Chapter 11

VOLTAGE REGULATOR, TYPE 97

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Voltage regulator, Type 97	*Stores Ref. 5UC/6043*
Controlled voltage	*115 volts a.c. ± 5 per cent*
Maximum pile loading	*30 watts*
Pile resistance range	*2 to 32 ohms*
Carbon pile	*Stores Ref. 5UC/*
Operating coil current	*0·12 to 0·13 amp.*
Operating coil resistance	*300 ohms cold*
Overall dimensions—	
Length	*5·6 in.*
Diameter	*3·5 in.*
Weight	*3 lb.*

Introduction

1. The voltage regulator, Type 97, is incorporated in the control panel, Type 34, to maintain the output of the rotary inverter, Type 102A, at 115 volts, 3-phase, 400 c/s a.c. A description of the control panel, Type 34, will be found in Sect. 7, Chap. 18 of this publication.

DESCRIPTION

2. This regulator (*fig.* 1) is of the single carbon pile type, and in general construction and principle of operation is similar to the standard design described in A.P.4343, Vol. 1, Sect. 6, Chap. 1. It incorporates the later flat type armature spring, with a bi-metal strip embodied for temperature compensation. The pile stack is 2 in. long, and incorporates fifty 1-mm. washers.

3. The regulator, Type 97, consists solely of the carbon pile assembly, with associated armature and operating coil. The stabilizing transformer, rectifiers, and ballast and trimmer resistors are incorporated in the control panel. A circuit diagram including the items fitted in the control panel is given in fig. 2.

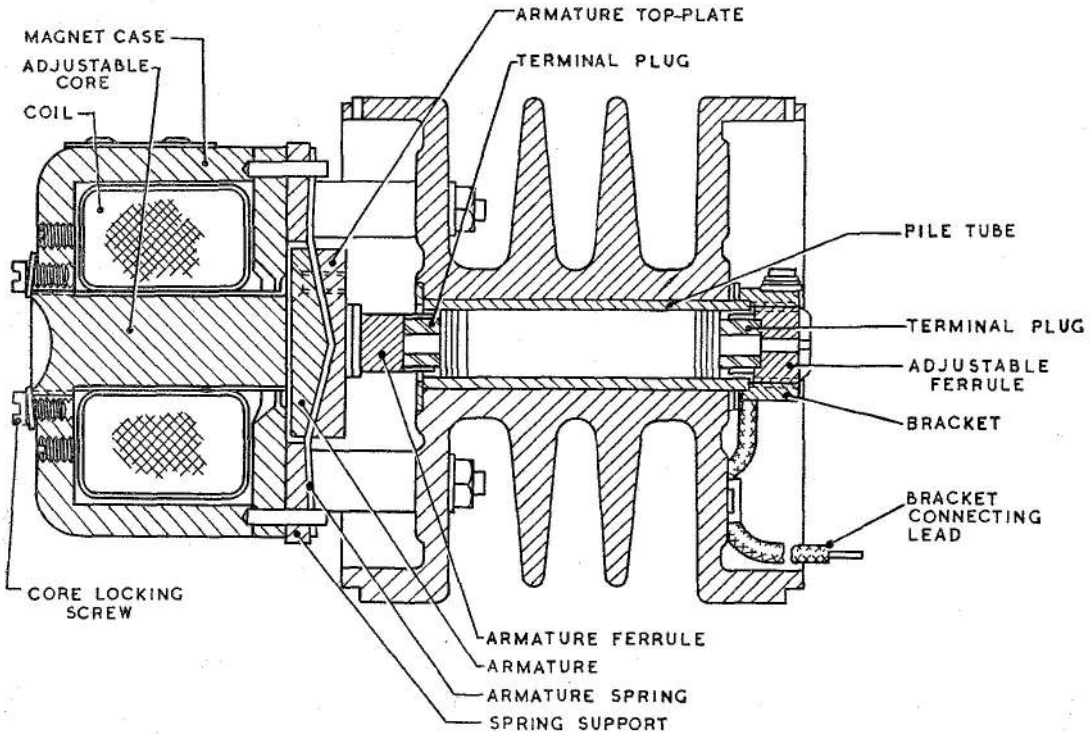

Fig. 1. Voltage regulator, Type 97

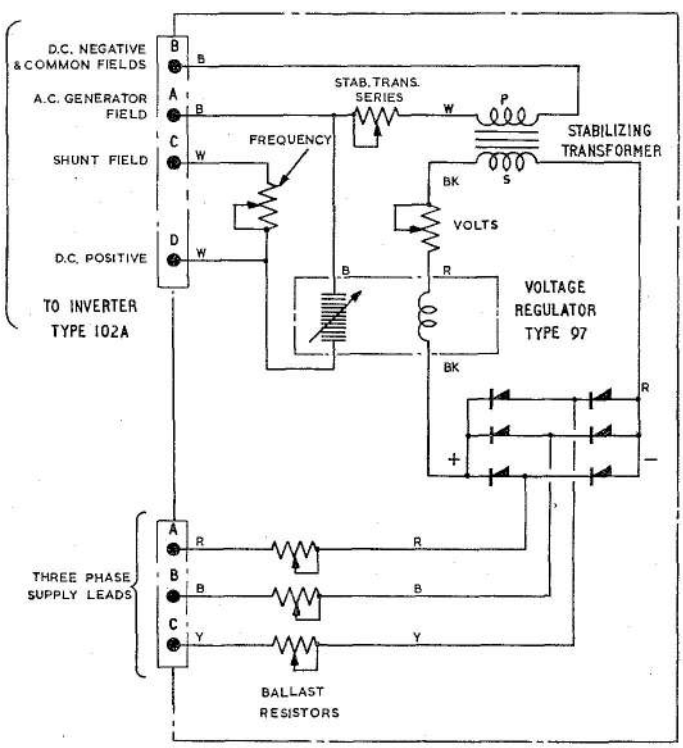

Fig. 2. Circuit diagram

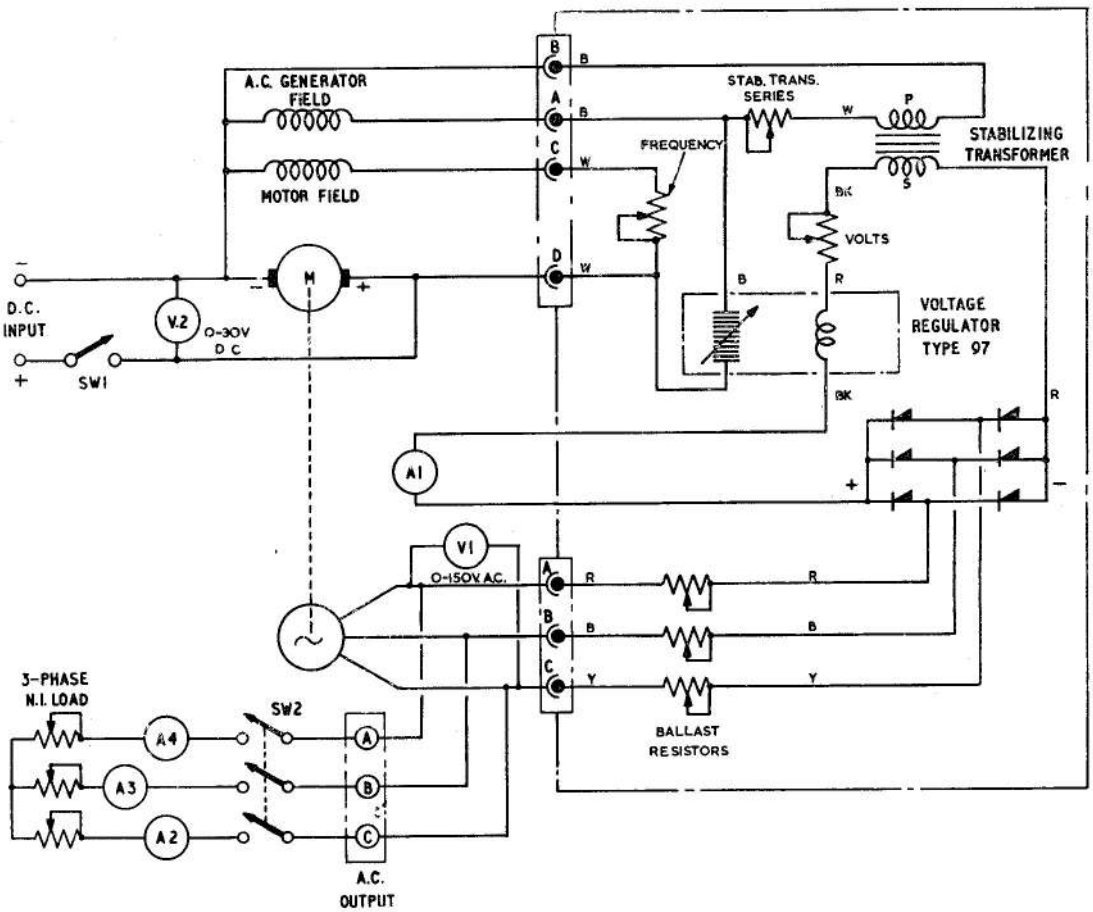

Fig. 3. Test circuit diagram

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 generator must afterwards be subjected to full test.

Testing of regulator

5. The regulator should be fitted in a control panel, Type 34, and tested in conjunction with an inverter, Type 102A. The connections are shown in the test circuit diagram in fig. 3. The stabilizing transformer must be in circuit for all tests.

6. Run the inverter on no load, and adjust the d.c. supply voltage and the frequency trimmer on the control panel until the output line voltage shown on V1 is approximately 115 volts, and the frequency is 400 c/s.

7. Set the voltage trimmer to its mid-position, and adjust the ballast resistors until the operating coil current (A1) is within the limits of 0·12 to 0·13 amp.

Regulation test

8. (1) With the inverter on no load, and over an input range of 23 volts, increasing to 29 volts, and then decreasing to 23 volts, the controlled voltage V1 must remain within the limits of 111 to 119 volts with the regulator cold.

(2) With the inverter on full load at unity power factor, and over the same input voltage range, the controlled voltage must remain within the same limits with the regulator cold.

(A.L.3, Dec. 57)

Stability tests

9. With the inverter on no load, switch the maximum d.c. supply of 29 volts on and off by means of SW1 at least three times. Under these conditions the regulator must be critically damped.

10. Following the test in para. 9, slacken the pile compression screw $\frac{1}{4}$ turn, i.e., equivalent to approx. 0·006 in. pile movement, and repeat the stability test. At this setting of the pile compression screw, the regulator must respond without tendency to sustained hunting.

11. Provided the regulator satisfies the test in para. 10, restore the pile compression screw to its original setting, and allow the regulator to cool. With the regulator at normal ambient temperature, repeat the regulation test.