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## Chapter 33

# VOLTAGE REGULATOR, TYPE 66 (ROTAX F 4101)

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### LEADING PARTICULARS

Voltage regulator, Type 66	...	Ref. No. 5UC/5524
Controlled voltage	...	28 volts $\pm$ 2½ per cent.
Maximum pile loading	...	35 watts
Pile resistance range	...	1.9 to 24 ohms
Carbon pile	...	Ref. No. 5UC/6338
Operating coil current	...	0.6 to 0.66 amp.
Operating coil resistance (cold)	...	15 ohms
Shunt stabilizing winding	...	940 ohms
Series stabilizing winding	...	16 turns
Equalizing coil resistance	...	3.5 ohms (approx.)
Fixed ballast resistor	...	15 ohms, 10 watt
Semi-adjustable ballast resistor	...	33 ohms, 15 watt
Remote trimmer, Type 5 (10 ohms, 7½ watts)	...	Ref. No. 5UC/5525
Fuse, Type 5 (10 amp.)	...	Ref. No. 5CZ/881
Dimensions	...	7.62 in. $\times$ 4.12 in. $\times$ 4.687 in.
Weight	...	3 lb. 6 oz. (approx.)

#### Introduction

1. The voltage regulator, Type 66, is used to control the output of the 3 kW rotary transformer, Type 1050, at 28 volts  $\pm$  2½ per cent.

#### 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 as described in A.P.4343, Vol. 1, Sect. 6, Chap. 1. ◀ The pile is 1½ in. long, and consists of a minimum of 38 1-mm. washers. ▶

3. The regulator unit is mounted on a base, beneath which are the fixed and semi-adjustable ballast resistor. A remote trim-

mer, Type 5 (10 ohms, 7½ watts) is connected between terminals 2 and 6, i.e., across the fixed ballast resistor, which is in series with the operating coil. This ensures that in the event of open-circuiting of one of the trimmer leads, the voltage level is still maintained within safe limits.

4. Two terminal blocks are fitted, one with terminals 1 to 4, and a second at the opposite end of the regulator, with terminals 5 and 6. A 10-amp. fuse, Type S, is mounted alongside the 4-way terminal block.

5. Series and shunt stabilizing windings are incorporated in the regulator unit, also an equalizing coil, to ensure that the load is shared equally when two or more transformers are run in parallel. ◀ The coil is such

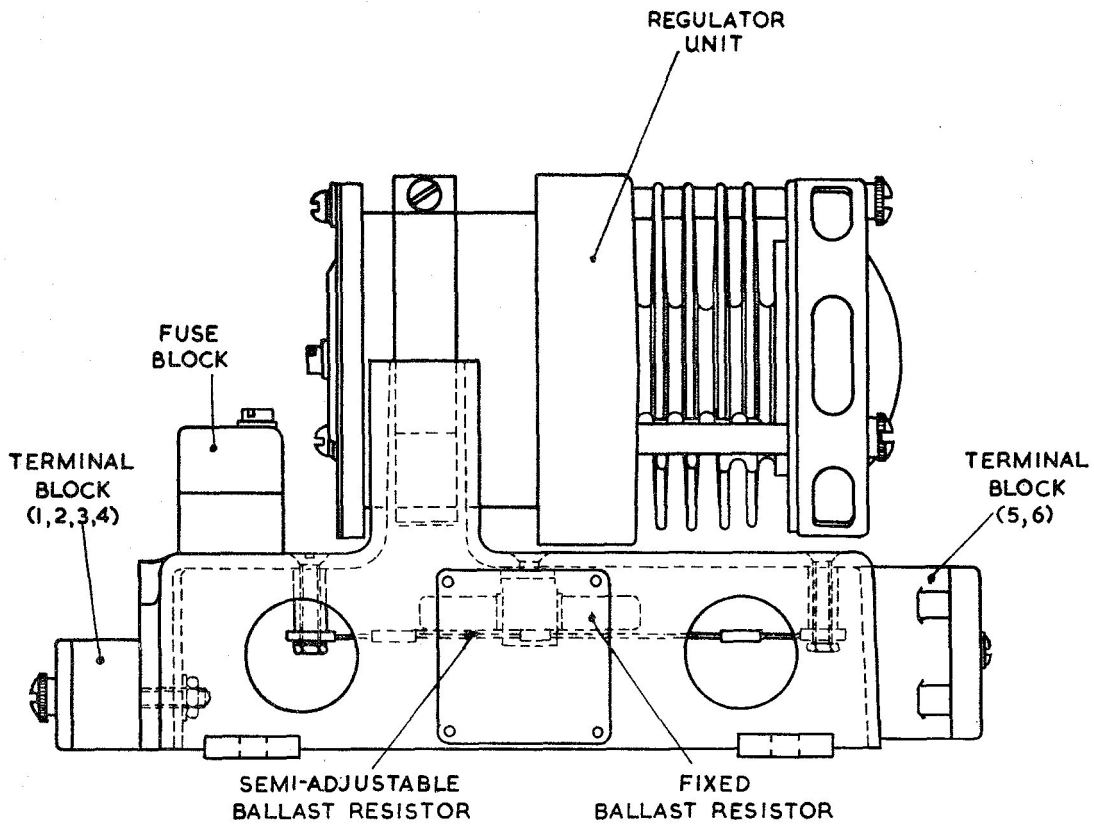


Fig. 1. Voltage regulator, Type 66

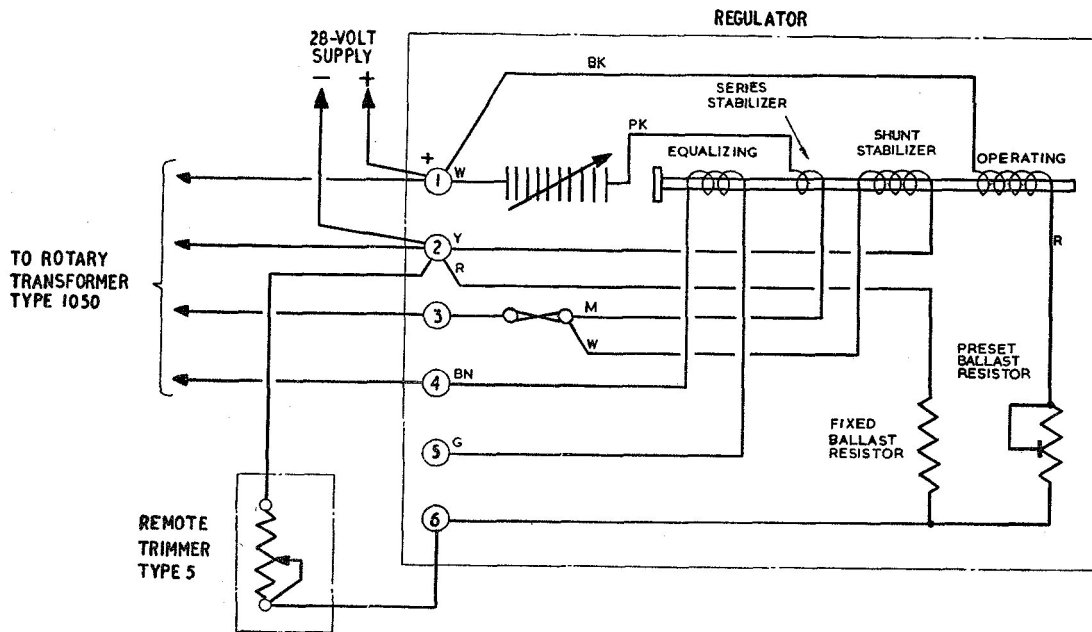


Fig. 2. Circuit diagram

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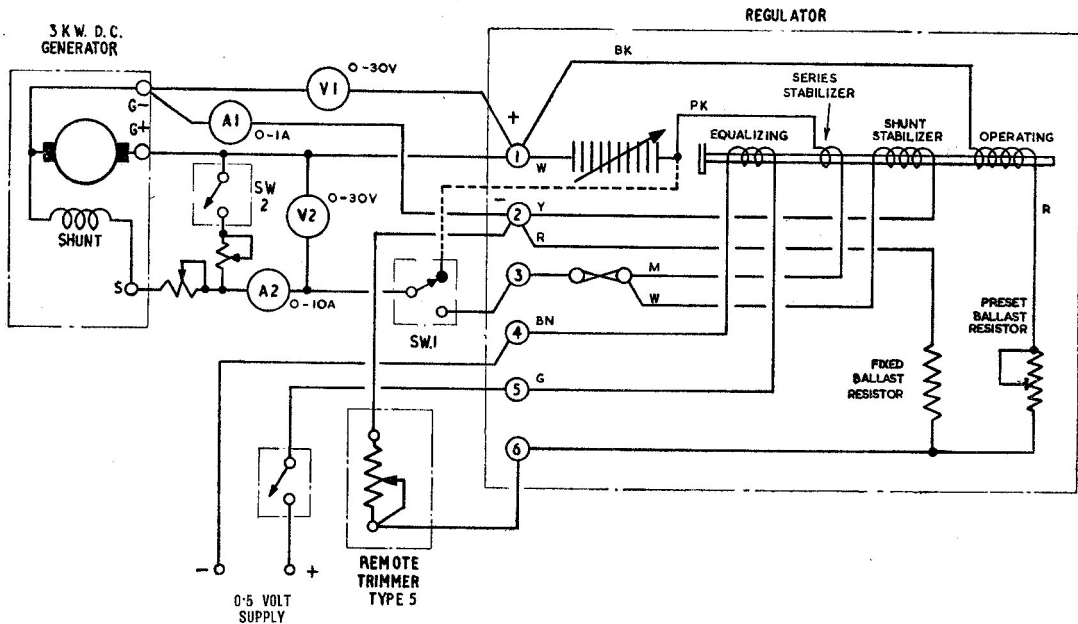


Fig. 3. Test circuit diagram

that the application of 0.5 volts across the coil causes the line voltage to fall from 28 volts to between 26.5 and 26.7 volts. ▶

#### SERVICING

6. 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.

#### Testing of regulator

7. ◀ It is preferable that the regulator should be tested in conjunction with the rotary transformers, Type 1050. If this is not available, however, a test may be carried out using a d.c. generator of suitable characteristics, such as Type O2 or U0, connected as shown in the circuit diagram in fig. 3. ▶

8. Disconnect and insulate the pink lead from the pile end bracket, and substitute the test lead from SW1 (fig. 3). With the stabilizing windings disconnected by switching SW1 to the test lead, the regulator must be adjusted to control the generator output at 28 volts with the coil current shown on A1 adjusted to within the limits of 0.6 and 0.66 amp. cold.

#### Regulation test

9. Run the generator at constant speed, and by variation of the series and diverter resistors, increase the pile resistance as measured by  $V2/A2$  smoothly from 2.5 ohms to 24 ohms, and then decrease to 2.5 ohms. Repeat this cycle, and over this cyclic variation of pile resistance, the controlled voltage V1 must be maintained within the limits of 28 volts  $\pm 2\frac{1}{2}$  per cent.

#### Note . . .

*It is important that the diverter resistor should always be switched in or out at its maximum value.*

#### Equalizing test

10. ◀ With the rotary transformer or generator on full load, connect a separate supply of 0.5 volts across the equalizing coil terminals 4 and 5, with the positive supply to terminal 5. On the application of this voltage, the line volts V1 must be reduced by between 1.3 and 1.5 volts. ▶

#### Stability test

11. Remove the test lead from the pile end bracket, and re-connect the pink lead which was disconnected (para. 8). With the stabilizing windings connected in circuit by switching

SW1 to the lead connected to terminal 3, and with the pile resistance adjusted to the maximum value of 24 ohms, switch the generator field on and off at least three times. Under this condition, the regulator must be critically damped.

**12.** Following this test, slacken the pile compression screw  $\frac{1}{8}$  turn, i.e., equivalent to

0.0045 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.

**13.** Provided the regulator satisfies the test in para. 12, restore the pile compression screw to its original setting, and repeat the regulation test.

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