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## Chapter 14

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## ROTARY INVERTER, TYPE 102A

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## LEADING PARTICULARS

Rotary inverter, Type 102A ... ..		Stores Ref. 5UB/5819
Input		
Voltage ... ..	25-28 V d.c.	
Current ... ..	44-52 amp.	
Output		
Voltage ... ..	115V, 3-phase a.c.	
Frequency ... ..	400 c/s	
Power (rated) ... ..	500W, 0.8 power factor (lagging)	
Phase sequence ... ..	A-B-C	
Input brushes		
Brush grade ... ..	KCEG 11	
Spring pressure ... ..	12-16 oz.	
Output brushes		
Brush grade ... ..	KCCM 6	
Spring pressure ... ..	2.5-3.5 oz.	
Rotation (viewed on commutator end) ... ..	Anti-clockwise	
Weight ... ..	24 lb.	
Overall dimensions (without blast cooling ducts)		
Length ... ..	11.75 in.	
Width ... ..	7.0 in.	
Depth ... ..	5.625 in.	

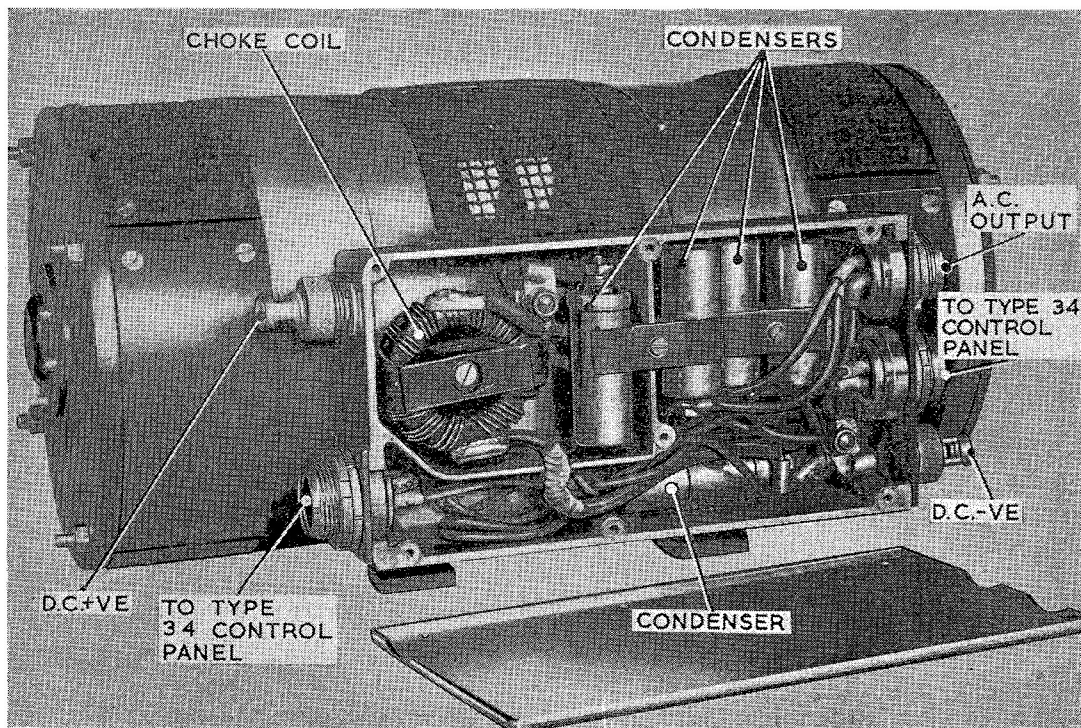


Fig. 1. Rotary inverter, Type 102A, arranged for self cooling

#### Introduction

1. The rotary inverter, Type 102A, is designed for use with control panel, Type 34. One 3-phase a.c. supply may be obtained from the unit by making connection to the socket attached to the terminal box. The machine is normally self-cooled by a double fan attached to the rotor shaft, but blast cooling from the aircraft slipstream is sometimes used.

#### DESCRIPTION

2. The inverter (*fig. 1 and 2*) consists of a 4-pole d.c. motor and a 6-pole, 3-phase, a.c. generator using the same rotor shaft. Interpoles are used in the d.c. motor, and the armature is wound retrogressive wave. The a.c. generator has six poles on the rotor shaft and two slip-rings are used for conveying direct current for the field excitation. The stator has 36 slots (two slots per pole per phase) and is mush wound two coils per slot.

3. The rotor shaft is carried in a roller bearing at the commutator end and a ball bearing at the a.c. end.

#### Brushgear

4. The d.c. brushgear is of the trailing type,

with clock-type springs; no means are supplied for adjusting the spring pressure. Four brushes are used and these are carried in four boxes secured to a brush rocker. This brush rocker is attached to the commutator end cover and is used for adjusting the position of the brushes for setting the speed of the motor.

5. The a.c. brushgear consists of four brushes (two to each slip-ring) carried in two castings. A plate between the two castings prevents carbon dust building up between the two sets of brushes and causing a short-circuit. Pressure is imparted to the brushes by leaf springs, and no means are provided for adjusting the pressure.

#### Terminal box

6. A terminal box is mounted on the side of the inverter and all the internal electrical wiring terminates at three plugs attached to the box. The box contains a choke coil and five condensers for radio interference suppression, and these are connected in the inverter circuit as shown in *fig. 3*. A removable earth link is attached to the outside of the terminal box.

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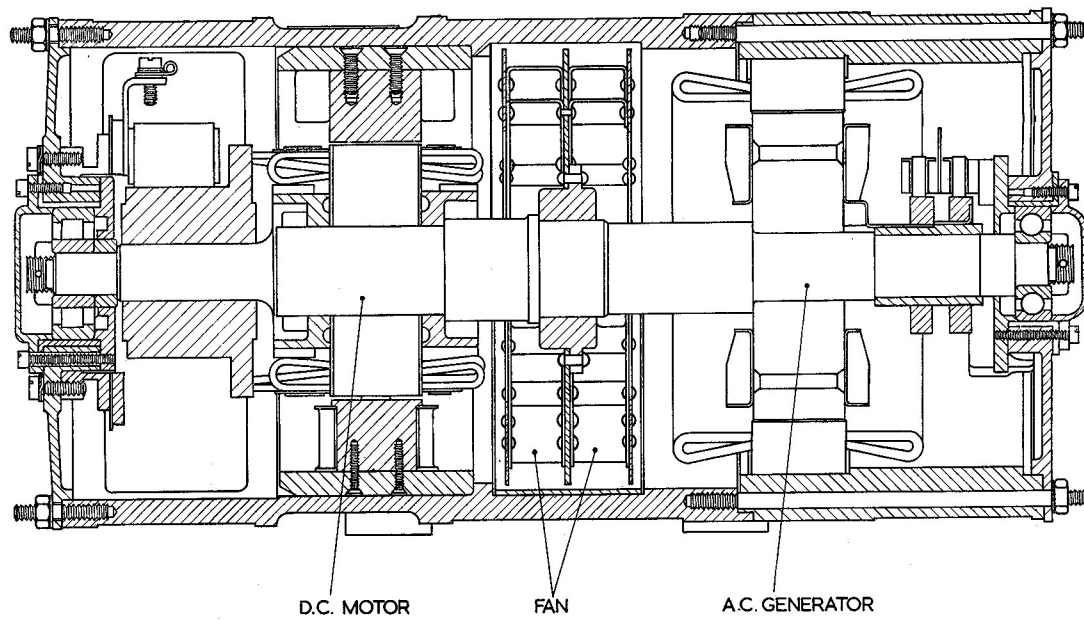


Fig. 2. Sectional view of the inverter

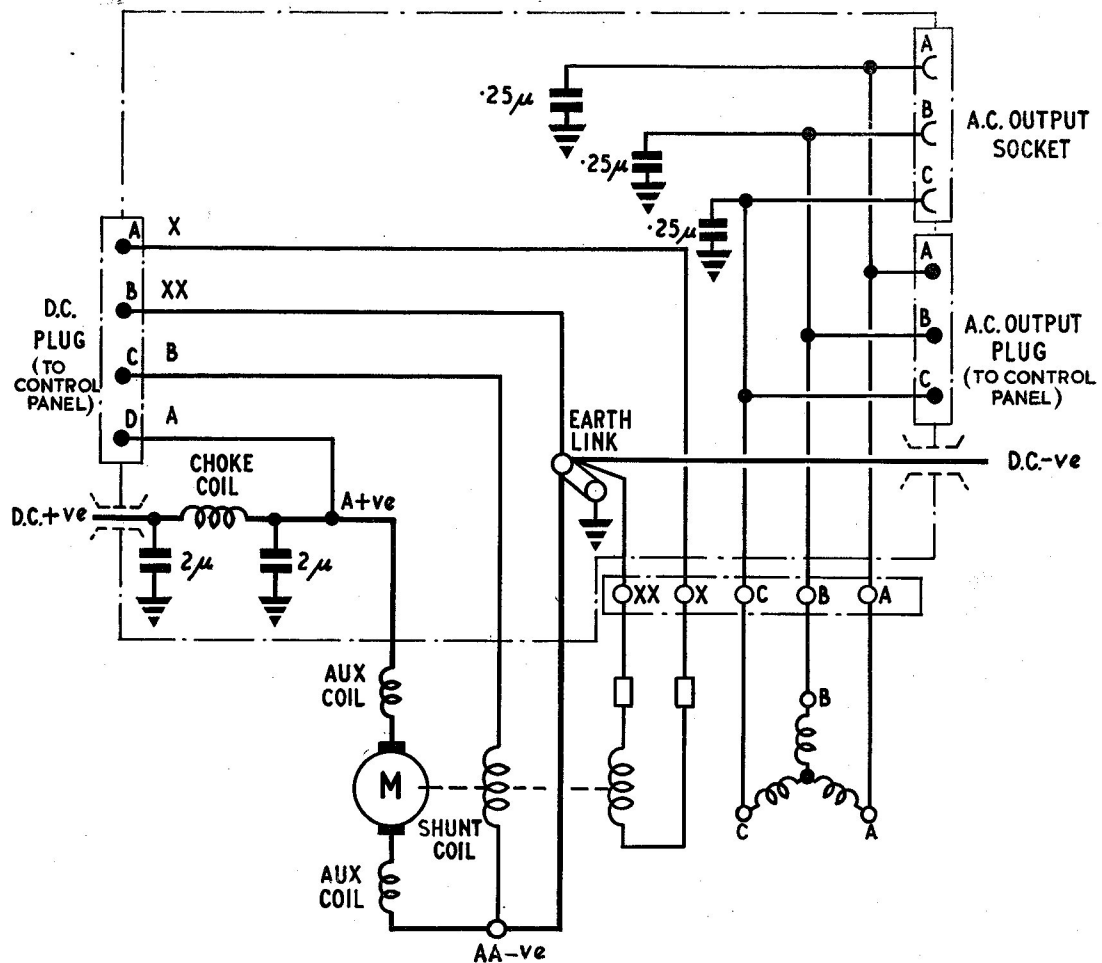


Fig. 3. Internal circuit diagram

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#### Cooling methods

7. A double fan situated between the motor and the a.c. generator is used for self cooling the machine. This fan is attached to the rotor shaft and rotates at the same speed. Ventilation is obtained by grill-covered holes in the inverter body. When blast cooling is used, ducts are fitted to the air inlets and outlet. The fan remains as part of the inverter when blast cooling is used.

#### Method of modifying the inverter for blast cooling

8. To modify an inverter so that it can be blast cooled, an air inlet manifold and an outlet pipe are fitted as shown in fig. 4. Before fitting the manifold and pipe, the grilled covers must be removed from the necessary ventilation holes. The pipe and

manifold may then be fitted, and held in position by the 4 B.A. screws.

#### OPERATION

9. The 28V d.c. aircraft supply is connected to the d.c. motor and drives the rotor shaft which also carries the poles of the a.c. generator. Excitation of the 6-pole field of the a.c. generator is obtained from the aircraft d.c. supply which is connected to two slip-rings on the rotor. When the motor is running, a 3-phase supply is generated in the a.c. stator windings. In order to obtain the required a.c. output the inverter is controlled by the Type 34 control panel (described in A.P.4343B, Vol. 1, Bk. 2, Sect. 7, Chap. 18).

#### SERVICING

10. General information on the servicing or

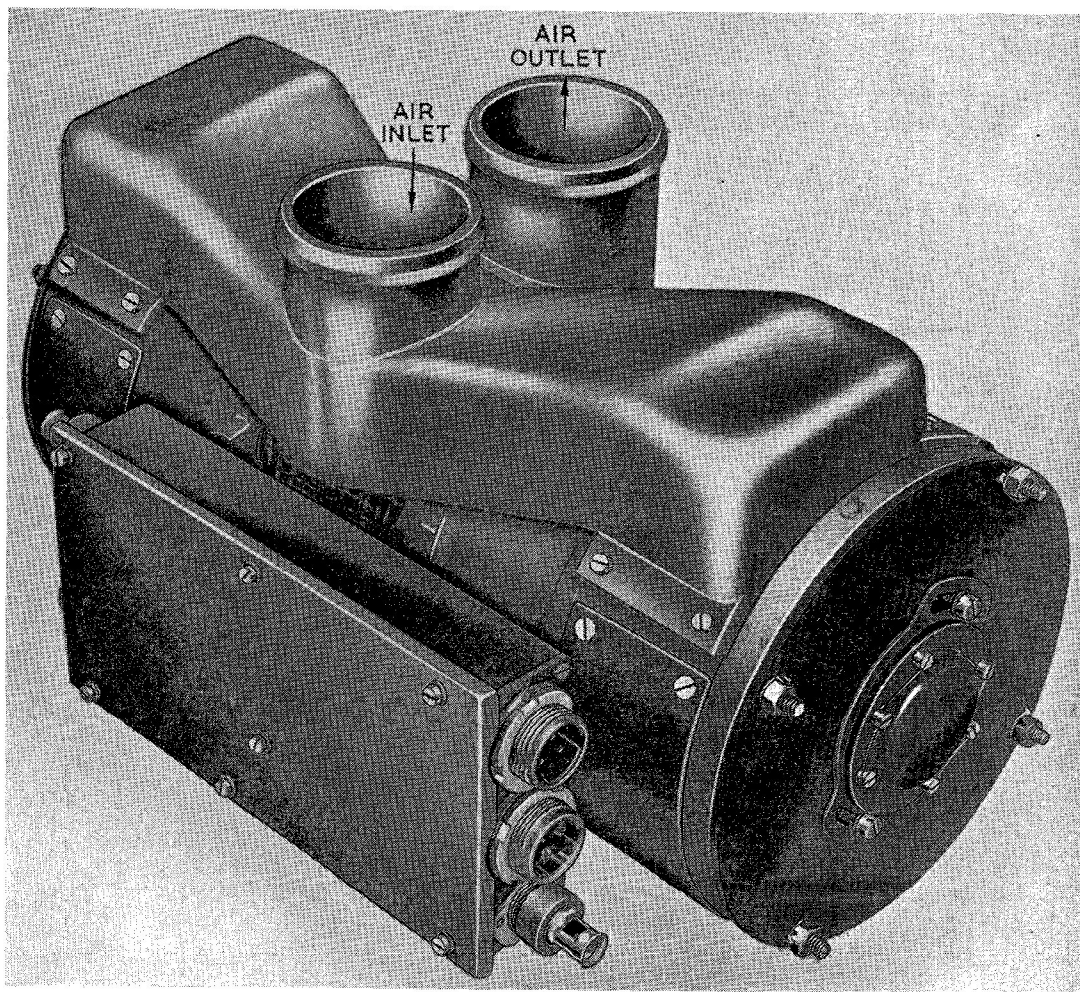


Fig. 4. Inverter arranged for blast cooling

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inverters will be found in A.P.4343, Vol. 1, Sect. 8.

**11.** The rotor bearings are packed with grease during manufacture and should need attention only when the inverter is being reconditioned. Details of the brushes and correct spring pressures are contained in the Leading Particulars. Check the brushes for wear and damage, and test the springs for correct pressure. Access to the brushgear is gained by removing the covers at each end of the inverter.

**12.** The correct positions of the brushes on the d.c. motor are set by the manufacturer. The positions are secured by two ch/hd. screws situated on the outer end of the commutator end plate, and it is important that

these screws are not disturbed and no attempt is made to alter the positions of the brushes, except when the machine is being tested after repair.

#### TESTING

**13.** The inverter must be tested in conjunction with Type 34 control panel.

**14.** During the test the full load must be 500 watts at 115 volts with unity power factor.

**15.** With full load applied and 27V input, adjust the frequency trimmer on the Type 34 control panel until the inverter output is 400 c/s. At this setting, check the frequency and voltage at 25V input and full load, and 28V input and  $\frac{1}{4}$  load.