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TACHOMETER GENERATOR, SANGAMO WESTON, MODEL S168, FORM 1

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL



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Prelim
Page 1/2

AMENDMENT RECORD SHEET

To record the incorporation of an Amendment List in this publication, sign against the appropriate A L No. and insert the date of incorporation

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52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		

CONTENTS

Chapters

- 1 Description and Operation
- 2 Standard Serviceability Test
- 3 Bay Servicing

Chapter 1

DESCRIPTION AND OPERATION

INTRODUCTION

1. The equipment described in this chapter is a tachometer generator. In the installed state, it is connected by a drive shaft and gearing to the aircraft engine. Its electrical output is designed for connection to a tachometer indicator.

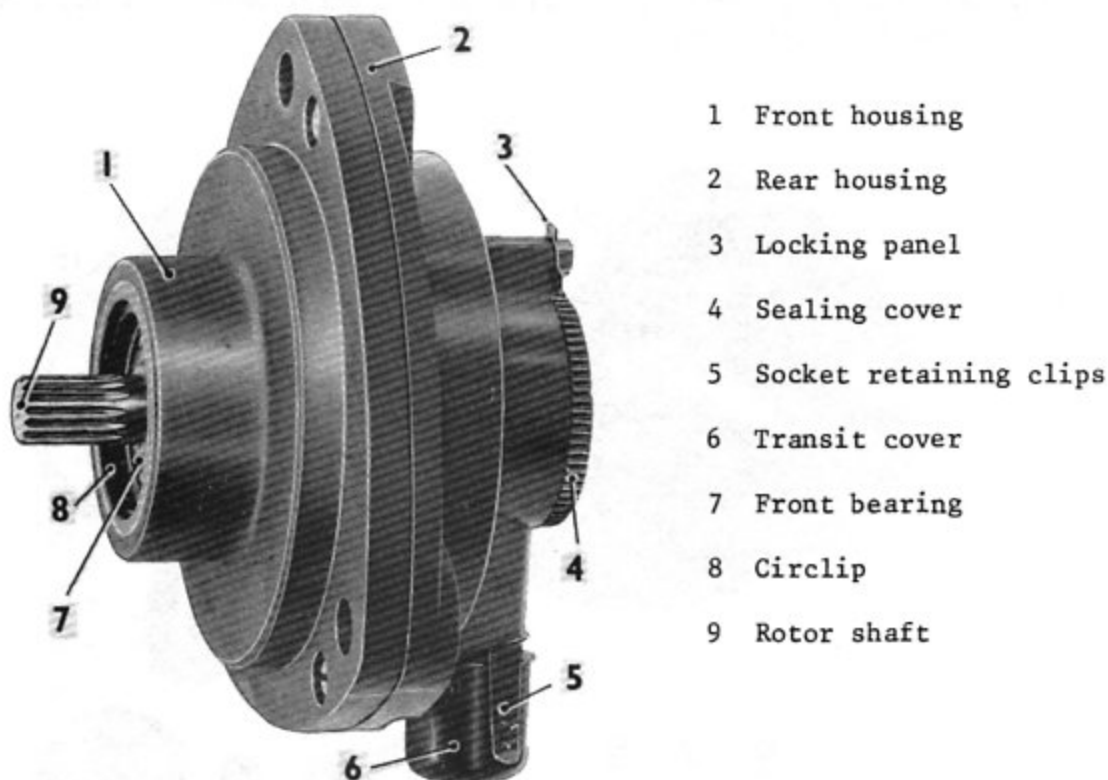


Fig.1 Generator S168, general view

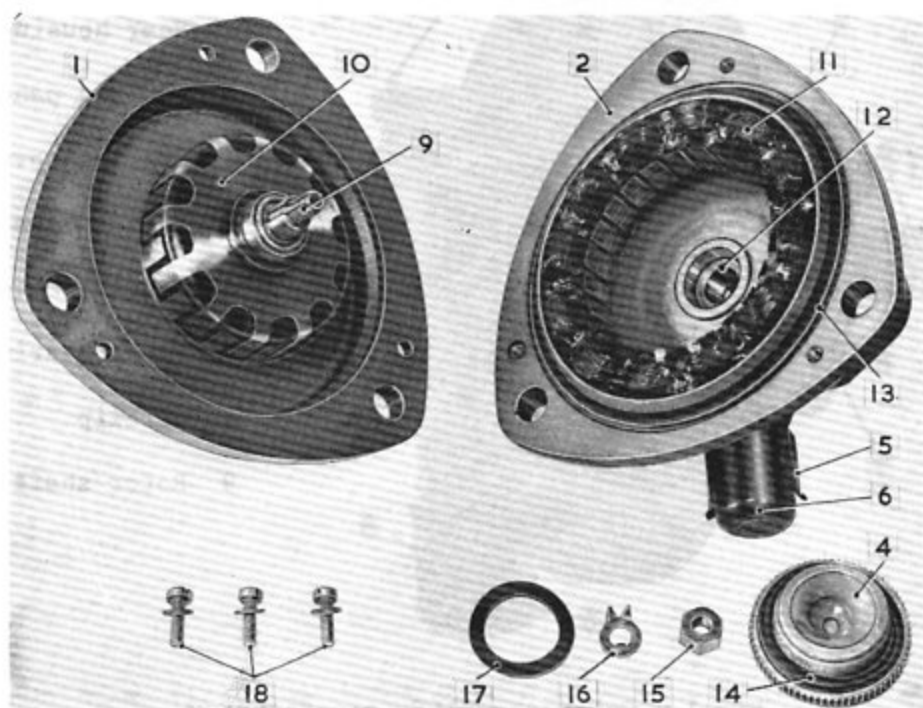
DESCRIPTION (fig.1 and 2)

2. Generator S168 is a 24-pole, alternator-type generator, with a permanent-magnet rotor, having an output of 10V and 200Hz for every 1,000 rev/min. of the generator. The wave-form approximates to a sine wave and the resistance of the stator winding is approximately 25Ω .

3. The maximum shaft speed of the tachometer generator is 6,000 rev/min. For indicated engine speeds of 10,000 rev/min. the tachometer generator is run at half engine speed using an engine to generator gear ratio of 2 : 1. For indicated speeds of over 10,000 rev/min. the generator is run at quarter engine speed using an engine to generator gear ratio of 4 : 1.

4. The generator is contained in a two-part die cast casing consisting of the front and rear housing. The rotor is fitted to a shaft which is supported by two bearings; the front and rear bearings, which are mounted in their respective housings. The 24-pole, single-phase, stator winding is mounted within the rear housing.

5. The shaft is assembled as an interference fit to the front bearing and has a 16-tooth male spline for gear coupling to the engine unit at one end and a 2 B.A. threaded portion for securing purposes at the other. The front bearing is retained in the front housing by a circlip and the rotor, suitably keyed, is assembled as a clearance fit on the shaft. The rotor is of moulded construction and is formed by moulding two 12-pole segmented magnetic inserts into an insulating material and mounting the whole on to a keyed bushing. The bushing is extended towards the rear bearing providing positive location of the rotor between a shoulder on the shaft and the rear bearing.



- | | |
|-------------------------|-------------------------------------|
| 1 Front housing | 12 Rear bearing |
| 2 Rear housing | 13 Rubber ring (case) |
| 4 Sealing cover | 14 Rubber ring (sealing cover) |
| 5 Socket retaining clip | 15 2 B.A. nut |
| 6 Transit cover | 16 Locking washer |
| 9 Rotor shaft | 17 Spring washer |
| 10 Rotor | 18 Case securing screws and washers |
| 11 Stator winding | |

Fig.2 Generator S168, partly dismantled

6. A 22 mm ball bearing is assembled as a clearance fit in the rear housing bearing recess. The rear housing is provided with a spigot to

engage with the front housing when the two halves are assembled. A plain washer together with a tab locking washer and 2 B.A. hex. hd. nut secure the rotor shaft to the inner race of the rear bearing. A rubber ring between the two housings provides an oil seal.

7. The case is finally clamped by three 6 B.A. ch. hd. screws with locking washers. Three clearance holes in each housing, which are aligned when the generator is assembled, are used to secure the generator to the engine unit.

8. To ensure that the outer race of the rear bearing remains stationary when the rotor shaft is rotated, a crimped spring washer is provided between the outer race and the sealing cover. To prevent the sealing cover becoming loose, due to vibration, a locking pawl secured by a hex. hd. screw is fitted.

9. A rubber ring on the sealing cover, completes the oil exclusion requirement for the generator case.

10. External electrical connections are effected via a 2-pole plug, which is located in a threaded protrusion on the rear housing casting. The plug is protected by a transit cover. Two clips retain the knurled clamping collar of the socket when connection is made.

Chapter 2

STANDARD SERVICEABILITY TEST

INTRODUCTION

1. The following tests are to be applied whenever the serviceability of the tachometer generator is suspect.

TEST EQUIPMENT

2. The following test equipment or suitable equivalent is required:

Item	Ref. No.	NATO Code
Dual tachometer tester	6C/6365770	
Voltmeter, digital, DVM5	10S/6208410	
Tester, Insulation, Multirange, Mk 2	5G/1112740	
or		
Tester Insulation, Type C	5G/9156675	
Block, terminal, 2-way	5CZ/1053794	
Frequency meter, digital, Racal 9520	10AF/6189684	

TESTING

Insulation resistance test

3. Using the resistance tester, measure the insulation resistance between each pin and the generator casing. The insulation resistance is to be not less than $50M\Omega$ at 250V.

Resistance test of a generator

4. Using the digital voltmeter, check the resistance of the generator windings by connecting the testmeter across the two pins of the plug. The resistance should be approximately 25Ω .

Output test of a generator

5. Proceed as follows:-

- (1) Connect the generator to the tachometer tester.
- (2) Connect voltmeter and frequency meter across generator output.

- (3) Ensure tachometer tester speed controls are set to minimum.
- (4) Switch on tachometer tester and check voltage, frequency and speed indications are as shown in Table 1.

TABLE 1

Tester Speed	Voltage	Frequency (Hz)
1000	10 ± 0.25	200
2000	20 ± 0.25	400
3000	30 ± 0.25	600
4200	42 ± 0.25	840

- (5) Ensure tester speed controls are set to minimum and switch off tester.
- (6) Disconnect generator.

Chapter 3
BAY SERVICING

INTRODUCTION

1. Servicing is limited to the examination of the bearings and a test for excessive friction. Insulation resistance tests are given in Chap.2.

LIST OF MATERIALS

2. The following lubricants are required:

Item	Ref. No.	NATO Code
Grease XG-287	34B/2241793	G-350
Oil OM-13	34D/100570	O-134

3. To examine the rear bearing for damage remove the 6 B.A. hex. hd. screw and locking pawl from the rear housing and unscrew the knurled sealing cover. Examine for damage and if necessary pack the rear bearing recess with grease XG-287. Refit the cover and secure the locking pawl with the hexagonal screw.

4. Examine the front bearing for damage and, if necessary, lubricate lightly using oil OM-13.

5. To test for excessive friction, rotate the splined shaft by hand and ascertain the amount of friction present. There should be no stickiness or erratic movement. If the friction is excessive, fit a new generator.