

Chapter 8

VOLTAGE REGULATOR 5UC/6010

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GENERAL DESCRIPTION

1. The voltage regulator 5UC/6010 is approved for use in aircraft where a stabilized 19V supply is required for heater and relay circuits of aircraft radio equipments. The input to the regulator is from the normal aircraft supply which may vary between 22 and 29 volts.

2. The regulator is approved for use with ARI.5874 but should not be treated as an integral part of the ARI.5874 since this installation may be wired into whatever 19V supplies are available in the particular aircraft. The regulator will supply $19V \pm 1V$ over an output range of 5 to 25 amp. The output voltage may be varied over a restricted range from the front panel while in use.

3. The unit is self-contained, chassis built and enclosed in a dust cover. It is designed for standard rack mounting (*Chap 10*) and for this purpose is supplied with back-plate cable connections.

4. On the front panel (*fig. 1*) are mounted the voltmeter and the following controls:—

- LIGHT A push-pull switch to switch the internal illumination of the voltmeter.
- CHECK ON A press-release switch for output level test.
- SET ON A press-release switch for output level adjustment.
- ADJUSTVOLTS An arbitrary calibrated scale and knob mounted on the controlling volts potentiometer, the scale of which can be locked in any desired position by a locking device.

CIRCUIT DESCRIPTION

5. The voltage regulator is fundamentally a variable resistance of the carbon pile type controlled by an electro-magnet energized from the output circuit. The carbon pile resistance CP1 (*fig. 2*) is connected in series between the DC supply provided by the aircraft and the load, such as heaters

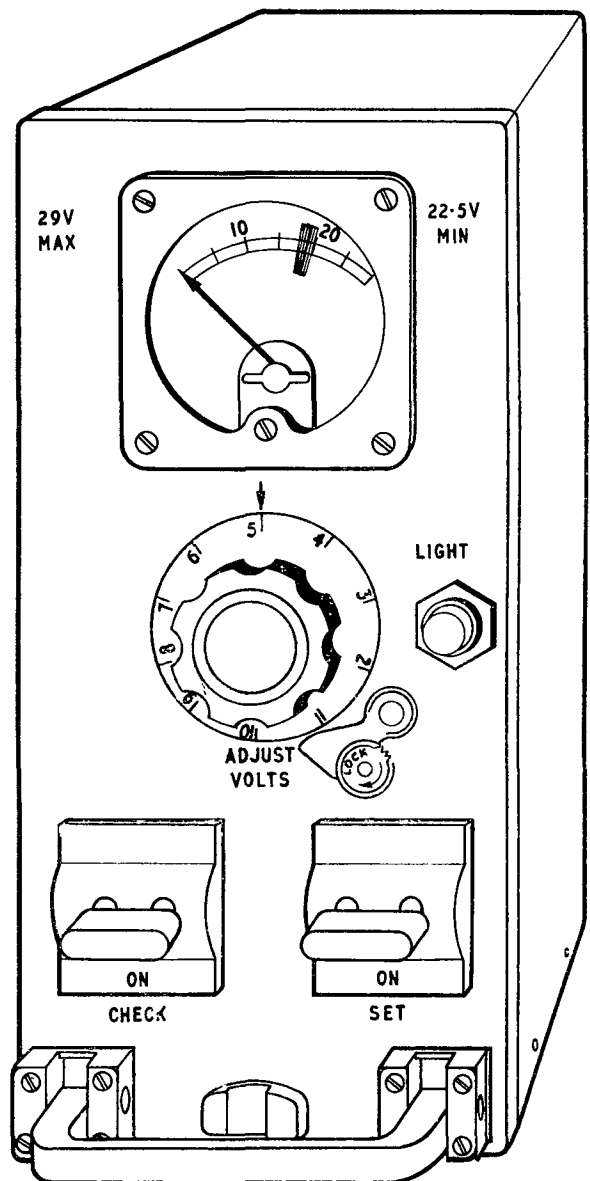


Fig. 1. Voltage regulator (5UC/6010)

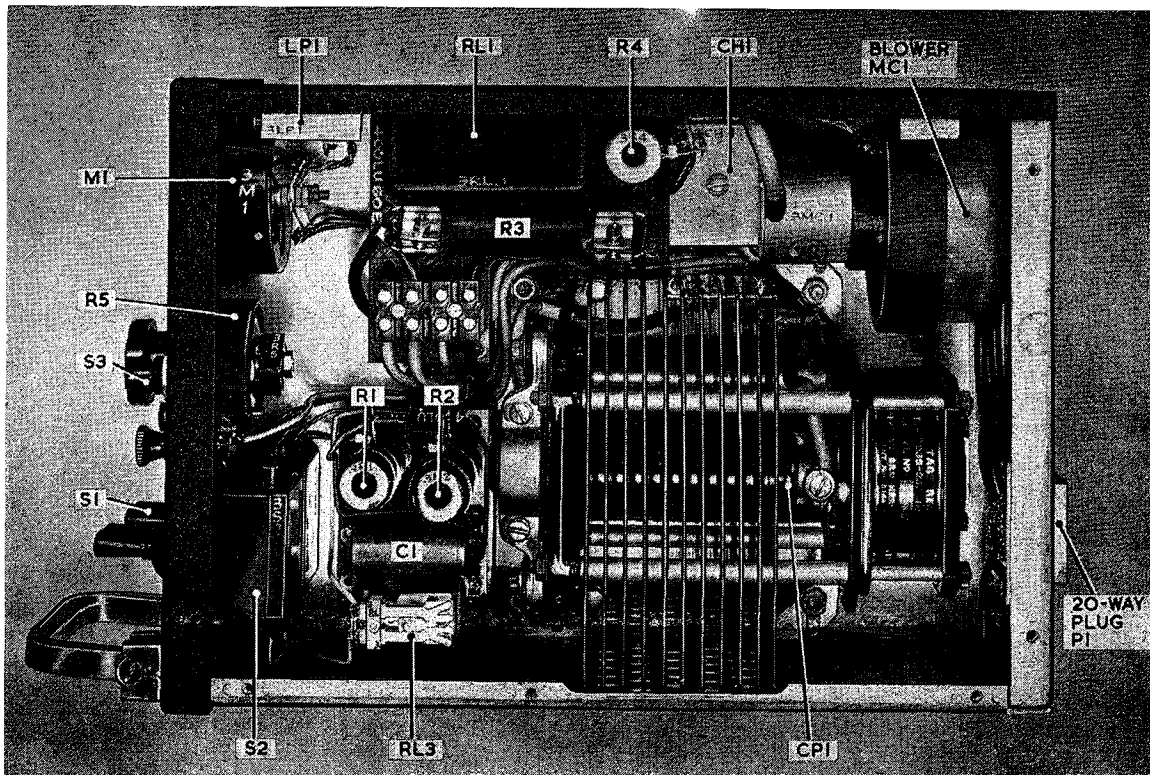


Fig. 2. Interior view

and relays, etc. The electro-magnet is so proportioned that as the battery voltage varies from 22-29 volts, the voltage across these heaters, relays, etc. remain substantially constant at 19 volts. To dissipate the heat generated in the carbon-pile, a cooling fan (MC1) is provided.

6. Reference to fig. 3 will show that when the aircraft positive supply is fed to the carbon-pile (via P1 pins 1 to 7) the main output relay (RL1) is energized. One pair of its contacts RL1/1 and RL1/1A are used to connect a resistor R3 in parallel with the carbon-pile. The object of this resistor is two-fold (1) it acts as a spark quench for the carbon-pile if the output current is of too low a value; (2) it modifies the resistance characteristics of the carbon-pile.

7. To verify that the carbon-pile is functioning properly, two test switches are provided on the front panel SET (S2) and CHECK (S1) the action of which are as follows.

8. When the SET switch is operated a resistor R2 is connected as a load to the output and the output voltage adjusted by the front panel control ADJUST VOLTS (R5) to read on the voltmeter (M1), say 19 volts.

9. If now the CHECK switch is operated, an additional resistor R1 is inserted in series with the carbon-pile and the load R2, thus dropping the voltage on the carbon-pile, which should then re-adjust itself so that the output voltage is substantially the same as when the SET switch was used.

10. Relay RL3 operates in the check and set circuit, whilst relay contacts RL1/3 and 3a operates the "blower" mechanism MC1 via filter CH1.

11. In the output circuit the ADJUST VOLTS R5 is the final control and variable resistor R4 the coarse control, the latter has been set at the factory for greatest efficiency and it should not be necessary to make any further adjustment.

SETTING-UP AND OPERATION

12. The voltage regulator functions with a 22-29 volts DC supply and delivers a supply of 19 volts for equipment requiring a stabilized voltage for heater and relay circuits etc., with special application to aircraft.

13. To expose the chassis completely, release the fastener on the rear of the dust cover and pull the cover from the chassis.

14. The incoming battery voltage switch can be remotely mounted in the most convenient location. When switching ON the regulator will automatically deliver 19 ± 1 volts to pins 13 to 20 of plug P1 and so to any equipment connected thereto. A simple test to check for current passing through is to actuate the LIGHT switch (S3) thus switching on the voltmeter lamp (LP1).

15. The calibrated scale of the voltmeter is marked in red over that part of the scale covered by the regulator (18-20 volts); this is to permit a quick reference at all times.

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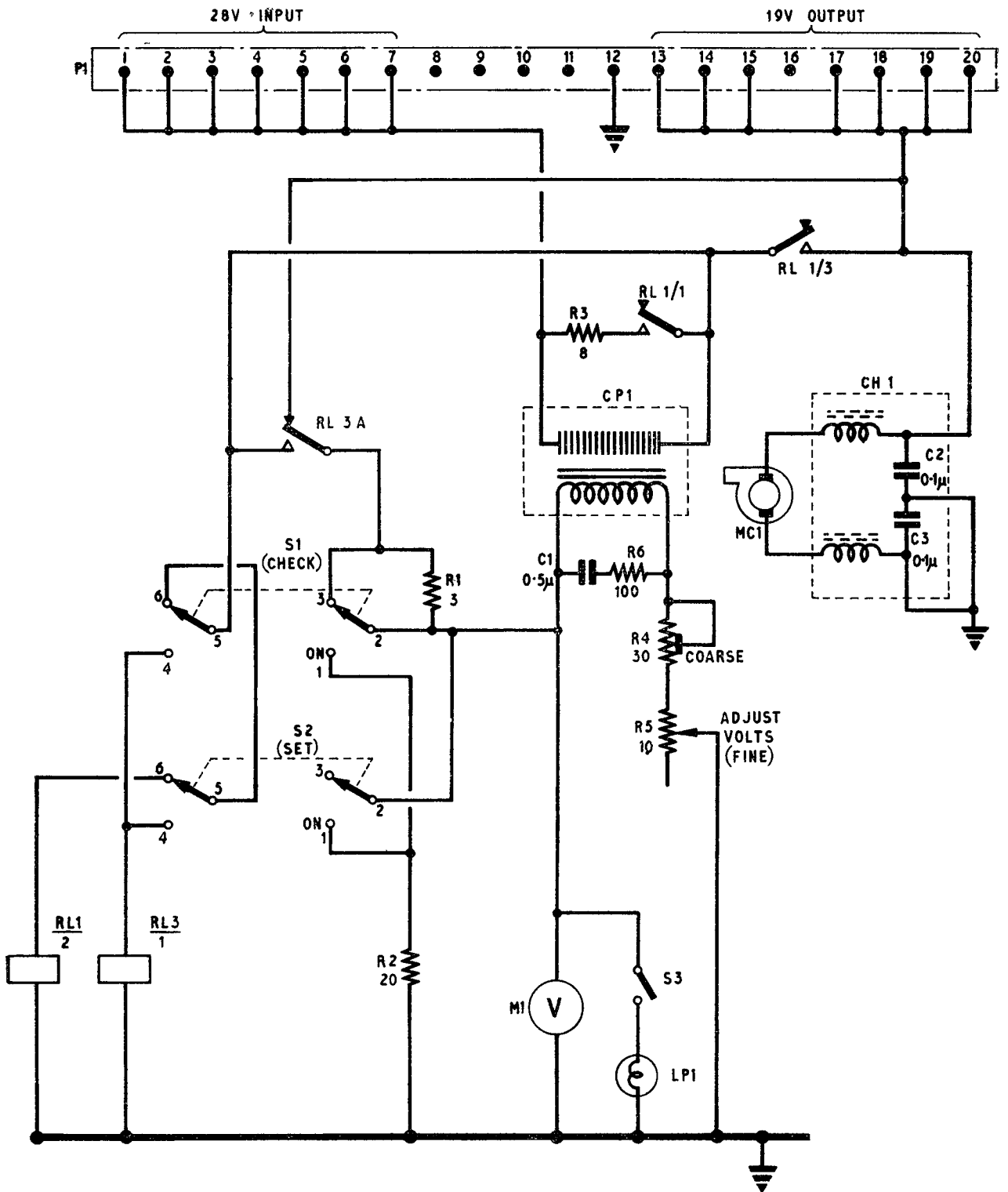


Fig. 3. Voltage regulator—circuit

16. Should the reading on M1 read out of calibration, operate the SET switch S2 and adjust ADJUST VOLTS R5 on the front panel until the meter registers 20 volts, this being the upper limit of the red calibration. Release SET, operate CHECK switch 3S1 and the meter should not register below 18 volts (the lower limit of the red calibration). Failure to reach this tolerance of ± 1 volt indicates that the voltage regulator is unserviceable.

17. The use of the various controls has already been described, the only part of the equipment that needs attention from time to time is the blower unit MG1 where a spot of anti-freeze grease should be applied to the bearings as necessary (*Vol. 4*). The brushes for the motor which drives the fan must be changed when they have become unduly worn (*Vol. 4*).