ZENITH 87-SERIES CARBURETOR

DESCRIPTION AND OPERATION

DESCRIPTION

The 87-Series Carburetor is of the single barrel horizontal design with twin floats and a single venturi built integral with the throttle body casting. The carburetor is of the "balanced" type in that all air for fuel bowl ventilation, metering well ventilation and idle operation must enter through the air cleaner. Since the metering well surrounds the discharge jet and the main jet (which are both centrally located), operation at extreme angles in any direction is permitted. The fuel supply system consists of the fuel inlet fitting, fuel valve floats in the float chamber automatically regulate the opening through the fuel valve (needle and seat) to maintain the proper level of fuel in the fuel bowl and meet the demands of the engine according to speed and load.

Fig. 1 External View

Fig. 2 Fuel Supply System

Fig. 3 Idle System

OPERATION

FUEL SUPPLY SYSTEM - Fuel under pressure is supplied through the fuel inlet fitting, fuel valve (needle and seat) to the float chamber. The

IDLE SYSTEM - At idle speed the throttle plate is advanced slightly from the fully closed position to expose the upper idle discharge holes to engine manifold vacuum (suction), see Figure 3. This suction is transmitted to the idle jet through a passage connecting the idle discharge holes with the idle jet. Fuel for idle is supplied through the main jet to a well at the base of the discharge jet. Fuel for idle is drawn from this well through the idle fuel pick-up passage and is

105
metered through the idle jet calibration before entering the idle air passage. As the fuel leaves the idle jet, it is mixed with air admitted through the idle air bleed calibration. This fuel-air mixture in the idle passage is discharged into the air stream through the upper two idle discharge holes, one of which is controlled by the idle adjusting needle. Turning the idle adjusting needle IN (clockwise) reduces the amount of fuel-air that reaches the air stream to provide a lean mixture. Turning the idle adjusting needle OUT (counter-clockwise) permits more of the fuel-air mixture to reach the air stream to provide a richer mixture.

Fig. 4 High Speed System

HIGH SPEED (MAIN METERING) SYSTEM - When the throttle plate is advanced to a point just above the idle range, the suction on the idle system diminishes, but the increased volume of air entering the engine through the venturi creates sufficient vacuum (suction) on the discharge jet to draw a mixture of fuel and air from the metering well. With the float chamber vented to air intake pressure, the pressure in the float chamber causes fuel to flow from the fuel bowl through the main jet into the metering well and discharge jet where it is mixed with air taken in through the well vent jet at a point below the level of fuel in the main discharge jet. The fuel-air mixture from the main discharge jet is discharged into the air stream at the throat of the venturi and mixed with the air passing through the venturi.

CHOKE SYSTEM - Closing the choke plate when starting a cold engine restricts the entrance of air to the carburetor and creates an increase in suction on the jets. The increase in suction causes more fuel to be drawn into the engine to provide the richer mixture needed for starting a cold engine. As soon as the engine begins to fire, the choke must be partially opened to prevent overchoking or flooding of the engine. As the engine warms up, the choke must be gradually opened to full open position.

SERVICE PROCEDURE
IDENTIFY CARBURETOR - See page 2 for illustration and procedure to follow.

DISASSEMBLY

REMOVAL OF THROTTLE BODY ASSEMBLY
1. Remove three bowl to body screw and lockwasher assemblies (33) and (32).
2. Raise throttle body slightly and separate bowl to body gasket (24) from fuel bowl.
3. Lift off throttle body assembly being careful not to damage floats.

DISASSEMBLY OF THROTTLE BODY

1. With throttle body inverted, remove float axle (22) by pressing against end of float axle at slotted end of hinge bracket, using screwdriver.
2. Remove float assembly (23) and fuel valve needle (part of 21).
3. Remove bowl to body gasket (24).
Fig. 6 Exploded View
4. Remove main discharge jet (35), using a small screwdriver.

5. Remove fuel valve seat (21) and fiber washer (20) using C161-85 wrench.

6. Remove idle adjusting needle (11) and friction spring (10).

7. Back out throttle stop screw (6) until end of screw is flush with face of throttle stop lever. Close throttle and mark across throttle body and across throttle levers as a guide to correct re-assembly of parts.

8. File off threaded end of throttle plate screws until flush with throttle shaft being careful not to damage throttle plate or throttle bore.

9. Remove throttle plate screws (43), throttle plate (42), and throttle shaft and lever assembly (9).

NOTE: If carburetor includes throttle lever (38), it will be necessary to remove nut (36), lockwasher (37) and lever (38) before throttle shaft and lever assembly (9) is removed.

10. To remove throttle shaft seal and retainer from model 87A8 carburetors, screw a 5/16" fine thread taper tap into seal retainer until firmly seated; then insert long punch or rod through opposite shaft hole and drive punch against end of tap to remove retainer and seal.

11. Close choke and mark across air intake body and choke levers as a guide to correct re-assembly of parts.

12. File off threaded end of choke plate screws and remove screws (18) and lockwashers (17).

13. Remove pitot tube set screw (19), pitot tube (15), and choke plate (16).

14. Rest choke lever on something solid and drive out taper pin (39). Remove lever (40) and then remove choke levers (13) with shaft (14) as an assembly.

15. To remove throttle shaft seal and retainer, screw threaded end of C161-185 extractor into retainer until firmly seated; then drive out extractor with retainer and seal from opposite side. Remove seal and retainer from extractor.

DISASSEMBLY OF FUEL BOWL

1. Remove main jet adjustment (30) and fiber washer (29), using a 9/16" open end wrench.

2. Remove main jet (28) and fiber washer (27), using C161-83 jet wrench.

3. Remove idle jet (25) from machined surface of fuel bowl, using a small screwdriver.

4. Remove fuel bowl drain plug (31) from bottom of casting.

CLEANING

Thoroughly clean all metal parts in Bendix Metalcene or Speedclene and rinse in solvent. Blow out all passages and channels in the castings with compressed air. Reverse the air flow through each passage to insure the removal of all dirt particles. NEVER USE A WIRE OR DRILL TO CLEAN OUT THE JETS.

INSPECTION

Inspect all parts and replace any that are damaged or worn. Always use a Zenith Repair Kit. For correct Repair Kit, refer to Zenith Parts Catalog Specification Page. If inspection reveals that the fit of the throttle shaft is quite loose in the throttle body bushings, then it will be necessary to install new throttle shaft bushings. The following procedure should be followed when installing new throttle shaft bushings in the throttle body.

REMOVAL AND REPLACEMENT OF THROTTLE SHAFT BUSHINGS

NOTE: To rebush the throttle body, the following Zenith tools, as well as the new bushings, must be available:

C161-73-1 Counter-bore Reamer
C161-71-1 Shaft Line Reamer
C161-72-1 Bushing Driver

Throttle Shaft Bushings CR9-13 (for 87B5, 87B6 & 87BY6 Models).

Throttle Shaft Bushings C9-72 (for 87A8 Model).

1. Place a suitable center in drill press bed. With one throttle shaft hole on this center, bring spindle down until counter-bore reamer contacts opposite shaft hole. Then set stop on drill press to length of bushing.
2. Counter-bore hole to accommodate bushing, using C161-73-1 Counter-bore Reamer.

3. Drive throttle shaft bushing in place, using C161-72-1 Bushing Driver.

4. Ream this bushing, using C161-71-1 Line Reamer.

NOTE: The opposite shaft hole is used as a "pilot" to keep reamer in alignment.

5. Turn throttle body casting over and prepare opposite shaft hole to take bushing. It will be necessary to reset stop on spindle as described above.

6. Counter-bore shaft hole, using C161-73-1 Counter-bore Reamer. Drive second throttle shaft bushing into place, using C161-72-1 Bushing Driver. Line ream this bushing as the final machining operation, using C161-71-1 Line Reamer.

NOTE: When installing new bushings in Model 87A8 carburetors, counter-bore reamer is not used and counter-bore reaming operation is omitted.

---

**RE-ASSEMBLY**

**ASSEMBLY OF FUEL BOWL**

1. Install main jet (28) and fiber washer (27), using C161-83 jet wrench.

2. Install main passage plug (30) and gasket (29) in threaded hole near bottom of fuel bowl, using a 9/16" wrench; or, if main jet adjustment is used, back out adjusting needle several turns before assembling main jet adjustment in fuel bowl.

3. Install idle jet (25) in recessed threaded hole of fuel bowl casting, using small screwdriver.

4. Install fuel bowl drain plug (31) in bottom of casting.

**ASSEMBLY OF THROTTLE BODY**

1. To install choke shaft seal and retainer, insert seal in open side of retainer, then place seal and retainer on C161-72-1 bushing driver. Insert small end of driver in choke shaft hole. Start retainer in counter-bore of body and lightly drive retainer into body flush with shaft boss.

2. Install choke shaft and lever assembly (13 and 14) and rotate shaft so that cut section faces out.

3. Slide choke plate into position and align hole in plate with holes in shaft. Then start choke plate screws (18) with lockwashers (17), leaving screws loose.


5. On units which include choke lever (40), assemble lever to choke shaft in same position as lever was in originally, using taper pin (38).

6. Install pitot tube (15) in same position as before removal and secure with set screw (19).

7. On 87A8 Models - Install seal in throttle shaft counter-bore with lip side out and then install seal retainer flush with machined surface of throttle shaft boss.

8. Install throttle shaft and lever assembly (9) in throttle body and rotate shaft to open position.

9. Insert throttle plate (42) in milled slot of shaft. Align holes in plate with holes in shaft and start throttle plate screws (43). Make sure throttle plate is in same position as before disassembly.

10. Close throttle several times to center throttle plate. Hold throttle plate closed and tighten screws.

11. On carburetors which include throttle lever (38), assemble lever on shaft in same position lever was in before disassembly and attach to shaft with lockwasher (37) and nut (36).

12. With throttle plate fully closed, turn throttle stop screw (6) in to the point of initial contact with the throttle stop; then turn stop screw IN (clockwise) one-half to three-quarters of a turn as a preliminary idle speed setting.

13. Install idle adjusting needle (11) and spring (10). Turn needle lightly against its seat and then back needle OUT (counter-clockwise) one full turn as a preliminary idle adjustment.

14. Install fuel valve seat (21) and fiber washer (20), using C161-85 wrench.
15. Install main discharge jet (35), using a small screwdriver.

16. Install fuel valve needle (21) in seat and position float assembly in hinge bracket. Insert tapered end of float axle (22) into float bracket at side opposite slot in bracket. Push float axle through slotted end of the bracket until centered in bracket, using handle of screwdriver.

NOTE: Do not bend, twist or apply pressure on the float bodies. The float bodies when viewed from the free end of the bodies must be centered and at right angles to the machined surface and must move freely on the float axle.

**ASSEMBLY OF BOWL TO THROTTLE BODY**

1. Place bowl to body gasket (24) on machined surface of throttle body.

2. Position bowl assembly on throttle body, being careful not to damage floats, and align holes in bowl with holes in gasket and throttle body.

3. Install two long and one short bowl to body screws (32) and (33) with lockwashers (34) and tighten screws evenly and securely.

**Assembly Is Now Completed**

**ADJUSTMENTS**

Final adjustments should be made on the engine with the specified air cleaner in place and the engine at normal operating temperature.

If carburetor is equipped with main jet adjustment, turn main jet adjusting needle IN (clockwise) until needle is just seated, then back needle OUT (counter-clockwise) two full turns as a preliminary adjustment.

**SPECIAL TOOLS REQUIRED**

<table>
<thead>
<tr>
<th>Tool Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C161-71-1</td>
<td>Shaft Line Reamer</td>
</tr>
<tr>
<td>C161-72-1</td>
<td>Bushing Driver</td>
</tr>
<tr>
<td>C161-73-1</td>
<td>Counter-bore Reamer</td>
</tr>
<tr>
<td>C161-83</td>
<td>Jet Wrench</td>
</tr>
<tr>
<td>C161-85</td>
<td>Fuel Valve Wrench</td>
</tr>
<tr>
<td>C161-185</td>
<td>Extractor Tool</td>
</tr>
</tbody>
</table>