

A. Removal and Installation of Carburetor or Fuel Injection System including Venturi Control Unit and Control Linkage

I. Removal and Installation of Carburetor on Models 180 a, 180 b, 220 a, 219, and 220 S

For repair procedure see Job Nos. 07-0 and 07-4.

Removal:

1. Loosen the air vent line cap nut on the cylinder head cover and remove the air intake silencer.

On Models 180 a and 180 b the air intake silencer is screwed to the two brackets; it is advisable to remove it together with the brackets. To do this, unscrew the fixing nuts for the brackets at the intake pipe.

On Models 219 and 220 a the air intake silencer is fastened to the brackets by means of snap catches. The brackets need not therefore be detached from the intake pipe. On Model 220 S the intake silencer is fastened to the carburetors by means of two pipe clips. In order to remove the air intake silencer, the two clamping screws on the pipe clips must be loosened.

2. Unscrew the fuel line and the vacuum line to the distributor, **holding the pipe union at the carburetor steady.**

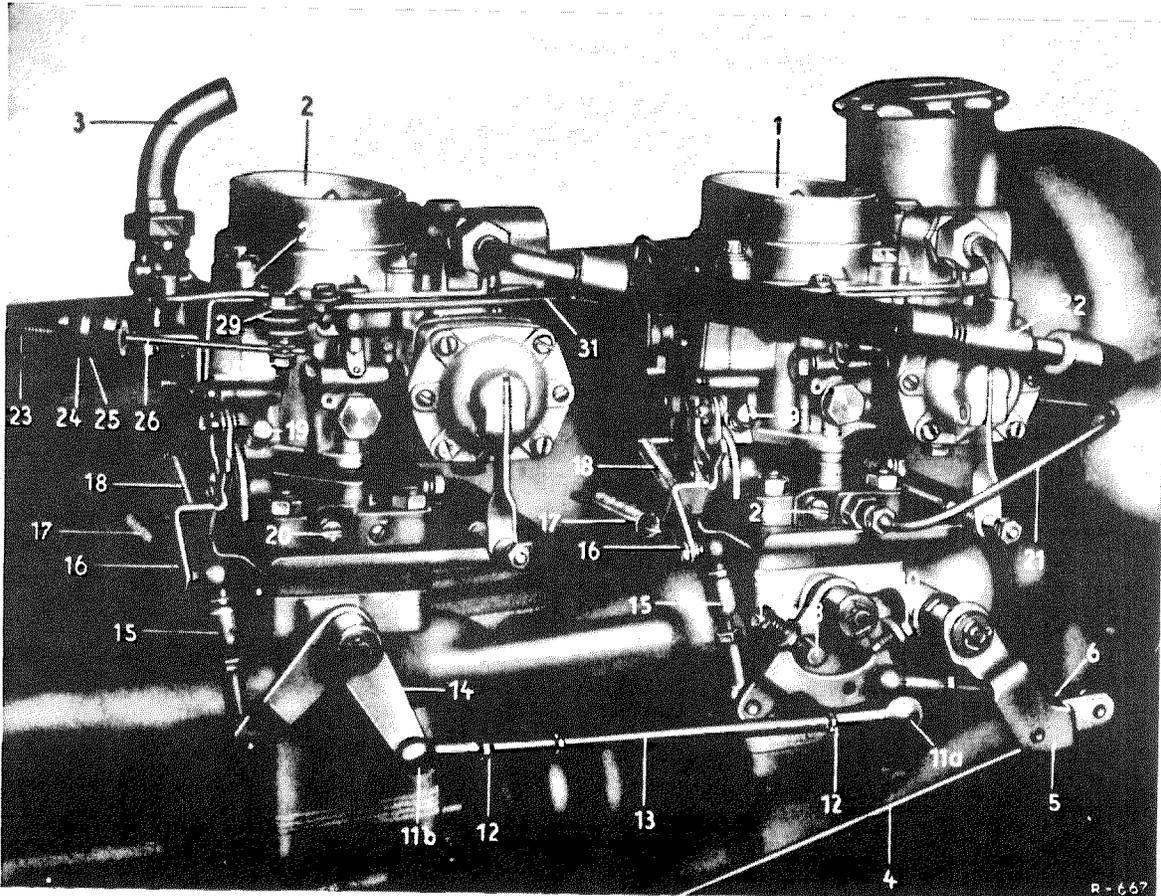


Fig. 01-4/1

Carburetor system for Model 220 S

- | | | | |
|--------------------|----------------------------|----------------------------------|----------------------|
| 1 Front carburetor | 10 Aperture limiting screw | 18 Tension spring | 25 Adjusting nut |
| 2 Rear carburetor | 11a Ball socket | 19 Idle adjustment screw | 26 Spring steel wire |
| 3 Vent tube | 11b Ball socket | 20 Idle mixture adjustment screw | 27 Angle lever |
| 4 Pull rod | 12 Hexagon nut | 21 Vacuum line to distributor | 28 Clamping screw |
| 5 Relay lever | 13 Push rod | 22 Fuel line | 29 Rubber bushing |
| 6 Push rod | 14 Angle lever | 23 Coil spring | 30 Hexagon nut |
| 7 Control lever | 15 Spring-loaded push rod | 24 Rubber bushing | 31 Connecting rod |
| 8 Stop bolt | 16 Throttle valve lever | | 32 Hexagon screw |
| 9 Idle stop screw | 17 Return spring | | |

3. Detach the carburetor linkage and the return spring at the throttle valve lever.

On Model 220 S also detach the connecting rod (31) to the start mechanism of the front carburetor (Fig. 01-4/1).

If the engine is installed in the vehicle, the choke cable must be disconnected on all Models (see Job No. 30-6).

4. Unscrew the carburetor fixing nuts and remove the carburetor, taking care that the lock washers do not fall into the intake pipe.

Remove the upper insulating flange (on carburetors with grey cast iron flange on Models 219 and 220 a remove the gasket), remove the screening plate and the lower insulating flange from the intake pipe.

In the case of the carburetor for Model 220 S of Stage 1, the upper insulating flange is provided with an air jet (1), which should be taken out after the flange has been removed (Fig. 01-4/2).

Installation:

5. Before the carburetor is installed, the insulating flanges, the screening plate, the attaching flange at the carburetor, and the intake pipe must be checked for plane surfaces. Damaged insulating flanges must be replaced. Small rough spots on the attaching flange of the carburetor and on the intake pipe can be removed on a surface plate by means of abrasive cloth.

The flange surfaces must be absolutely smooth, even and clean in order to ensure that the carburetor connections are leak-proof and that the engine cannot take in any excess air. Leaky carburetor flanges are responsible for uneven engine performance. Furthermore, they make it impossible to regulate the idle speed properly.

This is particularly important on cars of Model 220 a which have a carburetor with a die-cast flange.

On later cars this carburetor was fitted with a grey cast iron flange, which ensures better dimensional stability. The same carburetor was installed also on Model 219.

Note: When the grey cast iron flange was installed, it was necessary to dispense with the upper insulating flange so as not to change the installation height of the carburetor. By way of compensation, a standard paper gasket, Part No. 180 071 00 80, is installed on these carburetors between the carburetor flange and the screening plate (Fig. 01-4/3).

6. Install the lower insulating flange, and in the case of Models 220 a and 219, the gasket on the intake pipe (Fig. 01-4/3).

On Model 220 S insert the air jet (1) in the first Stage bore of the upper insulating flange (2) (Fig. 01-4/2).

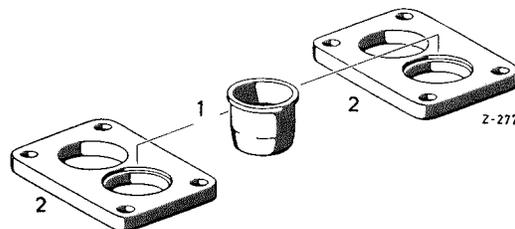


Fig. 01-4/2

1 Air jet
2 Upper insulating flange

On Models 219 und 220 a mount the insulating flange and the gasket with **sealing compound**. Use only a thin coat of sealing compound.

On all other carburetors the insulating flanges are mounted without sealing compound.

7. Install the carburetor, put on the spring washers, and tighten the carburetor by means of the hexagon nuts.

Tighten the nuts evenly in order to prevent distortion of the carburetor flange.

On Models 220 a and 219 the spacer sleeves (5) must be installed in the bores of the carburetor flange from the throttle valve part (7) before the fixing nuts are screwed on (Fig. 01-4/3).

The purpose of the spacer sleeves is to ensure that the tightening torque is transferred not to the carburetor flange (7), but to the grey cast iron flange (9). For this reason the spacer sleeves must project beyond the carburetor flange by the distance "a" = appr. 0.2 mm (Fig. 01-4/3).

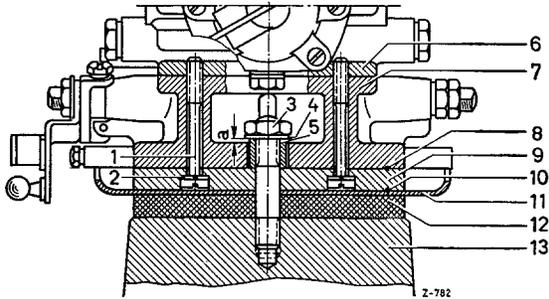


Fig. 01-4/3

a = appr. 0.2 mm

- | | |
|-----------------------|-------------------------|
| 1 Cylinder head screw | 8 Gasket |
| 2 Spring washer | 9 Grey cast-iron flange |
| 3 Hexagon nut | 10 Gasket |
| 4 Lock washer | 11 Screening plate |
| 5 Space sleeve | 12 Insulating flange |
| 6 Float chamber | 13 Intake pipe |
| 7 Throttle valve part | |

8. Screw on the fuel line and the vacuum line to the distributor, **holding the pipe union at the carburetor steady.**

9. Attach the carburetor linkage and the return spring to the throttle valve lever.

On Model 220 S also attach the connecting rod (3) to the start mechanism of the front carburetor (Fig. 01-4/1).

When the engine is installed in the vehicle, connect up the choke cable (see Job No. 30-6).

10. Attach the air intake silencer and attach the air vent line from the cylinder head cover to the air intake silencer. In order to attach the air intake silencer on Models 180 a and 180 b, screw the two brackets to the intake pipe, and on Models 219 and 220 a, close the snap catches at the brackets, and on Model 220 S screw down the two clamping screws on the pipe clips.

11. Check the adjustment of the carburetor linkage and adjust the idle (see Job No. 01-3, Section K).

II. Removal and Installation of Carburetor on Model 190 SL

For repair procedure see Job Nos. 07-0 and 07-4.

Removal:

Note: It is advisable to remove the carburetor only together with the intake pipes, since otherwise the upper spring washers (2) may drop into the intake pipe and cause damage when the carburetor is removed or installed (see Fig. 01-4/4).

1. Loosen the clamping screw (1) for the sleeve of the choke control on the air suction tube and the clamping screws (2) for the choke control on the choke valve levers of the two carburetors and pull out the cable (Fig. 01-4/5). Also loosen the clamping screw (4) for the hot-start cable and pull out the cable. Then detach the

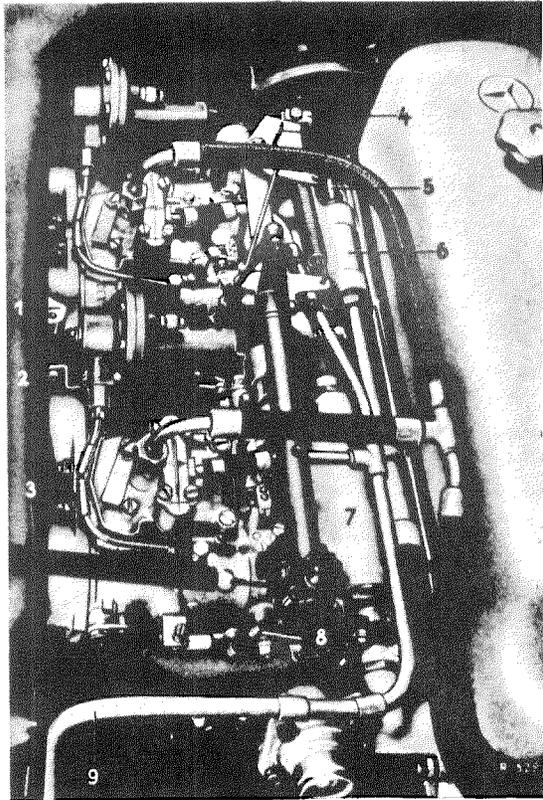


Fig. 01-4/5

Die-cast carburetor

- 1 Clamping screw for choke control sleeve
- 2 Clamping screw for choke control on both carburetors
- 3 Return spring for accelerator linkage
- 4 Clamping screw for hot-start cable
- 5 Control valve tube for ATE Power Brake
- 6 Rear intake pipe
- 7 Front intake pipe
- 8 Connecting rod
- 9 Fuel overflow line

return spring (3) for the accelerator linkage and the connecting rod (8) at the carburetor control shaft lever.

2. Unscrew the strut (4) supporting the carburetor system at the air suction tube (Fig. 01-4/6) and unscrew the hexagon nuts from the air suction tube.
3. Open the snap catches (5) on the air filter, detach the rubber hose (4) from the vent tube of the cylinder head cover, and remove the upper part of the filter (3) together with the air hose (2) and the air suction tube (1) (Fig. 01-4/7). Pay attention to the gaskets between air suction tube and carburetor.

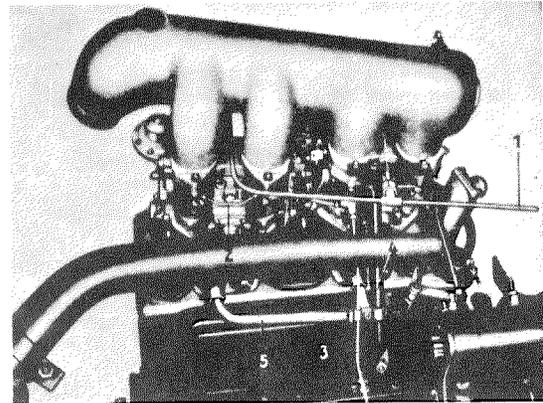


Fig. 01-4/6

Sand-cast carburetor

- 1 Fuel overflow line
- 2 Suction line
- 3 Leak-off pipe
- 4 Strut for supporting air suction tube
- 5 Return pipe to water pump

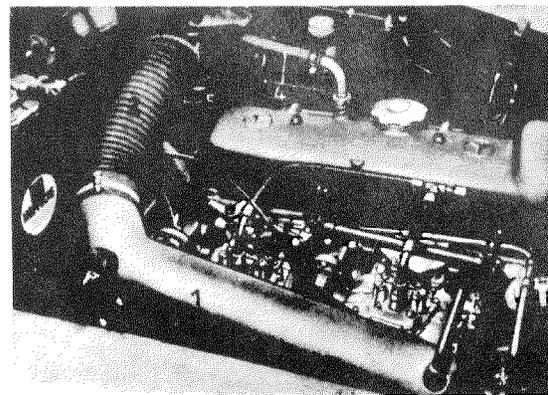


Fig. 01-4/7

Die-cast carburetor

- | | |
|------------------------|----------------|
| 1 Air suction tube | 4 Rubber hose |
| 2 Air hose | 5 Snap catches |
| 3 Upper part of filter | |

4. Disconnect the fuel line (4) at the two carburetors, holding the pipe union steady (Fig. 01-4/8). Then detach the hose between the fuel overflow line (3) and the front pipe union (on the bracket of the right radiator support).

Note: The fuel overflow line need not be detached from the carburetor and suction system.

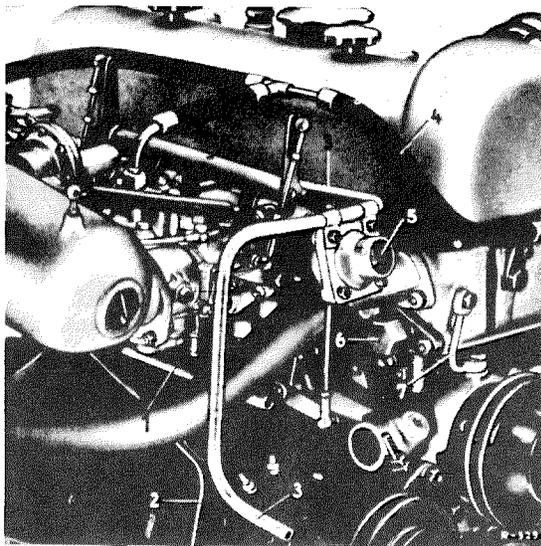


Fig. 01-4/8

Die-cast carburetor

- | | |
|----------------------|---|
| 1 Water return pipe | 5 Cooling water drain union with cooling water thermostat |
| 2 Leak-off pipe | |
| 3 Fuel overflow line | |
| 4 Fuel line | 6 Chain tightener |
| | 7 Air vent line |

5. Unscrew the cap nut at the Tee-piece of the leak-off pipe (3) (Fig. 01-4/6). It is not necessary to detach the lower part of the leak-off pipe from the strut supporting the carburetor or the upper part from the carburetors.
6. If the car is provided with an ATE Power Brake, disconnect the vacuum line at the threaded union (5) of the rear intake pipe (Fig. 01-4/5).
7. If the engine is installed in the vehicle, drain off part of the cooling water, collecting the water if additives are present.
8. Detach the water hose from the radiator to the cooling water thermostat (5) and the cooling water return line (1) at the con-

nections of the front and rear intake pipes (Fig. 01-4/8). Unscrew the hexagon nuts on the intake pipes, the exhaust manifold, and the cooling water drain union. Then remove the carburetors together with the intake pipes and the cooling water drain union together with the cooling water thermostat.

9. Detach the fuel overflow line (9) from the two carburetors and the fixing clip on the bearing bracket for the hot-start mechanism (Fig. 01-4/5). Then detach the connecting hose from the cooling water drain union to the front intake pipe and remove the fuel overflow line together with the fuel water drain union and the cooling water thermostat.
10. Disconnect the leak-off pipe (3) at the two carburetors (Fig. 01-4/6).
11. Detach the return spring for the hot-start mechanism. Unscrew the hexagon screws and nuts fastening the carburetors to the intake pipe. Remove the rear carburetor together with the hot-start mechanism and the front carburetor together with the control shaft bearing.

Installation:

12. Before installing the front carburetor, check whether the throttle valve of Stage 1 is absolutely horizontal under full load. If this should not be the case, correct the position of the throttle valve at the full-load stop as far as necessary.
13. Check the rubber flanges (3) and the rubber washers (5) between carburetor and intake pipe to see if they are fit for re-use and, if necessary, replace them (Fig. 01-4/9).

Note: Since the rubber flanges may be squeezed outward when they are compressed, the flanges used on former cars with a bore of 46 mm may project too far into the intake pipe and may cause the throttle valve and vacuum valve to jam. For this reason the bore in the rubber flange was enlarged to 49 mm. For this reason only

rubber flanges with the larger bore should be installed.

14. Attach the carburetors to the intake pipes and evenly tighten the hexagon screws.

Do not forget the spring washers (2) between carburetor flange and rubber flange (Fig. 01-4/9).

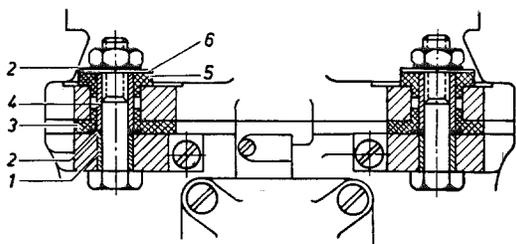


Fig. 01-4/9

- | | |
|--------------------------|-----------------|
| 1 Sleeve (cast integral) | 4 Sleeve |
| 2 Spring washer | 5 Rubber washer |
| 3 Rubber flange | 6 Washer |

Note: If the suction tubes have been disassembled, they must be reassembled again before the carburetors are installed and must be fitted to the cylinder head in order to ensure that the distance between them is correct; only then should the coupling nuts (5) of the compensating line (3) and the hose straps (14) of the connecting hose (12) be tightened (see Fig. 01-4/18).

When installing the carburetors, it is advisable first to attach the rear carburetor together with the hot-start mechanism and then the front carburetor together with the control shaft bearing.

Furthermore, the carburetors should be attached to the intake pipes before these are mounted in order to ensure that the spring washers (2) have not dropped into the intake pipe, since otherwise engine damage may occur (Fig. 01-4/9).

15. Attach the leak-off pipe (3) to the two carburetors (see Fig. 01-4/6). Attach the fuel overflow line to the two carburetors and the fixing clip to the bearing bracket of the hot-start mechanism

(see Fig. 01-4/5). Attach the connecting hose from the cooling water drain union to the first intake pipe.

16. Check the gaskets of the intake pipes and of the cooling water drain union and, if necessary, replace them.
17. Install the carburetors on the cylinder head together with intake pipes and cooling water drain union and tighten evenly.

Attach the water hose from the radiator to the cooling water thermostat (5) and the water return pipe (1) (see Fig. 01-4/8) to the various unions below the front and rear intake pipes. Top up the cooling water.

18. If the car is provided with an ATE Power Brake, attach the vacuum line to the threaded union (5) of the rear intake pipe (see Fig. 01-4/5).

19. Screw the cap nut of the lower leak-off pipe (3) to the Tee-piece (see Fig. 01-4/6). Attach the fuel line (4) to the two carburetors, holding the connecting union steady (see Fig. 01-4/8).

Attach the hose to the front pipe length of the fuel overflow line (3), making sure that the fuel overflow line is not bent when the hose is being installed.

20. Adjust the carburetor linkage (see Job No. 01-3, Section K).
21. Check the gaskets of the air suction tube and, if necessary, replace them. Place the air suction tube (1) on the carburetors and the upper part of the filter (3) together with air hose (2) on the air filter and close the snap catches (5) (see Fig. 01-4/7).

Screw on the air suction tube. Then attach the rubber hose (4) to the vent tube of the cylinder head cover (see Fig. 01-4/7). Attach the return spring (3) for the accelerator linkage (see Fig. 01-4/5).

22. Screw the strut supporting the carburetors to the air suction tube (Fig. 01-4/10).

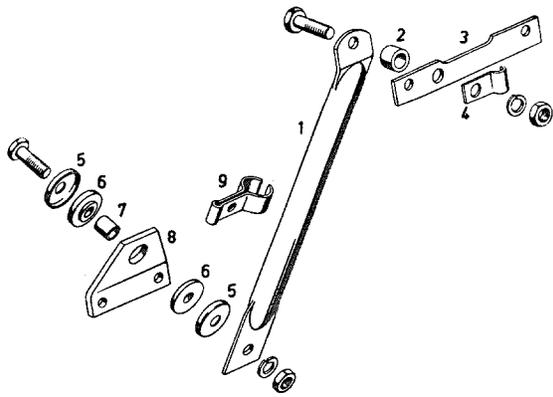


Fig. 01-4/10

- 1 Strut for supporting air suction tube
- 2 Spacer tube
- 3 Holder at air suction tube
- 4 Pipe clip
- 5 Cup washer
- 6 Rubber washer
- 7 Sleeve
- 8 Holder at crankcase
- 9 Pipe clip for fuel leak-off line

Note: The air suction tube upper attachment shown in the above picture 01-4/10 is the first version. In the second version the strut is screwed directly to a fixing eye cast integral with the suction tube. In this version the holder (3), the spacer tube (2), and the pipe clip (4) for the leak-off pipe are no longer required.

23. Insert the choke cable and attach the clamping screw (1) for the sleeve of the

choke cable and the clamping screws (2) for the choke cable to the choke valve levers of the two carburetors (see Fig. 01-4/5).

When doing this, check whether the choke valves are closed when the starter button is pulled out and whether, when the starter button is pushed in, the two valves are horizontal and the levers rest against the lower stop.

24. Insert the hot-start cable and lock the sleeve by means of the clamping screw (4) (see Fig. 01-4/5). Attach the return spring. Then press the angles of the hot-start mechanism against the counterweights until the distance is no more than appr. 2 mm. In this position tighten the clamping screw for the cable.

Check the hot-start cable for ease of movement, depressing the accelerator as far as it will go. When the cable is released, the hot-start cable must return properly to its initial position. In the released position the angle levers must not rest against the weights of Stage 2.

25. Check the adjustment of the carburetor linkage and adjust the idle (see Job No. 01-3, Section K).

Subsequent installation of die-cast carburetors

In Model 190 SL, up to Engine End No. 55 00708, sand-cast carburetors were installed, and as from Engine End No. 55 00709 die-cast carburetors are installed.

If sand-cast carburetors are subsequently replaced by die-cast carburetors, take care to ensure that also the pipe (Part No. 121 070 09 35) of the fuel overflow line at the front part of the air scoop bracket is replaced. In the case of sand-cast carburetors, the pipe has a cross-section of 6×0.75 mm, whereas on die-cast carburetors the cross-section is 10×1.0 mm. The larger cross-section of the fuel overflow line on die-cast carburetors is necessary, since in addition to the fuel also the total compensating air passes to the carburetors through this line. Therefore the pipe with the smaller cross-section must on no account be used for die-cast carburetors, since otherwise carburetor trouble is bound to occur.

When installing a new or a replacement engine, which are supplied only with die-cast carburetors, in a vehicle which was equipped with sand-cast carburetors, the pipe with the larger cross-section (Part No. 121 070 09 35) must also be used. When installing this, take care to ensure that the fuel overflow line and the pipe are screwed on in the correct position and without forcing, since otherwise speed build-up will be uneven (see Fig. 01-3/15 and No. 3 in Fig. 01-4/8).

The following parts are required when die-cast carburetors are subsequently installed:

Designation	Part No.	Number per car required
Front carburetor	000 071 61 01	1
Rear carburetor	000 071 62 01	1
Bearing bracket for hot-start cable	121 070 02 40	1
Fuel line	121 070 01 32	1
Fuel overflow line	121 070 08 35	1
Fixing clip at bearing bracket for hot-start cable	121 995 00 01	1
Hexagon socket screw	M 5 \times 10 DIN 912-8 G	2
Washer	5.3 DIN 433	1
Lock washer	B5 DIN 127	2
Hexagon nut	M5 DIN 934-5 S	2
Fixing clip at cooling water thermostat	121 995 03 35	2
Pipe to overflow line	121 070 09 35	1
Fillister head screw for pipe	AM 4 \times 12 DIN 7985-4 S	2
Lock washer	B 4 DIN 127	2
Hexagon nut	M 4 DIN 934-5 S	2
Fuel hose	B 8 \times 12 \times 40 DIN 73379	2
Hose clip	S 12/9 N 228 a	4
Fuel hose	A 9 \times 14 \times 70 DIN 73379	1
Air suction tube	121 090 04 29	1
Sealing flange	121 094 01 79	4
Sealing ring for fuel leak-off pipe	A 6 \times 10 DIN 7603 Fiber	4
Cheese-head screw	M 6 \times 18 DIN 912-8 G	2

III. Removal and Installation of Fuel Injection System, including Venturi Control Unit and Control Linkage on Model 220 SE

a) Injection Pump

Removal:

1. Remove air filter. For this purpose loosen vent line to cylinder head, supplementary air line (2), the connection to the venturi control unit and the fixing screw on supporting rod (19) (Fig. 01-4/11 a).

Then remove air filter **upward**, because the inlet air thermostat (13) projects into the air filter.

2. Drain part of the cooling water. Unscrew cooling water lines (3) and (14), as well as the supplementary air line (4), the oil line (6)

and the fuel lines on the injection pump. Also loosen cable for cold start magnet.

3. Detach push rod on adjustment lever (16), and unscrew guide tube with bracket (18) for oil dipstick.

4. Then unscrew the three fixing nuts and pull injection pump out toward the rear.

5. If an injection pump is replaced pull off drive lug on camshaft and attach to new pump, because spare pumps are delivered without drive lugs.

Loosening of nut on camshaft requires a hold on drive lug using serrated wrench 621 589 00 08. The drive lug is pulled off with puller 621 589 00 33.

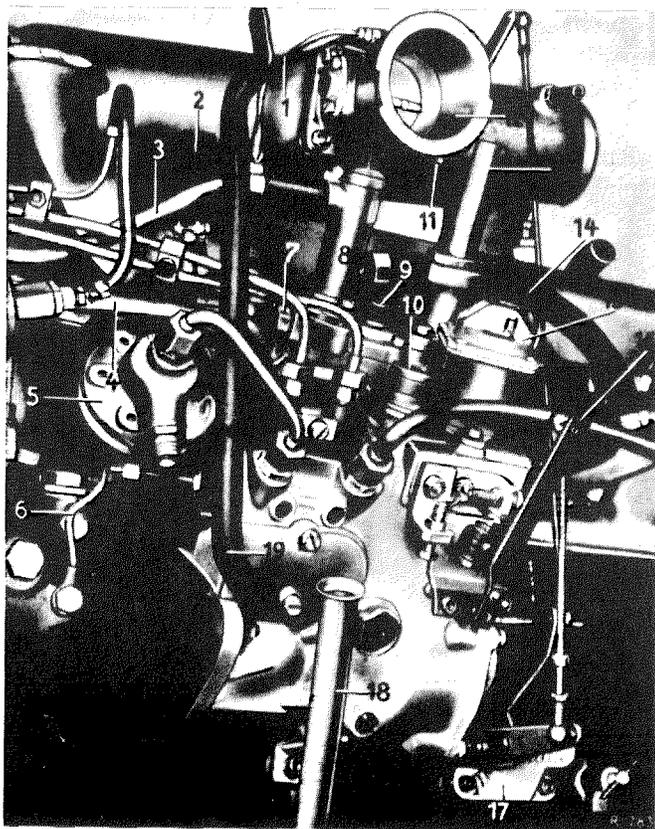


Fig. 01-4/11 a

ZEA Injection Pump

- 1 Vacuum line to distributor
- 2 Line for cold-start supplementary air
- 3 Cooling water line
- 4 Line for cold-start supplementary air
- 5 Damper unit
- 6 Oil line for oil lock
- 7 Stop bolt for cooling water thermostat
- 8 Cooling water thermostat
- 9 Stop screw for inlet air thermostat
- 10 Air filter for governor housing
- 11 Idle air throttle
- 12 Venturi control unit
- 13 Inlet air thermostat
- 14 Cooling water line
- 15 Cold-start magnet
- 16 Adjustment lever
- 17 Control lever with bearing block
- 18 Guide tube for oil dipstick
- 19 Supporting rod for air filter

Note: On the first version of the drive lug dimension $a = 1.5$ mm, on the second version $= 2.7$ mm (Fig. 01-4/11 b). Drive lugs of the 1st version should no longer be installed.

To obtain a good grip for the puller, two adjoining cylinder screws which hold the flange on the injection pump have to be screwed out (refer to Fig. 01-4/11 c). After the drive lug has been pulled, don't forget to screw the two screws down again.

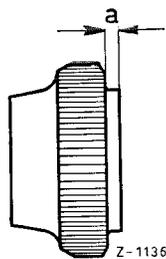


Fig. 01-4/11 b

Pay special attention to the check valve for the oil lock. The hollow screw should be tightened well, because otherwise oil may be lost.

Installation:

6. The injection pump for Model 220 SE is not set to an end of 60° after TDC in the delivery stroke as for the other gasoline injection engines, it should be set as follows:

Prior to installing the injection pump the piston of No. 1 cylinder is set to TDC (intersection dead center or ignition dead center) and the camshaft of the injection pump is rotated in such a manner that the marking line on the camshaft is aligned with the mark on the flange of the injection pump (Fig. 01-4/11 c).

This is the position in which the injection pump is installed. Installation according to instructions will then provide a delivery end of 120° before TDC for the No. 1 cylinder. An extra delivery end checkup by means of container and overflow pipe is not required for injection pump for Model 220 SE. This is why the fastening flange of the pump has no slotted holes for correcting the pump position.

7. Connect all lines and check whether cap nuts have been tightened well.

8. Attach push rod on injection pump lever and **check adjustment of control linkage** (refer to Workshop Manual Passenger Car Models starting August 1959, Job No. 00-16).
9. Install air filter, fasten and connect all lines. When installing air filter, make sure that **the rubber grommet is accurately seated in filter bottom** and is not pushed into filter housing.

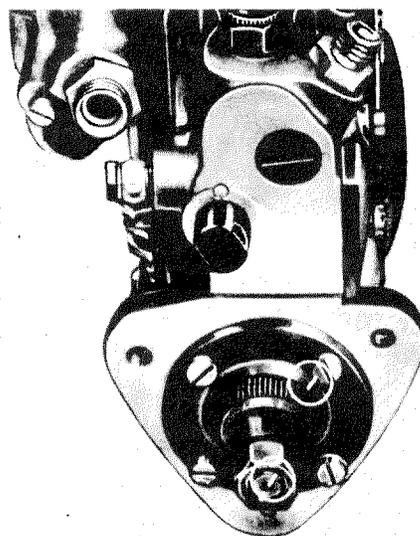


Fig. 01-4/11 c

b) Injection Valves and Fuel Distributor Fittings

The uniform distribution of the fuel to the individual cylinders does not only depend on uniform ejection pressure and flow volume of injection valves, but also from the condition of the pertinent fuel distributor fittings.

Fuel distributor fittings and injection valves are selected during production in such a manner that the injected quantity of the three injection valves which belong to one distributor fitting is of uniform size. The correlated parts are marked with letters and are supplied as a complete distribution group (Fig. 01-4/12 a).

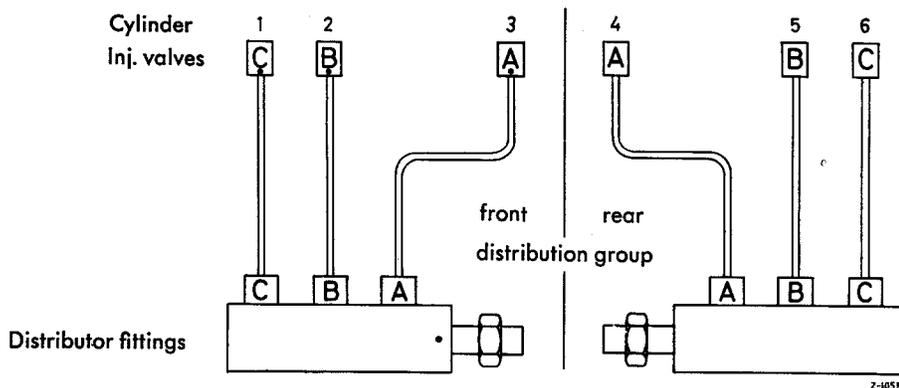


Fig. 01-4/12 a

In addition the front distribution group (fuel distributor fitting and injection valves for cylinders 1-3) is marked during production with a red dot (Fig. 01-4/12 a).

This mark should be heeded during assembly because otherwise nonuniform fuel distribution to the individual cylinders and a correspondingly bad-running engine might result.

When the injection valves and the distributor fittings are disassembled their sequence should be marked, or the two distributing groups should be placed in separate containers to prevent confusion.

Check Injection Valves and Fuel Distributor Fittings

The injection valves should be checked by means of a commercial tester and a pressure gauge with a measuring range of 0-25 kg/cm² and with test oil (OL 61 v 1) to the specified ejection pressure, proper shape of jet and for leaks.

Prior to the test check **whether the tester and the test oil are absolutely clean. The same applies to the filter of the tester**, which should be cleaned, if required. The pressure gauge is disconnected by closing the shutoff valve on the tester. Then the tester is first actuated several times **without** injection valve, to flush any remaining contaminations out of the apparatus. Then the unit **with the injection valve** is actuated several times **quickly and energetically**, to force out any remaining air.

1. Jet Shape – Visual Control of Injection Valves

The observation of the jet shape is effected by pushing the pump lever down quickly several times (2-3 strokes per sec.) with the pressure gauge disengaged. The jet should be uniformly well atomized and should have the shape of a cone-shaped shell.

If the jet drips, and is too wide, with too many strands and not completely compact, the injection valve is not in order.

If after another clearing of the injection valve the test conditions are not met, the injection valve or the complete distribution group, of which the objected injection valve is a part, should be replaced.

2. Check Ejection or Opening Pressure of Injection Valves

Push hand pump lever of switched-on pressure gauge slowly (1 stroke per sec.) down and read ejection pressure on pressure gauge when valve opens or ejection begins.

Caution: With pressure gauge switched-on increase pressure only slowly and above all blow off only slowly, because the pressure gauge might otherwise be damaged.

The opening or ejection pressure of the injection valves should be 13.0 to 15.5 atü. The difference of the ejection pressure within three injection valves (distribution group) belonging to one fuel distributor fitting should not be more than 0.5 atm. to guarantee uniform distribution of the fuel to the individual cylinders.

If there is a larger difference than 0.5 atm. the injection valve or the complete distribution group to which the objected to injection valve belongs should be replaced.

3. Check Injection Valves for Leaks

Push hand pump lever of switched-on pressure gauge slowly down to the point where the indicator stops on the pressure gauge 3 atm. below the previous measured ejection pressure. The injection valve is leakproof if no drop comes out of mouth of injection valve.

If an injection valve leaks the complete distribution group to which the objected to injection valve belongs should be replaced.

4. Measuring for Uniform Distribution of the Fuel of the Distributor Groups

Measuring the delivered quantity of fuel a distribution group for uniform distribution of the fuel may be done on a Bosch pump test stand or as follows:

The distribution group consisting of a distributor fitting and three injection valves about to be checked are connected to a two-plunger pump, exactly as in the vehicle. Only perfectly ejecting injection valves, in which the ejection pressure differs no more than 0.5 atm. from each other, should be used. A measuring glass is set under each injection valve.

The difference (max spread) of the fuel quantity delivered by the injection valves may not be more than 2.5 cc/1000 strokes at idling speed (350 rpm of the injection pump), and at full load (1000 rpm of the injection pump) no more than 3.0 cc/1000 strokes.

The cold-start quantity per injection valve at 40 rpm of the injection pump in a 220 SE should be mean 11 to 13 cc/100 strokes, but definitely not less than 8 cc/100 strokes (with OL 61 v 1). If there are larger differences between idling and full load, or if the fuel quantity is not reached during a cold start, as stated above, the complete distribution group should be replaced.

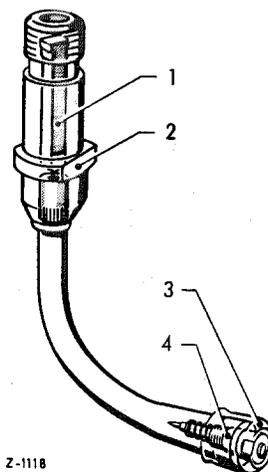


Fig. 01-4/12 b

Injection Valve

- 1 Filter
- 2 Connecting socket
- 3 Sheet metal cap
- 4 Valve insert

Z-1118

If a distribution group requires replacement, the rejected distribution group can now be completely replaced under part No. 000 078 01 95/80 (Bosch designation EPVT 1 P 12 Z injection valves with screen filter) or under part No. 000 078 00 95/80 (Bosch designation EPVT 1 P 11 Z injection valves with rod-type filter) (Fig. 01-4/12 a), that is, upon returning of a disassembled, complete, correlated distribution group you will receive an overhauled distribution group, in which the 3 injection valves (Fig. 01-4/12 b) have been given new valve inserts (4), the injection valve pipes have been cleaned, and provided with connecting sockets (2), and the respective fuel distributor fitting has been cleaned, and the reconditioned distribution group has been tested for uniform distribution of the fuel.

If no replacement distribution group is available, any Bosch service will replace the valve inserts (4) of the rejected distribution group or the injection valves (Fig. 01-4/12 b), while using the disassembled injection valve pipes and connecting sockets again, and will then re-install the assembly with the respective fuel distributor fitting.

Prior to installing a new distribution group or new injection valves with new valve inserts, the injection valves should be well flushed on a tester (for measuring the ejection pressure), to prevent any sticking of the injection valve needle as the result of resinification after extended storage.

Prior to installing the holders for the injection valves check whether the surface of the holder (10) and the surface on the intake pipe are undamaged. These surfaces must be perfectly level, because otherwise leaks may occur. Be sure to replace the seal between the holder (10) and the intake pipe and to use Teroson sealing compound for installation. When mounting the flange (9), which holds the injection valves in the holder (10), the hexagon nut which holds the flange (9) and the holder (10) may not be tightened more than 1.5 mkg (Fig. 01-4/12 c).

The cap nuts (6) should be tightened with about 2.5 mkg.

Following installation, the holders (10) of the injection valves should suitably be checked for seal tightness by spraying with gasoline while the engine is running.

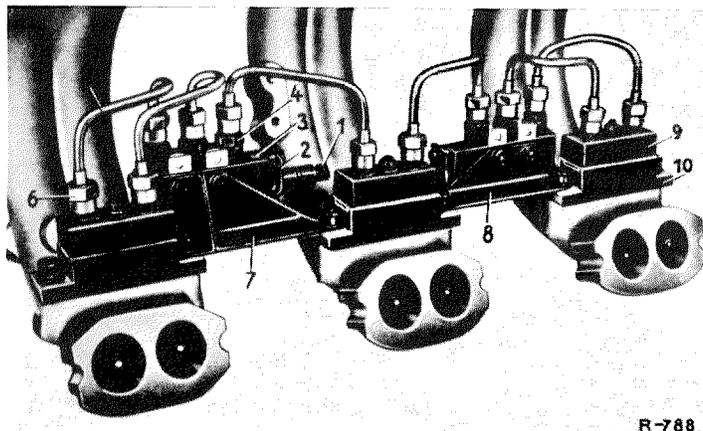


Fig. 01-4/12 c

- 1 Pressure pipe connection
- 2 Lock
- 3 Fuel distributor fitting
- 4 Pressure pipe connection
- 5 Injection pipe
- 6 Cap nut
- 7 Support for front distributor fitting
- 8 Support for rear distributor fitting
- 9 Flange
- 10 Holder for injection valves

Note: Whenever injection valves made by Bosch are tested or reconditioned, the respective, local Bosch agencies should be consulted, whenever possible.

Fuel Distributor Fittings

Each of the two fuel distributor fittings (3) is screwed to the support (7) or (8) (Fig. 01-4/12 c) by means of two hexagon bolts and one nut and one lock washer each. The supports (7) in turn are attached to the intake pipe together with the holders (10), with the higher support mounted in front and the lower at the rear.

Injection Valves with Holder

After disconnection injection pipes (4) and unscrewing flange (7), the injection valve may be removed from the holder (8) (Fig. 01-4/12 d).

The holders (8) themselves are attached to the intake pipe (Fig. 01-4/12 d) by means of two hexagon socket screws (9) with lock washers and washers (10) and gasket (11).

Note: On the side of the holder (8), to which the support for the fuel distributor fitting is attached does not require washer (10).

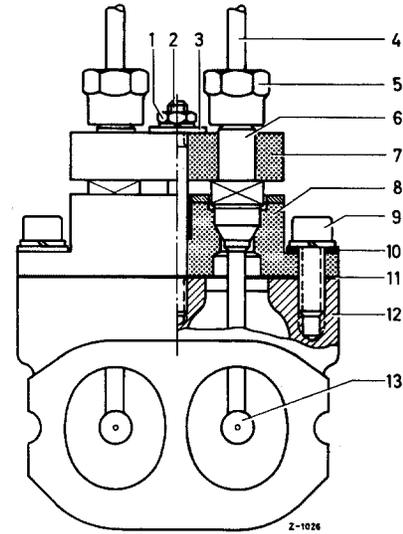


Fig. 01-4/12 d

1 Nut	8 Holder
2 Stud	9 Hexagon socket screw
3 Washer	10 Washer or support
4 Injection pipe	11 Gasket
5 Cap nut	12 Intake pipe
6 Injection valve	13 Locking cap on injection valve
7 Flange	

c) Venturi Control Unit

Removal:

1. Remove the air filter. To do this, unscrew the vent line to the cylinder head, the supplementary-air line (2), the connection to the venturi control unit and the fixing screw at the supporting rod (19) (see Fig. 01-4/11a). Then remove the air filter **upward**, since the inlet air thermostat (13) projects into the air filter.
2. Disconnect the vacuum line to the distributor at the venturi control unit, detach the pull rod and the return spring at the throttle valve lever and unscrew the control unit.

Installation:

3. Attach the venturi control unit and the return spring holder to the intake pipe; do not omit the sealing ring. Attach the vacuum line to the distributor and attach the pull rod and the return spring to the throttle valve lever.
4. After installing the venturi control unit, **check the adjustment of the control linkage** (See Workshop Manual Passenger Car Models, starting August 1959, Job No. 00-16).
5. Place the air cleaner in position and attach it. Connect up the supplementary-air line and the air vent line.

d) Control Lever with Bearing Block, and Control Linkage

Control Lever with Bearing Block

The control lever with bearing block is fastened to the crankcase by means of two hexagon socket screws and washers. Both parts, the control lever and the bearing block **must be replaced as a unit**, since the bore for holding the control linkage in the idle position is bored through both parts together.

The "O" rings (2) and the needle bearings (3) can be replaced individually (Fig. 01-4/13).

Before reassembly the needle bearings should be well filled with grease.

Control Linkage

The ball sockets of the control linkage must not have any play. **Worn ball sockets must always be replaced.** Before installing the control linkage, the ball sockets should be well filled with grease.

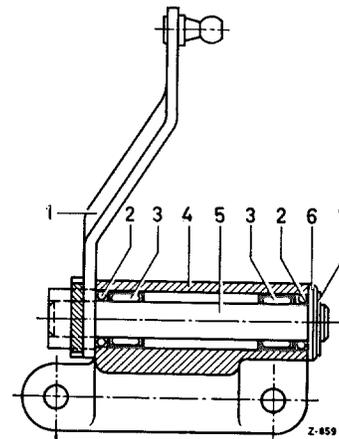


Fig. 01-4/13

- | | |
|------------------|-----------------|
| 1 Control lever | 5 Pivot pin |
| 2 "O" ring | 6 Washer |
| 3 Needle bearing | 7 Locking plate |
| 4 Bearing block | |

After installing the control lever with bearing block and the control linkage, **check the adjustment of the control linkage** (see Workshop Manual Passenger Car Models starting August 1959, Job No. 00-16).