Chapter 12

REGULATOR UNIT, ROTAX, TYPE ZA 6407

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Regulator unit, Type ZA6407	*Ref. No. 5UC/6591*
Excitation—	
Voltage	... 28 *volts d.c.*
Current	56·6 *amp. (max.)*
Generator output—	
(1) *Current*	200*A*
Voltage	100*V. a.c.*
(2) *Current*	... 100*A*
Voltage	208*V. a.c.*
Frequency	165 *to* 505 *c/s*
Regulator (LV)	*Newton Type* 4/63157
Resistor (R1)	0·32 *ohms*
Resistor (R2)	6·3 *ohms*
Resistor (R3)	10 *ohms*
Resistor (R4)	10 *ohms*
Resistor (R5)	5 *ohms*
Resistor (R6)	5 *ohms*
Overall dimensions—	
Length (over terminal block)	11·187 *in.*
Length (over mounting feet)	11·250 *in.*
Width	7·687 *in.*
Height	9·500 *in.*
Weight	... 21 *lb.*

Introduction

1. The ZA6407 regulator unit (fig. 1) is used with a three-phase a.c. generator, Type 166 (Rotax N 0605), in conjunction with a compounding transformer U3001, to control the excitation current in the rotor field, thus maintaining the 104 volt and 208 volt a.c. supply for a special busbar application in the aircraft.

DESCRIPTION

2. The regulator unit comprises one Newton regulator 4/63157 interconnected with six resistors, the regulator being anti-vibration mounted within the chassis frame-work, and held in suspension by eight tension springs (fig. 2). Four tension springs (Rotax N105905) to give a load of 8·5–9·5 lb., when extended to a length of 3·000 inches, are provided in the four bottom corners of the framework. Provision is made for adjusting the tension of the four springs located in the four top corners of the framework by anchor brackets provided which are fitted to the main framework.

3. The six resistors are mounted on a separate frame assembly which is supported by the regulator and they are positioned at the top of the unit. The complete frame and assemblies are enclosed by the perforated top and side panels, which for ease of servicing can be readily removed by unscrewing the associated quick release captive fasteners.

4. The top and side panels of the unit are perforated to permit air circulation for cooling purposes; the front and back of the unit comprise the regulator inspection panels secured by quick release fasteners, with the terminal block assembly mounted above the inspection panel at one end of the unit.

5. Four mounting feet are provided and are an integral part of the base of the unit; two rubber stops are provided at each end of the chassis to control the regulator end float, each stop being retained captive by a removable retaining plate which is adjustable and pre-set during manufacture to suit the regulator suspension.

6. Transport stop pegs are fitted at each end of the unit, to secure the regulator during transport from the manufacturer. The four stop pegs are removed prior to installation and re-fitted to the adjacent retaining screws when not required. Further information will be found in the installation details (fig. 4).

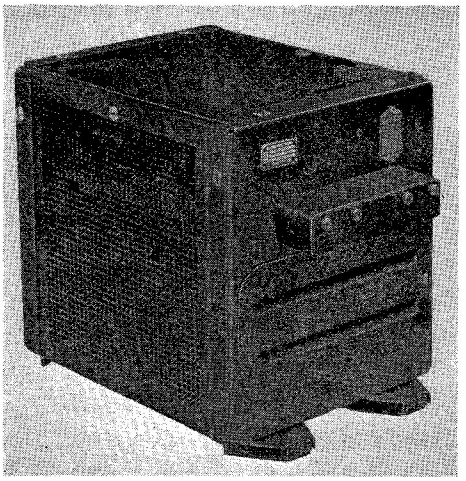


Fig. 1. General view of unit

Operation

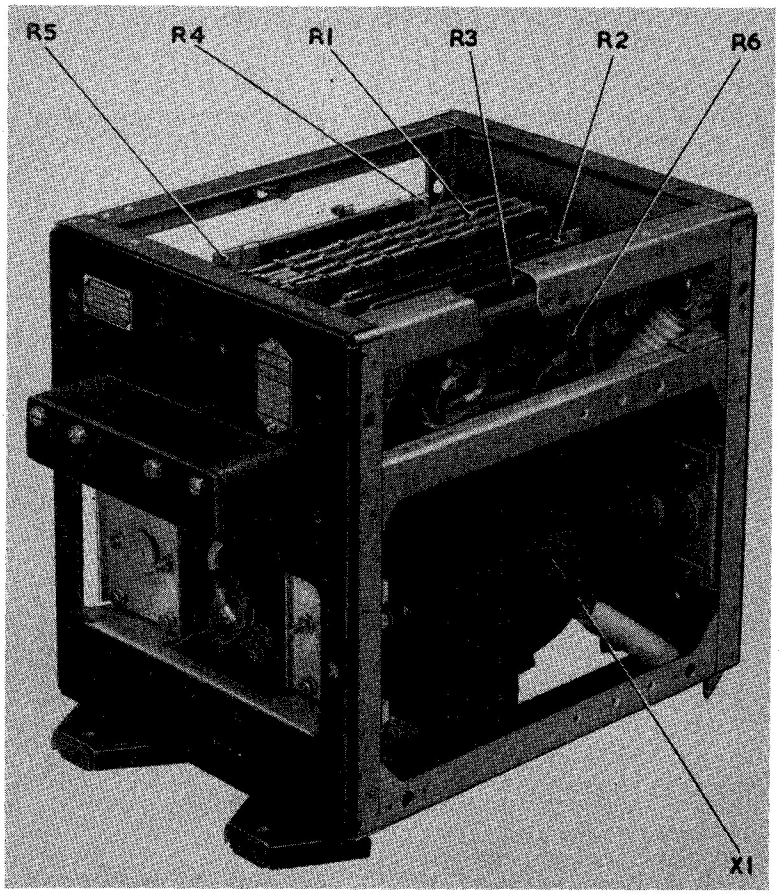
7. The ZA6407 regulator unit is connected in series with the L.V. busbar which supplies 28 volts d.c. to the regulator carbon pile, via relays D6212/1 and D6708 and resistors R1 and R2.

Compounding unit

8. The method of compounding consists of supplying the rotor field from two independent sources, a 28 volt d.c. supply from the L.V. busbar as above (para. 7) and from a rectified alternating current source which is proportional to the line output current of the generator, via the compounding transformer and rectifier unit U3001.

9. The primary windings of the compounding transformer are connected in series with the a.c. line output of the generator. The transformer output is rectified and fed to the rotor field in parallel with the d.c. output of the regulator carbon pile.

10. The sequence of events when the busbar voltage drops is that the stator voltage drops accordingly, causing a drop in voltage at the control coil of the regulator. The regulator carbon pile compresses due to the drop in voltage, resulting in an increase in rotor field current. The generator voltage will rise due to the increase in rotor current, and the stator field voltage increases accordingly to maintain the nominal 104 volt and 208 volt a.c. output to the special a.c. busbar in the aircraft.



Circuit Symbol	*Description*	*Value*
X1	Newton (LV) regulator	
R1	Series pile resistor	0·32 ohm
R2	Pile control resistor	6·3 ohm
R3 } (coupled	Regulator control coil	10·0 ohm
R4 } in parallel)	Pre-energizing resistors	10·0 ohm
R5	Regulator coil ballast resistors pre-set to adjust operating voltage level of system, and trim range given by external trimmer connected across terminals 3 and 4 of unit.	5·0 ohm
R6		5·0 ohm

Fig. 2. Three-quarter view with covers removed

INSTALLATION

11. Prior to installation in the aircraft of the ZA6407 unit it will be necessary to remove the four stop pegs from the regulator; these are retained in the rubber stops at each end of the chassis framework by an external thread provided on the four extension studs of the regulator.

12. The stop pegs must then be screwed firmly down on the adjacent studs provided and tie-wired in position as shown in the installation detail (fig. 4).

13. The unit is provided with four mounting feet having four 0·250 in. diameter clearance holes located on 10·625 in. × 4·500 in. centres. When mounting the regulator ensure that adequate clearance is provided for cooling purposes, as the unit is naturally cooled through convection.

Electrical connections

14. Electrical connection to the terminal block for terminals marked X and X1 is 0·250 in. –28 U.N.F. 2 A studs; copper crimping lugs Rotax N 104600/17 (Ref. No. 5X/6517). Terminals marked 1,2,3,4 and 5, 2 B.A. studs; copper crimping lug Rotax N 104600/53 (Ref. No. 5X/6669).

SERVICING

15. Make a visual check of the unit to ensure that it has not sustained any physical damage. Remove the terminal block cover, and examine the moulding for any signs of cracking or distortion, renew the terminal block if its condition is unsatisfactory. Check that the electric connections are clean and secure with no signs of corrosion. Refer to the two notes under the heading "Installation" (para. 12) prior to removing the unit from the aircraft.

16. Examine the regulator for security of mounting, paying particular attention to the suspension springs; faulty springs should be renewed. Check the rubber stops mounted at each end of the regulator for distortion or deterioration and renew if faulty.

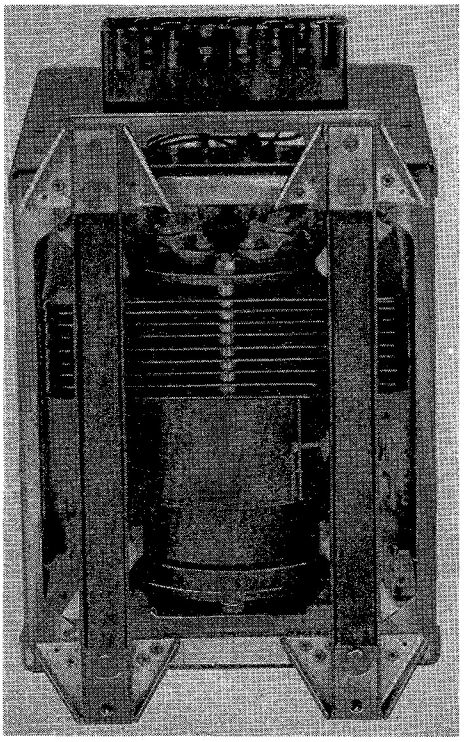


Fig. 3. Bottom view of unit

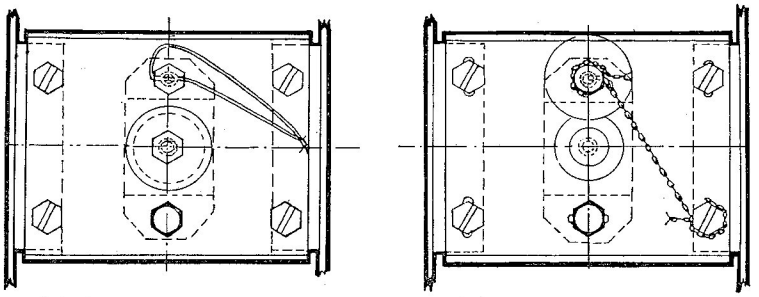


Fig. 4. Scrap view of transport stop peg

Resistor settings

17. If during servicing it is found necessary to check or adjust the regulator trimmer resistances R6 or R5, the resistor setting is carried out as follows:—

(1) Set the resistance measured between terminals 3 and 5 to 4 ohms by adjusting R6.

(2) Set the resistance measured between terminals 2 and 5 to 6 ohms by adjusting R5.

Dead pile resistance

18. (1) Connect a d.c. supply to terminals X and X1.

(2) Using first grade meters pass 10 amp. through the circuit.

(3) The volt drop across terminals X and X1 should not exceed 3·45 volts.

(4) Disconnect the circuit.

Insulation resistance test

19. Check the insulation resistance between terminal 5 and the frame, using a 250 volt insulation resistance tester; the insulation resistance should not be less than 5 megohms.

Note . . .

Further tests on the individual regulator will be found in a separate chapter in this book.

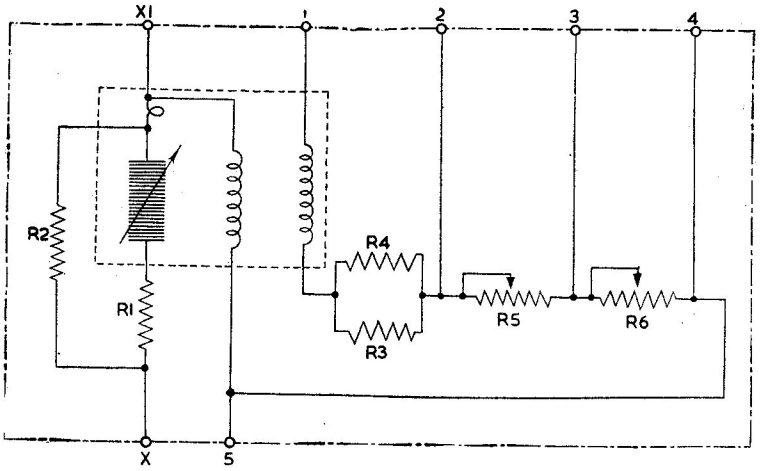


Fig. 5. Circuit diagram

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