

I. Trouble-Shooting Hints on Carburetor System

Engine trouble is often ascribed to the carburetor system although it may very well be due to other causes.

Before beginning any work on the carburetor system, the following points should be checked:

The spark plugs (electrode gaps – the appearance of the plugs may also give useful hints), the distributor (appearance and gap of distributor contacts – distributor rotor – distributor plate), the ignition cable harness and ignition lead plugs, the ignition setting, the tappet clearance, the compression pressure, the air filter, and the fuel pre-filter (dirt), the fuel line connections and the fuel pre-filter (leaks), and the fuel feed pump pressure.

Also check all parts supplied with interference suppressors, in particular the distributor rotor, the ignition lead plugs, and the spark plugs; the easiest way of checking these parts is to replace them by non-suppressed parts.

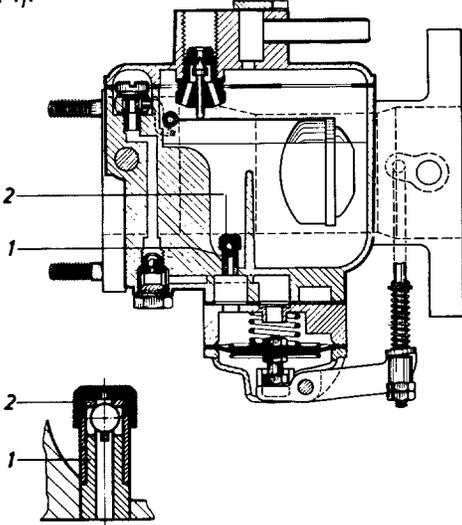
If carburetor faults develop during running, these are usually caused by dirt, gum deposits, dried-up or faulty seals and gaskets. In such cases it will usually suffice to thoroughly clean the float chamber, all jets, valves, injection tubes, bores, and canals, to blow them out with compressed air and to replace defective seals and gaskets. When this has been done, the carburetor will usually be in perfect working order. If normal cleaning fails to remove the faults, it is advisable to disassemble the carburetor completely and to clean and examine all parts. It is often impossible to determine with certainty the exact cause of a fault without checking all parts, since the same fault can have various causes. To assist in trouble-shooting, some possible faults and their causes are listed below.

| Cause | Remedy |
|--|--|
| Engine difficult to start when cold | |
| <p>Models 180 a, 180 b, 220 a, 219, and 220 S</p> <p>Starter fuel jet blocked</p> <p>Air leakage caused by loose starter housing</p> <p>Control cable for start mechanism wrongly connected</p> | <p>Clean starter fuel jet</p> <p>Check start mechanism</p> <p>Check adjustment of control cable (see Job No. 30-6).</p> |
| <p>Model 190 SL</p> <p>Choke valve not closing</p> <p>Failure of throttle valves of Stage 1 to open</p> <p>Choke valve sticking</p> <p>Throttle valves of Stage 2 not closing completely</p> | <p>Check adjustment of start mechanism (see Job No. 07-0, IV. Compound cross-draft carburetor for Model 190 SL, Section C)</p> <p>Check functioning of throttle valves</p> <p>Free up</p> <p>Check adjustment of throttle valves and, if necessary, readjust (see Job No. 01-3, Section K)</p> |

| Cause | Remedy |
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| Engine uneven after cold start | |
| <p>Models 180 a, 180 b, 220 a, 219, and 220 S Failure of starter air valve to open, and in consequence, start mixture too rich</p> <p>Model 220 S Mechanical throttle valve of Stage 2 not closing</p> <p>Model 190 SL Wrong adjustment of clearance between the relay lever and the throttle valve lever of Stage 1 on the rear carburetor</p> | <p>Check starter air valve, blow out vacuum canal and, if necessary, replace sealing ring</p> <p>Free up</p> <p>Adjust clearance after having adjusted the idle (see Job. No. 01-3, Section K)</p> |
| Engine difficult to start when hot | |
| <p>Models 180 a, 180 b, 190 SL, 220 a, 219, and 220 S Fuel level too high</p> <p>Model 190 SL Hot-start mechanism sticking</p> <p>Bowden cable of hot-start mechanism catching or wrongly adjusted</p> <p>Fuel retained in suction canal of Stage 1 and 2</p> | <p>Correct fuel level, clean or, if necessary, replace float needle valve, replace sealing ring, correct pressure of fuel feed pump</p> <p>Free up hot-start mechanism, if necessary, replace return spring</p> <p>Free up Bowden cable or readjust</p> <p>Check fuel suction pipe of Stage 2 and fuel outlet pipe of Stage 1</p> |
| <p>Poor idling</p> <p>Note: The idle can only be adjusted when the engine is at normal working temperature.</p> | |
| <p>Models 180 a, 180 b, 190 SL, 220 a, 219, and 220 S</p> <p>Idle fuel jet, idle air jet, or idle air suction pipes blocked</p> <p>Idle canal or by-pass bores blocked</p> <p>Suction canals fouled</p> <p>Fuel level incorrect</p> <p>Excessive delivery pressure of fuel feed pump</p> <p>Float needle valve leaking</p> <p>Idle mixture adjustment screw damaged or broken</p> | <p>Clean jets</p> <p>Clean canal and bores</p> <p>Clean suction canals</p> <p>Adjust fuel level</p> <p>Correct fuel feed pump delivery pressure</p> <p>Replace float needle valve or sealing ring</p> <p>Replace idle mixture adjustment screw</p> |

| Cause | Remedy |
|---|---|
| <p>Mixing tube holder loose</p> <p>Throttle valve shaft worn</p> <p>Injection tube dripping</p> <p>Leaks in insulation flange, carburetor flange, intake pipe flange, in the vacuum system of the Power Brake, or in the pneumatic ignition control</p> <p>Models 220 S and 190 SL</p> <p>Uneven adjustment of carburetor linkage</p> <p>Model 190 SL</p> <p>Throttle valves of Stage 2 not closing completely</p> <p>Idle mixture adjustment screws of Stage 2 not closed</p> <p>Models 180 a, 180 b, 220 a, 219, and 220 S</p> <p>Note: If in countries with particularly high air temperatures the engine shows a tendency to stop at idling speed, the ball valve screwed into the lower part of the accelerating pump can be replaced by a spring-loaded ball valve (DB Part No. 000 070 02 46, Solex No. ZK 3508). In the spring-loaded valve the spring raises the ball a little from its seat in the "at rest" position, so that, as the pressure in the fuel chamber of the accelerating pump gradually increases, the fuel can flow back into the float chamber. When the outside temperature is low, however, and the car is gradually accelerated, a slight unevenness may occur as a result.</p> | <p>Carefully solder guide of mixing tube holder and press into position</p> <p>Replace throttle valve parts together with parts or replace carburetor</p> <p>Set fuel level to lowest permissible value</p> <p>Test joints for leaks by smearing with soap and stop the leaks</p> <p>Carry out basic adjustment of carburetor linkage (see Job No. 01-3, Section K)</p> <p>Check automatic return adjustment of Stage 2 and, if necessary, readjust (see Job No. 01-3, Section K)</p> <p>Close idle mixture adjustment screws</p> |
| Idle too fast | |
| <p>Models 180 a, 180 b, 190 SL, 220 a, 219, and 220 S</p> <p>Return spring for carburetor linkage too weak</p> <p>Throttle valve shaft sticking</p> <p>Model 220 S</p> <p>Mechanical throttle valve of Stage 2 sticking</p> | <p>Increase tension of return spring</p> <p>Check throttle valve shaft for ease of movement</p> <p>Check throttle valve shaft and relay lever</p> |
| <p>Note: The mechanical throttle valve of Stage 2 must close completely in the idle position. If the throttle valve is not completely closed, a greatly increased idle speed results; in this case the idle will not react to an adjustment of the idle mixture adjustment screw.</p> | |

| Cause | Remedy |
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| <p>Model 190 SL Throttle valves of Stage 2 not closing</p> <p>Note: If the idle speed should be higher than usual when the accelerator pedal is released quickly, this may be due to worn throttle valves. In such cases the carburetors should be replaced.</p> | <p>Check the automatic return mechanism of Stage 2 and, if necessary, readjust (see Job No. 01-3, Section K)</p> |
| <p>Idle too low</p> | |
| <p>Models 180 a, 180 b, 190 SL, 220 a, 219, and 220 S Wrong adjustment of idle adjustment screw</p> <p>Pressure spring of idle adjustment screw too weak</p> | <p>Adjust idle by means of the idle adjustment screw to the prescribed idle speed</p> <p>Replace pressure spring or increase spring tension by inserting a washer</p> |
| <p>Carburetor floods</p> | |
| <p>Models 180 a, 180 b, 190 SL, 220 a, 219, and 220 S Float needle valve leaking</p> <p>Faulty float needle valve sealing ring</p> | <p>Replace float needle valve and sealing ring</p> <p>Replace sealing ring</p> |
| <p>Uneven speed build-up</p> | |
| <p>Models 180 a, 180 b, 190 SL, 220 a, 219, and 220 S By-pass bores blocked</p> <p>Injection tube holder gasket leaking</p> <p>Injection tube blocked</p> <p>Injection amount wrongly adjusted</p> <p>Ball valve of accelerating pump leaking</p> <p>Pump jet blocked</p> <p>Pump diaphragm faulty</p> <p>Model 190 SL Fuel suction pipe of Stage 2 or fuel outlet pipe of Stage 1 blocked</p> | <p>Clean bores</p> <p>Tighten injection tube or replace gasket</p> <p>Replace injection tube</p> <p>Correct injection amount</p> <p>Replace ball valve</p> <p>Clean pump jet</p> <p>Replace pump diaphragm</p> <p>Check or clean pipes</p> |

| Cause | Remedy |
|---|--|
| <p>Bad idle adjustment</p> <p>Idle fuel jets size 55 not yet installed</p> <p>Mixing tube no. 43 of Stage 1 not yet installed in die-cast carburetors and fuel line to accelerating pump not yet calibrated</p> | <p>Check idle adjustment</p> <p>Make sure that in the idle position the throttle valves of Stage 2 are completely closed (see Job No. 01-3, Section K)</p> <p>Replace in both Stages idle fuel jets size 50 by jets size 55 (possible also on sand-cast carburetors)</p> <p>Idle fuel jets size 55 are standard equipment as from Engine End No. 65 01365</p> <p>In order to improve speed build-up, mixing tube no. 42 was replaced by mixing tube no. 43 of Stage 1 in die-cast carburetors as from Engine End No. 55 01823. At the same time the fuel line to the accelerating pump was calibrated to 0.5 mm.</p> <p>On engines from Engine End No. 55 00709 (where die-cast carburetors were first installed) up to Engine End No. 55 01822 mixing tube no. 43, Part No. 000 071 09 49, can be subsequently installed in Stage 1.</p> <p>This mixing tube no. 43 should only be installed subsequently together with the calibrated sleeve Part No. 000 071 03 40. In order to subsequently calibrate the fuel line to the accelerating pump, the calibrated sleeve (2) is installed on the ball valve (1) in the float chamber and is carefully pressed into position. Care should be taken to ensure that the ball valve pressed into the carburetor housing is not displaced and that the sleeve is not damaged. If the sleeve should be too tight, the internal diameter should be modified accordingly (Fig. 01-3/14).</p>  <p style="text-align: center;">Fig. 01-3/14</p> <p>1 Ball valve for fuel admission 2 Calibrated sleeve</p> |

| Cause | Remedy |
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| | <p>Note: Carburetors in which the fuel flow to the accelerating pump is calibrated (as from Engine End No. 55 01823) have no calibrated sleeve. In this design calibration takes place by way of the ball valve.</p> |

Lack of response of the engine at full load and engine speeds between $n = 3000$ and 4000 RPM

Model 190 SL

Fuel overflow line compressed at bends (only in die-cast carburetors)

Connecting hose between fuel overflow line and pipe at the air scoop bracket compressed or pipe loose or twisted in the fixing clip

Replace fuel overflow line

Note: The line has a cross-section of 10×1.0 mm. It must have an inside diameter of 8 mm along the whole length of the line. It is necessary therefore to ensure that the line is not bent out of shape. If it should be found that the inside diameter is smaller on bends, the line must be replaced. The full cross-section of the line must be available everywhere, since the compensating air for the main carburetion system passes through this line to the two carburetors (see also Job Nos. 07-0 and 01-4, Section A).

Realign fuel overflow line. If necessary, replace connecting hose

Note: The pipe must be firmly attached to the air scoop bracket.

The distance between the lower end of the pipe and the drain funnel must be appr. 10 mm. Make sure that this distance is maintained. Instructions for fastening and arranging the pipe apply to both die-cast and sand-cast carburetors. On recent cars the pipe is no longer fastened to the air scoop bracket by a pipe clip, but by a retaining plate welded to the pipe. This new retaining plate can also be subsequently welded to the pipe (Fig. 01-3/15).

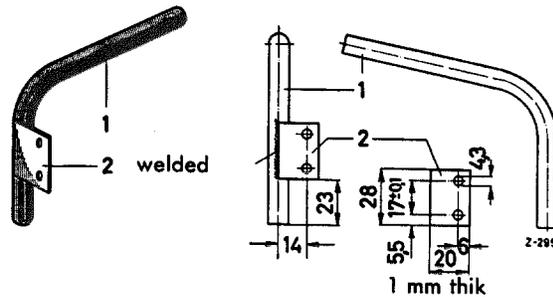


Fig. 01-3/15

1 Pipe 2 Retaining plate

| Cause | Remedy |
|--|---|
| Throttle valves of Stage 2 opening too quickly | <p>Resin deposits on the ball valves (delay valves) on the vacuum side of the vacuum box. Clean or replace ball valves</p> <p>Note: As from Engine End No. 65 04119 spring-loaded ball valves, Part No. 000 070 02 46, have been installed. These spring-loaded valves improve the build-up between Stage 1 and Stage 2, since the spring lightly presses the ball against the valve seat.</p> |
| Throttle valves of Stage 2 opening too slowly. | <p>Check diaphragm and vacuum line for leakage</p> <p>Check ease of movement of the lever linkage and of the throttle valve shaft of Stage 2</p> <p>Checking of throttle valves of Stage 2: The throttle valves of Stage 2 should open under the influence of the vacuum boxes at a speed of appr. $n = 3500$ rpm under full load. Their function can only be accurately checked on a test stand or during a road test with the engine hood removed. The opening of the throttle valves can be seen from the weights of the throttle valve levers. In general it will be sufficient to make a function check with the car stationary. To do this, cover the air intake pipe on the air intake silencer for a short time and accelerate with the other hand. The throttle valves of Stage 2 must open during this operation.</p> <p>This should be done very carefully, since there is a danger that without load the engine may race when Stage 2 is fully open.</p> |
| Throttle valves of Stage 2 sticking | <p>Check throttle valves</p> <p>Note: If there is any obstruction when the throttle valves are actuated, the cause in the case of older engines may be a fouling of the throttle valves of the rubber flanges between carburetor and intake pipe. If this should be the case, the carburetors must be removed and the rubber flanges must be replaced by flanges with an inside diameter of 49 mm.</p> <p>When repairs are carried out, the old flanges with an inside diameter of 46 mm should always be replaced by the new version flanges (see Job No. 01-4, Section A).</p> |

| Cause | Remedy |
|--|--|
| High fuel consumption | |
| <p>Models 180 a, 180 b, 190 SL, 220 a, 219, and 220 S</p> <p>Leaking float needle valve</p> <p>Faulty float needle valve sealing ring</p> <p>Fuel level too high</p> <p>Fuel pump delivery pressure excessive</p> <p>Carburetor jets, valves, etc. loose or leaking</p> <p>Idle air jet or air correction jets blocked</p> <p>Carburetor cover loose</p> <p>Mixing tubes blocked</p> <p>Cable of starter rotary slide valve wrongly adjusted</p> <p>Starter rotary slide valve leaking</p> <p>Model 220 S</p> <p>Connecting rod of the two start mechanisms bent</p> | <p>Clean or replace float needle valve</p> <p>Replace sealing ring</p> <p>Adjust fuel level</p> <p>Adjust delivery pressure</p> <p>Tighten jets and valves and, if necessary, replace sealing rings</p> <p>Clean jets</p> <p>Tighten carburetor cover, check gasket</p> <p>Clean mixing tubes (including side bores)</p> <p>Check cable and adjust correctly (see Job No. 30-6)</p> <p>Check starter rotary slide valve for leaks and, if necessary, reface sliding surfaces</p> <p>Check connecting rod and straighten or replace</p> |
| <p>Note: In the case of compound downdraft carburetors a leaking starter rotary slide valve or a slide valve which is not quite closed can be detected by examining the vacuum valve of Stage 2.</p> <p>If the starter rotary slide valve is leak-proof or if it is closed, the vacuum valve is completely closed when the engine is idling.</p> <p>Check by pressing on the counterweight of the vacuum valve.</p> <p>If the starter rotary slide valve is leaking or is in operation, the vacuum valve is raised at idling speed, since the engine receives the start mixture via Stage 2. When making this check, however, the mechanical throttle valve of Stage 2 must be completely closed, since otherwise the vacuum valve will be raised by the air flowing via Stage 2.</p> | |
| <p>Model 190 SL</p> <p>Start mechanism jammed or cable wrongly adjusted</p> <p>Line to mixture outlet tube loose or leaking on die-cast carburetors</p> <p>Fuel suction pipe loose or leaking</p> | <p>See under "Engine difficult to start when cold"</p> <p>Tighten line, replace sealing rings</p> <p>Tighten pipe, replace sealing rings</p> |