

CHARGING SYSTEM

91. Description

The charging current is supplied by the two lead alternator, but due to the characteristics of alternating current the battery cannot be charged direct from the alternator. To convert the alternating current to direct current a full wave bridge rectifier is connected into the circuit. The alternator gives full output, all the alternator coils being permanently connected across the rectifier.

Excessive charge is absorbed by the Zener Diode which is connected across the battery. Always ensure that the ignition switch is in the "OFF" position whilst the machine is not in use, to prevent overheating of the ignition coils, and discharging the battery.

To locate a fault in the charging circuit, first test the alternator as described in Subsection 93. If the alternator is satisfactory, the fault must lie in the charging circuit, hence the rectifier must be checked as given in Subsection 94 and then the wiring and connections as shown in Subsection 97.

Note—Ensure that the ammeter is well insulated from the surrounding earth points otherwise a short circuit may occur.

With the Zener Diode disconnected the minimum reading on the ammeter should be 8 amperes. **Caution**—Do not run machine for more than 15 seconds under these conditions.

Reduce engine speed and reconnect the Zener Diode. Increase engine speed to 3,000 r.p.m. and note reduction of input to the battery. No reduction of input to the battery will indicate faulty Zener Diode or associated wiring—see Zener Diode test, Subsection 101. If the reading is lower than quoted, then the alternator must be tested as described in Subsection 93 below.

93. Checking the Alternator Output

Disconnect the two alternator output cables coming from the engine and run the engine at 3,000 r.p.m.

Connect an A.C. voltmeter (0–15 volts) with 1 ohm load resistor in parallel with the two alternator leads. The minimum reading on the voltmeter should be 9 volts.

A suitable 1 ohm load resistor can be made from a piece of nichrome wire as shown in Subsection 98.

From the results obtained, the following deductions can be made:—

(1) If the reading is equal to or higher than quoted then the alternator is satisfactory.

(2) A low reading indicates that some turns of the coils are short circuited, or that the rotor has become partially demagnetised. If the latter case applies, check that this has not been caused by a faulty rectifier or that the battery is of incorrect polarity, and only then fit a new rotor.

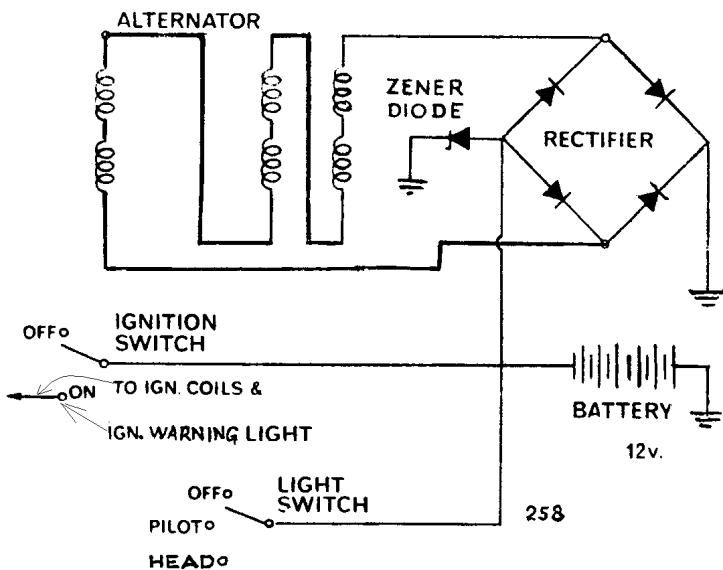
(3) A zero reading indicates that a coil has become disconnected, is open circuit, or is earthed.

(4) A reading obtained between any one lead and earth indicates that coil windings or connections have become earthed.

94. Rectifier Maintenance and Testing

The silicon bridge rectifier requires no maintenance beyond checking that the connections are clean and tight, and that the nut securing the rectifier to the frame is tight. It should always be kept clean and dry to ensure good cooling, and spilt oil washed off immediately with hot water. **Note**—The nuts clamping the rectifier plates together must not be disturbed or slackened in any way.

When tightening the rectifier securing nut, hold the spanners as shown in Fig. 29, for if the plates are twisted, the internal connections will be broken. Note that the circles marked on the fixing bolt and nut indicate that the thread form is $\frac{1}{4}$ in. U.N.F.



SCHEMATIC DIAGRAM OF 12 VOLT CHARGING CIRCUIT WITH SINGLE CHARGE RATE, ZENER DIODES

Fig. 28

92. Checking the D.C. Input to Battery

For this test the battery must be in good condition and a good state of charge, therefore before conducting the test ensure that the battery is up to the required standard, or alternatively fit a good replacement battery.

Disconnect the Zener Diode battery connection.

Connect D.C. ammeter (0–15 amp.) in series between the battery main lead (brown/blue) and battery negative terminal and then start the engine and run it at approximately 3,000 r.p.m.