Chapter 51

PUMP, FUEL, SPE.2011A, Mk. 1

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LEADING PARTICULARS

Pump, fuel, SPE.2011A, Mk. 1 .... *Ref. No. 5UE/*
Nominal voltage .... *26-volt d.c.*
Voltage range .... *25 to 29-volt d.c.*
Performance rating at 26 volt d.c. .... *2000 g.p.h. at 14 lb/in² minimum delivery pressure*
Power output at 26-volt d.c. .... *99 oz. in. torque, speed 6400 ± 100 r.p.m. and max. current of 28-amp.*
Weight of unit .... *14 lb. 8 oz. (approx.)*

Introduction

1. The SPE.2011A, Mk. 1, electrically driven, submerged fuel pump has been designed to supply fuel under pressure to the aircraft main fuel supply line, under all conditions of fuel de-aeration, high altitude vapour formation and at extreme fuel temperatures.

2. The pump is of the direct drive bottom mounted type, being installed in a vertical position within the base of the aircraft fuel tank, collector box or sump, with the totally enclosed driving motor and pump inlet immersed in the fuel. The whole assembly is fitted to a mounting plate, with a flange for attachment to the base of the fuel tank (*fig.* 2).

DESCRIPTION

General

3. A 26-volt d.c. motor drives a two stage centrifugal impeller which draws fuel from the tank into the pump.

4. The two impellers are mounted on the armature shaft which runs in two ball bearings. Above the impeller is a fuel gland and a thrower ring, adjacent to which, is a drain to prevent fuel from entering the motor.

5. The pump is similar in construction to the vertical bottom mounted type described in A.P.4343, Vol. 1, Sect. 16, Chap. 1 and 5, but the internal design has been modified as follows:—

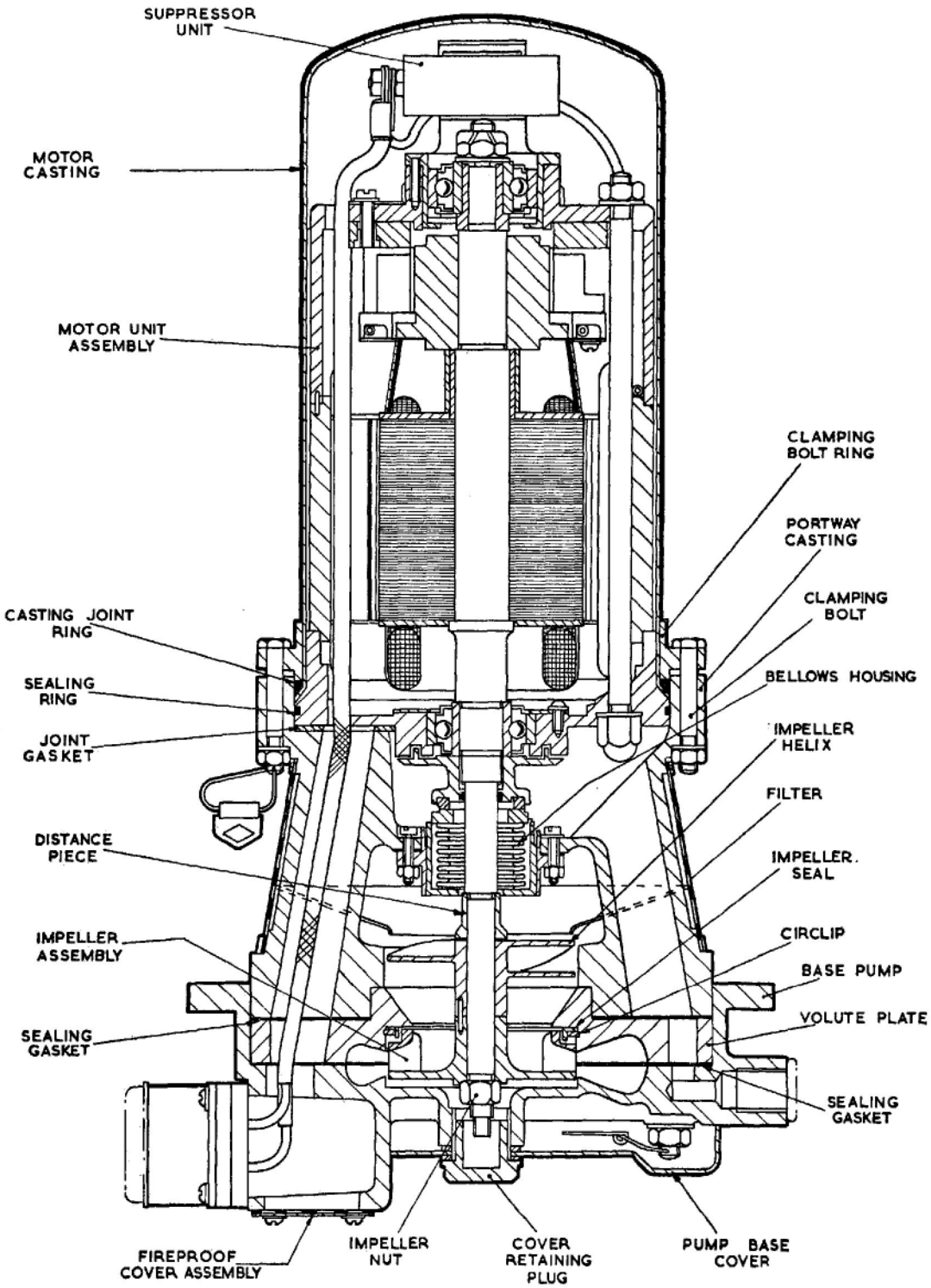

Fig. 1. Sectional view of pump

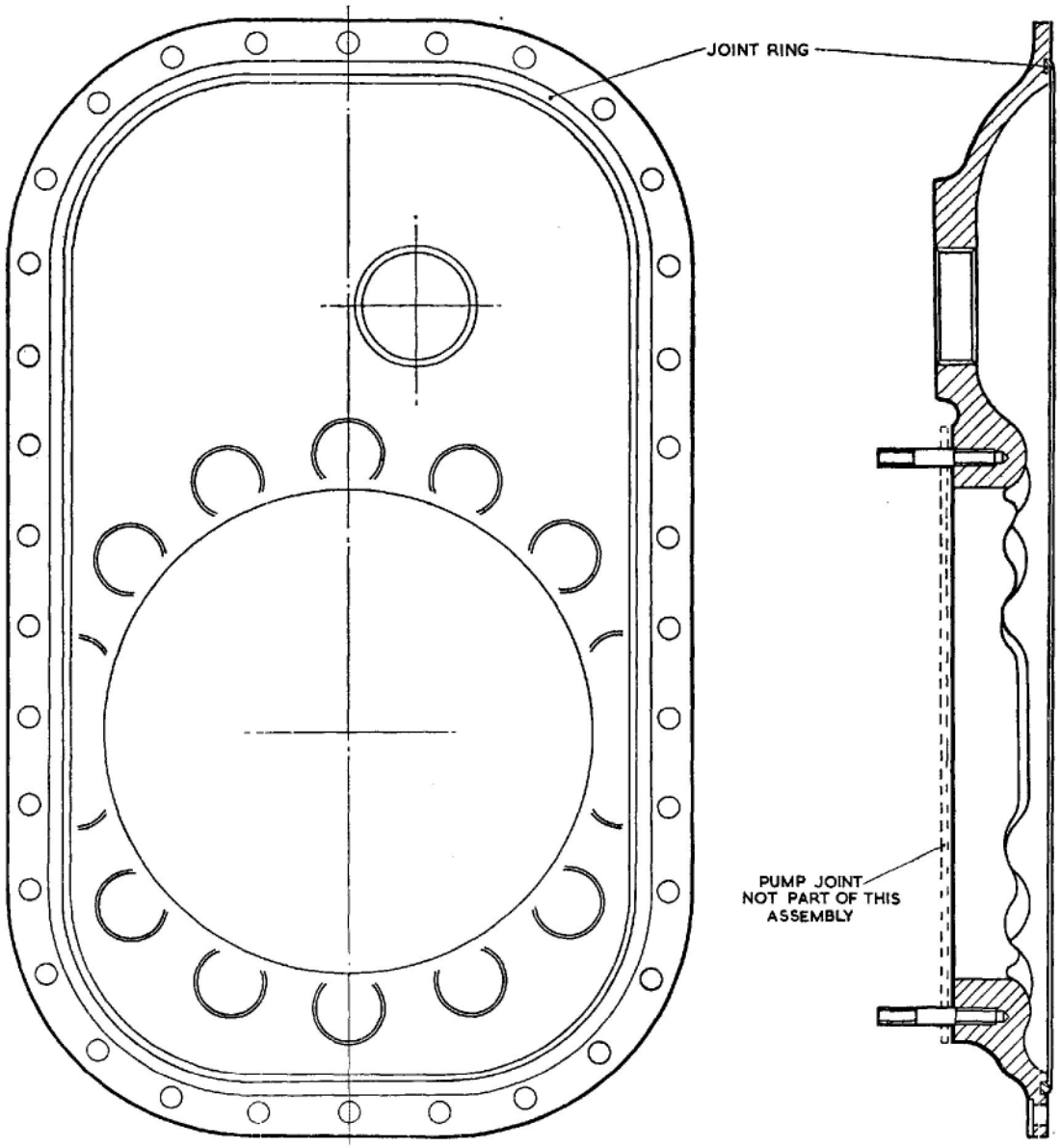

Fig. 2. Plan and side elevation of mounting plate

(1) Inversion of the metallic bellows fuel sealing gland.

(3) Improved fuel thrower assembly (to prevent ingress of fuel to motor), incorporating labyrinth seal.

Motor

7. The electric motor is a 26-volt d.c. compound machine, using a conventional 4-pole construction with separate pole pieces. Armature laminations are straight slotted. The commutator has 29 segments and the Fischer type bearings are lubricated with DTD.866 grease (XG-295) and are felt sealed. The brushes are 4 EGO high altitude grade carbon.

8. The pump unit is fitted with radio inter-

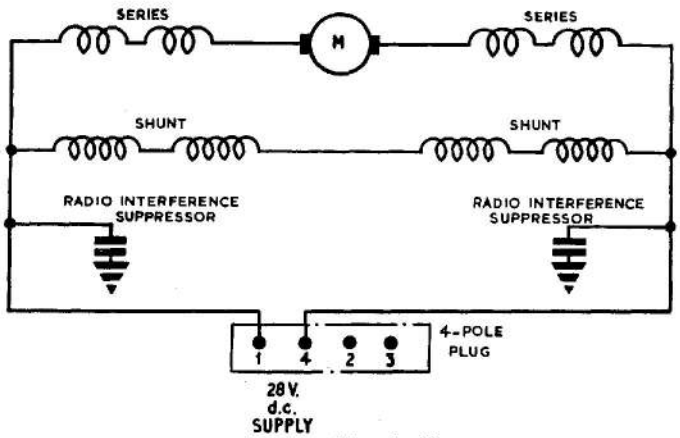

Fig. 3. Circuit diagram

ference noise suppressors, which are located in the upper end motor casing (*fig.* 3).

Electrical connection

9. Electrical connection to the pump motor is via a 4-pole, 37 ampere plug, pins1 and 4 only are used, 2 and 3 are spare (*fig.* 3).

OPERATION

10. Fuel enters the pump through a wire mesh filter situated at the centre of the pump, and is drawn in by a helical impeller (first stage) which serves the dual purpose of de-aerating the fuel and pressurising it at the eye of the impeller. This centrifugal impeller (second stage) feeds the fuel to the volute chamber and thence to the fuel outlet and main fuel line. The tank may also be re-fuelled through the by-pass valve, in which case the valve minimises reverse flow through the pump.

INSTALLATION

11. General information in installing this type of pump is contained in the relevant Aircraft Handbook, also in A.P.4343, Vol. 1, Sect 16, Chap. 1 and 5.

SERVICING

12. Examine all pipe connection joints to the pump for fuel leakage, and fit new joint washers if necessary. Ensure that all nuts and screws are tight and locking wire intact, also that the electrical connection is secure.

13. It is recommended that the pump be removed for bay servicing in accordance with the instructions contained in the relevant Aircraft Servicing Schedule.

TESTING

14. The electrical and operational test procedure is as described in A.P.4343, Vol. 1, Book 2, Sect. 16, Chap. 1.

Maxinum current at no-fuel-flow

15. The maximum current at no-fuel-flow is 30 amperes at 29 volts d.c.

Gland leakage test

16. With a voltage of 28 volts applied to the motor and no-fuel-flow, the pump is to be run for 15 minutes. During this test observe for:—

(a) External leakage
(b) Internal leakage
(c) Gland leakage

The allowable rate of leakage past the gland is 2 c.c.'s per hour running and 1 c.c. per hour stationary. No other leakage is permissible.

Insulation resistance test

17. After receipt from the manufacturers, but before installing the pump in an aircraft, the insulation resistance, when measured with a 250 volt (constant pressure) insulation resistance tester must not be less than 2 megohms.

18. After installation the measured insulation resistance must not be less than 50,000 ohms.

Note . . .

It is important when measuring the insulation resistance, with suppressors fitted, that a constant pressure tester is used, capacitor connections should be disconnected prior to this test.

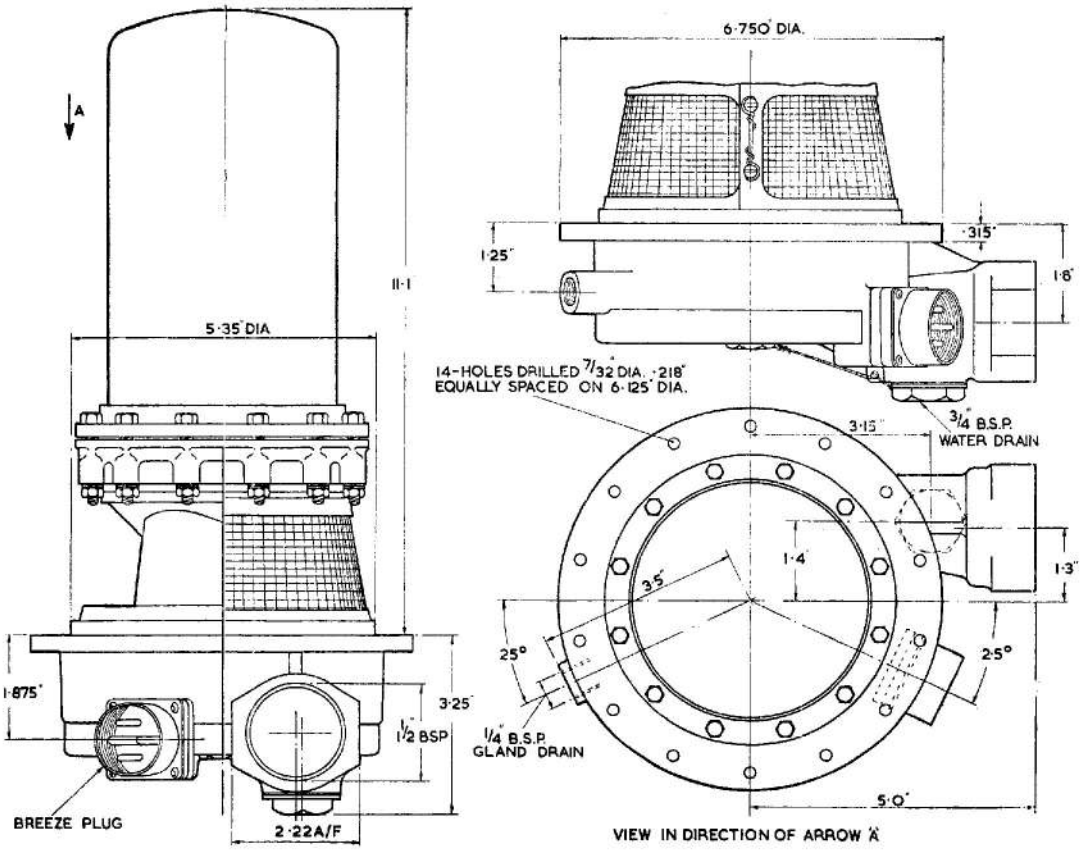

Fig. 4. Installation diagram

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