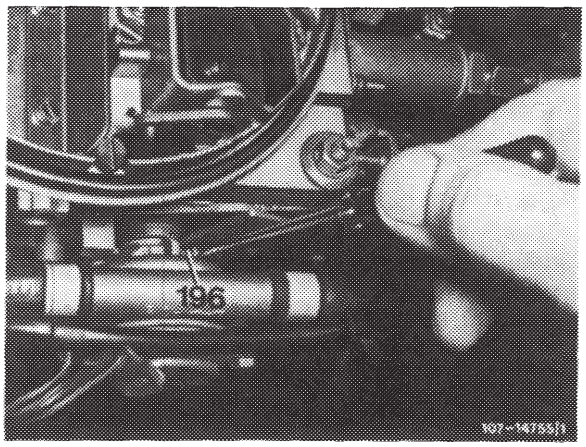
9 Check warming-up total mixture and adjust. Run engine with TN test choke installed. Push choke valve on lever (196) until noticeably stopped (choke valve gap). Check CO value and set by adjusting choke valve gap, if required.

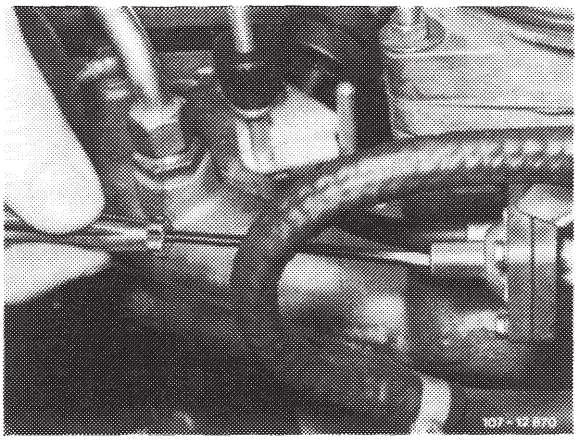
Screwing out = leaner
Screwing in = richer

Nominal value: 7—8 % CO

(On carburetors with draw-off connection for accelerating pump, set to low CO value).

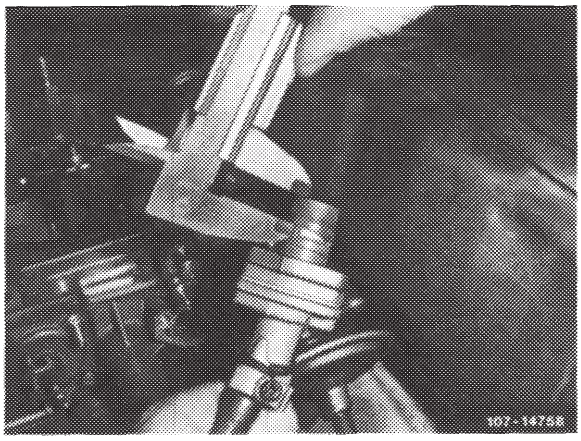


Note: If the adjusting screw is suddenly moving easily during adjustment, the O-ring is defective. In such a case, make sure to check pulldown once again for leaks.



Adjusting warming-up total mixture

10 Check TN control piston position at 85 °C coolant temperature and adjust. For this purpose, run engine with TN test choke installed. Measure dimension "X" form face to upper edge of control window directly adjacent to web.

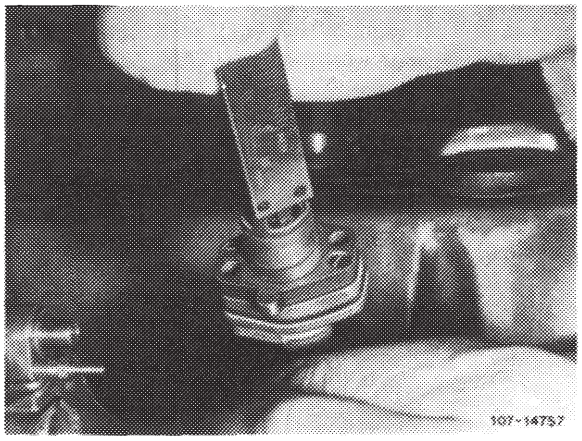


Measure dimension "X"

Then measure dimension "Y" from face to edge of control piston.

Dimension "Y" should be 0.8—1.0 mm smaller than dimension "X", so that the control piston closes the control window with overlap.

Control piston overlap: at 85 °C coolant temperature **0.8—1.0 mm.**

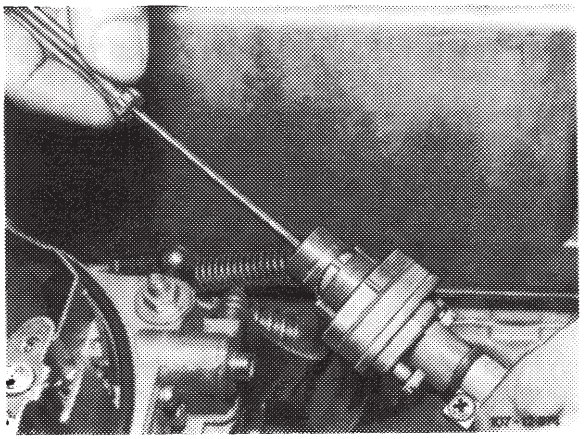


Measure dimension "Y"

Setting control piston position by means of adjusting screw.

Screwing out = reducing overlap
Screwing in = increasing overlap

Note: At + 20 °C temperature of TN choke the TN control window should be open by at least 2.5 mm. At each 10 °C change in temperature, the control piston travels a distance of approx. 0.5 mm, i.e. at approx. 70 °C coolant temperature the control window is just closed. At approx. 0 °C control window is completely open.



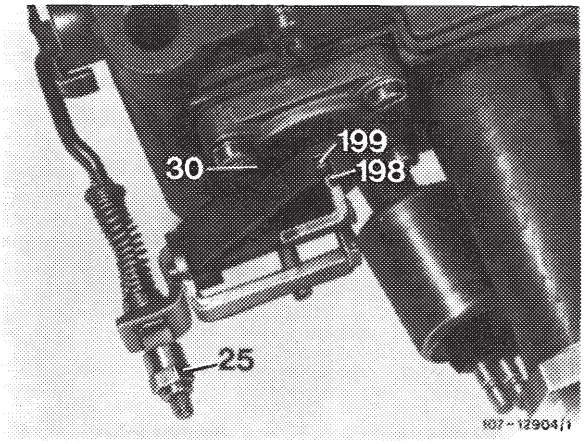
11 Remove TN test choke and re-install TN choke put aside earlier.

12 Check idle speed and idle speed emission value and adjust, if required.

Note: If the idle speed emission value is within the specified tolerance and the engine is running smoothly, do not change emission value since this value influences the warming-up total mixture.

13 Plug-in again vacuum line for air injection and EGR (air injection and EGR operative).

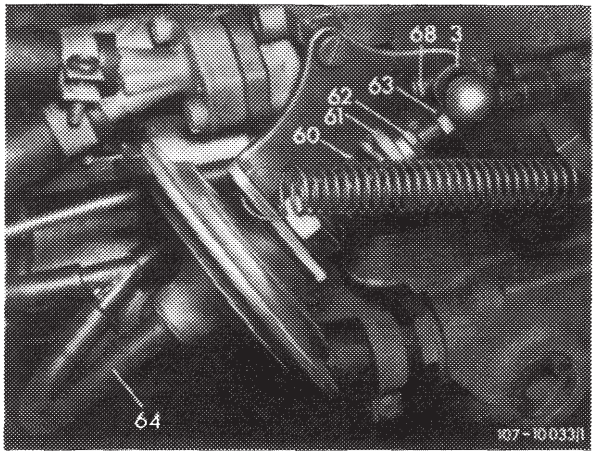
14 Check accelerating pump and adjust, if required (67.2–150).



25 Adjusting nut in accelerating pump

15 Adjust vacuum governor. For this purpose, run engine, pull off vacuum hose (64), set to specified speed by means of adjusting screw (63), plug-on vacuum hose.

Attention!
When loosening counternut, apply counterhold to diaphragm rod.

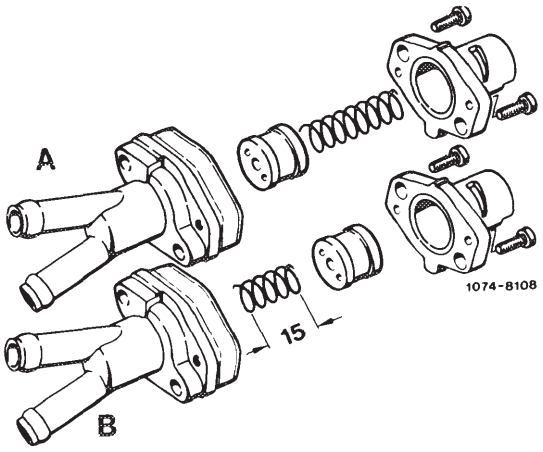


On automatic transmission, engage driving position, set to specified speed by means of adjusting nut (61). Turn power steering to full lock and engage air conditioner, engine should still run smoothly. Readjust speed, if required.

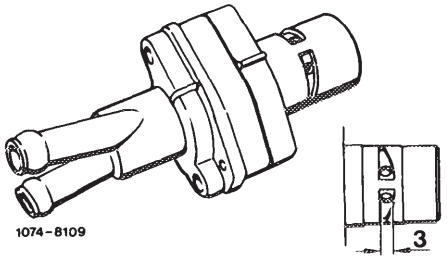
Self-made TN test choke

16 Unscrew the two fastening screws for the TN piston housing and remove piston housing.

17 Coat control piston with Omnifit or Loctite and slip back into piston housing with **open side first.** Shorten compression spring to approx. 15 mm, mount and tighten piston housing.



18 Then drill two 3 mm holes through TN control piston.



07.2–128 Testing starting device (choke) for function (cold start)

Testing and adjusting values

Voltages measured at battery

Rest potential		min. 12.2 volts
Starting voltage		min. 10 volts
Regulating voltage alternator		13.0–14.5 volts

Voltages measured at ignition coil

Terminal 15	Breaker contact "closed"	3.6–4.6
Terminal 1		0.7–1.5
Terminal 15	Breaker contact "open"	battery voltage
Terminal 1		battery voltage

Voltage at *pre-resistor*

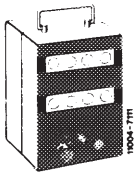
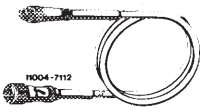
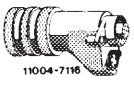
Pre-resistor output 0.4 ohm Cable: red/black (Pre-resistor bridge-over)	min. 9.6 volts

Carburetor

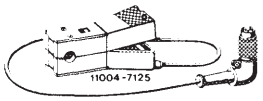
TN control window opening at + 20 °C	approx. 2.5 mm
CO value after starting cold engine	7–8 %[1])

[1]) If the CO value is essentially above upper tolerance, spark plugs have a tendency for sooting, engine starts misfiring. If it is considerably below lower tolerance, starting faults and bypass faults may occur.

Special tools

Digital tester		001 589 54 21 00
Connecting cable 3 m long		000 589 04 90 00
Intermediate plug (adaptor)		000 589 72 63 00

Trigger



000 589 71 63 00

Conventional test instruments

Voltmeter, revolution counter and CO measuring instrument

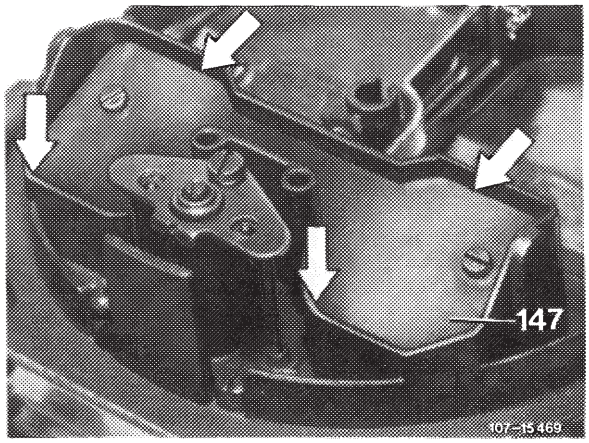
Testing

1 Let engine cool down to below + 20 °C. Check whether choke valve (147) is completely closed and has lateral clearance. **(Below + 20 °C the choke valve should be completely closed).**

2 Remove air filter, pull cable from choke cover heater so that choke valve is not completely opening during the following voltage measurements.

3 Check battery for external condition (visual checkup). Check battery poles for oxidation.

4 Test voltages on battery.



a) Rest potential

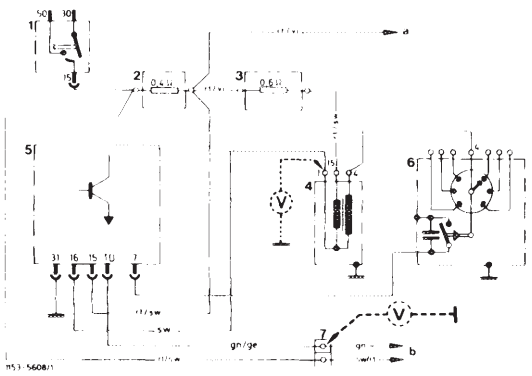
Connect voltmeter to battery plus and minus pole, read voltage.

Nominal value: min. 12.2 volts

b) Starting voltage

Pull high-voltage ignition cable 4 out of distributor cover and connect to ground. Operate starting motor while reading voltage.

Nominal value: min. 10 volts



1 Ignition starter switch
2 Pre-resistor 0.4 ohm
3 Pre-resistor 0.6 ohm
4 Ignition coil
5 Standard switchgear
6 Ignition distributor
7 Diagnosis plug
a To starter terminal 16
b To diagnosis socket

5 Test voltages at ignition coil.

a) With breaker contact **closed** at terminal 15 and terminal 1:

Nominal values: Terminal 15, 3.6—4.6 volts
Terminal 1, 0.7—1.5 volts

b) With breaker contact **opened** at terminal 15 and terminal 1:

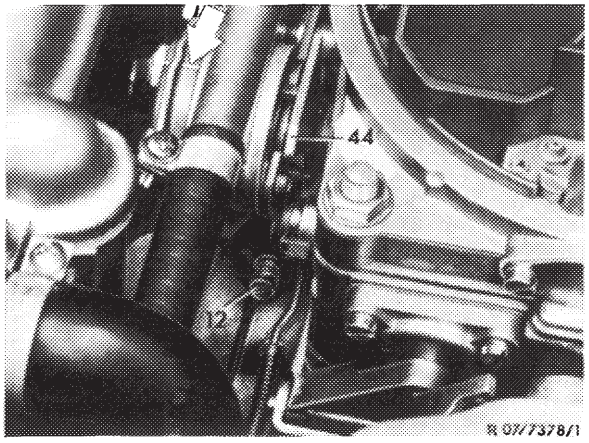
Nominal values: Terminal 15 and terminal 1 should be energized by battery voltage.

6 Measure voltage at pre-resistor 0.4 ohm while starting (pre-resistor bridge-over).

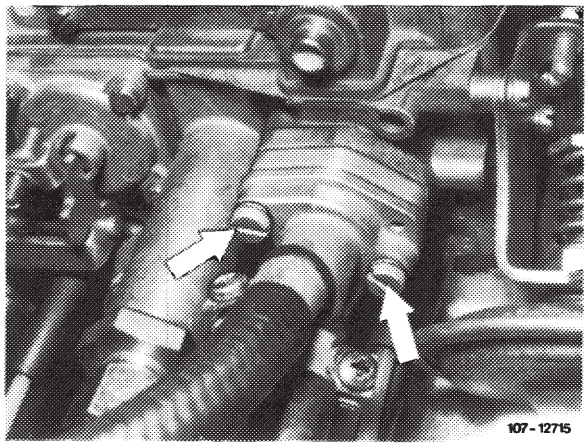
Nominal value: min. 9.6 volts

7 Insert high-voltage ignition cable 4 again into distributor cover.

8 Check choke cover preload. Markings (arrow) should be opposite each other.

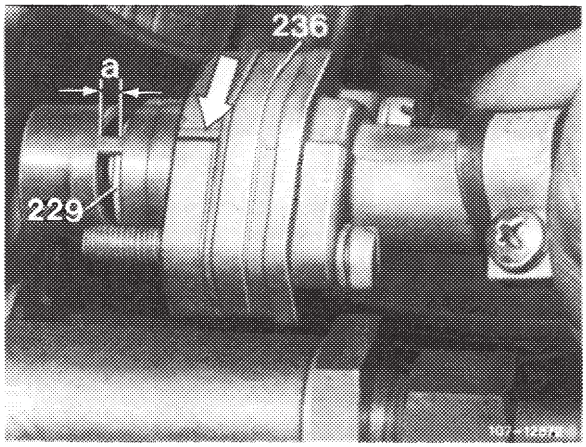


9 Remove TN choke after loosening fastening screws (arrow) together with coolant hoses.



10 Measure control window opening "a" exposed by control piston with slide gauge.

Nominal values: At + 20 °C approx. 2.5 mm.
At approx. 0 °C control window should be completely open.

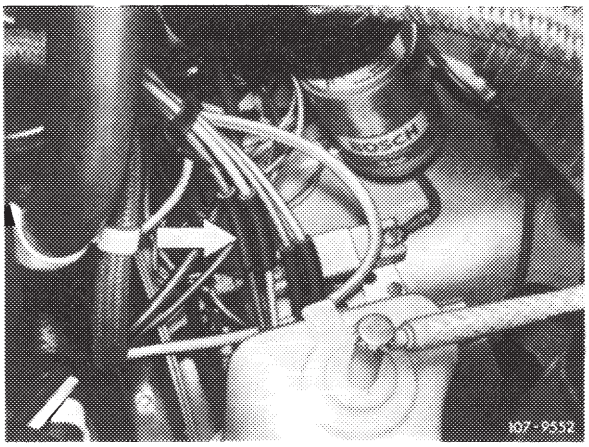


11 Install TN choke and air filter.

12 Check warming-up total mixture without air injection and EGR, adjust. For this purpose, connect CO measuring instrument and make air injection inoperative as described below (for (USA) 1973/74 nothing need be made inoperative):

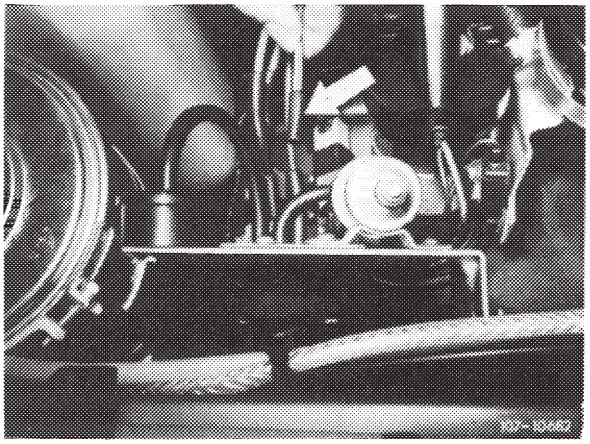
(J) 1976

Pull off **blue/purple** vacuum line at connecting point (arrow).



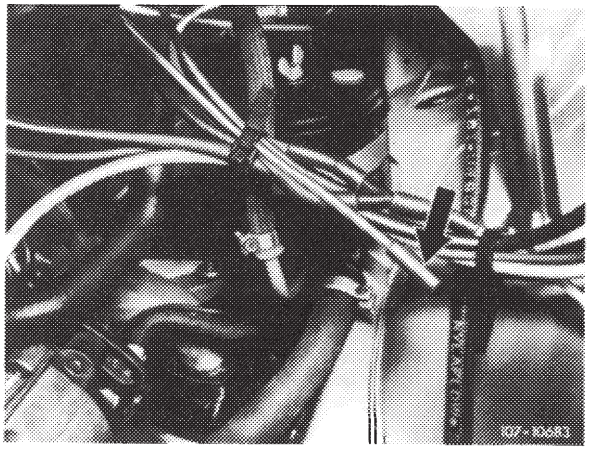
(S) 1976, model 114

Pull rubber cap (arrow) from **blue/purple** vacuum line.



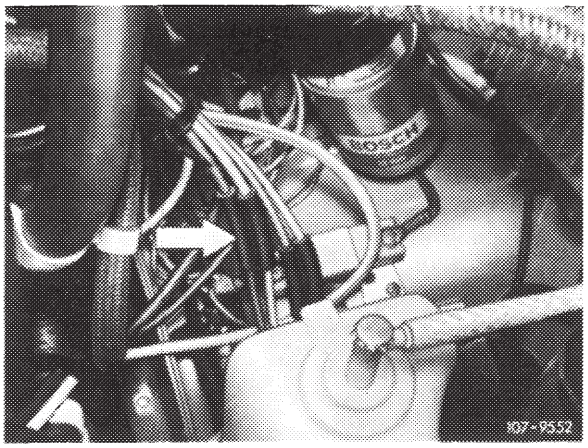
(S) 1976, model 116

Pull rubber cap (arrow) from **blue/purple** vacuum line.



(USA) California 1974

Pull off **red** vacuum line at connecting point (arrow).



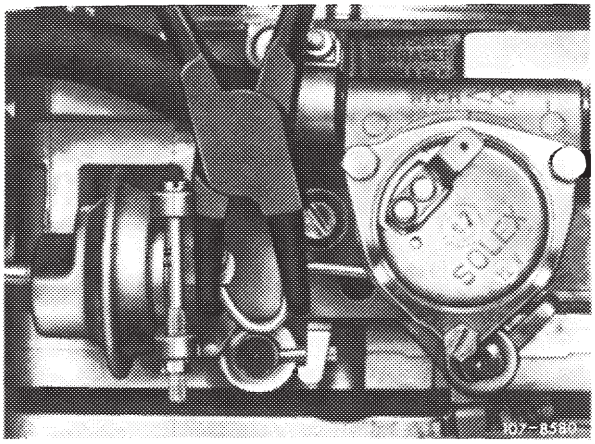
(USA) 1975/76

Pull off **blue/purple** vacuum line at connecting point (arrow).

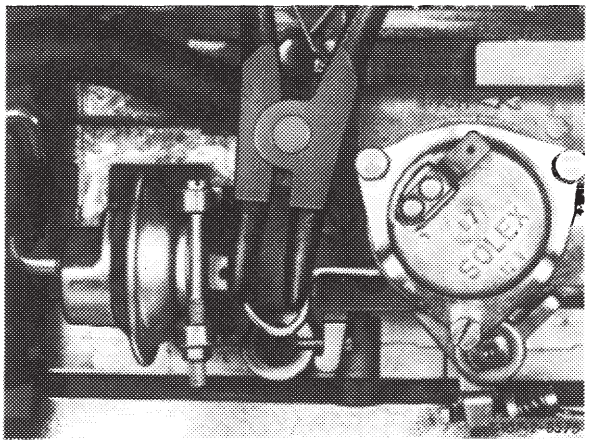
Start engine and rapidly depress accelerator upon firing.

Engage driving position for automatic transmission, permit CO value to come to rest and read. (If deviations from tolerance value are high, stop engine immediately, change choke valve gap accordingly and repeat CO test).

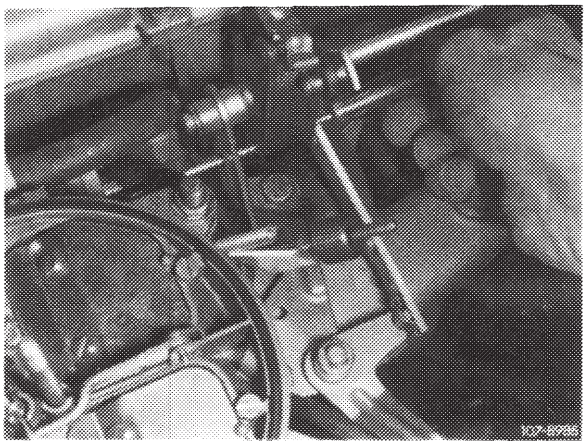
Nominal value: 7–8 % CO



Pushing together = leaner



Pushing apart = richer



Screwing out = leaner
Screwing in = richer

Again plug-on vacuum hoses for air injection and EGR (air injection with EGR operative).

13 Again plug-on cable for choke cover heater.

14 Test regulating voltage of alternator.

Note: Prior to testing regulating voltage, check acid density of battery. If acid density (state of charge) of battery is lower than 1.24 kg/dm^3 in tropical countries, a defective transistor regulator (full regulation) is no longer recognized.

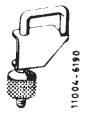
Checkup

Engine speed: 3000/min
Battery load: Compulsory consumer only (ignition)
Regulating voltage measured after approx. two minutes: 13.0—14.5 volts.

Testing and adjusting values

TN control piston overlap at + 85 °C coolant temperature	0.8–1.0 mm
TN control window opening at + 20 °C	approx. 2.5 mm

Special tool

Clamp		000 589 40 37 00

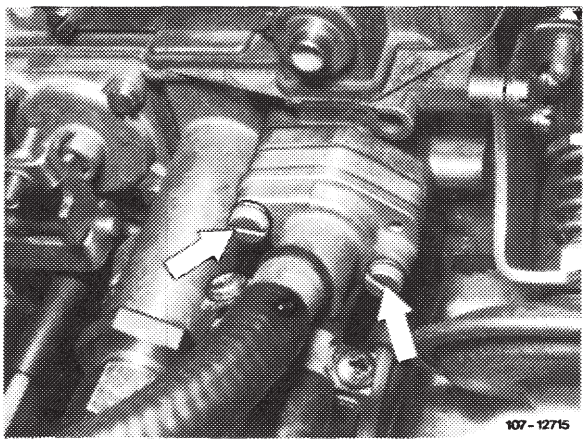
Conventional tool

Combined slide and depth gauge

Testing, adjusting

1 Run engine to operating temperature (coolant thermostat opened (approx. 85 °C).

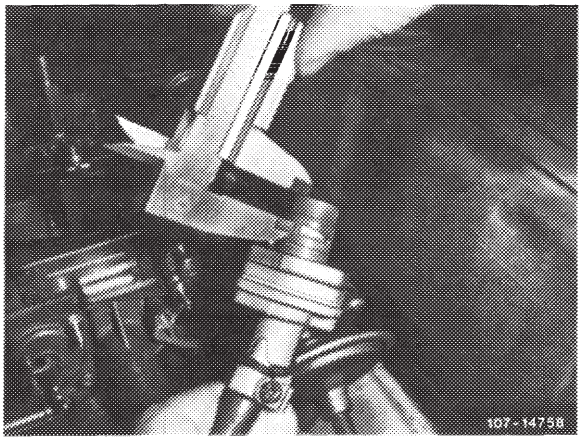
2 After loosening the two fastening screws (arrows) pull out TN choke with water hoses connected.



TN choke version 2 with enlarged expansion element and housing

3 Test and adjust TN control piston position. For this purpose, after pulling out TN choke, immediately measure dimension "X" from face up to upper edge of control window directly adjacent to web.

Attention!
Measuring is required immediately because upon cooling down the expansion element will respond and cause control piston to move to another position.

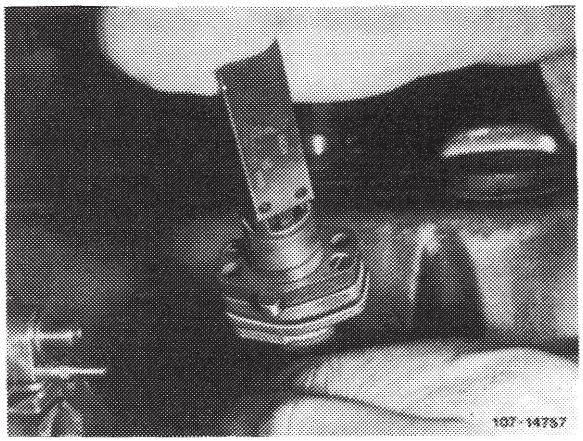


Measuring dimension "X"

4 Then measure dimension "Y" from face up to edge of control piston.

Dimension "Y" should be 0.8–1.0 mm smaller than dimension "X", so that the control piston will close control window with overlap.

TN control piston overlap: at + 85 °C coolant temperature **0.8–1.0 mm.**

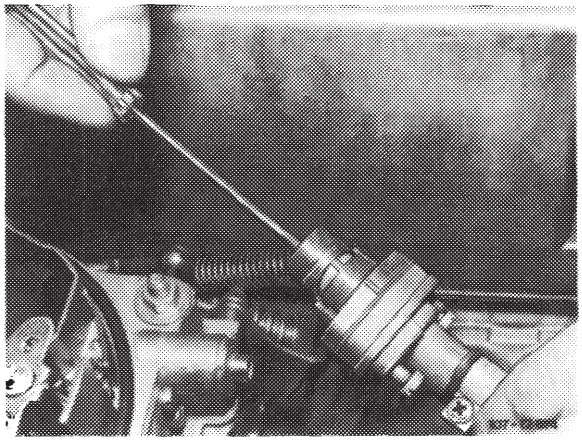


Measuring dimension "Y"

5 Adjust TN control piston position by means of adjusting screw.

Screwing out = reducing overlap
Screwing in = increasing overlap

Note: At + 20 °C temperature of TN choke, the TN control window should be open by approx. **2.5 mm.** Each 10 °C of temperature change will cause control piston to travel approx. 0.5 mm, i.e. at approx. 70 °C coolant temperature the control window is just closed. At approx. 0 °C the control window is wide open.



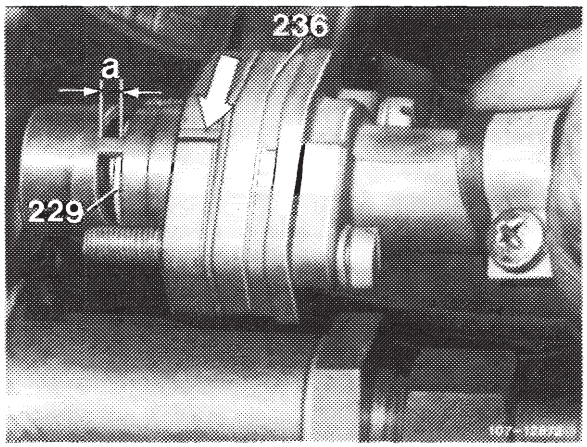
6 Pinch coolant hoses on TN choke and pull off.

7 Let TN choke cool down below + 20 °C (e.g. tap water) and then measure TN control window opening "a"

Nominal value: min. 2.5 mm.

(If control window opening is essentially less, replace TN choke).

8 Reinstall TN choke.

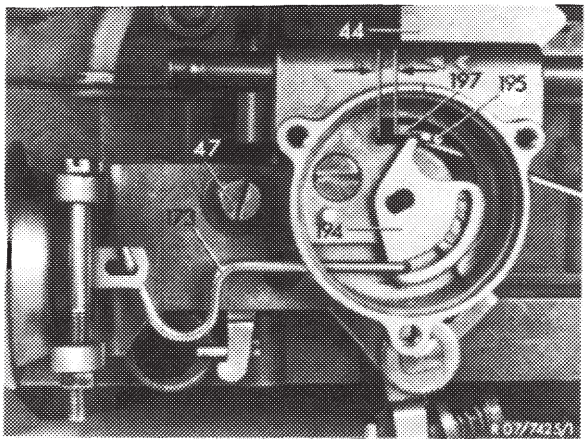


Testing and adjusting value

Distance "a" between choke housing and driver (197)	approx. 1.0 mm

Checking, correcting

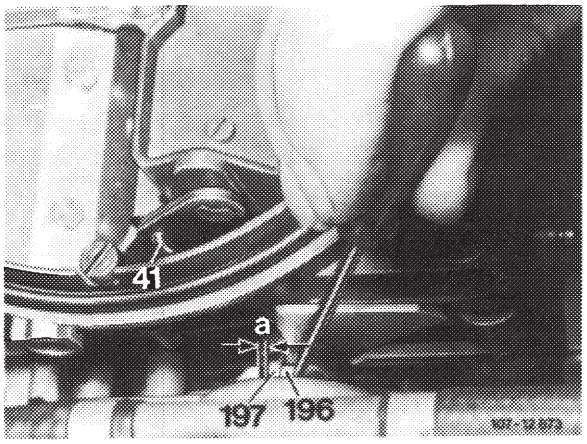
1 Check whether driver (196 and 197) is at right angle in relation to choke housing and rebend lever, if required.



Choke housing version 1

2 Operate throttle valve lever by half. Push driver (196 or 194) to the left up to stop.

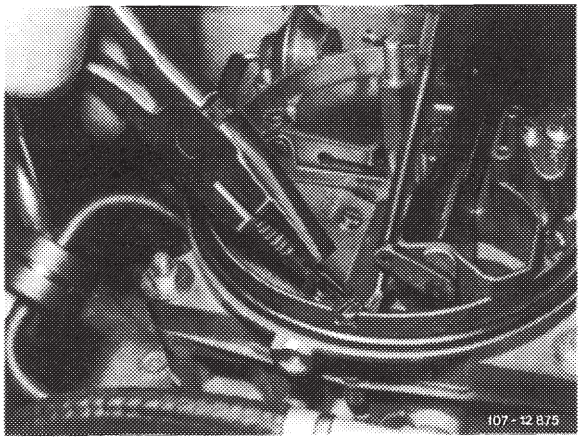
3 Check whether choke valve is **closed free of play** and whether the distance "a" between driver (197) and choke housing amounts to approx. 1.0 mm.



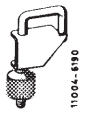
Choke housing version 2

4 Disconnect choke rod (41) if required and bend as needed.

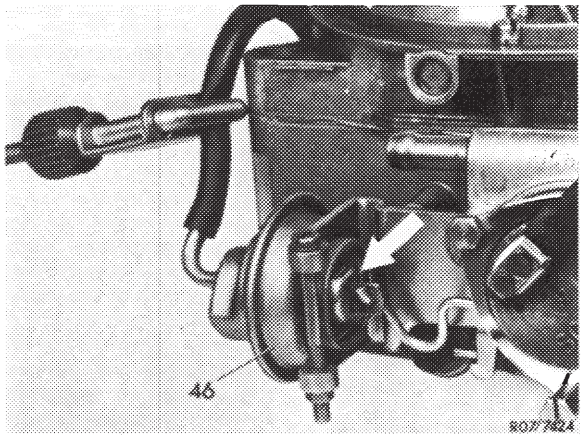
Attention!
To prevent distortion of driver (196), support choke rod.



Special tool

Clamp		000 589 40 37 00

Testing

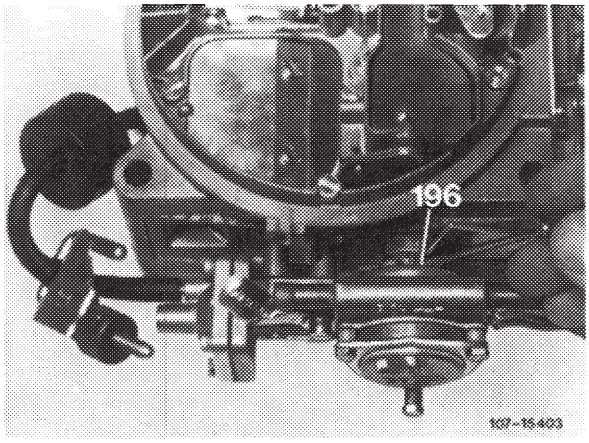


a) Choke housing version 1 (sheet metal pulldown)

1 Run engine at idle until diaphragm rests against end stop. Pinch vacuum hose, stop engine.

2 Push with screwdriver against sheet metal cup of diaphragm and check whether diaphragm is still resting against end stop. Replace vacuum hose or dashpot (46), if required.

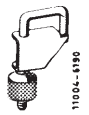
b) Choke housing version 2 (cast iron choke housing)



3 For this purpose, pinch vacuum hose with clamp with engine running. Stop engine. Open choke valve to gap. Choke valve gap should not become smaller, if it does, pulldown is leaking. Replace pulldown cover or diaphragm, if required.

Pulldown cover with O-ring

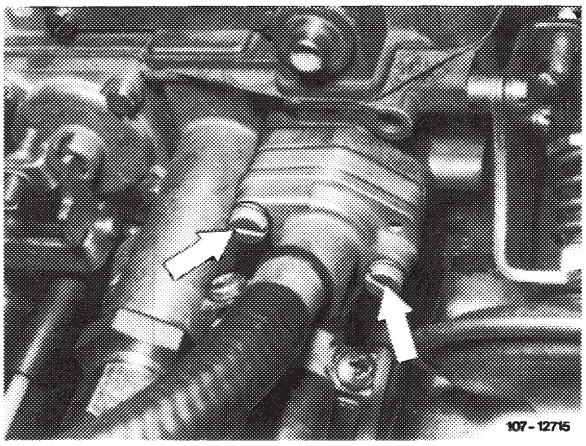
Special tool

Clamp		000 589 40 37 00

Removal

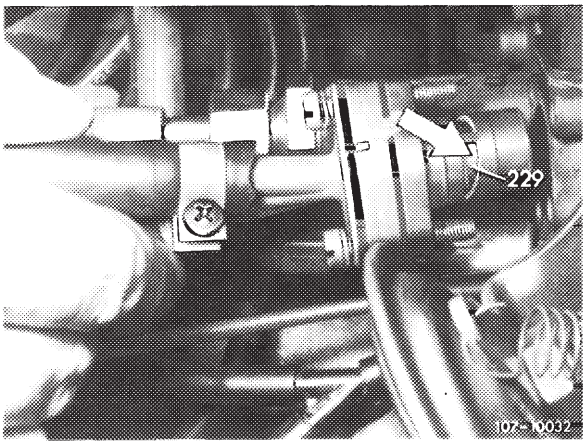
1 Pinch coolant hoses and pull off.

2 Pull TN choke out of carburetor housing after loosening fastening screws (arrows).



Installation

3 For installation proceed vice versa. Use new gasket and make sure that control window (arrow) is pointing upwards.



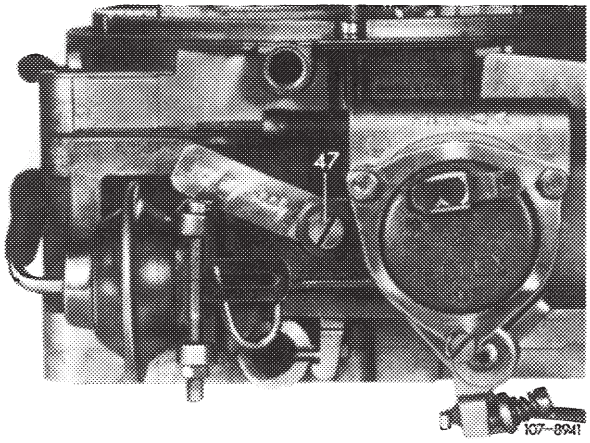
Note

The starter housing can be removed or installed without difficulties only with carburetor removed.

Removal

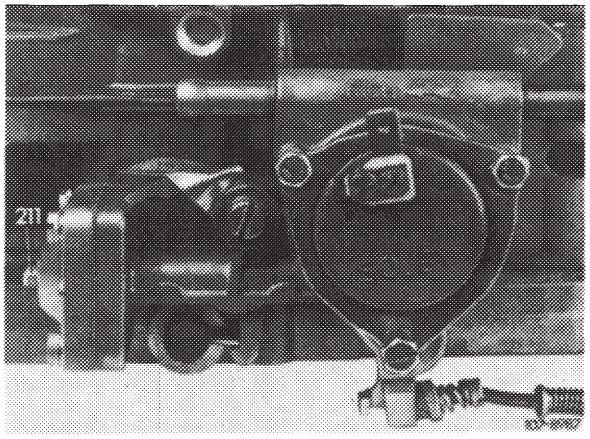
1 Remove carburetor (07.2–194).

2 Pull vacuum hose from choke housing. Unscrew fastening screw, remove choke housing and choke cover.

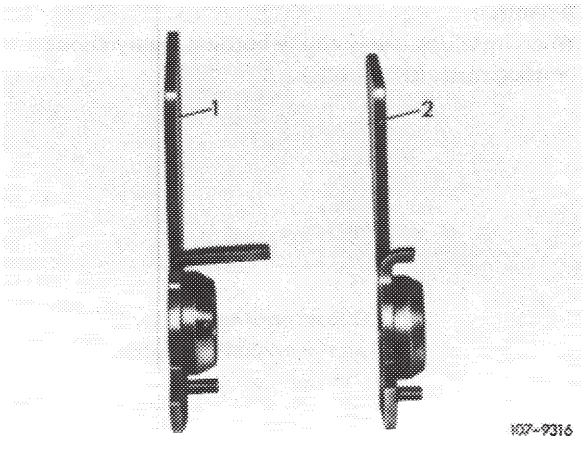


Choke housing version 1
(sheet metal pulldown)

Starting May 1973 a cast iron choke housing with integrated pulldown and a modified fast idle cam is installed. The choke valve gap is set by means of adjusting screw (211) to simplify adjustment. Subsequent installation is generally possible.



Choke housing version 2
(cast iron choke housing)



Fast idle cam versions

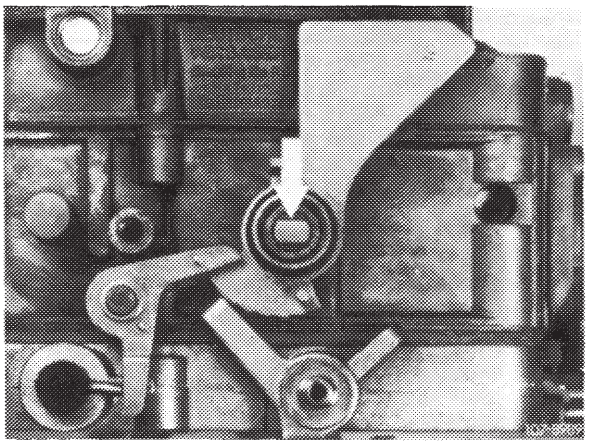
1 For choke housing with sheet metal pulldown
2 For cast iron choke housing (with short driver)

Installation

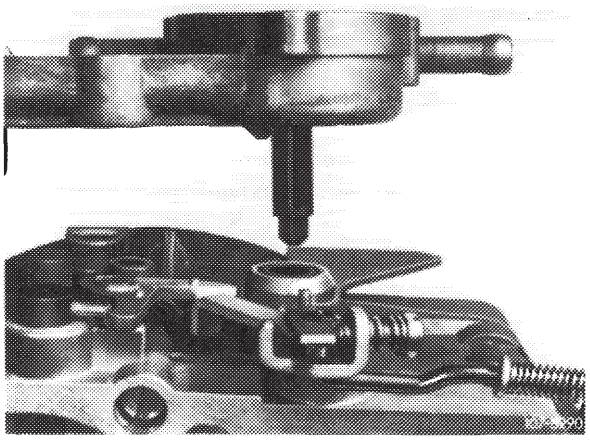
3 For installation, set up carburetor in such a manner that the choke housing can be installed vertically.

4 Position fast idle cam as shown in illustration and align.

5 Align driver lever for choke rod by means of a screwdriver inserted through bore in carburetor housing (arrow) in such a manner that the recess in driver lever shows up horizontally in center of carburetor housing bore.

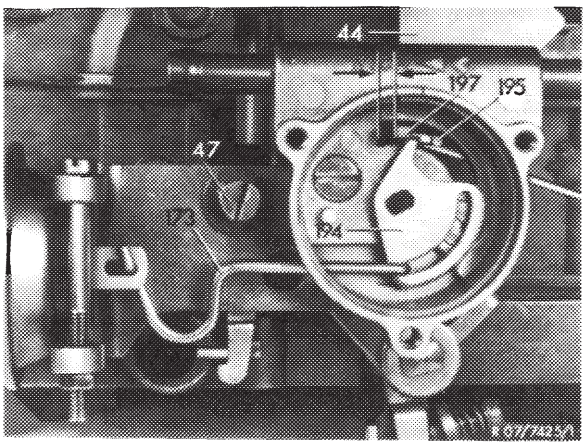


6 Carefully install choke housing from above.



7 Check that drivers (196 and 197) are aligned as shown in illustration.

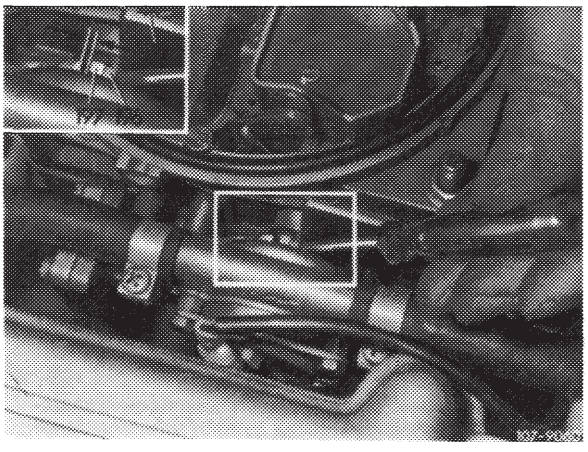
8 Check whether the driver (196 or 194) is moving when the choke valve is actuated, e.g. that it is positively connected. Then attach choke housing.



Choke housing version 1
(sheet metal pulldown)

44	Fast idle cam	194	Driver for actuating fast idle cam
47	Fastening screw	197	Driver of fast idle cam
173	Connecting rod		

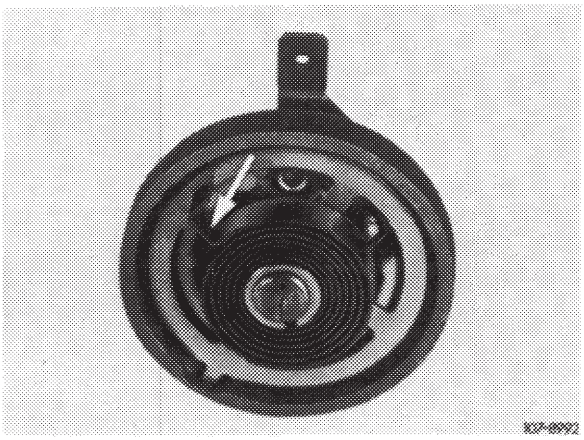
Attention!
When installing a new choke housing, apply choke housing mark (07.2–142).



Choke housing version 2
(cast iron choke housing)

44	Fast idle cam
196	Driver for actuating fast idle cam
197	Driver of fast idle cam

9 Install choke cover, making sure that the driver in choke housing rests against bimetallic spring side (arrow).



Spare parts for installing cast iron choke housing

Designation	Part no.
Choke housing	000 070 19 47
Fast idle cam	110 071 12 62
Fastening screw	001 071 27 71

Testing and adjusting values

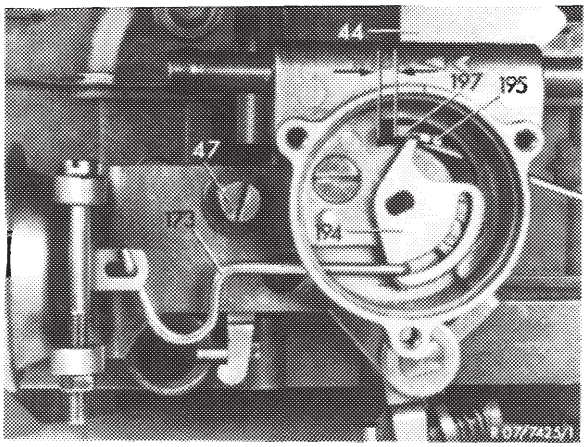
Distance "a" between choke housing and driver (197)	approx. 1.0 mm
Choke cover preload	to mark

Checking, correcting

1 Check whether driver (196 and 197) is at right angle in relation to choke housing and bend lever accordingly, if required.

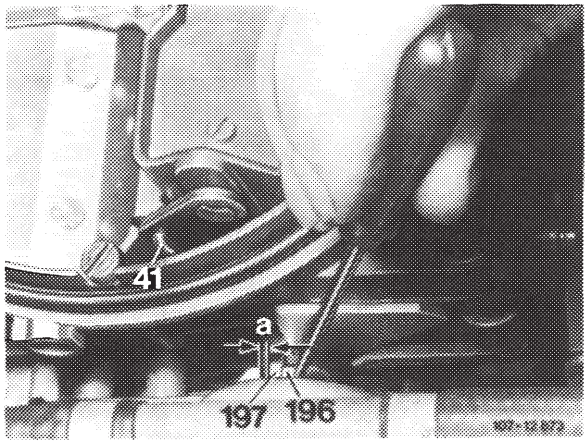
2 Operate throttle valve lever by half, push driver (196 or 197) to the left up to stop.

3 Check whether choke valve is closed free of play and distance "a" between driver (197) and choke housing amounts to approx. 1.0 mm.

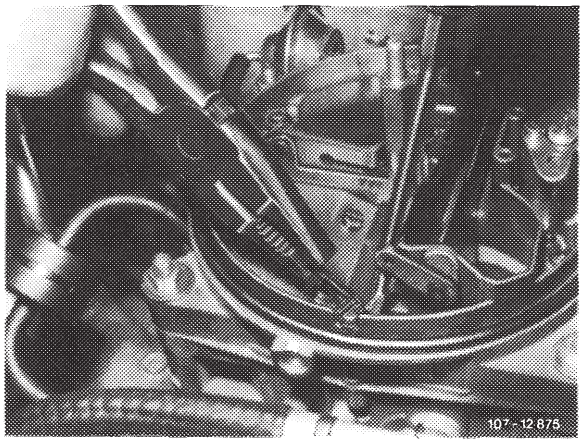


4 Disconnect choke rod, if required, and bend as needed.

Attention!
To avoid distortion of driver (196), support choke rod.

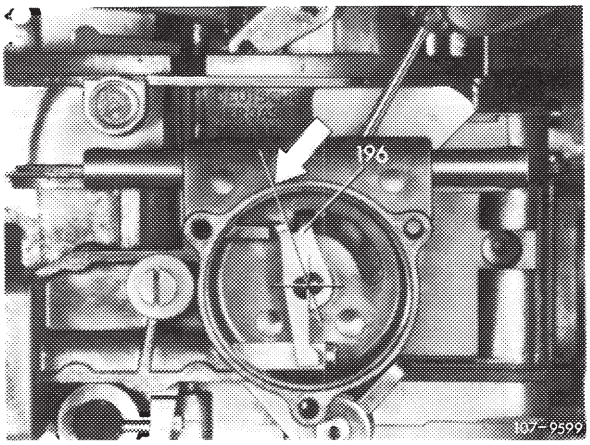


5 Actuate throttle valve lever by half. Push driver (194 or 196) to the left up to stop.



Rebending choke rod

6 Check marking notch (arrow) in extension of driver (194 or 196) and punch in new notch, if required.

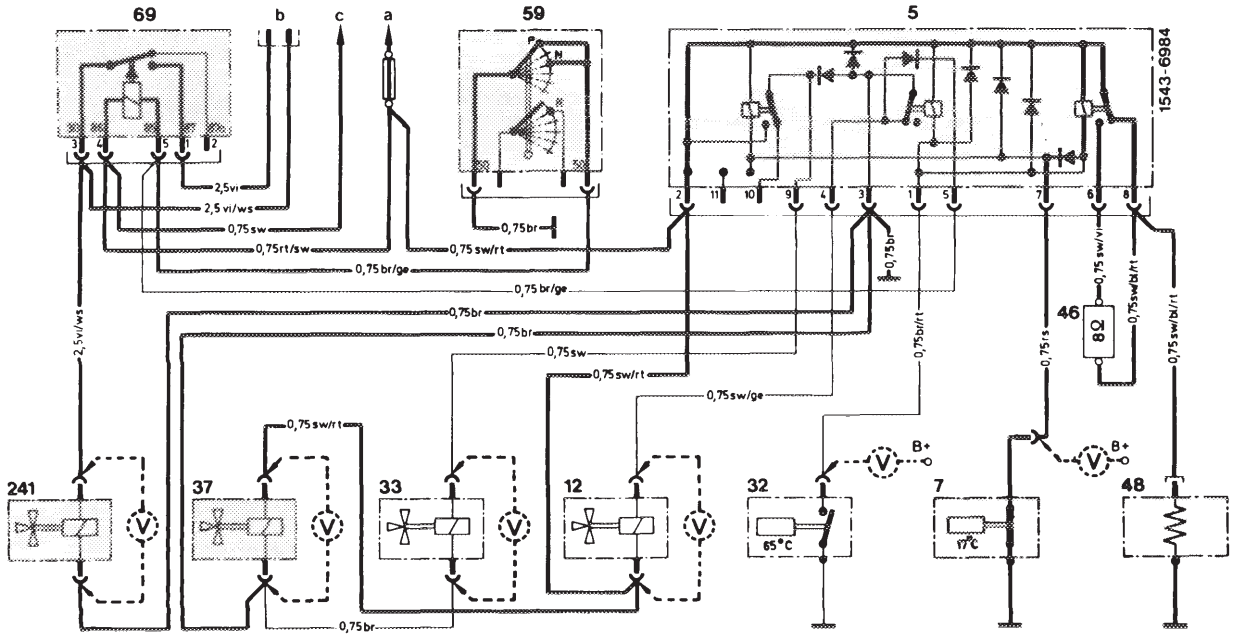


A. (J) 1976

Test conditions: All fuses in order, engine at operating temperature, run engine at idle.

Wiring diagram (drawn with ignition switched off below 17 °C engine oil temperature)

Choke cover-stepped heater, automatic choke, positive and negative venting of float chamber



5 Relay box
7 Temperature switch 17 °C
12 Switchover valve EGR (brown)
32 Temperature switch 65 °C
33 Switchover valve air injection (blue)
37 Switchover valve float chamber positive ventilation (green)
46 Resistor 8 ohms
48 Choke cover
59 Starter lockout and back-up lamp switch
241 Switchover valve automatic choke (white)

Color code

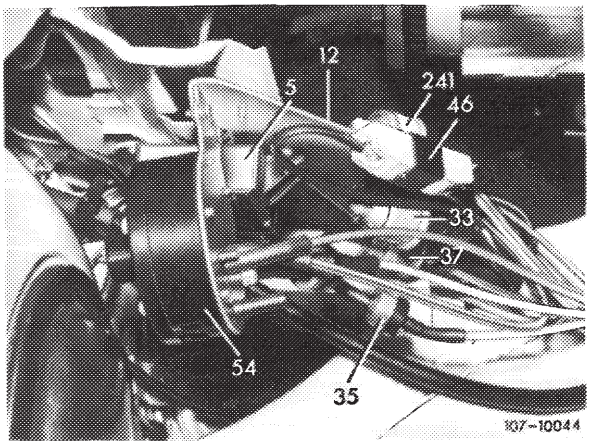
bl = blue
br = brown
ge = yellow
rs = pink
rt = red
sw = black
vi = purple
ws = white

a Fuse no. 4
b Coupler to main conductor
Cable color purple — starter terminal 50
Cable color purple/white — starter switch terminal 50
c Warning switch catalyst temperature

Testing choke cover-stepped heater

Connect voltmeter at output of resistor (46) and connect to ground. Disconnect plug connection of electric line to temperature switch 17 °C (7) and connect to ground.

Voltmeter indicating 7–8 volts.	Voltmeter not indicating 7–8 volts.

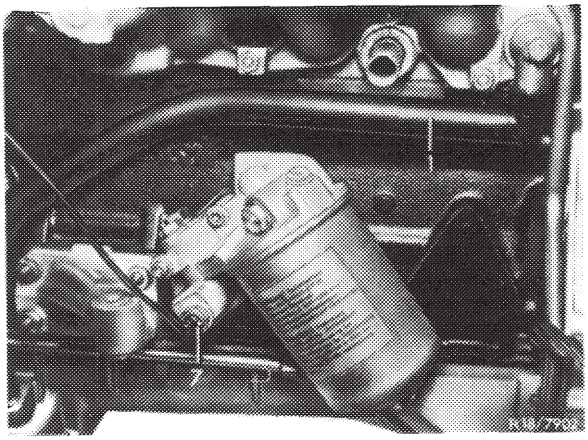


Test relay box (5)

Connect voltmeter at input of resistor (46) and to ground.

Connect plug connection of temperature switch (7) to ground. Voltmeter should indicate 7–8 volts.

If no voltage is measured, renew relay box (5).

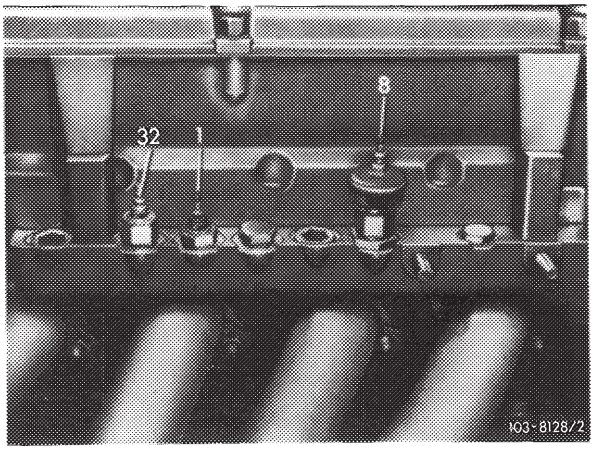


Testing choke cover-stepped heater

Connect voltmeter at output of resistor (46) and to ground.

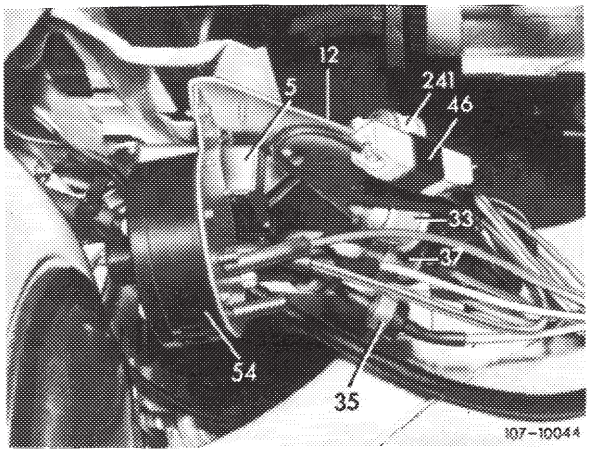
Pull plug from temperature switch 65 °C.

Voltmeter indicating approx. 12 volts.	Voltmeter not indicating approx. 12 volts.



Renew relay box (5).

End of test



Test conditions: All fuses in order, engine at operating temperature, run engine at idle.

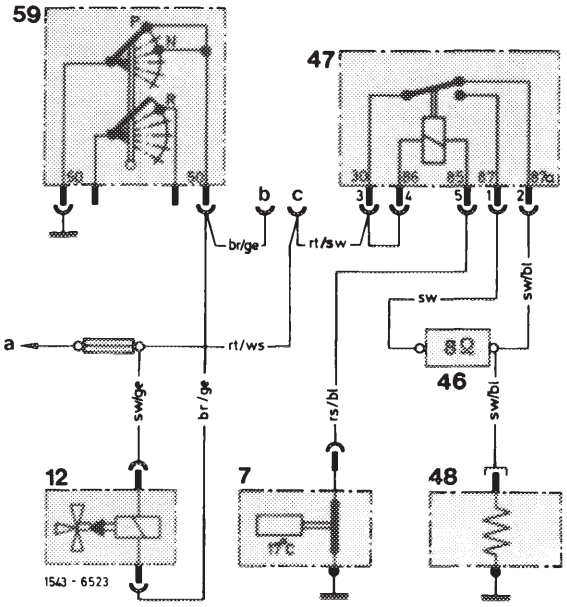
Wiring diagram (drawn with ignition switched off, below 17 °C engine oil temperature)

Choke cover-stepped heater, EGR

Color code

bl = blue	rs = pink	vi = purple
br = brown	rt = red	ws = white
ge = yellow	sw = black	

a Fuse no. 3 (15/54)
b Relay starter terminal 85
c Relay starter terminal 86



7 Temperature switch 17 °C
12 Switchover valve EGR (brown)
46 Pre-resistor 8 ohms
47 Relay pre-resistor choke cover
48 Choke cover
49 Starter lockout and back-up light switch

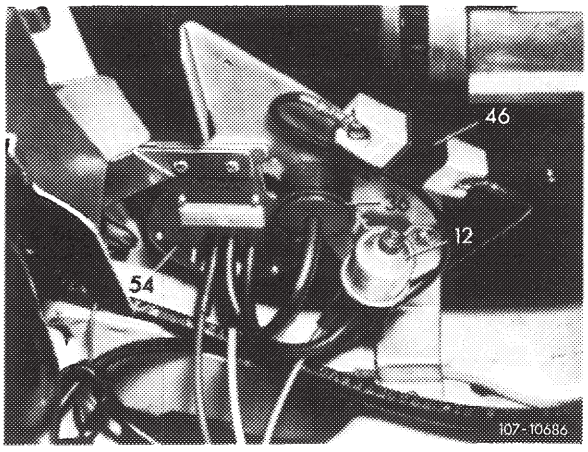
Testing choke cover-stepped heater

Connect voltmeter to output of resistor (46) and to ground. Disconnect plug connection of electric line to temperature switch 17 °C (7) and connect to ground.

Voltmeter indicating 7–8 volts.	Voltmeter not indicating 7–8 volts.

Test relay pre-resistor choke cover (47)

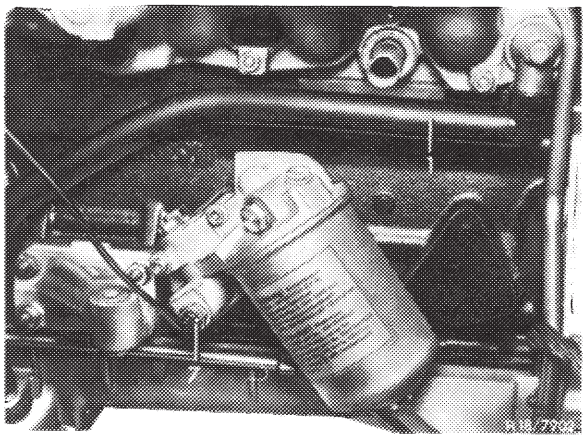
Connect voltmeter one after the other to both connections of pre-resistor choke cover (46) and to ground.



Connect plug connection of temperature switch 17 °C (7) to ground. Voltmeter should indicate approx. 7–8 volts once.

If no voltage of 12 volts is measured, test choke cover.

If less than 7–8 volts are measured, test pre-resistor or renew relay.



Testing choke cover-stepped heater

Connect voltmeter to output of resistor (46) and to ground.

Pull plug from temperature switch 65 °C.

Voltmeter indicating approx. 12 volts.	Voltmeter not indicating approx. 12 volts.

If less than 7–8 volts are measured, test pre-resistor or replace relay.

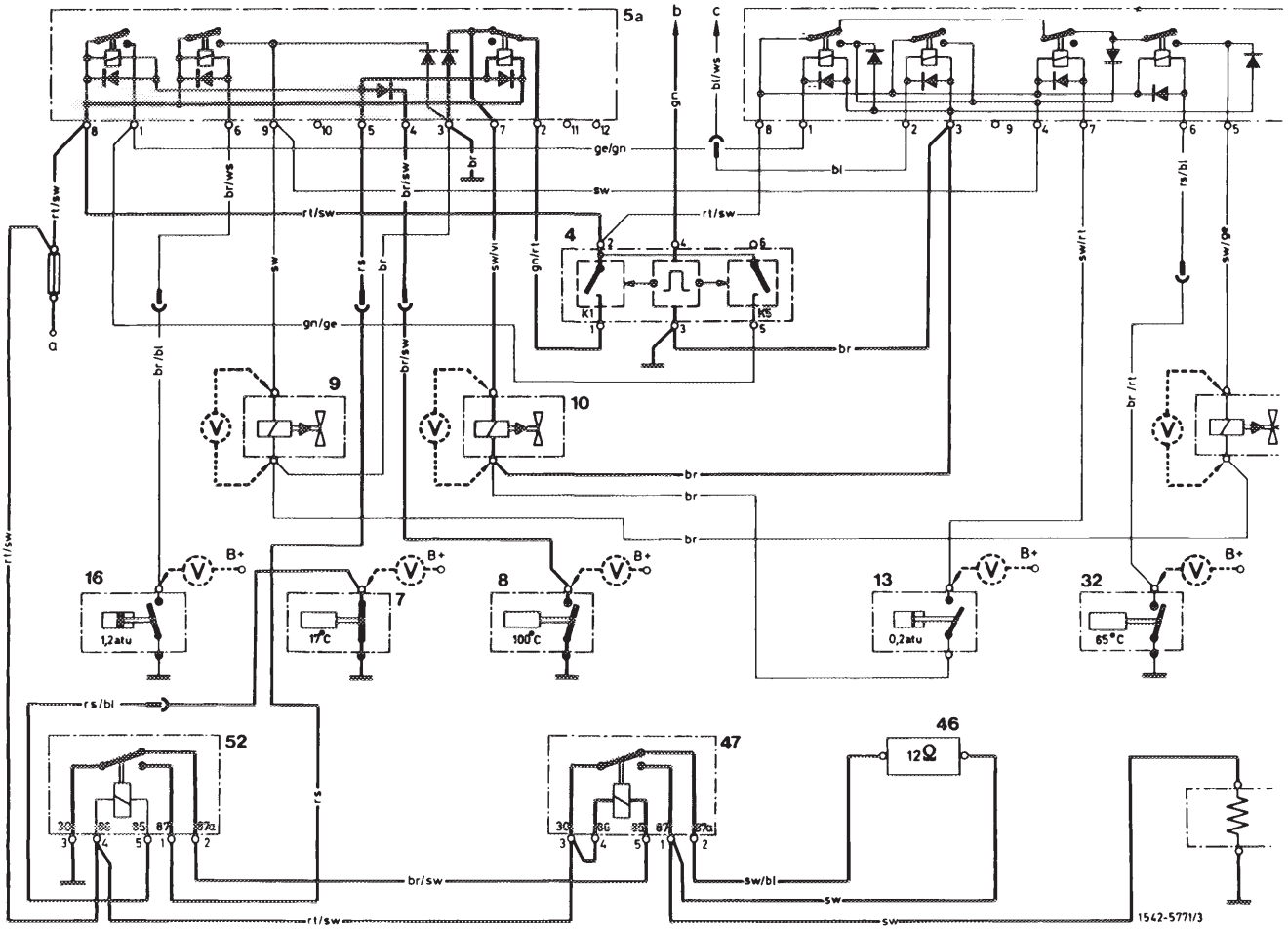
End of test

C. (USA) 1973/74

Test conditions: All fuses in order, engine at operating temperature, run engine at idle.

Wiring diagram (drawn with ignition switched off, below 17 °C engine oil temperature)

Choke cover-stepped heater, throttle valve lift



4 Rpm relay with 2 speeds 1800/2000/min and 3000/3400/min
5 Relay box (8-pole)
5a Relay box (12-pole)
7 Temperature switch 17 °C
8 Temperature switch 100 °C
9 Switchover valve ignition
10 Switchover valve throttle valve lift
12 Switchover valve EGR
13 Vacuum switch 0.2 bar
16 Oil pressure switch 1.2 bar
32 Temperature switch 65 °C
46 Resistor choke cover
47 Relay resistor choke cover
48 Choke cover
52 Relay temperature switch 17 °C

Color code

bl = blue	gn = green	sw = black	a Fuse no. 3
br = brown	rs = pink	vi = purple	b Double cable connector terminal 1 ZV
ge = yellow	rt = red	ws = white	c Relay air conditioner terminal 87a

Testing choke cover-stepped heater

Disconnect plug connection of electric line to temperature switch 17 °C (7) in oil filter housing and connect to ground.

Relax (47 and 52) audibly switching.	Relay (47 and 52) not switching.

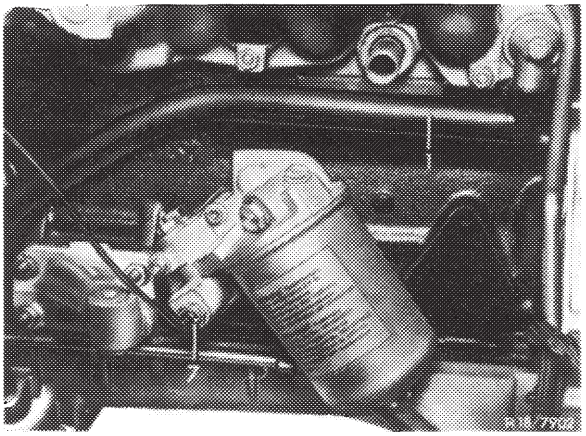
Test relay for resistor of choke cover (47)
(front relay, short cable)

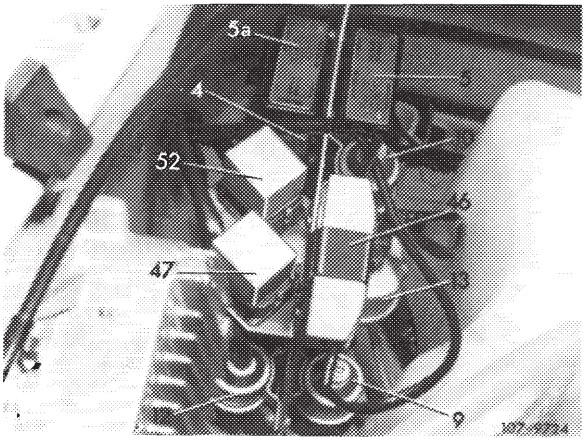
Connect voltmeter to output of resistor (46) and to ground. With the ignition switched on, the voltmeter should indicate approx. 13 volts. If there is no voltage, renew relay (47).

Loosen plug connection of electric line to temperature switch 17 °C and connect to ground. Voltmeter should indicate approx. 5 volts. If there is no voltage, renew resistor.

If approx. 13 volts are measured, exchange choke cover on carburetor and repeat test.

End of test



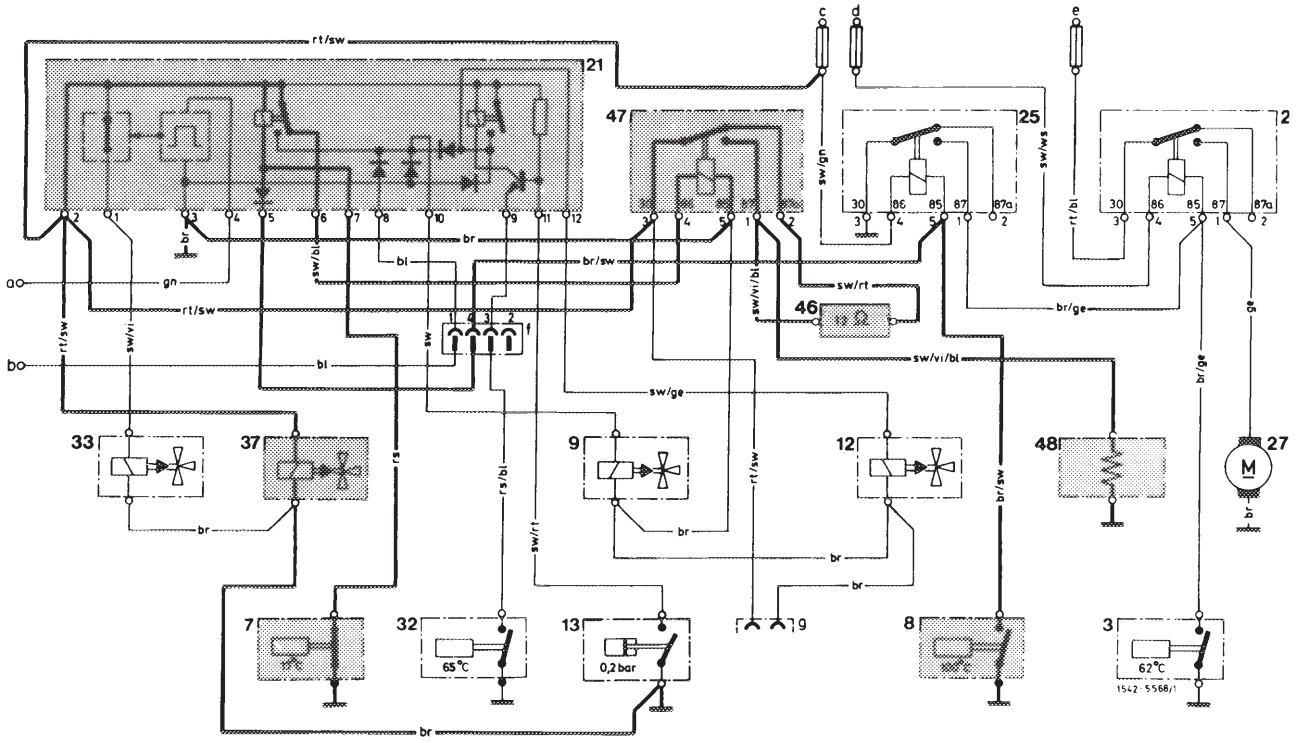


D. (USA) 1974 California

Test conditions: All fuses in order, engine at operating temperature, run engine at idle.

Wiring diagram (drawn with ignition switched off, below 17 °C engine oil temperature)

Choke cover-stepped heater, fuel evaporation control system



3 Temperature switch 62 °C
7 Temperature switch 17 °C
8 Temperature switch 100 °C
9 Switchover valve ignition
12 Switchover valve EGR
13 Vacuum switch
21 Switchbox
25 Relay disconnection temperature switch 62 °C/100 °C
26 Relay auxiliary fan
27 Auxiliary fan
32 Temperature switch 65 °C
33 Switchover valve air injection
37 Switchover valve fuel evaporation control system
46 Resistor choke cover
47 Relay resistor choke cover
48 Choke cover

Color code

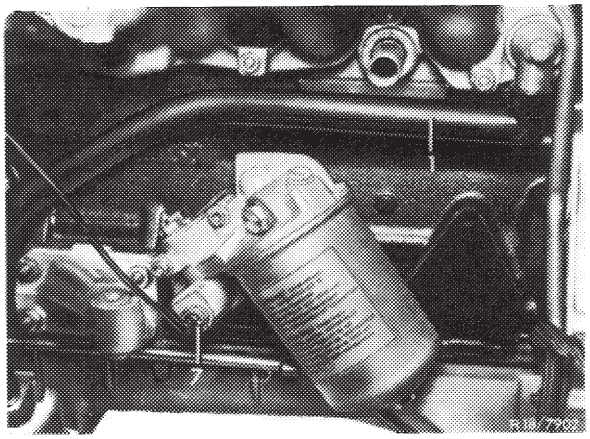
bl = blue
br = brown
ge = yellow
gn = green
rs = pink
rt = red
sw = black
vi = purple
ws = white

a To two-point cable connector terminal 7 (TD)
b Switch air conditioning system
c Fuse no. 3 (15/54)
d Fuse no. 4 (15/54)
e Auxiliary fuse box for auxiliary fan
f 4-point plug on relay holder
g 2-point coupler, tied-up

Testing choke cover-stepped heater

Disconnect plug connection of electric line to temperature switch 17 °C (7) in oil filter housing and connect to ground.

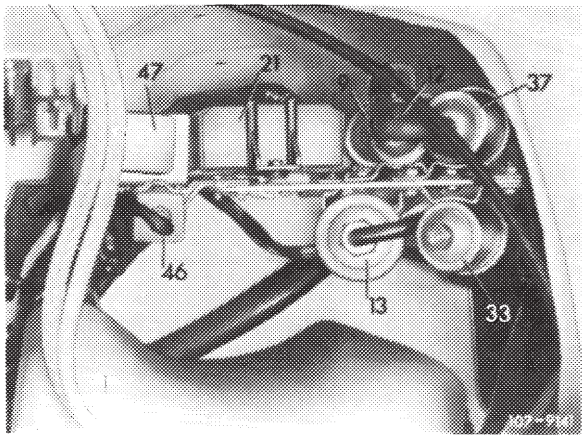
Relay (47) audibly switching.	Relay (47) not switching.



Test relay in switchbox (21)

Pull coupler from relay for resistor of automatic choke and connect voltmeter to terminal 1 and 3. Loosen plug connection of electric line to temperature switch (7) and connect to ground.

With the ignition switched on, the voltmeter should indicate approx. 13 volts. If no voltage is measured, renew switchbox (21).



Test relay for resistor of choke cover (47)

Connect voltmeter to output of resistor (46, upper connection) and to ground. With the ignition switched on, the voltmeter should indicate approx. 13 volts. If no voltage is measured, renew relay (47).

Loosen plug connection of electric line to temperature switch (7) and connect to ground. Voltmeter should indicate approx. 5 volts. If no voltage is measured, renew resistor.

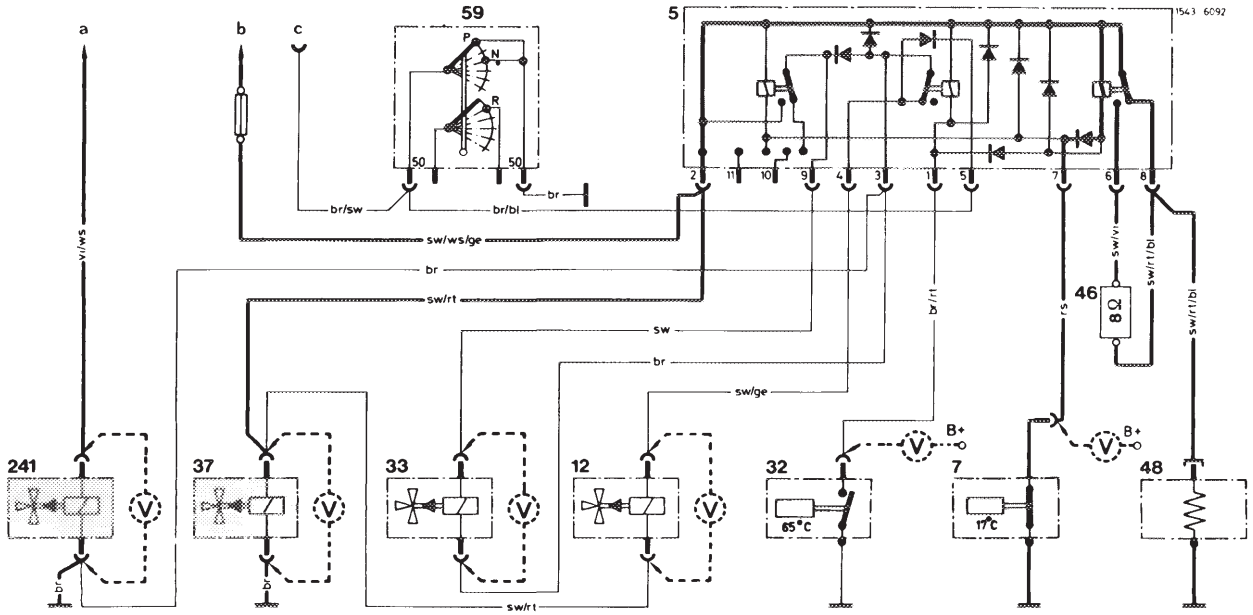
If approx. 13 volts are measured, exchange choke cover on carburetor.

End of test

Test conditions: All fuses in order, engine at operating temperature, run engine at idle.

Wiring diagram (drawn with ignition switched off, below 17 °C engine oil temperature)

Choke cover-stepped heater, automatic choke, tank breather



5 Relay box
7 Temperature switch 17 °C
12 Switchover valve EGR (brown)
32 Temperature switch 65 °C
33 Switchover valve air injection (blue)
37 Switchover valve float chamber positive vent (green)
46 Resistor 8 ohms
48 Choke cover
49 Starter lockout and back-up light switch
241 Switchover valve automatic choke (white)

Color code

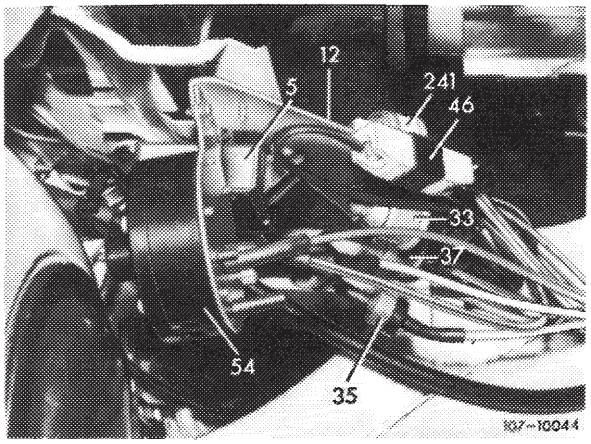
bl = blue
br = brown
ge = yellow
rs = pink
rt = red
sw = black
vi = purple
ws = white

a Terminal 50 starter
b Fuse no. 3
c Terminal 30 emergency starter switch

Testing choke cover-stepped heater

Connect voltmeter to output of resistor (46) and to ground. Disconnect plug connection of electric line to temperature switch 17 °C (7) and connect to ground.

Voltmeter indicating 7–8 volts.	Voltmeter not indicating 7–8 volts.

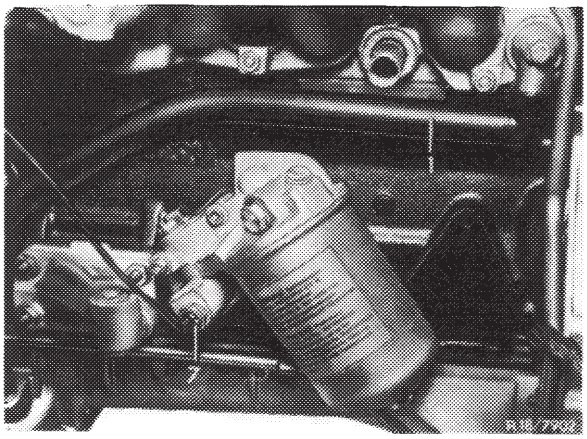


Test relay box (5)

Connect voltmeter to input of resistor (46) and to ground.

Connect plug connection of temperature switch to ground. Voltmeter should indicate 7–8 volts.

If no voltage is measured, renew relay box (5).

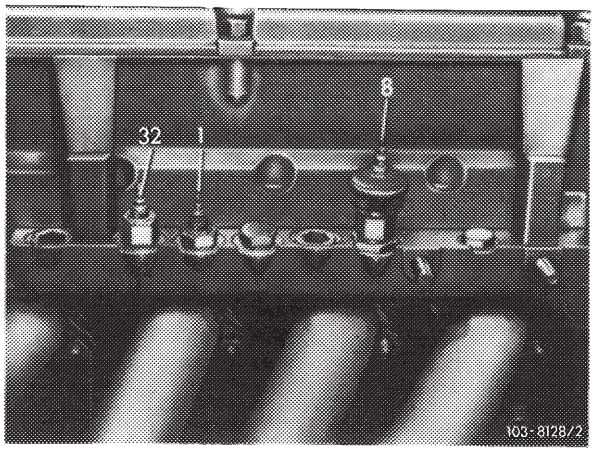


Testing choke cover-stepped heater

Connect voltmeter to output of resistor (46) and to ground.

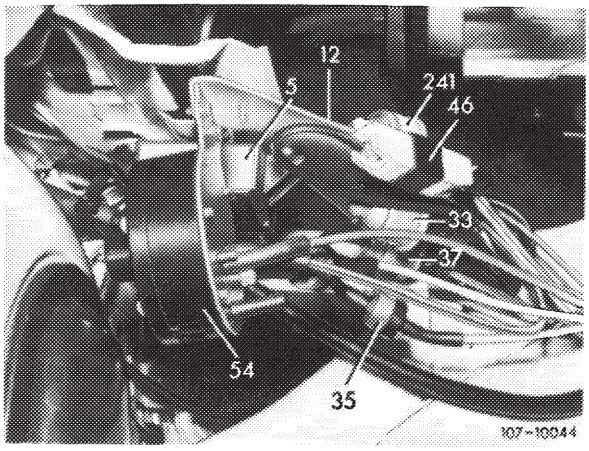
Pull plug from temperature switch 65 °C.

Voltmeter indicating approx. 12 volts.	Voltmeter not indicating approx. 12 volts.



Renew relay box (5).

End of test



07.2–147 Subsequent installation of choke cover-stepped heater

(USA) 1974 Federal

Testing and adjusting values

Voltage at pre-resistor output	above + 17 °C engine oil temperature	approx. 12 volts
	below + 17 °C engine oil temperature	approx. 5 volts

Conventional tool

Voltmeter

Note

In the event of complaints about poor engine output a choke cover-stepped heater can be installed in warming-up stage between – 5 °C to + 5 °C of (USA) 1974 Federal version as a remedy.

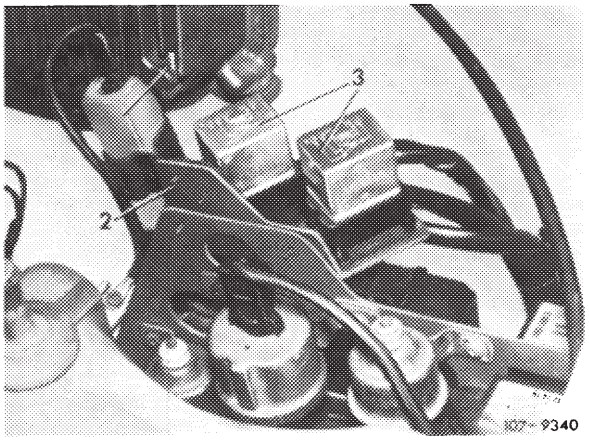
Installation

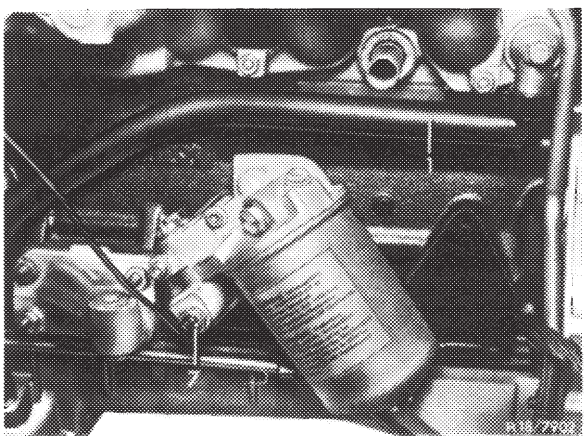
1 Attach pre-resistor (1) to auxiliary mounting bracket (2). Connect long cable of auxiliary cable harness at top to pre-resistor.

2 Attach auxiliary mounting bracket (2) to relay bracket.

3 Attach both relays (3) to auxiliary bracket (2). Attach plug of auxiliary harness to relay. Then install auxiliary harness in downward direction along main harness toward fuse box.

4 Attach grounding cable of auxiliary harness to ignition coil bracket. Disconnect connecting plug for engine oil temperature switch 17 °C laterally on front end carrier and connect to auxiliary harness. Engage connecting plug in clip.





5 Connect auxiliary harness with fuse no. 3 of fuse box.

6 Remove air filter and check whether a choke cover with code number "104" is installed and install, if required.

7 Pull cable from choke cover and disconnect cable terminal. Then insulate end of cable and slip plug of auxiliary line harness on choke cover.

8 Check choke cover-stepped heater for function (07.2—145).

Flat rate (includes choke cover, exchange):

Basic job: 20 work units or 1.7 hours
Connected job: 17 work units or 1.4 hours

Spare parts

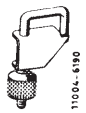
Quantity	Designation	Part no.
2	Relay	001 542 02 19
1	Auxiliary bracket	114 542 14 40
1	Auxiliary line harness	114 540 47 09
1	Choke cover "144"	000 071 28 28
1	Pre-resistor	001 545 11 18

07.2–150 Adjusting accelerating pump

Testing and adjusting values

Begin of injection	immediately

Special tool

Clamp		000 589 40 37 00

Note

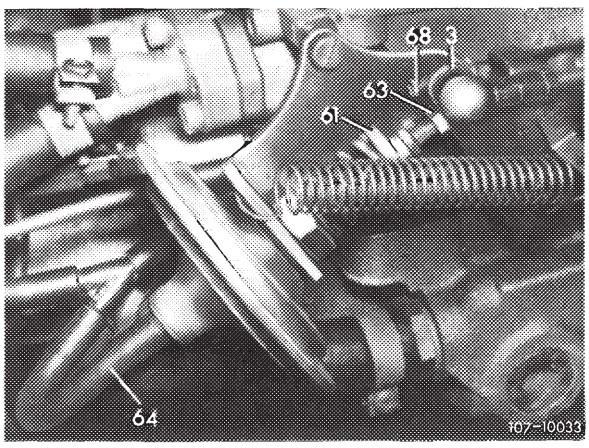
Perfect functioning of accelerating pump as well as accurate adjustment of pump are absolutely necessary for perfect starting or bypass characteristics. Starting and bypass faults may be caused by a wrong direction of injection jet, the jet should not touch neither the pre-atomizer nor the edge of the Venturi. Unless otherwise specified, injection should begin immediately. If the injected quantity is too low, bypass faults may occur in stage I and from stage I – II (stage jump).

Testing, adjusting

a) Begin of injection

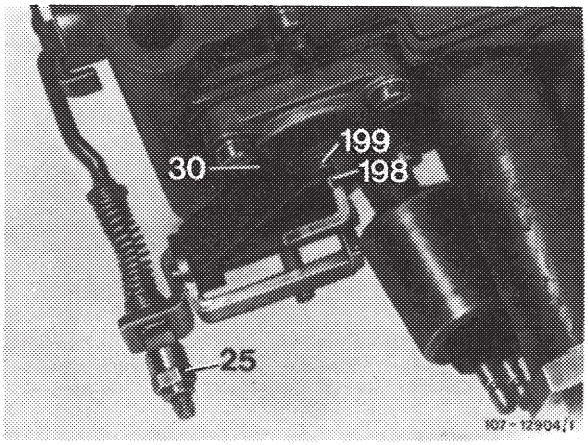
1 Keep engine running. Pinch vacuum hose (64), shut off engine.

2 Check whether throttle valve lever (3) is resting against idle speed adjusting screw (68) and adjust vacuum governor, if required.



3 Set adjusting nut (25) in such a manner that the actuating lever (198) depresses the diaphragm pressure pin (199) by 1.0 mm.

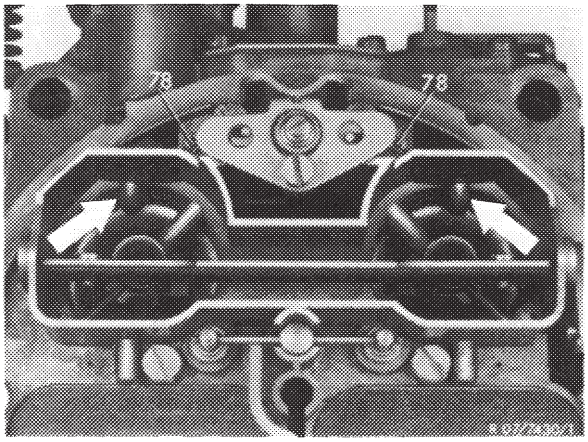
Note: If no self-locking polystop adjusting nut (25) is installed, secure adjusting nut following adjustment by compressing (pinching) nut.



b) Operation and direction of injection

4 For this purpose, slowly actuate throttle valve lever, so that a **uniform** fuel jet will come out of both injection bores (arrows) **immediately and on both sides.**

Attention!
The fuel jet should not touch edge of Venturi and pre-atomizer, since this may result in starting and bypass faults. If required, remove carburetor cover and clean injection bores.



07.2–152 Checking suction valve and delivery valves of accelerating pump for leaks

Self-made tool

Puller	refer to Fig. item 1

Note

With a leaking suction valve, fuel is pushed back into float chamber during delivery stroke and the quantity of the injected fuel is reduced. This may result in starting and bypass faults particularly during slow acceleration. If the delivery valves are leaking, air is drawn in during suction stroke which will also reduce the quantity of the injected fuel.

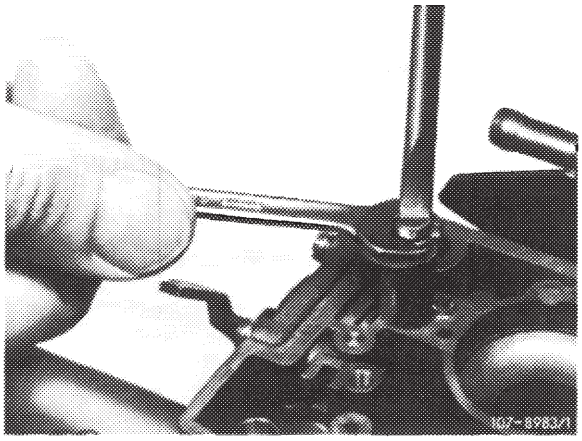
Checking suction valve for leaks

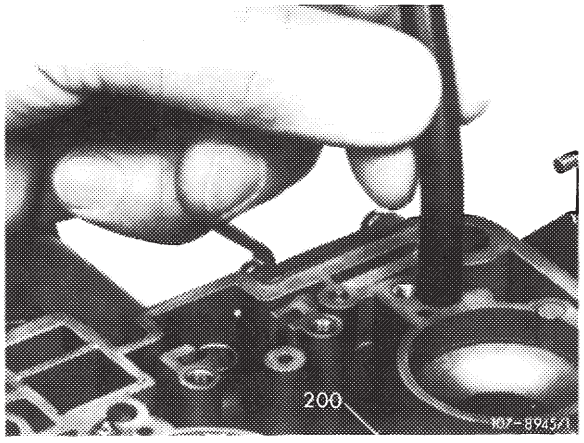
1 Remove carburetor cover (07.2–192).

2 Check suction valve for leaks. For this purpose, pull out closing plug for suction duct of accelerating pump by means of a self-made puller.

Attention!
Closing plugs without threads should be drilled 4 mm deep by means of a 3 mm drill and provided with M 4 metric threads. Carefully cover area around drilled hole first.

3 Fill float chamber with fuel, slip suitable hose over suction duct.

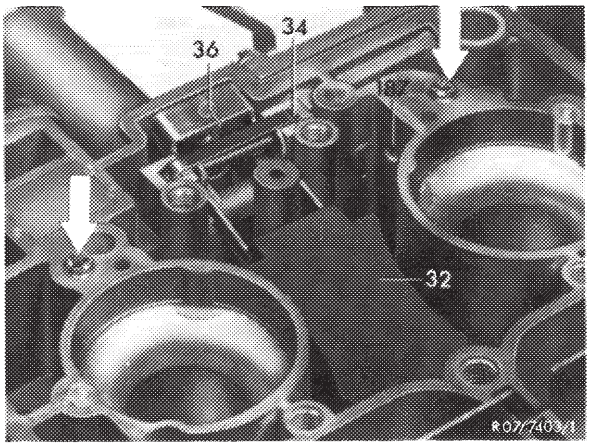




200 Suction bore

4 Keep both delivery valves (arrow) closed, on carburetors with negative vent bore (187) also keep this bore closed and blow into hose. No or only individual bubbles should come out of suction bore and enter float chamber.

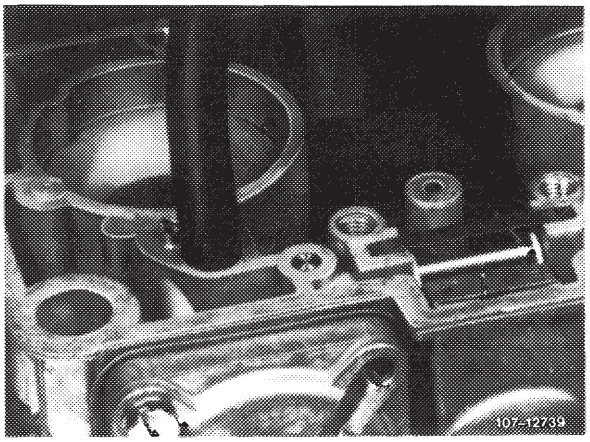
Attention!
In the event of a leaking suction valve seat, knock **lightly** against seat with a steel ball (5 mm dia.). Insert new steel ball and check once again for leaks. Then close suction duct.



Checking delivery valves for leaks

5 For this purpose, slip suitable hose over a delivery valve, keep other delivery valve closed, on carburetors with negative vent bore (187) keep this bore also closed and blow into hose. No or only individual air bubbles should come out of suction bore (200) and enter float chamber.

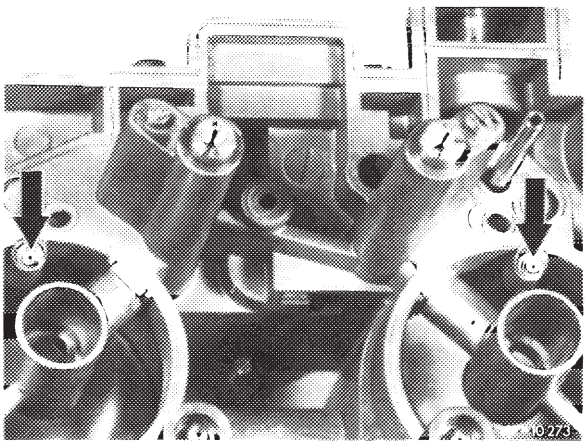
Attention!
In the event of leaks, knock **lightly** against balls of delivery valves on their seat.



6 Blow out injection bores (arrows) of accelerating pump with compressed air and check for unobstructed passage (clean injection bores with a 0.5 mm drill, if required).

7 Mount carburetor cover with new gasket (07.2–192).

8 Adjust accelerating pump (07.2–150).



Arrows = injection jets

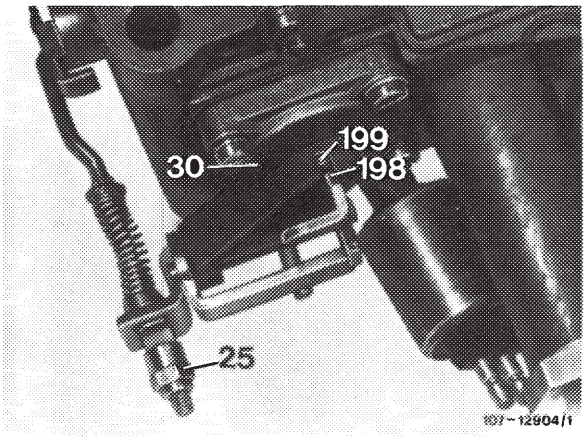
Testing and adjusting values

Begin of injection	immediately

Special tool

Clamp		000 589 40 37 00

Removal



1 Remove air filter.

2 Remove cover (30) after loosening fastening screws.

3 Remove diaphragm and compression spring.

4 Clean pump chamber.

Installation

5 Install new diaphragm, if required.

Note: Insert compression spring in such a manner that the large diameter faces the pump chamber. When tightening fastening screws of cover, operate throttle valve lever to full extent.

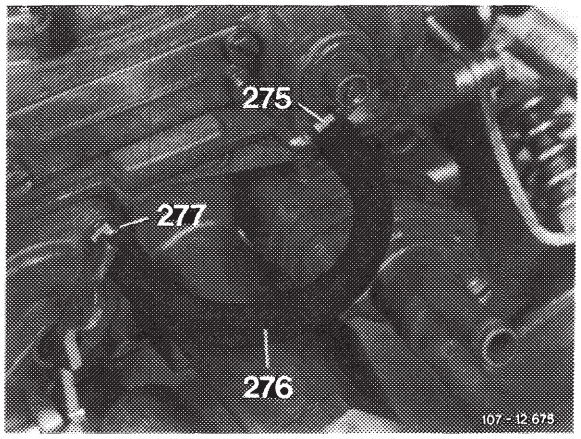
6 Adjust accelerating pump (07.2–150).

07.2–156 Subsequent installation of vapor bubble draw-off for accelerating pump (USA 1975/76 only)

A. General information and operation

Starting faults may come up at high outside temperatures as a result of vapor lock in accelerating pump.

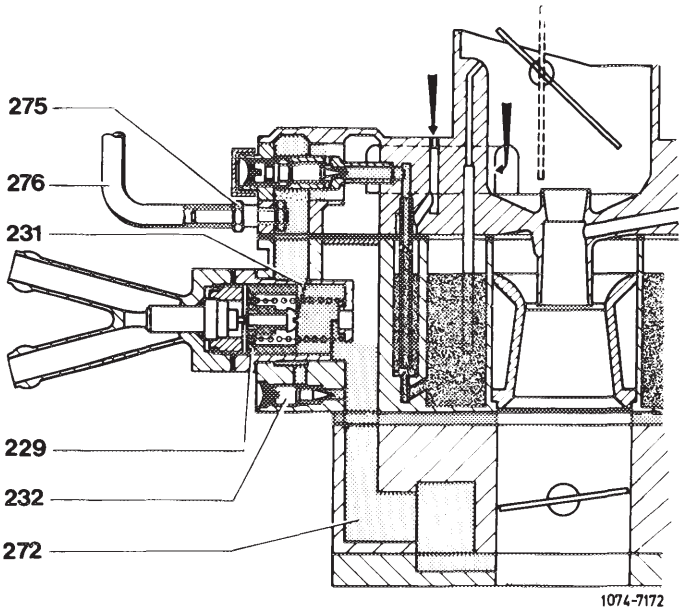
As a remedy, a vapor bubble draw-off can be subsequently installed.



Layout of vapor bubble draw-off

Operation

At operating temperature, the control window (231) of thermostatically controlled bypass choke (TN choke) is closed. By means of leak air on control piston (229) at idle, the vacuum in intake pipe is effective up to pump chamber and able to draw-off any vapor bubbles there.

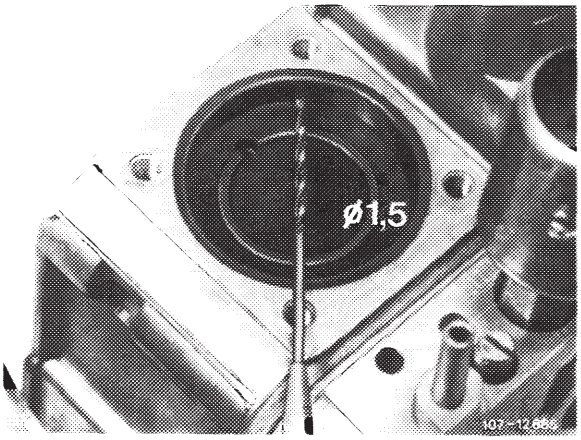


B. Subsequent installation

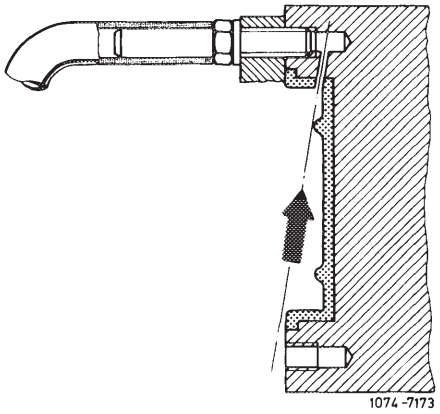
1 Remove carburetor, remove carburetor cover and take out float (07.2—194).

2 Remove accelerating pump cover, diaphragm and diaphragm spring.

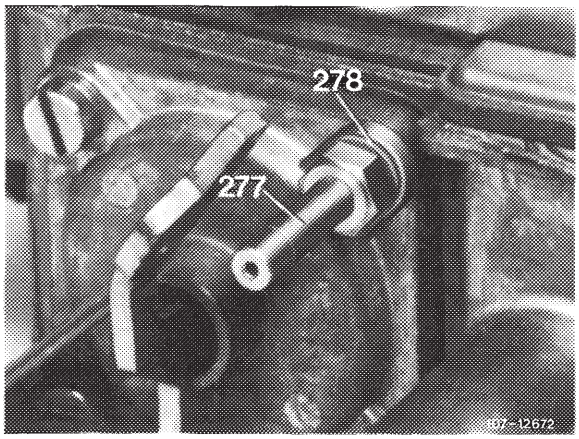
3 Drill a connecting duct of 1.5 mm dia. from pump chamber to threaded hole of cover fastening means.



Attention!
Be sure to maintain proper direction when drilling, to avoid drilling into float chamber. In addition, the suction and delivery bore in pump chamber must be kept closed (e.g. with grease) as a protection against drill chips.

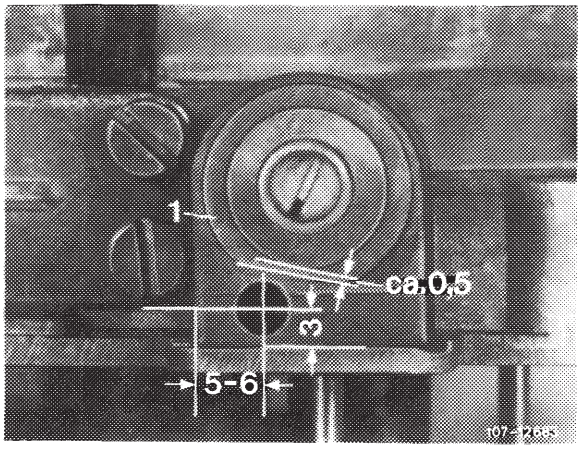


4 Clean connecting duct, pump chamber, suction and delivery bore (drill chips, grease). Install components of accelerating pump. Instead of fastening screw used up to now for threaded bore drilled through connecting duct, screw in draw-off connection (277) calibrated to 0.15 mm dia. together with sealing ring (278).



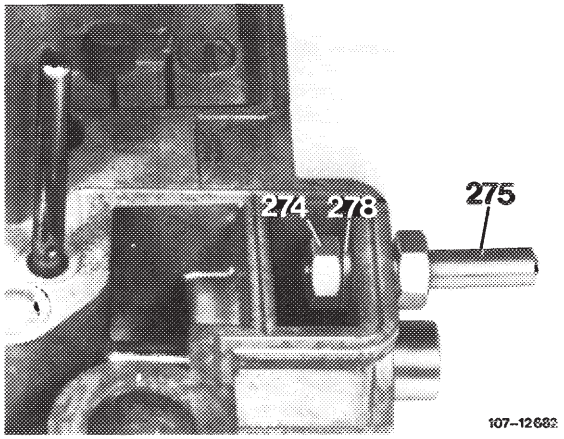
5 Drill fastening bore for draw-off connection (275).

For this purpose, refinish housing eye (1) in such a manner that approx. 0.5 mm material will remain on flange of carburetor cover. Mark bore, punch, drill to 2 mm dia. and then to 4 mm dia.



6 Screw draw-off connection (275) with sealing ring (278) and hex. nut (274) into carburetor cover.

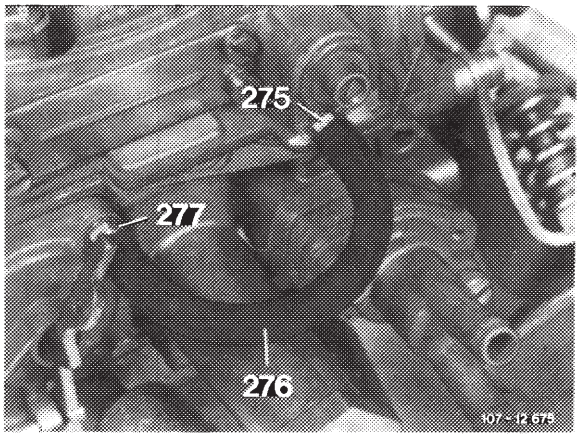
Note: The flange of the draw-off connection should be seated flat. If required, refinish contact surface. If hex. nut on carburetor cover touches carburetor cover, file off slightly.



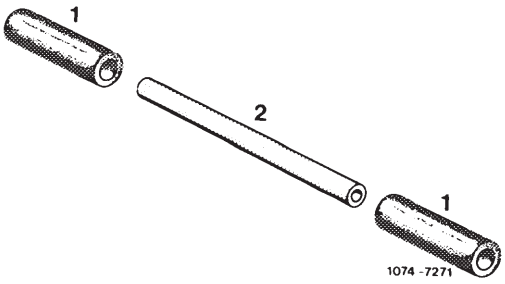
7 Shorten fuel hose (276) to 100 mm and plug on.

8 Insert float bracket and holddown, mount carburetor cover.

9 Install carburetor (07.2–194).



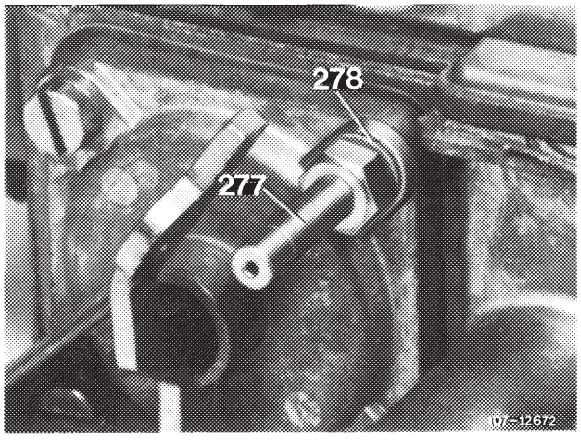
C. Checking vapor bubble draw-off for function



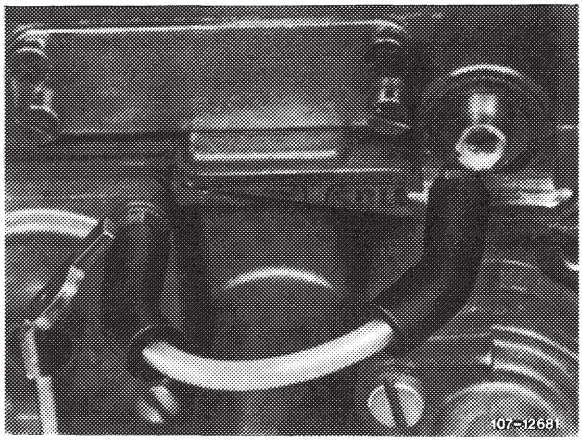
Test line

1 Vacuum hose, 30 mm long
2 Transparent vacuum line, 65 mm long

1 Run **engine at operating temperature** for a short moment and stop. Remove fuel hose and actuate throttle valve lever smoothly several times. A fuel jet should now come out of draw-off connection (277). If not, the throttle bore in draw-off connection is clogged. Clean throttle bore, if required.

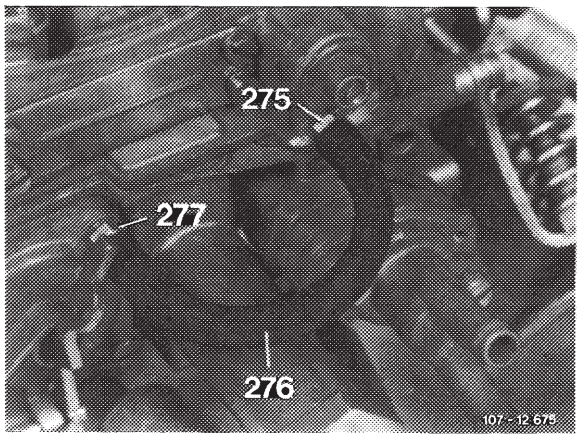


2 Plug-on self-made test line, run engine at idle. Fuel or vapor bubbles should be drawn off, visible in transparent test line.



Test line

3 If neither fuel nor vapor bubbles are drawn off, check draw-off connection (275) for passage and clean, if required.

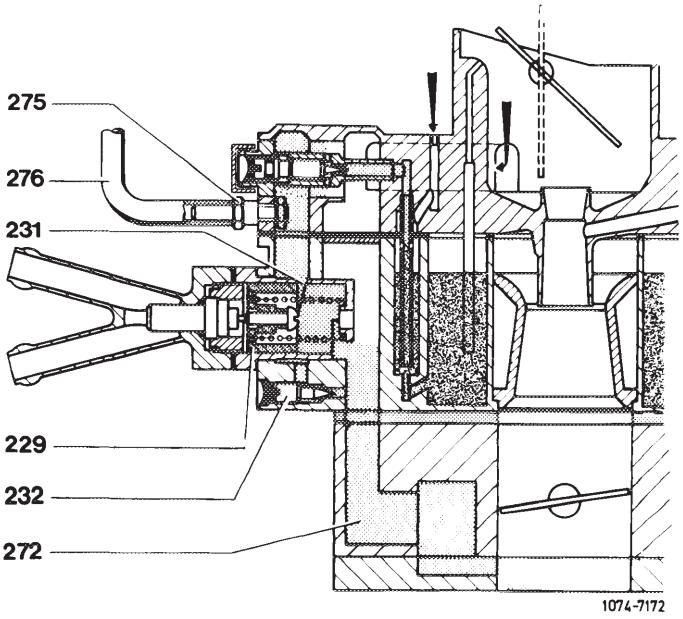


4 If there is still no draw-off, there is no or not enough vacuum available. In this case, unscrew leak air adjusting screw (232) by one turn. Repeat test.

5 Pull off test line and plug-on fuel hose (276).

6 Set to idle (07.2–100).

Attention!
When adjusting or checking idle speed emission value, the fuel hose (276) for drawing off at accelerating pump must be pulled off.

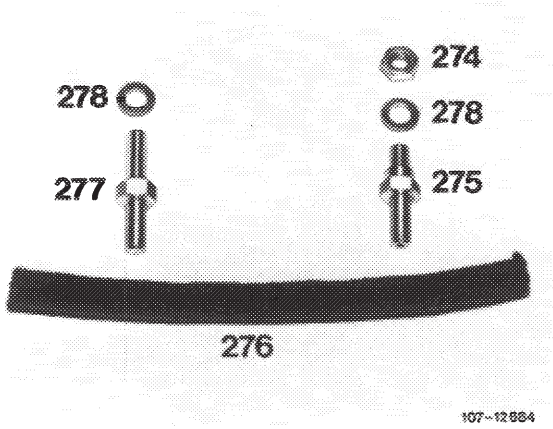


Flat rate

Basic job: 19 work units or 1.6 hours
Related job: 16 work units or 1.3 hours

Spare parts

Designation	Part no.
Conversion set for vapor bubble draw-off of accelerating pump	110 586 00 07



Conversion set

274 Hex nut.
275 Draw-off connection
276 Fuel hose
277 Draw-off connection with 0.15 mm throttle bore (orifice)
278 Sealing ring

Testing and adjusting values

National version		Adjusting weight	Length[1])
(J)	1976	170 ± 2	190
(S)	1976	160 ± 2	180
(USA)	Federal 1973/74	112 ± 2	125
(USA)	California 1974	143 ± 2	160
(USA)	Federal and California 1975/76	170 ± 2	190

[1]) These dimensions apply to St 37. When using other materials, the specified testing weight must be maintained. The respective length results from this weight.

Air valve gap

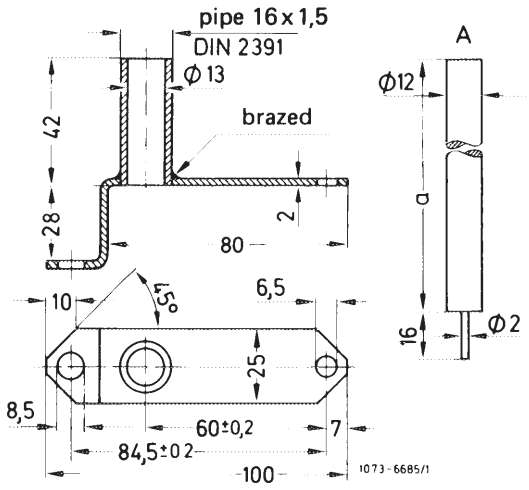
When loaded with adjusting weight	1.5 mm

Conventional tool

Hex. socket wrench 2.5 mm

Self-made tool

Adjusting device for air valve stage II



Note

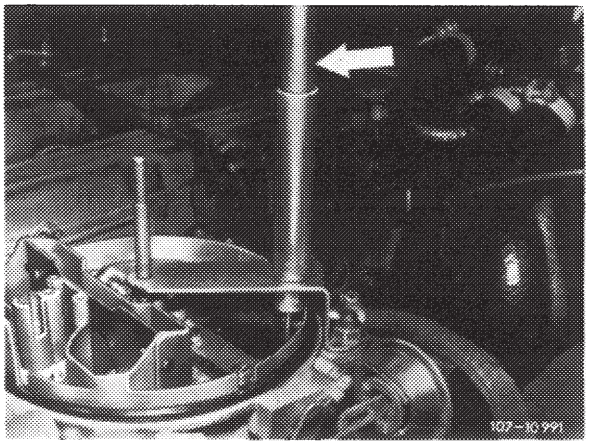
The correct adjustment of the restoring spring for air valve of stage II has a large influence on bypass from stage I to stage II. When the spring preload is too low, the air valve will open too fast, the mixture will become leaner and bypass faults (stage jump) will result. When the spring preload is too high, the air valve opens too slowly and the mixture will become overrich. Bypass faults and high fuel consumption will result.

If the dashpot for the air valve is leaking, sudden acceleration will make the mixture too lean and bypass faults may result.

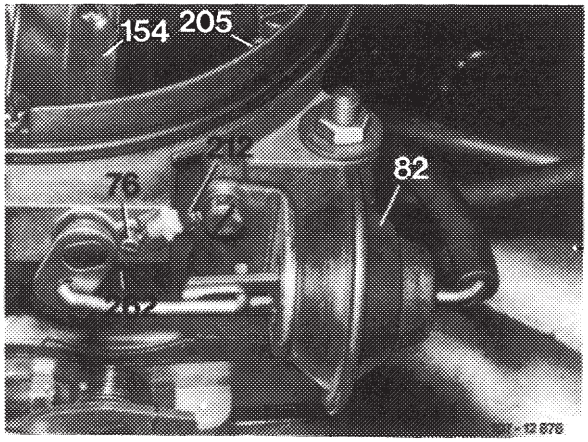
Testing, correcting

1 Check air valve for easy operation. For this purpose, actuate air valve, which should close again automatically.

2 Adjust air valve preload. For this purpose, attach adjusting device (self-made) to carburetor. Unscrew air filter fastening screw and insert instead a suitable stud or round rod for centering adjusting device.



3 **Carefully** place test weight (arrow) on air valve (do not drop) and check gap.



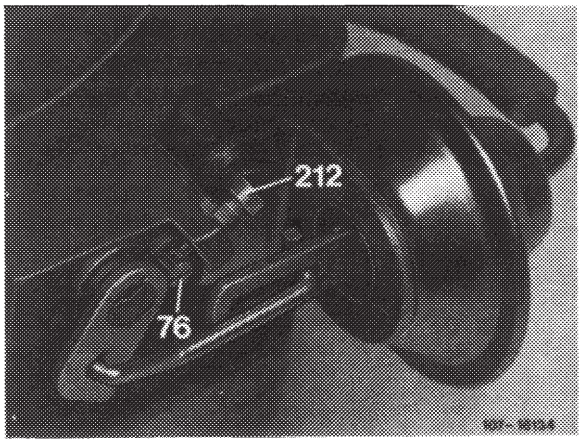
4 If the air valve is not pushed open or not more than 1.5 mm, change tension of restoring spring (262) by setting adjusting pin (76) accordingly. Prior to adjustment, slightly loosen locking screw (212) and then tighten again well.

Attention!
To avoid wrong adjustments, lift test weight from air valve while making adjustments.

5 Check dashpot for leaks. For this purpose, run engine, pinch vacuum hose of dashpot (82). Push air valve (154) open and release, the air valve should then snap back to stop (205). If not, replace vacuum control unit. With the engine stopped, check whether air valve (154) is easily operating and returns automatically to stop (205) when pushed-open lightly.

Note: If the adjusting pin (212) has been automatically released, or if the restoring spring must be replaced, install a modified adjusting pin, which is knurled at contact surface of locking screw (76).

Subsequent installation of knurled adjusting pin is generally possible (07.2–175).



Testing and adjusting values

Adjustment of jet needle	Dimension B = A + 3.3 mm

Conventional tool

Depth gauge

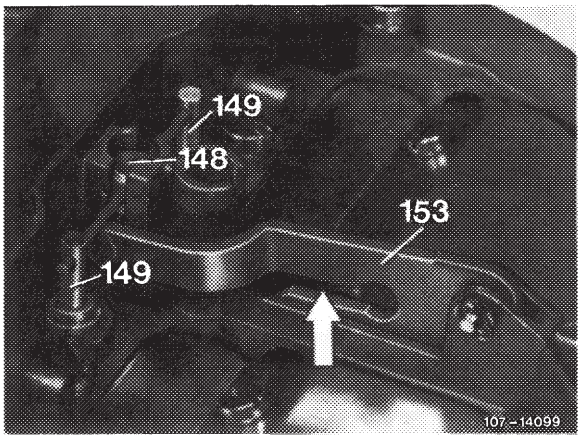
Note

The adjustment of the jet needles has an influence on fuel consumption and bypass characteristics from stage I to stage II. By means of the method described below, the jet needle position can be checked and corrected with the engine stopped.

Checking, correcting

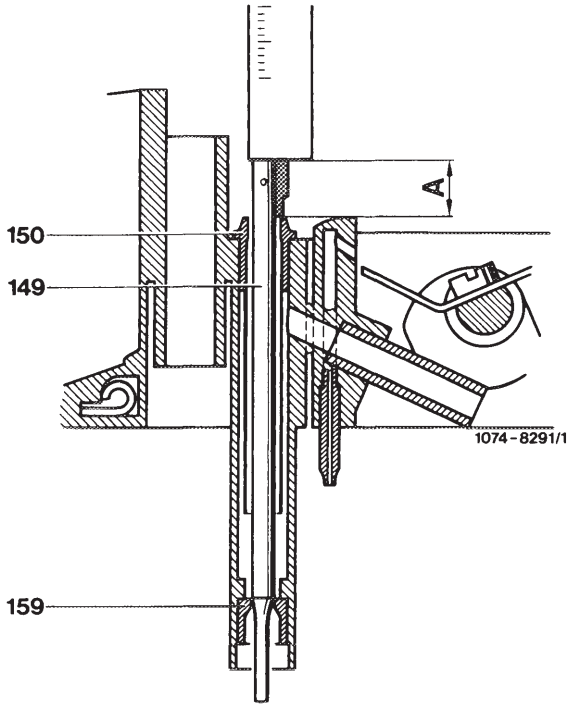
1 Remove carburetor cover (07.2–192).

2 Remove transmitting lever (153) and guide pin (148).



148 Guide pin
149 Jet needle
153 Transmitting lever

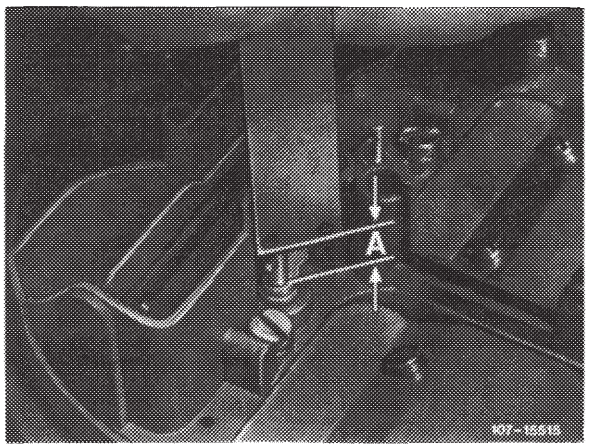
3 Place carburetor cover on two supports in such a manner that the jet needles (149) are unobstructed at bottom end. Let jet needles (149) be seated in main jets (159).



Measuring dimension "A"

4 Measure dimension "A" with depth gauge from face of jet needles to upper flange of air correction nozzles (150) and write down.

Note: Dimension "A" should be approximately the same on both sides. Deviations in excess of 0.5 mm indicate that the main jet has been subject to creep. In such a case, renew carburetor cover.



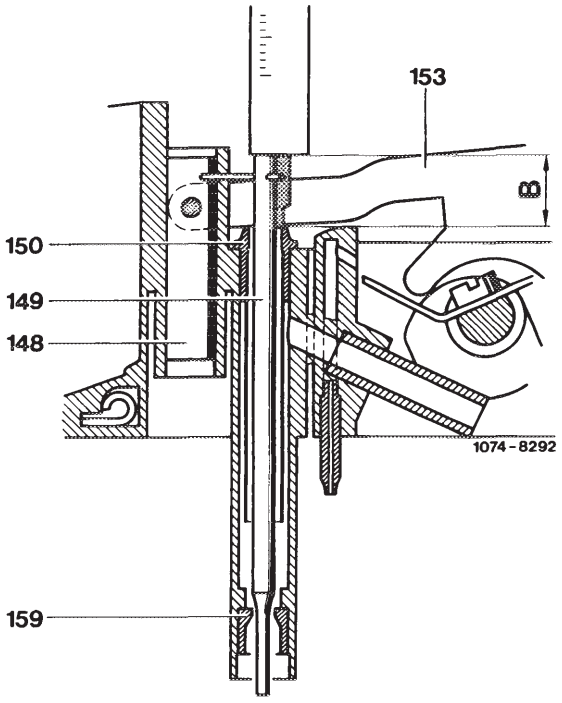
Measuring dimension "A"

5 Reinstall guide pin (148) and transmitting lever (153) and measure dimension "B" from face of jet needles to upper flange of air correction jets (150) and correct, if required.

Dimension "B" should be similar to dimension "A" + 0.3 mm.

Measuring example:

Measured dimension "A"	=	7.7 mm
	+	3.3 mm
Dimension "B" should be		11.0 mm



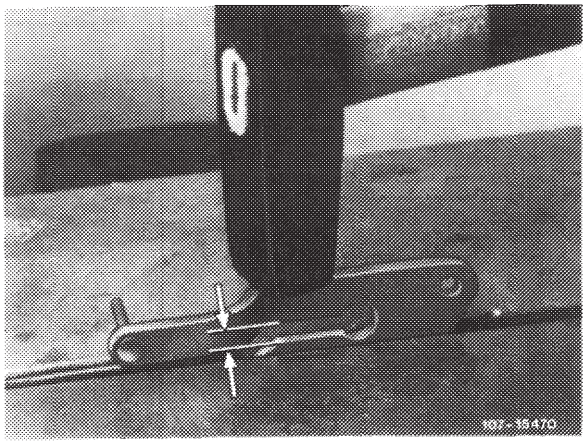
Measuring dimension "B"

Slight and one-sided deviations of dimension "B" should be corrected by pertinent bending of guide pin (148) arms.

Decreasing dimension "B" = leaner
Increasing dimension "B" = richer

If dimension "B" is the same on both sides but essentially too high, correct as follows:

Remove transmitting lever (153) (do not remove jet needles). Clamp removed transmitting lever into vise in such a manner that only the actuating arm of the jet needles projects. Reduce gap (arrows) by max. 0.3 mm by means of a light hammer blow and repeat test.



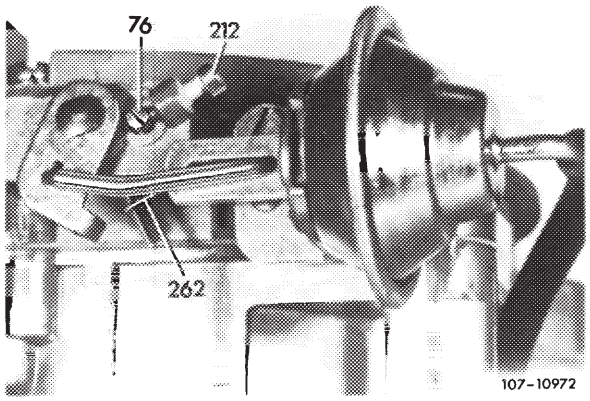
Attention!
When installing transmitting lever, make sure that the fastening pin can be slipped in free of tension so that air valve will not bind, since this will result in bypass faults.

Removal

1 Remove air filter.

2 Unscrew clamping screw (212).

3 Pull out adjusting pin (76) while removing restoring spring (262).



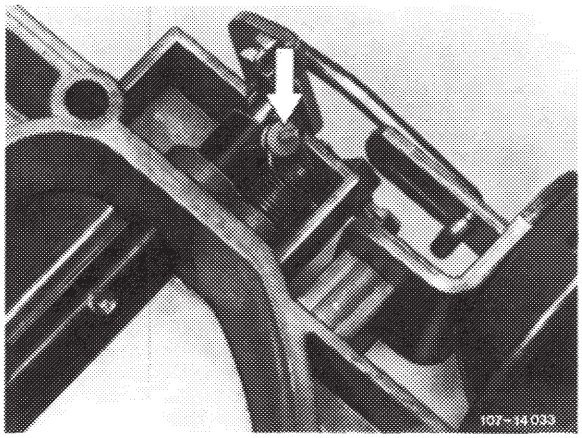
Installation

4 Install rew restoring spring, if required. For this purpose, move restoring spring into installation position. Slip in adjusting pin (76) up to stop while rotating adjusting pin so that the restoring spring can engage in slot of driver.

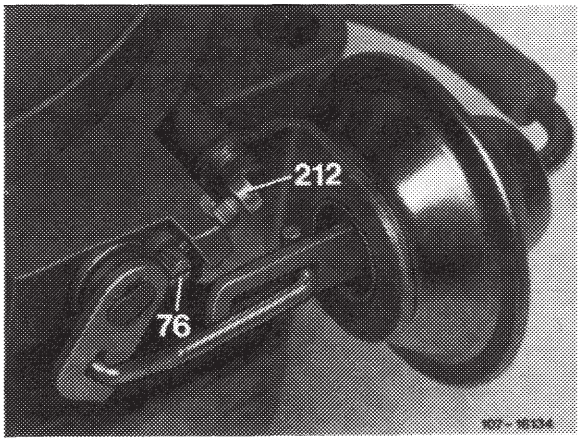
5 Correct air valve adjustment (07.2–170).

Note: When renewing restoring spring, install restoring spring with slide block (arrow) only. This will improve easy operation and breaking of spring will be prevented.

Restoring spring: part no. 000 071 64 16
Slide block: part no. 000 071 03 50



Simultaneously install adjusting pin (76) with knurled contact surface for locking screw (212) (07.2–175). This will prevent any automatic self-adjustment of adjusting pin and bypass faults from stage I to stage II.



07.2–175 Subsequent installation of modified adjusting pin for air valve preload of stage II

Testing and adjusting values

National version		Adjusting weight	Length[1])
(J)	1976	170 ± 2	190
(S)	1976	160 ± 2	180
(USA)	Federal 1973/74	112 ± 2	125
(USA)	California 1974	143 ± 2	160
(USA)	Federal and California 1975/76	170 ± 2	190

[1]) These dimensions apply to St 37. When using other materials, the specified testing weight must be maintained. The respective length results from this weight.

Air valve gap

When loaded with adjusting weight	1.5 mm

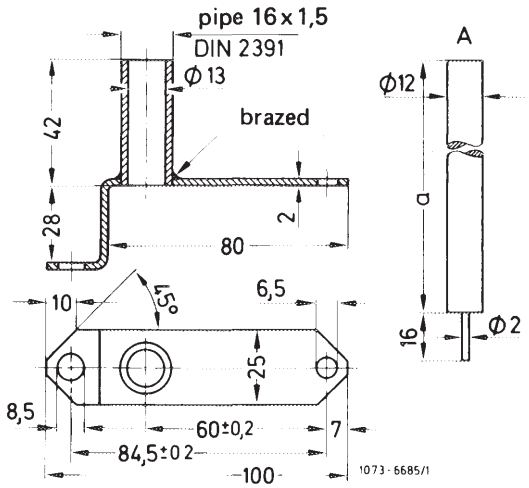
Conventional tools

Hex. socket wrench 2.5 mm

Drill 4.6 mm dia.

Self-made tool

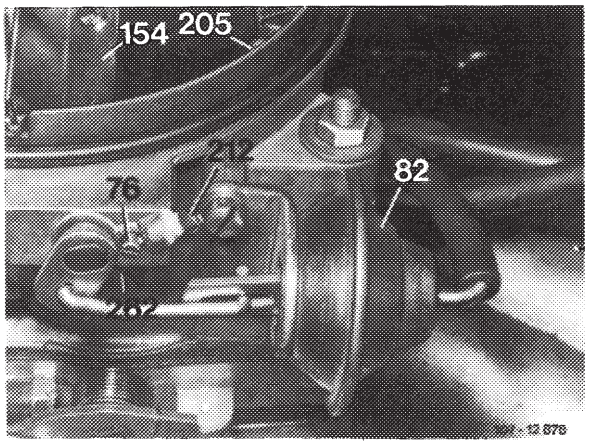
Adjusting device for air valve of stage II



Subsequent installation

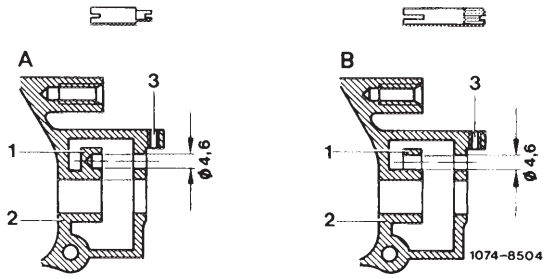
1 Remove carburetor cover (07.2–192).

2 Unscrew locking screw (212), remove adjusting pin (76) and restoring spring of adjusting pin.



3 Clamp carburetor cover into vise, using projective jaws.

4 Extend rear mounting bore of adjusting pin. For this purpose, drill completely through housing eye (1) with a drill of 4.6 mm dia.

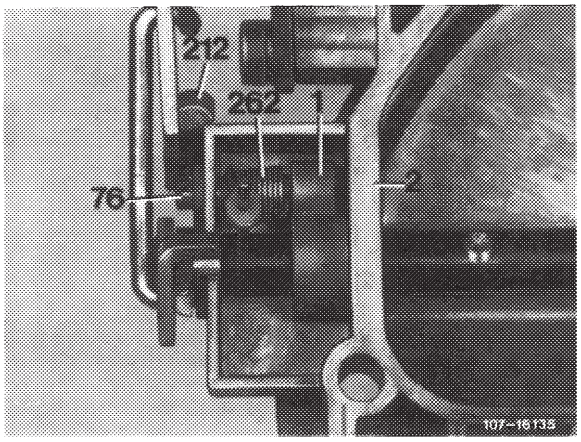


A Before B New

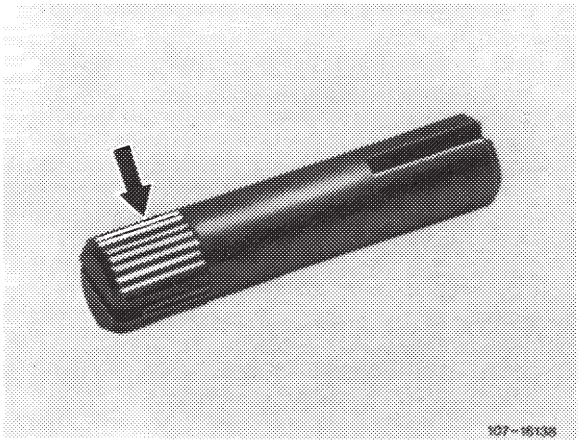
Attention!
Do not damage carburetor housing wall (2) toward mixing chamber while drilling.

5 Install new adjusting pin with knurls and restoring spring with slide block. For this purpose, move restoring spring into installation position. Slip-in adjusting pin up to stop while turning adjusting pin so that the restoring spring can engage in slot of driver. Install carburetor cover.

6 Complete air valve adjustment of stage II (07.2–170).



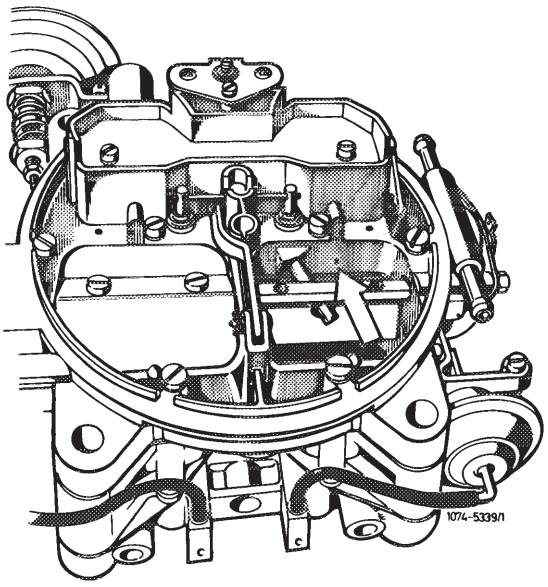
1 Housing eye
2 Carburetor housing wall
76 Adjusting pin
212 Locking screw
262 Restoring spring



New adjusting pin with knurls (arrow)

Note

To prevent bypass faults (stage jump) from stage I to stage II, the bypass bores (arrow) are located 8 mm deeper under air valve starting January 1973 or starting carburetor cover code number "04", respectively. Subsequent installation is generally possible.

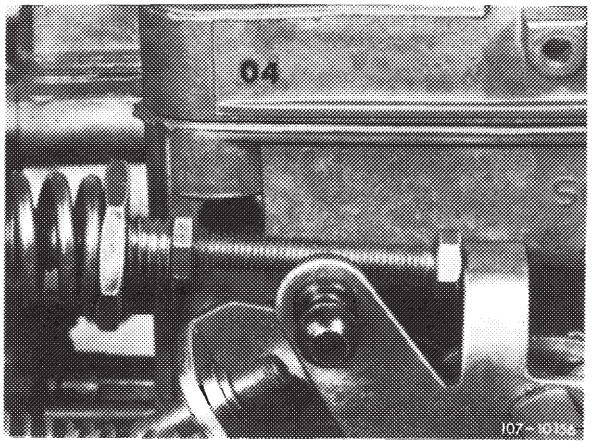


Scope

1 Remove carburetor cover, remove air valves of stage II.

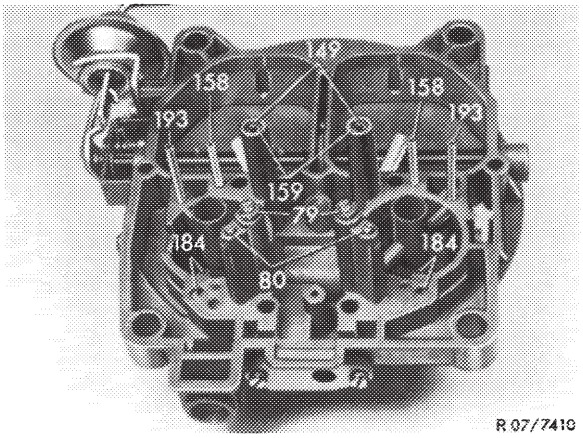
2 Close former bypass bores by riveting with aluminum plugs of 2 mm dia. and, in similar alignment underneath, 8 mm above carburetor cover parting surface, drill a new bypass bore 2 mm dia. for each stage.

Carburetor cover code number



3 Blow through riser pipes (158) for stage II, install air valves, while paying attention to easy operation of valves.

4 Mount carburetor cover.



Testing and adjusting values

Float version	Float level[1])
Flat roof float	–2 to 6 mm[3])
Hip roof float and fuel return valve **without** fuel pressure control	0 mm[2])
Hip roof float and fuel return valve **with** fuel pressure control	+2 mm[2])

[1]) Measured from parting surface **without** gasket.
[2]) With starting or bypass faults, set 2 mm higher.
[3]) Below parting surface.

Conventional tool

Depth gauge or slide gauge with depth gauge

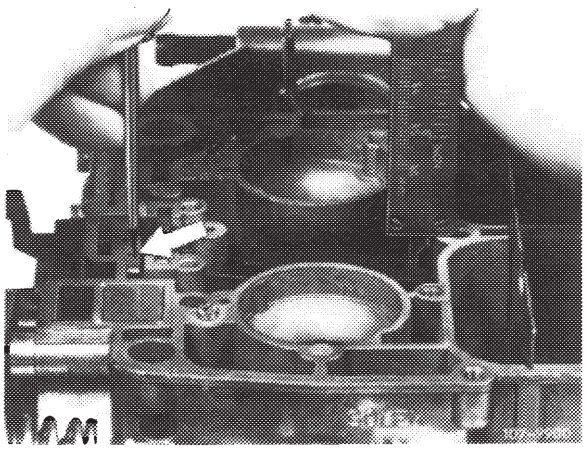
Note

The float level has an influence on starting characteristics particularly on gradients. If it is too low, the starting performance may become poorer, because the fuel level in mixing tubes of stage I is too low and the main jet system will start too late. In the event of starting faults, set to upper float level tolerance value.

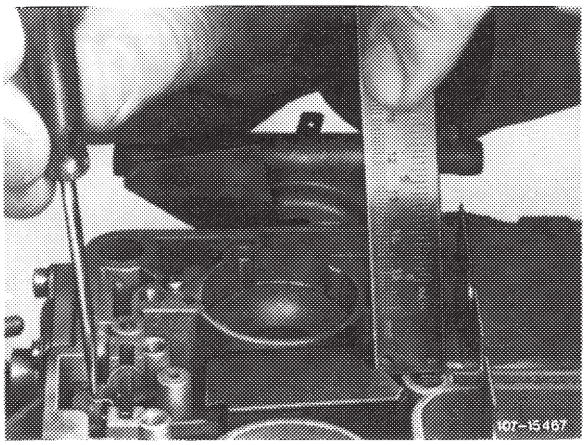
Testing, adjusting

1 Check float level and adjust, if required. For this purpose, push connecting web (arrow) downwards against **noticeable stop** and check float level without gasket.

Attention!
To prevent measuring errors, make sure that the float shaft rests on housing base while testing.

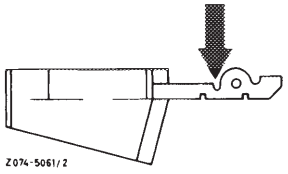


Measuring with flat roof float



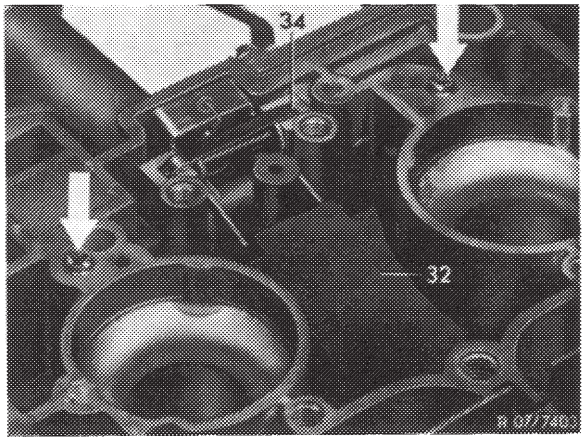
Measuring with hip roof float

2 Correct float level by rebending at specified bending spot (arrow).

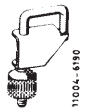


3 When installing float, attach float needle with wire clip to float arm in such a manner that the **open side** of the clip is pointing **in driving direction.**

Install float (32), making sure that the float shaft rests on base of recesses. Install holddown (34). Holddown should project slightly over parting surface. Rebend, if required.



Special tool

Clamp		000 589 40 37 00

Conventional tool

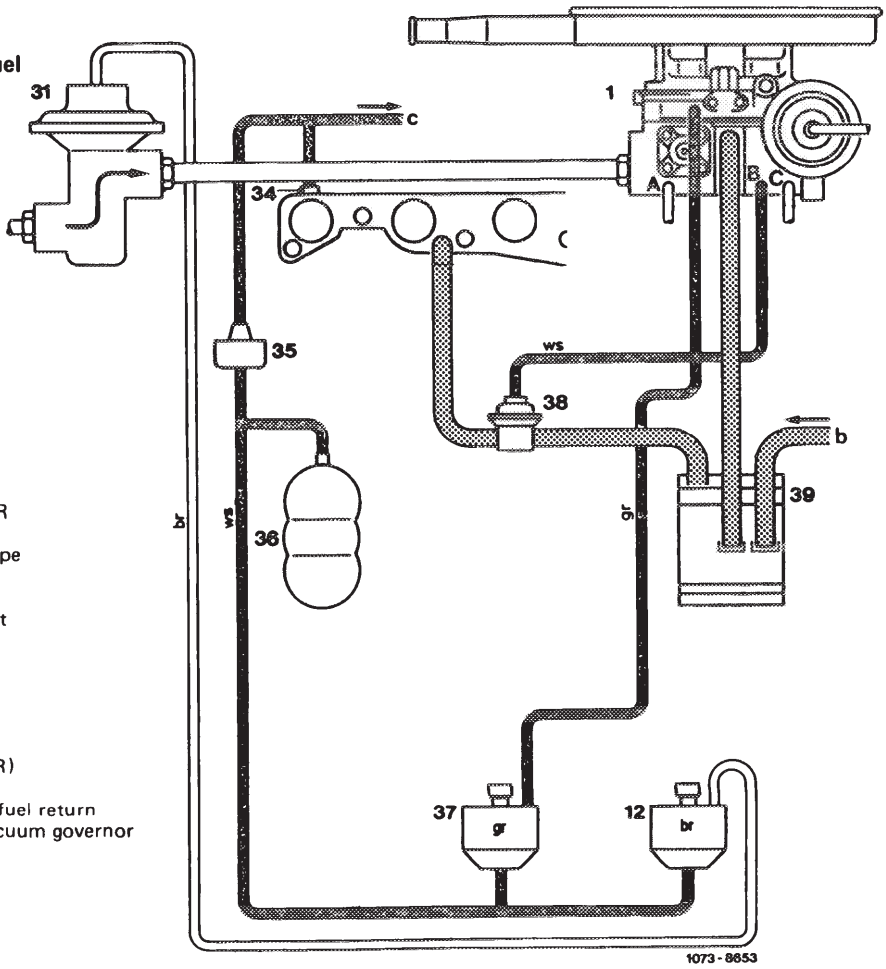
Vacuum tester

Note

The float chamber external venting system influences hot start characteristics, fuel consumption, bypass characteristics stage I and II and driving performance under full load. If the float chamber external venting system is defective, the fuel level in float chamber will be exposed to atmospheric air pressure, the fuel in mixing tubes will rise to an inadmissible level and the engine will be supplied with excessively rich fuel. High fuel consumption and driving faults will result.

A. (USA) 1974 California

Function diagram
Float chamber ventilation and fuel evaporation control system



1 Carburetor
12 Electric switchover valve for EGR
31 EGR valve
34 Vacuum connection on intake pipe
35 Check valve
36 Vacuum supply tank
37 Electric switchover valve for float chamber ventilation
38 Draw-off valve
39 Charcoal canister

b Negative tank vent connection
c Air conditioner connection
A Vacuum switch connection (EGR)
B Draw-off valve connection
C Decel diverter valve connection, fuel return valve, ignition switchover and vacuum governor

Line color

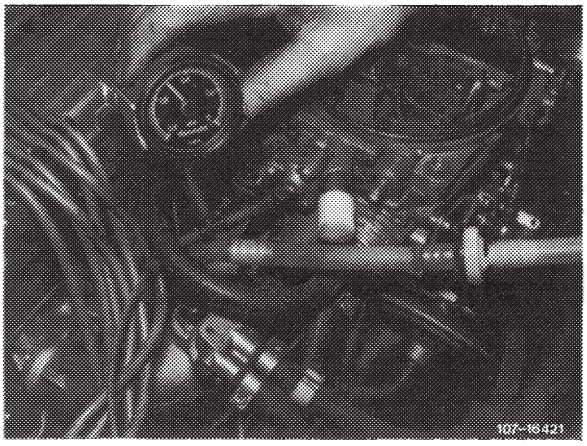
br = brown
gr = grey
ws = white

Test conditions: All electric fuses in order. Engine at operating temperature. Sealing at vacuum end of controls for EGR and air conditioner, as well as their operation in order.

Test scope

Connect vacuum tester. Run engine at idle, a vacuum should be indicated.

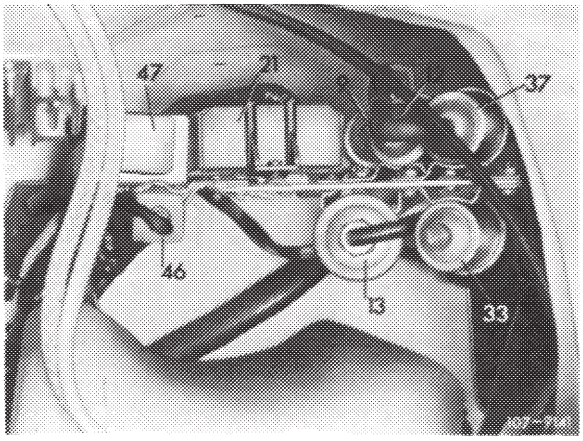
Vacuum in order.	No vacuum.



1 Check connecting pipe and diaphragm for leaks. For this purpose, pinch vacuum hose at vent valve. If vacuum is now available, attach connecting pipe by glueing with Omnifit or renew diaphragm, respectively.

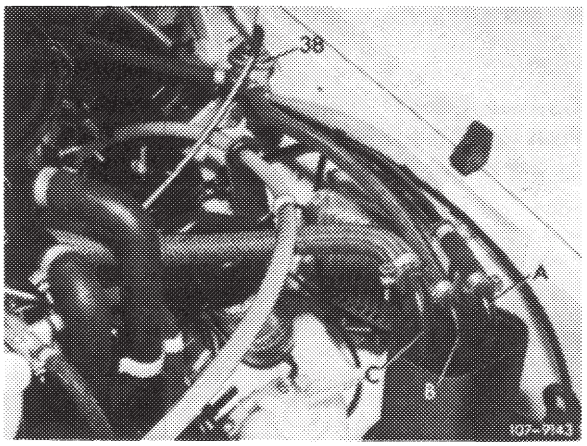
2 Check all vacuum hoses up to intake pipe for correct layout, condition and tight seat and recondition, if required.

3 Check electric switchover valve (37). For this purpose, switch ignition on and off. The operating noise should now be heard or felt. If not, check whether with the ignition switched on the plug is energized and connected to ground. Renew fuse or establish ground connection, as required. If everything is in order and the switchover valve is nevertheless not yet switching, renew valve since a mechanical defect is indicated.



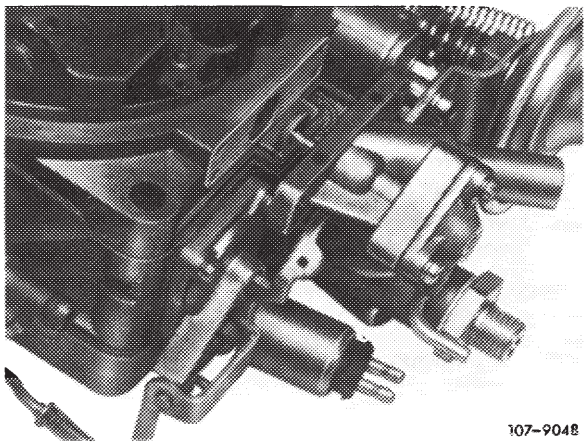
Pull hose on connection "C" from charcoal canister. With the engine running, blow into hose. There should be no passage and engine should not shut off.

No passage or engine not shutting off.	Passage or engine shutting off.



1. Valve plate not sealing because gasket is wrongly mounted (asymmetric), correct position of gasket, if required.

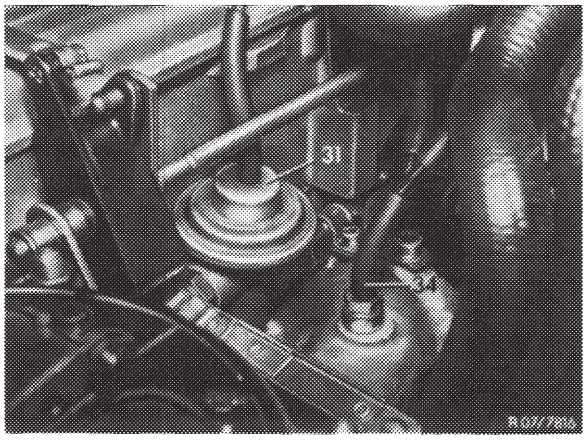
2. Valve plate not sealing because it is distorted. Renew vent valve, if required.



With the engine running, pull vacuum hose (34) from intake pipe (= full throttle simulation!) and watch vacuum readout. Vacuum should not drop and **should remain constant for at least two minutes.**

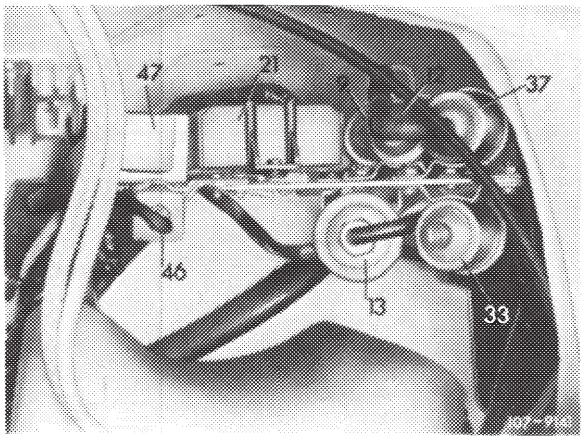
Note: Below 130 mbar, valve plate will no longer close.

Vacuum remains constant.	Vacuum drops.

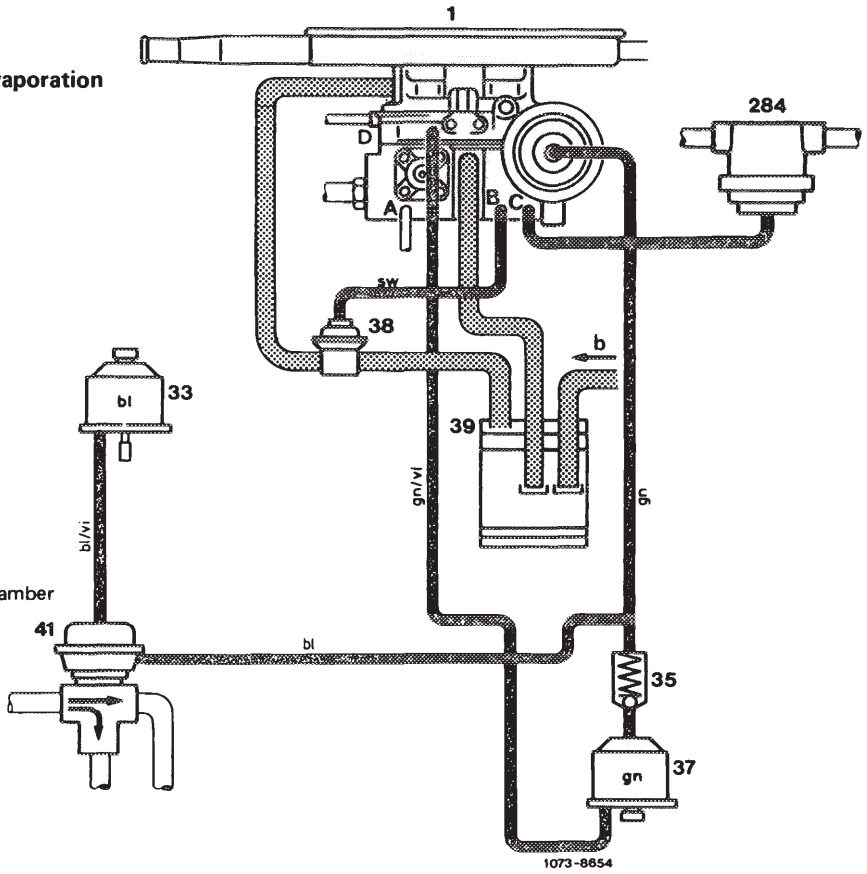


1. Check valve (35) leaking, renew if required.

2. Electric switchover valve (37) or (12) leaking. Check for leaks by shorting both switchover valves one after the other by pinching vacuum hoses to localize leaking member. Renew, if required.



Function diagram
Float chamber ventilation and fuel evaporation control system



1 Carburetor
33 Vacuum valve for air injection
35 Check valve
37 Electric switchover valve for float chamber ventilation
38 Draw-off valve
41 Decel diverter valve (air injection)
284 Fuel return valve (vacuum-actuated)
b Negative tank vent connection

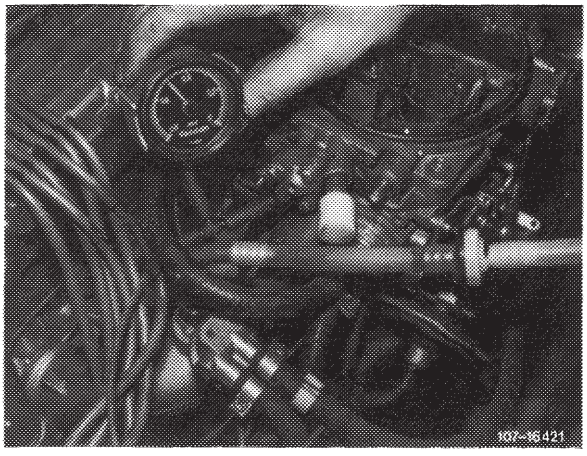
Line colors

bl = blue
gn = green
gn/vi = green/purple
sw = black

Test conditions: All electric fuses in order. Engine at operating temperature. Sealing at vacuum end of decel diverter valve (41) and switchover valve (33), as well as their function in order.

Connect vacuum tester. Run engine at idle speed, vacuum should be indicated.

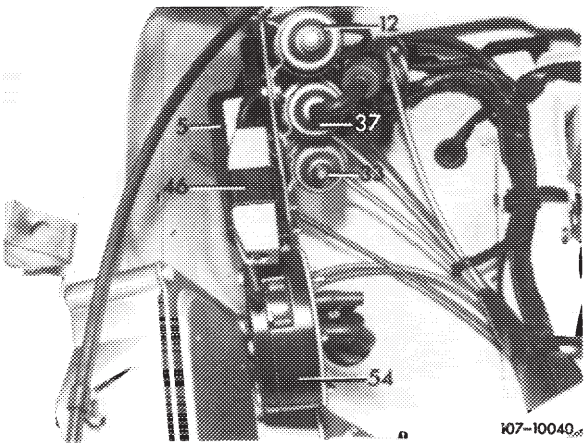
Vacuum in order.	No vacuum.

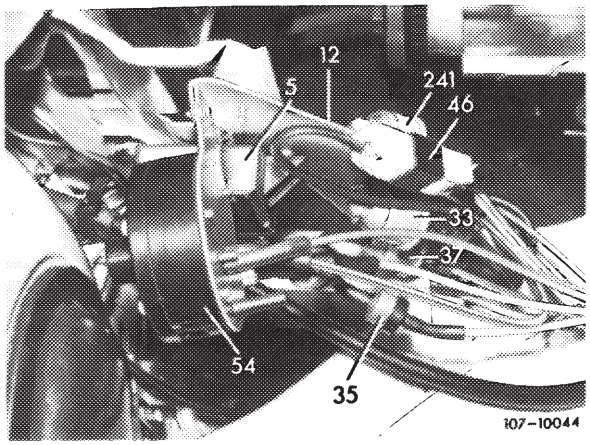


1. Check connecting pipe and diaphragm for leaks. For this purpose, pinch vacuum hose at vent valve. If vacuum is now available, attach connecting pipe, glue in with Omnifit or renew diaphragm, as required.

2. Check all vacuum hoses up to vacuum governor for correct layout, condition and tight seat and recondition, if required.

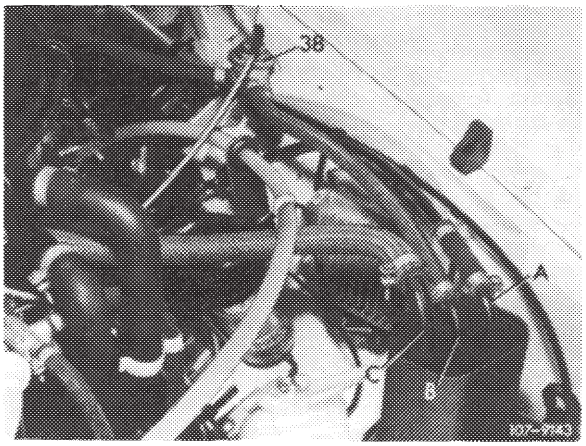
3. Check electric switchover valve (37). For this purpose, switch ignition on and off, the operating noise should now be heard or felt. If not, check whether with the ignition switched on the plug is energized and connected to ground. Renew fuse, if required or establish ground connection. If everything is in order and the switchover valve is nevertheless not switching, renew valve since a mechanical defect is indicated.

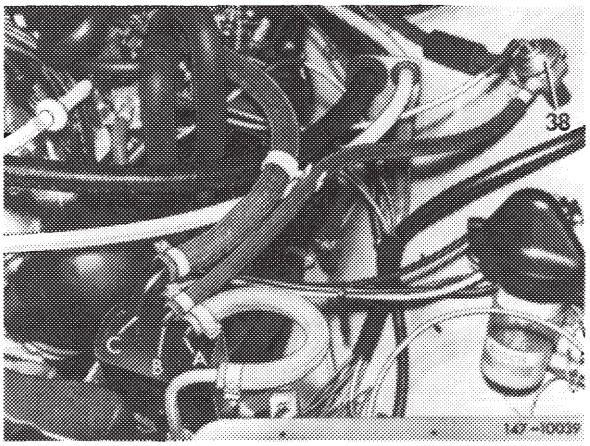




Pull off hose at connection "C" of charcoal canister. With the engine running, blow into hose, there should be no passage and engine should not shut off.

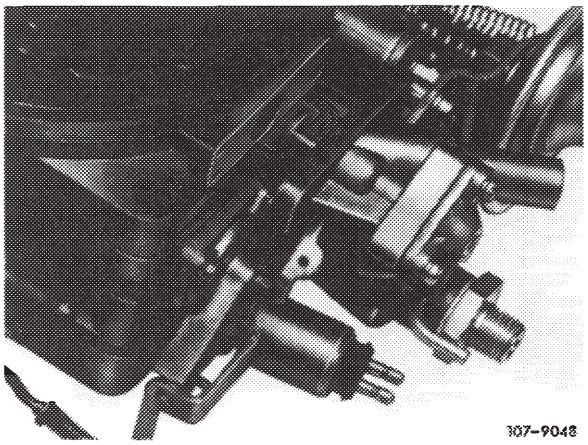
No passage and engine not shutting off.	Passage or engine shutting off.





1. Valve plate not sealing because gasket is wrongly mounted (asymmetric), correct position of gasket, if required.

2. Valve plate not sealing because it is distorted. Renew vent valve, if required.



With the engine running, pull off vacuum hose (64) (= full throttle simulation!) and watch vacuum readout. Watch vacuum, which **should remain constant for at least two minutes.**

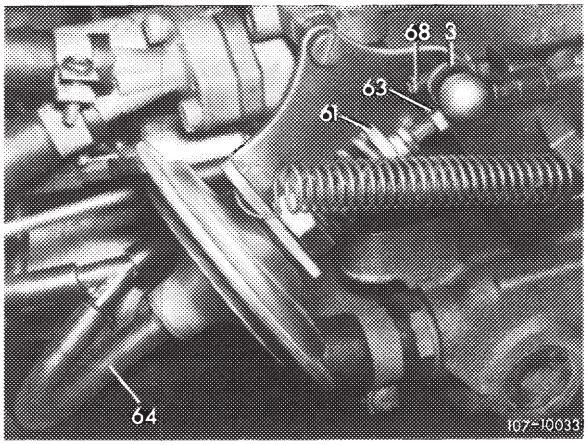
Note: Below aprrox. 130 mbar, valve plate is no longer closing.

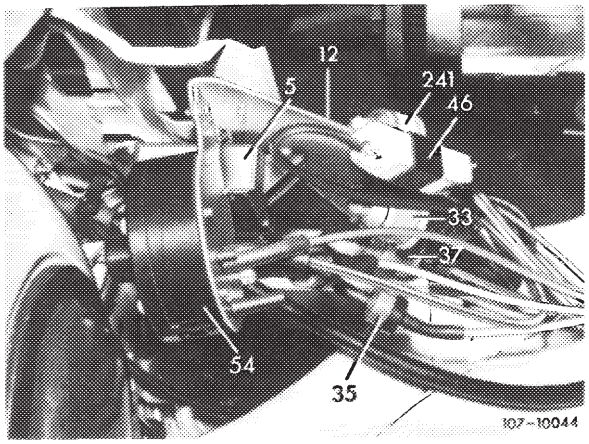
Vacuum remains constant.	Vacuum drops.

1. Check valve (35) leaking, renew if required.

2. Electric switchover valve (37), decel diverter valve, switchover valve (33) or fuel return leaking at vacuum end. Check for leaks by pinching vacuum hoses one after the other to localize leaking member, renew if required.

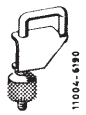
End of test





A. Without fuel pressure control

Special tool

Clamp		000 589 40 37 00

Conventional tool

Pressure tester

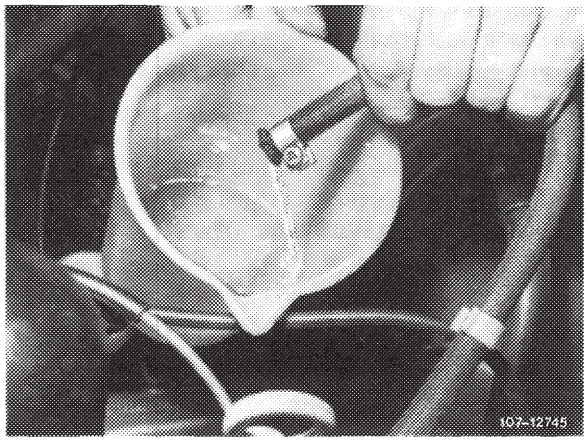
Note

On a vacuum -controlled fuel return valve, with a leaking diaphragm, the fuel is drawn off by the intake pipe vacuum. The results are high fuel consumption and irregular idle running. It may not be possible to adjust the idle speed emission value.

Checking

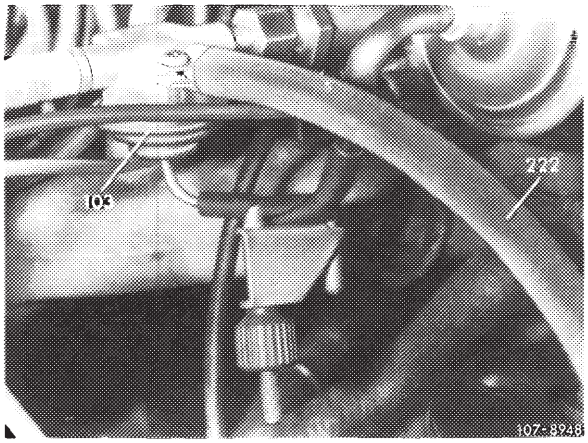
1 Pull fuel return hose from connection to return line. Hold fuel return hose into a container. Run engine, fuel should now come out of return hose in the shape of a jet.

On vehicles with air conditioning system and automatic transmission, engage driving position or switch on air conditioning system.



2 On fuel return valves **without** fuel pressure regulation (vacuum -controlled!), check diaphragm for leaks.

For this purpose, run engine at idle speed, pinch vacuum hose, idle speed emission value or idle speed should not change. Repiace return valve, if required.



B. With fuel pressure control (Ⓢ 1976 only)

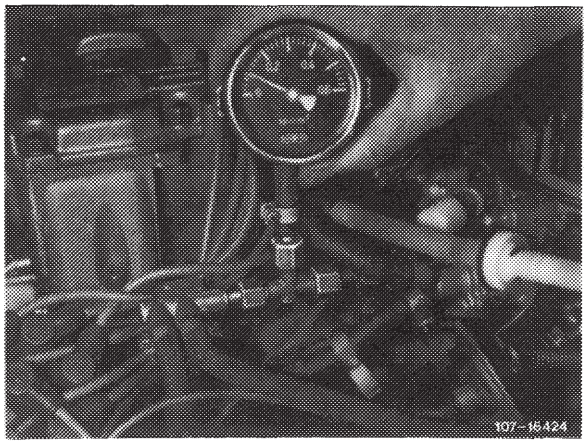
Test value	
Fuel pressure (measured after fuel return valve)	approx. 0.2 bar gauge pressure

Conventional tool
Pressure tester

Testing

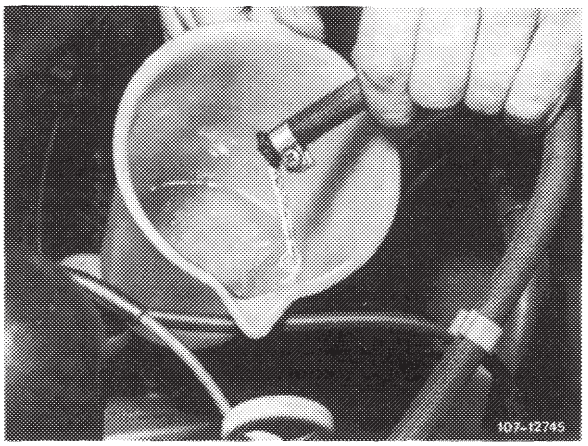
1 On fuel return valves **with** fuel pressure regulation Ⓢ 1976, check function of pressure control.

For this purpose, connect pressure tester between return valve and carburetor. Run engine at idle and read regulated fuel pressure.



2 Pull off fuel return hose at connection for return line. Hold fuel return hose into a container. Run engine, fuel should now come out of return hose in the shape of a jet.

On vehicles with air conditioning system and automatic transmission, engage driving position or switch on air conditioning system.



Identification: Information plate in national language on cross member in front of radiator or on cylinder head cover. Adjust engines according to data of respective exhaust gas information plate.

Testing and adjusting values

National version		Idle speed 1/min	Idle speed emission value % CO
(J)	up to 1976	800–900	max. 1.5
	1976		max. 1.0 **without** air injection
(S)	1976		
(USA)	1973	750–900	up to 1.5
(USA)	1974 Federal		
(USA)	1974 California	700–900	6–8 **without** air injection
(USA)	1975/76	800–900	max. 1.0 **without** air injection

Vacuum governor[1])

National version		Engine speed Vacuum hose pulled off 1/min		Engine speed Driving position engaged 1/min
		without TN choke	**with** TN choke	
(J)	1976	–	1700–1900	600–700
(S)	1976	–		
(USA)	1973/74	1200–1400		
(USA)	1975/76	–		

[1]) When all auxiliary units are engaged, the engine should still run smoothly.

Float level

Float version	Float level[1])
Flat roof float	−2 to 6 mm[3])
Hip roof float and fuel return valve **without** fuel pressure regulation	0 mm[2])
Hip roof float and fuel return valve **with** fuel pressure regulation	+2 mm[2])

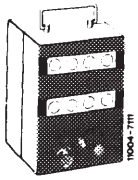
1) Measure from parting surface **without** gasket.
2) In the event of starting or bypass faults, set 2 mm higher.
3) Under parting surface.

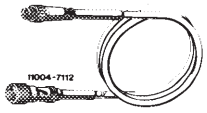
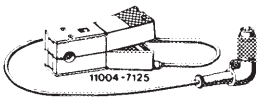
Carburetor line-up

National version	(J) 1976		(S) 1976		(USA) 1973 (USA) 1974 Federal		(USA) 1974 California		(USA) 1975/76	
Carburetor designation	Solex two-stage downdraft carburetor 4 A 1									
Carburetor stage	Stage I	Stage II	Stage I	Stage II	Stage I	Stage II	Stage I	Stage II	Stage I	Stage II
Main jet	X 105	–	X 105	–	X 100	–	X 112.5	–	X 105[2])	–
Jet needle	–	A 7	–	A 4	–	A 4	–	A 5	–	A 7
Idle speed fuel jet	47.5[1])	–	45[1])	–	45[3])	–	45[3])	–	47.5[1])	–
Idle speed air jet	102.5[1])	–	102.5[1])	–	110	–	100	–	102.5[1])	–

1) Combination jet
2) Model year 1975, size 100
3) Pressed-in, cannot be disassembled.

Special tools

Oil telethermometer		116 589 27 21 00
Digital tester		001 589 54 21 00

Connecting cable 3 m long		000 589 04 90 00
Intermediate plug (adaptor)		000 589 72 63 00
Trigger		000 589 71 63 00

Conventional tools

Revolution counter and CO measuring instrument

Self-made tool

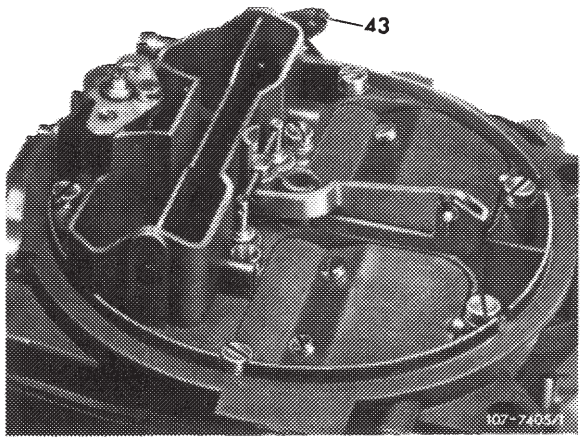
Puller	refer to Fig. item 9

Cleaning

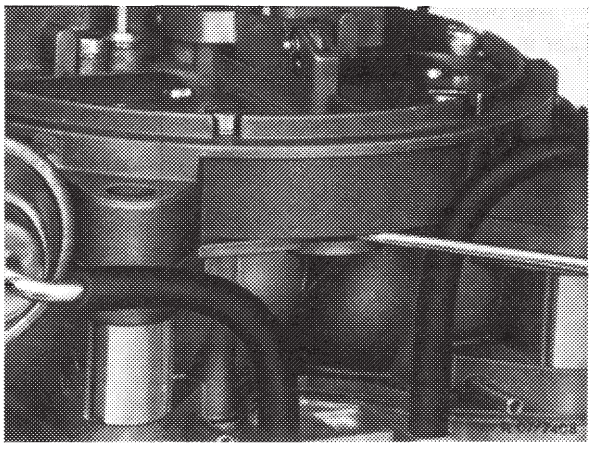
1 Remove air filter.

2 Thoroughly clean outside of carburetor.

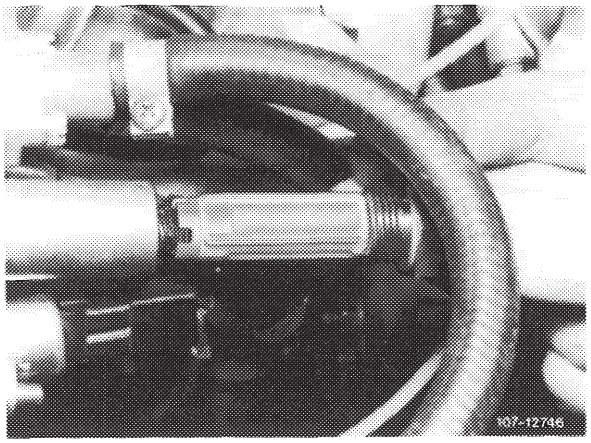
3 Loosen all fastening nuts and screws on carburetor cover. Pull off lock (43) and disconnect choke rod. Unscrew air filter fastening screw.



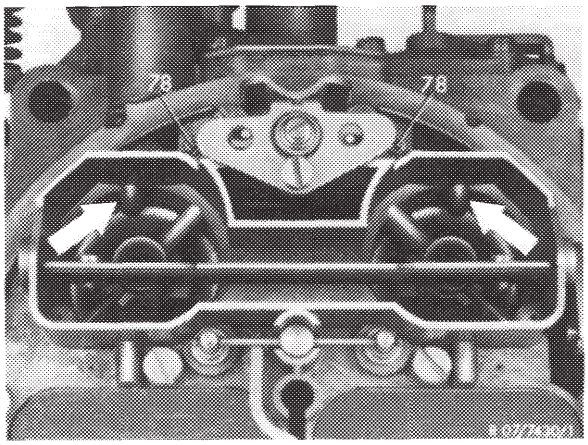
Attention!
Press off carburetor cover only at pressing-off point.



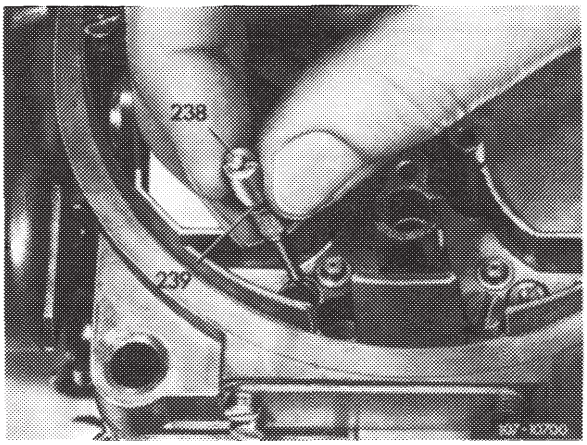
4 Clean filter strainer with compressed air.



5 Unscrew idle speed jets or combination jet (238). Blow out jet and duct with compressed air.



78 Idle speed air jet

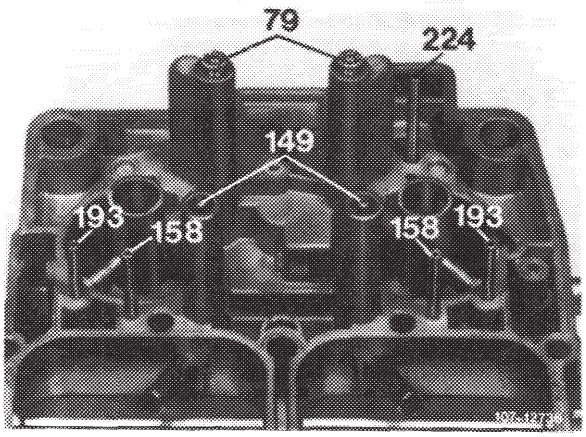


Combination jet

238 Idle speed and idle speed fuel jet
239 O-ring

6 Remove main jets (79). Blow out all ducts, bores, riser pipes and jets with compressed air.

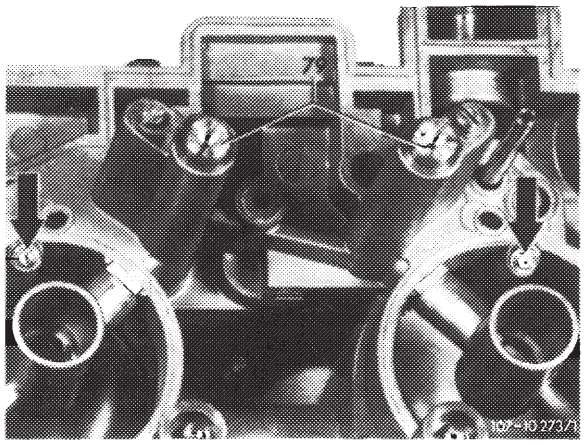
Attention!
Do not clean jets with metallic items (e.g. wire, drill).



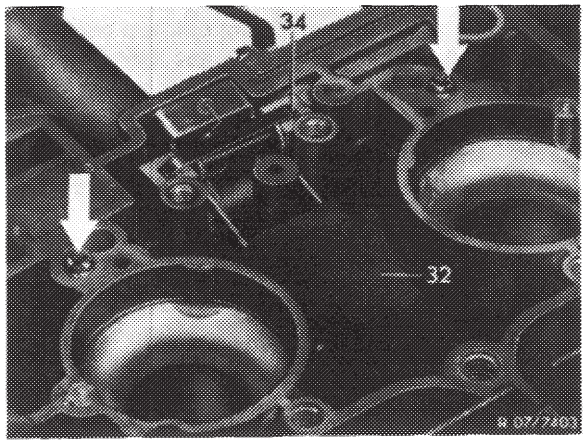
79 Main jets stages I
149 Jet needles stage II
158 Riser pipes bypass system stage II
193 Riser pipes starting mixture enrichment
224 Riser pipe TN choke (thermostatically controlled bypass choke)

7 Blow out injection bores (arrows) of accelerating pump with compressed air and check for unobstructed passage (clean injection bores with a 0.5 mm drill, if required).

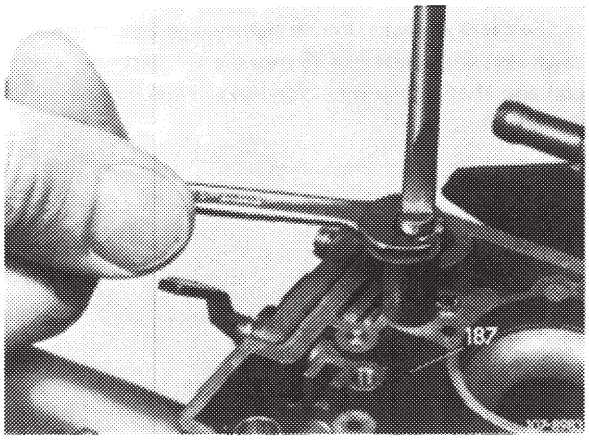
Check jet line-up. Install all parts.



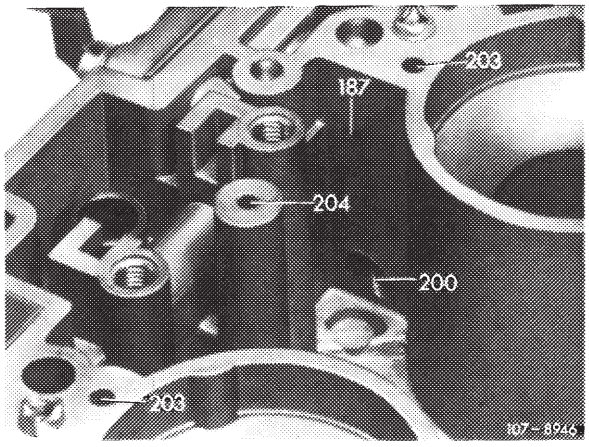
8 Remove holddown (34), float (32) with float needle valve.



9 Pull out closing plug for intake port (suction duct) of accelerating pump with self-made puller. Lift valve ball out of duct (e.g. welding wire with grease).

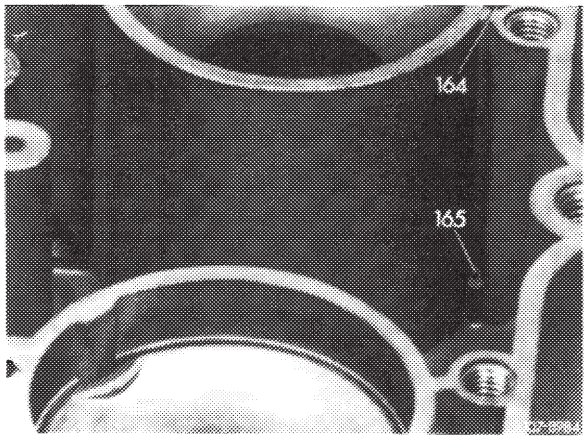


10 Clean float chamber and ducts (200, 203, 204, 187) with compressed air.



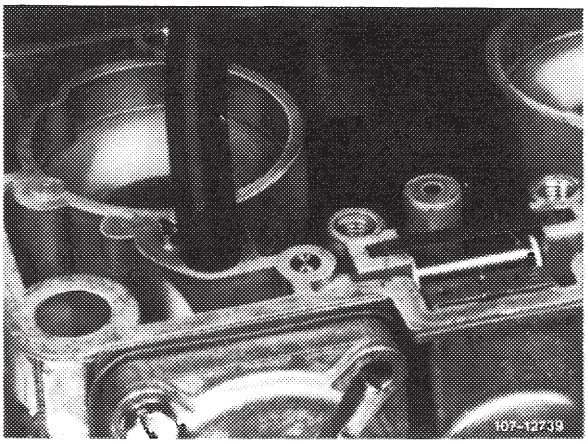
187 Vent bore
200 Intake port
203 Idle speed mixture ducts
204 Vacuum bore for controlling enrichment

11 Clean feed bores (165) and reserve chambers (164) with compressed air.

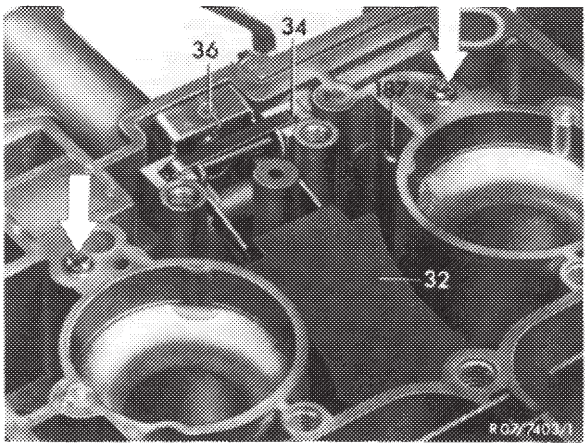


164 Reserve chamber for bypass system stage II
165 Feed bore for reserve chamber stage II

12 Check suction valve for leaks. For this purpose, install valve ball (5 mm steel ball). Fill float chamber with fuel. Slip suitable hose over suction duct (intake port), keep both delivery valves (arrow) closed, on carburetors with vent bore (187) also keep these bores closed and blow into hose. No or only individual air bubbles should come out of intake bore and enter float chamber.



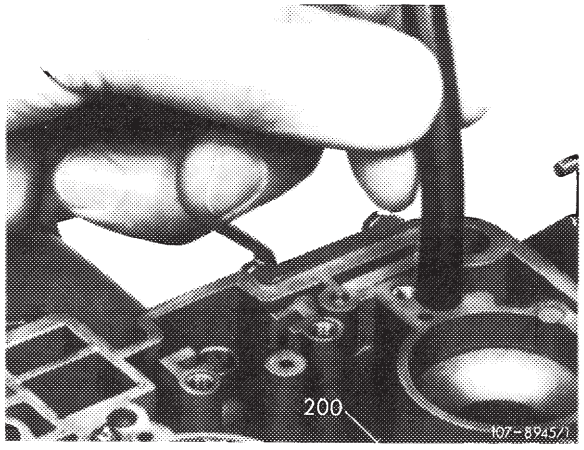
Attention!
In the event of leaks, knock **lightly** against suction valve seat with steel ball (5 mm dia.). Insert new steel ball and check once again for leaks. Then close intake port (suction duct).



187 Vent bore
Arrow = delivery valve

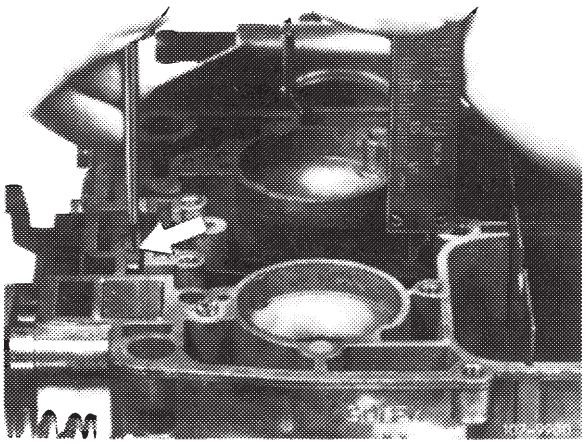
13 Check delivery valves for leaks. For this purpose, slip suitable hose over a delivery valve, keep other delivery valve closed, on carburetors with vent bore (187) keep this bore also closed and blow into hose. No or only individual air bubbles should come out of suction bore (200) and enter float chamber. Then check opposite delivery valve.

Attention!
In the event of leaks, knock balls of delivery valves **"lightly"** against their seat.

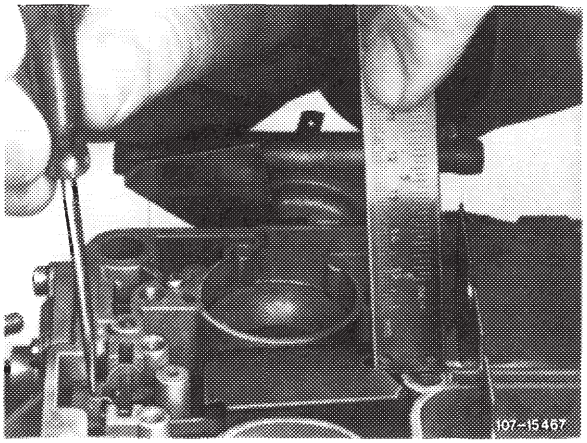


14 Check float level and adjust, if required. For this purpose, push connecting web (arrow) up to **noticeable stop** in downward direction and check float level without gasket.

Attention!
To avoid measuring faults, make sure that the float shaft rests on base of housing during test.

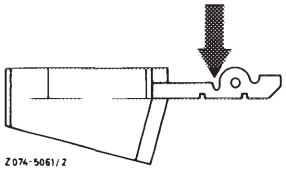


Measuring float level with flat roof float



Measuring float level with hip roof float

Correct float level, if required, by rebending at specified bending point (arrow).



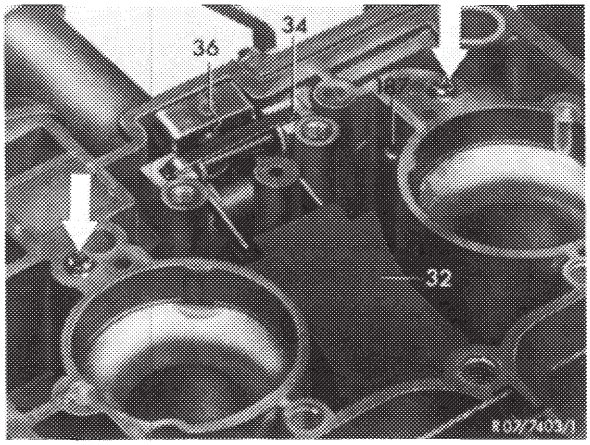
15 Attach float needle with wire clip on float arm in such a manner that the **open side** of clip points **in driving direction.**

16 Install float (32), making sure that the float shaft rests on base of recesses. Insert holddown (34). Holddown should project slightly over parting surface. Rebend, if required.

17 Mount carburetor cover with new gasket.

18 Mount air filter.

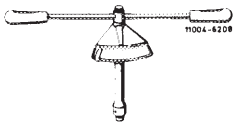
19 Adjust idle speed (07.2–100).



07.2–192 Removal and installation of carburetor cover

Tightening torques		Nm	(kpm)
Carburetor fastening nuts	with new insulating flange	10	(1.0)
	with insulating flange used up to now	8	(0.8)

Special tool

Torque wrench 4–16 Nm (40–160 kpcm)		000 589 67 21 00

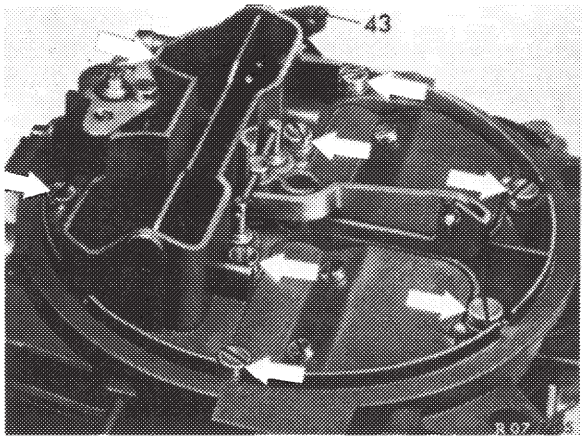
Removal

1 Remove air filter.

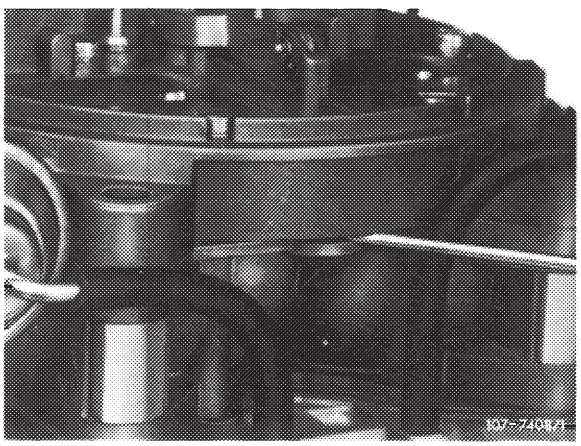
2 Pull off fuse (43) and disconnect choke rod.

3 Unscrew carburetor fastening nuts.

4 Unscrew carburetor cover fastening screws (arrow).



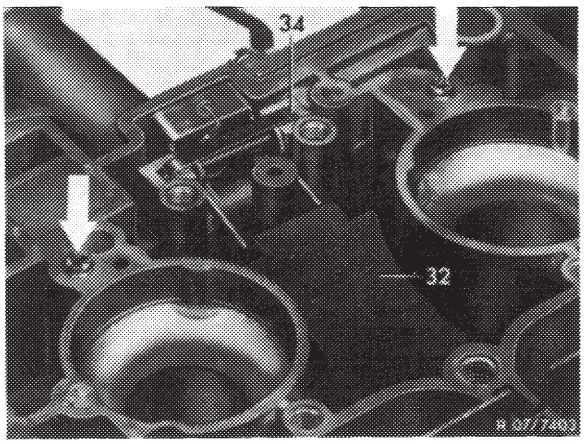
5 Force off carburetor cover at forcing-off point and remove.



Installation

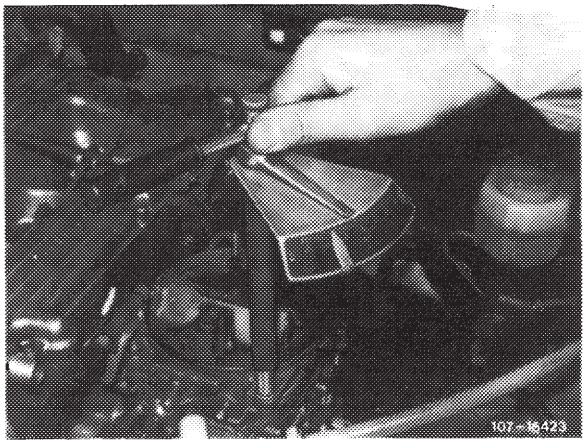
6 Install carburetor cover in vice versa sequence. Use new gasket.

Attention!
Prior to mounting carburetor cover, make sure that holddown (34) is installed.



Tighten carburetor fastening nuts uniformly and crosswise to specified torque.

Attention!
To prevent distortion of carburetor, tighten with a torque wrench only and up to specified torque.



Identification: Information plate in national language on cross member in front of radiator or on cylinder head cover. Adjust engines according to data of respective exhaust gas information plate.

Testing and adjusting values

Idle speed adjustment

National version	Idle speed 1/min	Idle speed emission value % CO
(J) up to 1976	800–900	max. 1.5
(J) 1976		max. 1.0 **without** air injection
(S) 1976		
(USA) 1973	750–900	up to 1.5
(USA) 1974 Federal		
(USA) 1974 California	700–900	6–8 **without** air injection
(USA) 1975/76	800–900	max. 1.0 **without** air injection

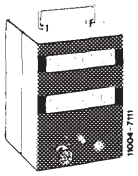
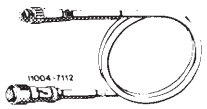
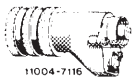
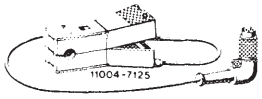
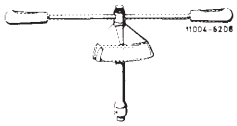
Vacuum governor[1])

National version	Engine speed Vacuum hose pulled off 1/min		Engine speed Driving position engaged 1/min
	without TN choke	**with** TN choke	
(J) 1976	–	1700–1900	600–700
(S) 1976	–		
(USA) 1973/74	1200–1400		
(USA) 1975/76	–		

1) When engaging all auxiliary units, the engine should still run smoothly.

Tightening torques		Nm	(kpm)
Carburetor fastening nuts	with new insulating flange	10	(1.0)
	with insulating flange used up to now	8	(0.8)

Special tools

Oil telethermometer		116 589 27 21 00
Digital tester		001 589 54 21 00
Connecting cable 6 m long		000 589 04 90 00
Intermediate plug (adaptor)		000 589 72 63 00
Trigger		000 589 71 63 00
Torque wrench 4–16 Nm (40–160 kpcm)		000 589 67 21 00

Conventional tools

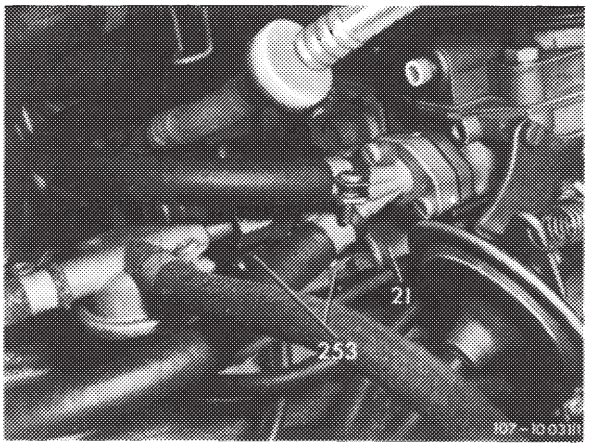
Revolution counter, CO measuring instrument

Removal

1 Remove air filter.

2 Evacuate excess pressure in cooling system by loosening radiator cap for a short moment, then tighten cap again.

3 Unscrew fuel return valve. Pull off electric cable on choke cover, plug on idle speed shutoff valves, vacuum lines and coolant hoses. Disconnect regulating rod on carburetor.



4 Unscrew carburetor fastening nuts and remove carburetor.

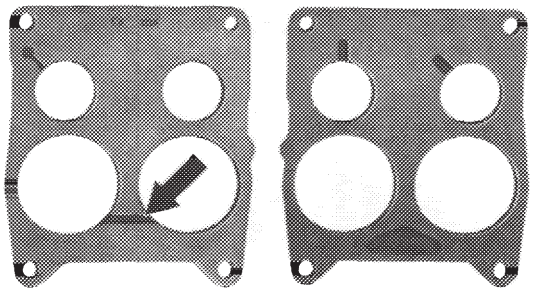
Installation

5 Install carburetor in vice versa sequence. Proceed as follows:

- Check insulating flange for damage and replace, if required.
- Pay attention to installation position and various insulating flange versions.

(USA) 1973/74
(USA) California 1974

Arrow = groove for drawing off fuel evaporation vapors, should point toward carburetor.

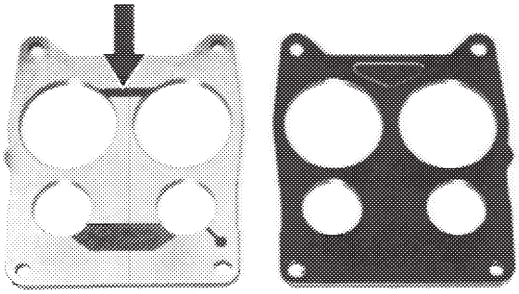


107-8916

(J) 1976
(S) 1976
(USA) 1975/76

Arrow = groove for drawing off fuel and crankcase evaporation vapors, should point toward carburetor.

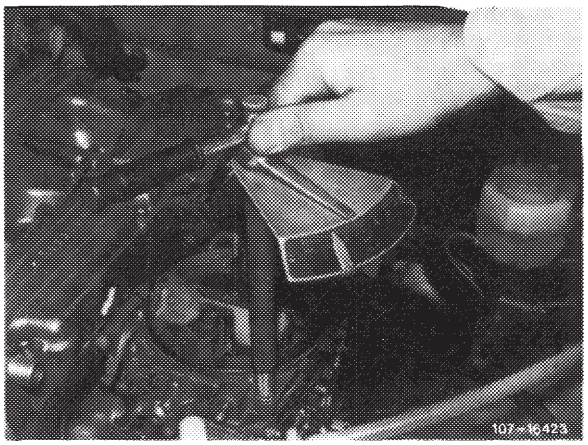
Attention!
This insulating flange should no longer be installed for model years 1973/74.



107-9854/1

- Tighten carburetor fastening nuts uniformly and crosswise to specified torque.

Attention!
To prevent distortion of carburetor, tighten with a torque wrench only and up to specified torque.



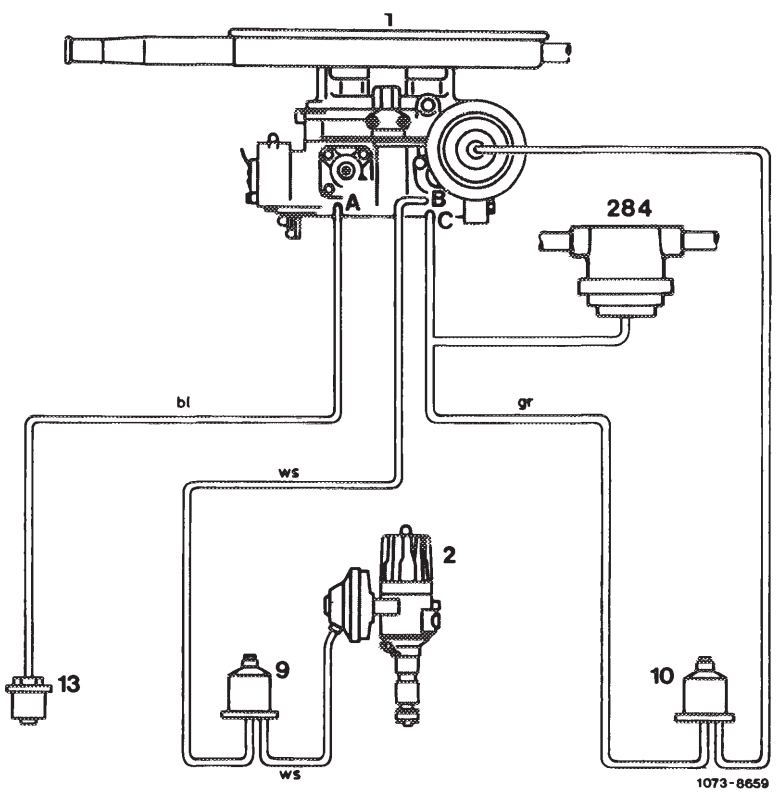
- Attach vacuum lines on carburetor according to diagram.

(USA) **1973/74 Federal**

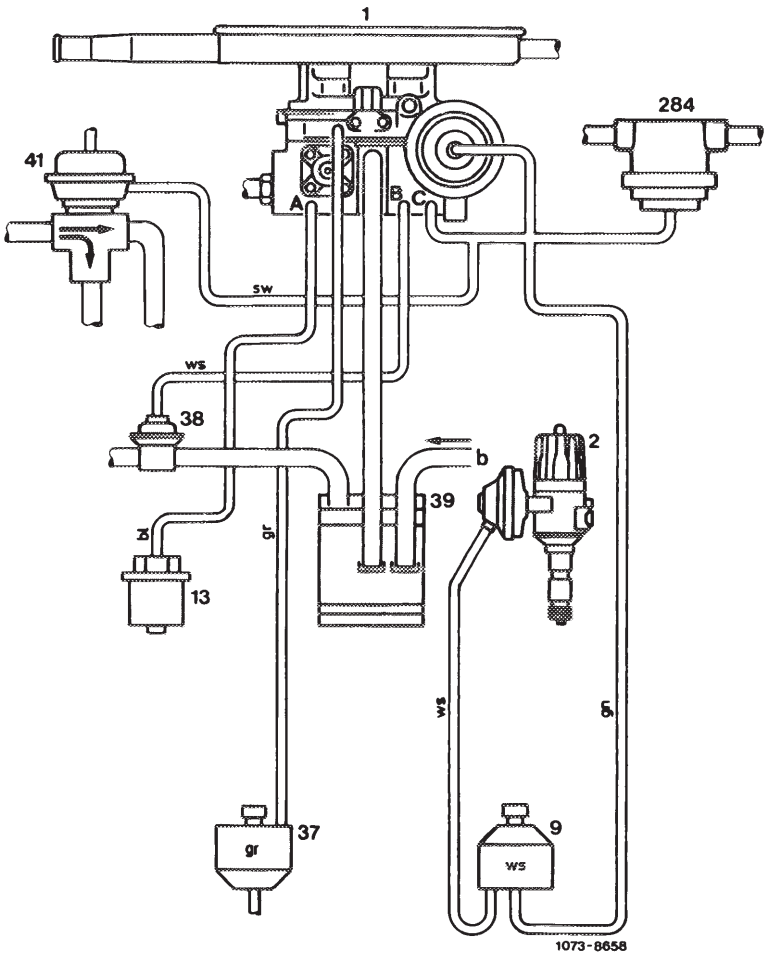
A Vacuum connection for vacuum switch (13) of ignition retard
B Vacuum connection for switchover valve (9) of ignition retard
C Vacuum connection for switchover valve (10) of throttle valve lift by vacuum governor, as well as for fuel return valve (284)

Line colors

gr = grey
bl = blue
ws = white



(USA) 1974 California

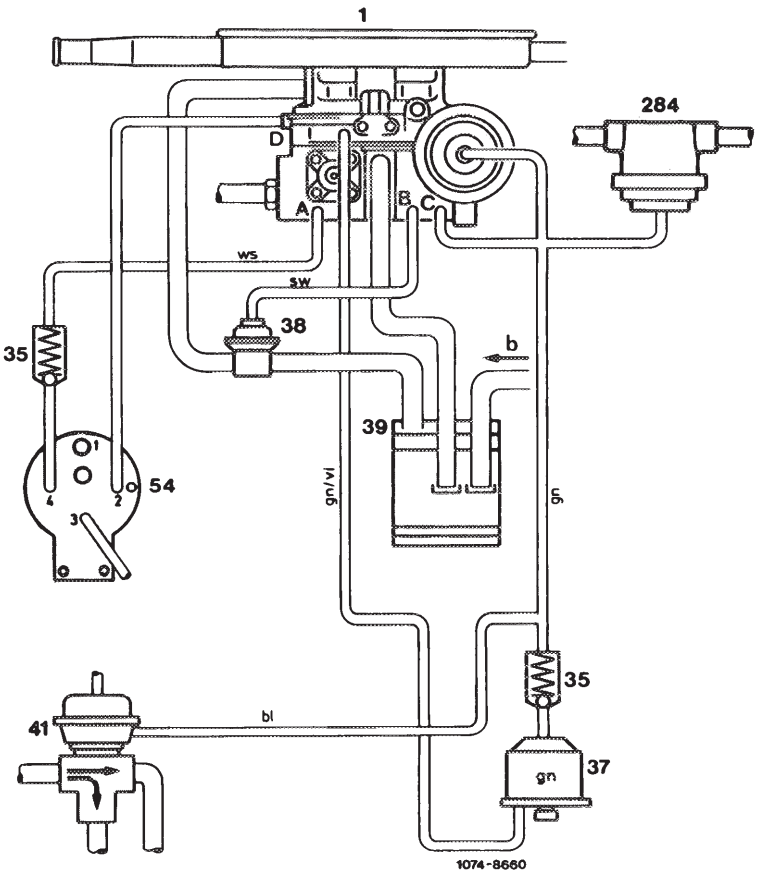


A Vacuum connection for vacuum switch (13) of ignition adjustment
B Vacuum connection for draw-off valve (38) of fuel evaporation control system
C Vacuum connection for switchover valve (9) of ignition adjustment, decel diverter valve of air injection, vacuum governor and fuel return valve (284)

Line colors

bl = blue
br = brown
gr = grey
gn = green
rt = red
ws = white

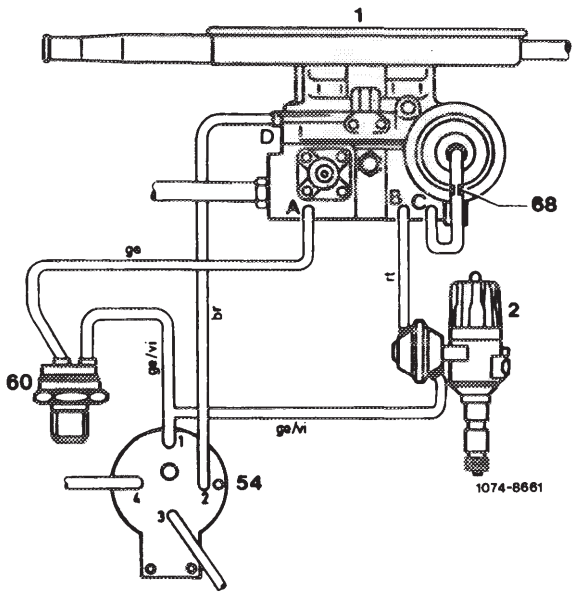
(USA) 1975/76, (J) 1976



A Vacuum connection check valve (35) of vacuum booster for EGR
B Vacuum connection for draw-off valve (38) of fuel evaporation control system
C Vacuum connection for check valve (35) of float chamber vent system, vacuum governor and fuel return valve (284)

Line colors

bl = blue
br = brown
gn = green
sw = black
vi = purple
ws = white



A Vacuum connection 40 °C thermovalve (60) of EGR
B Vacuum connection for ignition advance
C Vacuum connection for vacuum governor
D Vacuum connection for vacuum booster (54) of EGR

Line colors

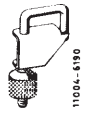
br = brown
ge = yellow
rt = red
vi = purple

6 Adjust idle speed (07.2–100).

Test values

Vacuum (suction end)	Measuring point	prior to pump inlet
	at starting speed mbar (mm Hg)	335–470 (250–350)
	max. pressure drop within first minute mbar (mm Hg)	95 (70)
Delivery pressure (pressure end)	Measuring point	following pump outlet
	at starting speed bar gauge pressure	0.20
	max. pressure drop within first minute bar gauge pressure	0.05

Special tool

Clamp		000 589 40 37 00

Conventional tool

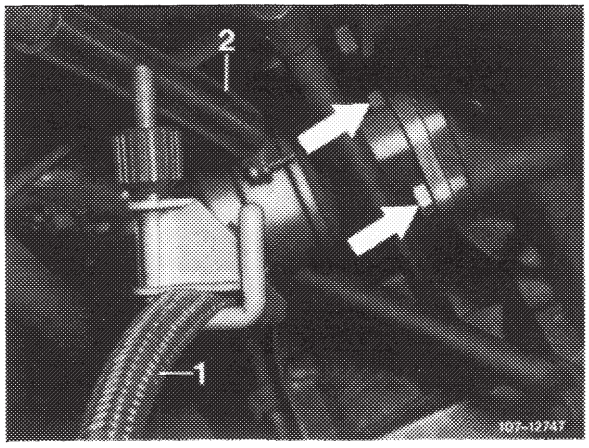
Fuel pump pressure vacuum tester	e.g. made by Bosch, EFAW 177
	e.g. made by SUN, VPT 212

Checking vacuum at suction end

1 Short ignition system. For this purpose, connect cable from ground to terminal 1 of ignition coil.

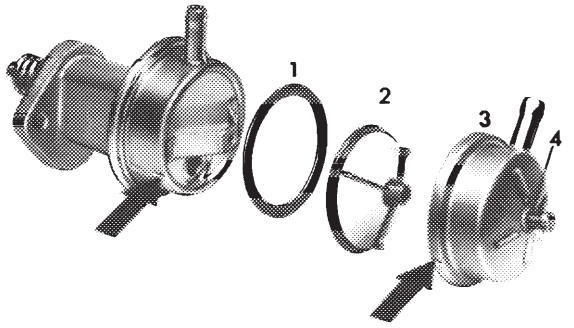
2 Pinch suction hose. Pull off suction and pressure hose.

Connect tester at suction end.



1 Suction hose
2 Pressure hose

3 Crank engine with starting motor until vacuum is no longer increasing. Compare indicated value with rated value. Watch pressure drop.



R 07/6447

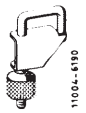
Checking delivery pressure at pressure end

4 Connect tester at pressure end.

5 Crank engine with starting motor until delivery pressure is no longer increasing. Compare indicated value with rated value. Watch pressure drop.

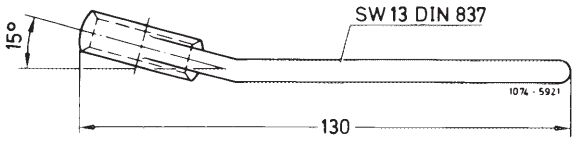
Note: If the vacuum or delivery pressure is not attained, check whether infiltrated (false) air is sucked in at rubber sealing ring (1). Renew sealing ring, if required, and repeat test.

Special tool

Clamp		000 589 40 37 00

Note

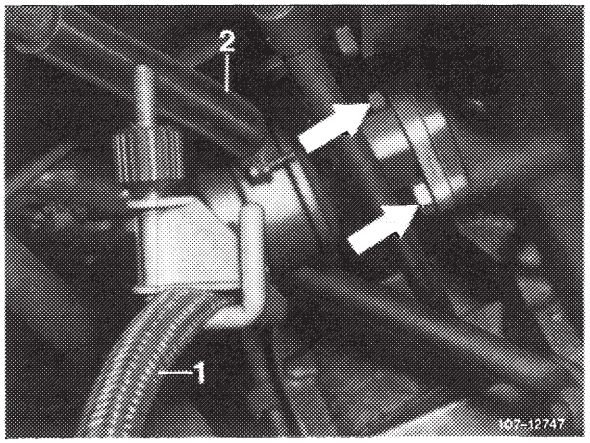
To facilitate loosening or tightening of fastening screws during removal and installation of fuel pump, particularly on vehicles with power steering, offset a conventional box wrench as shown in illustration.



Removal

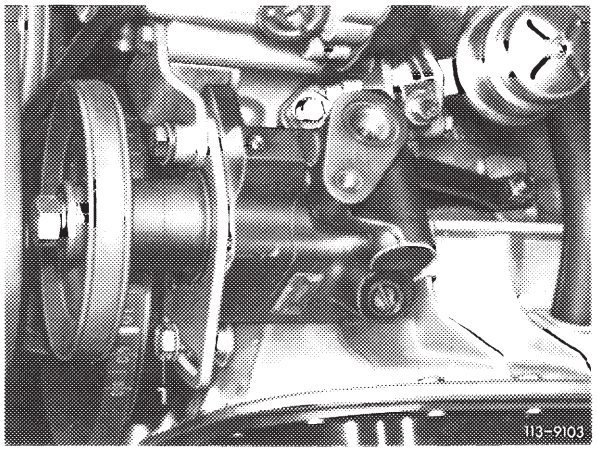
1 Pinch suction hose. Pull off suction and pressure hose.

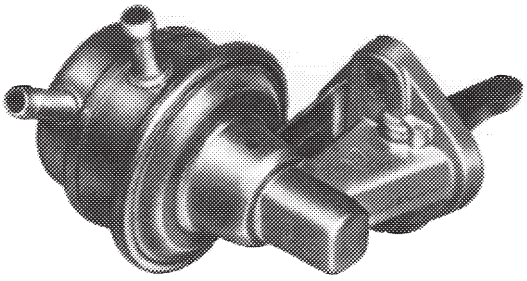
2 Unscrew fastening screws (arrows), remove fuel pump and sealing flange.



(USA) 1973/74
1 Suction hose
2 Pressure hose

For (J) 1976, (S) 1976, (USA) 1974 California an angular fuel pump is installed for lack of space due to air pump.

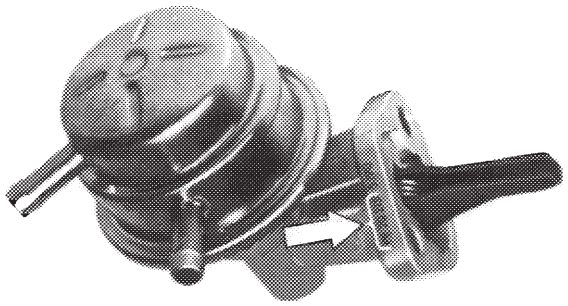




Angular fuel pump with removable cover

(USA) 1974 California
(USA) 1975/76
(J) 1976

107-9099



Angular fuel pump without removable cover with fuel shutoff valve (roll-over test)

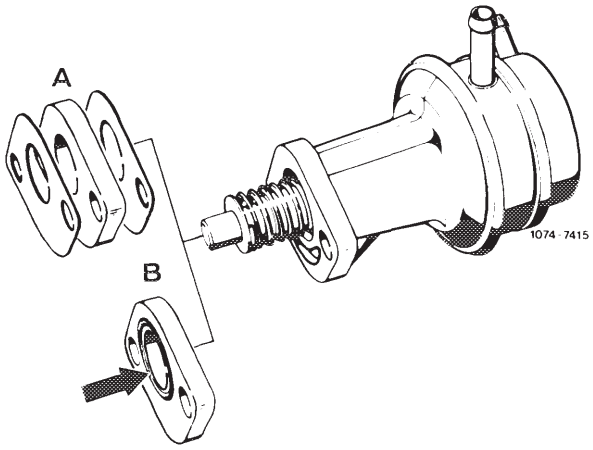
Code number: PE 20 215 (arrow)
(J) 1976
(USA) 1976

107-10953

Installation

3 For installation proceed vice versa.

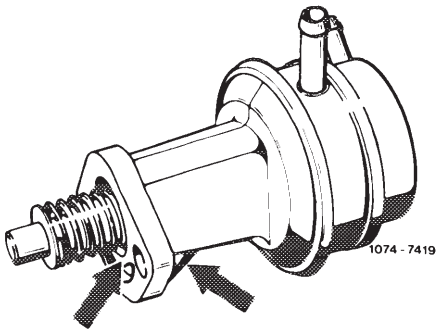
Note: For better sealing, starting May 1976, a sealing flange (B) with two O-rings (arrow) is installed between the fuel pump or angle piece and crankcase.



Repair instructions

a) Fuel pumps attached directly to crankcase by means of a sealing flange

For this type of arrangement, the sealing flange with two O-rings may be installed throughout only with a fuel pump provided with stiffening ribs (arrows).



b) Fuel pumps attached to an angle piece (engines with air pump)

With this arrangement, the sealing flange can be installed with two O-rings between angle piece and crankcase.

The respectively installed or available fuel pump (with or without stiffening ribs) may be used.

Attention!
When installing sealing flange, make sure in both cases that the O-ring rests on crankcase with its entire circumference, i.e. serves as a seal.

For this purpose, clean sealing surface on crankcase and apply a coat of chalk, talcum or india ink to O-ring. Press sealing flange with O-ring against crankcase. Use the two fastening screws for centering. Then evaluate contact surface. If the O-ring is not resting on its entire circumference, remove O-ring at crankcase end from sealing flange and install a paper gasket.

Note: Provide screws for attachment to crankcase prior to assembly with sealing compound (e.g. Hylomar) on threads.

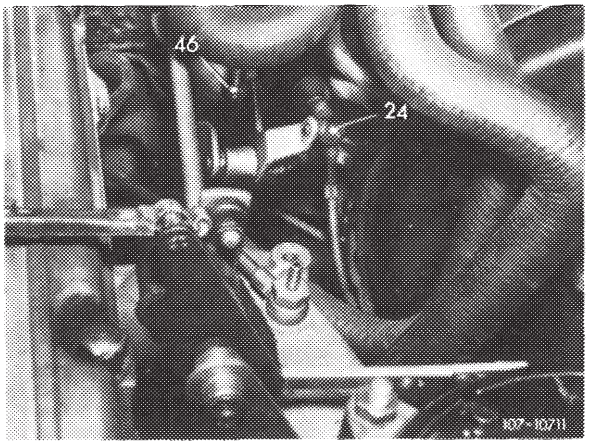
Length of regulating rods in mm[1])

Regulating rod, item		24	46	130	144
Model	114	88	69	120	306
	116	122			

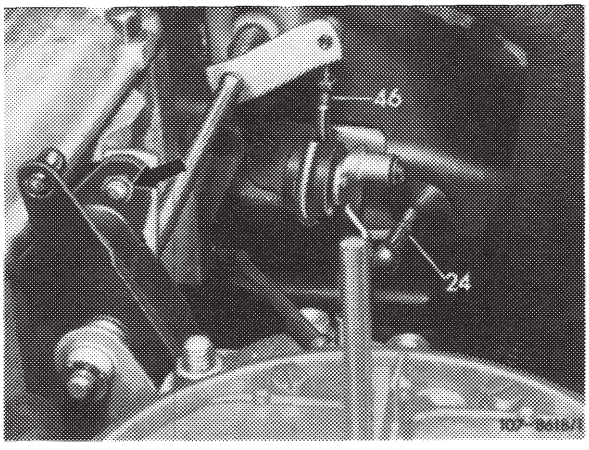
1) Measured from center of ball socket to center of ball socket.

Testing, adjusting

1 Disconnect regulating rods (24 and 46), check for specified length, adjust if required and reconnect.



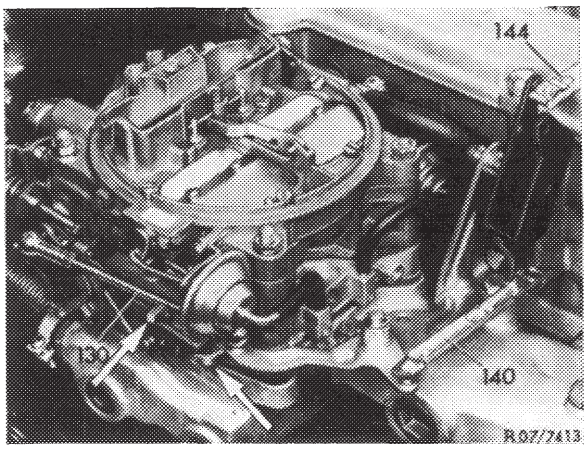
Model 114

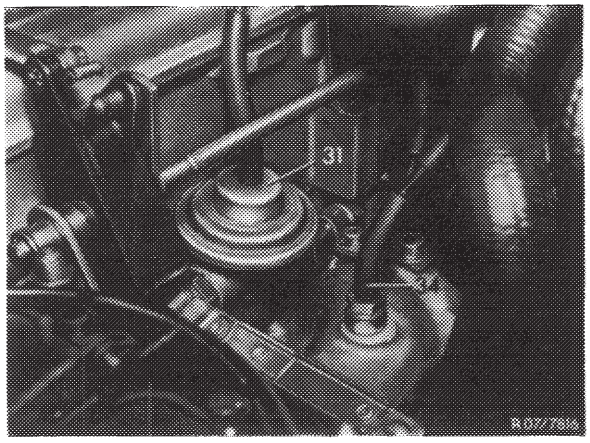


Model 116

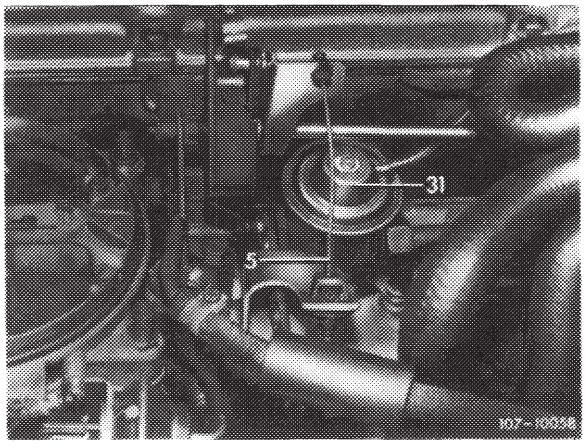
2 Adjust regulating rod (130). For this purpose, disconnect regulating rod, check for specified length, adjust if required and reconnect.

3 Adjust regulating rod (144). For this purpose, disconnect regulating rod, check for specified length, adjust if required and reconnect.

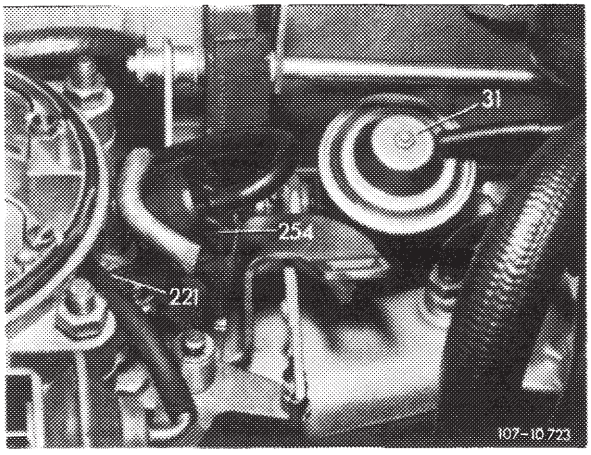




Layout regulation
(USA) 1973/74 Federal
(USA) 1974 California



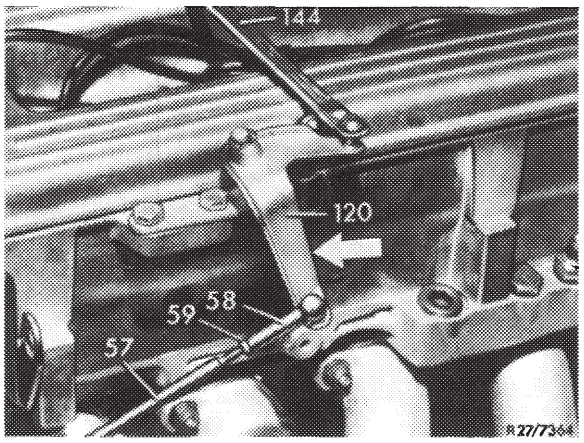
Layout regulation
(J) 1976
(USA) 1975/76



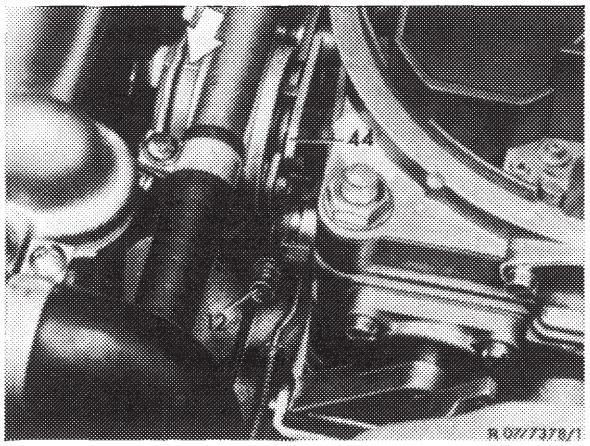
Layout regulation
(S) 1976

4 Adjust control pressure rod (57) for automatic transmission. Keep engine running. Disconnect control pressure rod and push toward the rear up to stop. Push angle lever (120) in direction of arrow until idle travel in regulating rod (140 in fig. item 3) is cancelled.

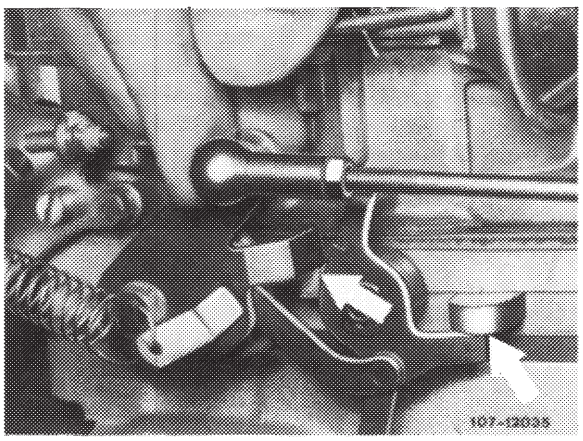
Then adjust ball socket (58) until socket can be connected again **free of tension.**



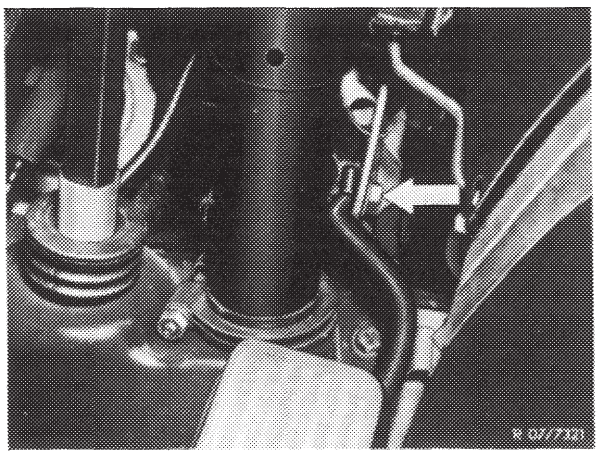
5 **Adjust full throttle stop.** Check and adjust only with stage II **unlocked.** For this purpose, push fast idle cam (44) completely down (not required if engine is at operating temperature).

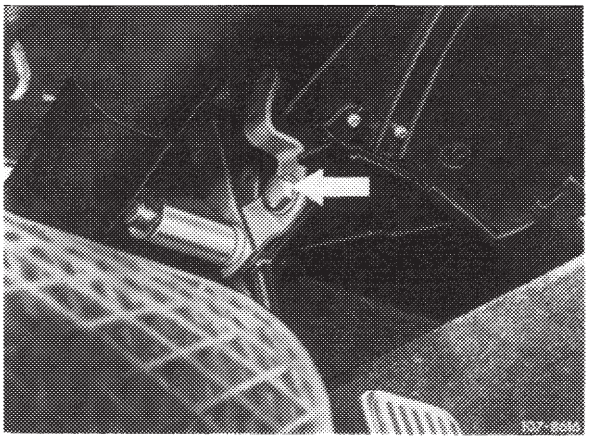


With the engine stopped, depress accelerator pedal only up to stop on kickdown switch (do not actuate kickdown switch). The throttle valve lever of I. and II. stage should rest against full throttle stop (arrows).



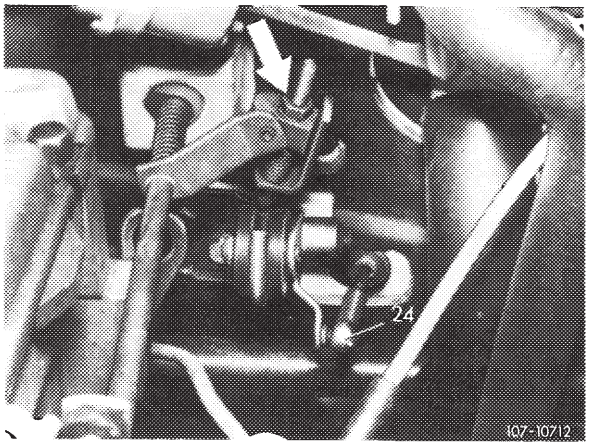
If the full throttle stop is not attained on model 114 or 116, loosen clamping screw (arrow) on regulating shaft. Slightly pull up accelerator pedal and tighten screw again. Check full throttle stop once again.





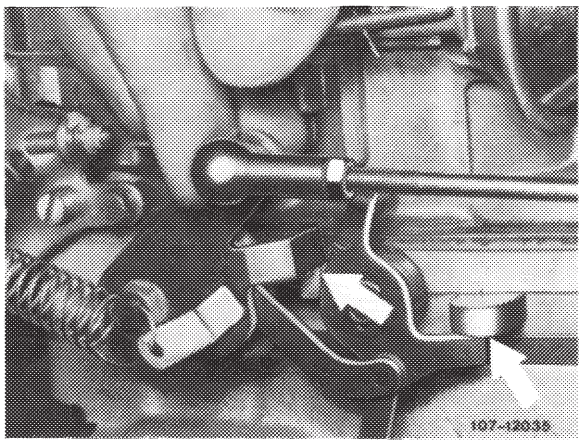
Model 116

On model 116 with stepless full throttle stop adjustment, set adjusting nut (arrow) accordingly.

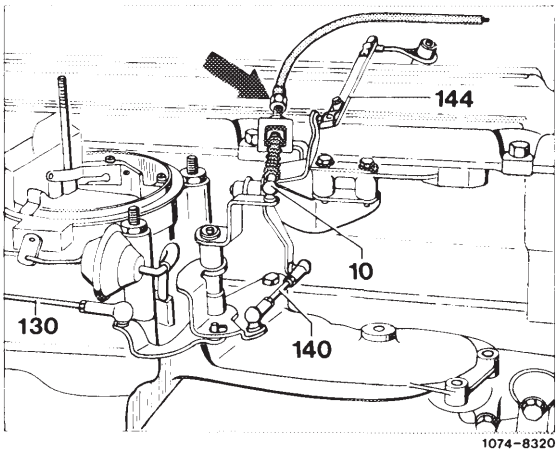


Adjustment on vehicles with righthand steering

The adjusting lengths are similar to lefthand steering vehicles, the same applies to adjustment. Following adjustment with engine stopped, step down fully on accelerator pedal (with automatic transmission, apply kickdown). The throttle valve lever of stage I and II should rest **free of tension** against full throttle stop of carburetor (arrows).

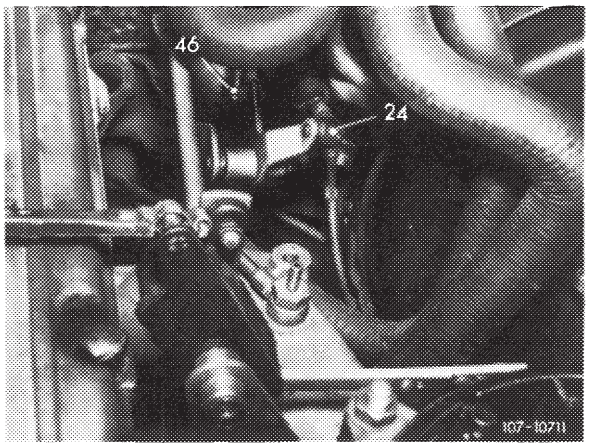


If the full throttle stop on carburetor is not attained, readjust Bowden wire (arrow).

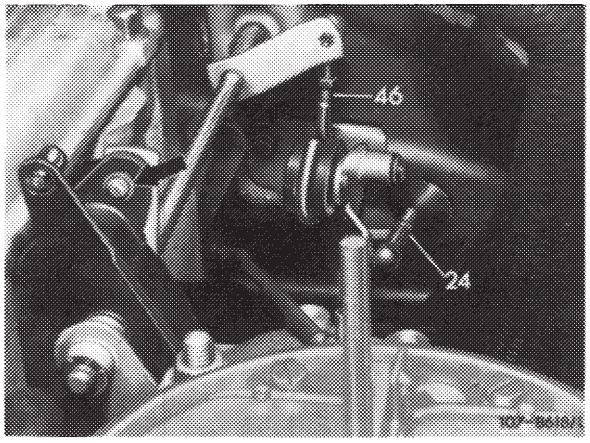


Removal

1 Disconnect regulating rod (46).

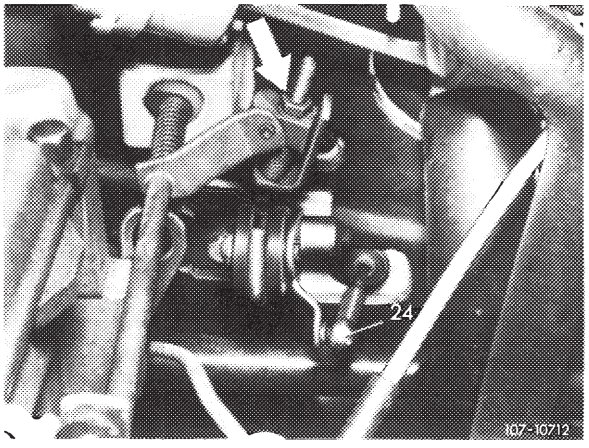


Model 114

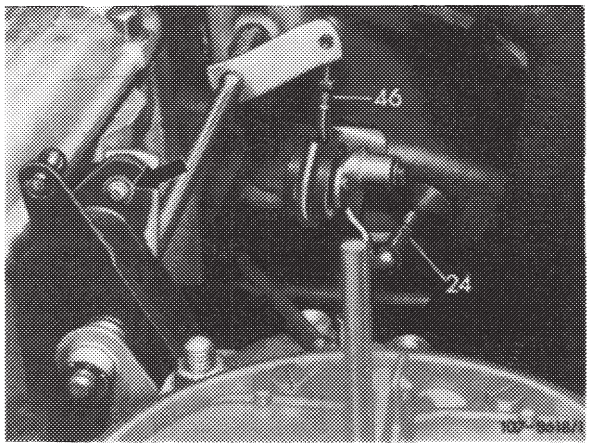


Model 116

On vehicles with stepless full throttle stop adjustment, force off regulating rod together with rubber bearing.



2 Pull off lock (arrow). Slide longitudinal regulating shaft toward the rear and remove. Pay attention to components of rear bearing.



Installation

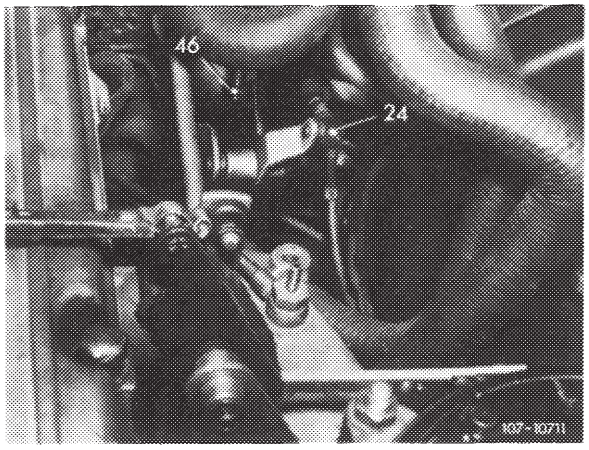
3 For installation proceed vice versa. Grease bearing points as well as ball sockets with Molykote-Long-term 2.

4 Adjust regulating linkage (07.2–300).

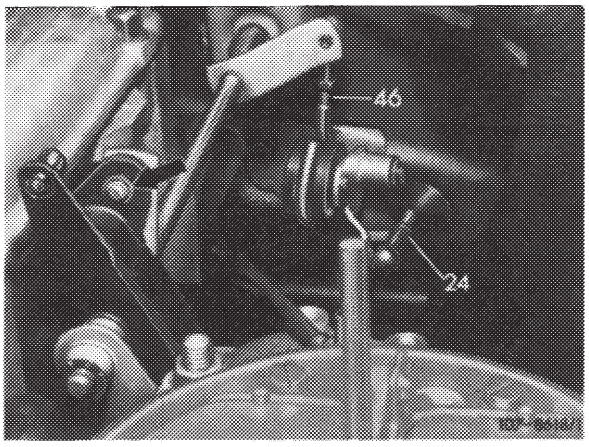
Removal

1 Remove accelerator pedal (07.2–330).

2 Disconnect regulating rod (24) and return spring in vehicle interior.

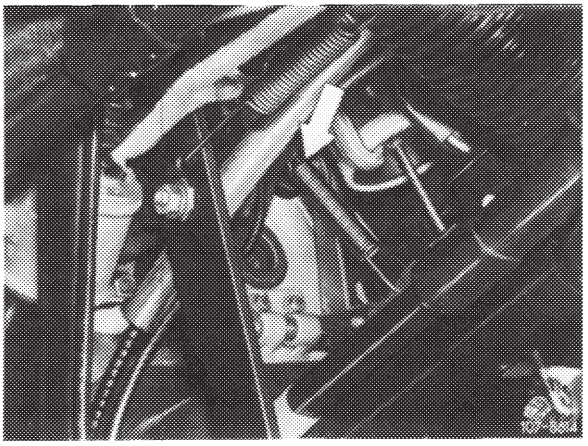


Model 114

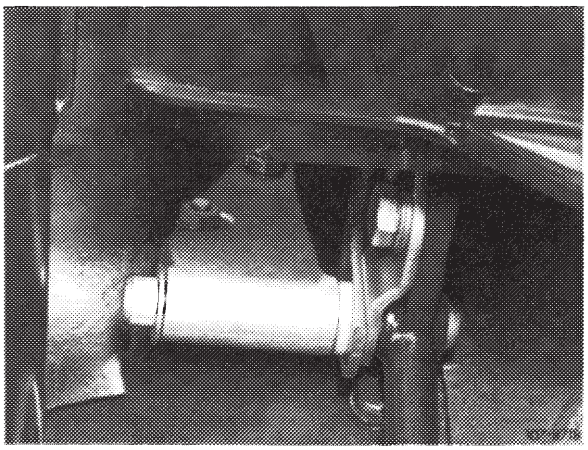


Model 116

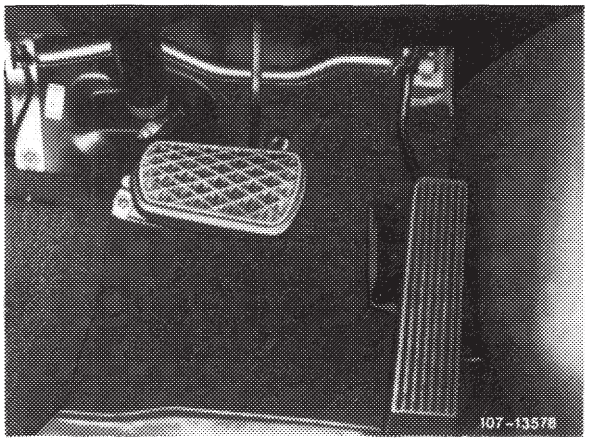
3 Unscrew fastening screws or nuts from bearing bracket. Remove bearing bracket and front wall regulating shaft.



Model 114 Bearing bracket fastening screws



Model 116



Righthand steering

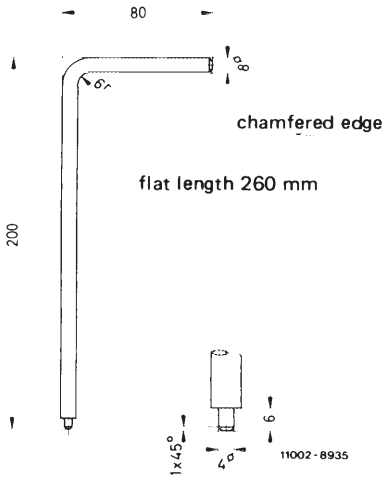
Installation

4 For installation proceed vice versa. Grease bearing points as well as ball sockets with Molykote-Long-term 2.

5 Adjust regulating linkage (07.2–300).

Self-made tool

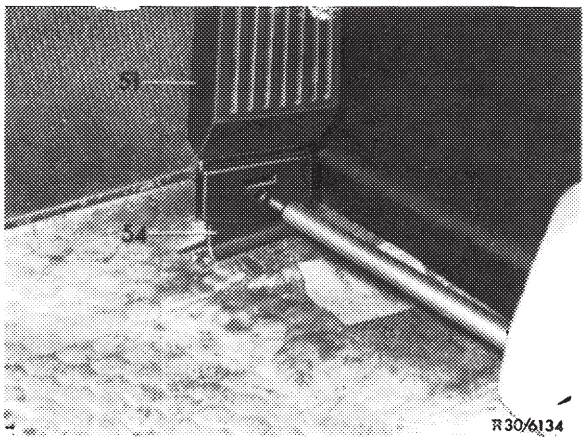
Remover for accelerator pedal



Version 1

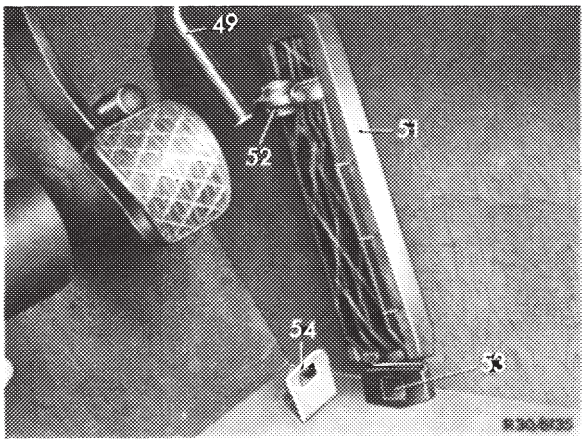
Removal

1 Remove accelerator pedal (51) from bearing plate (54). For this purpose, disengage clip from bearing plate by means of remover. **Be sure to use remover,** so that clip (53) is not damaged or excessively stretched.



Fastening accelerator pedal with push-type clip

2 Pull off accelerator pedal (51) in upward direction and out of accelerator lever (49).



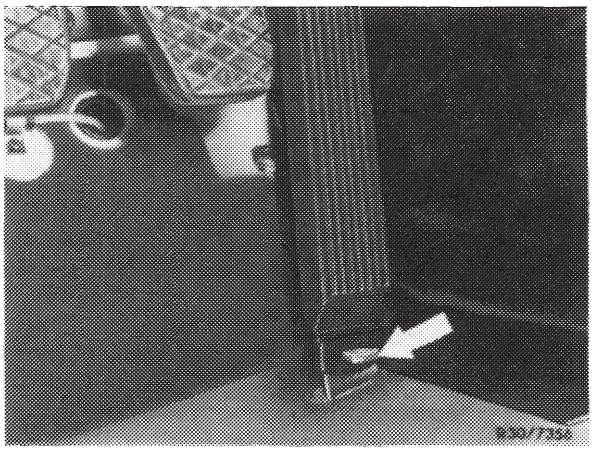
Installation

3 Slip accelerator pedal (51) with joint (52) into accelerator lever (49) and push tightly on bearing plate so that clip (53) is reliably engaging.

Version 2

Removal

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



Fastening accelerator pedal with spreader-type clip

Installation

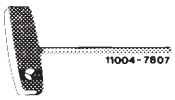
2 During installation, make sure that clip is reliably engaging.

A. Standard version

Checking and adjusting data

Engine	Idle speed 1/min	Idle speed emission value % CO
110.984/985 110.986/987	750–850	0.5–1.5
110.988 110.989 110.990	700–800	

Special tools

Screw driver 3 mm with tommy handle for regulating idle speed emission value		000 589 14 11 00
Puller		123 589 05 33 00
Installer		123 589 00 15 00
Oil telethermometer		116 589 27 21 00

Conventional testing tools and accessories

CO-measuring instrument, revolution counter	
Digital tester	e.g. made by Bosch, MOT 001.03

Note

On light alloy fuel distributor, removal of air cleaner for adjusting emission value at idle is no longer necessary.

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

Adjusting

1 Switch off air-conditioning system or automatic climate control. Move selector lever into position "P".

2 Remove air cleaner, with gray iron fuel distributor only.

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 51 756 or benzine.

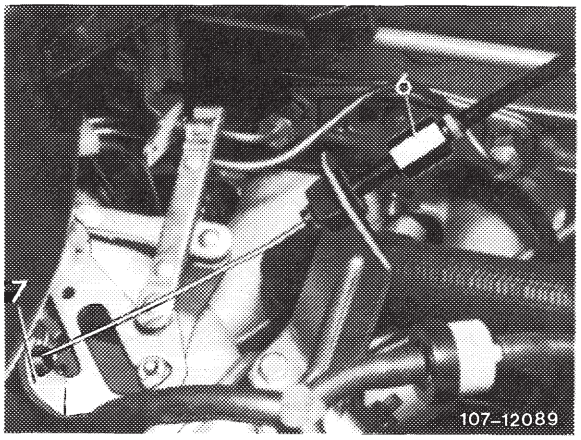
Attention!
Do not use conventional fuel for spraying (unhealthy vapors). Pay attention to inflammability and do not spray on red-hot parts or components of ignition system.

6 Vehicles with cruise control/tempomat:

Cruise control/tempomat, pneumatic

Check whether bowden wire for cruise control/tempomat rests free of tension against regulating lever (7).

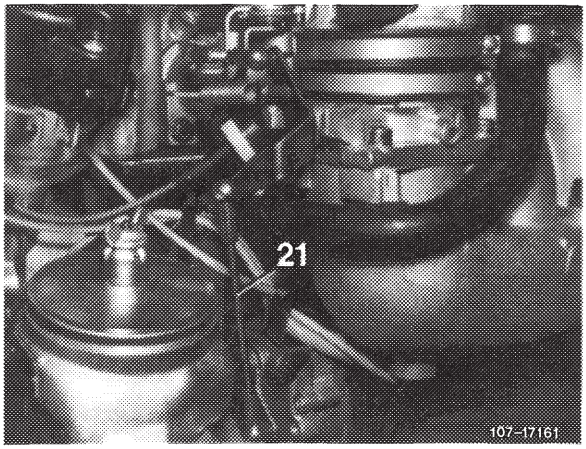
Set with adjusting nut (6), if necessary.



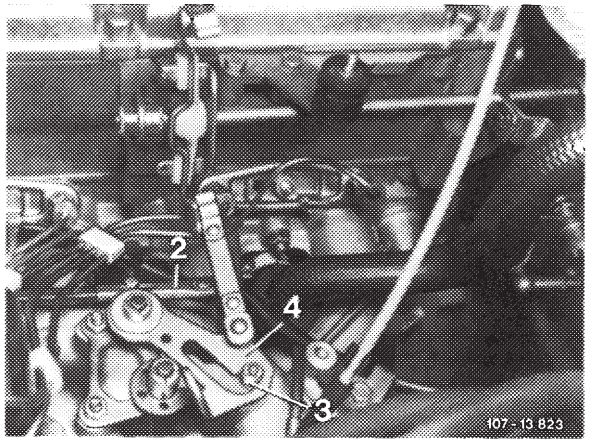
Cruise control/tempomat, electrical

Check whether actuator rests against idle speed stop of cruise control/tempomat. For this purpose, disconnect pull rod (21) and push lever of actuator clockwise to idle speed stop.

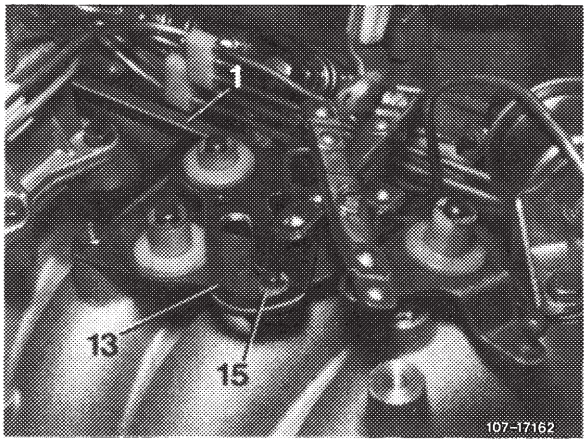
When connecting pull rod (21), make sure that the lever of the actuator is raised by approx. 1 mm from idle speed stop. Adjust pull rod, if required.



7 Check whether roller (3 and 15) in slotted lever (4 and 13) rests free of play against end stop. Adjust with connecting rod (1 and 2), if required.

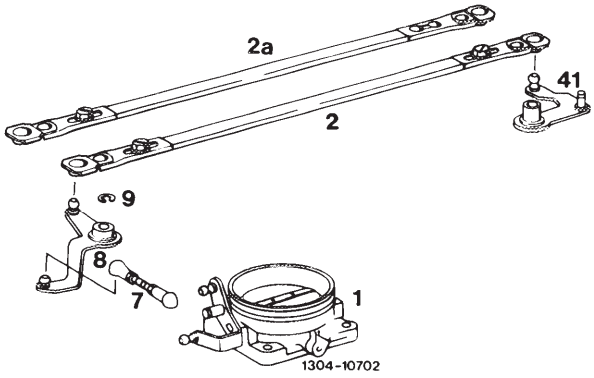


Model 123



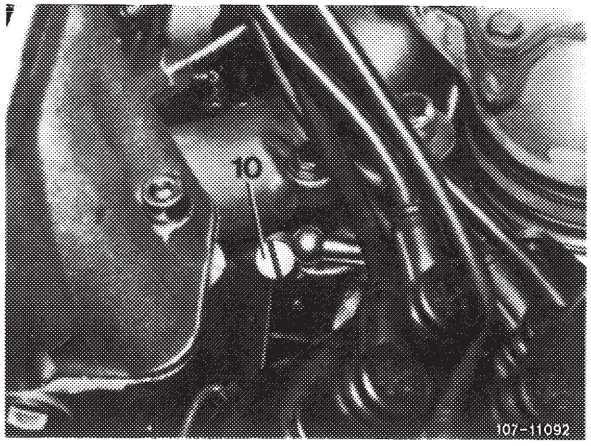
Model 126

Connecting rod can be adjusted on one side only. Pay attention to installation position (refer to Fig.).



2 Former version
2a Present version

8 Set to specified speed by means of idle speed adjusting screw (10).

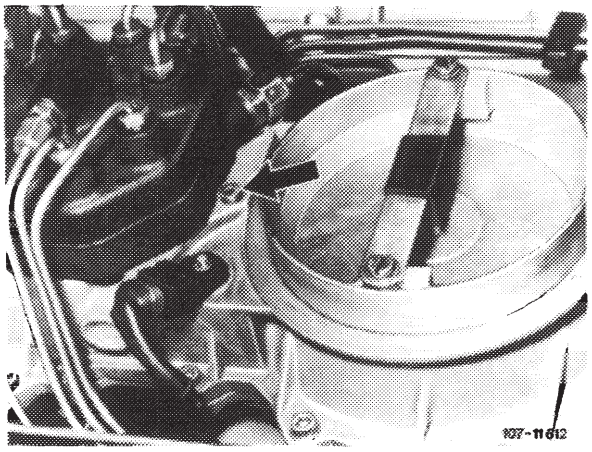


9 Adjusting idle speed emission value:

With gray iron fuel distributor

Unscrew closing plug (arrow).

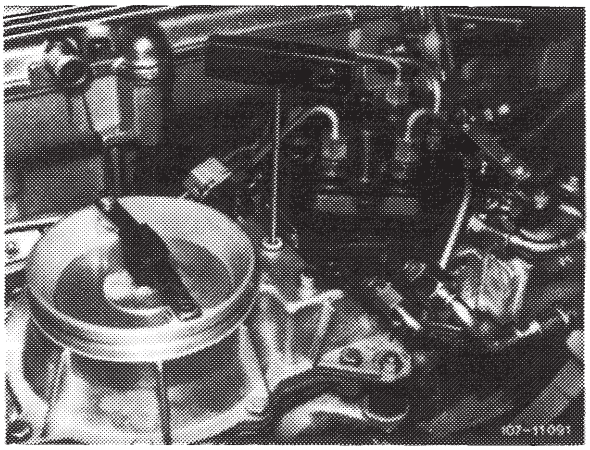
Attention!
On vehicles manufactured after 1.10.1976, remove safety plug first.



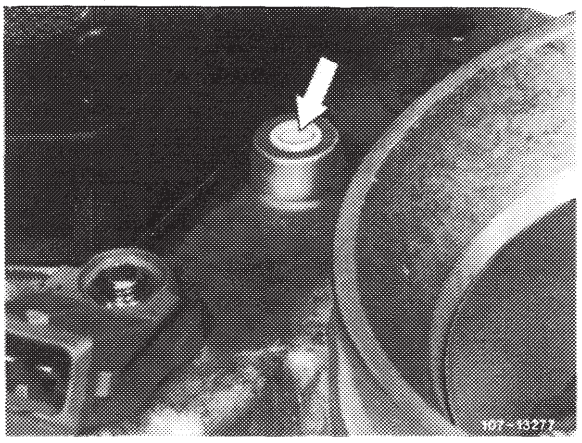
Insert screw driver through bore on idle speed mixture control screw and set emission value by turning screw.

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.



Following adjustments on vehicles manufactured after 1.10.1976, engines were provided with a blue safety plug (arrow), MB part no. 000 997 59 86.



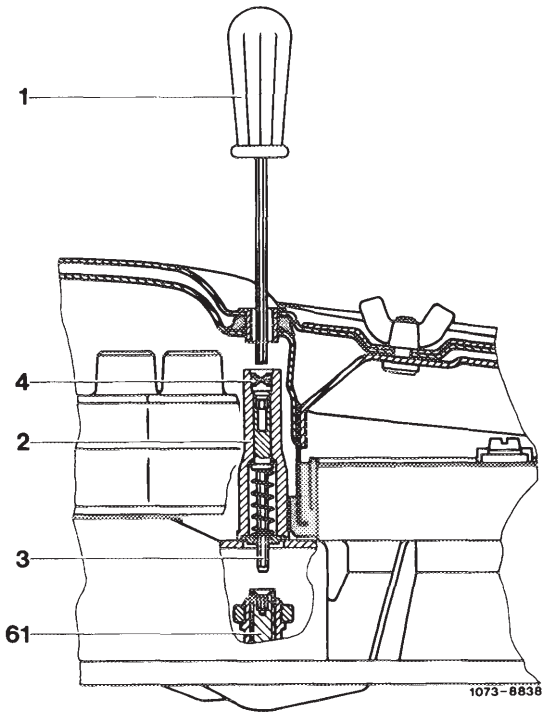
With light alloy fuel distributor

Pull out safety plug (4) by means of puller.

Push with screw driver (1) through recess on air cleaner top against adjusting device (2). Push adjusting device down with screw driver against spring force, turn slightly until hexagon (3) engages in mixture control screw (61).

Turning counterclockwise = leaner
Turning clockwise = richer

Release screw driver, the compression spring will then force adjusting device out of mixture control screw.



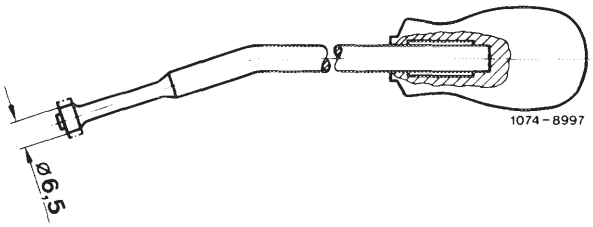
1 Screw driver
2 Adjusting device
3 Hexagon
4 Safety plug
61 Mixture control screw

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

Following adjustment, install a blue fuse plug (4), part no. 000 997 56 86 by means of installer.

Note: The diameter of the installer for knocking-in safety plug for protective cap of mixture control screw (61) has been changed from 8 mm to 6.5 mm.

In spare parts sector, only installers with changed diameter are now available. On former installers, grind diameter down to 6.5 mm.



10 With gray iron fuel distributor, mount air cleaner. Check idle speed emission value once again and readjust, if required.

11 Place selector lever into driving position, switch-on air conditioning, turn power steering to full lock, with engine running. Readjust engine speed, if required.

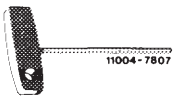
B. National version (AUS) (J) (S) (USA)

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

Testing and adjusting values

National version and model year	Idle speed 1/min	Idle speed emission value % CO **without air injection**
(AUS) Label: color code silver.		
1977–1980	800	0.5–1.5
1981/82	750–850	0.3–1.3
(J) Label: in Japanese language.		
1977–1980	800	0.4–2.0
(S) Label: color code blue.		
1977–1980	800	0.5–1.5
1981/82	750–850	0.3–1.3
(USA) Label: color code Federal black, California yellow.		
1977–1979	800	0.4–2.0

Special tools

Screw driver 3 mm with tommy handle for readjusting idle speed emission value	 11004-7807	000 589 14 11 00
Puller	 11004-8204	123 589 05 33 00
Installer	 11004-8278	123 589 00 15 00
Oil telethermometer		116 589 27 21 00

Conventional testing instruments and accessories

CO-measuring instrument, revolution counter	
Digital tester	e.g. made by Bosch, MOT 001.03

Note

For adjustment of emission value at idle with light alloy fuel distributor, removal of air cleaner is no longer required.

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

Adjustment

1 Switch off air conditioning or automatic climate control. Move selector lever into position "P".

2 With gray iron fuel distributor, remove air cleaner.

3 Connect test instruments.

- Revolution counter
- CO-measuring instrument
- Digital tester
- Oil telethermometer

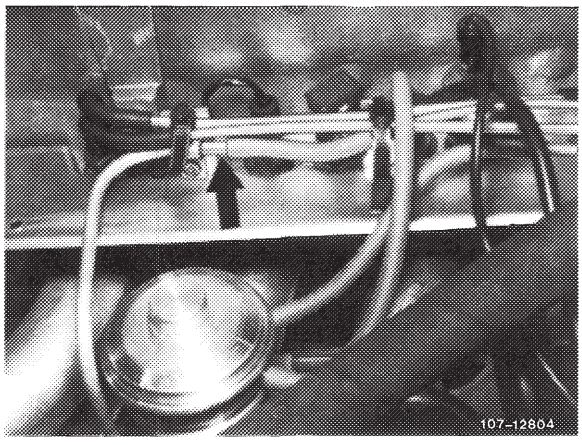
Connecting CO-measuring instrument

For this purpose, on (J) and (USA) version, pull conecting hose (arrow) from measuring point (exhaust backpressure line).

Respective model years:
(J) 1977–1980
(USA) 1977–1979

Connect CO-measuring instruments and exhaust backpressure line with a hose.

No catalyst is installed on (USA) tourist vehicles, for this reason, the emission value can be measured at exhaust tail pipe.



4 Run engine to 75—85 °C oil temperature.

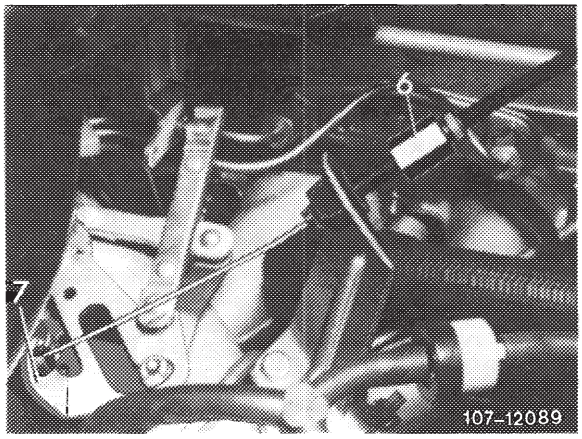
5 Check intake system for leaks. For this purpose, spray all sealing points with Iso-Oktan DIN 51756 or benzine.

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

6 Vehicles with cruise control/tempomat:

Cruise control/tempomat, pneumatic

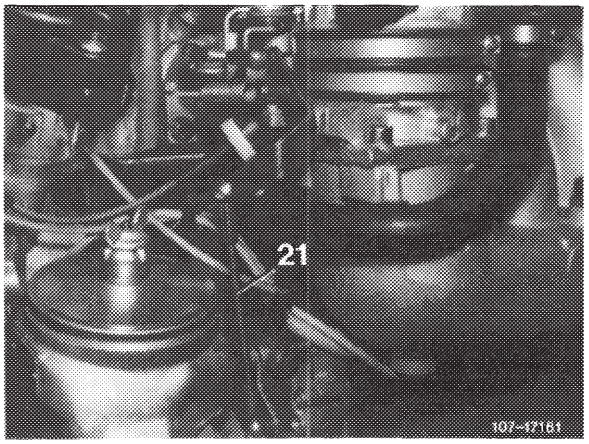
Check whether Bowden for cruise control/tempomat rests free of tension against regulating lever (7). Set with adjusting screw (6) if required.



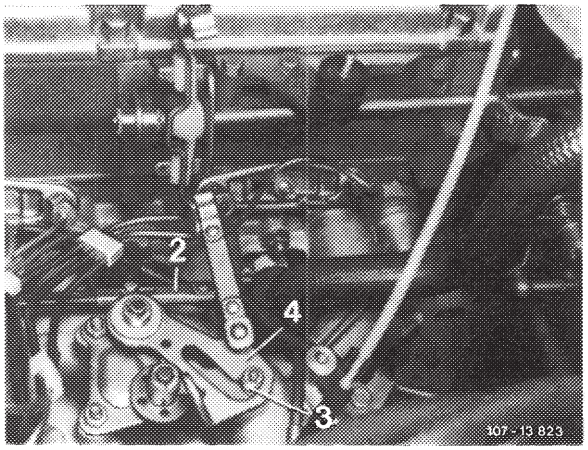
Cruise control/tempomat, electrical

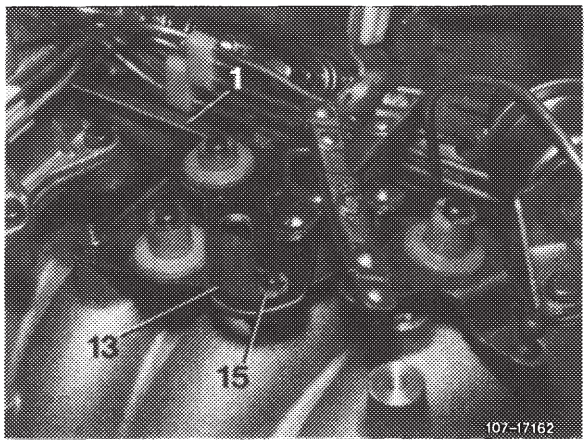
Check whether actuator rests against idle speed stop of cruise control/tempomat. For this purpose, disconnect pull rod (21) and push lever of actuator clockwise to idle speed stop.

When connecting pull rod (21), make sure that the lever of the actuator is raised from idle speed stop by approx. 1 mm. Adjust pull rod, if required.



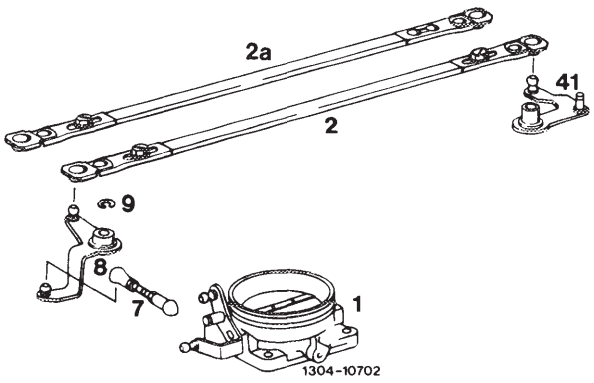
7 Check whether roller (3 and 15) in slotted lever (4 and 13) rests free of tension against final stop. Adjust with connecting rod (1 and 2), if required.





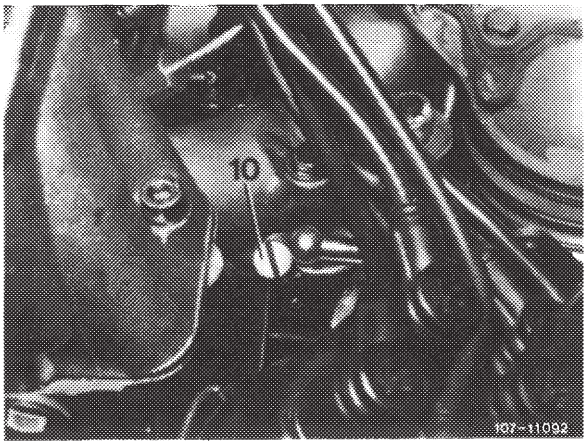
Model 126

Connecting rod can be adjusted on one side only.
Pay attention to installation position (refer to Fig.).



2 Former version
2a Present version

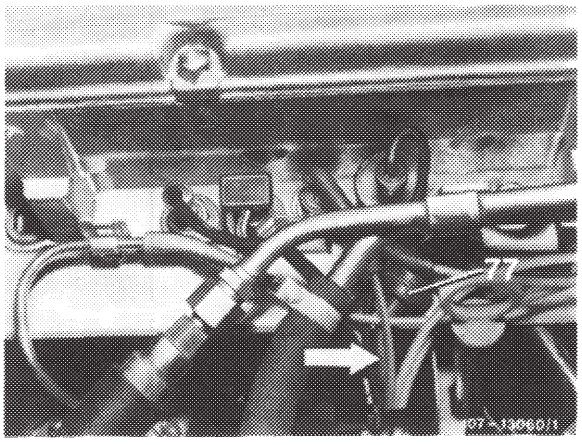
8 Set to specified engine speed by means of idle speed air screw (10).

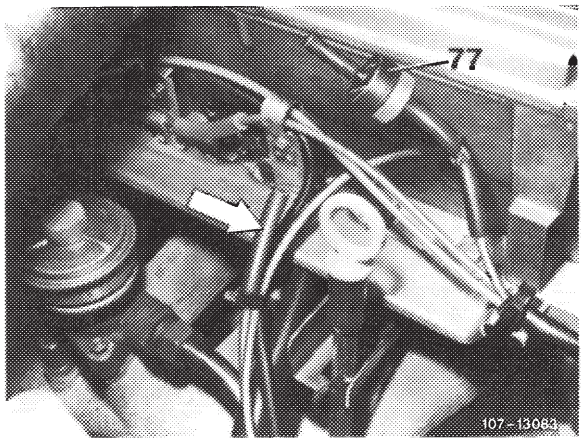


9 Check idle speed emission value.

(AUS) 1977–1982
(S) 1977–1982

Check idle speed emission value **without air injection.**
For this purpose, pull blue/purple vacuum line (arrow) from delay valve (77) and close small tube.
This will disconnect air injection.

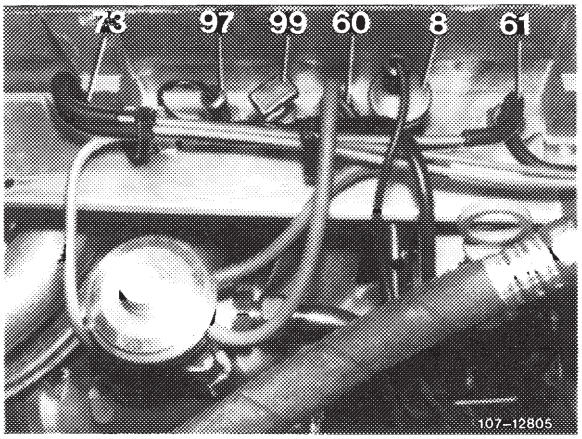




Ⓢ

Ⓙ 1977–1980
USA 1977–1979

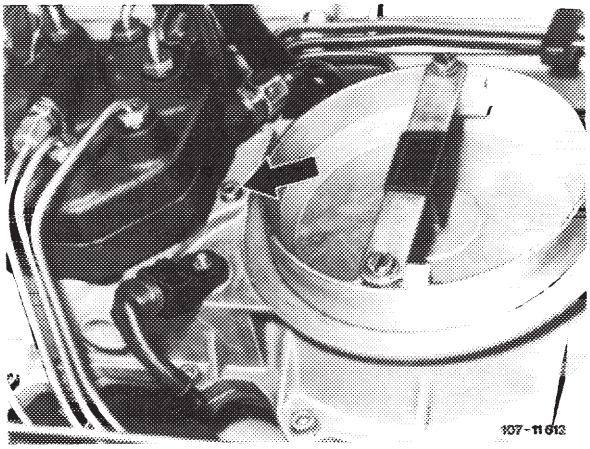
Check idle speed emission value **without** air injection, in cylinder head. For this purpose, pull blue vacuum line from blue thermo valve (60) and close line. This will disconnect air injection.



10 Adjust idle speed emission value:

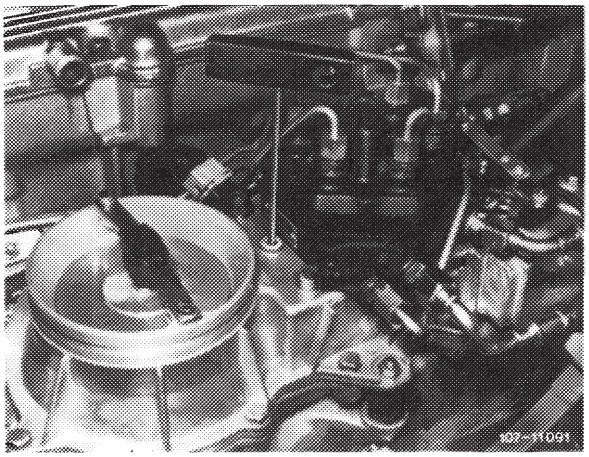
With gray iron fuel distributor

For this purpose, unscrew closing plug (arrow).



Insert screw driver through bore against 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, check idle speed emission value once again and readjust, if required.

Put back vacuum line on thermo valve.

Check idle speed emission value again (air injection operational). The idle speed emission value should be **below** previously set value.

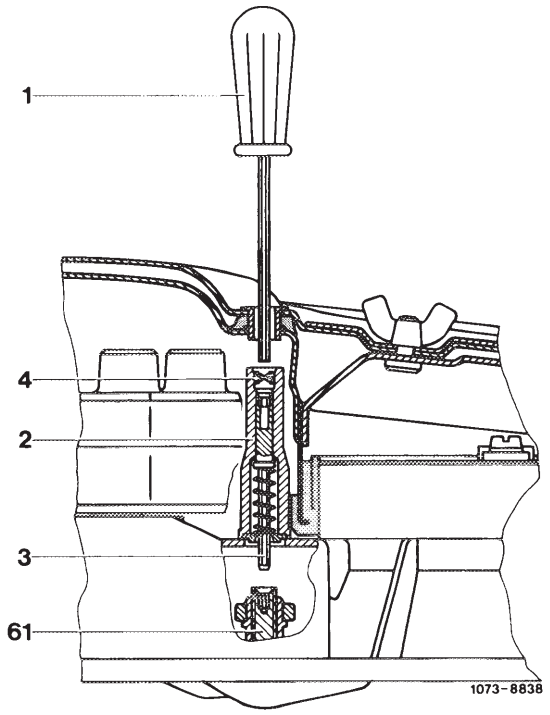
With light alloy fuel distributor

Pull out safety plug (4) with puller.

Insert screw driver (1) through cutout on air cleaner top and push against adjusting device (2). Push adjusting device down with screw driver against force of spring, turn slightly until hexagon (3) engages in mixture control screw (61).

Turning counterclockwise = leaner
Turning clockwise = richer

Release screw driver, the compression spring will disengage adjusting device from mixture control screw.



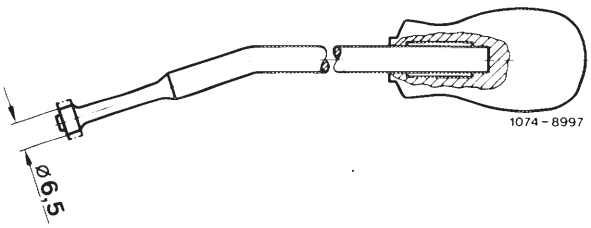
1 Screw driver
2 Adjusting device
3 Hexagon
4 Safety plug
61 Mixture control screw

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

Following adjustment, install a blue safety plug (4), part no. 000 997 56 86 by means of installer.

Note: The diameter of the installer for knocking-in safety plug for protective cap of mixture control screw (61) has been changed from 8 mm to 6.5 mm.

In spare parts sector, only the installers with changed diameter are now available. On former installers, grind diameter down to 6.5 mm.



11 With gray iron fuel distributor, mount air cleaner. Check idle speed and idle speed emission value once again and adjust, if required.

12 Place selector lever into driving position, engage air conditioning, turn power steering to full lock, while keeping engine running. Readjust engine speed, if required.

National version (J) (USA)

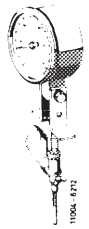
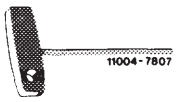
Identification: Information label in national language on radiator cross member.

Adjust engines according to data on respective emission label.

Testing and adjusting values

Model year	Idle speed 1/min	On-off ratio in % Test value	Adjusting value
(J) Identification: Label in Japanese language.			
1981/82	750 ± 50	40–60	50 ± 10
(USA) Identification: Label, black.			
1980/81	750 ± 50	40–60	50 ± 10

Special tools

Oil telethermometer		116 589 27 21 00
Puller for safety plug		123 589 05 33 00
Installer for safety plug		123 589 00 15 00
Screw driver 3 mm with tommy handle for readjusting idle speed emission value		000 589 14 11 00

Conventional testing instruments

Revolution counter	
Digital tester	e.g. made by Bosch, MOT 001.03
Lambda control tester KDJE-P 600	e.g. made by Bosch

Adjustment

1 Connect digital tester or revolution counter, oil telethermometer and lambda control tester.

2 Switch off air conditioning or automatic climate control. Move selector lever into position "P".

3 Run engine to 75–85 °C.

4 Check whether throttle valve lever rests against idle speed stop.

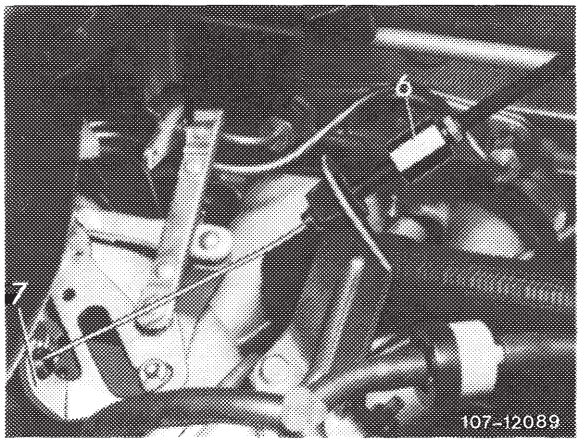
5 Check intake system for leaks. For this purpose, spray all sealing points with Iso-Oktan DIN 51756 or benzine.

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

6 Vehicles with cruise control/tempomat:

Cruise control/tempomat, pneumatic

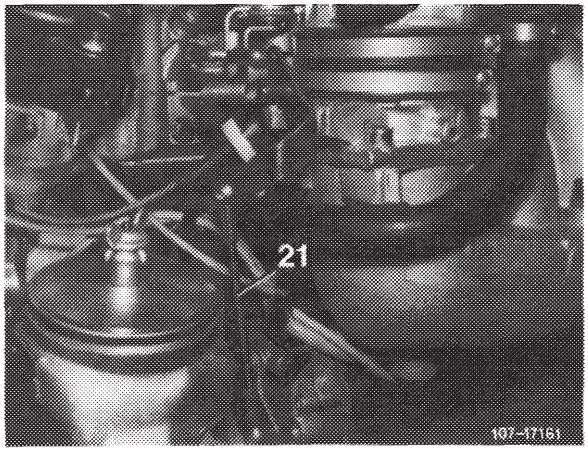
Check whether bowden wire for cruise control/tempomat rests free of tension against regulating lever (7). Adjust with adjusting nut (6), if required.



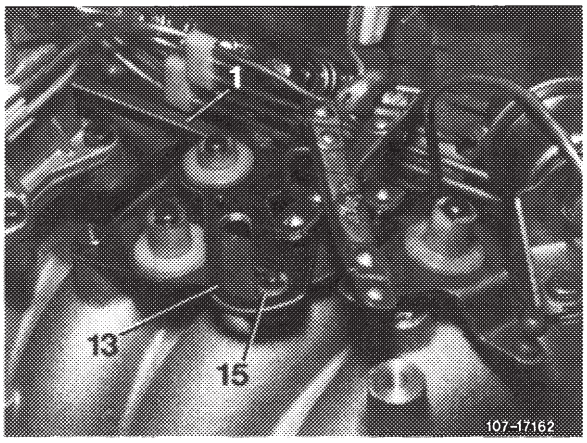
Cruise control/tempomat, electrical

Check whether actuator rests against idle speed stop of cruise control/tempomat. For this purpose, disconnect pull rod (21) and push lever of actuator clockwise to idle speed stop.

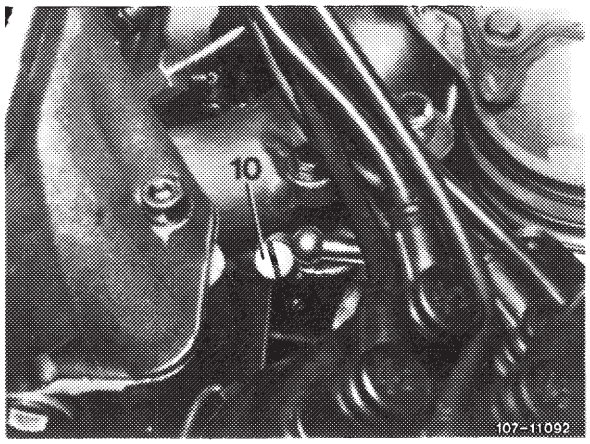
When connecting pull rod (21), make sure that lever of the actuator is raised by approx. 1 mm from idle speed stop. Adjust pull rod, if required.



7 Check whether roller (15) in slotted lever (13) rests free of tension against final stop. Adjust with connecting rod (1), if required.



8 Run engine at idle, switch off all electrical auxiliary consumers. Adjust an idle speed of 750–50/min by means of idle speed air screw (10).



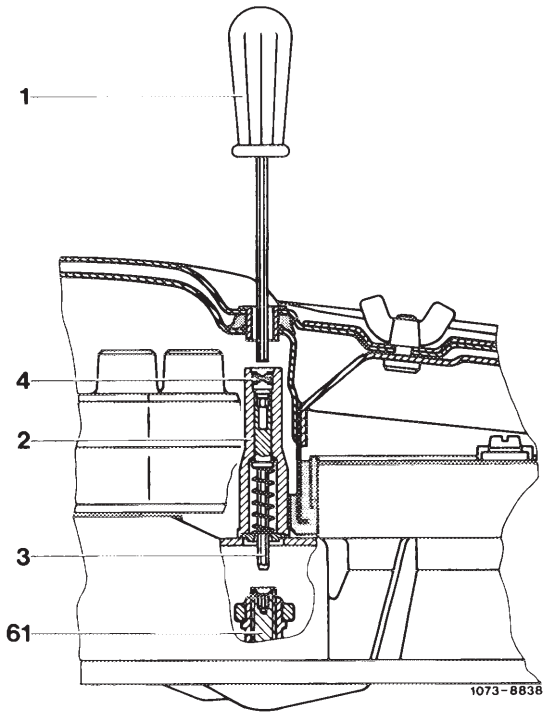
9 Check on-off ratio and adjust, if required.
(J) starting 1981, (USA) 1980.

Note: Air cleaner need not be removed for adjusting on-off ratio at idle.

Read on-off ratio on tester, if value is between 40–60 %, on-off ratio is in order. If not, pull out safety plug (4) by means of puller.

Insert screw driver (1) through cutout in air cleaner top and push against adjusting device (2). Push adjusting device down by means of screw driver against force of spring, turn slightly until hexagon (3) enters mixture control screw (61).

Turning counterclockwise = 60 % (leaner)
Turning clockwise = 40 % (richer)



Release screw driver, compression spring will push adjusting device out of mixture control screw.

Accelerate for a short moment, check on-off ratio and readjust, if required.

Following adjustment, install a blue safety plug (4), part no. 000 997 56 86 by means of installer.

(USA) 1981

Note

The adjusting device (2) is provided with a protective steel cap (4). Remove this cap only in the event of repairs, e.g. when renewing fuel distributor.

Read on-off ratio on tester, if value is between 40–60 %, on-off ratio is in order. If not, remove air cleaner.

Punch mark protective cap (4) and drill through sleeve with a 2 mm twist drill.

Screw 2.5 mm sheet metal screw (cut off tip) into hole and pull out protective cap (4) by means of pliers.

Push with screw driver (1) against adjusting device (2). Push adjusting device down with screw driver against force of spring, turn slightly until hexagon (3) enters mixture control screw (61).

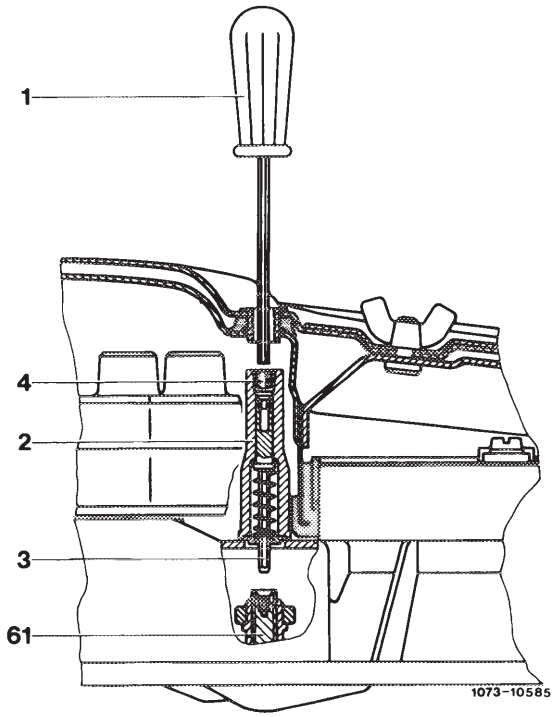
Turning counterclockwise = 60 % (leaner)
Turning clockwise = 40 % (richer)

Release screw driver, compression spring will then push adjusting device out of mixture control screw.

Mount air cleaner, accelerate for a short moment, check on-off ratio and readjust, if required.

Following adjustment, install new protective cap (4), part no. 116 070 00 54.

10 Move selector lever into driving position, switch on air conditioning, turn power steering to full lock, engine should now run smoothly. Readjust speed, if required.



A. Standard version

Testing and adjusting values

Engine	Idle speed 1/min	Idle speed emission value % CO
110.984/985/986/987	750–850	0.5–1.5
110.988/989/990	700–800	

Battery voltages

Rest potential	12.2 V
Starting voltage, min.	10 V

Voltages at ignition coil (with engine stopped and ignition switched on)

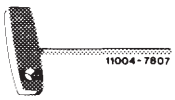
Transistorized ignition system TSZ 4

Voltage at terminal 15	approx. 4.5 V
Voltage at terminal 1	0.5–2.0 V
Pre-resistance bridge (when starting)	10 V

Transistorized ignition system TSZ 8 u

Terminal 15 (bushing 5 on diagnosis socket) against mass	Battery voltage
Terminal 1 and 15 (bushing 5 and 4 at diagnosis socket)	0 V

Special tools

Screw driver 3 mm with tommy handle for readjusting idle speed emission value		000 589 14 11 00
Puller		123 589 05 33 00
Installer		123 589 00 15 00

Oil telethermometer		116 589 27 21 00

Conventional testing instruments and accessories

CO-measuring instrument, revolution counter, stroboscope, voltmeter, oscilloscope
Digital tester — e.g. made by Bosch, MOT 001.03

Note

Do not regulate engine of it is too hot, e.g. immediately following a fast drive or after measuring output on chassis dynamometer.

Regulation

1 Switch-off 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. Lubricate all bearing points and ball sockets.

4 Perform full throttle checkup from inside vehicle (30–300).

5 Connect test instruments: 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 (15–501).

8 Test battery voltages.

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

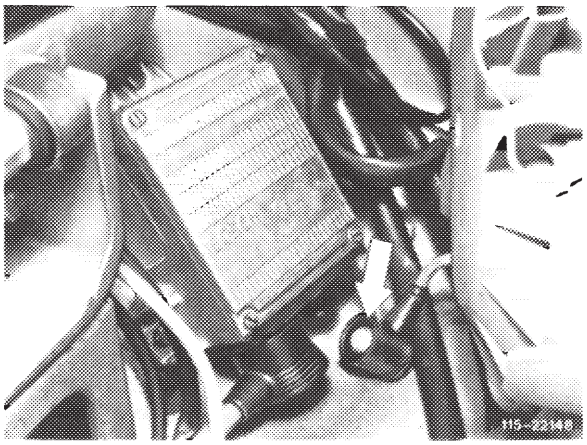
a) Rest potential

Connect voltmeter to battery while paying attention to polarity and read voltages. Nominal value 12.2 Volts.

b) Starting voltage

Pull plug from transmitter of ignition distributor on switching unit (green cable) or protective plug, part no. 102 589 02 21 00, plug on diagnosis socket.

Operate starter for a short moment while reading voltage. Nominal value min. 10 Volts; if nominal value is not attained, test battery, charge or replace, if required.



9 Voltages on ignition coil:

Transistorized ignition system TSZ 4

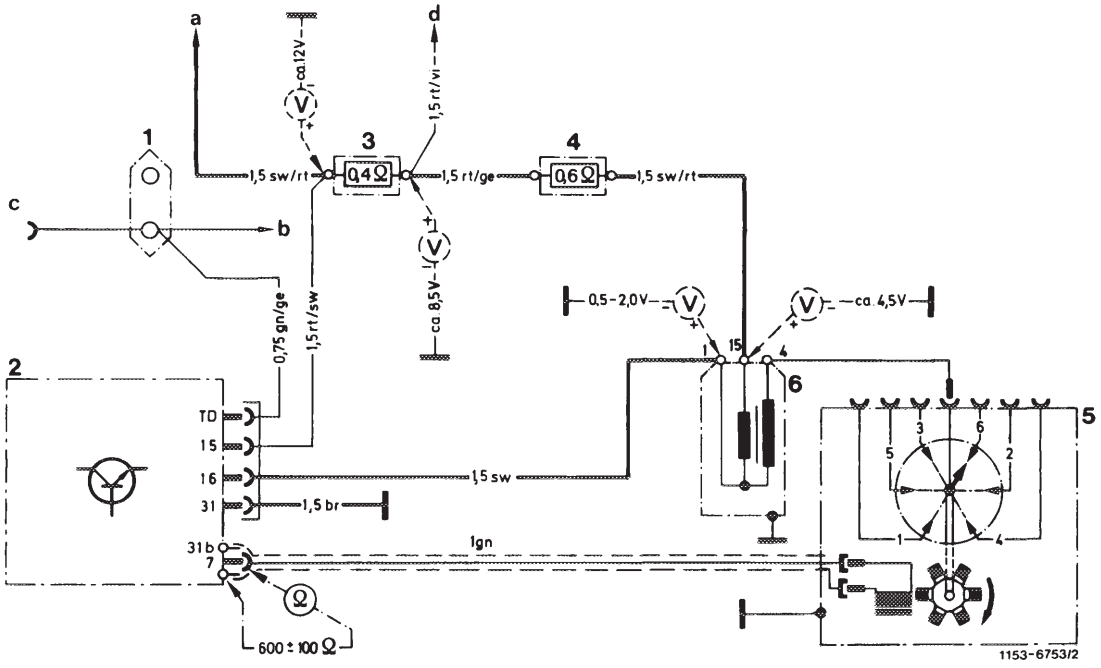
Test voltage on terminal 15 of ignition coil. For this purpose, disconnect positive cable of voltmeter from battery and connect to terminal 15 of ignition coil.

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

Voltage test on terminal 1 of ignition coil. For this purpose, 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.

Test pre-resistance bridge by starting engine and reading voltage during starting procedure. Nominal value 10 Volts.



Wiring diagram breakerless transistorized ignition TSZ 4

1 2-point cable connector
2 Switching unit
3 Pre-resistor 0.4 Ω
4 Pre-resistor 0.6 Ω
5 Ignition distributor with transmitter section
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

Transistorized ignition system TSZ 8 u

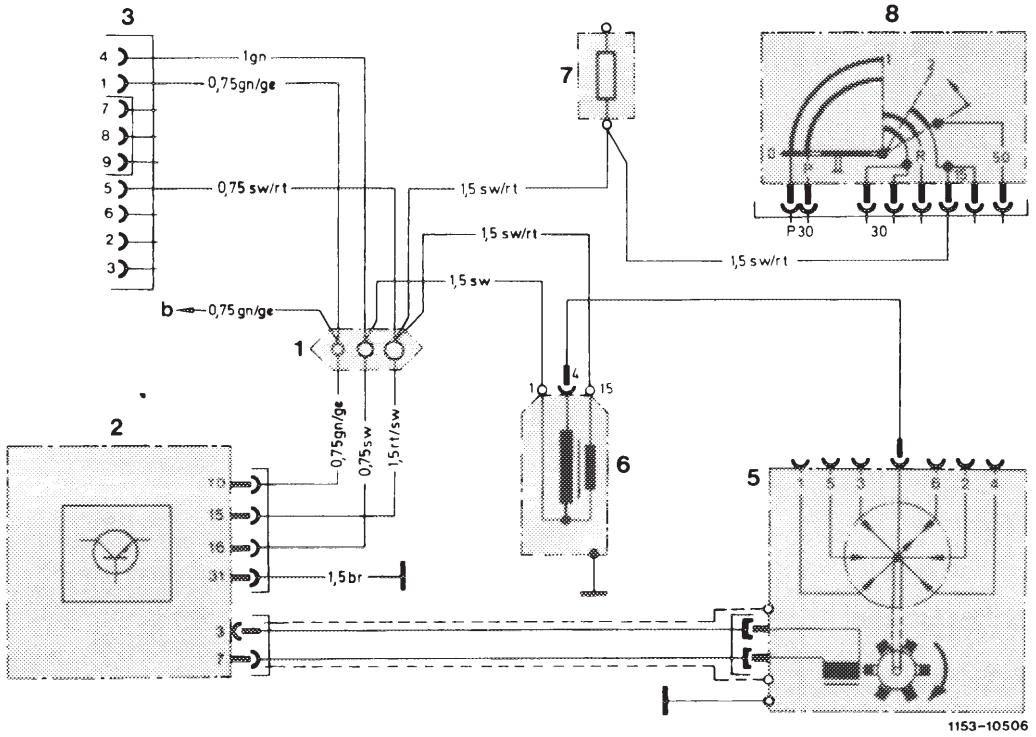
Switch-on ignition with engine stopped. Check voltage on jack 5 of diagnosis socket (3). Test terminal 15 against ground.

Nominal value: Battery voltage.

Test voltage difference between terminal 15 and terminal 1 on jack 5 and 4 of diagnosis socket (3).

Nominal value: 0 Volt.

If nominal values are not attained, test ignition system (15–562).

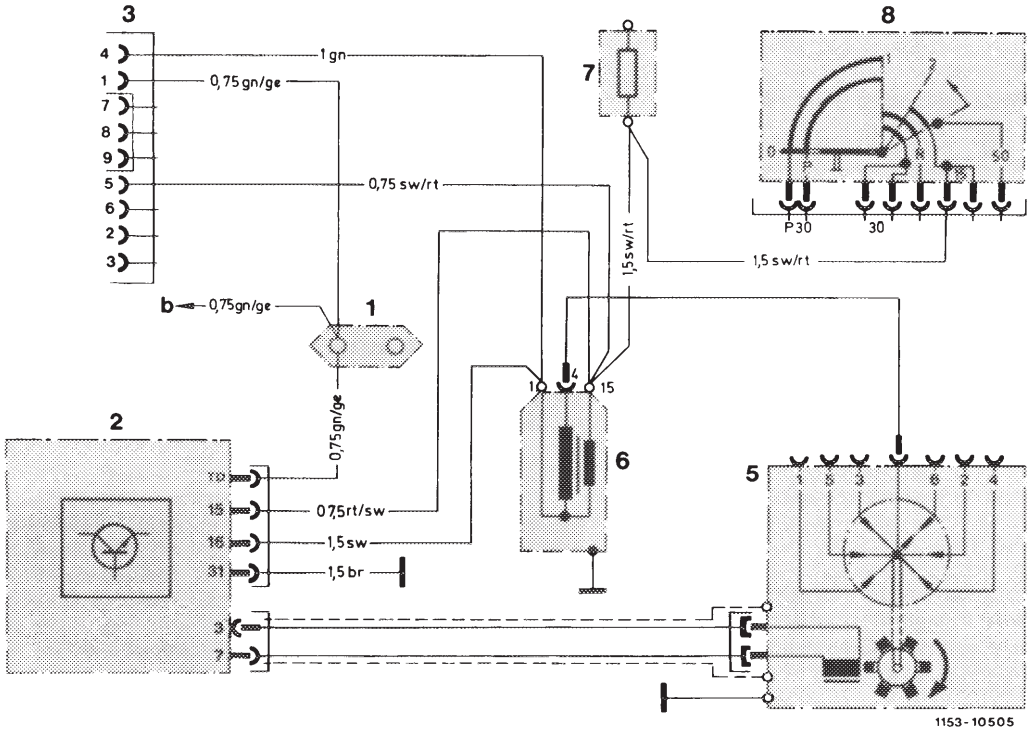


Wiring diagram breakerless transistorized ignition without pre-resistors TSZ 8 u in model 123

1 Line connector
2 Switching unit
3 Diagnosis socket
5 Ignition distributor
6 Ignition coil
7 Fuse box terminal 15
8 Ignition starting switch

a To fuse box, input terminal 15
b To fuel pump relay with rpm limitation

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



Wiring diagram breakerless transistorized ignition without pre-resistors TSZ 8 u in model 107, 126

1 Line connector
2 Switching unit
3 Diagnosis socket
5 Ignition distributor
6 Ignition coil
7 Fuse box terminal 15
8 Ignition starting switch

a To fuse box, input terminal 15
b To fuel pump relay with rpm limitation

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

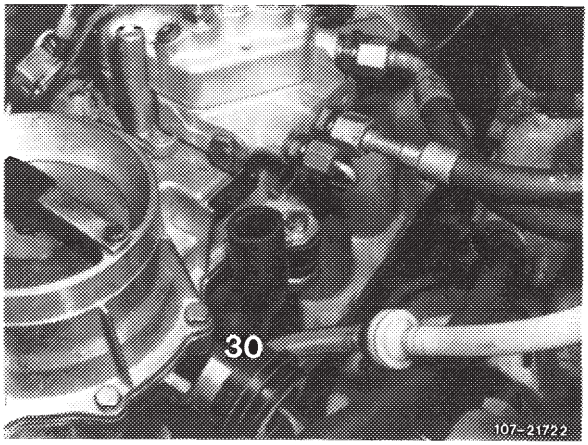
10 Check intake system for leaks. For this purpose, spray all sealing points with Iso-Oktan DIN 51756 or benzine.

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

Checking decel shutoff:

Checking on chassis dynamometer

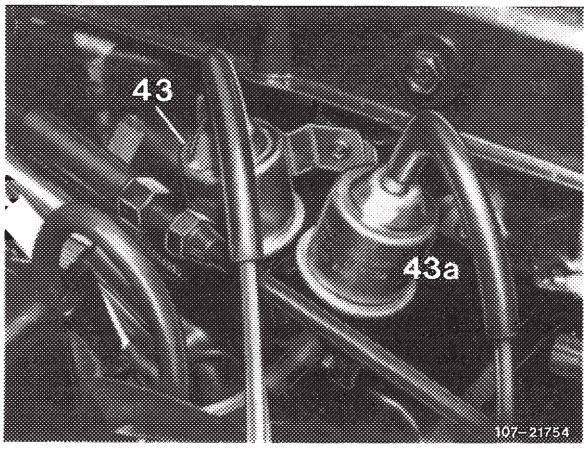
Run on chassis dynamometer at approx. 70 km/h in 4th speed or driving position "D". Release accelerator pedal, air flow sensor plate will then move into zero position. When combustion starts again at approx. 1100 /min or approx. 1300/min with refrigerant compressor, the air flow sensor plate will move into idle speed position. Check decel shutoff valve and its activation, if required (07.3–140).



Checking without chassis dynamometer (07.3–140).

Run engine at idle.

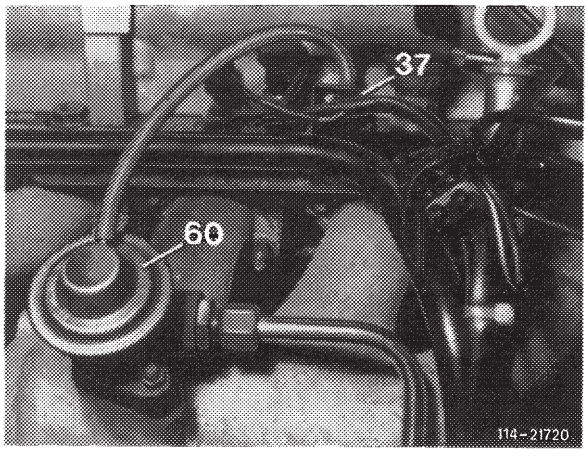
Pull vacuum lines from switchover valve (43a) and connect with each other. Decel shutoff valve (30) opens, engine should now stop. Check activation, if required.



43 Switchover valve air conditioning (identification: green cap)
43a Switchover valve decel shutoff (identification: gray cap)

12 Check EGR.

Pull vacuum line from EGR valve (60), plug-on test hose and activate with a vacuum. If engine is not clearly running worse, replace EGR valve. Check activation, if required (14–475).

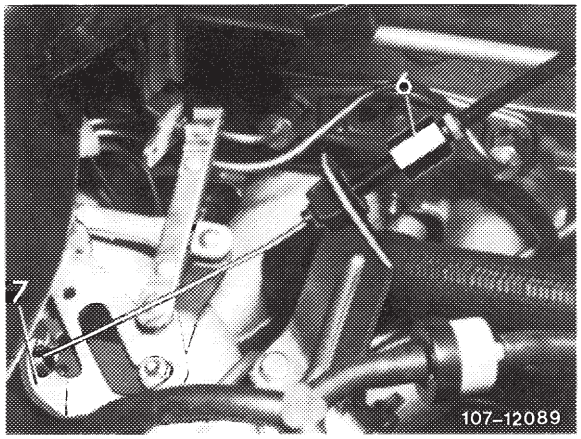


13 Run engine to 75–85 °C oil temperature.

14 Vehicles with cruise control/tempomat:

Cruise control/tempomat, pneumatic

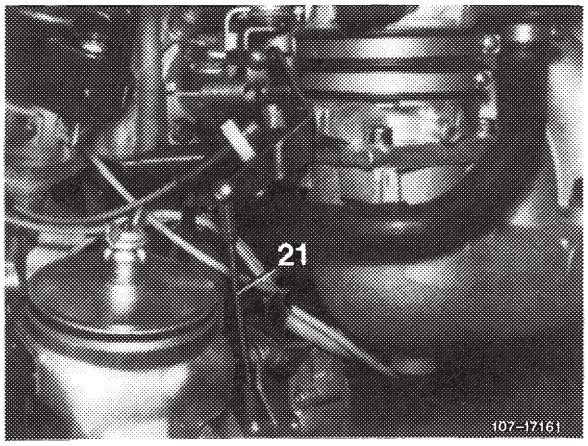
Check whether bowden wire for cruise control/tempomat rests free of tension against regulating lever (7). Adjust with adjusting nut (6), if required.



Cruise control/tempomat, electrical

Check whether actuator rests against idle stop of cruise control/tempomat. For this purpose, disconnect pull rod (21) and push lever of actuator clockwise against idle speed stop.

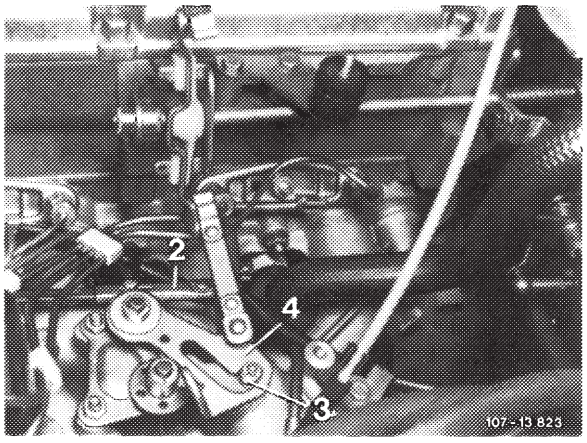
When connecting pull rod (21), make sure that the lever of the actuator is raised by approx. 1 mm from idle speed stop. Adjust pull rod, if required.

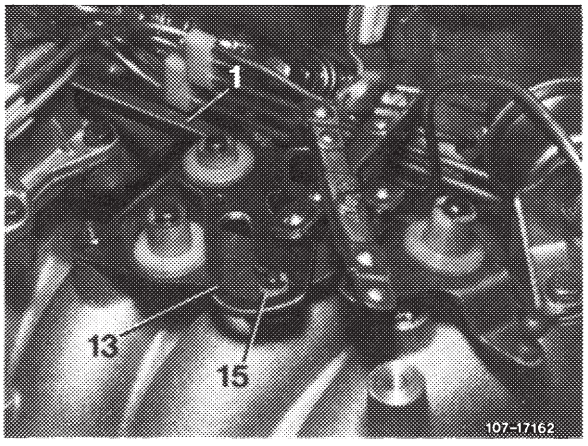


15 Check whether throttle valve rests against idle speed stop. Disconnect connecting rod for this purpose.

16 Check whether roller (3 and 15) on slotted lever (4 and 13) rests free of tension against final stop. Adjust with connecting rod (1 and 2), if required.

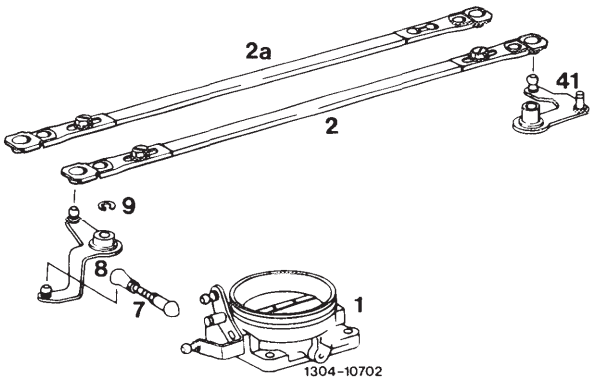
Model 123





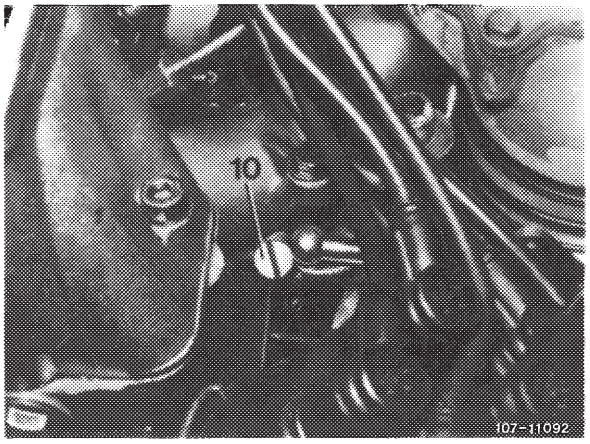
Model 126

The connecting rod can now be adjusted on one side only. Pay attention to installation position (refer to Fig.).



2 Former version
2a Present version

17 Set to specified engine speed by means of idle speed air screw (10).

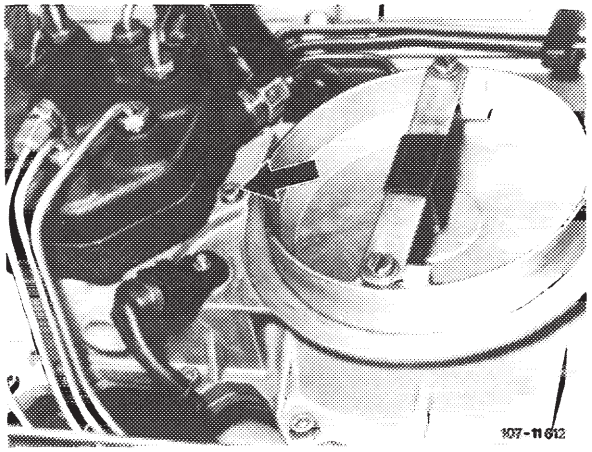


18 Adjust idle speed emission value:

With gray iron fuel distributor

For this purpose, unscrew closing plug (arrow).

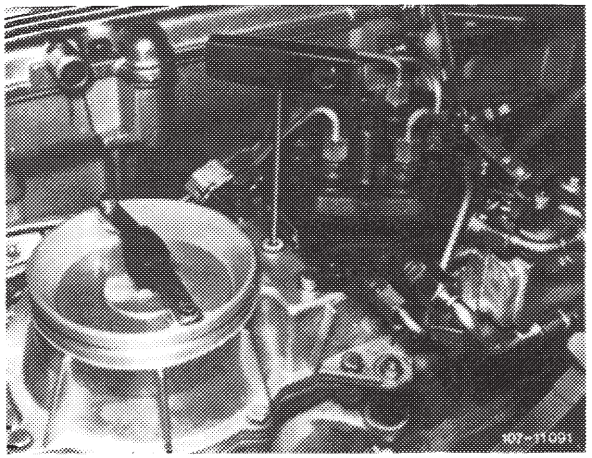
Attention!
On vehicles manufactured after 1.10.1976, remove safety plug first.



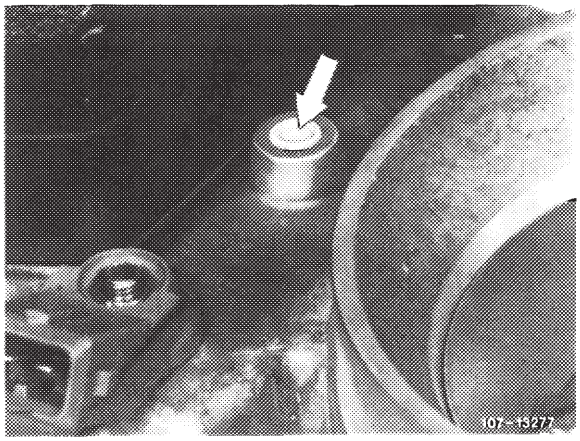
Insert screw driver through bore against idle speed mixture control screw and adjust emission value by turning screw.

Turning counterclockwise = leaner
Turning clockwise = richer

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



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



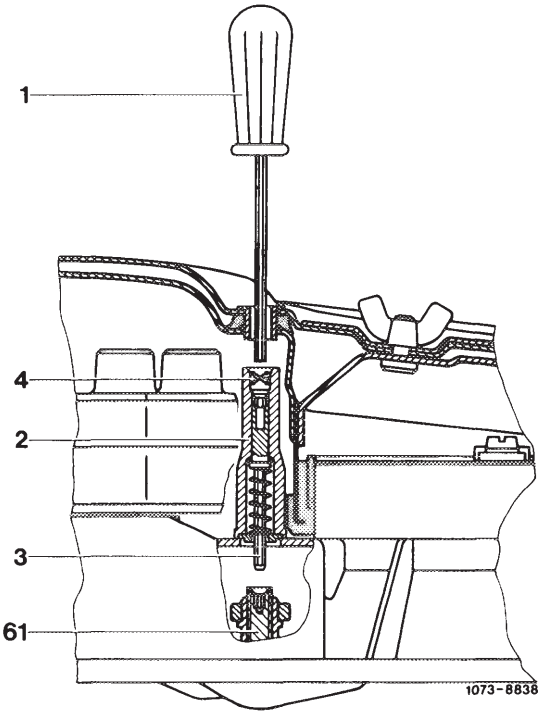
With light alloy fuel distributor

Pull out safety plug (4) by means of puller.

Push with screw driver (1) against adjusting device (2). Push adjusting device down with screw driver against force of spring, turn slightly until hexagon (3) enters mixture control screw (61).

Turning counterclockwise = leaner
Turning clockwise = richer

Release screw driver, the compression spring will disengage adjusting device from mixture control screw.



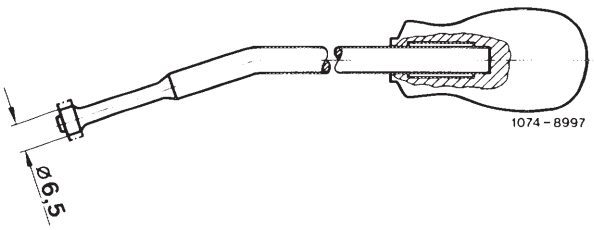
1 Screw driver
2 Adjusting device
3 Hexagon
4 Safety plug
61 Mixture control screw

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

Following adjustment, install a blue safety plug (4), part no. 000 997 56 86 by means of installer.

Note: The diameter of the installer for knocking back safety plug for protective cap of mixture control screw (61) had to be changed from 8 mm to 6.5 mm.

In spare parts sector only installers with changed diameter are now available. On former installers, grind diameter down to 6.5 mm.



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

20 Move selector lever into driving position, engage air conditioning, turn power steering to full lock, engine should run smoothly. Readjust engine speed, if required.

B. National version (AUS) (J) (S) (USA)

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

Testing and adjusting values

National version and model year	Idle speed 1/min	Idle speed emission value % CO **without air injection**
(AUS) Label: Color code silver.		
1977–1980	800	0.5–1.5
1981/82	750–850	0.3–1.3
(J) Label: In Japanese language.		
1977–1980	800	0.4–2.0
(S) Label: Color code blue.		
1977–1980	800	0.5–1.5
1981/82	750–850	0.3–1.3
(USA) Label: Color code Federal black, California yellow.		
1977–1979	800	0.4–2.0

Battery voltages

Rest potential	12.2 V
Starting voltage min.	10 V

Voltages on ignition coil (with engine stopped and ignition switched on)

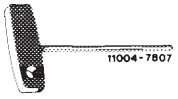
Transistorized ignition system TSZ 4

Voltage at terminal 15	approx. 4.5 V
Voltage at terminal 1	0.5 –2.0 V
Pre-resistance bridge (while starting)	10 V

Transistorized ignition system TSZ 8 u

Terminal 15 (bushing on diagnosis socket) against ground	Battery voltage
Terminal 1 and 15 (bushing 5 and 4 on diagnosis socket)	0 V

Special tools

Screw driver 3 mm with tommy handle for readjusting idle speed emission value		000 589 14 11 00
Puller		123 589 05 33 00
Installer		123 589 00 15 00
Oil telethermometer		116 589 27 21 00

Conventional testing instruments and accessories

CO-measuring instrument, revolution counter, stroboscope, oscilloscope, voltmeter	
Digital tester	e.g. made by Bosch, MOT 001.03

Note

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

Regulation

1 Switch-off 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. Lubricate all bearing points and ball sockets.

4 Perform full throttle checkup from inside vehicle (30–300).

5 Connect test instruments: 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 (15–501).

8 Test battery voltages.

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

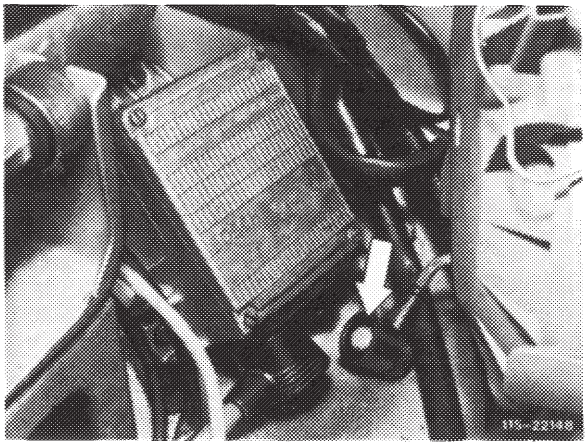
a) Rest potential

Connect voltmeter to battery while paying attention to polarity and read voltages. Nominal value 12.2 Volts.

b) Starting voltage

Pull plug from transmitter of ignition distributor on switching unit (green cable) or plug protective plug, part no. 102 589 02 21 00 on diagnosis socket.

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



9 Voltages on ignition coil:

Transistorized ignition system TSZ 4

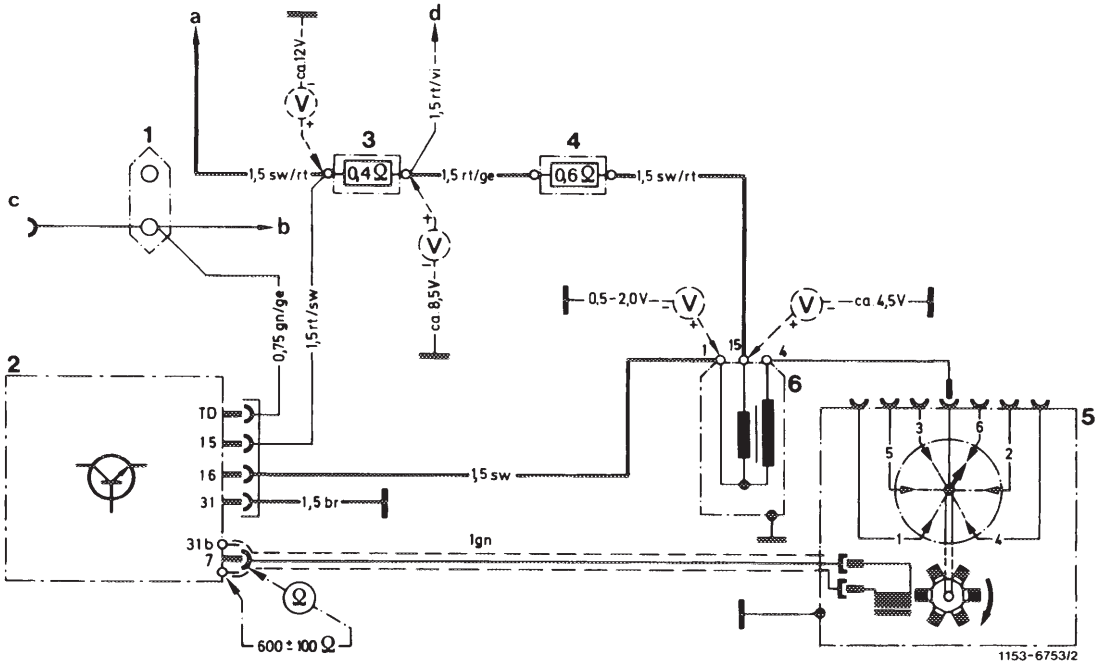
Test voltage on terminal 15 of ignition coil. For this purpose, disconnect voltmeter from battery and connect to terminal 15 of ignition coil.

Switch-on ignition and read voltage. Nominal value approx. 4.5 Volts.

Test voltage on terminal 1 of ignition coil. For this purpose, 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.

Test pre-resistance bridge by starting engine and read voltage during starting procedure. Nominal value 10 Volts.



Wiring diagram breakerless transistorized ignition system TSZ 4

1 2-point cable connector
2 Switching unit
3 Pre-resistor 0.4 Ω
4 Pre-resistor 0.6 Ω
5 Ignition distributor with transmitter section
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

Transistorized ignition system TSZ 8 u

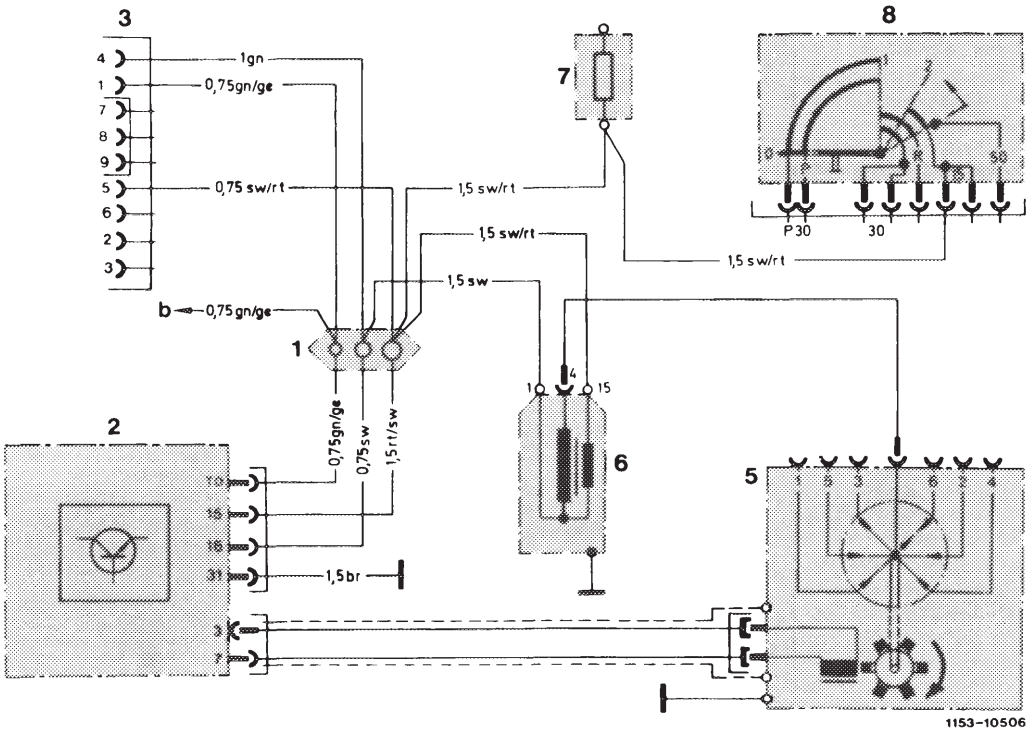
Switch-on ignition with engine stopped. On jack 5 of diagnosis socket (3) test voltage, terminal 15 against ground.

Nominal value: Battery voltage.

On jack 4 and 5 of diagnosis socket (3) test voltage difference between terminal 15 and terminal 1.

Nominal value: 0 Volt.

If nominal voltages are not attained, test ignition system (15–562).

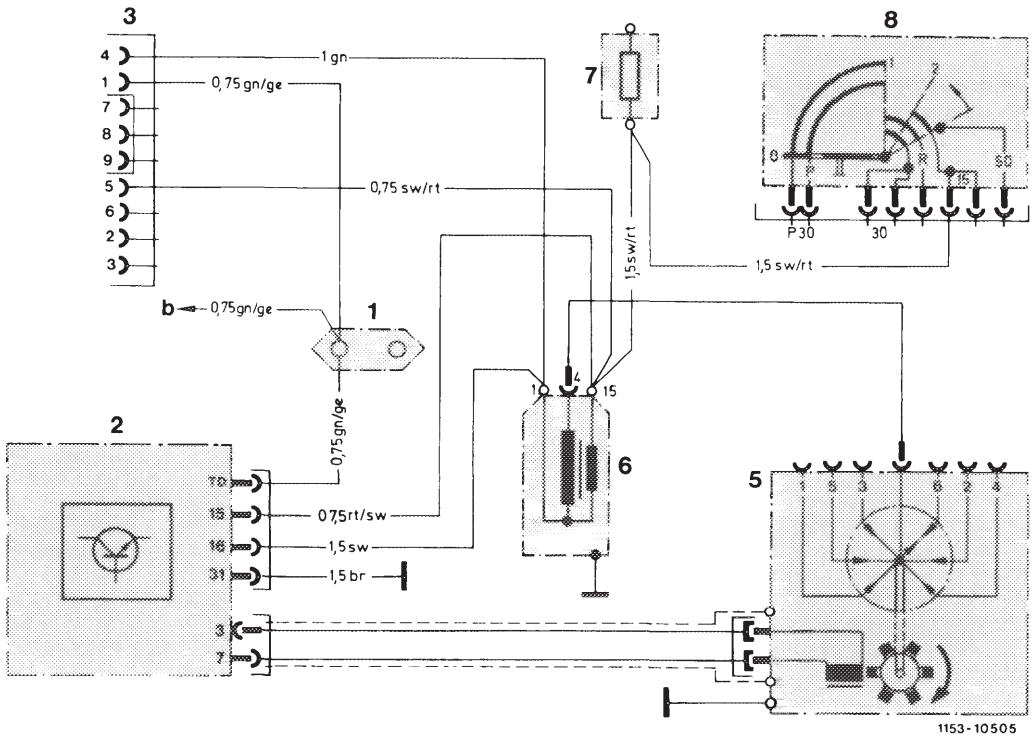


Wiring diagram breakerless transistorized ignition without pre-resistors TSZ 8 u in model 123

1 Line connector
2 Switching unit
3 Diagnosis plug
5 Ignition distributor
6 Ignition coil
7 Fuse box terminal 15
8 Ignition starting switch

a To fuse box, input terminal 15
b To fuel pump relay with rpm limitation

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



Wiring diagram breakerless transistorized ignition without pre-resistors TSZ 8 u in model 107, 126

1 Line connector
2 Switching unit
3 Diagnosis socket
5 Ignition distributor
6 Ignition coil
7 Fuse box terminal 15
8 Ignition starting switch

a To fuse box, input terminal 15
b To fuel pump relay with rpm limitation

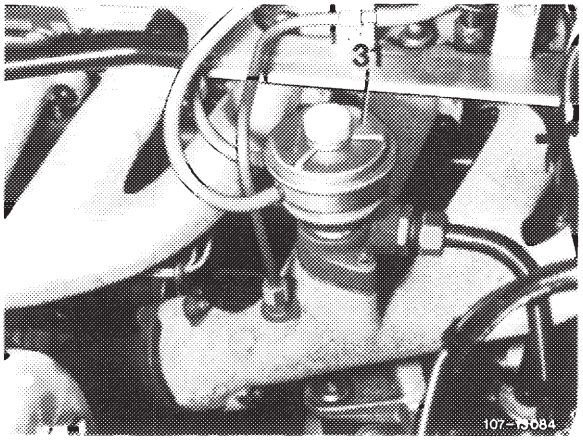
Color code
br = brown
ge = yellow
gn = green
rt = red
sw = black

10 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 inflammability and do not spray on red-hot parts or components of ignition system.

11 Check EGR.

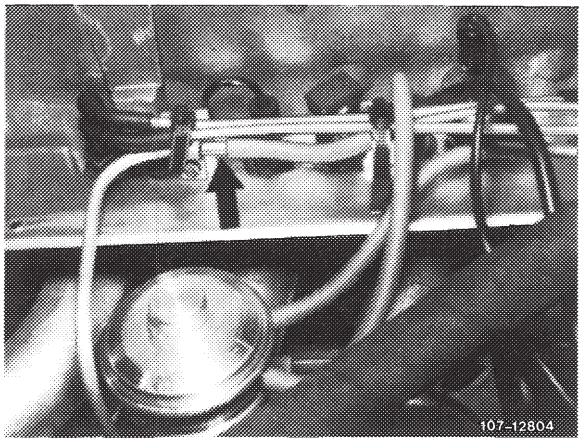
Pull red/purple vacuum line from EGR valve (31). Plug-on test hose and activate with a vacuum. If the engine is not running noticeably worse, replace EGR valve.



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

13 Connect CO-measuring instrument.

For this purpose, pull connecting hose (arrow) of measuring point (exhaust back pressure line) on (J) and (USA) version.



Respective model years:
(J) 1977–1980
(USA) 1977–1979

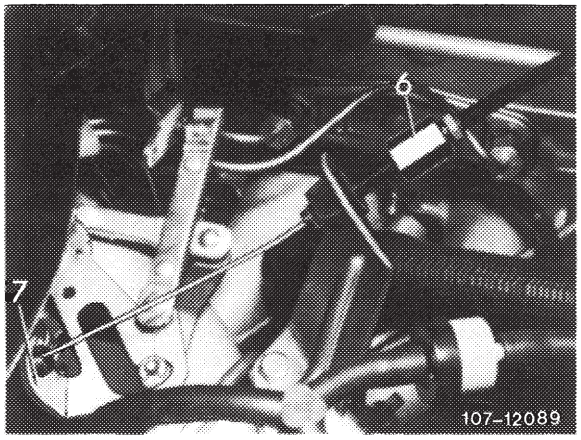
Connect CO-measuring instrument and exhaust back-pressure line by means of a hose.

No catalyst is installed on (USA) tourist vehicles, for this reason, the exhaust gas value can be measured on exhaust tail pipe.

14 Vehicles with cruise control/tempomat:

Cruise control/tempomat, pneumatic

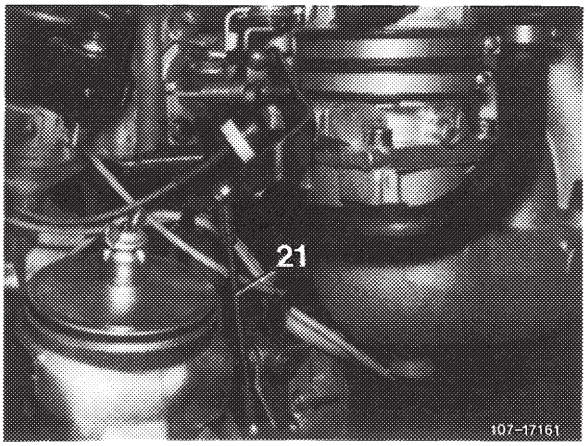
Check whether bowden wire for cruise control/tempomat rests free of tension against regulating lever (7). Adjust with adjusting screw (6), if required.



Cruise control/tempomat, electric

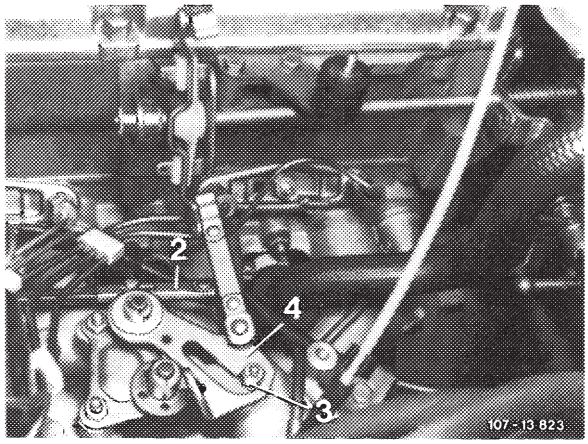
Check whether activator rests against idle speed stop of cruise control/tempomat. For this purpose, disconnect pull rod (21) and push lever of activator clockwise against idle speed stop.

When connecting pull rod (21), make sure that lever of activator is raised by approx. 1 mm from idle speed stop. Adjust pull rod, if required.

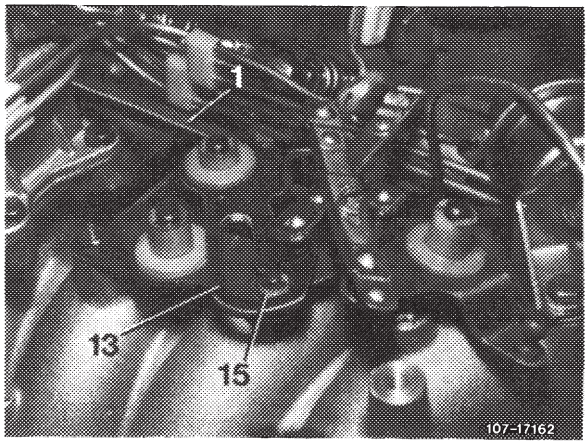


15 Check whether throttle valve rests against idle speed stop. Disconnect connecting rod for this purpose.

16 Check whether roller (3 and 15) in slotted lever (4 and 13) rests free of play against final stop. Adjust by means of connecting rod (1 and 2), if required.

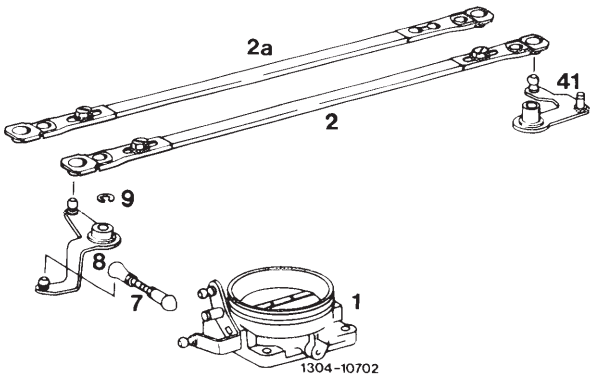


Model 123



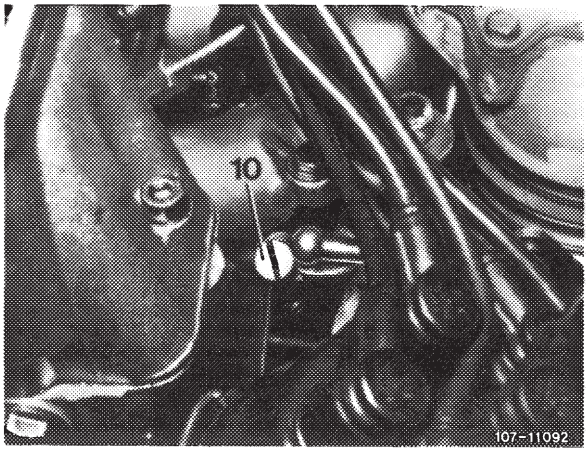
Model 126

Connecting rod can now be adjusted on one side only. Pay attention to installation position (refer to Fig.).



2 Former version
2a Present version

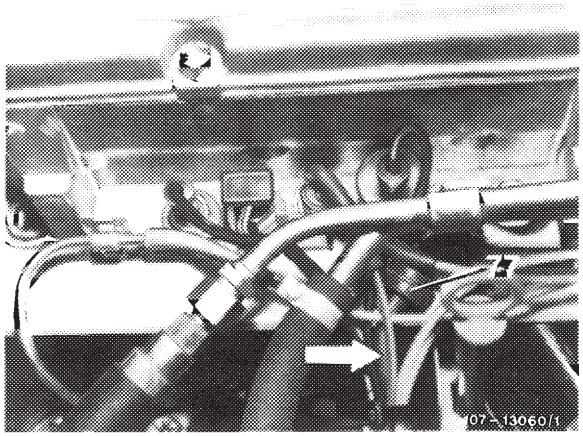
17 Adjust to specified engine speed by means of idle speed air screw (10).



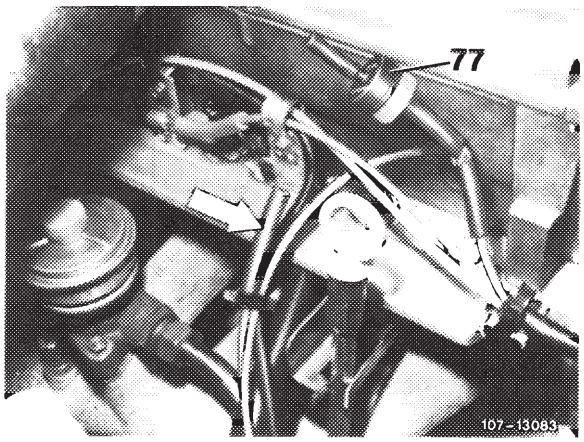
18 Check idle speed emission value:

(AUS) 1977–1982
(S) 1977–1982

Check idle speed emission value **without** injecting air. For this purpose, pull blue/purple vacuum line (arrow) from delay valve (77) and close small tube. The air injection is now disconnected.



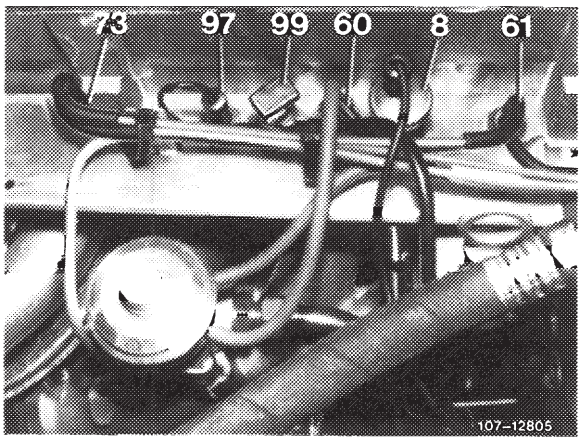
(AUS)



(S)

(J) 1977–1980
(USA) 1977–1979

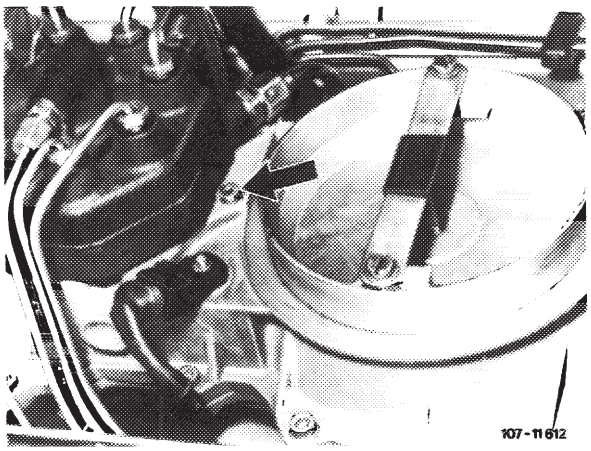
Check idle speed emission value **without** air injection in cylinder head. For this purpose, pull blue vacuum line from blue thermovalve (60) and close line. The air injection is now disconnected.



19 Adjust idle speed emission value:

With gray iron fuel distributor

Unscrew closing plug (arrow) for this purpose.



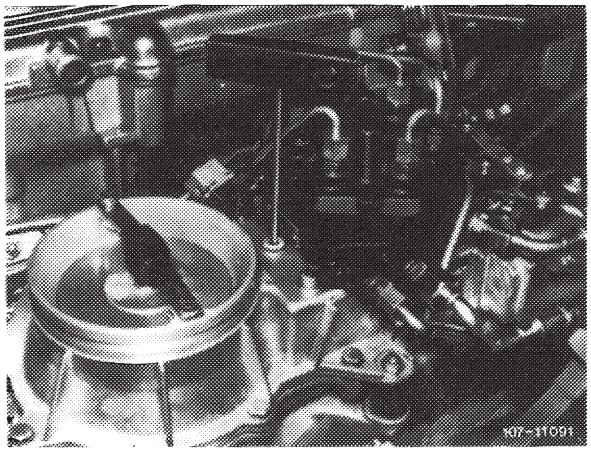
Insert screw driver through bore against idle speed mixture control screw and set emission value by turning screw.

Turning counterclockwise = leaner
Turning clockwise = richer

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

Put back vacuum line on thermovalve.

Check idle speed emission value once again (air injection operational). The idle speed emission value should be **below** previously set value.



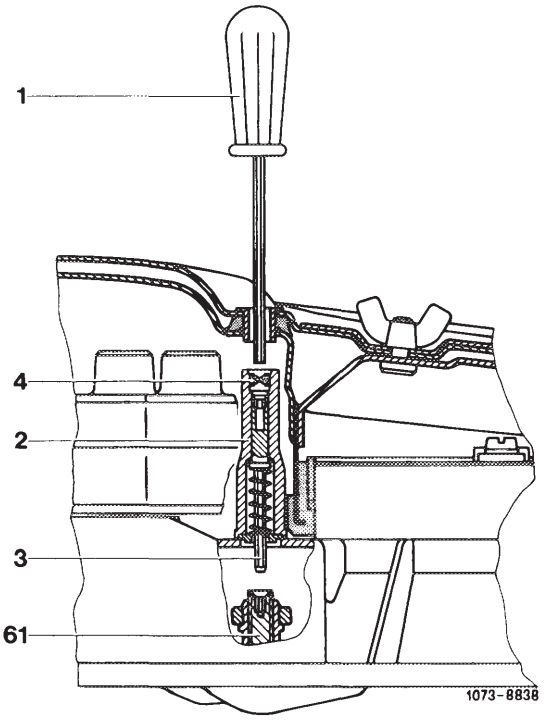
With light alloy fuel distributor

Pull out fuse plug (4) with puller.

Push with screw driver (1) against adjusting device (2). Push adjusting device down with screw driver against force of spring, turn slightly until hexagon (3) enters mixture control screw (61).

Turning counterclockwise = leaner
Turning clockwise = richer

Release screw driver, the coil spring will push adjusting device automatically out of mixture control screw.



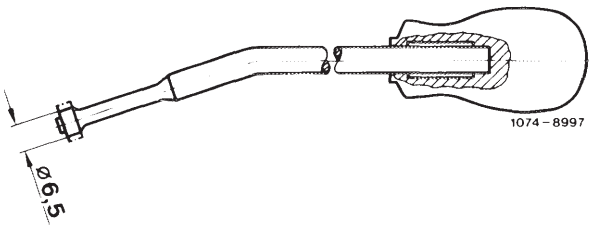
1 Screw driver
2 Adjusting device
3 Hexagon
4 Safety plug
61 Mixture control screw

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

Following adjustment, install a blue safety plug (4), part no. 000 997 56 86 by means of installer.

Note: The diameter of the installer for knocking-in safety plug for protective cap of mixture control screw (61) has been changed from 8 mm to 6.5 mm.

In spare parts sector only installers with reduced diameter are now available. On former installers, grind diameter down to 6.5 mm.



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

21 Place selector lever into driving position, engage air conditioning, turn power steering to full lock, engine should be running smoothly. Readjust engine speed, if required.

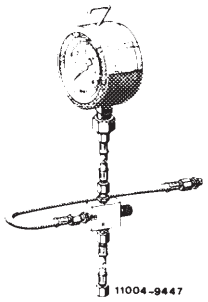
A. Standard version

Test values in bar gauge pressure

Engine		110.984/985 110.986/987	110.988/989 110.990
System pressure at idle with engine cold or at operating temperature		5.0–5.6	
Control pressure at idle with engine at operating temperature	Warm-up compensator stabilized	3.4–3.8 at 530 mbar[1])	3.6–4.0
	Full load enrichment at idle (vacuum hose pulled off)	2.8–3.2	
Control pressure according to ambient temperature at idle with engine cold		min. 0.5 (refer to diagram)	

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

Special tools

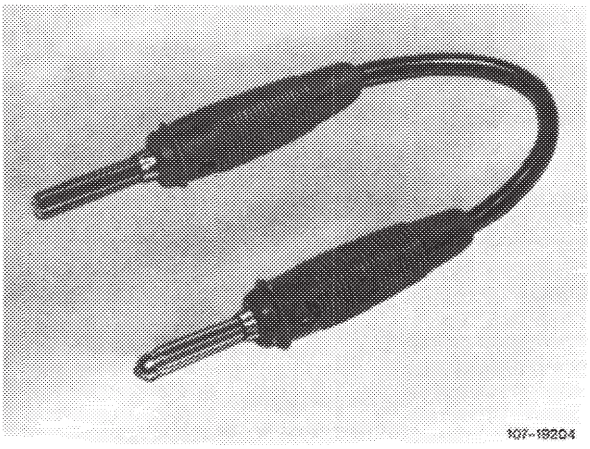
Pressure tester		102 589 00 21 00
Clamp for hose lines		000 589 40 37 00

Conventional tools

Voltmeter, ohmmeter	
Screw driver element 992–T 30	e.g. made by Hazet, D-5630 Remscheid

Self-made tool

Contact bridge



Note:

Prior to working on injection system, check firing point, spark plugs and idle speed adjustment.

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

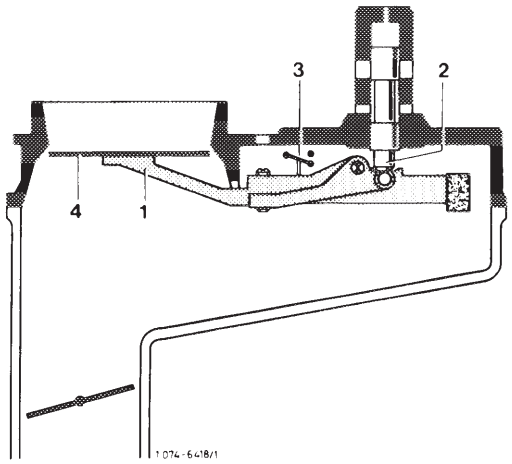
After stopping the engine, the fuel pressure should still amount to 2.5 bar gauge pressure after 30 minutes.

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 control piston (2) in fuel distributor For this purpose, proceed as follows:



Mixture controller **with** safety switch

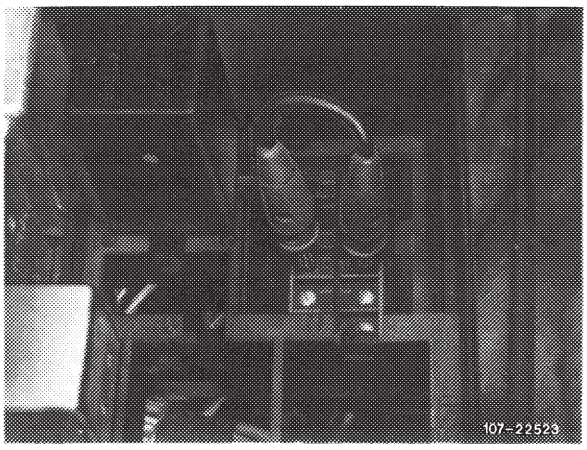
Pull plug from safety switch (3), switch-on ignition for a short moment to build up control pressure.

Mixture controller **without** safety switch

Pull off fuel pump relay and bridge the two jacks for a moment to build up control pressure.

Prior to September 1981: Jacks 1 and 2.
Starting September 1981: Jacks 7 and 8.

Push air flow sensor (4) down manually. A uniform resistance should then be felt along entire path. No resistance should be felt during fast upward moment, since the slowly following control piston lifts off from adjusting lever. If the upward movement is slow, a control piston should closely follow.



4 Check control piston in fuel distributor for leaks. Push air flow sensor for a short moment completely down and hold in this position, no fuel should then show up in air guide housing.

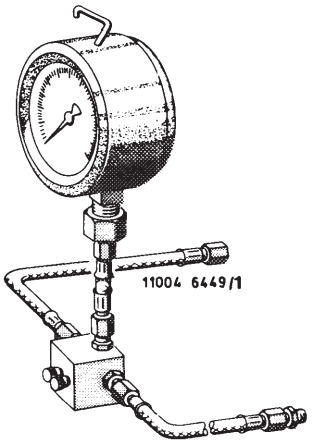
If fuel emerges, replace fuel distributor (07.3–205).

Connecting pressure measuring device

The pressure measuring device remains connected for all pressure measurements.

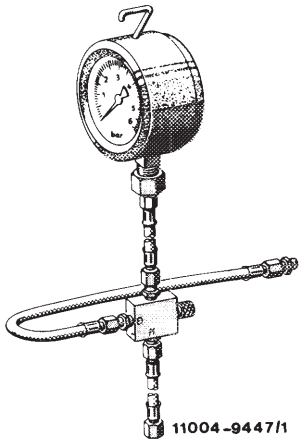
The pressure measuring device 102 589 00 21 00 now remains equipped with a valve screw on three-way valve only.

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

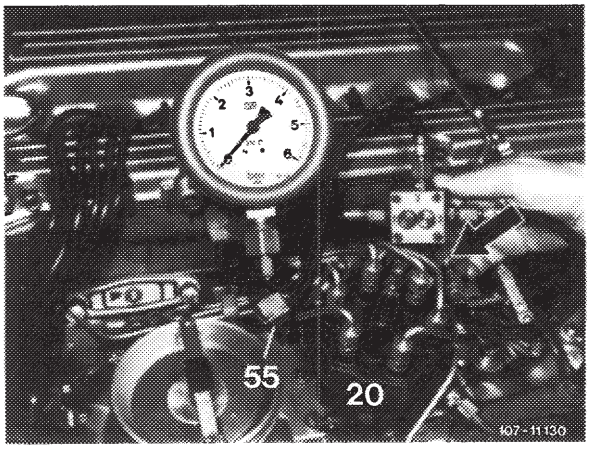


Pressure measuring device 2nd version

Connection A = hose line on fuel distributor
Connection B = hose line on released control pressure line

1 Unscrew control pressure line (arrow) on fuel distributor (20), while catching fuel with a rag.

2 Connect hose line from connection 1 or A to fuel distributor (20) and hose line of 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.

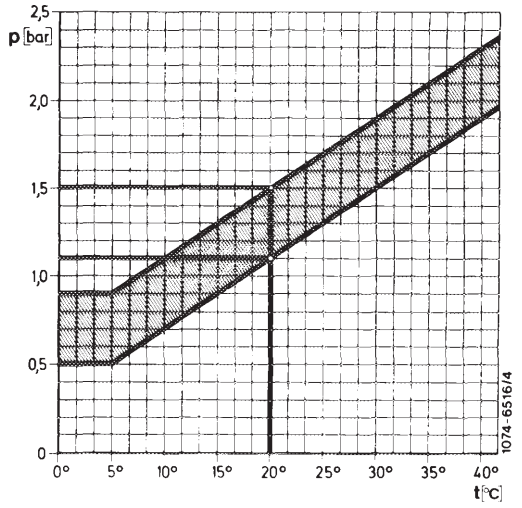
4 Run engine at idle and immediately read control pressure.

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

Example:

Warm-up compensator with Bosch end no. 010 and 057:
Ambient temperature +20 °C = 1.0–1.5 bar gauge pressure.

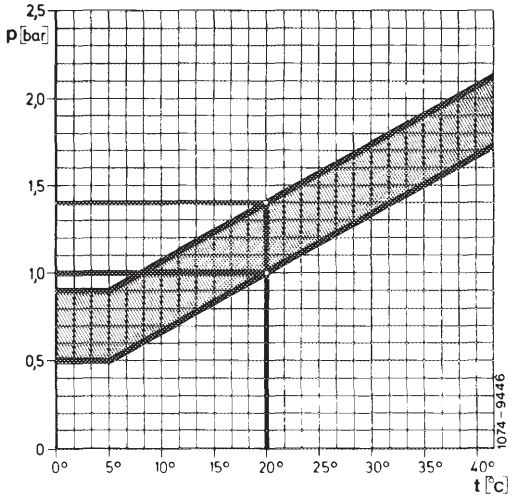
Warm-up compensator with Bosch end no. 103:
Ambient temperature +20 °C = 1.0–1.4 bar gauge pressure.



5 Check stabilizing time of warm-up compensator. Read initial control pressure at +20 °C. The stabilizing time at 3.4 bar gauge pressure should be within tolerance. Additional electric consumers switched off, minimum voltage 12 Volts.

Example:

Stabilizing time at +20 °C
Warm-up compensator with Bosch end no. 010 = 3–6 minutes
Warm-up compensator with Bosch end no. 057 and 103 = 2–4 minutes.



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

6 Close valve screw on pressure measuring device. When measuring pressure, with 2 valve screws, close valve screw at connection 3.

7 The system pressure should amount to 5.0–5.6 bar gauge pressure.

8 If the system pressure of 5.0–5.6 bar gauge pressure is not attained or exceeded, perform the following checkups:

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.

9 Re-open valve screw.

Checking control pressure at idle with engine at operating temperature

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

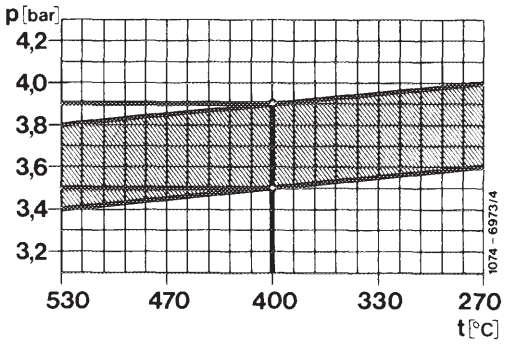
11 Control pressure should increase to 3.4—3.8 or 3.6—4.0 bar gauge pressure (warm-up compensator stabilized).

If the control pressure of 3.4—3.8 or 3.6—4.0 bar gauge pressure is not attained, perform the following checkups.

Engine 110.984/985/986/987

a) Check intake manifold vacuum. For this purpose, pull off vacuum hose (arrow in fig. item 12) on warm-up compensator and attach a 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.

Engine 110.988/989/990

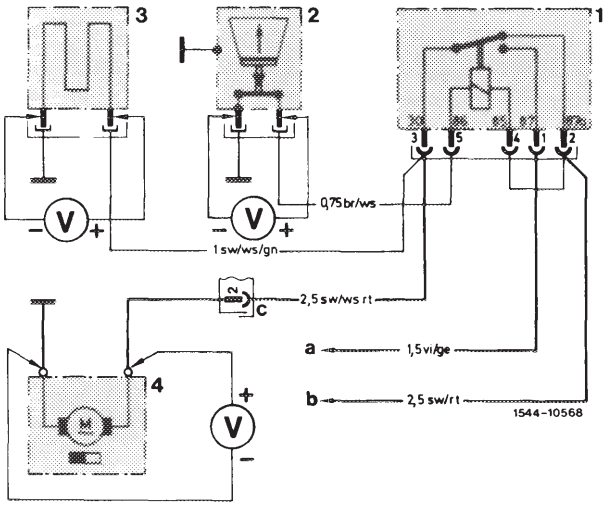
The control pressure is not influenced by vacuum from change on warm-up compensator.

b) Test voltage on warm-up compensator with engine running. Pull electrical connection from warm-up compensator and test voltage. Minimum voltage 12 Volts (without electrical consumers).

c) Test heater coil with an ohmmeter for passage. Resistance: 20—40 Ω.

Replace warm-up compensator in the event of an interruption.

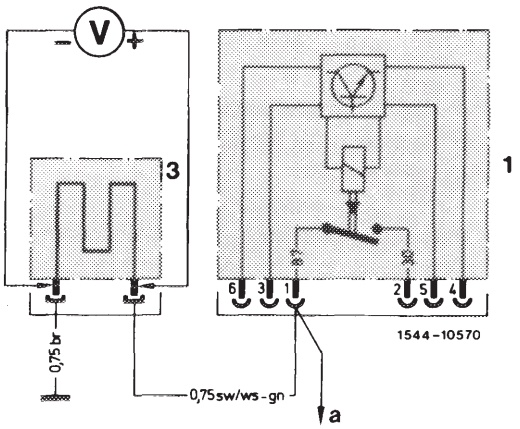
d) If the control pressure is above 3.6 or 3.8 bar gauge pressure, recondition system pressure regulator (07.3—210).



Mixture controller **with** safety switch

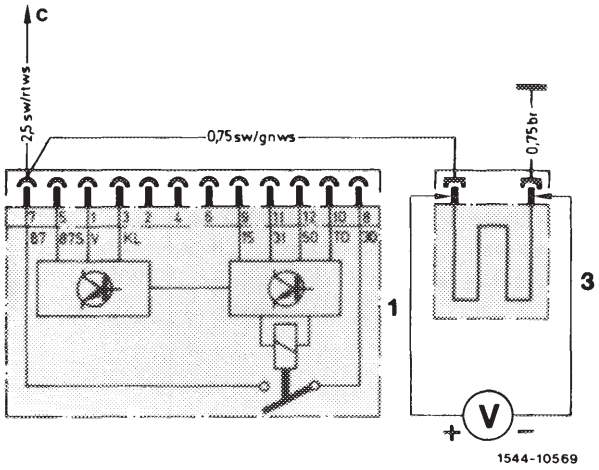
1 Fuel pump relay
2 Safety switch — air flow sensor plate
3 Warm-up compensator
4 Fuel pump
a Terminal 50 (starting)
b Terminal 15/54 (ignition)
c Plug connection 14-point tail lamp unit harness

Mixture controller **without** safety switch



Prior to September 1981

1 Fuel pump relay
3 Warm-up compensator
a To fuel pump

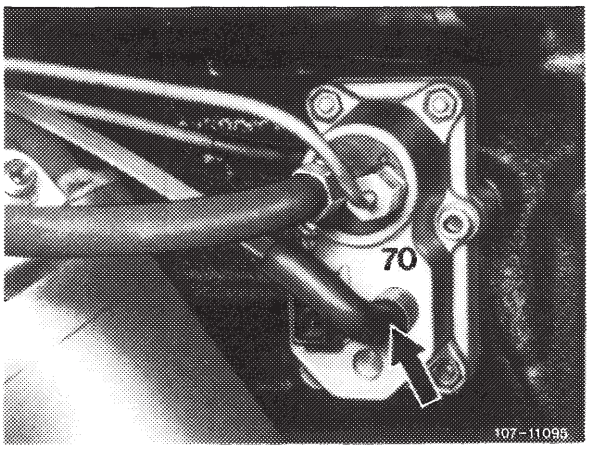


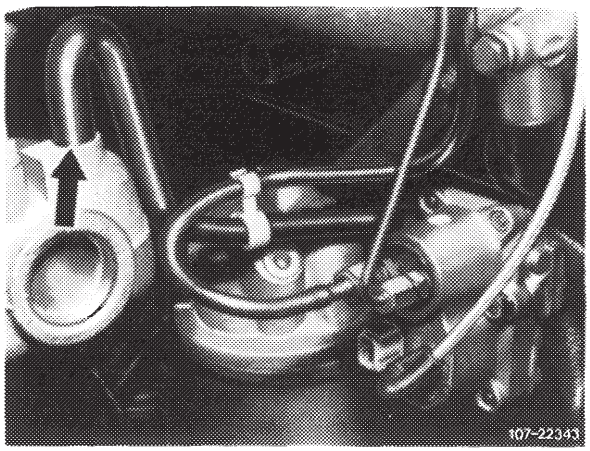
Starting September 1981

1 Fuel pump relay
3 Warm-up compensator
c To fuel pump

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

If a control pressure of 2.8–3.2 bar gauge pressure is not attained, replace warm-up compensator.





Checking fuel distributor and fuel pump for leaks

13 Stop engine. Control pressure will then drop below opening pressure of injection valves (approx. 2.8 bar gauge pressure).

14 If the control pressure drops immediately to 0 bar gauge pressure, replace check valve on fuel pump or subsequently install.

15 If the 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 1 drop in 4 seconds, recondition system pressure regulator or pressure compensating valve (07.3–210).

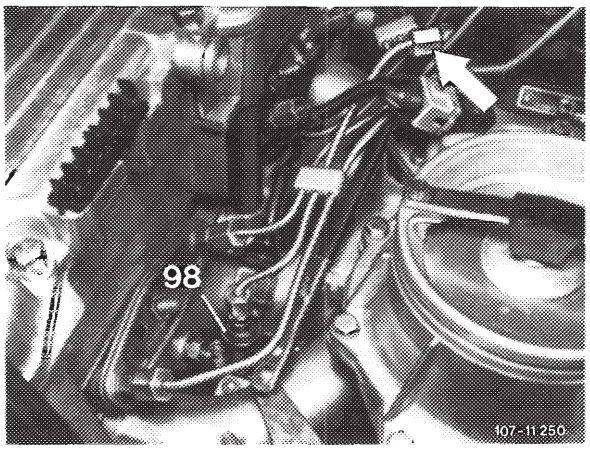
16 Check fuel reservoir for leaks (not included in time rate). For this purpose, disconnect leak line between fuel reservoir and intake damper.

17 Loosen leak line on intake damper and pull off. Loosen clamp, pressureless leaking is permissible. Replace fuel reservoir, if required (07.3–270).

18 Check cold-starting valve (98) for leaks. For this purpose, remove cold-starting valve (07.3–125, section Checking for leaks).

19 Close pressure measuring device, while catching fuel with a rag.

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



B. National version (AUS) (J) (S) (USA)

Test values in bar gauge pressure

Warm-up compensator Bosch end no.	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 idle (vacuum hose pulled off)

(AUS) starting 1977
Identification: Label silver.

(S) starting 1977
Identification: Label blue.

030 056 057	5.0–5.6	3.4–3.8	2.8–3.2

(J) 1977–1980
Identification: Label in Japanese language.

031	5.0–5.6	3.0–3.4	2.8–3.2

(USA) 1977–1979
Identification: Label black.
Identification: **1979** label Federal black, California yellow.

030 Federal	5.0–5.6	3.4–3.8	2.8–3.2
041 Federal high altitudes 1977		3.6–4.0	3.0–3.4
031 California		3.0–3.4	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").

Warm-up compensator Bosch end no.	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])	Acceleration enrichment with engine stopped and 0.5 bar vacuum at warm-up compensator

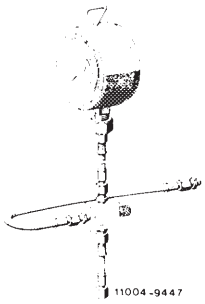
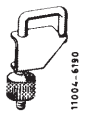
(J) starting 1981
Identification: Label in Japanese language.

(USA) 1980/81
Identification: Label Federal black.

067	5.0–5.8	3.4–3.8	1.4–1.8

[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

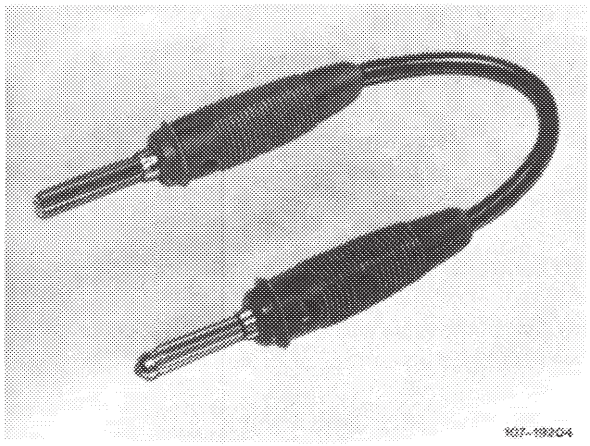
Pressure measuring device	 11004-9447	102 589 00 21 00
Clamp for hose lines	 11004-6190	000 589 40 37 00

Conventional tools

Voltmeter/ohmmeter	
Screw driver element 992–T 30	e.g. made by Hazet, D-5630 Remscheid

Self made tool

Contact bridge



Note

Prior to working on injection system, check firing point, spark plugs and idle speed adjustment.

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

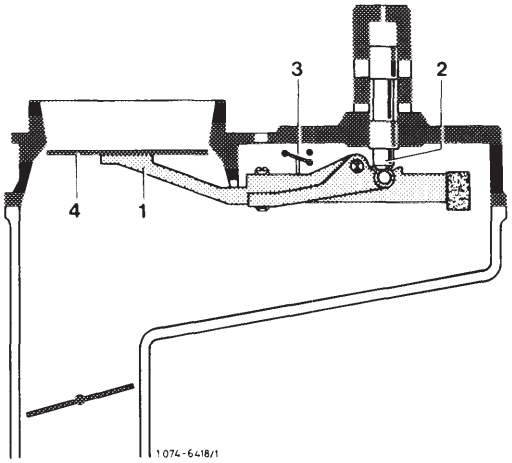
After stopping engine, the fuel pressure should still amount to 2.5 bar gauge pressure after 30 minutes.

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 control piston (2) in fuel distributor. For this purpose, proceed as follows:



Mixture controller **with** safety switch

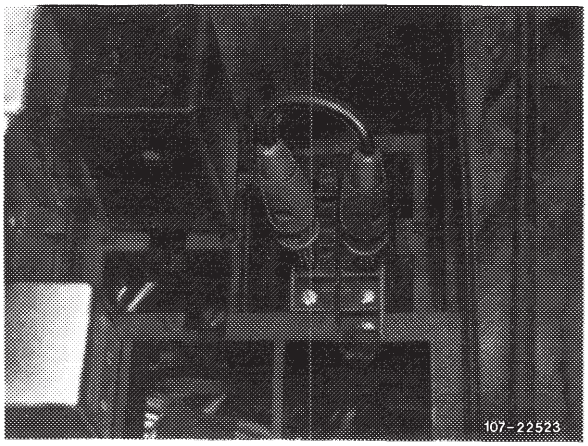
Pull plug from safety switch (3), switch-on ignition for a short moment to build up control pressure.

Mixture controller **without** safety switch

Pull off fuel pump relay and bridge the two jacks for a moment to build up control pressure.

Up to model year 1981: Jacks 1 and 2
Starting model year 1982: Jacks 7 and 8.

Push air flow sensor (4) down manually. A uniform resistance should then be felt along entire path. No resistance should be felt during fast upward movements, since the slowly following control piston lifts off from adjusting lever. If the upward movement is slow, a control piston should closely follow.



4 Check control piston in fuel distributor for leaks. Push air flow sensor for a short moment completely down and hold in this position, no fuel should then show up in air guide housing.

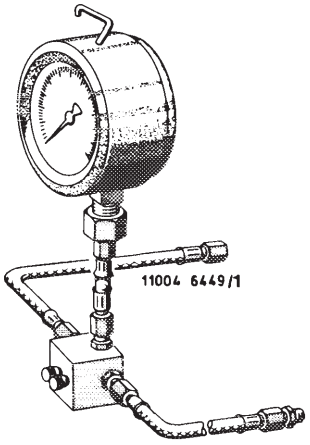
If fuel emerges, replace fuel distributor (07.3–205).

Connecting pressure measuring device

The pressure measuring device remains connected for all pressure measurements.

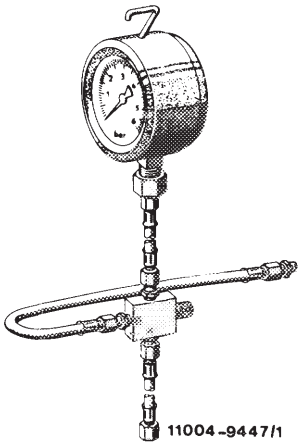
The pressure measuring device 102 589 00 21 00 now remains equipped with a valve screw on three-way valve only.

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

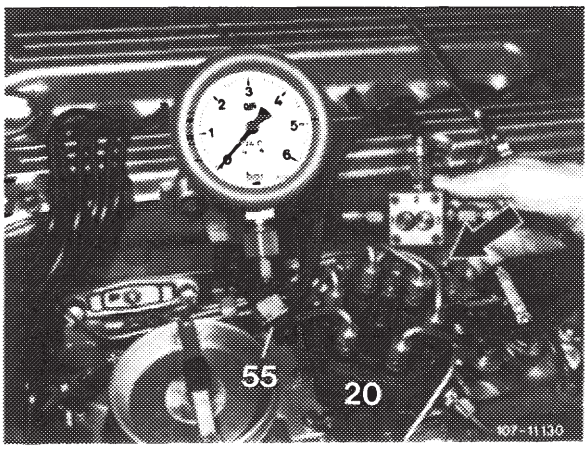


Pressure measuring device 2nd version

Connection A = hose line on fuel distributor
Connection B = hose line on released control pressure line

1 Unscrew control pressure line (arrow) on fuel distributor (20), while catching fuel with a rag.

2 Connect hose line from connection 1 or A to fuel distributor (20) and hose line of 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, recondition system pressure regulator (07.3–210), or check input strainer in warm-up compensator. Replace warm-up compensator, if required.

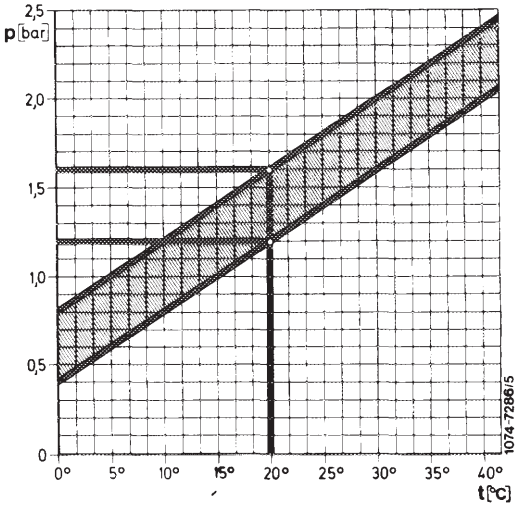
(J) (USA) Federal and California 1976/77
(AUS) (S) 1977

Warm-up compensator Bosch end no.
030 (AUS) (S) (USA) Federal
031 (J) (USA) California

Example:

Ambient temperature 20 °C = 1.2—1.6 bar gauge pressure.

Stabilizing time at + 20 °C = 3—6 minutes.



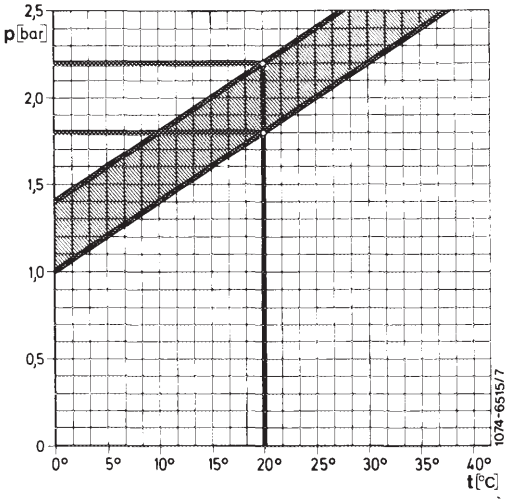
(USA) Federal high altitudes 1977

Warm-up compensator Bosch end no. 041

Example:

Ambient temperature 20 °C = control pressure 1.4—1.8 bar gauge pressure.

Stabilizing time at + 20 °C = 3—6 minutes.



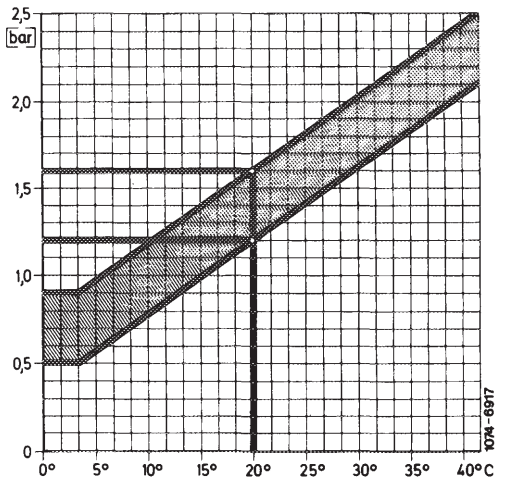
(AUS) (J) (S) (USA) 1978
(J) 1979/80 (USA) 1979

Warm-up compensator Bosch end no.
030 (AUS) (S) (USA) Federal
031 (J) (USA) California

Example:

Ambient temperature 20 °C = control pressure 1.2—1.6 bar gauge pressure.

Stabilizing time + 20 °C = 3—6 minutes.



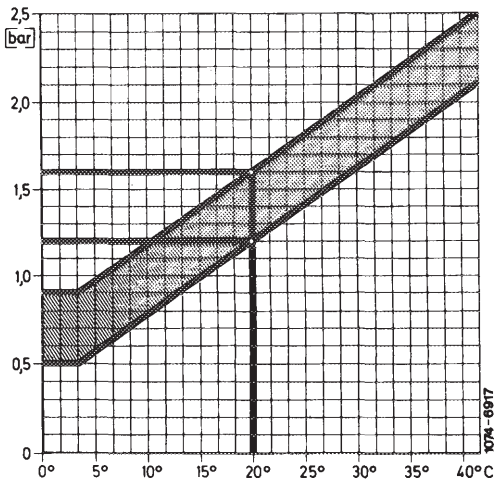
(AUS) (S) 1979/80

Warm-up compensator Bosch end no. 056

Example:

Ambient temperature 20 °C = control pressure 1.2—1.6 bar gauge pressure.

Stabilizing time at + 20 °C = 2—4 minutes.



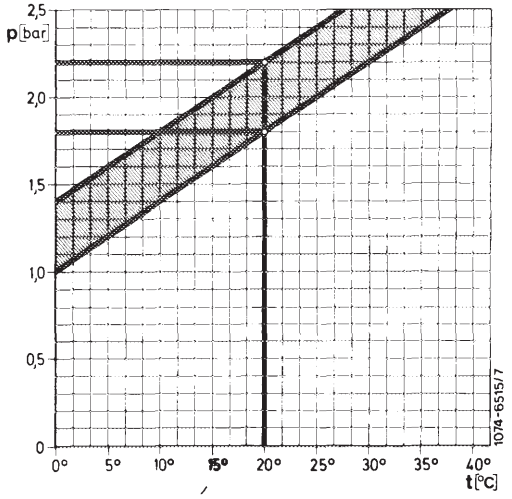
(J) **starting 1981**
(USA) **1980/81**

Warm-up compensator Bosch end no. 067

Example:

Ambient temperature 20 °C = control pressure 1.4–1.8 bar gauge pressure.

Stabilizing time at + 20 °C = 2–4 minutes.



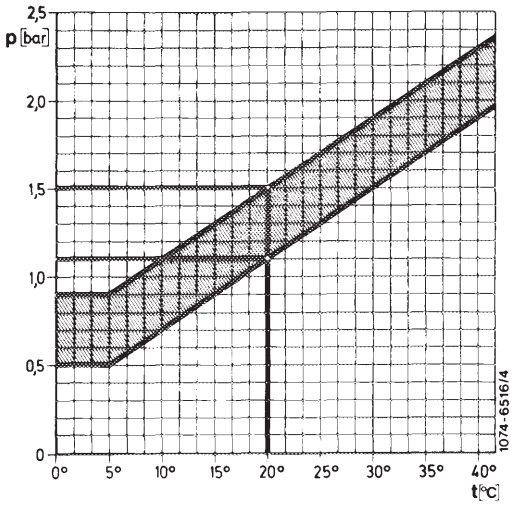
(AUS) (S) **starting 1981**

Warm-up compensator Bosch end no. 057

Example:

Ambient temperature 20 °C = control pressure 1.1–1.5 bar gauge pressure.

Stabilizing time at + 20 °C = 2–4 minutes.



5 Check stabilizing time of warm-up compensator. Read initial control pressure at + 20 °C. The stabilizing time at 3.4 bar gauge pressure should be within tolerance. Additional electric consumers switched off, minimum voltage 12 Volts.

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

6 Close valve screw on pressure measuring device. When measuring pressure, with 2 valve screws, close valve screw at connection 3.

7 The system pressure should amount to 5.0–5.6 bar gauge pressure.

8 If the system pressure of 5.0–5.6 bar gauge pressure is not attained or exceeded, perform the following checkups:

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.

9 Re-open valve screw.

Checking control pressure at idle with engine at operating temperature

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

11 Control pressure should increase to specified value (warm-up compensator stabilized).

If the control pressure is not attained, perform the following checkups:

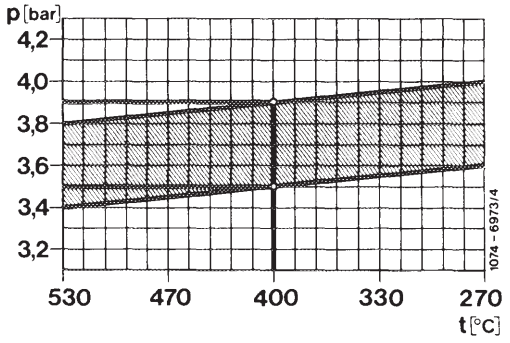
a) Check intake manifold vacuum. For this purpose, pull off vacuum hose (arrow) on warm-up compensator and attach a T-fitting for pressure gauge.

   Read intake manifold vacuum and transfer to vacuum diagram.

(USA) Federal 1977--1979
(AUS) (S) starting 1977

Example:

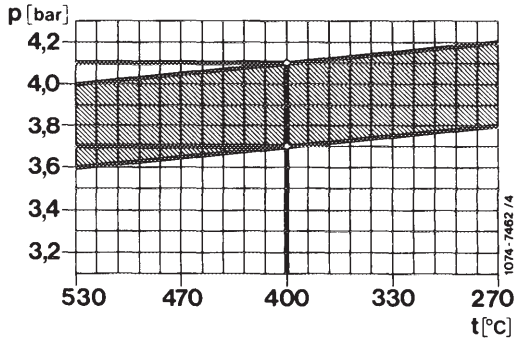
Intake manifold vacuum 400 mbar = control pressure 3.5–3.9 bar gauge pressure.



(USA) Federal high altitudes 1977

Example:

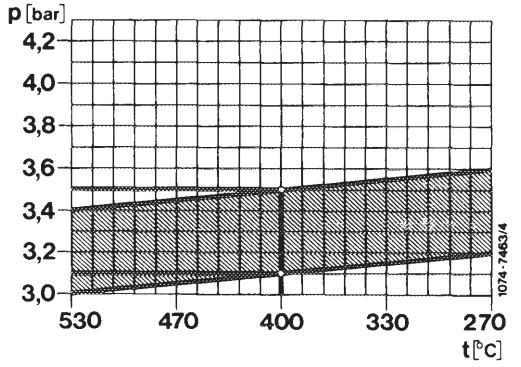
Intake manifold vacuum 400 mbar = control pressure 3.7–4.1 bar gauge pressure.



(J) 1977–1980
(USA) California 1977--1979

Example:

Intake manifold vacuum 400 mbar = control pressure 3.1–3.5 bar gauge pressure.

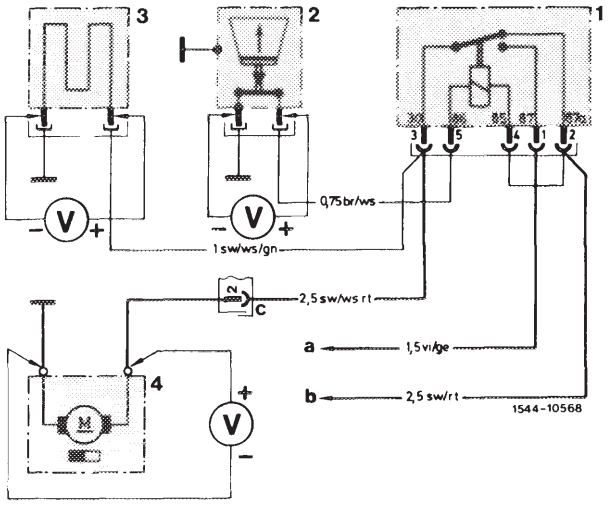


Note: Starting model year (J) 1981, (USA) 1980 the vacuum flow is straight. Control pressure is therefore independent of intake manifold vacuum.

b) Test voltage on warm-up compensator with engine running. Pull electrical connection from warm-up compensator and test for voltage. Minimum voltage 12 Volts (without electrical consumers).

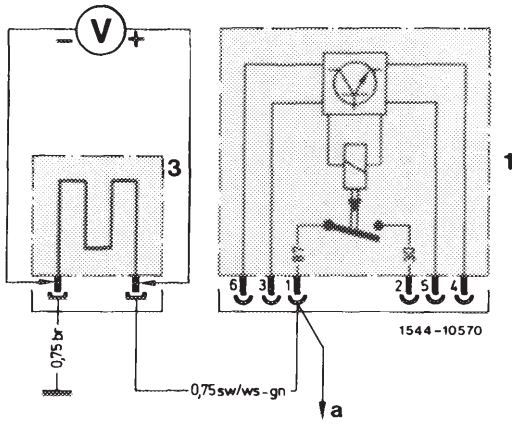
c) Test heater coil with an ohmmeter for passage. Resistance: 20–40 Ω.
Replace warm-up compensator.

d) If control pressure is above nominal value, re-condition system pressure regulator (07.3–210).

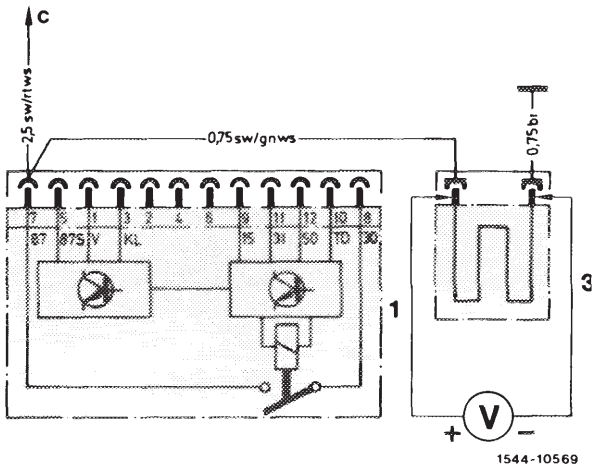


Mixture controller **with** safety switch
1 Fuel pump
2 Safety switch – air flow sensor plate
3 Warm-up compensator
4 Fuel pump
a Terminal 50 (starting)
b Terminal 15/54 (ignition)
c Plug connection 14-point tail lamp unit harness

Mixture controller **without** safety switch



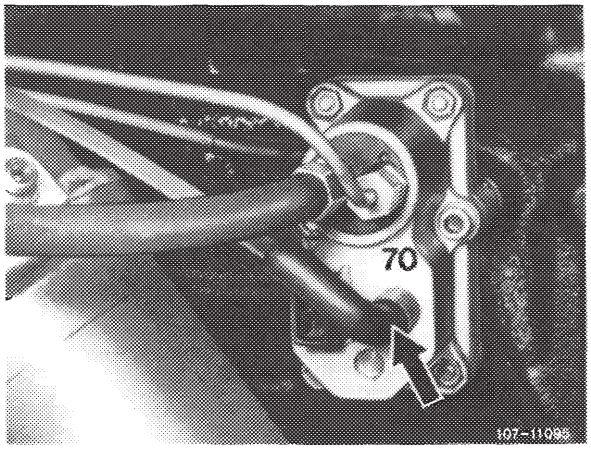
Up to model year 1981
1 Fuel pump relay
2 Warm-up compensator
a To fuel pump



Starting model year 1981
1 Fuel pump relay
3 Warm-up compensator
c To fuel pump

12 Check full load enrichment. For this purpose, pull vacuum hose (arrow) from warm-up compensator, control pressure should now drop to specified value.

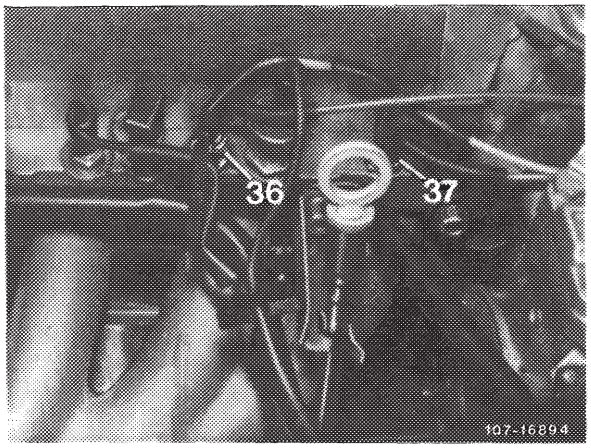
If the control pressure is not attained, replace warm-up compensator.

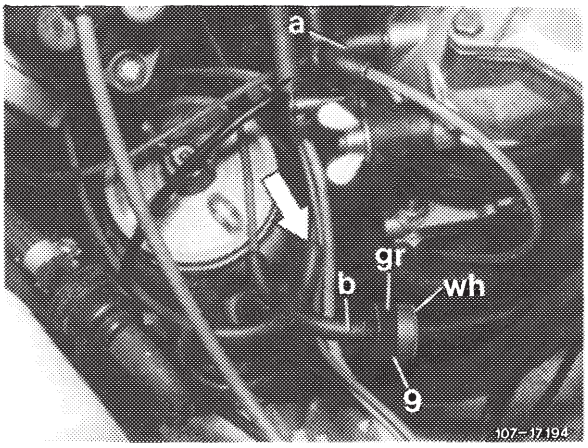


13 Check acceleration enrichment.

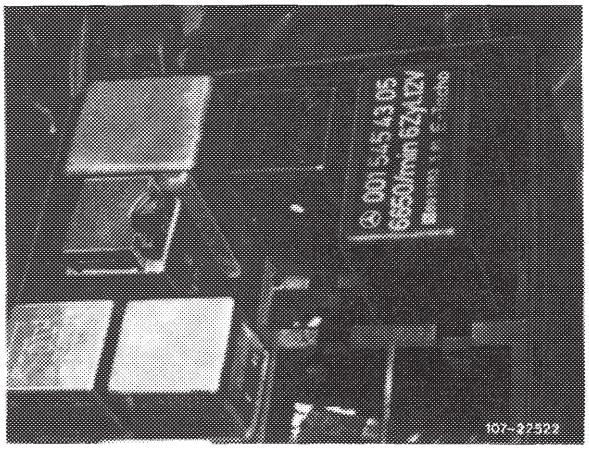
(J) starting 1981, (USA) 1980/81

Check thermovalve (37) 50 °C for passage. For this purpose, pull off vacuum hoses (a and b). The thermovalve is closed below approx. 50 °C coolant temperature, above approx. 50 °C coolant temperature there should be passage, if not, replace thermovalve (37).

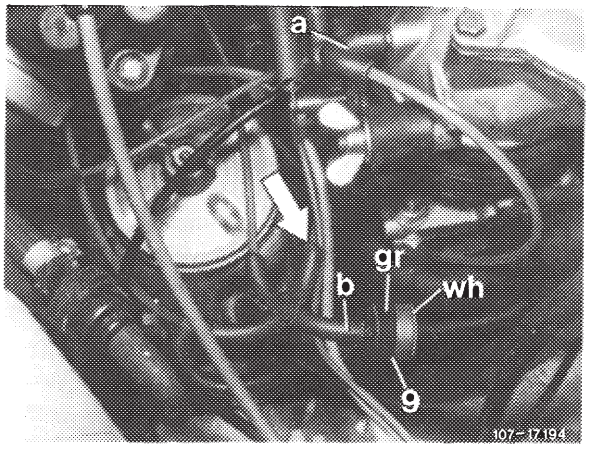




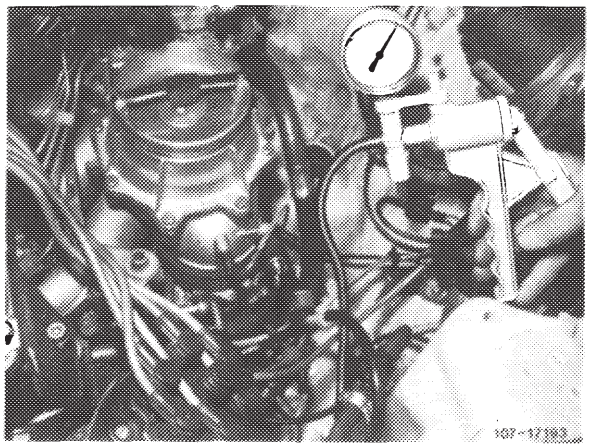
Stop engine, pull off fuel pump relay (arrow).



Pull vacuum line from distributor (arrow).

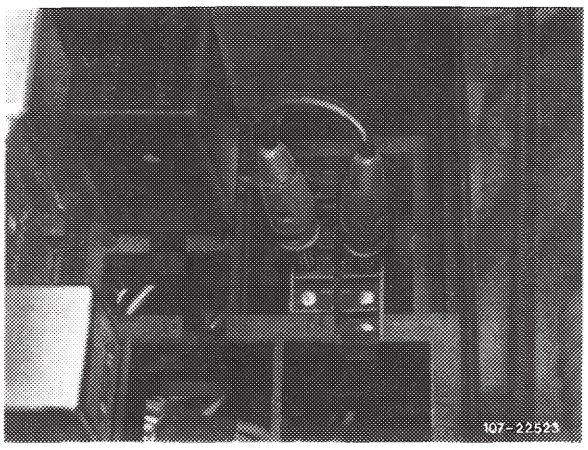


Plug vacuum pump to vacuum line toward warm-up compensator and activate warm-up compensator with 0.5 bar vacuum.

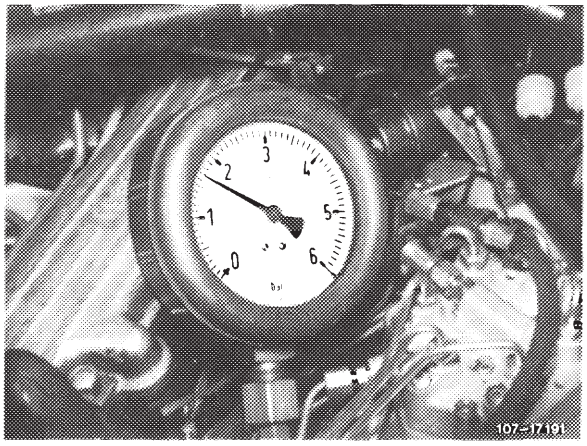


Bridge the two jacks on fuel pump relay coupler.

Up to model year 1981: Jacks 1 and 2.
Starting model year 1982: Jacks 7 and 8.



The control pressure should then amount to 1.4—1.8 bar gauge pressure. If the control pressure deviates from nominal value, replace warm-up compensator.



Checking fuel distributor and fuel pump for leaks

14 Stop engine. Control pressure will then drop below opening pressure on injection valves (approx. 2.8 bar gauge pressure).

15 If the control pressure drops inmediately to 0 bar gauge pressure, replace check valve on fuel pump or subsequently install.

16 If the 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 1 drop in 5 seconds, recondition system pressure regulator or pressure compensating valve (07.3–210).

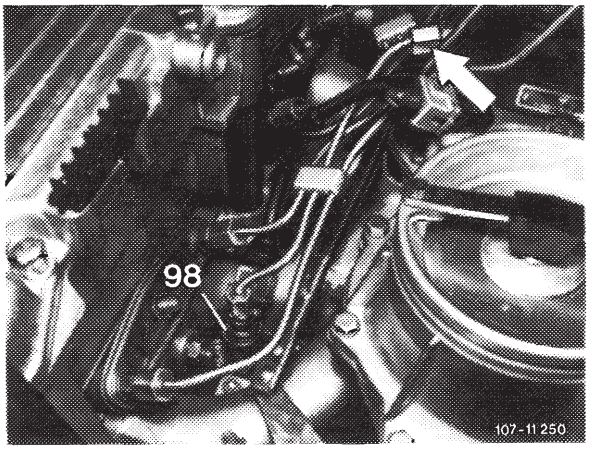
17 Check fuel reservoir for leaks (not included in time rate). For this purpose, disconnect leak line between fuel reservoir and intake damper.

18 Loosen leak line on intake damper and pull off. Loosen clamp, pressureless leaking is permissible. Replace fuel reservoir, if required (07.3–270).

19 Check cold-starting valve (98) for leaks. For this purpose, remove cold-starting valve (07.3–125, section "Checking for leaks").

20 Close pressure measuring device, while catching fuel with a rag.

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

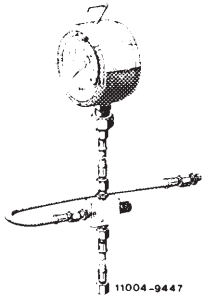


Test values in bar gauge pressure

Engine		110.984/985 110.986/987	110.988/989 110.990
System pressure at idle with engine cold or at operating temperature		5.0–5.6	
Control pressure at idle with engine at operating temperature	Warm-up compensator stabilized	3.4–3.8 at 530 mbar [1])	3.6–4.0
	Full load enrichment at idle (vacuum hose pulled of)	2.8–3.2	
Control pressure according to ambient temperature at idle with engine cold		min. 0.5 (refer to diagram)	
Starting voltage		10 V	

[1]) If the control pressure is not attained, check intake manifold vacuum (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

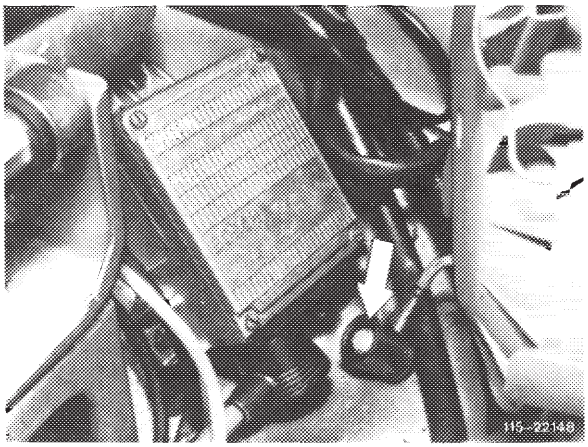
1 Pull cable plug from warm-up compensator and from cold starting valve.

2 Checking starting voltage.

Pull plug from ignition transmitter on switching unit (green cable) or plug protective plug, part no. 102 589 02 21 00, on diagnosis socket.

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

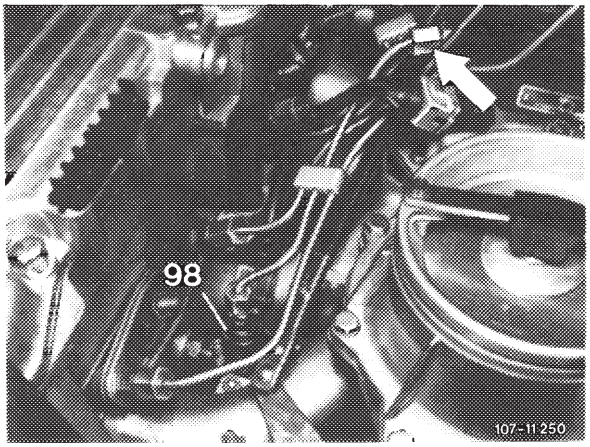
3 Check air flow sensor plate and control piston for easy operation, check fuel pressures and for internal leaks, as well as stabilizing time of warm-up compensator (07.3–120).



Checking cold-starting valve for function and leaks

4 Unscrew fuel line on cold-starting valve (98) and remove cold-starting valve.

5 Loosen fuel line (arrow) on fuel distributor and turn in such a manner that the cold starting valve can be again connected. Then hold cold starting valve into a container.



Checking function

6 Switch-on ignition.

7 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 plug instead and pull cable plug from safety switch.

Checking for leaks

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

9 Switch off ignition.

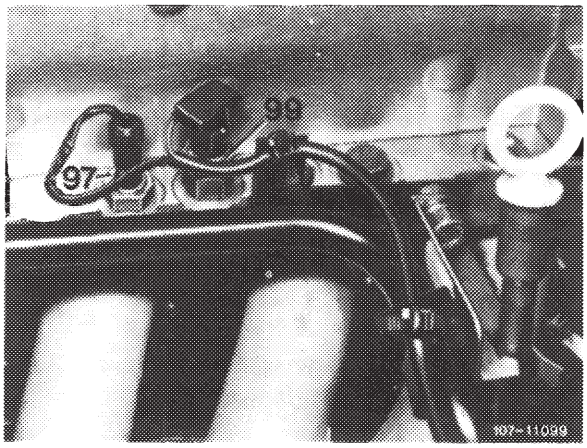
10 Mount cold starting valve with new seal.

11 Plug cable plug on safety switch and on cold-starting valve again.

Testing thermo time switch

The cold starting valve is actuated by closed thermo time switch only at coolant temperatures below +15 °C.

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



99 Thermo time switch

Testing below +15 °C coolant temperature

12 Connect voltmeter to connection of cold starting valve.

13 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 °C = 0 seconds
+10 °C = 1.5 seconds

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

Test value **below** +15 °C:

Connection G-ground = approx. 48 Ω
Connection W-ground = approx. 0 Ω

(Contacts in switch closed).

Testing above +15 °C coolant temperature

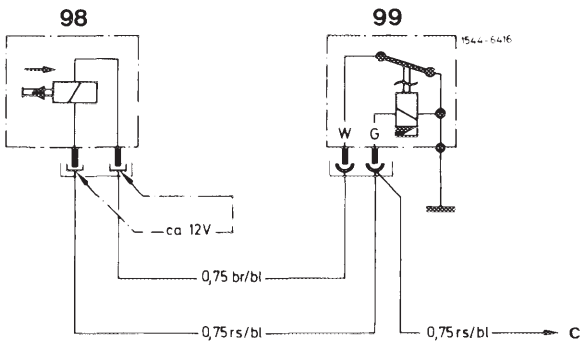
Above +15 °C coolant temperature the thermo time switch can be tested only by means of an ohmmeter. For this purpose, pull plug from thermo time switch.

Test values **above** +15 °C:

Connection G-ground = approx. 62 Ω
Connection W-ground = approx. 270 Ω

(Contacts in switch open).

Re-attach plug.



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

Testing cutoff point of auxiliary air valve

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

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

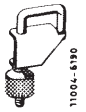
16 Connect fuel lines, run engine once again and check all fuel connections for leaks.

07.3–130 Checking delivery capacity of fuel pump

Test values

Voltage at fuel pump min.	11.5 V
Delivery capacity min.	1 liter/30 seconds

Special tool

Clamp for fuel hose		000 589 40 37 00

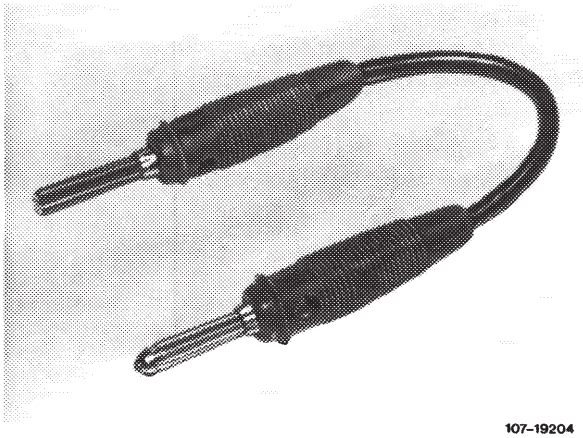
Conventional tools

Voltmeter, graduated measuring glass or measuring cup (at least 1 liter), stop watch

Self-made fuel hose

Fuel hose	500 mm long
Tube with sealing cone	
Coupling nut	M 14 x 1.5

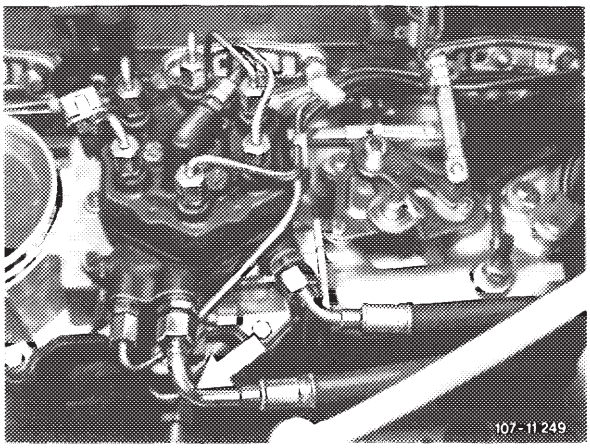
Contact bridge



107-19204

Checking

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

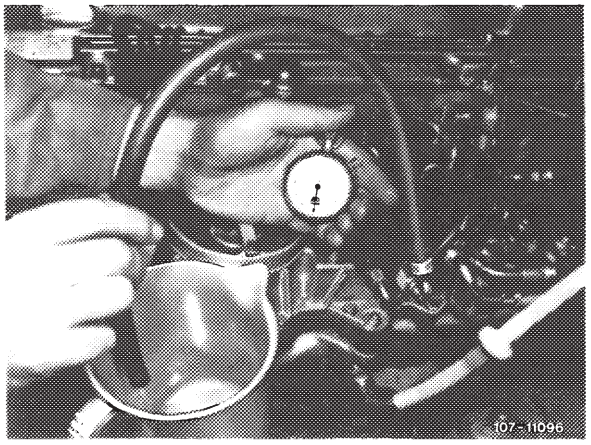


2 Screw self-made fuel hose to fuel distributor and hold into measuring glass or cup.

3 Check delivery:

Mixture control unit **with** safety switch

Switch-on ignition. Pull cable plug from safety switch in mixture control unit and put cable plug back again after 30 seconds.



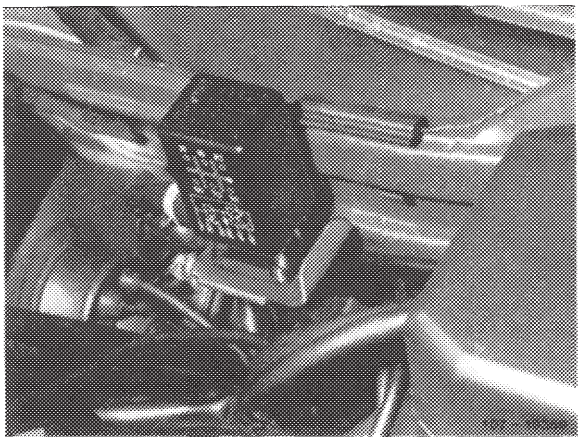
Mixture control unit **without** safety switch

Pull off fuel pump relay and bridge the two bushings (wiring diagram 07.3–120). This will provide voltage for fuel pump.

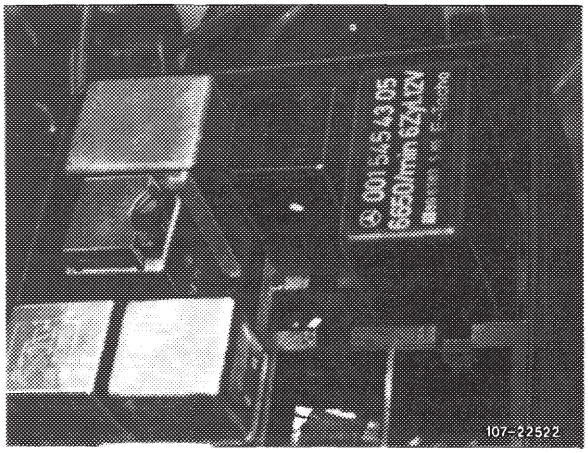
Pull off contact bridge after 30 seconds.

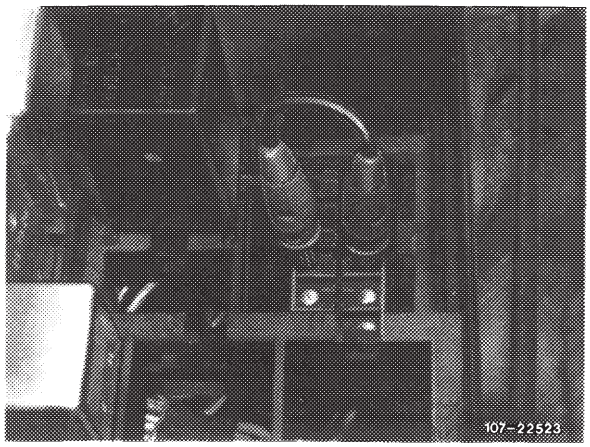
Prior to September 1981: Jacks 1 and 2.
Starting September 1981: Jacks 7 and 8.

Model 123



Model 126





4 If the delivery volume is less than 1 liter/30 seconds, check the following items:

a) Check strainer in feed connection of fuel distributor for passage.

b) Check voltage at fuel pump.
Nominal value = min. 11.5 Volts (with engine stopped).

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) Replace fuel filter.

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

6 Connect fuel return flow hose. Mount relay.

07.3–135 Checking injection valves

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

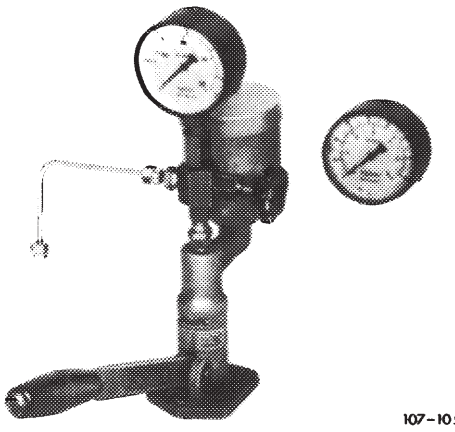
Valve tester Bosch KDJE–P 400	Bosch order designation KDJE–P 400
Nozzle tester EFEP 60 H[1])	Bosch no. 0 684 200 700
Pressure gauge 0–6 bar gauge pressure housing dia. = 100 mm Grade 1.0	Bosch no. 1 687 231 000
Pipe line	Bosch no. 1 680 750 001

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

Note

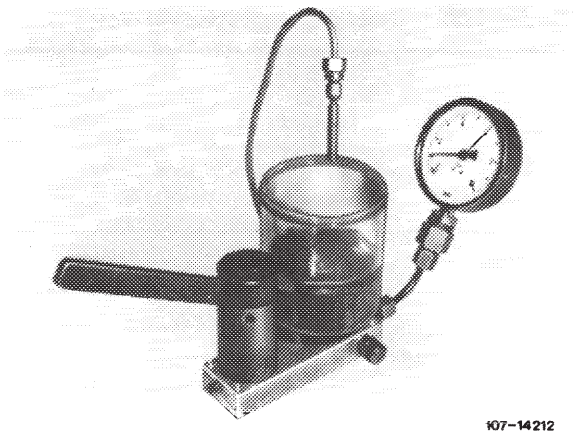
The nozzle or valve tester is used for testing opening pressure, for buzzing test, for evaluating jet and to test injection valves for leaks.

Prior to starting with injection valve test, the container of the tester must be filled and the unit must be bled. For testing, use kerosene only.



107-10592

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



107-14212

Testing

For testing, remove injection valves (07.3–215).

1 Coase leak test:

a) Connect removed injection valves to tester. Bleed pressure line with shutoff valve opened and coupling nut released. Then tighten coupling nut.

b) With shutoff valve opened, **slowly** operate hand lever (4 s/stroke) and built-up pressure up 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.

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

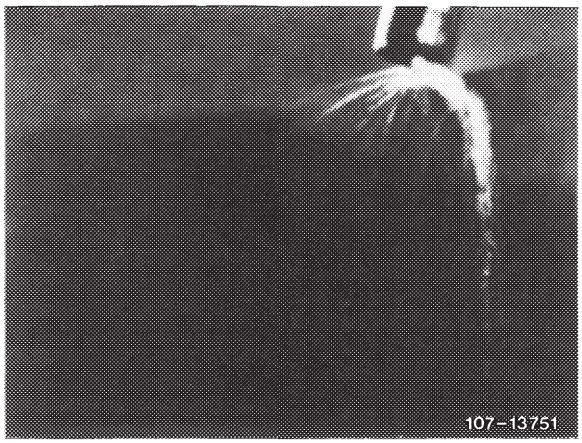
3 Fine leak test:

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

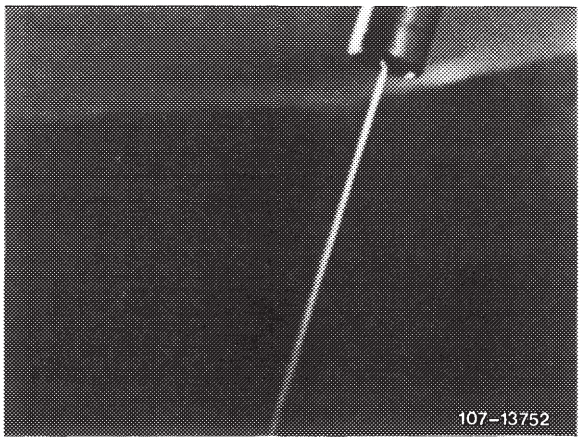
4 Buzzing test, evaluation of jet:

Close shutoff valve and flush valve by moving hand 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^{o} is permitted.

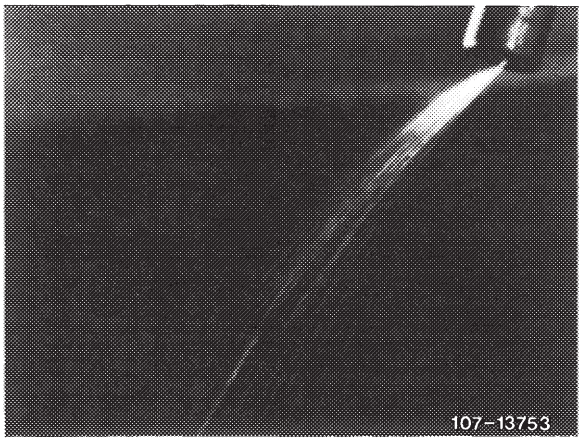
Damaged injection valves



Drop formation

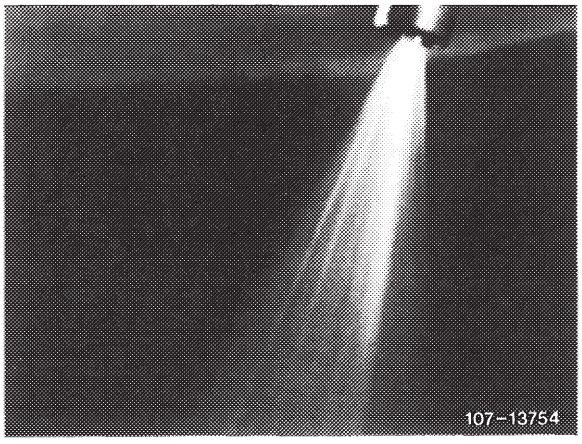


Cord-like jet

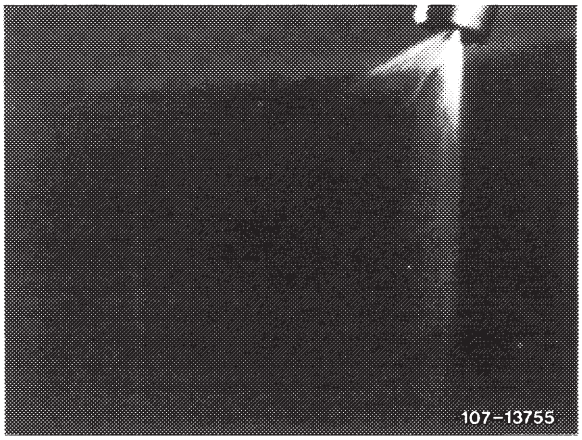


Spreading jet

Good injection valves



Good jet preparation



Slightly one-sided atomization

07.3–140 Checking decel shutoff

Test values

Speed km/h	Engine speed 1/min without refrigerant compressor	with refrigerant compressor
> 35	> 1100	> 1300

Conventional tools

Revolution counter, volt-ohmmeter

Digital multimeter with means for measuring AC (for impulse transmitter test)

Note

Since decel shutoff requires engine speed impulses and driving speeds, the respective component can be tested only on a dynamometer or on the road.

A function test of impulse transmitter can also be made by means of workshop oscilloscope Bosch MOT 300/400, 202 and SUN 1080, 1019, 2110 in position "Primary, special "or "Generator test".

Testing on dynamometer

Remove air cleaner.

Run on dynamometer at approx. 70 km/h in 4th speed or driving position "D". Release accelerator pedal, air flow sensor plate will move into zero position. As soon as combustion starts again at approx. 1100/min or approx. 1300/min with refrigerant compressor, the air flow sensor plate will move into idle position. Check decel shutoff valve and its activation, if required.

Testing without dynamometer (road test)

Run engine at idle.

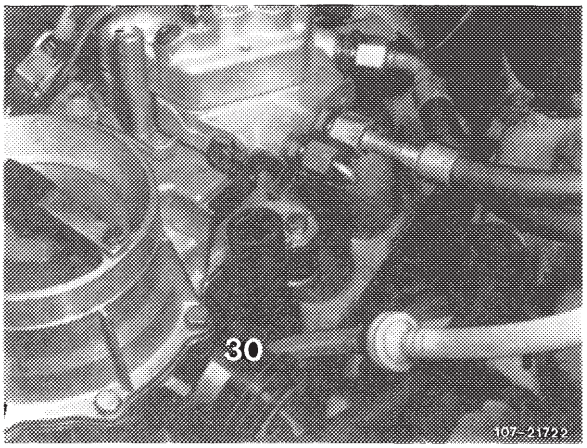
Test decel shutoff valve (30).

Test activation of switchover valve (43a).

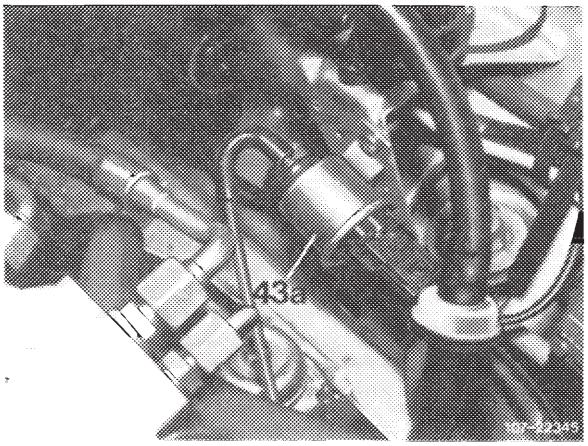
Test speed-dependent control.

Testing decel shutoff valve (30)

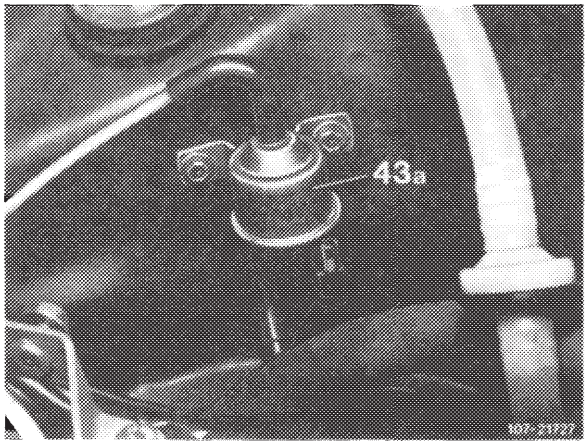
1 Run engine at idle. Pull off vacuum lines on switch over valve (43a) and connect with each other. Decel shutoff valve (30) will then open and the engine should stop.
If engine keeps running, check vacuum lines. Intake manifold vacuum should be available at idle. If vacuum is available, replace decel shutoff valve (30).



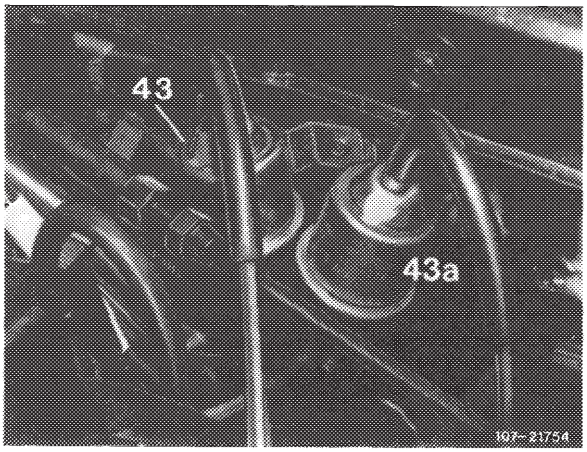
Layout switchover valves (43a)



Model 107



Model 123

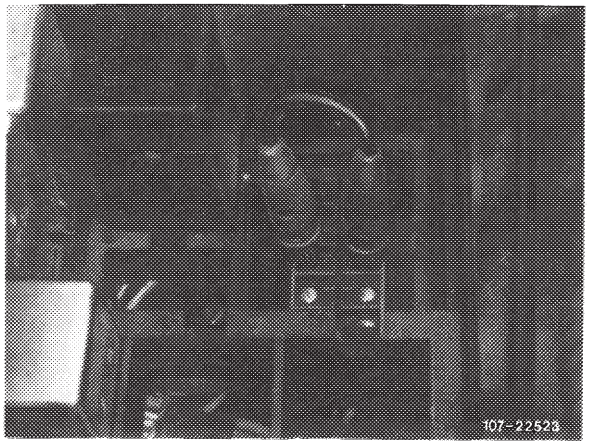


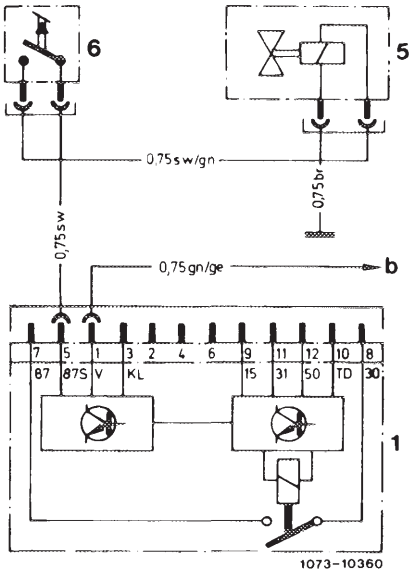
Model 126
43 Switchover valve air conditioning (identification: green cap)
43a Switchover valve decel shutoff (identification: gray cap)

Checking activation of switchover valve

2 Pull off fuel pump relay. Bridge jack 7 (terminal 87) and 8 (terminal 30), so that fuel pump will run. Start engine, connect jack 5 (terminal 87 S) of coupler with battery voltage. Engine should now stop.

If engine does not stop, check microswitch (3 or 6) or switchover valve (43a or 5).





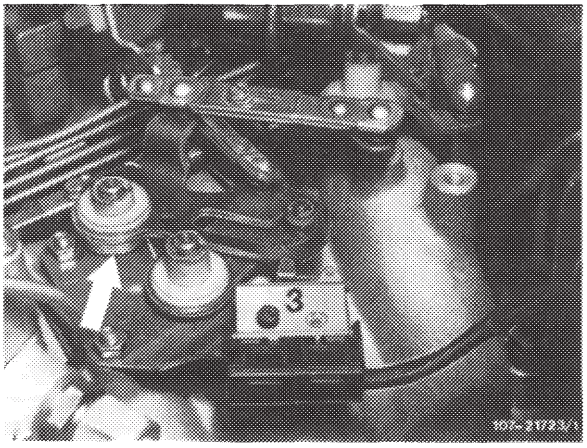
1 Electronic fuel pump relay
5 Switchover valve
6 Microswitch
b Tachometer transmitter

Testing microswitch (3)

Pull off coupler on microswitch. Connect ohmmeter.

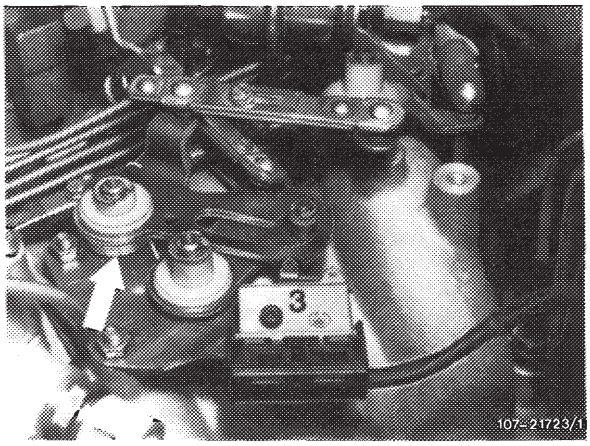
Readout: At idle 0 Ω
When accelerating ∞ Ω.

Check adjustment of slotted lever, if required. Roller *in slotted lever should* rest free of tension against final stop. Check rotary spring (arrow), if required.

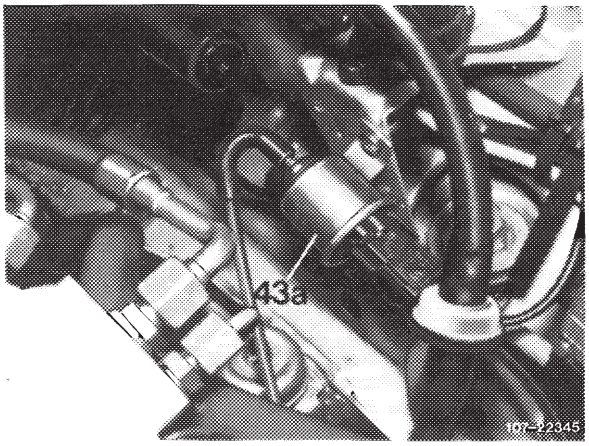


Testing switchover valve (43a)

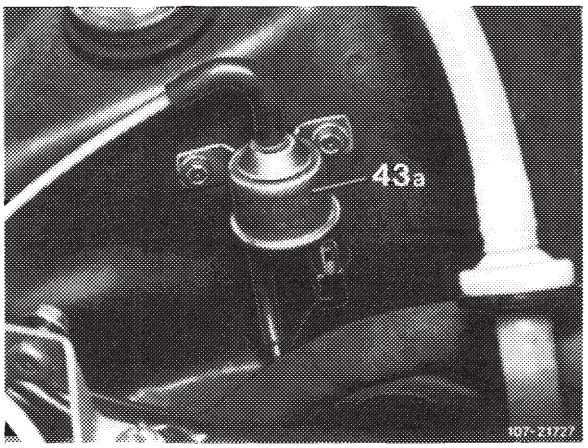
Pull coupler from microswitch (3) and connect cable, color black/green, to battery voltage, engine should now stop. If engine does not stop, test line with an ohmmeter for passage or replace switchover valve (43a).



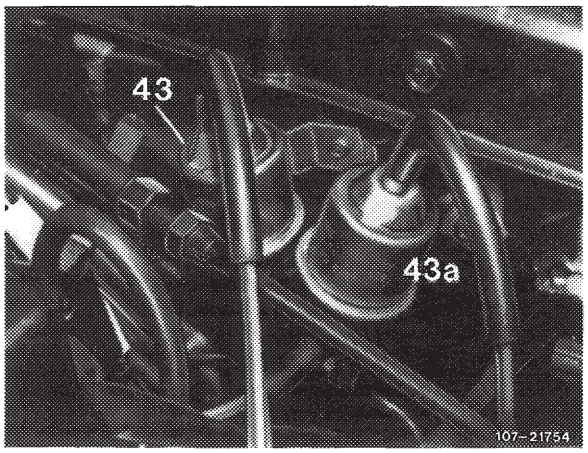
Layout switchover valves (43a)



Model 107

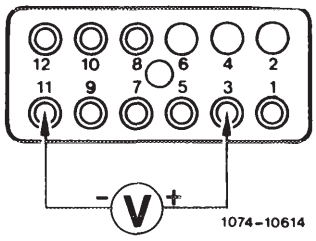


Model 123



Model 126
43 Switchover valve air conditioning (identifiaction: green cap)
43a Switchover valve decel shutoff (identifiaction: gray cap)

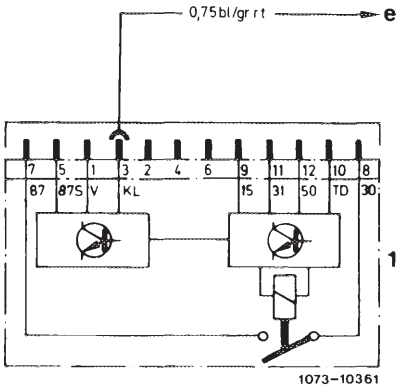
3 Check cutting-in impulse of refrigerant compressor. For this purpose, run engine at idle. Connect positive cable (red) of voltmeter to jack 3 (terminal KL) and negative cable (black) to jack 11 (terminal 31).



When switching-on refrigerant compressor, battery voltage should be available.

If no voltage is available, test line blue/gray/red (terminal KL) to refrigerant compressor for interruption.

Note: With air-conditioning system switched on, voltage should be available at jack 3 (terminal KL) of fuel pump relay (refer to wiring diagram group 83 air-conditioning system).



1 Fuel pump relay
e Refrigerant compressor

Test speed-dependent control

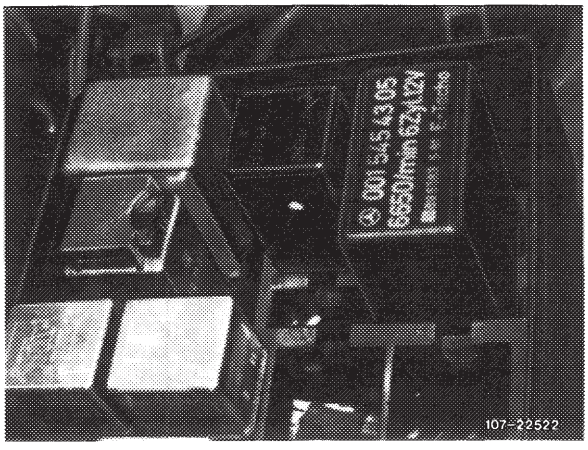
4 Pull coupler from switchover valve (43a) and connect voltmeter to coupler. Operate on dynamometer or on road in 4th gear, or in driving position "D" at 70 km/h. Release accelerator pedal, battery voltage should be available. If there is no voltage, test impulse transmitter on tachometer or replace fuel pump relay, if required.

There should be no voltage below approx. 1100/min or approx. 1300/min with refrigerant compressor.

Testing impulse transmitter on tachometer

5 A prerequisite for a signal is that the speed indicator is operational.

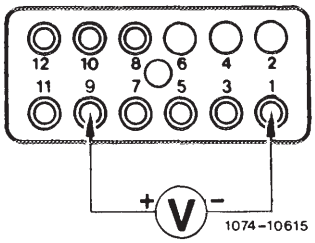
Test impulses for decel shutoff. Pull off fuel pump relay for this purpose.



Electronic tachometer

a) Testing output signal

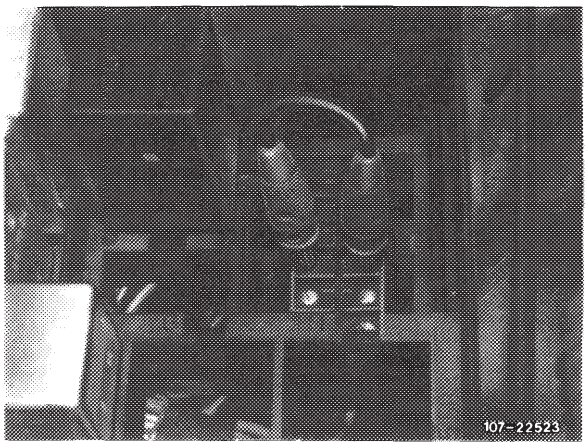
Connect digital multimeter (position V = DC). For this purpose, connect positive cable (red) to jack 9 (terminal 15), grounding cable (black) to jack 1 (terminal V).



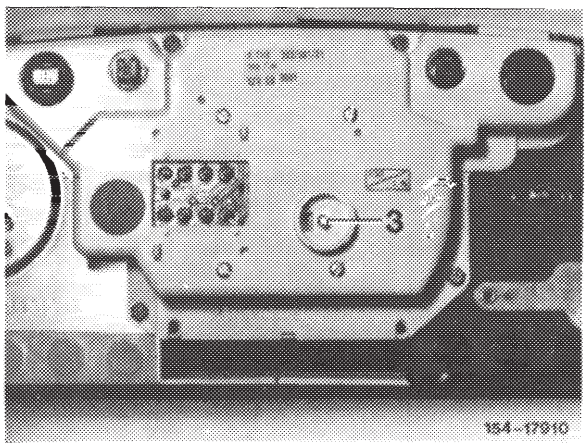
Attention!
Perform measurements in position V = only. Wrong handling will damage tachometer electronics.

Bridge jack 7 (terminal 87) and jack 8 (terminal 30), fuel pump will then run.

Operate on dynamometer or on road in 4th gear or in driving position "D" at 70 km/h. Readout should indicate $\geqq$ 1 Volt DC (in position V =). Measuring value increases with increasing vehicle speed.



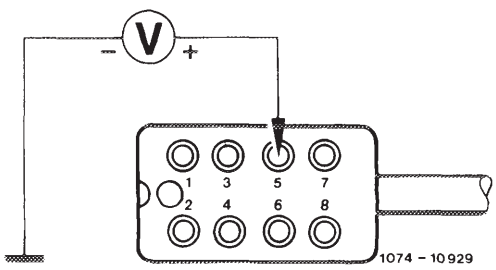
If there is no readout, test cable from jack 1 (terminal V) to impulse transmitter connection (3) by means of an ohmmeter for passage.



Model 107, 126
3 Impulse transmitter connection

Test speed readout of tachometer.

If there is no readout, remove instrument cluster. Remove 8-pole plug on tachometer.



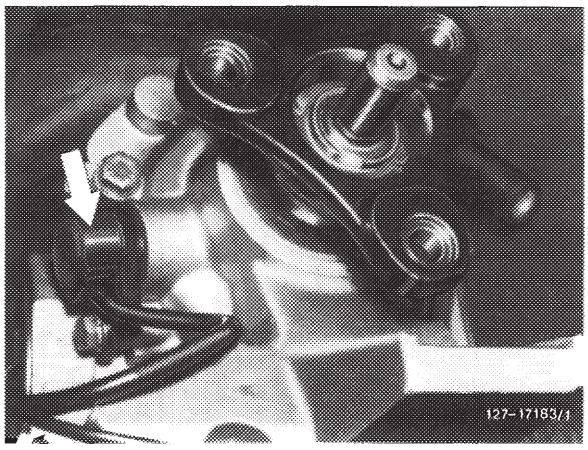
b) Testing input signal

Connect digital multimeter with means for measuring AC (in position V ~ or V $\wedge$) to jack 5.

Red = positive (jack 5)
Black = vehicle ground

Operate on dynamometer or on road in 4th gear or in driving position "D" at 70 km/h. Readout ≧ should amount to 1 Volt AC (in position V ~). Measuring value increases with increasing driving speed.

If there is no readout, test cable for passage by means of an ohmmeter or replace cable or impulse transmitter (arrow) in transmission.



Impulse transmitter automatic transmission

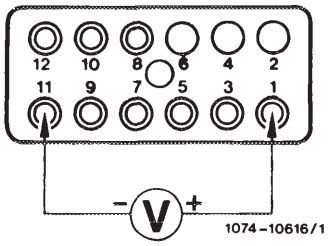
Mechanical tachomater

Connect digital multimeter with means for measuring AC (in position V ~or⩛). For this purpose, connect position cable (red) to jack 1 (terminal V), grounding cable (black) to jack 11 (terminal 31).

Bridge jack 7 (terminal 87) and jack 8 (terminal 30), fuel pump will now run.

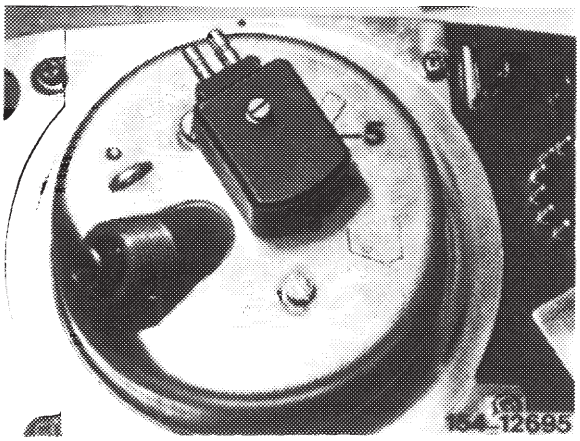
Operate on dynamometer or on road in 4th gear or in driving position "D" at approx. 70 km/h. Readout ≧ should amount to 1 Volt AC (in position V ~). Measuring value increases with increasing vehicle speed. speed.

If there is no readout, test cable for passage by means of an ohmmeter. Replace cable or impulse transmitter (5) on tachometer, if required.

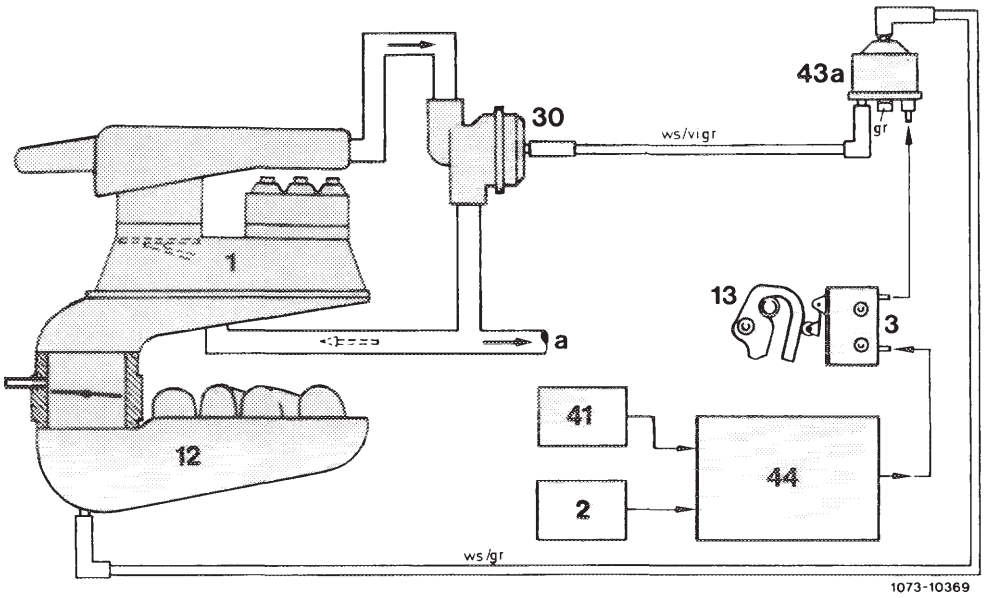


Test resistance of impulse transmitter (5). Nominal = 650 – 1370 Ω.

If the nominal value is exceeded or not attained, replace impulse transmitter.



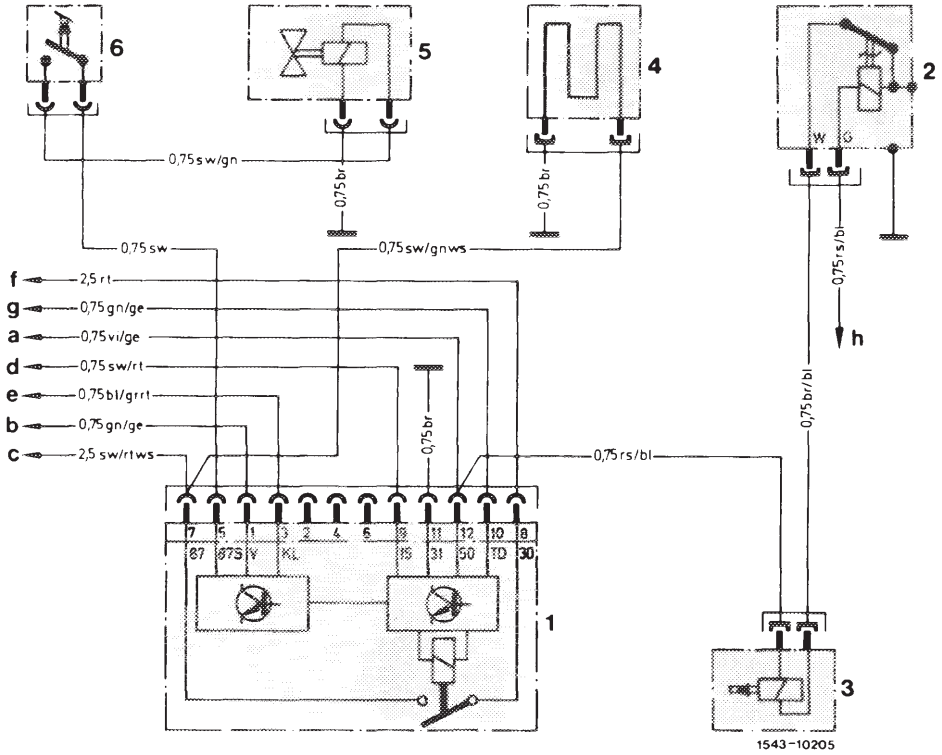
Model 123
5 Impulse transmitter



Function diagram decel shutoff

1	Mixture controller	41	Impulse transmitter mechanical tachometer	Color code	
2	Transistorized switching unit			gr	= gray
3	Microswitch	43a	Switchover valve decel shutoff	vi	= purple
12	Intake manifold			ws	= white
13	Slotted lever	44	Fuel pump relay		
30	Decel shutoff valve	a	To idle speed air distributor		

Note: For operation of decel shutoff and idle speed stabilization refer to 07.3–500.

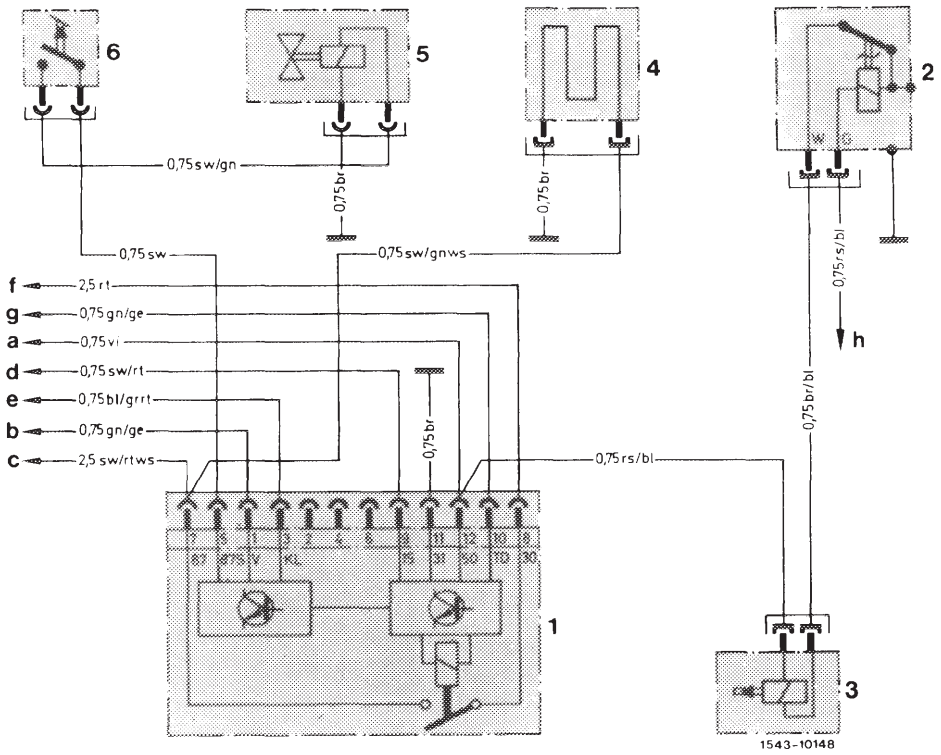


Wiring diagram decel shutoff model 123

1 Fuel pump relay
2 Thermo time switch
3 Cold starting valve
4 Warm-up compensator
5 Switchover valve
6 Microswitch

a To output starter lockout and backup lamp switch
b Transmitter mechanical tachometer
c Fuel pump
d Fuse 12 terminal 15 access
e Refrigerant compressor
f Cable connector engine terminal 30
g Cable connector terminal TD
h Cable connector engine terminal 50

Color code
bl = blue
br = brown
ge = yellow
gn = green
gr = gray
rs = pink
rt = red
sw = black
vi = purple
ws = white

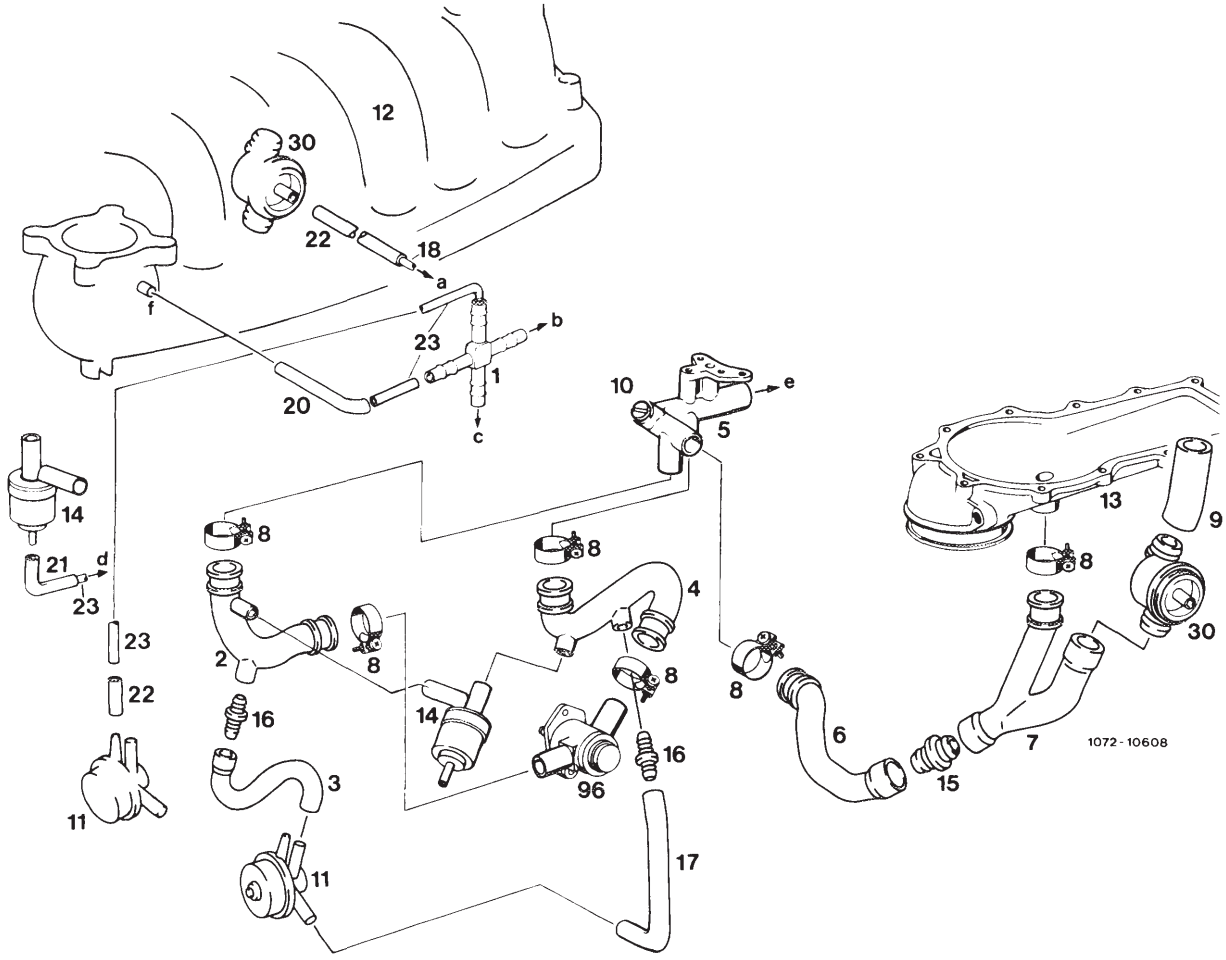


Wiring diagram decel shutoff model 107, 126

1 Fuel pump relay
2 Thermo time switch
3 Cold starting valve
4 Warm-up compensator
5 Switchover valve
6 Microswitch

a Cable connector engine terminal 50
b Transmitter electronic tachometer
c Fuel pump
d Fuse 14 terminal 15 access
e Refrigerant compressor
f Cable connector terminal 30
g Cable connector terminal TD
h Cable connector engine terminal 50

Color code
bl = blue
br = brown
ge = yellow
gn = green
gr = gray
rs = pink
rt = red
sw = black
vi = purple
ws = white



Decel shutoff and idle speed stabilization

1 Multiple distributor
2 Contour hose
3 Contour hose
4 Contour hose
5 Idle speed air distributor
6 Contour hose
7 Contour hose
8 Hose clip
9 Contour hose for air filter
10 Idle speed air screw
11 Decel circulating air valve
12 Intake manifold
13 Air guide housing
14 Bypass valve air conditioning
15 Plug connection
16 Plug connection
17 Contour hose
20 Contour hose
21 Contour hose
22 Connecting hose
23 Vacuum line
30 Decel shutoff valve
96 Auxiliary air valve

a To switchover valve decel shutoff
b To switchover valve decel shutoff
c To switchover valve air conditioning
d To switchover valve air conditioning
e Connection idle speed air
f Vacuum connection intake manifold

Conventional tool

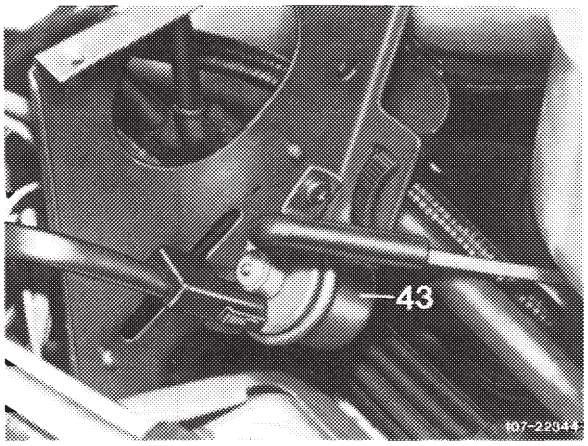
Voltmeter, revolution counter	
Digital tester	e.g. made by Bosch, MOT 001.03

Testing

1 Run engine at idle. When adding refrigerant compressor, the idle engine speed should increase by approx. 80/min.

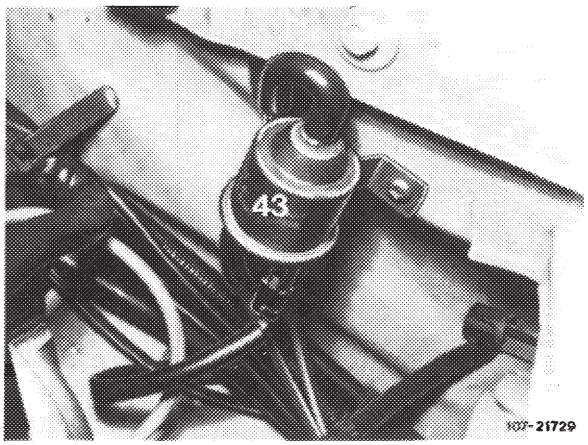
If the idle speed is not increasing, pull upper and lower vacuum line from switchover valve (43).

Vacuum should be available at upper line.

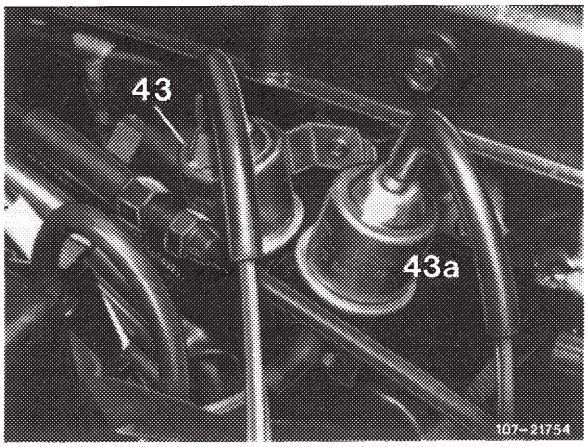


Model 107
43 Switchover valve (mounted on mounting bracket for coolant expansion tank).

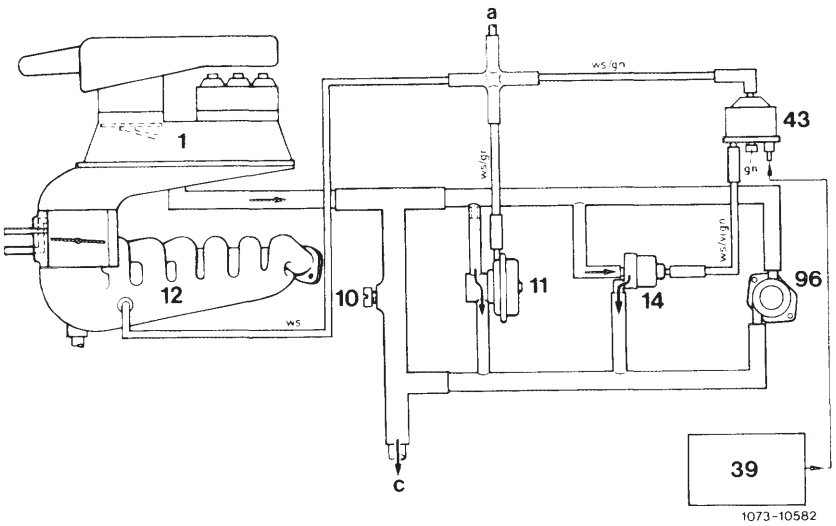
Layout switchover valves (43).



Model 123



Model 126
43 Switchover valve air conditioning (identification: green cap)
43a Switchover valve decel shutoff (identification: gray cap)



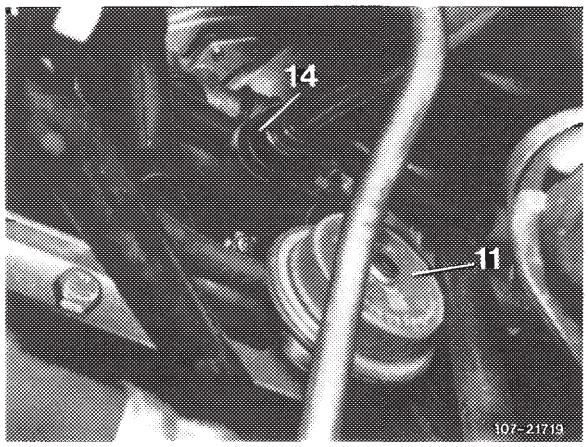
Function diagram idle speed stabilization on engines with refrigerant compressor

1 Mixture controller
10 Idle speed air screw
11 Decel circulating air valve
14 Bypass valve air conditioning
39 Relay air conditioning
43 Switchover valve rpm increase air conditioning
96 Supplementary air valve
a Connection switchover valve decel shutoff
c To idle speed air duct in intake manifold

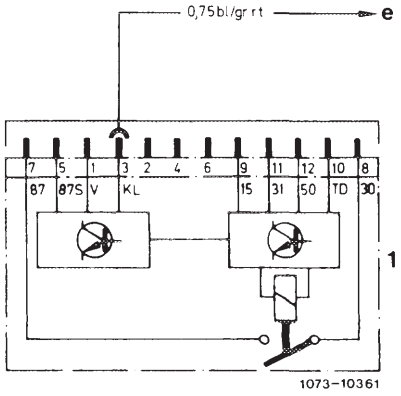
Color code
gn = green
vi = purple
ws = white

Note: For operation decel shutoff and idle speed stabilization refer to 07.3–500.

2 Connect both vacuum lines with each other, idle speed should then increase by approx. 80/min. If not, renew bypass valve (14).



3 If the engine speed increases, check electric activation of switchover valve (43). For this purpose, pull off coupler: with refrigerant compressor switched on, battery voltage should be available. If voltage is available, replace switchover valve. If no voltage is available, test voltage supply according to wiring diagram (refer to wiring diagram group 83 Air conditioning system).



1 Fuel pump relay
e Refrigerant compressor

07.3–150 Checking idle speed stabilization with rpm increase following start

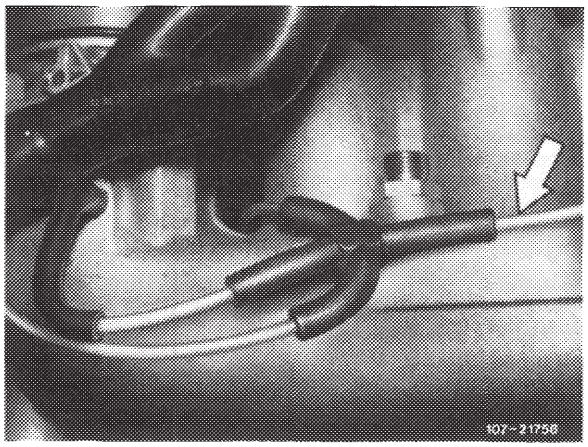
Conventional tools

Revolution counter	
Digital tester	e.g. made by Bosch, MOT 001.3

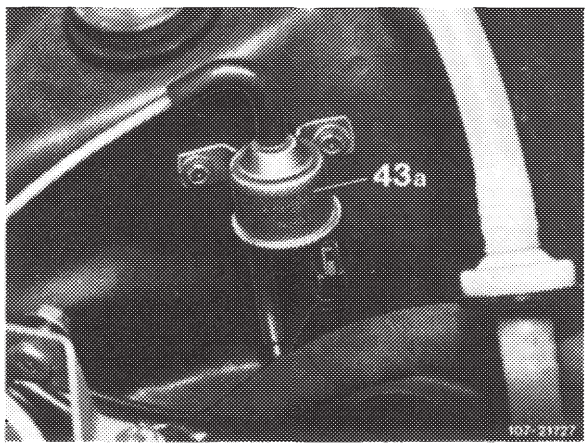
Testing

1 Run engine at idle.

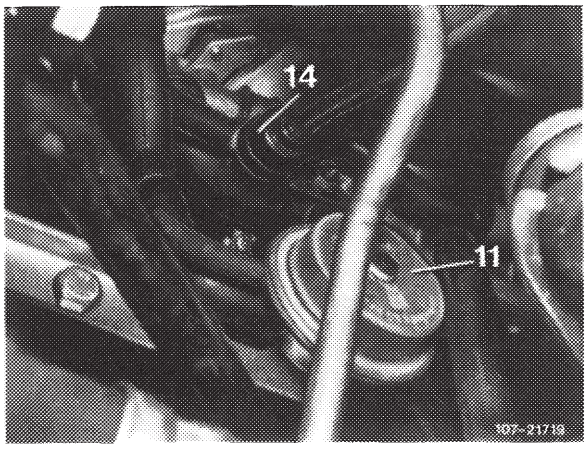
2 Pull off gray/black vacuum line (arrow) on 3 or 4-point rubber distributor (to reduce vacuum), put back again after approx. 3 seconds; idle speed should increase by approx. 500/min for a short period.

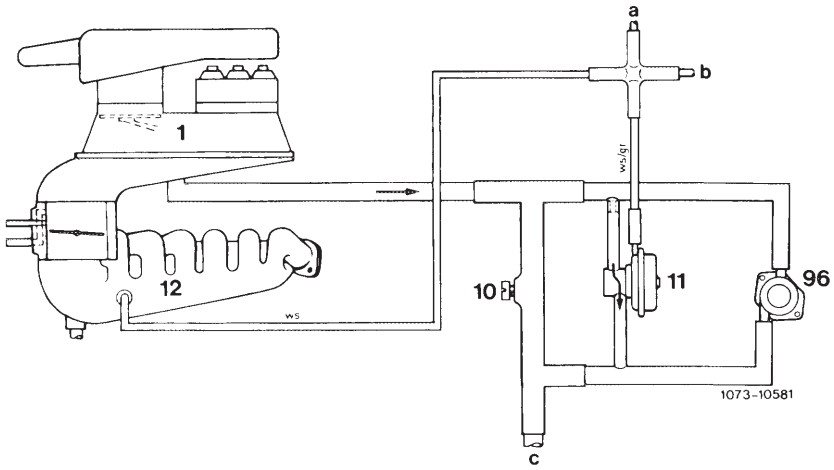


Note: On model 123 and 126, owing to better access, the upper vacuum line can be pulled from switchover valve (43a). As a result, the decel circulating air valve (11) is provided with atmospheric air via 3 or 4-point rubber distributor (refer to function diagram).



If there is no rpm increase, check line for passage. Renew decel circulating air valve (11), if required.





1 Mixture controller
10 Idle speed air screw
11 Decel circulating air valve
12 Intake manifold
96 Auxiliary air valve

a Connection switchover valve decel shutoff
b Connection switchover valve rpm increase air conditioning
c To idle speed air duct in intake manifold

Color code
gr = gray
ws = white

Note: For operation decel shutoff and idle speed stabilization refer to 07.3–500.

07.3–160 Checking fuel distributor for constant delivery

Test values

Load range	Fixation of air flow sensor plate at approx. . . cc/min	max. dissipation in cc/min
With gray 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

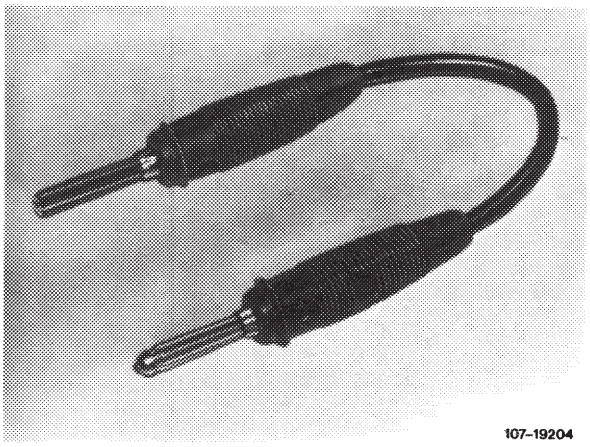
Conventional Bosch testers and accessories

Designation	order designation
Fuel distribution reference unit	KDJE–P 300
Tester carriage [1])	M 200/2 or KDJE–W 100

[1]) If the tester carriage is used for fuel distribution reference unit, an additional angle plate is required. The plate can be self-made or obtained from a Bosch representative.

Self made tool

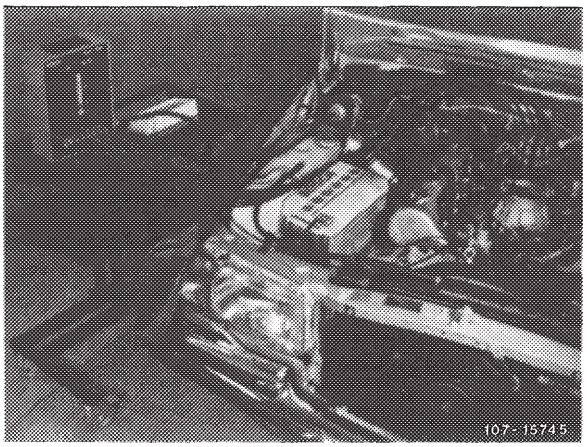
Contact bridge



107-19204

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 load) are simulated and set in air flow sensor plate by means of an adjusting device.

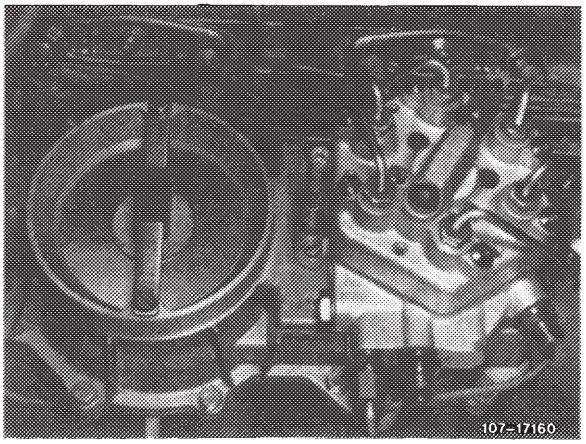


Testing

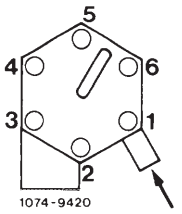
1 Set up fuel distribution reference unit horizontally adjacent to vehicle (tool or tester carriage).

2 Remove air cleaner.

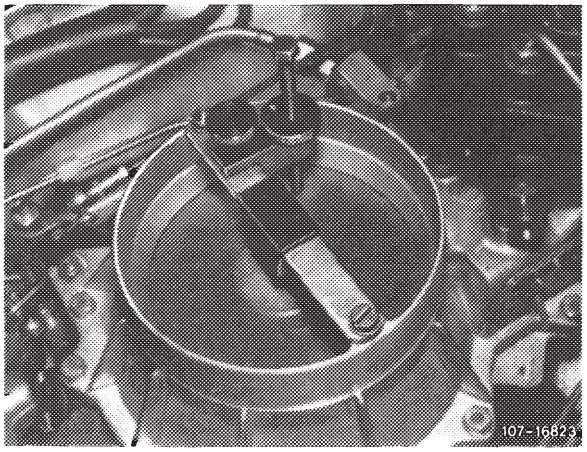
3 Unscrew injection lines on fuel distributor and loosen at injection valves, unscrew, if required.



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.



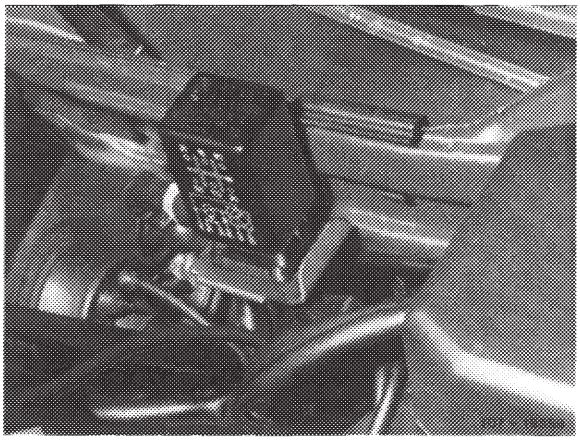
5 Clamp adjusting device for locating air flow sensor plate to stop bracket of air funnel (cone).



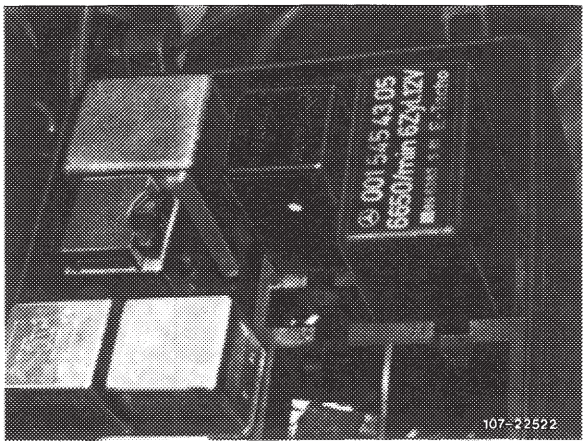
6 Switch-on ignition.

On vehicles without safety switch, pull off fuel pump relay and bridge the two jacks. This will connect the fuel pump to voltage.

Prior to September 1981: Jacks 1 and 2.
Starting September 1981: Jacks 7 and 8.



Model 123



Model 126

7 Deflect air flow sensor plate and push buttons 1 to 6 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 representatives 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, locate air flow sensor plate as described under item 7 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).

07.3–165 Checking fuel pump relay with electronic rpm regulation (breakaway)

Breakaway speeds

Engine	MB-part no.	Breakaway speed 1/min	Speed signal
Without decel shutoff			
Standard version and (AUS) (J) (S) (USA) starting model year 1981			
110.984 110.986 110.987	001 545 07 05 001 545 14 05	6650 ± 50	–
With decel shutoff			
Standard version			
110.988	001 545 42 05	6650 ± 50	Mechanical tachometer
110.989 110.990	001 545 43 05		Electronic tachometer

Conventional testers

Voltmeter, revolution counter

Layout fuel pump relay

Model 107

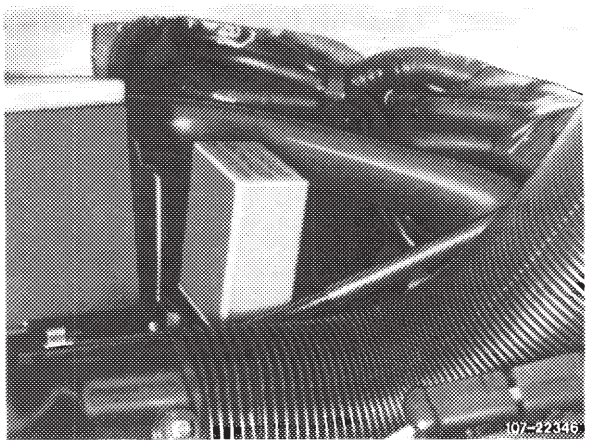
Lefthand steering

At the right inside vehicle behind glove box. For repairs, remove glove box.

Righthand steering

Model 107

At the right inside vehicle above pedals.

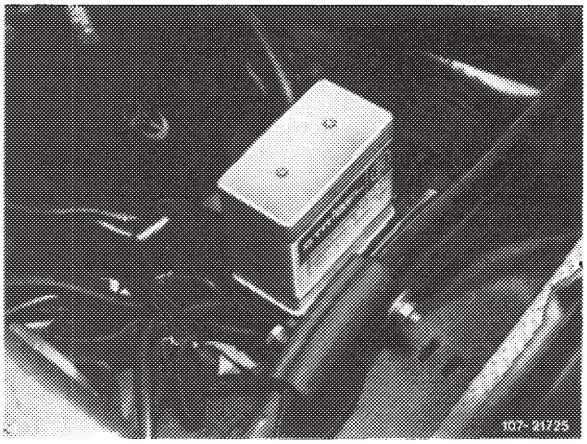


Model 123

Lefthand steering

At the left on wheel house.

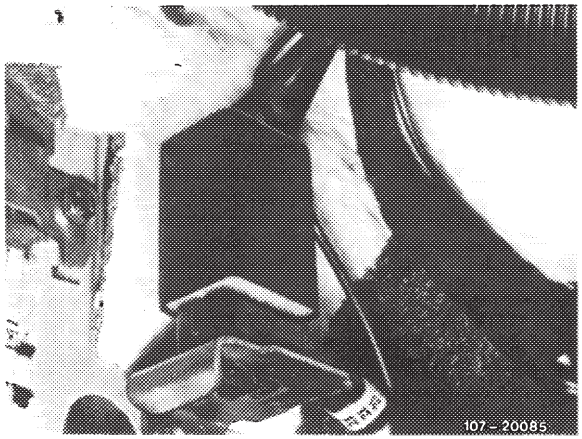
Model 123



Righthand steering

At the left inside vehicle behind side panelling. Remove cover for repairs.

Model 123

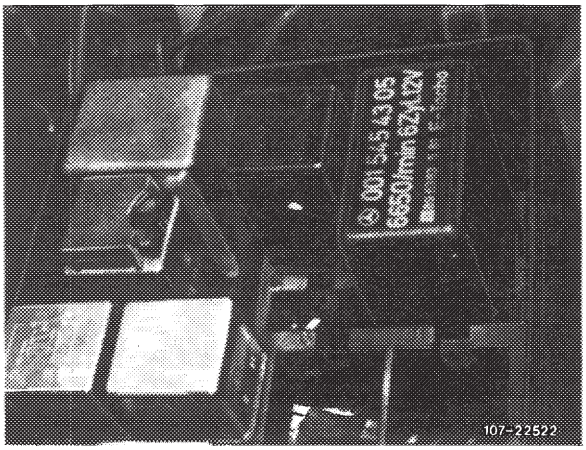


Model 126

Lefthand and righthand steering

At the left in fuse box.

Model 126

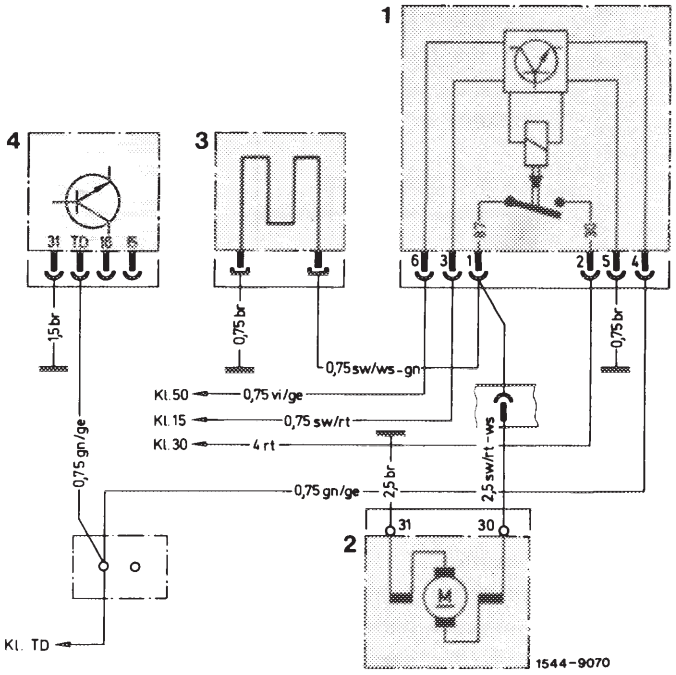


A. Prior to September 1981

Testing

Test condition

Battery charged to min. 60 %.

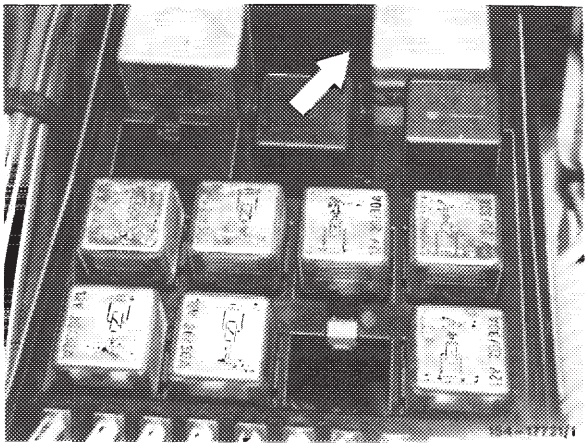


1 Fuel pump relay
2 Fuel pump
3 Warm-up compensator
4 TSZ (transistorized coil ignition) switching unit

Testing activation of fuel pump relay

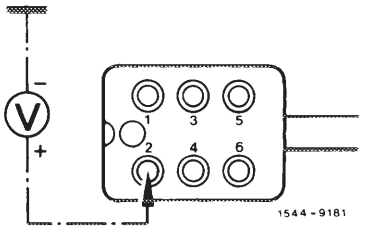
Remove fuel pump relay.
Connect negative cable (black) of voltmeter to vehicle ground). Measure voltage with positive cable (red) of voltmeter on jack 2 (terminal 30) of coupler.

approx. 12 Volts	0 Volt



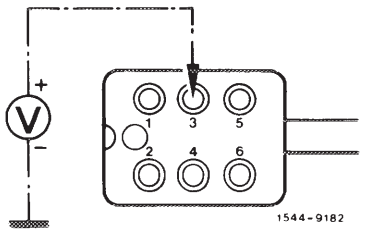
Test line (terminal 30, red) to cable connector engine harness for interruption.

Remove interruption.



Switch-on ignition.
Measure voltage by means of positive cable of voltmeter on jack 3 (terminal 15) of coupler.

approx. 12 Volts	0 Volt

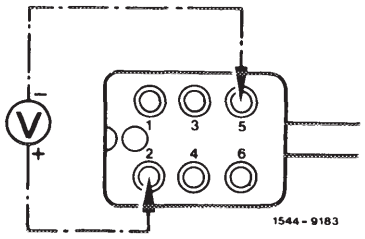


Test line (terminal 15, black/red) to ignition starting switch for interruption.

Remove interruption.

Connect positive cable (red) of voltmeter to jack 2 (terminal 30) and negative cable (black) of voltmeter to jack 5 (terminal 31) of coupler and measure voltage.

approx. 12 Volts	0 Volt



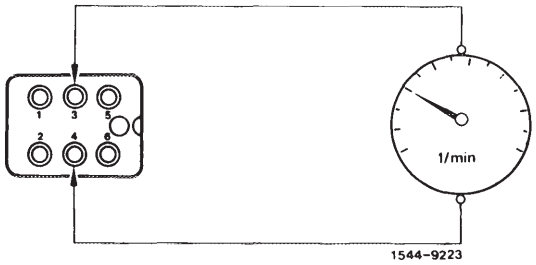
Test line (terminal 31, brown) to grounding point for interruption.

Remove interruption.

Connect revolution counter to jack 3 (terminal 15) and jack 4 (terminal TD) of coupler.

Operate starter.

approx. 200/min	0/min



Test line (terminal TD, green/yellow) to TSZ (transistorized coil ignition) switching unit for interruption.

Replace switching unit, if line is in order.

Testing operation of fuel pump relay

Connect negative cable (black) of voltmeter to vehicle ground. Plug fuel pump relay on coupler in such a manner that the voltage can be measured at connection 1 (terminal 87) of fuel pump relay by means of positive cable (red) of voltmeter. For this purpose, operate starter.

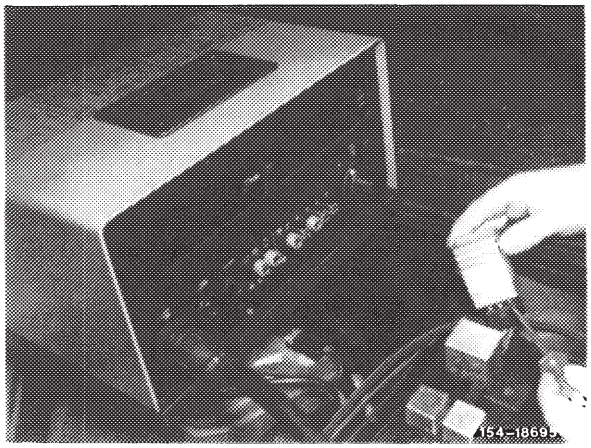
approx. 12 Volts	0 Volt

Replace fuel pump relay.

Run engine at idle.

Engine running.	Engine not running

Replace fuel pump relay.

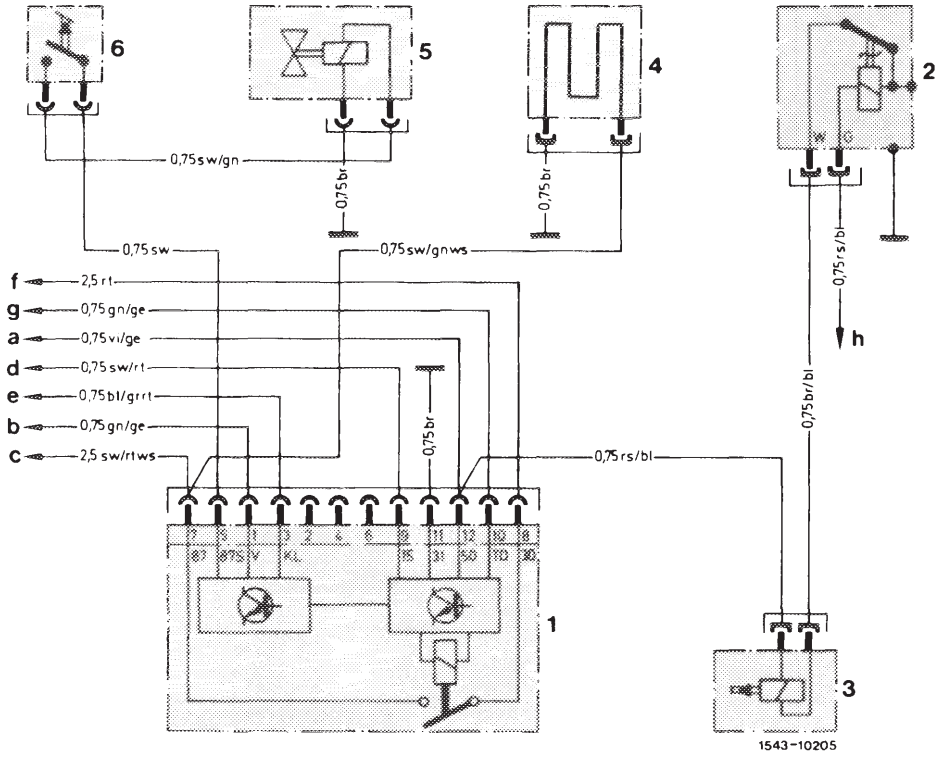


If engine is not regulated (breakaway) when attaining max. speed of engine, replace fuel pump relay.

The respective breakaway speed is punched into fuel pump relay.

End of test

B. Starting September 1981

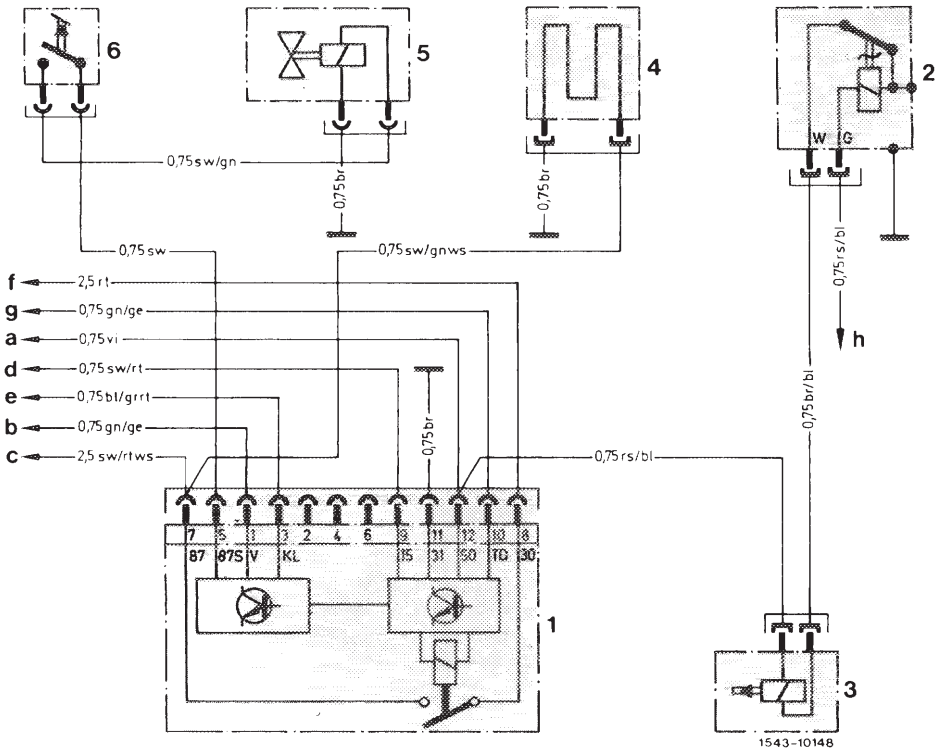


Wiring diagram model 123

1 Fuel pump relay
2 Thermo time switch
3 Cold starting valve
4 Warm-up compensator
5 Switchover valve
6 Microswitch

a To output starter lockout and backup lamp switch
b Transmitter mechanical tachometer
c Fuel pump
d Fuse 12 terminal 15 access
e Refrigerant compressor
f Cable connector engine terminal 30
g Cable connector terminal TD
h Cable connector engine terminal 50

Color code
bl = blue
br = brown
ge = yellow
gn = green
gr = gray
rs = pink
rt = red
sw = black
vi = purple
ws = white



Wiring diagram model 107, 126

1 Fuel pump relay
2 Thermo time switch
3 Cold starting valve
4 Warm-up regulator
5 Switchover valve
6 Microswitch

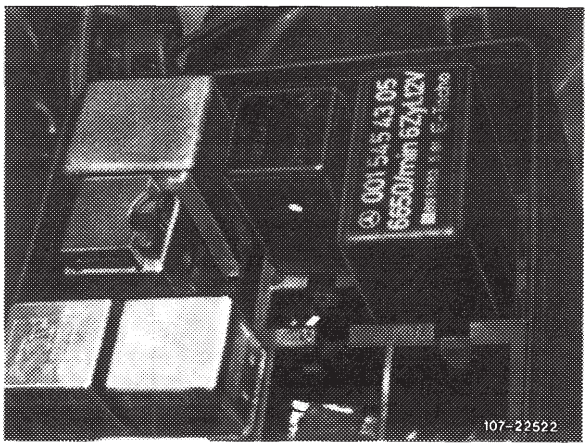
a Cable connector engine terminal 50
b Transmitter electronic tachometer
c Fuel pump
d Fuse 14 terminal 15 access
e Refrigerant compressor
f Cable connector terminal 30
g Cable connector terminal TD
h Cable connector terminal 50

Color code
bl = blue
br = brown
ge = yellow
gn = green
gr = gray
rs = pink
rt = red
sw = black
vi = purple
ws = white

Testing activation of fuel pump relay

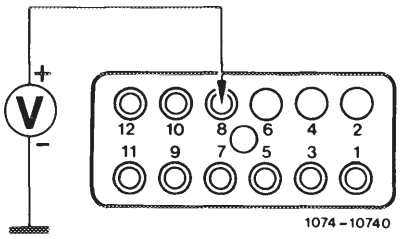
Remove fuel pump.
Connect negative cable (black) of voltmeter to vehicle ground. Measure voltage by means of positive cable (red) of voltmeter on jack 8 (terminal 30) of coupler.

approx. 12 Volts	0 Volt



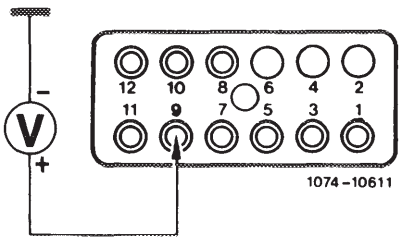
Test line (terminal 30, red) to cable connector engine harness for interruption.

Remove interruption.



Switch-on ignition.
Measure voltage by means of positive cable (red) of voltmeter on jack 9 (terminal 15) of coupler.

approx. 12 Volts	0 Volt

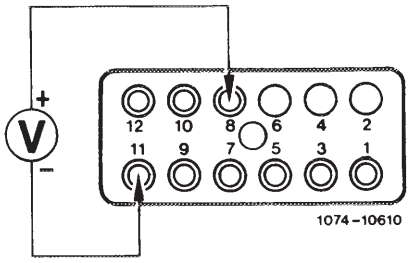


Test line (terminal 15, black/red) to fuse box for interruption.

Remove interruption.

Connect positive cable (red) of voltmeter to jack 8 (terminal 30) and negative cable (black) of voltmeter to jack 11 (terminal 31) of coupler and measure voltage.

approx. 12 Volts	0 Volt



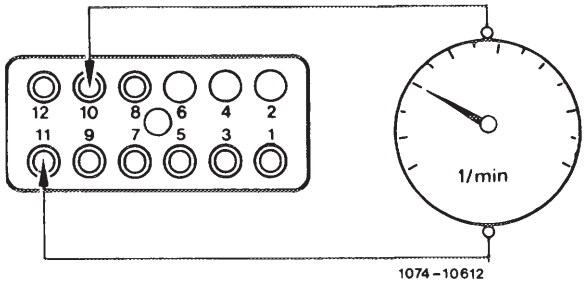
Test line (terminal 31, brown) to ground connection point for interruption.

Remove interruption.

Connect revolution counter to jack 10 (terminal TD) and jack 11 (terminal 31) of coupler.

Operate starter.

approx. 200/min	0/min



Test line (terminal TD, green/yellow) to TSZ (transistorized coil ignition) switching unit for interruption.

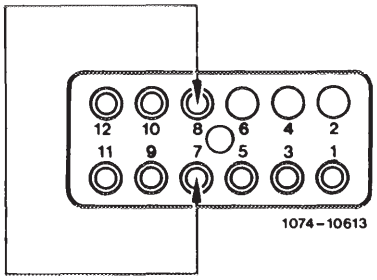
Replace switching unit if line is in order.

Testing operation of fuel pump relay

Bridge jack 7 (terminal 87) and 8 (terminal 30).
Fuel pump should now be heard starting.

Fuel pump running.

Yes	No



Test line (terminal 87, black/red/white) to fuel pump for interruption.

Remove interruption.

Fuel pump running.

Yes	No

Renew fuel pump.

Fuel pump running.

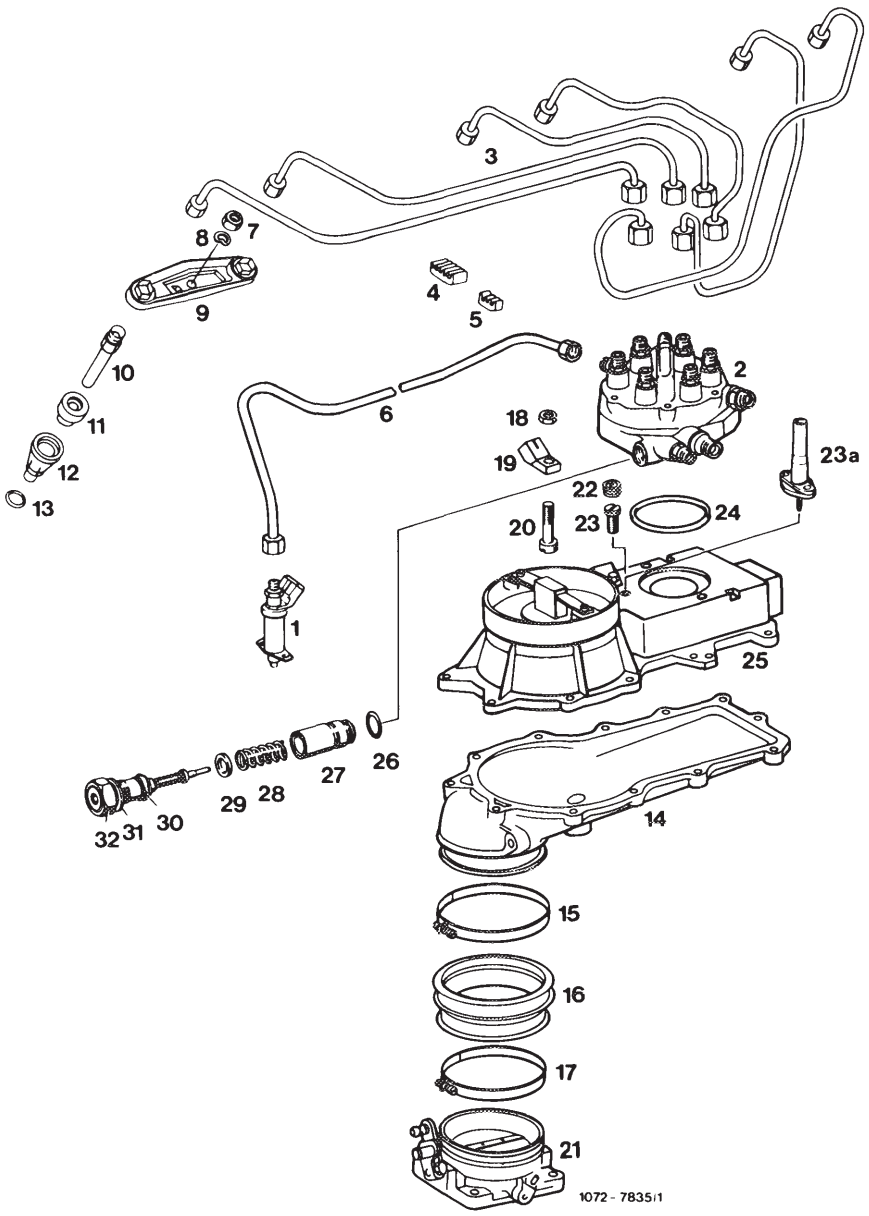
Yes	No

Renew fuel pump

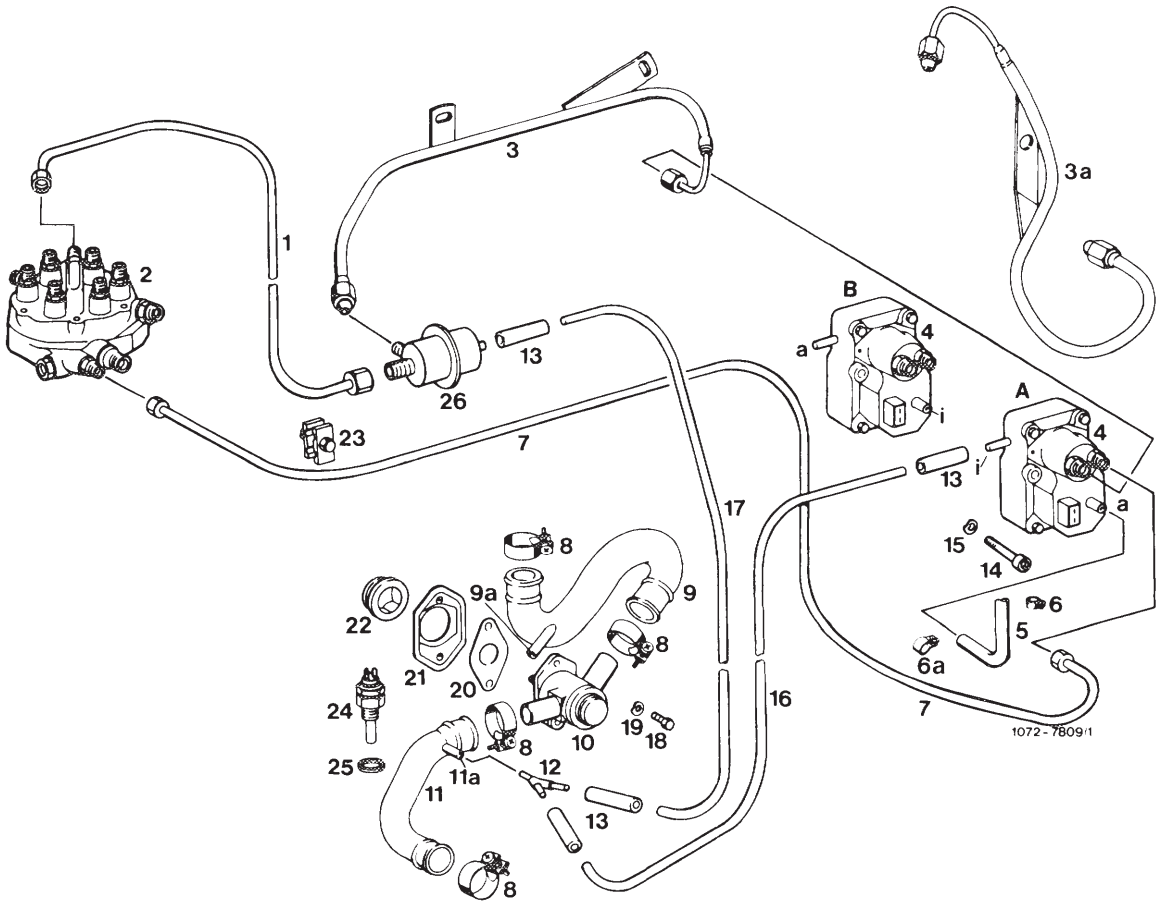
End of test

If engine is not regulated (breakaway) when engine max. speed is attained, replace fuel pump relay.

The respective breakaway speed is punched into fuel pump relay.



1 Cold starting valve
2 Fuel distributor
3 Injection lines
4 Plastic clip
5 Plastic clip
6 Fuel line
7 Nut
8 Corrugated washer
9 Fastening bridge
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 Polystop nut
19 Safety switch
20 Screw
21 Throttle valve housing
22 Closing plug
23 Closing plug
23a Adjusting device
24 O-ring
25 Air flow sensor
26 O-ring
27 Regulator piston
28 Compression spring
29 Adjusting washers
30 O-ring
31 Copper sealing ring
32 Closing plug



1 Control pressure line
2 Fuel distributor
3 Control pressure line with Tecalan 1st version
3a Control pressure line with Tecalan 2nd version, starting with increased output
4 Warm-up compensator
5 Vacuum hose for full load enrichment
6 Hose clamp
6a Hose clamp for emission version only
7 Fuel return line
8 Hose clamp
9 Contour hose
9a Connection for ignition retard
10 Auxiliary air valve
11 Contour hose
11a Connection leak line 1st version
12 Distributor
13 Connecting hose
14 Screw
15 Corrugated washer
16 Leak line
18 Screw
19 Corrugated washer
20 Gasket
21 Flange
22 Closing plug
23 Fastening holder
24 Thermo time switch
25 Sealing ring
26 Pressure damper

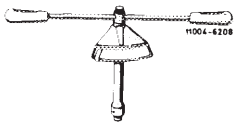
A Warm-up compensator prior to September 1981
a Vacuum connection for full load enrichment
i Connection to leak line (atmosphere)

B Warm-up compensator starting September 1981
a Vacuum connection for full load enrichment
i Connection to leak line (atmosphere)

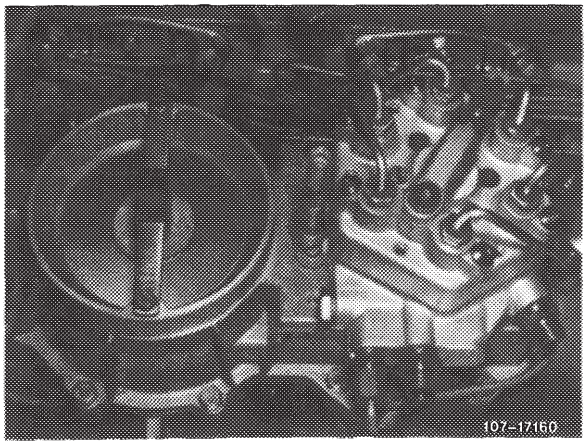
07.3–200 Removal and installation of mixture controller

Tightening torques	Nm
Hex. 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.

Close fuel feed and return line blind.

3 Pull electric connecting cable, to the extend installed, from safety switch.

4 Unscrew all hex. screws and both hex. nuts from mixture controller.

5 Remove mixture controller.

6 Renew air guide housing according to condition. For this purpose, loosen hose clamp on rubber sleeve and on contour hose for idle air.

7 Mount air guide housing.

8 Install mixture controller with Curil K 2 or Hylomar in vice versa sequence.

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).

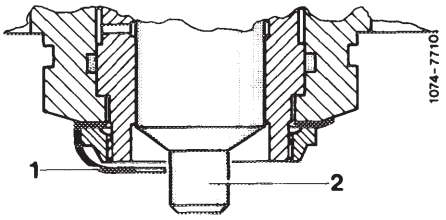
Tightening torques (reference values)	Nm
Injection lines to fuel distributor	
Fuel line for cold starting valve to fuel distributor	
Fuel return line from warm-up compensator to fuel distributor	10–12
Control pressure line to fuel distributor	
Control pressure line to pressure damper	
Injection lines to injection valves	10–15

Note

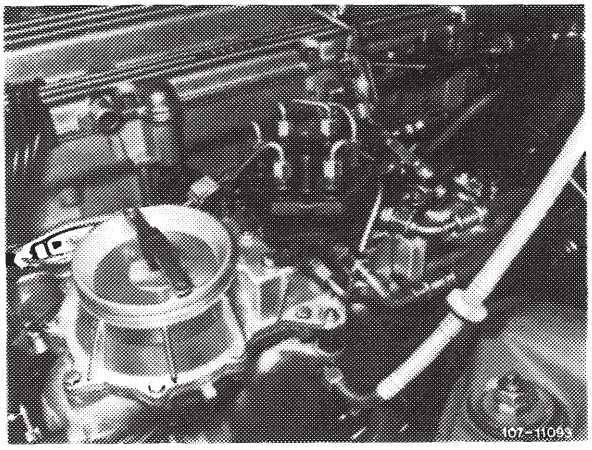
After stocks of fuel distributor made of gray iron have been used up, only fuel distributors made of light alloy are available as spare parts

Note that for engines 110.984/985/986 they are manufactured with the characteristic of the fuel distributor made of gray casting and without pressure compensating valve. This fuel distributor i s not identical with the light alloy distributor installed in production vehicles (series).

The fuel distributor (gray iron starting Bosch production date 725 and light alloy fuel distributor) is provided with a sheet metal lock (1), which prevents control piston (2) from falling out. The sheet metal lock serves to facilitate assembly, as well as a safety device during transportation, and should not be removed.



Removal



1 Remove air cleaner.

2 Unscrew all fuel and injection lines on fuel distributor and on injection valves. Catch fuel with a rag. Close fuel feed and return line blind.

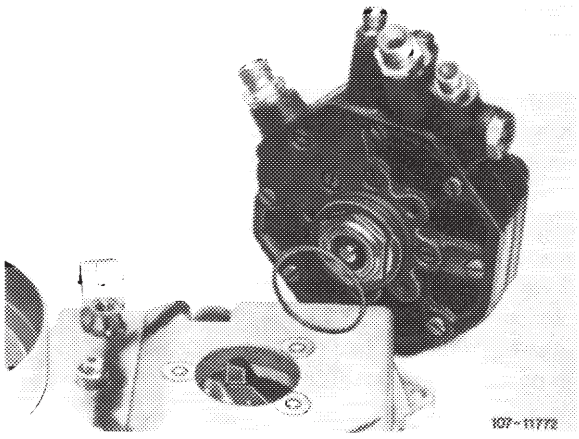
3 Unscrew double thread connection for control pressure line on fuel distributor.

4 Unscrew the three fastening screws on fuel distributor.

5 Remove fuel distributor by turning distributor back and forth.

Attention!
When removing fuel distributor which is not provided with a sheet metal lock, make sure that the control piston is not falling out.

Installation



6 Slip new rubber ring on fuel distributor.

7 Slightly lubricate rubber ring and **carefully** mount fuel distributor.

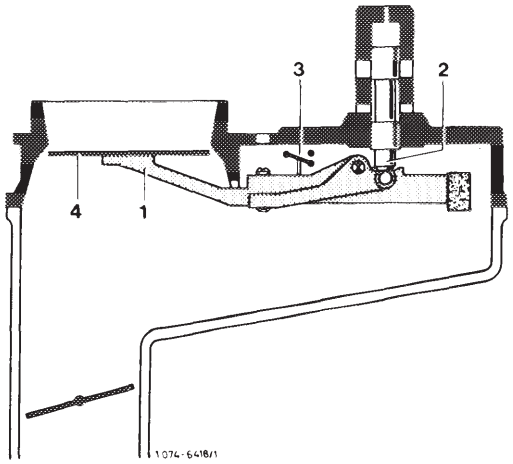
Attention!
Do not damage rubber ring during assembly, since otherwise false air will be sucked in.

8 Screw-in the three fastening screws on fuel distributor.

9 Screw-on double thread connection for control pressure line on fuel distributor.

10 Connect all fuel lines except injection lines.

11 Check adjusting lever (1) in air flow sensor and control piston (2) in fuel distributor for easy operation. In addition, on:



Mixture controller **with** safety switch

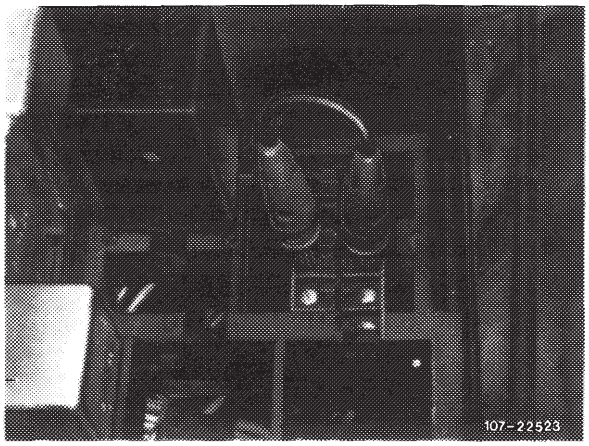
Pull plug from safety switch (3), switch-on ignition for a short moment to establish control pressure.

Mixture controller **without** safety switch

Pull-off fuel pump relay and bridge the two jacks for a short period to establish control pressure.

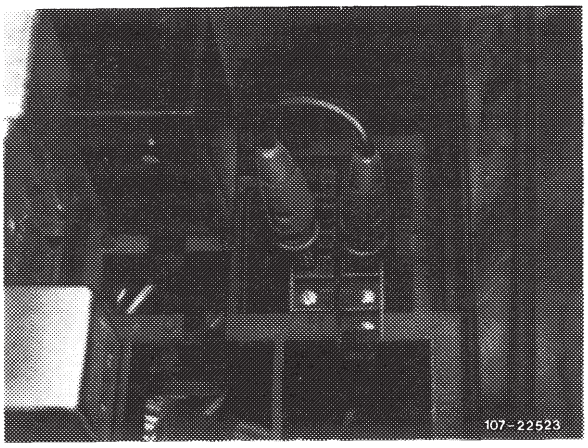
Prior to September 1981: Jacks 1 and 2.
Starting Spetember 1981: Jacks 7 and 8.

Push air flow sensor plate (4) manually down. A uniform resistance should be felt across entire path. During fast upward movement, no resistance should be felt, since the slowly following control piston lifts from adjusting lever. During a slow upward movement the control piston should follow closely.



12 Check association of control piston with air flow sensor plate and adjust, if required. For this purpose, switch-on ignition, pull cable plug from safety switch or pull off fuel pump relay and bridge the two jacks. The fuel should now just stop flowing at output connection to injection lines, adjust association by means of idle speed mixture control screw, if required.

Prior to September 1981: Jacks 1 and 2.
Starting September 1981: Jacks 7 and 8.



13 Mount injection lines.

14 Run engine and check all fuel connections, as well as rubber ring on fuel distributor for leaks by spraying.

15 Adjust idle speed (07.3–100).

07.3–210 Reconditioning of system pressure regulator and pressure compensating valve

Test values

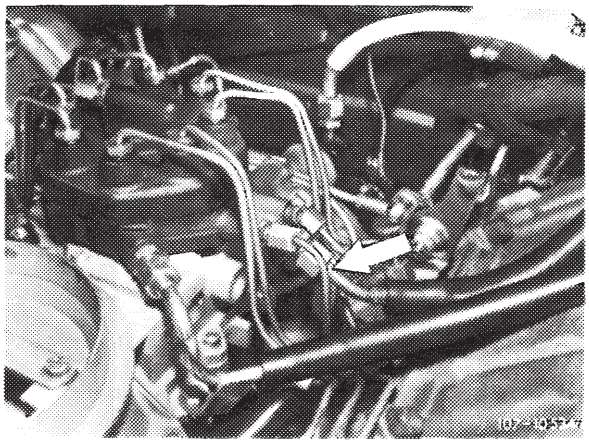
System pressure (engine cold or warm) at idle	5.0–5.6 bar gauge pressure

Conventional tools

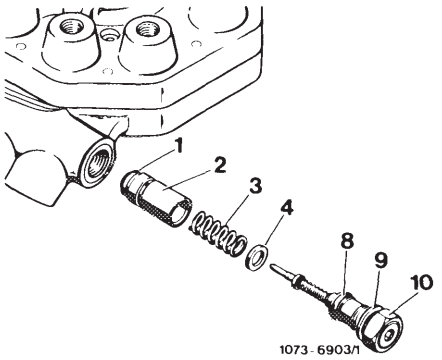
Screw driver element 992–T 30	e.g. made by Hazet, D-5630 Remscheid

Reconditioning system pressure regulator

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



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



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

4 Install parts from repair kit. O-ring (1) is also available as a single part.

Attention!
The regulator piston (2) is fitted for fuel distributor and should not be replaced. If required, completely replace fuel distributor.

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

Mount assembly group with removed adjusting washers (4) and copper sealing ring (9) included in delivery.

5 Test 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
0.15 mm
0.3 mm
0.4 mm
0.5 mm thick

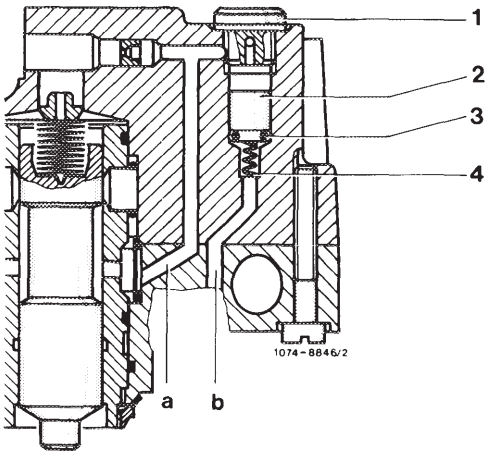
The adjusting washers are available in repair kit.

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

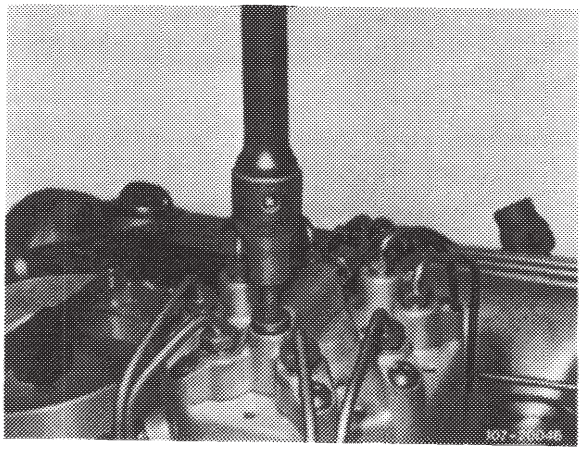
Reconditioning pressure compensating valve

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

7 Install parts of repair kit.



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



Tightening torques (reference values)	Nm
Injection lines to fuel distributor	10–12
Injection lines to injection valves	10–15

Removal

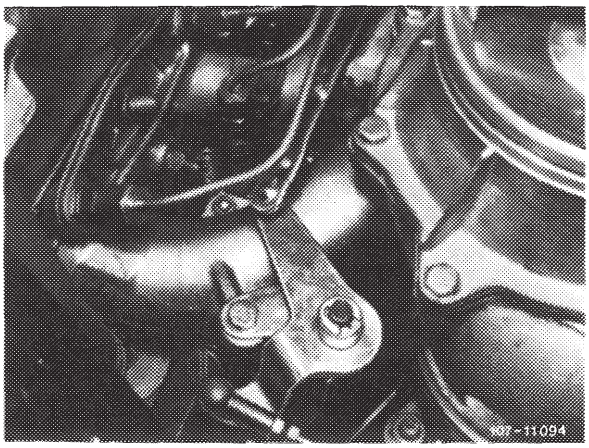
1 Remove air cleaner.

2 Unscrew injection lines from injection valves and on fuel distributor. When loosening injection lines, apply counterhold to injection valves.

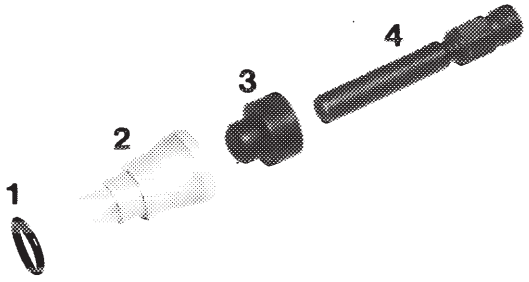
3 Loosen fastening nuts and remove fastening bridges.

For removing injection valves from cylinder 5, remove 6 pressure dampers.

Attention!
When removing fastening bridges, apply counterhold to injection valves, so that injection valves and insulating sleeves are not pulled out at the same time.

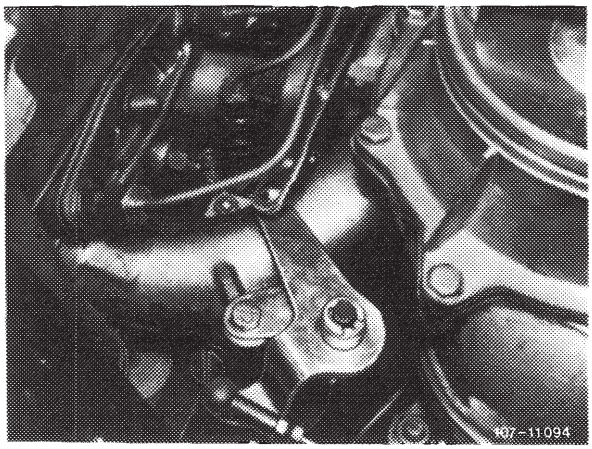


4 Pull out injection valves while applying counterhold to insulating sleeves (2). If the insulating sleeves are pulled out, install new O-rings (1).



107-11773

Installation



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

Install fastening bridges in such a manner that the lugs are at the left.

Note: Mount pulled-out insulating sleeves with new O-rings.

6 Connect injection lines while paying attention to tightening torques as reference values.

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

7 Run engine and check all fuel connections for leaks.

Note

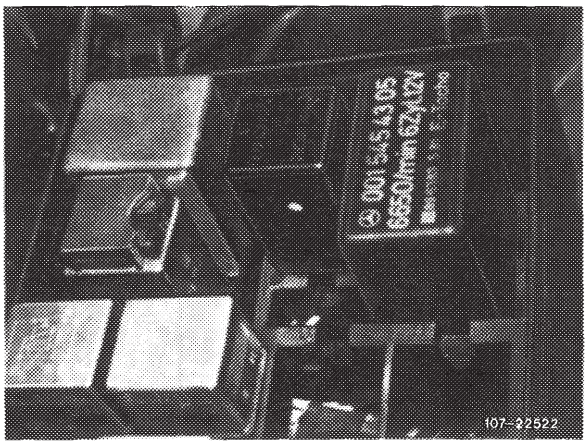
Following installation of light alloy fuel distributor in production vehicles (series), the safety switch on air flow sensor is no longer installed. An electronic relay is used instead (for operation, refer to 07.3–500).

Layout and testing of fuel pump relay (07.3–165).

For test jobs performed with engine stopped and fuel pump running, pull off fuel pump relay and bridge the two jacks.

Prior to September 1981: Jack 1 and 2.
Starting September 1981: Jack 7 and 8.

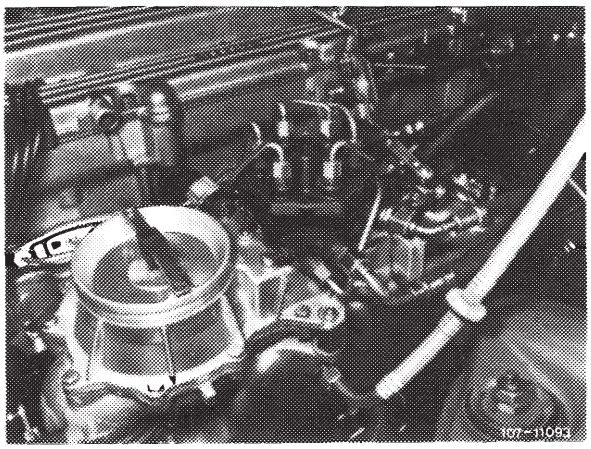
Model 126



Replacement

1 Remove and install mixture controller (07.3–200).

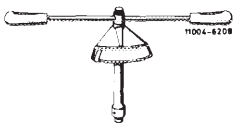
2 Remove and install fuel distributor (07.3–205).



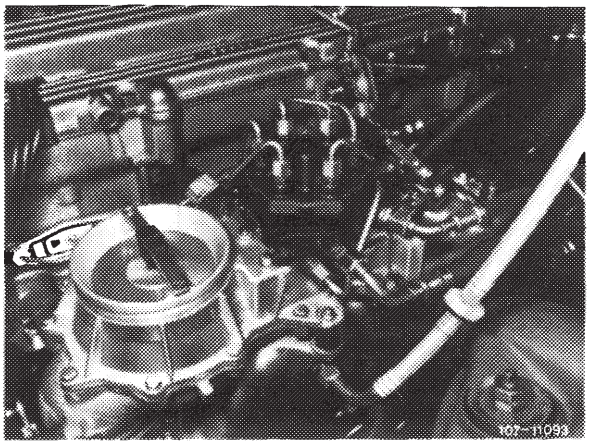
07.3–225 Removal and installation of mixture controller with air guide housing

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.

Close fuel feed and return flow line blind.

3 Pull electric connecting cables, to the extent installed, from safety switch.

4 Loosen hose clamp on rubber sleeve between air guide housing and throttle valve housing.

5 Unscrew both hex. nuts on rubber buffers.

6 Lift off mixture controller with air guide housing, while pulling off idle air hose.

Installation

7 For installation proceed vice versa.

8 Tighten both hex. nuts to specified tightening torques by means of a torque wrench.

9 Connect injection lines and fuel lines, while paying attention to tightening torques as reference values.

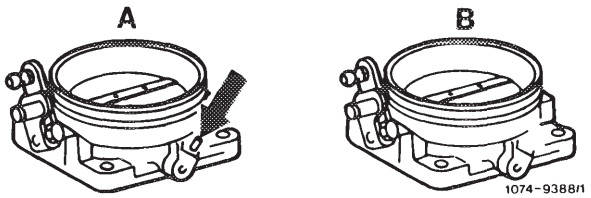
Attention!
When tightening injection lines and fuel lines, apply counterhold to injection valves as well as to double thread connections on fuel distributor.

10 Run engine and check all fuel connections for leaks.

11 Adjust idle speed (07.3–100).

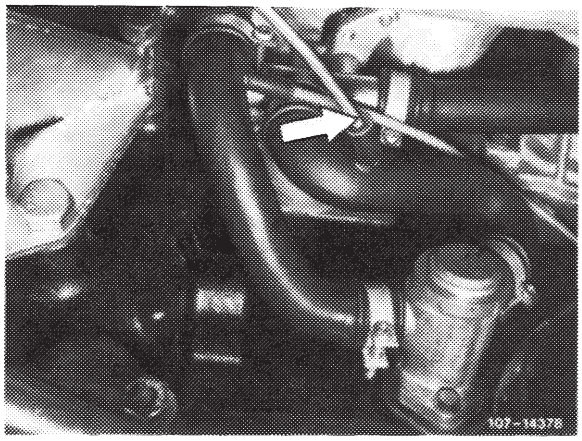
Note

Connection (arrow) for ignition retard on throttle valve housing is no longer installed.



A Former version
B Present version

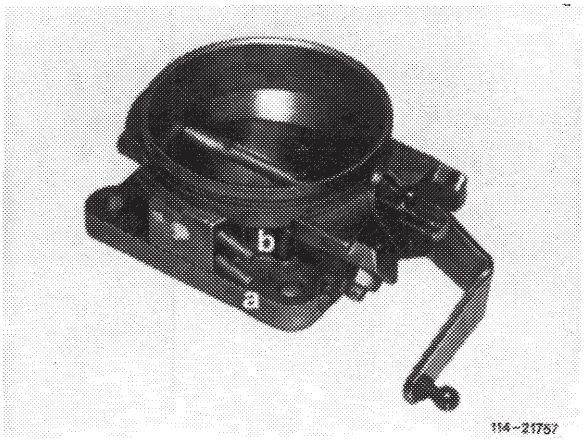
To obtain a higher speed following a cold start at low outside temperatures, the connection on throttle valve housing for ignition retard has been transferred from throttle valve housing to contour hose between auxiliary air valve and idle speed air distributor starting April 1978. In-between, the connection on throttle valve housing has been closed by means of a rubber cap.



Starting September 1981, the throttle valve housing is provided with 2 connections.

Connection "a" for EGR (function diagram refer to 14–500).

Connection "b" for ignition advance.



Removal

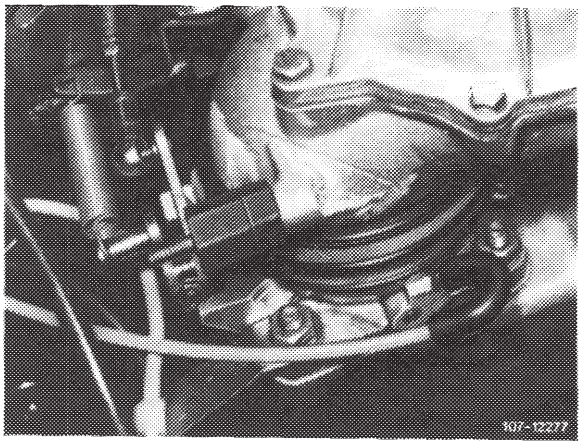
1 Remove mixture controller with air guide housing (07.3–225).

2 Loosen and remove rubber sleeve.

3 Disconnect regulating linkage and return spring.

4 Pull off vacuum connections.

5 Loosen fastening nuts and remove throttle valve housing.



Installation

6 For installation proceed vice versa, using new gasket.

7 Adjust regulating linkage (30–300).

8 Adjust idle speed (07.3–100).

07.3–242 Subsequent installation of safety switch on air flow sensor

When installing a new engine or an exchange engine without safety switch (19) on air flow sensor and distributor rotor with rpm limitation in vehicles which have been installed with these components up to now, use safety switch and distributor rotor from old engine.

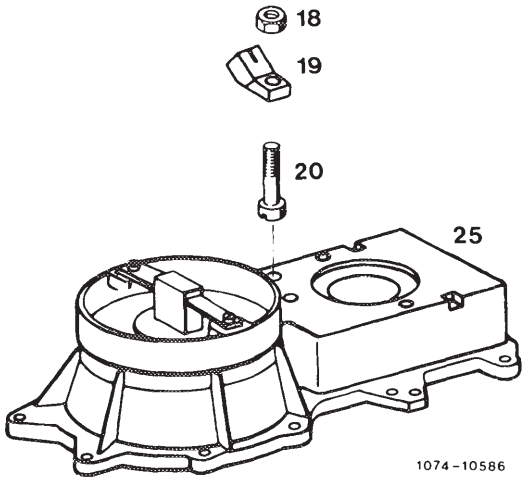
Installation

1 Remove mixture controller from new engine.

2 Install safety switch (19) as shown in Fig.. Do not use removed disk.

Attention!
When mounting safety switch, make sure that insulating disk is correctly mounted under leaf spring.

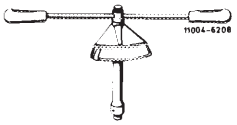
3 Install distributor rotor with rpm limitation into new engine.



07.3–245 Replacement, centering and zero position of air flow sensor plate

Tightening torque	Nm
Hex. screw	5.0–5.5

Special tool

Torque wrench 1/4" square, 4–16 Nm		000 589 67 21 00

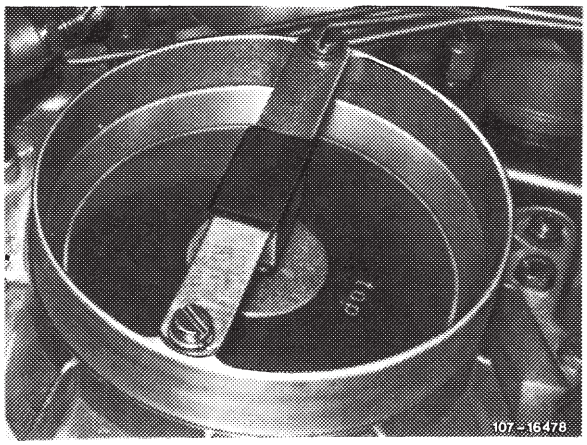
Conventional equipment and tools

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 screw out with care (risk of tearing threads).

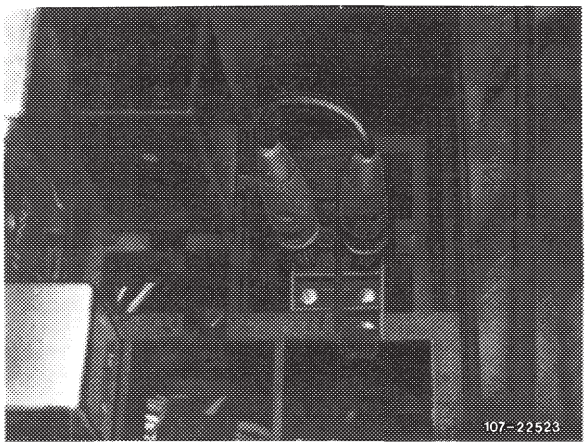
Attention!
The fastening screw is micro-encapsulated.

4 Clean bore for fastening air flow sensor plate with M 6 tap.

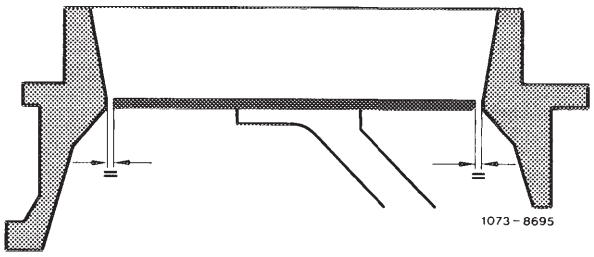
5 Install parts contained in repair kit. Make sure that the letters "TOP" are on top and insert air flow sensor plate. Lightly screw-in micro-encapsulated fastening screw (self-locking).

6 Center air flow sensor plate. For this purpose, pull off fuel pump relay (arrow) and bridge the two jacks **short**, or pull off plug on safety switch. Switch-on ignition for a short moment to establish control pressure.

Prior to September 1981: Jacks 1 and 2
Starting September 1981: Jacks 7 and 8



Use slip gauge 0.10–0.20 mm and make sure that the air flow sensor plate is accurately centered. Plate should not bind even under light lateral pressure (bearing play cancelled).

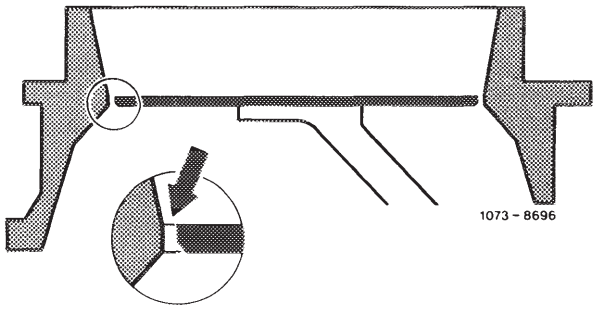


7 Tighten fastening screw to 5.0–5.5 Nm.

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

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

Note: To check zero position, bridge electric safety circuit (refer to item 6). This will provide control piston with control pressure.



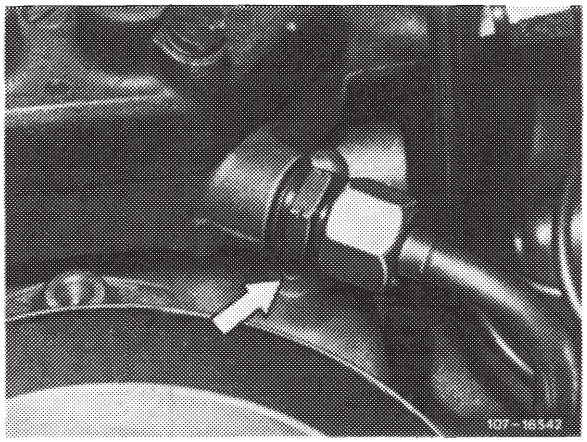
10 Adjust zero position of air flow sensor plate:

a) If too high, lock 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!
Do not knock-in guide pin too low.

Avoid repeated adjustments in both directions, since the press fit of the pin will become too loose.



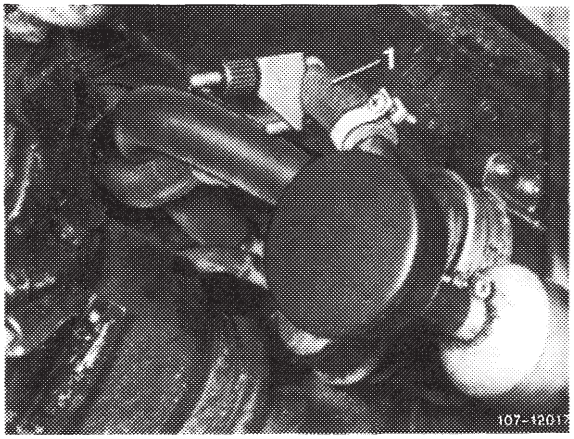
11 Mount stop bracket and fuel pump relay or attach plug to safety switch.

12 Adjust idle speed (07.3–100).

Special tool

Clamp for fuel hose		000 589 40 37 00

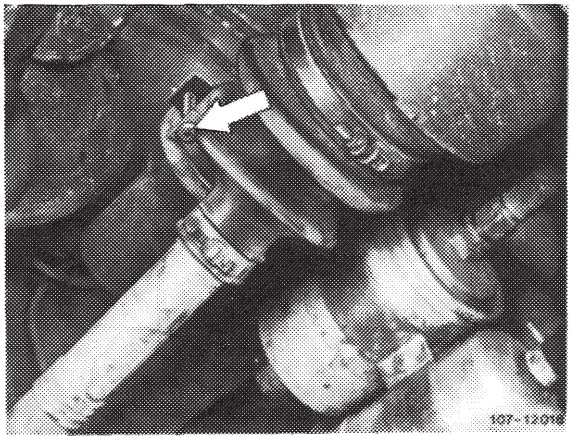
Removal



1 Unscrew protective case.

2 Pinch fuel intake hose (arrow) with a clamp.

1st version



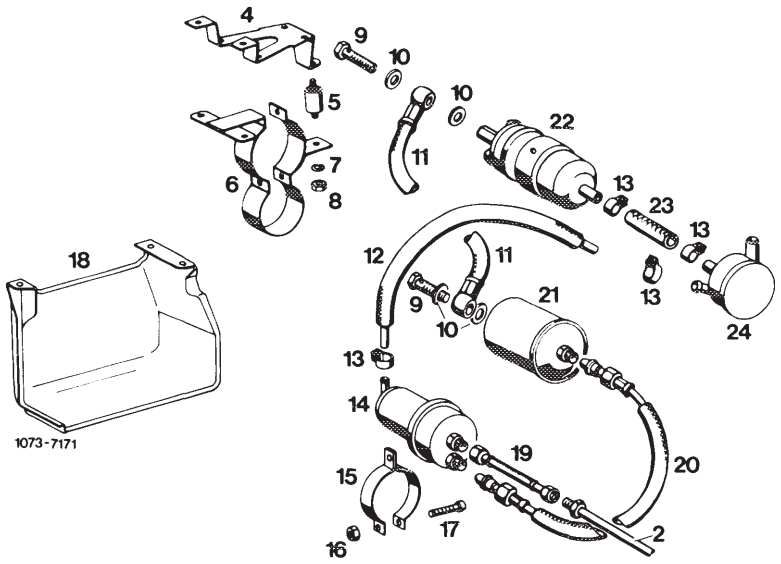
3 Pinch fuel feed hose.

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, fasten fuel feed hose to center connection of fuel reservoir.

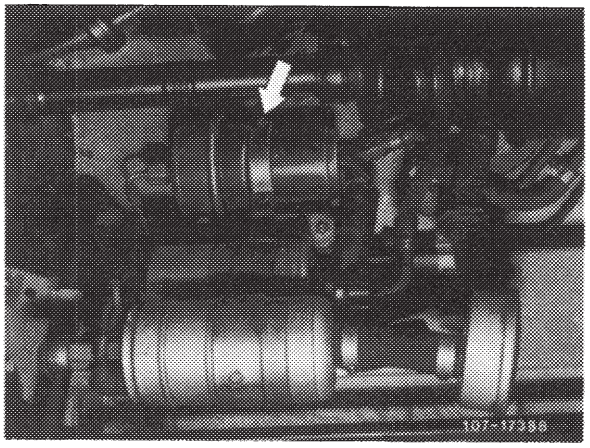
2 Fuel feed line
4 Mounting bracket
5 Anti-vibration buffer
6 Holder
7 Snap ring
8 Nut
9 Hollow screw
10 Sealing ring
11 Fuel hose
12 Fuel hose
13 Hose clamp
14 Fuel reservoir
15 Holder
16 Nut
17 Screw
18 Protective case
19 Fuel hose
20 Fuel hose
21 Fuel filter
22 Fuel pump
23 Fuel hose
24 Damper



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.



Installation

9 For installation proceed vice versa.

10 Remove clamp on fuel suction hose.

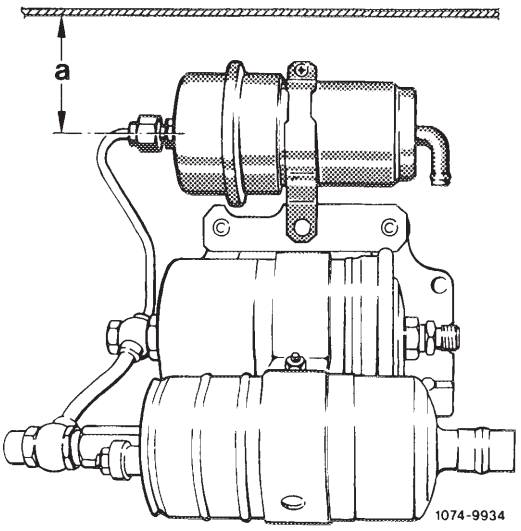
11 Run engine and check for leaks.

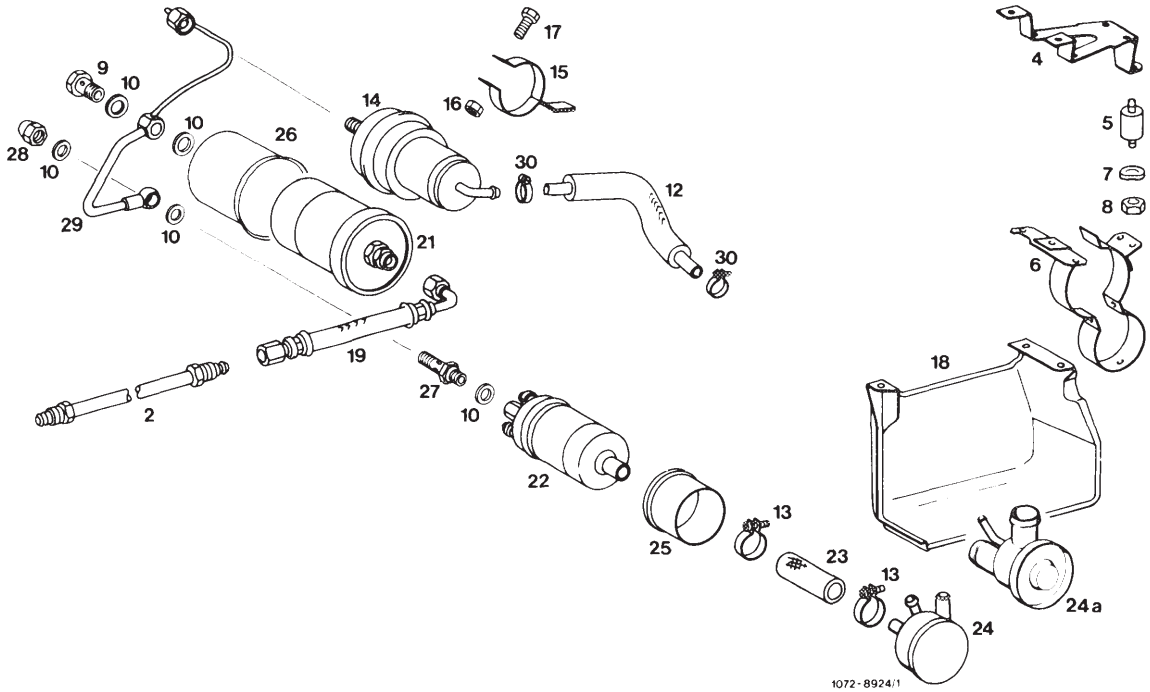
12 Mount protective case.

Note: On model 126, measure distance between fuel reservoir and body floor as shown in Fig.

Nominal dimension = 62 mm.

If required, push fuel reservoir in upward direction. For this purpose, apply manual counterhold against fuel pump.

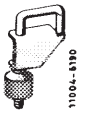




2	Fuel feed line	18	Protective case
4	Mounting bracket	19	Fuel hose
5	Anti-vibration buffer	21	Fuel filter
6	Holder	22	Fuel pump
7	Snap ring	23	Fuel hose
8	Nut	24	Damper 1st version
9	Hollow screw	24a	Diaphragm damper 2nd version
10	Sealing ring	25	Plastic sleeve
12	Fuel hose	26	Plastic sleeve
13	Hose clamp	27	Check valve
14	Fuel reservoir	28	Cap nut
15	Holder	29	Steel line
16	Nut	30	Hose clamp
17	Screw		

07.3–275 Removal and installation of fuel filter

Special tool

Clamp for hose lines		000 589 40 37 00

Note

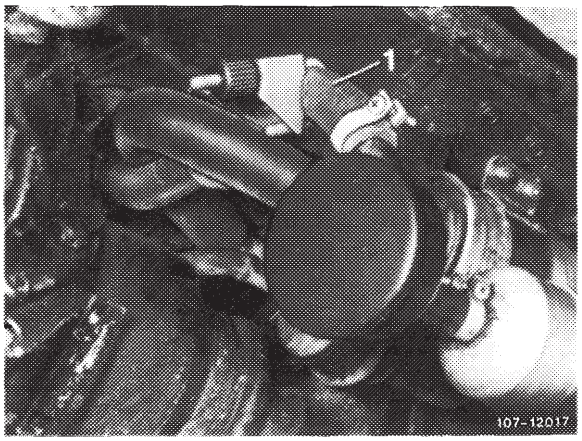
The fuel filter is especially provided with an integrated damper for silencing. To prevent contact corrosion, the fuel filter is provided with a plastic sleeve.

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

Removal

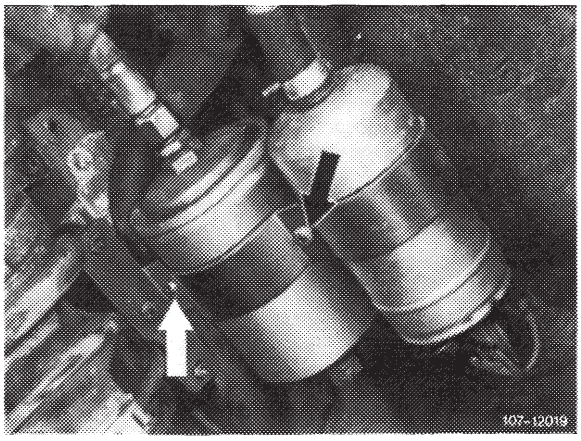
1 Unscrew protective case.

2 Pinch fuel suction hose (1) with a clamp.



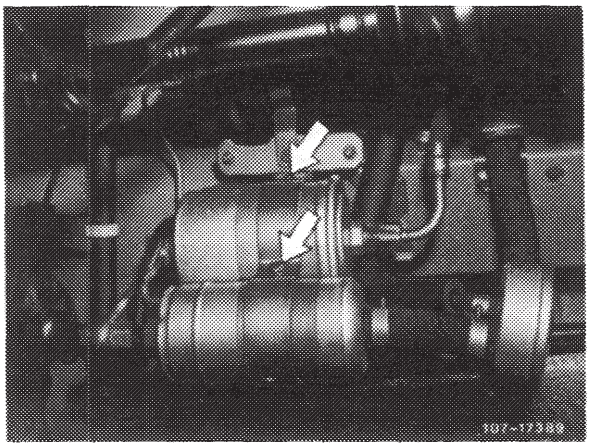
3 Unscrew fuel line and fuel hose from fuel filter.

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

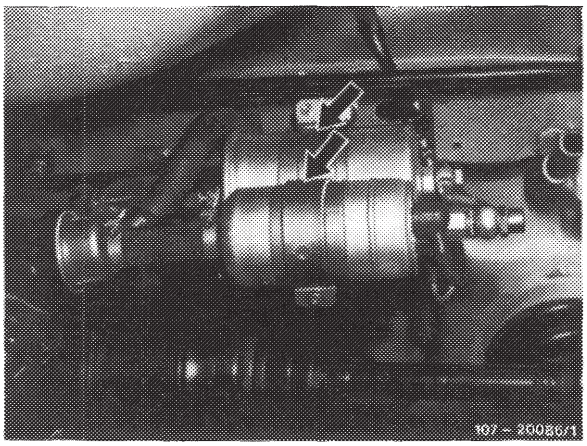


1st version

2nd version



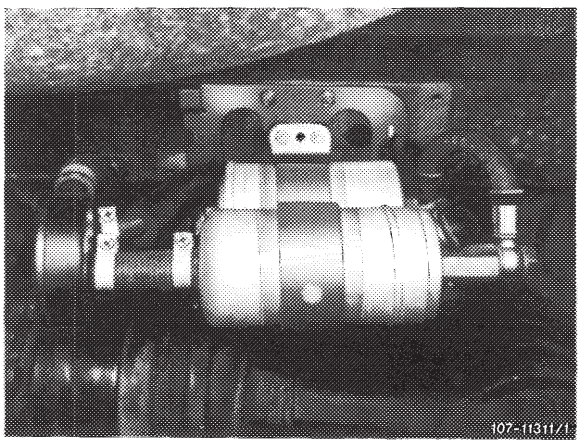
3rd version



Installation

5 For installation proceed vice versa, using new sealing rings.

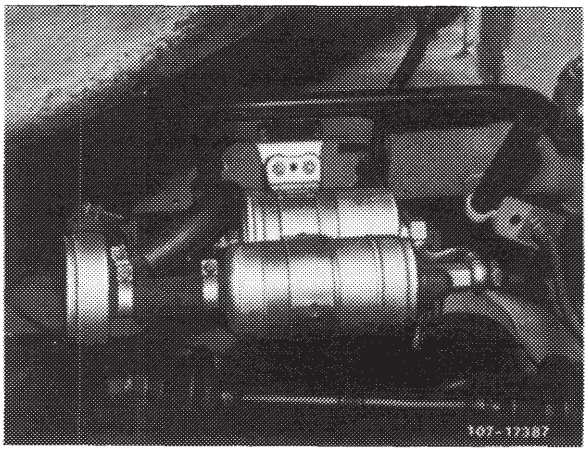
6 Locate fuel filter with plastic sleeve in holder. Plastic sleeve should project on both sides of holder, since direct contact of fuel filter with holder may lead to contact corrosion.



7 Remove clamp on fuel suction hose.

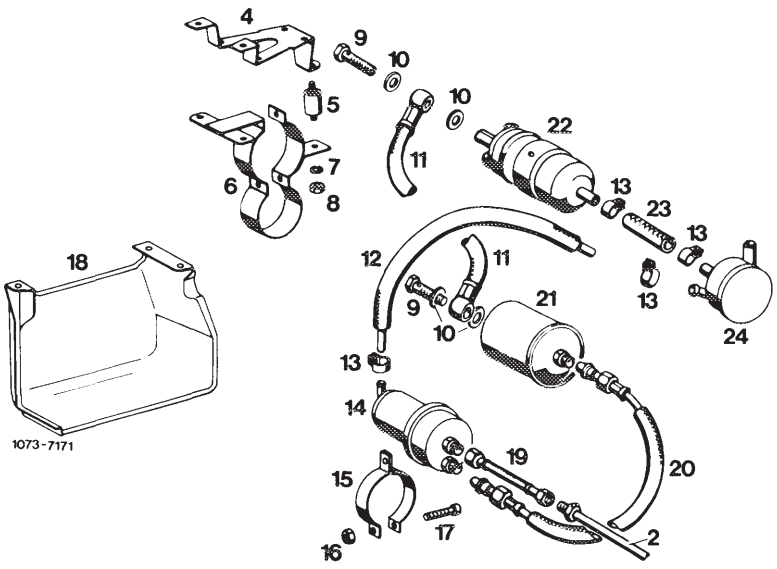
8 Run engine and check for leaks.

9 Mount protective case.

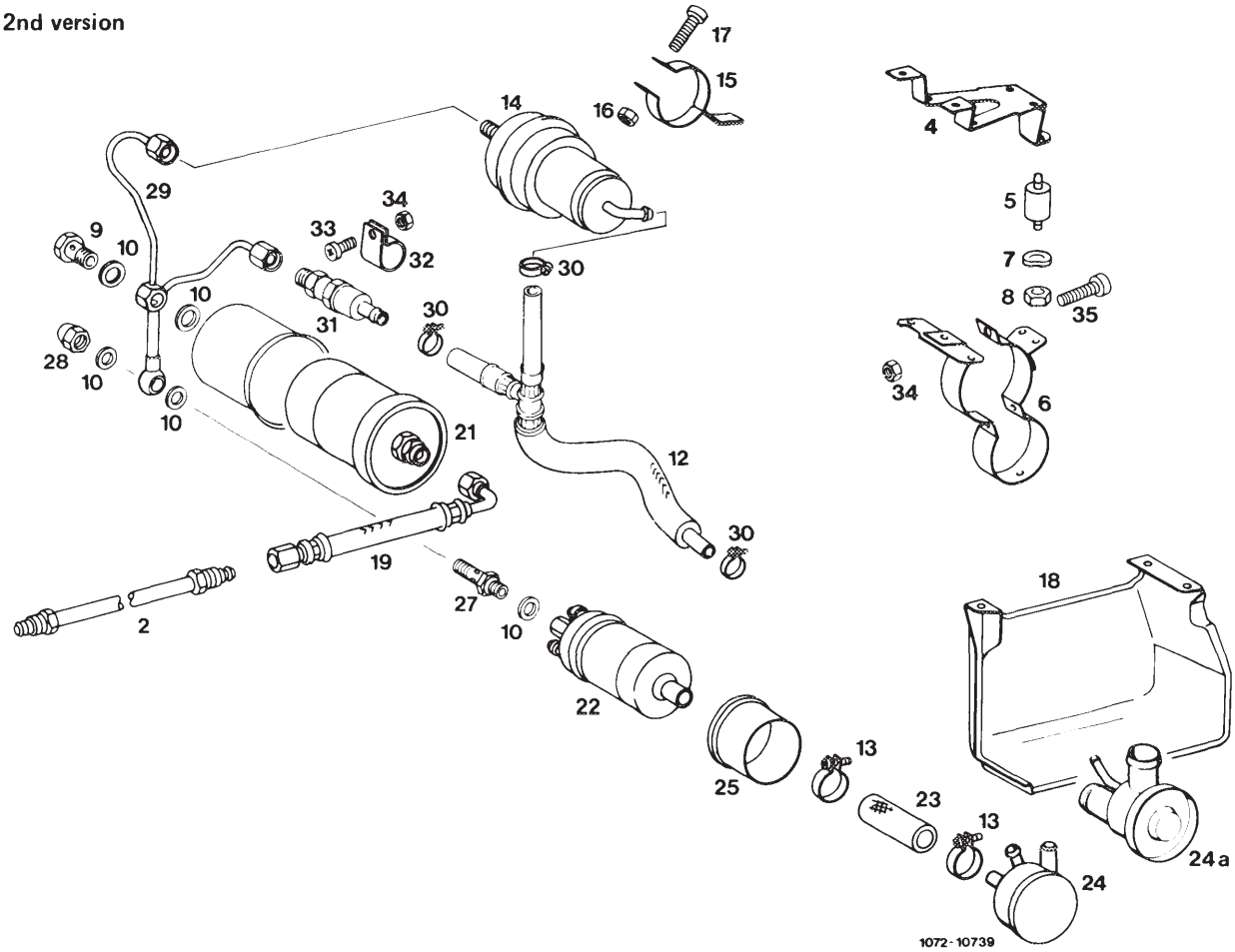


1st version

2 Fuel feed line
4 Mounting bracket
5 Anti-vibration buffer
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

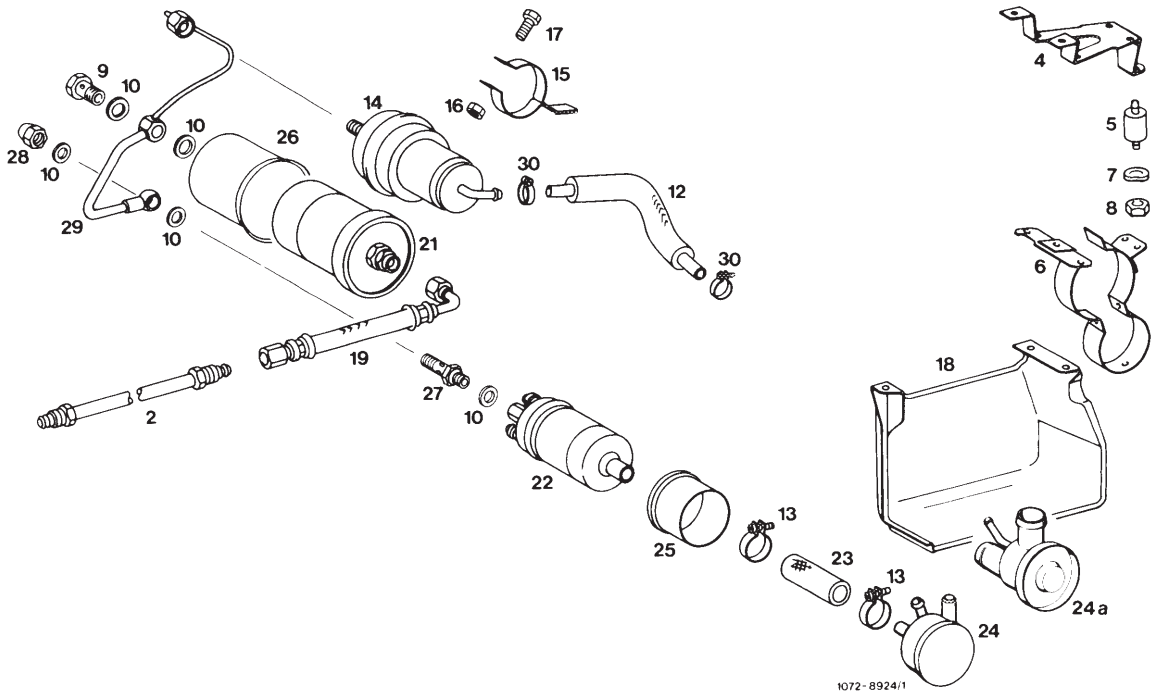


2nd version



2 Fuel feed line
4 Mounting bracket
5 Anti-viration buffer
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 1st version
24a Diaphragm damper 2nd version
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

3rd version



2	Fuel feed line	14	Fuel reservoir	24a	Diaphragm damper 2nd version
4	Mounting bracket	15	Holder	25	Plastic sleeve
5	Anti-vibration buffer	16	Nut	26	Plastic sleeve
6	Holder	17	Screw	27	Check valve
7	Snap ring	18	Protective case	28	Cap nut
8	Nut	19	Fuel hose	29	Steel line
9	Hollow screw	21	Fuel filter	30	Hose clamp
10	Sealing ring	22	Fuel pump		
12	Fuel hose	23	Fuel hose		
13	Hose clamp	24	Damper 1st version		

07.3–280 Removal and installation of fuel pump

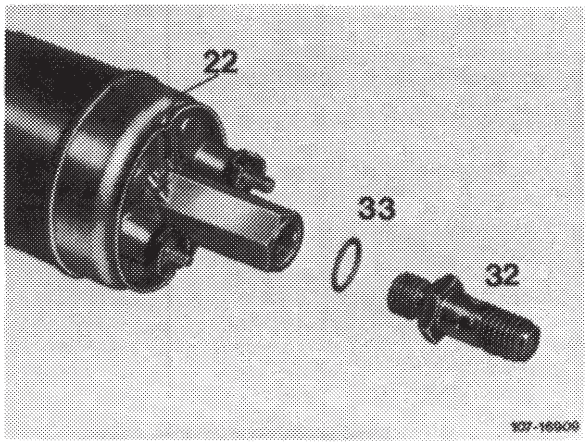
Special tools

Clamp for hose lines		000 589 40 37 00

Note

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

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



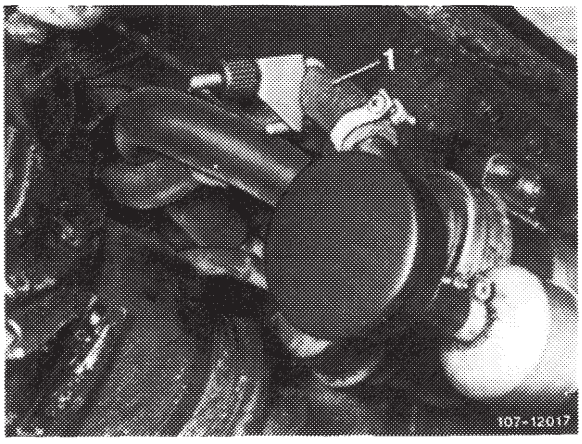
22 Fuel pump
32 Check valve
33 Sealing ring

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

Removal

1 Unscrew protective case.

2 Pinch fuel suction hose (1) with a clamp.

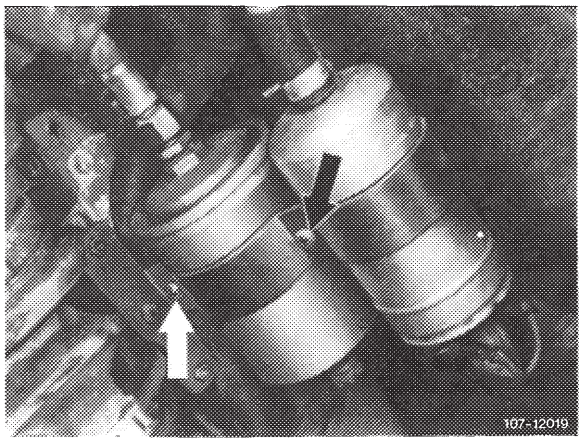


1st version

3 Loosen fuel hoses, pull off and unscrew.

4 Disconnect electric connecting cable.

5 Loosen fastening screw (arrow) and remove fuel pump.

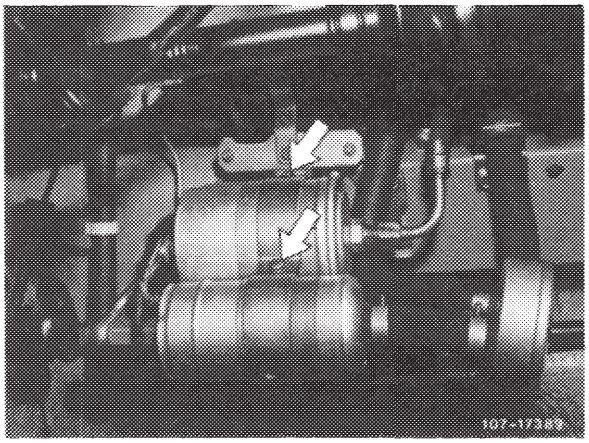


2nd version

6 Loosen fuel line on fuel filter and fuel reservoir. Loosen fuel line on fuel pump, pull off and unscrew.

7 Disconnect electric connecting cable.

8 Loosen fastening screw (arrow) and remove fuel pump.



Installation

9 For installation proceed vice versa using new sealing rings.

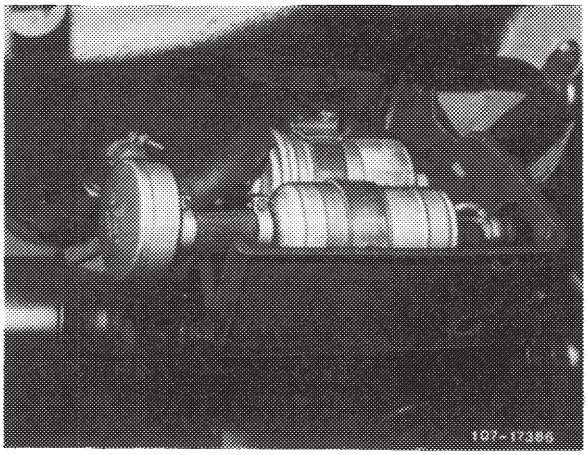
Pay attention to perfect installation of fuel hoses, also to correct polarity. In installation position, terminals should be horizontal.

10 Locate fuel pump in holder by means of plastic sleeve. 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 on fuel suction hose.

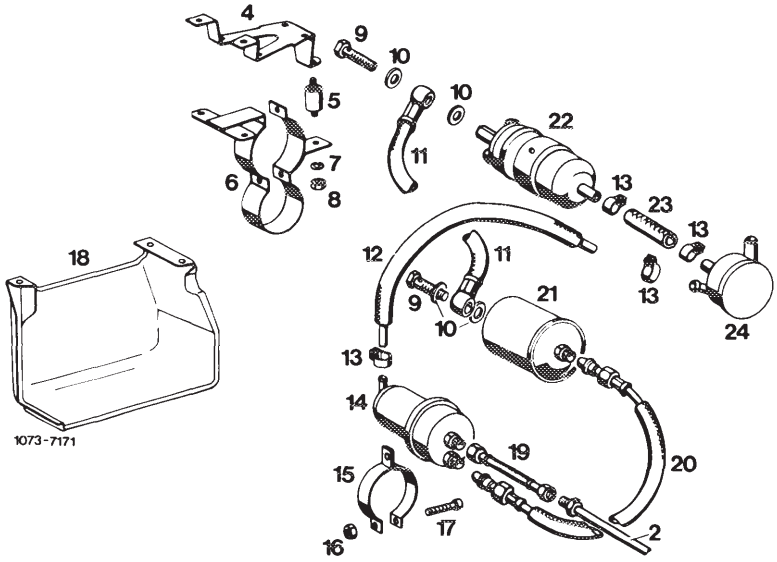
12 Run engine and check for leaks.

13 Mount protective case.

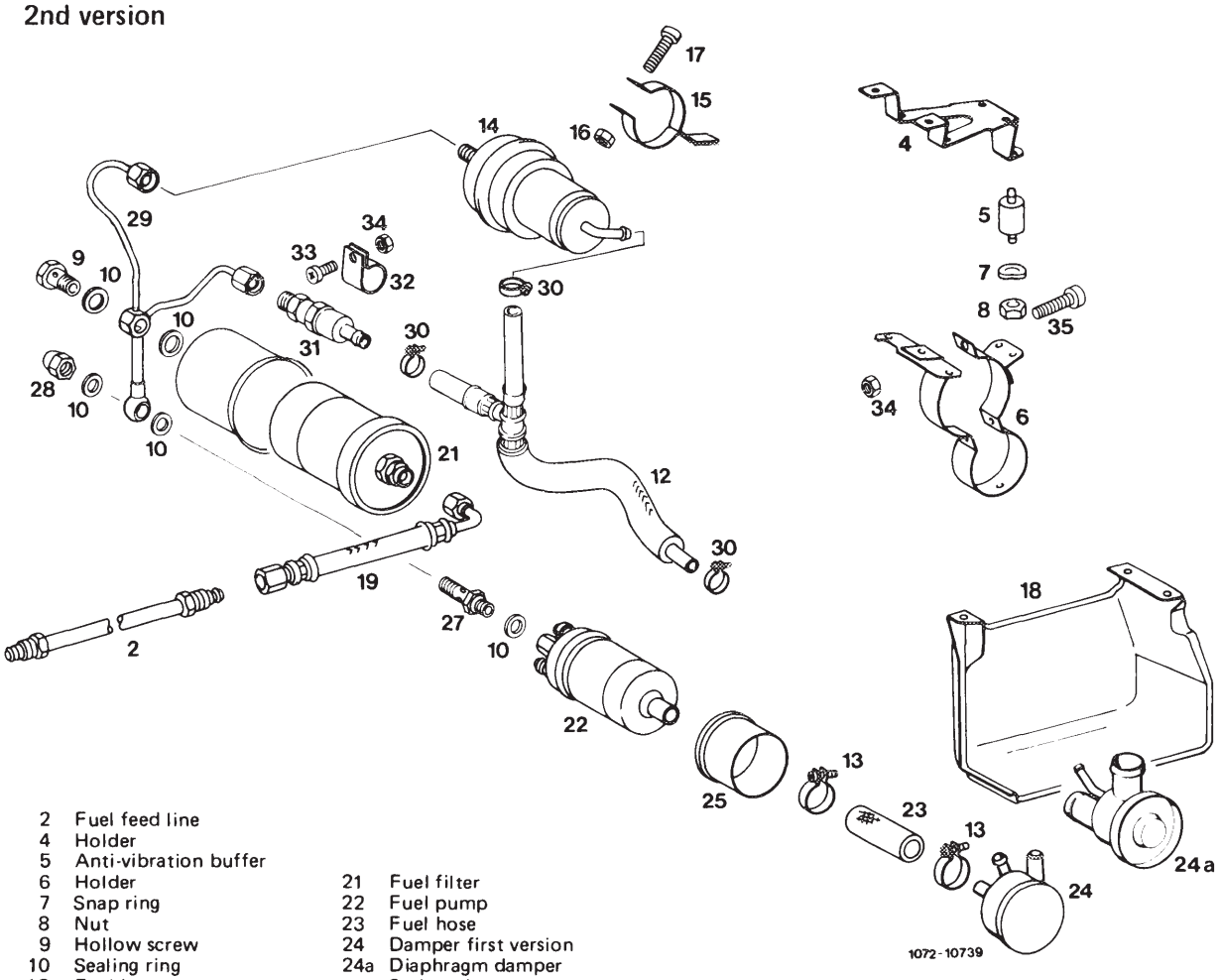


1st version

2 Fuel feed line
4 Holder
5 Anti-vibration buffer
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

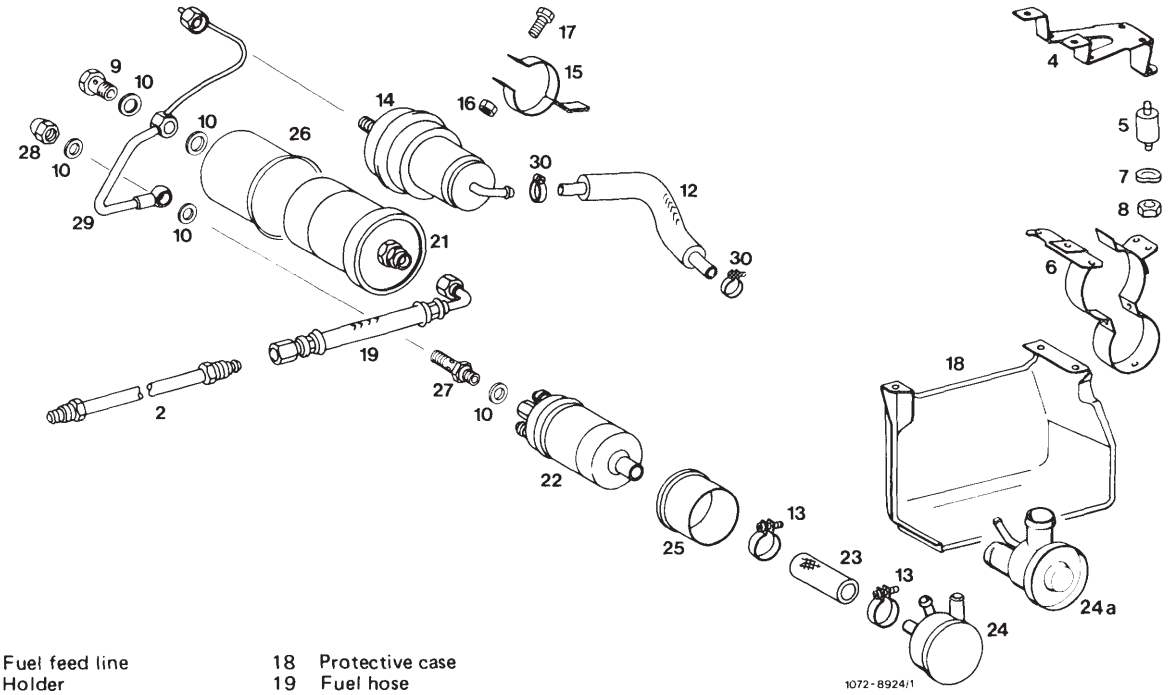


2nd version



2 Fuel feed line
4 Holder
5 Anti-vibration buffer
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 first version
24a Diaphragm damper 2nd version
25 Plastic sleeve
26 Plastic sleeve
27 Check valve
28 Cap nut
29 Steel line
30 Hose clamp
31 Pressure relieve valve
32 Clamp
33 Screw
34 Nut
35 Screw

3rd version

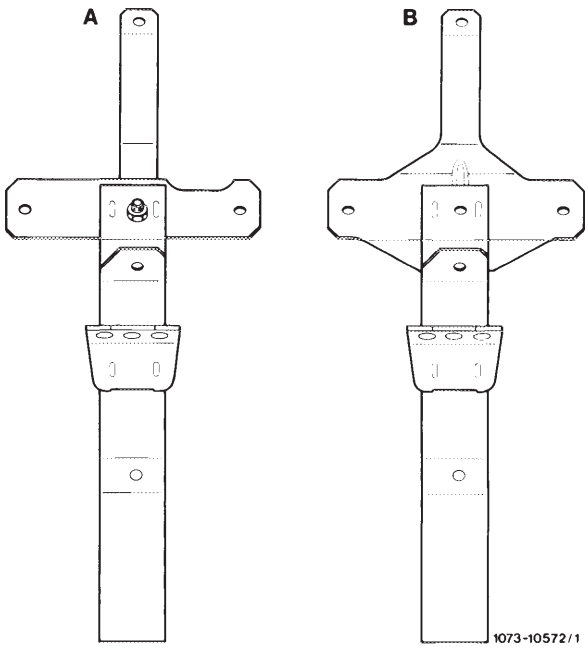


2	Fuel feed line	18	Protective case
4	Holder	19	Fuel hose
5	Anti-vibration buffer	21	Fuel filter
6	Holder	22	Fuel pump
7	Snap ring	23	Fuel hose
8	Nut	24	Damper 1st version
9	Hollow screw	24a	Diaphragm damper 2nd version
10	Sealing ring	25	Plastic sleeve
12	Fuel hose	26	Plastic sleeve
13	Hose clamp	27	Check valve
14	Fuel reservoir	28	Cap nut
15	Holder	29	Steel line
16	Nut	30	Hose clamp
17	Screw		

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

Note

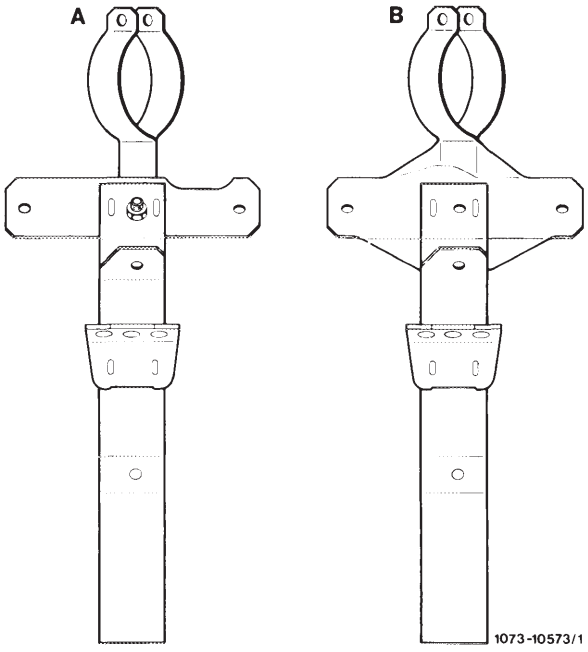
Holder has been modified to improve installation position and to increase rigidity.



Model 107, 123
A Former version
B Present version

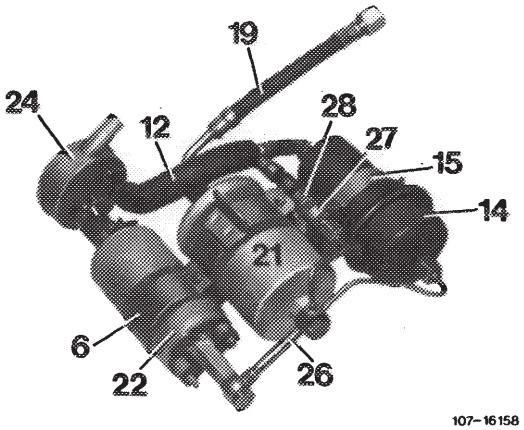
On model 126 the shape of the fuel line between pump, filter and reservoir has also been modified.

Start of series production: November 1981.



Model 126
A Former version
B Present version

In front of fuel filter (21) is an additional pressure compensating valve (27), which closes in the event of pressure in system. If the fuel volume in system is reduced when the fuel is cooling down, the pressure compensating valve will open. This will prevent that the control piston in fuel distributor will be pulled to full load under influence of vacuum, since otherwise during a cold start the full fuel quantity might be injected for a short period and the engine might be excessively enriched.

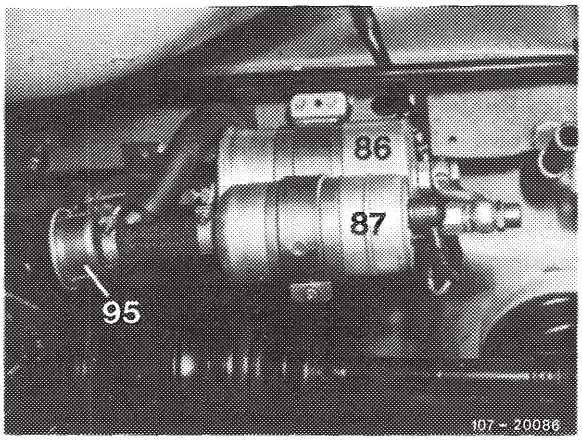


107-16158

B. Scope

Note

On models 107 and 126 fuel filters will be installed with damper (86), as well as a diaphragm damper (95). This will reduce noises caused by fuel pump.



107 - 20086

86 Fuel filter with damper
87 Fuel pump
95 Diaphragm damper

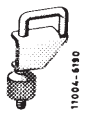
On vehicles in national version (AUS) (J) (S) and (USA) with CIS injection system prior to model year 1981, the respective components can also be installed. On vehicles of model year 1981, the changes are already in place. However, the fuel pump assembly differs by a fuel filter of larger diameter (owing to revised maintenance intervals).

Introduction into series

Model	Starting chassis end no.	Remarks
107.022 107.042	010166 010715	Fuel filter with damper and diaphragm damper (since April 1981)
126.022/023	004661	Fuel filter with damper (since April 1980)
126.022/023	016862	Diaphragm damper (since October 1980)

On vehicles with lower chassis end no. the components can be subsequently installed in the event of complaints about "Fuel pump loud".

Special tool

Clamp for hose lines		000 589 40 37 00

Spare parts

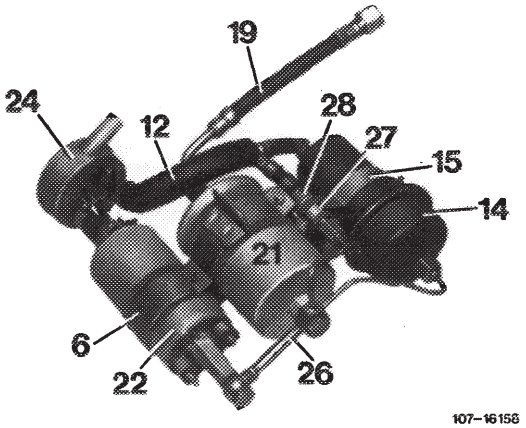
Designation	Part no.
Conversion kit	123 470 05 93
Steel line for engines with light alloy fuel distributor	126 470 01 64

Responsible for delivery: Plant 50 (PEW Sindelfingen)

Note

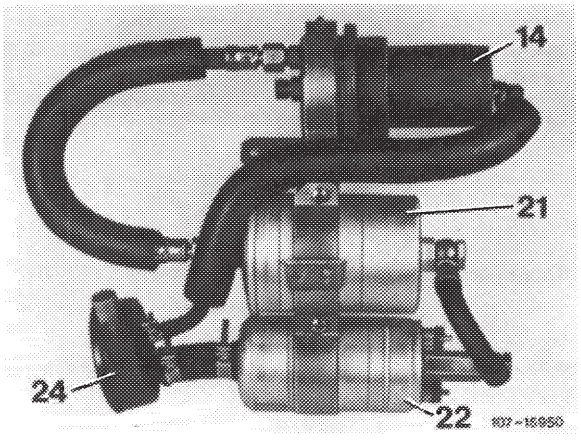
When exchanging fuel filter (21), fuel pump (22) or pressure compensating valve (27) make sure that a plastic sheet or plastic sleeve is mounted between these parts and holder (6, 15, 28). Sleeve should project on both sides of holder, since direct contact of parts with holder may lead to contact corrosion.

On vehicles in (AUS) and (J) version, a pressure compensating valve may not be subsequently installed.

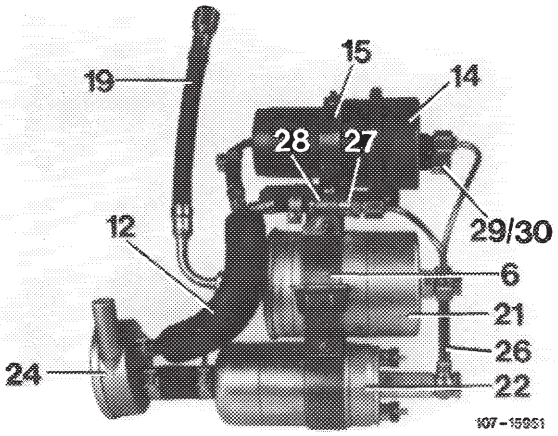


107-16158

Layout fuel pump assembly



Former layout
14 Pressure reservoir
21 Filter
22 Fuel pump
24 Damper

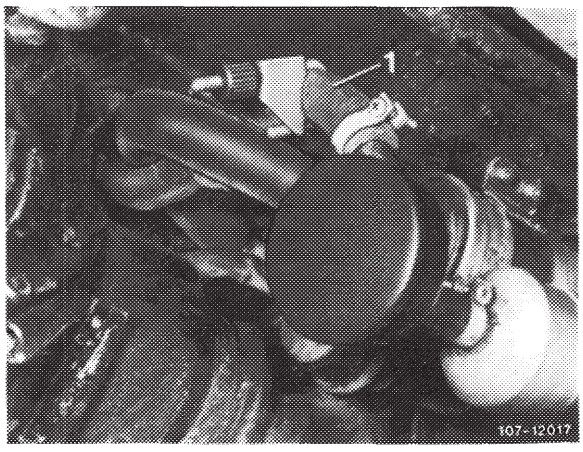


Present layout
6 Holder for fuel pump and filter
12 Leak line
14 Pressure reservoir
15 Holder for pressure reservoir
19 Fuel hose
21 Filter
22 Fuel pump
24 Damper
26 Fuel pressure line
27 Fuel compensating valve
28 Clamp for pressure compensating valve
29 Closing cone
30 Coupling nut

For conversion, the following parts may be used again:

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

Conversion



1 Unscrew protective case.

2 Disconnect electric connections.

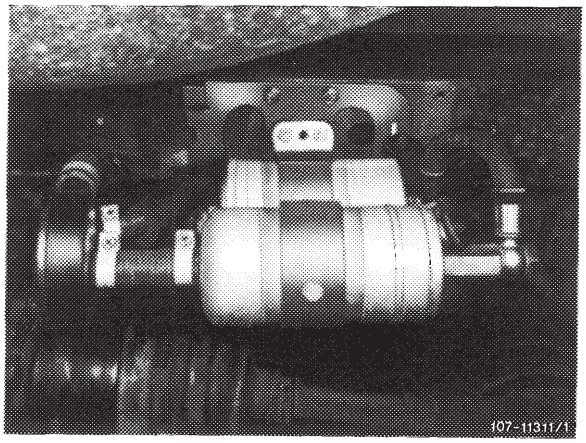
3 Pinch fuel suction hose (1) between fuel tank and suction damper by means of a clamp.

4 Loosen suction hose on suction damper and pull off.

5 Unscrew fuel pressure line from feed line to engine compartment. Clean screw connection first.

6 Unscrew fastening nuts of anti-vibration buffers and remove "fuel pump assembly".

7 Disassemble fuel pump assembly.

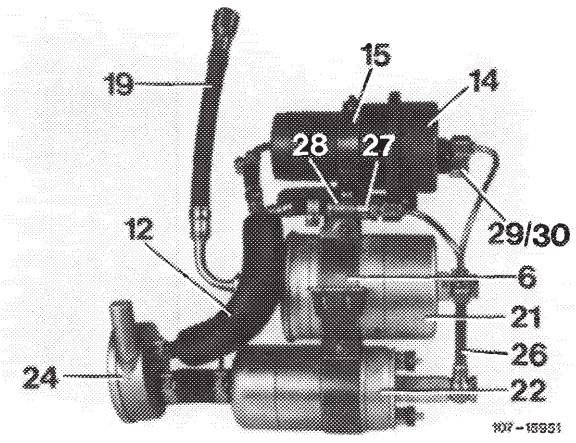


8 Clean fuel pump and fuel filter externally and mount in addition to plastic sleeve (slip up to bead of pump).

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

Attach plastic sleeve or sheet always in such a manner that it projects on both sides of holder. A direct contact of holder and pump or filter may lead to contact corrosion.

9 Assemble with components of conversion kit pump assembly, as shown in illustration. Slip fuel pump (22) up to bead into holder (6) 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) at pump, filter and pressure reservoir, align parts in relation to each other and tighten screws. On pressure reservoir, close the off-center connection with a closing cone (29) and a coupling nut (30).



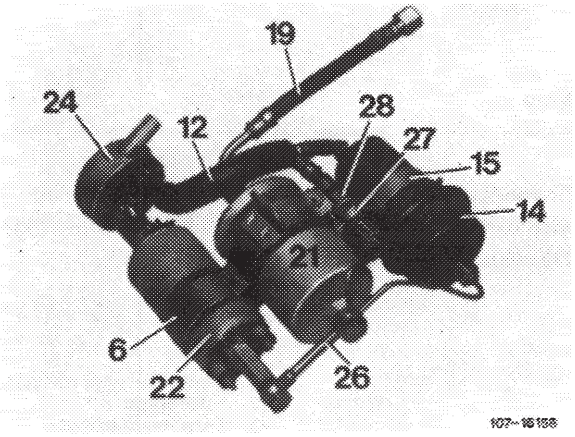
10 Install pump assembly and fuel hoses, and make electrical connections.

11 Remove clamp on suction hose, run engine and check system for leaks.

12 Mount protective case. Then make sure that fuel hoses are not exposed to chafing.

Note: On vehicles with auxiliary heater, the leak line is approx. 50 mm in front of suction damper. Insert a T-fitting. Here, the protective anti-chafing hose must be shortened.

A. General



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

As a result of the installation of light alloy fuel distributor, the pressure compensating valve is integrated in fuel distributor.

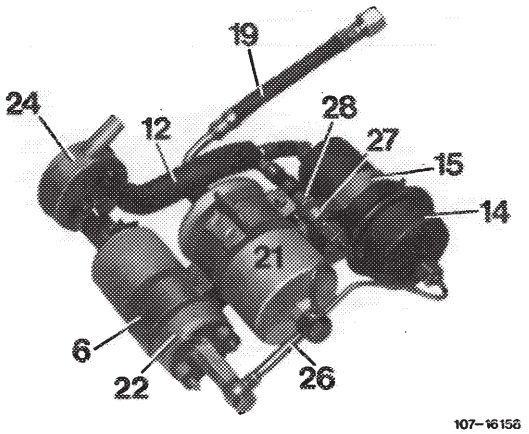
For **start of series production** refer to "Technical revisions".

Note: Since February 1981 the pressure reservoir (14) is connected in front of fuel filter on model 123.093. On this model, the pressure compensating valve (27) is not installed owing to installation position of fuel tank.

Operation

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

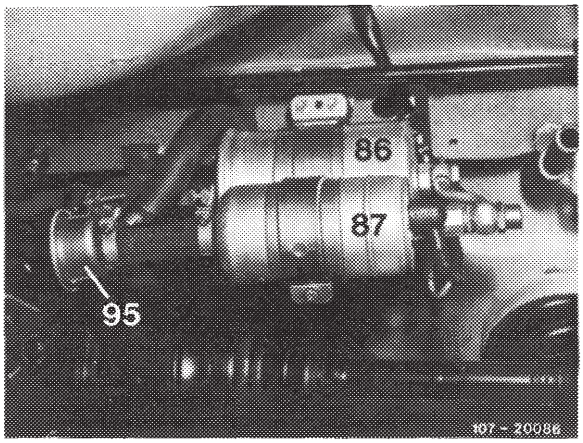
In front of fuel filter (21) is an additional pressure compensating valve (27), which closes in the event of pressure in system. If the fuel volume in system is reduced when the fuel is cooling down, the pressure compensating valve will open. This will prevent that the control piston in fuel distributor will be pulled to full load under influence of vacuum, since otherwise during a cold start the full fuel quantity might be injected for a short period and the engine might be excessively enriched.



B. Scope

Note

On models 107 and 126 fuel filters will be installed with damper (86), as well as a diaphragm damper (95). This will reduce noises caused by fuel pump.



86 Fuel filter with damper
87 Fuel pump
95 Diaphragm damper

On vehicles in national version (AUS) (J) (S) and (USA) with CIS injection system prior to model year 1981, the respective components can also be installed. On vehicles of model year 1981, the changes are already in place. However, the fuel pump assembly differs by a fuel filter of larger diameter (owing to revised maintenance intervals).

Introduction into series

Model	Starting chassis end no.	Remarks
107.022 107.042	010166 010715	Fuel filter with damper and diaphragm damper (since April 1981)
126.022/023	004661	Fuel filter with damper (since April 1980)
126.022/023	016862	Diaphragm damper (since October 1980)

On vehicles with lower chassis end no. the components can be subsequently installed in the event of complaints about "Fuel pump loud".

Special tool

Clamp for hose lines		000 589 40 37 00

Spare parts

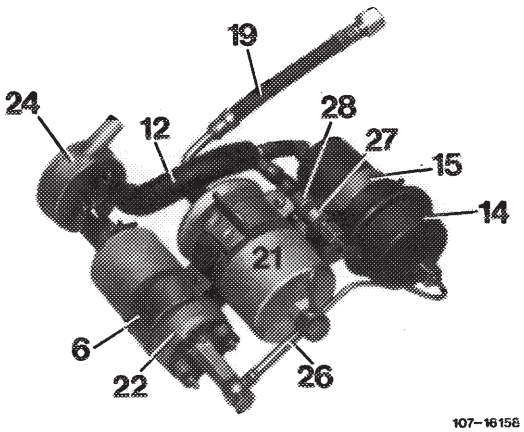
Designation	Part no.
Conversion kit	123 470 05 93
Steel line for engines with light alloy fuel distributor	126 470 01 64

Responsible for delivery: Plant 50 (PEW Sindelfingen)

Note

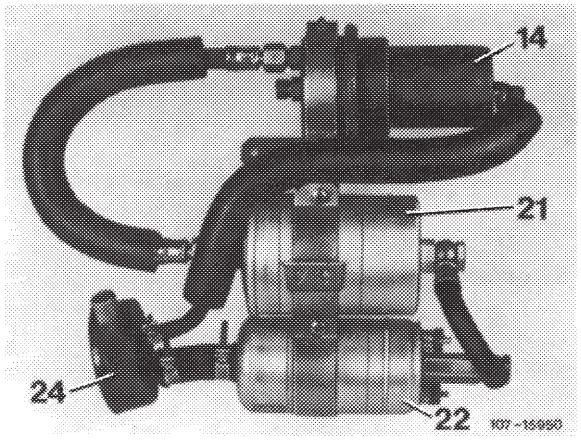
When exchanging fuel filter (21), fuel pump (22) or pressure compensating valve (27) make sure that a plastic sheet or plastic sleeve is mounted between these parts and holder (6, 15, 28). Sleeve should project on both sides of holder, since direct contact of parts with holder may lead to contact corrosion.

On vehicles in (AUS) and (J) version, a pressure compensating valve may not be subsequently installed.

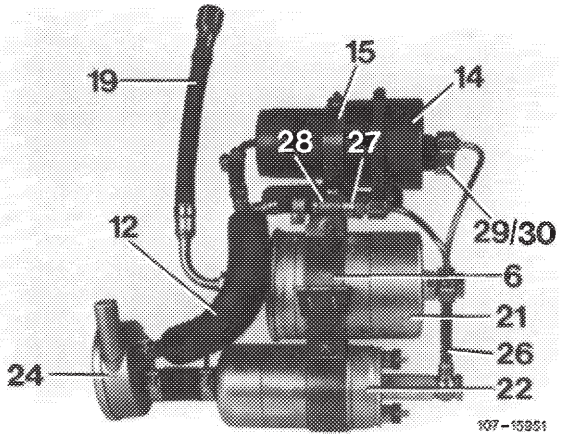


107-16158

Layout fuel pump assembly



Former layout
14 Pressure reservoir
21 Filter
22 Fuel pump
24 Damper



Present layout
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 Damper
26 Fuel pressure line
27 Fuel compensating valve
28 Clamp for pressure compensating valve
29 Closing cone
30 Coupling nut

For conversion, the following parts may be used again:

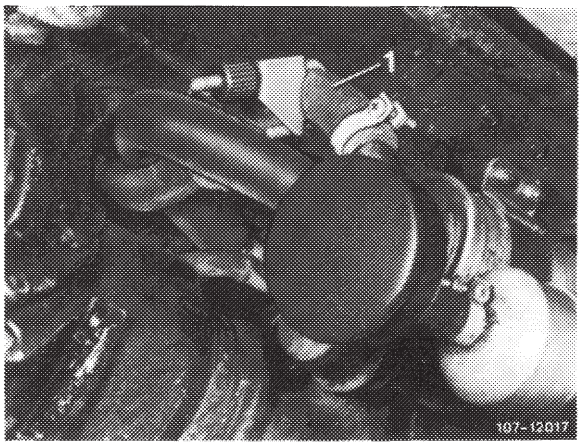
Fuel pump,
suction damper,
pressure reservoir,
fuel filter.

Conversion

1 Unscrew protective case.

2 Disconnect electric connections.

3 Pinch fuel suction hose (1) between fuel tank and suction damper by means of a clamp.

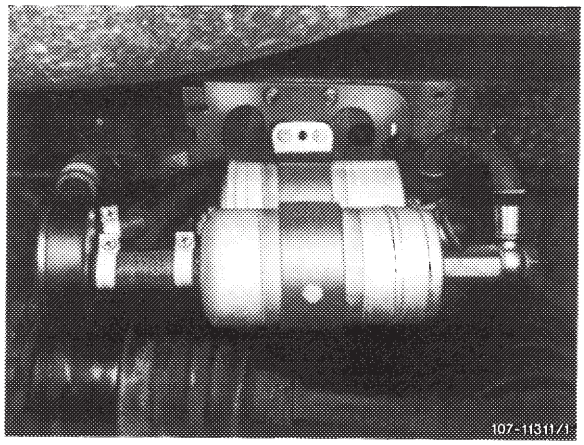


4 Loosen suction hose on suction damper and pull off.

5 Unscrew fuel pressure line from feed line to engine compartment. Clean screw connection first.

6 Unscrew fastening nuts of anti-vibration buffers and remove "fuel pump assembly".

7 Disassemble fuel pump assembly.

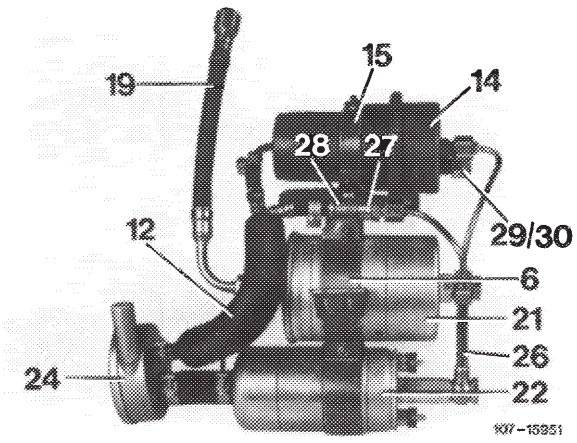


8 Clean fuel pump and fuel filter externally and mount in addition to plastic sleeve (slip up to bead of pump).

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

Attach plastic sleeve or sheet always in such a manner that it projects on both sides of holder. A direct contact of holder and pump or filter may lead to contact corrosion.

9 Assemble with components of conversion kit pump assembly, as shown in illustration. Slip fuel pump (22) up to bead into holder (6) 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) at pump, filter and pressure reservoir, align parts in relation to each other and tighten screws. On pressure reservoir, close the off-center connection with a closing cone (29) and a coupling nut (30).



10 Install pump assembly and fuel hoses, and make electrical connections.

11 Remove clamp on suction hose, run engine and check system for leaks.

12 Mount protective case. Then make sure that fuel hoses are not exposed to chafing.

Note: On vehicles with auxiliary heater, the leak line is approx. 50 mm in front of suction damper. Insert a T-fitting. Here, the protective anti-chafing hose must be shortened.

Note

In the event of a complaint concerning "Engine fires poorly when warm" an internal leak of fuel pump shows up, a check valve can be subsequently mounted to fuel pump.

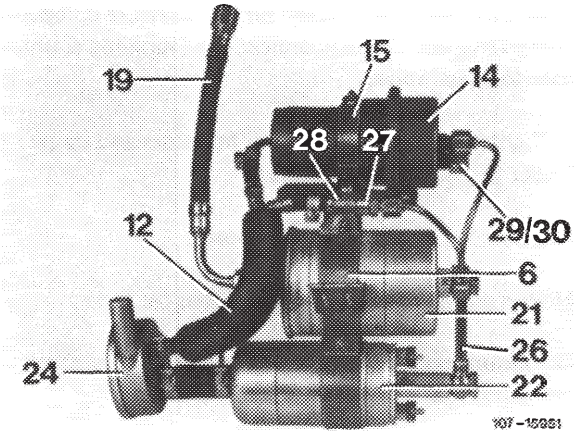
Installation

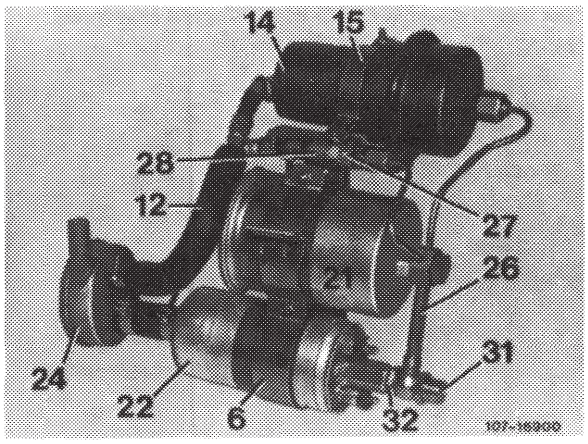
Fuel pump assembly with steel line between fuel pump and filter

1 Unscrew protective case.

2 Pinch fuel hoses (from fuel tank and to line toward engine) with one clamp each.

3 Unscrew fuel pump assembly on both front anti-vibration buffers.

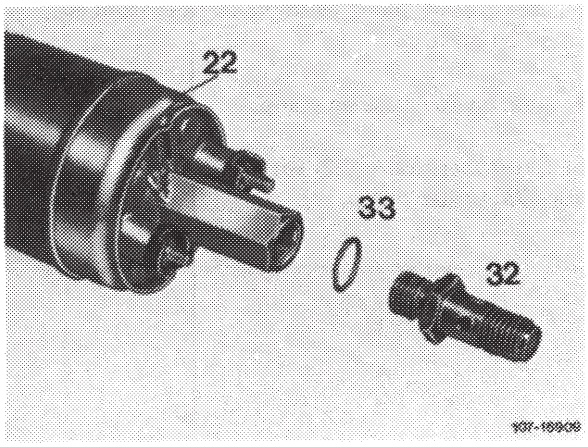




6 Holder for fuel pump and filter
12 Leak line
14 Pressure reservoir
15 Holder for pressure reservoir
19 Fuel hose
21 Filter
22 Fuel pump
24 Damper
26 Fuel pressure line
27 Pressure compensating valve
28 Clamp for pressure compensating valve
29 Closing cone
30 Coupling nut
31 Closing nut
32 Check valve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

4 Unscrew steel line (26) on fuel pump, filter, reservoir and pressure compensating valve.

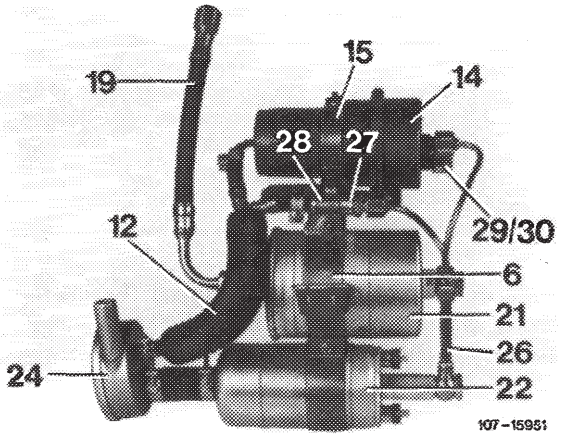
5 Screw check valve (32) with new copper sealing ring (33) to fuel pump.



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 used.

Note: The plastic sheeting or plastic sleeve of pump and filter should project on holder of both sides. Be sure to replace if demaged. Remove pump and filter for this purpose.

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



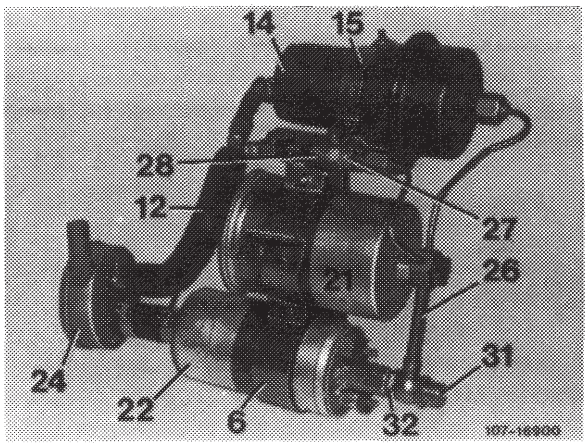
8 Mount steel line on reservoir and pressure compensating valve and tighten connections (applying counter-hold to check valve).

9 Tighten fuel pump and filter in holder and screw holder to anti-vibration buffers.

10 Remove clamps from fuel hoses.

11 Run engine and check connections for leaks.

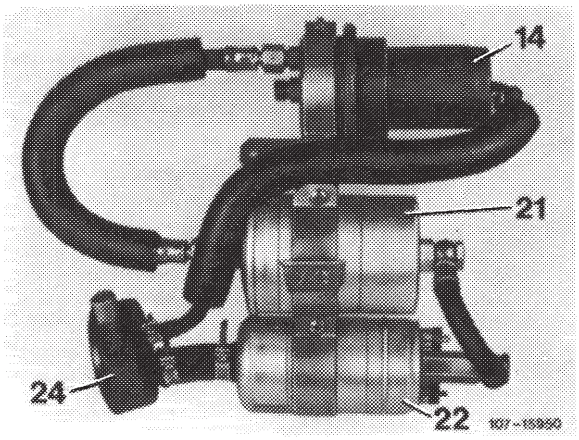
12 Mount protective case. Make sure that the steel line is not chafing against protective case.



Fuel pump assembly with hose between pump and filter

1 Unscrew protective case.

2 Pinch fuel hoses with clamps.

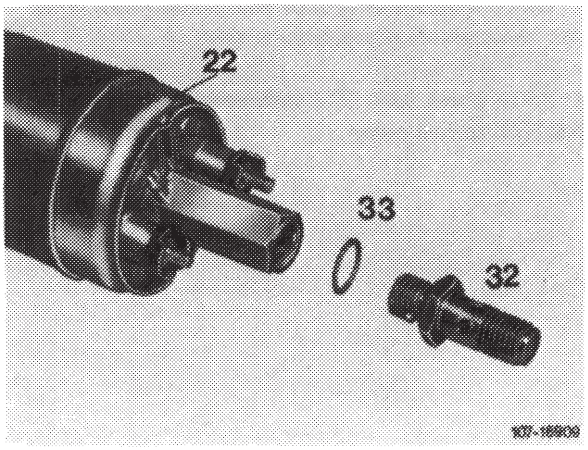


14 Pressure reservoir
21 Filter
22 Fuel pump
24 Damper

3 Unscrew fuel pump assembly on both front anti-vibration buffers.

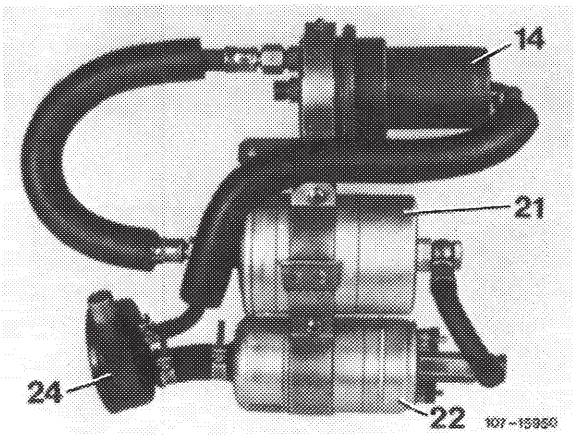
4 Unscrew fuel hose on pump.

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



6 Clip fuel pump in holder approx. 15 mm to the left (so that closing nut is no longer chafing against protective case) and mount fuel hose with 2 new copper sealing rings and closing nut to check valve (while applying counterhold to check valve). Hollow screw is no longer installed.

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



7 Tighten fuel pump and filter in holder and mount holder on anti-vibration buffers.

8 Remove clamps from fuel hoses.

9 Run engine and check system for leaks.

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

A. Decel shutoff

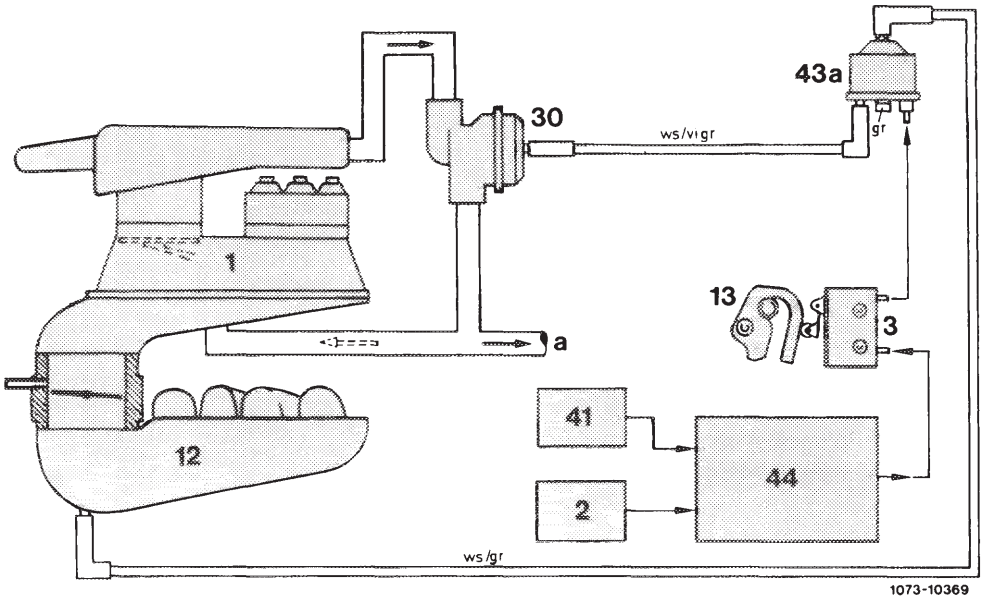
General

During deceleration, the switchover valve located in vacuum line between intake manifold and decel shut-off valve is activated by means of a microswitch and switched to passage.

The required air for decel operation is sucked in through decel shutoff valve switch which is opened by intake manifold vacuum, while bypassing the air flow sensor plate. The air flow sensor plate remains in zero position, that is, no fuel is injected.

Decel shutoff comprises the following components:

- Decel shutoff valve (30).
- Electronic control unit (fuel pump relay) for decel shutoff (44).
- Microswitch (3).
- Switchover valve (43a)
- Impulse transmitter (41) tachometer.

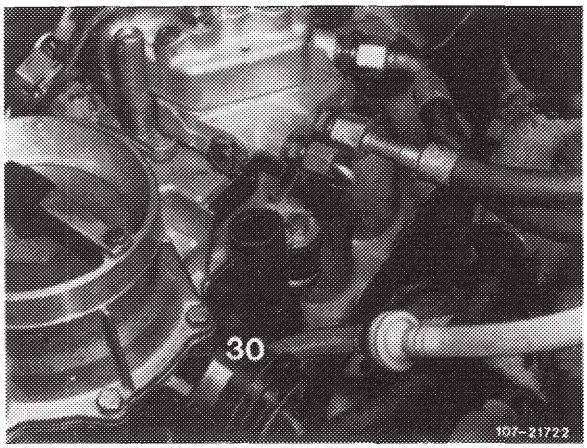


1 Mixture controller
2 Transistorized switching unit
3 Microswitch
12 Intake manifold
13 Slotted lever
30 Decel shutoff valve
41 Impulse transmitter tachometer
43a Switchover valve decel shutoff
44 Fuel pump relay
a To idle speed air distributor

Color code
gr = gray
vi = purple
ws = white

Decel shutoff valve

During deceleration (coasting) the decel shutoff valve (30) connects the air cleaner with the idle speed air system. As a result, with decel shutoff valve open, the air required by engine under deceleration is taken directly from air cleaner while bypassing the air flow sensor plate (refer to function diagram).



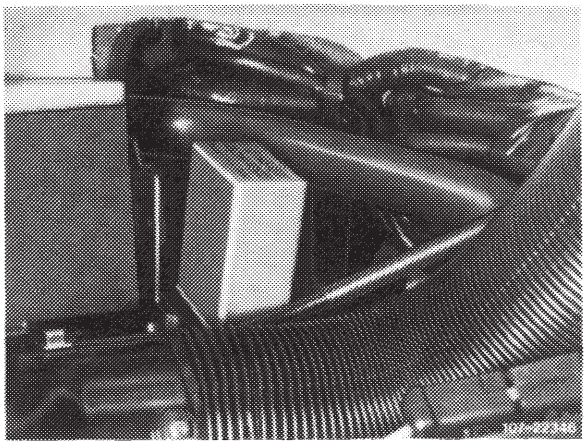
The air flow sensor plate is not deflected and is in zero position. The fuel feed to the injection valves is therefore interrupted (control slits closed).

The decel shutoff will be operational under the following conditions:

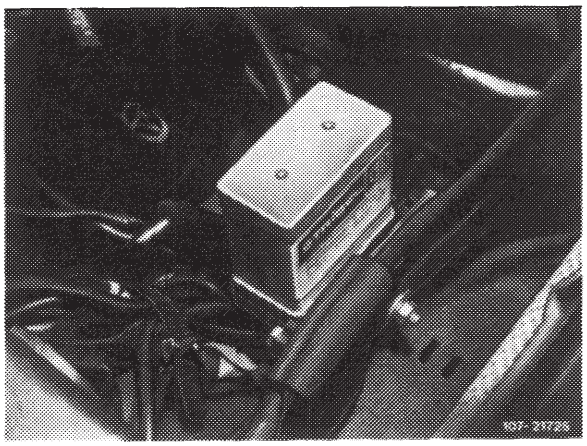
When decelerating (coasting) without air conditioning above 1100/min, and with air conditioning above 1300/min. At a driving speed above 30 km/h.

If these operating conditions are changed, e.g. by accelerating, the decel shutoff will become effective again when an engine speed of 1600/min without air conditioning, and of 1800/min with air conditioning, are exceeded first and the speed was higher than 35 km/h.

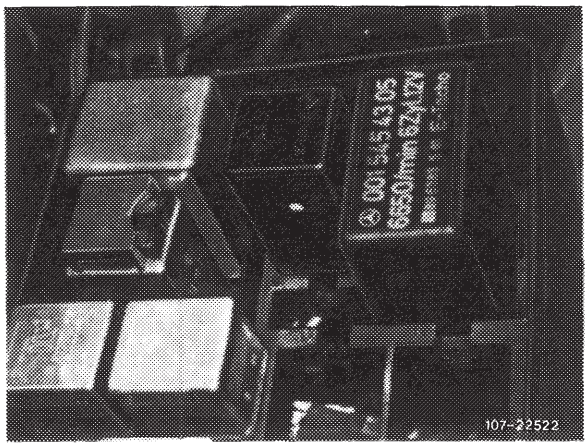
Decel shutoff is controlled by an electronic control unit (44), which is integrated in fuel pump relay.



Model 107



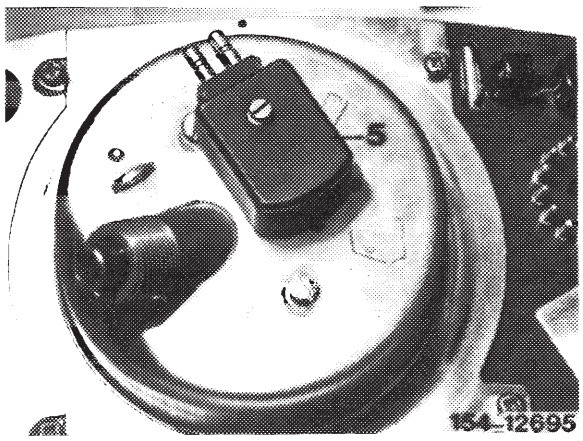
Model 123



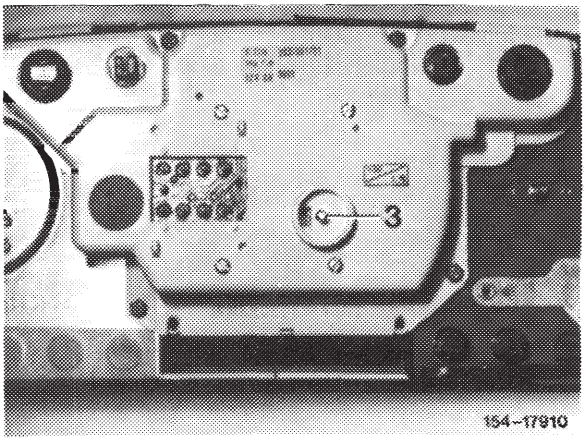
Model 126

The signal for the engine speed is tapped at switching unit of transistorized ignition system (TD).

On model 123 with mechanically driven tachometer, the vehicle speed is picked up by an impulse transmitter (5), on model 107 and 126 at electronic tachometer.



Model 123

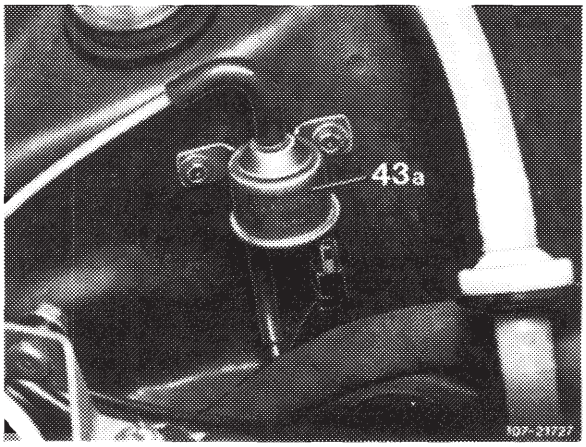


Model 107, 126

Switchover valve

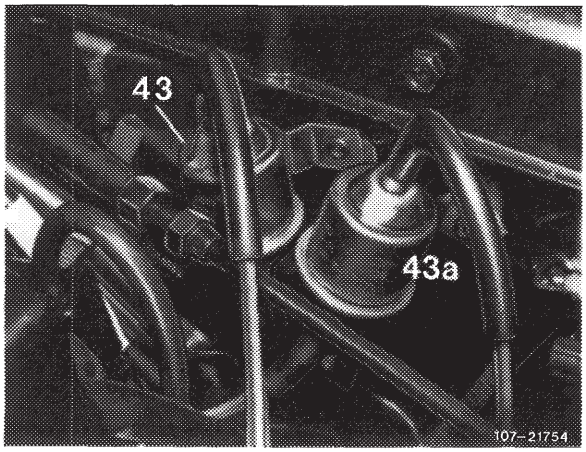
The switchover valve (43a) attached at front end is an electromagnetic valve.

With the microswitch closed and under the conditions named above, voltage is switched to switchover valve by way of control unit. The intake manifold vacuum acts on decel shutoff valve and opens the bypass line from air cleaner to air guide housing. The connection is interrupted the moment the voltage drops.



Model 123

Layout model 107 (refer to 07.3–140).



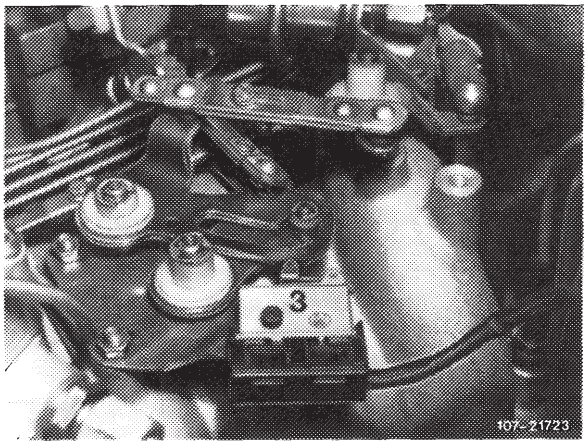
Model 126

Microswitch

The microswitch is located at regulation in idle path range of slotted lever.

With the accelerator pedal in idle speed position and under the conditions named above, the circuit is closed and the decel shutoff is triggered.

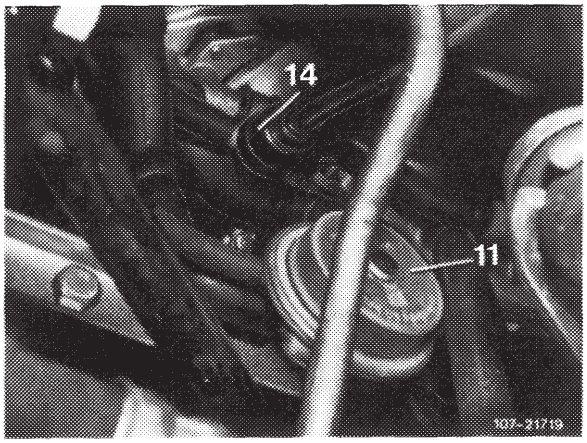
When the accelerator pedal is operated, the switch opens already before the throttle valve opens and the decel shutoff will be interrupted. That is, combustion starts again before the throttle valve opens. As a result, any cutting-in jerk will be avoided.



B. Idle speed stabilization with rpm increase following start

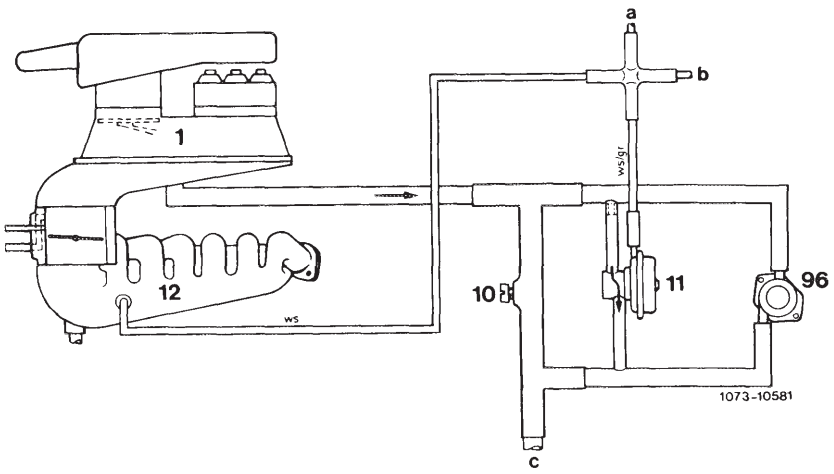
A decel circulating air valve (11) is installed for idle speed stabilization, as well as for an rpm increase after starting.

The valve is located on a holder behind ignition distributor below intake manifold.



Decel circulating air valve

The decel circulating air valve is controlled by the intake manifold vacuum. While bypassing the throttle valve and the idle speed adjusting screw, metered air from air guide housing is guided via contour hoses and the idle speed air distributor to the idle speed air ducts in intake manifold.



1 Mixture controller
10 Idle speed air screw
11 Decel circulating air valve
12 Intake manifold
96 Auxiliary air valve

a Conncetion switchover valve decel shutoff
b Connection switchover valve rpm increase air-conditioning system
c To idle speed air duct in intake manifold

Color code
gr = gray
ws = white

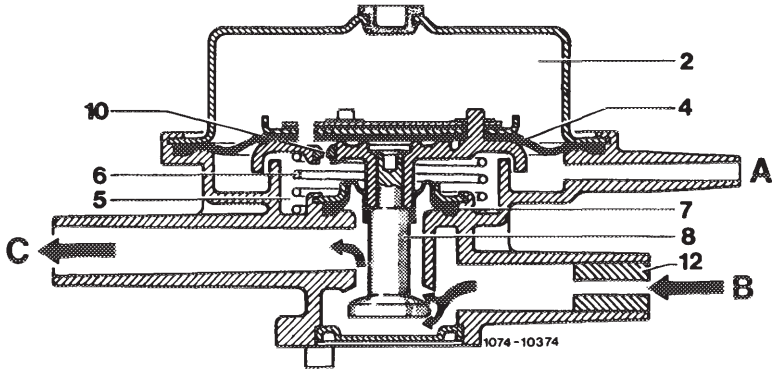
Operation

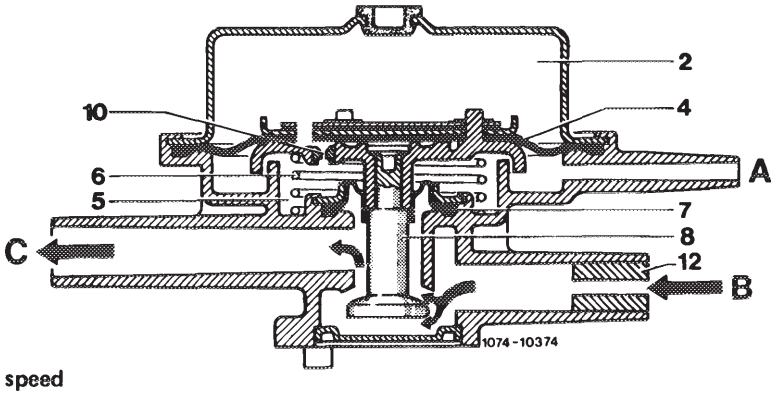
Rpm increase after start.

With engine stopped, atmopheric pressure prevails in lower and upper diaphragm chamber. When the engine is started, a vacuum will be built-in in lower diaphragm chamber (5) and will overcome the contact pressure of compression spring (6). Valve (8) is pushed in downward direction and the path for the bypass air from air guide housing to intake manifold will be cleared. This increased charge will also increase the engine speed at idle for a short period.

As soon as the vacuum in the two diaphragm chambers is again balanced by way of orifice (10), valve (8) will be pushed upwards by compression spring (6) and closed.

2 Upper diaphragm chamber
4 Diaphragm
5 Lower diaphragm chamber
6 Compression spring
7 Sealing diaphragm
8 Valve
10 Orifice
12 Throttle (restriction)
A Vacuum connection
B Air guide housing inlet
C To contour hose idle speed air distributor





Rpm stabilization from higher speed to idle speed

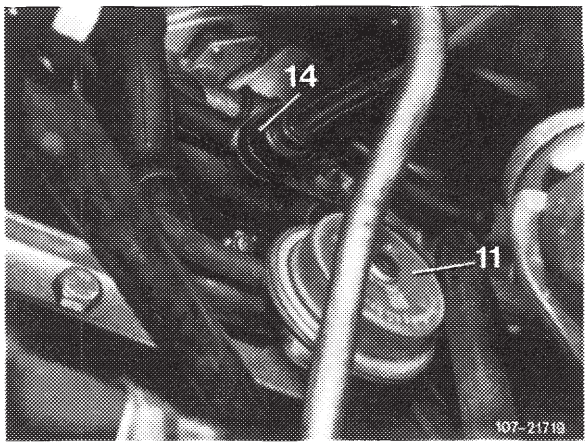
The decel circulating air valve delays adaptation to lower idle speed after accelerating, since the vacuum in the lower diaphragm chamber (5) increases faster than the compensating process by means of the upper diaphragm chamber via orifice (10).

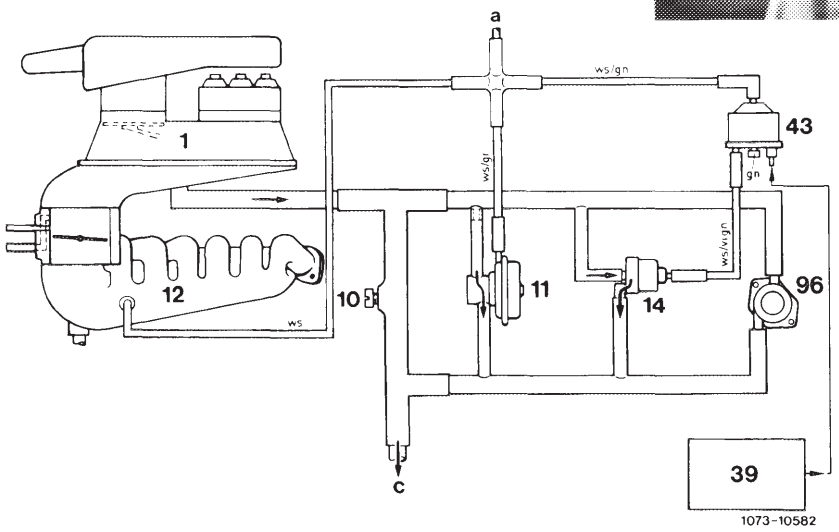
The adjusting force of the vacuum will overcome the contact pressure of compression spring (6). Valve (8) is pushed in downward direction and the bypass air can be sucked in by the engine through the idle speed ducts. Valve (8) will close following pressure compensation between upper and lower diaphragm chamber (2 and 5) via orifice (10).

C. Idle speed stabilization on engines with refrigerant compressor

Vehicles with air conditioning/automatic climate control are provided with a bypass valve (14) for rpm stabilization at idle.

Bypassing the throttle valve, the air measured by the air flow sensor plate is guided to intake manifold (12) by bypass valve (14). With the air-conditioning system/ automatic climate control switched on, the electric switchover valve (43) is energized and will connect the bypass valve (14) to the vacuum connection on intake manifold. The bypass valve will open under influence of intake manifold vacuum. Bypassing the throttle valve, the engine will aspirate more air and the idle speed will be increased.



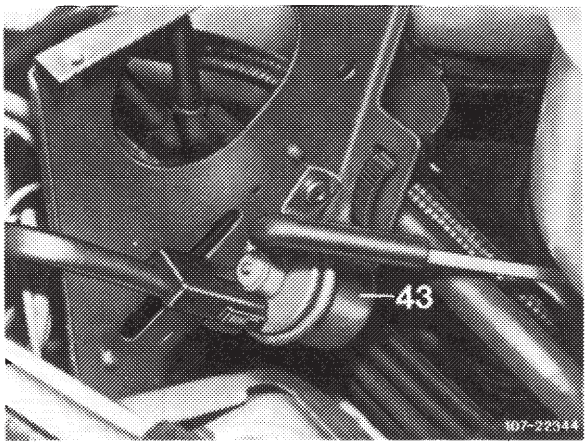


1 Mixture controller
10 Idle speed air screw
12 Intake manifold
14 Bypass valve air conditioning
39 Relay air conditioning
43 Switchover valve rpm increase air conditioning
96 Auxiliary air valve

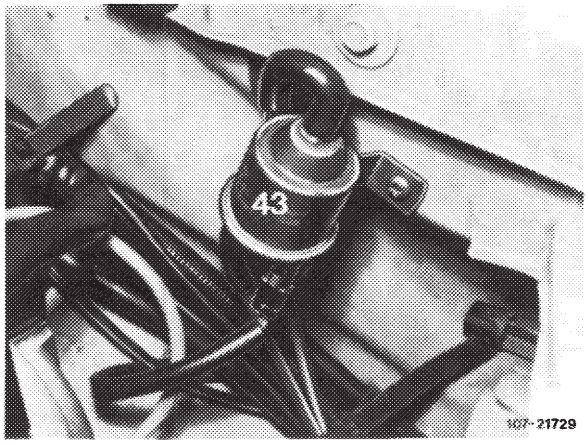
a Connection switchover valve-decel shutoff
c To idle air duct in intake manifold
d Connection decel circulating air valve

Color code
gn = green
vi = purple
ws = white

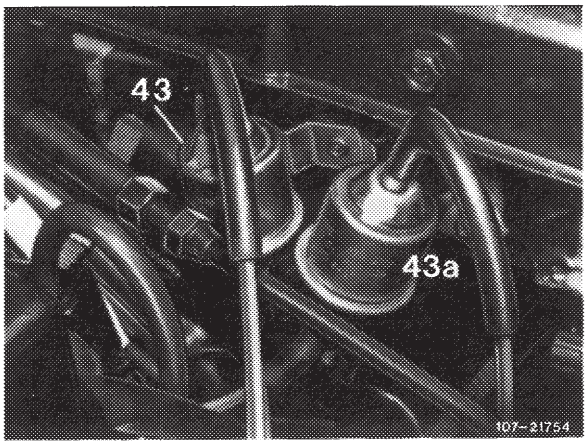
Layout of switchover valve (43)



Model 107

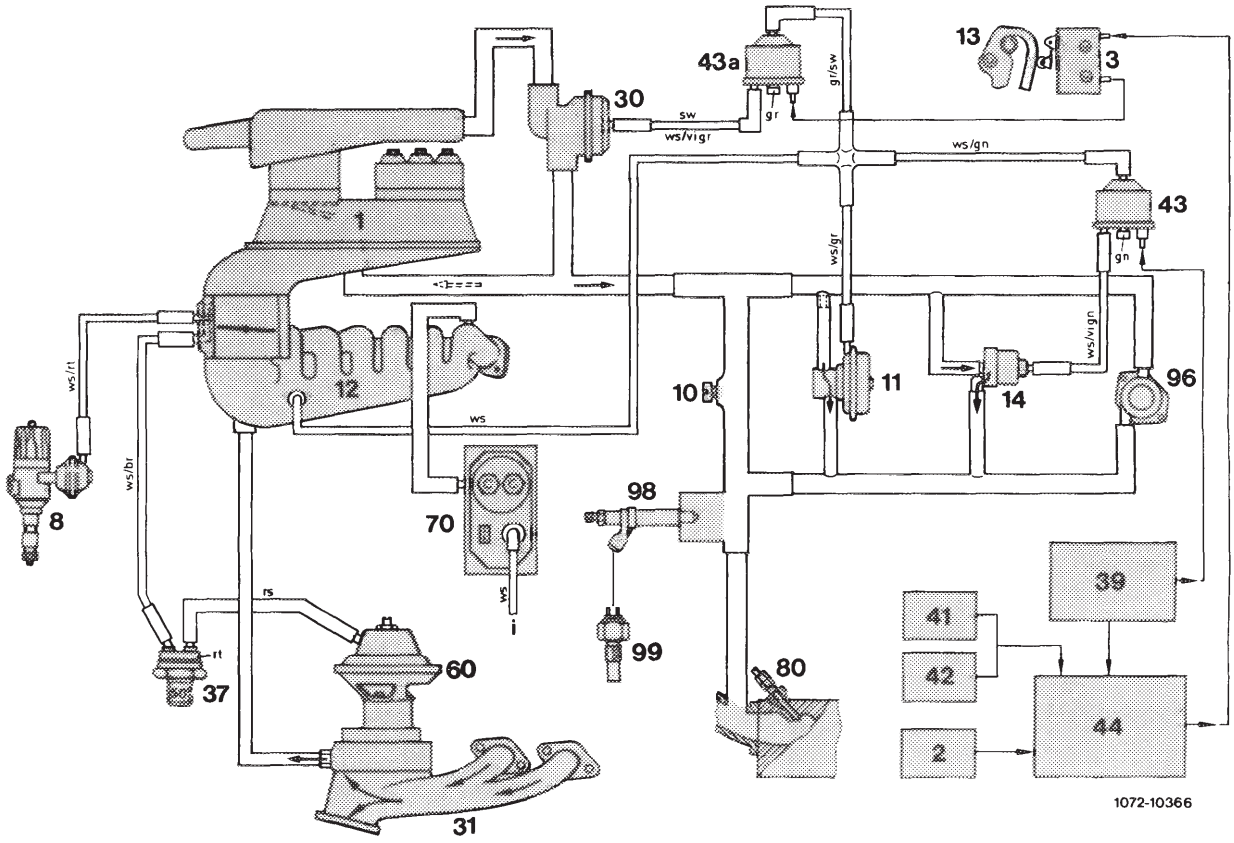


Model 123



Model 126

D. Function diagram decel shutoff, idle speed stabilization, EGR



1 Mixture controller
2 Transistorized switching unit
3 Microswitch
8 Ignition distributor
10 Idle speed air screw
11 Decel circulating air valve
12 Intake manifold
13 Slotted lever
14 Bypass valve air conditioning
30 Decel shutoff valve
31 Exhaust manifold
37 Thermovalve 50 °C EGR
39 Relay air conditioning
41 Impulse transmitter mechanical tachometer
42 Electronic tachometer
43 Switchover valve rpm increase air conditioning
43a Switchover valve decel shutoff
44 Fuel pump relay
60 EGR valve
70 Warm-up compensator
80 Injection valve
96 Auxiliary air valve
98 Cold start valve
99 Thermo time switch
i To leak line (atmosphere)

Color code
br = brown
gn = green
gr = gray
rs = pink
rt = red
sw = black
vi = purple
ws = white

E. Fuel pump relay

The fuel pump relay for supplying voltage to fuel pump has three or four functions:

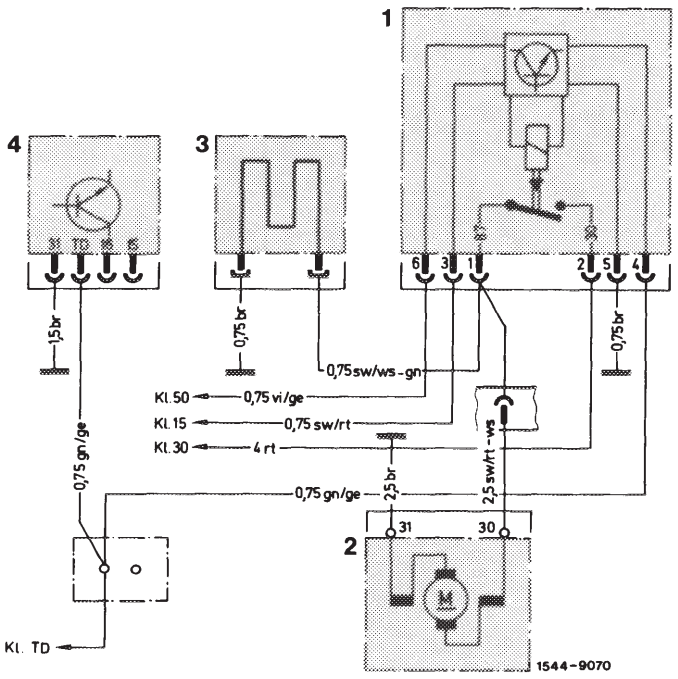
1. Activation of fuel pump while starting and with the engine running.

   In parallel with fuel pump, the warm-up compensator is likewise activated.

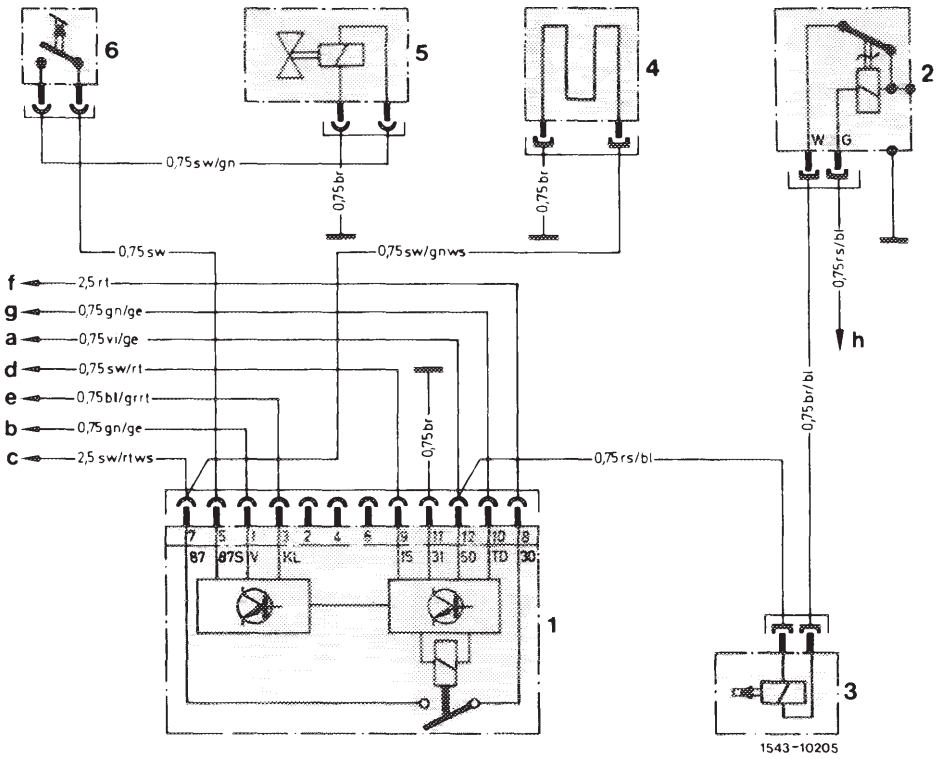
2. Rpm limitation after attaining max. engine speed.

3. Switching-off fuel pump as soon as there are no more impulses via terminal TD of switching unit: TD = transistor speed.

4. Control of decel shutoff. (starting September 1981).



Wiring diagram prior to September 1981
1 Fuel pump relay
2 Fuel pump
3 Warm-up compensator
4 Switching unit (TSZ)
TSZ = transistorized switching unit

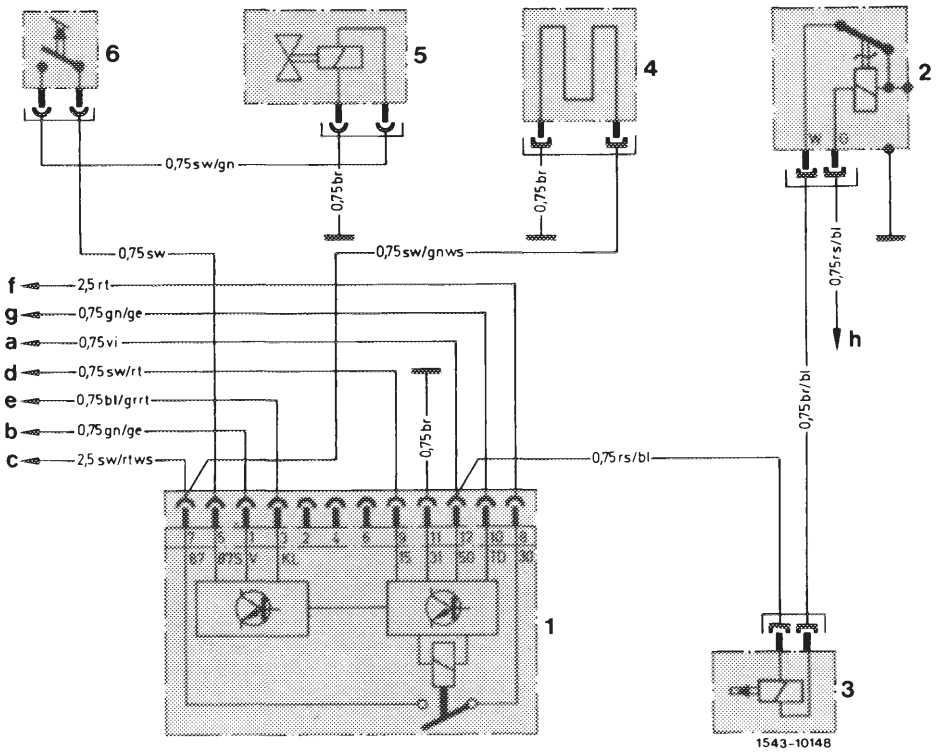


Wiring diagram starting September 1981 – model 123

1 Fuel pump relay
2 Thermo time switch
3 Cold starting valve
4 Warm-up compensator
5 Switchover valve
6 Microswitch

a To output starter lockout and backup lamp switch
b Transmitter mechanical tachometer
c Fuel pump
d Fuse 12 terminal 15 access
e Refrigerant compressor
f Cable connector engine terminal 30
g Cable connector terminal TD
h Cable connector engine terminal 50

Color code
bl = blue
br = brown
ge = yellow
gn = green
gr = gray
rs = pink
rt = red
sw = black
vi = purple
ws = white



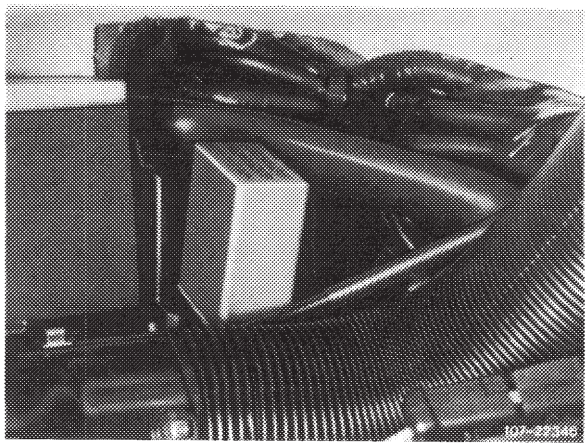
Wiring diagram starting September 1981 – model 107, 126

1	Fuel pump relay	a	Cable connector engine terminal 50
2	Thermo time switch	b	Transmitter electronic tachometer
3	Cold starting valve	c	Fuel pump
4	Warm-up compensator	d	Fuse 14 terminal 15 access
5	Switchover valve	e	Refrigerant compressor
6	Microswitch	f	Cable connector terminal 30
		g	Cable connector terminal TD
		h	Cable connector engine terminal 50

Color code
bl = blue
br = brown
ge = yellow
gn = green
gr = gray
rs = pink
rt = red
sw = black
vi = purple
ws = white

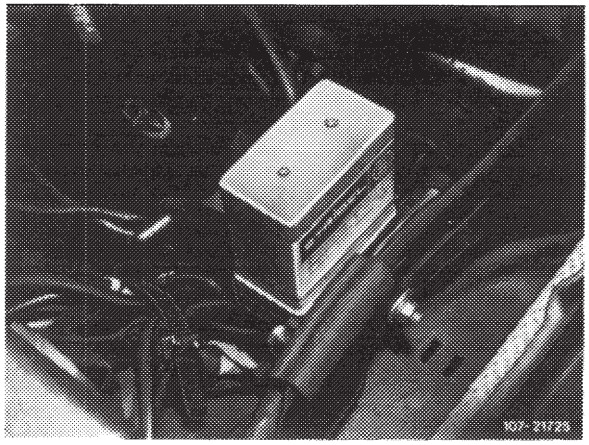
1. Activation of fuel pump while starting and with engine running

While starting, the fuel pump relay is activated via terminal 50 and with the engine running via terminal TD of ignition switching unit.



Model 107

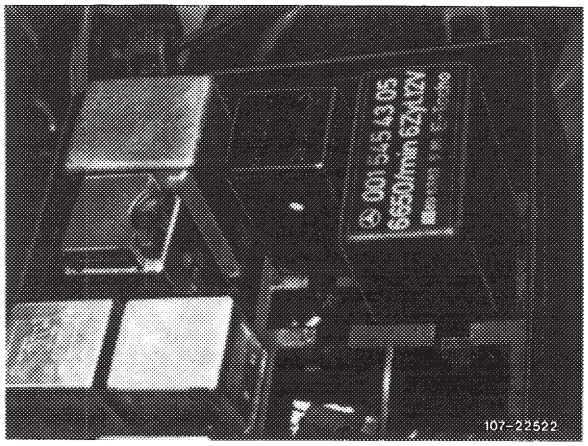
While starting, the fuel pump relay is activated via terminal 50, because the pertinent parallel activation of fuel pump relay via terminal TD is not enough at engine speed below approx. 80/min. The pulse sequence of terminal TD is too low to keep contacts 30 and 87 in pump relay continuously closed.



Model 123

At speeds above approx. 80/min, the frequency of the pulses is so high that contacts 30 and 87 in fuel pump relay remain continuously closed.

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



Model 126

2. Rpm limitation after attaining max. engine speed

After attaining a given pulse sequence according to max. engine speed, contacts 30 and 87 for fuel pump are interrupted. Fuel pump is deenergized and will switch off.

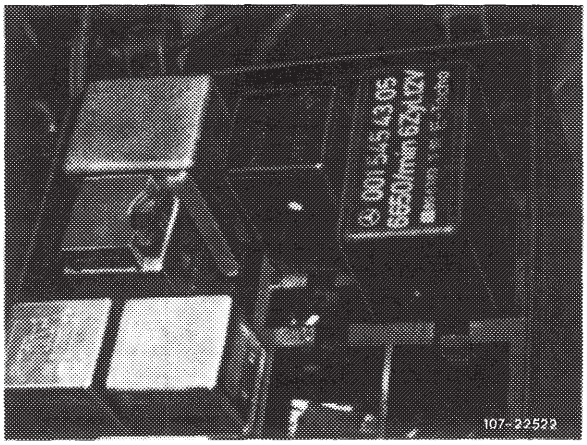
3. Switching-off fuel pump as soon as there are no pulses via terminal TD of switching unit

As a safety circuit, one second after last impulse of terminal TD, contacts 30 and 87 in fuel pump relay are interrupted. The pump is deenergized and switches off.

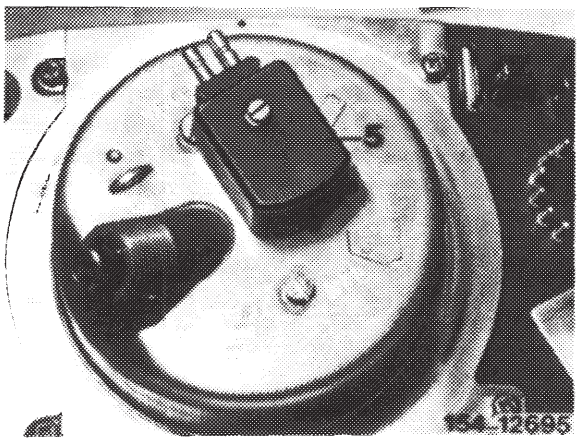
4. Control of decel shutoff starting September 1981

Decel shutoff is controlled by an electronic control unit which is integrated in fuel pump relay.

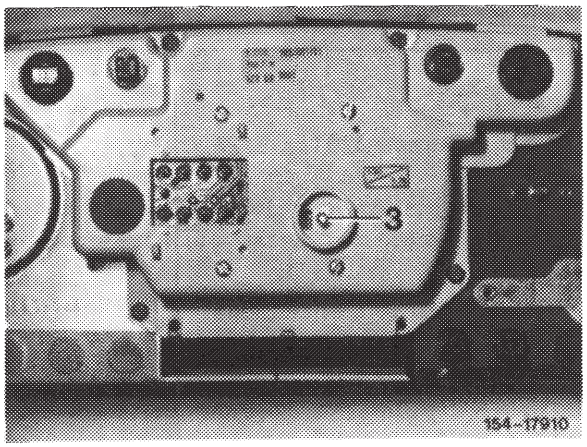
The signal for the engine speed is picked up at switching unit of transistorized ignition system (TD).



On model 123 with mechanically driven tachometer, the vehicle speed is picked up by an impulse transmitter (5), on model 107 and 126 on impulse transmitter connection (3) of electronic tachometer.



Model 123



Model 107, 126

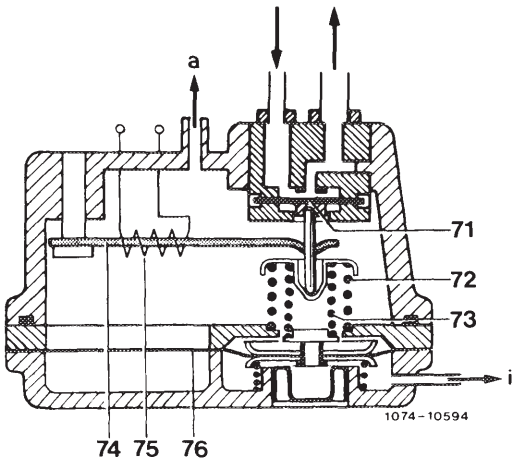
F. Warm-up compensator

The warm-up compensator regulates the control pressure which acts on control piston and serves for enriching the fuel mixture in warm-up stage and at full load.

The warm-up compensator is connected to two fuel lines, the control pressure line and the return flow line.

The control pressure acts on top of diaphragm valve (71), which throttles the outflow cross section of return flow line.

Two valve springs (72 and 73) operating at the bottom are adapted to normal control pressure.



71 Diaphragm valve
72 Outer valve spring
73 Inner valve spring
d To intake manifold (vacuum)
i To leak line (atmosphere)
74 Bimetallic strip
75 Heater coil
76 Vacuum diaphragm

A bimetallic strip (74) provided with a heater coil (75) is installed for enrichment during warm-up stage. The cold bimetallic strip acts against valve springs (72 and 73), so that diaphragm (71) will open and the control pressure will be reduced. Heating up will successively reduce the effect of the bimetallic spring until the control pressure has attained its normal value.

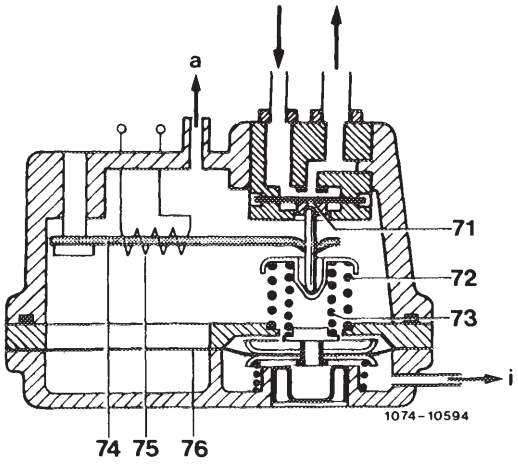
Full load enrichment

Prior to September 1981

For full load enrichment, the warm-up compensator is separated into two chambers by means of a vacuum diaphragm (76). Intake vacuum "a" is effective in upper chamber. The lower chamber is vented via connection "i".
To prevent the entry of dirt or water, the vent connection is connected to leak line of fuel damper.

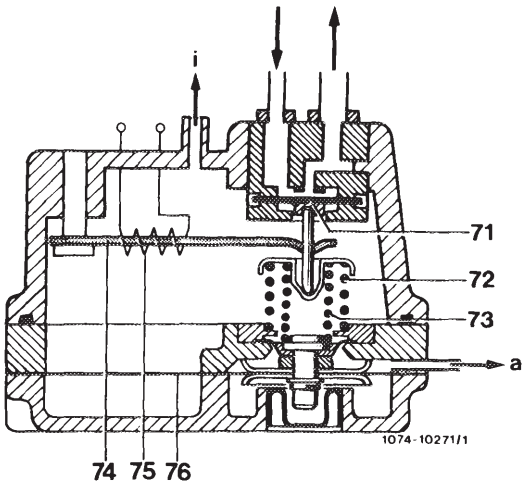
At idle and in partial load range the upper chamber is under influence of vacuum and vacuum diaphragm (76) rests against upper stop. In this position, the spring force establishes the normal value of the control pressure.

At full load, the vacuum in upper chamber is exhausted and the vacuum diaphragm (76) is moving in downward direction. The force of the inner valve spring (73) is getting less, and the control pressure is thereby reduced to full load value.



Starting September 1981

The lower chamber of the warm-up compensator has a vacuum diaphragm (76) which is controlled by the vacuum. Vacuum connection "a" is in lower chamber. The inner compression spring is relieved under influence of decreasing vacuum (increasing load).



71 Diaphragm valve
72 Outer valve spring
73 Inner valve spring
74 Bimatallic strip
75 Heater coil
76 Vacuum diaphragm
a To intake manifold (vacuum)
i To leak line (atmosphere)

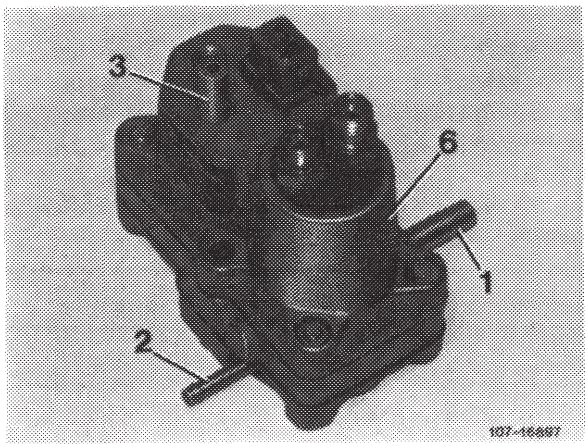
Under influence of resulting low control pressure (increase of outflow cross section) a low force is acting on control piston in fuel distributor. As a result, the air flow sensor plate is further deflected at the same air flow rate and a larger quantity of fuel will be supplied (mixture enrichment).

Connection "i" on upper chamber serves for venting. To prevent the entry of dirt or water, the vent connection is connected to leak line of fuel damper.

Acceleration enrichment

Ⓙ **starting 1981**
USA **1980/81**

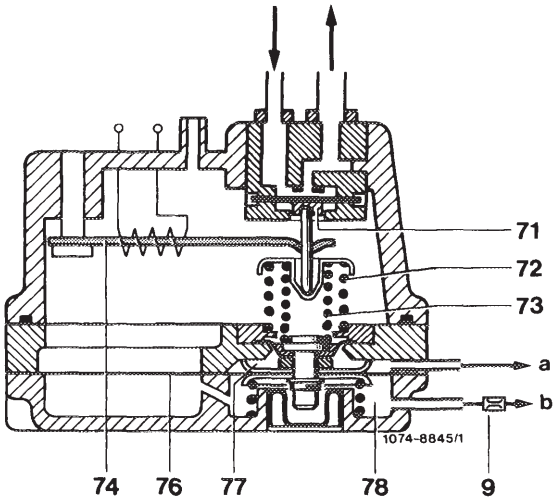
To obtain an additional mixture enrichment in warm-up stage during acceleration, the warm-up compensator has been provided with an acceleration enrichment.



1 Connection upper chamber
2 Connection lower chamber
3 Vent to atmosphere
6 Warm-up compensator

The full load enrichment via warm-up compensator is no longer employed and is now activated via throttle valve switch.

Acceleration enrichment is controlled in dependence of vacuum under a coolant temperature of 50 °C.



9 Throttle (restriction)
71 Diaphragm valve
72 Outer valve spring
73 Inner valve spring
74 Bimetallic spring
77 Vacuum diaphragm

77 Upper chamber
78 Lower chamber

a Connection upper chamber
b Connection lower chamber

Two springs are pressing down on control diaphragm (71) in warm-up compensator, the outer spring (72) is firmly supported in housing and the inner spring (73) is loaded or unloaded in dependence of vacuum.

A chamber in warm-up compensator housing-lower half is divided into an upper chamber (77) and a lower chamber (78) by a diaphragm. Both chambers are connected to intake manifold vacuum, with a choke (9) located in vacuum line to lower chamber.

At constant speed, the diaphragm (76) rests against upper stop. As a result, the vacuum in upper and lower chamber is the same.

During acceleration, the vacuum in the upper chamber decreases faster than in the lower chamber under influence of choke (9).

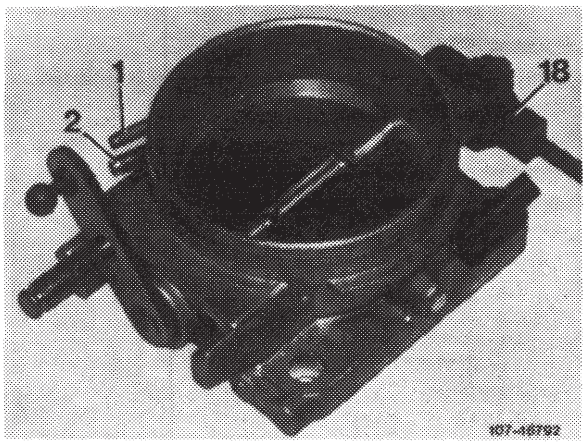
The inner spring is relieved up to pressure compensation of the two chambers and the pressure on control diaphragm is therefore lower.

As a result of the now lower control pressure (enlargement of outflow cross section) a lower force will act on control piston in fuel distributor. Consequently, the air flow sensor plate is further deflected while the air flow rate remains the same, so that a larger amount of fuel will be supplied (mixture enrichment).

Thermo valve (37) opens at a coolant temperature of 50 °C. The lower diaphragm chamber of the warm-up compensator is vented and the acceleration enrichment is cancelled. Both springs are pressing against control diaphragm and the control pressure obtains its normal value.

Full load enrichment by throttle valve switch

The throttle valve switch is attached to throttle valve housing and has two functions: Idle speed and full load contact.



1 Connection vacuum advance
2 Draw-off connection charcoal canister
18 Throttle valve switch

Idle speed contact

The idle speed contact on throttle valve switch results in a narrowing-down of the control range in control unit and thereby in a stabilization of the idle speed.

Full throttle contact

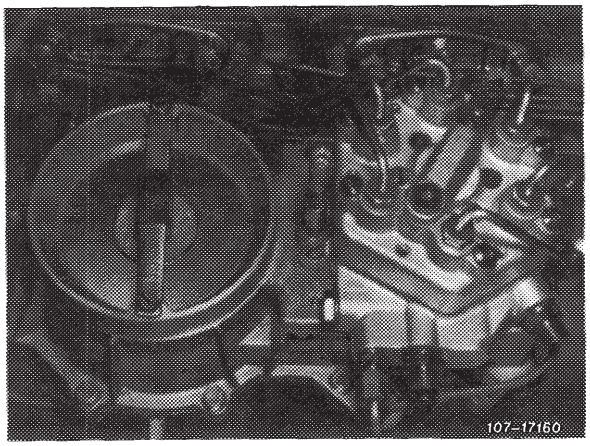
If the vehicle is driven in full throttle range (throttle valve against full throttle stop) , a fixed on-off ratio of 60 to 40 (slightly richer) is set in control unit via the full throttle contact.

G. Light alloy fuel distributor

The characteristic of the fuel distributor and the air funnel in air flow sensor has been changed in full load range. Consumption in full load range has been reduced as a result of improved adaptation.

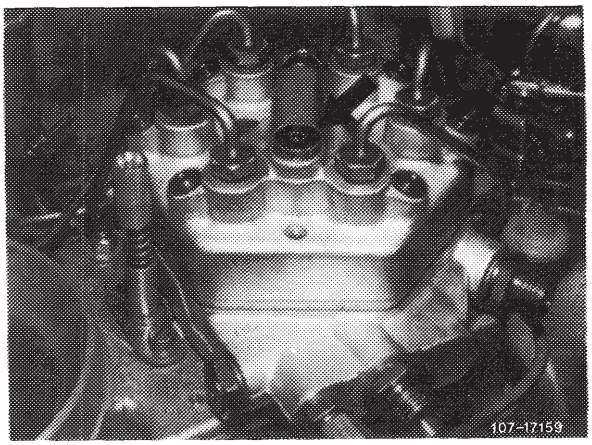
A fabric diaphragm is installed between upper and lower half. On top of fuel distributor are 6 closing screws with adjusting screws for differential pressure valves underneath. The differential pressure valves are set by manufacturer, adjustments are not permitted.

The connecting system of the injection line has been changed and now corresponds to that of 8-cylinder engines.



In addition, the fuel distributor upper half has been provided with a pressure compensating valve (arrow), as well as a compression spring above control piston.

On gray iron fuel distributor the compression spring is installed since February 1979, and on light alloy fuel distributor since start of series.

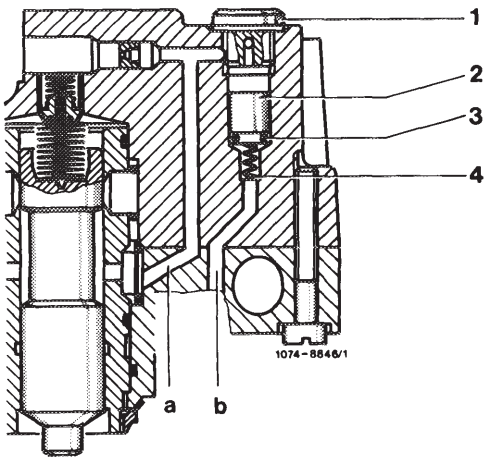


The pressure compensating valve is closed as long as the fuel system is under pressure.

The pressure compensating valve will open in the event of a pressure drop "after a long period of inoperation and cooling-down of fuel "below 0.3–0.5 bar gauge pressure.

Piston (2) is lifted, pressure compensation proceeds between system pressure and return flow pressure via piston gap.

This will prevent that the control piston in fuel distributor is lifted in direction of full load with the engine stopped and that a heavy mixture enrichment occurs during cold start.



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

Closing angle (dwell angle)

Normal coil ignition (S)

Closing angle (dwell angle) Testing and **adjusting value** at idle[1])	Change between idle and 3000/min
39–42°	max. ± 3°

[1]) When installing new breaker points, adjust closing angle (dwell angle) to 42 ± 1°.

Transistorized ignition system (J) (USA)

Identification: blue ignition coil, two pre-resistors and transistorized switchgear.

Closing angle (dwell angle) Testing and **adjusting value** at idle[2])	Change between idle and 3000/min
30–40°	max. ± 3°

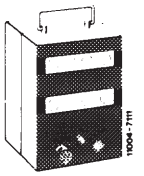
[2]) When installing new and when adjusting used breaker points, adjust closing angle (dwell angle) to 34 ± 1°.

Firing point

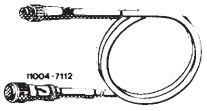
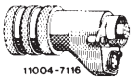
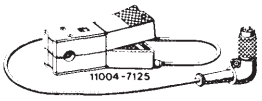
Ignition distributor Bosch no.	Adjusting value of firing point	Test value Ignition adjustment without vacuum			Vacuum adjustment after		Installation value of ignition distributor at starting speed
	with vacuum at idle	1500/min	3000/min	4500/min	"retard" at idle	"advance" at 4500/min (total)	without vacuum
(S) **1976**							
0 231 309 001	TDC	11–17°	26–30°	26–30°	4–6°	8–12° (34–42°)	5° before TDC
(J) **1976**							
0 231 311 001	7° before TDC	10–16°	26–33°	29–35°	–	–	7° before TDC
(USA) **1973/74**							
0 231 310 002	4° after TDC	13–17°	31–35°	37–41°	9–13°	–	7° before TDC
(USA) **1975/76**							
0 231 311 001	7° before TDC	10–16°	26–33°	29–35°	–	–	7° before TDC

Special tools

Digital tester



001 589 54 21 00

Connecting cable		000 589 04 90 00
Intermediate plug (adaptor)		000 589 72 63 00
Trigger		000 589 71 63 00

Conventional tools

Revolution counter, stroboscope, closing angle (dwell angle) measuring instrument

Checking and adjusting closing angle (dwell angle)

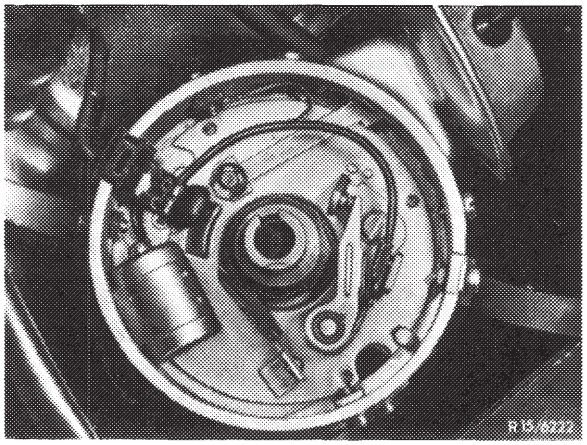
1 Measure closing angle (dwell angle) at idle speed.

2 Measure closing angle (dwell angle) change between idle speed and 3000/min, max. change ± 3°.

3 Adjust closing angle (dwell angle), if required or replace breaker points (07.5–505).

With used breaker points, the closing angle (dwell angle) can be adjusted only with transistorized ignition.

Large dwell angle – small point spacing
Small dwell angle – large point spacing



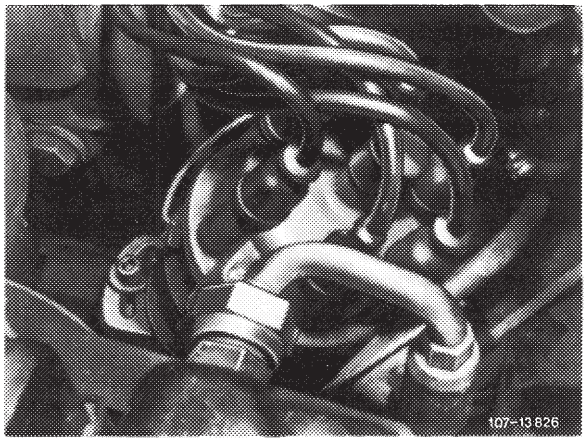
Checking and adjusting firing point

4 Measure firing point with stroboscope or digital tester at specified speed with or without vacuum.

5 Loosen ignition distributor and set adjusting value of firing point by turning ignition distributor.

Screw down ignition distributor and check firing point.

6 Check centrifugal and vacuum adjustment of ignition distributor. For this purpose, run through specified test values with or without vacuum adjustment.



07.5–503 Removing, preventing formation of layer on breaker points (breaker-controlled transistorized ignition)

Conventional tool

Voltmeter with measuring range	0–3 volts

The formation of a blue or a dark grey layer on breaker points of transistorized ignition systems may result in misfiring when in a progressive stage due to the insulating characteristics of such a layer – no matter whether a GE or an SI switchgear is installed. Pertinent complaints resulted in an unjustified exchange of switchgear.

The formation of layers on breaker points is the result of various influences which are shortly explained below:

Blue layer

The blue layer (tungsten oxide) is formed by the arch occurring during the closing stage and the resulting burning of contact material. This arch is above all caused by the discharge of the anti-interference capacitor in ignition distributor.

A large closing angle (small contact spacing) favors the intensity of the arch and thereby the formation of a layer.

Dark grey layer

The dark grey layer is the result of burnt grease, oil or dirt particles formed between breaker points.

A remedy with regard to complaints concerning the formation of layers requires the following jobs:

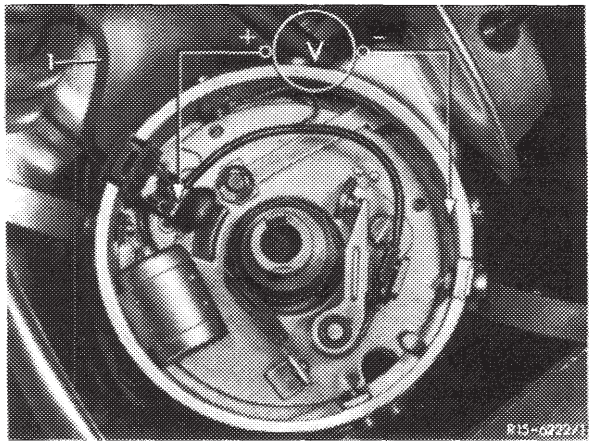
1. Check on ignition distributor whether

   a) a layer shows up on breaker point,

   b) the cams are showing score marks (check with finger nail).

2. If a visual checkup shows no distinct fault, check function of points by measuring voltage drop. Use voltmeter with measuring range of 0–3 volts.

   The voltage drop may amount to 0.5 volt with contact closed. A larger voltage drop is already indicating the formation of a layer.



1 Control line with capacitor

Remedies

1. Lining on breaker points:

   a) Exchange breaker points.

   b) Remove control line with capacitor (1) and replace by **shielded control line without capacitor.**

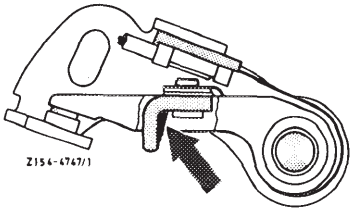
2. Score marks in distributor cam or rubbed-through lubricator felt:

   Exchange ignition distributor. Prior to installation, fit a shielded control line without capacitor to new ignition distributor.

Repair instructions

Breaker points

When renewing breaker points, be sure to coat slide piece (arrow) with a special grease pencil (special grease Bosch Ft 1 v 4). Without grease, the dwell angle will increase (smaller contact gap) due to the heavier wear of the slide piece. This in turn will favor the formation of a layer and may result in misfiring.



Arrow: point to be greased

Closing angle (dwell angle)

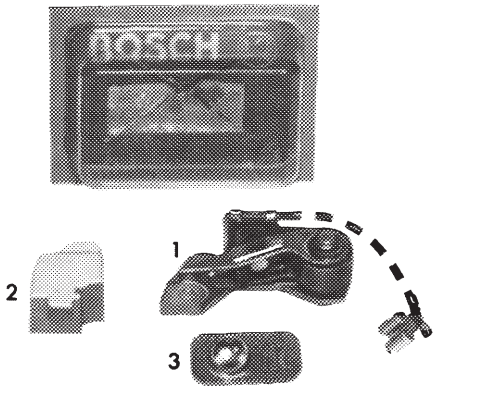
Set dwell angle to lower tolerance limit (07.5–500). This will guarantee that the dwell angle will not change beyond the specified value after running-in period of slide piece.

Adjusting values (lower tolerance) 34°

Protective breaker cap

Always mount protective breaker cap. Cap protects breaker point against grease, oil or dirt.

To make sure that during installation of breaker points the slide piece is greased and the protective cap is mounted, the breaker points are supplied with grease capsule and protective cap from now on.



115-10764

1 Breaker point
2 Protective cap
3 Grease capsule

Closing angle (dwell angle)

Normal coil ignition (S)

Closing angle (dwell angle) Testing and **adjusting value** at idle[1])	Change between idle and 3000/min
39–42°	max. ± 3°

1) When installing new breaker points, adjust closing angle (dwell angle) to 42 ± 1°.

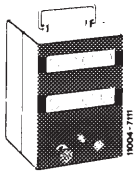
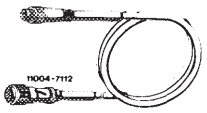
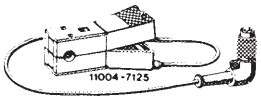
Transistorized ignition system (J) (USA)

Identification: blue ignition coil, two pre-resistors and transistorized switchgear.

Closing angle (dwell angle) Testing and **adjusting value** at idle[2])	Change between idle and 3000/min
34–40°	max. ± 3°

2) When installing new and when adjusting used breaker points, adjust dwell angle to 34 ± 1°.

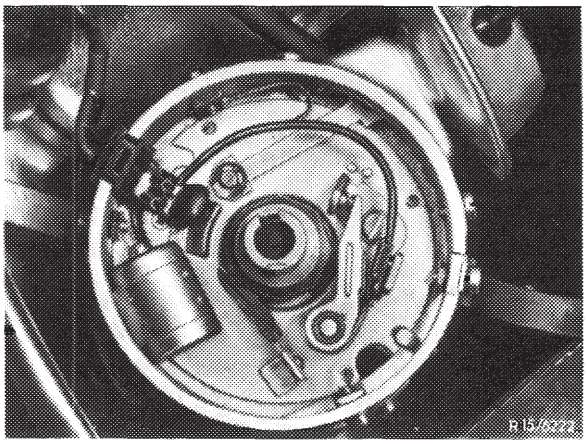
Special tools

Digital tester		001 589 54 21 00
Connecting cable		000 589 04 90 00
Intermediate plug (adaptor)		000 589 72 63 00
Trigger		000 589 71 63 00

Conventional tools

Closing angle (dwell angle) measuring instrument

Installation

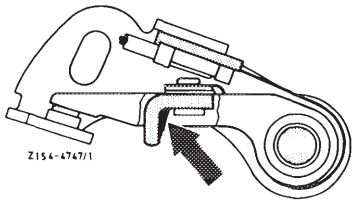


When renewing contacts, proceed as follows:

1 Wipe contacts prior to installation with a lintfree cloth to remove moisture or grease.

2 Coat slide piece of contact breaker, its bearing point and the cams of the distributor shaft with some Bosch special grease Ft 1 v 4.

3 When closed, contact breakers must be in parallel and at similar level in relation to each other.

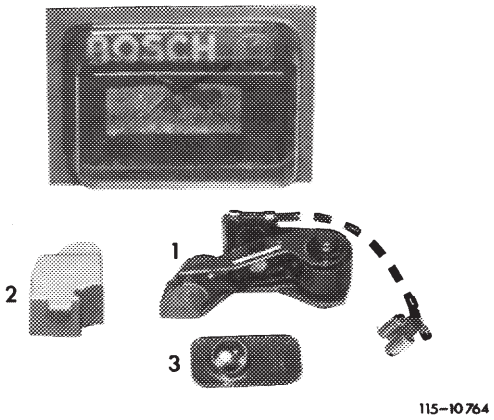


Arrow: spot to be greased

4 Set closing angle (dwell angle) to specified value.

Mount protective breaker cap. Cap protects contact against grease, oil or dirt particles.

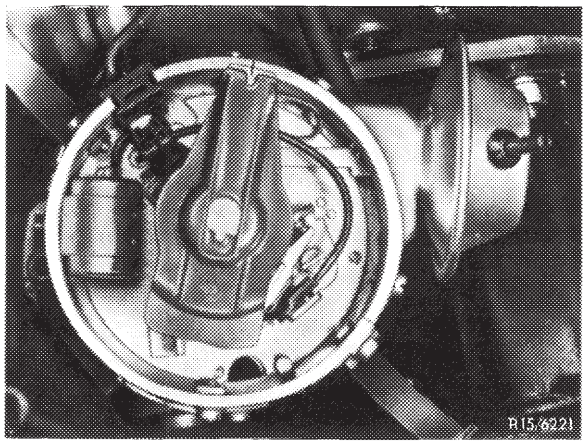
To make sure that during installation of breaker points the slide piece is greased and the protective cap is mounted, the breaker points are supplied with grease capsule and protective cap from now on.



1 Breaker point
2 Protective cap
3 Grease capsule

5 Check firing point and adjust (07.5–500).

Removal

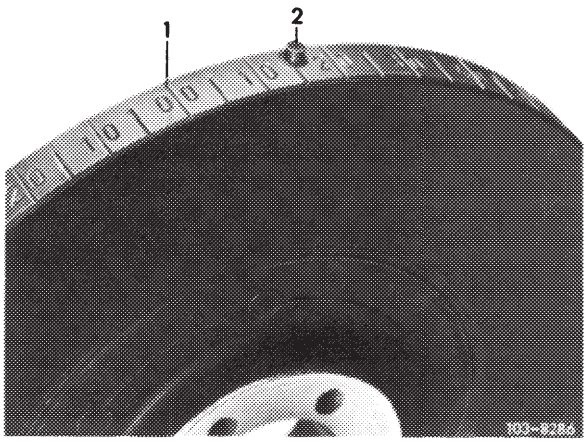


1 Remove protective cap, distributor cover, cable plug connections and vacuum line.

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.

In addition, the pointer on crankcase should be above TDC mark of vibration damper.

Attention!
On engines where the vibration damper carries a "010" mark also for BDC in addition to mark for TDC, the TDC mark is adjacent to pin in vibration damper.

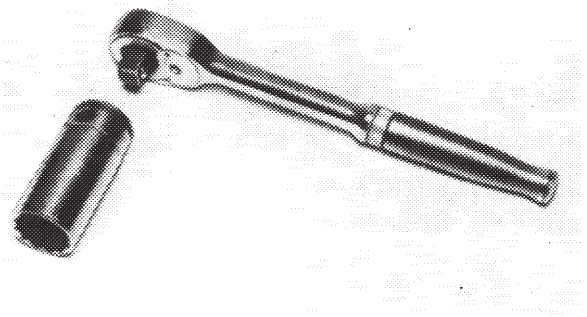


1 TDC mark

Rotate engine with combination tool.

Attention!
Do **not** rotate engine at fastening bolts of camshaft gears. Do not **rotate** engine **in reverse.**

3 Loosen hex. socket screw of distributor attachment and remove ignition distributor.



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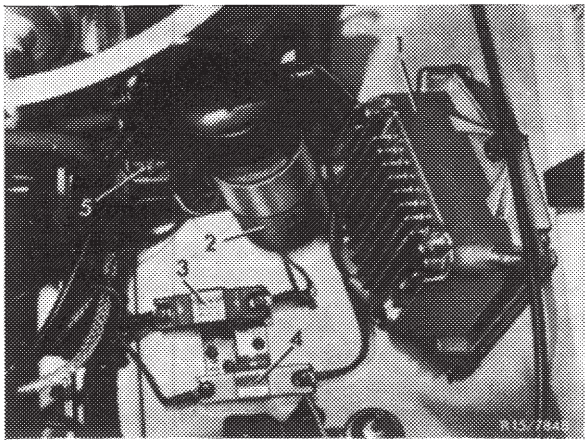
4 For installation proceed vice versa. Pay special attention to markings (refer to item 2).

5 Check closing angle (dwell angle) and firing point and adjust (07.5–500).

Layout of transistorized ignition



The system comprises:

Switchgear
Ignition coil
Pre-resistor 0.4 ohm (3)
Pre-resistor 0.6 ohm (4)

Operation

The ignition coil current is controlled by a transistorized circuit instead of the breaker point. The transistorized circuit is controlled by the breaker point.

With the breaker point closed, the switching transistor is conductive. When the breaker point opens, the transistor locks and the ignition coil current is interrupted. As a result of the interrupted circuit in the primary winding, the ignition voltage is induced in the secondary winding as before for conventional coil ignition.

To increase the ignition voltage, the 0.4 ohm pre-resistor is bridged by contact 16 on starter while starting.

Switchgear (1)

The switchgear has several transistors, resistors and other electronic components in a metal housing. This housing protects the components against mechanical damage and splash water and also serves to dissipate the heat due to energy losses. Contact on switchgear is made by a 4-way round plug connection with separate coaxial connection for activation.

In the event of repairs, only the complete switchgear can be exchanged.

Ignition coil (2)

Layout and external dimensions of ignition coil correspond to those of a normal heavy-duty ignition coil. But the design of the winding is different. The ratio amounts to approx. 1:185 as compared with 1:100 for conventional ignition coils.

External identification: painted blue.

Pre-resistors

Resistors 0.4 ohm and 0.6 ohm are designed similar to the ignition coil pre-resistors installed up to now: A ceramic body encloses the resistor winding, with extending connections.

A sheet metal clamp is placed around ceramic body for attachment. The color of this clamp informs about the resistance value, which is additionally punched in as a number.

Color	Code number	Resistor
blue, anodised	0.4	0.4 ohm
metallic, anodised	0.6	0.6 ohm

General information

On vehicles with transistorized systems, do not operate engine without battery connected.

When using rapid charging units for charging vehicle battery, separate battery from other vehicle circuits.

Starting assistance with rapid chargers is not permitted.

When installing battery, pay attention to correct polarity.

Do not confuse line connections on switchgear (e.g. when testing switchgear in installed condition).

Switchgear may suffer damage if these instructions are not observed.

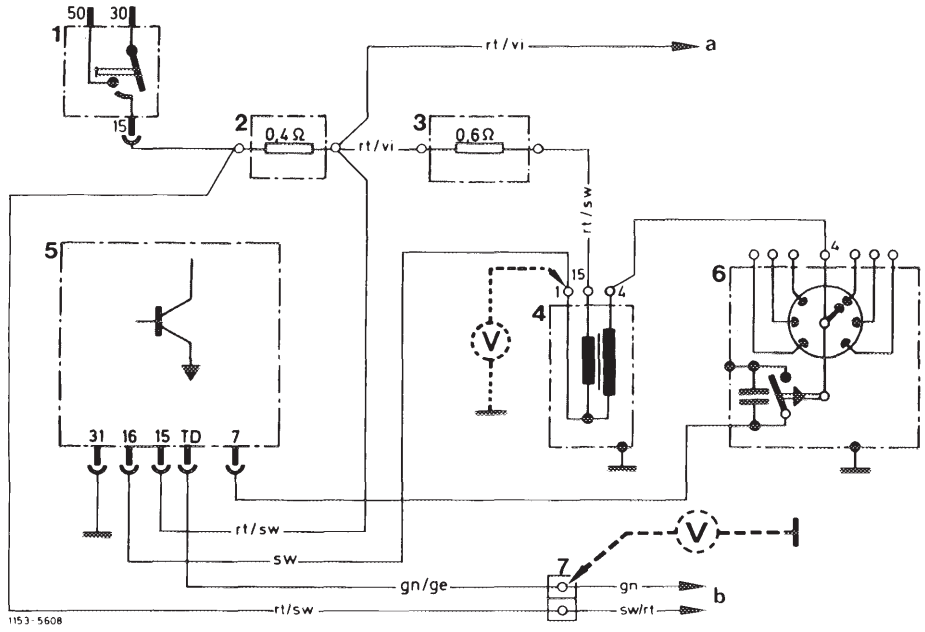
Instructions concerning test jobs

On engines with transistorized coil ignition, speed and dwell angle cannot always be measured in the usual manner.

Depending on type of tester used, connection at different points of ignition system is required. Always refer to operating instructions for tester. To facilitate connection of speed and dwell angle testers, an empty, offset cable shoe is screwed underneath cable connector 7.

Transistorized switchgear — standard switchgear — with SI transistor

Bosch order no.	installed in model	
0 227 051 014	114.060/073	(USA) up to including model year 1974
0 227 051 024	114.060/073 116.020	(J) model year 1976 (USA) model year 1975/76

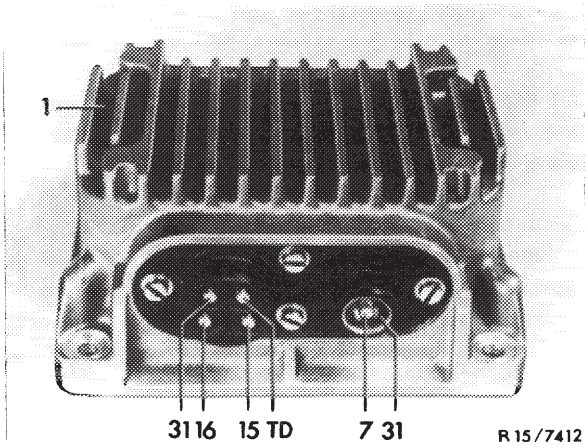


Wiring diagram

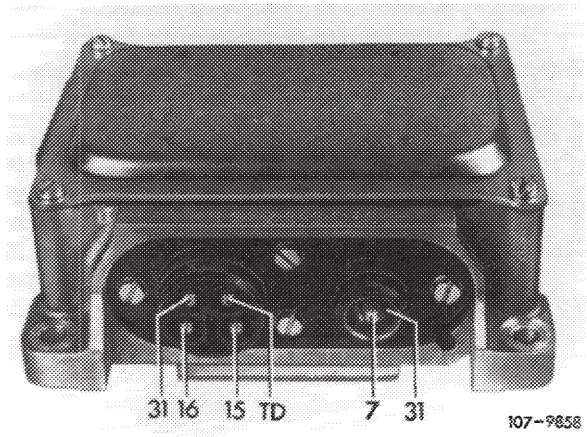
1 Ignition starting switch
2 Pre-resistor 0.4 ohm
3 Pre-resistor 0.6 ohm
4 Ignition coil
5 Switchgear
6 Ignition distributor
7 Cable connector with test terminal TD
a To starter terminal 16

ge = yellow
gn = green
rt = red
sw = black
vi = purple

Switchgear 0 227 051 014



Switchgear 0 227 051 024



Conventional tools

1 voltmeter, measuring range 0–3 V, 0–15 V with 0.1 V scale graduation

1 ohmmeter, measuring range starting 0.1 ohm

1. Testing pre-resistors

Loosen line connection on one connection of resistor about to be tested.

Measure resistance with ohmmeter.

Pre-resistor	Resistor rated value at 20 °C
0.4 ohm	0.4 ± 0.05 ohm
0.6 ohm	0.6 ± 0.05 ohm

Values on warmer pre-resistors will be slightly higher.

2. Testing ignition coil

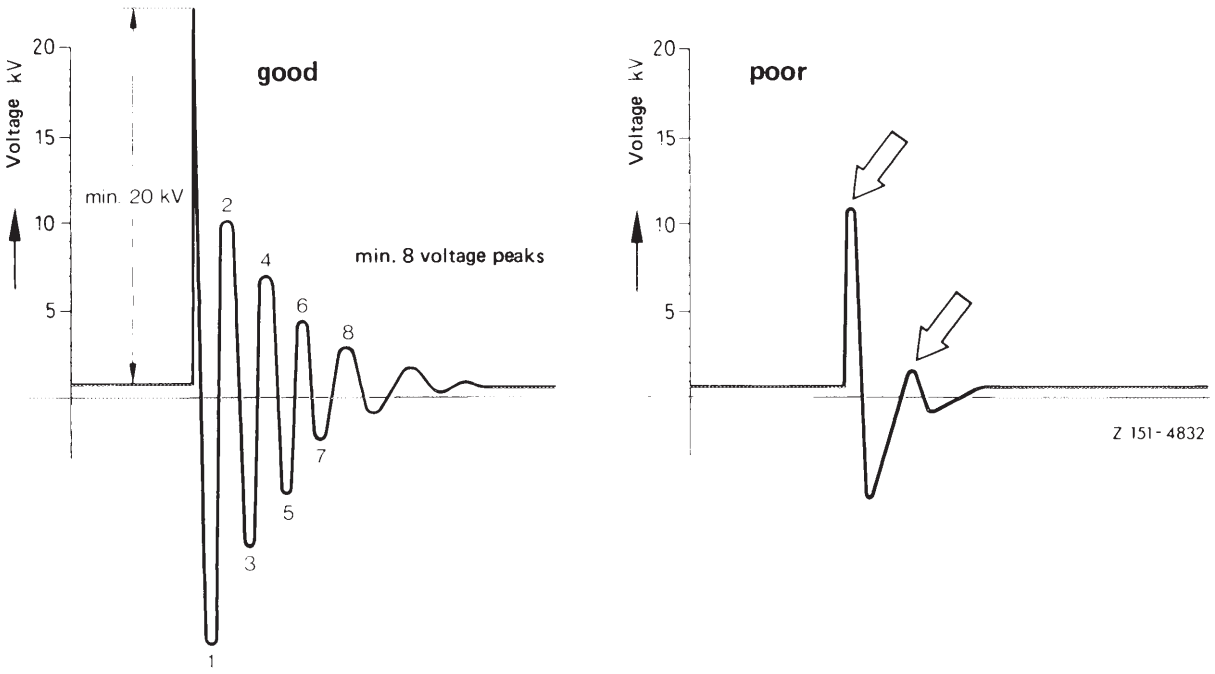
Insulation test

Separate ignition coil from vehicle circuits by removing terminals 1, 15 and 4.

Connect engine tester to ignition coil. Perform test according to operating instructions.

Whenever possible, test ignition coil with a suitable engine tester (e.g. SUN 745 or 1130) under operating conditions. This will show above all insulation damage, ground and winding shorts.

Evaluate voltage flow on scope according to the following illustration.



Selection Line-up
Fault Voltage below 20 kv, less than 8 voltage peaks
Cause Interrupted winding, winding short or insulation damage against ground
Remedy Renew ignition coil

Evaluation

The ignition coil is perfect, if the first oscillation attains 20 kv, followed by min. 8 voltage peaks. If this value is not attained, replace ignition coil.

Resistance test

Resistance rated value at 20 °C	
Primary winding measured between terminal 1 and terminal 2	0.38–0.45 ohm
Secondary winding measured between terminal 1 and terminal 4	8–11 kohm

Measuring values are slightly higher when ignition coil is warm.

3. Testing breaker point

For perfect functioning of transistorized systems the transfer resistance on breaker point should not be too high. To check, measure voltage drop at closed breaker point.

Connect voltmeter: + to cable connector (= terminal 7 or TD on switchgear)
— to ground

Voltage readout max. 0.3 volt.

If this value is exceeded, install a new breaker point.

4. Testing switchgears and line connections

Test for voltage on switchgear and whether the switching transistor permits passage of ignition coil primary current or locks at pertinent activation. The primary current will not be measured directly, but the voltage drop caused by this current for the sake of simplicity.

The test is made with the engine stopped and the ignition switched on.

Test voltage drop at input of 0.4 ohm resistor with breaker point closed.

Connect voltmeter: + to input pre-resistor 0.4 ohm
— to ground

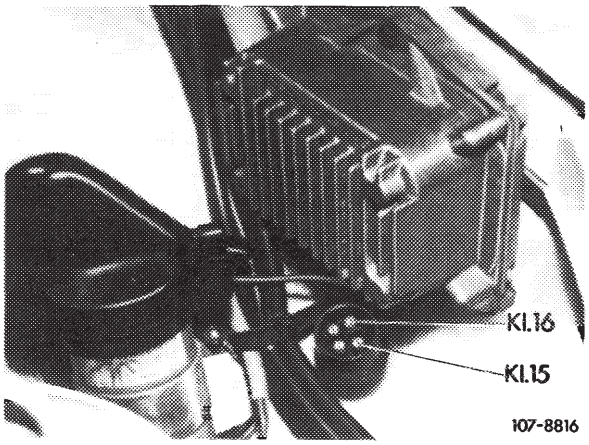
The voltage drop may amount to max. 0.4 volt.

If voltage drop is too high, test cable and cable connections.

4.1 Standard switchgears (SI)

Checking line connections

Pull 4-pole connecting plug from switchgear and test with voltmeter whether a battery voltage of 11.8—13 volts is available at terminal 15 and terminal 16 on 4-point plug with the ignition switched on.



Connect voltmeter: + to terminal 15 or
terminal 16
– to ground

If no voltage is measured, check all connections from input 0.4 ohm resistor to switchgear.

Then reattach 4-point round plug to switchgear.

Voltage with breaker point open

This will test tripping characteristics of transistor.

Connect voltmeter: + to terminal 1 ignition coil
– to ground

Battery voltage should be available at terminal 1, i.e. **readout = 11.8–13 volts.**

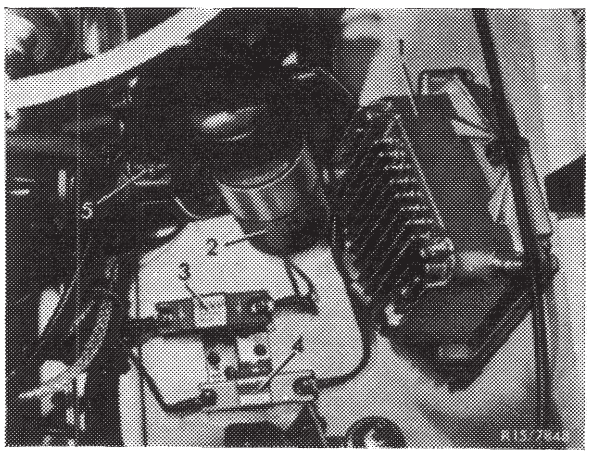
If not, replace switchgear.

Voltage with breaker contact closed

Voltmeter connected as before.
Voltage at terminal 1 ignition coil = 0.7–1.5 volts.

With breaker point closed, terminal 15 of ignition coil will show 3.6–4.6 volts, with open breaker point battery voltage.

If not, replace switchgear.



Layout of transistorized system with switchgear in model 114.060/073

1 Standard switchgear
2 Ignition coil
3 Pre-resistor 0.4 ohm
4 Pre-resistor 0.6 ohm
5 Cable shoe for test connection (cable color green/yellow)

Test values for switchgear test

Measuring points of associated voltage values for transistorized systems

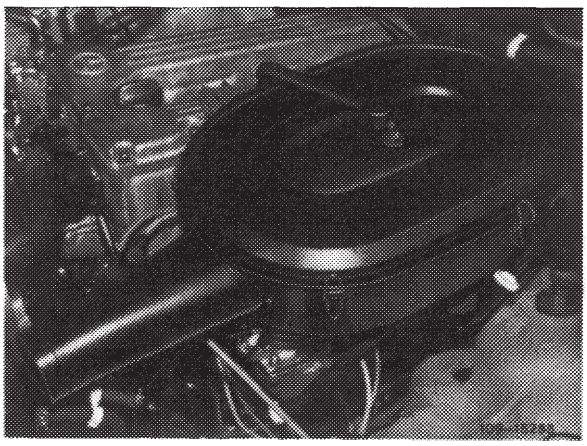
Voltmeter		Breaker point	Rated voltage values	Voltage values beyond rated range: causes, remedies
Plus to	Minus to		SI standard transistorized system	
Pre-resistor 0.4 ohm input	ground	closed	max. 0.4 V under battery voltage	With correct battery voltage: voltage drop battery – 0.4 ohm pre-resistor too high caused by transfer resistances (corrosion), line interruption etc.
Pulled off switchgear plugs terminal 15 terminal 16		without significance	battery voltage	With correct voltage on 0.4 ohm pre-resistor: Parallel resistance or circuit interruption between 0.4 ohm pre-resistor input and terminal 15 or terminal 16
Cable connector terminal 7 or TD		closed	0–0.3 V	Voltage value higher: transfer resistance on breaker point too high. Replace breaker point
Ignition coil terminal 15		closed	3.6–4.6 V	With correct voltage value on switchgear and on terminal 7 or TD: Switchgear defective Replace switchgear
		open	battery voltage	
Ignition coil terminal 1		closed	0.7–1.5 V	
		open	battery voltage	

Note

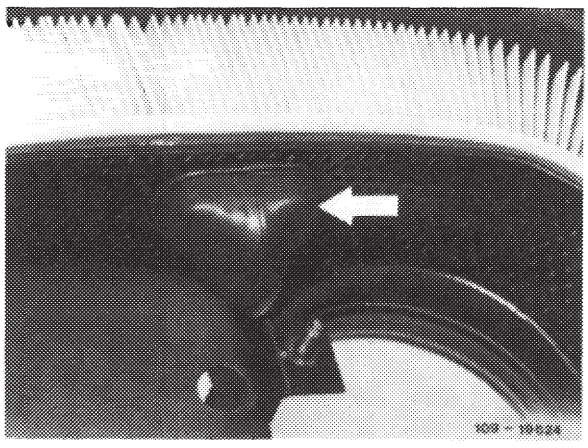
The air cleaner top is provided with a recess (arrow) for adjusting idle speed mixture.

As a result, the air cleaner need no longer be removed for adjusting idle speed mixture.

On air cleaner 2nd version the air intake proceeds directly at air cleaner, the connecting hose is no longer required.



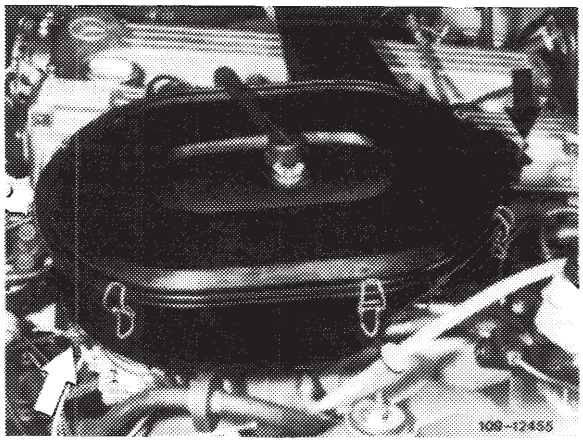
The connection for the decel shutoff valve is at air cleaner lower half.
Air intake is by way of a rubber scoop (arrow) at clean air side.



Removal

1 Unscrew both fastening nuts on vibration dampers.

2 Remove air cleaner, while pulling off contour hose for crankcase breather.

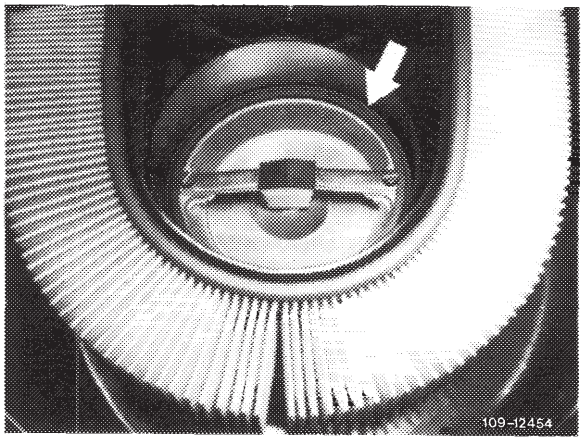


Installation

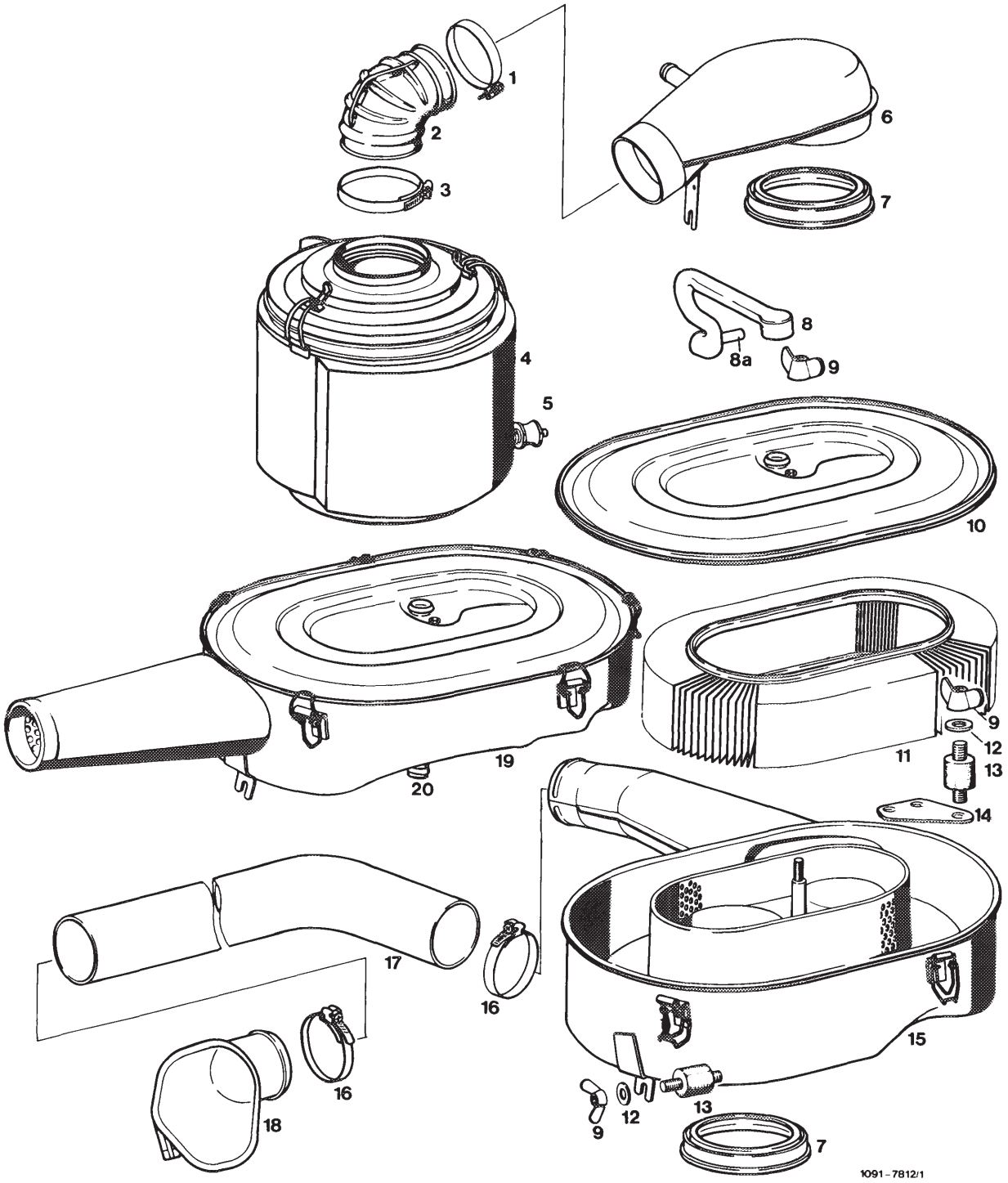
3 Remove air cleaner cover.

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.



Air cleaner



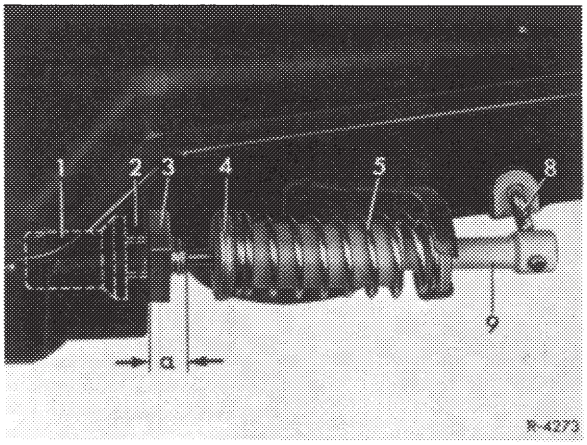
Model 107

1 Hose clamp
2 Rubber scoop
3 Hose clamp
4 Air cleaner
5 Vibration damper
6 Intake pipe

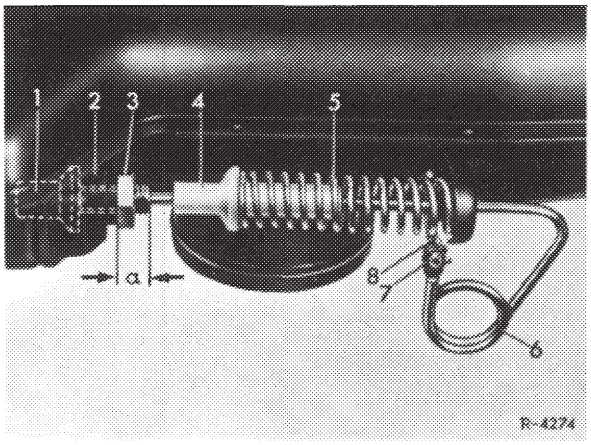
Models 116, 123, 126

7 Rubber sealing ring
8 Vent line
9 Wing nut
10 Air cleaner cover
11 Air cleaner element
12 Washer
13 Vibration damper
14 Holder
15 Air cleaner lower half 1st version
16 Hose clamp
17 Intake hose
18 Intake scoop
19 Air cleaner 2nd version
20 Connection for decel shutoff

Preheating of the intake air is automatically controlled by a termostat (1) installed in intake pipe of air filter and by an air valve (8).



Knecht version

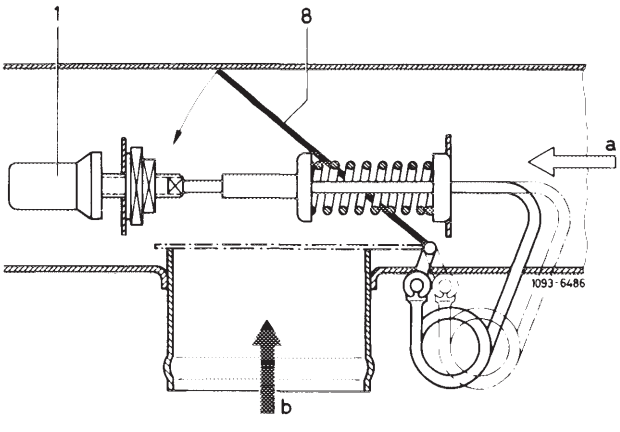


Mann und Hummel version

At thermostat temperature:

Below + 15 °C the fresh air input is closed by air valve (8) via duct "a". The warm air input via duct "b" is opened by the air valve, so that air preheated by the exhaust manifold will be drawn in.

Above + 35 °C the warm air supply is closed by air valve (8) via duct "b", so that only fresh air will be drawn in via duct "a".

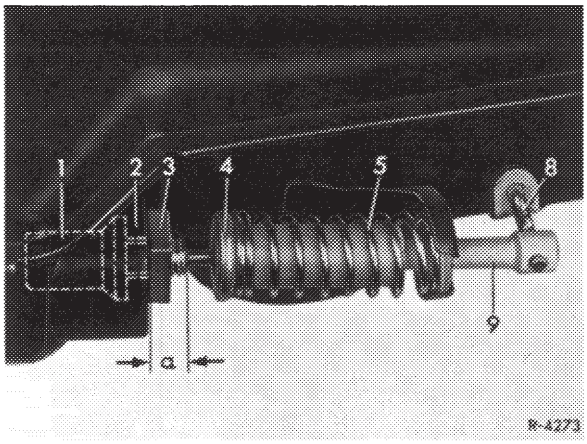


Testing and adjusting value

Thermostat, dimension "a"	7—8 mm

A. Knecht version

Removal



1 Compress compression spring (5) and push actuating bolt (9) from air valve shaft (8) and out of fastening eye.

2 Pull actuating bolt (9) together with guide sleeve (4) out of actuating pin of thermostat.

3 Unscrew square nut (3) and remove air filter cover.

4 Remove thermostat from inside out of intake pipe.

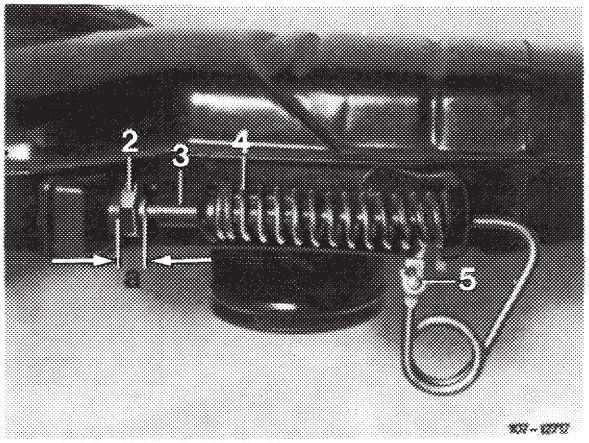
Attention!
Do not turn or push out plastic fastening nut (2).

Installation

5 Screw thermostat (1) from inside into plastic fastening nut (2) until dimension "a" = **7—8 mm** is attained. Lock thermostat by means of square counternut (3).

6 Install actuating bolt (9) with guide sleeve (4) and compression spring (5).

B. Mann und Hummel version



Removal

1 Push guide sleeve (3) against spring (4) and disconnect from pressure pin.

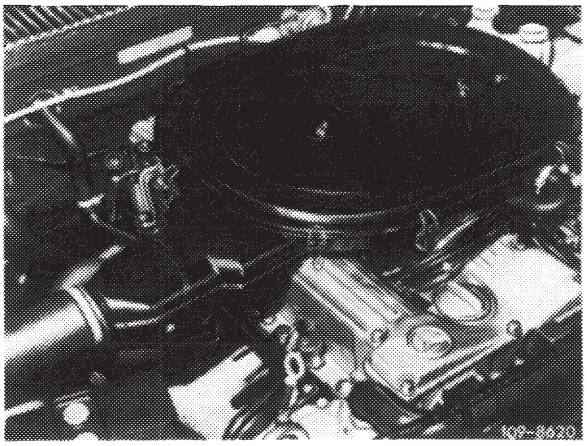
2 Remove air filter cover. Unscrew hex nut (2), unscrew thermostat from inside out of air filter housing.

3 Install thermostat in vice versa sequence and set dimension "a".

Removal

1 Pull off fresh air, warm air and crankcase breather hose.

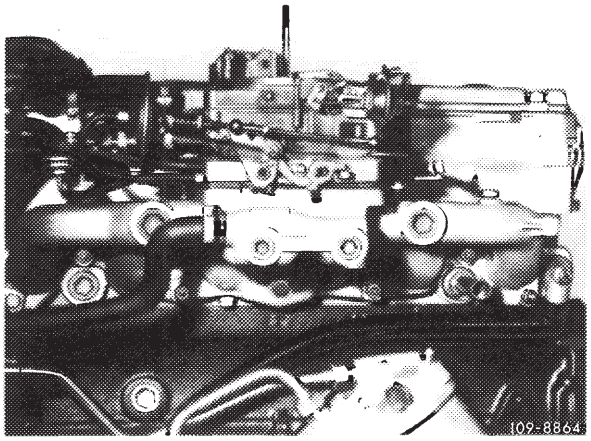
2 Loosen fastening nut as well as wing nut and remove air filter.



Installation

3 Install air filter in vice versa sequence. Pay attention to correct seat of sealing ring between carburetor and air filter and replace sealing ring, if required.

Removal



1 Partially drain coolant.

2 Remove air filter.

3 Remove carburetor (07.2—194).

4 Disconnect engine longitudinal regulating shaft and regulating rods.

5 Loosen all connections on intake pipe.

6 Loosen intake pipe fastening nuts or screws and remove intake pipe.

Installation

Install intake pipe in vice versa sequence as follows:

7 Install new intake pipe flange gasket.

8 Add coolant and check cooling system for leaks.

9 Adjust idle speed, while checking intake system for leaks (07.2—100).

Adjusting values

V-belts (width of profile in mm)	New V-belts (KG-scale on measuring instrument)	Used V-belts (KG-scale on measuring instrument)
9.5	30	20–25
12.5	50	40–45

Conventional tool

Measuring instrument (Krikit)	e.g. made by Gates GmbH, Gravener Straße 191–193, D-4018 Langenfeld 2
	e.g. Gates Rubber Company 999 S. Broadway USA-80217 Denver/Colorado

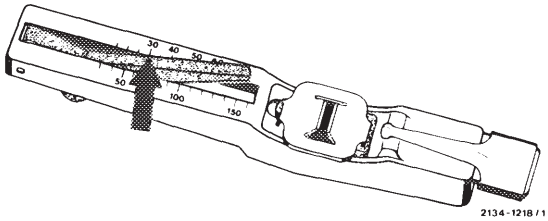
Checking condition of V-belts

Renew cracked, porous, burnt or worn V-belts.

Checking tension

For handling of instrument refer to operating instructions and tensioning V-belts (13–340).

The specified adjusting values refer to KG-scale of measuring instrument (arrow).



Used V-belts

Check tension of V-belts and compare with values for used V-belts (e.g. V-belt, width of profile 9.5 mm = adjusting value 20—25) shown on table and retension accordingly, if required.

Mounting and tensioning of new V-belts

Perfect assembly of a V-belt requires loosening of respective secondary unit or tensioning device of V-belt to the extent that the V-belt can be easily mounted. In addition, the running surfaces on V-belt pulleys should be free of burr, rust and dirt.

Keep away from oil, grease, chemicals. Do not use belt wax or similar compounds. Then make sure of optimal adjustment of belt tension (for adjusting values refer to table) to avoid complaints such as squealing V-belts and short life.

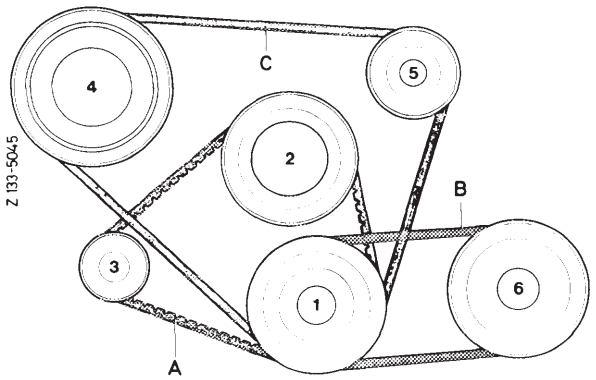
During maintenance jobs, mount V-belt **prior** to engine checkup and tension to value for **new V-belts** named in table (e.g. V-belt, width of profile 9.5 mm = adjusting value 30).

If possible, run engine approx. 10—15 minutes with all consumers connected. Then check tension. The value measured in this manner should be in agreement with value for **used V-belts** shown on table (e.g. V-belt, width of profile 9.5 mm = adjusting value 20—25). If it is less, retension V-belt to this value.

If the engine cannot be run in shop, check V-belt tension during final inspection or following a test drive.

V-belt	Models			Adjusting value KG-scale on measuring instrument
	107, 114, 116	107[1]), 116[1])	123, 126	
A Alternator	9.5 x 960		9.5 x 930	20–25
B Power steering pump	12.5 x 784 12.5 x 818[2])	12.5 x 825 12.5 x 818[2])		40–45
C Refrigerant compressor	12.5 x 1375[3])	12.5 x 1285		

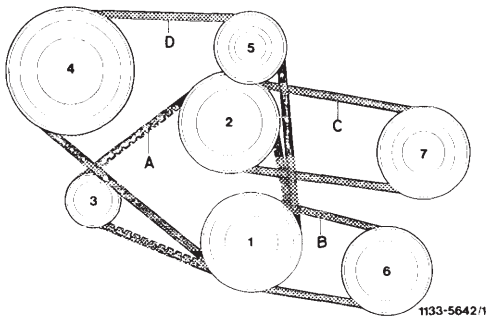
[1]) Power steering pump with cast-on reservoir.
[2]) Standard starting 5.1978.
[3]) Version 1 (swivelling tensioning roller), of models 114.060/062/072/073.



1 Crankshaft
2 Water pump
3 Alternator
4 Refrigerant compressor
5 Tensioning roller
6 Power steering pump

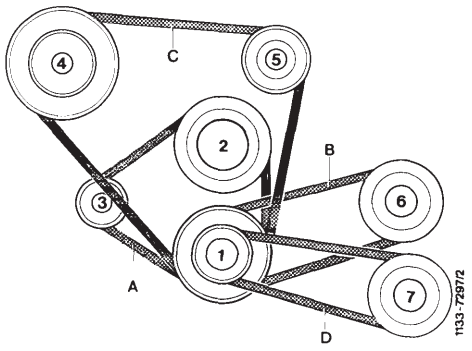
V-belt	California Model year 1974	California Model year 1975 (J) (S) (USA) Model year 1976	(AUS) (J) (S) (USA) Model year 1977/78	Adjusting value KG-scale on measuring instrument
A Alternator	9.5 x 960 9.5 x 980[1])			20–25
B Power steering pump	12.5 x 725	12.5 x 715	12.5 x 825 12.5 x 818[2])	40–45
C Air pump	9.5 x 910 optional 9.5 x 913		9.5 x 825	20–25
D Refrigerant compressor	12.5 x 1285			40–45

[1]) On 65-A alternator (J) 1979, with KW-pulley 110 032 08 04 (formerly 123 032 01 04).
[2]) Standard starting 5.1978.



Model year 1974–1976

1 Crankshaft
2 Water pump
3 Alternator
4 Refrigerant compressor
5 Tensioning roller
6 Power steering pump
7 Air pump



Model year 1977/78

1 Crankshaft
2 Water pump
3 Alternator
4 Compressor
5 Roller
6 Power steering pump
7 Air pump

Special tools

Wrench socket 8 mm, 1/2" square, 130 mm long		000 589 33 07 00

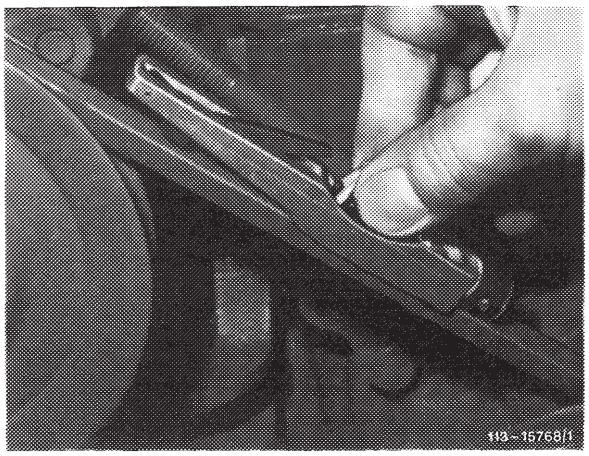
Note

Measuring instrument "Krikit" is recommended for checking V-belt tension.

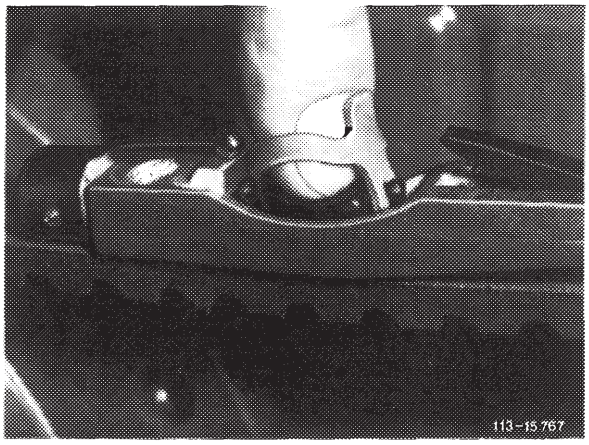
Handling of measuring instrument

For checking V-belt tension the measuring instrument can be held in different ways:

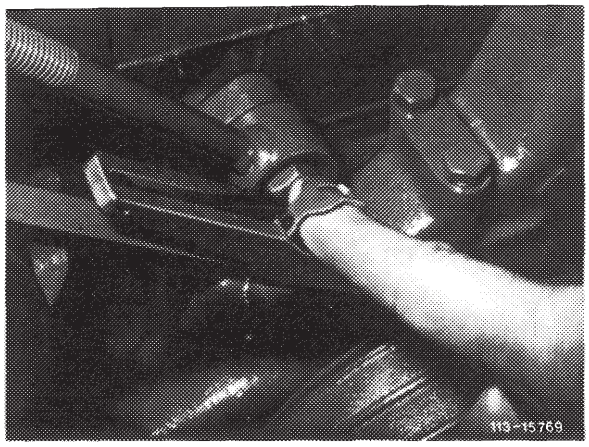
a) With thumb and forefinger on rubber loop, with finger tips resting on push button.



b) With forefinger from above in rubber loop.



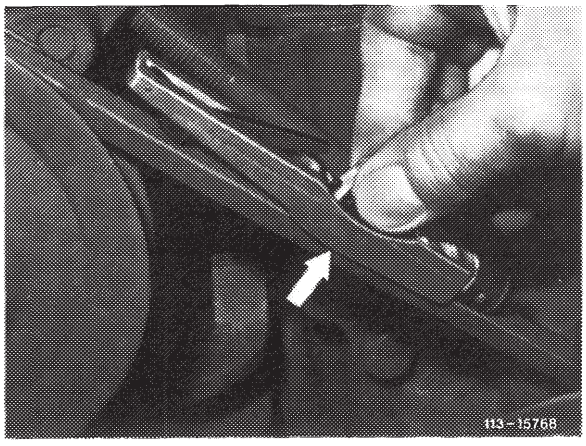
c) With forefinger laterally between rubber loop and push button.



Checkup

1 Lower indicating arm on measuring instrument.

2 Place measuring instrument on V-belt in center between pulleys. Lateral stop on measuring instrument should rest laterally against V-belt (arrow).



Attention!
On double belt drive make sure that measuring instrument rests only on one V-belt.

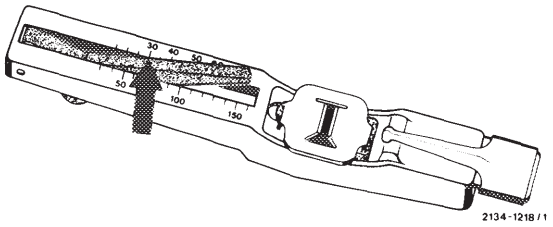
3 Exert uniform vertical pressure on top of V-belt by means of push button until click spring disengages audibly (or noticeably).

Note: Upon disengagement of click spring do not continue pushing measuring instrument, since this will result in a wrong indication.

4 Lift measuring instrument **carefully** from V-belt. Prevent impacts which may change position of indicating arm.

5 Read tension value on point of intersection of indicating arm on upper scale (arrow).

The specified adjusting values refer to KG-scale of measuring instrument.



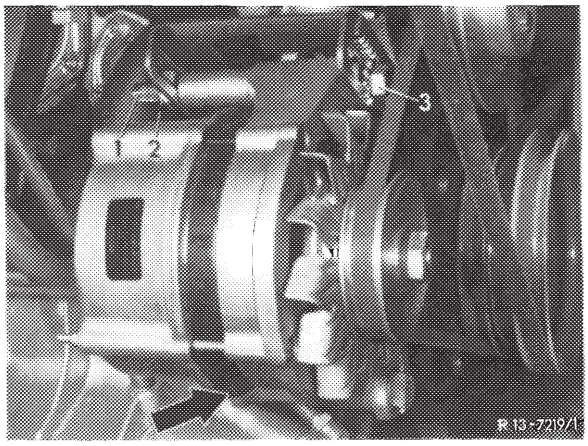
Tensioning

Belt A Alternator – coolant pump up to and including 1974

1 Loosen nut (2) and mounting bolt (arrow).

2 Adjust belt tightness at 6 mm square (1) or hexagon of tightening bolt (3).

3 Tighten nut (2) and mounting bolt (arrow).

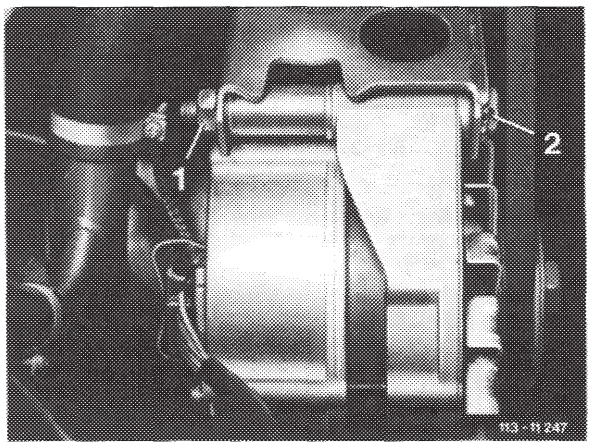


Belt A Alternator – coolant pump starting 1975

1 Loosen nut (1).

2 Adjust belt tightness with tightening bolt (2).

3 Tighten nut (1).

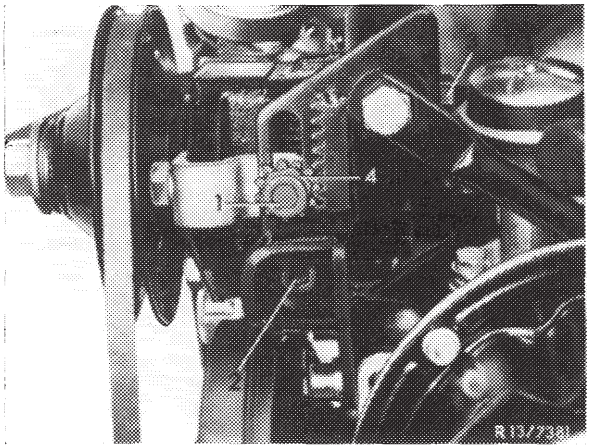


Belt B Power steering pump

1 Loosen mounting bolts (1, 2 and 3).

2 Adjust belt tightness with toothed disc (4).

3 Tighten mounting bolts (1, 2 and 3).

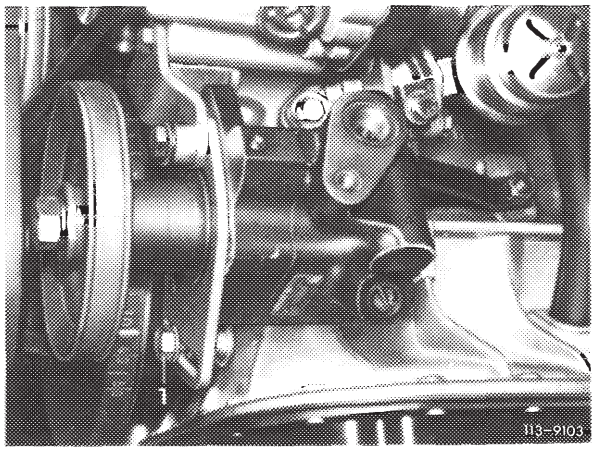


Belt B Power steering pump
USA version 1974 models

1 Loosen mounting bolt (1).

2 Adjust belt tightness by swinging out power steering pump.

3 Tighten mounting bolt (1).

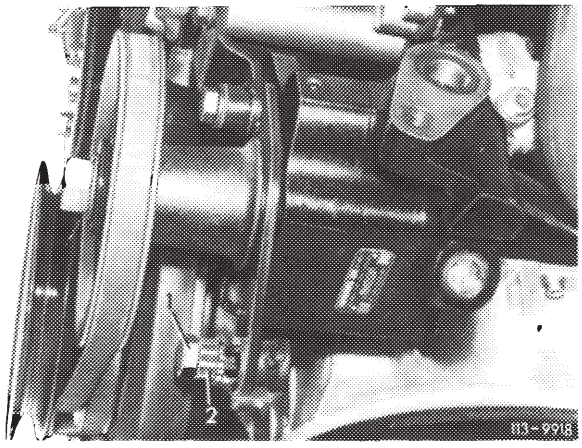


Belt B Power steering pump
USA version 1975/76 models
Sweden, Japan version
1976 models

1 Loosen mounting bolt (1).

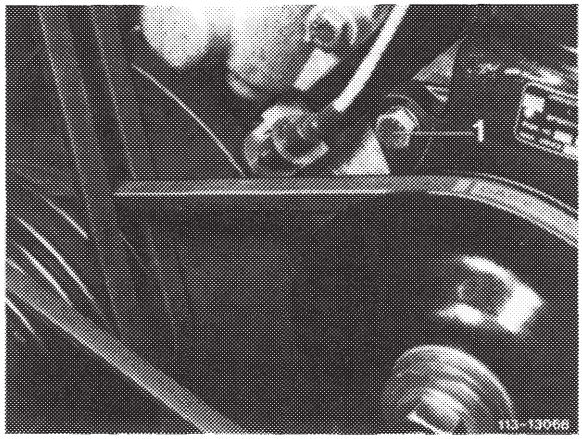
2 Adjust belt tightness with toothed disc (2).

3 Tighten mounting bolt (1).



Belt B Power steering pump model 123
Standard version
and starting model year 1977

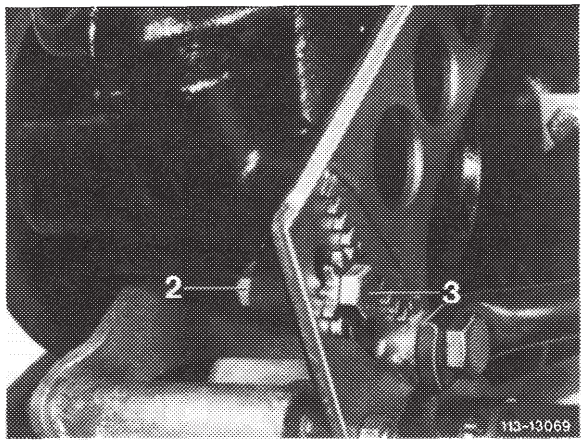
1 Loosen screw (1) on face of power steering.



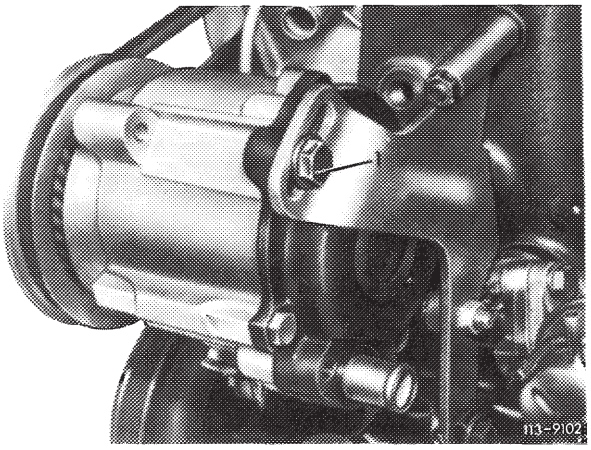
2 Loosen nut (2).

3 Tension belt with tensioning screw (3).

4 Tighten nut (2) and screw (1).



Belt C Air pump
USA version from 1974 – 1976 models
Sweden version from
1976 models
Japan version from
1976 models

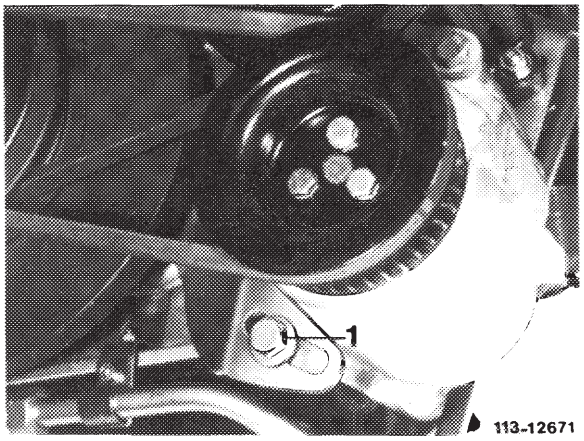


1 Loosen mounting bolt (1).

2 Adjust belt tightness by swinging out air pump.

3 Tighten mounting bolt (1).

Belt C Air pump starting model year 1977
Australia, Japan, Sweden,
USA version

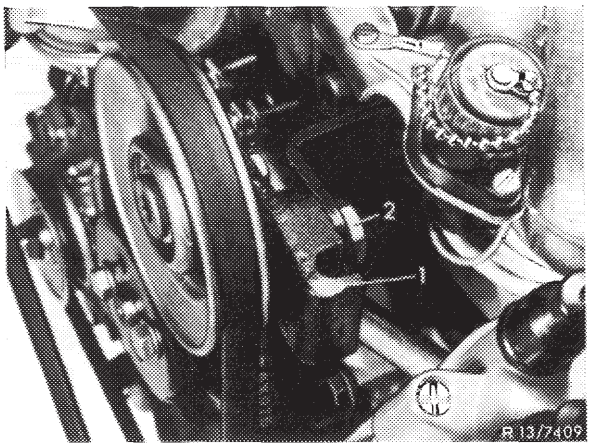


1 Loosen mounting bolt (1).

2 Adjust belt tightness by swinging out air pump.

3 Tighten mounting bolt (1).

Belt D 1st version compressor



1 Guide an appropriate tool with an approx. 8 mm dia. into opening of holder (1).

2 Loosen mounting bolt (2).

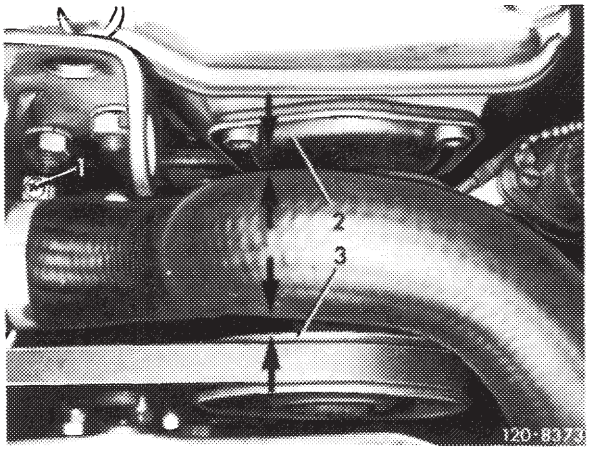
3 Adjust belt tightness by swinging holder (1) clockwise.

4 Tighten mounting bolt (2).

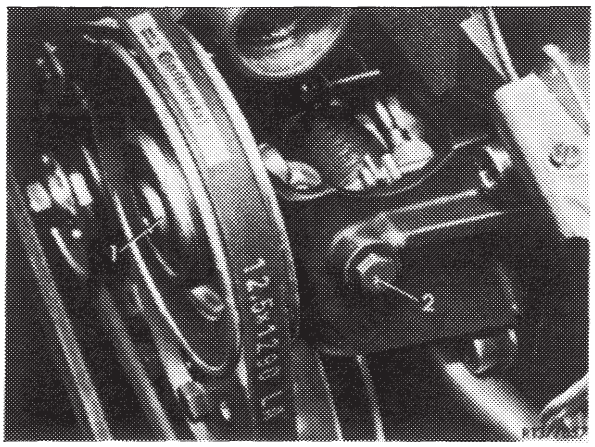
Attention!
Check the following distances of a re-tightened belt.
Distance from coolant hose to cover (2) is approx. 5 mm.

Distance from coolant hose to belt roller (3) is approx. 10 mm.

If these distances cannot be reached by loosening the hose clamp (1) and twisting the coolant hose, the tightening device must be converted to the 2nd version.



Belt D Refrigerant compressor version 2



1 Loosen expansion bolt (1).

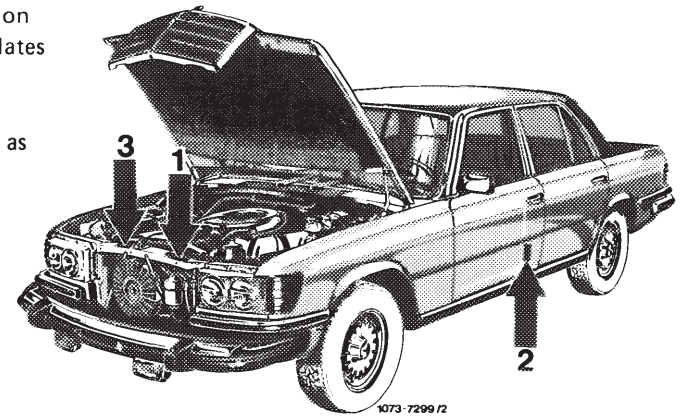
2 Adjust belt tightness with tightening bolt (2).

3 Torque expansion bolt (1) to 16 Nm.

Note: A number of vehicles has been delivered with the counternut on the tightening bolt (2). For this version the belt tightness is adjusted with the counternut. However, it would be more advantageous to exchange the M 6 x 90 adjusting bolt against a M 6 x 75 bolt, part number 000 933 006 176, and to install this bolt without a counternut.

The various emission control systems of USA version vehicles are identified by respective information plates (arrows 1, 2 and 3).

The respective plate shows the identification data, as well as all the important engine adjusting data.



Recognising emission control system from color of information plate – basic color/lettering

Model year	Federal version	California version	Federal version high altitudes	Federal version tourist vehicles	California version tourist vehicles
1973	black/silver	black/silver	–	–	–
1974		green/silver	–	–	–
1975		green/silver	–	yellow/silver	yellow/silver
1976					
1977	black/white	yellow/black	red/black	black/white	yellow/black
1978			–		
1979			–		
1980		black/white	–		black/white
1981					

1. Information plate on cross-member in front of radiator

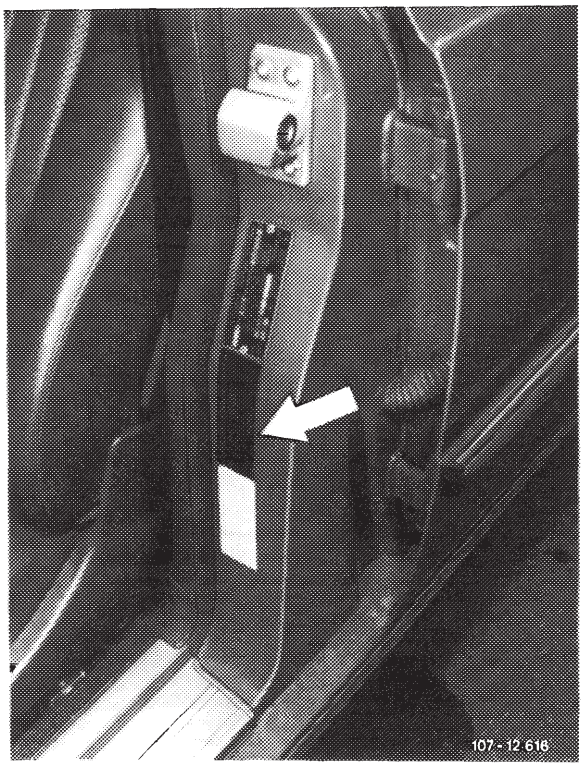
VEHICLE EMISSION CONTROL INFORMATION DAIMLER-BENZ AG. STUTTGART-UNTERTUERKHEIM
DISPLACEMENT: 167.5 CU. IN. ENGINE FAMILY: 78/2B/L6E/28 APPROVED M.B. EMISSION CONTROL SYSTEM: FI/EGR/Also/OBC
THIS VEHICLE IS CERTIFIED FOR BOTH LOW AND HIGH ALTITUDE LOCATIONS. IDLE-RPM: 800. TIMING: TDC AT IDLE. (VACUUM CONNECTED). CO-SET
(MEASURED AT EXHAUST MANIFOLD TAP CYL. 1-3 DISCONNECT EXHAUST HOSE TO EGR TRANSDUCER) 0.4-2.0% (AIR INJECTION DISCONNECTED.
TRANSMISSION IN NEUTRAL ACCESSORIES NOT IN OPERATION. OIL TEMP. 80°C. IN ADDITION SEE WORKSHOP MANUALS).
VALVE LASH AT WATER TEMP. BELOW 30°C INTAKE 0.10 mm EXHAUST 0.25 mm VALVE LASH AT WATER TEMP. ABOVE 45 °C INTAKE 0.15 mm EXHAUST 0.30 mm
THIS VEHICLE CONFORMS TO U.S.E.P.A. REGULATIONS APPLICABLE TO 1978 MODEL YEAR NEW MOTOR VEHICLES. IT ALSO CONFORMS TO CALIFORNIA
REGULATIONS APPLICABLE TO 1978 MODEL YEAR NEW MOTOR VEHICLES. THE VEHICLE ALSO CONFORMS TO APPLICABLE CANADIAN EMISSION STANDARDS.
1074 – 7957

Recognising catalyst from color of information plate
Basic color/lettering

Model year	Federal version	California version	Federal version high altitudes	Federal version tourist vehicles	California version tourist vehicles
1977	black/silver	green/silver	black/silver	red/silver	blue/silver
1978		red/silver	–		red/silver
1979			–		
1980		black/silver	–		
1981					

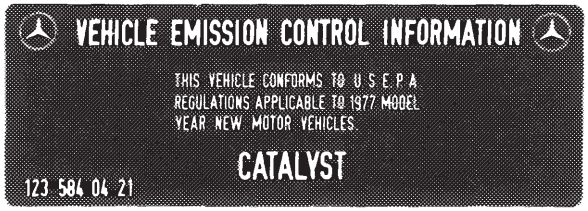
2. Information plate on door post of driver's door

This plate shows whether vehicle is provided with or without catalyst (s).



Information plates

This vehicle is provided with catalyst(s).



1074 – 8259

Tourist vehicle

This vehicle is not provided with catalyst(s) by manufacturer.

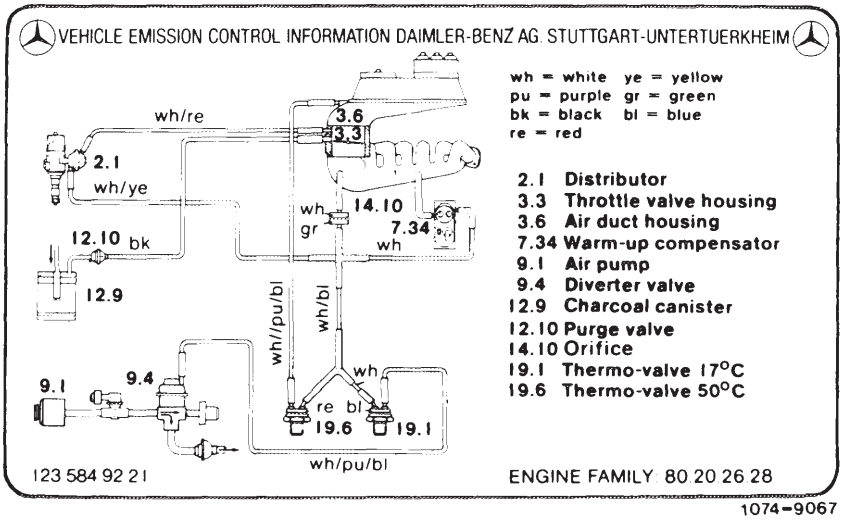
Catalyst(s) must be installed following import into USA.

1074 – 8260

3. Information plate for vacuum line layout on cross member in front of radiator (for California only starting model year 1980).

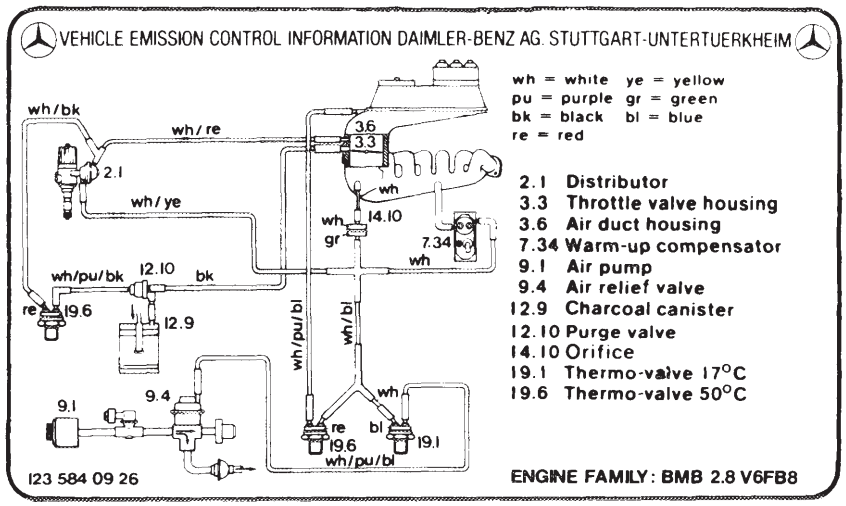
This plate shows the vacuum line layout for all emission system components in engine compartment.

Model year 1980



1074-9067

Model year 1981



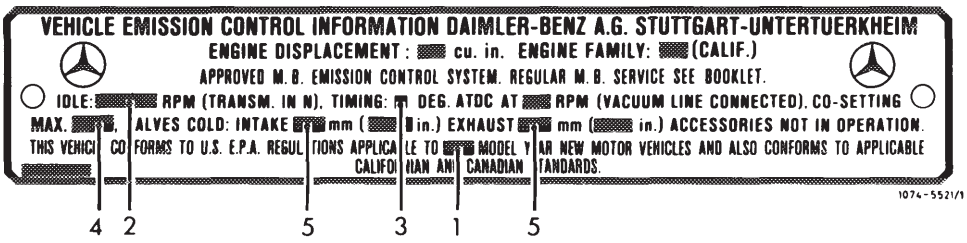
1143-9843

Federal and California version model year 1975/76

A. General

Information plate

Federal version basic color black
California version basic color green



1 Designation of model year
2 Idle speed
3 Firing point at a speed of . . .
4 Emission value at idle
5 Valve clearance

Identification of vacuum lines

Starting model year 1975 a new identification system for all vacuum lines in vehicle has been introduced.

The basic color of the vacuum lines for emission control system is transparent (white).

To facilitate recognition of the individual functions, additional color stripes will be used similar to the model years before.

Lines originating at a vacuum source (originating lines) **have one color stripe only.** These lines, to the extent they are part of a switch-over valve, are plugged to the center connection of the switch-over valve having the same color.

Lines terminating at a vacuum-operated device (terminating lines) have **two color stripes.** Purple is always the second color. These lines are plugged outside to switch-over valves having the same color.

Emission control unit	Color of vacuum originating line	Color of vacuum terminating line
EGR	brown	brown/purple
Air injection	blue	blue/purple
Fuel evaporation control		
Purge valve	black	black/purple
Float chamber vent	green	green/purple

Color coding of cable connections

Cable connections of switch-over valves are color-coded with tape according to their function (e.g. blue for air injection).

Vacuum switch-over valve

For easy identification, the filter caps are color-coded according to valve function.

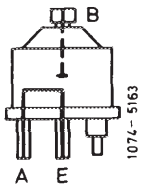
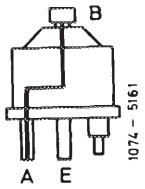
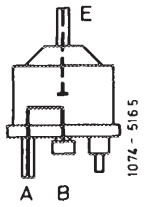
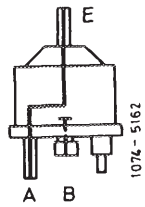
Blue cap — valve for air injection

Brown cap — valve for EGR

Green cap — valve for float chamber vent

White cap — valve for automatic choke

Do not confuse vacuum connections when mounting valves. Always slip vacuum-carrying line (originating line) on center connection. It is unimportant whether this connection is at top or bottom of valve.

Operation	Part No.	Color	De-energized	Energized
In a de-energized condition, connection B is closed. Vacuum connections A and E are connected to each other. When energized, port E is closed and only connection A is open to atmosphere. Never confuse connections E and A.	001 540 04 97 001 540 08 97 001 540 18 97	white brown blue		
In a de-energized condition, connection A is open to atmosphere. Connection E is closed. When energized, connections A and E are connected to each other and connection B (atmosphere) is closed. Never confuse connections E and A.	001 540 19 97	green		

A = connection to vacuum unit

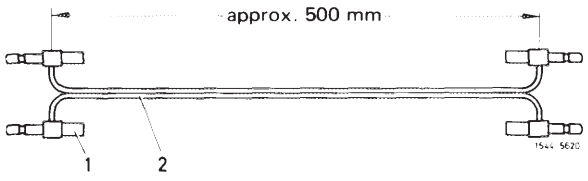
B = connection to atmosphere

E = connected to vacuum source

Test cable

To test the individual components of emission control system use a self-made cable according to drawing.

1 Plug part no. 003 545 28 28 (housing omitted)
2 Cable 1.5 mm²

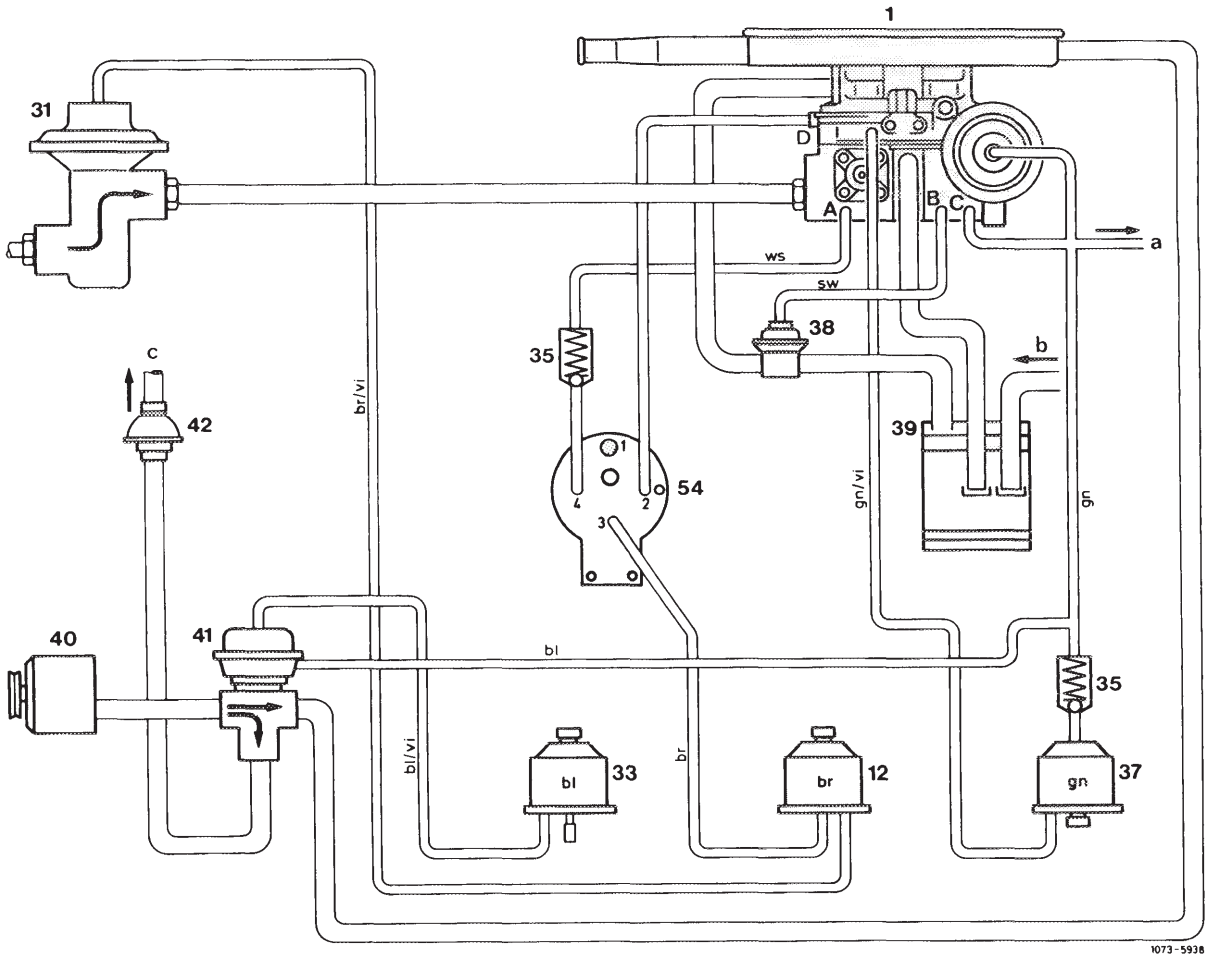


B. EGR (exhaust gas recirculation)

To reduce nitrogen oxides in exhaust gases, a portion of the gases from the exhaust manifold is returned to the intake pipe through a valve.

The quantity of the returned exhaust gas is limited and cut off completely in some driving conditions, so that the driving characteristics of the vehicle are not influenced.

Function diagram



1 Carburetor
12 Switch-over valve EGR
31 EGR valve
33 Switch-over valve air injection
35 Check valve
37 Switch-over valve float chamber vent
38 Purge valve
39 Charcoal canister
40 Air pump
41 Anti-backfire valve
42 Check valve air injection
54 Vacuum booster

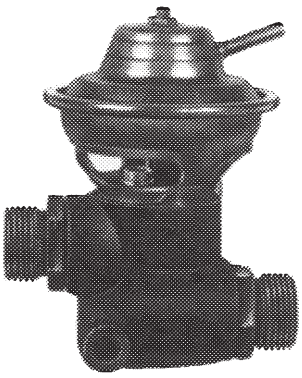
a Connection fuel return valve
b Connection tank vent
c Air injection line

bl = blue
br = brown
gn = green
sw = black
vi = purple
ws = white

EGR components:

EGR valve

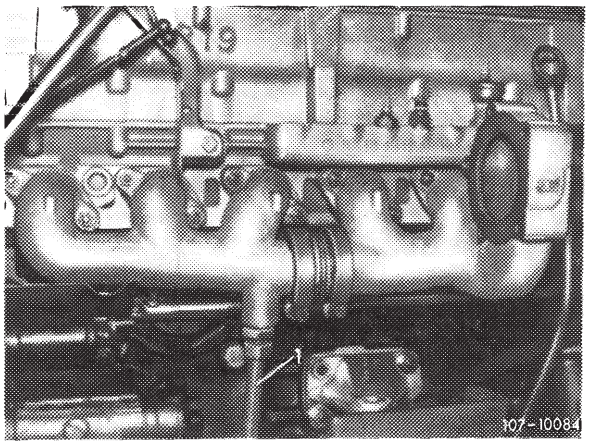
The EGR valve controls the volume (amount) of the returned (recirculated) exhaust gases in dependence of the coolant temperature and the vacuum.



107-10006

EGR line

The EGR line (1) runs from exhaust manifold underneath engine to EGR valve on intake pipe.



107-10084

EGR is activated:

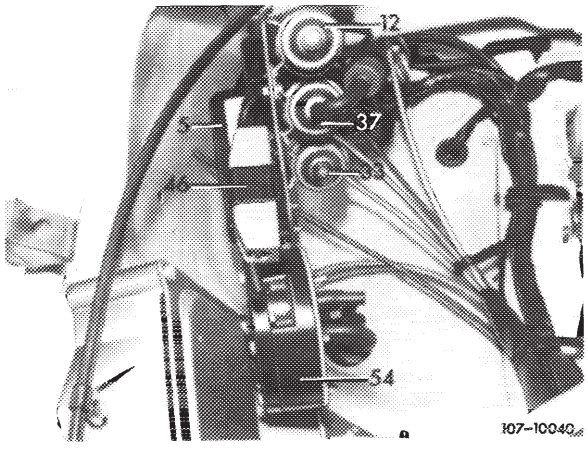
- above 65 °C coolant temperature.
- in all driving positions of selector lever.

Operation

The EGR system is electrically controlled via the switch-over valve (12) and pneumatically via the vacuum booster (54) in dependence of vacuum in carburetor.

Above 65 °C coolant temperature, the temperature switch (32) closes, the switch-over valve (12) is de-energized. If the Venturi vacuum is adequate, the EGR valve (31) is activated via the vacuum booster.

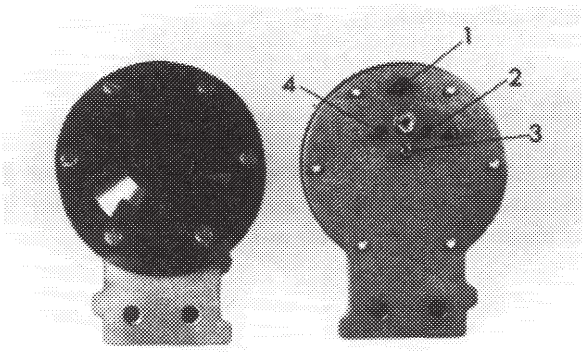
In selector lever positions "N" or "P" starter lockout and back-up lamp switch is closed, the switch-over valve (12) is connected to ground via relay box (5). The vacuum line to EGR valve (31) is interrupted.



107-10040

Vacuum booster

The vacuum booster serves the purpose of controlling the vacuum for the EGR valve in accordance with Venturi vacuum.



1 Connection closed by rubber cap
2 Connection Venturi vacuum
3 Connection switch-over valve EGR
4 Connection intake manifold vacuum

107-9852

Operation

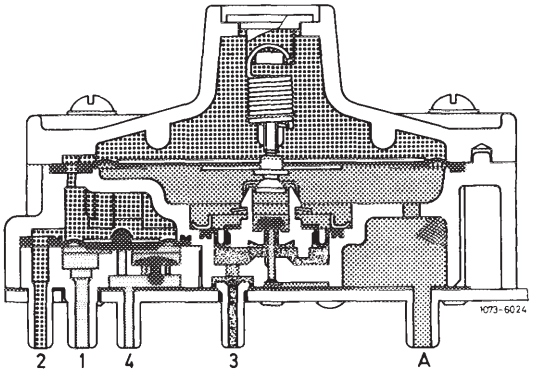
The Venturi vacuum activates the large Venturi diaphragm (a) from above via connection (2). The Venturi diaphragm (a) is connected to the small governor diaphragm (b). The governor diaphragm (b) is activated from below by the vacuum which activates the EGR valve.

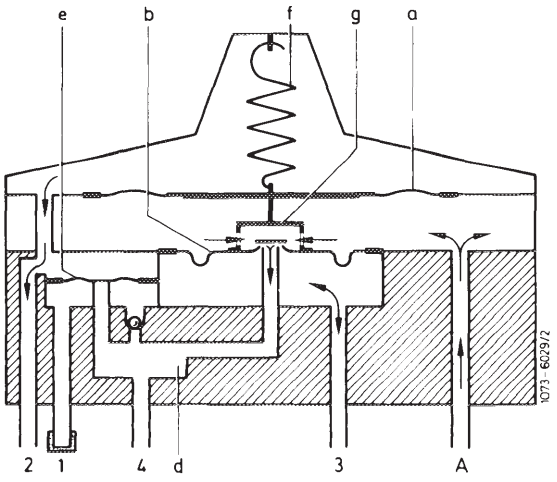
Since the surfaces of the large diaphragm in relation to the small diaphragm are at a ratio of 10:1, the Venturi vacuum will be boosted at a ratio of 10:1.

A small vacuum supply tank (d) is installed in connection (4) of vacuum booster. If the vacuum is less than the max. intake manifold vacuum attained before, the check valve closes and only the vacuum from the vacuum storage tank (d) is applied.

Spring (f) serves to set the pressure in such a manner that the EGR valve is already activated with a slight vacuum at idle speed, with valve unopened. As a result, the EGR valve will react without delay as soon as it is activated by an additional vacuum.

There are three control positions of vacuum booster:

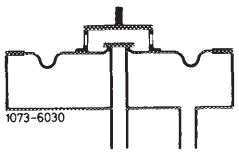




Diagram

1 Connection closed by rubber cap
2 Connection Venturi vacuum
3 Connection switch-over valve EGR
4 Connection intake manifold vacuum
A Vent bore
a Venturi diaphragm
b Governor diaphragm
d Vacuum storage tank
e Shut-off diaphragm
f Spring
g Double valve

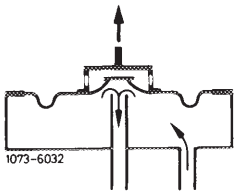
1. **Equilibrium between Venturi diaphragm (a) and governor diaphragm (b)**



The forces acting on large Venturi diaphragm (a) and on small governor diaphragm (b) are in balance.

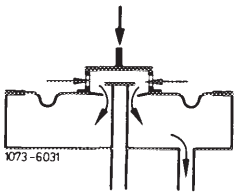
The EGR valve remains in its momentary position.

2. **Venturi diaphragm (a) is moving in upward direction**



Venturi vacuum increases when throttle valve is opened. Vacuum above Venturi diaphragm (a) increases. Governor diaphragm (b) is lifted by Venturi diaphragm and opens double valve (g). Vacuum can now act on EGR valve. Emissions are recirculated.

3. **Venturi diaphragm (a) is moving in downward direction**



Venturi vacuum decreases when throttle valve is closed. The vacuum under governor diaphragm pulls governor diaphragm in downward direction. Double valve (g) opens and vents space under governor diaphragm (b) until balance is re-established. No emissions are recirculated.