Chapter 42

VOLTAGE REGULATOR, TYPE 100

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Voltage regulator, Type 100	*Ref. No.* 5UC/
Controlled voltage	12 *volts* ± 2 *per cent*
Current rating	3 *to* 10 *amp.*
Carbon pile	*Ref. No.* 5UC/
Pile resistance range (including series resistor)	1·11 *to* 4·6 *ohms*
Maximum pile loading (including series resistor)	180 *watts*
Pile series resistor (separately mounted)... ...	0·75 *ohms*, 130 *watts*
Operating coil current	0·7 *to* 0·77 *amp.*
Operating coil resistance (cold)	8·35 *ohms*
Semi-adjustable ballast resistor	12 *ohms*
Trimmer resistor	10 *ohms*, 7½ *watts*
Dimensions	6·75 *in.* × 6·1 *in.* × 5·88 *in.*
Weight	6¾ *lb.*

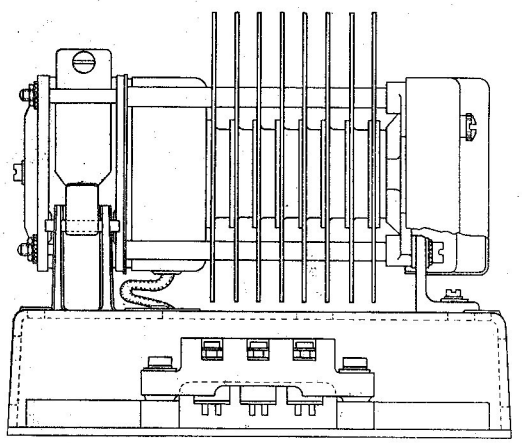

Fig. 1. Voltage regulator, Type 100

Introduction

1. The voltage regulator, Type 100, is used to control the voltage supply to airborne radio equipment. With an input varying between 25 and 29 volts d.c., the output is controlled at 12 volts $\pm$ 2 per cent.

2. General information on the construction and principle of operation of d.c. carbon pile regulators is given in A.P.4343, Vol. 1, Sect. 6, Chap. 1, to which reference should be made.

DESCRIPTION

3. The voltage regulator, Type 100 (*fig.* 1), is of the series carbon pile type, where the pile is connected in series with the input and the operating coil across the output. The regulator unit is mounted on a base, the leads from the coil and pile and from the ballast and trimmer resistors beneath the base being brought out to a 3-way terminal block. The pile is connected across terminals 1 and 3 (*fig.* 3), and incorporates eighteen 3-mm. washers and seventeen 1-mm. washers assembled alternately, with a 3-mm. washer at each end. The pile is $2\frac{7}{8}$ in. long.

4. A 0·75-ohm, 130-watt resistor is mounted remote from the regulator and connected in series with the pile. The actual pile resistance range is 0·36 to 3·85 ohms, giving a total range, in conjunction with the series resistor,

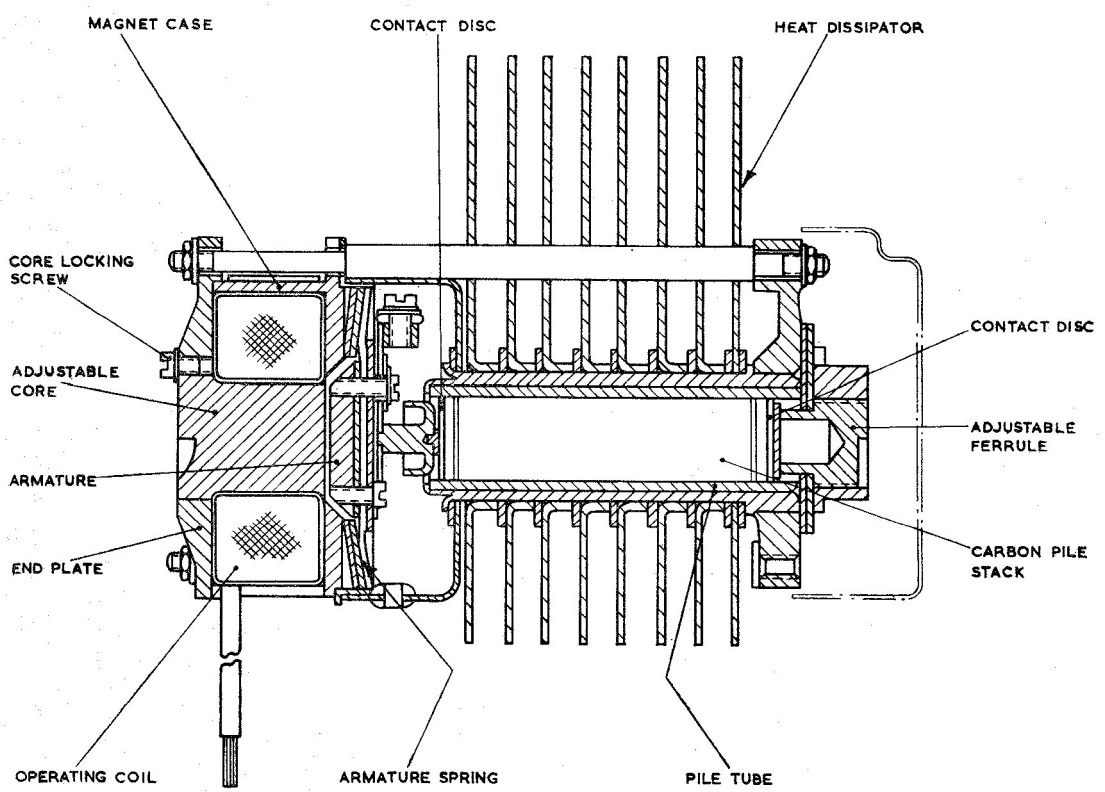

Fig. 2. Sectional view of regulator

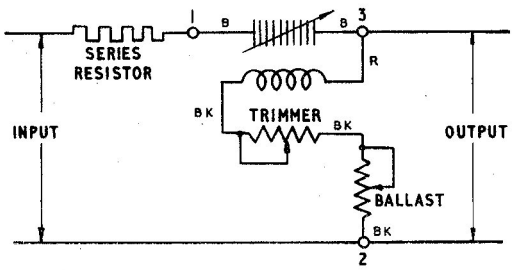

Fig. 3. Circuit diagram

of 1·11 to 4·6 ohms. The trimmer resistor is brought out to a screwdriver adjustment on the top plate.

5. A sectional view of the regulator unit is given in fig. 2. From this it will be seen that the original type of armature spring is fitted. The regulator incorporates the new type of pile end bracket, calibrated to indicate the amount of rotation necessary to effect the required pile movement.

INSTALLATION

6. It is important that the regulator should be mounted with the base in the vertical plane, i.e., with the terminal block at the bottom.

SERVICING

7. General instructions for the servicing of 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.

Testing of regulator

8. A typical test circuit diagram for a series regulator is given in fig. 7 of the chapter mentioned in para. 7. The regulator should be connected in such a circuit, and to a supply which can be varied between 25 and 29 volts d.c.

9. Set the magnet core in the flush position, then adjust the pile compression screw until the dip position is reached. Lock the compression screw in this position, then adjust the voltage by means of the magnet core and check for regulation and stability as follows.

Regulation test

10. Reduce the input supply voltage to 25 volts, increase it to 29 volts, then reduce once more to 25 volts. The regulated voltage should be maintained within 12 volts $\pm$ 2 per cent under the following conditions, with the coil current adjusted to 0·7 to 0·77 amp. at 22 volts:

(1) The load resistor adjusted so that the load current is 3 amp.

(2) The load resistor adjusted so that the load current is 10 amp. If the output voltage does not meet these tests, correction should be made by adjusting the core.

Stability tests

11. To check the stability of the regulator, switch a supply voltage of 28 volts on and off three times. The regulator should respond without any tendency to hunt.

12. Immediately following the above test, the pile compression screw is to be slackened $\frac{1}{8}$th turn, and the test given in para. 11 repeated. There must again be no sustained hunting.

13. Provided the regulator satisfies the test in para. 12, the compression screw is to be returned to its original setting, and the regulation test in para. 10 repeated.

RESTRICTED

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