

Chapter 4

VOLTAGE REGULATOR, TYPE 43

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LEADING PARTICULARS

Voltage regulator, Type 43				Stores Ref. 5UC/4269
Incorporating—				
Carbon pile				Stores Ref. 5UC/365
Trimmer resistor (5 ohms)				Stores Ref. 5UC/5082
Ballast resistor (12 ohms)				Stores Ref. 5UC/1028
Pile resistance range				3 to 35 ohms
Coil current				1.0 to 1.1 amp.

Introduction

1. The carbon pile voltage regulator, Type 43, is used on aircraft to control the American engine-driven generator, Type E5A. It is basically a Type G regulator with a modified pile stack, mounted on a base with a 4-way terminal block and associated ballast and trimmer resistors.

DESCRIPTION

2. The voltage regulator, Type 43, is a carbon pile regulator which operates on the standard principle described in Chap. 1 of A.P.4343, Vol. 1, Sect. 6. The carbon pile consists of 38 washers 1 mm. thick, and pressure is adjustable by means of the pile compression screw. At the other end is the magnet case, enclosing the operating coil; the end of the magnet core is slotted for adjustment in the normal manner.

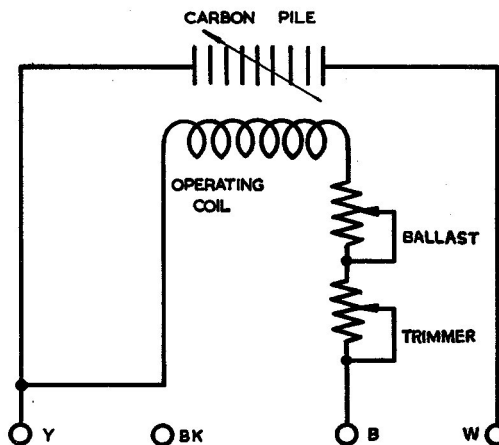


Fig. 1. Circuit diagram

(A.L.I, Aug. 57)

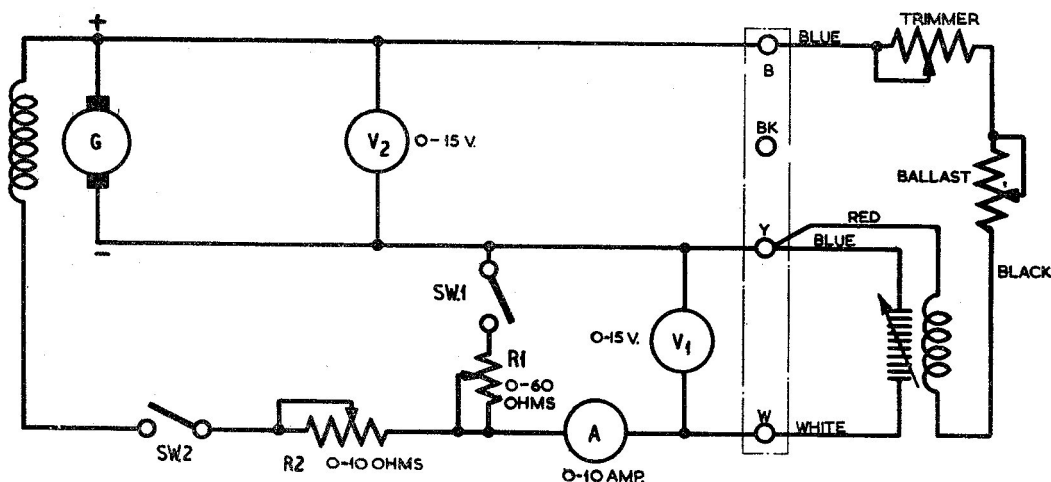


Fig. 2. Test circuit diagram

3. In series with the operating coil are the ballast and trimmer resistors, which are mounted on the base. The unit is fitted with a 4-way terminal block, to which the connections are made; a circuit diagram showing the internal connections is given in fig. 1. The ballast resistor is set during manufacture, and any voltage adjustments must be made by means of the trimmer resistor.

SERVICING

4. General servicing instructions for this type of regulator are given in A.P.4343, Vol. 1, Sect. 6, Chap. 1. That chapter describes the fitting of a new pile stack, and the preliminary mechanical adjustment for a regulator which is completely out of order. When any adjustment is made, the regulator must afterwards be subjected to full test.

Final voltage adjustment

5. Connect the regulator in the test circuit as shown in fig. 2. This shows the regulator connected to a generator, Type L or LX, but if it is available the Type E5A should be used. It should be noted, however, that with this generator the polarity is reversed from that shown in fig. 2.

- (1) With the trimmer resistor in the mid position, R2 shorted and SW1 open, run the generator at 5,000 r.p.m. (4,000 r.p.m. if Type E5A is used).
- (2) Turn the pile compression screw "in" slowly while observing V2. When the voltage reaches about 15 proceed to turn the pile compression screw "out" slowly. The line volts will fall. When a minimum voltage is reached (i.e., the "dip" position), lock the pile compression screw in that position.

Note . . .

The minimum voltage must lie between the limits of 13 and 14.2. If the "dip" is outside these limits, the line voltage must be adjusted up or down as required by the magnet core, and the test repeated until the "dip" is found to lie within the stated limits.

Regulation test

6. After the adjustment described above, make a final check as follows. With the trimmer resistor in the mid position, the regulator should be so adjusted that the line voltage is maintained between 13.5 and 14.2 over a pile resistance range increasing from 3 ohms to 35 ohms and then decreasing to 3 ohms. The coil current at 14.2 volts should be between 1.0 and 1.1 amp.

Stability test

7. To check the regulator for stability, switch full load on and off at least three times at generator speeds of 4,000, 5,000, and 6,000 r.p.m. (with generator, Type L or LX). Then switch the generator field on and off at least three times at the above generator speeds. Under these conditions the regulator must remain critically damped.

8. Immediately following the above test, slacken the pile compression screw of the voltage element $\frac{1}{8}$ turn, and repeat the stability test as given in para. 7 above. Under this condition the armature spring must respond and settle with not more than two oscillations.

9. Provided the regulator satisfies the test given in para. 8, restore the original setting and repeat the regulation test in para. 6.

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