

NOTE: The actual meter reading varies with the meter used and the individual rectifier, but, generally speaking, the lower reading should be within 1/3 scale of zero ohms.

Be careful not to strike, scratch, or in any other way damage the rectifier. Such

CAUTION damage may cause the rectifier to short.

REGULATOR

The solid-state regulator limits dynamo output voltage a maximum of 14.0 ~ 15.0 volts. Since it contains no contacts or other moving parts, it does not wear out and never needs to be adjusted. It is therefore manufactured as a sealed unit, and must be replaced as a unit should it become defective. Internal regulator operation is explained here only to aid the technician in troubleshooting and in understanding test procedures.

When the field coil current (I_f) is constant, the dynamo output voltage (V) increases with an increase in engine rpm. However, the voltage will become excessive at high engine rpm, burning out the lights and overcharging the battery unless the field coil current is reduced. The regulator is included in the circuit to reduce the field coil current at high rpm, keeping the voltage between 14.0 ~ 15.0 V for all electrical equipment.

Regulator Circuit

(a) at Low Engine Speed

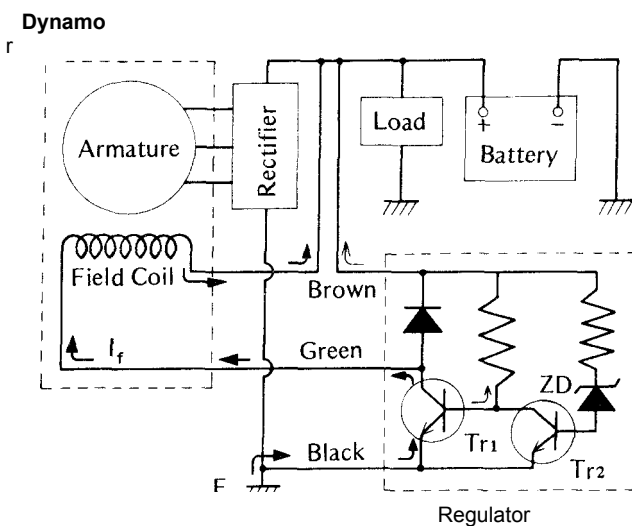


Fig. 562 shows a basic circuit of the regulator that is referred to in the following explanation.

The main components of the circuit are two transistors (Tr) and a zener diode (ZD). The transistors function as electronic switches to control the field coil current. The zener diode checks on the dynamo output voltage and triggers the driver transistor (Tr2).

When the dynamo output voltage is lower than the specified value, such as at low engine speeds, the field coil current (I_f) runs from chassis ground (E), through transistor Tr1, thus magnetizing the field coil. When engine speed rises, and the voltage increases above the specified value, ZD conducts and "switches on" driver transistor Tr2, which in turn "switches off" transistor Tr1. This blocks current flow to the field coil, and reduces its magnetism, which lowers dynamo output voltage.

As dynamo output voltage drops below the preset breakdown voltage of the zener diode, it no longer conducts, thereby "switching off" Tr2. Transistor Tr1 "switches on", energizing the field coil and increasing its magnetism, which raises the dynamo output voltage until it again reaches the specified value, and the cycle explained above repeats itself.

Thus, the transistors act as relays by switching on and off as many as several hundred times per second, and serve to keep the dynamo output voltage constant. **When inspecting the regulator, observe the following to avoid damage to the regulator.**

Caution 1. Do not reverse the battery lead connections.

This will burn out the diodes.

2. Do not disconnect the regulator with the ignition switch on. This may damage the transistors.

3. Do not disconnect the battery leads while the engine is running.

Regulator testing

In circuit:

If the battery continually discharges, or if it overcharges, the regulator may be defective. Symptoms of too high a charging voltage are: (a) battery water must be added often to all the cells; (b) lights burn out when running at high rpm.

(b) at High Engine Speed

