

## Chapter 14

### GENERATOR, ROTOL, TYPE, SNA SERIES

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#### Introduction

1. The generators in the SNA/ series are of a special type, and are used in aircraft, engine speed synchronising systems. A description of the Rotol, Type SN4/5 system is described in A.P.4343, Vol. 1, Sect. 13.

2. The generators are mounted on, and, driven by the engine and their function is that of a tachometer generator.

3. The output of these generators is 3 phase with line voltages varying between 25—40 volts a.c. at frequency in the order of 75—100 c/s.

4. The following description is typical of the generators appearing in this series. For particulars of Types, reference should be made to the List of Appendices to this chapter.

#### DESCRIPTION

##### General

5. A sectional view of a typical generator in the SNA/ series is shown in Fig. 1. It consists mainly of a two piece housing which encloses a magnetised rotor operating in a 3 ph wound stator.

##### Case

6. The outer case is machined from a light alloy casting and incorporates an integral mounting flange. This flange is suitably machined, and drilled having six equally spaced  $\frac{9}{32}$  in. diameter holes, which locate on the studs provided on the appropriate face of the engine driven gearbox.

7. The non-flanged end of the case is fitted with four studs to which an end frame is secured. Mounted on the end frame is a 4-pin Breeze plug to which the aircraft socket is attached.

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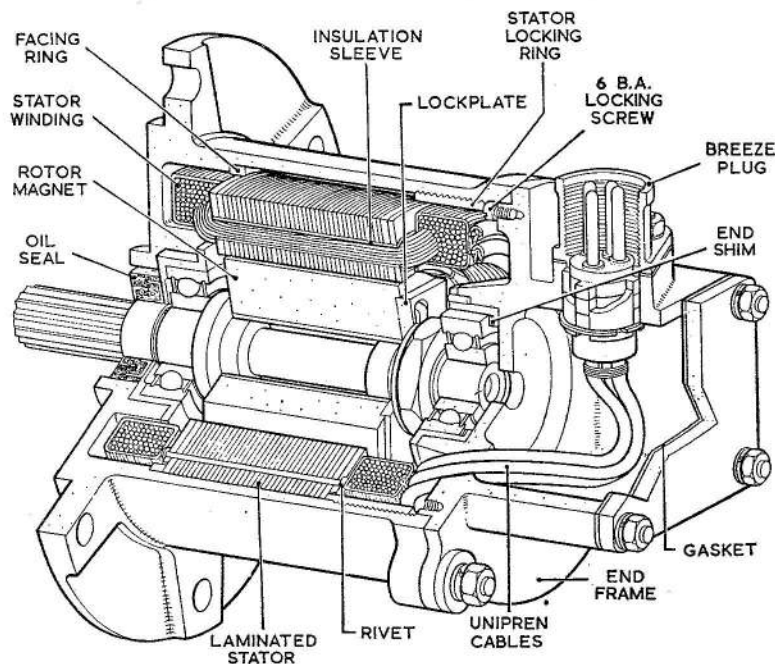


Fig. 1. Sectional view of typical generator

### Stator

8. The stator is located by the head of a rivet projecting into the bore of the case and secured in the case by a locking ring. This ring screws into the threaded bore of the case and is itself locked by a setscrew fitted in the base of the end frame. On assembly of the frame to the case, the head of the set screw locates in a slot provided in the end of the locking ring.

9. The 3-phase star connected winding pass through slots off the laminated stack, and are connected, by cables to the appropriate pins of the Breeze plug. An elongated hole in the end frame base provides a passage for the cables. The head of the end frame is detachable to facilitate inspection.

### Rotor

10. The rotor is a permanent magnet and is keyed to the main shaft, by a locking plate. The rotor and locking plate are secured to the shaft by a  $\frac{9}{16}$  in. B.S.F. nut and tab wash

11. Two single row ball bearings incorporating grease shields are fitted to the rotor shaft and locate in the bearing liners of the case and end frame. The bearing at the driving end of the shaft locates against a shaft flange; this flange ensures correct positioning of the

rotor. The bearing at the other end of the shaft locates against a shoulder on the shaft formed by a diameter reduction.

12. The shaft protrudes through the base of the case and is externally serrated to engage with the engine drive shaft. An oil seal fitted on the shaft and housed in a recess in the base prevents the ingress of oil from the engine gear box.

### End frame

13. The end frame is spigoted on to the main case and secured by 4 B.A. nuts (*para. 7*). A Ch.Hd. screw fitted in any one of the five tapped holes in the end frame enables the screw head to engage with one of the four slots in the stator locking ring.

14. A bearing liner is carried in this frame and locked in position by a peg. On assembly a laminated brass shim is fitted between the bearing and the inner end of the liner. The shim is important since it determines the correct amount of end float of the rotor shaft.

15. An access cover and gasket is secured to four 4 B.A. studs in the end frame by nuts and washers. The Breeze plug is secured to the top end of the end frame by two 2 B.A.

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studs, nuts and washers. The plug is pin offset to ensure that the aircraft socket is located correctly. A hole drilled in one of the Breeze plug locking studs is provided for wire-locking the aircraft socket.

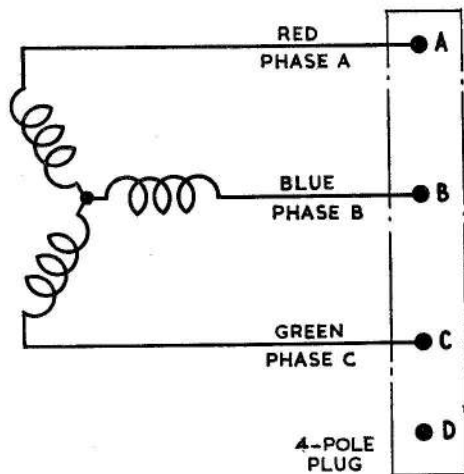


Fig. 2 Circuit diagram

#### Electrical

16. The wiring diagram of the generator, is given in Fig. 2. It is important that the phase sequence is correct; red to A, blue to B, and green to C; pin D of the plug is not used.

#### INSTALLATION

17. The following instructions are of a general nature; for details of specific installations, reference should be made to the appropriate aircraft handbook.

#### Pre-mounting checks

18. Before mounting the generator, the following checks should be made:—

- (1) The type number of the unit is correct.
- (2) All blanks have been removed from the generator and the engine mounting face.
- (3) The threads of the aircraft electrical socket and the thread and pins of the generator Breeze plug are undamaged.
- (4) The threads of the engine studs and the serrations of the rotor shaft and engine drive quill are undamaged.

(5) The driving quill is a sliding fit on the rotor shaft serrations.

(6) The driving quill, lubricated with clean engine oil, is positioned in the engine drive.

(7) The mounting faces of the generator and the engine are dry, clean and free from burrs and scores.

(8) The gasket on the engine mounting face is new.

(9) The oil seal is undamaged and correctly fitted on the rotor shaft.

#### Mounting

19. The generator may now be installed as follows:—

(1) Correctly locate the generator on the gearbox mounting face; ensuring that the rotor shaft serrations freely engage those over the quill and firmly secure. Tighten the nuts evenly and firmly in diametrical sequence.

(2) Connect the aircraft harness socket to the generator Breeze plug and wire lock.

#### Removal

20. When removing the generator from the engine gear box after releasing the six  $\frac{1}{4}$  in. B.S.F. nuts and washers, care should be taken not to damage the mounting faces of the engine and generator. Application of an alternating side load to the generator should be sufficient to break the joint.

#### Note . . .

*Do not use a screwdriver blade or a similar instrument to break the joint.*

#### SERVICING

21. The generator should require very little attention. The following servicing notes are of a general nature. For servicing details on the various types of generators appearing in this series reference should be made to the relevant aircraft or bay servicing schedule.

22. The joint between the generator and the engine must be examined for oil leaks. Seepage may be due to loose nuts, which should be tightened. If the nuts are already tight, or tightening proves ineffective, it is almost certain that the gasket is faulty.

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23. Remove the unit and fit a new gasket, ensuring that the mounting faces of the engine and generator are clean, smooth, and free from burrs, scores and other damage.

24. The cover on the end frame should be removed and the interior chamber inspected for the presence of oil and the condition of the electrical leads. If these points are satisfactory the cover must be replaced and secured. If there are signs of oil in the

chamber the generator must be removed for a more detailed examination.

25. The electrical connections, leads and plugs should be checked for serviceability.

**Insulation resistance test**

26. The insulation resistance between any phase and the frame should be measured using a 250 volt insulation resistance tester and should not be less than 50,000 ohms.

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## Appendix 1

### GENERATOR, ROTOL, TYPE SNA/4

#### LEADING PARTICULARS

<b>Generator, Rotol, Type SNA/4</b>	..	..	..	..	<b>Ref. No. 37M/1</b>
<i>Output Voltage (3 phase)</i>	..	..	..	..	29.5 to 34 V. a.c.
<i>Frequency</i>	..	..	..	..	90 to 105 c/s
<i>Speed Range</i>	..	..	..	..	6430 to 7500 rev./min.
<i>Rotation (viewed from drive end)</i>	..	..	..	..	clockwise
<i>Bearings</i>					
RA 64484	..	..	..	..	Ref. No. 37M/154
RA 64485	..	..	..	..	Ref. No. 37M/155
Grease XG 275	..	..	..	..	Ref. No. 34B/9100512
<i>Output (open circuit)</i>	..	..	..	..	29.5—0.5 V, a.c. when driven anti-clockwise at 4,500 rev/min.

The Generator, Rotol, Type SNA/4 is similar to that described and illustrated in the main chapter.

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## Appendix 2

### GENERATOR, ROTOL, TYPE SNA/7A and B

#### LEADING PARTICULARS

Generator, Rotol, Type SNA/7A	..	..	Ref. No. 37M/
Generator, Rotol, Type SNA/7B	..	..	Ref. No. 37M/130

*The following data are common to both.*

Output Voltage	..	..	25 to 40 V, a.c.
Frequency	..	..	75 to 100 c/s
Speed Range	..	..	3,000 to 5,500 rev/min.
Rotation (viewed from drive end)	..	..	clockwise
<i>Bearings post mod (C) SN 126</i>			
RA 64484	..	..	Ref. No. 37M/154
RA 64485	..	..	Ref. No. 37M/155
Grease XG 275	..	..	Ref. No. 34B/9100512
Output (open circuit)	..		SNA/7A 40.5 to 42.5V at 5,100 r.p.m. SNA/7B 37.5 to 39.5V at 5,100 r.p.m.
Output (on load)			SNA/7A 80 ohms per phase $35v \pm 1V$ at 4,500 rev/min. SNA/7B 160 ohms per phase $33v \pm 1V$ at 4,500 rev/min.

The Generators, Rotol, Types SNA/7A and B are similar to that described and illustrated in the main chapter.

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