Chapter 3

PUMP, DE-ICING, T.K.S. TYPE A

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Motor	*Part No X/26301*
Voltage	28*V*
Brush length (new)	0·68 *in*
Brush length (min.)	0·552 *in*
Commutator dia. (new)	1·68 *in*
Commutator dia. (min.)	1·5 *in*
Maximum eccentricity	0·002 *in*
Depth of mica undercut	0·02 *in*
Resistance at 20 deg. C	
Armature	0·47 — 0·57 *ohm*
Shunt field	44 — 54 *ohm (total)*
Series field	0·032 — 0·04 *ohm per coil*

DESCRIPTION

Introduction

1. The T.K.S. de-icing pump Type A (fig. 1) is a cellular pump unit, each cell housing two complete pump units. The pump is driven through gearing by a 28V compound wound, d.c. motor. The T.K.S. Type 7 and the T.K.S. 28000 series pumps are variants of this type.

Motor

2. The motor comprises a yoke, armature, commutator and drive end frames. The complete assembly is secured by two long bolts threaded at both ends and insulated

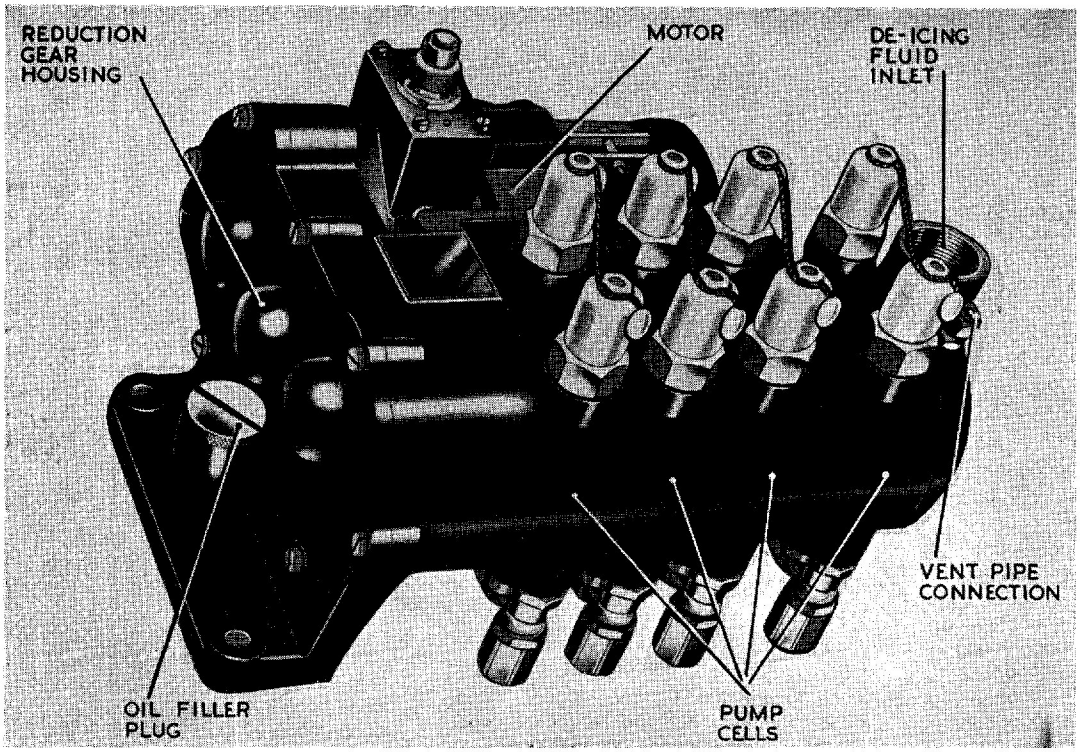

Fig. 1. Pump, de-icing, TKS Type A

using Systoflex tube. The two leads of the motor are brought out to a terminal block mounted on the drive end frame. The armature, which is wire wound rotates between two sealed for life ball bearings. A fan housed in the commutator end frame and keyed to the armature shaft provides cooling for the motor.

Pump

3. The pump is described in A.P.1464D, Vol. 1, Part 2, Sect. 20.

SERVICING

4. Examine the motor for signs of external damage and corrosion. The motor should be examined in accordance with A.P.4343, Vol. 1, Sect. 18, Chap. 1, at intervals specified in the relevant Servicing Schedule.

5. If it is required to renew any part of the motor it should be removed from the pump as follows :—

(1) Remove the filler cap then drain the oil from the gearbox.

(2) Remove the eight 2 BA screws from the pump gear case cover then remove the cover.

(3) Remove the $\frac{1}{4}$ in. B.S.F. nut and tab washer securing the motor gear wheel then remove the gear wheel.

(4) Remove the three $\frac{1}{4}$ in. B.S.F. set screws securing the motor to the gear case.

(5) Remove the four $\frac{1}{4}$ in. B.S.F. set screws securing the clamping band to the pump body then remove the clamping band and motor.

Dismantling

6. When the motor has been removed from the pump it should be dismantled until the defective part is removed as detailed in the following sub-para. :—

(1) Loosen the cover band bolt then remove the cover band.

(2) Identify the brush holders and brushes then remove the brush leads and brushes.

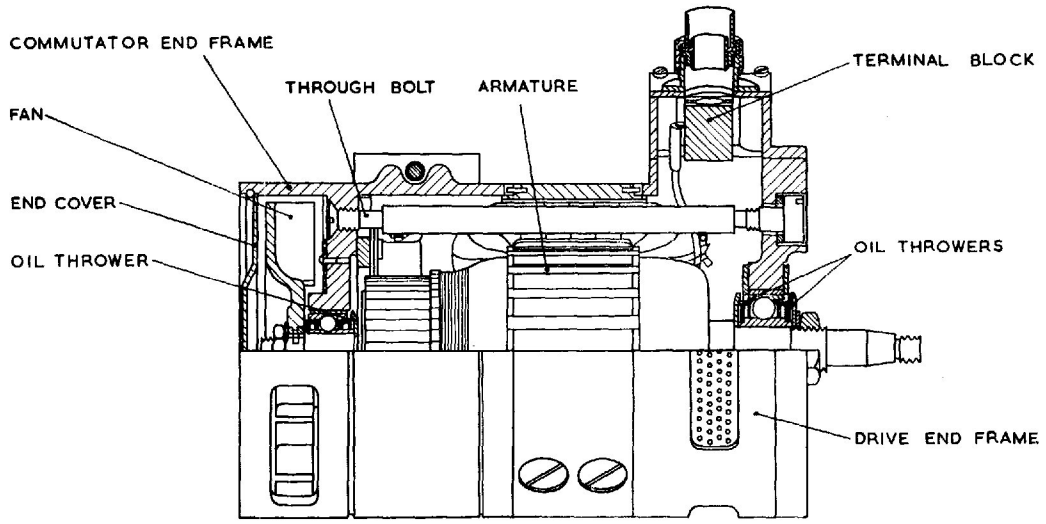

Fig. 2. Section view of motor

(3) Remove the circlip securing the commutator end cover then remove the commutator end cover.

(4) Remove the nut and tab washer securing the fan. Remove the fan then, using a pair of pliers, remove the fan driving pin.

(5) Remove the two nuts and lock washers from the long bolts visible in the face of the drive end frame. The nuts should be removed using a slotted screwdriver.

(6) Remove the commutator end frame from the yoke.

(7) Remove the terminal box cover and terminal screws. Push the freed leads from the field coils into the drive end frame.

(8) Remove the drive end nut, washer and oil thrower.

(9) Remove the screw securing the bearing retaining plate then remove the armature and bearing from the drive end frame using a brass or aluminium drift.

(10) The bearings can be removed from the armature shaft if required using a bearing extractor of the appropriate size.

Cleaning

7. All components except the bearings, armature and field assemblies should be washed in lead free kerosine and allowed to dry. The commutator should be cleaned using a rag moistened in lead free kerosine.

Assembling

8. After the motor has been repaired it should be assembled as follows : —

(1) Fit the bearing in the drive end frame securing it in position with the retaining plate and four screws.

(2) Refit the oil thrower on the drive end of the armature shaft then fit the armature to the drive end bearing.

(3) Refit the oil thrower, washer and nut to the drive end of the armature.

(4) Refit the yoke to the drive end frame engaging the spigot in the hole provided. Care should be taken to thread the leads up into the terminal block.

(5) Refit the oil thrower to the commutator end of the armature shaft then refit the commutator end frame to the yoke taking care to locate the spigot and long bolts.

(6) Secure the complete assembly using the two nuts provided.

(7) Refit the fan drive pin then refit the fan securing it in position using the nut and plain washer provided.

(8) Refit the end cover securing it in position with a circlip.

(9) Fit the brushes and connect the brush leads. Care should be taken to ensure that the pigtails are well clear of the end frame.

(10) Refit the cover band.

9. Before assembling the motor to the pump, clean all traces of jointing compound from the aluminium motor gasket. Apply Hermetite or equivalent jointing compound to the gasket and motor flange then proceed as follows :—

(1) Fit the motor and gasket to the gear case lightly securing the motor in position using the band and four $\frac{1}{4}$ in. B.S.F. set screws.

(2) Secure the motor to the gear case using the three $\frac{1}{4}$ in. set screws then tighten the cover band set screws.

(3) Fit the key in the armature shaft.

(4) Refit the gear wheel and secure it in position using a tab washer and $\frac{1}{4}$ in. B.S.F. nut.

(5) Apply Hermetite to the gear case and cover mating surfaces.

(6) Using a new gasket refit the gear case cover and secure it in position using eight 2BA screws

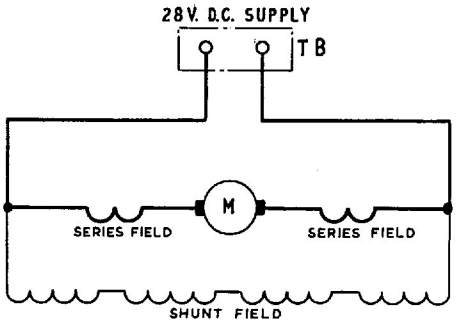

Fig. 3. Circuit diagram

TESTING

Insulation resistance test

10. Test the insulation resistance between the terminals and frame. A reading of not less than 50000 ohms should be obtained.

Load test

11. With the motor connected to a 29V supply apply a torque of 44 oz. inches. The speed should be between 3500 and 4300 rev/min and the current not more than 8·7 amps.

12. Ensure that the motor rotates in a clockwise direction when viewed from the drive end.

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