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Chapter 6

GENERATOR, TYPE 02

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Generator, Type 02

Clockwise rotation	Stores Ref. 5UA/3620
Anti-clockwise rotation	Stores Ref. 5UA/3619
Output	100 amp. at 30 volts
Speed range	3,250—6,000 r.p.m. cont.
Brushes—	
Grade	EGO (HA) (Stores Ref. 5UA/2384)
Spring pressure	12 to 18 oz.
Lubricant	Grease XG–271 (Stores Ref. 34B/208)
Weight	37½ lb.
Suppressor	Type W2 (Stores Ref. 5CY/3001)
Voltage regulator and cut-out combined	Type B (Stores Ref. 5UC/3880)

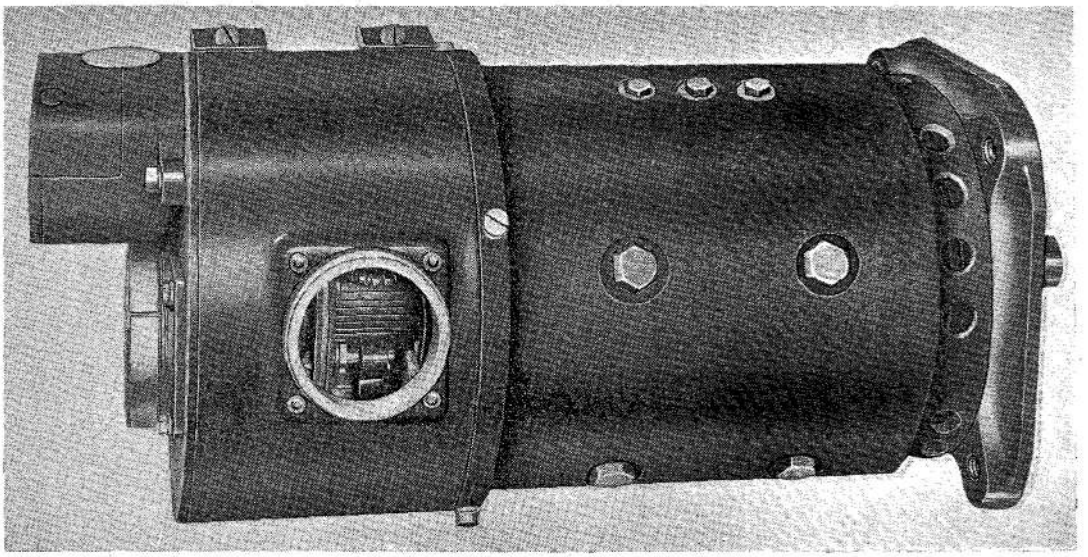

Fig. 1. Generator, Type O2

Introduction

1. The engine-driven generator, Type O2, is similar in design to the Type KX, but has been modified to give an increased output of 100 amp. at 30 volts.

DESCRIPTION

2. The generator, Type O2 (*fig.* 1) is a shunt-wound, four-pole machine, with two interpoles to assist commutation. The pole-pieces are offset in the bore of the yoke in order to accommodate the interpoles.

Terminals

3. The terminal markings are as follows :—

Positive, marked G+ ..	Yellow
Negative, marked G— ..	Blue
Field, marked S ..	Grey

One end of the field winding is connected internally to the negative terminal and the other to the terminal marked S.

Bearings

4. The armature is carried in two grease-lubricated ball races. One is located in the driving end frame, and is secured in position on the shaft by a bearing clamp nut. The remaining bearing is free to slide in an annular recess in the commutator end frame and is held in position by the inner bearing plate.

Brush gear

5. Four brushes are set diametrically about the commutator, and the connections are brought out to connecting rings mounted on, and insulated from, the end frame, and thence to the terminals. The brush holders are mounted on a brush ring, the position of the ring, relative to the commutator end frame, being adjustable by slackening off two nuts on the screws projecting through the end frame.

Cooling

6. The generator is cooled with air from the aircraft slipstream which enters through one of the apertures on the commutator cover band, passes through the yoke, and out through a number of holes in the yoke at the driving end. Both cooling unions on the commutator end shield should be blanked off with covers, and the one not in use on the commutator cover band should be similarly treated. The generator requires an airflow of at least 75 cub. ft. per min.; it is essential that there is a straight through airflow, and with older generators the perforated cover band should be removed to assist cooling.

INSTALLATION

7. The mounting of the generator will depend on the type of engine, and on the particular aircraft in which it is installed.

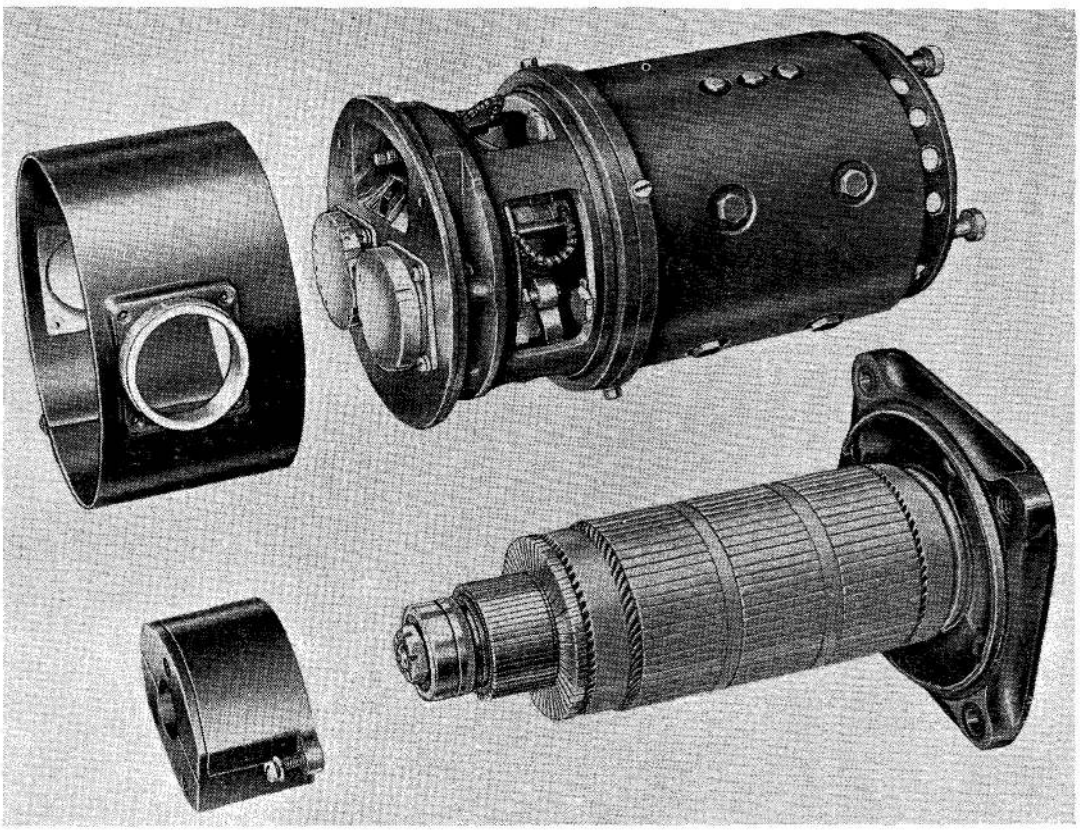

Fig. 2. Generator, showing brush gear

Where necessary, reference should be made to the relevant S.I.S. in which general instructions for the installation of the generator are given.

8. Before fitting, inspect the name plate fitted to the yoke of the machine and see that the direction of rotation and type of generator are correct for the engine and aircraft concerned. The direction of rotation is taken when looking at the driving end of the machine.

9. The splined end of the shaft protruding from the driving end of the machine must be protected by a ferrule when the generator is not in use. When a coupling member engaging with a corresponding member on the engine is fitted to the shaft, see that it is a close sliding fit on the shaft, and properly secured and locked. In all instances, the shaft should be lightly coated with clean engine oil.

Air pipes

10. Pipes for the cooling air are usually made of thin aluminium; they must be handled with care and should not be bent or restricted except as designed, particularly at the inlet or outlet apertures.

Corrosion

11. After installation, anti-corrosive treatment should be applied to certain components. Information on this subject will be found in A.P.4343, Vol. 1, Sect. 2, Chap. 1.

OPERATION

12. The generator is coupled to the aircraft engine through gearing, the ratio being such that over the speed range of the engine, the speed range of the generator is within the limits given under Leading Particulars.

Voltage regulation

13. Output voltage is maintained approximately constant by an external voltage

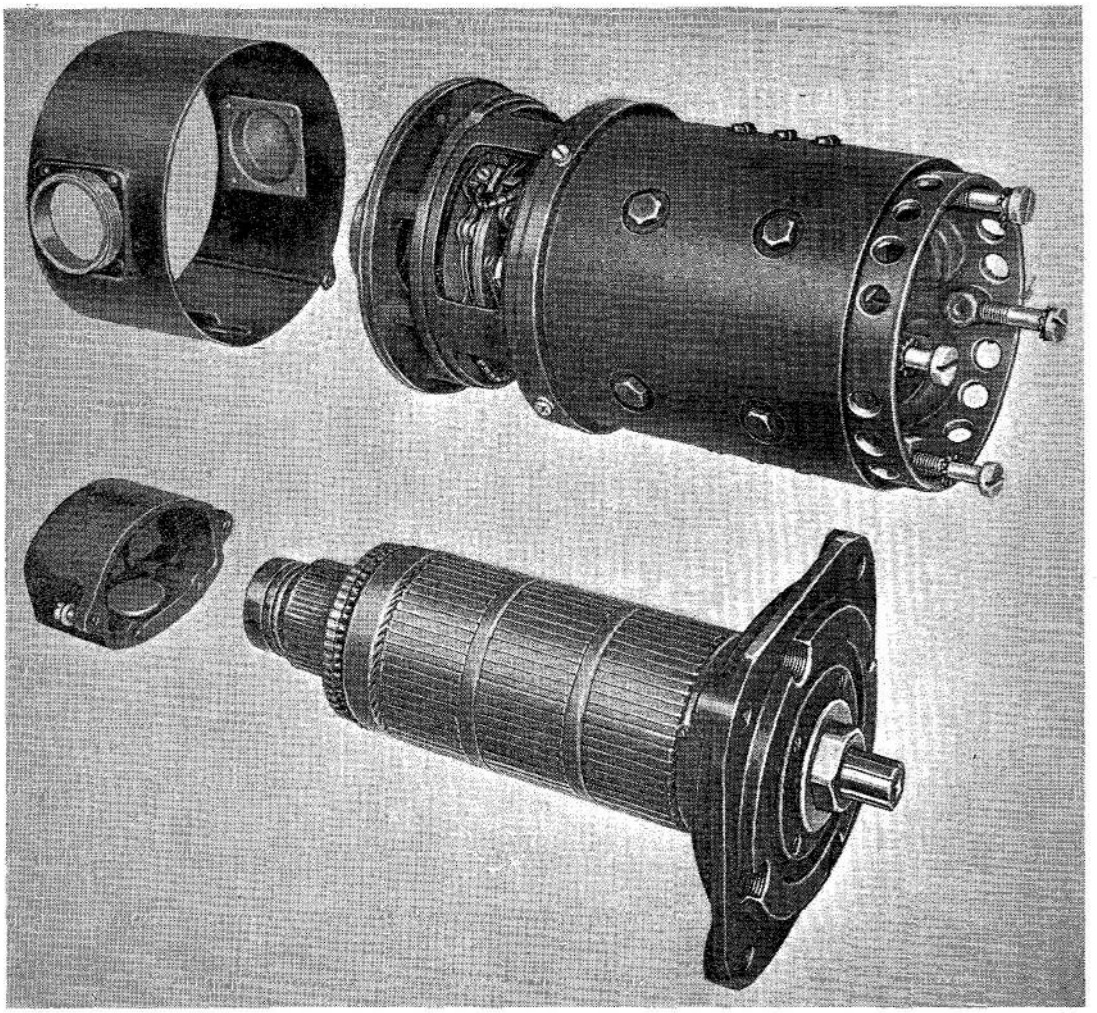

Fig. 3. Generator, showing cooling holes

regulator, irrespective of fluctuations in speed and load. A battery, connected in parallel with the generator, supplies all the general service loads when the generator is not running. A reverse current cut-out protects the generator from back discharge when the generated voltage falls below the voltage of the batteries.

Generators in parallel

14. When two generators are used in parallel, the regulators must be connected in such a manner that the generators share the load equally. The regulators are described in A.P.4343B, Vol. 1, Sect. 1, to which reference should be made.

SERVICING

15. 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

16. The bearings cannot be lubricated without partial dismantling of the generator. The general servicing and lubrication of bearings is dealt with in A.P.4343, Vol. 1.

Dismantling

17. Remove the commutator cover band and lift the brushes off the commutator. Remove the four ch/hd. screws from the driving end frame and gently tap the driving end frame away from the yoke. Withdraw the armature complete with driving end frame and bearings (*fig.* 2).

18. To dismantle the driving end bearing, unscrew the oil thrower disc nut. Remove the four csk/hd. screws in the driving end frame which secure the bearing retaining plate. Tap the armature gently out of the end frame. It is not normally necessary to remove the commutator end frame, but this may be done by removing the four securing bolts and disconnecting the generator shunt field and interpole windings.

Insulation resistance

19. If necessary, insulation tests may be carried out before assembly in accordance with A.P.4343, Vol. 1.

Assembling

20. To assemble the generator, reverse the procedure described in para. 17 and 18, paying special attention to the peening of the driving end bearing plate screws, and to the locking of all other nuts and screws if required. Ensure that the nuts holding the terminals are tight. If these are not secure, there is a tendency, when subsequently tightening the nuts securing the external cable lugs, for the terminals to turn and cause damage to the insulation.

21. Where locating pins are provided, see that they are placed in, and register correctly with, their appropriate slots before the parts are tightened up.

Brush gear

22. Only the correct grade of brushes, as listed in Leading Particulars, should be used, and the correct spring pressure should be maintained throughout their effective life.

23. The position of the brush rocker relative to the end frame can be adjusted by slackening the two nuts on the screws projecting through the end frame. The correct brush position is when the brushes are set approximately one half segment in advance of the neutral position.

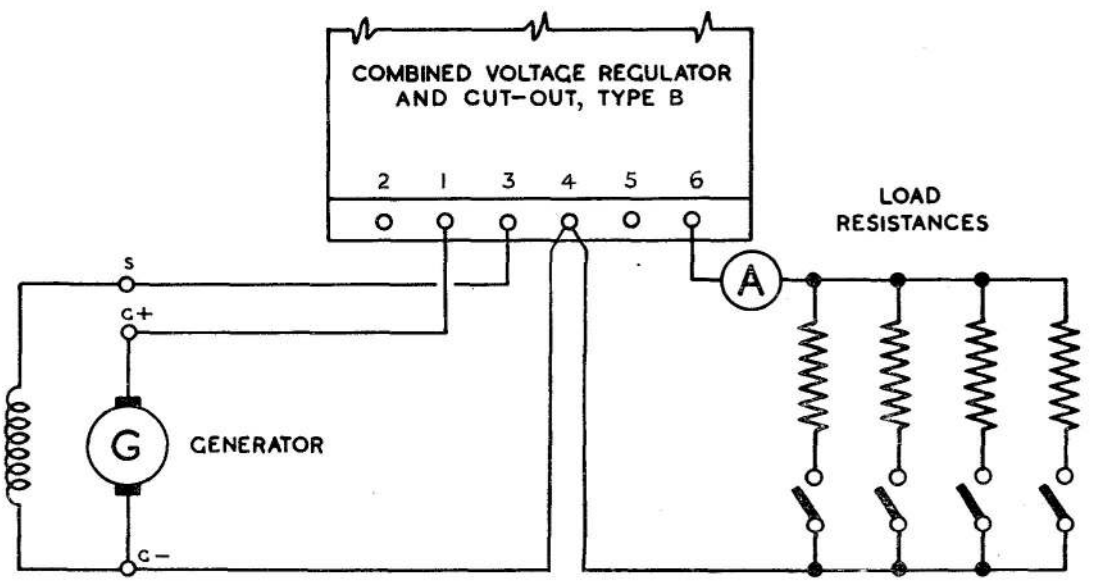

Fig. 4. Test circuit diagram

◀ Terminal box

24. The 4 B.A. screw securing the insulating plate inside the terminal box must be taken out, coated with varnish, and screwed in again whilst still wet. This precaution is necessary as cases have occurred of the screw vibrating loose and causing a short circuit.▶

TESTING

25. 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.

26. 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

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

Performance

28. With the generator connected in the appropriate test circuit (*fig.* 4), run up on no load to approximately 3,250 r.p.m. There should be no hesitation in build up and the correct voltage should be attained.

29. 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

30. 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.

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