

# Electrical Testing of Generator and Regulator (Three-Element Voltage/Current Regulator)

Job No.

15—16

The testing of the armature and the exciter coil of the generator for short-circuit in windings and short-circuit to ground should be made in the same way as in the case of the starter; this is described in Job-No. 15—5.

## A. Testing Electric Leads to Generator in Vehicle

1. Hold the positive lead of a voltmeter on the terminal B + (51) at the regulator and the negative lead on ground and check whether the rated voltage of the battery is shown (Fig. 15—16/1).

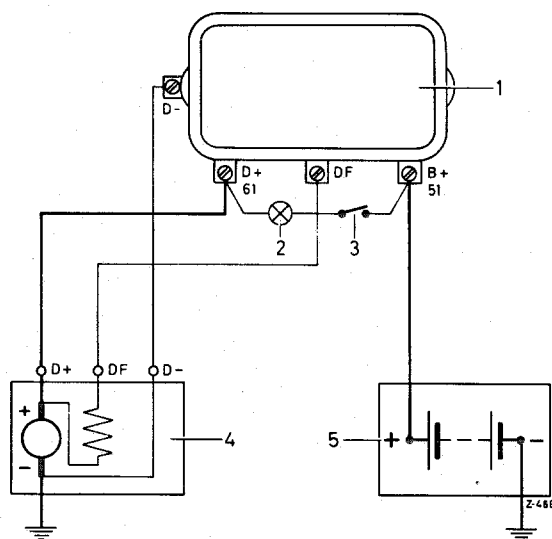


Fig. 15—16/1

- |                   |             |
|-------------------|-------------|
| 1 Regulator       | 4 Generator |
| 2 Charging light  | 5 Battery   |
| 3 Ignition switch |             |

2. Switch on the ignition; the charging light must light up.

**Note:** The charging light is incorporated in the circuit via the ignition switch between the terminal 51 and the terminal 61 of the regulator. It therefore lights up when the ignition is switched on. When the engine is started the light must go out as soon as the voltage of the generator approaches that of the battery.

3. Disconnect the blue cable (Lead No. 72) of the main wiring harness from the terminal D + (61) at the regulator. The charging light must now be extinguished.

If in spite of this the charging light still lights up, this shows that the blue cable has a short-circuit to ground. The short-circuit must be removed or alternatively, the blue cable (Lead No. 72) of the main wiring harness must be re-laid (see Job No. 54—1, Section A, Circuit Diagram of Main Wiring Harness, Cable Sheaf 35).

**Note:** Any intermittent short-circuit to ground of this cable can easily lead to damage to the regulator and to the generator. In this case, therefore, the generator and also the regulator must be removed and checked.

## B. Testing Voltage Regulation of Generator in Vehicle

1. Connect up a voltmeter between the terminal D + (61) and the terminal D— at the regulator (see. Fig. 15—16/1).
2. Start the engine.
3. Disconnect the red cable (Lead No. 54, Cable

Sheaf 35) of the Main Wiring Harness from the terminal B + (51) at the regulator and insulate it.

4. Increase the engine speed until the voltage shown on the voltmeter no longer rises. This

is now the regulation voltage which is maintained constant by the regulator, and it should lie between 13.8 and 14.8 Volts when the generator is cold.

5. If no voltage is shown on the meter, the generator is not being energized.

In order to ascertain whether the generator is defective, the generator must be operated as an electric motor for a short time. To do this, remove the fan belt. Then connect the terminal DF to the terminal D— at the reg-

ulator and also the terminal B + (51) to the terminal D + (61).

The generator must now turn smoothly, operating as an electric motor, in its rated direction of rotation. At the same time, the generator is polarized. Then repeat the check of the regulation voltage.

6. If the voltage is too low the fault may lie in the generator or in the regulator. If the voltage is too high, the fault lies in the regulator.

### C. Testing Current Regulation of Generator in Vehicle

1. Disconnect the ground cable at the negative terminal of the battery.

2. Disconnect the red cable (Lead No. 54, Cable Sheaf 85) of the Main Wiring Harness from the terminal B + (51) at the regulator and connect a suitable ammeter between the terminal 51 and the cable (see Fig. 15—16/1).

Re-connect the ground cable to the negative terminal of the battery.

3. Run the engine at high r.p.m. and switch on the normal permanent current-consuming units.

**Note:** The normal permanent current-consuming units are the parking light, the upper

beam, the license plate lights and the tail lights.

4. The ammeter must now indicate the current delivered by the generator. If the ammeter indicates no current, the switch in the regulator is defective. The regulator must be replaced if this is the case.

5. Slow the engine gradually down to idle speed. The pointer of the ammeter must now cross slowly over the zero of the instrument and enter the negative part of the scale. This means the current is flowing from the battery to the generator. The greatest negative value obtained is the reverse current. Shortly before the engine reaches idle speed, the switch must switch off, that is to say, the instrument must return to 0 and the charging light must light up.

### D. Testing Voltage Regulation and Current Regulation of Generator on the Test Stand or with a Tester

The testing of the voltage and current regulation of the generator described in Sections B and C are make-shift tests which are in general adequate for normal practice. If an accurate check is required, particularly if the output is to be measured, the generator, together with the regulator, must be tested on a test stand which allows a resistive load to be used.

A number of testers have recently appeared on the market, which allow the generator and the regulator to be properly tested whilst still installed in the vehicle. When these testers are used, attention must in each case be paid to the instructions for use issued by the makers.

When the test is made, the specified test values must be obtained.

## Test Values for Generator and Regulator

<b>Generator</b> LJ GEG 160 12 - 2500 R 8				<b>Regulator</b> RS/UA 160/12/15	
Regulation voltage Volts	Cut-in engine speed r. p. m.	Load at rated output Watts	Engine speed r. p. m.	Cut-in of current regulator at rated output (battery and shunt load) Amps.	Reverse current Amps.
at idle speed without battery 13.8 — 14.8	2050	160	2560	17.5 — 20.5 cold 19.5 — 22.5 warm	2.5 — 7.5

**Note:** When the generator is tested, the carbon brushes must be well run-in. At normal working engine speeds and rated load there must be no arcing at the collector.