IV. Compound Cross-Draft Carburetor for Model 190 SL

A. General

Model 190 SL is equipped with two Solex carburetors Type 44 PHH. These horizontal compound carburetors are also known as cross-draft carburetors and have been developed for sports cars with high maximum speeds. They incorporate the latest advances in carburetor design (Figs. 07-0/28 and 07-0/29).

Solex Carburetor Type 44 PHH

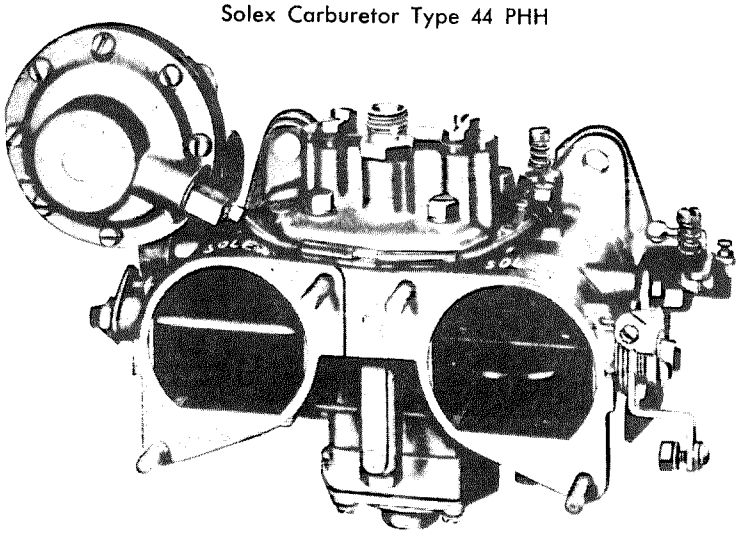


Fig. 07–0/28

Air suction-tube side

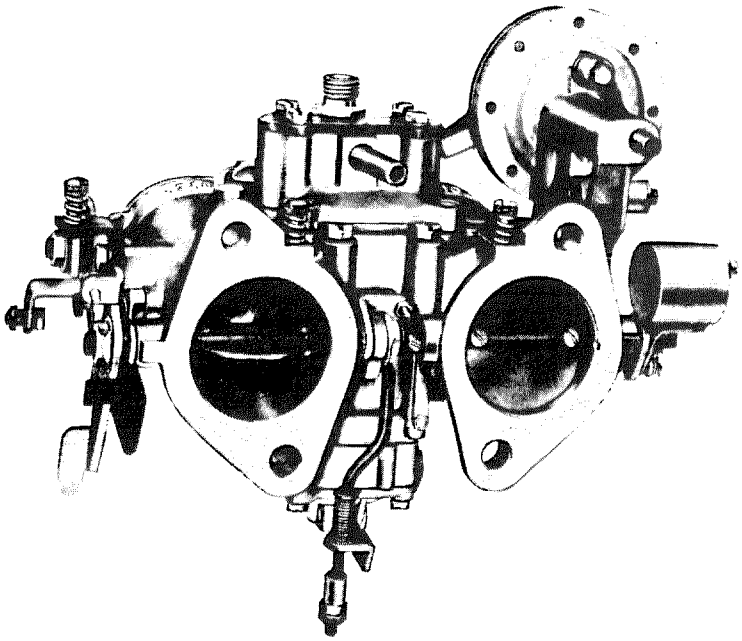


Fig. 07–0/29

Engine side

Two versions of this carburetor have been installed in cars of Model 190 SL. The 1st version has a sand-cast carburetor housing (installed up to Engine End No. 55 00708) and the 2nd version has a die-cast carburetor housing (installed as from Engine End No. 55 00709). The two versions of the carburetor work on the same principle (Figs. 07–0/30 and 07–0/31).

The subsequent installation of die-cast carburetors is described in Job No. 01–4.

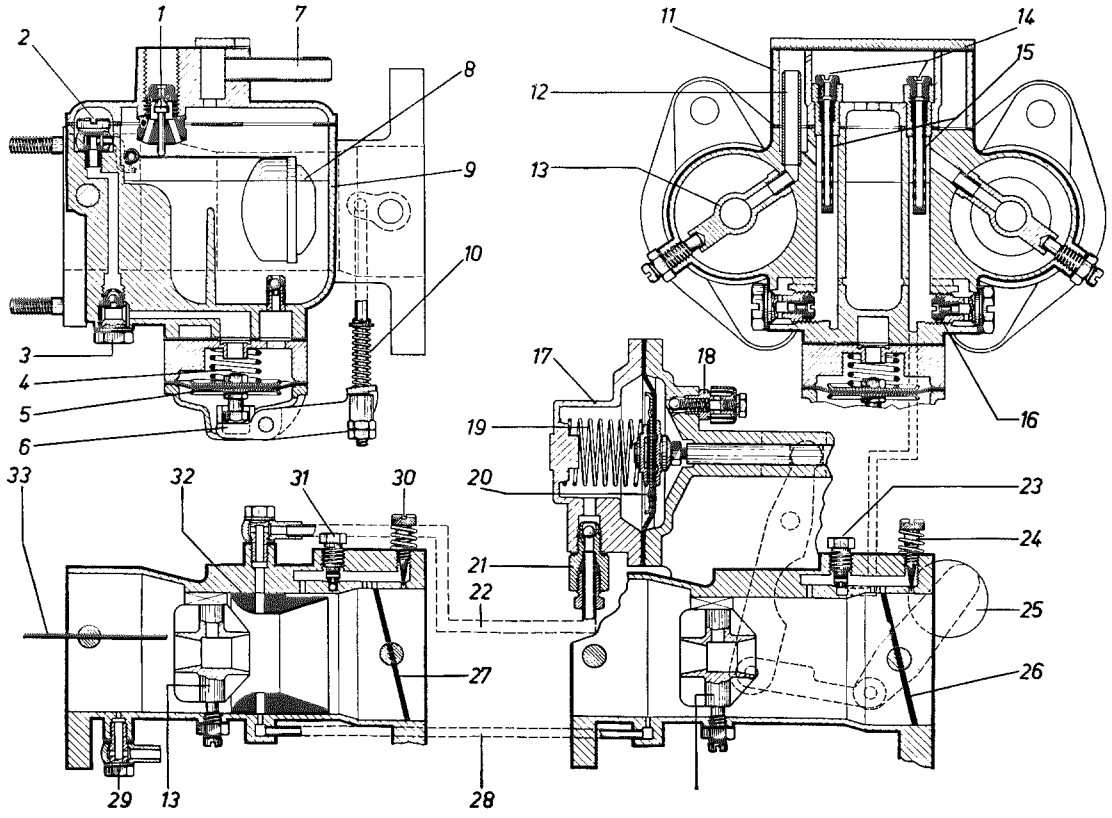


Fig. 07–0/30

Solex Carburetor Type 44 PHH

(Die-cast carburetor)

I Stage 1

II Stage 2

1 Float needle valve
2 Pump jet
3 Ball valve for accelerating pump
4 Diaphragm spring
5 Pump diaphragm
6 Pump arm
7 Connection for fuel overflow line and float chamber ventilation
8 Float
9 Float chamber
10 Connecting rod with pressure spring and adjusting nuts
11 Carburetor cover
12 Overflow control tube
13 Diffuser
14 Air correction jets
15 Mixing tubes
16 Main jet plug with main jets
17 Vacuum box
18 Ball valve (delay valve on atmosphere side)
19 Diaphragm spring
20 Diaphragm
21 Ball valve (delay valve on vacuum side)
22 Vacuum line
23 Idle fuel jet of stage 2
24 Idle mixture adjustment screw of stage 2
25 Throttle valve lever of stage 2 with counterweight
26 Throttle valve of stage 2
27 Throttle valve of stage 1
28 Fuel suction line
29 Union for fuel outlet line
30 Idle mixture adjustment screw of stage 1
31 Idle fuel jet of stage 1
32 Air horn
33 Choke valve

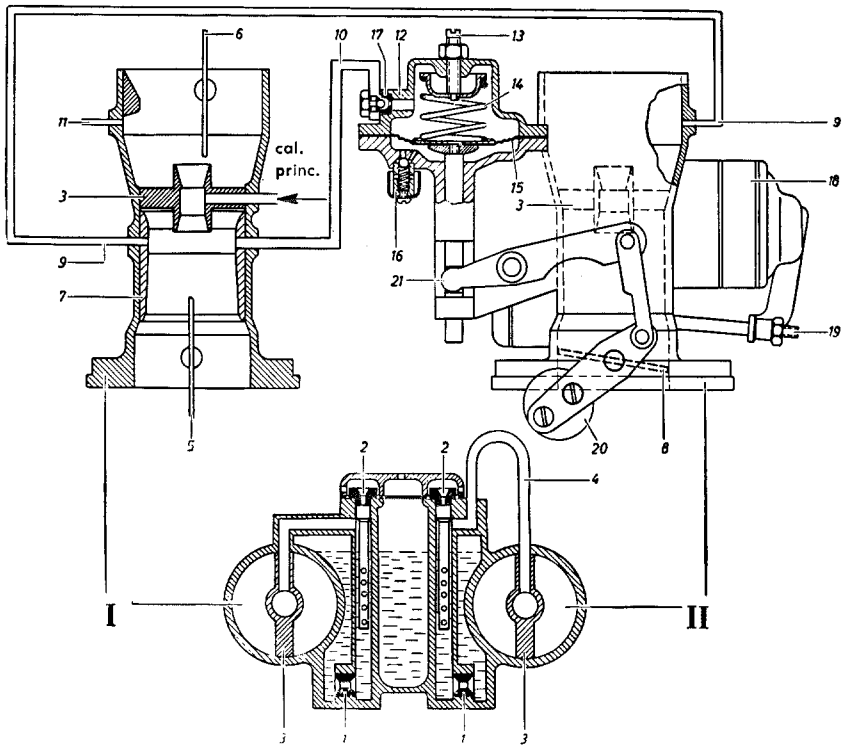


Fig. 07–0/31

Solex Carburetor Type 44 PHH

(Sand-cast carburetor)

I Stage 1 II Stage 2

1 Main jets
2 Air correction jets with mixing tubes
3 Diffuser
4 Overflow control tube
5 Throttle valve of stage 1
6 Choke valve
7 Air horn
8 Throttle valve of stage 2
9 Fuel suction line
10 Vacuum line to vacuum box
11 Fuel outlet line
12 Vacuum box
13 Adjusting screw
14 Diaphragm spring
15 Diaphragm with diaphragm rod
16 Ball valve (delay valve on atmosphere side)
17 Ball valve (delay valve on vacuum side)
18 Accelerating pump
19 Connecting rod with pressure spring and adjustment nuts
20 Throttle valve lever of stage 2 with counterweight
21 Relay lever

B. Arrangement and Function of the Throttle Valves

The compound cross-draft carburetor has two suction canals with one throttle valve each. Each suction canal forms one "stage" and there is no connection between the throttle valve (27) of stage 1 and the throttle valve (26) of stage 2 (see Fig. 07–0/30). Whereas the throttle valve shaft of stage 1 is actuated as usual via the throttle valve lever (38), the throttle valve of stage 2 is opened automatically via the vacuum box (17). The diaphragm (20) in the vacuum box is connected to the throttle valve lever (25) of stage 2 by means of the diaphragm rod (34), the relay lever (35) and the relay arm (36). In the "at rest" position the diaphragm (20) is pushed to the right by the diaphragm spring (19) and thus closes the throttle valve of stage 2.

The counterweight on the throttle valve lever (25) prevents the throttle valve of stage 2 from fluttering when it is closed. The space to the left (spring side) of the diaphragm in the vacuum box is connected via the vacuum line (22) to the suction canal of stage 1 at the narrowest point of the air horn (32).
The space to the right of the diaphragm (atmosphere side) is under atmospheric pressure. The vacuum obtaining in the air horn of stage 1 when the throttle valve is fully open causes the throttle valve (26) of stage 2 to open at an engine speed of approx. 3500 rpm. The two ball valves (delay valves) (21) on the vacuum side and (18) on the atmosphere side of the vacuum box prevent a sudden opening of the throttle valve of stage 2 (Figs. 07–0/32 and 07–0/33).

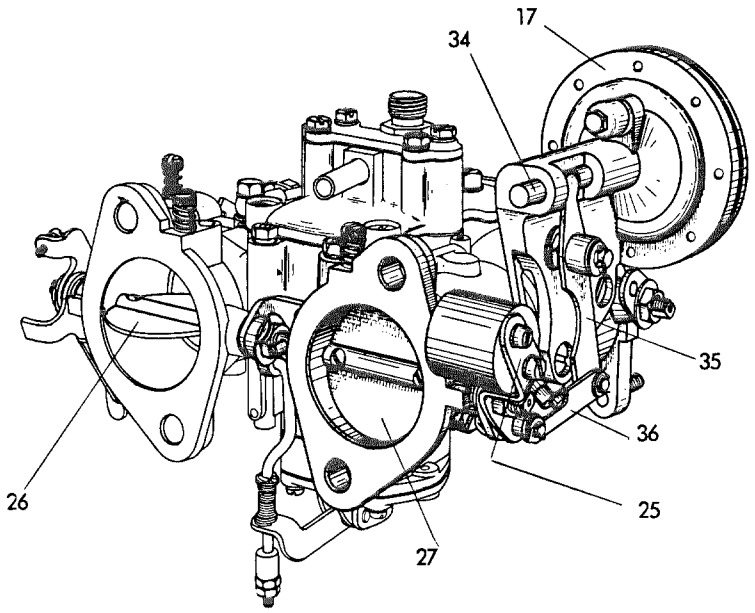


Fig. 07–0/32

Throttle valve of stage 2 not yet operative
(Stage 1 in full-load position)

17 Vacuum box
25 Throttle valve lever of stage 2 with counterweight
26 Throttle valve of stage 2
27 Throttle valve of stage 1
34 Diaphragm rod
35 Relay lever
36 Relay arm

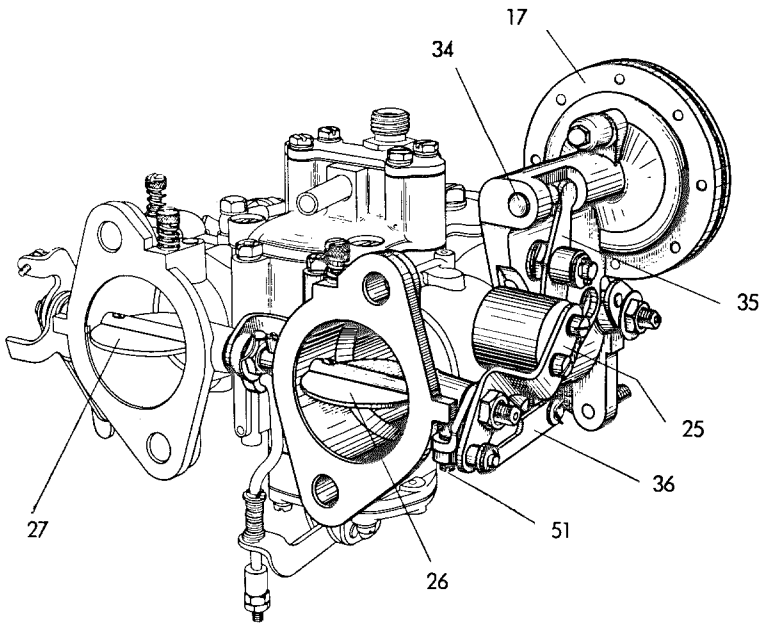


Fig. 07–0/33

Throttle valve of stage 2 operative
(Stages 1 and 2 in full-load position)

17 Vacuum box
25 Throttle valve lever of stage 2 with counterweight
26 Throttle valve of stage 2
27 Throttle valve of stage 1
34 Diaphragm rod
35 Relay lever
36 Relay arm
51 Aperture limiting screw for throttle valve of stage 2

When the accelerator pedal is released, the so-called automatic return mechanism of stage 2 causes the throttle valve of stage 2 to be closed by the throttle valve shaft of stage 1. The automatic return mechanism consists of the relay lever (59) on the throttle valve shaft (53) of stage 1, the set screw (69), the clamping strap (67) of the clamping screw (68) and the abutment screw (70) screwed into the throttle valve shaft (61) of stage 2 (Fig. 07–0/34).

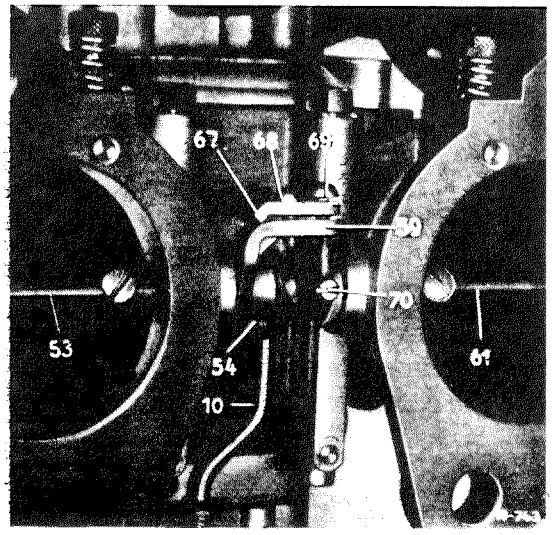


Fig. 07–0/34

10 Connecting rod with pressure spring
53 Throttle valve shaft of stage 1
54 Transmission lever for connecting rod of accelerating pump
59 Relay lever
61 Throttle valve shaft of stage 2
67 Clamping strap
68 Button head screw (clamping screw)
69 Button head screw (set screw)
70 Abutment screw

In the idle position of the carburetor linkage the set screw (69) must rest against the abutment screw (70) without any clearance.

When the two throttle valves of stages 1 and 2 are fully opened, the set screw also rests against the abutment screw, so that the throttle valve shaft of stage 1 makes stage 2 automatically inoperative when the accelerator pedal is released.

The automatic return mechanism of stage 2 should be adjusted after the idle adjustment has been made (see Job No. 01–3, Section K).

C. Starter Mechanism

The starter mechanism of the carburetor works on the choke valve system, a stepless and progressive system in which there is a fixed relationship between choke valve position and start mixture enrichment. The starter mechanism is actuated by a pull knob on the instrument board and a bowden cable. The starter mechanism consists of a choke valve in the suction canal of stage 1; the choke valve shaft (71) is offset from the center of the suction canal.

In the sand-cast carburetors the starter mechanism is located in a special choke valve section screwed to the carburetor housing. The die-cast carburetors have no special choke valve section and the choke valve shaft is located in the carburetor housing itself.

When the starter mechanism is not in operation under normal running conditions, the choke valve (33) is open (Fig. 07–0/35).

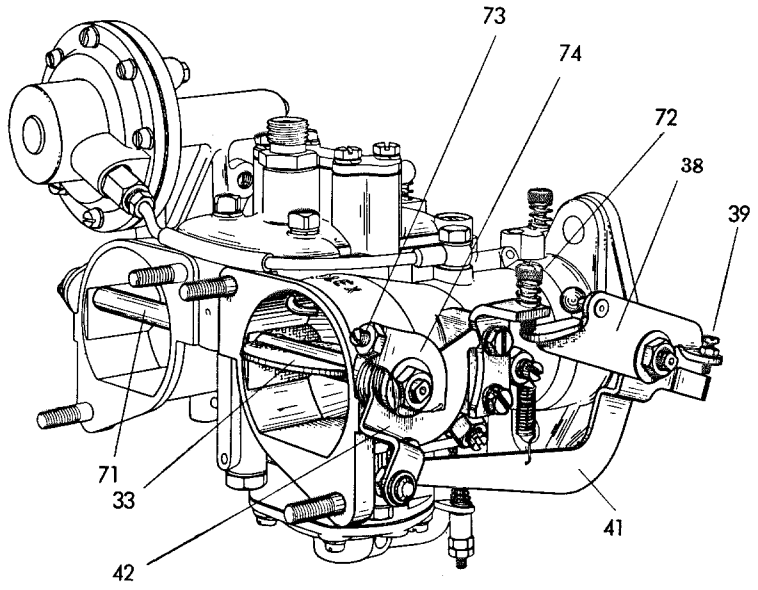


Fig. 07–0/35

Normal running position — Starter mechanism inoperitive
(Choke valve open)

33 Choke valve
38 Throttle valve lever of stage 1
39 Adjusting screw
41 Relay lever
42 Choke valve lever with cam plate
71 Choke valve shaft
72 Idle adjustment screw
73 Adjusting screw
74 Abutment

When the knob is pulled out, the starter mechanism is in operation and the choke valve (33) is closed (Fig. 07–0/36).

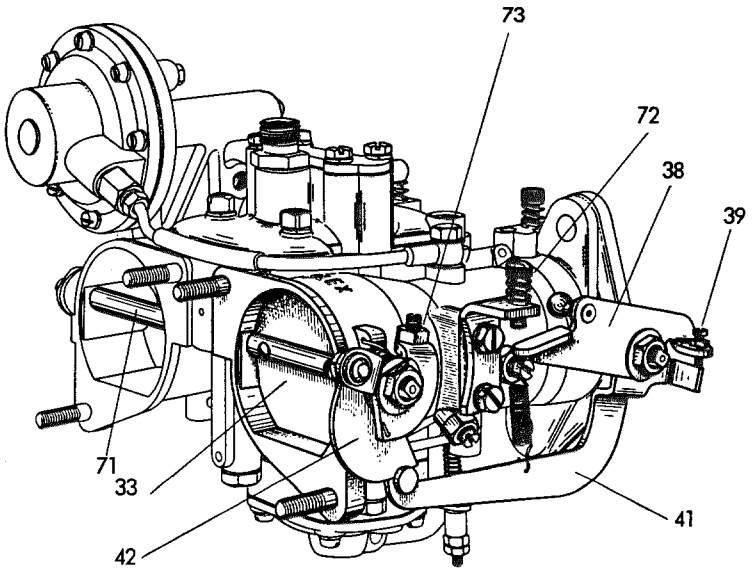


Fig. 07–0/36

Starter mechanism operative
(Choke valve closed)

33 Choke valve
38 Throttle valve lever of stage 1
39 Adjusting screw
41 Relay lever
42 Choke valve lever with cam plate
71 Choke valve shaft
72 Idle adjustment screw
73 Adjusting screw

The choke valve is closed by a coil spring; it is opened by a relay lever when the engine has started.

When the choke valve closes, the throttle valve (27) of stage 1 is automatically opened approx. 5° by the choke valve lever (42) with cam plate and the relay lever (41) (Fig. 07-0/37).

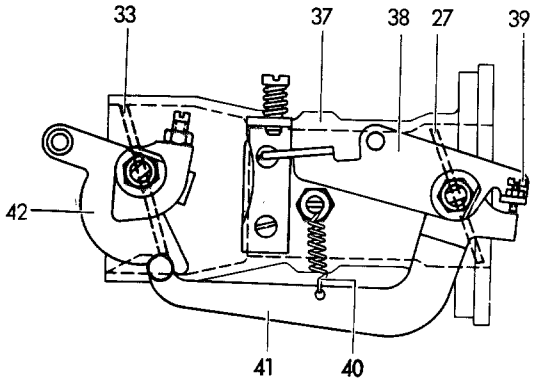


Fig. 07-0/37

Starter mechanism

27 Throttle valve of stage 1
33 Choke valve
37 Carburetor housing
38 Throttle valve lever of stage 1
39 Adjusting screw
40 Tension spring
41 Relay lever
42 Choke valve lever with cam plate

The throttle valve must open in order to ensure that the vacuum building up in the suction tube can become effective in the mixing chamber of the carburetor and in order to ensure proper starting and running of the engine.

Note: a) The cam plate on the choke valve lever (42) and the relay lever (41) are fitted to the rear carburetor only. The throttle valve on the front carburetor is automatically opened by the control shaft of the carburetor linkage (see Fig. 07-0/35).

b) When the choke valve is closed there must be a clearance of 1.0 mm between the adjusting screw (73) on the abutment (74) and the choke valve lever (42) (see Fig. 07-0/35).

c) When the starter mechanism is inoperative, the choke valve must be fully open. The stop lever on the choke valve shaft must rest against the carburetor housing. This point needs particular attention when the choke cable is being connected (see also Job No. 30-6).

d) When the starter mechanism is inoperative, there must be a clearance of approx. 0.4 mm between the adjusting screw (39) on the throttle valve lever and the relay lever (41) when the carburetor linkage is in the idle position. The tension spring must press the relay lever against the cam plate of the choke valve lever (see Fig. 07-0/35).

Cold Start

When the engine is being started, the closed choke valve (33) produces an effective vacuum in the diffuser (13) of stage 1, so that sufficient fuel is drawn from the main supply system to provide a mixture rich enough to start the engine cold. When the engine has started, the pressure flow regulates the opening of the choke valve (33) against the pressure of the coil spring, with the result that the combustion air necessary for the start mixture can enter (Fig. 07-0/38).

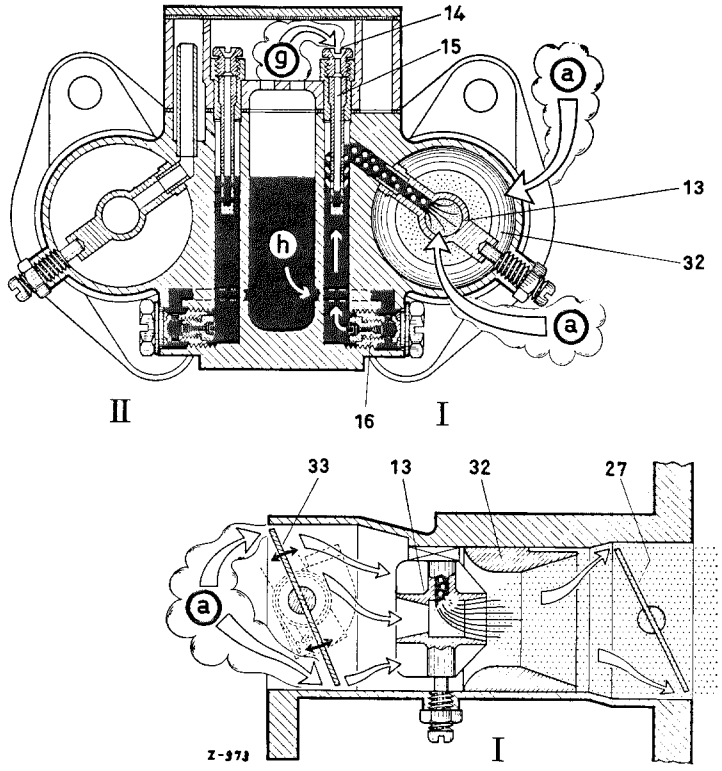


Fig. 07-0/38

Cold start
(After engine has started)

I Stage 1 II Stage 2

a) Starter air entry
g) Entry of compensating air for main carburetion system
h) Fuel feed
13 Diffuser
14 Air correction jet
15 Mixing tube
16 Main jet plug with main jet
27 Throttle valve of stage 1
32 Air horn
33 Choke valve

By slowly pushing in the pull knob the engine speed can be adapted to the driving situation.

There is no objection to warming up the engine with the starter mechanism in operation. However, the starter mechanism should be switched off by pushing the knob right in as soon as the engine has reached normal working temperature. When the engine is warm, the knob must not be pulled to start the engine.

D. Idle System

The carburetor has two idle systems, one for stage 1 and one for stage 2. The idle system of stage 1 serves the normal purpose of supplying the engine with the idle mixture required and of ensuring a satisfactory change-over to the main carburetion system.

The idle system of stage 2 only serves to improve speed build-up when stage 2 is brought into operation.

Idle System of Stage 1

The difference between the idle systems in die-cast and sand-cast carburetors is that in the die-cast carburetor the idle air supply is drawn from the mixing chamber in the suction of the carburetor and passes via the recess in the air horn (32) through the idle air bore (43) (replacing the idle air jet) into the idle canal (45), whereas in the sand-cast carburetor the idle air passes into the idle canal through the idle air jet (44) from outside (Figs. 07-0/39 and 07-0/40).

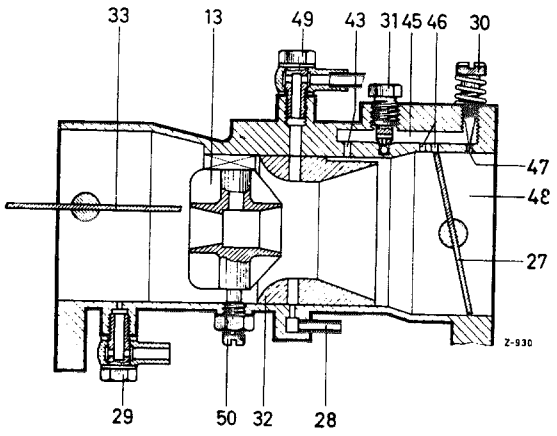


Fig. 07-0/39

Idle system of stage 1
(Die-cast carburetor)

13 Diffuser
27 Throttle valve of stage 1
28 Fuel suction line
29 Union for fuel outlet line
30 Idle mixture adjustment screw of stage 1
31 Idle fuel jet of stage 1
32 Air horn
33 Choke valve
43 Idle air bore of stage 1
45 Idle canal of stage 1
46 By-pass bores of stage 1
47 Idle mixture bore of stage 1
48 Suction canal of stage 1
50 Retaining screw for diffuser

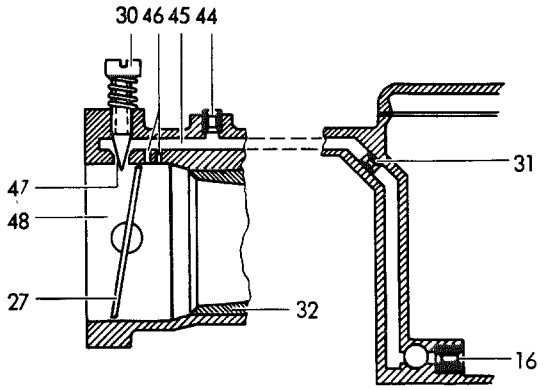


Fig. 07-0/40

Idle system of stage 1
(Sand-cast carburetor)

16 Main jet
27 Throttle valve of stage 1
30 Idle mixture adjustment screw of stage 1
31 Idle fuel jet of stage 1
32 Air horn
44 Idle air jet
45 Idle canal of stage 1
46 By-pass bores of stage 1
47 Idle mixture bore of stage 1
48 Suction canal of stage 1

a) Idle Phase 1

The fuel which is drawn in via the idle fuel jet (31) mixes with the air entering through the idle air bore (43) forming a mixture which then passes into the idle canal (45). When the throttle valve (27) is in the idle position, a further supply of air enters through the rear by-pass bore (46); the idle mixture enters the suction canal through the idle mixture bore (47) and through the front by-pass bore (46) and combines with the air flowing past the throttle valve to form the final idle mixture (Figs. 07-0/39 and 07-0/41).

The section of the idle mixture bore can be varied by the idle mixture adjustment screw (30) (Fig. 07-0/41). The final idle mixture can be leaned out by tightening the idle mixture adjustment screw and enriched by slackening it. The idle speed is adjusted with the idle adjustment screw (72) on the throttle valve lever (38) (see Job No. 01-3, Section K, and Fig. 07-0/36).

b) Idle Phase 2

When the throttle valve is opened slightly, idle mixture emerges both through the idle mixture bore (47) and the rear by-pass bore (46). The two by-pass bores now ensure a smooth change-over from the idle to the main carburetion system (see Figs. 07-0/39 and 07-0/41).

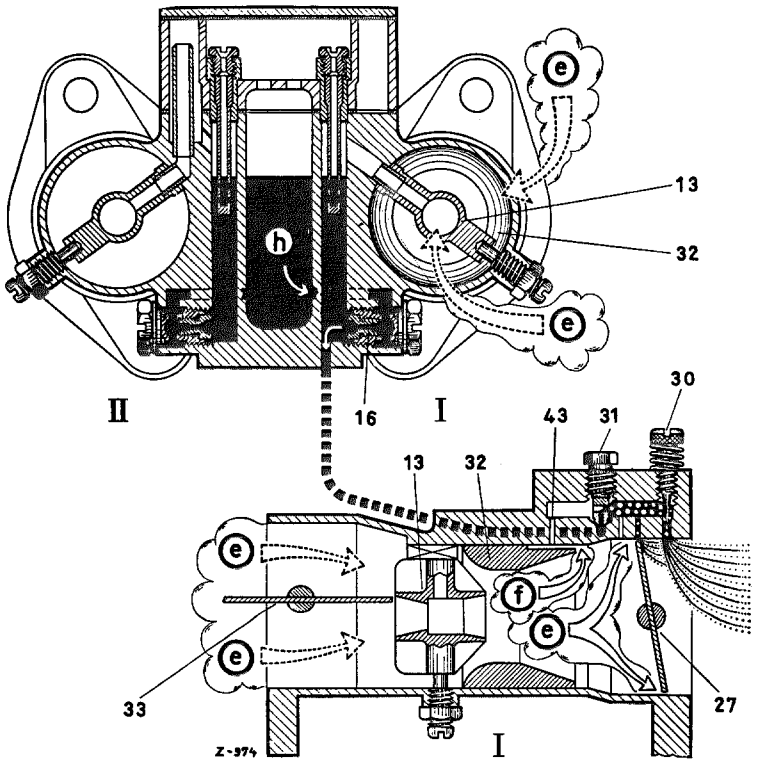


Fig. 07-0/41

Idle — Phase 1

I Stage 1 II Stage 2

e) Entry of main air
f) Entry of idle air
h) Fuel feed

13 Diffuser
16 Main jet plug with main jet
27 Throttle valve of stage 1
30 Idle mixture adjustment screw of stage 1
31 Idle fuel jet of stage 1
32 Air horn
33 Choke valve
43 Idle air bore of stage 1

Idle System of Stage 2

The 2nd stage of the carburetor also has an idle system which is used only to improve the speed build-up when the 2nd stage is brought into operation. When the engine is idling, is in the partial-load range and in the full-load range up to approx. 3500 rpm, the idle system of stage 2 is not in operation, since both the mixture adjustment screw (24) and the throttle valve (26) of stage 2 are closed.

The idle air supply for the idle system of stage 2 of both die-cast and sand-cast carburetors is drawn in from the mixing chamber in the suction canal through the idle air bore (63) (Figs. 07-0/42 and 07-0/43).

Note: As from Engine End No. 65 01133 the die-cast carburetors have only one by-pass bore in stage 2.

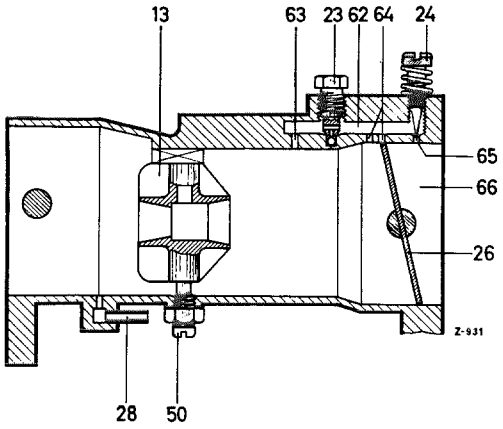


Fig. 07-0/42

Idle system of stage 2
(Die-cast carburetor)

13 Diffuser
23 Idle fuel jet of stage 2
24 Idle mixture adjustment screw of stage 2
26 Throttle valve of stage 2
28 Fuel suction line
50 Retaining screw for diffuser
62 Idle canal of stage 2
63 Idle air bore of stage 2
64 By-pass bores of stage 2
65 Idle mixture bore of stage 2
66 Suction canal of stage 2

When the engine reaches a speed of approx. 3500 rpm under full load, the throttle valve (26) of stage 2 begins to open. The fuel drawn in through the idle fuel jet (23) combines with the air entering through the idle air bore (63) to form a mixture in the idle canal (62). This mixture emerges at the by-pass bores (64) as soon as the throttle valve (26) of stage 2 opens. This additional enrichment of the fuel-air mixture prevents a change-over shock when stage 2 is brought into operation (see Figs. 07-0/42 and 07-0/43).

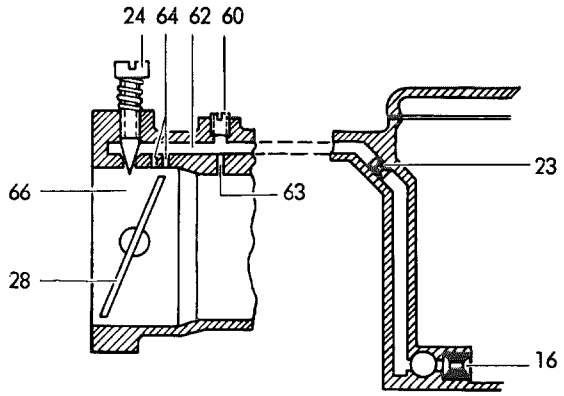


Fig. 07-0/43

Idle system of stage 2
(Sand-cast carburetor)

16 Main jet
23 Idle fuel jet of stage 2
24 Idle mixture adjustment screw of stage 2
26 Throttle valve of stage 2
60 Grub screw
62 Idle canal of stage 2
63 Idle air bore of stage 2
64 By-pass bores of stage 2
66 Suction canal of stage 2

Note: The idle mixture adjustment screw of stage 2 remains closed.

E. Main Carburetion System

The float chamber (9) of the carburetor is located in the center between the two suction canals. The connection (7) connects the float chamber with the outside air via the fuel overflow line. The float chamber is closed at the top by the carburetor cover (11). The cover carries the float valve (1) and the threaded union for the fuel line.

The suction canal of stage 1 has an air horn (32) with a diffuser (13) installed in front of it. The outlet tube for the fuel and the fuel mixture opens into the diffuser. By a canal the outlet tube is connected with a cylindrical cavity which is supplied with fuel from the float chamber via the main jet (16) screwed into the main jet plug. The mixing tube (15), which is held in the carburetor by the air correction jet (14), projects from above into the cylindrical cavity.

The suction canal of stage 2 has the same type of diffuser as stage 1, but it has no air horn because stage 2 is only brought into operation at relatively high engine speeds. Main jet plug with main jet, mixing tube and air correction jet are arranged symmetrically to stage 1.

Particular importance attaches to the overflow control tube (12) in stage 2 through which the fuel mixture must pass on its way to the outlet tube of the diffuser (13) of stage 2. This device is necessary in order to counteract the effect of the partial vacuum which is formed in the air suction tube between carburetor and air filter. When the throttle valve of stage 2 is closed, this partial vacuum acts also on the main carburetion system of this stage and would flood it, i. e. without the overflow control tube, fuel would be drawn from the diffuser and – mixed with inlet air – would pass to stage 1 through the air suction tube (Fig. 07-0/44).

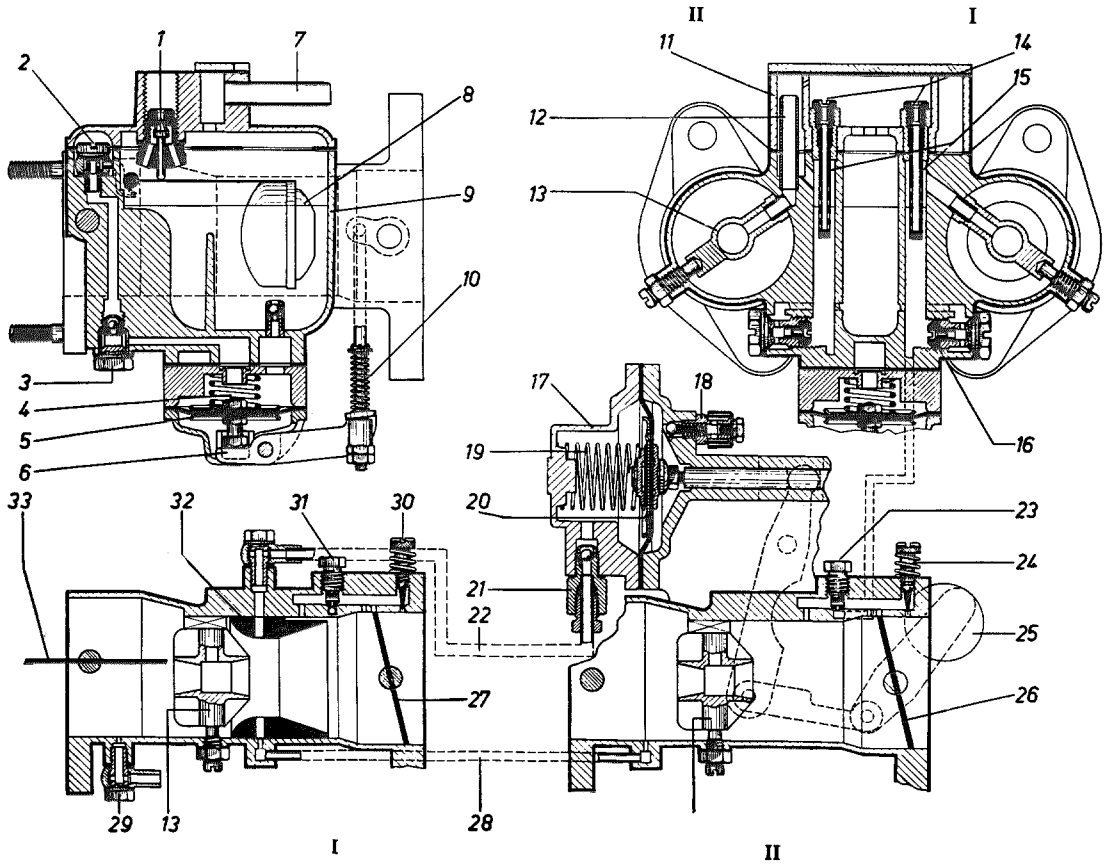


Fig. 07-0/44

I Stage 1 II Stage 2

1 Float needle valve
2 Pump jet
3 Ball valve for accelerating pump
4 Diaphragm spring
5 Pump diaphragm
6 Pump arm
7 Connection for fuel overflow line and float chamber ventilation
8 Float
9 Float chamber
10 Connecting rod with pressure spring and adjusting nuts
11 Carburetor cover
12 Overflow control tube
13 Diffuser
14 Air correction jets
15 Mixing tubes
16 Main jet plug with main jets
17 Vacuum box
18 Ball valve (delay valve on atmosphere side)
19 Diaphragm spring
20 Diaphragm
21 Ball valve (delay valve on vacuum side)
22 Vacuum line
23 Idle fuel jet of stage 2
24 Idle mixture adjustment screw of stage 2
25 Throttle valve lever of stage 2 with counterweight
26 Throttle valve of stage 2
27 Throttle valve of stage 1
28 Fuel suction line
29 Union for fuel outlet line
30 Idle mixture adjustment screw of stage 1
31 Idle fuel jet of stage 1
32 Air horn
33 Choke valve

Note: a) Fig. 07-0/44 shows the die-cast carburetor. As far as the main carburetion system is concerned, the sand-cast carburetor works the same way, the only difference is in the arrangement of the canals and jets (see 07-0/31).

b) In the die-cast carburetor the compensating air passes to the correction jet through the fuel overflow line and in the sand-cast carburetor through two openings which are located at the side of the carburetor cover and are covered by strainers.

c) In both types of carburetors the float chamber is ventilated through the fuel overflow line whose connection has a 6 mm internal diameter in the die-cast carburetor and a 4 mm internal diameter in the sand-cast carburetor.

d) Arrangement and mounting of the float in the carburetor cover are the same for both types. The floats themselves have the same weight, but differ in their shape and must not be mixed up.

e) In the sand-cast carburetor the overflow control tube is screwed to the carburetor housing, whereas in the die-cast carburetor it is located inside the carburetor (see Figs. 07-0/31 and 07-0/44).

a) Partial-Load and Full-Load Range at Low Engine Speed

(Only stage 1 in operation)

Normally the fuel level is the same in the float chamber and in the two cylindrical cavities into which the fuel flows through the main jets (16).

When the throttle valve (27) of stage 1 is opened, the partial vacuum begins to have an effect on the outlet tube of the diffuser. As a result, fuel is drawn from the cylindrical cavity via the outlet tube of the diffuser and is mixed with the air entering through the air inlet branch. Compensating air enters through the air correction jet (14) in progressively larger amounts, passes through the bores of the mixing tube (15) and combines with the fuel flowing through the main jet to form a mixture. Air enrichment increases with increasing engine speed, thus preventing overenrichment of the mixture (Fig. 07-0/45).

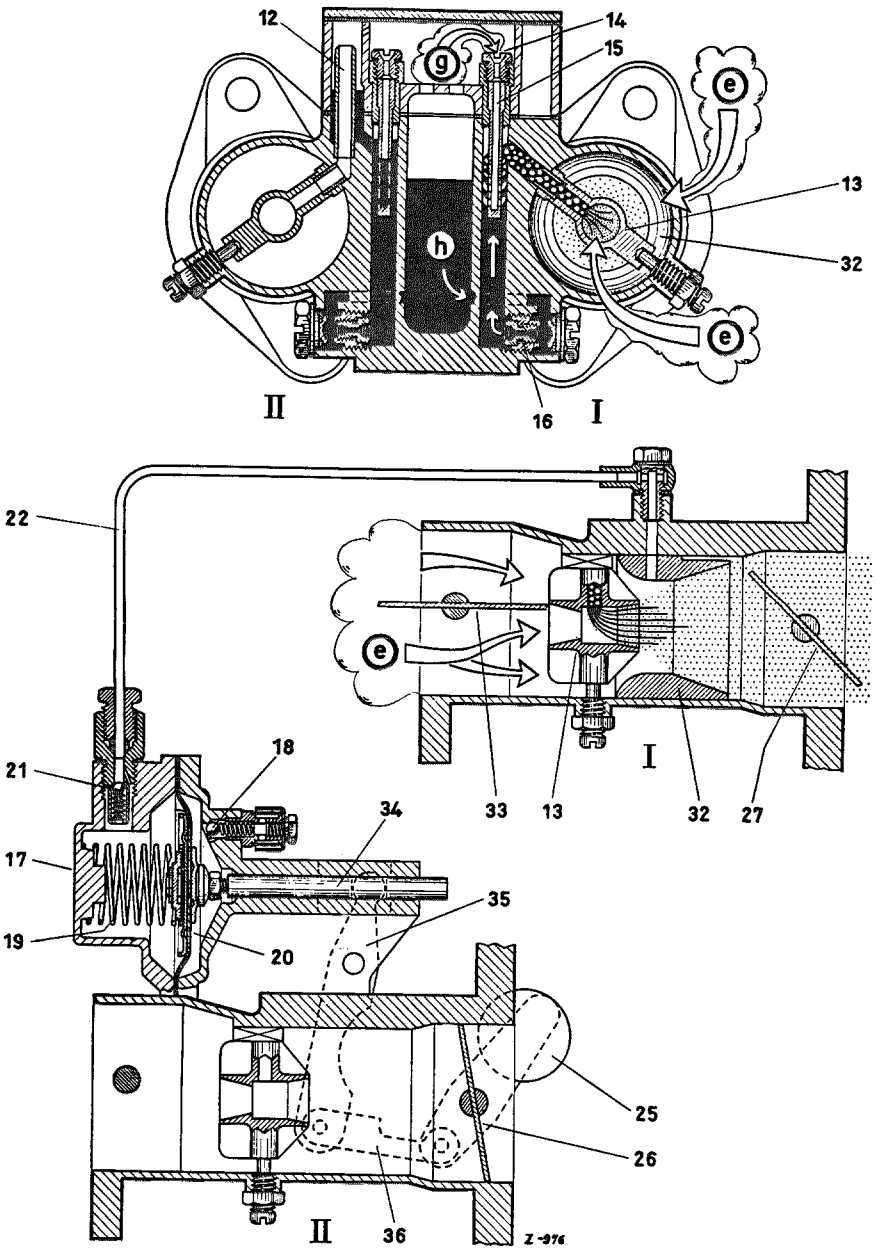


Fig. 07-0/45

Function in partial-load range and
in full-load range at low engine speed
(Only stage 1 in operation)

I Stage 1 II Stage 2

e) Entry of main air
g) Entry of compensating air for main carburetion system
h) Fuel feed

12 Overflow control tube
13 Diffuser
14 Air correction jets
15 Mixing tubes
16 Main jet plug with main jets
17 Vacuum box
18 Ball valve (delay valve on atmosphere side)
19 Diaphragm spring
20 Diaphragm
21 Ball valve (delay valve on vacuum side)
22 Vacuum line
25 Throttle valve lever of stage 2 with counterweight
26 Throttle valve of stage 2
27 Throttle valve of stage 1
32 Air horn
33 Choke valve
34 Diaphragm rod
35 Relay lever
36 Relay arm

b) Full-Load Range at High Engine Speed

(Stage 2 brought into operation)

When the engine has reached approx. 3500 rpm with the throttle valve of stage 1 completely open, the partial vacuum in the air horn has increased to such an extent that through the vacuum line (22) it begins to operate the vacuum box (17) by overcoming the weight and the spring pressure. As a result, the throttle valve (26) of stage 2 begins to open; the change-over is made easier by the fuel mixture which emerges through the by-pass bores (64) of the idle system of stage 2. With increasing throttle valve opening the supply of mixture is taken over by the main jet system of stage 2, so that the engine can reach its full output.

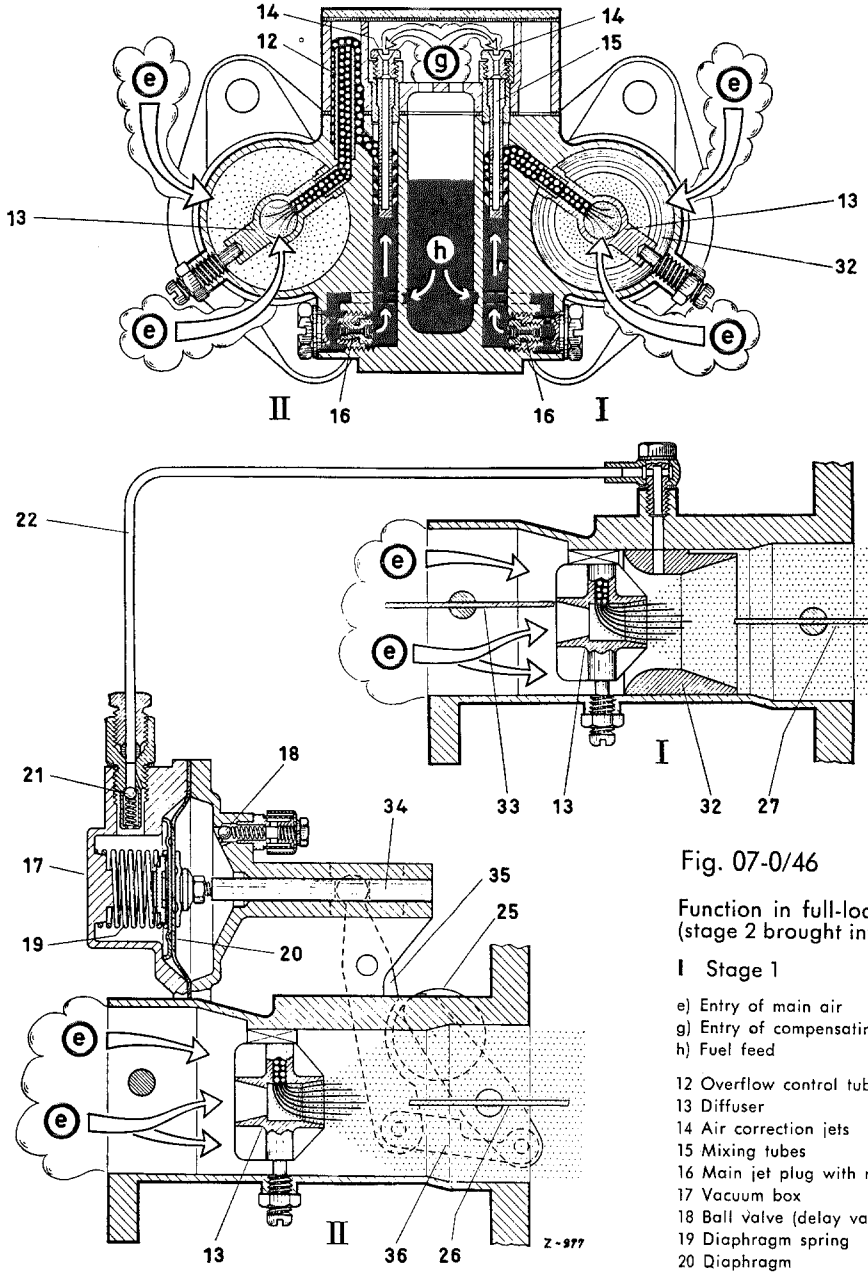


Fig. 07-0/46

Function in full-load range at high engine speed (stage 2 brought into operation)

I Stage 1 II Stage 2

e) Entry of main air
g) Entry of compensating air for main carburetion system
h) Fuel feed

12 Overflow control tube
13 Diffuser
14 Air correction jets
15 Mixing tubes
16 Main jet plug with main jets
17 Vacuum box
18 Ball valve (delay valve on atmosphere side)
19 Diaphragm spring
20 Diaphragm
21 Ball valve (delay valve on vacuum side)
22 Vacuum line
25 Throttle valve lever of stage 2 with counterweight
26 Throttle valve of stage 2
27 Throttle valve of stage 1
32 Air horn
33 Choke valve
34 Diaphragm rod
35 Relay lever
36 Relay arm

Note: The amount of vacuum required to bring the 2nd stage into operation can only be achieved under full load. Over the whole partial-load range only stage 1 is in operation.

F. Accelerating Pump

The "neutral" pump No. 82 is used as an accelerating pump for both the sand-cast and the die-cast carburetor. With this type of pump the engine draws in fuel from the pump system via the injection tube according to the degree of vacuum obtaining in the intake pipe.

However, the main task of the accelerating pump is to spray additional fuel into the mixing chamber of the suction canal of stage 1 when the accelerator pedal is depressed; as a result, speed build-up and acceleration are improved.

The accelerating pump is located at the bottom of the carburetor housing between the two suction canals (Fig. 07-0/47).

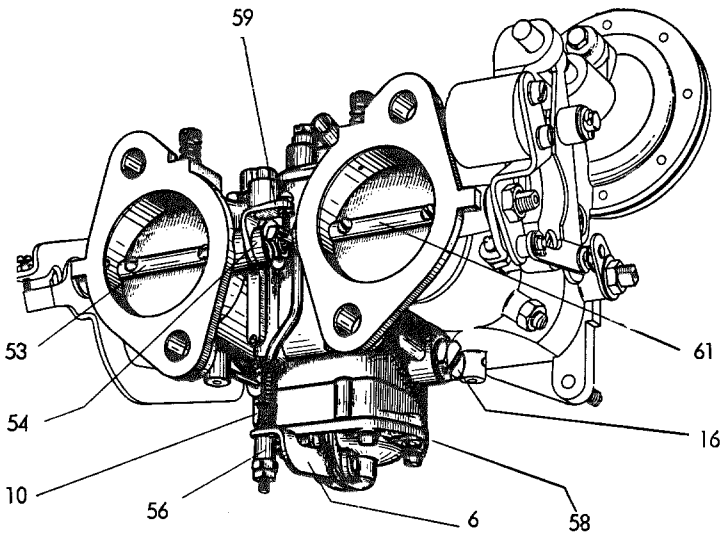


Fig. 07-0/47

6 Pump arm
10 Connecting rod with pressure spring
16 Main jet plug with main jet
53 Throttle valve shaft of stage 1
54 Transmission lever
56 Adjusting nuts
58 Accelerating pump
59 Relay lever for automatic return mechanism of stage 2
61 Throttle valve shaft of stage 2

The pump arm (6) of the accelerating pump is connected to the throttle valve shaft (53) of stage 1 by the adjustable connecting rod (10) and the transmission lever (54). When the throttle valve is closed, the diaphragm spring (4) presses the pump diaphragm (5) outward. Since the pump chamber is connected with the float chamber via the ball valve (55) the pump chamber is filled with fuel.

When the accelerator pedal is depressed, the pump arm (6) is moved via the connecting rod (10). The pump arm in turn presses the diaphragm (5) inward so that the fuel which is in front of the diaphragm is injected through the ball valve (3), the pump jet (2) and the graded injection tube (52).

During the injection period the ball valve (55) now operating as a check valve is closed. When the accelerator pedal is released, the diaphragm spring (4) presses the diaphragm (5) back. The ball valve (55) now operates as a through-way valve, whereas the ball valve (3) works as a check valve and prevents air from entering the pump system from the suction canal (Fig. 07-0/48).

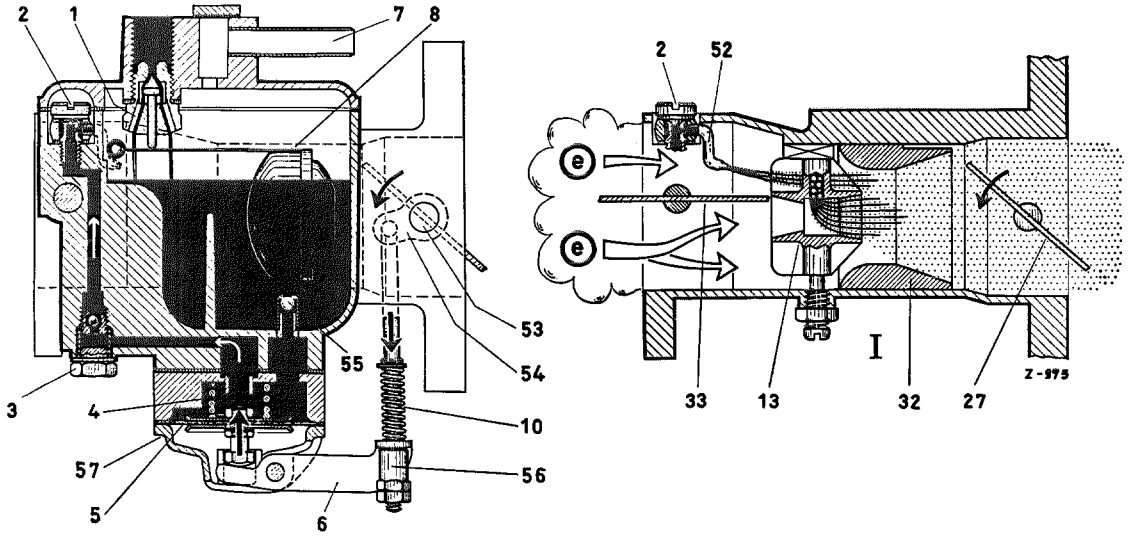


Fig. 07-0/48

Acceleration

I Stage 1

e) Entry of main air

1 Float needle valve
2 Pump jet
3 Ball valve of accelerating pump
4 Diaphragm spring
5 Pump diaphragm
6 Pump arm
7 Connection for fuel overflow line and float chamber ventilation
8 Float
10 Connecting rod with pressure spring
13 Diffuser
27 Throttle valve of stage 1
32 Air horn
33 Choke valve
52 Injection tube
53 Throttle valve shaft of stage 1
54 Transmission lever
55 Ball valve for accelerating pump
56 Adjusting nuts
57 Cover

Depending on the degree of vacuum obtaining in the suction canal, extra fuel can be drawn in from the pump system without operating the pump arm of the accelerating pump.

The injection amount of the accelerating pump can be varied by adjusting the adjusting nuts (56) on the connecting rod (10). When the nuts are tightened, the pump stroke and in consequence the injection amount is increased and vice versa.

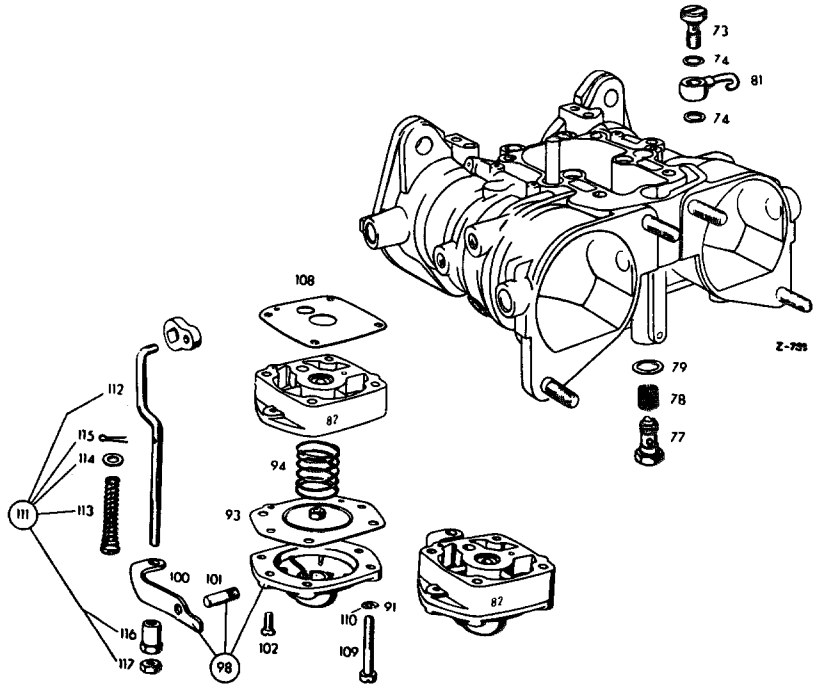


Fig. 07–0/49

Accelerating pump
(Die-cast carburetor)

13 Transmission lever on throttle valve shaft stage 1
73 Pump jet
74 Fiber sealing ring
77 Ball valve
78 Stainer for ball valve
79 Fiber sealing ring
81 Injection tube
91 Accelerating pump
93 Pump diaphragm
94 Diaphragm spring
98 Cover (complete)
100 Pump arm
101 Pump arm shaft
102 Oval head countersunk screw
108 Rubberised-fabric gasket
109 Cheese head screw
110 Lock washer
111 Connecting rod (complete)
112 Connecting rod
113 Pressure spring
114 Washer
115 Cotter pin
116 Shoulder nut (adjusting nut)
117 Hexagon nut (lock nut)

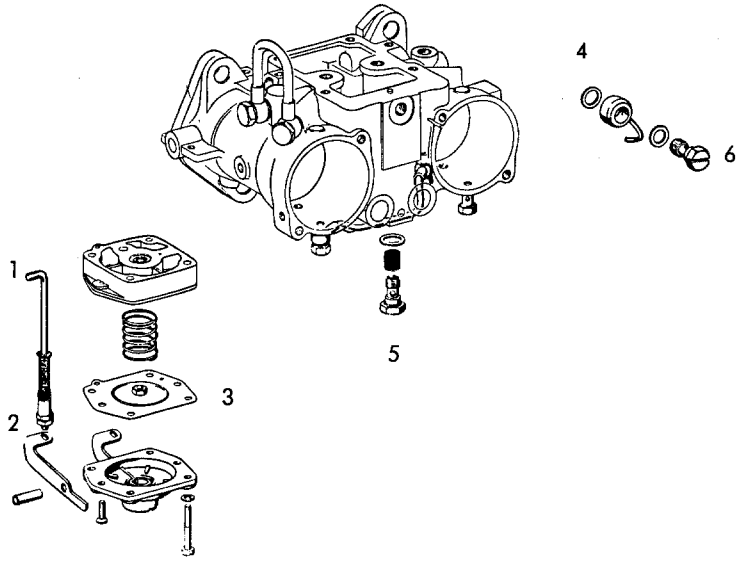


Fig. 07–0/50

Accelerating pump
(Sand-cast carburetor)

1 Connecting rod (complete)
2 Pump arm
3 Pump diaphragm
4 Injection tube
5 Ball valve
6 Pump jet

The adjusting nuts (56) must not be tightened until the pump arm (6) moves away from the diaphragm since in that case injection would not take place immediately the throttle valve is opened. The injection amount of the accelerating pump should be 0.4–0.6 cc/stroke. Adjustment of the injection amount is described in Job No. 01-3, Section H.

Note: a) This version of the neutral accelerating pump has no plate valve as a stop for the diaphragm.

b) In the case of the die-cast carburetor the fuel line to the accelerating pump is calibrated by the ball valve (55) with a diameter of 0.5 mm (installed as a standard part as from Engine End No. 55 01823). In all engines with Engine End Nos between 55 00709 (in which the first die-cast carburetors were installed) and 55 01822 the fuel line to the accelerating pump can be calibrated subsequently by installing the calibrated sleeve Part No. 000 071 03 40 on the ball valve (see also Job No. 01–3, Section I).

c) Sand-cast and die-cast carburetors differ in the arrangement of the canals in the carburetor housing and in the arrangement and design of the injection tube and the pump jet (Figs. 07-0/49 and 07-0/50).

G. Fuel Exhaust Device

When the throttle valves of stages 1 and 2 are suddenly closed at high engine speeds, some fuel may remain in the suction canals of the carburetors.

This would enrich the mixture in stage 2 and would have an undesirable effect both at idling speed and when the throttle valves are opened. For this reason the fuel left in stage 2 is drawn off via the fuel suction line (4) and passes into the suction canals of stage 1 and from there into the mixing chambers of te suction canals.

When the engine is not running, the fuel accumulating in stage 1 of both carburetors runs off through the fuel outlet line (16) and ensures that the engine will start properly when hot. The arrangement of the fuel suction line and the fuel outlet line for the die-cast carburetors is shown in Fig. 07–0/51.

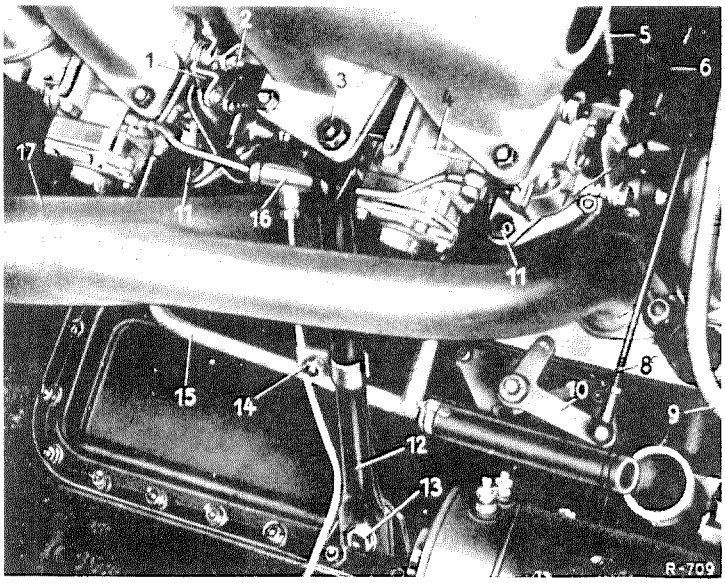


Fig. 07–0/51

1 Choke valve lever of rear carburetor
2 Choke valve lever of front carburetor
3 Hexagon nut
4 Fuel suction line
5 Return spring for carburetor linkage
6 Push rod from control shaft to throttle valve lever of front carburetor
7 Throttle valve lever
8 Push rod from angle lever on crankcase to control shaft
9 Fuel overflow line
10 Angle lever
11 Hexagon screw
12 Strut for supporting air suction tube
13 Hexagon screw
14 Pipe clip
15 Cooling water return line for pre-heating of intake pipe
16 Fuel outlet line
17 Exhaust manifold

In the die-cast carburetors the fuel suction line is firmly connected to the carburetor housing, whereas in the sandcast carburetors the line is connected from the outside (Fig. 07–0/52).

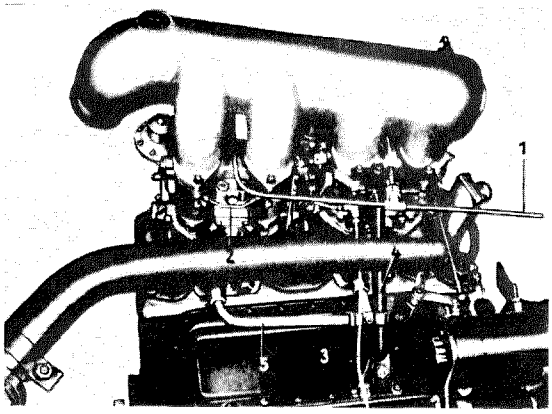


Fig. 07–0/52

1 Fuel overflow line
2 Fuel suction line
3 Fuel outlet line
4 Strut for supporting air suction tube
5 Cooling water return line for pre-heating of intake pipe

H. Hot-Start Mechanism

In order to ensure that the engine also starts at high outside temperatures a hot-start mechanism is incorporated in the carburetor system; it is operated by a pull knob and bowden cable from the instrument panel. When the hot-start control is pulled, the throttle valves of stage 2 are forced open by the angle levers. This enables the evaporated fuel to be drawn off quickly. As soon as the engine has started, the pull knob should be released quickly. The accelerator pedal must be depressed fully before the hot-start control is pulled since otherwise the throttle valves of stage 1 would be opened via the automatic return mechanism levers of stage 2 and this might result in a distortion of the levers (Figs. 07–0/53 and 07–0/54).

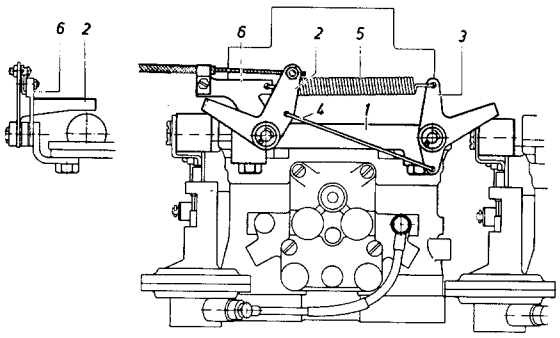


Fig. 07–0/53

1 Bearing bracket
2 Angle lever for rear carburetor
3 Angle lever for front carburetor
4 Connecting strap
5 Return spring
6 Bracket for return spring on bearing bracket

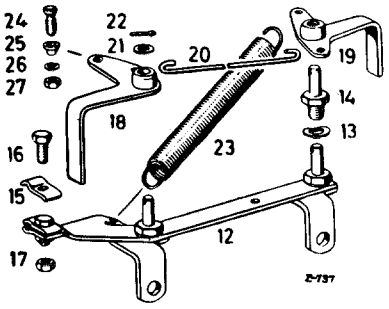


Fig. 07–0/54

12 Bearing bracket for hot-start control
13 Spring washer
14 Pivot pin
15 Fixing clip for hot-start control
16 Hexagon screw
17 Hexagon nut
18 Rear angle lever for hot-start control
19 Front angle lever for hot-start control
20 Connecting strap for angle lever
21 Washer
22 Cotter pin
23 Return spring
24 Fixing screw for bowden cable on angle lever
25 Bushing
26 Washer
27 Hexagon nut

Under normal conditions the hot-start mechanism is not required for starting the engine at normal running temperature; fully depress the accelerator pedal as usual.

I. Installation of Electrical Idle Cut-Out Valves

Engines with high compression ratios have a tendency to self-ignition when fuels of low anti-knock value are used and when outside temperatures are high; as a result, there is after-firing when the engine is switched off.

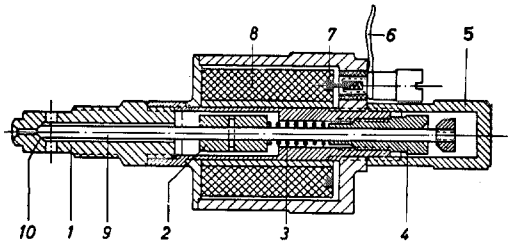
Fuels should have a minimum anti-knock rating of 92 according to the research method (ROZ); when fuels of a lower anti-knock rating are used and heavy after-firing occurs when the engine is switched off, electrical idle cut-out valves manufactured by the firm of Solex can be subsequently installed in the die-cast carburetors (Fig. 07–0/56).

Note: Because of the different arrangement of the idle fuel jets these electrical idle cut-out valves cannot be subsequently installed in sand-cast carburetors.

The idle cut-out valves (Part No. 000 071 02 92), together with the special idle fuel jets size 55 (Part No. 000 071 28 36) are screwed in in place of the standard idle fuel jets. When the ignition is switched on, the electro-magnet (8) in the valve moves the magnet core (2), the valve needle (9) opens up the idle fuel jet (1) and the idle system of the carburetor can fulfil its normal function.

When the ignition is switched off, the current to the electro-magnet (8) is interrupted and the valve needle (9) is forced on to the sealing cone (10) by a pressure spring (3). Now the idle system is cut off from its fuel supply and after-firing of the engine is therefore no longer possible.

If anything should happen to interrupt the electrical operation of the valve (blown fuse, burnt-out electro-magnet, etc.), it is possible to put the cut-out valve out of operation in the open position by unscrewing the threaded sleeve (4) (Fig. 07–0/55) after having removed the valve cap (5).



1 Idle fuel jet
2 Magnet core
3 Pressure spring
4 Threaded sleeve
5 Valve cap
6 Electric lead
7 Contact ring
8 Electro-magnet
9 Valve needle
10 Sealing cone

Fig. 07–0/55

In engines from Engine End No. 55 00709 (in which the die-cast carburetors were first installed) to Engine End No. 55 01822 these cut-out valves can be installed subsequently only when the mixing tube No. 43 has been installed in stage 1 and if the fuel flow to the accelerating pump is regulated by a calibrated sleeve.

As from Engine End No. 55 08123 mixing tube No. 43 has been installed in stage 1 as a standard part and the fuel line to the accelerating pump has been calibrated (see also Job. No. 01–3, Section I).

Work Involved

1. Unscrew the idle fuel jets of stage 1 on both carburetors and screw in the complete idle cut-out valves (1), together with the special jets (see Fig. 07–0/56).

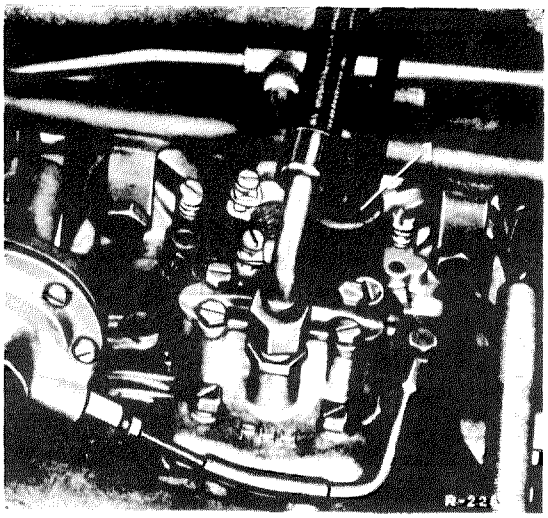


Fig. 07–0/56

1 Solex electrical idle cut-out valve, (Part No. 000 071 02 92) with special jet size 55 (Part No. 000 071 28 36).

Note: The standard idle fuel jets cannot be used when the idle cut-out valves are installed.

2. Connect the two idle cut-out valves by a cable 400 mm long and fasten the cable to the fuel line with a cable holder. Lay a cable 1100 mm long from the idle cut-out valve of the rear carburetor along the hot-start control cable to the cowl and then lay the cable, together with the lead of the flash signal mechanism through the rubber grommet into the interior of the car and to the fuse box. Then fix the cable to the hot-start control cable and the fuel line by four cable holders (Fig. 07–0/57).

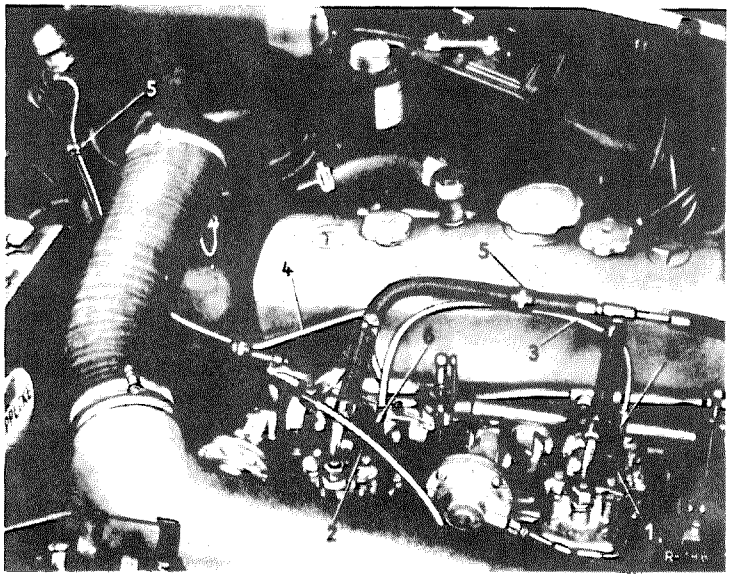


Fig. 07–0/57

1 Idle cut-out valve on front carburetor
2 Idle cut-out valve on rear carburetor
3 Cable 400 mm long
4 Cable 1100 mm long
5 Cable holder with pad
6 Rubber hose

3. Connect the cable leading from the idle cut-out valves to the fuse box to the consumer side of the 8-ampere fuse (No. 3 or No. 4), together with the horn or reversing light switch cables.

Note: a) The cable must have a section of at least 1 sq. mm. Cover the cable sockets on the idle cut-out valves with an oil and fuel-resistant rubber hose so that no parts are exposed. Use suitable small cable sockets (e. g. the 3.5×0.5 mm sockets produced by the firm of Noris) for connecting the cable to the idle cut out valves in order to exclude the danger of short-circuits. To prevent possible damage use a pad between the cable holder (5) and the cable (see Fig. 07-0/57).

b) When adjusting the idle make quite sure that the idle mixture adjustment screw of stage 2 and the throttle valve of stage 2 are completely closed on both carburetors (see Job No. 01-3, Section K).

K. Technical Specifications of Solex Compound Crossdraft Carburetor Type 44 PHH

Details of the Carburetor	Model 190 SL			
	Sand-Cast Carburetor (Installed up to Engine End No. 55 00708)		**Die-Cast Carburetor** (Installed as from Engine End No. 55 00709)	
	Stage 1	Stage 2	Stage 1	Stage 2
Suction canal diameter	40		40	
Air horn "K"	26	—	26	—
Main jet "G"	125	180	130	160
Air correction jet "a"	170	120	180	160
Mixing tube "s"	1	19	43	42
Mixing tube holder (reserve) (cast into carburetor housing)	7	7	7	7
Idle fuel jet "g"	50	50	55	55
Idle air jet "u"	1.7	—	—	—
Idle air bore	—	1.7	1.7	1.7
Accelerating pump	No. 82 (neutral)		No. 82 (neutral)	
Injection amount cc/stroke	0.4–0.6		0.4–0.6	
Pump jet "Gp"	40		50	
Injection tube	Special version (0.4 graded)		Special version (0.8 graded)	
Float needle valve	2.0		2.0	
Float weight (brass float) g	10		10	
Float adjustment mm	39–40		37–38	
Angle of inclination of throttle valves	13°	13°	13°	17°
Angle of inclination of choke valve	13	—	13°	—
By-pass bores mm ⌀	1.3/1.7	1.3/1.7	1.3/1.7	1.7

Note: a) Mixing tube "s" has been installed as a standard part, together with the calibrated fuel line to the accelerating pump as from Engine End No. 55 01823. From Engine End No. 55 00709 (when the die-cast carburetors were first installed) to Engine End No. 55 01822, mixing tube "s" 42 was installed and the fuel line to the accelerating pump was not calibrated.

b) Idle fuel jets "g" 55 have been installed as standard parts as from Engine End No. 65 01365. Up to Engine End No. 65 01364 idle fuel jets "g" 50 were used.

c) The dimension given for the float adjustment refers to the distance from the separating surface of the carburetor cover (with gasket) to the upper edge of the vertical float wall.

d) On the die-cast carburetors the throttle valve of stage 2 has been installed at an angle of 17° as from Engine End No. 65 01133. Up to Engine End No. 65 01132 the throttle valve angle of inclination was 13°

e) The by-pass bore in the suction canal of stage 2 in the die-cast carburetor has a diameter of 1.7 mm as from Engine End No. 65 01133. Up to Engine End No. 65 01132 the suction canal of stage 2 had two by-pass bores with a 1.3 and 1.7 mm diameter.