

## G. Measurement and Adjustment of Pressure of Fuel Feed Pump

### I. Models 180 a, 180 b, 180 c, 190 SL, 220 a, 219 and 220 S

The fuel feed pump, the location of the pump on the engine, its drive, as well as measuring and adjusting of delivery pressure, are the same as for Model 190.

**Note:** When reassembling the pump make sure that prior to tightening the upper part of the pump the diaphragm spring is pre-stressed up to stop by means of hand lever, because otherwise the diaphragm will either tear or warp during operation.

#### Test Values of Fuel Feed Pump

Delivery Pressure		Vacuum at Suction Side
At Starter Speed	At Idling Speed	
0.12–0.16 atm.	0.15–0.20 atm.	0.28–0.38 atm.

### II. Model 220 SE

For description and test procedure of electric fuel feed pump refer to Workshop Manual Passenger Car Models starting August 1959, Job. No. 00–15.

## H. Measurement and Adjustment of Fuel Level and Injection Amount in Carburetor Engines

### Fuel Level and Injection Amount

Model	180 a	180 b	180 c	190 SL	220 a, 219	220 S
Fuel Level mm	16–20	16–18	16–18	*)	13–15	19–21
Injection quantity cm <sup>3</sup> /stroke	0.9–1.2	1.0–1.2	0.7–1.0	0.4–0.6	1.3–1.5	1.1–1.3

\*) Distance from separating surface of carburetor cover with gasket to upper edge of vertical float wall: For die-cast carburetors 37–38 mm, for sand-cast carburetors 39–40 mm.

**Note:** The injection amounts named in the table for models 220 a and 219 refer to the total injected by both injection tubes.

**After measuring the injection amount, check whether injection tubes are aligned in such a manner that the injection jet hits the edge of the closed throttle valve, if this is not the case, speed build-up faults may result.**

### I. Measurement and Adjustment of Fuel Level

a) **Models 180 a, 180 b, 180 c, 220 a and 219**  
For the downdraft carburetor of models 180 a and 180 b, 180 c, and the double-downdraft carburetor for models 220 a and 219 measuring and adjustment procedures

are substantially the same as for the compound downdraft carburetor of model 190. The fuel level is measured as usual on the wall which faces the suction canal (Fig. 01–3/5).

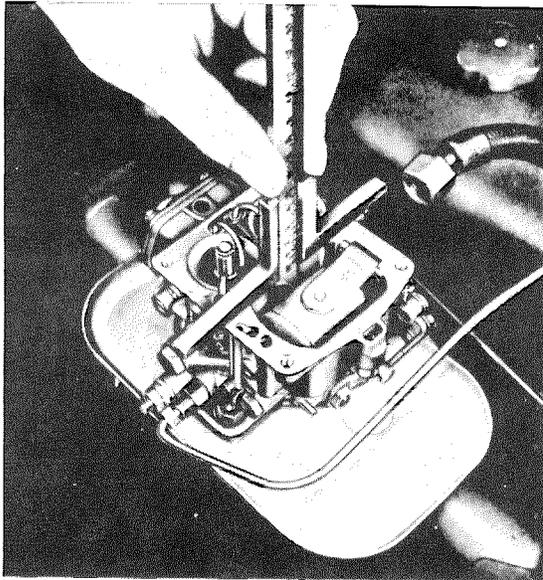


Fig. 01-3/5

For correcting the fuel level in downdraft carburetors, copper sealing rings are available for the float needle valve in the following thicknesses:

Part No. 000 997 81 40  
0.5 mm thick

Part No. 000 997 28 40  
1.0 mm thick (standard)

Part No. 000 997 82 40  
1.5 mm thick

Part No. 000 997 83 40  
2.0 mm thick

The fuel level can thus be corrected quite simply. An alteration of 0.5 mm in the thickness of the sealing ring is equivalent to an alteration in fuel level of appr. 1 mm.

#### b) Model 220 S

In the case of the compound downdraft carburetor for Model 220 S the fuel level measuring procedure is exactly the same as in the case of the compound downdraft carburetor for Model 190.

#### c) Model 190 SL

In the case of the cross-draft compound

carburetor for Model 190 SL a different method is used to measure the fuel level. When the carburetor cover is removed, the float is removed with it. This means that instead of the float level, the position of the float in relation to the carburetor cover has to be measured (Fig. 01-3/8).

To do this, disconnect the fuel line, the support of the fuel overflow line at the hot-start mechanism, and the hose connections at the carburetor covers. Then unscrew the four fixing screws from the carburetor covers and carefully remove the carburetor covers, taking care not to bend the float arms (Figs. 01-3/6 and 01-3/7).

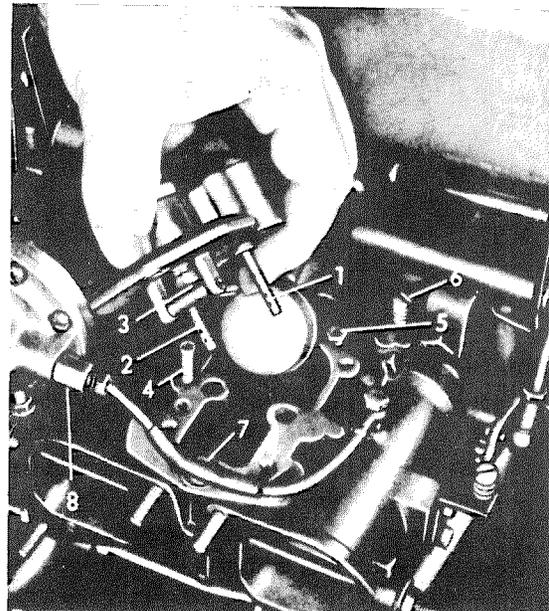


Fig. 01-3/6

#### Die-cast carburetor

- 1 Mixing tube of Stage 1
- 2 Mixing tube of Stage 2
- 3 Float needle valve
- 4 Mixture outlet tube
- 5 Idle fuel jet of Stage 1
- 6 Idle mixture adjustment screw of Stage 1
- 7 Pump jet with injection tube
- 8 Ball valve (delay valve) on the vacuum side

**Note:** On sand-cast carburetors the fuel overflow line is connected to the carburetor covers by means of a cap nut.

To check the float adjustment, measure the position of the float in relation to the separating surface of the carburetor cover. The distance "h" from the separating surface (with gasket) to the upper edge of the vertical float wall should be:

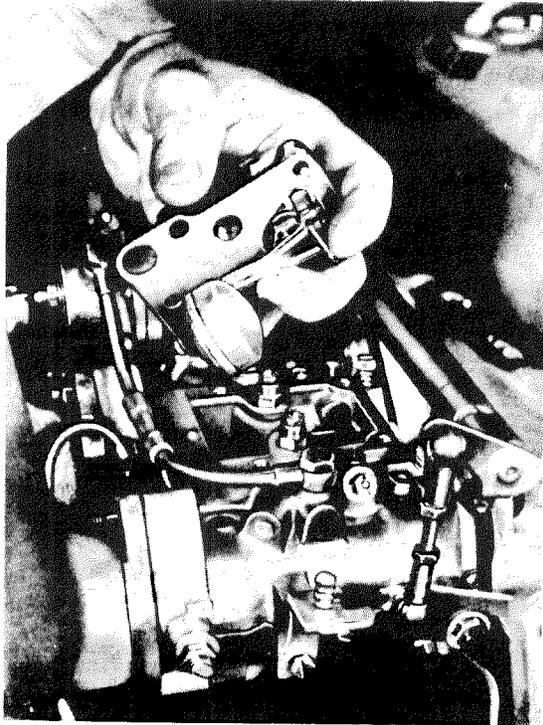


Fig. 01-3/7  
Sand-cast carburetor

$h = 37-38$  mm for die-cast carburetors  
 $h = 39-40$  mm for sand-cast carburetors  
 (Fig. 01-3/8).

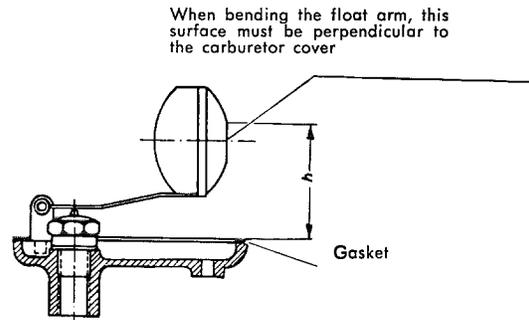


Fig. 01-3/8

## II. Measurement and Adjustment of Injection Amount

**Note:** To measure the injection amount of the accelerating pump, use measuring tubes that have been bent to the correct shape. **On no account must the injection tubes of the carburetors be used** for this purpose, since there is a danger that the tubes will leak in the holder. The gaskets for the holder of the injection tubes should always be replaced.

It is advisable always to measure the fuel amount produced by five strokes in order to achieve the required degree of accuracy.

### a) Models 180 a, 180 b, 220 a, and 219

In the case of the downdraft carburetor for Models 180 a and 180 b and the double downdraft carburetor for Models 220 a and 219 measuring and adjustment procedures are basically the same as in the case of the compound downdraft carburetor for Model 190.

Unlike other carburetor models, the connecting rod to the accelerating pump in the downdraft carburetor for Models 180 a and

180 b is provided with three cotter-pin holes instead of an adjusting nut. The adjustment can be slightly changed by adding washers between the pump arm and the cotter pin (see also Job No. 07-0, Sections E and F). When measuring the injection amount on the double downdraft carburetor for Models 220 a and 219 the two injection tubes must be considered as a unit (Fig. 01-3/9a).

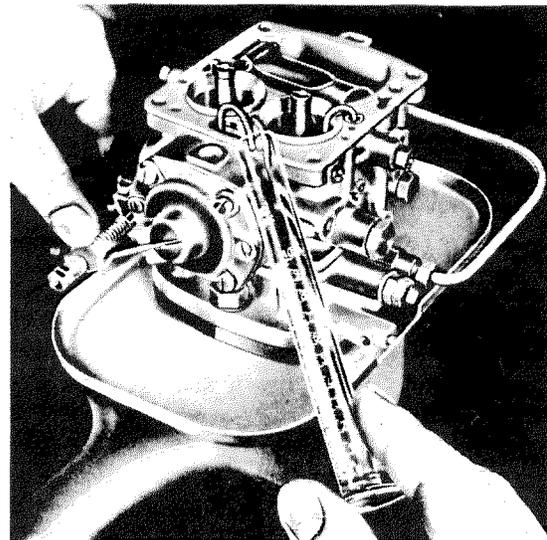


Fig. 01-3/9a

The injection amounts given in the Table always refer to the two injection tubes together.

**When the injection amount has been adjusted, the two injection tubes must be so positioned that the injection jet is directed toward the edge of the closed throttle valve.** If there are any doubts, check the height of the injection tube for the 1<sup>st</sup> version carburetor for Model 180 a and of the injection tubes of the double downdraft carburetor for Models 220 a and 219. Measure the distance "a" from the separating surface of the carburetor housing to the lower end of the injection tube (Fig. 01-3/9b).

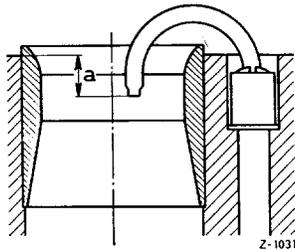


Fig. 01-3/9b

$a = 9.0 \pm 1.0$  mm for Model 180 a  
 $a = 5.0 \pm 1.0$  mm for Models 220 a and 219

b) **Model 220 S**

In the case of the compound carburetor for Model 220 S the procedures for measuring and adjusting the injection amount are exactly the same as in the case of the compound carburetor for Model 190.

c) **Model 190 SL**

On Model 190 SL the measuring procedure is different for die-cast carburetors and sand-cast carburetors.

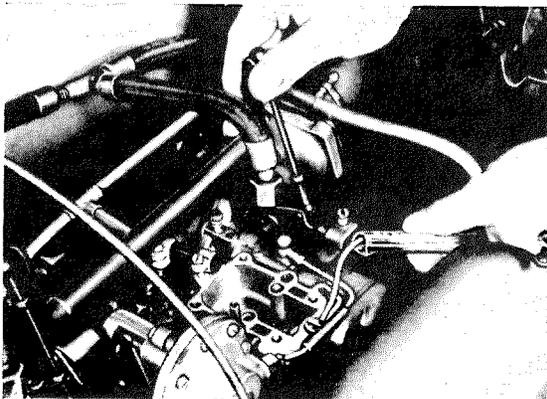


Fig. 01-3/10

Measurement on a die-cast front carburetor

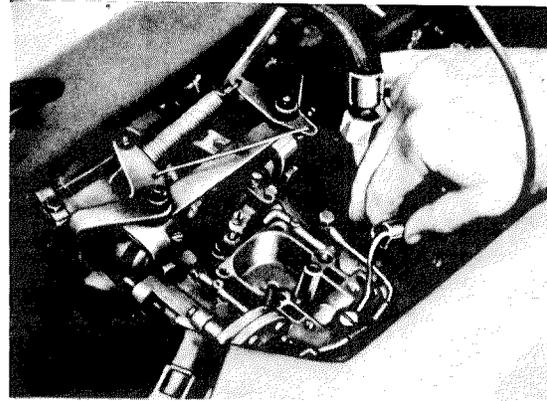


Fig. 01-3/11

Measurement on a die-cast rear carburetor

On the die-cast carburetors the carburetor covers are removed and the injection tubes are replaced by two Measuring Tubes 000 589 51 21 (Figs. 01-3/10 and 01-3/11).

If it is necessary to correct the injection amount, it is advisable to remove the air suction tube, which makes it much easier to adjust the connecting rods on the accelerating pumps, particularly on the rear carburetor.

**Note:** In order to ensure that during future measuring operations the choke control need not be disconnected when the air suction tube is removed, it is advisable to cut a slot as shown in Fig. 01-3/12a into the fixing eye for the choke control sleeve. If that is done, the air suction tube can be removed by simply loosening the clamping screw for the control sleeve.

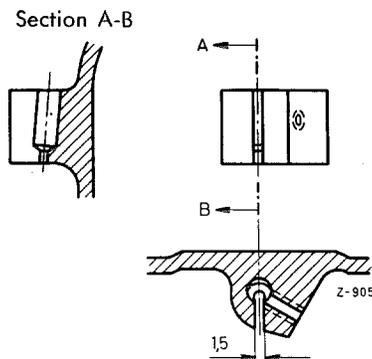


Fig. 01-3/12a

In the case of sand-cast carburetors, the air suction tube and the choke valve housings

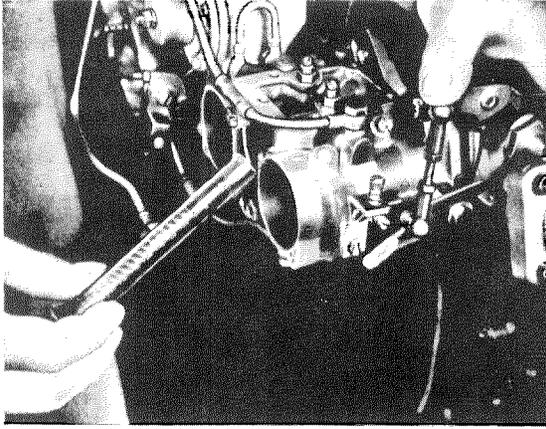


Fig. 01-3/12b

Measurement on a sand-cast front carburetor

must be removed. Then unscrew the injection tubes and install them upside down (Fig. 01-3/12b).

When screwing the choke valve housings and the air suction tube to sand-cast carburetors, make sure that the gaskets are absolutely flat and are not damaged during the operation. It is advisable to glue them to the flange surfaces with grease. Damaged gaskets should always be replaced.

The cylinder head screws used to fasten the choke valve housings must be well tightened to ensure that they cannot work loose.

### III. Checking the Beginning of Enrichment via the Pump System on Carburetors for Model 180 a

1. Disconnect the push rod (10) from the angle lever of the carburetor linkage (Fig. 01-3/13a). Back out the idle adjustment screw (7) at the throttle valve lever until the throttle valve is completely closed.

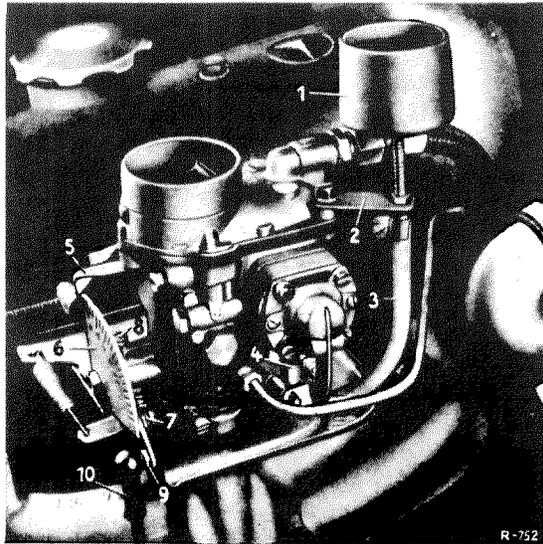


Fig. 01-3/13a

- 1 Container with outlet pipe
- 2 Holder
- 3 Hose length
- 4 Pipe union
- 5 Metal pointer
- 6 Graduated disk
- 7 Idle adjustment screw
- 8 Aperture limiting screw
- 9 Throttle valve lever
- 10 Push rod

2. Clamp a metal pointer (5) into position by means of the rear square screw for fastening the carburetor cover.

3. Fasten a suitable graduated disk (6) to the throttle valve shaft by means of an  $M 8 \times 1$  hexagon nut and adjust it so that, **when the throttle valve is completely closed**, the pointer points to  $0^\circ$  on the graduated disk.

4. Screw out the ball valve on the lower part of the carburetor housing and replace it by a pipe union (4) consisting of a pierced ball valve and a soldered pipe length.

5. Fasten a suitable small container (1) to the carburetor cover; the container must have an outlet pipe and a holder. Then connect the container to the pipe connection by means of a suitable hose length (3) and fill up with fuel.

**Note:** The outlet pipe of the container must not be too short, since otherwise the head will be insufficient to provide the necessary fuel flow.

The hose length must be of fuel-resistant material.

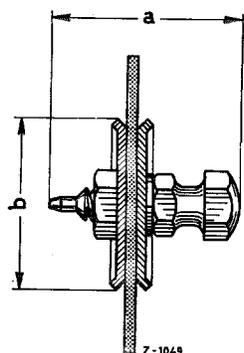


Fig. 01-3/13b

6. The enrichment delivery point differs according to the design of the pump diaphragm (see Table). The type of diaphragm used in any given carburetor can only be determined by removing the diaphragm.

In addition, check the position of the cotter pins in the connecting rod.

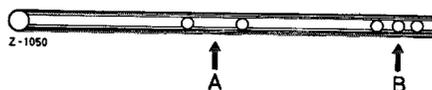


Fig. 01-3/13c

### Enrichment Delivery Point

Pump diaphragm	Bolt length "a"	19	20.5	
	Plate dia. "b"	16	16	22
Enrichment delivery point		55°—60°	40°—44°	36°—40°
Cotter pin "A"		right pin hole	left pin hole	
Cotter pin "B"		center pin hole		
Washer between pump arm and cotter pin "B"		—	1 mm	—

7. Now move the throttle valve lever a few times. In order to check the enrichment delivery point, slowly open the throttle valve until fuel emerges from the injection tube. This is the enrichment delivery point.

Repeat the process several times in order to obtain accurate values. Just before the delivery point is reached, the throttle valve lever should be moved very slowly.

If there is a constant dripping of fuel from the injection tube, the ball valve in the accelerating pump is leaking. In that case remove and clean the valve after detaching the accelerating pump.

If fuel enrichment delivery occurs too early, the pin of the pump diaphragm can be slightly shortened. If the delivery point is far beyond the specified value, the pump diaphragm must be replaced.