

B. Starter Mechanism

The starter mechanism of the carburetor works in two stages on the rotary slide valve principle. The starter mechanism is actuated by a bowden cable with a pull knob on the instrument panel. If the starter knob is pulled right out, the starter mechanism is set at the "cold-start position". If the starter knob is pressed in about halfway, the starter mechanism is set at the "warm-up position". If the starter knob is pressed in completely, the starter mechanism is inoperative. Connecting the choke control is described in Job No. 30-6.

a) Cold-Start Position

(Starter knob pulled right out)

When the starter mechanism is in this position, the aperture (34) in the starter rotary slide valve (20) is in the center of the starter mixture canal (30) in the starter flange of the carburetor housing.

In the 1st phase of the cold start the partial vacuum obtaining in the suction tube exerts an influence on the starter system via the starter mixture canal (30) when the engine is being started. As a result fuel from the float chamber is drawn into the fuel canal (18) through the starter fuel jet (15). A certain amount of air enters at the same time through the notch in the carburetor cover which connects up with the float chamber; as a result, a kind of pre-mixture is present in the fuel canal (18) leading to the starter rotary slide valve.

The notch is designed primarily to prevent fuel from being drawn up by the siphon effect when the starter mechanism is inoperative and if the starter rotary slide valve should have a slight leak.

Through a graded bore in the fuel canal (18) the pre-mixture enters the starter mixing chamber (27) behind the rotary slide valve via the fuel slot (28) in the starter flange and the graded bore (33) in the slide valve (Figs. 07-0/12 and 07-0/13).

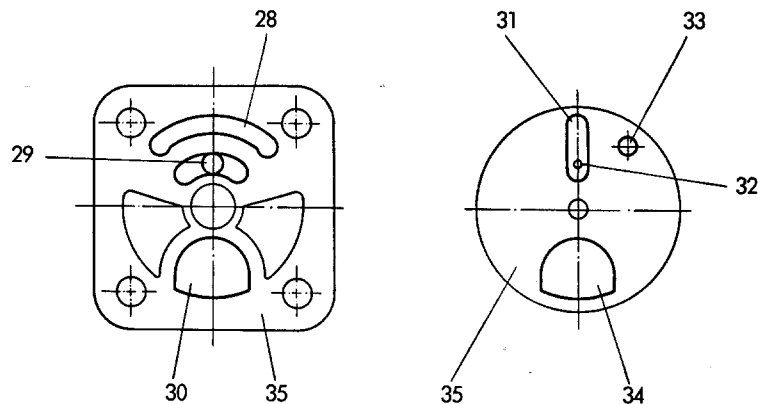


Fig. 07-0/12

Starter flange of
carburetor housing

Starter rotary slide valve

- 28 Fuel slot in starter flange for fuel canal (18)
- 29 Canal for additional air
- 30 Starter mixture canal
- 31 Chamber in starter rotary slide valve
- 32 Graded bore in starter rotary slide valve

- 33 Graded fuel intake bore in starter rotary slide valve
- 34 Aperture in starter rotary slide valve for
starter mixture canal (30)
- 35 Sealing surface

At the same time air is drawn from the suction canals of the carburetor through the canal (29). In the chamber (31) of the starter rotary slide valve this additional air mixes with the pre-mixture which enters the starter mixing chamber (27) via the graded bore (32) in the starter rotary slide valve. Here the mixture combines with the pre-mixture entering through the graded bore (33) in the starter rotary slide valve and the air entering through the starter air bore (19) in the starter housing which acts as a starter air jet. The fuel-air mixture which is now formed passes through the aperture (34) in the starter rotary slide valve and the starter mixture canal (30) into the two suction canals of the carburetor and together with the air streaming through the throttle valve gap forms the final start mixture. Fig. 07-0/13 shows the mode of action of the starter mechanism phase 1 when the engine is being started.

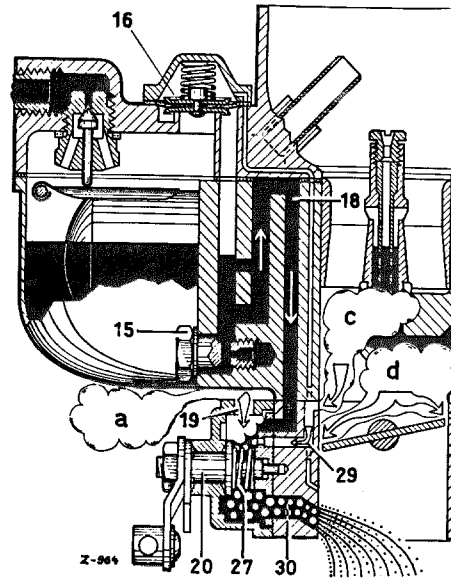


Fig. 07-0/13

Cold start — phase 1
When starting the engine
(Starter air valve closed)

- | | |
|---|-------------------------------|
| a) Starter air entry | 18 Fuel canal |
| c) Additional air entry from suction canals | 19 Starter air bore |
| d) Main air entering through throttle valve gap | 20 Starter rotary slide valve |
| 15 Starter fuel jet | 27 Starter mixing chamber |
| 16 Starter air valve | 29 Canal for additional air |
| | 30 Starter mixture canal |

As soon the engine has started, the 2nd phase of the cold start begins. The increase in engine speed brings about an effective partial vacuum beneath the throttle valves. This partial vacuum exerts a pull on the spring-loaded side of the diaphragm of the starter air valve (16) via the vacuum canal (21) (see Fig. 07-0/14).

As a result of the partial vacuum effect the starter air valve (16) opens and admits more air into the starter system from the float chamber via the air canal (17) and the fuel canal (18). This additional air immediately leans out the start mixture after the engine has started, thus ensuring the proper running conditions for the engine. Fig. 07-0/14 shows the mode of action of the starter mechanism after the engine has started.

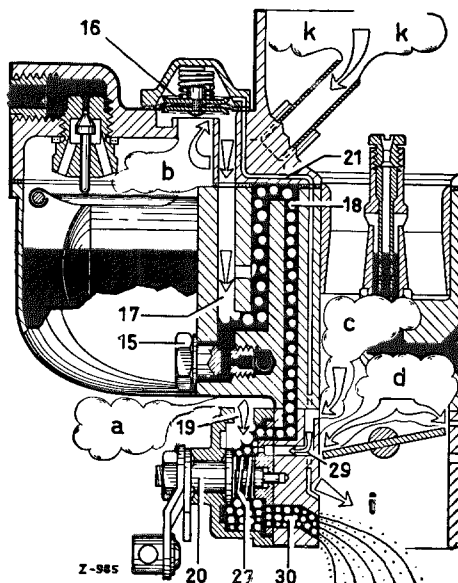


Fig. 07-0/14

Cold start — phase 2
After the engine has started
(Starter air valve opened)

- a) Starter air entry
- b) Additional air entry via the starter air valve
- c) Additional air entry from suction canals
- d) Main air entering through throttle valve gap
- i) Partial vacuum
- k) Air entry into float chamber
- 15 Starter fuel jet
- 16 Starter air valve
- 17 Air canal from starter air valve to fuel canal (18)
- 18 Fuel canal
- 19 Starter air bore
- 20 Starter rotary slide valve
- 21 Vacuum canal to starter air valve
- 27 Starter mixing chamber
- 29 Canal for additional air
- 30 Starter mixture canal

b) Warm-Up Position

(Starter knob pushed halfway in)

As soon as the engine has warmed up a little, the starter knob can be pushed in halfway. As a result, the starter rotary slide valve is turned toward the right via the starter lever; the graded bore (33) in the slide valve is covered by the sealing surface (35) on the starter flange (see Fig. 07-0/12). Since the starter mixing chamber (27) is no longer connected with the fuel canal (18) by the bore (33), but only by the fine-grained bore (32) in the starter rotary slide valve, the amount of fuel admitted is greatly decreased and the start mixture is leaned out further. Fig. 07-0/15 shows the mode of action of the starter mechanism during warming-up.

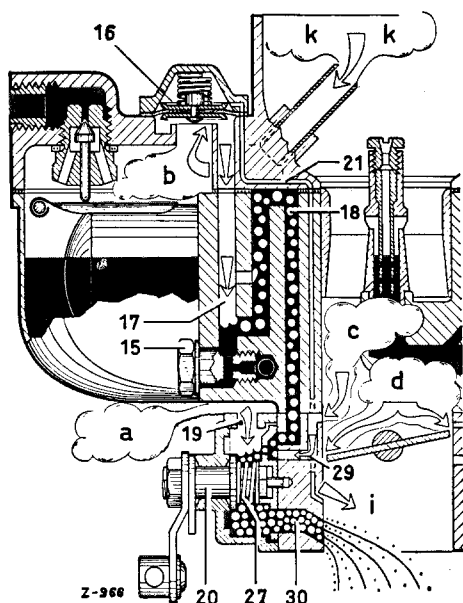


Fig. 07-0/15

Warm-up position
(Starter air valve opened)

- a) Starter air entry
- b) Additional air entry via the starter air valve
- c) Additional air entry from suction canals
- d) Main air entering through throttle valve gap
- i) Partial vacuum
- k) Air entry into float chamber
- 15 Starter fuel jet
- 16 Starter air valve
- 17 Air canal from starter air valve to fuel canal (18)
- 18 Fuel canal
- 19 Starter air bore
- 20 Starter rotary slide valve
- 21 Vacuum canal to starter air valve
- 27 Starter mixing chamber
- 29 Canal for additional air
- 30 Starter mixture canal

c) Driving Away with Starter Knob Pulled Out

When the car is driven away with the starter knob pulled out, the partial vacuum in the suction canals is shifted upward by the opening of the throttle valves. As a result, the supply of start mixture from the canal (30) decreases. This is compensated for by the start mixture drawn in via the additional air canal (29) so that the supply of start mixture to the engine remains unaffected.

If as a result of quick acceleration from low engine speed the throttle valves are opened still further, the partial vacuum suddenly drops. The starter air valve (16), which had opened as soon as the engine started, now closes again, so that the starter system produces a rich start mixture for the change-over just as it did at starting. As soon as the engine reaches sufficient speed, the starter air valve, actuated by the partial vacuum which is increasing again, once more opens and leans out the start mixture. By this automatic action of the starter air valve the cold engine is supplied with a correctly proportioned start mixture suitable for all conditions and a satisfactory change-over to the main carburetion system is ensured when the starter knob is pulled. Fig. 07-0/16 shows the mode of action of the starter mechanism when the car is being driven away.

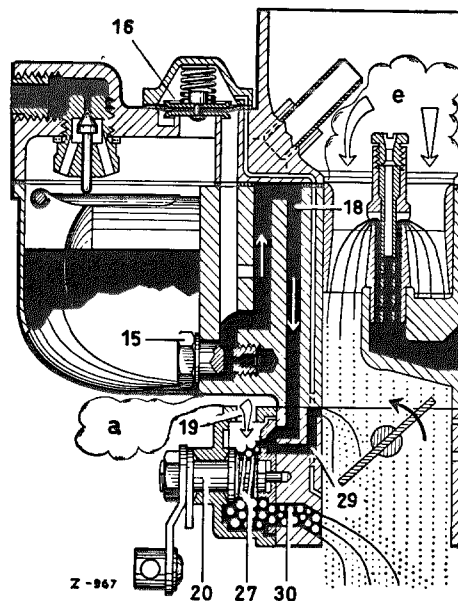


Fig. 07-0/16

Change-over with starter mechanism
in action
(Starter air valve closed)

- a) Starter air entry
- b) Main air supply
- 15 Starter fuel jet
- 16 Starter air valve
- 18 Fuel canal
- 19 Starter air bore
- 20 Starter rotary slide valve
- 27 Starter mixing chamber
- 29 Canal for additional air
- 30 Starter mixture canal

Note: As a rule the car should be driven away with the starter mechanism in the "warm-up position". However, at very low temperatures the car can be driven away with the starter mechanism in the "cold-start position".

d) Starter Mechanism Inoperative

(Starter knob pushed right in)

When the starter knob is pushed right in, the starter rotary slide valve is turned to the right to a point where both the graded bore (33) and the graded bore (32) and the fuel slot (31) in the starter rotary slide valve are completely covered (see Fig. 07-0/12). The starter mixture canal (30) is also closed. The starter system is now out of action.

In order to prevent fuel from being drawn from the starter system, when the starter mechanism is inoperative, but if the starter rotary slide valve is not quite tight, a notch as described in Section a) has been made in the carburetor cover. This notch connects the float chamber with the fuel canal (18). For that reason only air and no fuel can be drawn in when there is a slight leak in the starter rotary slide valve.