# Electrical Circuit Load Testing

**By Dennis Shortino**

**ALLDATA Tech-Assist Team**

So, you have an electrical problem and you used your ohmmeter or your power probe to test the circuit… and everything check's out okay. Now what?

The problem may be that ohm testing and power probes are a very unreliable way to check a circuit. Why? Neither the ohmmeter nor the power probe places enough stress on the circuit to show its flaws. In fact, they only provide anywhere from 180 microamps to 12 milliamps of current through the circuit.

Imagine a partially broken multi-strand wire that has all the strands but one broken. The ohmmeter and power probe would still show the circuit has continuity, but it would be unable to carry enough current to power much of a load. In other instances, a wire may be completely broken but the ends are barely touching. An ohmmeter will show that the circuit is good, but when normal current flows, the broken ends will separate.

Another force at work is an electrical property called conductance. Conductance is the propensity of a circuit to flow current. Conductance and resistance do not necessarily correlate as you might think they would. When current flows, things change. Unwanted resistance, created by conditions such as corrosion, cause wires to become less able to carry current when the circuit is doing work. So, although a wire seems to be fine during an ohm test, it can be way out of specifications when current flows.

Here are a variety of simple testing tools you can purchase or create to test a circuit's ability to carry current and to verify that the wiring in a circuit is performing as it should. These tools will give you a little variety of different loads and ways to connect them.

- A length of 16-gauge wire outfitted with an inline fuse holder (see Image 2)
- Variety pack of bladed fuses to fit your inline fuse holder
- Jumper lead
- Simple 12v test light using an incandescent bulb – Rated @ 180 milliamps (see Image 3)
- Light bulb (1156) and two-wire connector (see Image 4)
- Sealed-beam headlamp and two-wire connector (see Image 5)

**How to Use**

To perform a loaded circuit test, using the testing tools mentioned above:

1. Choose a lamp that would stress but not overload the circuit.

   **NOTE:** Test the brightness of your test lamp first to establish the lamp's intensity when connected directly to the battery. To do this, connect the inline-fused side of your test lamp wire to the vehicle's battery positive (+) terminal. Connect the other side of the test lamp's wire directly to the battery negative (-) terminal.

2. Isolate or disconnect the wiring you want to test so the wires are no longer connected to the harness or the component(s).
3. To perform the test, connect the inline-fused side of your test lamp (bulb) lead to the battery positive (+) terminal or good known power source. Connect the other test lamp lead to one end of the vehicle's wiring harness connector you want to test (PIN10, Image 1).

4. Connect a jumper wire from the other end of the harness wire (PIN 5, Image 1) you're testing to the negative (-) battery terminal or good known ground.
5. If the lamp shines as bright as it did when connected directly to battery, the wire is good. If it doesn't illuminate or is dim, the vehicle's wire is defective.
6. To add another dimension and accuracy to the test; especially if you have a hard time judging lamp brightness, you can measure the voltage drop across the lamp to see if the voltage is the same as when it was connected directly to the battery.

**Helpful Tip:** You can use your test lamps in other ways, like testing an HO2S heater power supply. Disconnect the O2S and connect a lamp across the harness connector's heater positive and negative pins. Start the engine and the light should light up or blink. If the light does not turn on with engine running the circuit is ether open or has a bad relay. If the light is on or blinks before engine is started the circuit is shorted.

## IMAGES
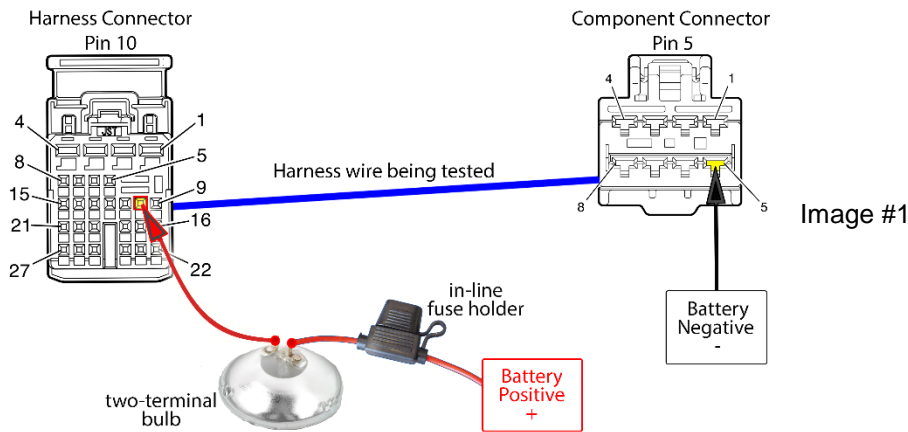


Image #1

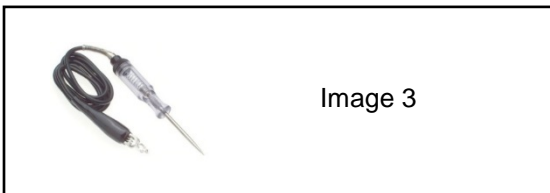**Load Test Circuit Diagram**

## Tools



Image 2



Image 3



Image 4



Image 5