

CANCELLED

DO NOT DESTROY

Chapter 13

PUMP, DE-ICING, WELDON TYPE 105B

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Introduction

1. The Weldon de-icing pump Type 105B is a cam rotor type pump driven by an electric motor at 12000 rev/min. Further details of the description and operation of this pump are contained in A.P.4343D, Vol. 1, Book 2, Sect. 10, Chap. 13.

Dismantling

2. The pump and motor should be dismantled as detailed in the following paragraphs.

Pump

3. Remove the locking wire from the four screws securing the pump to the motor then proceed as follows:—

- (1) Remove the four screws securing the pump to the motor and separate

the pump from the motor.

- (2) Remove the seal spring and washer from the pump rotor shaft.

- (3) Using long-nosed thin pliers, remove the cage seal taking care not to damage the bronze seat.

- (4) Remove the locking wire from the nine screws securing the cover to the pump body and remove the screws and cover.

- (5) Remove the rotor by pressing on the end of the rotor shaft.

- (6) Collapse the blades towards the centre and remove the blades and retaining ring. Identify each blade so that each blade can be restored to its original slot and position during assembly.

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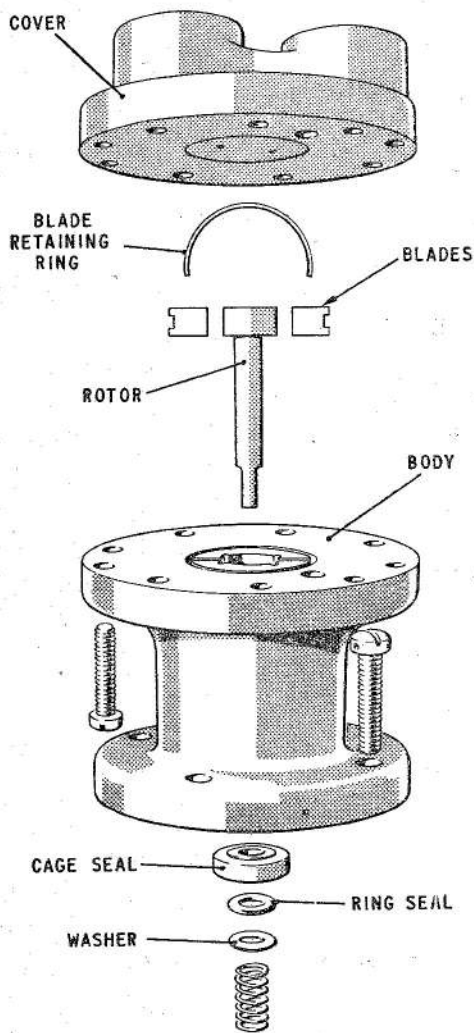


Fig. 1. Exploded view of pump

Motor

4. The motor should be dismantled in the following sequence:—

- (1) Remove the locking wire and screws securing the brush caps (7). Remove the brush cap, copper washer (8) and brush holder screw (9) then remove the brushes (10).
- (2) Remove the two screws securing the two brush holders (11) and remove the brush holders.
- (3) Remove the two nuts and washers

securing the drive end frame (1) and remove the drive end frame, copper gasket (2) and oil seal (3).

(4) Remove the four screws securing the plug (19) and remove the plug and gasket (18).

(5) Remove the two screws securing the hub cap (17) and remove the hub cap, gasket (16) and washers (14) and (15).

(6) Remove the commutator end frame complete with armature.

(7) Remove the screw and washer from the end of the armature shaft and separate the armature from the commutator end frame.

(8) Using the appropriate bearing extractor remove the two bearings.

Cleaning

5. The pump and motor, except the armature and field assembly, should be cleaned in gasoline non-lead. The armature and inside the field assembly should be cleaned using a clean cloth moistened in gasoline non-lead.

Examination and repair

6. The bearings, brushes, cage seal and seal ring should be discarded. Examine the bronze seal face on the bottom of the insert in the body for scratches or nicks. Examine the blade retaining ring at the blade contact points. It should be discarded if worn. Examine the items detailed in Table 1. Any parts worn beyond the specified dimensions should be discarded.

Motor

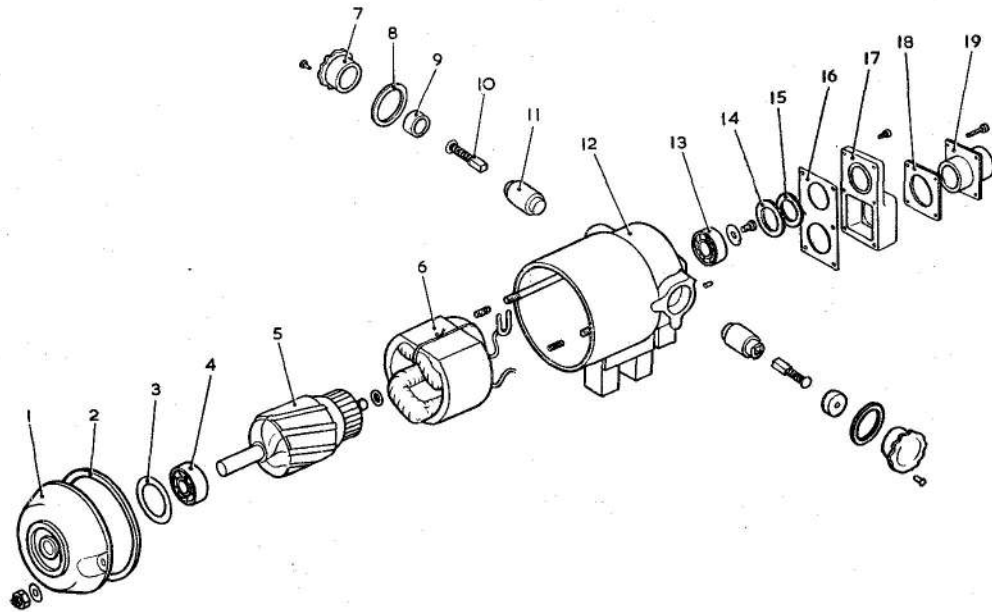
7. Examine the motor for signs of damage. Examine the armature for damage or burnt insulation and the commutator for scores or pitting. The commutator may be skimmed provided it is not reduced to less than 0.84375in. After skimming the mica should be undercut to a depth of 0.03125in.

Re-assembling

Motor

8. The motor should be assembled in the following sequence:—

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- | | | | |
|----|---------------------------|----|-------------------------|
| 1 | END FRAME, DRIVE | 11 | BRUSH HOLDER |
| 2 | GASKET, COPPER | 12 | END FRAME, COMMUTATOR |
| 3 | SEAL, OIL | 13 | BEARING, COMMUTATOR END |
| 4 | BEARING, DRIVE END | 14 | WASHER |
| 5 | ARMATURE | 15 | WASHER |
| 6 | FIELD COIL | 16 | GASKET, HUB CAP |
| 7 | CAP, BRUSH | 17 | HUB CAP |
| 8 | WASHER, COPPER | 18 | GASKET, PLUG |
| 9 | SCREW, BRUSH HOLDER | 19 | PLUG |
| 10 | BRUSH AND SPRING ASSEMBLY | | |

Fig. 2. Exploded view of motor

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(1) Place the washer on the armature shaft at the commutator end and fit new bearing. Fit new bearing to drive end of the armature shaft.

(2) Fit the armature (5) into the commutator end frame (12) and refit the screw and washer on the end of the armature shaft.

(3) Fit the commutator end frame, complete with armature, to the yoke.

(4) Refit the washers (14 and 15), gasket (16) and hub cap (17) securing them in position with two screws.

(5) Reconnect the field coil lead to the plug pin and fit plug (19) and gasket (18) to the hub cap. Secure the plug in position with the four screws.

(6) Fit new oil seal (3) on the armature shaft and fit the copper gasket (2) and drive end frame (1) to the yoke. Secure the end frame with two locknuts and plain washers.

(7) Push the brush holders (11) into their sockets and secure them in position using the two grub screws.

(8) Fit new brushes (10) in their holders and secure in position with the screws (9).

(9) Refit the copper washer (8) and brush cap (7) securing in position with two screws. The two screws should be wire locked.

9. Before assembling the motor to the pump, it should be tested as detailed in para. 11 and 12.

Pump

10. The pump should be assembled in the following sequence:—

(1) Refit the blades in the slots and the retaining ring in the groove. Push the blades to the extreme outside and tilt the tops outwards to form a cone to allow easy entrance of the rotor. The blades must be the same way round, and fitted to the same slots, as previously.

(2) Push the rotor into place. The blades should then assume their normal position.

(3) Examine the tops of the blades and the rotor to ensure that they are 0.004-0.006in. below the surface of the body.

(4) Refit the cover on the body with the inlet port hole directly over the drilled inlet hole in the body. Secure the cover in position using nine screws.

(5) Apply several drops of light grade, clean oil to the inlet port to serve as a lubricant for initial start.

(6) Turn the rotor shaft to ensure it turns freely.

(7) Wire lock the nine screws.

(8) Apply a drop of light grade, clean oil to the seal face of the bronze insert to serve as a lubricant for initial starting.

(9) Fit the rubber sealing ring inside the cage seal and push this assembly on to the rotor shaft.

(10) Place the seal washer then the spring on to the rotor shaft. To attach the pump to the motor, engage the end of the rotor shaft with the slot in the armature shaft. Secure the pump and motor together using four screws.

TESTING

Motor

Insulation resistance test

11. Remove the negative brush and test the insulation resistance between the pin of the plug and the motor frame. A reading of not less than 50000 ohms should be obtained.

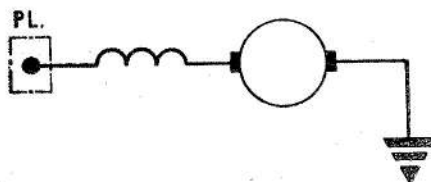


Fig. 3. Circuit diagram

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Load test

12. If a suitable test rig is available, connect the motor to a 27V d.c. supply and load the motor to a torque of 1.128 oz/in. The current should be 1.1 to 1.4A at a speed of 12,500 to 16,000 rev/min.

Pump*Calibration test*

13. Connect the pump to a suitable test rig. Using a 28V d.c. supply, run the motor and ensure that there is a flow of 3.6-4.8 gal/hour per outlet.

TABLE 1
Schedule of fits and clearances

| Fig. No. | Description | Dimension new (in) | Permissible worn dimension (in) |
|----------|---------------------------------|--------------------------|--|
| 1 | Rotor head diameter | 0.3746 | 0.3744 |
| 1 | Rotor head length | 0.1877 | 0.1875 |
| 1 | Rotor shank diameter | 0.1875 | 0.1870 |
| 1 | Body insert bore diameter | 0.3752 | 0.3750 |
| 1 | Body insert shank bore diameter | 0.1885 | 0.1880 |
| 1 | Body insert blade slot width | 0.0450 | 0.0445 |
| 1 | Body insert blade slot depth | 0.1881 | 0.1879 |
| 1 | Blade height | 0.1877 | 0.1875 |
| 1 | Blade thickness | 0.0442 | 0.0440 |
| 1 | Retaining ring | | Discard if it shows any wear |

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1

2

3

4

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