

Chapter 3

STARTER MOTOR, ROTAX TYPE C8601

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LEADING PARTICULARS

Starter motor, Type C8601	Stores Ref. 37F/5502
Voltage	112 to 120-V, d.c.
120-V characteristic :	
Volt drop	1 volt per 14.5 amp.
Current	245 amp.
Output	26 h.p. at 6,500 r.p.m.
Torque	21 lb. ft.
112-V characteristic :	
Volt drop	1 volt per 50 amp.
Current	250 amp.
Output	28 h.p. at 6,700 r.p.m.
Torque	21.9 lb. ft.
Maximum starting current	600 amp.
Rating	60 sec.
Rotation (looking on drive end)	Clockwise
Brush spring pressure	3 lb. \pm 4 oz.
Minimum brush length	0.650 in.
Brush grade	EG 7439
Weight	48 lb.

Introduction

1. This motor has been designed to start aircraft turbo-jet engines; a particular application is its use with the "Olympus" engine.

DESCRIPTION

2. The Type C8601 starter motor (fig. 1) is a totally enclosed, 4-pole machine, fitted with interpoles. The armature is wave

wound and the principal winding on the main and interpole fields is connected in series with it. A short shunt winding, to limit the no-load speed, is also wound on the main poles, inside the series coils.

3. In general, the machine comprises four main assemblies. They are, two end frames, yoke and field coil assembly, and armature.

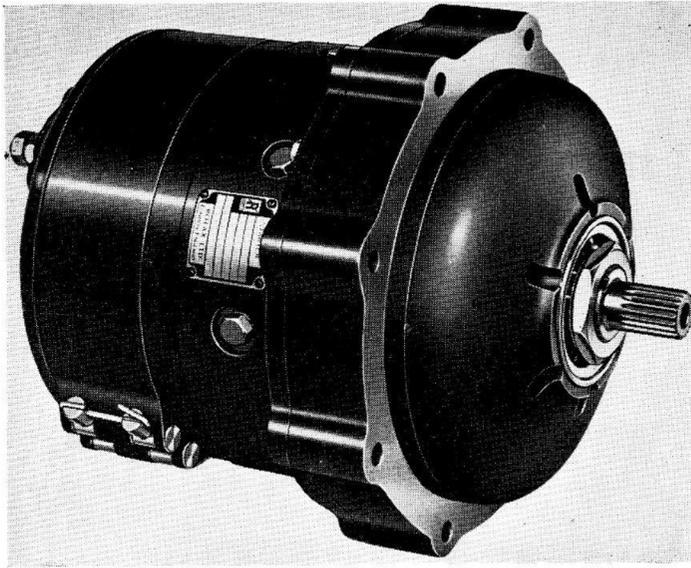


Fig. 1. Starter motor, Type C8601

End frames

4. Two frames, known as the commutator end frame and drive end frame, are bolted to each end of an intermediate frame (yoke). Together they form the casing of the motor. Each end frame houses a ball bearing which supports one end of the armature shaft. In addition, the commutator end frame carries the brush-gear and has two terminal posts mounted on it, whilst the drive end frame houses an oil seal. Access to the brush-gear is gained via a detachable window strap which girths the commutator end frame and is clamped in position by two screws.

5. The drive end frame is a dome-shaped casting with a flange. The flange is internally machined to provide a deep locating spigot and it mates with a similar, though thinner, flange welded to the yoke. The two flanges are secured to each other by four bolts. Eight equi-spaced peripheral bosses, formed by the two flanges, contain $\frac{5}{16}$ in. dia. clearance holes for mounting purposes. The holes are disposed on a P.C.D. of 7.800 in.

Yoke and field coil assembly

6. Interposed between the two end frames is the yoke and field coil assembly. The yoke is manufactured from low carbon mild steel and the main poles, contained

therein, from "Permendur" lamination held together by a square rivet.

7. The main pole series field and the inter-pole field are wound with five and six turns per pole respectively of strip conductor wound on edge. The short shunt field consists of four coils connected in series, each of 400 turns per pole.

Armature

8. The armature is wave wound and has 43 slots, with two conductors per slot. It is keyed to a steel shaft which protrudes beyond the frames at each end. At the drive end, the shaft is splined on a nominal diameter of $\frac{3}{4}$ in. and over a similar length. The shaft extending beyond the commutator end frame is machined to hexagonal form to allow for hand turning. An end cap, housing a felt washer, is bolted to the end frame and shrouds the hexagonal part of the shaft.

Electrical connections

9. The starter motor is connected to its supply via two $\frac{5}{16}$ in. dia. B.S.F. terminals located externally on the commutator end frame (*fig. 2*). In certain instances the terminals may be equipped with lugs and rubber shrouds, though these are not normally supplied with the machine.

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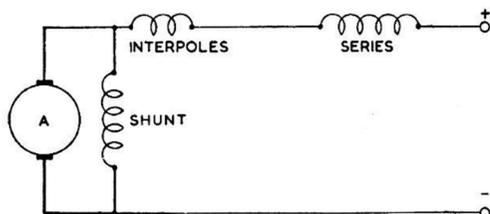


Fig. 2. Diagram of internal connections

INSTALLATION

10. Before installing the starter, the appropriate aircraft and engine handbooks should be consulted. Mechanically, installation consists of bolting the flange of the drive end frame (*para.* 5) to the engine, using eight $\frac{5}{16}$ in. dia. bolts and spring washers. The bolts and spring washers are supplied as loose items and it is usual for them to be contained in a linen bag suitably secured to the unit.

11. The overall dimensions of Type C8601 starter motor are as follows:—

Length	10.999 in.
Length (to mounting face)	7.687 in.
Flange diameter	7.900 in.

SERVICING

12. Although these motors operate on 112/120-V, servicing will normally be in accordance with the information contained in A.P.4343, Vol. 1, Sect. 15.

Brush-gear

13. Service the brush-gear in the following manner:—

- (1) Remove the window strap, which encloses the brush gear, by releasing the two clamping screws.
- (2) Check the length of the brushes to ascertain if they are long enough to perform satisfactorily until the next servicing period. The minimum permissible length is 0.650 in. If new brushes require fitting it will necessitate removal of the unit from the aircraft in order that new brushes can be properly bedded.
- (3) Check that the brush-gear is free from

carbon deposits and that the brushes slide freely in their boxes without any tendency to bind. If a brush appears to be binding this may be due to an accumulation of carbon dust in the box. Loose dust may be removed with a jet of dry compressed air.

- (4) Badly chipped or cracked brushes should be removed and new ones fitted.
- (5) Check the brush spring pressures by attaching a spring balance (Stores Ref. 1H/97) to the tip of the brush springs and raising them level with the top of the brush boxes. The reading should be between 2 lb. 12 oz. and 3 lb. 4 oz.

Lubrication

14. The ball bearings of the motor are grease lubricated during manufacture and, normally, should not require lubrication during servicing periods.

General

15. Ensure that all external screws and locking devices are secure. Examine the connections to the supply terminals for security and damage, also the brush-gear connections.

16. At the conclusion of the servicing operations, ensure that the inspected components are in their correct positions and replace and secure the window strap.

Testing

17. The insulation resistance between all live parts and the frame should be measured, using a 500 volt insulation resistance tester, and should not be less than 50,000 ohms.

Note . . .

This value applies to units being tested under normal workshop conditions. Due allowance should be made for the climatic conditions of the locality and those of the aircraft servicing area or dispersal point. In particularly damp or humid climates, the reading may be low enough to give apparently sufficient reason for rejection and in these instances discretion should be exercised.



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