Chapter 4

STARTER MOTOR, ROTAX, TYPE C6103

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Starter motor, Type C6103	*Ref. No.* 37*F*/5504
Rated output	20 *b.h.p.*
Operating voltage	125-*V d.c.*
Current (at rated output)	155 *amp.*
Torque (at 6,100 *r.p.m.)*	17 *lb. ft.*
Rating	1 *minute*
Direction of rotation	*Clockwise*
Brush grade	*E.G.O.*
Brush spring pressure	32 *to* 36 *oz.*
Minimum brush length	0·550 *in*
Weight	37 *lb.*
Mounting	*Flange*

Introduction

1. The Type C6103 starter motor is designed for the electric starting of certain gas turbine engines. On these engines, the necessary engaging jaw mechanism and reduction gears are integral with the engine, and the starter is therefore a straightforward electric motor.

DESCRIPTION

2. The Type C6103 starter is a four-pole compound wound motor with a rated output of 20 b.h.p. for one minute. Current requirements are 155 amp. at 125V d.c. (for rated output).

3. There are four principle assemblies as follows :—Armature and bearings; yoke and field; commutator end frame and brush-gear; driving end frame.

Armature and bearings

4. The armature shaft is hollow and runs in two ball bearings, one at each end. Each bearing is a clearance fit on the shaft, and in its liner, and each is locked by a tab washer, and a key washer. The commutator end bearing is enclosed by a bearing cap, and is grease lubricated. The driving end bearing is open in its housing, and is lubricated by oil from the engine to which the starter is fitted. The liner, extending behind the bearing, houses an oil seal which is pressed into position and retained by a circlip.

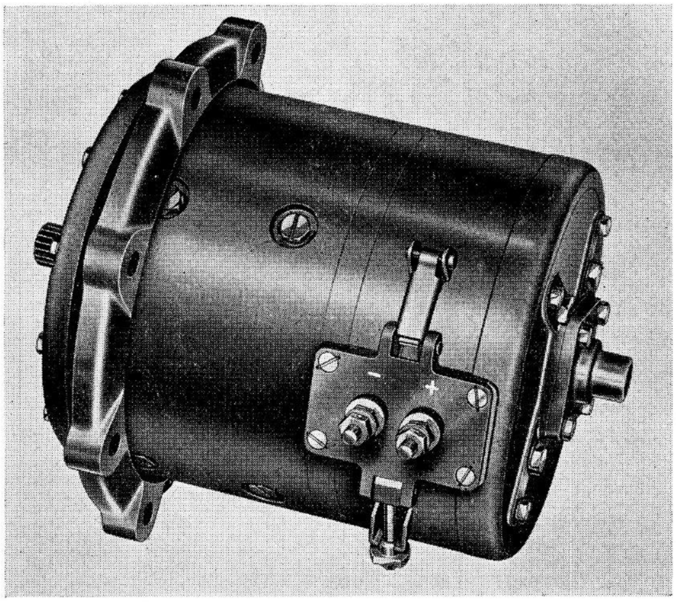

Fig. 1. General view of the Type C6103 starter motor

5. The motor is wave wound, the copper conductors laying in 43 semi-enclosed slots in the laminated core. Each slot carries two conductors, which are wedged and insulated. The windings are banded by steel rings.

Yoke and field

6. This consits of four laminated poles energized by series and shunt windings, and four solid interpoles with windings in series with the main series field. The poles and windings are fitted to the interior of a cylindrical steel yoke, and the whole assembly is varnish impregnated and baked.

Commutator end frame and brush-gear

7. Two brass terminal posts are fitted in apertures in the back of the commutator end frame, and insulated with bushes and washers. A nut with a spring washer, and plain washer secures each terminal post, and holds the lower part of the terminal casing in place. The terminal cover sub-assembly is finally bolted in position.

8. The series and interpole fields are connected, at one end, to one of the terminal posts, and at the other, to a flag terminal on a brush platform. The shunt field is connected by flexible leads to brush boxes of opposite polarity.

9. The brush sub-assembly consists of four boxes fitted to a moulded ring. Each box has a platform for connections, and carries two brushes which are held in contact with the commutator by swan-neck springs. Opposite brush boxes are connected by copper strips. The complete sub-assembly is bolted to the commutator end frame.

10. The commutator end frame complete is fitted to the yoke by eight bolts, two being accessible at each of four window openings. East window is covered by a strap secured by two captive bolts.

11. The driving end frame is secured to the yoke by eight bolts.

Operation

12. Although wound with both series and shunt fields, the starter has series charac-

teristics. It produces a bigh torque at slow speed when accelerating the engine, but as the engine speed increases, the torque decreases, and at no-load starter speed is high, but limited to a safe value by the shunt field. The starter is normally used with a two-stage starter panel.

INSTALLATION

13. This type of starter can only be used with gas turbine engines which have a complete engaging jaw mechanism, and a suitable reduction gear incorporated in their structure.

14. Before mounting the starter, lubricate the oil seal, and driving end bearings with oil of the same grade as that used on the engine it is to be fitted to.

15. If it is necessary to revolve the armature shaft in the process of fitting the serrations into the engine coupling, use a 2 B.A. box spanner. Never attempt to turn the engine by hand cranking the armature shaft.

16. Anchor the electrical supply cables to the two studs on the commutator end frame.

17. It is important that when mounting a starter, no engine oil is allowed to seep into the motor.

SERVICING

◀**18.** Full repair information will be found in A.P. 4343D, Vol. 6, Book 1, Sect. 2.▶ For normal servicing, it is not necessary to remove the starter from the engine. Dismantling is confined to removing the window strap to give access to the brush gear and commutator. Procedure should be as follows :—

(1) Remove the brushes and examine them for cracks, security of pigtail, and wear. Minimum brush length is 0·550 in. Ensure they are sufficiently above minimum length to last until the next service date.

(2) Measure the pressure of each brush spring with a spring balance. When held level with the top of its brush box.

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R-Type mask
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