

## Chapter 19

### PUMP, FUEL, BP 18, Mk. 1, 1A, 1B, 1C and 1D

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#### LEADING PARTICULARS

Pump, fuel, BP 18, Mk. 1, 1A, 1B, 1C and 1D		Ref. No. 5UE/6311
Delivery rate	400 gallons per hour	
Pressure	10 lb. per sq. in.	
Operating voltage	24 volts d.c.	
Maximum current consumption	7.5 amp. at 24 volt d.c. and 8.5 amp. at 28.8 volt d.c.	
Weight	7 lb. 4 oz.	
Power output	26 oz. in. torque at 24 volt d.c., speed 5650 +nil rev/min., max., current 7.5 amp.	

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#### Introduction

1. The BP 18, Mk. 1 is an electrically driven fuel booster pump, designed for mounting vertically in the base of aircraft fuel tanks in conjunction with a special sleeved housing assembly, the details of which will be found in the relevant Aircraft Handbook. The assembled pump and sleeved housing unit is designated BP 19, Mk. 1, and the design is such that it enables the pump to be dismantled and replaced without the necessity of draining the fuel tank. The pump can only be mounted in aircraft fuel tanks which are fitted with the special sleeved housing, and although primarily intended for supplying a continuous pressurized flow of fuel from main tanks to the engine pump under all conditions of vapour formation, fuel aeration, etc., it may also be used for the transfer of fuel from auxiliary to main tanks.

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#### DESCRIPTION

2. The BP 18, Mk. 1, pump is a composite unit consisting, in the main, of an electric motor and a pump assembly. The pump base assembly (*para.* 6) is of generally cylindrical form, the casing being a casting, one end of which has been suitably recessed to provide a fuel tight seating for the electric motor. A vapour guide cone is fitted to the lower end of the pump base casting, and the fuel entry to the guide cone is covered by a cylindrical filter.

#### Driving motor

3. The two-pole compound wound motor is flameproof and is totally enclosed within an aluminium casing. It is designed to operate on 24 volts d.c., with a speed of 5,650 r.p.m. and a maximum current consumption of 7.5 amp. (see Leading Particulars).

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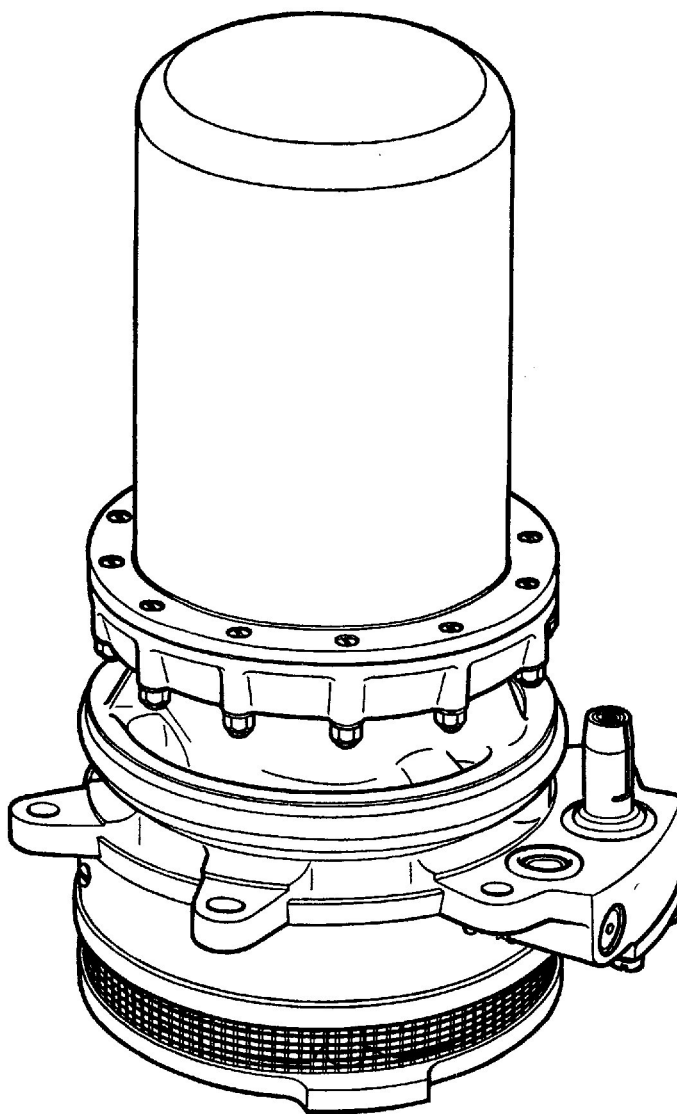


Fig. 1. BP 18, Mk. 1 pump

4. The armature spindle is supported in ball bearings which are recessed in the upper and lower end frames of the motor unit. A self-locking nut secures the spindle to the upper bearing, whilst at the lower bearing there is a special nut in the form of a thrower for the dispersal of any fuel which may have crept up the spindle past the bellows gland. The motor leads pass downwards through a duct in the base casting to the electrical assembly.

5. The extended armature spindle passes through the bellows gland to the impeller

chamber where it terminates in a machined end to receive the impeller assembly (*para.* 10) which is retained by a special nut.

#### **Pump base assembly**

6. The pump base assembly comprises the mounting for the motor and houses the bellows fuel gland which prevents fuel from entering the lower bearing or the motor. The casting is mainly cylindrical with a waisted centre section surrounded by an inverted bell enclosing a spiral volute forming the delivery outlet from the impeller chamber. From the central recess above the gland,

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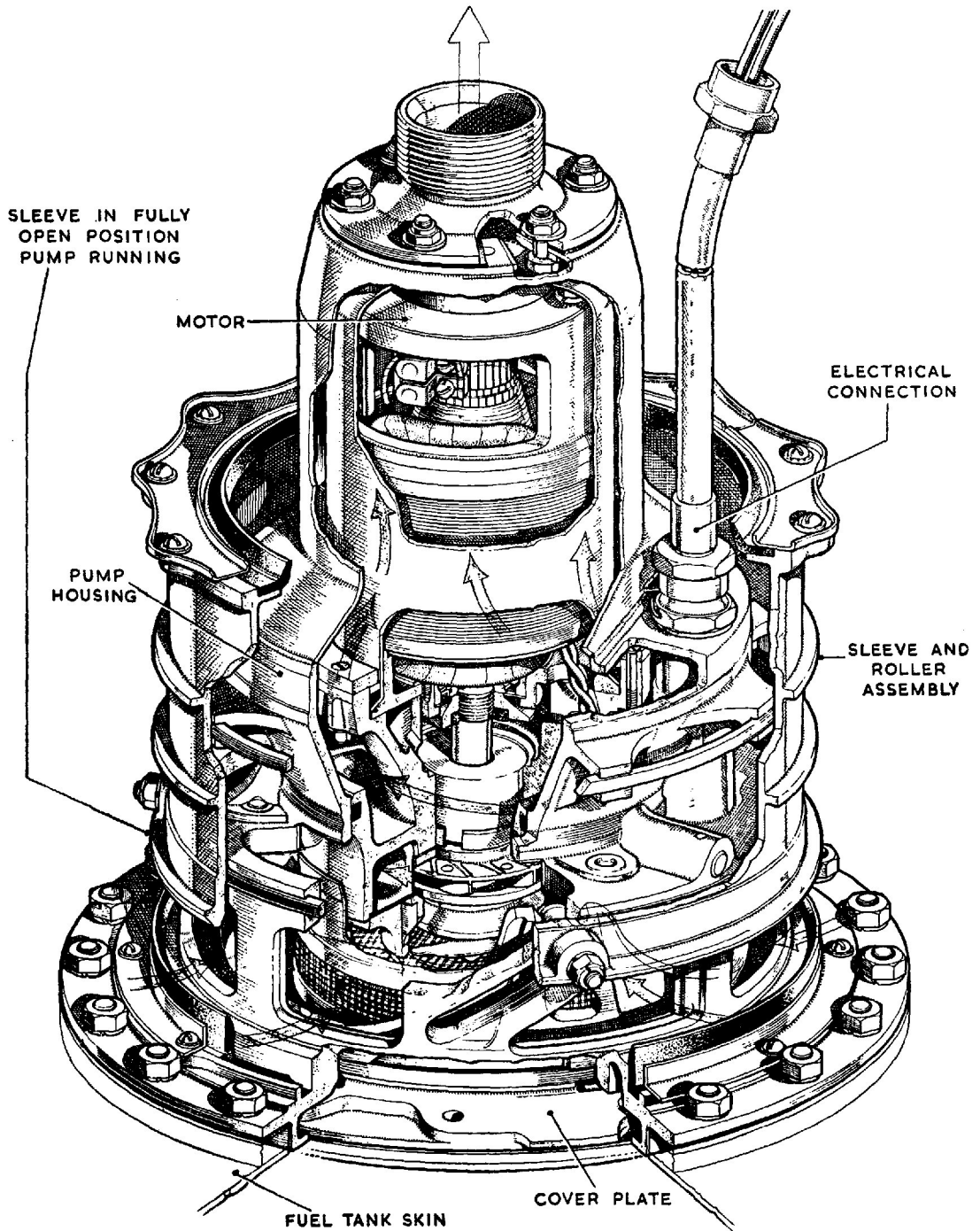


Fig. 2. Part sectional view of Mk. I pump and motor

a hole passes through the casting emerging on the face of the terminal block adjacent to the electrical contact pillar, where it serves the dual purpose of venting the motor and draining any excess fuel which may have passed through the gland.

7. Surrounding the base casting, the base of the electrical contact pillar and the drain hole, are rubber sealing rings let into slots in the casting, which make contact with the sleeved housing (*para. 1*) and prevent leakage of fuel.

8. For the adjustment of the impeller clearance in the impeller chamber, shims are inserted between the casting and the impeller plate until the requisite clearance is obtained.

9. To secure the pump in the sleeved housing, 6 holes, each  $\frac{3}{8}$  in. diameter, are provided in lugs which are equally spaced around the casting.

#### Impeller

10. The impeller comprises a triple bladed helix, surmounted by a vaned centrifuge, and is secured at the lower end of the motor shaft by a special nut.

#### Filter

11. To prevent the entry of foreign matter to the pump, a wire gauze filter assembly completely surrounds the fuel entry below the vapour guide cone. The filter is retained by long bolts passing through it into the volute cover plate and base casting.

#### Modifications of the BP 18, Mk. 1

12. There are other versions of this type of pump, e.g., the BP 18, Mk. 1A, Mk. 1B, Mk. 1C and Mk. 1D, each pump incorporating a small modification from the original Mk. 1 pump. All these pumps hold the same Reference Number 5UE/6311, the reason being, each Mark of pump can be housed in the sleeved housing and become, together with the housing, a BP 18, Mk. 1 assembly, there being no appreciable change in design.

13. The differences between these fuel pumps and the original BP 18, Mk. 1 pump are described in the following paragraphs in alphabetical order.

#### BP 18, Mk. 1 to Mk. 1A

14. Introduction of an improved grade of motor carbon brush, namely; Morgan crucible "EGO" grade in place of CM5H grade, to give increased life to the pump between overhauls.

#### BP 18, Mk. 1A to Mk. 1B

15. To provide satisfactory electrical bonding of the pump unit to airframe, various components have had their surface finish modified to ensure continuity, in addition, suitable protection of conducting faces during transit and storage has been incorporated. The rubber seals and grooves on the pump mounting face have been modified to ensure proper seating.

#### BP 18, Mk. 1B to Mk. 1C

16. Introduction of a motor end casing with steel end plate and bearing sleeve (*fig. 3* shows the changes in design).

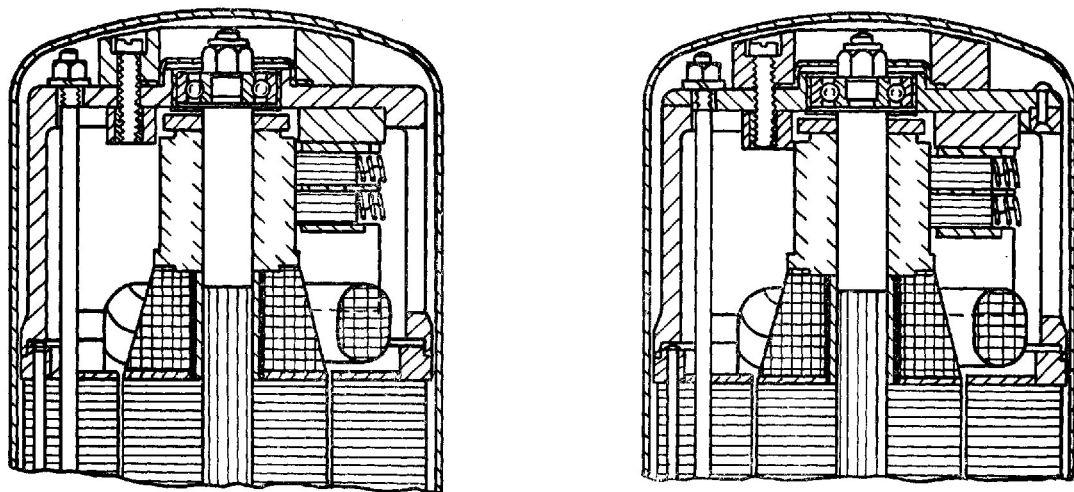
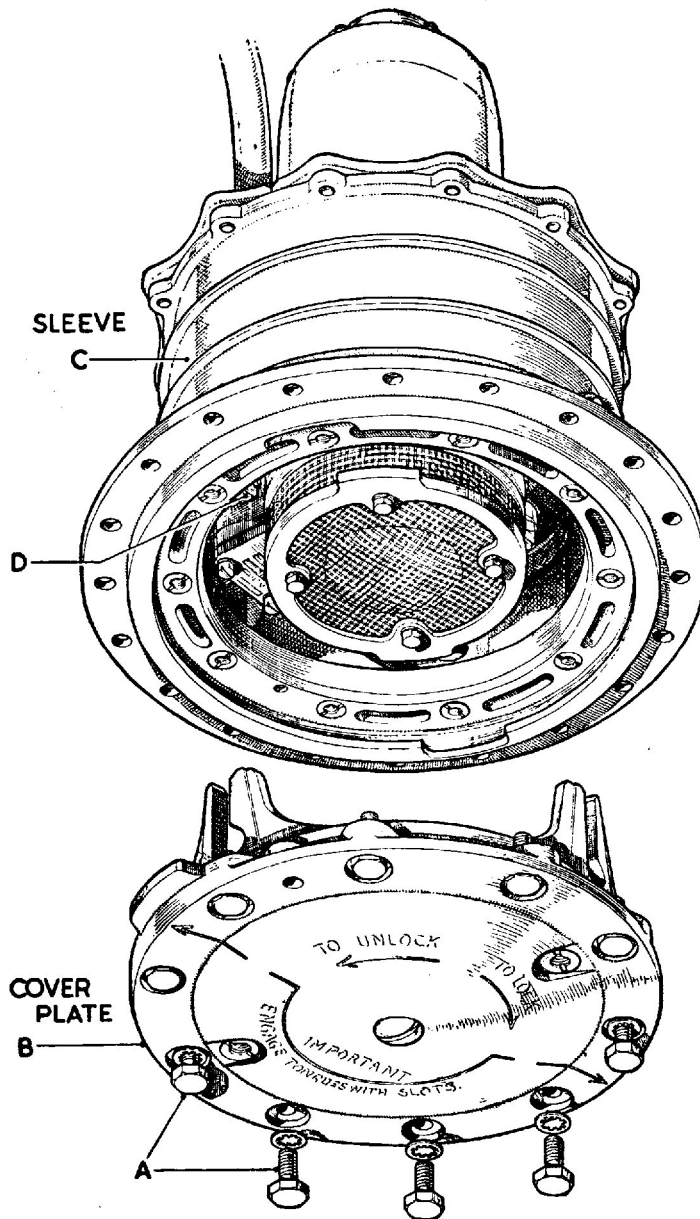


Fig. 3. Part sectional views of motor for Mk. 1B and Mk. 1C pump

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#### REMOVAL OF PUMP FROM FUEL TANK

- (1) ENSURE THAT PUMP IS SWITCHED OFF.
- (2) REMOVE SCREWS "A".
- (3) ROTATE COVER PLATE "B"  
(to disengage the bayonet fixing and close outer sleeve "C")
- (4) REMOVE COVER PLATE "B"
- (5) UNSCREW PUMP SECURING SCREWS "D" AND WITHDRAW PUMP FROM HOUSING SLEEVE

Fig. 4. Pump in housing sleeve

