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Chapter 1

GENERATORS, ROTAX, B2000 SERIES

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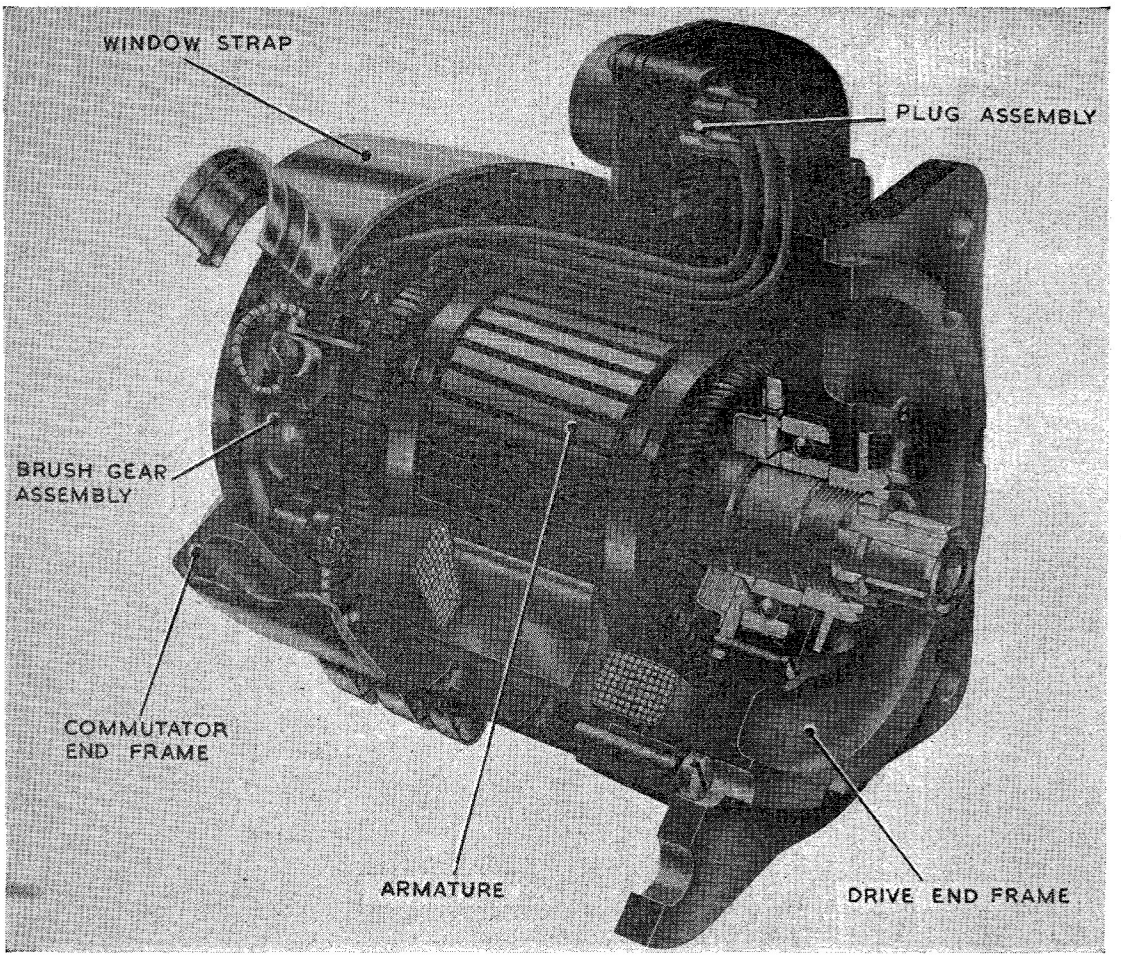

Fig. 1. Sectional view of typical generator

Introduction

1. The B2000 series of generators are engine-driven machines which provide a 1 kW, 28-volt d.c. supply for aircraft electrical systems.

DESCRIPTION

2. A sectional view of a typical generator is shown in fig. 1. The generators in this series are four-pole, shunt-wound machines which follow conventional design, with an armature carried at each end by ball bearings supported in the end frame. The commutator end frame is fixed to the yoke by eight screws and tab washers, and the driving end frame by seven screws and lock washers.

3. The brushgear incorporates two pairs of diametrically opposite brushes, connected as shown in the internal wiring diagram in fig. 2. Access to the brushgear is gained by removing the window strap, which incorporates the cooling air induction inlet.

Cooling

4. Cooling of this generator is by blast air, a minimum air pressure of 3·5 in. of water being required at an output of 35 amp at 28 volts.

INSTALLATION

5. The generator is secured by four fixing holes in the mounting flange which forms part of the driving end frame.

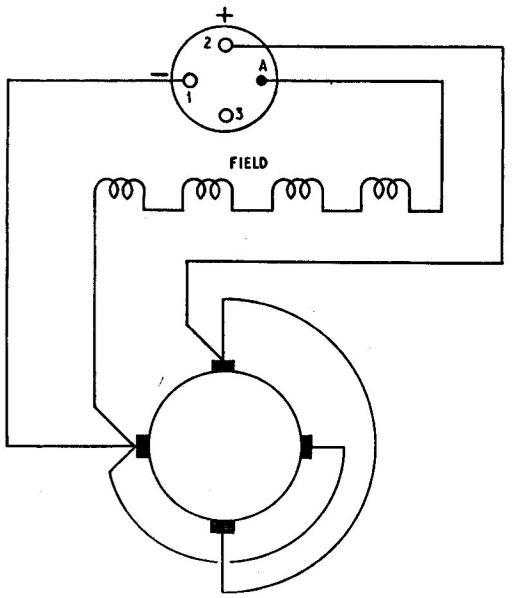

Fig. 2. Diagram of internal connections

SERVICING

6. General information on the servicing of generators will be found in A.P.4343, Vol. 1, Sect. 2, Chap. 1, which should be read in conjunction with the following paragraphs and the relevant Servicing Schedule.

7. The window strap at the commutator end (where fitted) should be removed, and the internal wiring connections examined for security and serviceability. All nuts, screws and locking devices should be checked and secured where necessary. The plug should also be released from the cable elbow and the connections examined for security.

Brushgear

8. Brushes should be renewed at periods prescribed in the relevant Servicing Schedule, and whenever examination reveals that they will not remain serviceable for the period that must elapse before the next servicing. If new brushes have been fitted, they should be bedded to the surface of the commutator as laid down in A.P.4343, Vol. 1, Sect. 1, Chap. 2. Check that brushes slide freely in their boxes.

9. The brush spring pressure should be checked with a suitable spring balance and the reading taken at a point where the spring just leaves the brush.

Lubrication

10. The bearing at the driving end cannot be lubricated without partial dismantling of the generator, but the bearing at the commutator end is accessible. The lubricant required for this type of generator is grease XG-271, and bearings should be packed one third of their capacity only.

Testing

11. If the serviceability of the machine is suspect, it may be tested as laid down in Appendix A.

Appendix A

STANDARD SERVICEABILITY TEST FOR GENERATORS, ROTAX, B2000 SERIES

Introduction

1. The following tests may be applied to the machine before it is put into Service, or at any time when its serviceability is suspect.

Test equipment

2. The following test equipment is required:—

(1) Tester, generator, one in the Mk. 5 series

(2) Balance, spring, 0-4 lb. (Ref. No. 1H/97)

(3) Bridge megger tester, Type B (Ref. No. 5G/1708)

(4) Insulation resistance tester, Type C (Ref. No. 5G/152) (for R.A.F.) or Type 0557/A.P.5047 (for R.N.)

Testing

3. Before mounting the generator on the test set, check for freedom of rotating parts by turning the armature by hand. There should be no excessive end play in the bearings; a slight radial play which can just be felt by hand is permissible.

Brushgear

4. Check the brush length and brush spring pressure; the brush length should be not less than 0·562 in., and the spring pressure should lie between 10 and 12 oz.

Resistance of windings

5. The resistance of the windings when corrected to 20 deg. C should be as follows:—

Winding	*Resistance value (ohms)*
Shunt field	4·19 to 5·11
Armature	0·126 to 0·160

Polarity

6. Run the generator in the correct direction of rotation, as shown below, with a suitable voltmeter across the output terminals. The meter reading should confirm the terminal markings.

Type	Rotation
B2001/2F	Anti-clockwise
B2003/1F	Anti-clockwise
B2005	Clockwise

Performance

7. With the generator connected to the test set, run up on no load to approximately 4,000 r.p.m. There should be no hesitation in build-up and the correct voltage should be attained.

8. Run at the same speed on half load (17·5 amp.) for 10 min. During this run, there should be no more than pin-point sparking at the brushes. At the end of the test the brushes should still slide freely in their boxes.

Insulation resistance

9. The insulation resistance between all live parts and the frame, measured with a 250 volt insulation resistance tester with the machine still warm should be not less than 0·05 megohm.

Appendix 1

GENERATOR, ROTAX, TYPE B2001/2F

LEADING PARTICULARS

Generator, Type B2001/2F	*Ref. No.* 5*UA*/6380
Output	35 *amp at* 28 *volts* (1 *kW*)
Speed range	4,000 *to* 7,000 *r.p.m.*
Rating	*Continuous*
Rotation	*Anti-clockwise*
Cooling	*Blast air*
Minimum brush length	0·562 *in.*
Brush spring pressure	10 *to* 12 *oz*
Brushes	*Grade EG*11 (*HAM*) (*Ref. No.* 5*UA*/5075)
Resistance of windings at 20 *deg. C*—	
Field	4·19 *to* 5·11 *ohms*
Armature	0·126 *to* 0·160 *ohm*
Overall dimensions—	
Length	8·125 *in.*
Height	7·151 *in.*
Width	5·400 *in.*
Weight	16 *lb.*

1. This generator is identical with that described and illustrated in the main chapter, and has a straight air inlet incorporated in the window strap assembly.

Appendix 2

GENERATOR, ROTAX, TYPE B2003/1F

LEADING PARTICULARS

Generator, Type B2003/1F	*Ref. No.* 5*UA*/4747
Output	35 *amp at* 28 *volts* (1 *kW*)
Speed range	4,000 *to* 7,000 *r.p.m.*
Rating	*Continuous*
Rotation	*Anti-clockwise*
Cooling	*Blast air*
Minimum brush length	0·562 *in.*
Brush spring pressure	10 *to* 12 *oz*
Brushes	*Grade EG*11 (*HAM*) (*Ref. No.* 5*UA*/5075)
Resistance of windings at 20 *deg. C*—	
Field	4·19 *to* 5·11 *ohms*
Armature	0·126 *to* 0·160 *ohm*
Overall dimensions—	
Length	8·173 *in.*
Height	6·781 *in.*
Width	5·850 *in.*
Weight	16 *lb.*

1. This generator is identical with that described and illustrated in the main chapter, apart from the design of the air inlet, which is a right-angled elbow.

Appendix 3

GENERATOR, ROTAX, TYPE B2005

LEADING PARTICULARS

Generator, Type B2005	*Ref. No. 26BV/397 (with fan unit)*
Output	35 *amp at* 28 *volts* (1 *kW*)
Speed range	4,000 *to* 7,000 *r.p.m.*
Rating	*Continuous*
Rotation	*Clockwise*
Cooling	*Fan*
Minimum brush length	0·562 *in.*
Brush spring pressure	10 *to* 12 *oz.*
Brushes	*Grade EG*11 (*HAM*) (*Ref. No. 5UA/5075*)
Resistance of windings at 20 *deg. C*—	
Field	4·19 *to* 5·11 *ohms*
Armature	0·126 *to* 0·160 *ohm*
Overall dimensions—	
Length	9·140 *in.*
Height	7·250 *in.*
Width	5·350 *in.*
Weight	15¼ *lb.*

1. This generator (*fig.* 1) is generally similar to others in the B2005 series, but, in addition, has a fan assembly built on to the commutator end, the generator itself having an extended armature shaft at the commutator end for that purpose. The fan assembly provides suction for instruments such as the directional gyro and artificial horizon, and also circulates cooling air through the generator. Information on the fan assembly will be found in A.P.1275A, Vol. 1, Sect. 27.

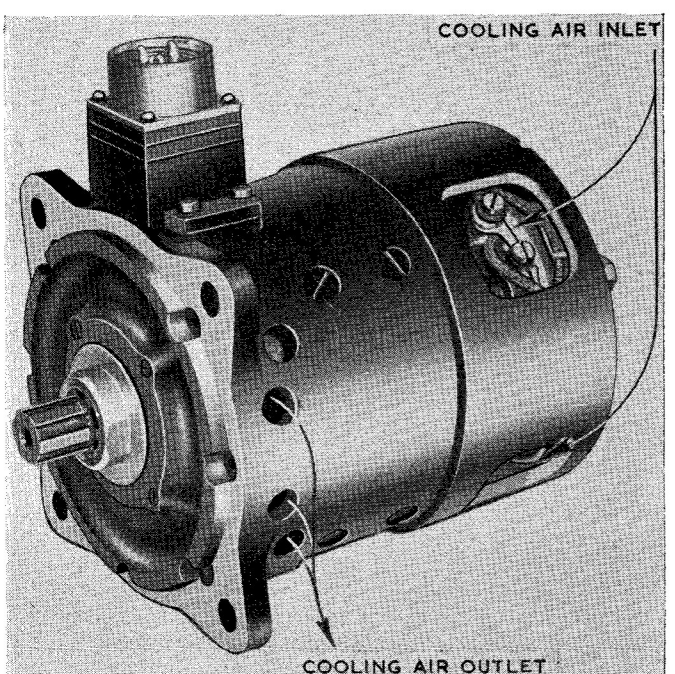

Fig. 1. Generator, Type B2005