

Chapter 5

VOLTAGE REGULATOR, TYPE J2

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LEADING PARTICULARS

Voltage regulator, Type J2 ...	Stores Ref. 5UC/2573
Carbon pile ...	Stores Ref. 5UC/3279
Trimmer resistor (5 ohms)...	Stores Ref. 5UC/5082
Ballast resistor (26 ohms) ...	Stores Ref. 5UC/3273
Coil current...	1.1 to 1.21 amp.
Pile resistance range ...	2 to 25 ohms

Introduction

1. The voltage regulator, Type J2, is used on aircraft to control the d.c. output of the generator, Type UO. It incorporates a voltage regulator and a current limiting unit which maintain the generator output at 28 volts d.c., 100 amp. For parallel running, a linkage arrangement introduces a slightly falling volts/load characteristic to ensure that the load is equally shared by the two generators.

DESCRIPTION

2. The voltage regulator, Type J2, operates on the standard carbon pile principle described in A.P.4343, Vol. 1, Sect. 6, Chap. 1. The current unit in this regulator is that remote from the terminal block assembly, as shown in fig. 1; the underside is illustrated in fig. 2. A variable trimmer resistor is incorporated in series with the voltage coil, the adjuster, which is slotted for screwdriver operation, being brought to the front through a hole in the base plate. The carbon pile is 1.875 in. long, and consists of 1 mm. washers,

with a silver disc at each end; connection to the external circuit is made through silver contacts.

3. A circuit diagram is given in fig. 3, in which it can be seen that additional windings in the voltage unit are used for stabilizing. A high resistance winding is connected across the field, acting in the same direction as, and superimposed on, the main voltage coil. A third coil is wound in series with the pile to balance the effect of the shunt stabilizing coil under steady conditions. With rapid changes of speed or load, the shunt stabilizing coil acts as a damping device and prevents hunting.

INSTALLATION

4. The regulator should be mounted in an upright position with the terminal block at the bottom. For details of the cable connections, reference should be made to the appropriate Aircraft Handbook. It is essential that the link should be in the correct position for the particular installation. The link is removed by withdrawing the screws, when it

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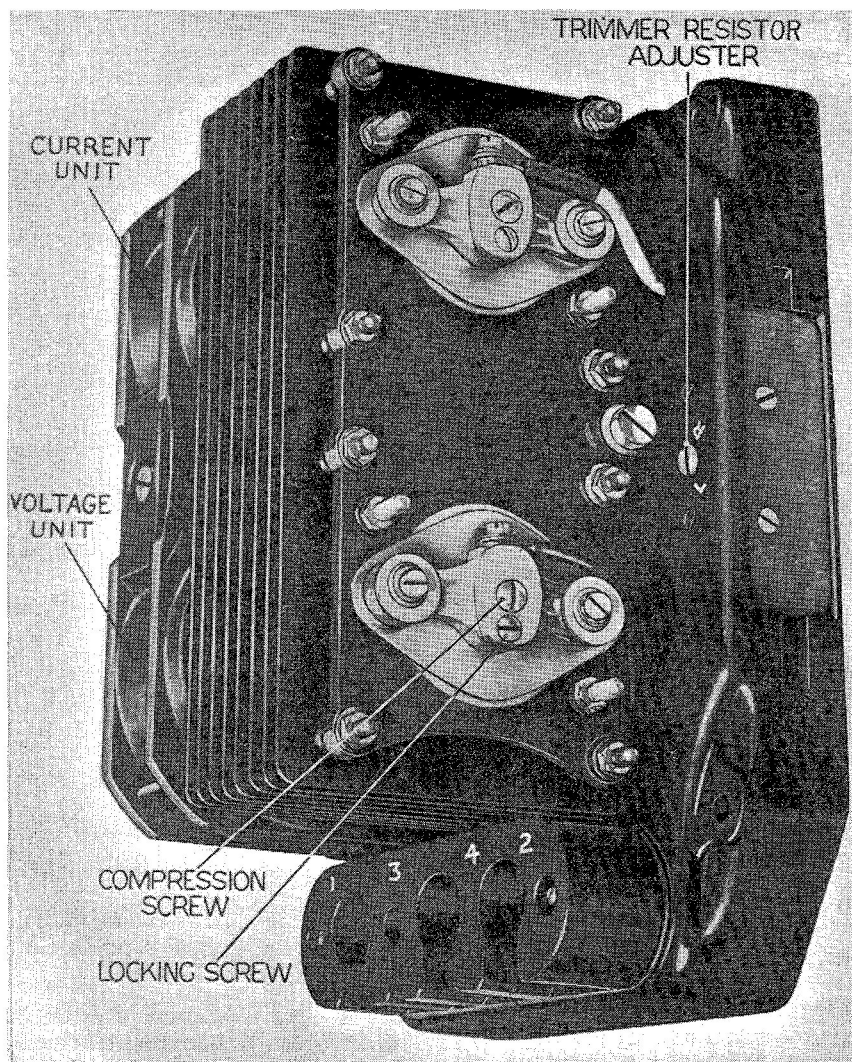


Fig. 1. Voltage regulator, Type J2

may be placed in its new position, and the screws firmly tightened down.

SERVICING

5. 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 method of adjusting a regulator which is out of order. If any adjustment is made, the regulator must be fully tested for regulation and stability.

Final voltage adjustment

6. Connect the regulator in a test circuit as shown in fig. 3, using a generator, Type UO,

driven by a bench testing set with a suitable switchboard and loading panel. With the generator running at approximately 5,000 r.p.m., the voltage adjustment should be made as described in A.P.4343, Vol. 1, Sect. 6, Chap. 1. Before commencing tests, check that the link is in the correct position, i.e., across terminals C and B, and that the contact arm of the trimmer resistor is in the mid position.

7. When the final voltage adjustment has been made, check that the current in the voltage operating coil is between 1.10 and 1.21 amp. with 28 volts applied across the voltage coil and ballast and trimmer resistors

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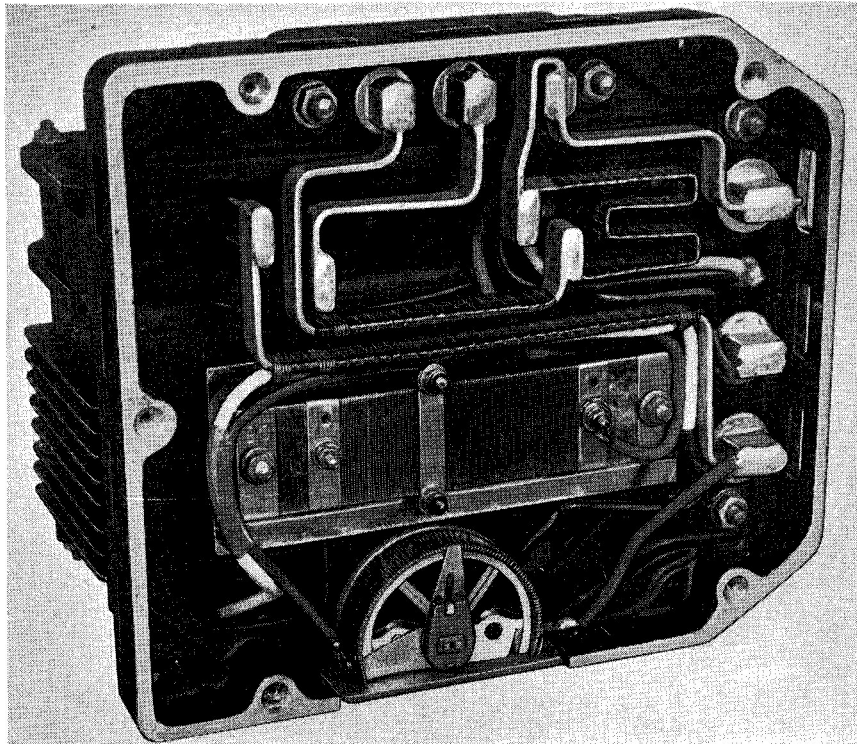


Fig. 2. Underside of regulator

in series. The regulator should then be tested for regulation and stability.

Regulation test

8. With the link in the position C-B, run the generator from rest to 3,000 r.p.m. on no load. Increase the generator speed from 3,000 r.p.m. to 6,000 r.p.m., then decrease the speed until the pile is working at 2.0 ohms, given by $\frac{V_2}{A_2}$. Throughout the test, the line voltage as measured on V1 must remain within the limits of 27.0 and 28.5 volts.

Stability test (voltage unit)

9. To check stability of the voltage regulator unit, switch full load on and off at least three times at generator speeds of 4,000 r.p.m., 5,000 r.p.m. and 6,000 r.p.m. Under these conditions, the regulator should be critically damped.

10. Immediately following the above test, slacken the pile compression screw of the voltage unit $\frac{1}{8}$ th of a turn, and repeat the stability test given in para. 9. Under this

condition, the armature spring must respond and settle with not more than two oscillations.

11. If the regulator satisfies the test in para. 10, the original setting is to be restored and the regulation test given in para. 8 repeated.

Note . . .

Before readings are taken, the regulator must be operated over its full resistance range (corresponding to generator speeds of 3,000 r.p.m.-6,000 r.p.m.-3,000 r.p.m.) for not less than three cycles.

Current unit

12. The following test must be made for correct operation of the current unit, remembering that the current unit is that remote from the terminal block.

13. With the generator running at 5,000 r.p.m., adjust the variable load resistor until the line voltage indicated on V1 is reduced to 14.0 volts; the reading indicated on A1 should be not less than 104 amp. and not greater than 110 amp. This limiting current

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