

Chapter 3

TRANSFORMER-RECTIFIER UNIT (ENGLISH ELECTRIC, TYPE AE.451)

LIST OF CONTENTS

	Para.		Para.
<i>Introduction</i>	1	<i>Servicing</i>	16
<i>Description</i>	2	<i>Insulation</i>	17

LIST OF ILLUSTRATIONS

	Fig.		Fig.
<i>Transformer rectifier unit, Type AE.451</i> ...	1	<i>Circuit diagram</i>	3
<i>End view of unit showing transformer</i> ...	2		

LEADING PARTICULARS

<i>Transformer-rectifier unit</i> ...	<i>Ref. No. 5UB/6428</i>
<i>Regulated input</i>	<i>200V, 400 c/s, 3 phase</i>
<i>Input current</i>	<i>24.35 amp—25.30 amp—26.40 amp</i>
<i>Output</i>	<i>224 amp at 21.80V—22.65V—23.60V</i>
<i>Rating</i>	<i>7 k.W. Continuous</i>
<i>Overall dimensions:—</i>	
<i>Length</i>	<i>21 ins.</i>
<i>Width</i>	<i>9½ in.</i>
<i>Height</i>	<i>9 ins.</i>
<i>Weight</i>	<i>50 lbs.</i>

Cooling:—

Blast air requirements ... 3.1 lb. per min. at 60,000 ft. at
10 deg. C. Ambient for pressure
drop of 8.5 inches water gauge.
11 lb. per min. at ground level at
50 deg. C. maximum ambient
for pressure drop of 1.1 inches
water gauge.

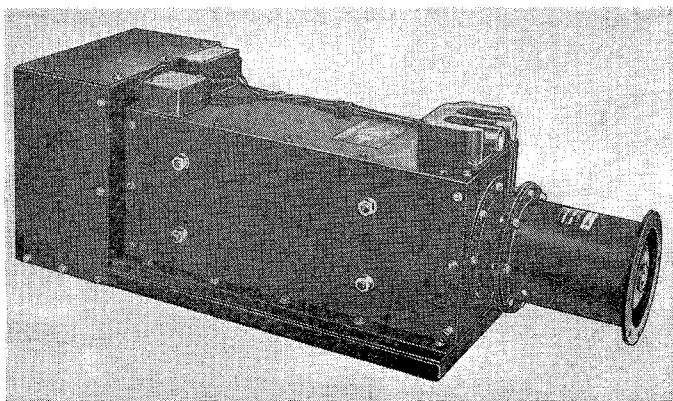


Fig. 1. Transformer-rectifier unit, Type AE.451

Introduction

1. The transformer - rectifier unit Type AE.451 is designed to provide a nominal 28 volt d.c. unregulated output from a 3 phase, 200 volt, 400 cycle, closely regulated supply.

DESCRIPTION

2. The components of the unit consist of a transformer, rectifiers, input and output terminal blocks, and a 6-way fuse box.

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 is a blower unit which provides a cooling air flow through the unit. At the outer end of the transformer cover is a circular hole with eight 2 B.A. "Aerotight" hexagon nuts with double anchor plates riveted equidistant around its circumference. This allows for a tube connection to be made for exhaust of the cooling air.

4. The casing in which the unit is boxed consists of a base assembly, side assembly, cover assembly and end assemblies.

5. The base is a sheet of aluminium alloy riveted to a rectangular frame of the same material. The frame is "U" shape in section, welded at each corner and with four aluminium blocks drilled to take securing bolts, riveted, two each side, inside the section.

6. The transformer is a 3 phase "E" core unit with three sets of tapings 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 which is secured to the base frame by six 2 B.A. hexagon head screws. The transformer itself is secured by two clamping strips and four $\frac{1}{4}$ in. B.S.F. hexagon head steel bolts, and is enclosed in a housing of sheet aluminium alloy. This is attached to the base by nine 4 B.A. stainless steel cheese head screws.

7. 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. Ross Courtney terminals are connected to the block terminals A3, B3 and C3 and run through grommets to an external input terminal box.

8. The input terminal box is secured to the top of the rectifier housing by two special, long 4 B.A. cheese head screws and two 6 B.A. stainless steel screws. The two 4 B.A. screws pass through and secure the terminal box cover.

9. The rectifier unit, Westalite Rectifier Unit Type T.D.A. 11L14, consists of two double voltage selenium rectifiers with cooling fins. The cooling fins are made of aluminium for lightness and are positioned in line with the air flow through the unit.

10. The rectifier unit is supported near each of its four corners by a flat steel strip which is attached to the base by 2 B.A. cheese head screws. The spindles running through the rectifiers pass through holes in the supports and side plates and are secured externally by four $\frac{3}{8}$ in. B.S.F. nuts. A large and a small deflection plate are screwed to the side plates on each side of the rectifier unit. Three flat electrolytic copper links connect the rectifiers to each other and the leads from the transformer secondary terminals are connected to the links by three $\frac{5}{16}$ in. B.S.F. steel nuts and bolts.

11. 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

RESTRICTED

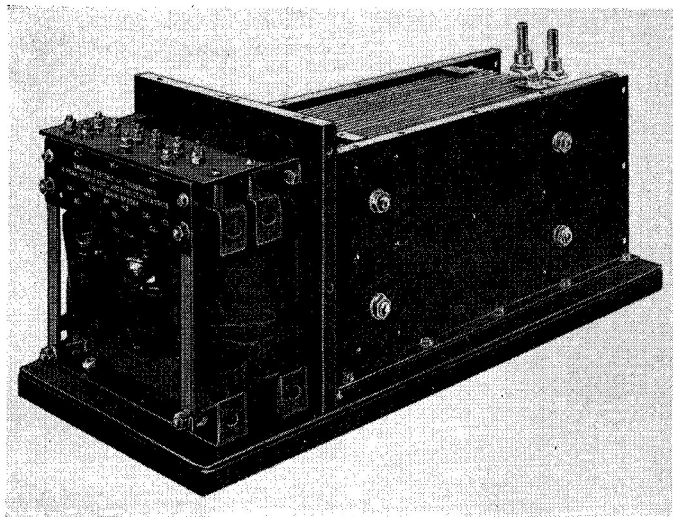


Fig. 2. End view of unit showing transformer

terminal studs are brought through the top cover to a paxolin terminal block which is secured to the cover by four 4 B.A. stainless steel cheese head 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 brass B.S.F. stiffnut. The terminal block has a flat cover secured by two special 4 B.A. screws.

12. Fitted adjacent to the input terminal box is a fuse box — 6 way, Type 'S' Ref. 5H/74 — which is secured to the top cover

by two 6 B.A. stainless steel cheese head screws. The fuse box carries three 2.5 amp fuses, Type 'S' which are connected in the blower motor circuit.

13. Short 'Unipren 6' leads connect the terminals of the input terminal box to one side of each fuse. At the terminal box end, the leads are fitted with 2 B.A. Ross Courtney terminals, and the other ends are soldered into ferrules and crimped, for connection into the fuse holder. The three 'Unipren 6' supply leads to the blower motor are run from the fuze box externally along the top

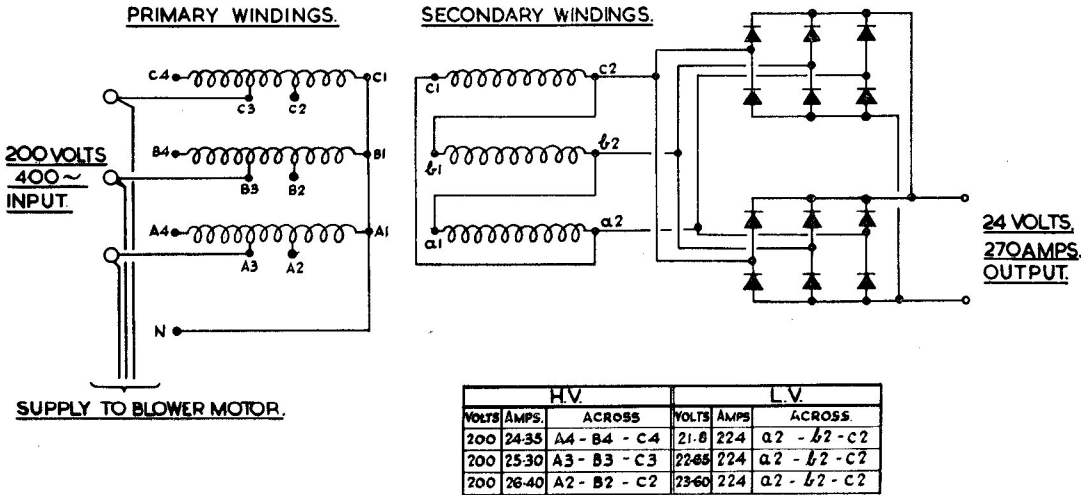


Fig. 3. Circuit diagram

F.S./2

(A.L.6, July 58)

RESTRICTED

cover to which they are clipped, and enter the motor through a rubber grommet.

14. The 'Plannair' Axial Flow Blower is supplied separately; it may be coupled directly to the Cooling Air Duct Flange or by a short length of metal ducting. The three phase Induction Motor of the blower unit is supplied, as stated above, through externally accessible fuses, from the input terminals of the unit. No separate switch is necessary.

15. The 'Plannair' Axial Flow Blower enables the blast air requirements to be met when the aircraft is stationary.

SERVICING

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

Insulation

17. Using a standard insulation tester (*Ref. 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 2 megohms.

RESTRICTED