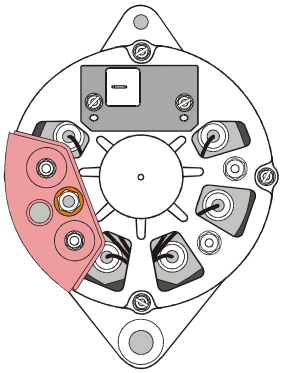
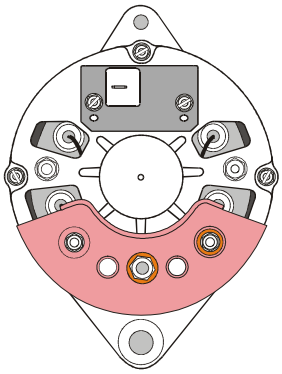
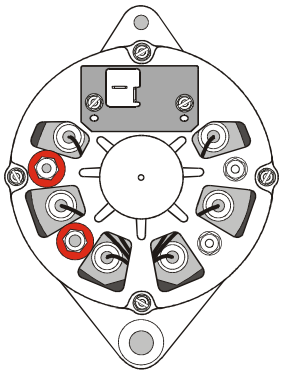


1965 - 1970
37 Amp
One Isolation-diode
Figure 1



1965 - 1970
55 Amp
Two Isolation Diodes
Figure 2



1971 - 1975
37 - 55 Amp
Diode Trio
Figure 3

AMC began using Motorola charging systems in 1965. It was quite an advanced charging system for its time. It had a solid-state voltage regulator, electronic charge-light control and externally replaceable brushes.

The most unique feature of the Motorola alternator is the isolation-diode plate. This is the crescent-shaped plate (usually red or blue) that mounts to the SRE housing of the alternator. What's it for? Here's a quote from a 1968 Motorola sales brochure. "This Motorola feature incorporates semiconductors (silicon diodes) rather than the conventional electromechanical relay. The isolation-diode assembly provides a solid-state device for illuminating the *tell tale* warning light. This exclusive feature minimizes battery drain - uses less current to excite the magnetic field during starting operation as compared to alternators not having this feature." As you can see from ***Figure 4***, the isolation-diode keeps battery current from feeding back into the charge-light and voltage regulator circuits. A more detailed explanation of the isolation-diode functions will be found in the sections ***1965 Only*** and ***1966 - 1970***.

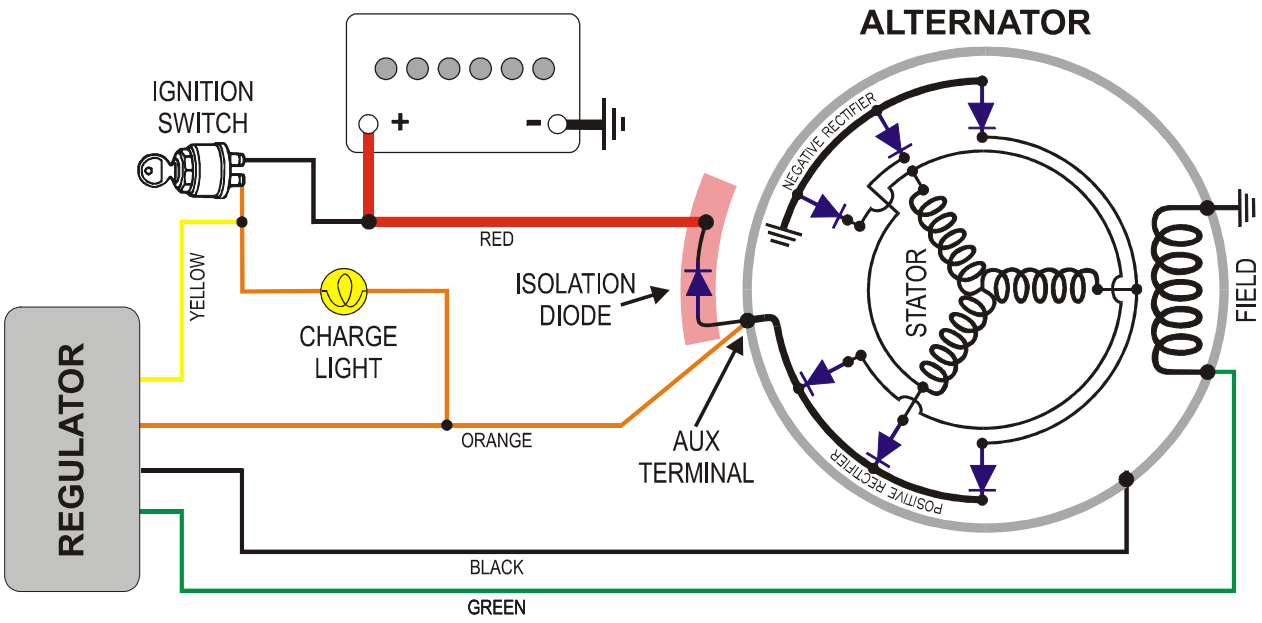


Figure 4 Alternator with ISOLATION-DIODE

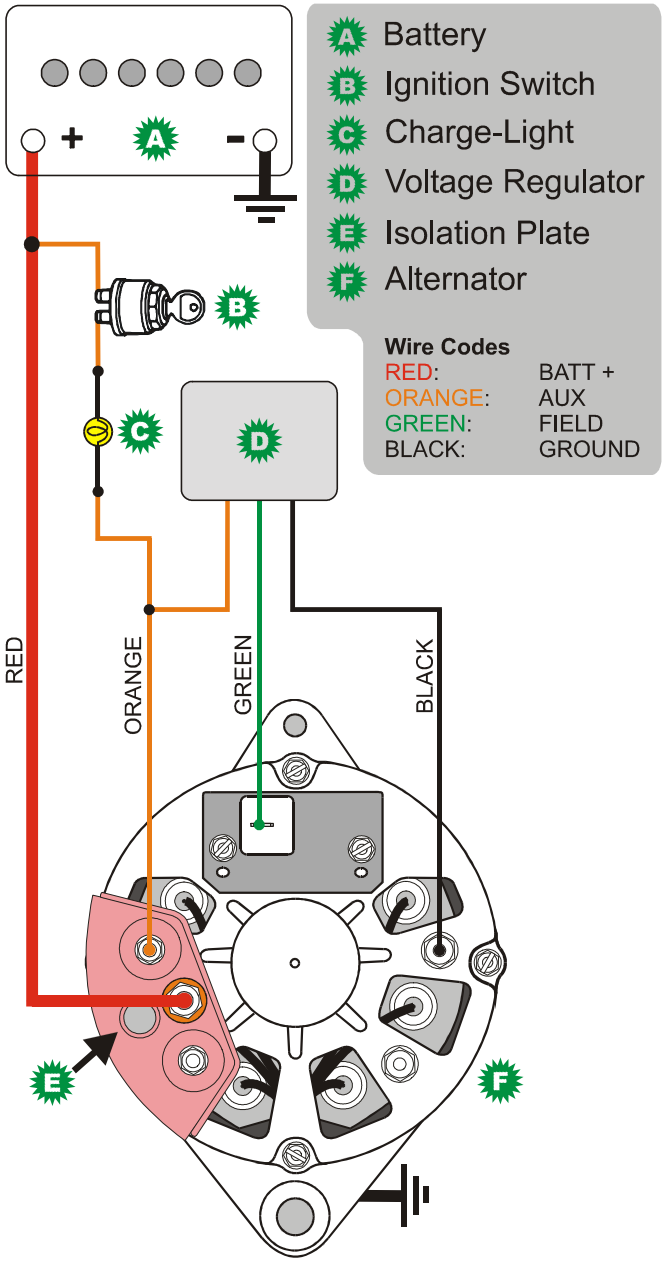


Figure 5 1965 Wiring Diagram

1965 Only

1965 was the first year AMC used the Motorola charging system. Two alternator capacities were available - 37 amps for cars without air conditioning and 55 amps for cars with air conditioning.

The 1965 charging system is unique in that it uses a three-wire solid-state voltage regulator. All later AMC vehicles use a four-wire solid-state voltage regulator.

The isolation-diode was new in 1965. The purpose of the isolation-diode is to provide a means of controlling the charge light without using an electromechanical relay. Here's how it works.:

1) When the engine is off, the isolation-diode "isolates" the current present at the alternator ***BATT+*** terminal. It blocks current from feeding back through the ***AUX*** terminal. Without the isolation-diode, current from the battery would follow the orange charge-light wire to the voltage regulator, and the charging system would always be on. In fact, this is what happens when an isolation-diode has a shorting-type failure.

2) When the ignition is turned to the run position, current flows from the battery ⇨ through the ignition switch ⇨ through the charge indicator light and is directed by the voltage regulator, to the rotor coil. The current finds a ground path at the negative brush inside the alternator and the charge-indicator bulb lights up.

3) When the engine starts, the alternator produces current which is split at the isolation-diode plate and follows two paths. Most of the current passes through the ***BATT+*** terminal to charge the battery and run accessories. About 3 amps of the current goes out the ***AUX*** terminal along the orange wire to the voltage regulator and the charge-indicator light. The voltage regulator uses this current to power the rotor field. The charge-indicator light goes out, since it has the same voltage on either side of the filament and no current can flow.

USE THE CORRECT REGULATOR

Regulators used on alternators with isolation-diodes are set 0.8 volts higher to compensate for the voltage drop in the isolation-diode. A regulator used with an isolation-diode equipped alternator should not be used with a diode-trio equipped alternator. The higher voltage setting will cause overcharging and result in high water loss and shorter battery life. Conversely, if a regulator designed for a diode-trio equipped alternator is used with an isolation-diode equipped alternator it will result in undercharging and shorter battery life.

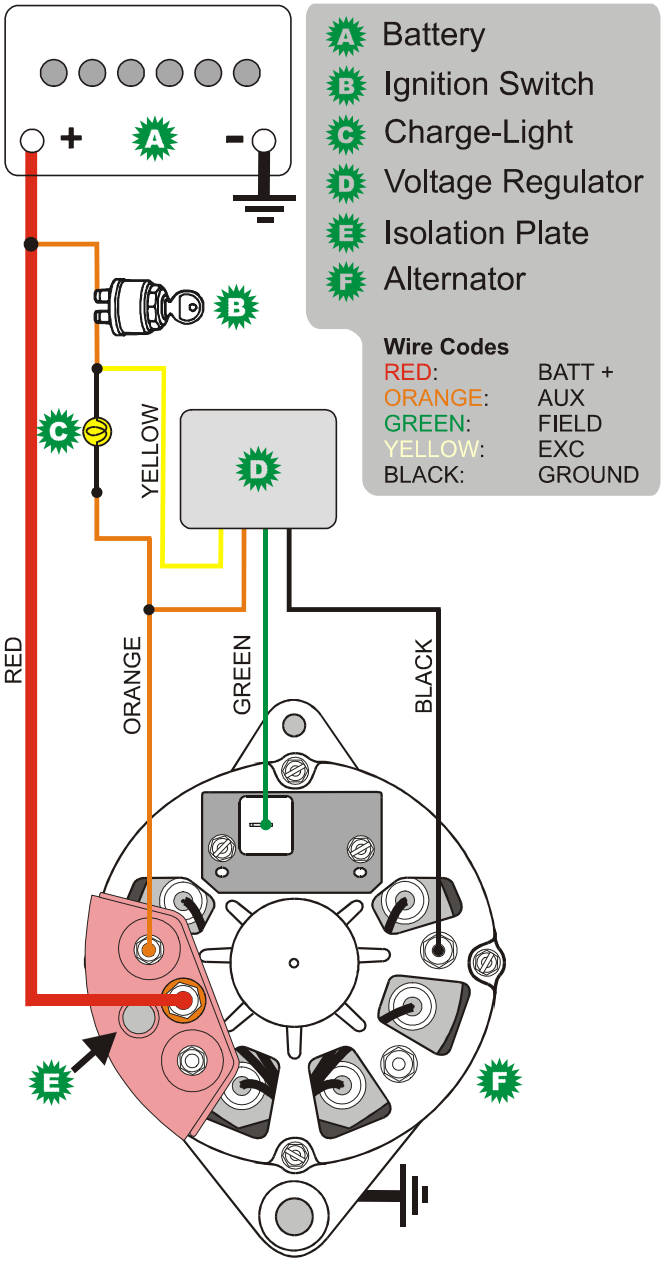


Figure 6 1966 - 1970 Wiring Diagram

1966 - 1970

In 1966, AMC made a small change to the Motorola charging system. A fourth wire (yellow) was added to the voltage regulator. This yellow wire conducts full battery voltage to the regulator when the ignition key is in the run position. It's called an ***Excitation*** wire. It improves low-speed charging system turn-on and allows more precise monitoring of the battery state-of-charge.

Other than the addition of the ***Excitation*** wire, the 1966 - 1970 Motorola charging system functions like the ***1965 Only*** system.

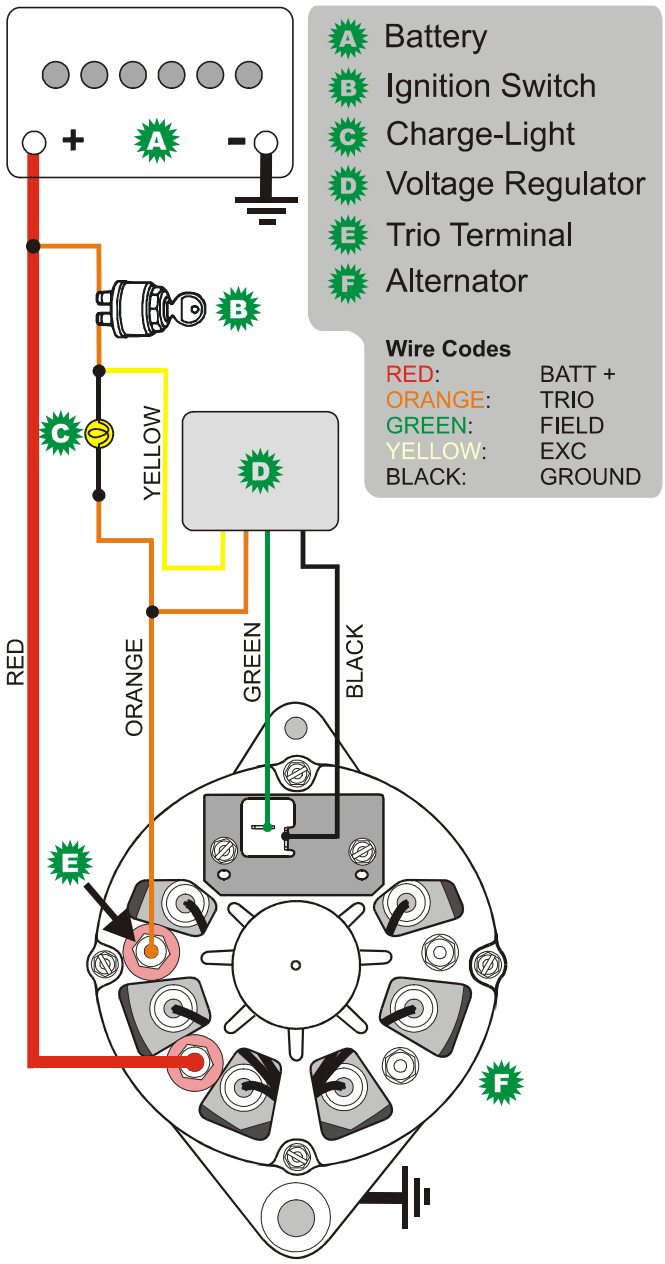


Figure 7 1971 - 1975 Wiring Diagram

1971 - 1975

In 1971, AMC dropped the isolation-diode from the Motorola charging system. A diode-trio was installed inside the alternator, on the positive rectifier plate. Two alternator capacities were available - 37 amps for cars without air conditioning and 55 amps for cars with air conditioning.

The voltage regulator remained solid-state with four wires. The color codes stayed the same as earlier isolation-diode regulators. It's very important to use the correct voltage regulator. See ***USE THE CORRECT REGULATOR*** in the ***1965 Only*** section.

Here's how it works:

1) When the engine is off, the main rectifier diodes block the current present at the alternator ***BATT+*** terminal.

2) When the ignition is turned to the run position, current flows from the battery ⇨ through the ignition switch ⇨ through the charge indicator light and is directed by the voltage regulator, to the rotor coil. The current finds a ground path at the negative brush inside the alternator and the charge-indicator bulb lights up.

3) When the engine starts, the alternator produces current which is split at the positive diode plate and follows two paths. Most of the current passes through the ***BATT+*** terminal to charge the battery and run accessories. About 3 amps of the current goes out the ***TRIO*** terminal along the orange wire to the voltage regulator and the charge-indicator light. The voltage regulator uses this current to power the rotor field. The charge-indicator light goes out, since it has the same voltage on either side of the filament and no current can flow.

About the author:

This Tech Basics guide was written by Wesley S. Grueninger. Wes has been in the rebuilding industry since 1975, the year he started Auto Lab. Auto Lab specializes in remanufacturing import alternators and starters in addition to stocking a full line of domestic units. Many hours of research have gone into the Tech Basics series and we want to hear from you if you have any suggestions or comments. Contact us at autolab@execpc.com.