

Chapter 9A—DISMANTLING

HIGH PRESSURE FUEL PUMPS

Types M.G.B.B. 124 and M.G.B.B. 125

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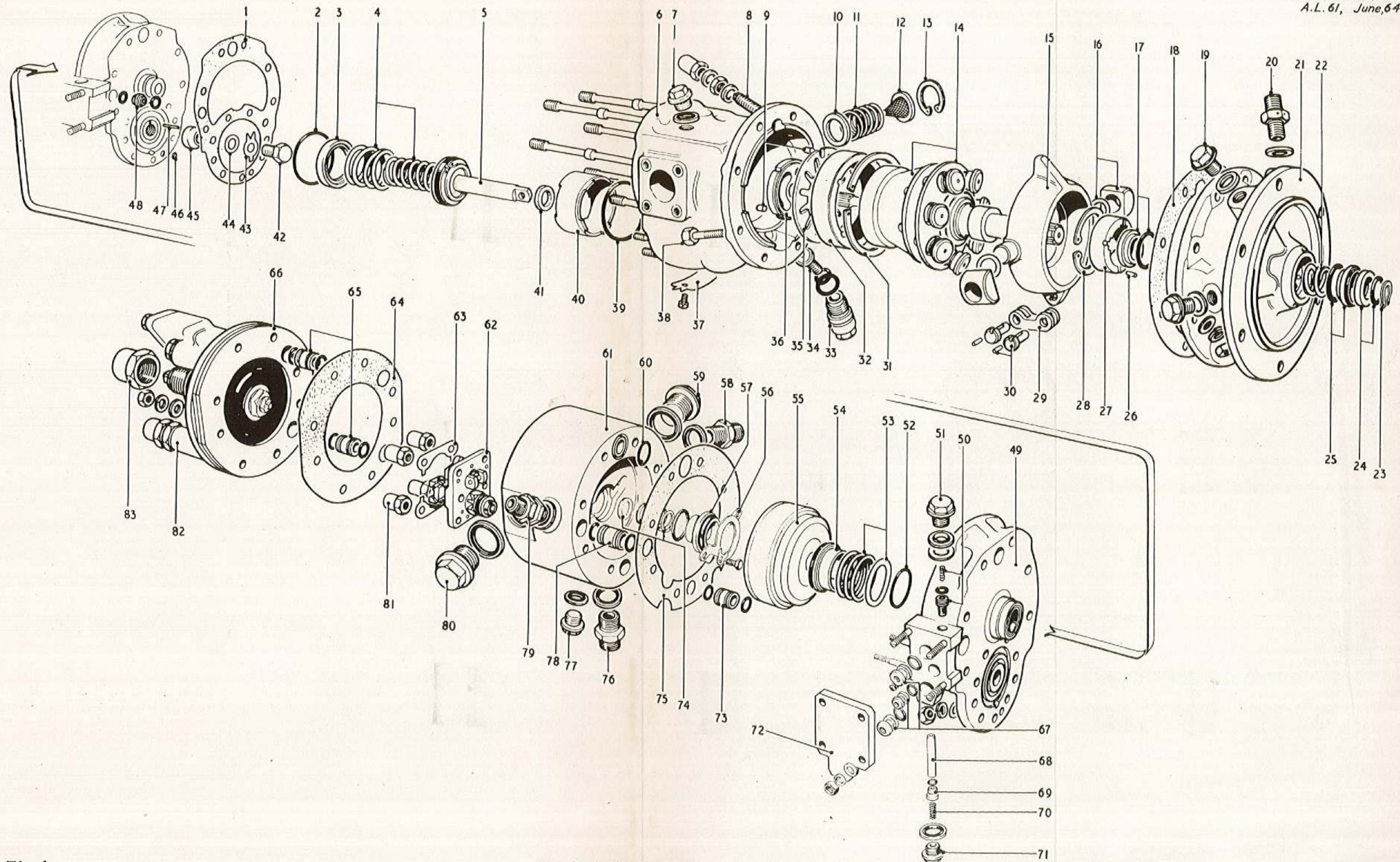


Fig.1

Exploded view of pump
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Fig.1

KEY TO FIG. 1 (EXPLODED VIEW OF PUMP)

- | | |
|---|---|
| 1 GASKET | 42 NO-FLOW STOP SCREW |
| 2 COVER JOINT RING | 43 TABWASHER |
| 3 SERVO SPRING SEAT | 44 SHIM WASHER (as required) |
| 4 CONTROL SPRINGS | 45 SERVO STOP PILLAR |
| 5 CONTROL PISTON ASSEMBLY | 46 FACE SEALING RING |
| 6 PUMP BODY | 47 STOP PILLAR PEG |
| 7 PLUG AND BONDED SEAL | 48 BOBBIN AND SEALING RINGS |
| 8 DELIVERY ADJUSTING SCREW | 49 H.M.G. HOUSING |
| 9 LOCATING DOWELS | 50 H.P. STRAINER, SEAL AND SPRING |
| 10 WASHER | 51 PLUG, BONDED SEAL AND SHIM |
| 11 SPRING | 52 BEARING SEALING RING |
| 12 INLET STRAINER | 53 WASHER AND SPRING |
| 13 CIRCLIP | 54 CARBON FACE SEAL |
| 14 ROTOR ASSEMBLY WITH AUXILIARY CAMPLATE,
THRUST BALL AND PISTON ASSEMBLIES | 55 H.M.G. ASSEMBLY |
| 15 CAMPLATE | 56 CLAMP RING (1 off), TABWASHERS AND BOLTS (2 off) |
| 16 TRUNNION BLOCK AND WASHER (2 off) | 57 CARBON FACE SEAL AND SEALING RING |
| 17 CARBON FACE SEAL AND SEALING RING | 58 SERVO UNION AND BONDED SEAL |
| 18 GASKET | 59 PLUG (SUCTION CONNECTION) |
| 19 PLUG AND WASHER (4 off) | 60 FACE SEALING RING |
| 20 SEAL DRAIN UNION AND BONDED SEAL | 61 AMPLIFIER VALVE HOUSING |
| 21 CAMPLATE HOUSING | 62 ROCKER LEVER PLATE AND ORIFICE ASSEMBLY |
| 22 FACE SEAL SPRING | 63 LOCKING WASHER (2 off) |
| 23 CIRCLIP | 64 GASKET |
| 24 EXTENSION COLLAR AND SEALING RING | 65 BOBBINS AND SEALING RINGS |
| 25 CARBON FACE SEAL AND SEALING RING | 66 OVERSPEED CONTROL ASSEMBLY |
| 26 LOCATING DOWEL | 67 BLANKING BOBBINS AND SEALS (3 off) |
| 27 CARBON BEARING | 68 DISTANCE PIECE |
| 28 CIRCLIP | 69 H.M.G. FEED ORIFICE AND SEALING RING |
| 29 LINK | 70 SPRING |
| 30 LINK PIN AND PEG (2 off) | 71 PLUG AND BONDED SEAL |
| 31 CIRCLIP | 72 BLANKING PLATE AND NUTS AND WASHERS (4 off) |
| 32 MAIN CARBON BEARING | 73 BOBBIN AND SEALING RINGS |
| 33 SERVO ORIFICE AND PLUG | 74 SPRING AND WASHER |
| 34 SERVO STRAINER | 75 GASKET |
| 35 RETAINING SPIDER | 76 SERVO CONNECTION |
| 36 PORT INSERT | 77 PLUG |
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| 38 CAMPLATE HOUSING BOLTS (8 off) | 79 H.P. UNION AND BONDED SEAL |
| 39 SEALING RING | 80 PLUG (SUCTION CONNECTION) |
| 40 CONTROL CYLINDER LINER | 81 REACH NUT (4 off) |
| 41 FELT RING | 82 BLEED VALVE ASSEMBLY |
| | 83 CAPNUT |

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Introduction

1. The instructions given in this chapter concern the reconditioning of the high pressure fuel pump. The chapter is divided into four parts each dealing with one main aspect of reconditioning, namely, 9A—dismantling, 9B—examination, 9C—assembling, and 9D—testing.

General

2. The pump log book must be available for reference before any work is attempted on the pump. The log book contains test and dimensional figures, running times and details of servicing, repairs and modifications. All relevant further details must be recorded in the log book when the work is completed.

3. Precautions must be taken to ensure thorough cleanliness of the working area

before and during dismantling of the pump. Component parts must be cleaned on removal from the unit, (para. 73 to 75 refers) and carefully stored to avoid damage pending examination.

4. Paper joints, gaskets, split pins, locking wire and metal washers must be renewed whenever the joint or assembly is disturbed. Metal washers used for packing or adjustment or as spring seats may be re-used if found satisfactory on examination.

Special tools

5. The following special tools must be used for specific dismantling operations to avoid unnecessary damage to component parts and to ease the operations.

Tool No.	Description
G.61437	Gauge, quillshaft concentricity
T.160988	Box key
T.166109	Fixture, dismantling and assembly, rocker lever plate and orifice assembly
T.175565	Spanner, reach nuts
T.193935	Spanner, camplate stop screw
T.193937	Stand, piston and slipper assemblies
T.193938	Spanner, orifice locknut
T.199127	Spanner, ring
T.203382	Compression tool, rotor extension collar
T.203383	Sheath, quillshaft splines
T.247908	Extractor, rotor extension collar
T.255863	Extractor and assembly tool, port insert
T.265777	Adapter plate, use with T.265777/H
T.265777/H	Fixture, Hydra-clamp and adapter plate
T.272432	Extractor, strainer from body
T.275309	Stand, hydro-mechanical governor
T.277767	Stand, rotor assembly
T.277768	Extractor, quillshaft from rotor
T.277771	Extractor, strainer
T.282139	Extractor, h.m.g. feed orifice
T.287355	Riveting tool, h.m.g. mounting plate (Check for availability of this tool in order to decide upon the extent of dismantling to be undertaken.)
T.295343	Extractor, cylinder liner from body
T.297767	Extractor, carbon face seal from housing

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Tool No.	Description
T.305243	Extractor, spring guides from rotor
T.307372	Extractor, rocker lever plate from housing
T.307373	Extractor, overspeed control from unit
T.318534	Extractor, bobbin
T.318535	Extractor, bobbin
T.340034	Extractor, strainer

Checks and precautions before dismantling

6. A pump must not be dismantled unless complete calibration testing equipment and service tools are available.

7. Consider any complaints reported with the fuel pump and examine the exterior of the unit for damage or broken locking wire. Check that all ports have been securely covered to prevent the entry of foreign matter into the pump. Examine exposed threads to ensure that no damage has occurred in transit.

8. When removing dust caps, examine the interior of each for foreign matter. If it is suspected that this is present, it is advisable to continue dismantling the pump, omitting the preliminary calibration tests. The unit will contain inhibiting fluid which must be drained.

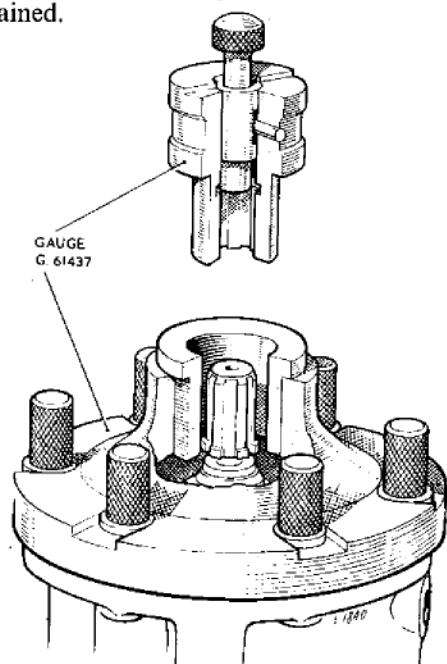


Fig. 2. Checking the quillshaft concentricity

9. Check the concentricity of the quillshaft, using the gauge G.61437, as shown in *fig. 2*. If the quillshaft will not accept the gauge, the pump must not be run on the test rig. Examine the quillshaft splines for any damage or burrs which may have fouled the gauge; if no damage is apparent, it will be necessary to remove the rotor assembly from the pump and check the quillshaft 'run-out' as described in Chapter 9C.

10. Calibrate the pump as described in Chapter 9D.

11. When the rig is started, should there be any noise from the pump which appears to indicate a damaged condition, the test rig must be stopped and the pump completely dismantled. If the pump runs smoothly, the calibration tests should be completed. The performance obtained is a guide to the general condition of the pump and will indicate parts requiring special attention during examination.

Dismantling the pump

12. The following instructions for dismantling the pump are listed in the recommended sequence. If the stripping of a sub-assembly is not considered advisable, a new sub-assembly must be fitted. Defective pumps must be dealt with according to their reported complaints; complete stripping is not essential in every instance, e.g. where units have completed short running times, the dismantling of sub-assemblies may be discretionary.

13. It is advisable to have available small containers in which to store the component parts of sub-assemblies and mated parts which are kept together for ease of identification during examination and assembly.

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14. Remove the pump inlet and outlet connections.

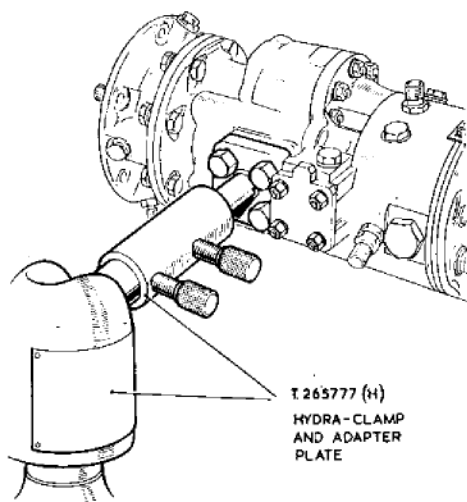


Fig. 3. Dismantling and assembling fixture

- Removing and dismantling the overspeed control assembly (fig. 1 and 4)

15. Mount the pump on the Hydra-clamp fixture T.265777/H (fig. 3) and remove the eight nuts, washers and shims from the diaphragm cover, using the ring spanner T.199127. Lift off the modification plate bracket.

16. Remove the central cap nut and the governor adjusting screw with sealing ring, using the box key T.160988; then remove the remaining assembly from the pump, using the extractor T.307373. Lift off the exposed gasket. The two transfer bobbins and sealing rings may have remained in the joint face of the amplifier valve housing or in the joint face of the overspeed diaphragm cover. Withdraw the bobbins, using the extractor T.318534.

17. Remove the diaphragm and attached parts from the housing, using a soft drift on the exposed end of the spring anchor in the control spring housing. Lift off the gasket.

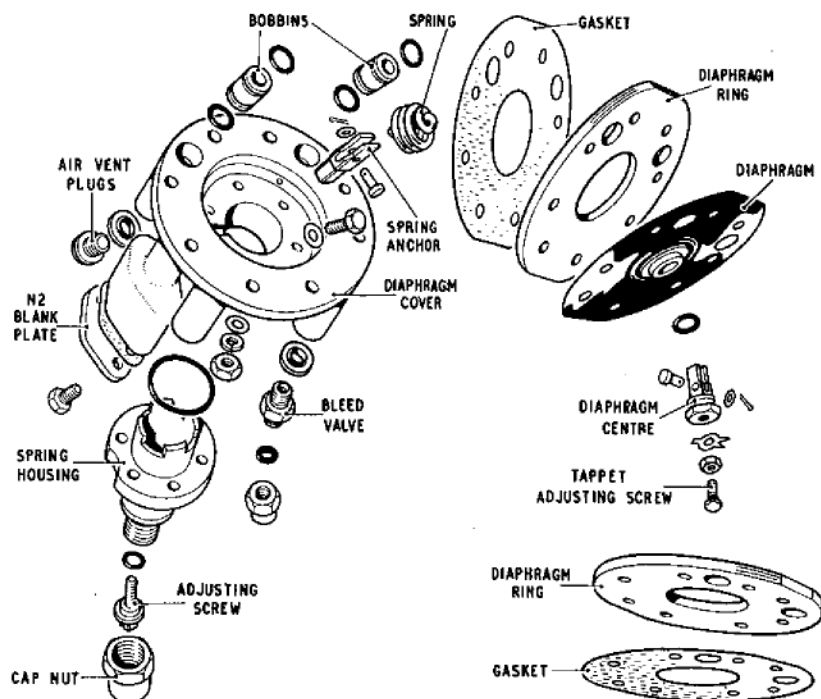


Fig. 4. Exploded view of overspeed control assembly and attaching parts

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18. Remove the split pins, washers and clevis pins, and separate the spring from the spring anchor and diaphragm centre. Press out the diaphragm centre from the diaphragm.

19. Separate the diaphragm and diaphragm rings. If the diaphragm and diaphragm rings are accidentally bonded together and will not separate easily, immerse the assembly in boiling water for a few minutes until separation is effected. Blow dry with a moisture free air blast.

20. Remove the tabwasher, locknut, tappet adjusting screw and sealing ring from the diaphragm centre. Release the six lock-wired

bolts and washers from inside the diaphragm cover, and push out the control spring housing and sealing ring.

21. If not previously removed when draining off the fluid, remove the bleed valve assembly, air vent flanged plugs (these are alternative positions for the bleed valve) and the N₂ blank connection.

Removing and dismantling the rocker lever plate and orifice assembly (fig. 1 and 5)

22. Unlock the tabwashers on the rocker lever plate and remove the four reach nuts, using the spanner T.175565; then remove the assembly from the housing, using the extractor T.307372.

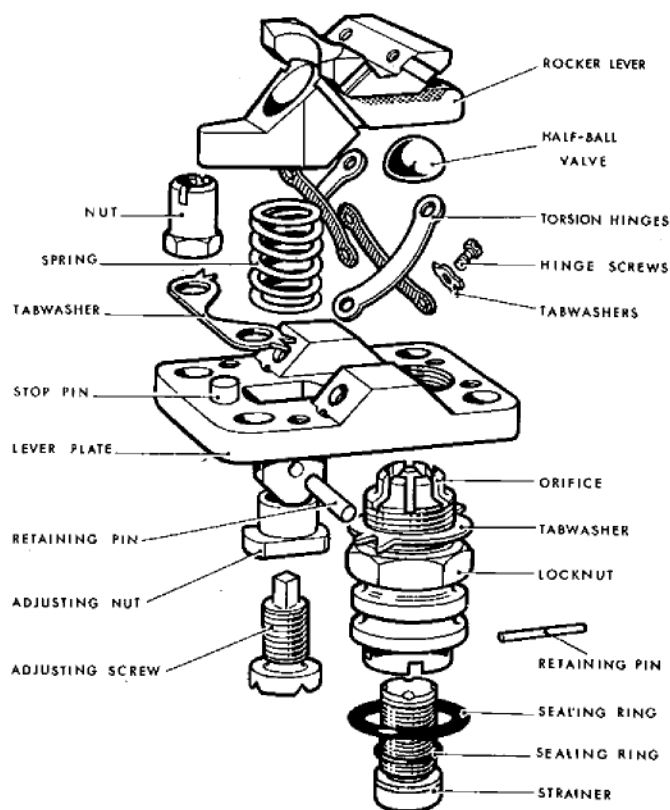


Fig. 5. Exploded view of rocker lever plate and orifice assembly

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23. Remove the adjusting pin, adjusting screw, adjusting nut and spring, and punch out the peened retaining pin from the orifice. Withdraw the strainer and sealing ring, using the extractor T.340034.

24. Release the orifice tabwasher and nut, using the spanner T.193938, and screw out the orifice. Take care not to damage the half-ball amplifier valve which is released when the orifice is withdrawn.

25. Remove the small sealing ring from beneath the strainer head and the larger sealing ring from the orifice outer groove. The four torsion hinges securing the rocker lever to the plate need not be removed unless damage is apparent. To remove, proceed as follows:—

26. Mount the rocker lever plate on the fixture T.166109 (fig. 6), then remove the four lower tabwashers and screws on the torsion hinges, and lift off the rocker lever with attached hinges.

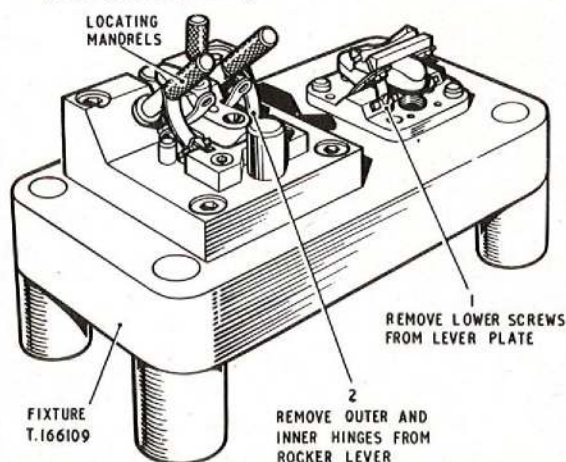


Fig. 6. Removing the rocker lever from the rocker lever plate

27. Invert the rocker lever and fit it to the opposite end of the fixture as shown. Remove the four remaining tabwashers and screws and lift off the hinges.

Removing and dismantling the amplifier valve housing (fig. 1)

28. Withdraw the housing from the pump studs, lift off the gasket and extract the two

exposed bobbins and sealing rings, using the extractor T.318535.

29. Unlock the two tabwashers and remove the two 4BA screws and the clamp ring. Remove the carbon face seal, sealing ring, spring and washer from the housing centre bore.

30. Remove all seals, sealing rings, connections and blanking plugs from the housing.

Removing and dismantling the hydro-mechanical governor (h.m.g.) assembly (fig. 1 and 7)

31. Withdraw the assembly from the h.m.g. housing and mount it on the stand T.275309. Remove the outer ring of twelve bolts and six double tabwashers.

32. Screw two slave 4BA bolts for about four turns into two diametrically opposed outer ring bolt holes. Take the assembly in the hand and lightly tap the slave bolt heads with a hide mallet until the end plate (held by its seal) is free. Remove the slave bolts.

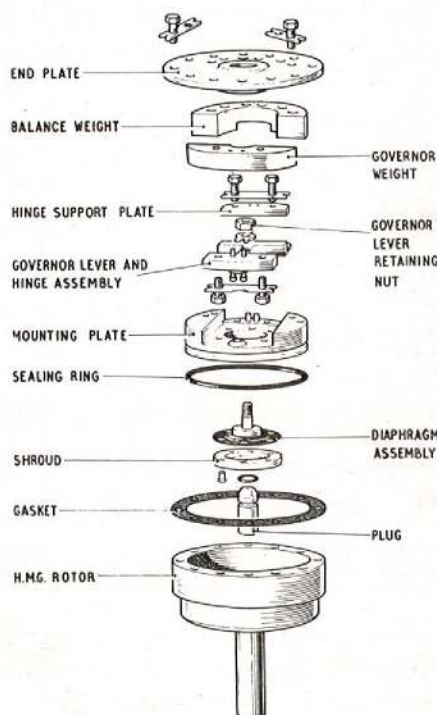


Fig. 7. Exploded view of hydro-mechanical governor assembly

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33. Remove the end plate and attached assemblies, lift off the gasket and remove the two outer pairs of bolts and double tabwashers from the end plate. Lift off the mounting plate and attached governor lever assembly.

34. Remove the remaining pair of bolts and the double tabwasher from the end plate and lift off the governor balance weight. Remove the nut and tabwasher from the diaphragm assembly centre screw.

35. Release the tabwasher on the leaf hinge support plate and remove the two leaf hinge retaining bolts, the double tabwasher and the support plate. Lightly jar the mounting plate and lever assembly on the bench to free the leaf hinge from the dowel pegs.

36. If necessary, remove the two attaching bolts and the double tabwasher from the lever and lift off the governor weight.

37. Tap out the plug from the rotor bore and remove the sealing ring from the plug.

38. On time-expired pumps, the diaphragm assembly that forms part of the mounting plate assembly should be renewed irrespective of condition. If the special riveting fixture T.287355 is not available for fitting a new diaphragm to the existing mounting plate, the complete mounting plate assembly should be renewed. To remove the diaphragm, proceed as follows:—

(a) Place the mounting plate on a suitable tufnol block and punch out the six rivets, taking care not to damage the countersinks and bores of the shroud and mounting plate holes.

(b) Separate the plate, diaphragm and shroud. Discard the diaphragm.

Removing and dismantling the hydro-mechanical governor housing (fig. 1)

39. Remove the washer, spring and carbon face seal, using the extractor T.297767, and remove the sealing ring from the integral carbon bush housing.

40. Remove the retaining nuts and washers, then withdraw the housing from the pump body and remove the servo spring seat and servo springs which will move from the pump body when the h.m.g. housing is released.

41. Remove the nuts and washers from the platform cover plate on the side of the h.m.g. housing; then lift off the cover plate and remove the exposed blanking bobbins and sealing rings.

42. Remove the large flanged plug and spring from the side of the h.m.g. housing and withdraw the strainer and sealing ring, using the extractor T.277771.

43. Remove the flanged plug and washer positioned directly opposite the strainer and sealing ring (para. 42) and withdraw the exposed spring, governor feed orifice and sealing ring, using the extractor T.282139, and the distance piece.

44. If considered necessary, remove the no-flow stop screw, tabwasher and adjusting shim(s). Although shown dismantled in fig. 1, the servo stop pillar and locating peg need not be removed.

Removing the camplate housing (fig. 1)

45. Remove the circlip, using the compression tool T.203382 and the circlip pliers; then extract the rotor extension collar from the camplate housing, using the extractor T.247908.

46. Remove the carbon face seal, sealing ring and spring.

47. Fit the protective sheath T.203383 over the quillshaft, then remove the housing retaining nuts, washers and bolts, and lift the housing from the pump body. During this operation it may be necessary to rock the camplate housing gently to free the trunnion blocks from their housing bores. This rocking must be kept to a minimum to avoid damage to the carbon bearing. Remove the gasket.

48. Remove the protective sheath from the rotor quillshaft.

Dismantling the camplate housing (fig. 1)

49. Remove the circlip from the inner end of the housing bore and withdraw the carbon bearing. If difficulty is experienced in removing the bearing and if no burr is apparent on the edges of the circlip retaining groove, heat the casting to 70 to 90°C in an oven or in hot water and remove the bearing whilst the casting is warm.

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50. Remove the carbon face seal and sealing ring. Do not remove the carbon bearing locating dowel unless it is a loose fit or damaged.

51. Remove the seal drain union and blanking plugs.

Removing the camplate (fig. 1)

52. Remove the trunnion blocks and shim washers.

53. Incline the camplate at the delivery adjusting screw side until the slots in the link and camplate are in line, then push out the link pin and peg and remove the camplate. When inclining the camplate, ensure that the rotor pistons do not lift with it.

Removing and dismantling the rotor assembly (fig. 1 and 8)

54. Lift out the rotor assembly complete with the thrust ball and auxiliary camplate assembly and place on the stand T.277767.

55. Remove the seven piston and slipper assemblies and place on the stand T.193937. The pistons are marked and should be placed on the corresponding pegs on the stand.

56. Remove the auxiliary camplate, thrust ball, shim washers, spring seat and centre spring.

57. Remove the seven spring seats and springs from the rotor. The spring seats may adhere to the piston bores. Tap the pistons on the bench to remove.

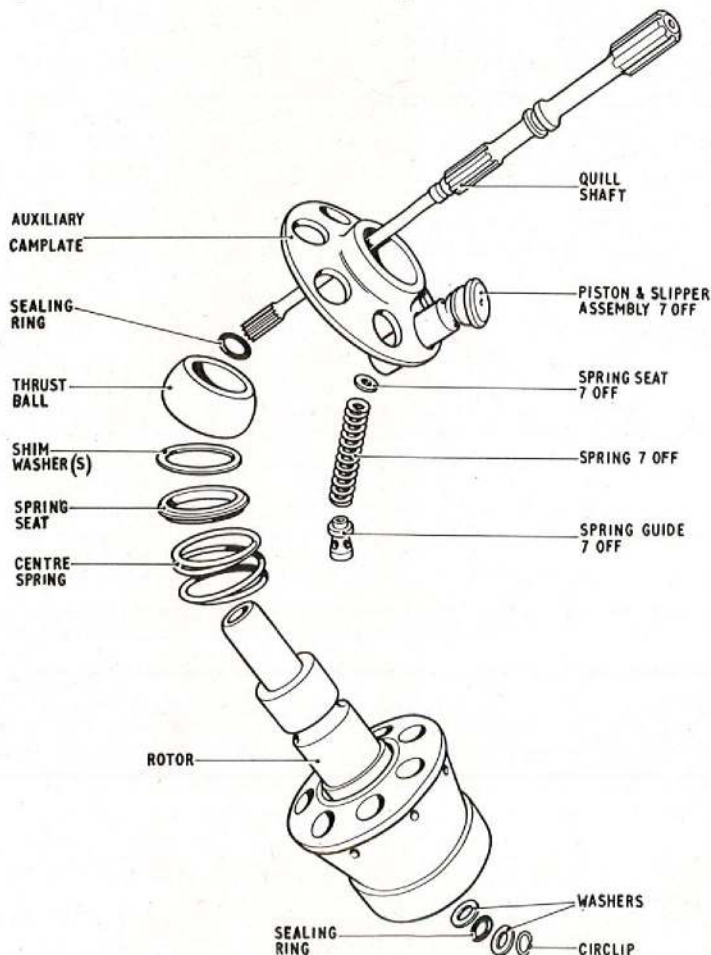


Fig. 8. Exploded view of rotor and mating assemblies

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58. Tap out the seven spring guides, using the extractor drift T.305243.

Removing the rotor quill shaft

59. Invert the rotor in the fixture T.277768 and place the assembly and fixture on a suitable hand-press.

60. Locate the punch T.277768 over the small end of the quillshaft and jar the shaft sufficiently to free it from the retaining circlip and sealing ring.

61. Invert the rotor and tap the small end of the quillshaft on the bench until the retaining circlip drops free from the rotor central bore. Remove the retaining circlip, washers and sealing ring and complete the removal of the quillshaft. If the retaining circlip does not drop free from the rotor central bore, push the quill shaft home again from the large spline end and repeat paras. 59, 60 and 61.

Removing the main carbon bearing and port insert (fig. 1).

62. Remove the large circlip, using standard circlip pliers, and remove the carbon bearing and retaining spider.

63. Remove the port insert, using the extractor and assembly tool T.255863. Do not remove the carbon bearing and port inset locating dowels unless they are damaged or a loose fit.

Removing and dismantling the control piston assembly (fig. 1)

64. Turn the link until the slots in the link and piston are in line, then push out the link pin and peg. Remove the link.

65. Remove the piston assembly, using a soft, non-metallic drift if necessary, and remove the circlip, retaining plate and seal from the piston head.

Removing the control cylinder liner (fig. 1 and 9)

66. Remove the large gasket from the pump body face, and remove the cover joint ring from the top of the liner.

67. Remove the liner, using the extractor T.295343 as shown in fig. 9, and remove the sealing ring from the pump liner bore.

68. Remove the felt ring from the pump control piston bore.

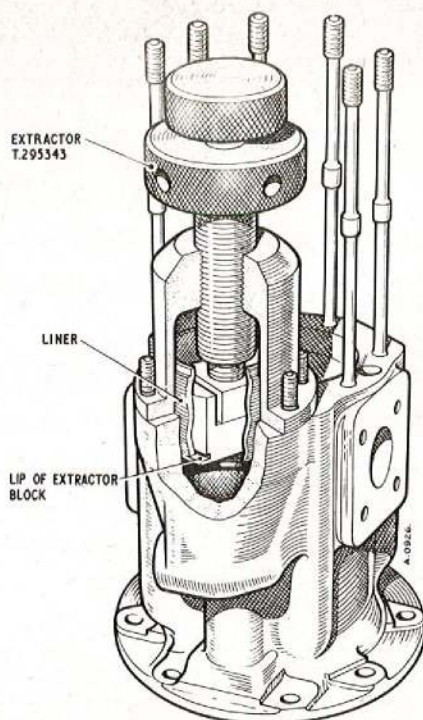


Fig. 9. Removing the control cylinder liner

Pump body details (fig. 1)

69. Remove the servo orifice and plug from the pump body side and extract the strainer assembly, using the extractor T.272432.

70. Remove the circlip, strainer, spring and washer from the pump inlet bore.

71. Remove the camplate stop screw, using the tool T.193935 and a standard spanner.

72. Remove any remaining blanking plugs, unions and washers to facilitate cleaning and examination.

Cleaning

73. If any defect in the pump is suspected to be due to the presence of foreign matter, the appropriate parts must be examined before cleaning.

74. The components must be thoroughly washed in kerosine, preferably by use of a pressure gun and bath supplied by a pump with adequate filtering facilities. Hard brushes, cloths and abrasives must not be used.

75. After cleaning, all components must be dried thoroughly, using a moisture free air blast, then placed in clean dry containers pending examination.

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