

Chapter 20

TRANSFORMER-RECTIFIER UNIT

(English Electric, Type AE5717)

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LEADING PARTICULARS

Transformer-rectifier unit	<i>Ref. No. 5UC/6935</i>
<i>Regulated input</i>	200V, 3-phase, 400 c/s
<i>Max. transformer input current</i>	27A
<i>Min. transformer output</i>	24.5V at 270A
<i>Rating</i>	7kW Continuous
<i>Overall dimensions</i>	
<i>Length</i>	27 $\frac{7}{16}$ in.
<i>Width</i>	9 $\frac{5}{16}$ in.
<i>Height</i>	11 $\frac{9}{16}$ in.
<i>Weight</i>	52 lb.
<i>Cooling air requirements</i> ...	4 lb. per min. at 60,000 ft. at 10°C. ambient for pressure drop of 9 in. water gauge. 11 lb. per min. at ground level at 45°C maximum ambient for pressure drop of 1.1 in. water gauge.

Introduction

1. The transformer-rectifier unit Type AE5717 is designed to provide a nominal 28-volt d.c. unregulated output, from a 200-volt, 3-phase, 400 c/s closely regulated supply.

DESCRIPTION

2. The components of the unit consist of a transformer, rectifier, input and output terminal blocks, a 6-way fuse box and an axial fan blower.

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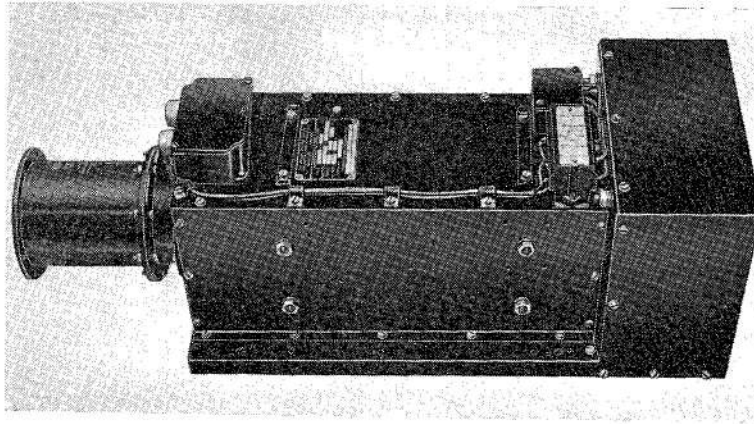


Fig. 1. Transformer-rectifier unit, Type AE5717

3. The transformer and the rectifier unit (fig. 1) are mounted on a common base, but each is enclosed in its own housing. Attached to the end of the rectifier housing at the air inlet end, is a blower unit, which provides a cooling air flow through the unit. The transformer cover has a circular aperture with eight 2 B.A. stiffnuts with double anchor plates riveted equidistant around its circumference. This allows for a duct connection to be made for the exhaust cooling air.

4. The components are housed within a light alloy case which consists of a base assembly, side assemblies cover assembly and end assemblies. The base is a sheet of aluminium alloy riveted to a rectangular frame of the same material. The frame is welded at each corner, four aluminium blocks drilled to take securing bolts are riveted, two each side inside the section.

5. The transformer is a 3-phase "E" core unit with three sets of tappings on the star primary so that the output voltage can be adjusted. The secondary is delta connected. The transformer is mounted at one end of the base on a steel support plate which is secured under the base frame by six 2 B.A. hexagon head screws. The transformer is secured by two clamping strips and four $\frac{1}{4}$ in. B.S.F. hx. hd. steel bolts. A tie bar bridges the top of the transformer, to which it is secured by two $\frac{1}{4}$ in. B.S.F. bolts. Two $\frac{5}{16}$ in. studs project from the tie bar and are secured to the end assembly between the transformer and rectifier unit. The transformer is enclosed in a housing of sheet aluminium alloy. This is attached to the base by stainless steel ch. hd. screws.

6. The inner end of the transformer is adjacent to the input side of the rectifier unit to which the secondary windings are connected. The primary windings are tapped and brought out to terminals on a block which is integral with the transformer. The terminals are identified by engraved letters and numbers adjacent to them on the block. "Unipren 24" leads complete with 2 B.A. Hellerman terminals are connected to the block terminals A3, B3, and C3, and run through grommets to an external input terminal block.

7. The input terminal block is secured to the top of the rectifier housing by two 6 B.A. stainless steel screws, and two special long 4 B.A. ch. hd. screws which also pass through and secure the terminal block cover.

8. The rectifier unit, Westalite rectifier unit Type TDA, 11L14, consists of two double voltage selenium rectifiers with cooling fins. The aluminium cooling fins are positioned in line with the air flow through the unit.

9. The rectifier unit is supported at the rectifier spindles, near each of its four corners by a shallow steel channel section, bent over at each end to parallel the base and top cover. They are attached to the base by 2 B.A. ch. hd. screws, at the top the channel section is reduced to a flat section thickened at the end to take a 2 B.A. tapped hole into which a 2 B.A. ch. hd. screw is secured, which passes through a locking plate and the cover assembly. The rectifier spindles pass through holes drilled in the rectifier supports and side plate assemblies, and are secured externally by four $\frac{3}{8}$ in. B.S.F. nuts. A large and small

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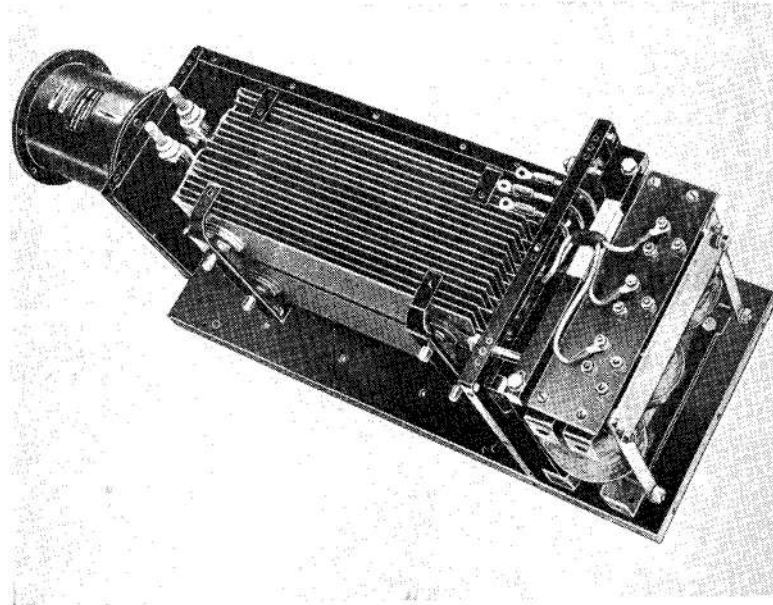


Fig. 2. View with three panels removed

deflection plate are riveted to each side plate. Three flat electrolytic copper links connect the rectifiers to each other, and the transformer secondary output terminal lugs are connected to the links by three $\frac{5}{16}$ in. B.S.F. steel nuts and bolts.

10. At the output end of the rectifier unit the connections are secured by $\frac{5}{16}$ in. B.S.F. nuts and bolts to two terminal bars which have terminal studs brazed to them. These terminal studs are brought through the top cover to a paxolin terminal block, which is secured to the cover by two 4 B.A. stainless steel ch. hd. screws. The two terminal studs are locked by shakeproof washers and $\frac{3}{8}$ in. B.S.F. thin brass nuts, and each is complete with a $\frac{3}{8}$ in. 'Erma' cable lug secured by a

shakeproof washer and a $\frac{3}{8}$ in. B.S.F. brass stiffnut. The terminal block has a flat cover secured by two special 4 B.A. screws.

11. Fitted adjacent to the input terminal block is a fuse box—6-way, Type 'S' Ref. No. 5H/74—which is secured to the top cover by two 4 B.A. stainless steel ch. hd. screws. The fuse box carries three 5A fuses, which are connected in the blower motor circuit.

12. Short 'Unipren 6' leads connect the terminals of the input terminal block to one side of each fuse. At the terminal block end, the leads are fitted with 2 B.A. Hellerman terminals, and the other ends are soldered into ferrules and crimped, for connection into the fuse holder. The three 'Unipren 6'

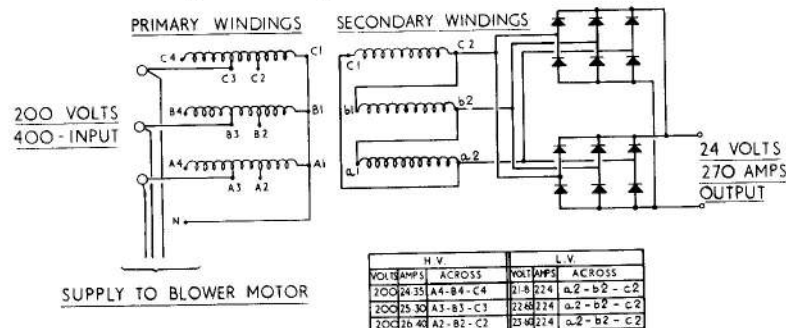


Fig. 3. Circuit diagram

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supply leads to the blower motor are run from the fuse box externally along the top cover to which they are clipped, and through a grommet in the flanged tube to the motor.

13. The 'Plannair' axial flow blower is coupled by a flanged tube to the end assembly. The three-phase induction motor of the blower unit is supplied, as previously stated, via externally accessible fuses, from the input terminals of the unit. No separate switch is necessary.

14. When blast air delivery is normal it enters the unit through the blower casing. When the aircraft is stationary the 'Plannair' axial flow blower enables the blast air requirements to be met.

SERVICING

15. Ensure the unit is clean and free from damage. All screws, nuts, rivets and electrical connections should be checked for tightness. The insulation of the connecting leads should be examined for signs of fraying or deterioration.

Insulation resistance test

16. Using a standard insulation resistance tester (*Ref. No. 5G/152*), the insulation resistance should be measured firstly between all terminals and the casing, and secondly, between the a.c. input terminals and the d.c. output terminals. In both instances the reading obtained should not be less than 5 megohms.

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