

Chapter 9C—ASSEMBLING

HIGH PRESSURE FUEL PUMPS

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

LIST OF CONTENTS

	<i>Para.</i>		<i>Para.</i>
<i>Introduction</i>	1	<i>Fitting the port insert and main carbon bearing</i>	65
<i>General</i>	2	<i>Checking the camplate angle</i>	67
<i>Special tools</i>	3	<i>Checking the auxiliary camplate lift</i>	72
Building the sub-assemblies		<i>Checking the no flow stop screw setting</i>	75
<i>Fitting the rotor quill shaft</i>	4	<i>Fitting the camplate housing</i>	80
<i>Rotor assembly</i>	9	<i>Fitting the h.m.g. housing</i>	85
<i>Rocker lever plate and orifice assembly</i>	12	<i>Checking the h.m.g. carbon face seal spring compression</i>	91
<i>Overspeed control assembly</i>	29	<i>Fitting the h.m.g. assembly</i>	94
<i>Hydro-mechanical governor (h.m.g.) lever and mounting plate assembly</i>	36	<i>Fitting the amplifier valve housing</i>	96
<i>Assembly of the complete h.m.g. assembly</i>	37	<i>Fitting the rocker lever plate and orifice assembly</i>	99
<i>Trimming the h.m.g. weight</i>	51	<i>Setting the governor tappet clearance</i>	100
Main assembly and build checks		<i>Fitting the overspeed control assembly</i>	105
<i>Checking the trunnion block clearance</i>	57	<i>Pump body details</i>	106
<i>Checking the camplate side float</i>	58	<i>Final acceptance check</i>	108
<i>Fitting the control cylinder liner</i>	60		
<i>Fitting the control piston assembly</i>	61		

LIST OF TABLES

	<i>Table</i>
<i>Drilling stages and hole diameters</i>	1

LIST OF ILLUSTRATIONS

	<i>Fig.</i>		<i>Fig.</i>
<i>Fitting the rotor quillshaft</i>	1	<i>Fitting the control piston circlip</i>	7
<i>Locking the rotor quillshaft</i>	2	<i>Fitting the control piston assembly</i>	8
<i>Fitting the rocker lever to the rocker lever plate</i>	3	<i>Checking the camplate angle</i>	9
<i>Setting the rocker lever pre-load</i>	4	<i>Checking the auxiliary camplate lift</i>	10
<i>Weight drilling positions and depths</i>	5	<i>Checking the h.m.g. carbon face seal load</i>	11
<i>Fitting the control cylinder liner</i>	6	<i>Setting the overspeed governor tappet clearance</i>	12

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Introduction

1. This chapter details the procedure and essential checks to be carried out during the re-assembly after reconditioning of the high pressure fuel pump and incorporated sub-assemblies.

General

2. To ease assembly and prevent seal damage, the seal leads and sealing rings should be lubricated with liquid paraffin (medical grade) prior to fitting. This may be applied by dipping the component and

draining well or by means of a nylon tube or rod. The fluid should be stored in a closed glass container when not in use. Periodical checking of the fluid and container is essential to ensure thorough cleanliness.

Special tools

3. The following special tools are required to accomplish the operations described in this chapter. Where alternative tools are quoted, the higher number indicates a tool of improved design and is recommended when ordering new tools.

<i>Tool No.</i>	<i>Description</i>
G 61113	Plate gauge, camplate angle
G 61324	Adapter ring and pegs, auxiliary camplate lift
G 68363	D.T.I. gauge, auxiliary camplate lift (alternative to G 122671)
G 91340	Setting gauge, overspeed governor tappet clearance
G 122671	D.T.I. gauge, auxiliary camplate lift
T 160988	Box key, overspeed governor setting
T 166109	Assembly fixture, rocker lever to rocker lever plate
T 175555	Assembly tool, circlip to piston rod
T 175565	Spanner, rocker lever plate to amplifier valve housing
T 175567	Assembly tool, spring guides to rotor
T 193935	Spanner, flow delivery screw
T 193938	Spanner, rocker lever orifice locknut
T 193939	Box key, assembly of stall pressure screw
T 194499	Assembly tool, piston rod assembly to body
T 199127	Ring spanner, retaining nuts
T 199561	Splined spanner, rotation of rotor
T 203382	Compression tool, rotor extension collar
T 203383	Assembly sheath, camplate housing to body
T 203522	Assembly tool, liner to servo bore of pump body
T 206237	Setting fixture, rocker lever plate and orifice assembly
T 247945	Assembly tool, rotor extension collar
T 255863	Tool, extractor and assembly, port insert
T 260527	Guide sleeve, piston rod assembly to body
T 265777/H	Hydraclamp fixture complete with adapter plate T 265777, for general pump assembly and dismantling
T 265777	Adapter plate only, for use with the above fixture
T 266748	Continuity meter, used with T 206237
T 268399	Drill jig, governor weight trimming
T 275309	Assembly and dismantling fixture, h.m.g. assembly
T 277764	Leak test fixture, governor lever mounting plate and diaphragm assembly
T 277768	Stand, rotor quillshaft locking

RESTRICTED

Tool No.	Description
T 277769	Assembly tool and stand, rotor quill to rotor
T 282113	Pressure test fixture, rotor quill shaft seals
T 282139	Extractor and assembly tool, h.m.g. feed orifice
T 287355	Riveting tool, diaphragm to mounting plate
T 290953	Slave orifice, setting rocker lever plate and orifice
T 301666	Assembly tube, rotor quill shaft circlip (used with T 277768)
T.303036	Assembly tool, spring anchor to overspeed control
T 303901	Bending tool, tabwashers, h.m.g. end plate
T 310170	Setting piece, h.m.g. carbon face seal load check
T 314012	Protection sleeve, H.P. strainer to body
T 338125	Test key, link peg, link pin and link
T 340438	Adapter, torque spanner

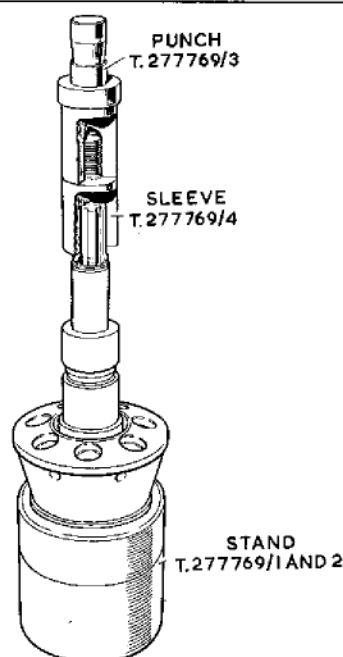


Fig. 1. Fitting the rotor quillshaft

BUILDING THE SUB-ASSEMBLIES

Fitting the rotor quillshaft

4. Mount the rotor on the stand T 277769, fig. 1. Fit a sealing ring to the groove between the larger splines and insert the shaft into the rotor bore. Place the assembly on a suitable hand press, locate the tool T 277769 over the quill and apply a load until the shaft is felt to 'bottom' in the rotor.

5. Invert the rotor and mount it on the stand T 277768, fig. 2. Place a washer, sealing ring, second washer and circlip over the shaft. Position the hollow drift T 301666 over the shaft and tap the drift until the circlip engages in the recess.

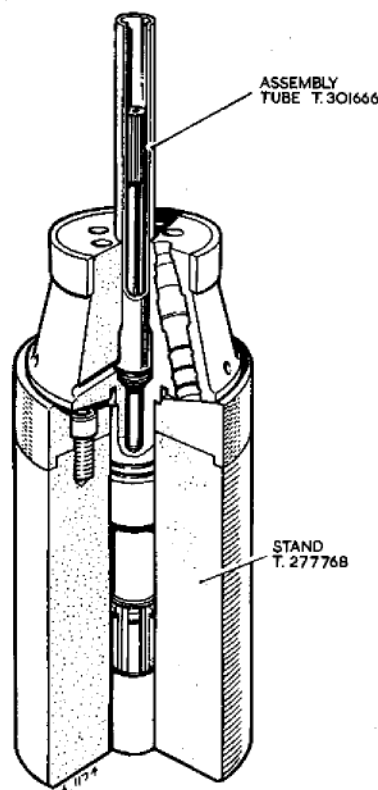


Fig. 2. Locking the rotor quillshaft

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6. Check the quill shaft at both ends for concentricity to the rotor, using a dial test indicator and V-blocks to support the rotor bearing journals. The quill shaft splines should be concentric within 0.008 in. total indicator reading.

7. If beyond the limits, remove the shaft, turn it through 180° and refit. Repeat the concentricity check and if unsatisfactory, fit a replacement shaft.

8. Leakage test the assembly, using the fixture T 282113. Apply air at a pressure of 5 lb/in² and check for leakage between the rotor and shaft with the fixture immersed in kerosine. If satisfactory, raise the pressure to 40 lb/in² and recheck. No leakage is permissible.

Rotor assembly

9. Fit the spring guides into the seven rotor bores, using the tool T 175567, and fit the seven piston springs.

10. Fit the centre spring, spring seat, shim washers, thrust ball and auxiliary camplate to the rotor.

11. Fit the spring seat into each piston bore (chamfered edge toward the slipper) and insert the pistons through the auxiliary camplate into the rotor bores. The pistons are numbered to correspond with their respective bores in the auxiliary camplate and rotor.

Rocker lever plate and orifice assembly

12. Invert the rocker lever and locate with the centre mandrel on the fixture T 166109 as shown in fig. 3 stage 1. Locate the two inner torsion hinges to the fixture, using mandrels, and secure the free ends of the hinges to the rocker lever with tabwashers and screws. The screws should be finger-tight only at this stage.

13. Remove the mandrels, turn the rocker lever through 180°, refit to the fixture and assemble the two outer hinges to the rocker lever. Secure finger-tight.

14. Locate the rocker lever plate on the fixture dowels as shown in fig. 3 stage 2. Assemble the rocker lever and hinges to the rocker lever plate and secure finger-tight with the tabwashers and screws.

15. Remove the assembly from the fixture and screw the slave orifice T 290953 into the lever plate until contact is just made with the rocker lever bowl, then screw in a further half turn. The slave orifice is used at this stage in place of the normal orifice and amplifier valve to facilitate initial setting.

16. Assemble the rocker spring, adjusting nut and adjusting screw. With the spring compression at a minimum, insert the adjusting pin in the lever plate and rotate the adjusting screw, using the box key T 193939, so that the pin is disengaged from the screw head locking slots and rests on a land between the slots. This provides sufficient tension in the torsion hinges for initial build.

17. Release all torsion hinge retaining screws one half turn. By repeated depression of the rocker lever tail, ensure that the rocker lever rises to the fullest extent allowed by the clearances between the slackened screws and hinge holes, under pressure from the rocker spring.

18. Using the fixture T 166109, tighten all retaining screws and lock the tabwashers. Take care not to strain the torsion hinges during this operation, i.e. apply torque only to the screw.

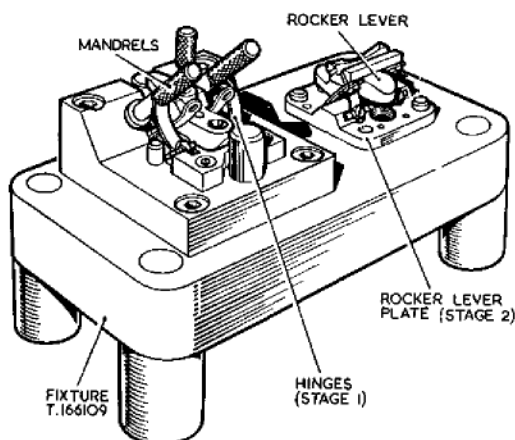


Fig. 3. Fitting the rocker lever to the rocker lever plate

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19. Remove the slave orifice and fit the amplifier valve and orifice assembly complete with new tabwasher and locknut. Do not lock at this stage.

20. Release the adjusting pin from the lever plate and remove the rocker spring, adjusting nut and adjusting screw.

21. Mount the assembly on the preload setting fixture T 206237, fig. 4 and position the insulating bracket and micrometer attachment over the rocker lever bowl and lock the bracket in position. The contact faces of the rocker lever and the micrometer should be perfectly clean and dry.

22. Connect the continuity meter T 266748 or a similar device which consists of dry

cells, a 2.5 volt bulb and an on/off switch arranged in series so that when the micrometer shank contacts the rocker lever the bulb lights up.

23. Ensure that the rocker lever is in a neutral plane, i.e. no preload is being imposed by the orifice, then carefully screw in the micrometer until the bulb lights up. Note the micrometer reading, then set back 0.005 to 0.008 in.

24. With the fixture preload key located in the orifice slot, carefully screw in the orifice until contact with the amplifier valve is re-established and the indicator bulb relights. Tighten the orifice locknut using the spanner T 193938 maintaining the light on, then lock the orifice tabwasher.

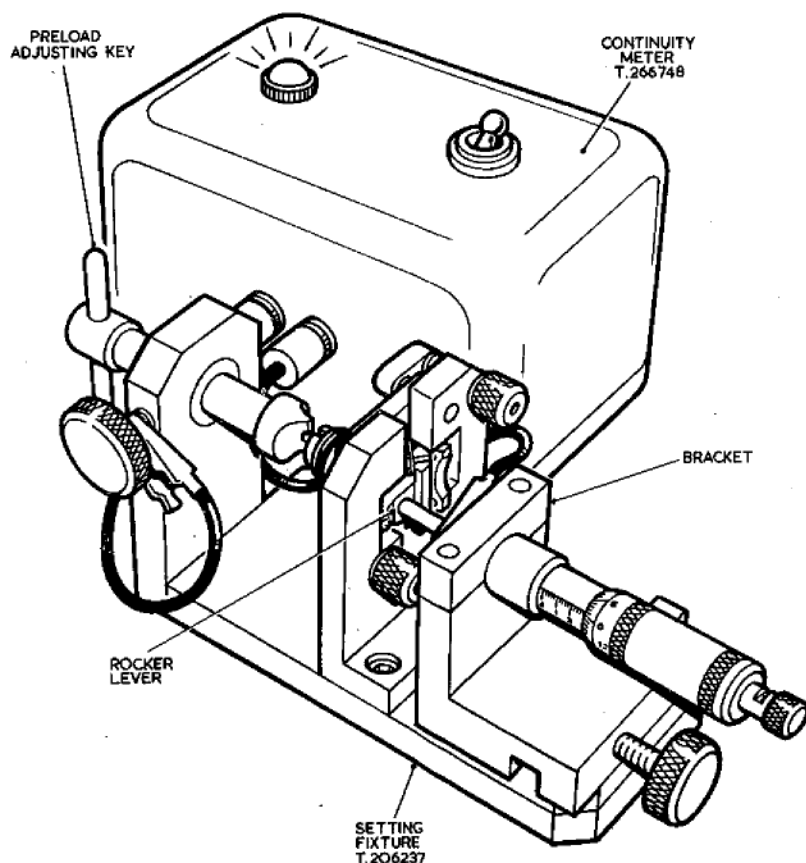


Fig. 4. Setting the rocker lever pre-load

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25. Fit the adjusting nut to the adjusting screw and assemble these, together with the rocker spring and adjusting pin, to the lever plate. If necessary, turn the screw, using the box key T 193939, to locate the pin in the screw head grooves. Final adjustment of the screw will be set on the test rig stall pressure test, Chap. 9D.

26. Using a feeler gauge, check the gap between the rocker lever tail and stop pin which should be between 0.025 and 0.040 in.

27. Fit the strainer and sealing ring to the orifice bore, then insert the retaining pin and peen over to secure.

28. Fit a sealing ring to the orifice outer groove and store the assembly in a safe place pending build to the pump.

Overspeed control assembly

29. Assemble the control spring housing and new sealing ring to the diaphragm cover and secure with six bolts and plain washers. Tighten the bolts to a torque loading of 20 lb. in., and lock the bolts with 24 s.w.g. wire, specification D.T.D. 189.

30. Fit a sealing ring to the diaphragm centre and loosely assemble the tappet adjusting screw, locknut and tabwasher.

31. Push the diaphragm centre through the diaphragm assembly and attach the spring by means of the link pin. Secure with a washer and split pin. Assemble the spring anchor to the opposite end of the spring in a similar manner.

32. Place a gasket and one of the diaphragm rings on the diaphragm cover, ensure that all holes are aligned, then assemble the spring anchor to the built-up spring housing and cover. If difficulty is experienced in inserting the spring anchor, place the threaded tool T 303036 through the top of the housing to engage the spring anchor then pull into position. The second diaphragm plate is fitted at a later stage.

33. Remove the tool and assemble the governor adjusting screw and sealing ring. Adjust finger-tight only and loosely assemble the capnut.

34. Before fitting the bleed valve, carry out a leakage test as described in 'Testing',

Chap. 9D. The ball valve and spring inside the bleed valve body is retained by a rolled lip and should not be disturbed. A faulty valve will necessitate replacement of the complete assembly.

35. Fit the valve assembly and the blanking plugs with bonded seals to their appropriate positions on the diaphragm cover and store in a safe place pending rebuild to the pump.

Hydro-mechanical governor (h.m.g.) lever and mounting plate assembly

36. If the special riveting fixture T 287355 and a hydraulic hand-pump is available, the diaphragm assembly (which forms part of the mounting plate assembly) need only be renewed. Non-availability of this fixture, however, will necessitate replacement of the complete mounting plate assembly at overhaul irrespective of condition. The following procedure should be adopted to assemble a new diaphragm assembly:—

(1) Loosely assemble the shroud, diaphragm assembly and mounting plate with the six rivets in position.

(2) Ensure that the rivets are protruding approximately 0.058 in. above the surface of the mounting plate to allow for compression on riveting. The rivets may be cut to secure the above protrusion.

(3) Measure the thickness of the assembly (shroud face to mounting plate face) at six equal points on the pitch circle diameter between the rivets. Note the dimensions and location for reference to sub-para. (8).

(4) Fit the assembly to the riveting fixture T 287355, ensuring location on the dowel.

(5) Close the pressure release cock and operate the hand-pump until the draw-up plate just contacts the assembly.

(6) Gradually increase the hydraulic pressure to achieve the diaphragm nip and satisfactory rivet form. The pressure may be raised according to local experience. For guidance it should be noted that the initial pressure should be in the region of 800 lb/in².

RESTRICTED

(7) Release the fluid pressure and index the fixture rotary base to position the three remaining rivets. Repeat sub-para. (5) and (6).

(8) Measure the thickness as in sub-para. (3). The reduction in thickness must not be more than 0.005 in. and not less than 0.002 in. If less than 0.002 in., refit the assembly to the fixture and apply pressure in excess of 800 lb/in². If necessary, pressure may be increased to an absolute maximum of 1500 lb/in². At each pressure stage the pressure must be equal for each set of three rivets.

(9) Closely examine the rivets which should be of good form and the heads and closures should fill the rivet hole countersinks.

(10) Visually examine the diaphragm and centre screw. Ensure that there is no distortion of the diaphragm and that the centre screw is square to the mounting plate.

(11) Clean and dry off the assembly and fit the leak test fixture T 277764, allowing 0.005 in. clearance between the diaphragm centre and the fixture centre support. Apply a fine film of french chalk to the area covering the diaphragm and rivets. Test for leakage by applying a fluid pressure of 500 lb/in² for five minutes. Reject for any sign of rivet or diaphragm failure. Discolouration of the french chalk around the rivets due to seepage of kerosine is permissible.

Assembly of the complete h.m.g. assembly

37. If previously removed, fit the governor lever to the governor weight and secure with the two bolts and a new double tabwasher. Lock the tabwasher.

38. Fit the governor lever and attached weight to the mounting plate, locating the hinge plate over the dowels.

39. Fit the support plate, a new double tabwasher and the two bolts to the hinge

plate and secure the two bolts. Lock the tabwasher.

40. Depress the diaphragm centre to its fullest extent, and with the governor lever pad resting on the orifice face check that the gap between the diaphragm centre and the underside of the governor lever is a minimum of 0.005 in.

41. Fit the nut and a new tabwasher to the diaphragm centre and tighten the nut to a torque loading of 10 lb/in. to 12 lb/in. It is important that the hinge plate should lie flat on the mounting plate and that the mounting plate orifice land should be square to the governor lever pad. Lock the tabwasher.

42. Fit the balance weight to the end plate and secure with a new double tabwasher and the two bolts. Do not fully tighten the bolts at this stage.

43. Locate the end plate and attached balance weight on the governor lever mounting plate assembly and fit the four retaining bolts and two new double tabwashers.

44. Tighten the four mounting plate retaining bolts and the two balance weight retaining bolts.

45. Ensure that with the governor lever pad contacting firmly on the mounting plate orifice land there is a clearance gap of not less than 0.025 in. between the top of the governor weight and the inside face of the end plate. This measurement must not be taken between the orifice and the lever pad.

46. Lock up the three double tabwashers on the end plate.

47. Assemble a new sealing ring to the plug and insert the plug into the rotor bore (counterbore towards the splines).

48. Mount the rotor on the assembly fixture T 275309 and position a new joint gasket on the rotor mating face.

49. Fit a new sealing ring to the mounting plate outer groove and assemble the end plate and mounting plate assembly to the governor rotor. Ensure that the fuel passage

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hole in the rotor and the mounting plate orifice are aligned correctly during this operation.

50. Fit new double tabwashers and secure the assembly with the twelve retaining bolts. Tighten down evenly and lock the tabwashers, using the tool T 303901.

Trimming the h.m.g. weight

51. If a new governor weight or governor lever assembly has been fitted, it may be found that the differential pressures obtained are above the limits quoted in the 'Test Schedule', Chap. 9D. This may be rectified by drilling a maximum of three holes in the outer periphery of the governor weight at the positions shown in fig. 5.

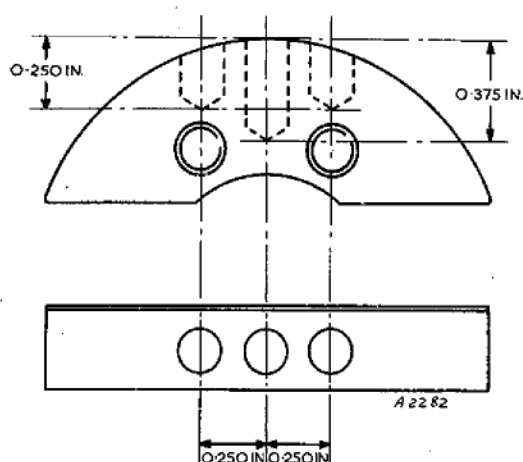


Fig. 5. Weight drilling positions and depths

52. The following table gives the maximum permissible drilling dimensions only, and within these limits any combination of drillings may be used to obtain the correct differential pressure, provided that when drilling the outer holes they are maintained as a matched pair by drilling both identically.

Drilling position	Maximum depth in inches	Maximum diameter in inches
Centre hole	0.375	0.187
Outer hole	0.250	0.187

53. The amount of drilling required must be determined by stages with a rig test following each stage, and experience gained in this technique will enable any trimming to be done with a minimum of rig testing.

54. Mount the assembled governor lever and mounting plate assembly into the drilling fixture T 268399 and make the first drilling or set of drillings.

55. Remove the assembly from the drilling fixture, remove any fraze from the drillings, wash thoroughly in clean kerosine, dry with a compressed air blast and re-assemble to the end cover.

56. Use Table 1 as a guide only to select the required drilling stage as individual units may differ slightly from each other in response to the same drilling stage. The drilling stages quoted are at maximum drilling depth conditions.

TABLE 1
Drilling stages and hole diameters

Drilling stage	Drill hole diameters in inches		Pressure difference in lb/in ² gauge
	Outer	Centre	
1	—	1×0.125	2
2	2×0.125	—	4
3	2×0.125	1×0.125	6
4	2×0.125	1×0.156	8
5	2×0.156	1×0.125	10
6	2×0.156	1×0.156	12
7	2×0.156	1×0.187	14
8	2×0.187	1×0.156	16
9	2×0.187	1×0.187	18

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MAIN ASSEMBLY AND BUILD CHECKS

Checking the trunnion block clearance

57. Check each trunnion block in the camplate housing pockets for free sliding fit. Using a depth gauge, check that the upper face of each block is between 0.001 in. and 0.005 in. lower than the camplate housing joint face.

Checking the camplate side float

58. Fit the right-hand and left-hand trunnion blocks and shim washers to their respective trunnions on the camplate and assemble to the camplate housing.

59. Using the gauge G 62105, check that the overall clearance between the blocks and pivoting shoulders of the camplate is between 0.006 in. and 0.010 in. If this clearance is unobtainable, another pair of shim washers should be selected to suit and the previous checks carried out.

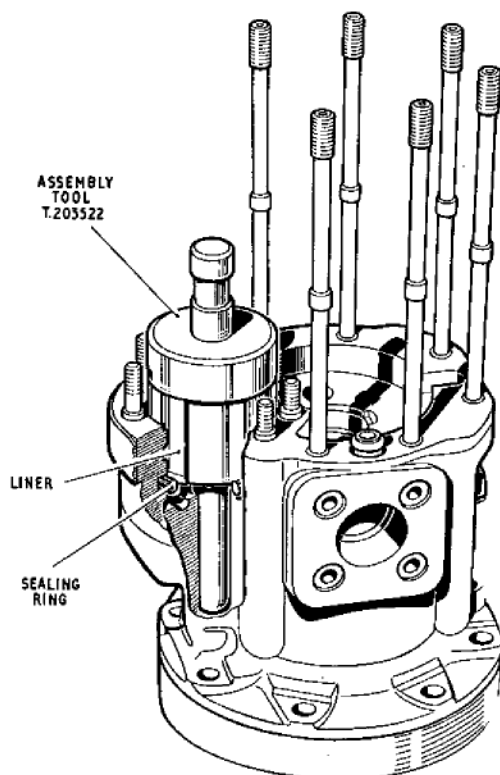


Fig. 6. Fitting the control cylinder liner

Fitting the control cylinder liner

60. Mount the pump body on the hydraulic clamp assembly fixture T 265777/H. Fit a new sealing ring to the control cylinder bore in the pump body. Fit the liner, using the assembly tool T 203522, fig. 6.

Fitting the control piston assembly (fig. 8)

61. Fit a new seal and the retaining plate to the piston head. Fit the circlip and press into position, using the tool T 175555, fig. 7.

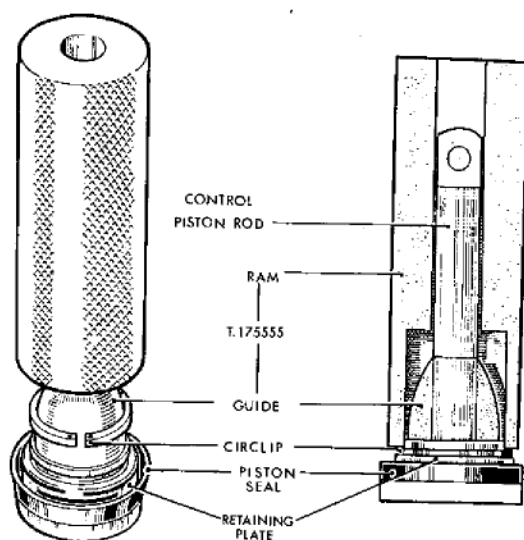


Fig. 7. Fitting the control piston circlip

62. Fit a new felt ring to the bore in the pump body. Locate the guide T 260527 on the control cylinder liner, fig. 8 and push the control piston into position, using the tool T 194499. Invert the pump.

63. Fit the link to the piston rod and secure with the link pin and peg. With the servo housing nearest to the operator the link pins must be fitted from left to right, i.e. with the link pin heads on the left-hand side of the camplate lug. Use the test key T 338125 to ensure that the pin is secure in the link.

64. At this stage the h.m.g. housing is fitted to the pump to enable the no flow stop screw setting only to be checked (para. 75), and will be removed after this check has been accomplished. (The fitting of the h.m.g. housing as a functional part of the pump is

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described in para. 85.) If previously removed, fit the peg, stop pillar, shim washers, tab-washer and no flow stop to the h.m.g. housing. Do not lock the tabwasher at this stage. Position a gasket on the pump body face and assemble the h.m.g. housing to the pump body, using slave washers and nuts to secure.

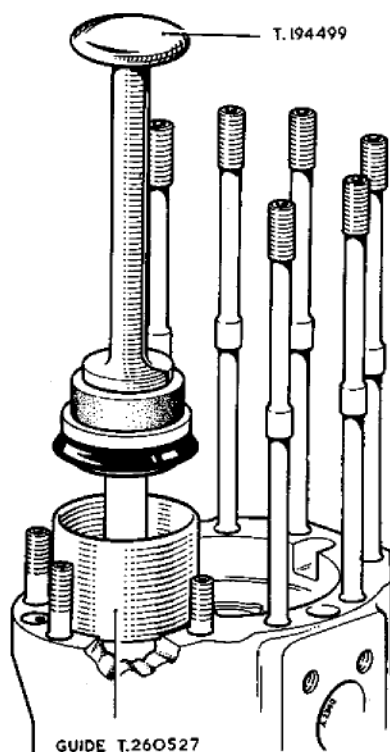


Fig. 8. Fitting the control piston assembly

Fitting the port insert and main carbon bearing

65. If previously removed, fit the port insert and carbon bearing locating dowels in the pump body. Lower the port insert into position, using the tool T 255863, and check that the insert seats squarely on the pump insert face with no tendency to 'rocking'.

66. Fit the retaining spider and carbon bearing and secure with the circlip.

Checking the camplate angle (fig. 9)

67. Fit the built up rotor assembly and thrust ball and auxiliary camplate assembly to the pump body, locating the rotor squarely in the carbon bearing.

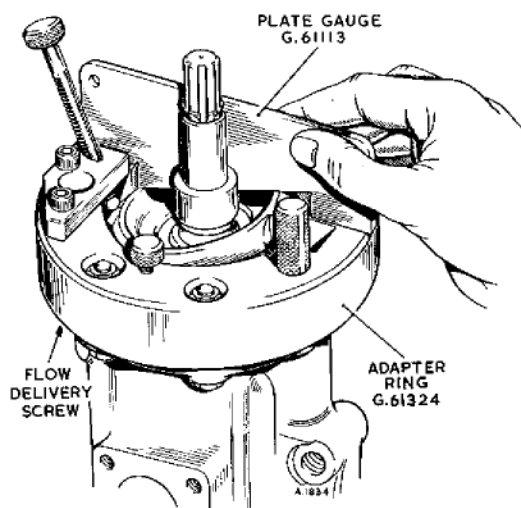


Fig. 9. Checking the camplate angle

68. Position the camplate and trunnion blocks over the rotor and fit a gasket to the pump body. Fit the link pin and peg to the link and camplate and check the locking, using the test key T 338125.

69. Fit the adapter ring G 61324 to the pump body and secure with slave nuts. Screw the knurled screws firmly down onto the trunnion blocks.

70. Fit the delivery adjusting screw, bonded seal and locknut to the pump body.

71. Place the plate gauge G 61113 across the adapter ring and adjust the delivery adjusting screw, using the spanner T 193935, until it just contacts the camplate lug with the camplate aligned by the plate gauge at the angle of $15\frac{1}{2}^\circ$. Secure the adjusting screw with the locknut taking care not to over-tighten.

Checking the auxiliary camplate lift (fig. 10)

72. Screw in the inclined knurled screw (part of G 61324) to maintain the camplate against the delivery adjusting screw at the $15\frac{1}{2}^\circ$ setting. Fit the dial indicator gauge G 122671 as shown, and check the auxiliary camplate lift (as detailed in para. 73) at seven different rotor positions by indexing each piston adjacent to the delivery screw in turn.

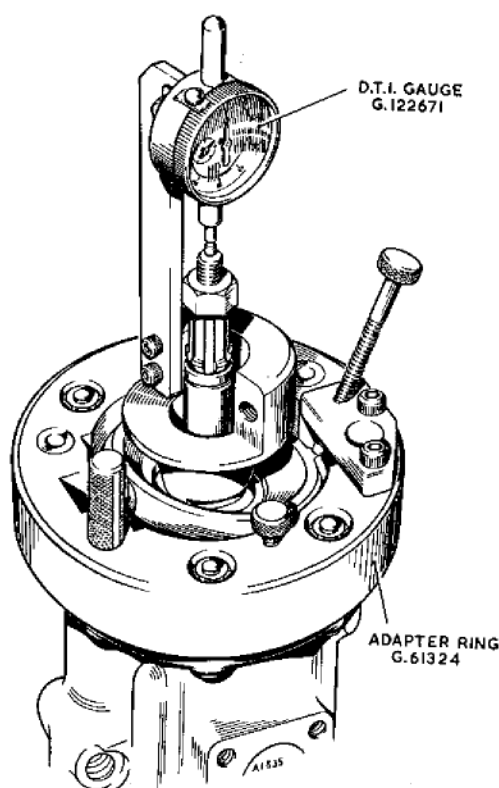


Fig. 10. Checking the auxiliary camplate lift

73. Zero the gauge with the rod just contacting the auxiliary camplate then press with the fingers to force the auxiliary camplate down. The lift should be between 0.002 in. and 0.007 in. at each piston position. Shim as required beneath the thrust ball.

74. Set the camplate to the neutral position, check the auxiliary camplate lift at any rotor position. The lift should be more than the maximum lift recorded at the $15\frac{1}{2}^\circ$ position. Remove the dial indicator gauge G 122671.

Checking the no flow stop screw setting

75. Press the control piston down on the no flow stop screw and hold in this position.

76. Measure the depth from the face of the adapter ring G 61324 to the machined face on the camplate at a position mid-way between the trunnions on the control piston side of the pump.

77. Take a similar measurement diametrically opposite to that in para. 76.

78. The measurement at the control piston side of the camplate is to be 0.010 in. to 0.020 in. less than the opposite measurement so ensuring a minimum positive stroke. To achieve this setting, remove the h.m.g. housing and adjust the amount of shimming underneath the no flow stop screw as required. Re-check the measurements as described above.

79. Remove the h.m.g. housing and lock the tabwasher on the no flow stop screw. Remove the adapter ring G 61324.

Fitting the camplate housing

80. Before fitting the housing to the pump body, assemble the carbon face seal and sealing ring to the housing inner bore. Locate the carbon bearing over the dowel and press the bearing in position with the hand. Secure with the circlip.

81. Place a new gasket on the pump body flange. Place the protective sheath T 203383 over the quill shaft and fit the housing and attached assemblies to the pump body, ensuring seating of the trunnion block spigots in the pump body locating bores. Do not allow the camplate housing to lift after being located and during the fitting of the securing bolts and nuts, otherwise leakage may occur during running due to unseating of the oil seal.

82. Secure with eight plain washers, spring washers and nuts and tighten evenly, using the ring spanner T 199127.

83. Remove the sheath and check the rotor for ease of rotation, using the splined spanner T 199561. Refit the sheath.

84. Assemble the spring and carbon face seal with sealing ring to the housing then push home the rotor extension collar and sealing ring, using the tool T 247945. Keep the assembly and spring depressed using the tool T 203382 and fit the circlip. Check the rotor for ease of rotation.

RESTRICTED

Fitting the h.m.g. housing

85. Fit a face sealing ring and the bobbin with sealing rings to their respective counter-bores in the housing face.

86. Locate a gasket on the pump body face and assemble the inner and outer control springs and spring seat to the pump body servo bore. Ensure that the springs locate squarely on the control piston.

87. Position a cover joint ring around the spring seat and assemble the housing to the pump body. Nine studs are located around the control piston end of the pump body. The four inner stud nuts are secured with tabwashers and the remaining five with plain washers and grover washers. Lock the tabwashers.

88. Fit a sealing ring to the H.P. strainer. Assemble the strainer and the spring to the larger bore in the end of the projection on the h.m.g. housing, using the protection sleeve T 314012, and secure with a washer, bonded seal and the flanged plug.

89. Assemble the governor fixed feed orifice and sealing ring to the smaller bore in the end of the projection on the h.m.g. housing, using the threaded extractor T 282139. Assemble the distance piece, spring, sealing washer and flanged plug to the above bore.

90. Assemble the three blanking bobbins and sealing rings into the face of the projection on the h.m.g. housing. Fit the blanking plate and secure with nuts and washers.

Checking the h.m.g. carbon face seal spring compression

91. This check is undertaken to ensure the correct spring compression when assembled into the pump. The setting piece T 310170 is machined to the nominal working length of the spring.

92. To check, proceed as follows referring as necessary to figure 11:—

(1) Locate the h.m.g. in the h.m.g. housing and push fully home over the rotor quillshaft splines.

(2) Measure the height of the h.m.g. sealing face above the housing joint face and record as dimension 'A'.

(3) Position the setting piece T 310170 in the spring locating bore in the carbon face seal body; place the face seal on a suitable level surface and measure the distance from the upper face of the setting piece to the level surface. Record as dimension 'B'.

(4) Measure the depth of the shim seating face from the amplifier valve housing joint face, add to this measurement 0.007 in. to allow for the joint face gasket compressed thickness and record as dimension 'C'.

(5) Add together the dimensions 'A' and 'B' and subtract the sum from dimension 'C'. Select shims to this value with the tolerance of plus or minus

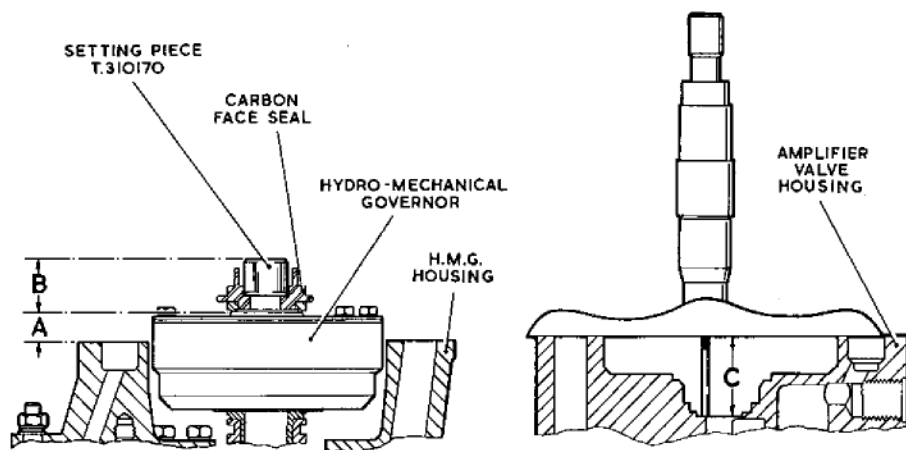


Fig. 11. Checking the h.m.g. carbon face seal load

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0.008 in. It will be found in practice that only one shim of approximately 0.010 in. thickness is usually required.

93. Example, using typical dimensions to the formula $C = (A + B)$:-

dimension A = 0.290 in.

dimension B = 0.560 in.

dimension C = 0.860 in.

$C - (A + B) = 0.860 - (0.290 + 0.560)$
= 0.010 in.

Therefore the shimming required underneath the carbon face seal spring is 0.010 in. plus or minus 0.008 in.

Fitting the h.m.g. assembly

94. Fit a sealing ring to the bearing groove in the h.m.g. housing and assemble the washer, spring and carbon face seal to the housing.

95. Align the h.m.g. rotor over the pump rotor shaft and press home the assembly with the fingers.

Fitting the amplifier valve housing

96. Fit the two bobbins with sealing rings to the mating face of the h.m.g. housing and position a gasket over the studs.

97. Fit a sealing ring to the carbon face seal and assemble the washer, spring and carbon face seal to the amplifier valve housing. Secure with the clamp ring and two bolts and tabwashers. Lock up the tabwashers.

98. Press a face sealing ring into the face of the housing and assemble the housing to the unit. Fit the bonded seals, unions and blanking plugs to the housing.

Fitting the rocker lever plate and orifice assembly

99. Locate the built-up assembly on the four studs in the amplifier valve housing and secure with two double tabwashers and four reach nuts. Tighten with the spanner T 175565 but do not lock the tabwashers at this stage.

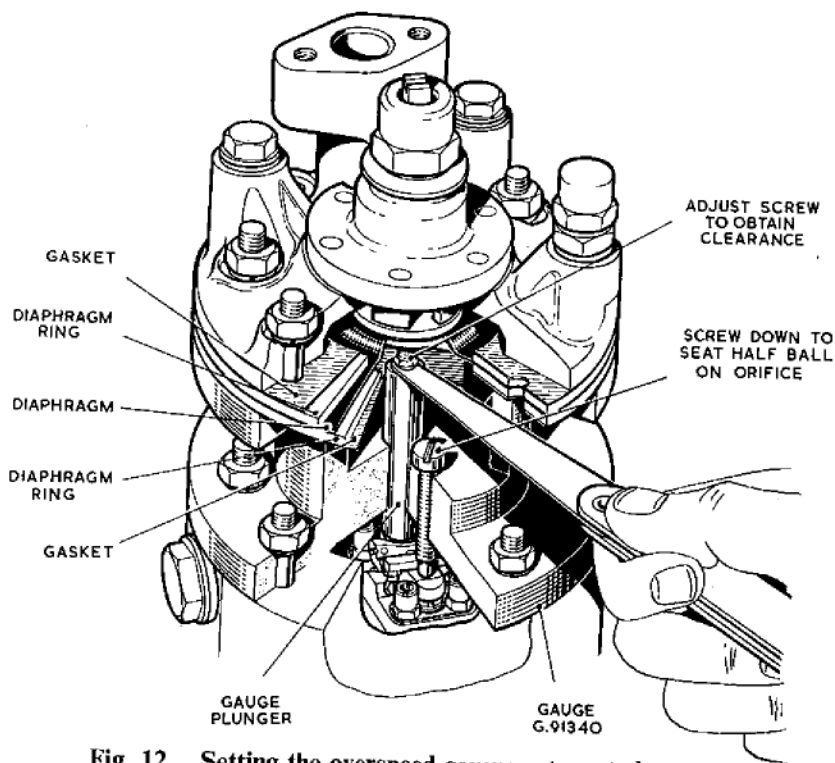


Fig. 12. Setting the overspeed governor tappet clearance

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Setting the governor tappet clearance (fig. 12)

100. This check is carried out to determine the working clearance between the diaphragm adjusting screw and the contacting face of the rocker lever tail.

101. When using a torque spanner plus an extension, the torque spanner *dial reading* required is calculated by using the following formula:—

Effective length of torque spanner	×	Torque loading required
Effective length of torque spanner	+	Effective length of extension

For example, to apply a torque load of 20 lb. in. with a torque spanner of 12 in. effective length and an extension of 4 in. effective length, the dial reading required would be:—

$$\frac{12 \times 20}{12 + 4} = \frac{240}{16} = 15 \text{ lb. in.}$$

102. Fit the gauge G 91340 over the pump body studs and assemble the pump gasket, diaphragm ring and built-up overspeed control assembly as shown in fig. 12. Secure with slave nuts and washers.

103. Screw in the governor adjusting screw to tension the spring, using the box key T 160988. Release the gauge plunger to allow it to rest on the rocker lever tail, then adjust the internal screw to maintain the half-ball amplifier valve on the orifice lands. Lock the plunger in position.

104. Using a feeler gauge, measure the clearance as shown. Adjust the diaphragm screw to obtain a clearance of 0.017 in. to 0.019 in. Tighten the locknut to a torque loading of 20 lb. in. to 25 lb. in. using the torque spanner adapter T 340438. Do not lock the tabwasher at this stage. Remove the assembly and gauge from the unit.

Fitting the overspeed control assembly

105. Fit the two bobbins with sealing rings to the housing face. Position a gasket and the diaphragm ring over the studs and assemble the built-up overspeed control to the unit. Locate the modification plate bracket over the studs. Secure with eight washers, spring washers and nuts, using the spanner T 199127.

Pump body details

106. Fitting the servo orifice and strainer assembly.

(1) Fit a sealing ring to the combined plug and servo orifice. Fit the strainer and sealing ring to the pump body bore and screw in the plug and orifice.

(2) Torque tighten to 125 lb. in. maximum.

107. Fitting the inlet strainer assembly.

(1) Fit the washer to the pump inlet bore and assemble the spring and strainer. Secure with the circlip.

(2) Remove the pump from the hydraulic assembly fixture and fit blanking plates and dust caps pending rig testing.

Final acceptance check

108. This check is carried out after final calibration and completion of final leakage tests, etc.

(1) Check that the unit external wire locking has been completed and the unit serial number and inspection record sheets are correct.

(2) Fit the modification plate to the bracket and secure with the two bolts, four tabwashers and two nuts.

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