

Chapter 4

GENERATOR, TYPE LX

LIST OF CONTENTS

	Para.		Para.
Introduction	1	Servicing	14
Description		Bearings and lubrication	15
Terminals	2	Dismantling	16
Bearings	3	Assembling	18
Brush gear	4	Brush gear	19
Cooling	5	Testing	21
Installation	6	Polarity	23
Operation	11	Performance	24
Parallel operation	13	Insulation	26

LIST OF ILLUSTRATIONS

	Fig.
Sectional view of generator	1
Diagram of internal connections, looking on commutator end	2
Test circuit diagram	3

LEADING PARTICULARS

Generator, Type LX

Anti-clockwise rotation	Stores Ref. 5U/187
Clockwise rotation	Stores Ref. 5U/188
Output	14.5 volts, 60 amp. full load
Speed range	3,300 r.p.m. to 6,000 r.p.m. cont. 7,500 r.p.m. (max.) for 5 min.
Brush grade	Grade CM6 (H.A.) (Stores Ref. 5U/2382)
Brush spring pressure	12 to 15 oz.
Lubricant	Grease XG-271 (Stores Ref. 34B/208)
Weight	22 lb.
Cable	Trigenmet No. 2 (Stores Ref. 5E/2014)
Suppressor	Type Y1 (Stores Ref. 5C/2605)
Voltage regulator	Type F12 (Stores Ref. 5U/191)
Test switchboard	Type B (Stores Ref. 5G/1947)
Used with additional loading panel	Stores Ref. 5G/2677
Resistance of field windings at 20 deg. C.	2.2 ohms \pm 10 per cent.

RESTRICTED

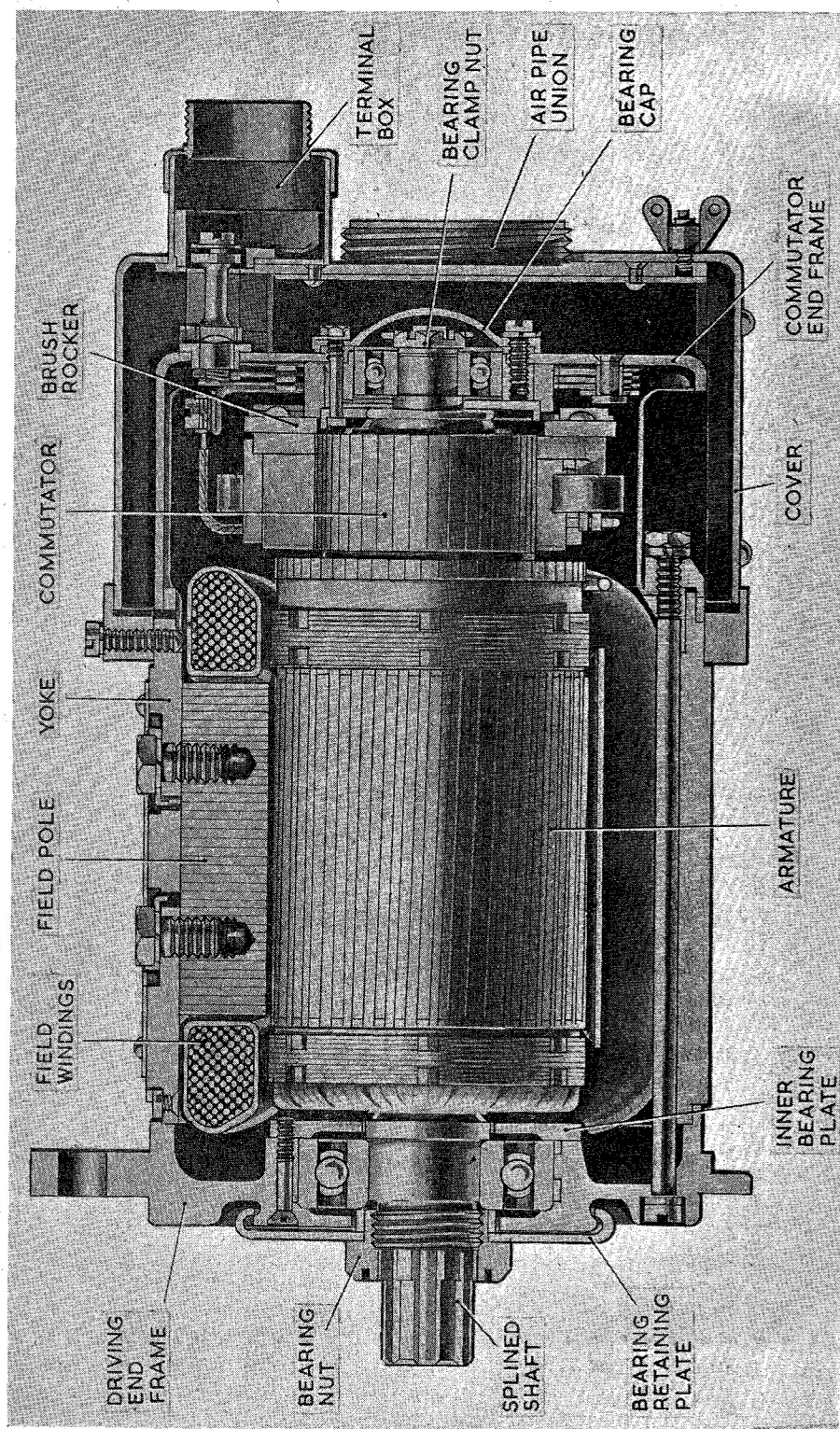


Fig. 1. Sectional view of generator

RESTRICTED

Introduction

1. The generator, Type LX, is a self-excited, 4-pole, shunt-wound machine, and is driven through gearing from the aircraft engine. A sectional drawing is given in fig. 1.

Terminals	DESCRIPTION
------------------	--------------------

2. The terminal markings are as follows :—
- | | |
|----------------|-------------|
| Positive | Yellow spot |
| Field | Grey spot |
| Negative | Blue spot |

One end of the field winding is connected internally to the positive terminal, and the other to the field terminal. The internal connections are shown in fig. 2.

Bearings

3. The armature is carried in two grease-lubricated ball bearings, one of which is located in the driving end frame, the other in the annular recess in the commutator end frame. The driving end bearing is secured in position on the shaft by a combined oil thrower and lock-nut, and the commutator end bearing by a castellated nut and split pin.

Brush gear

4. Four brushes are set about the commutator. Diametrically opposite brushes are interconnected through rings mounted in the commutator end frame, one pair of brushes

being connected to the positive terminal and the other to the negative terminal. The brush rocker is secured to the commutator end frame by two 4 B.A. bolts and nuts. The bolts protrude through the commutator end bearing cap, and the nuts, which are locked by tab-washers, are accessible through the air pipe unions in the end plate. To adjust the brush position, slacken off the two 4 B.A. nuts, rotate the brush rocker as required, and tighten the nuts. The correct position of the brush rocker is marked by corresponding white lines painted on the rocker and on the end frame.

Cooling

5. The generator is cooled by air from the slipstream, which is blown directly into the machine and over the commutator. Four air pipe unions are fitted, but only two are used at any one time. The two not in use should be blanked off with the blanking caps provided. The arrangement of air pipes for each installation is decided during manufacture of the aircraft, and should not be altered without authority.

INSTALLATION

6. The arrangements for the mounting of an engine-driven generator in an aircraft depend primarily upon the type of engine, and, in some cases, also upon the particular type of aircraft. Reference may be made to the S.I.S., in which general instructions for the installation of the generator are given.

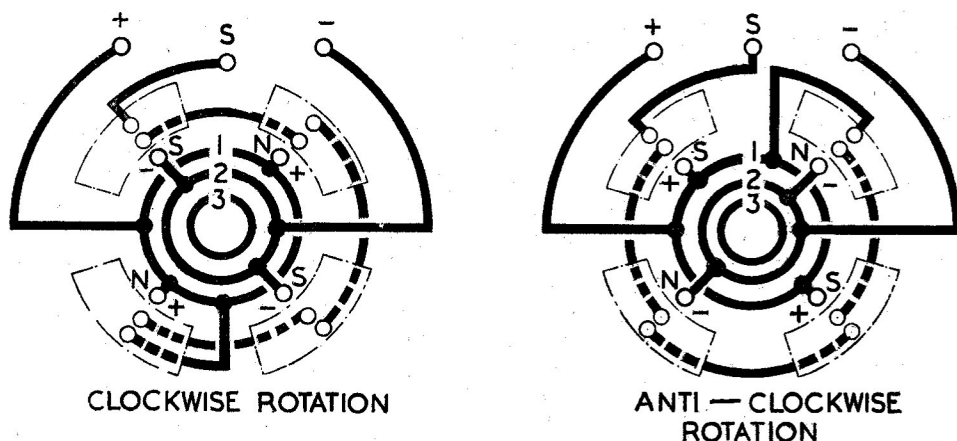


Fig. 2. Diagram of internal connections, looking on commutator end

RESTRICTED

7. Before fitting a generator, check that the direction of rotation and type are correct for the particular engine and aircraft. These details are given on the name-plate attached to the yoke of the machine. The direction of rotation is taken when looking at the driving end of the machine.

8. The splined end of the shaft protruding beyond the driving end frame should be protected by a ferrule when the generator is not in use. In some installations a coupling member, which is intended to engage with a corresponding member on the engine, is fitted to the generator shaft. With this arrangement care should be taken to see that the coupling member is a close sliding fit on the shaft, and that it is properly secured by an axial or clamping bolt, which should be suitably locked after tightening. In other installations, the generator shaft engages directly with a suitably splined driving member on the engine. In either instance the shaft should be first coated lightly with clean engine oil.

9. Anti-corrosive treatment is to be applied to certain components after installing a generator. Information on this subject is given in A.P.4343, Vol. 1, Sect. 2, Chap. 1.

10. As cooling air pipes are usually of thin aluminium, care should be taken to see that they are not bent or restricted, except as designed, especially at the inlet or outlet apertures.

OPERATION

11. The generator is coupled to the aero engine through gearing. It may be fitted either on the engine or on an auxiliary gearbox. The gear ratio is so arranged that over the speed range of the particular engine, the speed range of the generator drive is within the limits for the generator.

12. The generator is controlled by an external regulator, which is designed to maintain the output voltage at an approximately steady figure, irrespective of fluctuating engine speed, the state of charge of the battery, or the load connected to the supply. The battery is connected in parallel with the generator and supplies all the general service loads when the generator is not running, or when, due to a reduction in speed, the voltage of the generator falls below the figure at which the cut-out opens.

Parallel operation

13. Where two or more generators are employed in parallel, it is essential that the regulator should be correctly connected for this purpose, as otherwise the generators will not share the load equally and considerable trouble will then be experienced. Reference should therefore be made to A.P.4343B, Vol. 1, Sect. 3, where the regulator, Type F12, is described, and operating instructions given.

SERVICING

14. The following instructions should be read in conjunction with the chapter on the servicing of d.c. generators to be found in A.P.4343, Vol. 1, Sect. 2, Chap. 1. The machines should be inspected as laid down in the relevant Servicing Schedule. Commutator covers should be removed and the brushes, commutator, internal connections, etc., should be examined. The external connections must also be inspected and all nuts, union caps, and fixing screws checked, and, if necessary, tightened. When an inspection is being made on an aircraft dispersed in the open, care must be taken to prevent the ingress of moisture into the generator or terminal box.

Bearings and lubrication

15. The generator must be removed from the aircraft and dismantled for lubrication. The bearings are grease-lubricated and the general instructions given in A.P.4343, Vol. 1, should be adhered to.

Dismantling

16. Remove the commutator cover and lift the brushes. Remove the two 4 B.A. nuts on the bolts which project through the commutator end bearing cap; these may be reached through the air pipe unions in the commutator end frame. Remove the four through bolts by unscrewing from the driving end. Remove the armature and driving end frame by tapping gently on opposite sides of the frame, or prising carefully with two screwdrivers. If the armature is tight, remove the commutator end frame, held by four csk/hd. screws, and the bearing cap, held by four similar screws. The end of the armature shaft will then be exposed and should be carefully tapped out.

Note . . .

On this machine, removal of the armature unlocks the brush rocker. The rocker should, therefore, be checked first to ensure that its position is correctly marked.

RESTRICTED

17. To dismantle the driving end bearing, unscrew the bearing nut, remove the four csk/hd. screws in the driving end frame which hold the bearing retaining plate, and tap the armature gently out of the end frame.

Assembling

18. Assemble in the reverse order, ensuring that all screws and nuts are properly tightened, and that the brush rocker is correctly positioned. When re-fitting the armature to the yoke, it will be found helpful to support the yoke in an upright position and to lower the armature into it, having first positioned the two bolts in the brush rocker locking plate, approximately opposite the holes in which they fit.

Brush gear

19. Only the correct type of brushes should be used and the correct spring pressure should be maintained throughout their effective life.

20. To adjust the brush position, slacken the two 4 B.A. nuts which pass through the commutator end bearing cap, rotate the brush rocker as required, and re-tighten the nuts. The brush rocker is free to be removed when the armature has been withdrawn. When checking the brush position (A.P.4343, Vol. 1, Sect. 2, Chap. 1, para. 25), the positive

terminal of the battery should be connected to the positive (yellow spot) terminal on the generator, and the negative terminal of the battery through a tapping key to the field (grey spot) terminal.

TESTING

21. Before installing a new or serviced generator, the machine should be tested as laid down in the following paragraphs, using a suitable test set. If the generator fails to function correctly and the fault cannot be located and corrected, normal defect action should be taken.

22. The armature should revolve freely, without any fouling of the fixed parts or excessive end play in the bearings. A slight radial play which can just be felt by the hand is permissible.

Polarity

23. Run the generator in the correct direction of rotation, with a suitable moving coil voltmeter connected across the output terminals. The meter readings should confirm the terminal markings.

Note . . .

It should be remembered that with a centre zero meter there is a possibility of confusion when reading the polarity.

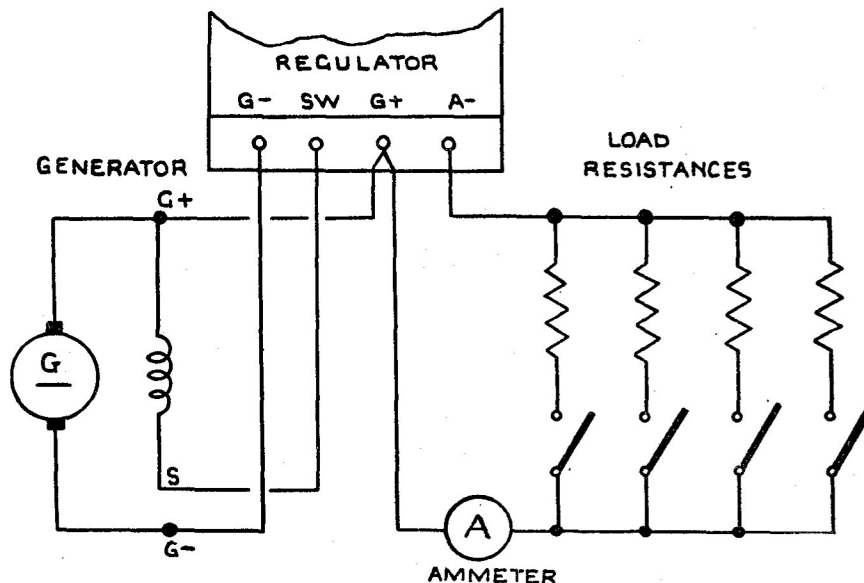


Fig. 3. Test circuit diagram

RESTRICTED

Performance

24. With the generator connected in the appropriate test circuit (*fig. 3*), run up on no load to approximately 3,300 r.p.m. There should be no hesitation in build up and the correct voltage should be attained.

25. Run at the same speed on half load for ten minutes. During this run, there should

be no more than pin-point sparking at the brushes. At the end of this test the brushes should still slide freely in their boxes.

Insulation

26. Whilst the generator is still hot from the preceding test, the resistance of all live parts together to the frame, measured with a 250-volt insulation resistance tester, should be not less than 0.1 megohm.