

HOW TO TEST FOR A STARTER VOLTAGE DROP

One of the most overlooked tests when troubleshooting starting problems is a voltage drop test. Every electrical circuit is designed to operate on a certain amount of voltage. If the voltage is lower than what is required, proper operation will not take place. This is especially true with high current circuits, such as the starting system. Voltage drop is caused by excessive resistance in the circuit created by a bad cable or poor connection where cables are attached. Sometimes you can see the problem; Corroded battery terminals, for example, are usually quite evident. But often times the resistance can be caused by corrosion inside the cable, or by a loose or rusted connection. A voltage drop test will always identify the cause of the problem. It's fast and easy and requires only a DVOM.

How To Test

Before you perform a voltage drop test, make certain that your battery is fully charged and in good condition. A defective or partially discharged battery will prevent you from getting accurate readings. Most auto supply stores can test the battery for you. Use the volt meter to test the battery voltage. A fully charged 12 volt battery should read 12.6 volts. If you have had the battery on a charger, it will have a surface charge on it and read higher. Remove the surface charge by turning on the headlights for one minute, then check the battery voltage again. It should come back to 12.6 volts if it is fully charged.

Voltage drop testing can be done only when current is flowing in the circuit. This means that the starter must be cranking to test the starting circuit. The important thing to remember is that the current flowing through the circuit is near the maximum amperage required for that circuit.

The only tool you need is a digital volt meter. Most volt meters are auto-ranging, but some require you to manually select the scale. If you must manually set your voltmeter, select the range closest to 2 volts DC.

Step-by-step Starter Positive and Negative Voltage Drop Testing Procedure

Positive:

1. Verify that battery is fully charged
2. Disable ignition
3. If using an auto-ranging DVOM, set to DC voltage. If not using an auto-ranging meter, set to 2 volts DC
4. Connect the meter's positive lead to the battery positive post (Figure 1, page 2)
5. Connect the meter's negative lead to the starter's battery positive terminal (Figure 1, page 2)
6. While cranking the engine, note volt meter reading
7. If over 0.25 volts, high resistance is indicated. You can isolate where the resistance is located by moving the meter's leads closer to each other and measuring voltage drop across each part of the circuit. For instance, you can measure the battery post connection resistance by testing between the battery post and the battery cable terminal

Negative

1. Verify that battery is fully charged
2. Disable ignition
3. If using an auto-ranging DVOM, set to DC voltage. If not using an auto-ranging meter, set to 2 volts DC
4. Connect the meter's positive lead to the starter's case (Figure 2)
5. Connect the meter's negative lead to the battery negative terminal (Figure 2)
6. While cranking the engine, note volt meter reading
7. If over 0.25 volts, high resistance is indicated. You can isolate where the resistance is located by moving the meter's leads closer to each other and measuring voltage drop across each part of the circuit. For instance, you can measure the battery post connection resistance by testing between the battery post and the battery cable terminal

Figure 1 : Positive Voltage Drop Test

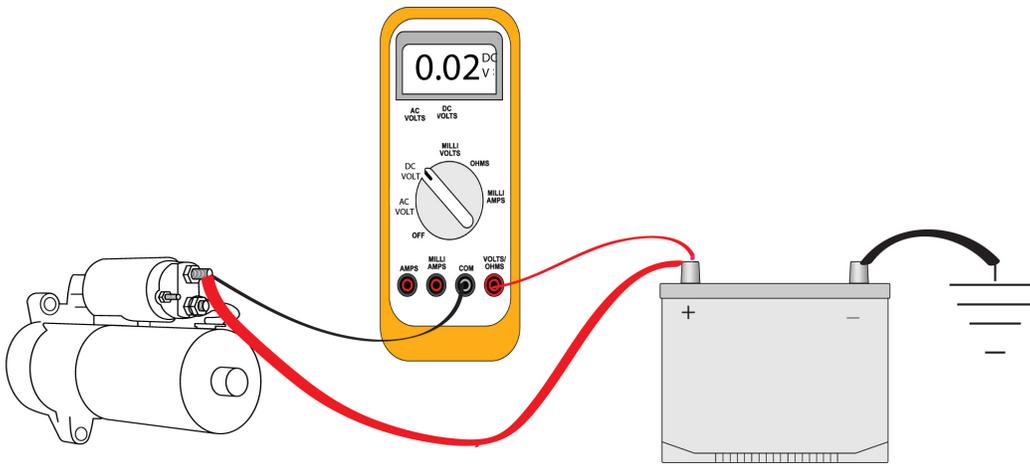


Figure 2 : Negative Voltage Drop Test

