interruption.



Check zero position of air flow sensor plate. Measure voltage with voltmeter at jack 4 (terminal 85) and jack 5 (terminal 86) of coupler.

approx. 12 volts

0 volt



1. Test line between jack 4 and 2, as well as brown/white line to safety switch for interruption.

Repair interruption.

2. Test safety switch.

Air flow sensor plate opened.

Measure voltage at jack 4 (terminal 85) and jack 5 (terminal 86) of coupler.

0 volt

approx. 12 volts

Test safety switch and renew, if required.

Activate starter.

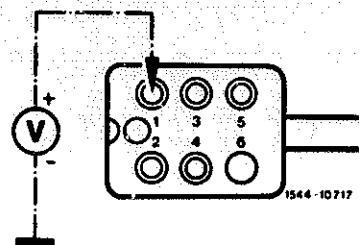
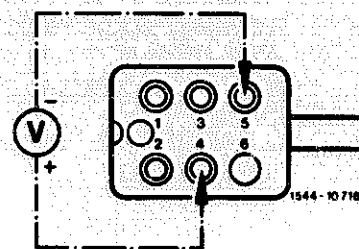
Measure voltage with positive cable of voltmeter at jack 1 (terminal 87).

approx. 12 volts

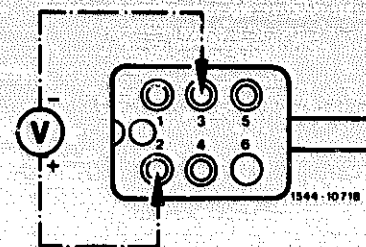
0 volt

Test purple/yellow line for interruption.

Repair interruption.



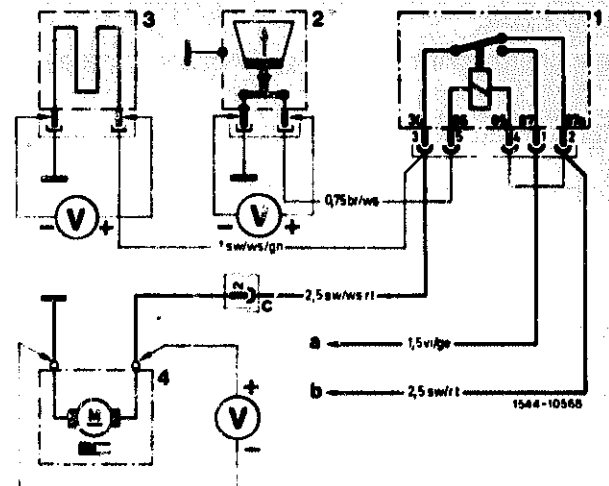
Test activation of fuel pump.	
Measure voltage with voltmeter at jack 2 (terminal 87a) and jack 3 (terminal 30).	
approx. 12 volts Fuel pump running.	0 volt



Test black/white/red line and grounding line for interruption (wiring diagram).

Repair interruption.

Line in order and fuel pump not running, renew pump.



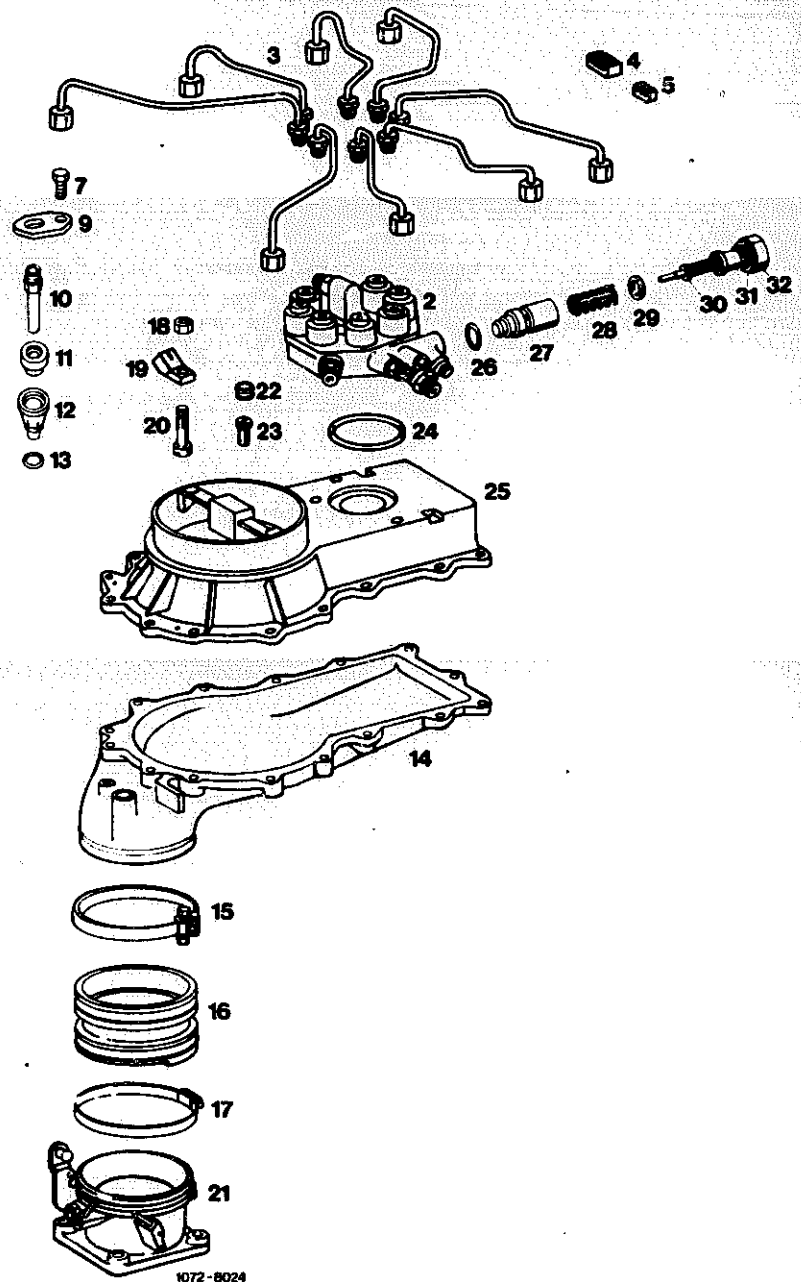
- 1 Fuel pump relay
- 2 Safety switch air flow sensor plate
- 3 Warm up compensator
- 4 Fuel pump
- a Terminal 50 (starting)
- b Terminal 15/54 (ignition)
- c Plug connection 14-point tail lamp unit harness

Run engine at idle.	
Running.	Not running.

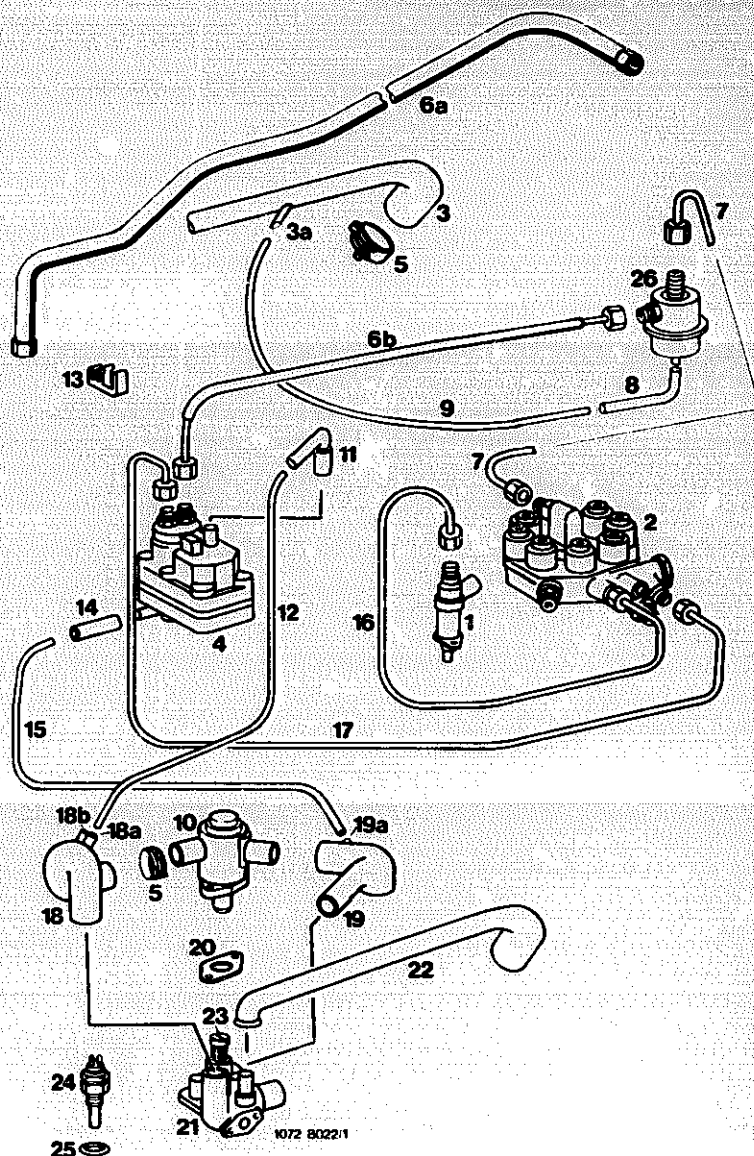
In order	Renew relay.
----------	--------------

End of test

- 2 Fuel distributor
- 3 Injection lines
- 4 Plastic clip
- 5 Plastic clip
- 7 Hex, head screw
- 9 Fastening bracket
- 10 Injection valve
- 11 Rubber ring
- 12 Plastic sleeve
- 13 O-ring
- 14 Air guide housing
- 15 Hose clamp
- 16 Rubber sleeve
- 17 Hose clamp
- 18 Polyston nut
- 19 Safety switch
- 20 Screw
- 21 Throttle valve housing
- 22 Closing plug
- 23 Closing screw
- 24 O-ring
- 25 Air flow meter
- 26 O-ring
- 27 Regulating piston
- 28 Compression spring
- 29 Adjusting washers
- 30 O-ring
- 31 Copper sealing ring
- 32 Closing plug



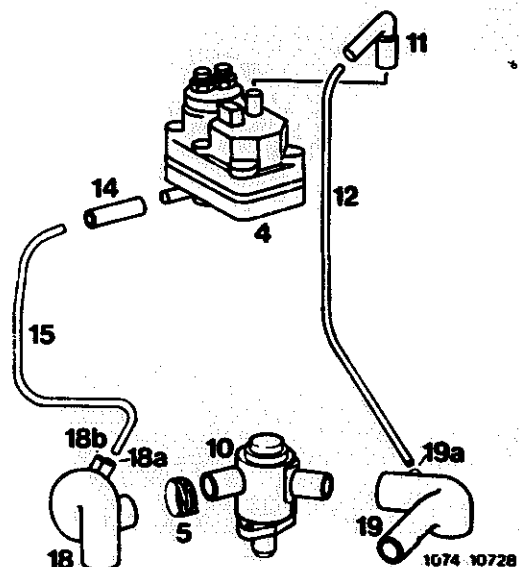
- 1 Cold starting valve
- 2 Fuel distributor
- 3 Contour hose for venting at righthand cylinder head cover
- 3a Leak connection
- 4 Warm-up compensator
- 5 Hose clamp
- 6a Control pressure line made of Tecalan 1st version
- 6b Control pressure line with Tecalan insert 2nd version
- 7 Control pressure line
- 8 Connecting hose
- 9 Leak line
- 10 Auxiliary air valve
- 11 Contour hose
- 12 Vacuum line
- 13 Plastic clip
- 14 Connecting hose
- 15 Leak line
- 16 Fuel line
- 17 Fuel line
- 18 Contour hose
- 18a Connection for full load enrichment
- 18b Connection for ignition retard adjustment
- 19 Contour hose
- 19a Connection for leak line
- 20 Gasket
- 21 Idle speed distributor
- 22 Contour hose
- 23 Idle speed air screw
- 24 Thermo time switch
- 25 Sealing ring
- 26 Pressure damper



(AUS) (USA) starting 1979

Connection for full load enrichment modified.

- 4 Warm-up compensator
- 5 Hose clamp
- 10 Auxiliary air valve
- 11 Contour hose
- 12 Vacuum line
- 14 Connecting hose
- 15 Leak line
- 18 Contour hose
- 18a Connection full load enrichment
- 18b Connection ignition retard adjustment
- 19 Contour hose
- 19a Connection leak line



Tightening torques

Nm

Hex. head screws mixture controller to air guide housing

9-10

Hex. nuts mixture controller to intake manifold (rubber buffer)

9-10

Injection lines and fuel lines to fuel distributor (reference value)

10-12

Injection lines to injection valves (reference value)

10-15

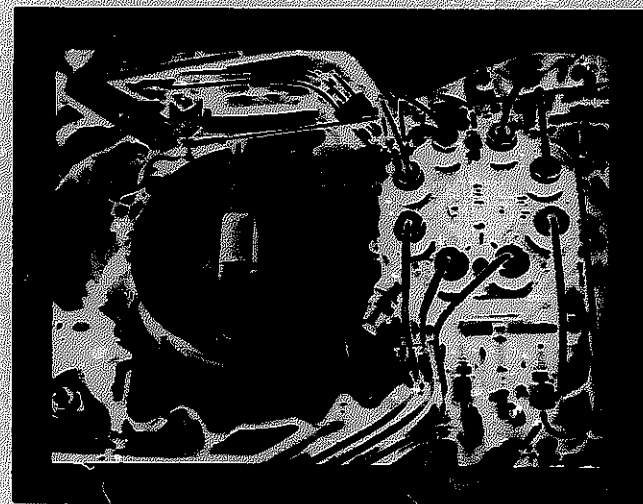
Special tool

Torque wrench 1/4" square,
4-16 Nm


000 589 67 21 00

Removal

- 1 Remove air cleaner.
- 2 Unscrew all fuel and injection lines on fuel distributor and on injection valves. Catch fuel with a rag.
Deactivate fuel forward and return flow line.
- 3 Pull electric connecting cable from safety switch.
- 4 Unscrew all hex. screws and both hex. nuts on mixture controller.
- 5 Remove mixture controller with gasket.
- 6 Renew air guide housing according to condition.
For this purpose, loosen hose clamp on rubber sleeve and on contour hose for idle speed air.



Installation

- 7 Mount air guide housing.
- 8 Install mixture regulator with Curil K 2 or Hylomar in reverse order.

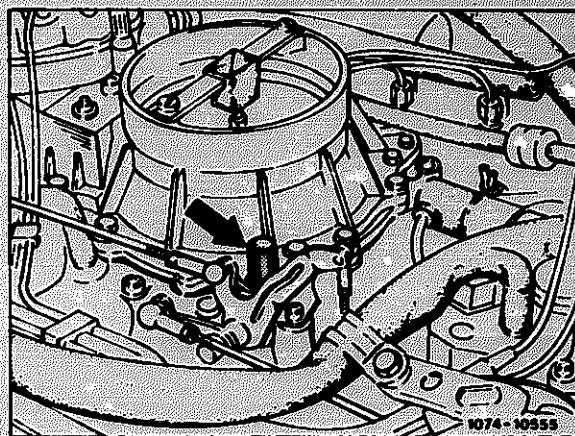
For better location of air cleaner, use a stop nut (arrow), part No. 117 070 00 41 at front right instead of hex. nut.

- 9 Tighten hex. screws and hex. nuts to 9–10 Nm.

- 10 Connect injection lines and fuel lines. Pay attention to tightening torques as reference values.

Attention!

When tightening injection lines and fuel lines, apply counterhold to injection valves, as well as to double thread connections on fuel distributor.



- 11 Run engine and check all fuel connections for leaks.

- 12 Adjust idle speed (07.3–100).

Tightening torques (reference values)

Nm

Injection lines to fuel distributor

Fuel line for cold starting valve to fuel distributor

Fuel return flow line from warm-up compensator to fuel distributor

10-12

Control pressure line to fuel distributor

Control pressure line to pressure damper

Injection lines to injection valves

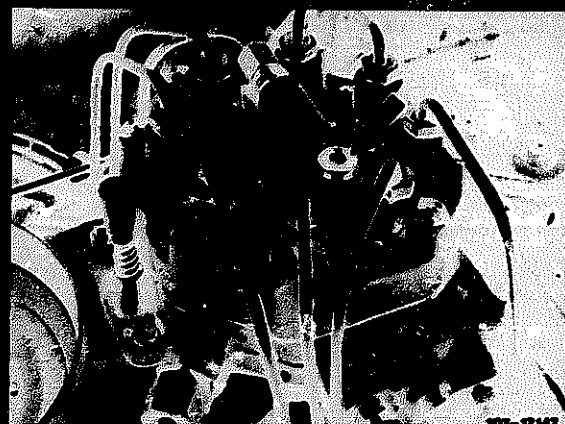
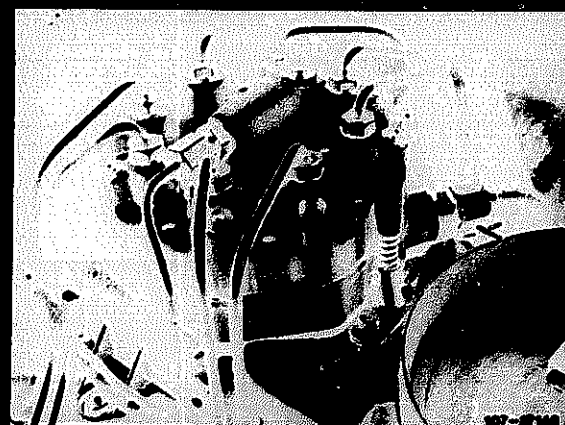
10-15

Note

After using up fuel distributor made of grey iron, only fuel distributors made of light alloy are available as spare parts. These fuel distributors are provided with a fabric diaphragm between upper and lower half. Fuel distributor upper half has 8 closing plugs with adjusting screws underneath for differential pressure valves. The differential pressure valves are set by manufacturer and may not be readjusted.

In addition, the fuel distributor top has a pressure compensating valve (arrow), as well as a compression spring integrated above control piston.

The compression spring is installed on grey-iron fuel distributor since February 1979 and on light-alloy fuel distributor since start of series.



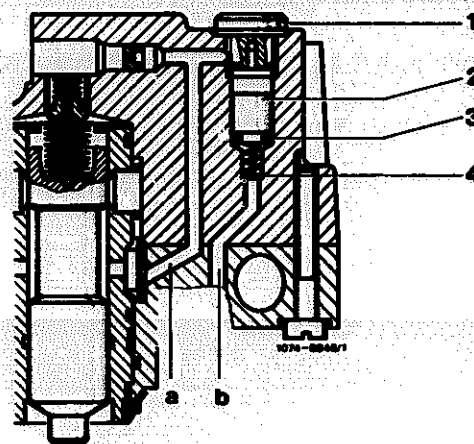
The pressure compensating valve is closed as long as pressure is available in fuel system.

In the event of a pressure drop "following an extended period of inoperation and cooling-down of fuel" below 0.3–0.05 bar gauge pressure, the pressure compensating valve will open.

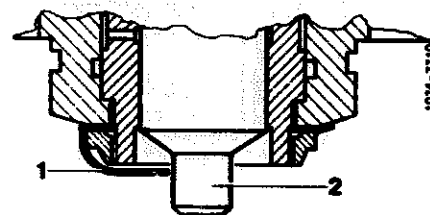
Piston (2) is raised, pressure compensation will occur above piston gap between system pressure and return flow pressure.

This will prevent that the control piston in fuel distributor will be raised in direction of full load with the result that during a cold start the mixture will be excessively enriched.

- 1 Closing plug
- 2 Piston
- 3 O-ring
- 4 Compression spring
- a System pressure
- b Return flow



Starting with Bosch production code number 724 the fuel distributor is provided with a sheet metal lock (1), which prevents falling-out of control piston (2). The **sheet metal lock** serves to facilitate assembly and also as a transportation safety lock and **may not be removed**.



Removal

- 1 Remove air cleaner.
- 2 Unscrew all fuel and injection lines from fuel distributor and on injection valves. Catch fuel with a rag.

Deactivate fuel forward and return flow.



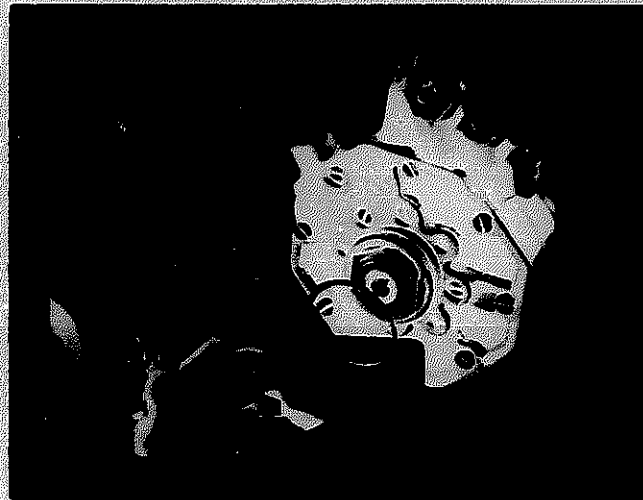
- 3 Unscrew the three fastening screws on fuel distributor.
- 4 Remove fuel distributor by turning back and forth.

Attention!

With fuel distributor without sheet metal lock make sure when removing distributor that the control piston is not dropping out.

Installation

- 7 Mount fuel distributor in vice versa sequence.
- 8 Slip new rubber ring on fuel distributor.



- 9 Lightly lubricate rubber ring and carefully mount fuel distributor.

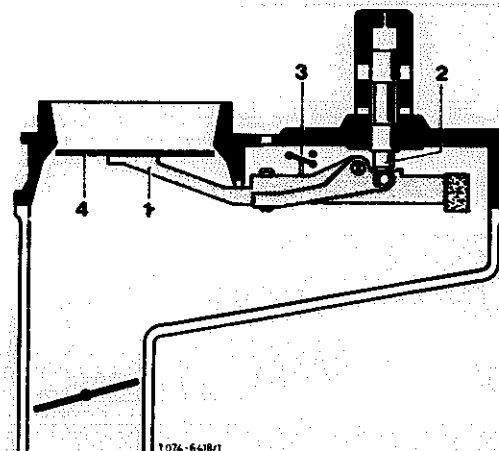
Attention!

Do not damage rubber ring during assembly to prevent drawing in filter air.

- 10 Connect all fuel lines except injection lines.

- 11 Check for easy operation of adjusting lever (1) in air flow sensor and of control piston (2) in fuel distributor.

For this purpose pull plug from safety switch (3). Switch on ignition for a short moment to establish control pressure. Push air flow sensor plate (4) manually down. A uniform resistance should be felt along entire path. No resistance should be noticed during fast upward movement, since the slowly following control piston will lift from adjusting lever. During slow upward movement, control piston should follow closely.



all flow sensor plate and adjust, if required.
on ignition for this purpose, pull cable plug from
safety switch. Fuel should now just stop flowing at
outlet connection for injection lines, adjust associa-
tion by means of idle speed mixture control screw,
if required.

13 Mount injection lines.

**14 Run engine and check all fuel connections, as
well as rubber ring on fuel distributor by means of
spray test.**

15 Adjust idle speed (07.3–100).

Test values

System pressure (engine cold or warm) at idle

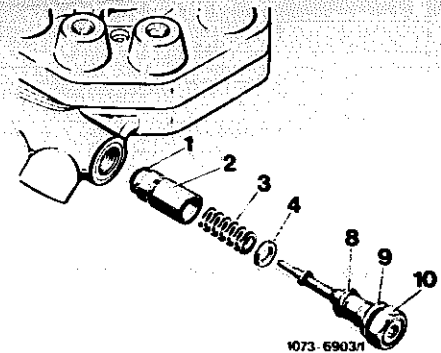
5.0-5.6 bar gauge pressure

Reconditioning system pressure regulator

1 Reduce fuel pressure. For this purpose, unscrew fuel return hose (arrow) on fuel distributor. Catch fuel with a rag. Deactivate fuel return flow hose.



2 Disassemble system pressure regulator. Unscrew closing plug (10). When screwing out, make sure that compression spring (3) and adjusting washer (4) are not falling out.



1st version

3 Remove control piston (2) with a magnet or a wooden stick (pencil).

Note: If O-ring (1) is defective, individual replacement is possible. In such a case, it is not necessary to renew the complete system pressure regulator.

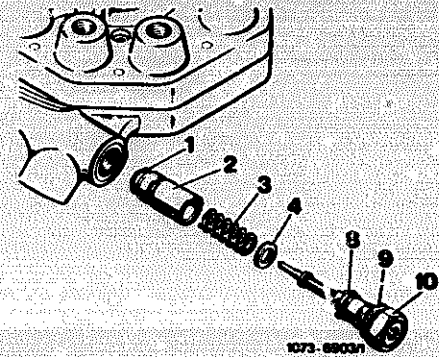
4 Install components of repair set.

Attention!

The control piston (2) is adapted to fuel distributor and should not be replaced. If required, renew complete fuel distributor.

Place new O-ring (1) on control piston (2), lubricate slightly and mount control piston with compression spring (3).

Mount assembly group together with removed adjusting washers (4) and copper sealing ring (9) supplied.

**2nd version**

5 Remove control piston (2) with a magnet or a wooden stick (pencil).

Note: If contour ring (1) is defective, individual replacement is possible. In such a case, it is not necessary to renew the complete system pressure regulator.

6 Cut contour ring (1) and remove.

7 Install components of repair set.

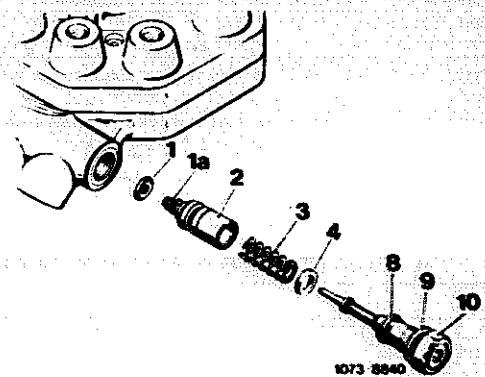
Attention!

The control piston (2) is adapted to fuel distributor and should not be replaced. If required, renew complete fuel distributor.

Place new contour ring (1) carefully on lock (1a) lubricate slightly and mount control piston with compression spring (3).

Mount assembly group together with removed adjusting washers (4) and copper sealing ring (9) supplied.

8 Check system pressure (07.3 - 120). If system pressure deviates from nominal value, remove system pressure regulator once again and adjust system pressure by adding or removing adjusting washers (4).



Adjusting washers are available as follows:

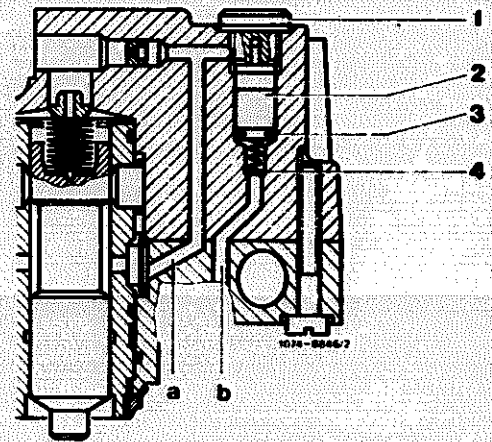
0.1 mm thick
0.15 mm
0.3 mm
0.4 mm
0.5 mm

Adjusting washers are also contained in repair set.

0.1 mm provides approx. 0.2 bar gauge pressure
system pressure.

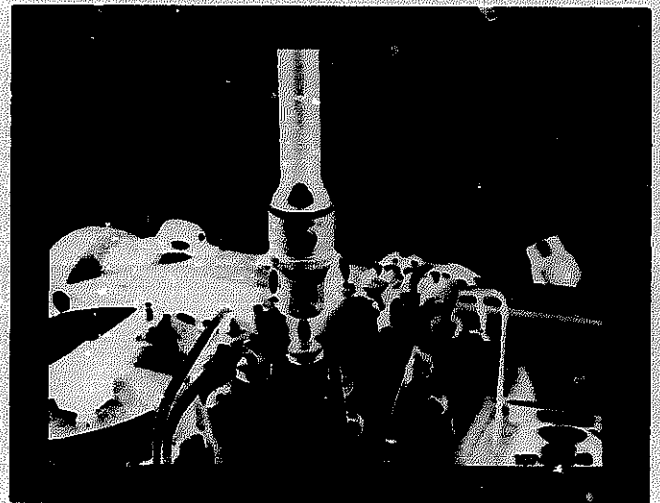
Reconditioning pressure compensating valve

9 Unscrew closing plug (1). Remove piston (2) with
contour ring (3).



10 Install components of repair set.

For loosening closing plug (1), use screwdriver
element, e.g. made by Hazet, order No. 992-T 30,
D-5630 Remscheid.



Tightening torques (reference values)

Nm

Injection lines to fuel distributor

10-12

Injection lines to injection valves

10-15

Removal

- 1 Remove air cleaner.
- 2 Unscrew injection lines on injection valves and on fuel distributor. When releasing injection lines, apply counterhold to injection valves.

Attention!

When unscrewing injection line from cylinder 2, do not kink Tecalan line (if installed), unscrew Tecalan line, if required.

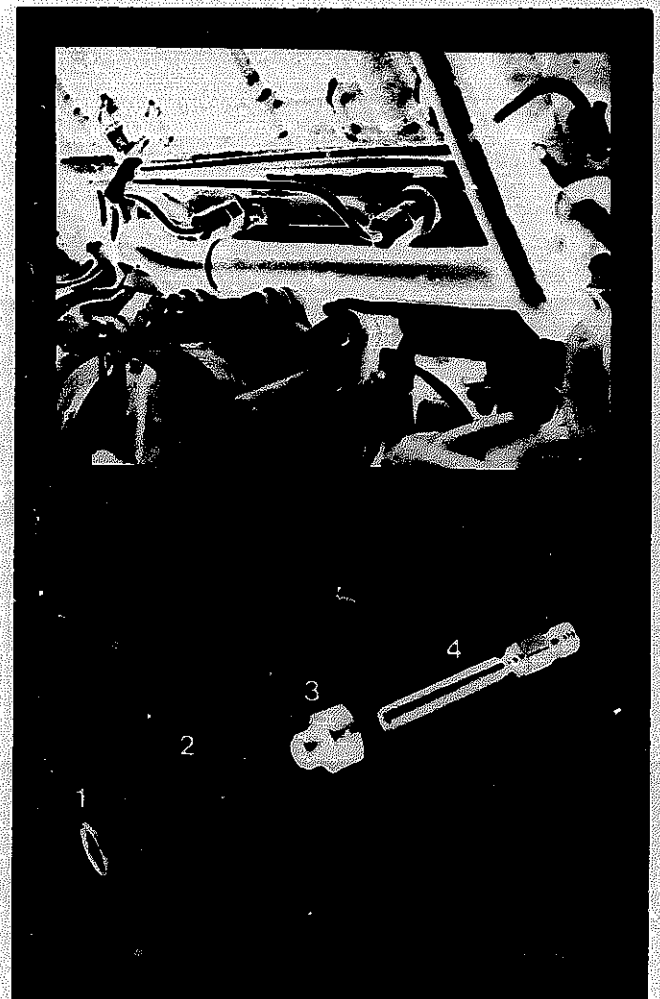
- 3 Unscrew fuel line for cold starting valve.
- 4 Loosen fastening screws and remove fastening bridges.

When loosening 8th injection valve, unscrew bearing bracket for longitudinal regulating shaft.

Attention!

When removing fastening bridges, apply counterhold to injection valves, so that injection valves and insulating sleeves are not taken along.

- 5 Pull out injection valves, while applying counterhold to insulating sleeves (2). If the insulating sleeves are pulled along, install new O-rings (1).



Installation

6 Install injection valves in vice versa sequence. For this purpose, transfer rubber sealing rings (3) or renew, if required.

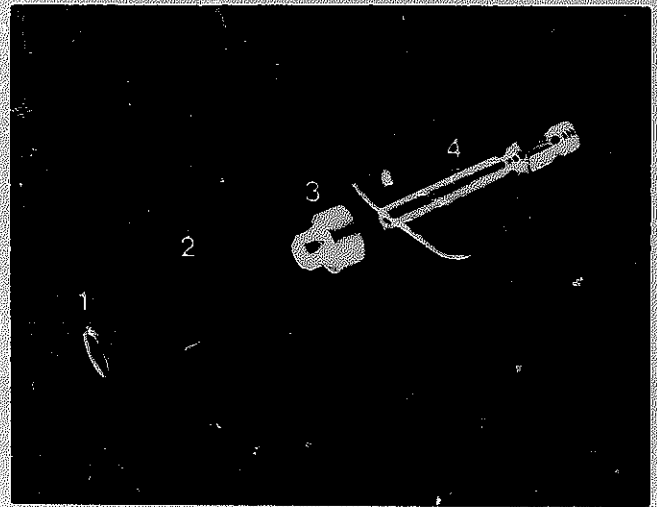
Note: If insulating sleeves have been pulled out, install with new O-rings.

7 Connect injection lines and fuel line for cold starting valve, while paying attention to tightening torques as reference values.

Attention!

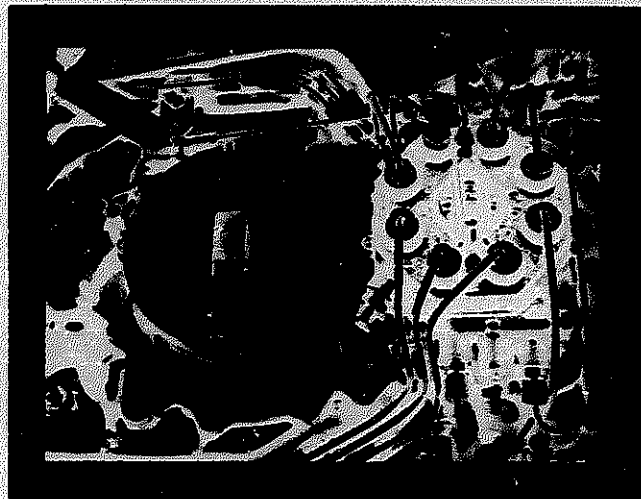
When tightening injection lines, apply counterhold to injection valves.

8 Run engine and check all fuel connections for leaks.



Replacement

- 1 Remove and install mixture controller (07.3-200).
- 2 Remove and install fuel distributor (07.3-205).



Tightening torques

Nm

Hex. nuts mixture controller to intake manifold (rubber buffer)

9-10

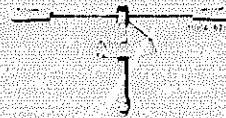
Injection lines and fuel lines to fuel distributor (reference value)

10-12

Injection lines to injection valves (reference value)

10-15

Special tool

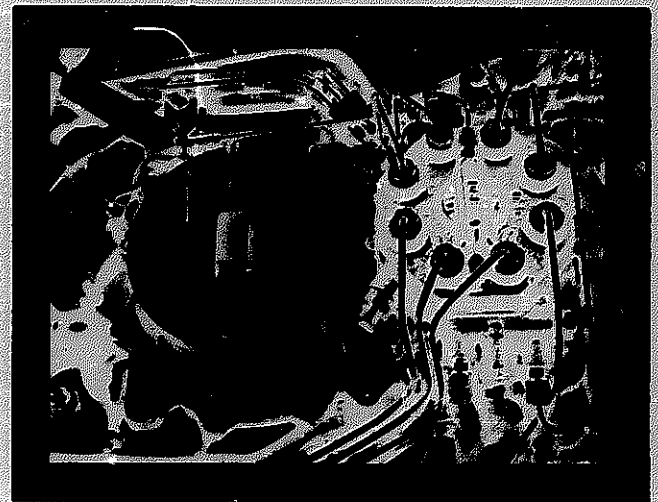
Torque wrench 1/4" square,
4-16 Nm


000 589 67 21 00

Removal

- 1 Remove air cleaner.
- 2 Unscrew all fuel and injection lines on fuel distributor and on injection valves. Catch fuel with a rag.
- 3 Unscrew holder for fuel forward and return flow line and deactivate lines.
- 4 Pull electric connecting cable from safety switch.
- 5 Loosen hose clamp on rubber sleeve between air guide housing and throttle valve housing.
- 6 Pull contour hose from air guide housing to auxiliary air valve.
- 7 Unscrew hex. nuts on rubber buffers.
- 8 Lift off mixture controller with air guide housing.

Note: With Tecalan line, make sure that it is not kinked.



Installation

- 9 For installation proceed vice versa.
 - 10 Tighten hex. nuts to specified torques by means of a torque wrench.
 - 11 Connect injection lines and fuel lines, while paying attention to tightening torques as reference value.
- Attention!**
When tightening injection lines and fuel lines, apply counterhold to injection valves as well as to double thread connections on fuel distributor.
- 12 Run engine and check all fuel connections for leaks.
 - 13 Adjust idle speed (07.3–100).

Note

Throttle valve housing without connection for ignition retard adjustment.

The connection on throttle valve housing for ignition retard adjustment is no longer in place. Ignition retard adjustment is now made at connection of contour hose between auxiliary air valve and idle speed air distributor (1F-525).

In the event of repairs, only the throttle valve housing without connection for ignition retard adjustment is installed and the connection for ignition retard adjustment must be closed with rubber cap, part No. 000 987 11 45, respectively. In this connection, also renew contour hose between auxiliary air valve and idle speed air distributor, since the ignition retard adjustment is performed there.

Start of series: approx. September 1977.
Starting chassis end No. 003385.



Removal

- 1 Remove mixture controller with air guide housing (07.3-225).
- 2 Remove and install ignition distributor (15-510).
- 3 Loosen and remove rubber sleeve.
- 4 Disconnect regulating linkage and return spring.
- 5 Pull off vacuum connections.
- 6 Loosen fastening screws and remove throttle valve housing.

Installation

- 7 For installation proceed vice versa with new gasket.
- 8 Adjust regulating linkage (30-300).
- 9 Adjust ignition timing (15-500).
- 10 Adjust idle speed (07.3-100).

Note

Fastening of warm-up compensator has been modified. The warm-up compensator is now fastened directly on intake manifold and a steel control pressure line with internally located plastic hollow body (float) (formerly Tecalan control pressure line) is additionally mounted between warm-up compensator and diaphragm damper.

Owing to the different installation position of warm-up compensator the control pressure line and the return flow line have also been modified.

Former version



Present version

When renewing control pressure line and return flow line, change fastening on vehicles with low chassis end No., since the following parts are no longer available as a spare part:

- Fastening bracket for warm-up compensator
- Rubber washers
- Tecalan control pressure line
- Return flow line

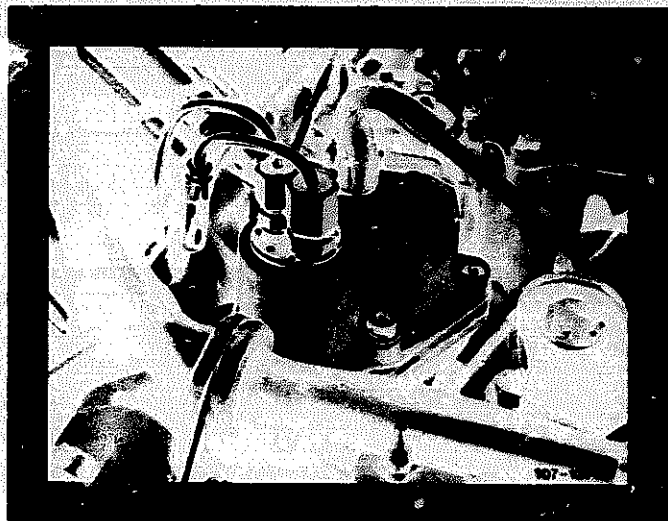
Renewing

1 Remove all connections on warm-up compensator and unscrew warm-up compensator on fastening bracket.

2 Unscrew fastening bracket together with rubber washers from intake manifold.

3 Unscrew injection line from cylinder 4 and disconnect regulating linkage. Remove bearing bracket for regulating linkage, as well as diaphragm damper and control pressure line. Also unscrew fastening bracket for ignition harness (cylinder 1-4).

4 Mount warm-up compensator without fastening bracket directly to intake manifold.



5 Screw on new steel control pressure line and diaphragm damper as well as new return flow line (do not yet tighten) and mount diaphragm damper.

6 Install control pressure line and return flow line free of tension and chafing.

7 Tighten control pressure and return flow line and secure with plastic clips.

8 Reinstall injection line for cylinder 4 and bearing bracket for regulation.

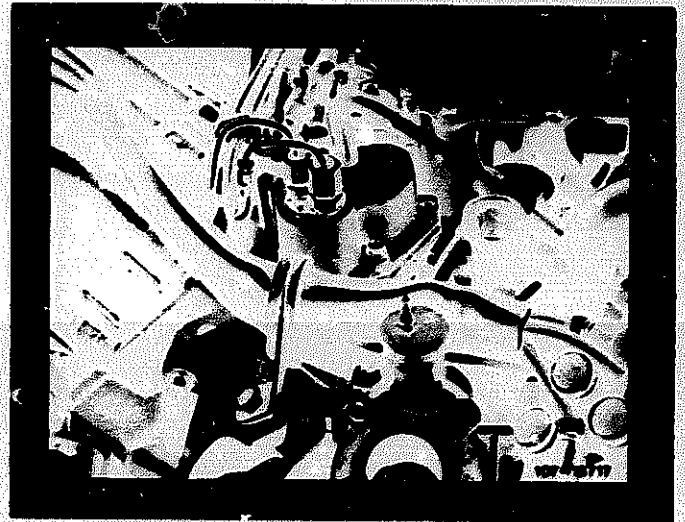
9 Attach regulating linkage, check for easy operation and adjustment and adjust, if required (30–300).

10 Plug electric connection as well as vacuum connections to warm-up compensator and install free of tension. Shorten vacuum lines, if required.

11 Mount modified rubber grommet on ignition harness (cylinder 1–4).

12 Install ignition harness and fasten with new bracket.

13 Run engine and check for leaks.



07.3-245 Renewing and centering air flow sensor plate, checking and adjusting zero position of air flow sensor plate

Tightening torque

Nm

Hex. head screw

5.0-5.5

Special tool

Torque wrench 1/4" square,
4-16 Nm



000 589 67 21 00

Conventional equipment and tools

Hot-air blower, tap M 6

Removal

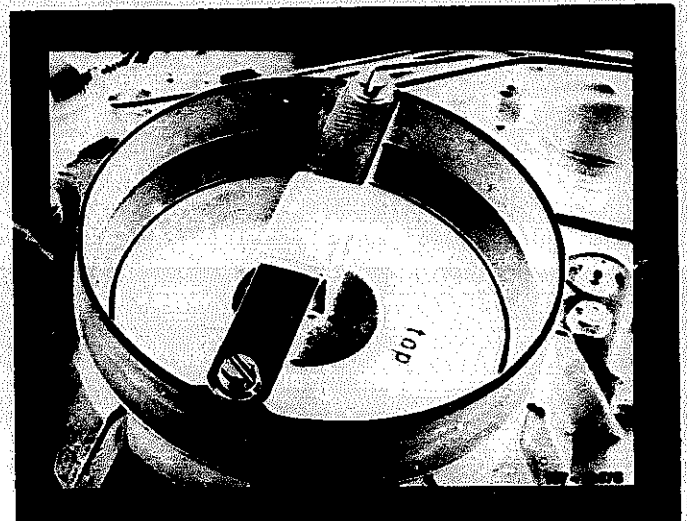
- 1 Remove air cleaner.
- 2 Unscrew stop bracket.

- 3 Heat fastening screw with a hot-air blower and unscrew with care (risk of tearing threads).

Attention!

Fastening screw is micro-encapsulated.

- 4 Clean bore for fastening air flow sensor plate by means of tap M 6.

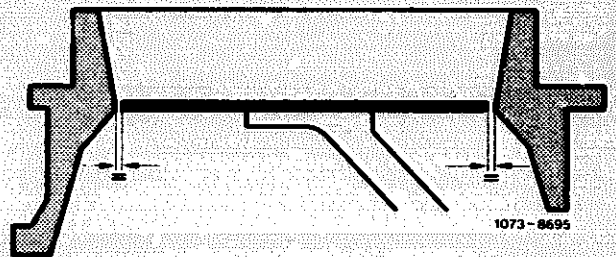


Installation

5 Install components included in repair set. Insert air flow sensor plate with the letters "TOP" in upward direction together with washer. Lightly screw in fastening screw (self-locking).

6 Center air flow sensor plate. Pull plug from safety switch. Switch on ignition for a short moment to establish control pressure.

Apply feeler gauge 0.10–0.20 mm to make sure that the air flow sensor plate is accurately centered. Air flow sensor plate should not bind even under light lateral pressure (bearing play cancelled).

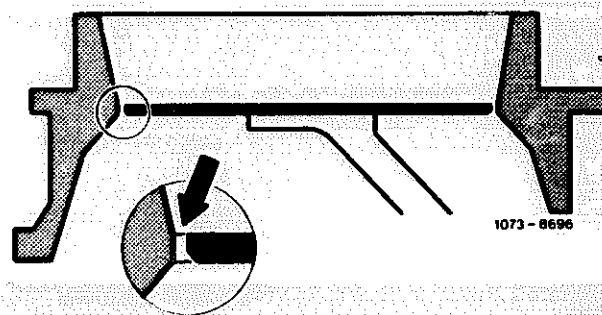


7 Tighten fastening screw to 5.0–5.5 Nm.

8 Check air flow sensor plate for easy operation. For this purpose, push plate down manually. Sensor plate should not bind. Release plate, when moving back sensor plate should also not bind and should audibly knock against resilient stop. Center air flow sensor plate once again, if required.

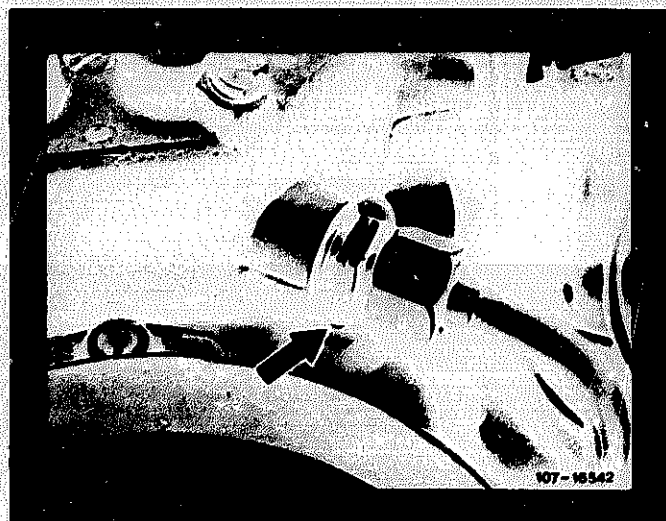
9 Check zero position (rest position) of air flow sensor plate. Upper edge of sensor plate should be accurately flush with cylindrical portion of air funnel (arrow) along entire circumference. A higher location up to max. 0.5 mm is permitted.

Note: To check zero position, pull plug from safety switch and switch on ignition for a short moment (refer to item 6). This will energize the control piston with control pressure.



10 Adjust zero position of air flow sensor plate.

- a) If too high, unscrew fuel feed connection, knock in guide pin (arrow) by means of a mandrel to required depth.
- b) If too low, remove mixture controller and knock in guide pin from below (07.3-200).



Attention!

Knock in guide pin very carefully, so that pin is not knocked in too deeply.

Avoid repeated adjustments in both directions by all means, since the press fit of the pin will become too slight.

**11 Mount fuel feed connection and stop bracket.
Connect plug to safety switch.**

12 Adjust idle speed (07.3–100).

Special tool

Clamp for fuel hoses



000 589 40 37 00

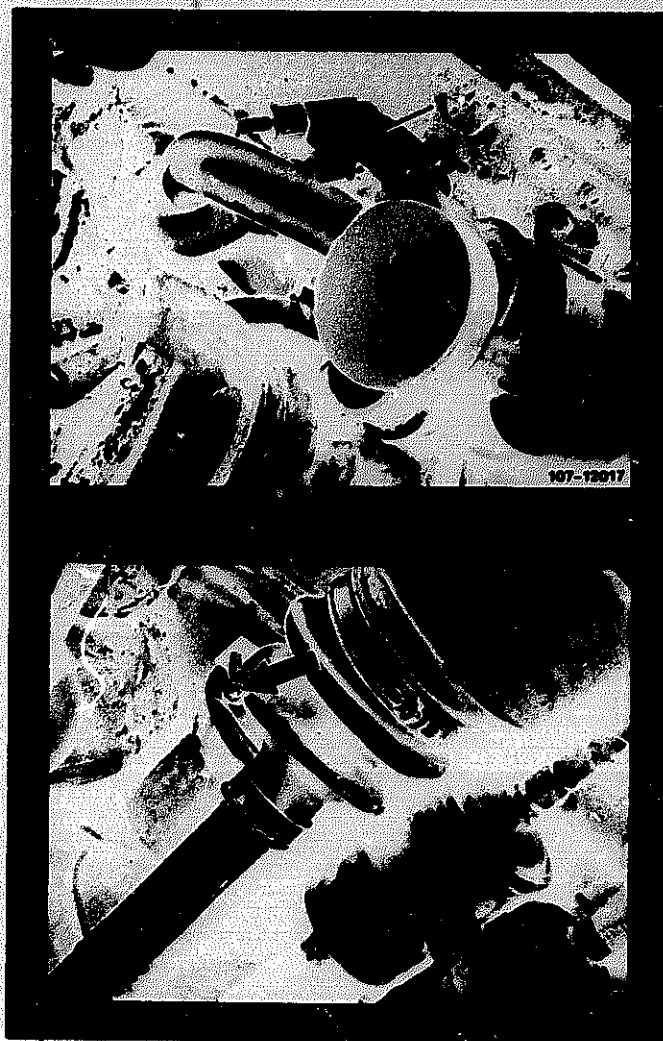
Removal

- 1 Unscrew protective case.
- 2 Pinch fuel intake hose (1) with clamp.

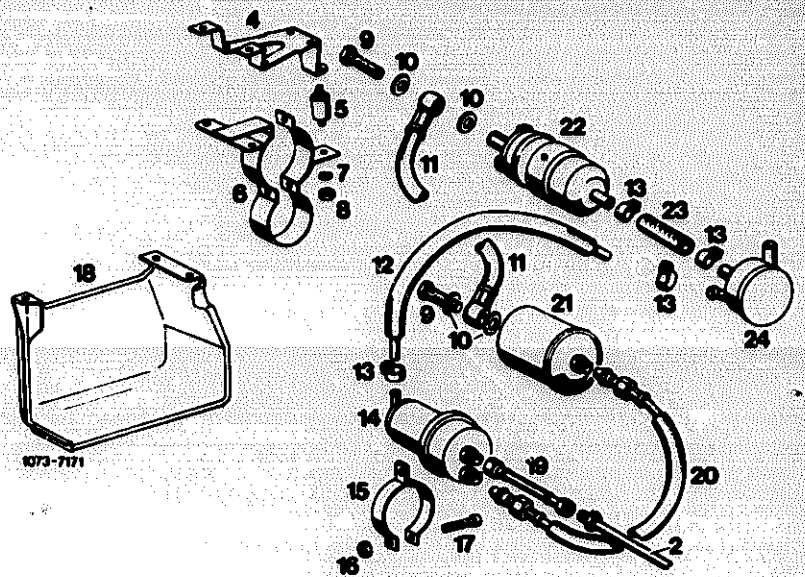
- 3 Pinch fuel forward-flow hose.

1st version

- 4 Unscrew both fuel hoses on fuel reservoir, also pinch leak hose, loosen and pull off.
- 5 Loosen fastening screws (arrow) for clamp and remove fuel reservoir.
- 6 For installation proceed vice versa. Pay attention to correct connection of fuel hoses. Mount fuel forward-flow hose to center connection of fuel reservoir.

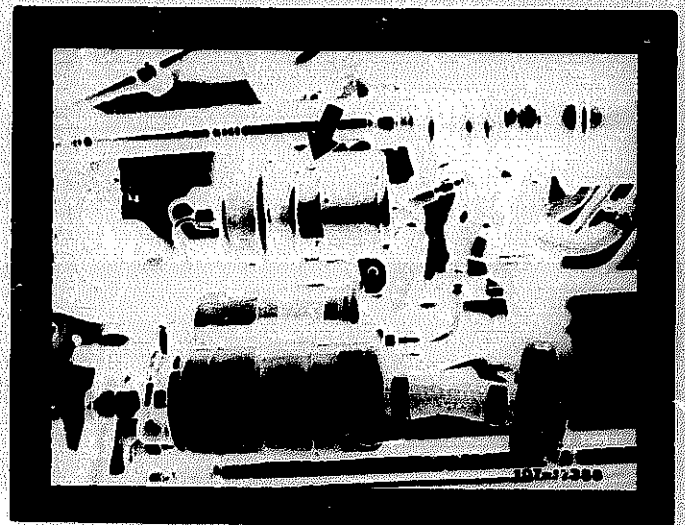


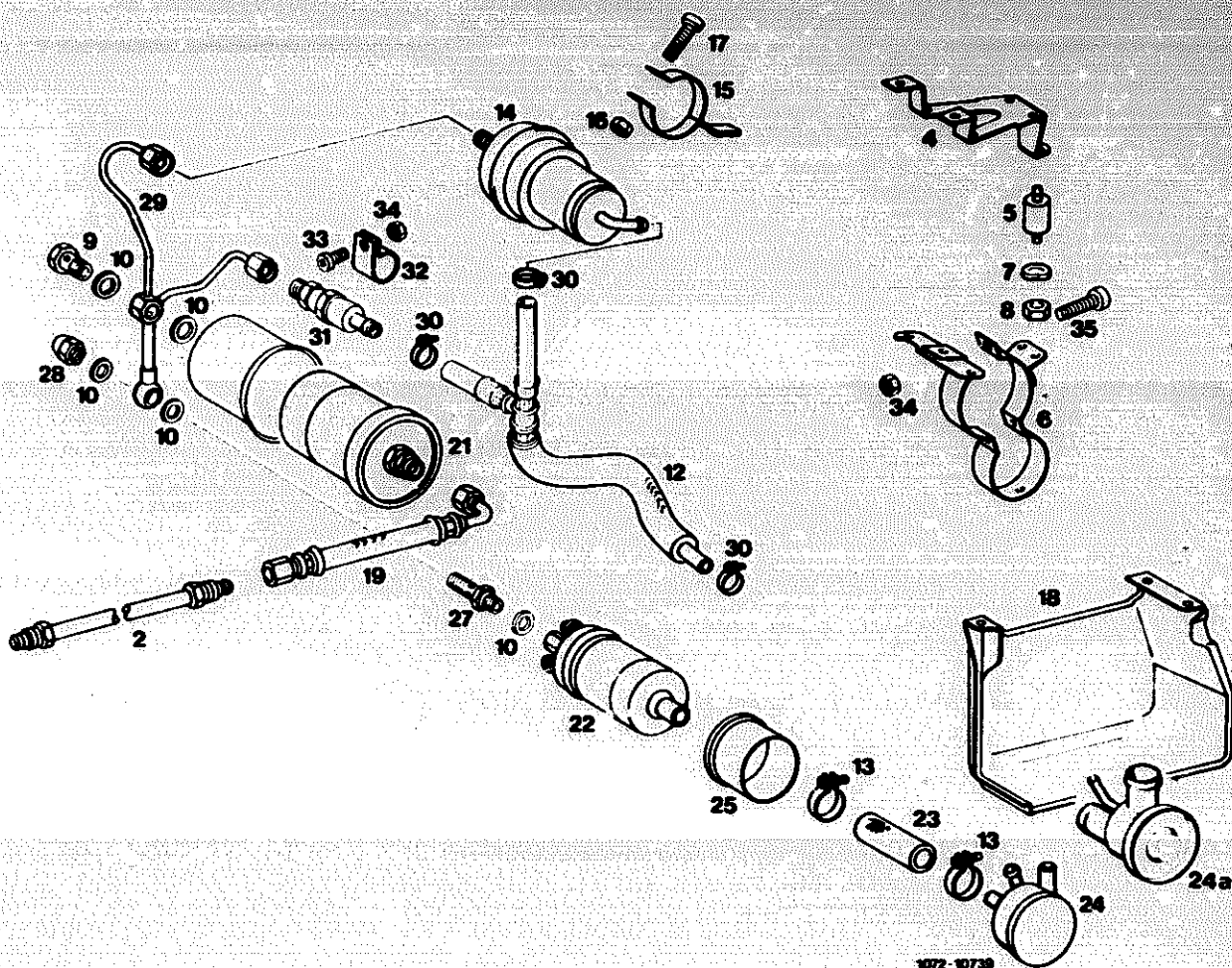
- 2 Fuel forward-flow line
- 4 Holder
- 5 Vibration damper
- 6 Holder
- 7 Snap ring
- 8 Nut
- 9 Hollow screw
- 10 Sealing ring
- 11 Fuel hose
- 12 Fuel hose
- 13 Hose clamp
- 14 Fuel reservoir
- 15 Holder
- 16 Nut
- 17 Screw
- 18 Protective case
- 19 Fuel hose
- 20 Fuel hose
- 21 Fuel filter
- 22 Fuel pump
- 23 Fuel hose
- 24 Damper



2nd version

- 7 Unscrew fuel line on fuel reservoir, also pinch leak hose, loosen and pull off.
- 8 Loosen fastening screw (arrow) for clamp and remove fuel reservoir.
- 9 For installation proceed vice versa.
- 10 Remove clamp from fuel suction hose.
- 11 Run engine and check for leaks.
- 12 Mount protective case.





- | | |
|--------------------------|--------------------------|
| 2 Fuel forward-flow line | 21 Fuel filter |
| 4 Holder | 22 Fuel pump |
| 5 Vibration damper | 23 Fuel hose |
| 6 Holder | 24 Damper |
| 7 Snap ring | 25 Plastic sleeve |
| 8 Nut | 26 Plastic sleeve |
| 9 Hollow screw | 27 Check valve |
| 10 Sealing ring | 28 Cap nut |
| 12 Fuel hose | 29 Steel line |
| 13 Hose clamp | 30 Hose clamp |
| 14 Fuel reservoir | 31 Pressure relief valve |
| 15 Holder | 32 Clamp |
| 16 Nut | 33 Screw |
| 17 Screw | 34 Nut |
| 18 Protective case | 35 Screw |
| 19 Fuel hose | |

Special tool

Clamp for fuel hoses



000 589 40 37 00

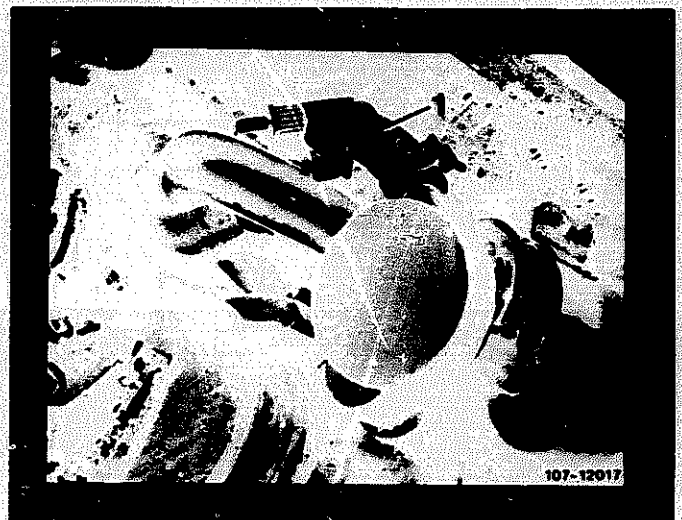
Note

The fuel filter has an additionally integrated damper for noise reduction. To prevent contact corrosion, the fuel filter is provided with a plastic sleeve.

When exchanging fuel filter, make sure that the plastic sleeve is installed between fuel filter and holder. Make sure that sleeve projects on both sides of holder, since direct contact of fuel filter with holder may result in contact corrosion.

Removal

- 1 Unscrew protective case.
- 2 Pinch fuel suction hose (1) with clamp.



3 Unscrew fuel line and fuel hose or both fuel hoses on fuel filter.

4 Loosen both fastening screws (arrow) and remove fuel filter.

1st version

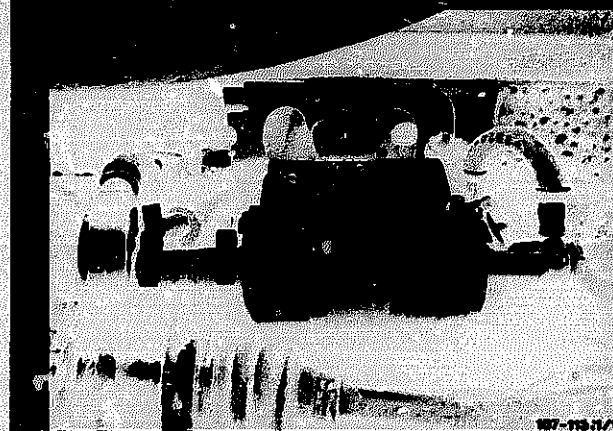


2nd version



5 For installation proceed vice versa using new sealing rings.

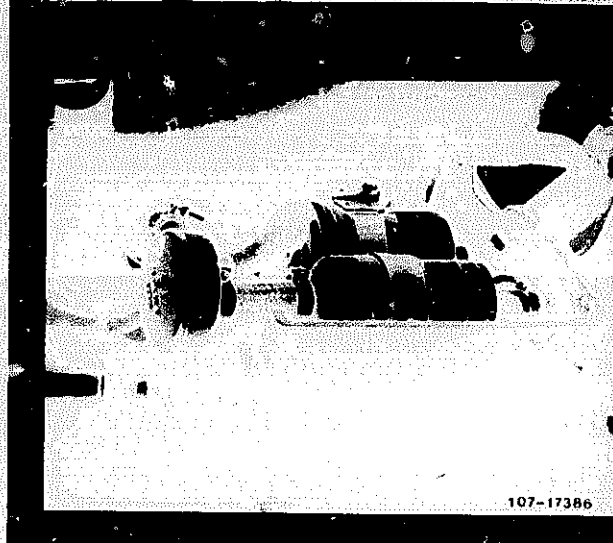
6 Fix fuel filter with plastic sleeve in holder. Plastic sleeve should project on both sides of holder, since direct contact of fuel filter with holder may lead to contact corrosion.



7 Remove clamp on fuel suction hose.

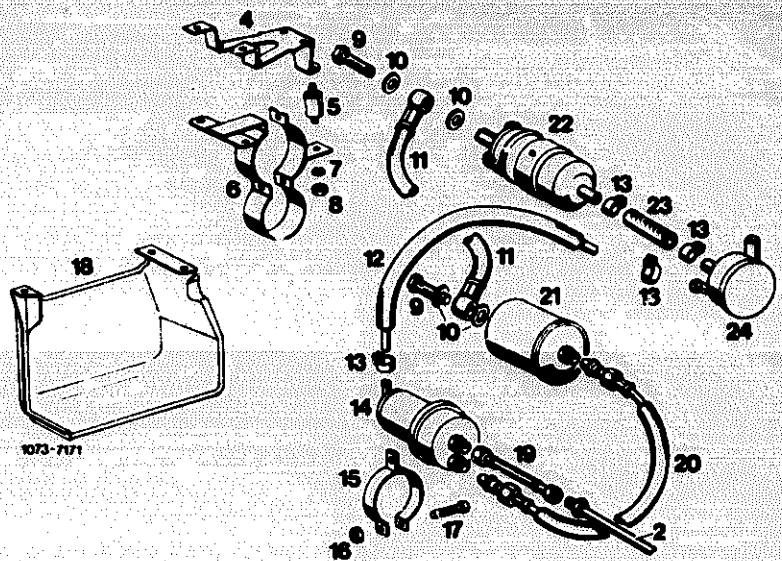
8 Run engine and check for leaks.

9 Mount protective case.

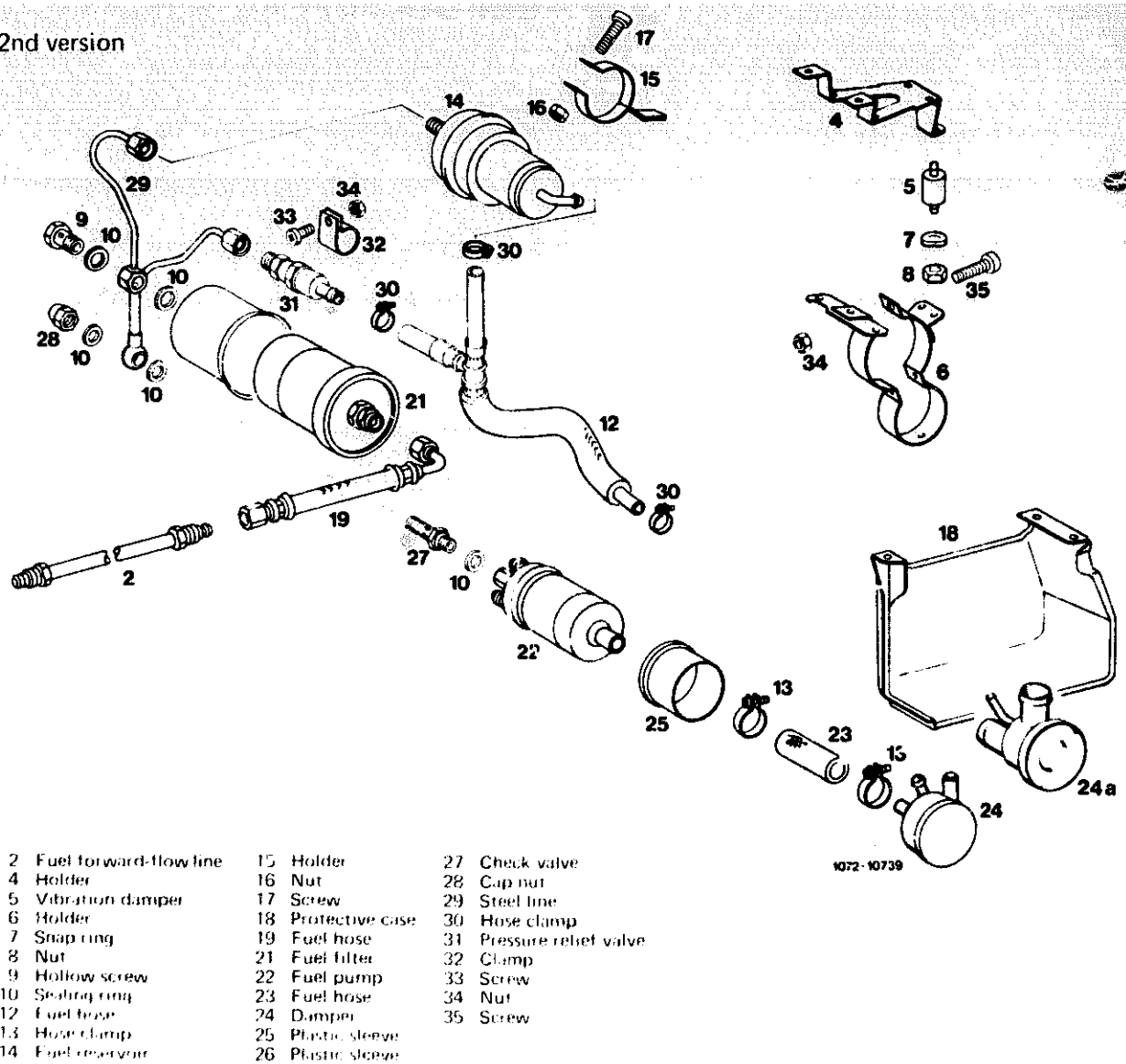


1st version

- 2 Fuel forward-flow line
- 4 Holder
- 5 Vibration damper
- 6 Holder
- 7 Snap ring
- 8 Nut
- 9 Hollow screw
- 10 Sealing ring
- 11 Fuel hose
- 12 Fuel hose
- 13 Hose clamp
- 14 Fuel reservoir
- 15 Holder
- 16 Nut
- 17 Screw
- 18 Protective case
- 19 Fuel hose
- 20 Fuel hose
- 21 Fuel filter
- 22 Fuel pump
- 23 Fuel hose
- 24 Damper



2nd version



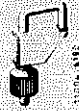
- 2 Fuel forward-flow line
- 4 Holder
- 5 Vibration damper
- 6 Holder
- 7 Snap ring
- 8 Nut
- 9 Hollow screw
- 10 Sealing ring
- 12 Fuel hose
- 13 Hose clamp
- 14 Fuel reservoir

- 15 Holder
- 16 Nut
- 17 Screw
- 18 Protective case
- 19 Fuel hose
- 21 Fuel filter
- 22 Fuel pump
- 23 Fuel hose
- 24 Damper
- 25 Plastic sleeve
- 26 Plastic sleeve

- 27 Check valve
- 28 Cap nut
- 29 Steel line
- 30 Hose clamp
- 31 Pressure relief valve
- 32 Clamp
- 33 Screw
- 34 Nut
- 35 Screw

Special tool

Clamp for hose lines



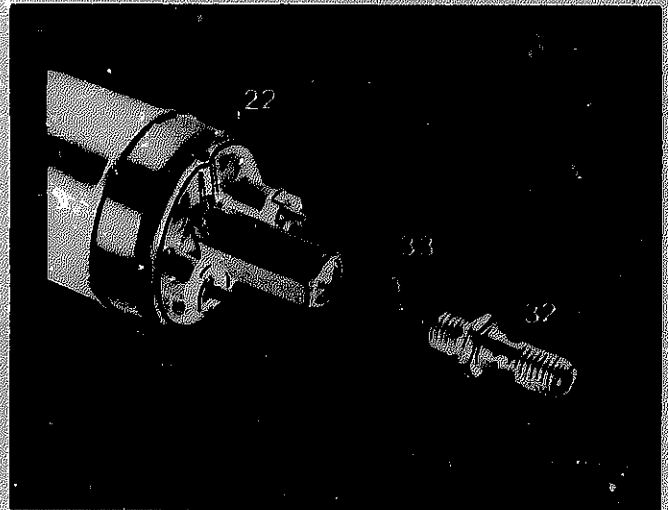
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Note

Starting April 1980 the fuel pump is provided with a special coating on roller running surface, an exchangeable check valve, and with a plastic sleeve to prevent contact corrosion.

The check valve has been moved in outward direction and can be separately replaced in the event of failure.

- 22 Fuel pump
- 32 Check valve
- 33 Sealing ring



When exchanging fuel pump, make absolutely sure that the plastic sleeve is mounted in-between fuel pump and holder. Sleeve must project on both sides of holder, since direct contact of fuel pump with holder may lead to contact corrosion.

Note: Use plastic sleeve also on model 107, 116 and 123.

Removal

- 1 Unscrew protective box.
- 2 Pinch fuel suction hose (1) with a clamp.

1st version

- 3 Loosen fuel hoses, pull off and unscrew.
- 4 Disconnect electric connecting cable.
- 5 Loosen fastening screw (arrow) and remove fuel pump.

2nd version

- 6 Loosen fuel line on fuel filter and fuel reservoir.
Loosen fuel line on fuel pump, pull off and unscrew.
- 7 Disconnect electric cables.
- 8 Loosen fastening screw (arrow) and remove fuel pump.

Installation

- 9 For installation proceed vice versa using new sealing ring.

Pay attention to perfect installation of fuel hoses, as well as to correct polarity. Terminals should be horizontal in installation position.



10 Locate fuel pump with plastic sleeve in holder. Plastic sleeve should project on both sides of holder, since direct contact of fuel pump with holder may lead to contact corrosion.

11 Remove clamp from fuel suction hose.

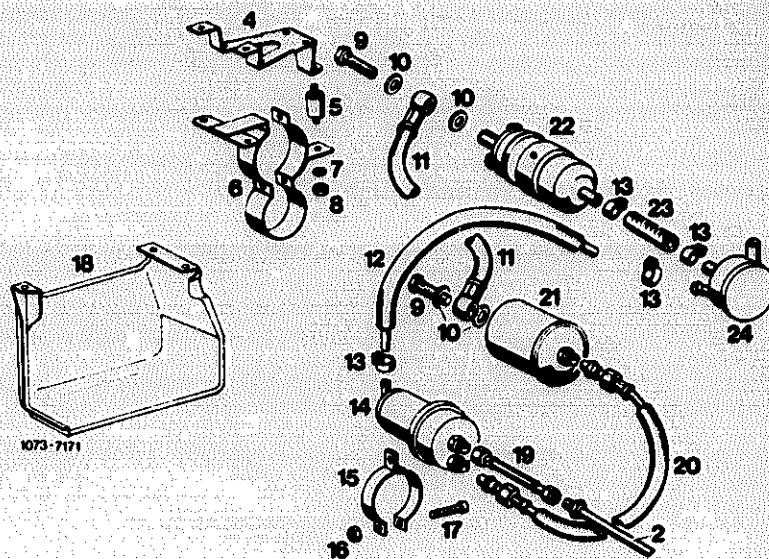
12 Run engine and check for leaks.

13 Mount protective box.

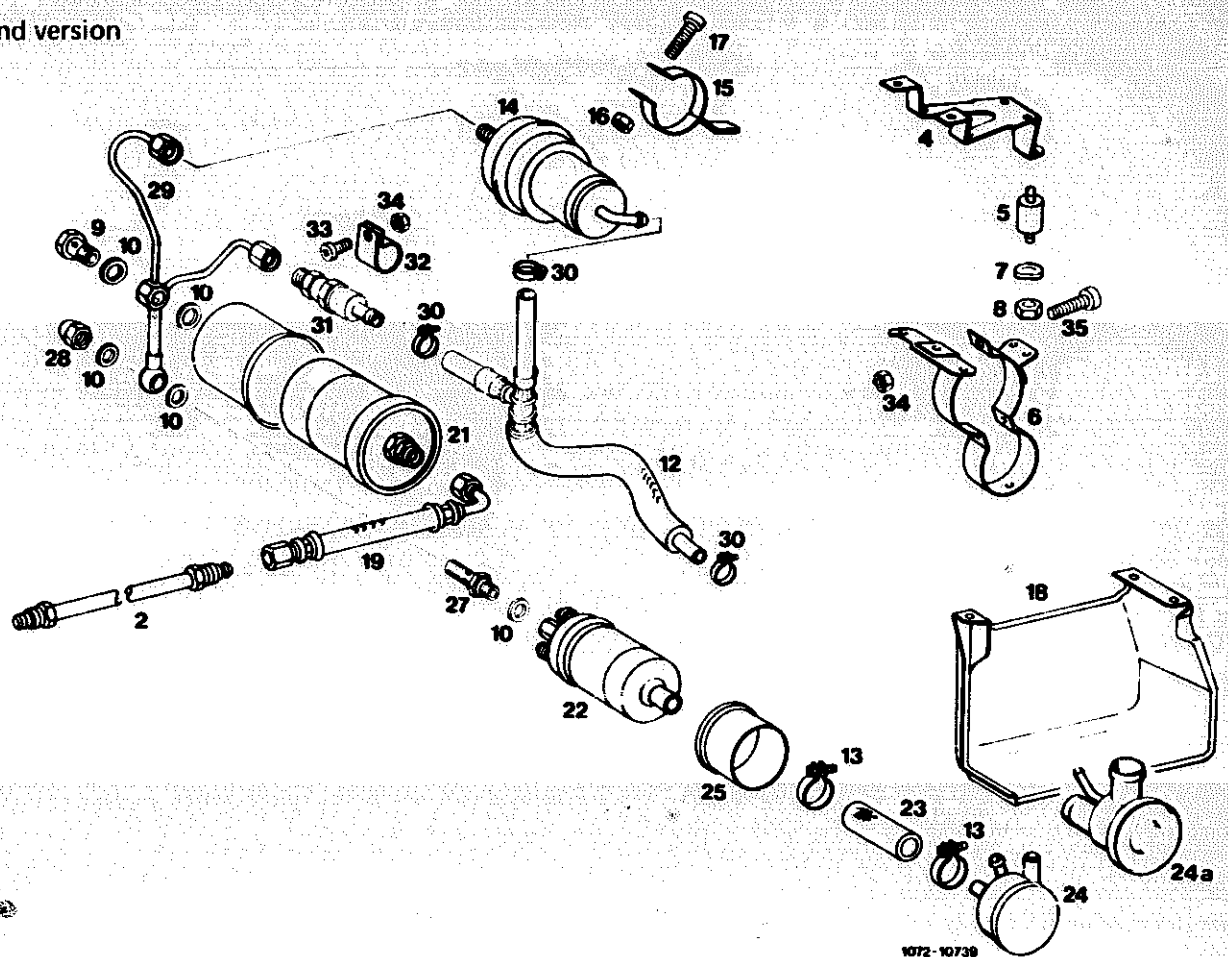


1st version

- 2 Fuel forward-flow line
- 4 Holder
- 5 Vibration damper
- 6 Holder
- 7 Snap ring
- 8 Nut
- 9 Hollow screw
- 10 Sealing ring
- 11 Fuel hose
- 12 Fuel hose
- 13 Hose clamp
- 14 Fuel reservoir
- 15 Holder
- 16 Nut
- 17 Screw
- 18 Protective box
- 19 Fuel hose
- 20 Fuel hose
- 21 Fuel filter
- 22 Fuel pump
- 23 Fuel hose
- 24 Damper



2nd version

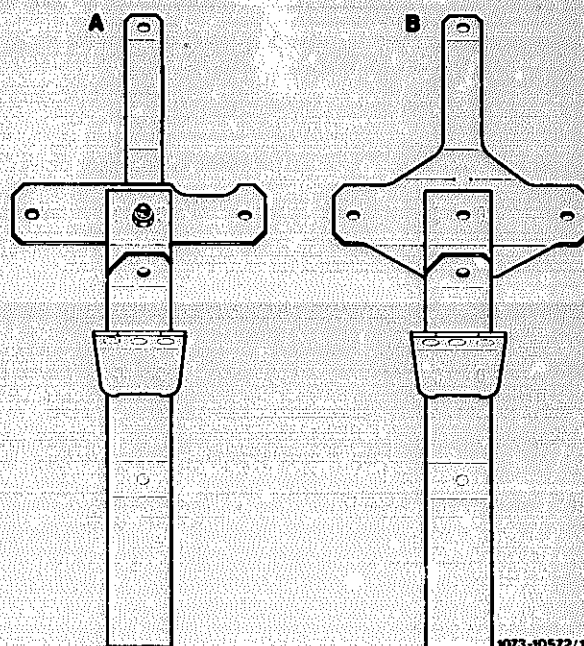


- | | | |
|--------------------------|-------------------|--------------------------|
| 2 Fuel forward-flow line | 15 Holder | 27 Check valve |
| 4 Holder | 16 Nut | 28 Cap nut |
| 5 Vibration damper | 17 Screw | 29 Steel line |
| 6 Holder | 18 Protective box | 30 Hose clamp |
| 7 Snap ring | 19 Fuel hose | 31 Pressure relief valve |
| 8 Nut | 21 Fuel filter | 32 Clamp |
| 9 Hollow screw | 22 Fuel pump | 33 Screw |
| 10 Sealing ring | 23 Fuel hose | 34 Nut |
| 12 Fuel hose | 24 Damper | 35 Screw |
| 13 Hose clamp | 25 Plastic sleeve | |
| 14 Fuel reservoir | 26 Plastic sleeve | |

Renewing

For renewing holder, remove fuel reservoir (07.3-270), fuel filter (07.3-275) and fuel pump (07.3-280).

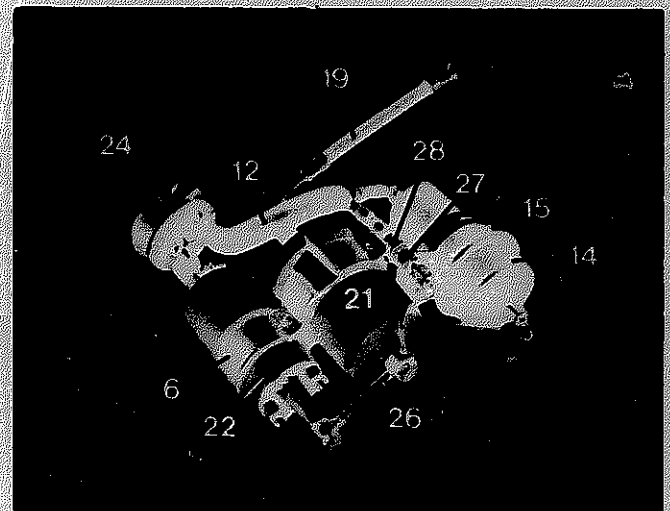
The holder has been modified to improve installation position and to increase rigidity.



A. General

Since February 1979 the pressure reservoir (14) is installed in front of fuel filter, an additional compensating valve (27) is also installed. As a result, the engine will fire easier when cold, and smooth running directly upon cold start is improved.

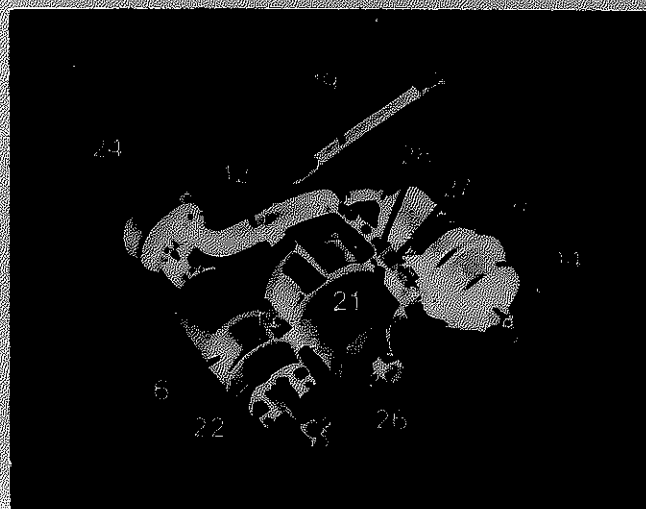
With light-alloy fuel distributors the pressure compensating valve is integrated in fuel distributor.



Functional description

The pressure reservoir (14) has now only one connection and is filled only slowly with fuel owing to throttle (orifice). From fuel filter the fuel flows directly into feed line to engine. As a result, the fuel pressure on injection valves will be built up faster.

In front of fuel filter (21) is an additional pressure compensating valve (27), which will close in the presence of pressure in system. If the fuel volume is reduced in system when the fuel is cooling down, the pressure compensating valve will open. This will prevent a vacuum to pull the control piston in fuel distributor to full load. Otherwise, the full fuel quantity might be injected for a short period during a cold start and the engine might be provided with overrich fuel.



B. Converting fuel pump assembly

Special tool

Clamp for hose lines



000 589 40 37 00

Spare parts

Designation

Part No.

Conversion set

123 470 05 93

Steel line for engines with light-alloy fuel distributor

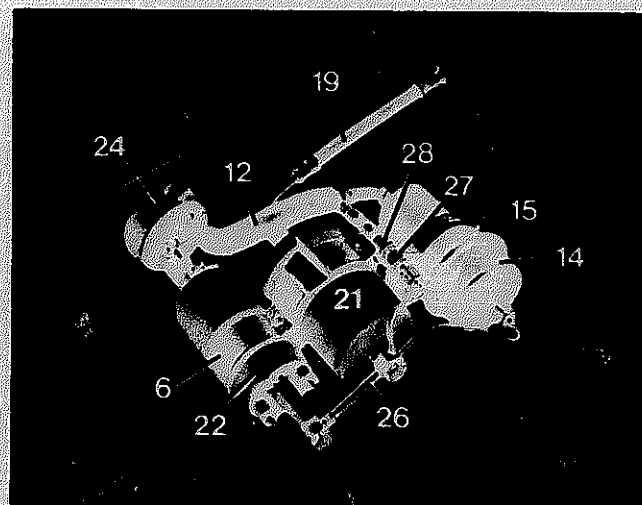
126 470 01 64

Responsible for delivery: Werk 50 (PEW Sindelfingen)

Note

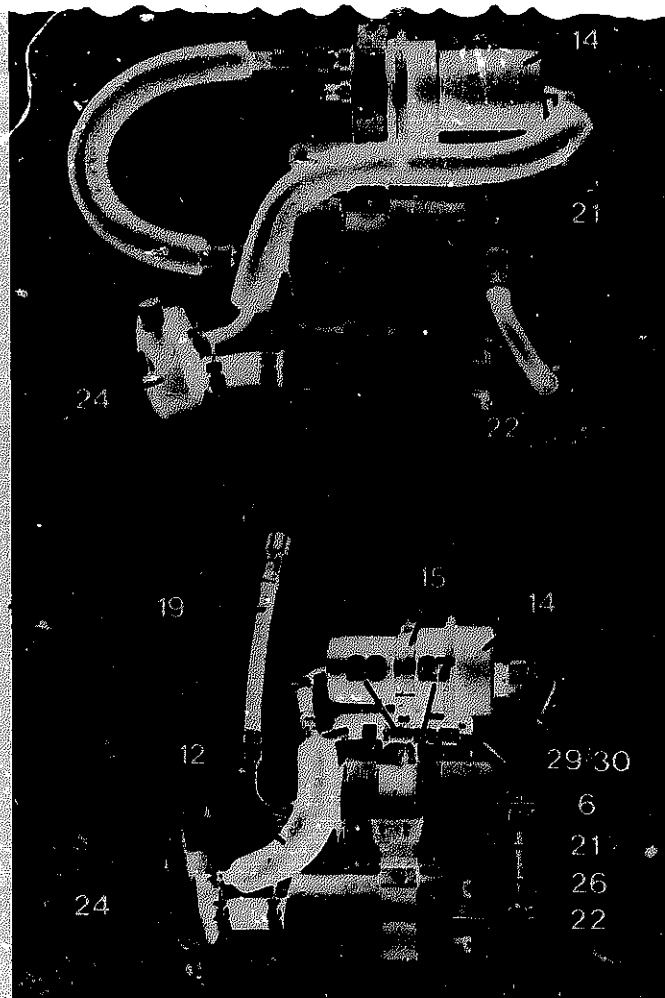
When exchanging fuel filter (21), fuel pump (22) or pressure compensating valve (27) be sure that a new plastic film or plastic sleeve is placed between these components and the holder (6, 15, 28). Plastic member should project on both sides of holder, since direct contact of components with holder might lead to contact corrosion.

Do not subsequently install pressure compensating valve in vehicles of Australia and Japan version.



1st version

- 14 Pressure reservoir
- 21 Filter
- 22 Fuel pump
- 24 Suction damper



2nd version

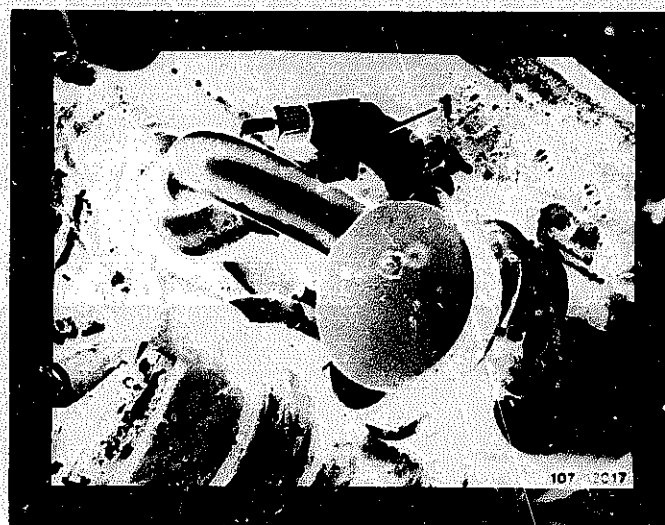
- 6 Holder for fuel pump and filter
- 12 Leak line
- 14 Pressure reservoir
- 15 Holder for pressure reservoir
- 19 Fuel hose
- 21 Filter
- 22 Fuel pump
- 24 Suction damper
- 26 Fuel pressure line
- 27 Pressure compensating valve
- 28 Clamp for pressure compensating valve
- 29 Closing cone
- 30 Coupling nut

During conversion, the following parts can be used again:

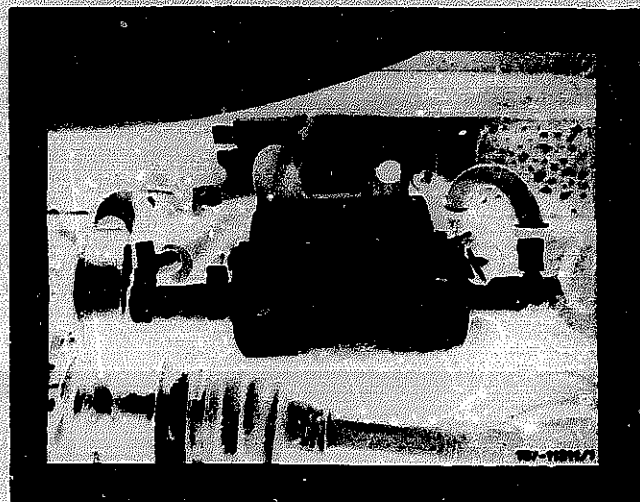
Fuel pump,
suction damper,
pressure reservoir,
fuel filter.

Conversion

- 1 Unscrew protective box.
- 2 Disconnect electric connections.
- 3 Pinch fuel suction hose (1) between fuel tank and suction damper by means of a clamp.



- 4 Loosen suction hose or suction damper and pull off.
- 5 Unscrew fuel pressure hose from feed line to engine compartment. Clean screw connection first.
- 6 Unscrew fastening nuts of vibration dampers and remove "fuel pump assembly".
- 7 Disassemble fuel pump assembly.

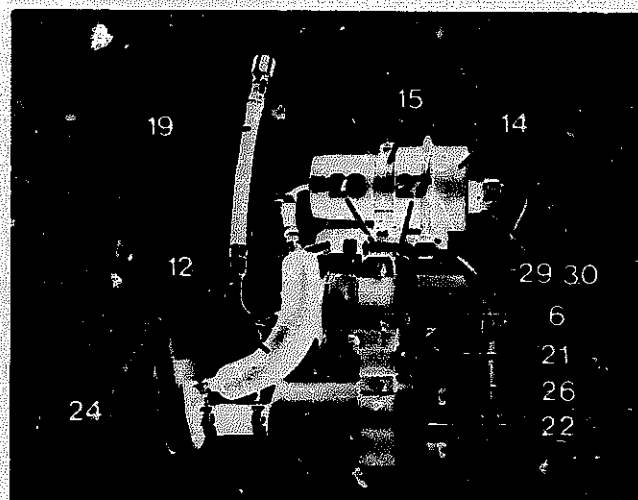


- 8 Clean fuel pump and fuel filter externally and mount with additional plastic sleeve (slip up to bead of pump).

As an exception, the film (e.g. Tesafilm) may be glued on instead of plastic sleeve.

Fasten plastic sleeve or film on principle in such a manner that the material projects on both sides of holder. Direct contact between holder and pump or filter may lead to contact corrosion.

- 9 Assemble pump assembly with parts of conversion set as shown in Fig. Slip fuel pump (22) up to head into holder (15) and mount clamp (28) for pressure compensating valve (27) under holder of pressure reservoir. Prior to tightening screws of holder, position fuel pressure line (26) against pump, filter and pressure reservoir. On pressure reservoir, close off-center connection with a closing cone (29) and a coupling nut (30).



10 Install pump assembly and connect fuel hoses, as well as electric connections.

11 Remove clamp from suction hose, start engine and check system for leaks.

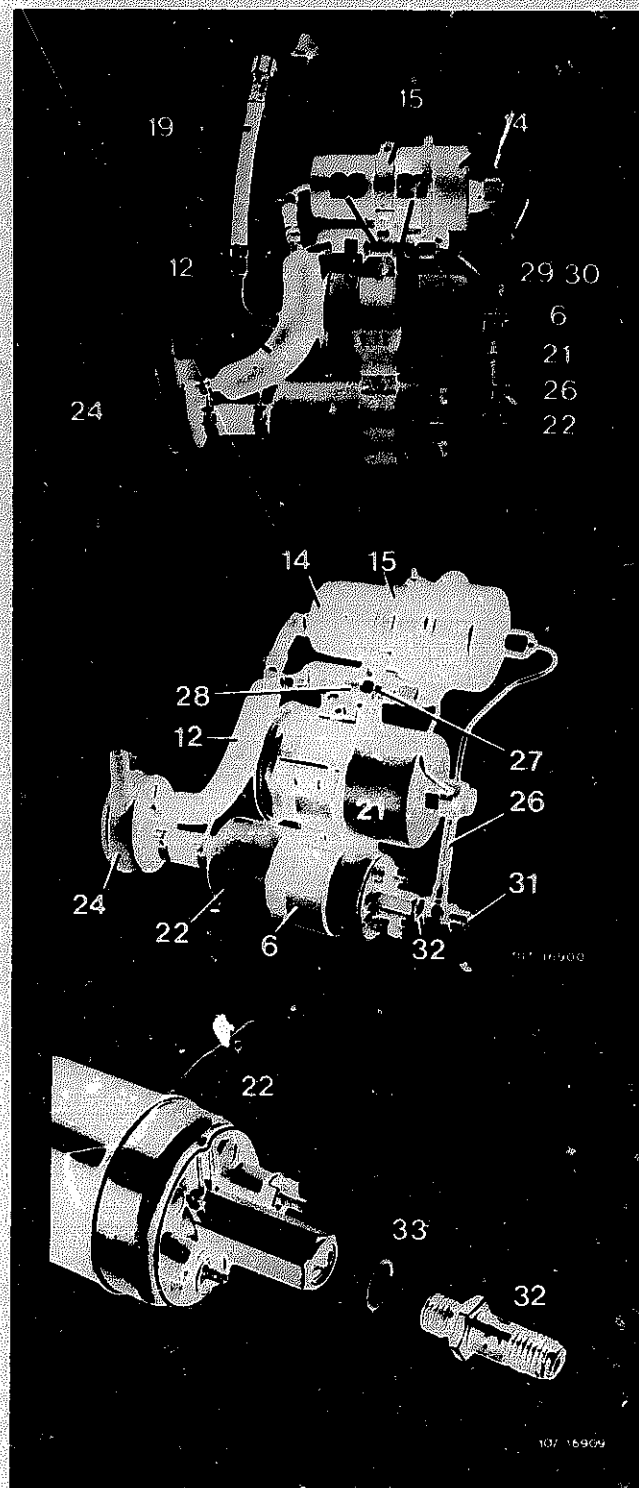
12 Mount protective box. Then check whether fuel hoses are installed free of chafing.

Note: On vehicles with auxiliary heater, insert a T-member into leak line, approx. 50 mm from suction damper. Shorten anti-chafing hose at this point.

Fuel pump assembly with steel line between fuel pump and filter

- 1 Unscrew protective box.
- 2 Pinch fuel hoses (from fuel tank and line to engine) with one clamp each.
- 3 Unscrew fuel pump assembly on both front vibration dampers.

- 6 Holder for fuel pump and filter
- 12 Leak line
- 14 Pressure reservoir
- 15 Holder for pressure reservoir
- 19 Fuel hose
- 21 Filter
- 22 Fuel pump
- 24 Suction damper
- 26 Fuel pressure line
- 27 Pressure compensating valve
- 28 Clamp for pressure compensating valve
- 29 Closing cone
- 30 Coupling nut
- 31 Closing nut
- 32 Check valve
- 33 Sealing ring



- 4 Unscrew steel line (26) on fuel pump, filter, reservoir and pressure compensating valve.
- 5 Screw check valve (32) with new copper sealing ring (33) to fuel pump.

6 Mount steel lines. For this purpose, slip fuel pump up to bead into holder. Connect steel line with new copper sealing rings and closing nut (screw on closing nut only lightly). Hollow screw is no longer installed.

Note: Plastic film or plastic sleeve of pump and filter should project on holder on both sides and must be renewed, if damaged. For this purpose, remove pump and filter.

7 Mount fuel filter in holder in such a manner that the steel line is in alignment with fuel pump.

8 Mount steel line on reservoir and pressure compensating valve and tighten connections (apply counterhold to check valve).

9 Tighten fuel pump and filter in holder and screw holder to vibration dampers.

10 Remove clamps on fuel hoses.

11 Run engine and check connections for leaks.

12 Mount protective box. Make sure that the steel line is not chafing against protective box.

Fuel pump assembly with hose between pump and filter

1 Unscrew protective box.

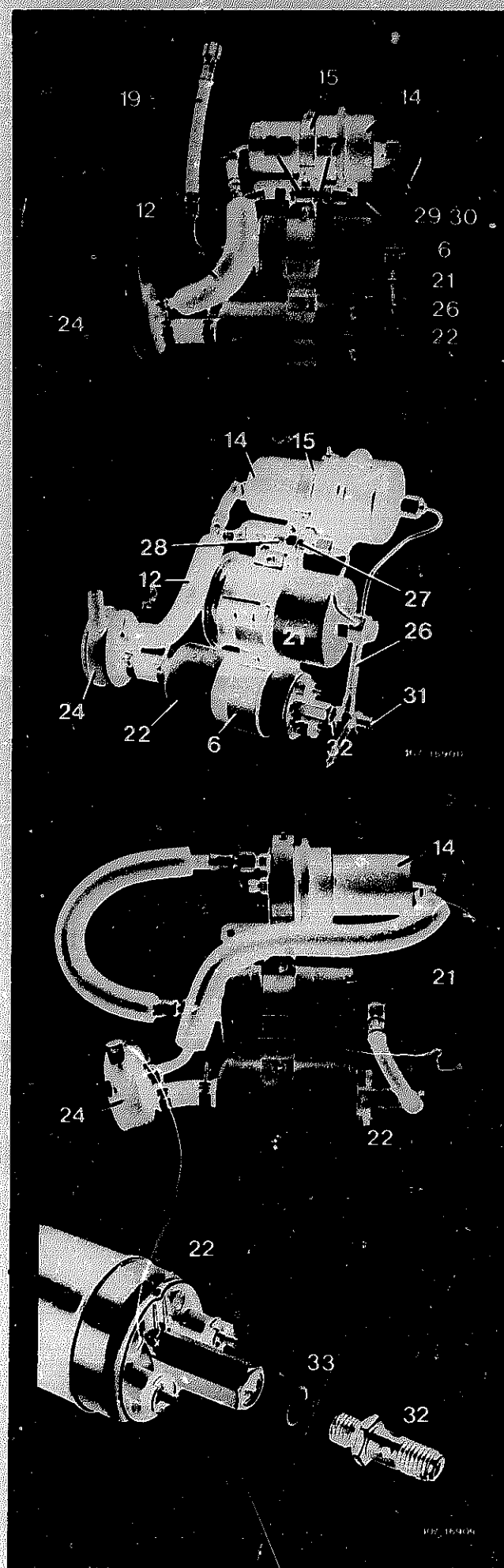
2 Pinch fuel hoses with clamps.

14 Pressure reservoir
21 Filter
22 Fuel pump
24 Suction damper

3 Unscrew fuel pump assembly on both front vibration dampers.

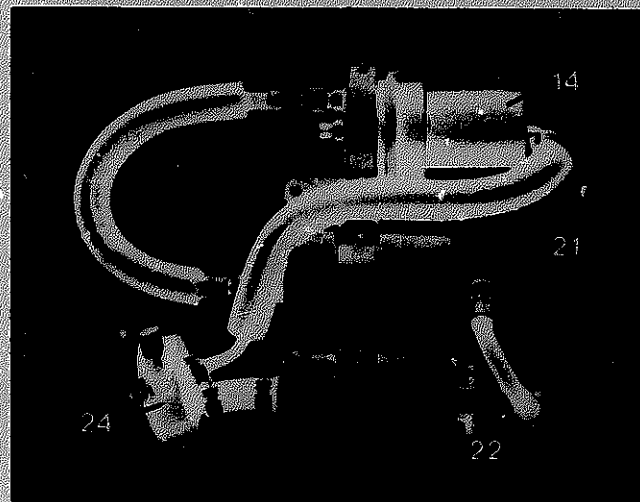
4 Unscrew fuel hose on pump.

5 Screw check valve (32) with new copper sealing ring (33) to fuel pump.



6 Slip fuel pump in holder approx. 15 mm to the left (so that closing nut is not chafing against protective box) and mount fuel hose with 2 new copper sealing rings and closing nut to check valve (applying counterhold to check valve). Hollow screw is no longer installed.

Note: Plastic film or plastic sleeve of pump and filter should project on holder on both sides and must be renewed if damaged. For this purpose, remove pump and filter.



7 Tighten fuel pump and filter in holder and mount holder on vibration dampers.

8 Remove clamps on fuel hoses.

9 Run engine and check system for leaks.

10 Mount protective box. Make sure that the fuel hose is not chafing against protective box.

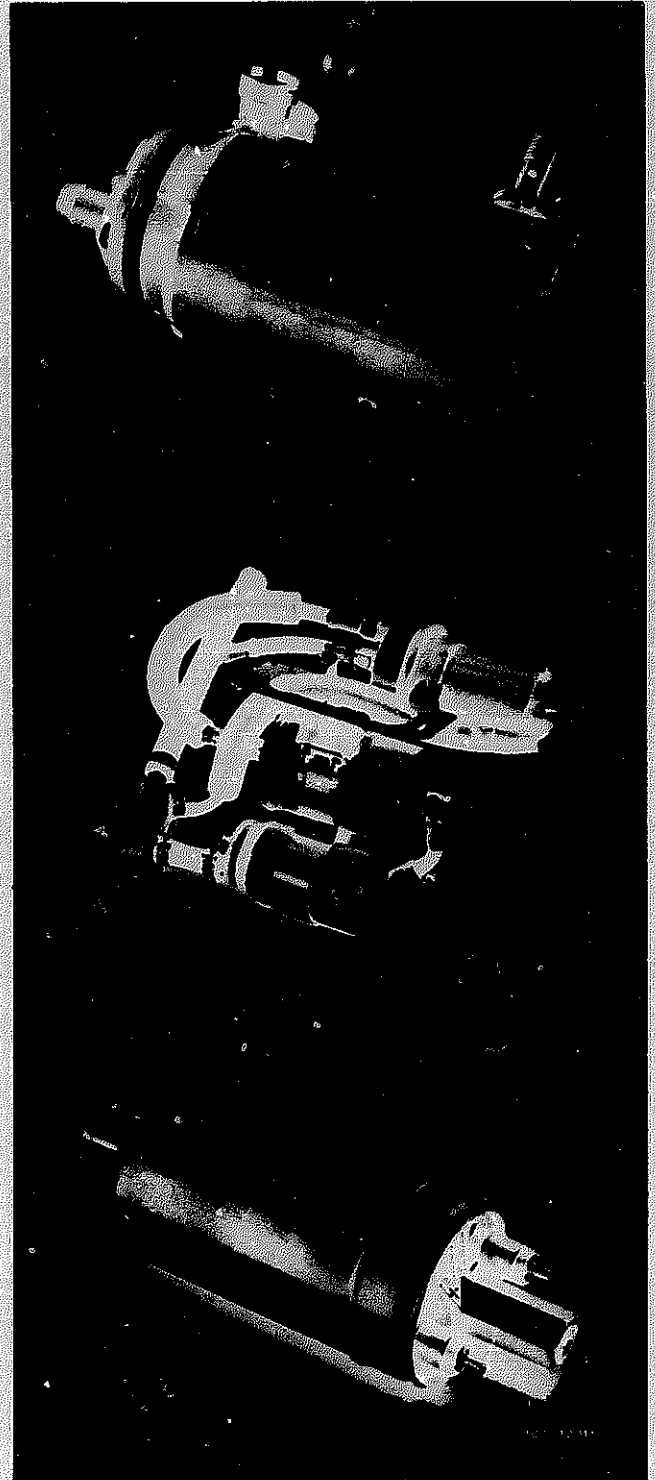
Note

When renewing fuel pump make sure that a fuel pump of latest design is installed. For conversion jobs refer to job No. 07.3-282 "Section B".

Fuel pump 1st version

Fuel pump 2nd version

On this fuel pump the fuel connections and the electrical connections have been modified. Except for location of fuel hose (pressure end) between fuel pump and fuel filter and electrical connections, the installation position is the same.

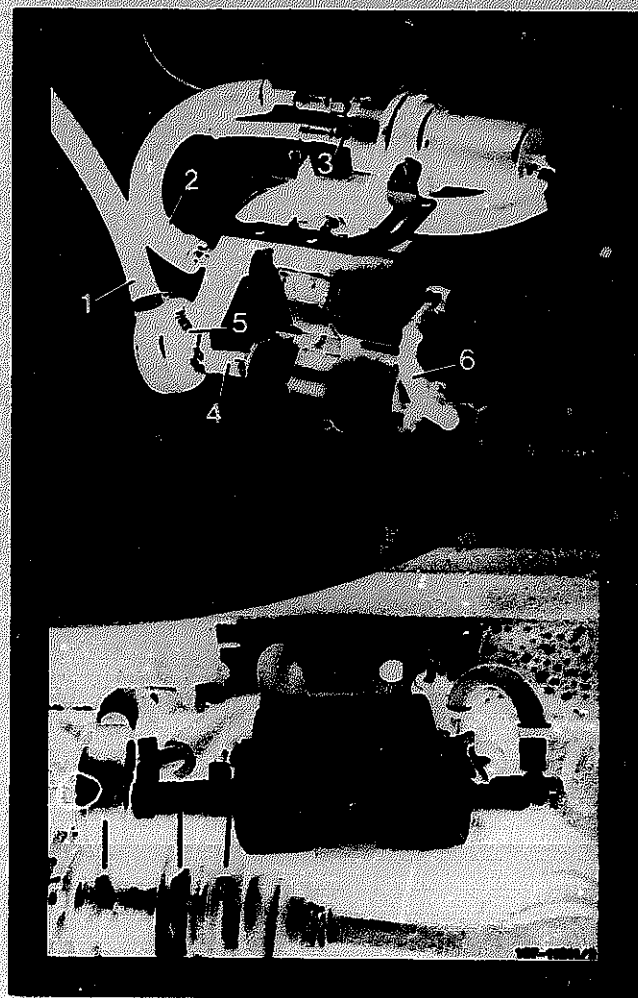


Fuel pump 3rd version

To keep intake characteristics constant under all climatic conditions, the intake connection (3) has been increased to a diameter of 13 mm (formerly 10 mm). As a result, the diameter of the connection on damper container (1) and that of fuel hose (2) also required a change.

Repair note

If in connection with complaint "Engine firing poorly when warm" an internal leak of fuel pump is found, a check valve can be subsequently mounted on former fuel pump (07.3-283).



09

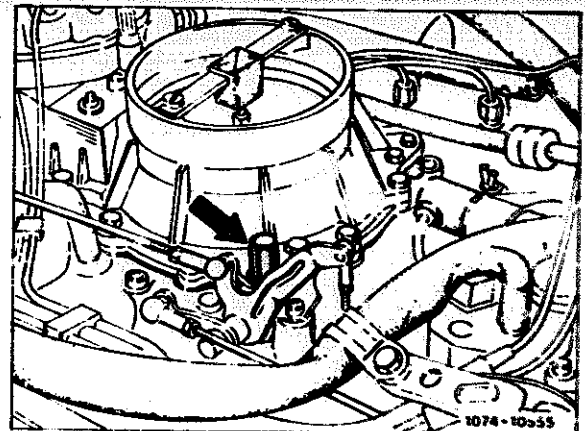
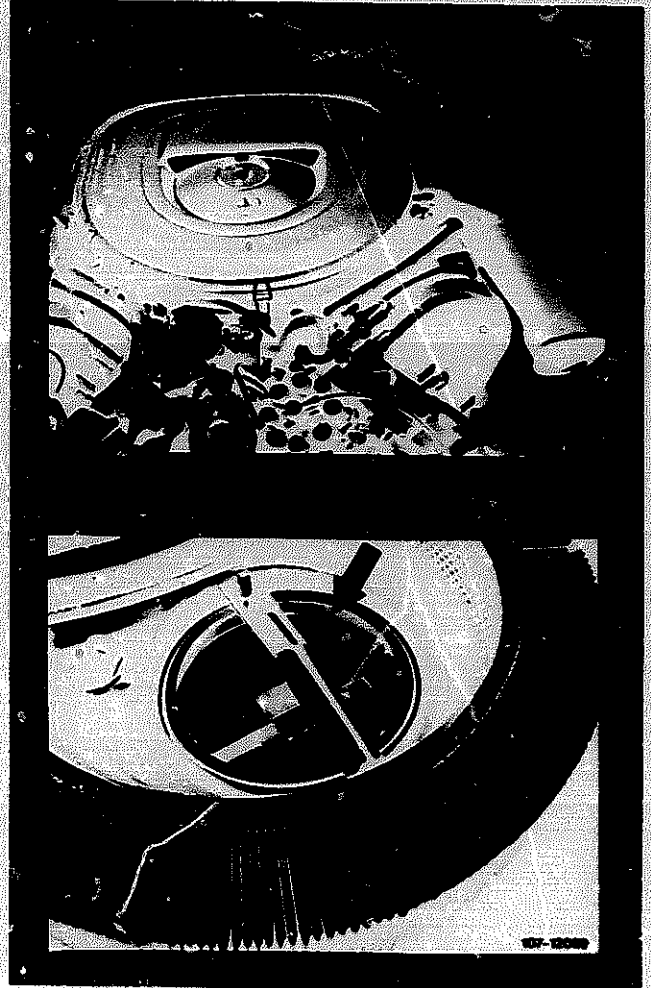
Removal

- 1 Unscrew both wing nuts on vibration dampers.
- 2 Remove air cleaner, while pulling off contour hose for crankcase breather.

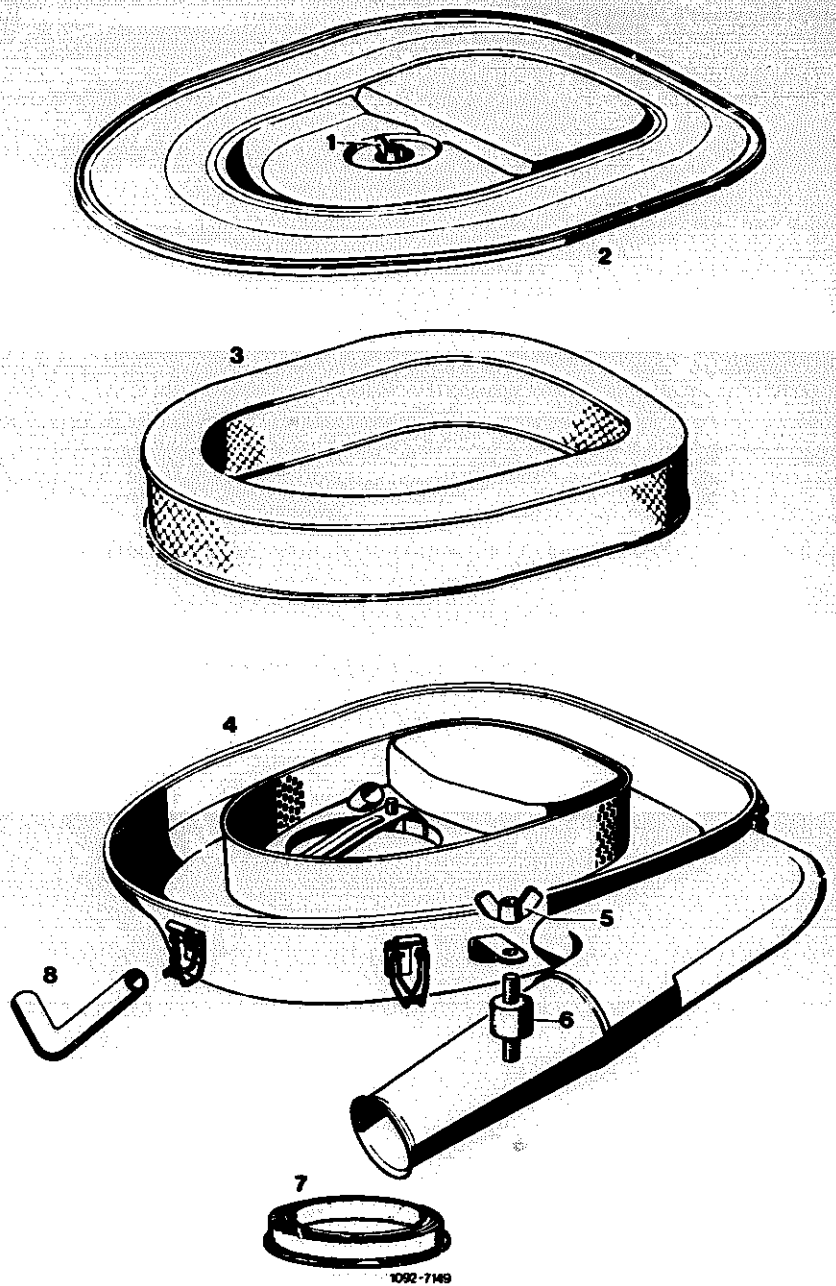
Installation

- 3 Remove air cleaner cover.
- 4 Mount air cleaner. Pay attention to correct seat of sealing ring (arrow) between air flow sensor and air cleaner.
- 5 Mount air cleaner cover.

note: For better location of air cleaner, mount a stop nut (arrow), part No. 117 070 00 41, on mixture controller at front right (formerly hex. nut).



Air cleaner



E 10

F 10

14

F 10

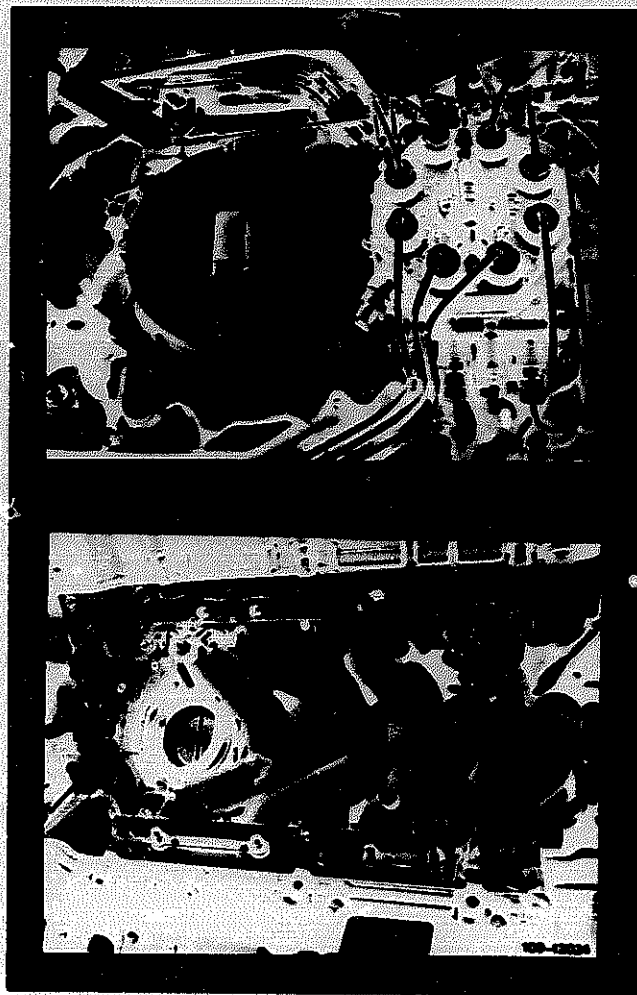
14-450 Removal and installation of intake manifold upper and lower half, replacement of gaskets

Note

When removing and installing intake manifold, the mixture controller with air guide housing need not be removed.

Removal

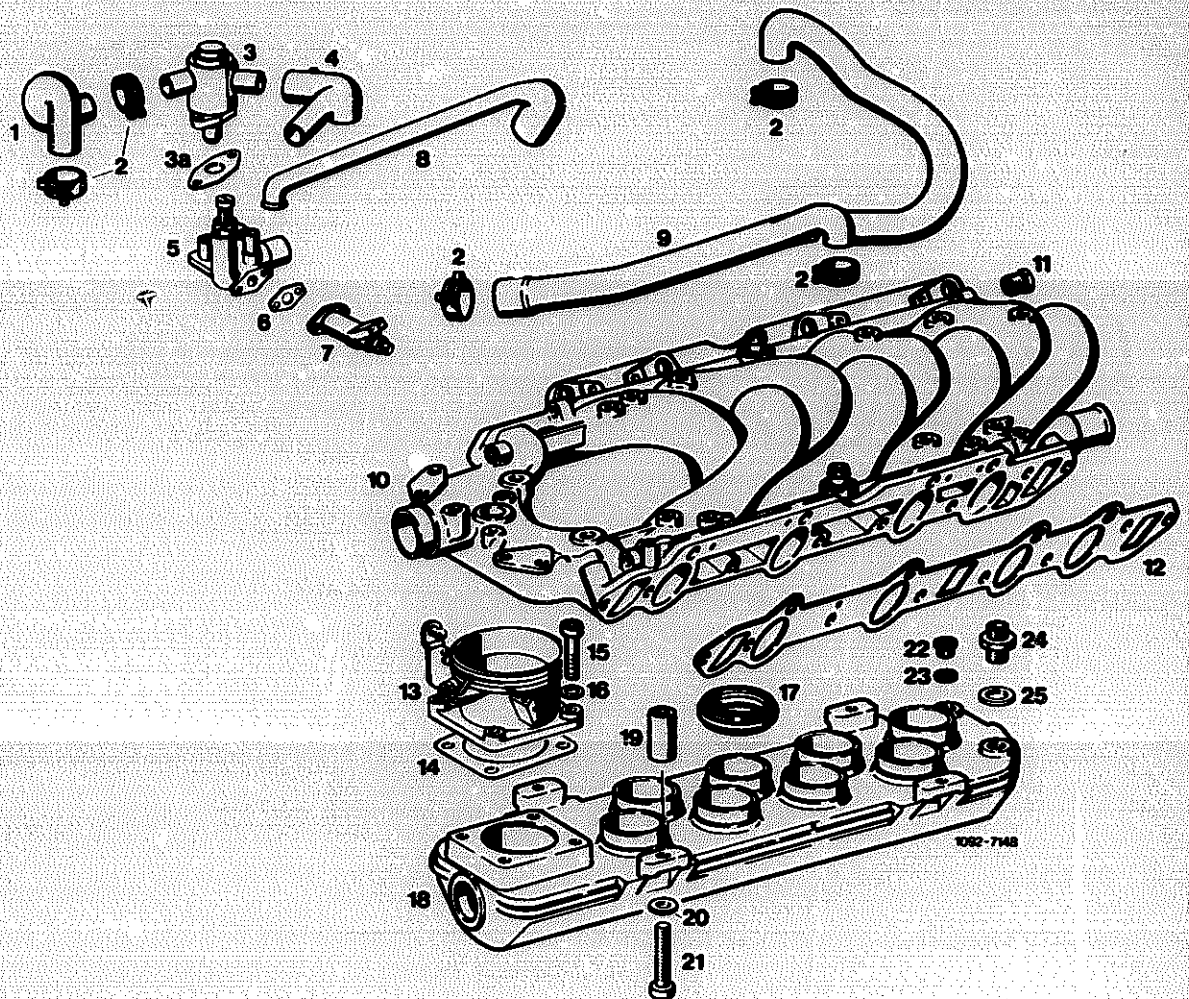
- 1 Disconnect battery.
 - 2 Partially drain coolant.
 - 3 Unscrew injection lines and fuel lines. Catch fuel with a rag.
- Deactivate fuel lines.
- 4 Pull off additional air lines.
 - 5 Force off control pressure rod for automatic transmission.
 - 6 Screw off bearing bracket for guide block regulation.
 - 7 Unscrew bearing bracket for longitudinal regulating shaft.
 - 8 Pull off all connecting cables and plug connections.
 - 9 Unscrew vacuum line for automatic transmission and for brake unit.
 - 10 Unscrew idle speed air distributor.
 - 11 Loosen and pull off coolant hoses.
 - 12 Unscrew all fastening screws and remove intake manifold toward the rear.
 - 13 Clean intake manifold and check flange surfaces with straightedge.



Installation

- 14 Mount intake manifold in vice versa sequence with new gaskets.
- 15 Adjust regulating linkage (30–300).
- 16 Connect battery.
- 17 Fill in coolant.
- 18 Run engine, check fuel lines for leaks. Check intake system, fuel distributor and injection valves for leaks by spraying with Iso-Oktan or benzine.
- 19 Adjust idle speed (07.3–100).

Intake manifold



- | | | |
|------------------------------|-------------------------------|-----------------------------|
| 1 Contour hose | 10 Intake manifold upper half | 20 Washer |
| 2 Spring hose clamps | 11 Closing plug | 21 Hex. socket screw |
| 3 Auxiliary air valve | 12 Gasket | 22 Closing plug |
| 3a Gasket | 13 Throttle valve housing | 23 Sealing ring |
| 4 Contour hose | 14 Gasket | 24 Double thread connection |
| 5 Idle speed air distributor | 15 Hex. socket screw | 25 Sealing ring |
| 6 Gasket | 16 Washer | |
| 7 Cold starting valve | 17 Rubber connection | |
| 8 Contour hose | 18 Intake manifold lower half | |
| 9 Auxiliary air line | 19 Spacing sleeve | |

Renewing

- 1 Remove and install intake manifold (14-450).
- 2 Remove and install injection valves and insulating sleeves (07.3-215).
- 3 Remove and install mixture controller with air guide housing (07.3-225).
- 4 Unscrew all unscrewable parts on installed intake manifold and mount on new intake manifold together with new gaskets.
- 5 Unscrew intake manifold upper half from intake manifold lower half. For this purpose, loosen vacuum line for brake unit on intake manifold lower half, then unscrew fastening screws and pull from rubber intermediate members.
- 6 Mount intake manifold lower half with new rubber intermediate members to intake manifold upper half.



Tightening torque

Nm

Fastening screw for engine mount

75

Removal

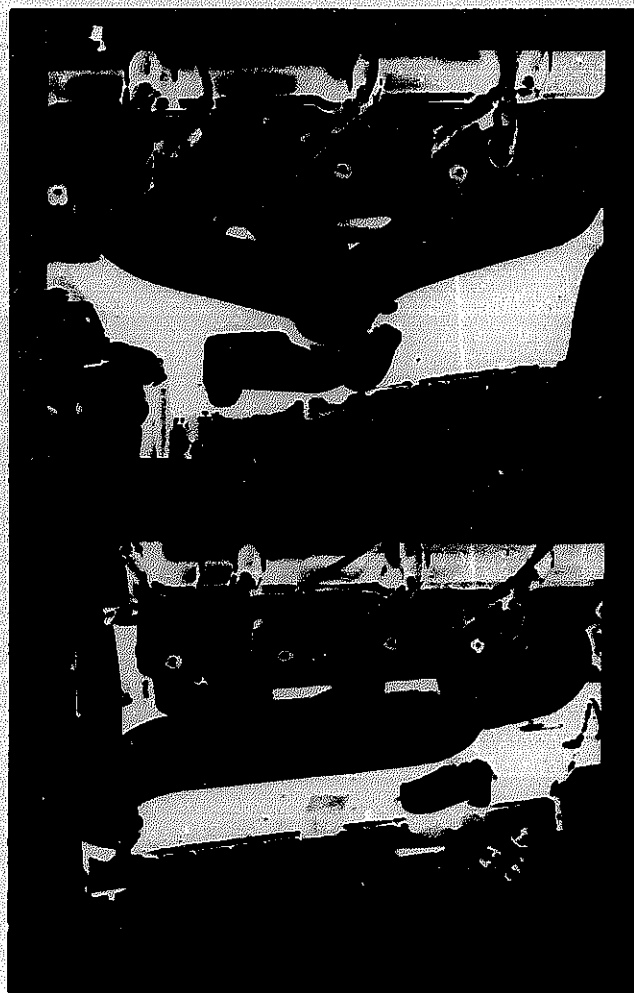
- 1 Remove exhaust system (49--100).
- 2 Remove engine longitudinal regulating shaft (30--310).
- 3 Remove air cleaner.

Exhaust manifold left

- 4 Pull off ignition cable.
- 5 Unscrew all exhaust nuts.
- 6 Completely unscrew fastening screw for lefthand engine mount and fastening nut for engine shock absorber.
- 7 Lift engine with pituit to the extent that exhaust manifold can be removed.

Exhaust manifold right

- 8 Remove windshield washer reservoir with holder.
- 9 Remove battery and battery holder.
- 10 Pull off ignition cable.
- 11 Unscrew all exhaust nuts.



12 Unscrew fastening screw for righthand engine mount and fastening screw for engine shock absorber.

13 Lift engine with pitlift until exhaust manifold can be removed.

Installation

14 For installation proceed vice versa and renew all gaskets and exhaust nuts.

15 Mount flange gaskets with sheet metal (arrow) facing exhaust manifold.

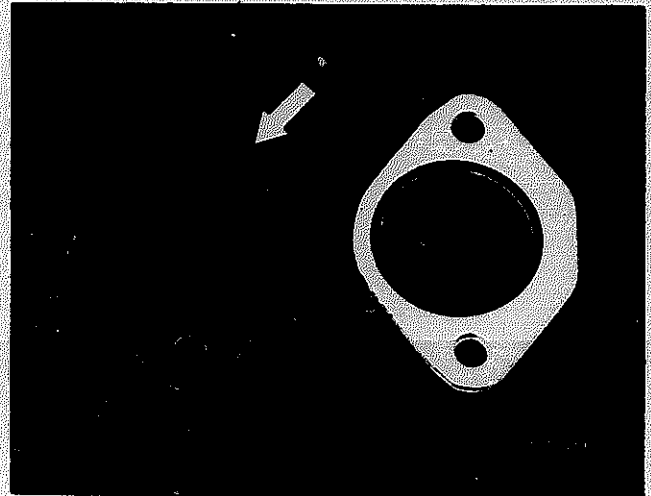
16 Tighten fastening screws for engine mount to 75 Nm.

17 Mount exhaust system.

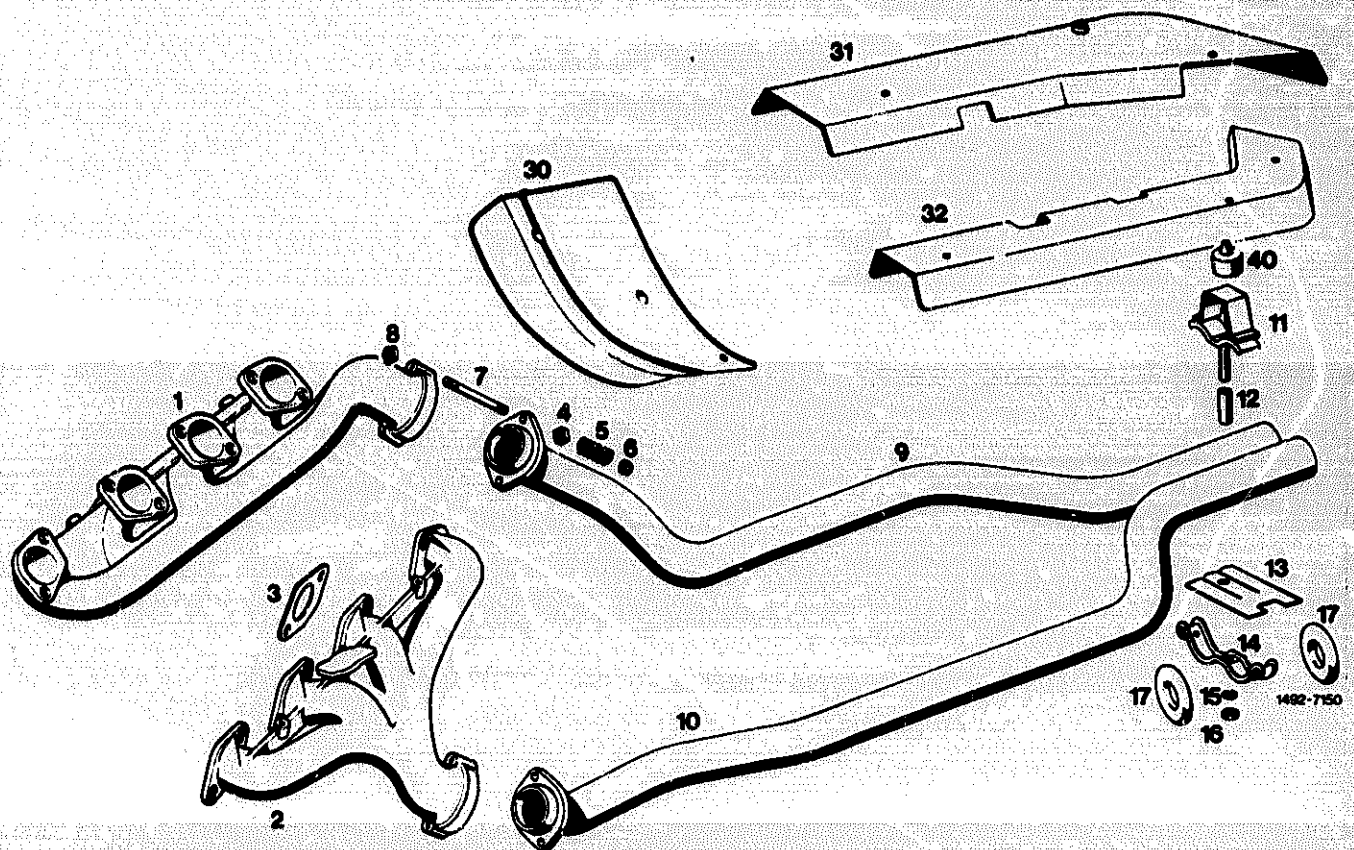
18 Check whether roller in slotted lever rests against end stop. Adjust if required (30–300).

19 Mount air cleaner. Pay attention to correct seat of sealing ring between air flow sensor and air cleaner.

20 Run engine and check exhaust system for leaks.



Exhaust manifold with front exhaust pipes



- | | | |
|--------------------------|--------------------------|------------------------|
| 1 Exhaust manifold right | 8 Rivet nut | 15 Snap ring |
| 2 Exhaust manifold left | 9 Exhaust manifold right | 16 Hex nut |
| 3 Sealing flange | 10 Exhaust manifold left | 17 Rubber ring |
| 4 Spacing sleeve | 11 Clamp | 30-32 Shielding plates |
| 5 Spring | 12 Spacing tube | 40 Rubber buffer |
| 6 Self-locking hex. nut | 13 Insulating plate | |
| 7 Stud | 14 Holding clamp | |

C 11

15

C 11

15 Electrical system engine (ignition system)

Designation	Type and reason for change	Installation	Job No.
Spark plugs	Reduction of thermal value from 200 to 175, as well as revised information label on cylinder head cover.	August 1976	--
Ignition distributor	Revised characteristic.	January 1977	501
Spark plugs	Electrode gap increased from 0.7 to 0.8 mm, to provide better emission values.	August 1977	-
Vacuum retard adjustment	Displacement of vacuum retard connection from throttle valve housing to contour hose between auxiliary air valve and idle speed air distributor. As a result, different ignition distributor with different spring in vacuum control unit. Starting chassis end No. 003385.	April 1978	571

Testing and adjusting values

Standard version

Ignition distributor Bosch No.	Adjusting value ¹⁾ of firing point without vacuum 3000/min	Test value Ignition timing with/without vacuum			Vacuum adjustment in direction of		Installation value of ignition distributor at starting speed without vacuum
		Idle with ²⁾	1500/min without	3000/min without	"retard" at idle	"advance" ³⁾ at 3000/min	
0 237 404 004	30°	TDC + 3°	13-17°	30°	8-12°	8-12°	10° before TDC
0 237 404 007	30°	TDC + 3°	14-22°	30°	8-12°	8-12°	10° before TDC

1) If normally compressed engines are operated with fuel under 98 RON (min. 88 MON), adjust firing point in direction of "retard" and match to obtain rating of fuel used. The reference value for this adjustment is: set firing point back by 1-2° crank angle per 1 RON. Max. setback should not exceed 6° crank angle.

Attention!

Taking firing point back is considered an "emergency measure". Reduced output and increased fuel consumption will result. In addition, the engine should not be fully loaded. As soon as fuel with specified octane number is available, set again to full advance.

2) Disengage air conditioning, automatic transmission in position "N" or "P".

3) On vehicles with thermo valve for advance adjustment, the vacuum adjustment (above + 65 °C) is without function.

National version

Ignition distributor Bosch No.	Adjusting value of firing point with vacuum 800/min	Test values Ignition timing		Vacuum adjustment in direction of		Installation value of ignition distributor at starting speed without vacuum
		without vacuum 1500/min	3500/min	"retard" at idle	"advance" at 3500/min	

(AUS) 1979-1980

Identification: silver information label on cross member in front of radiator.

0 237 405 002	TDC	9-16°	27-33°	6-10°	8-12°	7° before TDC
---------------	-----	-------	--------	-------	-------	---------------

(USA) 1977-1979

Identification: green/black information label in English language on cross member in front of radiator.

0 237 405 002	TDC	9-16°	27-33°	6-10°	8-12°	7° before TDC
---------------	-----	-------	--------	-------	-------	---------------

Conventional tools

Revolution counter, stroboscope

Note

To adjust ignition timing (firing point) pull off both vacuum lines for ignition timing. After setting firing point, test specified firing point at idle with vacuum.

2

Testing and adjusting

1 Test firing point with stroboscope or digital tester at specified speed and with or without vacuum.

2 Loosen ignition distributor fastening, if required, and set adjusting value of firing point by turning ignition distributor.

Screw down ignition distributor and check firing point once again.

3 Check centrifugal and vacuum adjustment of ignition distributor. For this purpose, run through specified test values.

Note

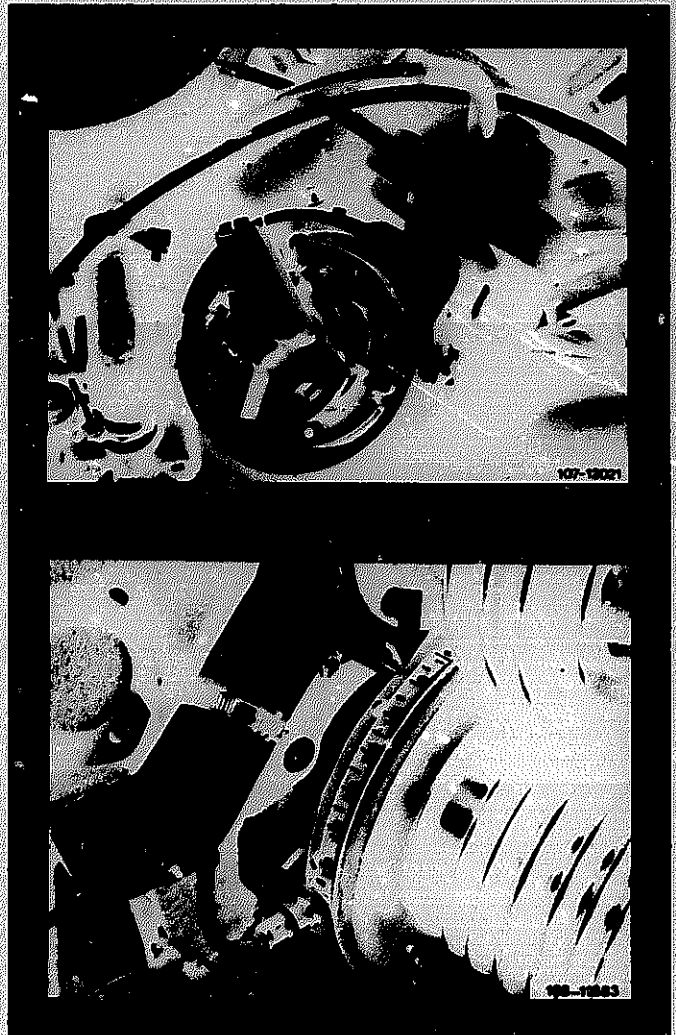
Turn crankshaft in direction of engine rotation at fastening screw of V-belt pulley only.

Removal

- 1 Remove ignition distributor cap, cable plug connections and vacuum lines.
- 2 Set engine to ignition TDC of 1st cylinder. For this purpose, the markings on the distributor rotor and on distributor housing should be in alignment.
- 3 In addition, the pointer on crankcase should be above TDC mark of vibration damper.
- 4 Loosen ignition distributor attachment and pull out ignition distributor.

Installation

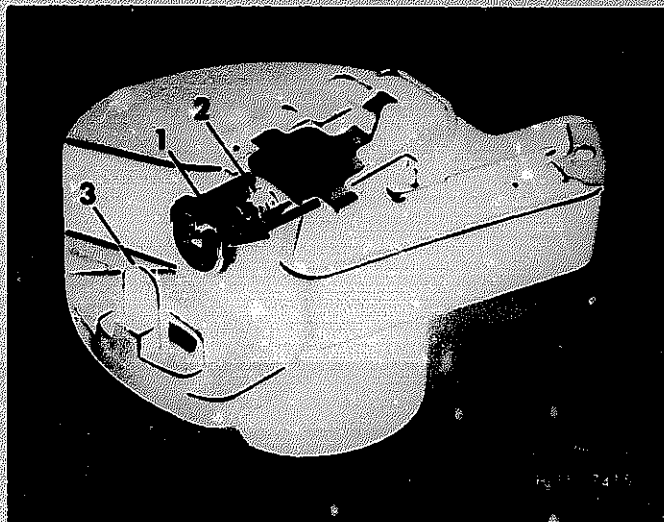
- 5 For installation proceed vice versa. Pay special attention to ignition TDC of 1st cylinder and to markings on distributor housing and vibration damper (refer to item 2 and 3).



Note. The ignition distributor rotor is provided with a speed limiter (except **USA**). The distributor rotor is identified with breakaway speed 5300 and 6.9.

6 Adjust firing point (15-501)

- 1 Flyweight
- 2 Spring
- 3 Grounding spring

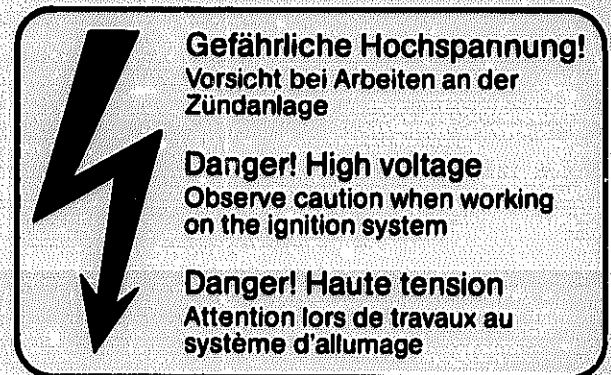


Attention!

When working on breakerless transistorized ignition system, be sure to observe the following safety instructions:

- Persons with heart stimulators should not work on such ignition systems.

Information label in engine compartment



1154-9352

- With the engine running or at starting speed, do not touch, pull off etc. components of ignition system, ignition cable, ignition coil, spark plug connector.
- Perform assembly jobs on ignition system only with engine stopped and ignition switched off.
- Also connect and disconnect test instruments only with engine stopped and ignition switched off.
- Do not install adapters or transmitters, e.g. for stroboscope, into ignition cable, e.g. cylinder 1, which are metallically bright.

Note

This ignition system is widely free of maintenance requirements and guarantees adequate ignition voltage even at max. speeds and a more accurate adherence to firing point.

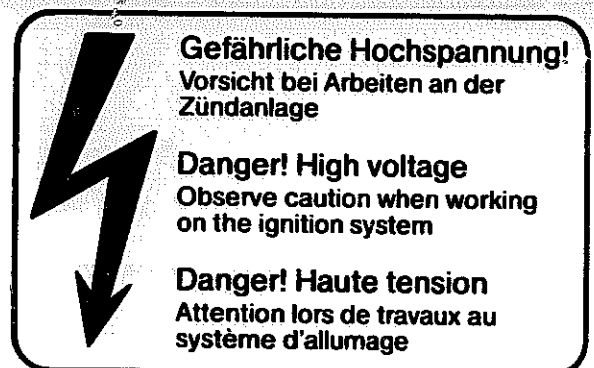
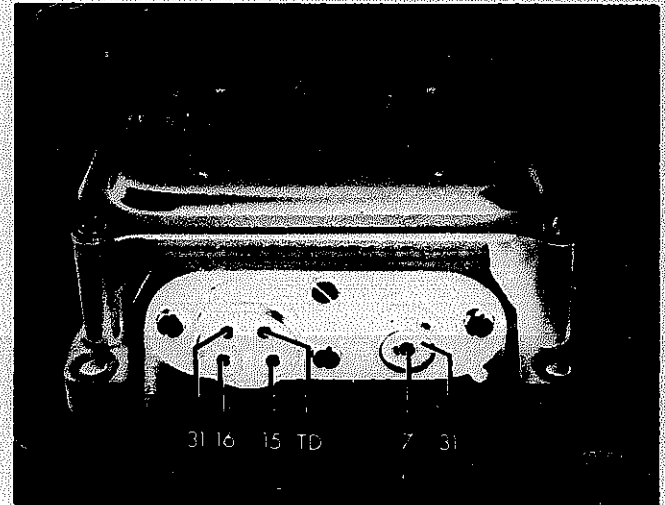
Identification: Yellow paint dot on housing top up to production date 930 and a different Bosch No. 0 227 100 001.

Components of ignition system

Ignition coil

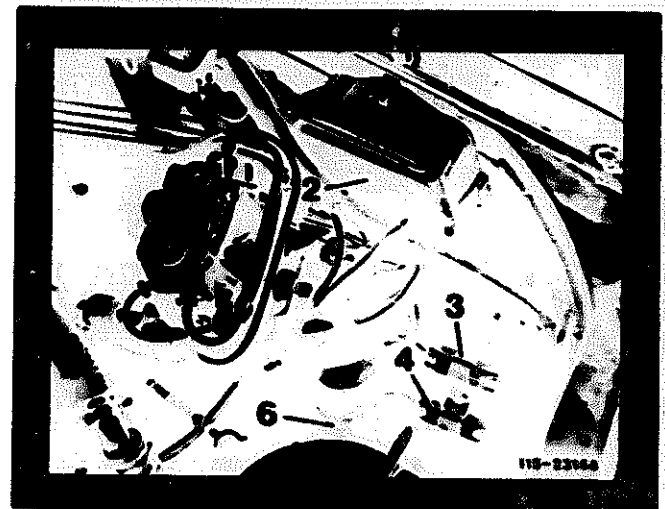
Design and external dimensions of the ignition coil are similar to those of a normal high-performance ignition coil. However, the coil layout is different. The transformation ratio amounts to approx. 1 : 185 as compared with 1 : 100 for conventional ignition coils.

Identification: Blue paintwork and sticker transistor Bosch No. 0 221 122 001.



1154-9352

- 1 Cable connector
- 2 Switching unit TSZ 4
- 3 Series resistor 0.6 ohm
- 4 Series resistor 0.4 ohm
- 6 Ignition coil



Series resistors

Series resistors 0.4 ohm and 0.6 ohm are similar to those of former ignition coil resistors: The resistance coil is surrounded by a ceramic body, with projecting connections.

A sheet metal clamp is placed around ceramic body for attachment. The color of this clamp provides information with regard to resistance value, which is also punched in as a number.

Color	Code number	Resistance
anodized, blue	0.4	0.4 ohm
anodized, metallic	0.6	0.6 ohm

Switching unit

The switching unit contains several transistors, resistors and other electronic components in a metal housing. This metal housing protects the components against mechanical damage and splash water and serves also for eliminating dissipated electric heat. Contacting on switching unit is performed by a 4-point round plug connection and coaxial plug for activation.

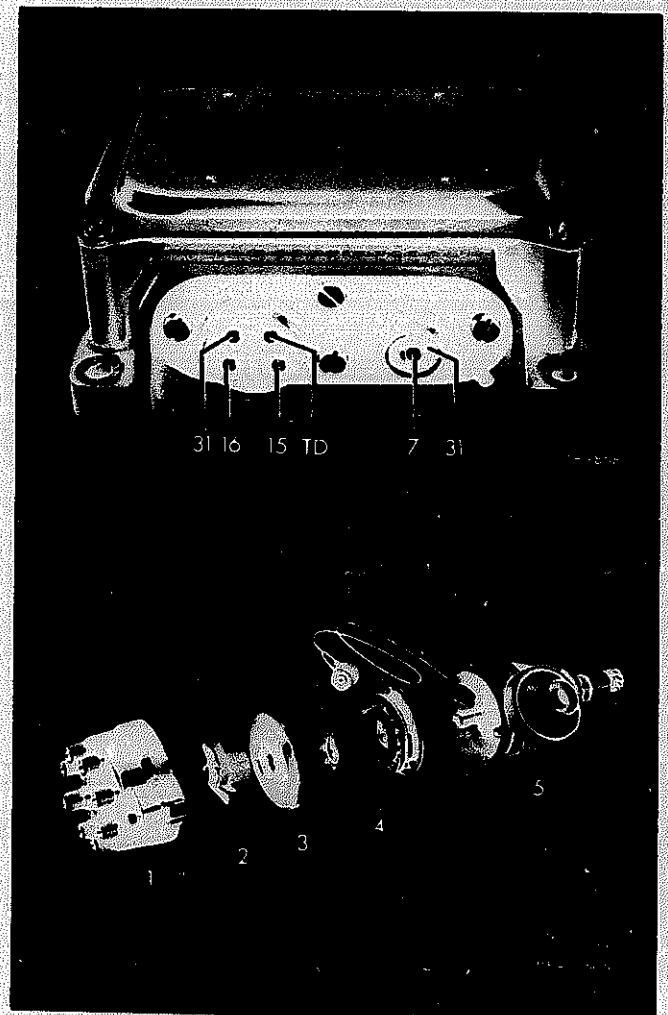
In the event of repairs, only the complete switching unit can be replaced.

Ignition distributor

Instead of a contact set, the ignition distributor is provided with a transmitter section, which operates according to the induction principle.

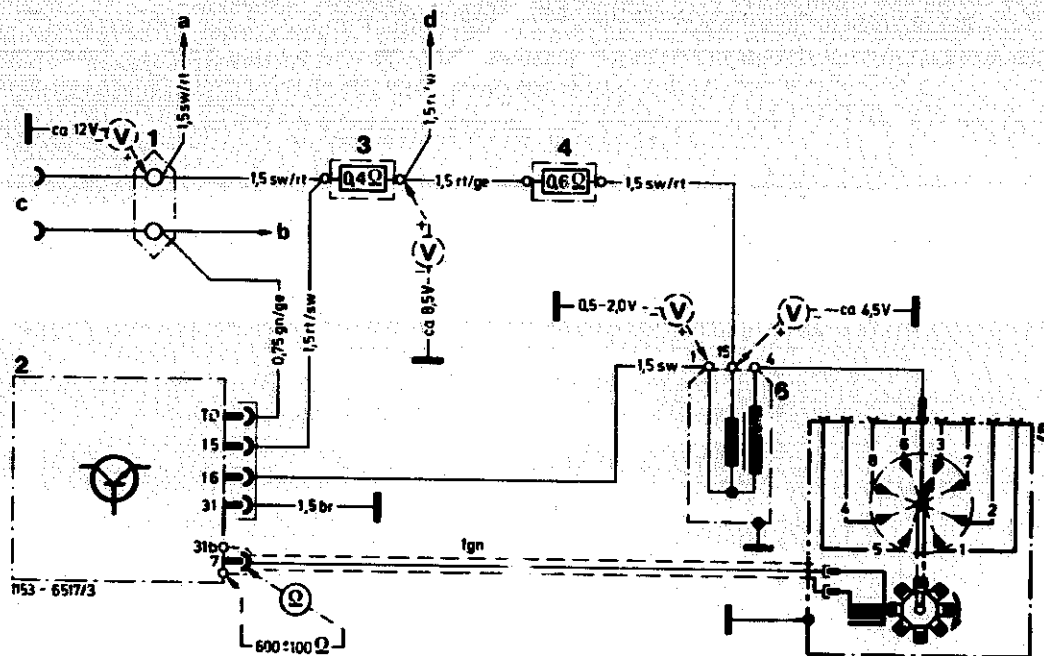
Ignition timing by centrifugal forces and vacuum is similar to former ignition distributors.

- 1 Ignition distributor cap
- 2 Ignition distributor rotor
- 3 Shielding cap
- 4 Transmitter section
- 5 Ignition distributor housing



A rotor with its number of teeth corresponding to number of engine cylinders produces during its rotation per tooth a change of magnetic flux in a magnetic field established by a permanent magnet. As a result, an induction coil located in magnetic field establishes a control voltage (0.3 V – 100 V) which depends in its size on engine speed, with a steep change from positive to negative halfwave. This steep change of polarity of control voltage is used in switching unit following zero passage for impulse shaping, impulse amplification and interruption of primary current.

If the primary current is interrupted, the ignition voltage is induced in secondary winding of ignition coil. The dwell angle control in switching unit adapts the current flow time of primary current to the engine speed, that is, the dwell angle will also become larger with increasing speed, so that adequate ignition voltage is assured also in upper speed range.



Wiring diagram breakerless transistorized ignition system

- | | |
|---|--|
| 1 2-point cable connector | a Ignition starting switch |
| 2 Switching unit | b Instrument cluster, revolution counter |
| 3 Series resistor 0.4 ohm | c Diagnosis socket |
| 4 Series resistor 0.6 ohm | d Terminal 16 starter |
| 5 Ignition distributor with transmitter section | |
| 6 Ignition coil | |

Test values

Battery rest potential		approx. 12 V
	Terminal 1 and ground	0.5-2.0 V
	Terminal 15 and ground	approx. 4.5 V
Input voltage series resistor		approx. 12 V
	Primary terminal 1 and 15	0.33-0.46 ohm
	Secondary terminal 1 and 4	7-12 kΩ
Transmitter resistance between terminal 7 and 31 d		600 ± 100 ohm
Transmitter coil with control line terminal 7 and ground		∞
Dwell angle at	approx. 1500/min	25-39°
	approx. 5000/min ¹⁾	33-40°

1) Perform dwell angle test at 5000/min only if complaints refer to misfiring at high speeds.

Conventional testers

Voltmeter, ohmmeter, dwell angle measuring instrument, revolution counter



- | | |
|---|--|
| 1 Double cable connector | a Ignition starting switch |
| 2 Switching unit | b Instrument cluster, revolution counter |
| 3 Series resistor 0.4 ohm | c Diagnosis socket |
| 4 Series resistor 0.6 ohm | d Terminal 16 starter |
| 5 Ignition distributor with transmitter top | |
| 6 Ignition coil | |

Color code
br = brown
ge = yellow
gn = green
rt = red
sw = black

In the event of complaints about misfiring, test high voltage side of ignition system first (spark plugs, ignition cable, spark plug connectors).

If the complaint refer to firing of engine, complete the following tests on ignition system in addition to tests at fuel end.



Check electrical screw connections and plug connections of ignition system for tight seat.

Voltage test

Note: With the ignition switched on and the engine stopped a primary current of approx. 8 amps will flow continuously through system.

1 Input voltage at double cable connector cable color black/red (15/54):

Nominal value approx. 12 volts.

2 Voltage at ignition coil at approx. 20 °C:

Terminal 15 and ground = approx. 4.5 volts

Terminal 1 and ground = 0.5–2.0 volts

a) If value at terminal 1 is exceeded, the switching unit is defective and should be replaced.

b) If value at terminal 1 is attained, but no ignition voltage (ignition spark) is induced, check transmitter section in ignition distributor and secondary winding of ignition coil.

Resistance values of ignition coil at approx. 20 °C:

Primary winding terminal 15 and terminal 1
0.33–0.46 ohm

Secondary winding terminal 1 and terminal 4
7–12 kΩ

Testing dwell angle

Note: The dwell angle cannot be adjusted. Testing is a functional inspection of switching unit (dwell angle control).

Connect dwell angle measuring instrument.

Nominal value at

engine speed	dwell angle
--------------	-------------

1500 ± 50/min	25–39
---------------	-------

5000 ± 50/min ¹⁾	33–40
-----------------------------	-------

¹⁾ Test at 5000/min only in the event of complaints about misfiring at high speeds.

If this value is not attained when measuring dwell angle, check ignition distributor transmitter section first. If transmitter section is in order, replace switching unit.

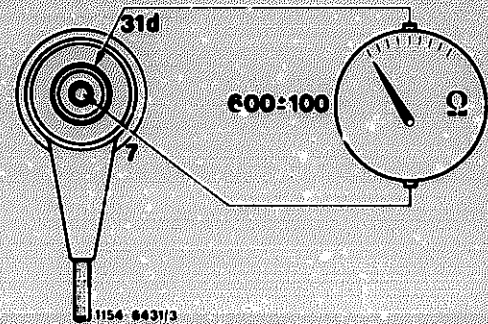
Testing ignition distributor transmitter section

Pull control line of ignition distributor from switching unit and connect ohmmeter.

- 1 Check transmitter resistance between terminal 7 and 31 d.

Nominal value: $600 \pm 100 \text{ ohm}$

Note: On cold engine, the ohmic value should be in lower half of specified value, on warm engine in upper half.



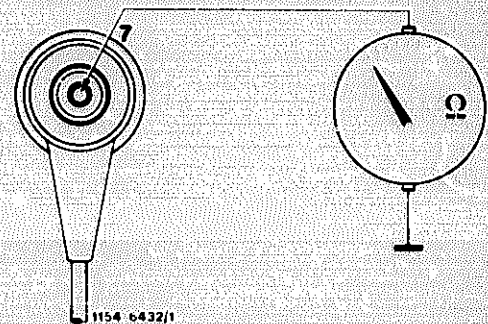
Ohmmeter connection for transmitter resistance test

- 2 Test transmitter coil including control line for ground connection.

Nominal value: Terminal 7 – ground = ∞

Note: The control line can be pulled from transmitter coil and separately tested for interruption or ground connection.

When checking control line, make sure that the connecting contacts are not widened.



Ohmmeter connection for checking ground connection

3 Check transmitter section for mechanical damage.
Check for presence of air gap between rotor and
stator.

Note: If the transmitter section is defective, replace
complete ignition distributor.

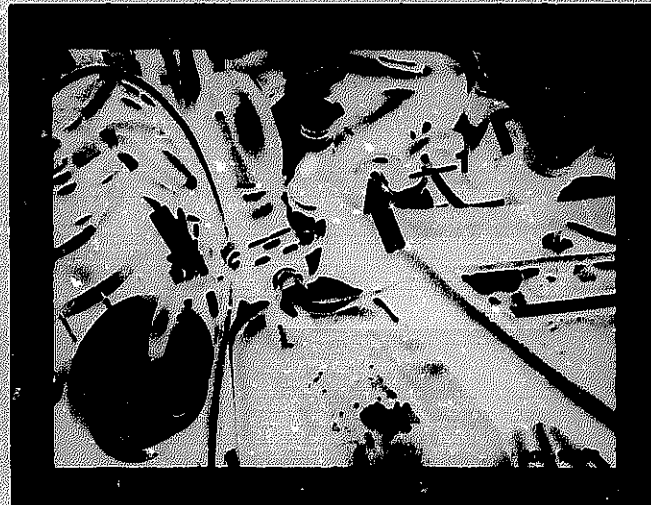
Breakerless ignition distributor

- 1 Distributor cap
- 2 Distributor rotor
- 3 Dust protection cap
- 4 Transmitter section
- 5 Distributor housing with
transmitter connection



Note

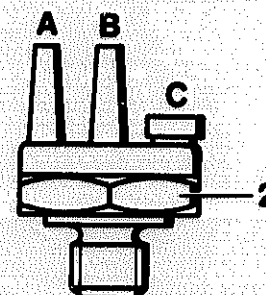
To shut off the vacuum advance adjustment of ignition distributor at high coolant temperatures (approx. 90 °C), a thermovalve 65 °C (1) has been installed in coolant circuit on a number of vehicles.



Function

Below approx. +65 °C coolant temperature on thermovalve (thermovalve open) the vacuum flows from throttle valve housing through thermovalve to vacuum advance unit on ignition distributor, so that the firing point will be adjusted by 8–12° in direction of advance.

Above approx. +65 °C coolant temperature on thermovalve (corresponding to approx. 90 °C coolant temperature on telethermometer in instrument cluster) the thermovalve (2) closes. The vent throttle (C) vents connection (A) in thermovalve, that is, the vacuum advance adjustment goes back to approx. 0°.



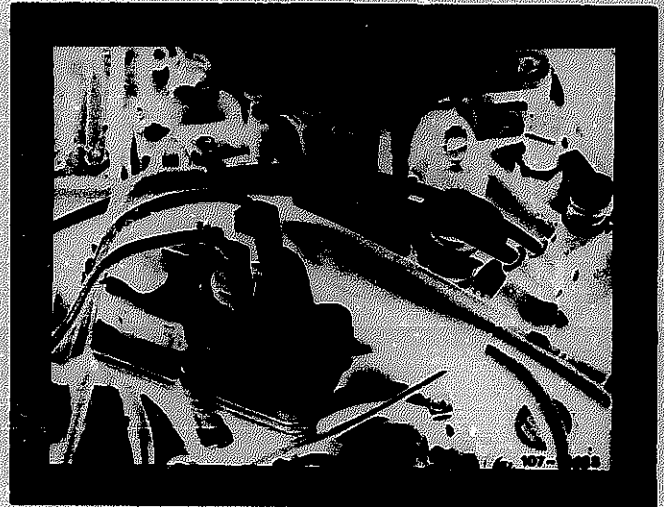
- 2 Thermovalve
- A Connection advance unit (ignition distributor)
- B Connection advance bore (throttle valve housing)
- C Vent throttle

1154 - 10 710

Note

The connection of the vacuum retard adjustment has been modified since approx. April 1978. It is now located in contour hose between auxiliary air valve and idle speed air distributor. The throttle valve housing can no longer be connected.

The changed connection required a modified spring in vacuum control unit of ignition distributor.



Function

At low outside temperatures, following a cold start and influence by low intake manifold vacuum (auxiliary air valve open), the ignition is no longer adjusted in direction of "retard". The idle speed will therefore increase directly following a cold start at very low outside temperatures around approx. 150-200/min.

Repair note

Installation of modified throttle valve housing also requires installation of modified contour hose.

Scope

- 1 Install modified contour hose.
- 2 Pull white/yellow vacuum line from throttle valve housing and connect to contour hose.
- 3 Close freed connection on throttle valve housing with rubber cap, part No. 000 987 11 45.
- 4 Mount new vacuum control unit for ignition distributor.

Spare parts

Designation	Part No.
Contour hose	100 094 11 91
Throttle valve housing	001 140 19 53
Ignition distributor	002 158 58 01
Vacuum control unit	000 158 57 18
Rubber cap	000 987 11 45

Note: If no conversion to modified vacuum retard adjustment is made, make sure that

- the modified ignition distributor or vacuum control unit, respectively, can be separately installed without additional changes and that
- during installation of modified contour hose the vacuum connection on contour hose is closed.

A 13

A 13

30

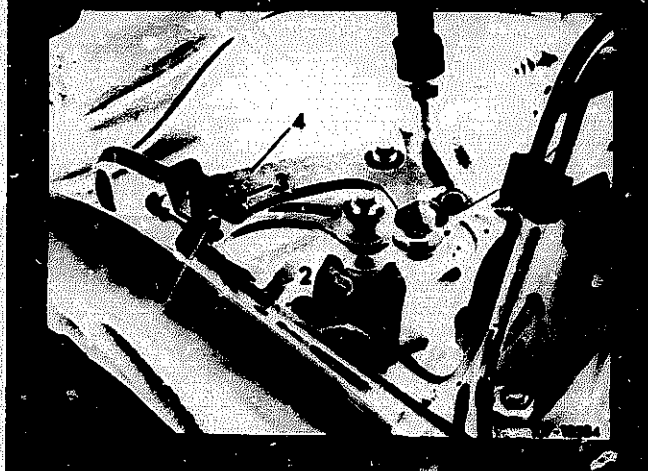
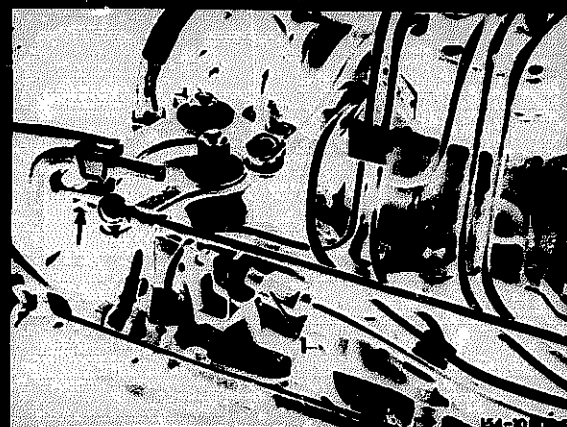
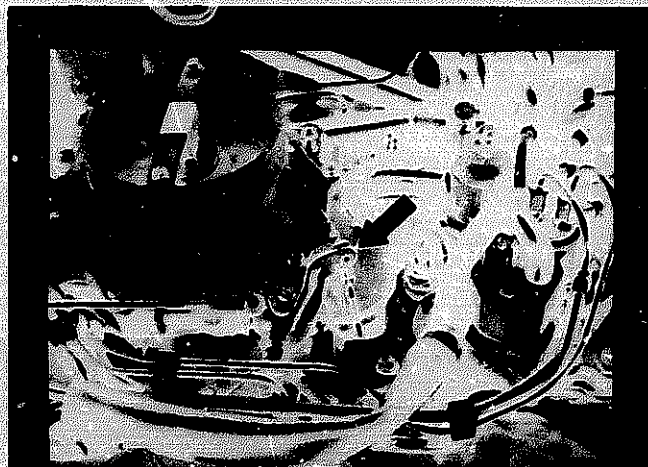
B 13

Adjusting values

Length of connecting rod from throttle valve housing to guide lever	104 mm
Length of connecting rod from accelerator pedal to guide lever	122 mm

Adjustment

- 1 Check regulating linkage for easy operation and distortion. Renew linkage, if required.
- 2 Disconnect connecting rod (arrow) on guide lever. Check whether throttle valve rests against idle speed stop. Reconnect connecting rod free of tension and adjust to 104 mm length, if required.
- 3 On vehicles with cruise control/Tempomat, check whether Bowden wire for cruise control/Tempomat rests free of tension against regulating lever. Adjust by means of adjusting screw (1), if required.
- 4 Adjust connecting rod (2) in such a manner that roller (3) in slotted lever (4) rests free of tension against end stop.

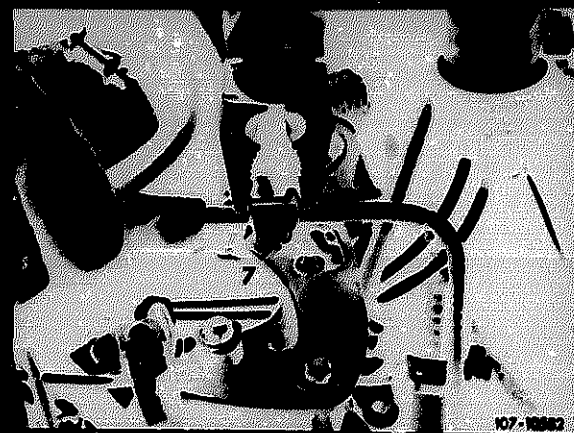
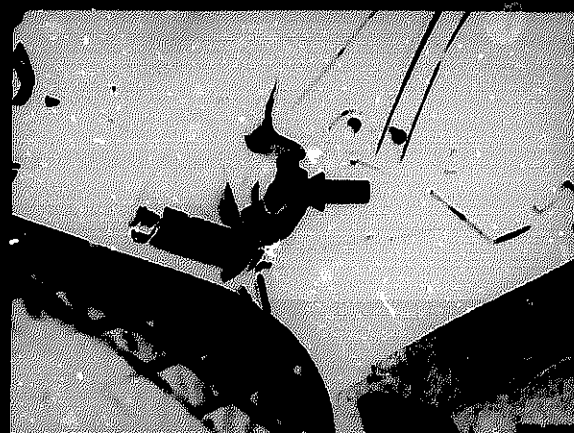


Checking full throttle stop

5 With engine stopped, step on accelerator pedal from inside vehicle down to stop on kickdown switch. Throttle valve lever should rest against full throttle stop. Set hex. nut (arrow) of regulating linkage, if required, in such a manner that the throttle valve lever rests against full throttle stop.

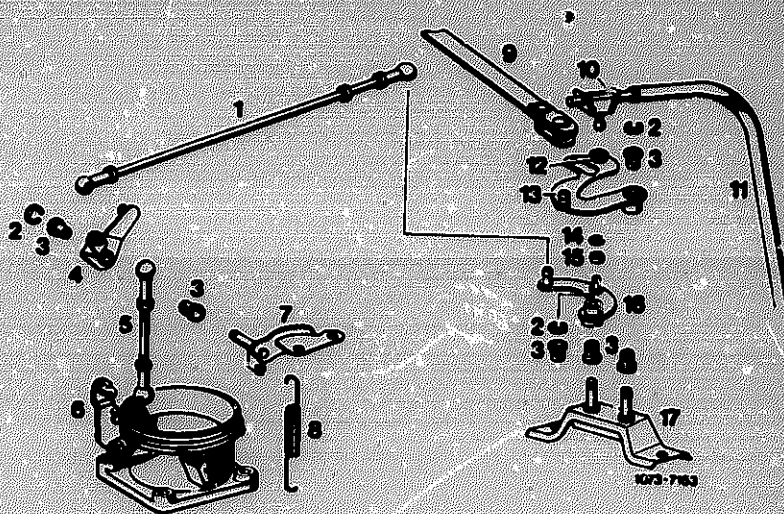
If the full throttle or idle speed stop is not attained with this adjustment, adjust connecting rod from guide lever engine compartment to accelerator pedal to 122 mm, measured from ball socket center to ball socket center. For this purpose, loosen fastening screw (arrow). Pull accelerator pedal slightly upwards and tighten fastening screw again.

6 Adjust control pressure rod (at idle speed position). For this purpose, compress adjusting clip (7) with pliers and push control pressure rod completely to the rear against stop.



Survey engine regulation

- 1 Regulating rod
- 2 Locking ring
- 3 Plastic bushing
- 4 Guide lever
- 5 Connecting rod
- 6 Throttle valve housing
- 7 Bearing bracket
- 8 Return spring
- 9 Connecting rod for longitudinal regulating shaft
- 10 Adjusting clip
- 11 Control pressure rod
- 12 Plastic bushing
- 13 Slotted lever
- 14 Locking ring
- 15 Roller
- 16 Guide lever
- 17 Bearing bracket



Removal

- 1 Disconnect regulating rods.
- 2 Force off lock (arrow).
- 3 Push longitudinal regulating shaft to the rear and remove. Pay attention to compression spring, plastic bushings and joint balls.



Installation

- 4 For installation proceed vice versa. Grease bearing points as well as ball sockets of regulation with Molykote Longterm 2.
- 5 Adjust regulating linkage (30-300).

Adjusting value

Length of connecting rod from accelerator pedal to guide lever

122 mm

Removal

- 1 Remove accelerator pedal (30-330).
- 2 Disconnect connecting rod.
- 3 Disconnect return spring, unscrew fastening nuts from bearing bracket and remove regulating shaft together with bearing bracket.

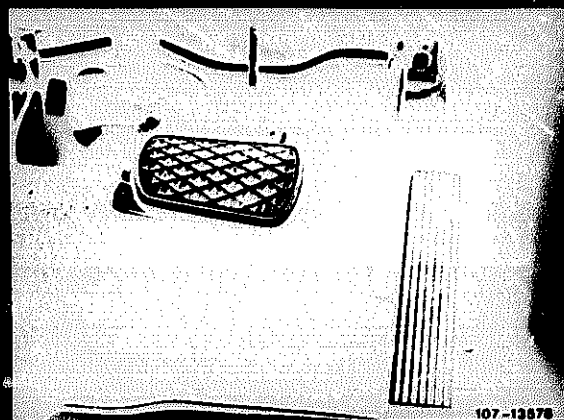
Leifthand steering



Installation

- 4 For installation proceed vice versa, while connecting return spring to inner hole. Grease bearing points as well as ball sockets of regulation with Molykote Longterm 2.

Righthand steering



Adjustment

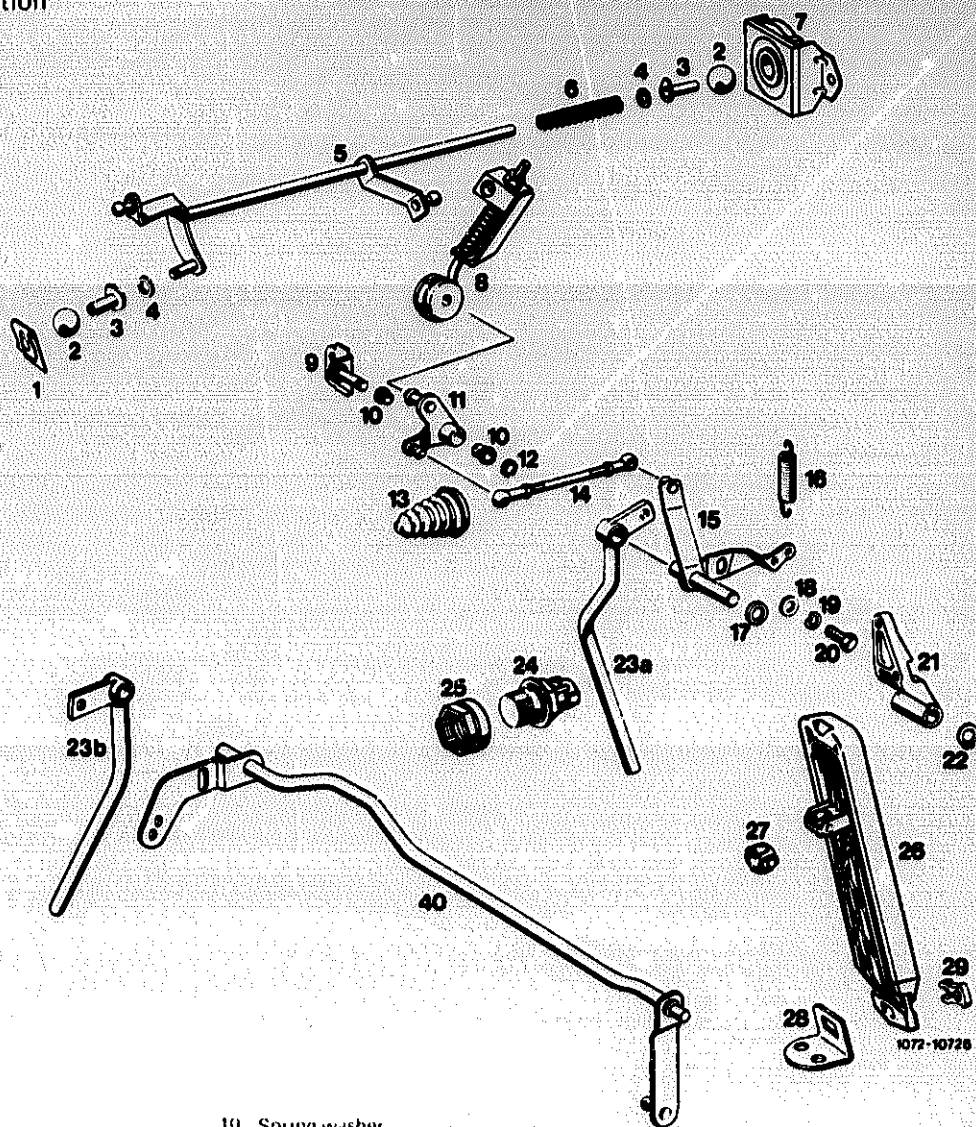
- 5 With engine stopped, step fully down on accelerator pedal from inside vehicle up to stop on kickdown switch. Throttle valve lever should rest against full throttle stop. If required, adjust regulating linkage with hex. nut (arrow) in such a manner that the throttle valve lever rests against full throttle stop.



If the full throttle or idle stop is not attained with this adjustment, adjust connecting rod from guide lever engine compartment to accelerator pedal to 122 mm, measured from ball socket center to ball socket center. If required, adjust regulating lever inside vehicle. For this purpose, loosen fastening screw (arrow), release accelerator pedal slightly and tighten fastening screw again.



Survey chassis regulation



- 1 Clip
- 2 Joint ball
- 3 Bearing bushing
- 4 Spacing ring
- 5 Longitudinal regulating shaft
- 6 Compression spring
- 7 Bearing for longitudinal regulating shaft
- 8 Adjustable pushrod
- 9 Fastening bracket
- 10 Plastic bushing
- 11 Angle lever
- 12 Locking ring
- 13 Rubber grommet
- 14 Connecting rod
- 15 Guide lever
- 16 Return spring
- 17 Spacing ring
- 18 Washer

- 19 Spring washer
- 20 Hex. head screw
- 21 Bearing
- 22 Locking ring
- 23a Accelerator pedal lever left-hand steering
- 24 Kickdown switch
- 25 Adjusting nut
- 26 Accelerator pedal
- 27 Joint
- 28 Fastening plate
- 29 Clip
- 23b Accelerator pedal lever right-hand steering
- 40 Front wall regulating shaft right-hand steering

Removal

- 1 Compress expanding clip (arrow) behind accelerator pedal and pull out.




Installation

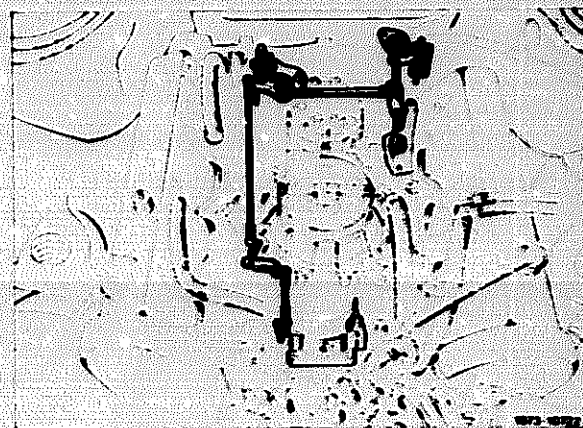
- 2 During installation, make sure that expanding clip is reliably engaging.

Lubrication

Following each engine wash and preservation of engine compartment, lubricate all bearing points of all regulating shafts, regulating levers, joints of regulating linkage and cable controls with an oil can.

On  version vehicles use the following hydraulic fluids only:

BP Aero-Hydraulik 1
Castrol DB Hydraulik Fluid
Esso Univers J-13
Mobil Aero HFA
Shell Aero Fluid 4



47

47 Fuel system

Designation	Type and reason for change	Installation	Job No.
Tightening torques	Revised tolerances.	Entering	700
		production 1979	710
Venting sleeve with diaphragm	Better protection against excessive fuelling.	Entering production 1978	720

Filling capacities in liters

Full readout	approx. 96
Warning lamp – reserve	11–13

Tightening torques

	Nm
Fastening screws or fastening nuts for fuel tank	17–25
Hex. head closing plug for immersion tube transmitter or screw-type immersion tube transmitter	35–43
Fuel filter	

Special tool

Torque wrench, double arm, 1/2" square,
15–65 Nm



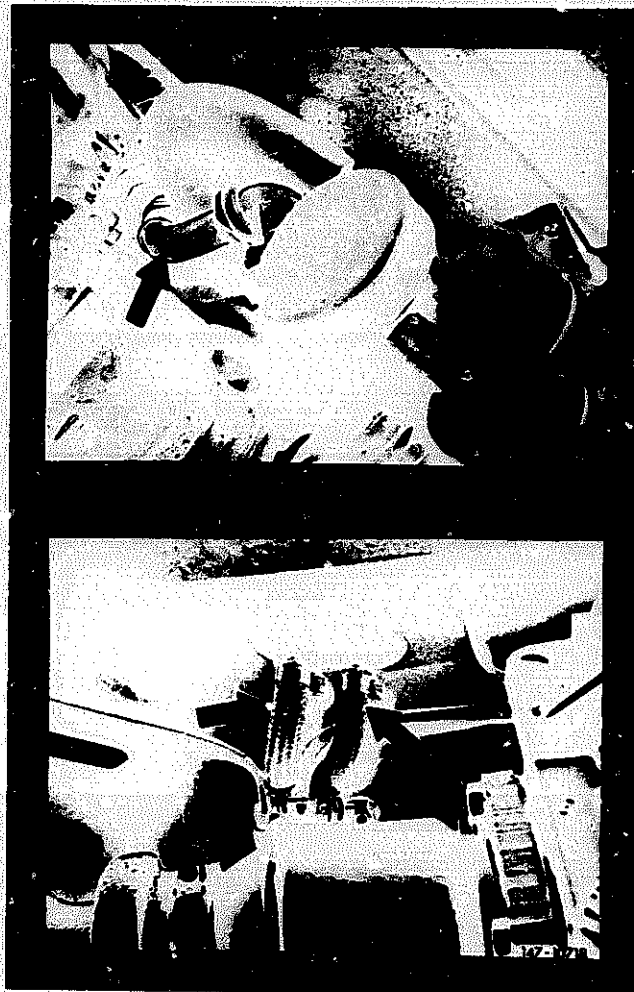
000 589 27 21 00

Attention!

When removing fuel tank, pay attention to safety rules.

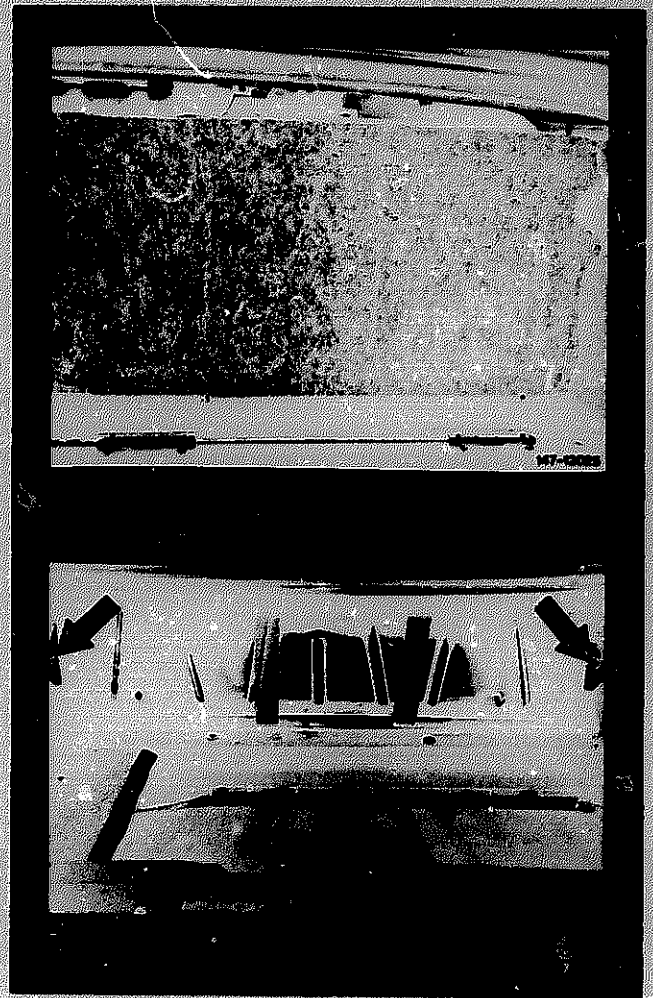
Removal

- 1 Disconnect grounding line on battery.
- 2 Drain fuel tank. Carefully pump out fuel, so that no residual fuel remains in fuel tank.
- 3 Loosen suction hose, return flow hose and vent hose (arrows). Catch residual fuel in hoses. Close hoses and connections.



- 4 Remove trunk floor mat.
- 5 Unscrew back wall and remove.

- 6 Loosen fuel tank fastening screws or fastening nuts (arrows).
- 7 Slightly pull out fuel tank and pull coupler from immersion tube transmitter.
- 8 Remove fuel tank.

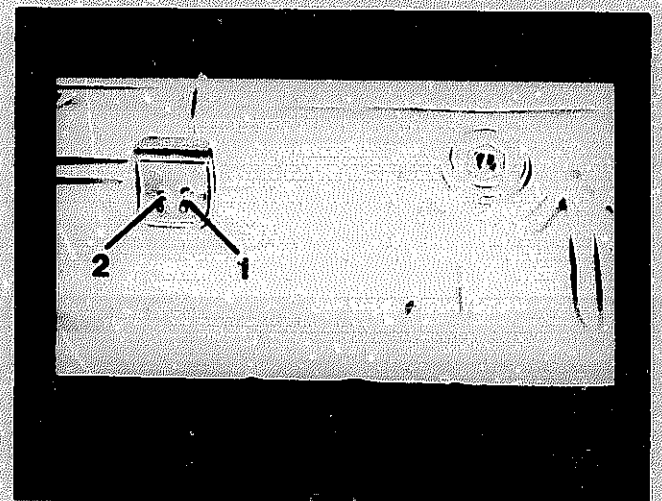


Installation

- 9 Install fuel tank in vice versa sequence and proceed as follows:

a) After using up parts in stock, only fuel tanks with directly screwable immersion tube transmitter are available from spare parts stockroom. In such a case, also renew immersion tube transmitter (47-710).

b) Glue down both gaskets at underside of fuel tank with MB universal glue, part No. 000 989 92 71. For installation, coat both gaskets following sealing surface or bead with slide compound (talcum, wax or the like).



- 1 Positive and negative vent line
- 2 Fuel return-flow line

c) Check whether damping shims on fuel tank are tight, glue down with MB universal glue, part No. 009 989 92 71, if required.

d) Blow out filter jacket (b) and check for damage. Renew sealing ring (a). Tighten fuel filter (68) to 35–43 Nm.

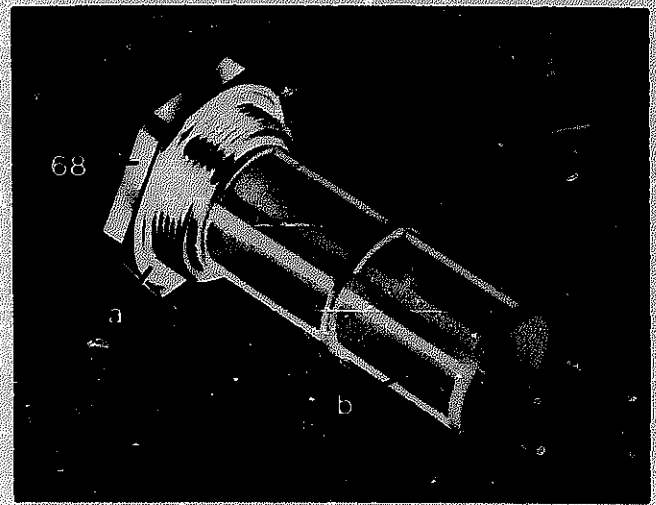
e) Mount fuel tank with reinforcing panels and washers provided. Tighten fastening nuts to 17–25 Nm.

f) Pay attention to correct seat of rubber sleeve on fuel filler neck.

g) Mount coupler for fuel gauge and check for function (grounding line on battery connected).

h) Renew defective fuel hoses.

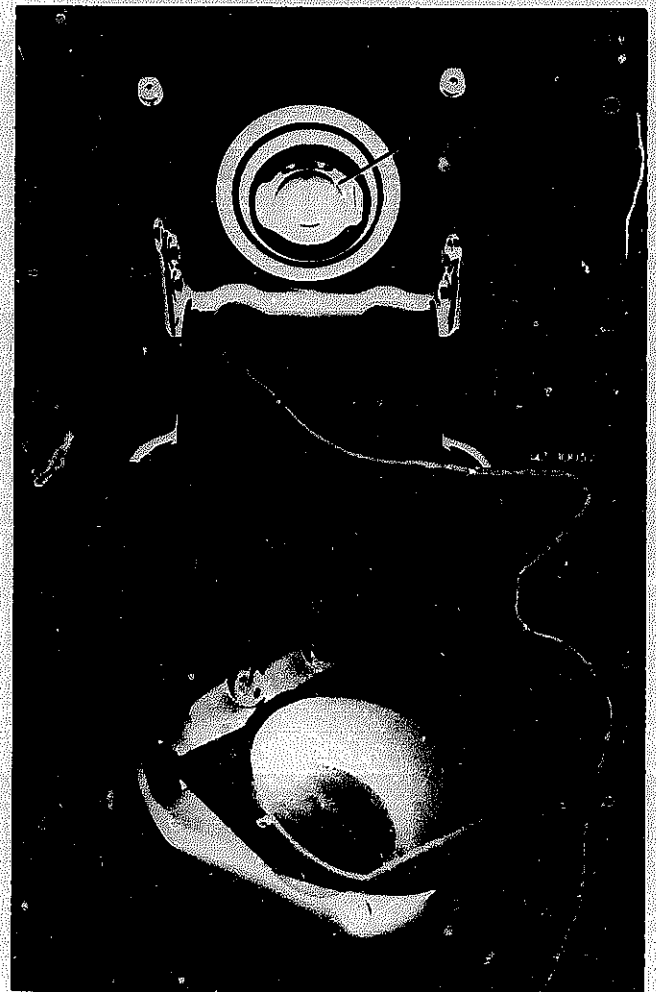
i) Check fuel system for leaks.



(USA) starting model year 1977

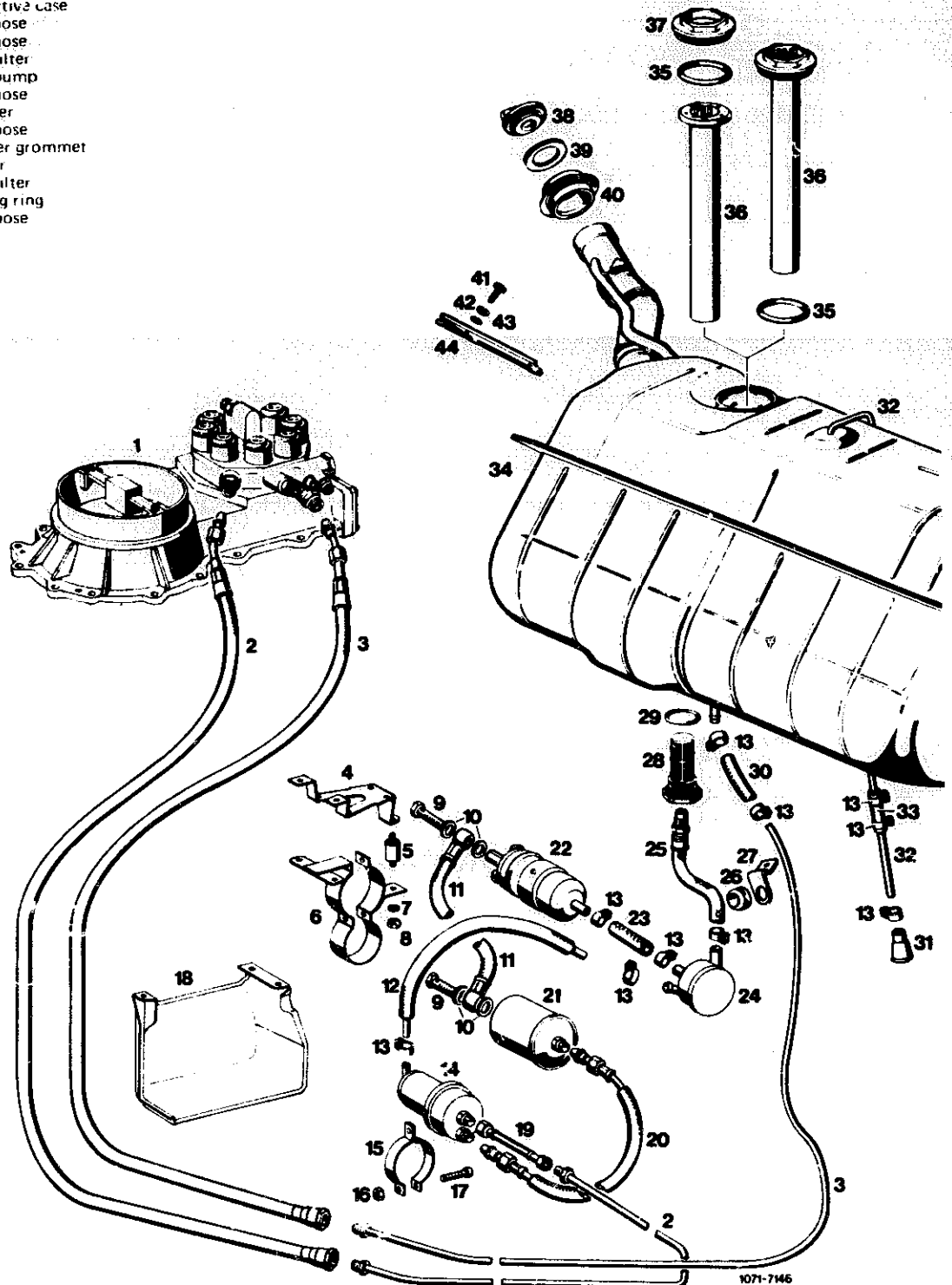
Owing to the small fuelling guns for lead-free fuel, these vehicles are provided with a guide funnel (1) in filler neck.

If a fuel tank is renewed on these vehicles, a guide funnel must be simultaneously installed in **USA only**. For this purpose, prior to installing fuel tank, insert guide funnel into filler neck and knock in fastening rivets (1) up to stop by means of a mandrel.



Fuel system

- | | | | |
|----|------------------------|----|----------------------------|
| 1 | Mixture controller | 31 | Rubber sleeve |
| 2 | Fuel forward-flow line | 32 | Vent line into atmosphere |
| 3 | Fuel return-flow line | 33 | Fuel hose |
| 4 | Holder | 34 | Fuel tank |
| 5 | Vibration damper | 35 | Sealing ring |
| 6 | Holder | 36 | Immersion tube transmitter |
| 7 | Snap ring | 37 | Screw flange |
| 8 | Nut | 38 | Filler cap |
| 9 | Hollow screw | 39 | Seal |
| 10 | Sealing ring | 40 | Rubber grommet |
| 11 | Fuel nose | 41 | Hex, head screw |
| 12 | Fuel hose | 42 | Snap ring |
| 13 | Hose clamp | 43 | Washer |
| 14 | Fuel reservoir | 44 | Reinforcing strip |
| 15 | Holder | | |
| 16 | Nut | | |
| 17 | Screw | | |
| 18 | Protective case | | |
| 19 | Fuel hose | | |
| 20 | Fuel hose | | |
| 21 | Fuel filter | | |
| 22 | Fuel pump | | |
| 23 | Fuel hose | | |
| 24 | Damper | | |
| 25 | Fuel hose | | |
| 26 | Rubber grommet | | |
| 27 | Holder | | |
| 28 | Fuel filter | | |
| 29 | Sealing ring | | |
| 30 | Fuel hose | | |



Tightening torque

Nm

Hex. head closing plug for immersion tube transmitter
or screwable immersion tube transmitter

35-43

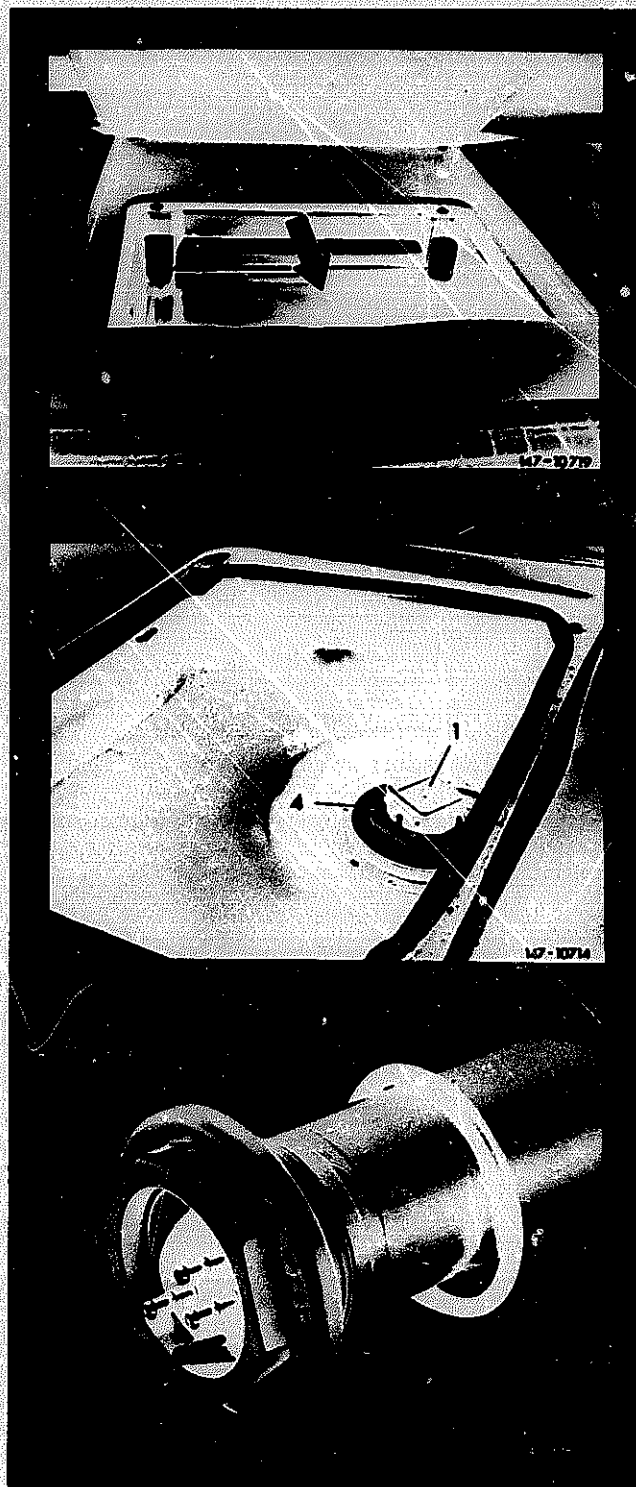
Removal

1 Remove first aid kit and plastic tray (arrow).

2 Pull coupler (1) from immersion tube transmitter
and protect against slipping off by means of a wire.

3 Unscrew hex. head closing plug (4) or immersion
tube transmitter and remove immersion tube trans-
mitter.

Immersion tube transmitters of the latest version are
screwed directly into fuel tank.



Installation

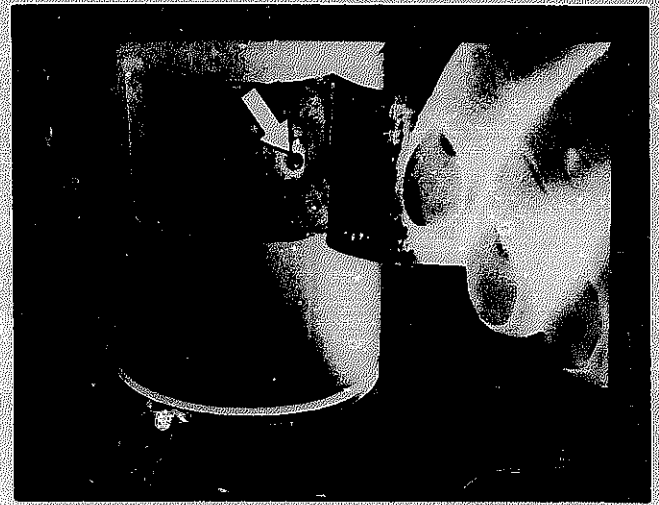
For installation proceed vice versa as follows:

- a) Immersion tube transmitters are available in spare parts stockroom in two different versions. During renewal, make sure that the same is installed for the same.
- b) Use new rubber sealing ring.
- c) Prior to inserting immersion tube transmitter, remove locking pin (arrow).
- d) Insert immersion tube transmitter in such a manner that the locking cam engages in recess of fuel tank or that brass locating pin for electric plug points in driving direction to the rear.

This is no longer required for immersion tube transmitter of the latest version.

Note: If an immersion tube transmitter with locking cam is installed in a fuel tank without recess, remove locking cam.

- e) Plug coupler for fuel gauge on immersion tube transmitter and check for function. Check function of fuel gauge.
- f) Check for leaks.

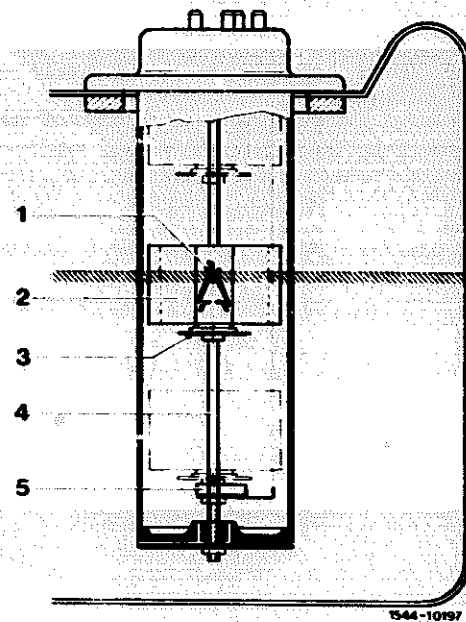


All models

When the fuel level drops, the sliding contact (1) on float (2) of immersion tube transmitter increases the resistance, the voltage drops and the needle in the instrument will swing back.

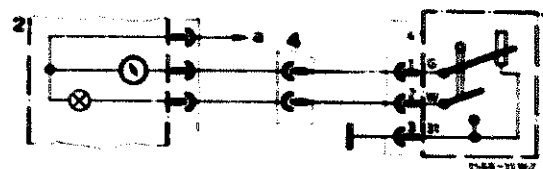
When the fuel level drops still further, the reserve warning contact (5) in immersion tube transmitter is closed and will connect the reserve warning light to ground.

- 1 Sliding contact
- 2 Float
- 3 Contact plate
- 4 Guide and contact rod
- 5 Reserve warning contact



When the ignition is switched on, the indicating instrument and reserve warning contact will be energized via fuse.

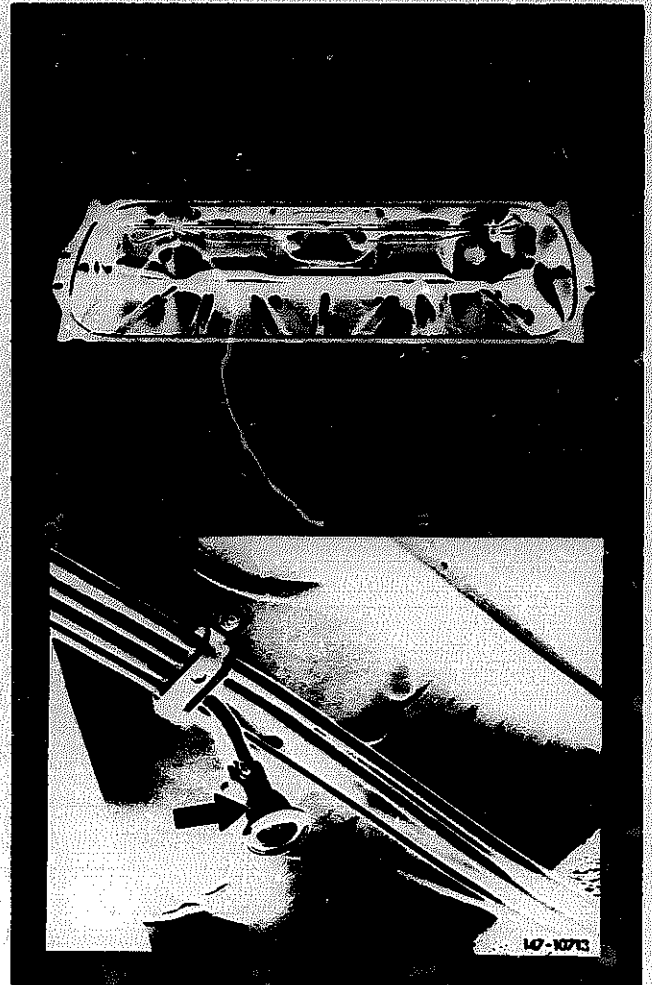
- 1 Immersion tube transmitter
- 2 Fuel indicating instrument
- 4 Plug connection to lamp and harness
- 5 To terminal 15



A venting system comprising pertinent lines and a collecting tray in fuel tank is installed for positive and negative venting of fuel tank.

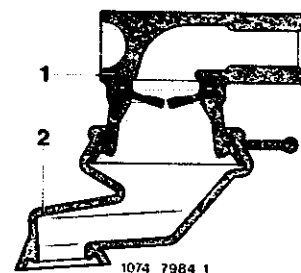
The fuel expansion tank is integrated in fuel tank. Fuel vapors are escaping through line (arrow) into the atmosphere.

1st version



A vent sleeve with diaphragm is installed starting approx. June 1978. The diaphragm increases the pressure in fuel tank by approx. 10 mbar. As a result, the automatic fuelling gun will be switched off sooner when the fuel tank is filled.

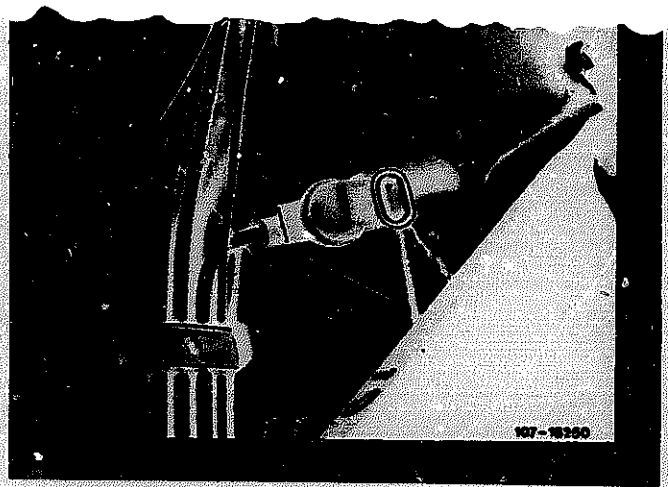
2nd version



In the event of repairs, install only vent sleeve with diaphragm also for vehicles manufactured at an earlier date. In such a case, re-bend vent line with a suitable mandrel in such a manner that the vent sleeve is pointing downwards.

Attention!

When re-bending line, make sure that no kinks will result.

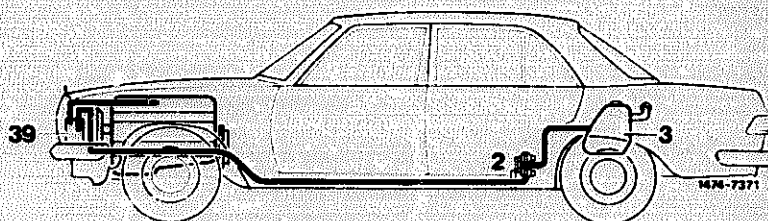


The fuel evaporation control system prevents the escape of evaporation vapors from fuel system into the atmosphere.

(USA) 1977

Function diagram

- 2 Valve system
- 3 Fuel tank
- 39 Charcoal canister



Components of fuel evaporation control system:

Valve system

The valve system is mounted underneath vehicle at level of rear legroom.



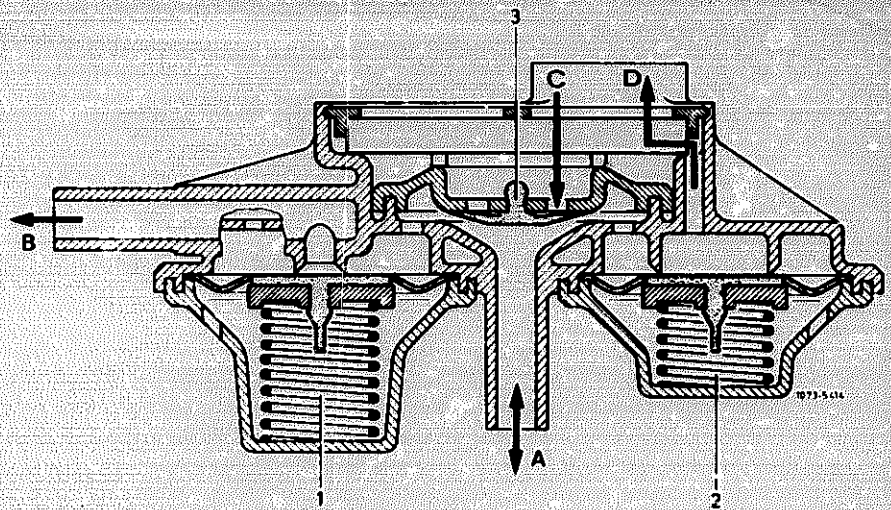
The valve system comprises three valves:

1. Pressure relief valve (negative vent valve).
2. Safety valve.
3. Vacuum relief valve (positive vent valve).

The **pressure relief valve** opens at a slight overpressure. The evaporation vapors will flow through pressure relief valve into a line toward charcoal canister.

Sectional view valve system

- 1 Pressure relief valve
- 2 Safety valve
- 3 Vacuum relief valve
- A Inlet to valve system/outlet to fuel expansion tank vent
- B To charcoal canister
- C Fresh air inlet
- D Outlet safety valve



The **safety valve** opens in the event of overpressure in fuel evaporation control system. The fuel vapors will be vented directly into the atmosphere.

The **vacuum relief valve** opens in the event of a vacuum established when the fuel tank is cooling down or when content is reduced.

Charcoal canister

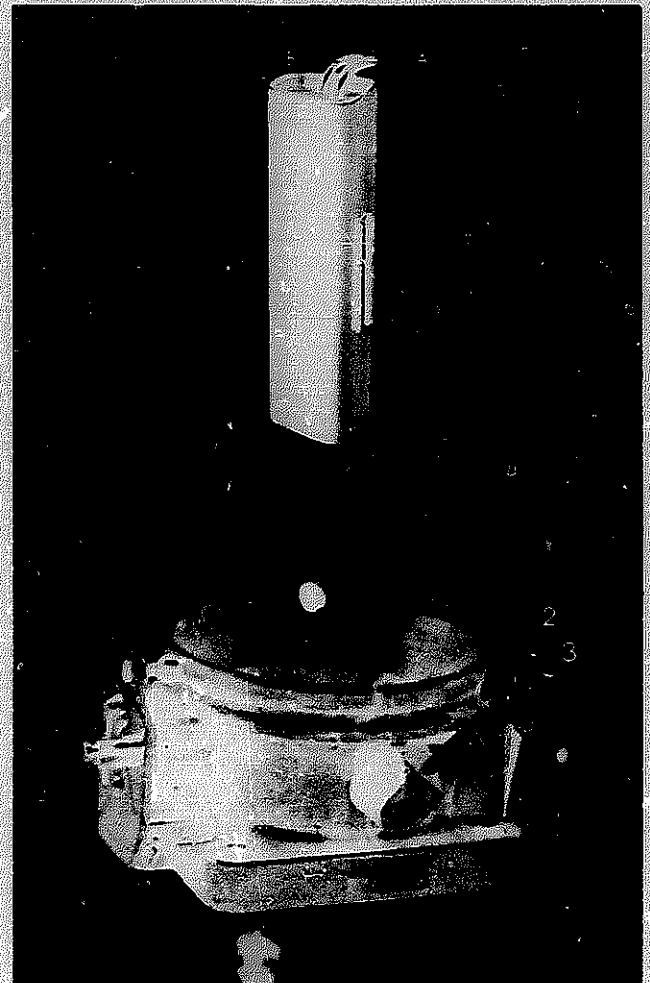
The fuel evaporation vapors from fuel tank are stored in charcoal canister and are drawn off again while driving.

- A Connection, fuel vapors from tank
- B Connection, throttle valve housing

Throttle valve housing

The throttle valve housing is provided with a connection for drawing evaporation vapors from charcoal canister.

- 1 Vacuum connection ignition retard
- 2 Vacuum connection ignition advance
- 3 Vacuum connection charcoal canister



Operation

The fuel vapors from fuel tank are routed to charcoal canister via valve system (2). The fuel evaporation vapors are stored in charcoal canister when the engine is stopped and are drawn off into throttle valve housing when the engine is running as from a given throttle valve position.

Arrow = Draw-off line to throttle valve housing

AUS 1979/80, USA 1978/79

Function diagram

- 3 Fuel tank
- 4 Vent valve unit
- 5 Purge valve
- 39 Charcoal canister

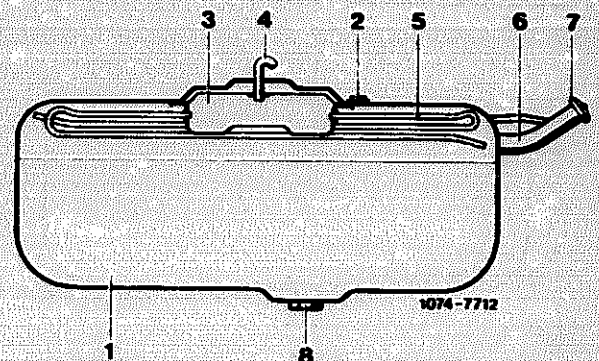


Components of fuel evaporation control system:

Fuel tank

The tube system of the fuel tank is connected to a collecting tray into which connection (4) toward vent valve unit is entering.

- 1 Fuel tank
- 2 Immersion tube transmitter
- 3 Expansion tank
- 4 Connection vent valve unit
- 5 Tube system
- 6 Filler neck
- 7 Closing cap
- 8 Connection fuel feed line



Vent valve unit

The vent valve unit (4) is mounted underneath vehicle at level of rear floorboard and replaces (USA only) the valve system known from model year 1977.

The unit comprises a pressure relief valve (negative vent valve) and a vacuum relief valve (positive vent valve).



Charcoal canister

The fuel evaporation vapors from fuel tank are stored in charcoal canister and drawn off again while driving.

- A Draw-off connection
- B Tank vent connection

Purge valve

The purge valve (5) is located in purge line from charcoal canister to throttle valve housing.

Throttle valve housing

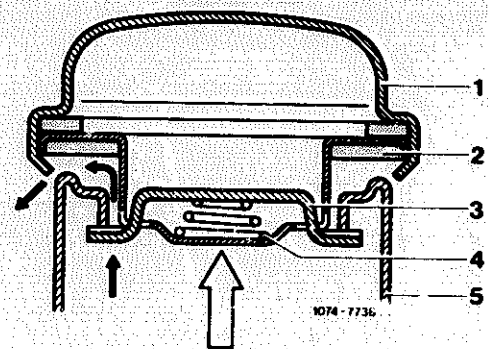
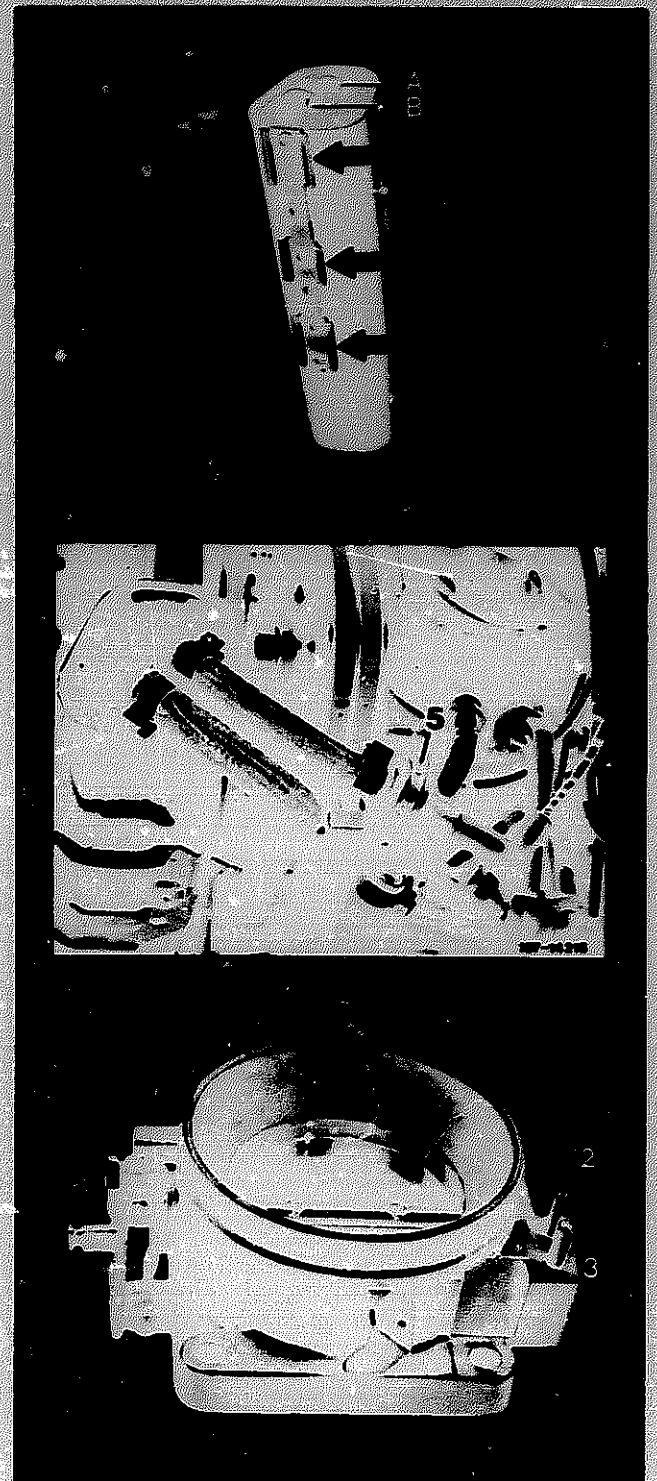
To prevent mixing up of vacuum connections, the OD of the vacuum connection (3) toward charcoal canister has been enlarged from 4 to 5 mm. To purge the fuel vapors from the charcoal canister, two purge bores are provided above the throttle valve.

- 2 Vacuum connection ignition advance
- 3 Vacuum connection charcoal canister

Fuel tank cap

To avoid excessive pressure in fuel tank, the fuel tank cap has been modified.

- 1 Closing cap
- 2 Sealing ring
- 3 Locking clamp
- 4 Compression spring
- 5 Filler neck



Operation

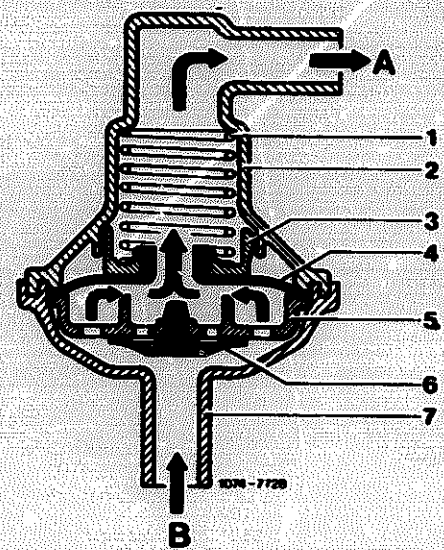
Evaporation system

The pressure in fuel tank is increased to 30–50 mbar by means of the vent valve unit (4). This ensures that less fuel vapors can escape from tank.

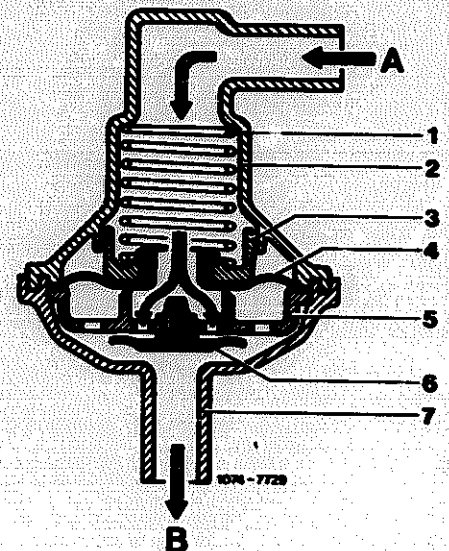
If a pressure of 30–50 mbar is attained in fuel tank, the pressure relief valve (4) opens and permits the fuel vapors to travel to the charcoal canister, where they are stored if the engine is not running.

Vent valve unit, open to charcoal canister

- | | |
|-------------------------|---------------------------------|
| 1 Compression spring | 6 Vacuum relief valve |
| 2 Valve housing | 7 Connection fitting |
| 3 Spring seat | A Connection, charcoal canister |
| 4 Pressure relief valve | B Connection, fuel tank |
| 5 Valve disk | |

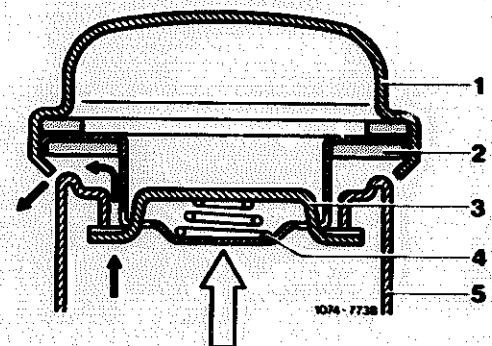


When the fuel cools down, the decreasing volume is balanced by the intake of air or of fuel evaporation vapors from charcoal canister via vacuum relief valve (6) starting at a vacuum of 1–16 mbar. If the vacuum in the fuel tank drops below 1 mbar, the vacuum relief valve (6) closes.



Vent valve unit, open to fuel tank

If the pressure in the fuel tank increases above 100–300 mbar due to a malfunction in the fuel evaporation system, the fuel vapors can escape via the fuel filler cap.



- | | |
|-----------------|----------------------|
| 1 Fuel tank cap | 4 Compression spring |
| 2 Sealing ring | 5 Filler neck |
| 3 Locking clamp | |

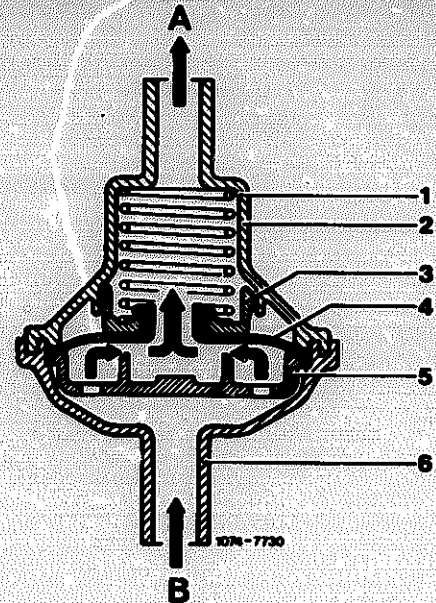
Purge system

The charcoal canister is connected with the throttle valve housing by a hose in which the purge valve (5) is installed.

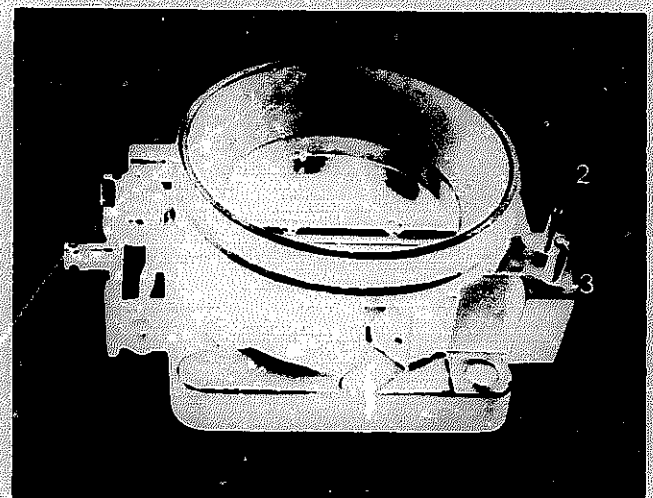
When the engine is running and the vacuum in the purge line exceeds 30–50 mbar, the purge valve opens. The fuel vapors stored in the charcoal canister can be drawn into the throttle valve housing depending on the throttle valve position.

Purge valve open

- 1 Compression spring
- 2 Valve housing
- 3 Spring seat
- 4 Pressure relief valve
- 5 Valve disk
- 6 Connection fitting
- A Connection throttle valve housing
- B Connection charcoal canister



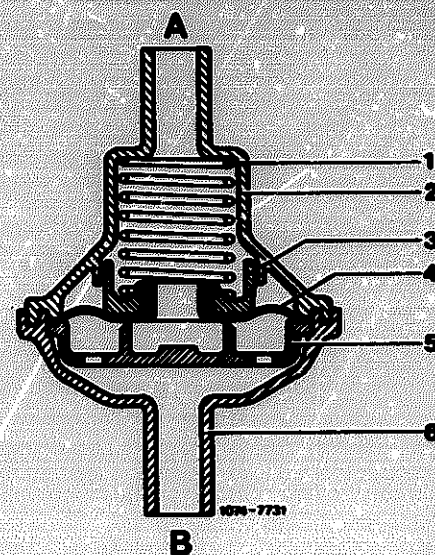
As the throttle valve is opened, the two purge bores in the throttle valve housing, which terminate in a common passage, are progressively exposed to the venturi vacuum. This will result in a metered purging in the lower partial load operating range of the engine without influencing the driving characteristics.



At idle and during coasting (throttle valve closed) both purge bores are located on the atmospheric side of the throttle valve. The purge valve is closed and, therefore, no purging of fuel vapors from the charcoal canister takes place.

Purge valve closed

- 1 Compression spring
- 2 Valve housing
- 3 Spring seat
- 4 Pressure relief valve
- 5 Valve disk
- 6 Connection fitting
- A Connection throttle valve housing
- B Connection charcoal canister



A 16

A 16

49

B 16

49 Exhaust system

Designation	Type and reason for change	Installation	Jgr. No.
Shielding plate	New shielding plate on trunk floor at the left above rear muffler installed as standard equipment. Standardization, required by exhaust gas layout (USA) starting model year 1977.	Middle of October 1976 starting chassis end No. 001684	100

Removal and installation of exhaust system is not fully explained, only a few particularly important items are described which must be observed during removal and installation or during partial removal, e.g. of rear muffler with plug connection.

Removal

1 Unscrew self-locking nuts on exhaust manifold. Remove springs and spacing sleeves.

2 At the **left**, unscrew **lower** stud with the assistance of 2 hex. nuts or a stud extractor from exhaust manifold.

3 At the **right**, unscrew **upper** stud from exhaust manifold.

4 Check parts for re-use and renew, if required.



Renewing rivet nut on exhaust manifold

5 If a stud has been broken while unscrewing, knock out remainder in upward direction by means of a suitable mandrel.

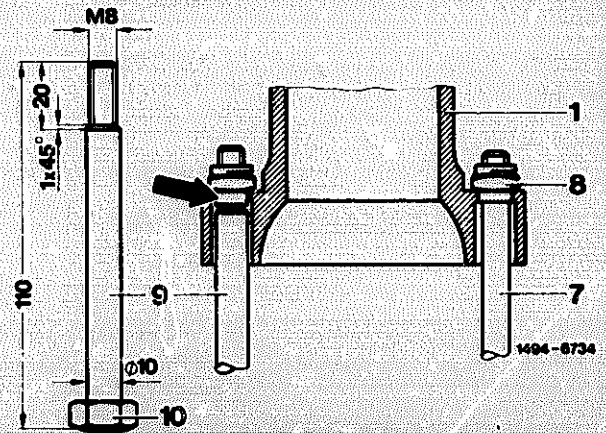
6 Insert rivet nut into bore of exhaust manifold. Then screw self-made assembly screw (9) into rivet nut (8) until rivet nut (8) is widened on flange (arrow).

Attention!

Upon widening, rivet nut should not be tightly seated in exhaust manifold, since the self-made assembly screw will become loose again under influence of high release torque while screwing out.

7 Unscrew assembly screw.

- 1 Exhaust manifold
- 7 Stud
- 8 Rivet nut
- 9 Assembly screw for widening slot nut flange
- 10 Hex. nut M 10 welded on a stud



Installation

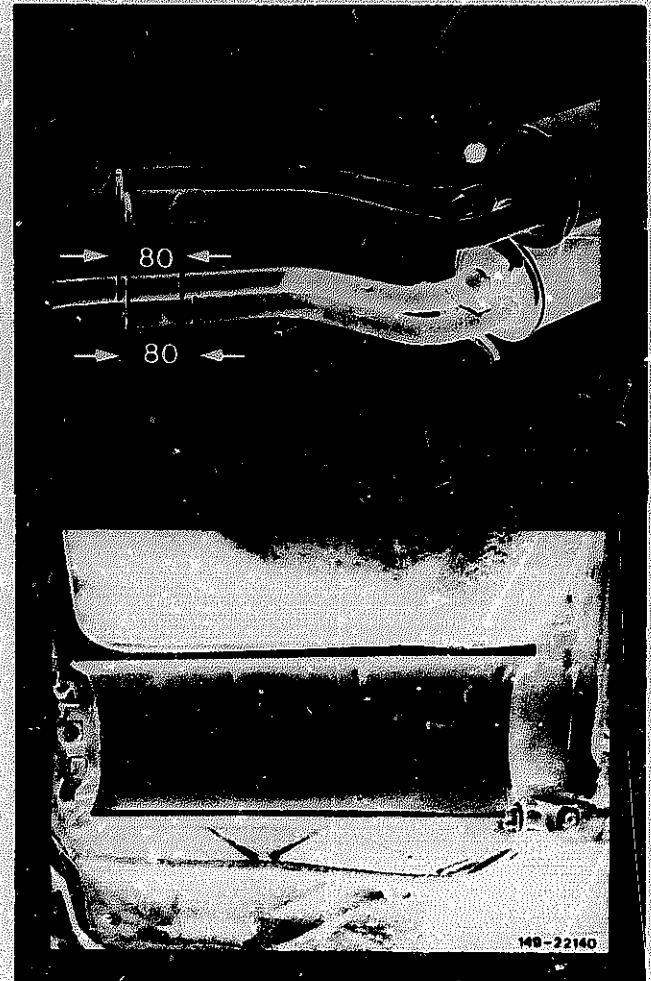
Renewing rear muffler:

8 Position new rear muffler with plug connection accurately above removed assembly (standard assembly) and mark pipe length of new rear muffler on removed system.

Starting from mark 80 minus 10 mm in direction of rear muffler, cut pipe to guarantee a plug-in depth of 70-80 mm.

Installing shielding plate:

Note: On vehicles manufactured prior to October 1976 install shielding plate subsequently above rear muffler.



9 Mark fastening bores for shielding plate. Make sure that the front bore is in center of cross strut (arrow). Maintain distances in relation to spare wheel recess and frame cross member (a and b).

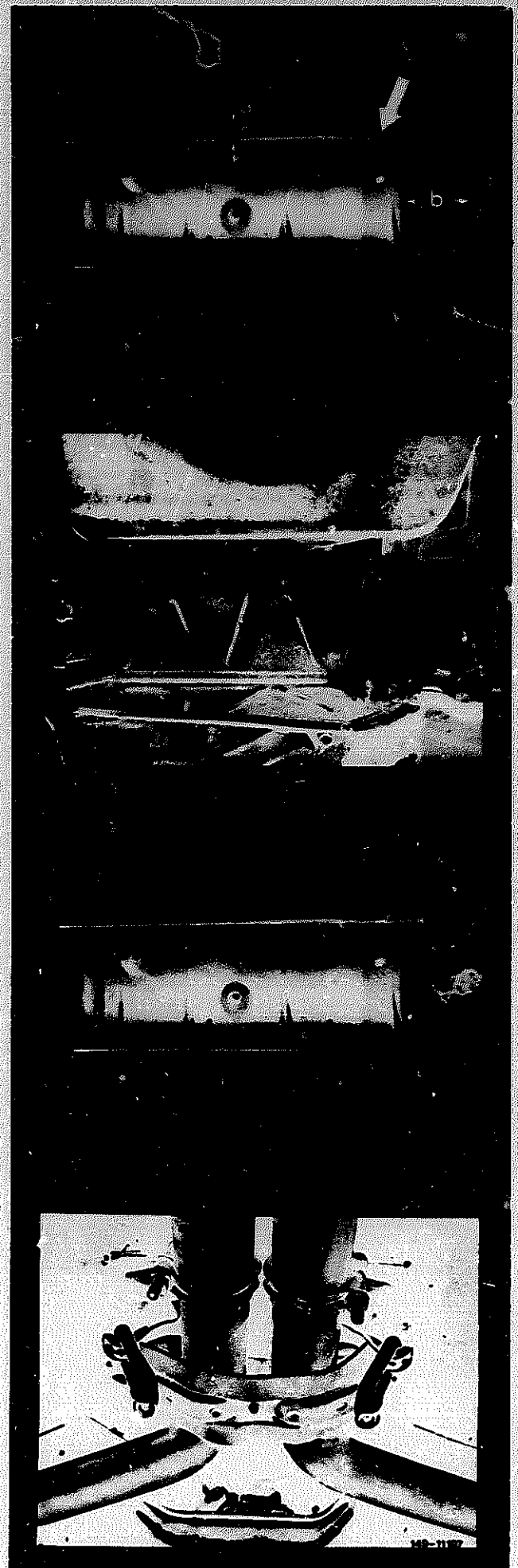
a 20 mm
b 150 mm

10 Drill holes 3.5 mm dia. (arrows).

11 Mount shielding plate.

12 Introduce both front exhaust pipes into exhaust manifold and attach rubber rings. At front exhaust mount, use softer rubber rings only.

Note: Rubber rings are available in two different types of shore hardness. Hardness can be identified by manual compression.



13 Screw in studs up to end of threads and tighten by approx. one more turn.

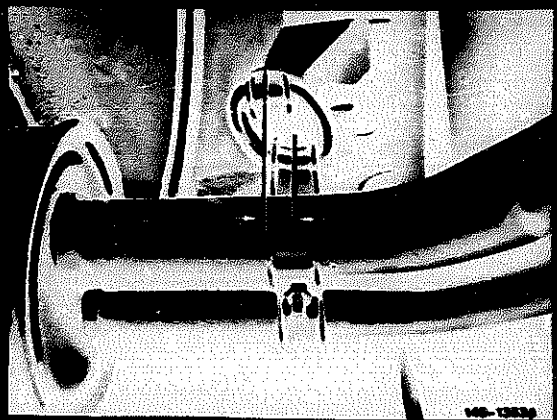
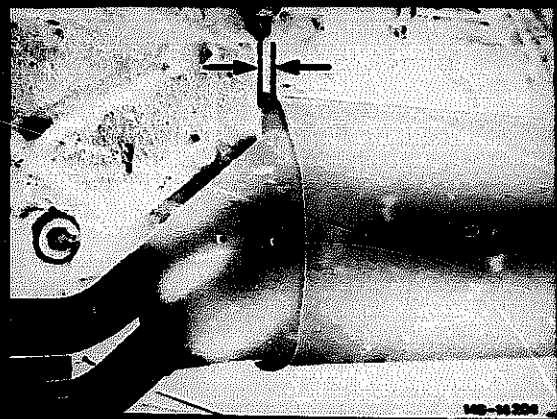
14 Slip spacing sleeves and springs on studs. Screw on new self-locking hex. nuts.

15 Alternately tighten both hex. nuts of a flange until the springs are compressed **coil to coil**. Then loosen hex. nuts by **two** turns.

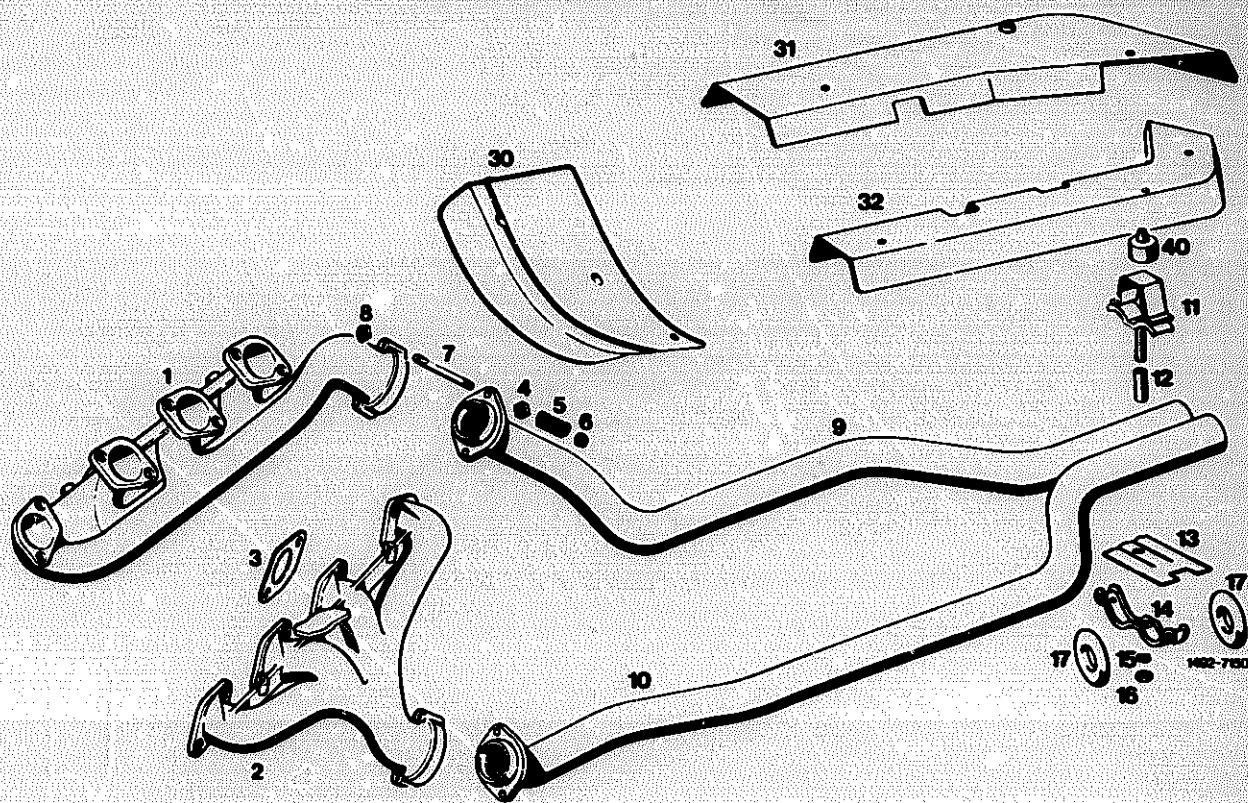
16 Pay attention to spacing between center muffler and frame floor (distance approx. 20 mm, arrow).

17 Mount rear muffler in such a manner that the holding clamp of rear muffler is approx. 10 mm in front of holders on frame floor (arrow), so that in the event of an elongation of the exhaust system the correct installation length is assured.

18 Run engine and check exhaust system for leaks.



Exhaust manifold with front exhaust pipes

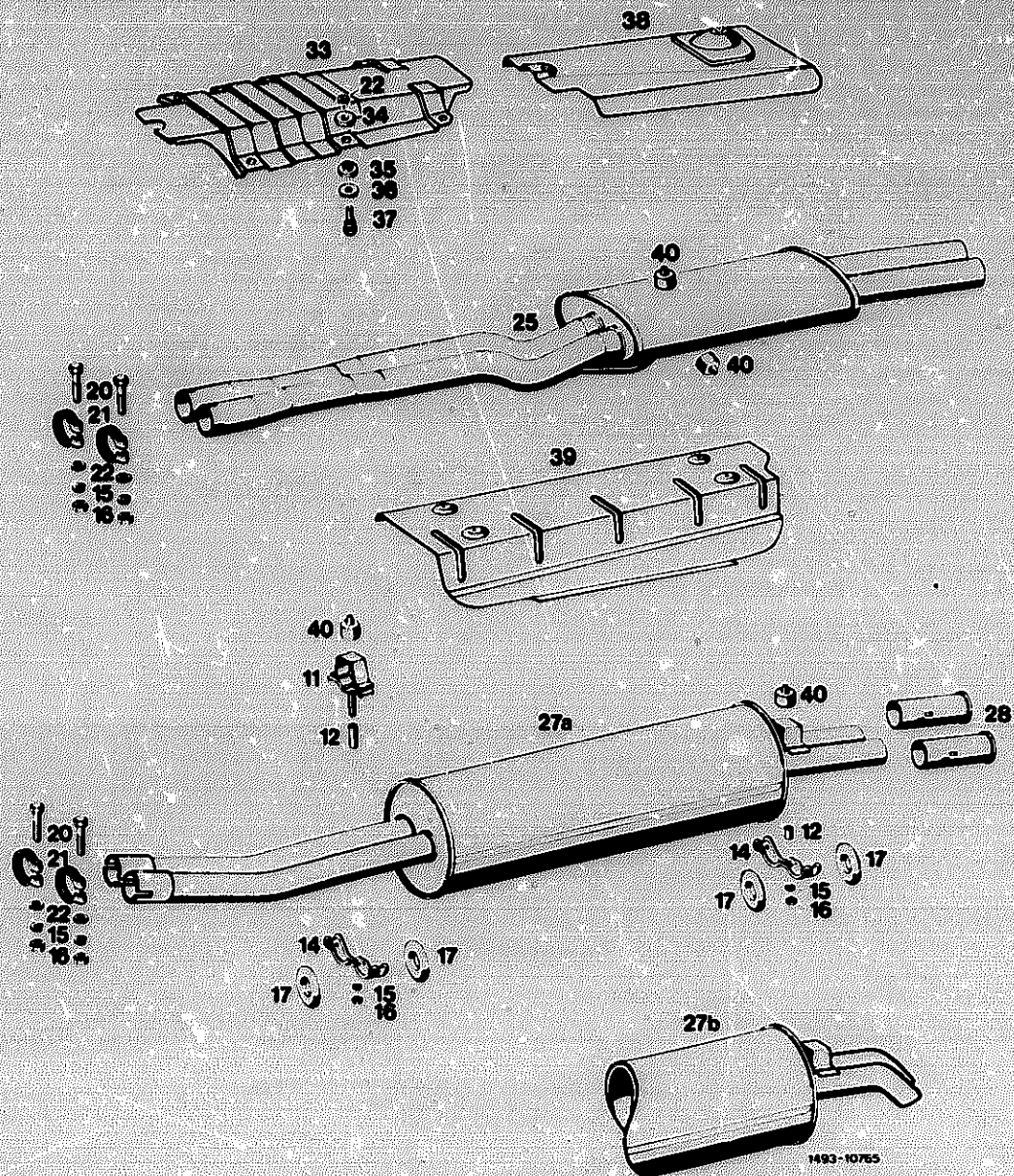


- 1 Exhaust manifold right
- 2 Exhaust manifold left
- 3 Sealing flange
- 4 Spacing sleeve
- 5 Spring
- 6 Self-locking hex. nut
- 7 Stud

- 8 Rivet nut
- 9 Exhaust pipe right
- 10 Exhaust pipe left
- 11 Clamp
- 12 Spacing tube
- 13 Insulating plate
- 14 Holding clamp

- 15 Snap ring
- 16 Hex. nut
- 17 Rubber ring
- 30-32 Shielding plates
- 40 Rubber buffer

Exhaust system starting at plug connection



- 11 Clamp
- 12 Spacing tube
- 14 Holding clamp
- 15 Snap ring
- 16 Hex. nuts
- 17 Rubber rings
- 20 Hex. head screws

- 21 Pipe clamp
- 22 Washers
- 25 Center muffler
- 26 Intermediate pipe
- 27a Rear muffler 1st version
- 27b Rear muffler 2nd version
- 28 Exhaust molding

- 33 Shielding plates
- 34 Rubber washer
- 35 Rubber washer with collar
- 36 Washer
- 37 Hex. head screw with collar
- 38-39 Shielding plates
- 40 Rubber buffer

Coordinates

Rough idle as well as driving faults in lower partial range up to approx. 2000/min, also with engine at operating temperature	B 17 – C 17
Engine splashes in warm-up stage, engine fires but is not running continuously, also not after second start	B 17 – E 17
Irregular idle, exhaust gas fluctuating between 1–10 % CO. Engine stopping at idle	D 17 – E 17
Engine shaking at idle or poor transition when cold. (AUS) 1979–1980, (USA) 1977–1979	E 17 – F 17
Rough idle, irregular spark plug pattern and poor accelerator response (corrosion in fuel system)	E 17 – F 17
Engine poorly firing when warm	G 17 – H 17
Engine stops and is no longer firing due to overenrichment	H 17 – I 17
Engine oil dilution without recognizable cause	K 17 – L 17
High fuel consumption	K 17 – L 17
Idle speed following cold start too low	L 17 – M 17
Delayed firing of cold engine	L 17 – O 17
Engine not running smoothly following cold start	N 17 – O 17
Fuel pump loud	N 17 – B 18
Engine not firing, warm-up compensator is not heated	A 18 – B 18

Programmed repairs engine 100.985 Combustion

*Job No. of flat rate unit or standard texts and flat rates data.

Complaint:

Rough idle as well as driving faults in lower partial range up to approx. 2000/min, also with engine at operating temperature.

Cause/Remedy:

1. Adjust idle speed (07.3-100, *07-014).
 2. Check fuel pressures (07.3-120, *07-155).
 3. Check ignition cable and spark plug connectors for contamination and passage.
 4. Check injection valves (07.3-135, *07-786).
 5. Check fuel distributor for constant delivery (07.3-160, *07-162).
 6. Check whether marks on vibration damper and camshaft are in alignment. Check timing with dial gauge, if required (05-215, *05-251).
-

Complaint:

1. Engine splashes in warm-up stage.
 2. Engine fires but is not running continuously, also not after second start.
-

Cause/Remedy:

1. Check fuel pressures. Check starting control pressure on cold engine, while measuring stabilizing time of warm-up compensator (07.3-120, *07-155).

Nominal: warm-up compensator with Bosch end No. 010 3-6 minutes.

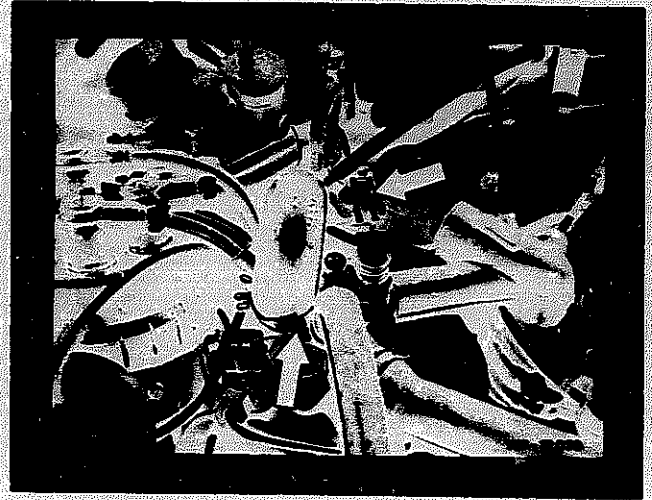
Measured at idle at 20 °C ambient temperature and min. 12 volts (without electrical consumers).

2. If contact pressure is too high, check the following items one after the other:

- a) Recondition system pressure regulator (07.3--210, *07--160).
- b) Check return line from warm-up compensator to fuel distributor for passage.
- c) Check warm-up compensator for rust deposits. For this purpose, unscrew input connection on warm-up compensator. If the screen in warm-up compensator shows evidence of rust residue, perform the following jobs:

Clean screen, renew control pressure line between warm-up compensator and pressure damper and renew pressure damper. If the control pressure is still too high, renew warm-up compensator.

3. Check auxiliary air valve (07.3--125).
4. Check contour hose between auxiliary air valve and idle speed air distributor for tight seat. Mount two spring hose clamps (arrows), if required.



Complaint:

**Irregular idle, exhaust gas fluctuating between 1--10 % CO.
Engine stopping at idle.**

Cause/Remedy:

Air flow sensor plate flutters.

1. Remove air cleaner.
 2. Run engine at idle.
 3. Watch air flow sensor plate, if plate flutters, renew fuel distributor.
-

Complaint:

Engine shaking at idle or poor transition when cold.

(AUS) 1979/80, (USA) 1977–1979

Cause/Remedy:

Check EGR (refer to repair instructions

"Exhaust gas (AUS) (USA) 1977–1980")

Complaint:

Rough idle, irregular spark plug pattern and poor accelerator response (corrosion in fuel system).

Cause/Remedy:

Water or rust in fuel system.

Checkup

If formation of rust is suspected, check as follows:

- a) Unscrew system pressure regulator and check for traces of rust.
- b) Warm-up compensator — check input screen and pressure damper for rust deposits.
1. If water or rust sediments are more intensive, drain contents of fuel tank.
2. Remove fuel pressure reservoir and drain. Renew pressure reservoirs with 2 connections.
3. Exchange fuel filter and install stainless suction damper in front of fuel pump (series since October 1978).
4. Replace grey-iron fuel distributor by light-alloy distributor.
5. Renew pressure damper between fuel distributor and warm-up compensator in addition to fuel line.
6. Clean screen in warm-up compensator, exchange warm-up compensator, if required; install connection with screen (part No. 000 074 4886) in warm-up compensator.
7. Blow out fuel lines with compressed air.

Complaint:

Engine poorly firing when warm.

Cause/Remedy:

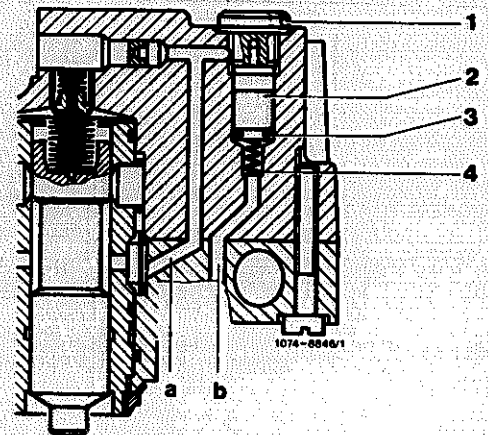
1. Check whether cold starting valve is still injecting while starting at operating temperature of engine. If yes, renew thermo time switch.
2. Check CIS A for leaks. For this purpose, connect pressure measuring device. Run engine for a short moment and stop. Control pressure will drop below opening pressure of injection valve to approx. 2.8 bar gauge pressure. After 30 minutes the pressure should amount to at least 2.5 bar gauge pressure. If the pressure has dropped to lower values, an internal leak may be in evidence at the following points:

Check fuel pressures and for internal leaks (07.3-120, *07-157).

- a) Renew system pressure regulator (O-ring or contour ring on control piston).
- b) Control piston.
- c) Check-valve on fuel pump.
- d) Slot carrier O-ring (fuel distributor).
- e) Cold starting valve.
- f) Diaphragm in warm-up compensator torn, renew warm-up compensator.
- g) Diaphragm damper.
- h) Pressure reservoir.
- i) Check zero position of air flow sensor plate (07.3-245).
- j) Pressure compensating valve.

Pressure compensating valve mounted on fuel pump assembly, renew pressure compensating valve.

Pressure compensating valve integrated in light-alloy fuel distributor. Unscrew closing plug (1). Remove piston (2) with contour ring (3). Install parts from repair set.



Complaint:

Engine stops and is no longer firing due to over-enrichment.

Cause/Remedy:

Oil dilution.

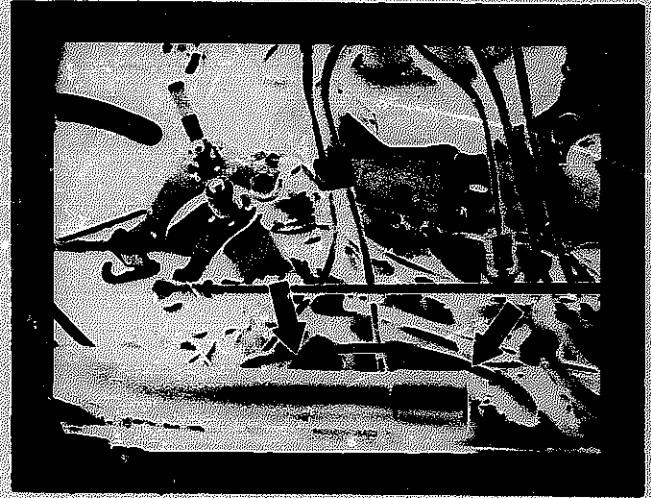
Check pressure damper in control pressure line as follows:

1. Pull leak line from air guide housing or from contour hose or pressure damper. Catch emerging fuel in a container.
2. Switch on ignition and pull cable plug from safety switch.

Attention!

If fuel is now flowing out on leak line or on pressure damper, the diaphragm in pressure damper is leaking.

3. Mount new pressure damper in such a manner that the groove in pressure damper housing engages in lug in holder.
4. Connect leak line of pressure damper on contour hose, part No. 100 094 12 91, for vent cylinder cover. Deactivate former connection on distributor with rubber cap part No. 000 987 11 45.
5. Draw off fuel in intake manifold lower half and cylinders with syringe, part No. 112 589 00 72 00, as follows:
 - a) Unscrew vacuum connection (brake unit) on intake manifold. Introduce a plastic line (similar to the one for ignition timing) into intake manifold connection up to intake manifold lower half and draw off fuel.
 - b) Unscrew all spark plugs and draw fuel from each cylinder.
6. On vehicles with automatic transmission, pull closing cap from plastic vacuum control unit on transmission so that any fuel which may be present can flow out.
7. Run engine and check pressure damper for leaks by pulling off leak line.



Complaint:

Engine oil dilution without recognizable cause.

Cause/Remedy:

If high-boiling constituents, e.g. diesel fuel or kerosene, are added to premium-grade gasoline, the engine oil may become diluted.

The mixture is simultaneously made considerably leaner and the tendency of engine toward pinging is increased especially under load.

1. Check fuel pressures and for internal leaks (07.3-120, *07-157).
2. Check control pressure cold. Pay attention to starting control pressure.
3. Check emission value with cold engine.
Nominal 8-10 % CO.
4. Check stabilizing time of warm-up compensator (07.3-120).
5. Perform exhaust gas test under load.
6. Check whether cold starting valve is still injecting while starting at operating temperature of engine.
If yes, renew thermo time switch.
7. Check contacting on electrical plug connection on warm-up compensator.

Complaint:

High fuel consumption.

Cause/Remedy:

1. Adjust idle (07.3-100, *07-014).
2. Check stabilizing time of warm-up compensator.

Nominal: Warm-up compensator with Bosch end No. 010 3-6 minutes.

Measured at idle at + 20 °C ambient temperature and at min. 12 volts (without electrical consumers).
3. Perform exhaust gas test under load.

Complaint:

Idle speed following cold start too low.

Cause/Remedy:

Connect ignition retard adjustment to contour hose between auxiliary air valve and idle speed air distributor. This will provide engine following cold start at low outside temperatures with an rpm increase of approx. 200/min.

Convert ignition retard adjustment as follows:

1. Connect ignition retard adjustment to contour hose part No. 100 094 11 91.
2. Renew vacuum control unit, part No. 000 158 57 18 for ignition distributor.
3. Connect vacuum line (white/yellow) to contour hose and shorten, if required. Deactivate connection on throttle valve housing with rubber cap, part No. 000 987 11 45.
4. Remove gasket between mixture controller and air guide housing and seal with Hylomar or Curil K 2.



Complaint:

Delayed firing of cold engine.

Cause/Remedy:

Establish fuel pressure prior to starting. For this purpose, pull off safety switch and switch on ignition for a short moment.

If the engine is then firing immediately, perform the following jobs:

- a) With grey-iron fuel distributor:
Subsequently install a pressure compensating valve and place pressure reservoir connection in front of fuel filter (refer to 07.3-282 section "B").

b) With light-alloy fuel distributor:

Connect pressure reservoir in front of fuel filter (refer to 07.3-282 section "B"). Instead of steel line in conversion set, install steel line part No. 126 470 01 64. Do not mount pressure compensating valve on pump assembly, since a pressure compensating valve is already integrated in fuel distributor.

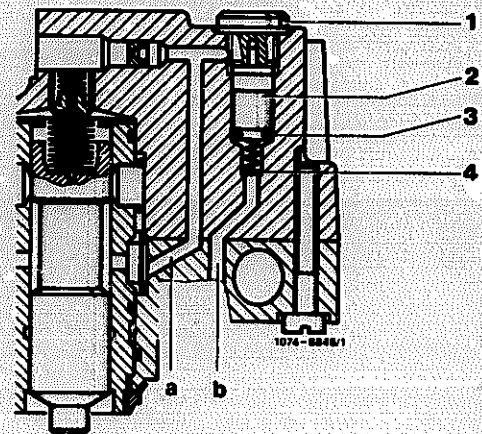
Complaint:

Engine not running smoothly following cold start.

Cause/Remedy:

1. Check auxiliary air valve (07.3-125, '07-037).
2. Check pressure relief valve in light-alloy fuel distributor. For this purpose, unscrew closing plug (1) and check piston (2) for easy operation. Renew defective parts.

Note: If the pressure relief valve is mounted on fuel pump assembly, renew pressure compensating valve.



Complaint:

Fuel pump loud.

Cause/Remedy:

With regard to complaint "Fuel pump loud" the difference is whether inside vehicle a buzzing sound is heard or outside vehicle there is occasionally a loud noise of fuel pump (rattling noise).

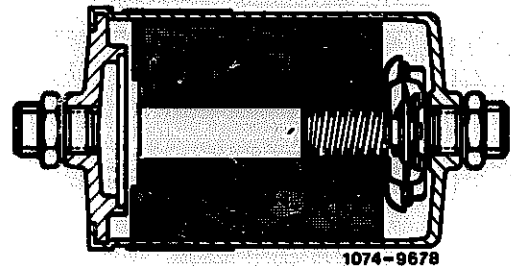
Note: When evaluating noises inside vehicle, make sure that blowers and auxiliary fans of air conditioning system are switched off.

a) Buzzing sound inside vehicle (solid-born sound)

At idle speed of engine the vehicle floor or the fuel tank may be stimulated into vibrating under influence of pulsating delivery of fuel pump (based on principle), which is heard as a buzzing sound inside vehicle. This noise can be reduced by means of fuel filter with damper and the diaphragm damper.

1. Check fuel line for perfect condition and installation.
2. Check screen in feed connection of fuel distributor for passage. If contaminated, clean screen or renew.

3. Subsequently install fuel filter with damper.

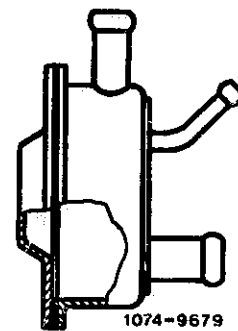


4. Exchange intake damper for diaphragm damper.

Spare parts

Designation	Part No.
Fuel filter with damper	001 477 84 01
Diaphragm damper	000 476 00 16

Responsible for delivery: Werk 50 (PEW Sindelfingen).



b) Rattling noise

This noise can be heard only outside vehicle and is caused by the formation of gas in fuel pump. The cause may be the fuel quality and temperature, outside temperatures as well as high mountain passes. In such cases, an exchange of fuel pump provides no remedy.

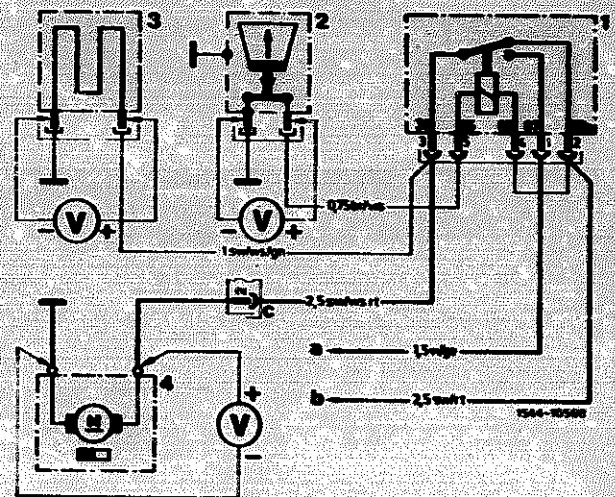
Complaint:

Engine not firing, warm-up compensator is not heated.

Cause/Remedy:

Check activation of fuel pump relay (07.3-165).

- 1 Fuel pump relay
- 2 Safety switch air flow sensor plate
- 3 Warm-up compensator
- 4 Fuel pump
- a Terminal 50 (starting)
- b Terminal 15/54 (ignition)
- c Plug connection 14-point tail lamp harness



This film replaces microfilm No. 07 102 2010 01.

Below is a survey of revisions and additions in key words. They are in part already known from service informations (SI) published at an earlier date. The national versions (AUS) (USA) model years 1977-1980 have been additionally incorporated. Job descriptions in film have been adapted to included texts of flat rate units (standard texts and flat rates).

	Job No.	Coordinates
Idle speed and emission values at idle added to national versions.		
Respective job numbers:		
Adjustment of idle speed	07.3-100	G 1 - O 1
Checking and regulating engine	07.3-110	O 1 - J 2
Control pressures of national versions added.		
Respective job number:		
Checking fuel pressures and for internal leaks	07.3-120	K 2 - F 3
Constant delivery of fuel distributor incorporated (SI 07.3/20).		
Respective job number:		
Checking fuel distributor for constant delivery	07.3-160	G 4 - L 4
Light-alloy fuel distributor for repairs incorporated (SI 07.3.25).		
Respective job number:		
Replacement of fuel distributor	07.3-205	L 5 - B 6
Contoured ring on regulating piston added.		
Respective job number:		
Reconditioning system pressure regulator and pressure compensating valve	07.3-210	B 6 - F 6

Revisions on throttle valve housing.

Respective job number:

Removal and installation of throttle valve housing 07.3 230 O 6 - P 6

Warm-up compensator fastening modified (SI 07.3/12).

Respective job number:

Renewing warm-up compensator 07.3 240 A 7 E 7

Renewing air flow sensor plate, centering, checking zero position
of air flow sensor plate and adjusting incorporated (SI 07.3/22).

Respective job number:

Renewing air flow sensor plate, centering, checking zero position
of air flow sensor plate and adjusting 07.3 245 E 7 L 7

Subsequent installation of pressure compensation valve on fuel pump
assembly (SI 07.3/21).

Respective job number:

Converting fuel pump assembly 07.3 282 N 8 E 9

Subsequent installation of check valve on fuel pump (SI 07.3/23).

Respective job number:

Subsequent installation of separate check valve on fuel pump 07.3 283 E 9 J 9

Newly included job descriptions:

Checking fuel pump relay 07.3 165 L 4 E 6

Notes concerning jobs on breakerless transistorized ignition system TSZ 4 15 528 L 11 M 11

General description of breakerless transistorized ignition system TSZ 4 15 530 N 11 B 12

Lubricating regulating linkage and regulating shafts 30 335 N 13 O 13

Programmed repairs extended:

Irregular idle, exhaust gas fluctuating between 1–10 % CO. Engine stopping at idle	D 17 – E 17
Engine shaking at idle or poor transition when cold (AUS) 1979/80, (USA) 1977–1979	E 17 – F 17
Rough idle, irregular spark plug pattern and poor accelerator response (corrosion in fuel system)	E 17 – F 17
Engine oil dilution without recognizable cause	K 17 – L 17
High fuel consumption	K 17 – L 17
Idle speed following cold start too low	L 17 – M 17
Delayed firing of cold engine	L 17 – O 17
Engine not running smoothly following cold start	N 17 – O 17
Fuel pump loud	N 17 – B 18
Engine not firing, warm-up compensator is not heated	A 18 – B 18

Table for testing and adjusting ignition timing extended.

Respective job number:

Testing and adjusting ignition timing	15-501 E 11 – H 11
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Ignition distributor rotor with rpm limitation newly included.

Respective job number:

Removal and installation of ignition distributor	15-510 H 11 – L 11
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Shutoff of vacuum ignition advance – Function newly included.

Respective job number:

Shutting off vacuum advance	15-570 K 12 – L 12
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Function of vacuum retard newly included.

Respective job number:

Function of vacuum retard 15-571 L 12 - O 12

Draining fuel tank by drawing off fuel.

Respective job number:

Removal and installation of fuel tank 47-700 D 14 - J 14

Newly included job descriptions:

Function description of immersion tube transmitter for fuel gauge 47-715 N 14 - O 14

Fuel evaporation control system (AUS) (USA) 47 800 B 15 - M 15

Plug connection between center and rear muffler newly included.

Subsequent installation of shielding plate above rear muffler.

Distance between center muffler and frame floor included.

Installation position on rear muffler newly included.

Illustrated table modernized.

Respective job number:

Removal and installation of exhaust system 49-100 D 16 - M 16

07.3 Mechanically controlled gasoline injection (CIS A)

Technical revisions	Job No.	Coordinates
		D 1 – F 1
Testing and adjusting jobs		
Adjustment of idle speed	07.3-100	G 1 – O 1
Including:		
Running engine oil temperature to 75–85 °C.		
Checking cruise control/Tempomat adjustment.		
Checking intake system for leaks.		
Adjusting idle speed and idle speed emission value.		
Checking and adjusting adjustment of slotted lever.		
Switching on all auxiliary units and checking engine for smooth running.		
Checking and regulating engine	110	O 1 – J 2
Including:		
Checking and lubricating engine regulating linkage.		
Checking full throttle control from inside vehicle.		
Connecting testing tools.		
Evaluation of oscilloscope display.		
Checking and adjusting ignition timing.		
Checking centrifugal and vacuum adjustment.		
Testing battery voltage.		
Testing ignition coil, terminal 1 and 15.		
Checking intake system for leaks.		
Checking EGR. (AUS) and (USA) version only.		
Running engine to 75–85 °C oil temperature.		
Checking cruise control/Tempomat adjustment.		
Checking idle speed stop on throttle valve.		
Checking and adjusting slotted lever.		
Adjusting idle speed and idle speed emission value.		
Switching on all auxiliary units and checking engine for smooth running.		
Checking fuel pressures and for internal leaks	120	K 2 – F 3
Including:		
Checking all fuel connections for leaks.		
Checking air flow sensor plate and control piston for easy operation.		
Checking control piston for leaks.		
Connecting pressure measuring device.		
Checking control pressure cold at idle.		
Checking system pressure at idle.		
Checking control pressure warm at idle.		
Checking full load enrichment.		
Checking voltage and resistance on warm-up compensator.		
Checking fuel distributor and fuel pump for leaks.		

Checking choke system	125	G 3 – M 3
Including:		
Checking starting voltage		
Checking air flow sensor plate and control piston for easy operation		
Checking fuel pressures and for internal leaks		
Checking cold starting valve for function and leaks		
Checking thermo time switch		
Checking auxiliary air valve		

Checking delivery capacity of fuel pump	130	N 3 – P 3
Checking injection valves	135	A 4 – F 4
Checking constant delivery of fuel distributor	160	G 4 – L 4
Checking fuel pump relay	165	L 4 – E 5

Assembly jobs

Survey mixture preparation	199	E 5 – H 5
Removal and installation of mixture controller	200	H 5 – L 5
Replacement of fuel distributor	205	L 5 – B 6
Reconditioning of system pressure regulator and pressure compensating valve	210	B 6 – F 6
Removal and installation of injection valves	215	G 6 – J 6
Replacement of air flow sensor	220	K 6 – L 6
Removal and installation of mixture controller with air guide housing	225	L 6 – O 6
Removal and installation of throttle valve housing	230	O 6 – P 6
Replacement of warm-up compensator	240	A 7 – E 7
Replacing, centering of air flow sensor plate, checking and adjusting zero position of air flow sensor plate	245	E 7 – L 7
Removal and installation of fuel reservoir	270	L 7 – P 7
Removal and installation of fuel filter	275	A 8 – E 8
Removal and installation of fuel pump	280	E 8 – L 8
Replacement of holder for fuel pump, fuel filter and fuel reservoir	281	L 8 – M 8
Conversion of fuel pump assembly	282	N 8 – E 9
A. General		N 8 – O 8
B. Conversion of fuel pump assembly		O 8 – E 9
Subsequent installation of separate check valve on fuel pump	283	E 9 – J 9
Survey fuel pump	285	K 9 – M 9

09 Air cleaner

Removal and installation of air cleaner	09-400	B 10 – E 10
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14 Intake manifold, exhaust manifold

Removal and installation of intake manifold upper and lower half, replacement of gaskets	14-450	G 10 – L 10
Replacement of intake manifold (intake manifold removed)	455	L 10 – M 10
Removal and installation of exhaust manifold	470	N 10 – B 11

15 Electrical system (ignition system)

Technical revisions		D 11 – E 11
Testing and adjusting ignition timing	15-501	E 11 – H 11
Including:		
Testing ignition timing in speeds without and with vacuum.		
Removal and installation of ignition distributor	510	H 11 – L 11
Including:		
Testing ignition timing in speeds without and with vacuum.		
Notes concerning jobs on breakerless transistorized ignition system TSZ 4	528	L 11 – M 11
General description of breakerless transistorized ignition system TSZ 4	530	N 11 – B 12
Testing breakerless transistorized ignition system TSZ 4	562	B 12 – J 12
Including:		
Checking electrical screw connections and plug connections for tight seat.		
Voltage test, testing dwell angle.		
Testing ignition distributor transmitter section.		
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30 Regulation

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Removal and installation of engine longitudinal regulating shaft	310	G 13 – H 13
Removal, installation and adjustment of front wall regulating shaft	320	H 13 – L 13
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47 Fuel system

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49 Exhaust system

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