

Chapter 16

ROTARY INVERTER, TYPE 108 (ROTAX S3301)

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LEADING PARTICULARS

Inverter Type 108 (Rotax S3301)		Stores Ref. SUB/5953
Input voltage ...	25-28V, d.c.	
Output ...	115V, a.c. Single phase 650 Watts, 0.9 p.f. lag, and 0.95 p.f. lead	
Frequency ...	400 c.p.s.	
Rating ...	Continuous	
Speed ...	8000 r.p.m.	
Rotation (viewed on commutator end)	Clockwise	
Cooling ...	Fan to 35,000 ft; blast and fan to 55,000 ft.	
Electrical connection		
Input ...	2 split terminal lugs, cable holes .413 in. dia.	
Output ...	2 pole miniature Mk. 4 plug	
Control panel interconnection ...	12 pole miniature Mk. 4 plug	
Brush grade		
d.c. ...	K.C.E.G.11	
a.c. ...	K.C.E.G.11	
Brush spring pressure		
d.c. ...	20-24 ozs.	
a.c. ...	4-5 ozs.	
Minimum brush length		
d.c.562 in.	
a.c.375 in.	
Minimum slip ring diameter75 in.	
Minimum commutator diameter ...	1.875 in.	
Weight ...	30.5 lb.	
Length ...	16.625 in.	
Width ...	6.375 in.	
Height ...	7.968 in.	

(A.L.179, Dec. 55)

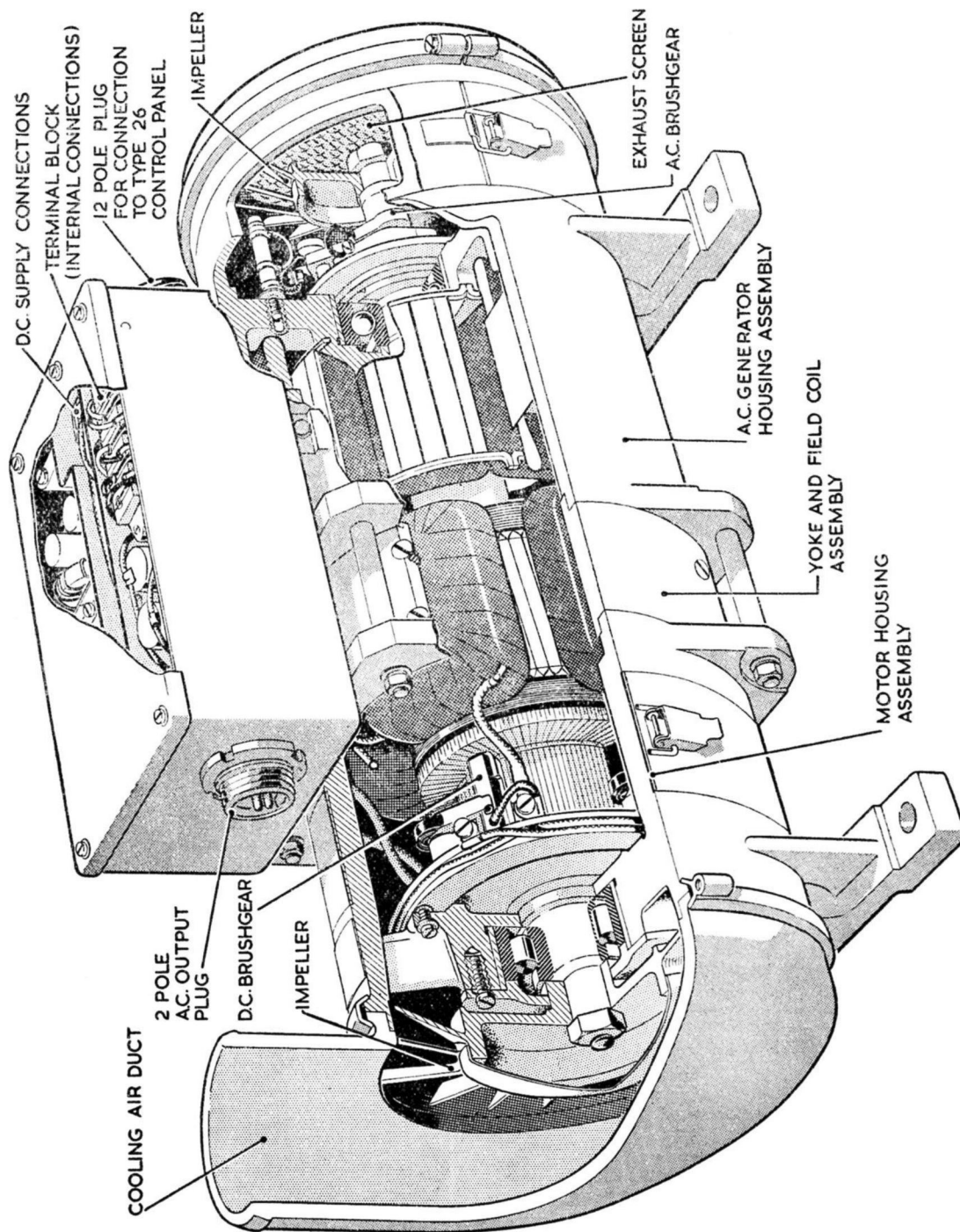


Fig. 1. Sectioned view of inverter

Introduction

1. The rotary inverter Type 108 (*fig. 1*) is designed to give an output of 650 watts at 0.95 p.f. lead, 0.90 p.f. lag, 115V, a.c. single phase 400 c.p.s. with an input of 25-28V, d.c.

2. This machine is designed to operate in conjunction with a control panel Type 26.

DESCRIPTION

3. The inverter consists of a 25-28V, d.c. compound wound, four pole motor, driving

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Suppressor unit

8. The suppressor unit contains the capacitors and chokes comprising the suppression circuit (*fig. 2*) and also a terminal block for the internal a.c. and d.c. connections. The main d.c. supply is connected to cable lugs. The a.c. output is taken via a 2-pole miniature plug, whilst the interconnection between the inverter and its control panel is done through a 12-pole plug. Access to the suppressor unit is obtained by removing the top cover.

Cooling

9. For low altitudes, cooling is effected by two impellers, one mounted at the commutator end and the other by the slip rings. Air is drawn in through the inlet at the commutator end, and is expelled through a screen at the a.c. end.

10. For high altitudes blast cooling is employed. By slackening the clamping bolt and strap, the air inlet can be placed in any radial position relative to the main body.

OPERATION

11. Current is supplied at 28V, d.c. (nominal) to the motor, and also the rotor winding via the slip rings. The shaft rotates in a clockwise direction looking at the commutator end. As stated in para. 2 the inverter is normally used with a control panel Type 26. When an increase of load occurs both voltage and frequency tend to fall but the control panel corrects this in the following way. A corrective current is fed to the control winding of the d.c. motor resulting in an increase of speed and thus an increase of frequency. A larger current is also fed to the rotor windings causing a stronger flux and thus increasing output voltage. In the case of a drop in load these two actions are reversed.

12. The output voltage is actually kept between 110V, a.c. and 120V, a.c., and the frequency between 398 c.p.s. and 402 c.p.s.

INSTALLATION

13. There are four mounting feet drilled with 0.312 in. diameter holes. The machine may be mounted in any position, but one in which it is normally horizontal is preferable.

14. Provision for adequate circulation of free air in and around the unit must be made and if blast cooling is to be employed then suitable arrangements must be made for a blast air supply. The blast air requirements for these machines are given in the following table:—

Air Temperature (degrees/c.)	Cooling air requirements (lb./minute)
—30	1.30
—15	1.40
+ 5	1.60
+25	1.84
+45	2.20

15. Interconnection between the inverter and its associated control panel should be made using screened cables between the plugs and sockets. All cable runs should be kept as short as possible.

SERVICING

Brush gear

16. The inverter will require little servicing other than attention to the a.c. and d.c. brush gear. The bearings are packed with grease and should not require any attention.

17. Both sets of brush gear become easily accessible on removing their covering straps. Particular attention must be given to minimum brush length, and if the remaining length is not sufficiently greater than the minimum permissible, then the brushes must be renewed. This will entail removing the inverter from the aircraft in order to bed the brushes in properly. Any carbon dust deposits must be blown away using dry compressed air. The brushes must slide easily in their respective boxes. Brush spring pressures when measured with a spring balance, and with the trigger level with the top of the brush box, must be within the limits as shown in leading particulars. For the d.c. brushes use a spring balance Stores Ref. 1H/59 and for the a.c. brushes a spring balance Stores Ref. 1H/97. All brush gear connections must be tight and free from corrosion.

Commutator and slip rings

18. The commutator and slip rings must be examined for signs of wear. If there is any serious scoring or burning then the complete inverter must be removed for repair.

General

19. The suppressor unit should be examined to make sure that all connections are tight and free from corrosion.

20. A check should be made to see that the blast air supply is not obstructed.

21. Finally the suppressor unit cover must be put on and screwed down, and the brush-gear covering straps clamped in position.

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