Chapter I

GENERATOR, TYPE Y1

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Generator, Type Y1 (Clockwise or anti-clockwise rotation)	Stores Ref. 5U/5211
Output	6KVA, single-phase
Speed range	3,000 to 4,800 r.p.m.
Maximum speed (for 5 min.)	6,000 r.p.m.
Frequency	1,200 to 1,900 c.p.s.
Field excitation voltage	24-volt. d.c.
Voltage control	Voltage regulator, Type 50
Control level	115-volt. ± 2%
Cooling	Fan-assisted blast cooling
Lubricant	Oil, OMD—110 (Stores Ref. 34D/162)
Length (overall)	13.625 in.
Weight	53.6 lb.

Introduction

1. The Type Y1 alternating current generator (*fig.* 1) supplies an a.c. controlled output of 52·2 amperes at 115 volts ± 2 per cent, when connected through a Type 50 voltage regulator. The generator is designed for aircraft installation, but may also be used for various ground duties. It is suitable for either clockwise or anti-clockwise rotation.

2. A 24-volt d.c. supply is required for excitation of the generator field.

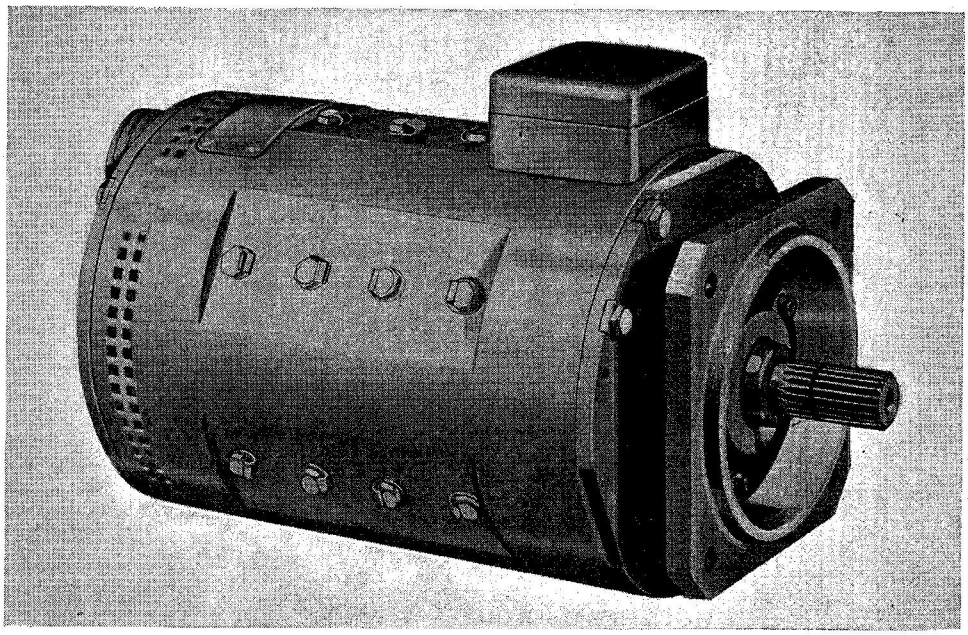

Fig. 1. General view of generator, Type Y1

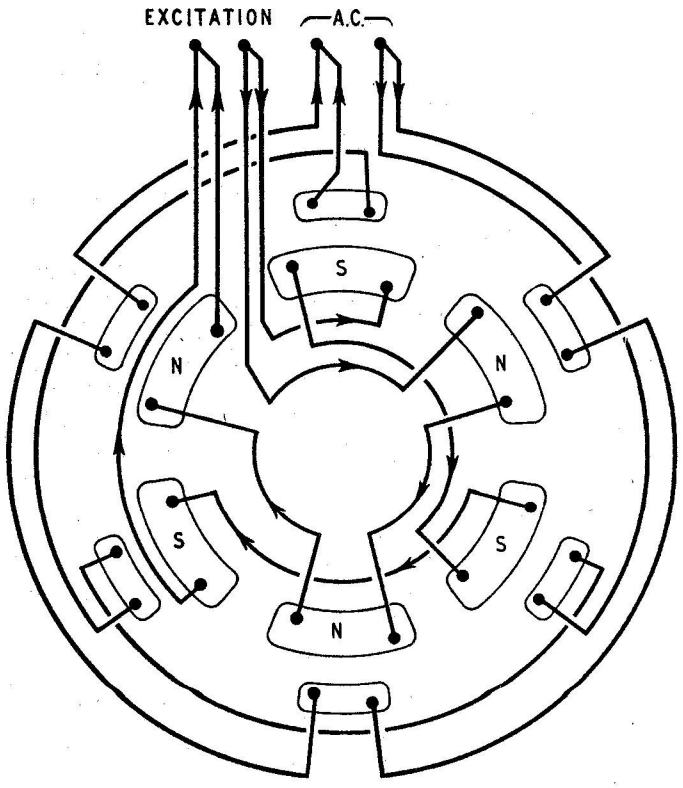

Fig. 2. Internal connections

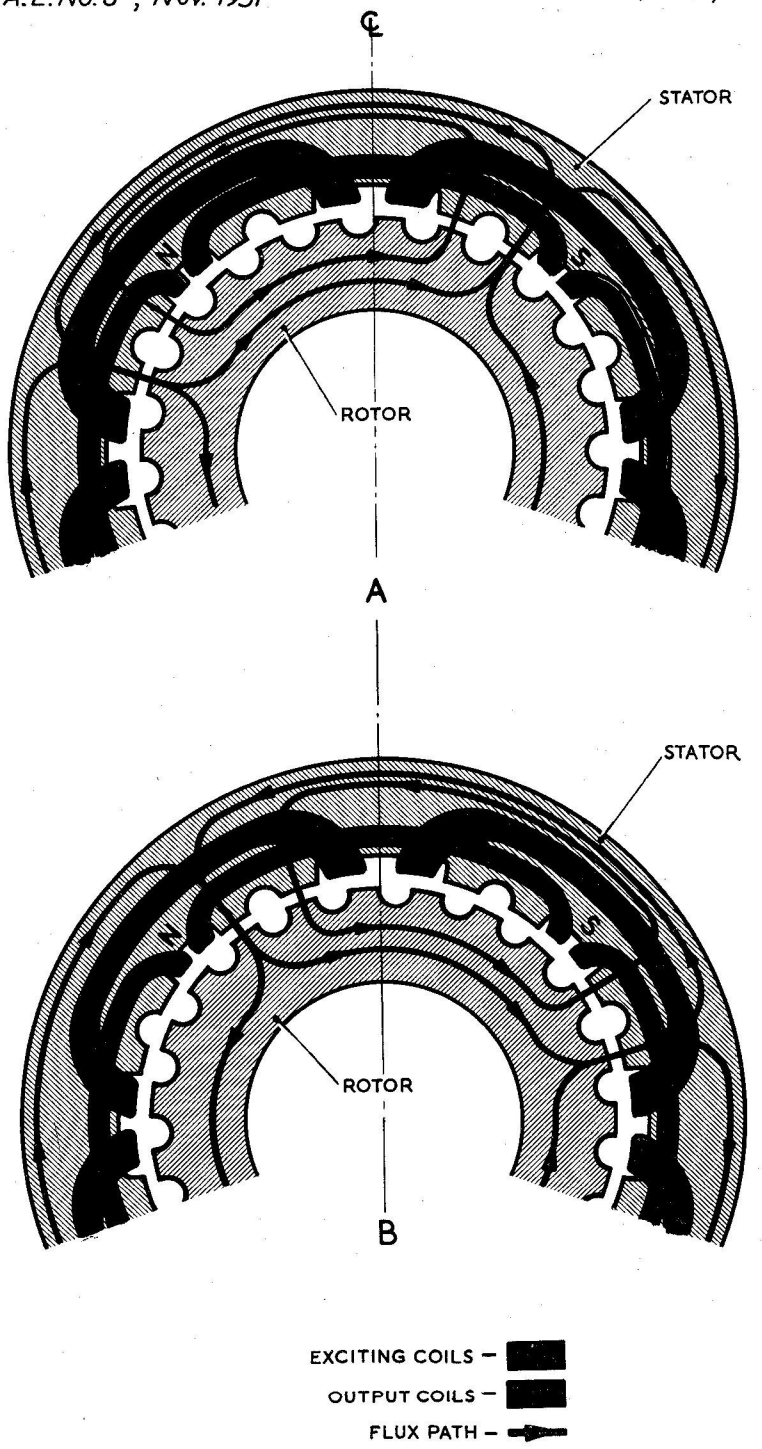

Fig. 3. Principle of generator

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DESCRIPTION

General

3. The Type Y1 is a heteropolar inductor generator and has both the a.c. (output) and the d.c. (excitation) coils on the stator. There are six a.c. coils and six excitation coils, each set of coils being connected 3 series and 2 parallel (*fig.* 2). The a.c. coils are arranged in slots at the centre of each pole piece; each coil spans one pole pitch as shown diagrammatically in fig. 3. The excitation coils are shown in red and the output coils in blue; the flux path is also shown.

Yoke and frame assemblies (*Fig.* 4)

4. The six poles and stator assemblies are secured to the yoke by four bolts to each pole piece; these bolts are locked by tab washers. A shrouded terminal block is secured to the top of the yoke at the driving end, and air outlet vents are provided around the periphery at the non-driving end.

5. The driving end frame has two flanges; one for attachment by seven bolts to the yoke, and the other for mounting the generator to the aircraft engine or gearbox. Four holes are provided in this flange for the mounting bolts. The opposite end frame is bolted to the yoke, and a nozzle for attachment of the cooling air inlet pipe is provided in this frame.

Bearings

6. The rotor bearings are oil lubricated and are carried in the end frames. The driving end bearing is secured to the rotor shaft by a nut, and is retained in the end frame by an inner bearing plate and an outer bearing cap. The non-driving end bearing is retained on the rotor shaft by a cone shaped sleeve pressed on to the end of the shaft. The bearing is then located in the end frame by a bearing plate and cap. The oil is retained in the bearings by felt washers contained within the bearing plates and caps.

Rotor and cooling system

7. The rotor consists of circular soft iron stampings with teeth cut in the periphery. They are insulated from each other in order to reduce eddy current losses and are secured to a hollow drum which is mounted on the rotor spindle.

8. The generator is semi-enclosed and cooled by through ventilation, a fan forming part of the rotor assembly. Air enters through

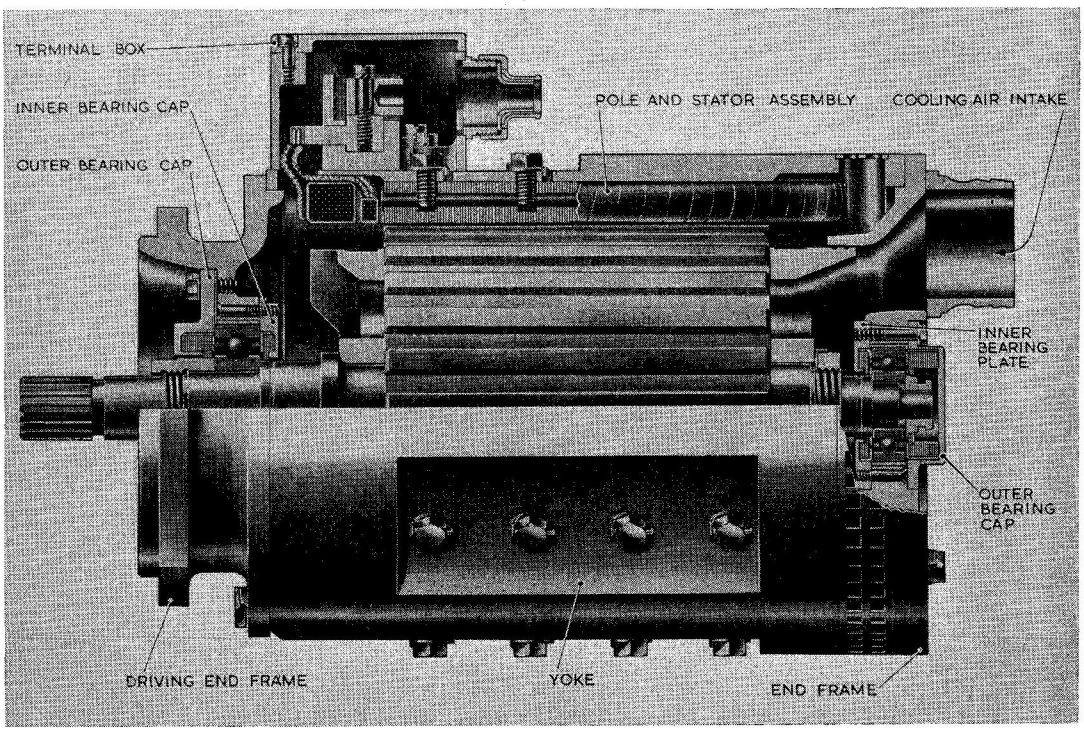

Fig. 4. Sectional view of generator

the inlet vent pipe, and flows through axial vents in the rotor and then back through the air gap and the spaces between the rotor teeth ; it is expelled through the peripheral openings in the yoke.

Terminal connections

9. Two cable glands are provided to the terminal block ; the smaller gland for the 24-volt d.c. supply and the larger for the a.c. output. The appropriate cable connections are shown in fig. 5.

SERVICING

Lubrication of bearings

10. The bearings are lubricated only when the generator is dismantled for servicing ; the felt lubricating pads then being examined for damage, and soaked in oil.

Testing

11. When testing this type of generator for satisfactory operation, it is only necessary to ensure that there are no open circuits in either the stator or excitation windings, and that the insulation resistance is satisfactory.

12. For test purposes the generator is connected to a suitable test circuit, including, a Type 50 voltage regulator, a 24—29-volt d.c. supply, and a dummy load. The generator should then be driven at approximately 4,800 r.p.m. on a load of 52 amperes for a period of 20 minutes. At the end of this period the insulation resistance to the frame of all live parts, connected together, should not be less than 1 megohm when tested with a 250-volt insulation tester.

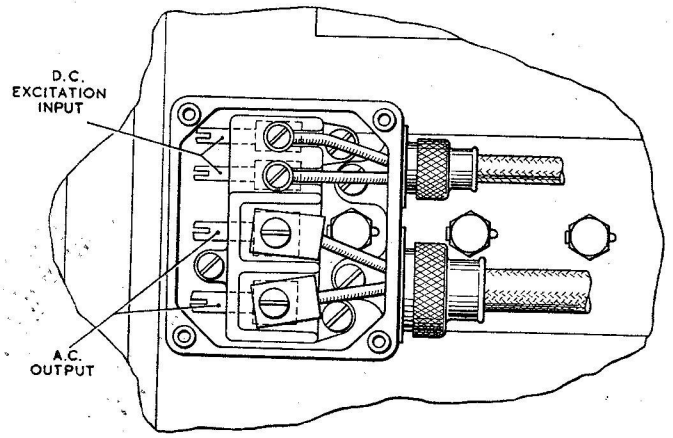

Fig. 5. Terminal connections

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