

Chapter 8

RECTIFIER, WESTINGHOUSE, TYPE 690

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LEADING PARTICULARS

Rectifier, Type 690	...	Stores Ref.
Input voltage	...	24 V, a.c. (nominal)
Output voltage	...	28 V, d.c. (nominal)
Output current	...	250 amp.
Overall length	...	16 $\frac{3}{8}$ in.
Overall width	...	6 $\frac{1}{2}$ in. (approx.)
Overall height	...	8 in. (approx.)
Fixing centres ($\frac{3}{8}$ in. B.S.F. studs)	...	9 in. by 3 $\frac{1}{2}$ in.

Introduction

1. The Type 690 selenium-compound rectifier (*fig. 1*) has been designed for providing a d.c. supply directly from the main engine-driven a.c. generator in certain aircraft. The rectified full-load power output from each unit is 250 amp. at 28V, d.c.

DESCRIPTION

2. Each rectifier consists of two halves which are connected in parallel within the framework holding them together. The rectifiers are bridge connected to give three-phase full-wave rectification. The ripple on the d.c. output is so small that any additional smoothing circuits are unnecessary.

3. The input a.c. is taken in by means of three terminal tags and the output d.c. is taken away by two similar tags, marked + and - respectively. Each tag has a $\frac{5}{16}$ in. diameter hole drilled in it for attaching leads.

4. The rectifiers are designed to be air-cooled, and air is drawn through them into the engine air intake for this purpose.

INSTALLATION

5. Four $\frac{3}{8}$ in. B.S.F. fixing studs are brought out at one side of the rectifier unit. Their centre distances are given in Leading Particulars. The circuit diagram is given in *fig. 2*.

6. The cooling airflow must be co-related to the maximum possible continuous loading of the rectifier in such a manner as to prevent the plate temperatures of the rectifier exceeding 75 deg. C. As a guide to the airflow required, a minimum linear velocity of 1500 ft. per minute is adequate to cool the rectifier in an ambient temperature of 45 deg. C. at a load of 150 amp. d.c. The minimum airflow required may be assumed to be proportional to the load.

(A.L.2, Nov. 57)

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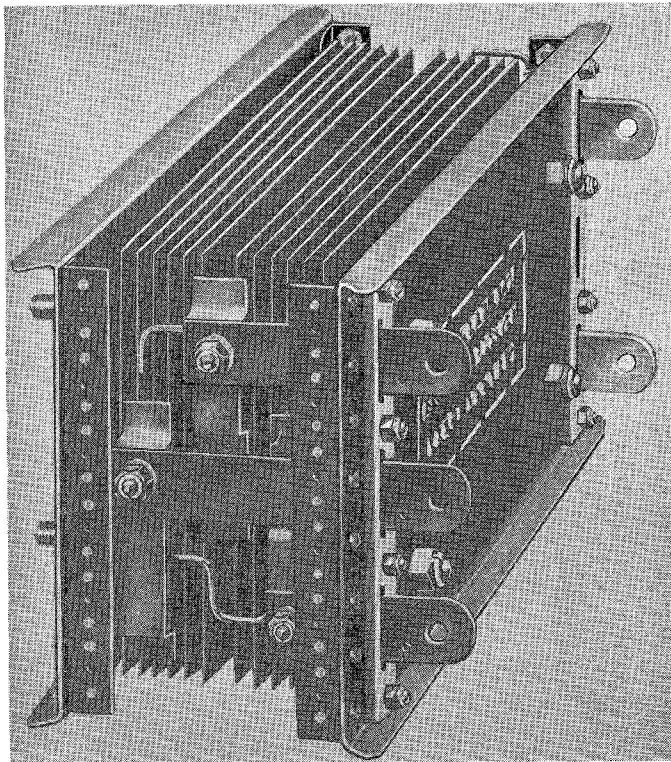


Fig. 1. General view, rectifier, Type 690

SERVICING

7. It is important to have regular inspections and tests of forced-air-cooled rectifiers due to the possibility of damage to the protective paint by abrasive particles or moisture in the air stream. Unequal expansion of the element and paint film may cause similar trouble, and later the paint film may begin to flake off. There may also be present small brown spots scattered over the surface of the plates. These may be due to pin holes in the paint or splashes from pin-hole faults on the next plate.

8. If any brown spots appear within a distance of one inch of the mounting bolts, if flaking of the paint has occurred, or if any parts of the leading edges of the rectifier have lost their protective finish the unit should be taken out of service.

TESTING

Increase in forward resistance

9. The increase in forward resistance is a gradual change and generally caused by excessive operating temperatures. Although an increase in rectifier resistance will lead to

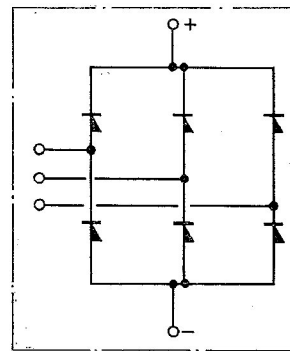


Fig. 2. Circuit diagram

a decreased current output this will normally be corrected automatically by the regulators and is not serious so long as the output is maintained without difficulty.

10. However, a check should be made to see that the a.c. input voltage to the rectifier does not exceed 25V a.c. with a d.c. output of 100 amp.

Decrease in reverse resistance

11. Decrease in reverse resistance which may be more rapid than increase in forward resistance, is usually associated with moisture penetrating the rectifier.

12. To detect the decrease a check should be made of reverse leakage current. With the rectifier *in situ* on the aircraft and a low range ammeter connected across the main circuit-breaker (with the breaker open) battery voltage (24V) will be put on to the d.c. side of the rectifier. Under these conditions the reverse current must NOT EXCEED 4 amp. at 20 deg. C. At least 5 seconds must be allowed to elapse after completing the test circuit before noting the reading so that the current may stabilize.

Note . . .

A high voltage insulation tester must NEVER be used to check reverse resistance. The use of such an instrument may destroy the rectifier.

Insulation resistance

13. Check the insulation resistance of the rectifier by joining the a.c. and d.c. terminals together and testing between them and earth with a 250V insulation tester. A reading of at least 2 megohms should be obtained.

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