

Chapter 9B—EXAMINING HIGH PRESSURE FUEL PUMPS Types M.G.B.B. 124 and M.G.B.B. 125

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Introduction

1. This chapter concerns the examination of the fuel pump components to verify their condition before rebuilding. Certain build checks, however, will be necessary during pump rebuild.

General

2. Where dimensional checks of specific components are necessary, the method only is described; the particular dimensions are tabulated in the Schedule of Fits, Clearances and Repair Tolerances, (Vol. 2, Part 2.).

3. Where components fail to meet the required examination standards, reference should be made to an approved repair scheme, where applicable, or with due regard to the function of the component and the nature of the defect, a new part should be fitted.

4. Scrupulous cleanliness of the immediate working area and tools used is essential during the handling and examination of the components.

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Redundant and consumable parts

5. As it is usual during examination to reject any parts rendered redundant by essential modifications, complete information covering modifications must be available for reference.

6. Metal washers, split pins, locking wire, gaskets, sealing washers and sealing rings are discarded during dismantling and their new replacements should be available for examination with the related components. Washers which are used for packing, adjustment or as spring seats may be re-used provided they are free from damage and distortion.

Crack detection

7. Wherever there is doubt concerning the soundness of components, they must be tested for cracks. The following components must be tested for cracks during examination at overhaul, the starred items by using an approved fluorescent penetrant method, and the unstarred items by using an approved magnetic testing method.

Description

H.m.g. rotor and end plate
H.m.g. leaf hinge*
H.m.g. housing carbon bearing*
Control piston
Control piston link and link pegs
Camplate
Auxiliary camplate
Rotor, bearing sleeve and extension
Quillshaft
Piston spring guides
Port insert
Camplate stop (flow delivery) screw

Special tools

8. The following special tools are for use during the examination of the fuel pump components.

<i>Tool No.</i>	<i>Description</i>
G 54619/23	Setting pieces, 5 off
G 119152/53	Setting pieces, 2 off
G 59529/33	Setting rings, 5 off
G 119150/51	Setting rings, 2 off
G 95019	Gauge, piston and slipper length

<i>Tool No.</i>	<i>Description</i>
G 62106	Dial test gauge, rotor small carbon-bearing clearance
G 100299	Dial test gauge, rotor large carbon bearing clearance
G 126351	Gauge, slipper lift
G 56550	Gauge, slipper lift, (alternative to G 126351)
T 210194	Fixture, strainer pressure drop test
T 217345	Fixture, strainer pressure drop test
T 287355	Fixture, riveting, (ref. only to availability)
T 293193	Lapping tool, rotor extension
T 310165	Lapping tool, h.m.g. rotor

Installation fittings

9. Examine all installation adapters and unions for cleanliness and general condition. Ensure that threads and joint faces are undamaged.

Protected surfaces

10. Cadmium plated components must conform to the following standards:—

- (1) The plating must be free from flaking.
- (2) Parent metal must not be exposed unless otherwise stated.
- (3) Discolouration of the plating is acceptable provided that the discolouration is not thermal, so affecting plating adhesion, unless otherwise stated.

11. Anodised surfaces on which the parent metal has been exposed should be treated by applying an appropriate repair scheme.

12. All chipped or flaked enamel should be renewed.

Sealing bores and leads

13. All seal bores and seal leads must conform with the following acceptance standards.

- (1) *Seal bores.* The sealing area must be free from damage, fretting and score marks; transverse scratches on the sealing area are not acceptable. The ideal surface finish for sealing areas is com-

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parable with 12 micro-inches or better. The seal bores may be polished to restore the surface finish providing the drawing dimensions or repair limits, where applicable, are maintained.

(2) *Seal leads.* The seal leads must be free from damage which may affect the seal during assembly. Protruding material, rough surfaces, damage, etc., may be removed by using '500 grade Silicon Carbide' paper. The edge between the seal lead and the seal bore may be blended out to remove any damage. The edge between the seal lead and the face may be radiused up to 0.025 in. A surface finish comparable with 12 micro-inches or better should be maintained on the seal lead. The angle of the seal lead may be increased up to 60° included angle. It is important to maintain the distance which the seal extends down the bore to within drawing dimensions or repair limits, where applicable, unless otherwise stated.

Overspeed control assembly

14. Examine the diaphragm assembly for distortion, cracking and splitting, and the riveting for security. The diaphragm is 100% replacement on time-expired pumps, irrespective of condition.

15. Examine the spring anchor, link pins, diaphragm centre, governor adjusting screw, tappet adjusting screw and locknut for undue wear and general condition.

16. Examine the capnut, the spring housing, and diaphragm outer rings for general condition and ensure that the spring anchor is a sliding fit in the housing bore.

17. Examine the diaphragm cover for general condition, ensuring that all internal drillings are clean and that joint faces are smooth and flat.

18. Examine the air vent blanking plugs and bleed valve assembly for general condition. Leakage test the bleed valve as follows:—

(a) Apply a fuel pressure to the inlet end of the valve of 5 lb/in² and 20 lb/in². The maximum leakage should not exceed 5 cm³/min.

(b) Fit the sealing ring and dome nut to the opposite end of the assembly and apply a fuel pressure of 80 lb/in². No external leakage is permissible.

19. The ball valve and spring inside the body is retained by a rolled lip and should not be disturbed. If the valve is faulty, a new assembly must be fitted.

20. Examine the spring which must be free from corrosion. Examine the spring for wear. Superficial fretting and wear of a polished nature is acceptable providing there is no perceptible depth to the wear or any ridges or grooves on the link pin contacting area.

Rocker lever plate and orifice assembly

21. Examine the rocker lever plate for general condition and ensure that all tapped holes are serviceable.

22. Examine the rocker lever for security of the riveted bridge piece and ensure that all tapped holes are serviceable. Examine the lever tail tappet screw contact face for indentation. Witness marking only is acceptable.

23. Examine the half-ball recess for wear. Indentation is acceptable providing that the diameter of the worn area does not exceed 0.060 in. Lightly polish the recess to remove any burrs at the edge of the worn area. Check that the half-ball swivels freely in the recess.

24. Examine the half-ball for wear on the dome and sealing face. Only wear of a polished nature is acceptable. Check the sealing face for colour registration against an optical flat glass. Not more than two colour bands are permissible.

25. The torsion hinges must be free from damage, distortion and cracks. Witness marking due to contact with attaching parts only is acceptable.

26. Examine the orifice assembly for damage, erosion, burrs and crumbling edges. The faces of the leg lands and the orifice insert face must be flat and level within 0.0002 in. total indicator reading, using an electro-limit comparator to check.

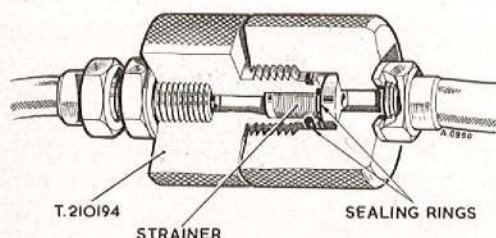


Fig. 1. Pressure drop testing the rocker lever strainer assembly

27. Examine the strainer for serviceability and carry out a pressure-drop test, using the fixture T 210194 (fig. 1). Record the pressure drop with the test fixture only, then fit the strainer and record the pressure drop difference which should not exceed 8 lb/in² at a fuel supply of 50 gal/h.

Amplifier valve housing

28. Examine the mating faces and sealing ring seats for scores, distortion and damage.

29. Examine all drillings and tapped holes for cleanliness and check the condition of all flanged plugs and installation unions.

30. Examine the carbon face seal retaining clamp ring, new tabwashers, bolts, spring and spring seating washer for general condition.

Hydro-mechanical governor assembly

31. Examine the rotor and end plate for fretting, corrosion and scoring which may have affected the bore of the carbon bearing or the faces of the two carbon faces seals. The carbon face seal sealing areas must be free from transverse scratches which may allow fuel leakage across the sealing areas.

32. Dimensionally check the rotor diameter in relation to the carbon bearing.

33. Examine the internal splines for fretting. Light stoning of sharp edges and slight scoring is permissible.

34. Examine the end face of the rotor at the splined end for scoring and ensure that the face is flat. Slight witness marking may be removed, using the lapping tool T 310165 and fine-grade lapping paste.

35. Examine the mating faces of the rotor and end plate for flatness and damage and ensure that all tapped holes are serviceable.

36. Examine the rotor plug and the rotor drive shaft plug location area for general condition.

37. Examine the balance weight, governor weight, governor lever and hinge for general condition. Ensure that the hinge is parallel to the orifice pad within 0.002 in. total dial indicator reading. If this reading cannot be obtained, no resetting of the hinge is permissible.

38. Examine the hinge locating dowels for security and freedom from fraze or damage.

39. Examine the mounting plate and diaphragm assembly for general condition and ensure that the orifice is unobstructed and free from damage on the land. The riveted diaphragm assembly which forms part of the mounting plate assembly is to be replaced on time-expired pumps, irrespective of condition. If the special riveting fixture T 287355 is available, the diaphragm assembly only need be changed. Where this fixture is not available, the complete mounting plate assembly must be renewed. Further examination checks are detailed in Chap. 9C.

Carbon face seals

40. Examine the two carbon face seals, new sealing rings, springs and washers for general condition. A good track should exist on the carbon faces. Deep scoring and signs of chipping or cracking is not permissible.

Hydro-mechanical governor housing

41. Dimensionally check the carbon bearing bore in relation to the rotor drive shaft.

42. Examine the mating faces for damage and distortion and all tappings and drillings for cleanliness.

43. Examine the studs for security and squareness to the housing faces and ensure that the threads are in good condition.

44. Carefully examine the carbon bearing for scoring, chipping or crumbling. The bearing is 'cemented' in position during manufacture and any defect, unless covered by a repair scheme, will necessitate replacement of the housing assembly.

45. If not removed, check the no-flow stop screw for security and general condition. If removed, check the threads of the screw and servo stop pillar and check that the adjusting shims are in good condition.

46. Examine the bobbins and sealing rings for general condition.

47. Closely examine the governor feed orifice which fits into the projection of the h.m.g. housing. Ensure that the orifice bore is clean, and that the extraction threads are free from fraze and undamaged.

48. Check the fuel flow through the orifice as described in Chap. 9D.

49. Examine the distance piece, spring and flanged retaining plug for general condition.

50. Examine the H.P. strainer, spring, shim washer, bonded seal and retaining plug which fit into the opposite end of the housing projection.

Control piston assembly

51. Examine the piston, circlip, retaining plate, new piston seal, springs and spring seat for corrosion and scoring. Light fretting and wear of a polished nature on the servo springs locating area of the piston is acceptable. Only superficial wear of a polished nature is acceptable on the servo springs.

52. Dimensionally check the piston rod diameter in relation to the pump body bore.

53. Dimensionally check the piston rod link hole in relation to the link pin diameter.

54. Examine the link, link pins and pegs as follows:—

(1) *Link*. Witness marking on the sides of the link due to contact with the camplate and the control piston is acceptable providing there is no step at the limit of the marked areas. The link pin locating bores must be free

from fretting; only wear of a polished nature is acceptable. The link peg locating bores must be free from indentation and the edges free from chipping. Dimensionally check the link bores in relation to the link pin diameters.

(2) *Link pins*. The link peg locating slots should be free from deposits, indentation and wear of a perceptible depth; only heavy witness marking is acceptable. The edges of the slots should be well defined and free from chipping. The bearing diameter surface should be free from fretting; only wear of a polished nature is acceptable.

(3) *Link pegs*. The surface must be free from indentation and wear of a perceptible depth. The ends of the pegs must be free from damage.

(4) Dimensionally check the link pin diameter in relation to the camplate link bore.

55. Examine the control cylinder liner for corrosion and scoring.

Camplate housing

56. Examine the front, rear and seal drain joint faces for scores, fraze and bruising, and ensure that the condition of all tapped holes is good.

57. Examine the bore and internal drillings for scoring, fraze and cleanliness. Check the bearing locating peg for tight fit in the housing.

58. Examine the circlip, rotor extension collar, carbon bearing, carbon face seals and spring for general condition. A good track should exist on the carbon face seal, deep scoring and signs of chipping or cracking is not permissible.

59. Check the rotor bearing for fit in the housing bore. The bearing should slide firmly into position under finger pressure. No attempt should be made to ease a bearing by the use of abrasives or machining. Any replacement is by selective assembly. The carbon bearing clearance check on the rotor is described in para. 88 of this chapter.

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60. Examine the seal drain connections and blanking plugs for general condition.

Camplate, trunnion blocks and washers

61. Examine the camplate for overheating and also damage due to 'pick up' from the piston slippers. Only superficial scratches and wear of a polished nature is acceptable.

62. Dimensionally check the lug link pin bore in relation to the link pin diameter.

63. Dimensionally check the camplate trunnion diameters in relation to the trunnion block bores.

64. Examine the washers which must be free from corrosion, scores, damage and bronze deposits. Scratches, heavy witness marks and wear of a polished nature are acceptable.

65. Examine the trunnion blocks for scoring, particularly on the flat faces which contact the trunnion block washers. Where the trunnion block bore sizes meet requirements, scoring of trunnion block faces is permissible providing that the side float of the camplate when assembled to the trunnion blocks in the camplate housing is between 0.006 in. and 0.010 in. and that no steps are left on the operational arc of contact on the block face.

66. Where steps exist in the scoring and the existing camplate side-float is sufficiently small to allow it, the faces may be machined back to clean up.

67. A step is permissible in the bore of each block between the worn and unworn areas providing that any fraze present is removable with '500 grade Silicon Carbide' paper. Otherwise the bores must be free from fretting and scoring; only wear of a polished nature is acceptable.

68. New trunnion blocks may be interchanged left to right during first build at reconditioning, but not after endurance testing.

Piston and slipper assemblies

69. Check the pistons for ease of movement in the rotor bores. Check the piston diameters for wear in the following manner using a comparator together with the setting pieces G 54619 to G 54623, G 119152 and

G 119153. The setting piece diameters are identical in size to the bores of a new rotor, seven sizes being available to correspond with the seven sizes of piston encountered.

(1) Select the appropriate grade setting piece corresponding to the size etched on the slipper skirt.

(2) Adjust the comparator gauge to the diameter of the setting piece.

(3) Insert the piston between the gauge and the contact point and make four checks along the length of the piston at 90° to each other.

(4) Check and record the amount of wear indicated.

(5) Subtract the minimum diameter of each piston from the corresponding rotor bore maximum diameter. If the clearance thus obtained is outside the limits quoted in the Fits and Clearances Schedule, the piston(s) concerned must be rejected.

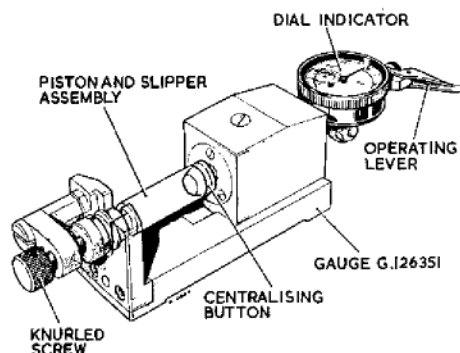


Fig. 2. Checking the piston/slipper lift

70. Check the piston/slipper lift in the following manner, using either gauge G 56550 or G 126351; refer to fig. 2.

(1) Insert each piston and slipper assembly, in turn, into the bore of the gauge with the skirt end of the piston locating against the centralising button on the dial indicator. Secure the assembly with the knurled screw.

(2) Press the piston towards the slipper and set the dial indicator to zero.

(3) Firmly withdraw the piston to its fullest extent and record the lift indicated; ensure that the piston is pulled squarely, otherwise a false reading may be indicated.

(4) Reject the piston if the recorded lift is outside the limits quoted in the Fits and Clearances Schedule.

71. Measure the height of each piston and slipper assembly in the following manner, using the height gauge G 95019 together with a suitable surface table and dial indicator; refer to fig. 3.

(1) Insert the piston into the sleeve portion of the gauge, then place the gauge, slipper lowermost, on the surface table. The gauge bore 'A' is identical in size to a new piston; seven sizes are available to correspond with the seven sizes of piston diameters encountered; e.g. G 95019/1 is a size one gauge, as illustrated. The overall length of the sleeve portion of the gauge is 1.645 in. for all seven sizes. This dimension is marked on the gauge adjacent to the bore size and gauge number and is shown in fig. 3 as dimension 'X'.

(2) Insert the gauge plug into the exposed bore of the piston. The distance from the plug seating face to the top of the plug boss is 0.100 in. and is shown in fig. 3 as dimension 'Y'.

(3) Locate the dial indicator button on the top face of the sleeve and set the indicator to zero.

(4) Position the sleeve so that the indicator button contacts the top of the plug boss, then note the indicator reading and record as dimension 'Z'.

Example:

Height of piston and slipper assembly
 $= (X - Y) + Z$
 $= (1.645 - 0.100) + 0.011 \text{ in.}$
 $= 1.556 \text{ in.}$

(5) Repeat the above check on the remaining piston and slipper assemblies and record the dimensions obtained. Refer to the paragraph headed 'Strip Inspection' in the Test Schedule, Chap. 9D, which defines the permissible reduction in height after endurance running.

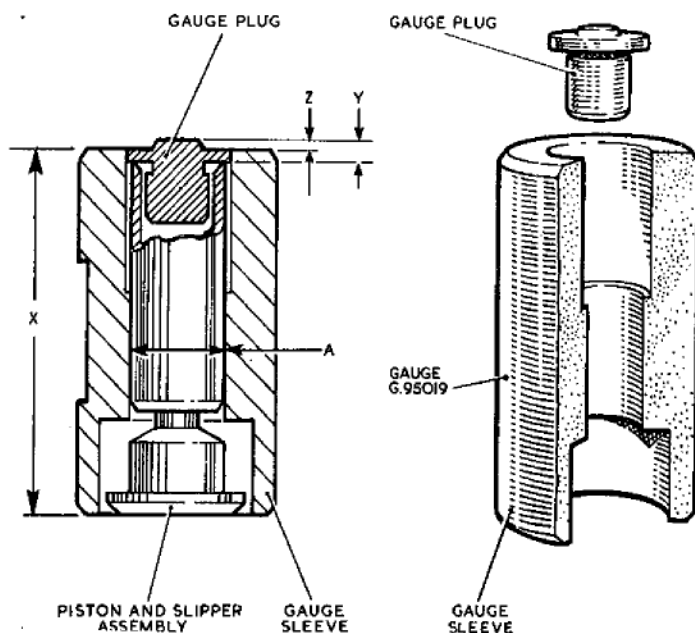


Fig. 3. Checking the piston/slipper height

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72. Dimensionally check the slipper skirt diameters. Providing the dimensional checks are within the stated limits, the assemblies may be accepted to the following standards:—

(1) *Piston skirt*. Light scratches are permissible. Circumferential scoring is permissible providing they are not more than six in number and that the gap between them is not less than 0.050 in. No other departures from the above surface finish is permissible.

(2) *Piston bore*. The bore should have a surface finish comparable with 25 micro-inches and free from deposits. The radiused lead should be free from damage. The bleed hole should be free from obstruction and deposits.

(3) *Piston slipper (silver plated)*. The slipper should be free to swivel on the piston ball. The plating on the camplate contacting face should be free from flaking or swaging. Light scoring of the plated area is permissible, providing that the base metal is not visible. Scoring of the unplated area and impregnation by foreign materials is not permissible. Discolouration of the silver plating is permissible up to a light grey or black bronze appearance, providing that:—

(a) The plating is intact beneath the discolouration.

(b) The discolouration of the affected area is uniform, i.e. free from local intense corrosion.

(c) The base metal is not exposed.

(d) A dull black appearance is not acceptable.

(4) *Slipper skirt*. The skirt must be free from damage and fraze. Worn areas (due to auxiliary camplate rub) should be of a polished appearance.

(5) *Underside of slipper head*. This surface should be free from damage, and the outer diameter free from abrasion due to 'edging' against the auxiliary camplate. Evidence of wear to be of a polished nature only.

73. Check that the piston springs are free from corrosion, fracture and sharp edges. Piston springs on time-expired pumps are 100% replacement, irrespective of condition. The discarded springs, however, should be examined for completeness to ensure that no fragment(s) have affected other parts of the pump assembly.

74. Ensure that the spring seats are sound and the pressure feed holes unobstructed. Superficial fretting and wear of a polished nature is acceptable on the spring seats spring locating area.

Thrust ball and auxiliary camplate assembly

75. These components are a lapped mating assembly and should not be interchanged with other similar parts. Examine the flats surrounding the slipper locating bores in the auxiliary camplate for damage. Evidence of dishing of the flats and steps at the limit of wear is acceptable providing that the wear does not extend beyond the original flat area and is of a polished nature.

76. The flat showing evidence of greatest wear must be checked for hardness, and a reading of 700 V.P.N. obtained at 10 Kgm. loading. Carry out this check as near as possible to the slipper locating bore.

77. The thrust ball mating area of the auxiliary camplate must be free from score marks and scratches, only wear of a polished nature and superficial surface discolouration is acceptable.

78. The edges between the slipper locating bores and the surrounding flats must have a radius of at least 0.015 in. to prevent damage to the underside of the slipper heads. If restoring this radius is necessary, a surface finish comparable to 30 micro-inches must be obtained.

79. Dimensionally check the thrust ball bore in relation to the rotor diameter.

80. Examine the thrust ball spring seat mating area for damage. Score marks and evidence of wear is acceptable.

81. The thrust ball auxiliary camplate mating area must be free from damage and the plating free from flaking. Fretting or score marks is not permissible. Only light

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scratches and wear of a polished nature is acceptable. Evidence of parent metal being exposed on the thrust ball spherical diameter is acceptable providing that there is evidence of plating on at least 50% of the area above the centre line of the ball. General discolouration of the plating on the thrust ball is acceptable.

82. Fretage and wear in the thrust ball bore is acceptable providing that the bore diameter is within the specified limits.

83. Examine the spring seat, spring and shim washer(s) for general condition.

Rotor carbon bearings

84. The bearing to be free from cracks and crumbling. Light score marks and chipping is permitted on the outside diameters and the two ends. Damage is acceptable in the dowel location slots providing that no more than 0.015 in. is removed from the edges of the slot and that the width of the slot is not increased by more than 0.005 in. due to contact with the dowel.

85. The bearing surface edges must be free from chipping and crumbling, especially around the lubrication slots. Light scoring

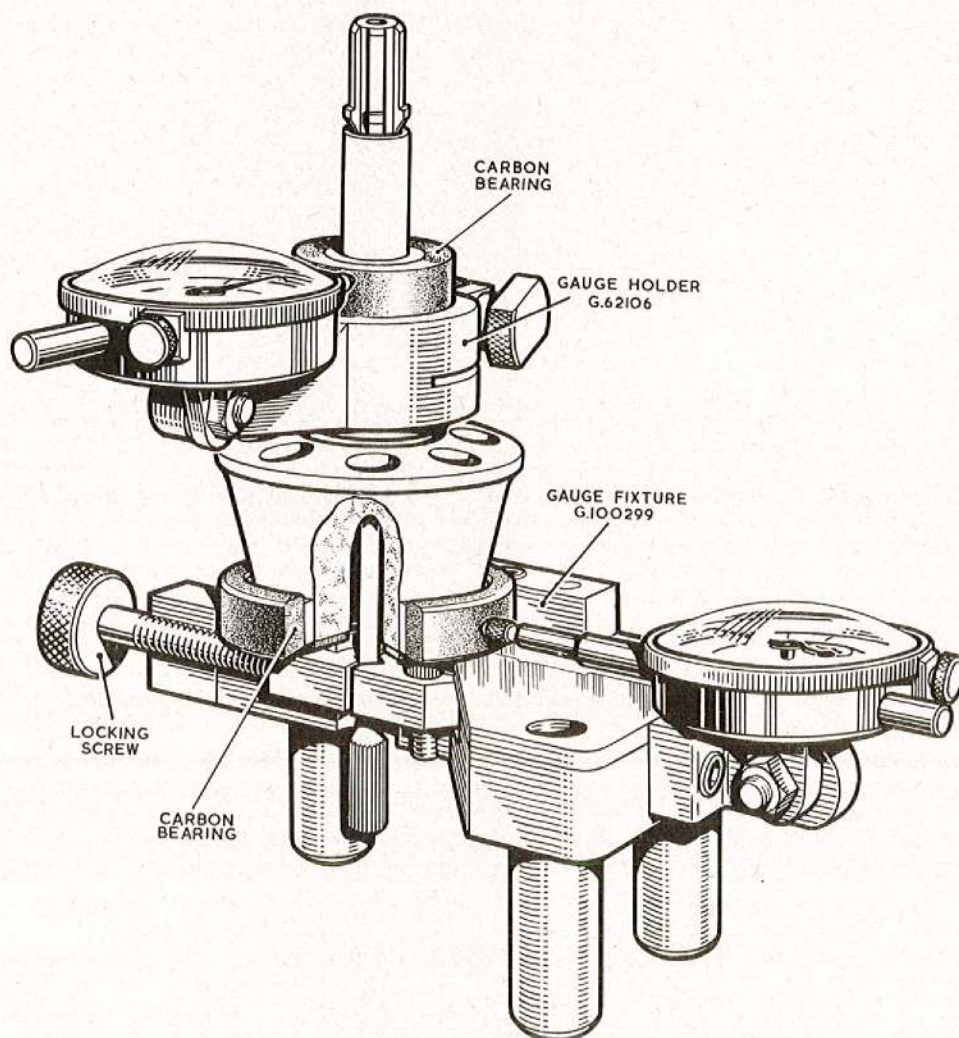


Fig. 4. Checking the rotor carbon bearing clearance

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of the bearing surface is permissible providing that the scores are more than 0.050 in. away from the edge of the bearing surface. Surface impregnation by foreign material is not acceptable.

86. Discolouration of the bearing surface is permissible providing that the discolouration is of a uniform nature and takes the colour of the metallic constituent of the bearing material. Local intense discolouration is not acceptable.

87. Check that the bearings are a good sliding fit in the body and camplate housing. No attempts should be made to ease a bearing by the use of an abrasive or by machining. Replacements should be by selection to give the desired fit.

88. Check the diametral clearance between the bearings and their corresponding journals on the rotor, using the gauge G 62106 to check the smaller bearing and the gauge G 100299 to check the larger bearing, both gauges being used together for convenience as shown in fig. 4. (To enable gauge G 100299 to be used the quill shaft must be assembled to the rotor.) Proceed as follows:—

(1) Place a finger on the carbon bearing adjacent to the button of the gauge and press against the journal to take up all clearance. Set the dial indicator gauge to zero and transfer the finger pressure to the opposite side of the bearing when the gauge will indicate the clearance. Rotate the bearing approximately one-sixth of a turn and recheck, repeat the check at one-sixth of a turn intervals until the bearing has rotated completely. The maximum clearance indicated should be within the limits quoted in the Fits and Clearances Schedule.

(2) Check the clearance on the other bearing using the same method.

(3) If clearance is excessive and a new carbon bearing is to be fitted, first check that the fit in the pump body or camplate housing is correct before re-checking the journal clearance.

Rotor assembly (refer to fig. 6 for location of examination areas)

89. Check the rotor assembly to the limits quoted in the Fits and Clearances Schedule in conjunction with the various mating components.

90. Unless stated otherwise in this paragraph, light damage and score marks are acceptable providing that no noticeable distortion has taken place.

91. Examine the components for cleanliness; pay special attention to the bores and drillings.

92. New piston springs must be fitted at reconditioning.

Rotor piston bores

93. Visually examine the seven rotor bores for wear, using an Introscope or suitable equipment. Plating wear is acceptable provided that the parent metal is not exposed on the two centre lands in any bore. The bores must be free from damage. Score marks running axially along the bores are not acceptable. Light score marks running circumferentially around the bores are acceptable provided that there is a definite clear band between any two score marks, otherwise only scratches and service witness marks are permissible. The plating must be free from flaking. General surface discolouration is acceptable.

94. Dimensionally check the diameter of the two centre lands of each bore to the limits quoted in the Fits and Clearances Schedule, using an Intercheck gauge and the setting rings G 59529 to G 59533, and G 119150 to G 119151, fig. 5. The setting ring bores are identical in diameter to a new rotor; seven sizes are available to correspond with seven sizes of rotor as indicated. Set the gauge to zero in the selected setting ring bore, remove the ring and check the rotor bore; make four checks at 90° to each other in each bore. If any one bore fails to meet the visual examination or dimensional check, as detailed in para. 93 and 94, the rotor must be rejected.

95. Examine the spring guide locating bores. Wear and fretting is permissible up to the dimensional limits quoted in the Fits and Clearance Schedule.

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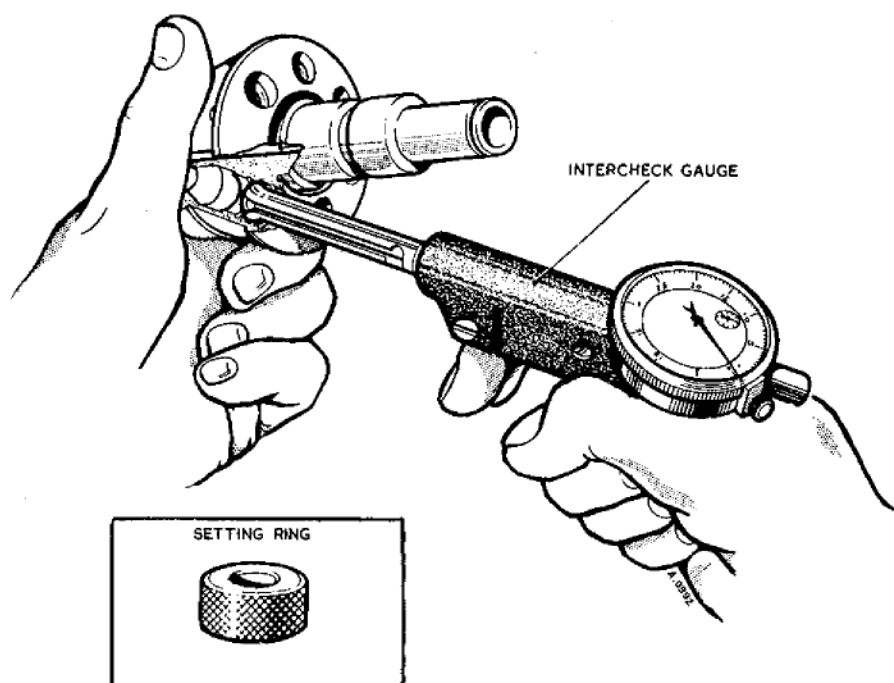


Fig. 5. Checking the rotor piston bores

Rotor port face

96. Examine the rotor port face. Light scoring and erosion is permissible providing that the parent metal is not exposed. Impregnation by foreign material is not acceptable. Discolouration of the silver plating is permissible up to a light grey or black bronze appearance providing that:—

- (1) There is evidence that the silver plating is intact beneath the discolouration.
- (2) The discolouration of the affected area is uniform and not local and intense.
- (3) There is no evidence of parent metal being exposed.

Note . . .

No departure from the above standards is permissible. A dull black appearance is not acceptable.

Rotor bearing sleeve

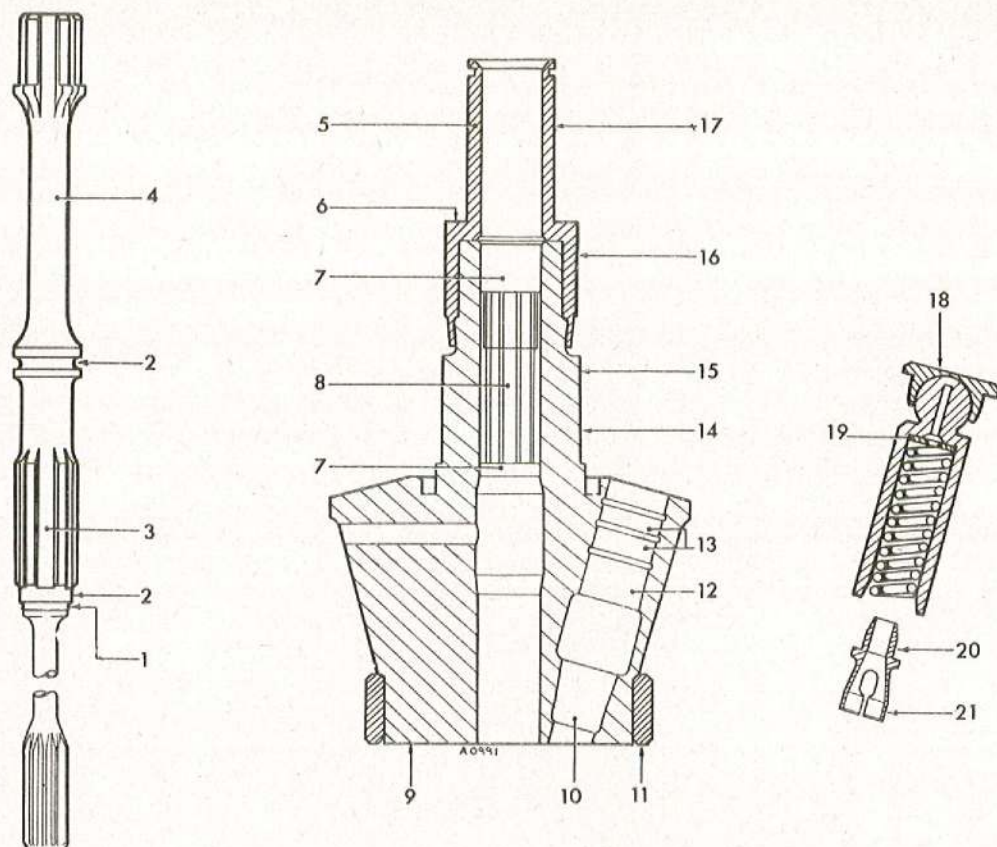
97. Dimensionally check the rotor bearing sleeve to the limits quoted in the Fits and Clearance Schedule.

98. The bearing sleeve must have a polished appearance and a surface finish comparable with 16 micro-inches or better. Corrosion, damage and score marks are not permissible. Only wear of a polished nature is acceptable. Where thermal discolouration has occurred the surface finish may be restored with '500 grade Silicon Carbide' paper providing that after polishing, a minimum hardness of 680 VPN/10 Kgm load is recorded at four places on the sleeve spaced 90° apart and that the dimensional limits quoted in the Fits and Clearances Schedule are maintained.

Rotor extension

99. Dimensionally check the rotor extension to the limits quoted in the Fits and Clearance Schedule.

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- | | |
|---|--|
| 1 CIRCLIP LOCATING GROOVE | 12 PISTON BORE |
| 2 SEALING RING SEALING AREA | 13 CENTRE LANDS |
| 3 QUILL SHAFT SPLINES | 14 SPRING SEAT DIAMETER |
| 4 QUILL SHANK | 15 THRUST BALL DIAMETER |
| 5 ROTOR EXTENSION | 16 JOURNAL DIAMETER |
| 6 SHOULDER AND MATING FACE (for Carbon Face Seal) | 17 SEALING DIAMETER |
| 7 SEALING RING SEALING BORE | 18 PISTON AND SLIPPER ASSEMBLY |
| 8 QUILL SHAFT LOCATING SPLINES | 19 SPRING SEAT |
| 9 ROTOR PORT FACE | 20 SPRING LOCATING DIAMETER |
| 10 SPRING GUIDE LOCATING BORE | 21 MATING DIAMETER (Spring Guide to Rotor) |
| 11 BEARING SLEEVE | |

Fig. 6. Sectional view of rotor

100. Where thermal discolouration has occurred, the surface finish may be restored by polishing with '500 grade Silicon Carbide' paper providing that after polishing a hardness of 680 VPN/10 Kgm load minimum is recorded at two places spaced 180° apart, and that the dimensional limits quoted in the Fits and Clearance Schedule are maintained.

101. The journal diameter must be free from corrosion, damage and score marks and is to have a polished appearance and a

surface finish comparable with 16 micro-inches or better. Only light scratches and service witness marks are permissible.

102. The sealing diameter surface must be free from damage, corrosion and score marks and must have a finish comparable with 8 micro-inches or better. Only wear of a polished nature is acceptable, light damage and score marks may be removed by polishing. The sealing diameter is to be checked for hardness, the minimum hardness acceptable is 680 VPN/10 Kgm load.

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103. The carbon face seal mating face must have a surface finish comparable with 6 micro-inches or better, and must be free from corrosion, damage and score marks. Transverse scratches across the face are not acceptable, only light circumferential scratches and service witness marks are acceptable. This face may be lapped flat to cure oil seal leakage, refer to 'Testing', Chap. 9D, using the tool T 293193.

Thrust ball and thrust ball spring seat locating diameter

104. Dimensionally check this diameter to the limits quoted in the Fits and Clearance Schedule.

105. Wear and fretting is permissible on this diameter up to the limits quoted in the Fits and Clearances Schedule. Frazzle and sharp edges must be removed. '320 grade Silicon Carbide' paper is recommended for this operation. Care must be taken to ensure that the thrust ball mating area is not affected by this operation and that the dimensions referred to in the Fits and Clearances Schedule are maintained.

Quillshaft locating spline

106. Dimensionally check this spline to the limits quoted in the Fits and Clearances Schedule. Score marks, fretting and wear are acceptable on the spline minor diameter up to the limits quoted in the Schedule. The end of the bore nearest to the rotor extension may be bell mouthed outside the 'permissible worn dimension' for a distance of 0.2 in. down the bore. Wear and fretting on the sides of the splines is acceptable provided that there is no evidence of a step near the root of the spline.

O-ring sealing bores

107. These bores are situated immediately adjacent to the port face end of the spline, and adjacent to the rotor extension at a distance of approximately 1.50 in. down the bore. The bores must have a surface finish comparable with 12 micro-inches or better and are to be free from damage or score marks which may provide a leakage path past the seal. The approach to these sealing areas must be free from damage which may affect the seal on assembly.

Quillshaft

108. The quillshaft must be dimensionally checked to the limits quoted in the Fits and Clearances Schedule and must be examined to ensure that it is free from corrosion and damage. On dimensionally checking the splines, ensure that a false reading is not obtained due to the splines being tapered or undercut. A radius of up to 0.005 in. is permissible on the corner of the splines where the major diameter meets the side of the splines.

Light damage and score marks are acceptable in the circlip retaining groove providing that the O-ring sealing area is not affected.

109. The surface finish of the sealing rings sealing areas must be comparable with 12 micro-inches or better and must be free from damage which may provide a leakage path past the seal.

110. The quill shank must be free from damage and score marks. Only light scratches are acceptable. Light damage and score marks may be removed by polishing.

Piston spring guides

111. Dimensionally check the spring guides to the limits quoted in the Fits and Clearances Schedule and ensure that they are free from corrosion. Wear and fretting is permissible up to the limits quoted in the Schedule. The spring locating shoulder and rotor mating diameter must be free from damage, only superficial fretting and wear is permissible.

Port insert, retaining spider and circlip

112. Examine the port insert for general condition. Check the parallelism of the two sealing faces of the insert; refer to the limits quoted in the Fits and Clearances Schedule.

113. Examine the insert rotor bearing face for wear and chipping at the edges and examine for signs of rotor plating adhering to the insert.

114. Examine the retaining spider for general condition. The port insert mating edge of the spider may be chamfered due to contact with the port insert. The spider may

be re-used providing that the chamfer does not extend to the full thickness of the spider. In cases where the spider has been reversed and there is a chamfer on both sides of the spider, it may be re-used providing that the two chamfers do not meet.

115. The bearing circlip must be free from fretting, only witness marking and wear of a polished nature is acceptable. Distortion of the circlip is acceptable.

Pump body casting and details

116. Examine the casting for general condition, particularly the joint faces. Ensure that all drillings and bores are clean and not damaged. Examine the studs and inserts for security and general condition.

117. Examine the port insert seating face in the pump body in accordance with the following standards:—

- (1) General discolouration and wear of a polished nature is permissible.
- (2) Fretting corrosion is acceptable around the inlet port providing that it does not exceed, by comparison, that shown in the photograph 'A', fig. 7. The line drawing provides location only and is not to be regarded as a standard for assessing damage.
- (3) Erosion lines across the face in any direction are acceptable providing that

they are no wider by comparison than the heavy line diametrically opposite to the dowel in photograph 'A'. Two such lines are acceptable.

(4) Fine erosion lines radiating from the high pressure outlet port are acceptable as shown in photograph 'A'.

(5) The erosion lines shown in photograph 'B' are not acceptable.

(6) No other deviation from the original surface finish is acceptable.

(7) The dowel should be a firm fit in the body and must be free from damage. Only wear of a polished nature is acceptable.

118. Examine the carbon bearing locating dowel for firm fit and damage.

119. Examine the delivery screw, new washers and nuts for general condition. The dome end of the delivery screw should be free from damage and fretting. Only wear of a polished nature is acceptable.

120. Examine the inlet strainer, circlip, spring and washer for general condition.

121. Examine the servo orifice, strainer and retaining plug for general condition. Pressure drop test the strainer, using the fixture T 217345. The pressure drop should not exceed 8 lb/in² at a fuel supply of 50 gal/h.

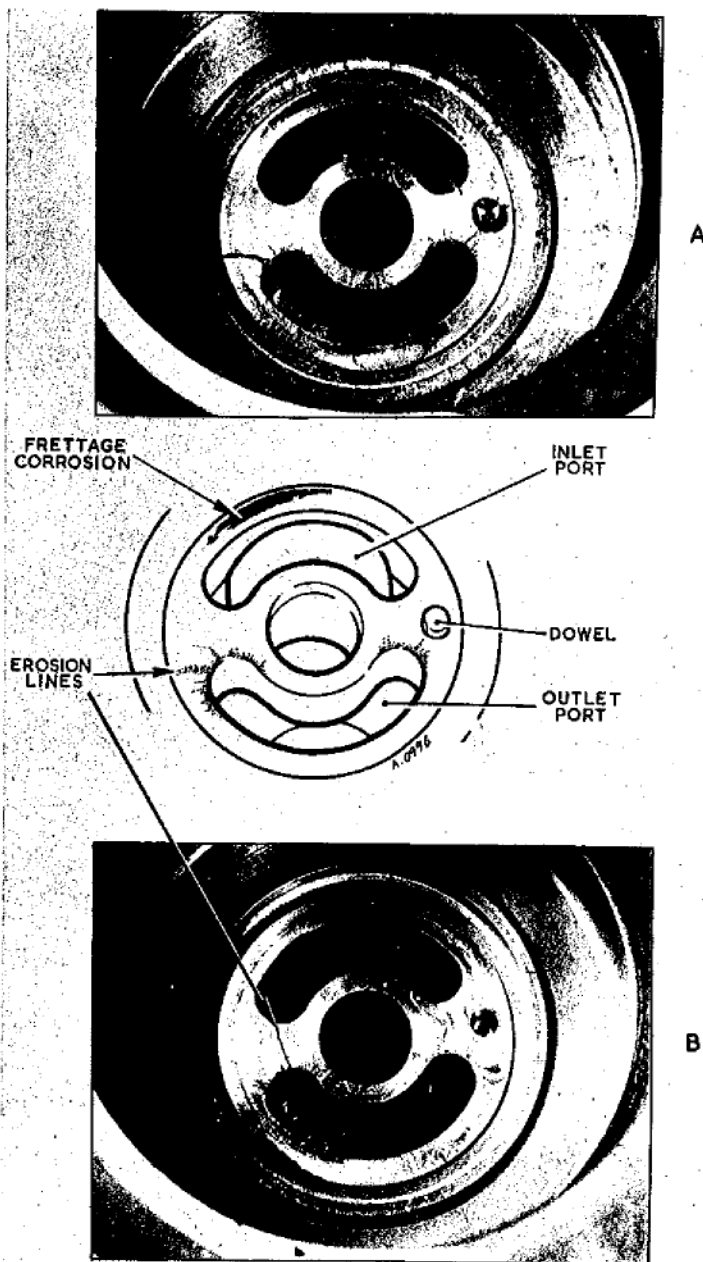


Fig. 7. Photographic standards of pump body port insert face

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