



# TECH TIPS

## SOLENOID TYPES AND CIRCUITS

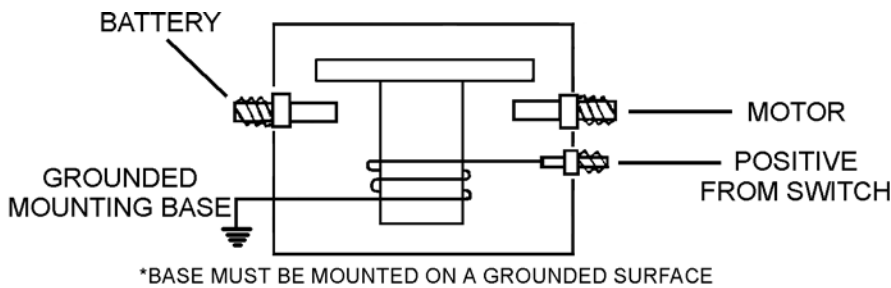


Many of the remote mount solenoids look identical on the outside.

However, they can be very different on the inside. Beside the different internal circuits, these can be rated for continuous duty or intermittent duty use.

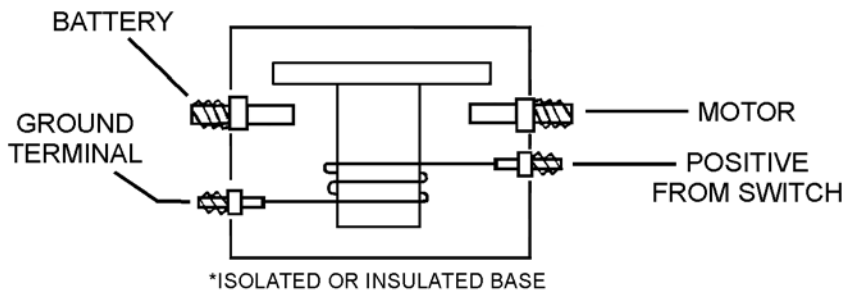
**Continuous duty solenoids** are wound with very fine wire and draw very little amperage. The contacts in continuous duty solenoids will usually have a lower amperage rating than that of the intermittent duty type. These are normally used as tilt trim relays. This type of solenoid can also be used for a variety of applications where a remote relay is needed to power a motor or other device.

**Intermittent duty solenoids** are wound with much heavier wire and draw more amperage. The contacts have a very high amperage rating. If these stay energized for extended periods of time they heat up and eventually burn out the coil inside the solenoid. This type of solenoid is normally used as a starter motor relay.



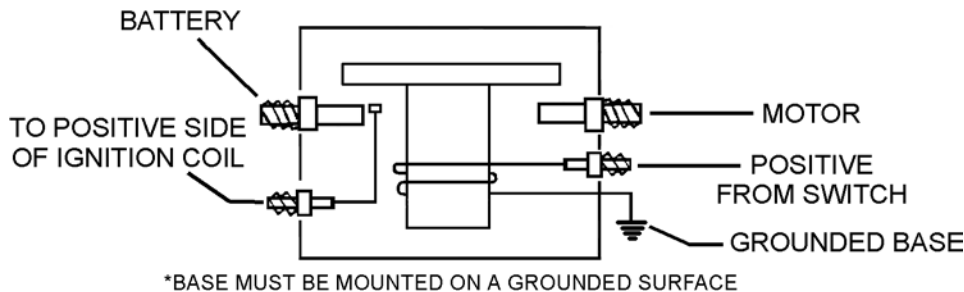
### GROUNDED BASE SOLENOIDS

One end of the coil is grounded to the mounting base. This type solenoid must mount on a grounded surface or a ground must be attached to the base.



### INSULATED BASE SOLENOIDS

Both ends of the coil in this unit are insulated. A separate ground must be connected and this type of solenoid can be mounted on any surface.



### SOLENOIDS EQUIPPED WITH RELAY TERMINAL

This type of solenoid is normally used for starting motors. Since conventional ignition coils operate on 7 volts, the relay terminal supplies 12 volts to the ignition coil during starting for easier starts. The base of this solenoid must be grounded.



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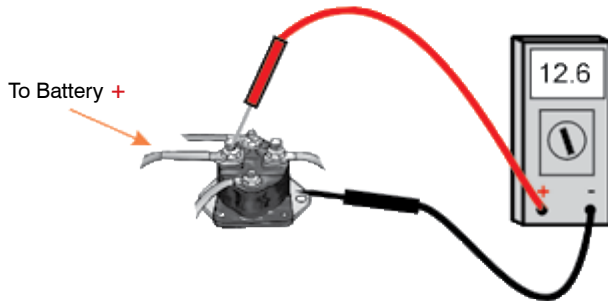
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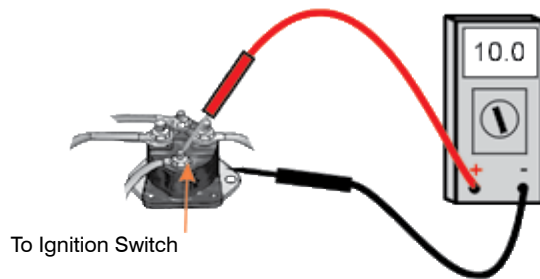
# TECH TIPS

## SIMPLE SOLENOID TESTING: GROUNDED BASE REMOTE SOLENOIDS

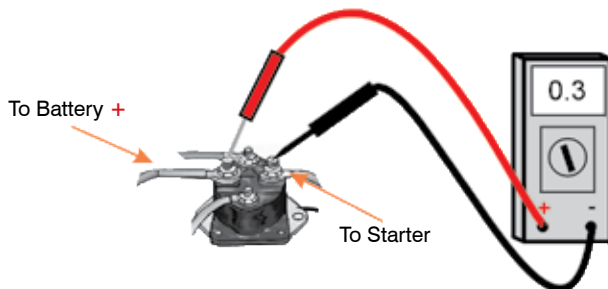
**NOTE: Before Performing These Tests You Must Fully Charge and Load Test The Battery to Verify It Is Good.**



**Step 1:** Check the voltage on the battery side of the solenoid as shown on the left. The reading should be the same as the battery reading (12.6V = Full Charged Battery).

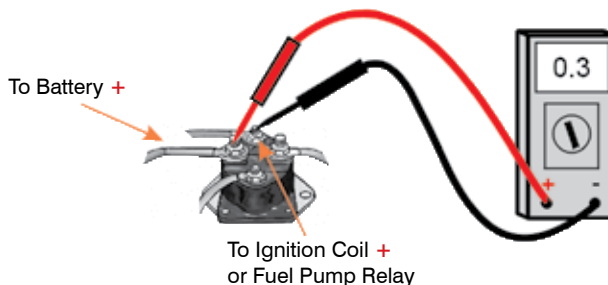


**Step 2:** With the voltmeter still connected, turn the key to the start position and read the voltage. The voltage should not drop below 10.0 volts on this terminal. If the voltage drops below 10.0 volts, The battery cable should be cleaned or replaced. If the reading is 10.0 volts or more move on to step 3.



**Step 3:** Keep the negative voltmeter lead on the metal base of the solenoid and move the positive voltmeter lead to the terminal marked "S" on the solenoid. Turn the key to the start position and read the voltage. The Voltage could read a little lower than the previous reading but should never be below 10.0 volts. If the voltage is lower than 10.0 volts, You must troubleshoot the start circuit (ignition switch, voltage supply to the ignition switch, neutral safety switch).

**Step 4:** Move the positive voltmeter lead to the battery terminal on the solenoid and the negative voltmeter lead to the terminal that the starter cable is attached. Turn the key to the start position and read the voltage. The voltage should read no more than .3 volts. If the reading is more than .3 volts the contacts have excessive resistance and the solenoid should be replaced.



**Step 5:** Some solenoids use a relay terminal on the solenoid to power fuel pumps or supply full battery voltage to ignition coils when the starter is activated. This terminal is usually marked "I" or "R". Connect the voltmeter as shown. Turn the key to the start position. You should read no more than 0.3 volts. If you have more than 0.3 volts the solenoid should be replaced.



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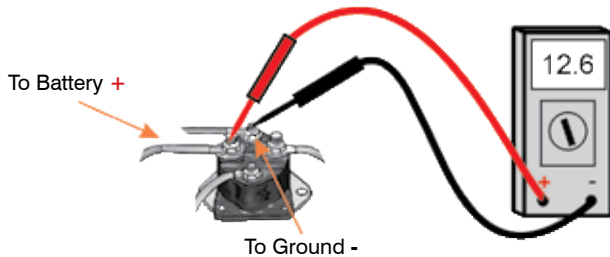
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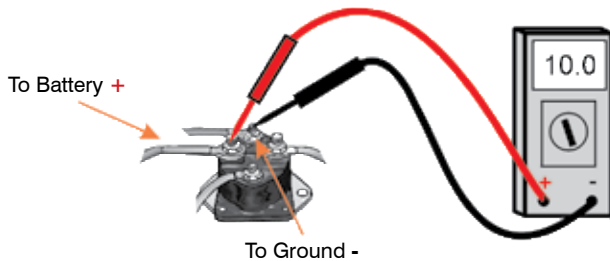
# TECH TIPS

## SIMPLE SOLENOID TESTING: INSULATED BASE REMOTE SOLENOIDS

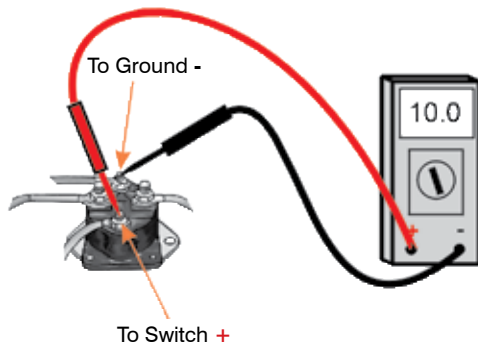
**NOTE: Before Performing These Tests You Must Fully Charge and Load Test The Battery to Verify It Is Good.**



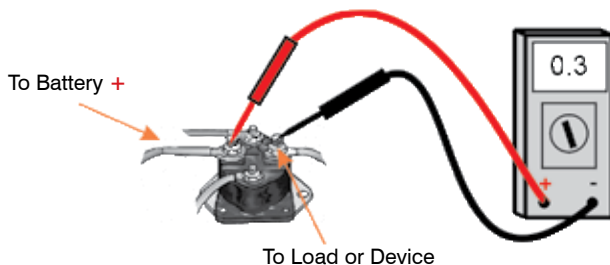
**Step 1:** Check the voltage on the battery side of the solenoid as shown on the left. The reading should be the same as the battery reading (12.6V = Full Charged Battery).



**Step 2:** With the voltmeter still connected, activate the switch and read the voltage. The voltage should not drop below 10.0 volts on this terminal. If the voltage drops below 10.0 volts, the battery cable should be cleaned or replaced. If the reading is 10.0 volts or more move on to step 3.



**Step 3:** Keep the negative voltmeter lead on the ground terminal of the solenoid and move the positive voltmeter lead to the terminal marked "S" on the solenoid. Activate the switch and read the voltage. The Voltage could read a little lower than the previous reading but should never be below 10.0 volts. If the voltage is lower than 10.0 volts, you must troubleshoot the switch circuit (toggle switch, push button switch, or voltage supply to these switches).



**Step 4:** Move the positive voltmeter lead to the battery terminal on the solenoid and the negative voltmeter lead to the terminal that the starter cable is attached. Activate the switch and read the voltage. The voltage should read no more than .3 volts. If the reading is more than .3 volts the contacts have excessive resistance and the solenoid be replaced.



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