III. Compound Downdraft Carburetor for Model 220 S

A. General

Model 220 S is equipped with two Solex compound downdraft carburetors Type 32 PAITA which are built on the same principles as the carburetor used in Model 190 (Fig. 07-0/20)

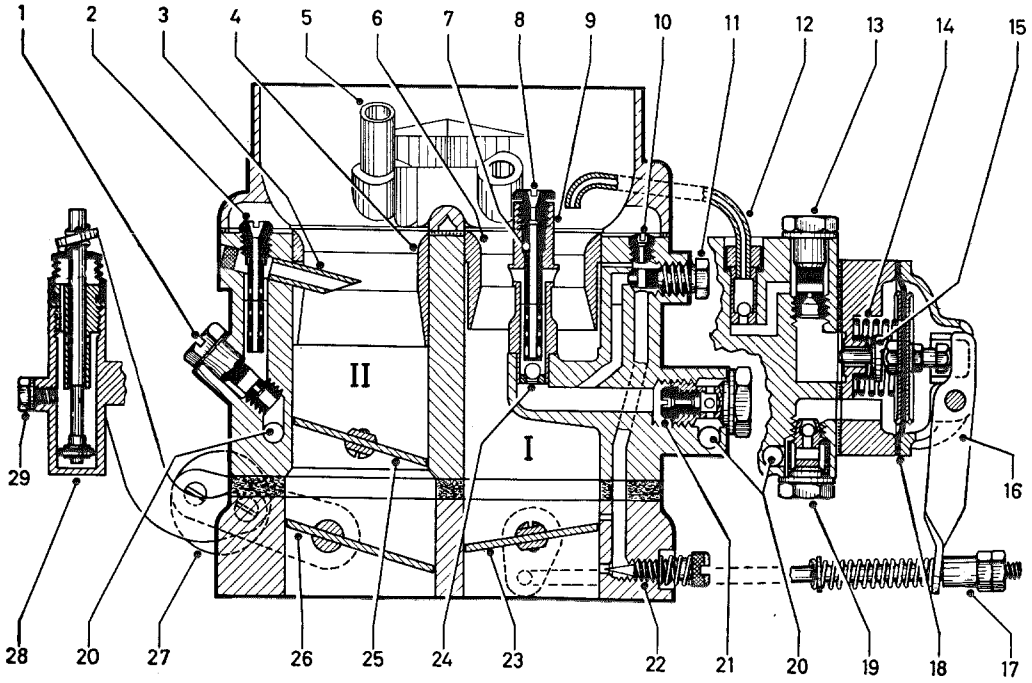

Fig. 07-0/20

Solex Carburetor Type 32 PAITA
I Stage 1 II Stage 2

1 Main jet of Stage 2
2 Air correction jet with mixing tube of Stage 2
3 Discharge tube to main carburetion system Stage 2
4 Air horn of Stage 2
5 Float chamber vent tube
6 Air horn of Stage 1
7 Mixing tube of Stage 1
8 Air correction jet of Stage 1
9 Mixing tube holder
10 Idle air jet
11 Idle fuel jet
12 Injection tube
13 Pump jet
14 Diaphragm spring
15 Plate valve with bore
16 Pump arm
17 Connecting rod with pressure spring and adjusting nuts
18 Pump diaphragm
19 Ball valve
20 Fuel feed
21 Main jet plug with main jet of Stage 1
22 Idle mixture adjustment screw
23 Throttle valve of Stage 1
24 Boll valve in mixing tube holder
25 Throttle valve of Stage 2
26 Vacuum valve
27 Counterweight with lever
28 Oil shock-absorber for vacuum valve
29 Plug and filler screw

The carburetor for Model 220 S differs from the carburetor of Model 190 in the following details:

a) The carburetor jets etc. (see Section E).

b) The height of the carburetor cover from the separating surface to the upper edge of the air intake branch is 33 mm in the carburetor for Model 220 S and 43 mm in the carburetor for Model 190.

c) In the carburetor for Model 220 S the tube (5), cast integral with the carburetor cover and ventilating the float chamber, is not graded (see Fig. 07-0/20).

d) Recent models have a bore in the carburetor flange for the connection of a vacuum tester; this bore is closed with a grub screw.

B. Arrangement and Function of Throttle Valves

The actuating linkage for the throttle valves of stages 1 and 2 has been modified (Fig. 07-0/21). However, the arrangement and the function of the throttle valves correspond to the description given in Workshop Manual Model 190.

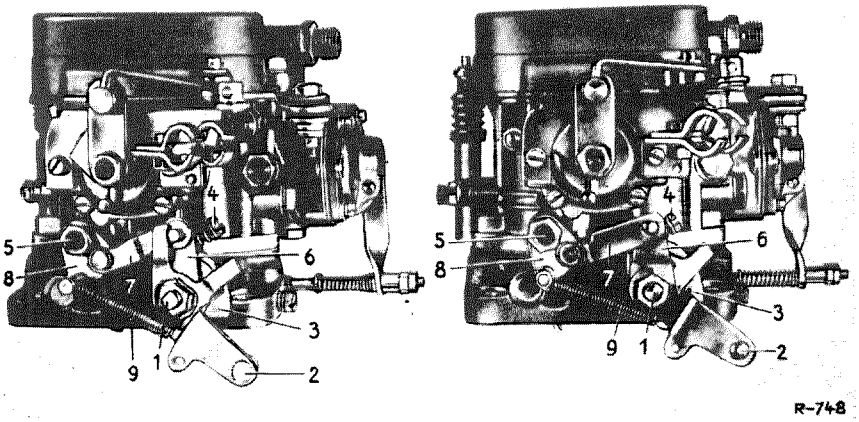

Fig. 07-0/21

1st Version

1 Throttle valve of Stage 1
2 Throttle valve lever
3 Abutment
4 Idle adjustment screw
5 Throttle valve shaft of Stage 2

2nd Version

6 Relay lever
7 Relay arm
8 Drag lever
9 Tension spring

The carburetors with the 1st version of the actuating linkage were installed as a standard part up to Engine End Nos N 85 04580 and Z 85 01748. The carburetors with the 2nd version of the actuating linkage have been installed as a standard part as from Engine End Nos N 85 04581 and Z 85 01749.

C. Starter Mechanism

On Model 220 S, as from Engine End Nos N 75 11273 and Z 75 00522 carburetors with a three-stage starter mechanism were installed. In the cold-start position (starter knob pulled right out) and in the warm-up position (starter knob pushed halfway in) the functioning of the starter mechanism is as described in the Model 190 Workshop Manual.

In the new third position, warm-up position II (starter knob pushed in about 3/4 of the way), the engine receives in addition to the idle mixture an additional mixture from the starter system when the normal running temperature has not yet been reached; this additional mixture ensures satisfactory idling of the engine even at this stage. When the engine is warming up, warm-up position I (starter knob pushed in about halfway) may cause overenrichment of the mixture; by using warm-up position II (starter knob pushed in about 3/4 of the way) the starter mechanism can now remain operative until the engine has reached the working temperature of at least 70° C. This is of particular advantage in cars with a hydraulic automatic DB clutch, since when a gear is engaged, the shift surge is so strong that the idling speed may decrease and cause the engine to stall. Furthermore, the shift surge is slightly larger when the oil in the hydraulic automatic clutch is cold than when it has warmed up to operating temperature.

Warm-Up Position II

(Starter knob pushed in about 3/4 of the way)

When the engine is warmed up, but if the idling speed with the starter mechanism inoperative is still too low, the starter knob can be pushed in about 3/4 of the way. As a result, the starter rotary slide valve is turned toward the right as seen from warm-up position I. The chamber (19) of the slide valve is now opposite the second part (26) of the split fuel slot in the starter flange on the carburetor housing. Since this second part of the slot is connected to the first part (22) of the fuel slot only by a very fine graded bore, the amount of fuel passed from the starter mechanism is decreased still further (Fig. 07-0/22).

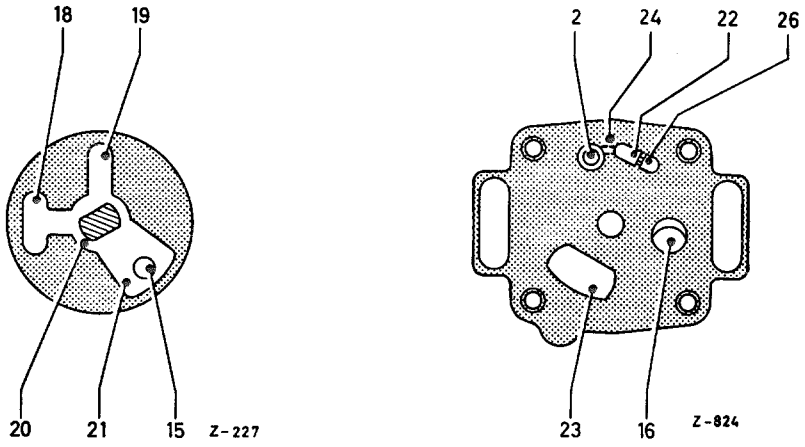

Fig. 07-0/22

Starter rotary slide valve

Starter flange of carburetor housing

2 Graded bore of fuel canal
15 Starter air bore in starter rotary slide valve
16 Graded bore of additional air canal
18 Chamber in starter rotary slide valve
19 Chamber in starter rotary slide valve
20 Mixing chamber in starter rotary slide valve
21 Cavity in starter rotary slide valve
22 Fuel slot, part 1
23 Starter mixture canal
24 Graded intake bore for fuel slot
26 Fuel slot, part 2

D. Scavenging Device for Fuel System

a) General

On Model 220 S a scavenging device for the fuel system can be installed as an optional extra. Even at high outside temperatures and when driving in a line of traffic, this scavenging device prevents the formation of vapor bubbles in the fuel system. The scavenging device consists mainly of the return valve (3) on the front carburetor which is connected to the fuel tank by the hose (7) and the fuel return line (12).

The fuel return valve is actuated mechanically by the pump arm (9) of the accelerating pump (8). When the return valve is open, the excess fuel runs back into the fuel tank through the return valve and the return line. This fuel circulation cools the fuel line and prevents the formation of vapor bubbles.

With the carburetor linkage in the idle position and the throttle valves slightly open, the valve pin of the return valve, which is fitted with a sealing cone, is pressed outward by the pressure spring so that the bore remains open for the fuel flow. When the throttle valves are opened further, the pump arm (9) by overcoming the elastic force, presses the valve pin far enough in to close the bore to the passage of fuel and thus interrupts the scavenging process (see Fig. 07-0/23).

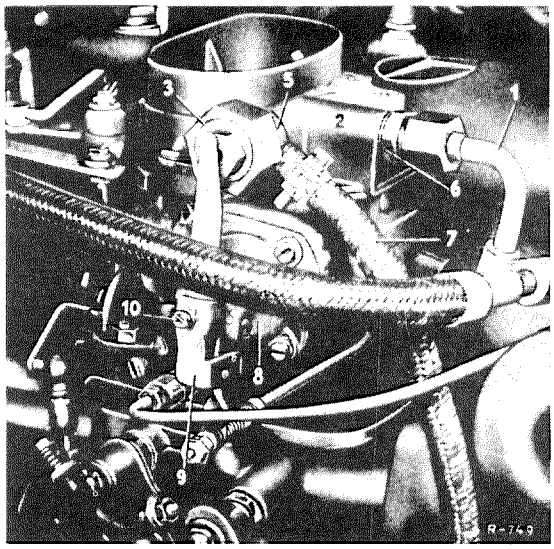

Fig. 07-0/23

1 Fuel pressure line
2 Connector at carburetor cover
3 Fuel return valve
4 Fiber gaskets
5 Ring connector
6 Threaded union
7 Hose for fuel return line
8 Accelerating pump
9 Pump arm
10 Adjusting screw and lock nut

The return mechanism is adjusted by means of the adjusting screw (10) on the pump arm with the throttle valve of Stage 1 completely closed. In this position there must still be a valve travel of 0.4–0.6 mm (see Fig. 07-0/24).

b) Subsequent Installation of Scavenging Device

1. Disconnect and remove the fuel pressure line at the fuel feed pump and at the carburetors.
2. Remove the carburetor cover of the front carburetor. Unscrew the float needle valve and the threaded union for the fuel pressure line.
3. Drill through the front part of the connector (2) on the carburetor cover which was hitherto closed, using a 7 mm diameter drill, and tap an M 12×1.5 thread (Fig. 07-0/24).
4. Clean the carburetor cover and carefully remove all chips.
5. Fit the carburetor cover and screw the threaded union (6) for the fuel pressure line into the front connection of the carburetor cover. If necessary, use a new fiber sealing ring (see Fig. 07-0/25).
6. Screw the fuel return valve (3) with fiber sealing rings (4) and ring connector (5) into the side connection hitherto used for the fuel pressure line and tighten (see Fig. 07-0/24).

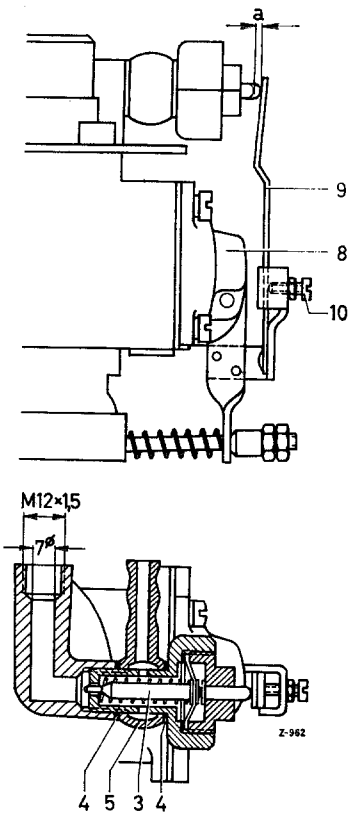

Fig. 07–0/24

a) Travel of fuel return valve

3 Fuel return valve
4 Fiber sealing rings
5 Ring connector
8 Accelerating pump
9 Pump arm
10 Adjusting screw and lock nut

7. Slide the hose (7) of the fuel return line onto the ring connector (5) and fasten with a hose clip (see Fig. 07–0/25).

8. Connect the new fuel pressure line (1) (Fig. 07–0/25).

9. Unscrew the accelerating pump (8) and remove the cover taking care not to damage the pump diaphragm. After carefully tapping out the shaft remove the pump arm (see Fig. 07–0/24).

10. Install the new pump arm (9) and drive in the shaft. Screw the cover to the accelerating pump making sure that the pump diaphragm is correctly positioned. Screw the accelerating pump to the carburetor.

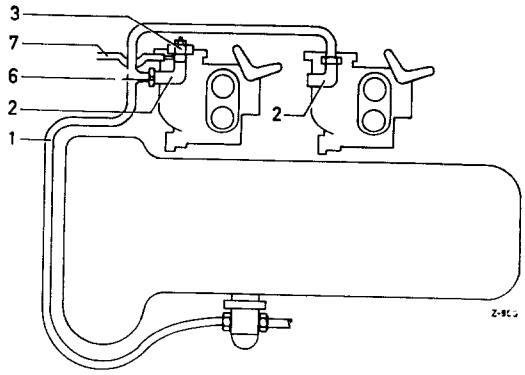

Fig. 07–0/25

1 Fuel pressure line
2 Connectors at carburetor cover
3 Fuel return valve
6 Threaded union
7 Hose for fuel return line

If necessary, use a new rubberised-fabric gasket (see Fig. 07–0/24).

11. Remove the extension for the filler neck of the fuel tank. As shown in Fig. 07–0/26 drill a 9.5 mm diameter hole into the filler tube (14) of the extension and braze the union (11) D 6 DIN 7613 for connecting the fuel return line.

12. Fit the front part (12) of the fuel return line onto the chassis base panel along the propeller shaft cover and fasten it with six fixing clips using oval head tapping screws and spring washers (Fig. 07–0/27).

Note: a) When fitting the front part of the fuel return line make sure that there is enough space for the front end of the line between the right longitudinal member of the chassis and the subframe. Fasten the line to the longitudinal member in such a way that it cannot be damaged by the movements of the subframe.

b) In order to avoid damage to the fuel return line (12) grind down the welding seam along the longitudinal member over a length of approx. 10 cm (see Fig. 07–0/27).

13. Slide the hose (7) onto the fuel return line (12) and fasten with a hose clip.

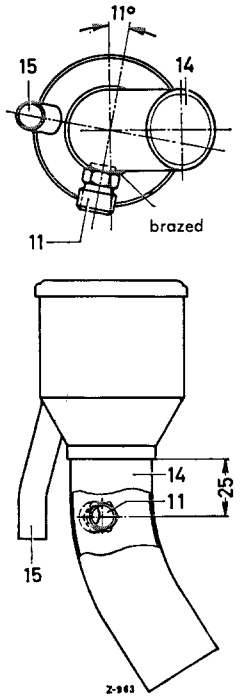

Fig. 07–0/26

11 Fuel return line union
14 Fuel filler tube
15 Pipe for air vent line

14. Fit the rear part (13) of the fuel return line above the chassis cross member and connect to the front part (12) of the line. Then fasten the line (13) to the chassis base panel by three fixing clips using oval head tapping screws and spring washers (see Fig. 07–0/27).

15. Install the extension of the fuel tank filler neck making sure that the hoses and the upper and lower parts of the rubber cuff are correctly positioned. Connect the fuel return line.

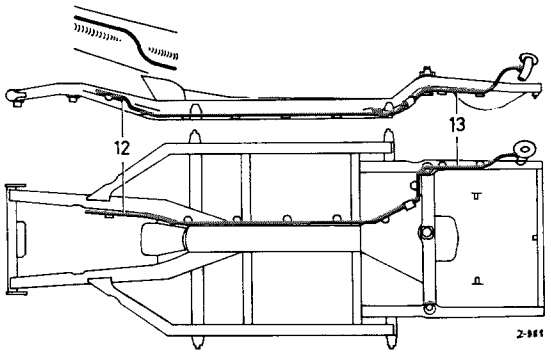

Fig. 07-0/27

12 Fuel return line (front part)
13 Fuel return line (rear part)

16. Adjust the injection amount of the accelerating pump (see Job No. 01-3, Section H).

17. Detach the spring-loaded push rod at the throttle valve lever of the front carburetor. Then back off the idle adjustment screw until the throttle valve of stage 1 is completely closed. Turn in the adjusting screw (10) on the pump arm until the return valve is completely closed. Then back the adjusting screw out again until the valve pin of the return valve has travelled the specified distance "a" of 0.4–0.6 mm. Then lock the adjusting screw with the hexagon nut (Fig. 07-0/24).

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

List of Parts

Number required	Designation	Part No. or DIN designation
1	Fuel return valve with ring connector	000 070 10 46
1	Pump arm	000 070 13 21
1	Fuel pressure line	180 070 11 32
1	* Fuel return line (front part)	180 470 00 72
1	* Fuel return line (rear part)	180 470 01 72
9	* Fixing clips	1×8 DIN 72571
9	* Spring washers	B 5 DIN 137
9	* Oval head tapping screws	B 4.2×9.5 DIN 7981
1	* Fuel hose	B 8×12×480 DIN 73379
2	* Hose clips	S 15/9 Zy N 288 a
1	* Union	D 6 DIN 7613

Note: In some engines the fuel return valve (without ring connector), the pump arm and the fuel pressure line have already been installed as standard parts.

In these cases only the fuel return line has to be installed subsequently in order to make the scavenging device complete. For this purpose the parts marked with an asterisk and a ring connector (Part No. 000 990 19 88) are required.

E. Technical Specifications of Solex Compound Downdraft Carburetor Type 32 PAITA

Details of the Carburetor	Model 220 S	
	Stage 1	Stage 2
Air horn "K"	23	27
Main jet "Gg"	0125	0130
Air correction jet "a"	200	190 c with mixing tube
Mixing tube "s"	44	—
Mixing tube holder with polyamide ball valve (reserve)	5.7	—
Idle fuel jet "g"	47.5	—
Idle air jet "u"	1.8	—
Idle air bore	1.5	—
Accelerating pump	No. 841 (neutral)	
Injection amount cc/stroke	1.1—1.3	
Pump jet	80	
Injection tube	high (0.5 graded)	
Starter fuel jet	100	
Starter air bore in starter rotary slide valve	3.0	
Float needle valve	2.0	
Float weight (float made of nylon) g	7.3	
Fuel level mm	19—21	
Angle of inclination of throttle valves	8°	17°
Angle of inclination of vacuum valve	—	170
By-pass bores	1.15/1.15	—
Filling capacity of oil shock-absorber Engine oil SAE 10 W cm^3	—	approx. 1.2

Note: a) As from Engine End No. N 85 05174 and Z 85 02038 the carburetors have been equipped with a mixing tube holder (reserve) 5.7. Up to Engine End Nos N 85 05173 and Z 85 02037 a mixing tube holder (reserve) 5.5 was installed.

b) As from Engine End No. 65 03594 the idle air jet "u" 1.8 has been installed as a standard part. Up to Engine End No. 65 03593 an idle air jet "u" 1.2 was used. The carburetors on these engines should always be subsequently equipped with an idle air jet "u" 1.8.