

**PLB**

AMERICAN BOSCH DIVISION



SPRINGFIELD 7, MASS., U. S. A.

# SERVICE INSTRUCTIONS

for

# FUEL INJECTION PUMP



TYPE  
PLB . . . A

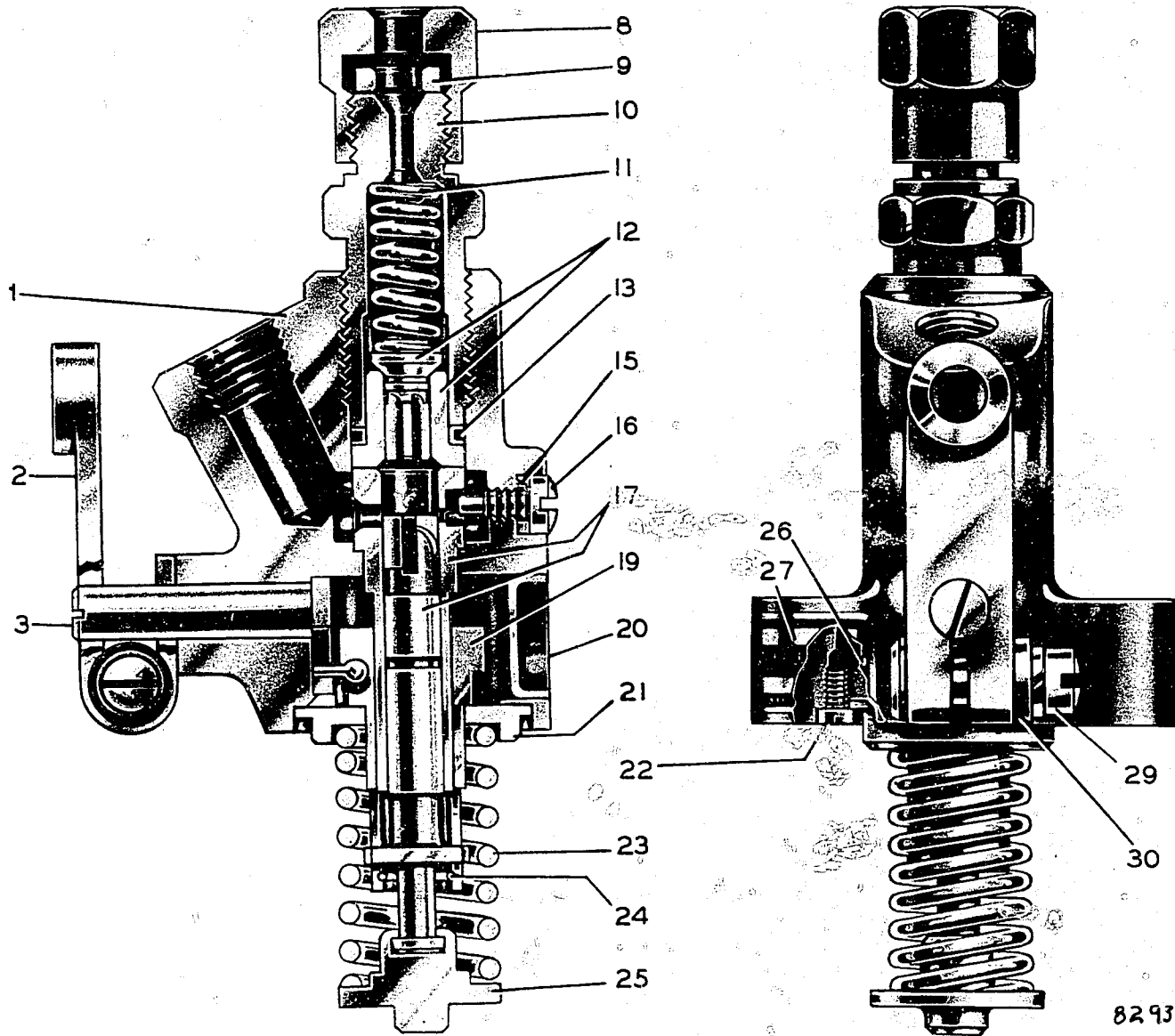


Figure 1

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## TYPE PLB FUEL INJECTION PUMP

### DISASSEMBLY OF PLB PUMP

For Service Tools and Equipment See Section D4000

Prior to disassembly wash off all external dirt and grease from the unit. Prepare a clean work bench and vise incorporating a set of brass jaws or equivalent.

1. Place plunger spring compressing tool TSE 7694-2 in the vise as shown (See Figure 2).

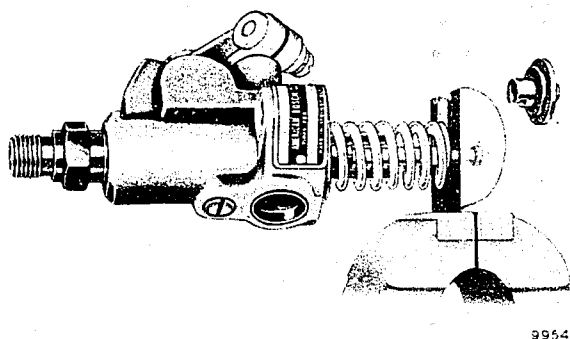


Figure 2

2. Carefully slip the lower spring seat (25) into the compressing tool so that the spring seat (25) and the bottom coil of plunger spring (23) are separated by the compressing tool. Compress the spring (23) and slide off the lower spring seat (25) from plunger (23).

### CLEANING AND EXAMINATION OF PARTS

A large variety of cleaning fluids and compounds are available, but in some cases they have objectionable characteristics that make them unsuitable for cleaning fuel injection equipment parts.

Bendix and Karbonoff cleaner have been found satisfactory and are recommended as safe for cleaning pump parts. Plunger spring and painted pump housing should not come in contact with the fluids, as their action will almost immediately soften paint and remove plating. The fluids are to be used in accordance with their manufacturers' instructions.

Regular fuel oil may be used as a cleaner if more effective cleaners are not available. This will readily remove grease and dirt provided a brush is used but will not dissolve lacquers formed on the internal parts.

3. Remove compressing tool from vise and mount pump on holding plate TSE 76188 and clamp in vise. Remove plunger retaining spring (24) with needle nose pliers.

4. Carefully remove plunger (17) and place on clean paper.

5. Mount pump in upright position in vise, and remove delivery valve holder (10) delivery valve spring (11). Remove delivery valve assembly (12) with gasket (13) using service tool TSE 7682.

6. Remove barrel locating screw (16) and gasket (15) and plunger barrel (17) mating latter with its plunger.

7. Remove closing plug (20). This plug is generally damaged by removing and will have to be replaced with new plug.

8. Remove pump housing from holding plate.

9. Remove upper spring seat fastening screws (22) and remove upper spring seat (21).

10. Lift out control sleeve (19).

11. Scribe small reference line across face of control lever (2) to coincide with slot in control shaft assembly (3).

12. Loosen clamping screw (29) and remove control lever (2).

13. The control shaft assembly (3) can now be removed thru the closing plug opening (20).

Wash each pump separately. The plunger and barrel assembly and the delivery valve assembly must be washed separately in clean solvent. They must also be handled individually in order to prevent them from becoming nicked by coming in contact with other parts. Brush the parts to remove stain and dirt, if necessary.

Hard or sharp tools, emery cloth, crocus cloth, jeweler's rouge, grinding compounds, or abrasives of any kind should never be used in the cleaning of pumps.

After washing the parts lay them on a clean surface, preferably wax paper.

Examine all the parts carefully. In general, it will be found that there has been only minute wear on

any of them, but abnormal conditions, such as dirt in the fuel may have caused damage to the extent that parts will require replacement. Occasionally, it may be advisable to replace a part as a precautionary measure, whereas, actually it might serve its purpose for an additional period of time.

A cracked part is a warning of imminent breakage and replacement is essential. Do not confuse surface stains with actual cracks.

**HOUSING:** Inspect the housing for cracks and other damage. Check the spring seat for excessive wear. Examine the housing for damaged threads.

**PLUNGER AND BARREL ASSEMBLY:** Preferably examine with the aid of a magnifying glass. Fine scratches, scuff marks and a dull appearance of plunger surfaces indicates considerable wear, invariably due to abrasives in the fuel oil. Such wear, particularly on the upper portion of the lapped surface above the helix, greatly reduces the accuracy of delivery and affects engine performance. Plunger in this condition must be replaced. Figure 3 shows an enlarged illustration of a plunger badly worn by abrasives in the fuel oil to the extent that it is necessary to install a new plunger and barrel. Figure 4 illustrates a plunger that has seen considerable service but is still in good operating condition. The plunger and barrel are a mated assembly and must be replaced as an assembly, never individually.

Examine the barrel carefully, especially the lapped end. If this surface is rusted or pitted these marks may be removed with the aid of a surface plate and lapping compound. Otherwise the plunger and barrel must be replaced with a new one.

Occasionally, plungers are found to have dark discolorations and pit marks on the lapped surface, which indicates corrosion caused by fuel oil containing destructive acids or water. In such cases, the grade of fuel oil should be changed as soon as possible and the filtering system investigated. Plungers showing corrosion or pit marks or if the edge of the helix is rough or worn must be replaced, because this condition prevents proper metering of fuel.

**DELIVERY VALVE AND BODY:** Preferably examine with the aid of a magnifying glass. The valve should not show scratches, scuff marks, or pits on its relief piston or on the conical seating surface. Likewise, the valve body seat should not show scratches, scuff marks or pits. This indicates wear by erosion which will affect engine performance. Slight scuff marks can be removed from the seating surface of the valve by lapping valve and seat together using BM 10007 lapping compound. Do not allow this lapping compound to reach the relief piston.

The delivery valve seats should be tested for tightness by inserting the assembly together with the delivery valve spring into the correct test device, TSE 76115, which is then connected to the nozzle test stand.

Apply pressure of 800 pounds per square inch and through the opening in the test device observe, if any leakage occurs. If oil leaks at this point, the seat is not tight and must be relapped. All traces of lapping compound must be removed before assembling the delivery valve to the pump. The flat lapped surface may be lapped on a surface plate, if necessary.



Figure 3

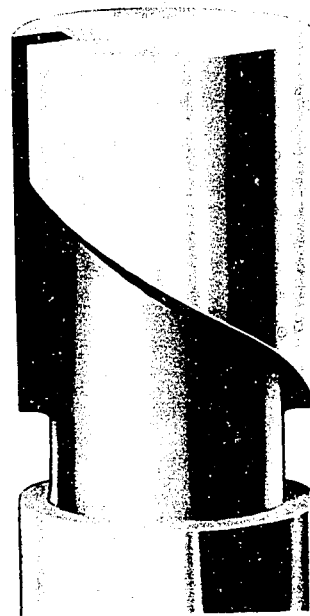


Figure 4

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If badly damaged, such assemblies should be replaced. Individual parts are not interchangeable. If the valve when lubricated with clean oil does not slide to its seat of its own weight, apply clean mutton tallow and work the valve into the body with a back and forth rotary motion to remove gummy deposits. Under no circumstances use a grinding compound on the relief piston. Wash thoroughly and repeat this operation, if necessary.

**DELIVERY VALVE HOLDER AND SPRING:** Examine the holder for damaged threads. The spring must be free from nicks or pitting. Either of these might cause breakage. If springs are flexed by bending, cracks will become apparent. Always replace questionable springs with new ones.

#### REASSEMBLY OF PLB PUMP

At reassembly care should be exercised to assure cleanliness. Make sure that all parts have been carefully examined, cleaned and dipped in clean calibrating or fuel oil.

1. Mount pump housing (1) on holder plate TSE 76188 and clamp plate in vise.
2. Insert control shaft assembly (3) thru closing plug opening at position (20) and install control lever (2) to position marked at disassembly time.
3. Remove plunger from barrel (17), insert barrel into pump housing with elongated hole of the barrel facing the locating screw (16) hole.
4. Insert locating screw (16) and gasket (15) and tighten carefully. The end of screw (16) must enter the elongated hole of the barrel freely. With the screw secured, the barrel should be free to move vertically.
5. Install delivery valve assembly (12) with gasket (13), delivery valve spring (11) and delivery valve holder (10). Torque holder to 30 lbs. foot.
6. Remove pump from holding plate and install control sleeve (19) engaging guide slot in sleeve

**CONTROL SLEEVE:** Examine control guide slot for wear or damage. Slight wear is normal and will not appreciably affect performance. Replacement will be necessary if the wear is excessive or if plunger guide slots are badly worn.

**SPRING SEATS:** Replace with new ones if worn. This is rarely necessary.

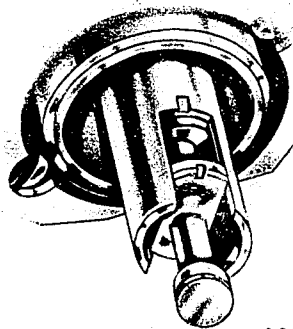
**BARREL LOCATING SCREW:** Examine for mutilated head or damaged threads. Replace with new if spill deflecting end shows signs of erosion.

**CONTROL SHAFT ASSEMBLY:** Examine ball end for excessive wear and fit of shaft in housing. Replace if damaged in any way.

**GASKETS:** Replace all gaskets with new ones.

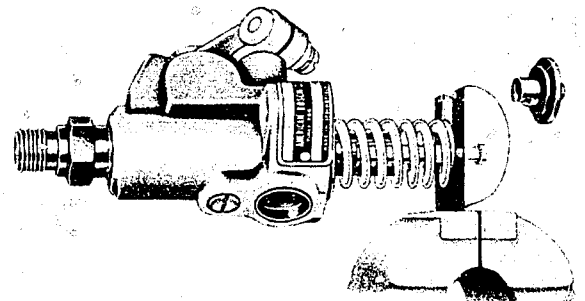
with ball end of control shaft assembly (3). See figure 1.

7. Install upper spring seat (21) and secure with two screws (22).
8. Insert plunger into barrel carefully, aligning the notch on plunger yoke with notch on control sleeve (19). See Figure 5. Install plunger retaining spring (24) in control sleeve (19).
9. Place spring compressing tool TSE 7694-2 in the vise. Pull plunger out of barrel until yoke rests against retaining spring (24).
10. Slip plunger spring (23) over plunger (17) and control sleeve (19) into upper spring seat (21).
11. Position the assembly against the compressing tool in the vise and compress plunger spring (23) until the plunger protrudes sufficiently to slip on the lower spring seat (25) over plunger knob. (See figure 6.)
12. Release the pressure on spring and slide pump assembly off compressing tool.
13. Install new closing plug (20) flush with pump housing.
14. The pump is now ready for testing.



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Figure 5



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Figure 6