BMW 600 Carburetor

Bill Rogers www.isettadoc.com

M 12 = Carburetor

Removing and Installing Carburetor

1. Remove carburetor air cleaner. To do this, disconnect throttle return spring from the air breather body. Remove two screws SW 10 and lock-washers holding air breather body to fan housing.

Fig. 115

Pull vacuum hose from air breather body tube. Loosen bolt, nut SW 10 and washer retaining the clip, which fastens the air breather body connector pipe to carburetor. Remove air filter assembly from carburetor.

2. Disconnect accelerator control cable (located on the left side of the carburetor) by loosening nut SW 8 or a slotted-head screw (depending on the fastening type).

Fig. 116

Caution! When reinstalling the accelerator cable make certain that with completely floored accelerator pedal the throttle valve is fully opened, and with a released accelerator pedal and the idle screw backed-off the throttle valve is completely closed. On readjustment of the idling speed the idle screw is again screwed in as required for the correct setting.

3. Disconnect choke control cable (on the right side of the carburetor) by loosening the nut SW 7 (hold the screw head SW 8 for this purpose).

Fig. 117

Caution! When reconnecting the choke control cable make sure that the choke is fully opened when the control lever (the uppermost of the three levers located just above the driver's side wheel well) is pushed into its forward position, and that the choke is closed with the lever in opposite position (for starting the engine when cold). When disconnecting and connecting the control cables on the carburetor links, care should be taken to avoid any cable bending. After connection of control cables check the connecting links for proper function.

Fig.118

4. Remove fuel hose from connector on the fuel filter located on the bottom of the fuel tank. After the carburetor is removed from the engine, remove the fuel hose from the banjo connector on the base of the carburetor.

5. Remove two nuts SW 14 and lock-washers holding carburetor to engine intake manifold. Remove carburetor and flange gasket.

Fig. 119

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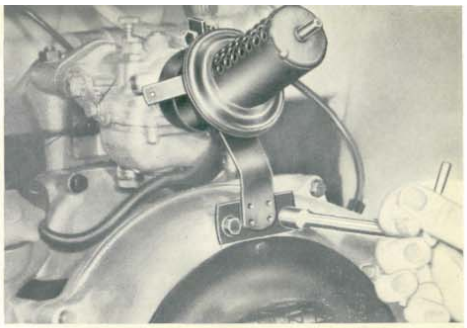

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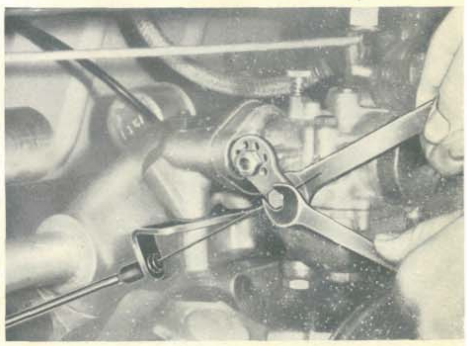

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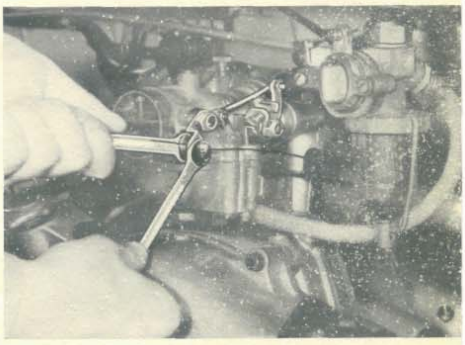

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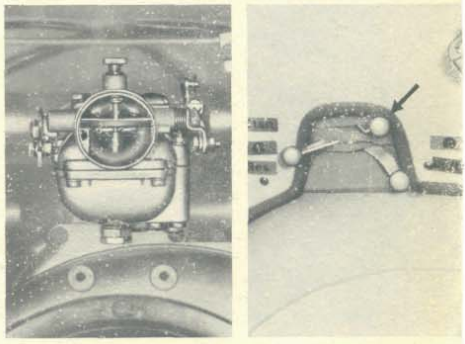

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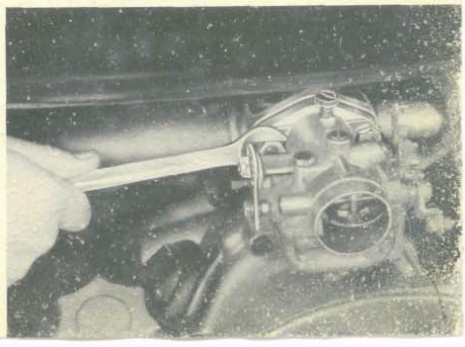

Dismantling removed Carburetor, Cleaning and Reassembling

6. Remove main jet carrier SW 17 and rubber “O” ring seal from carburetor bowl. Remove gasket between main jet carrier and emulsion tube.

Fig. 120

Caution! When assembling, always use new gasket between main jet carrier and emulsion tube.

7. Remove main jet from carrier by means of screw driver. Remove bowl with gasket from air-intake body. For this purpose remove four short cylindrical screws from the bowl and one long cylindrical screw from the air intake body together with their lock washers by means of a screwdriver.

8. Lift out the dual float together with float fulcrum pin and needle valve. If necessary, unscrew float valve seat with a screwdriver.

Fig. 121

9. Loosen hollow screw SW 17 on fuel union body and remove the two parts together with the corresponding two gaskets.

10. Remove pump inlet check valve and gasket from float bowl, using screwdriver.

11. Remove pump discharge cluster from float bowl, using 12 mm screwdriver.

Fig. 122

To dismantle pump discharge cluster, take out the inner slot-headed screw and plastic seal ring, and remove pump spring and piston.

12. From air intake body (air horn), remove idle orifice tube clamp screw and rubber gasket with screwdriver and push idle orifice tube carefully out of the air intake body, sliding the tube from below upwards. Slide emulsion tube from above downwards out of air intake body. It may be necessary to heat the air horn body to remove the emulsion tube by means of a propane torch. Do not drive out the emulsion tube with a hard punch – if necessary us a soft brass dowel to remove the emulsion tube.

Fig. 123

13. Unscrew the plug SW 11 covering the air correction jet and remove plug with gasket. Remove air correction jet by means of screwdriver.

Fig. 124

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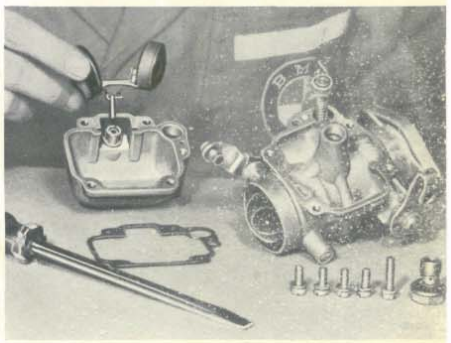

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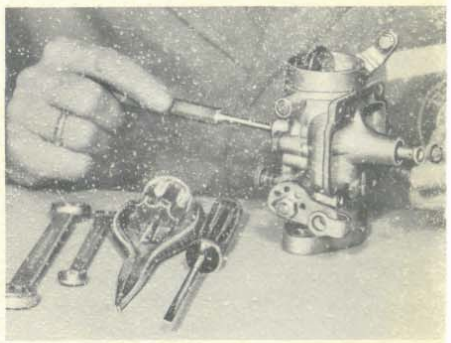

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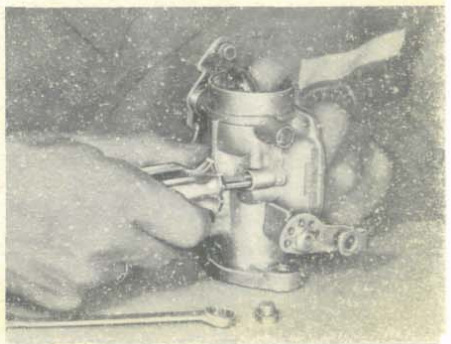

14. Unscrew pump jet and rubber gasket from sloping side on body top, and push discharge nozzle from inside outwards out of the air intake body.

Fig. 125

Caution! When reinstalling the pump jet, make sure that the rubber gasket seats in the recess below the screw head.

15. Unscrew idle mixture adjusting screw and spring by hand.

16. If necessary, remove low speed (pilot) jet air bleed from the air horn, inserting the screwdriver from the choke valve side for this purpose.

Fig. 126

17. Jets and passages should be cleaned with compressed air. Never clean jets with a wire or other mechanical means because the orifices may become enlarged, making the mixture too rich for proper performance. Having well cleaned all parts, install new gaskets when reassembling the carburetor.

Inspections to be performed before assembling the carburetor!

18. To check the fuel level in float bowl, plug the threaded orifice for main jet carrier with a 10mm bolt and "O" ring seal, screw in pump intake valve and discharge cluster with gaskets and install hollow screw with fuel union body and gaskets. Install float needle valve seat, dual float with fulcrum pin and float needle in float bowl and supply fuel through fuel union body (float bowl in horizontal assembly position, fuel fall approx. 230 mm = 9 inches).

Fig. 127

When the fuel level is at 3 ± 1 mm (.12" ±.04") below the surface of the fuel bowl, without a gasket, the float needle valve should close the fuel inlet orifice. If not, rectify by carefully bending the plate on float fulcrum pin until fuel supply is shut off at the above indicated level.

Fig. 128

Check needle valve and needle valve seat for leakage and wear.

19. Check proper function of plastic washer, rubber seal and spring disc on pump rod by repeatedly depressing the pump piston which is suspended at the air horn.

Fig. 129

The outer spring must always hold the spring disc and seal washers against the pump cylinder wall and seal the oval aperture for the pump rod, otherwise fuel consumption will increase due to the upper portion of float bowl being vented to the atmosphere.

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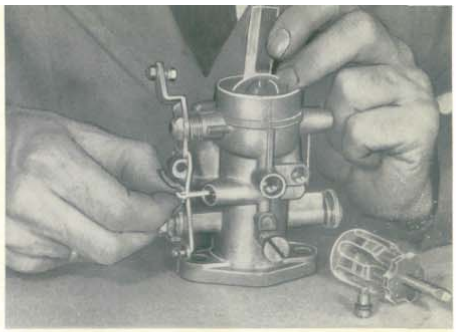

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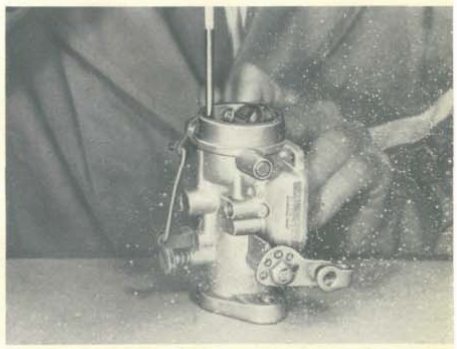

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Recondition with oil or replace the pump piston assembly. Check plunger sleeve for wear, avoid squeezing the sleeve, when inserting it in the pump cylinder.

Fig. 130

20. **Removing micronic fuel filter**

Close the fuel shut-off cock. Loosen wing nut located below the filter-retaining clamp enough to allow the latter to be turned. Remove inspection glass and clean. Unscrew the knurled nut retaining the micronic filter element; replace the cartridge at least every 10,000 miles.

Fig. 131

21. **Replacing micronic air filter**

Unscrew the knurled nut holding the top cover. Remove filter top cover, rubber gasket, micronic filter element and the second rubber gasket. The micronic type paper filter elements are disposable and should be changed every 10,000 miles. Adverse driving conditions may make it necessary to change the filter element more frequently.

Fig. 132

22. **Idle adjustment**

Turn idle mixture adjusting screw in until it seats lightly, and back off 1 ½ turns (basic adjustment). Warm up engine to normal operating temperature. Turn the throttle valve stop screw until idling speed of approximately 800-900 rpm is attained.

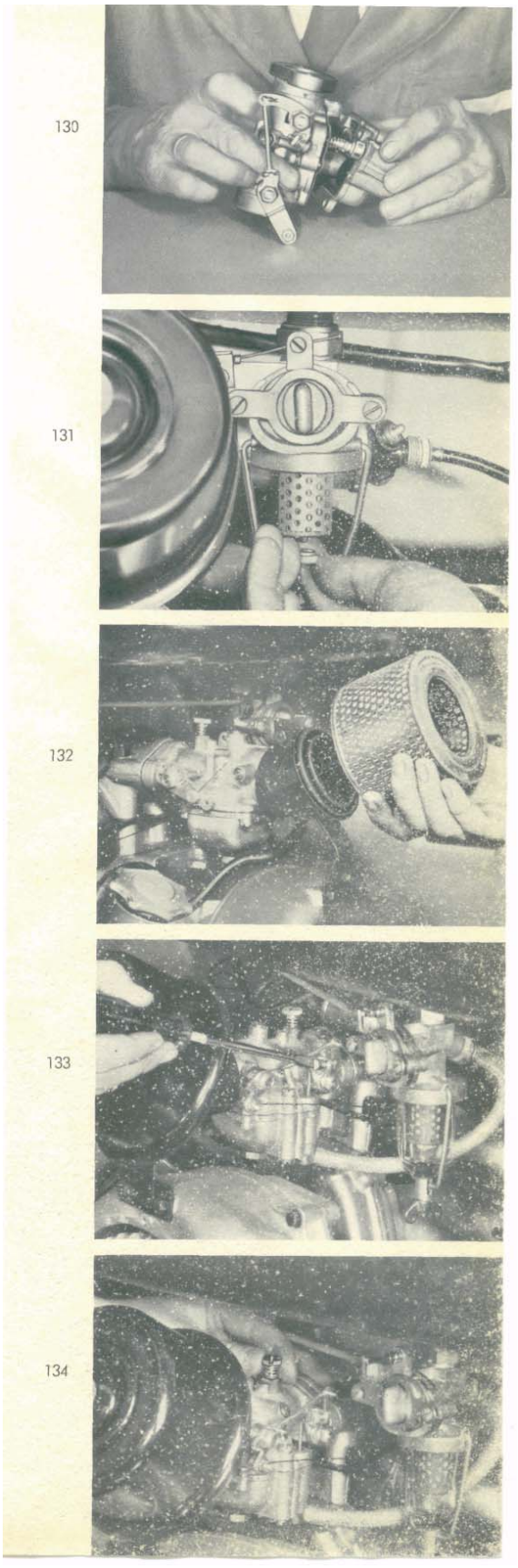
Fig. 133

Gradually turn in idle mixture adjusting screw clockwise until the position is found where the engine just tends to stall (due to a lean mixture), then back it off in an counter clockwise direction until gentle slow running is attained (with a richer mixture).

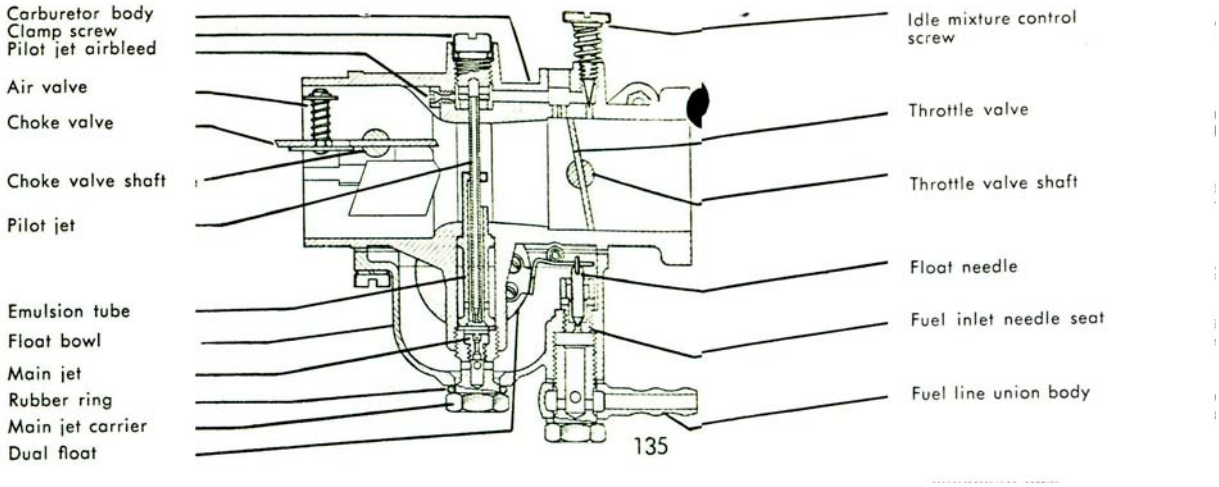
Fig. 134

At this point, readjust the idle adjustment screw so that an idling speed of 800 - 900 rpm is attained. The red generator indicator light should then brightly glow and not flicker (control range of the cutout relay).

Before adjusting the idling speed it is a good policy to check the condition of spark plugs and the electrode gap (0.7 mm = 0.28"). The engine should be in a good mechanical condition, especially no by-pass air should be allowed to enter the intake manifold through leakages.



BMW 600 Carburetor



General operations for the Zenith 28 KI-P Carburetor

1. The Choke System

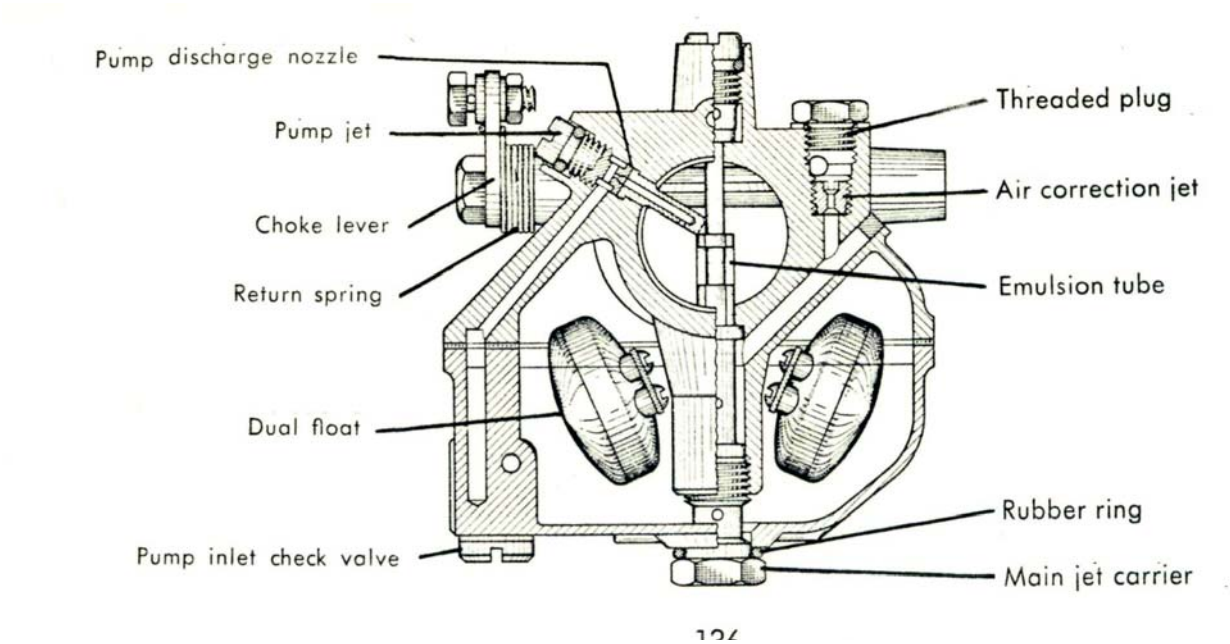
To start the engine when cold, it is necessary to close the choke valve. This automatically opens the throttle valve slightly through a link connecting the two parts, so as to allow the vacuum created by the action of the pistons in the cylinders to pull gas through the emulsion tube. The fuel-air mixture formed by this action is considerably rich. The air required after starting the engine is admitted by the spring loaded air valve located on the choke valve assembly, which opens automatically when the engine starts.

As the engine warms up the choke valve should be gradually opened so as to insure a steady fast idle engine speed. When the engine is hot, the choke valve should be fully open.

2. The Idle System

The tube-type pilot (idle) jet is fitted in the emulsion tube from above and secured in position by a clamp screw. With closed or slightly opened throttle valve a vacuum is created in the passage behind the idle mixture screw. Due to this vacuum, fuel is drawn through the idle jet, up the pilot tube and is mixed with air that enters through the pilot air bleed jet. This air fuel mixture in turn, after passing the idle mixture adjusting screw, is mixed in the intake manifold with the air admitted through the throttle valve opening to form the definite idle mixture. Turning the idle mixture adjusting screw toward the seat decreases the enriched fuel and gives a leaner idle mixture, turning the control screw away from the seat enriches the mixture. The setting of the idle mixture adjusting screw influences the fuel consumption of engine not only at idling speed, but also in city traffic or when the throttle valve is frequently closed. It is therefore advisable to favor a lean mixture, but rich enough to insure a smooth engine idle. Our instruction for idle adjustment (Step 22) should be interpreted accordingly. The factory standard size of pilot jet should not be altered (see the last page for jet sizes based on carburetor series).

To insure smooth take over from idling range to part-load range, one or two accelerating ports are provided in the carburetor throat, before the throttle valve.



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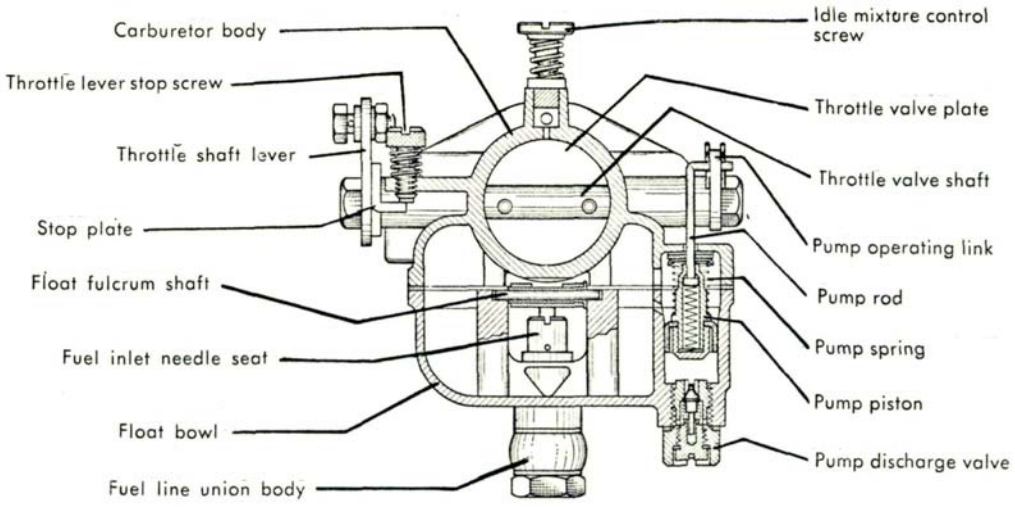
3. The Main Jet System

Fuel from the fuel union body flows into the float bowl, where it is maintained at a predetermined constant level by means of the float needle valve control. Fuel from the fuel bowl chamber flows through orifices in the main jet carrier past the main jet into the emulsion tube. The main jet meters the maximum discharge rate, particularly with full load and high engine speed. As the vacuum increases, more fuel is drawn from the emulsion tube through the annular aperture between emulsion tube and pilot jet tube. The fuel level in the emulsion tube lowers until the lateral holes in the emulsion tube are uncovered. Compensating air admitted past the air correction jet then enters the emulsion tube where it is emulsified with fuel discharged by the main jet. As engine speed increases, more compensating air is admitted through the compensating air bleed which maintains uniform mixture ratio under changing suction and engine speeds.

The calibration of the main jet and the air correction jet has been completed at the factory through tests to obtain a maximum fuel economy and performance and should not be altered.

When assembling be careful to avoid bending the pilot jet tube. This is important in order to obtain a uniform annular opening on the fuel discharge of the emulsion tube. A bent or inclined jet tube, for instance, causes an alteration of the mixture consistency, depending on the shape of unevenness of the annular opening regarding to the suction direction. Recently, the pilot jet tubes are provided with guide ribs.



4. Accelerating System

This system features a mechanically operated pump piston, actuated by a lever mounted on the throttle shaft. When the throttle is opened, the pump piston moves downward in its cylinder. The downward travel of the pump piston forces fuel past the pump discharge valve through the discharge nozzle in the mixing chamber. When the pump piston moves upward, fuel is supplied to the pump cylinder through the inlet check valve at the bottom. On its downward stroke the pump rod exerts pressure on the pump piston by means of the piston spring in order to supply an extra amount of fuel to insure instantaneous response from the engine when the throttle is opened suddenly. The length of the pump stroke determines the amount of fuel discharged through the accelerating jet. The calibrated pump jet limits only the duration of the discharge, because the discharge pressure is held nearly constant by the piston spring.

The pump discharge valve was originally supplied in a **short** and a **long** type depending on series of the carburetor. The long discharge valve is opened by the pump piston, when this is in its lower position, so during the full-load range an extra amount of fuel enters the mixing chamber past the discharge nozzle. This allows a sufficient fuel-air mixture ratio during the full-load range, whereas on the carburetors with the short pump discharge valve other parts are provided.

The float bowl vent is connected to the central air intake behind the air cleaner. This arrangement prevents the carburetor to a fair extent from getting dirt into its interior.

Moreover eventual dirt deposits on the air filter (increased vacuum in the mixing chamber) does not cause higher fuel consumption, because the same vacuum prevails also over the fuel level in the float bowl. It is however important that the seal of the pump rod aperture is in proper condition. (See Step 19)

a. Notes from Bill Rogers

- A few notes from my experiences. The idle mixture screw should be initially set to the 1 ½ turns out from the seat based on my experience. The original documents stated that you should start with just 1 turn out from the seat. I have found that the engine will not idle at this low of an adjustment.
- The idle jet tube is a long slender tube through the middle of the carburetor. This tube has a jet pressed into the bottom of the tube. When cleaning this orifice, be very careful that you do not blow this jet out of the end of the tube. It is only held in by friction. This tube is item 28 on the exploded view of the carburetor. Also, check the bottom ½ of this tube for cracks. I have found several that were cracked and this allowed excess fuel to pass and resulted in a rich mixture that could not be adjusted properly. In one case I was able to solder up this crack and continue to use the tube, but care must be taken to not allow any solder to build up on the outside or inside of the tube. This will alter the flow of fuel in either the idle circuit or main circuit. Either case will cause the engine to run with an improper mixture.

Carburetor adjustment

Carburetor type	Zenith 28 KL-P 1	Zenith 28 KL-P 2	Zenith 28 KL-P 3
From Chassis Number onwards	supersedes previous types	125959	139690
Venturi	23 mm. diam.	23 mm. diam.	23 mm. diam.
Main jet HD	152.5	140	155
Air correction jet KD	240	240	220
Emulsion tube MR	No. 3, 29.5 mm	No. 3, 29.5 mm	No. 4, 34.5 mm
Emulsion tube outlet	5.2Φ H8	5.2Φ H8	5.2Φ H8
Emulsion tube bores	2×1.5Φ and 2×1Φ	2×1.5Φ and 2×1Φ	2×1.5Φ and 2×1Φ
Pilot jet g	50	50	50
Pilot jet air bleed LLD	150	160	160
Idle mixture adjusting (control) screw	approx. 1 turn opened	approx. 1 turn opened	approx. 1 turn opened
Pump disch. valve PV	short	long (16 mm.)	short
Pump jet GP	50	70	70
Pump discharge nozzle	8 (0.4Φ)	7 (0.65Φ)	7 (0.65Φ)
Pump inlet check valve	50	55	55
Float needle valve SV	22	22	22
Float weight + needle	15 grams	15 grams	15 grams
Fuel level	3±1 mm.	3±1 mm.	3±1 mm.
Orifice in throttle plate	without	1Φ (mm.)	1Φ
Idle tube	incorporated in emulsion tube	incorporated in emulsion tube	incorporated in emulsion tube
Carburetor body	without overflow groove	with overflow groove	without overflow groove
Carburetor body	bored to 5.7Φ for g (pilot jet)		