the CONTINUITY TEST

using a Volt meter or test light

Test Light
A 12 Volt type may be dim on 6 Volts or may not light up at all.

Incandescent type cannot indicate polarity.
LED type indicates polarity.
Neither type measures Voltage.
Incandescent does vary light output according to Voltage.
Incandescent draws enough milliAmps to indicate current flow.

DC Volt Meter
Indicates Voltage & Polarity
Does not indicate current flow

Resistance test: See page 13
CONTINUITY TEST:
establishes electrical path
main benefit: quick

Let's test a light circuit. The parts:

6 Volt Lead Acid Battery
6 Volt Light Bulb & Socket
10 Amp Glass Fuse
16 Gauge Wire

the Tools:

Test Light
DC Volt Meter

Continuity Test vs. Resistance Test
>> Test Light vs. Multimeter <<
Measuring Volts and Resistance

How-To by Jon Pardue

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CONTINUITY TEST:
establishes electrical path
main benefit: quick

Calibrate your tools: verify function

Test Light

6.31
Volt Meter
DC Volts
6 Volt
Lead Acid Battery

DC Volt Meter

6.31
Volt Meter
DC Volts
6 Volt
Lead Acid Battery
CONTINUITY TEST:
establishes electrical path
main benefit: quick

Problem circuit: bulb NOT functioning

The battery is good: we just tested it.
Our testers are good, we just tested them.

Using a quick continuity test,
we can most likely establish where the problem is.
CONTINUITY TEST:
establishes electrical path
main benefit: quick

Red/White wire: continuity

This tells us
the Red/White wire has continuity.

Must be some other problem.

If the Red/White wire was open,
the test light would be dark.
CONTINUITY TEST:
establishes electrical path
main benefit: quick

Red/White wire: continuity
Fuse: continuity

This is two tests in one!
This tells us the FUSE
and
the Red/White wire have continuity

>> Must be some other problem.

If the fuse OR the Red/White wire was defective,
the test light would be dark.
CONTINUITY TEST:

Red wire: continuity
Red/White wire: continuity
Fuse: continuity

This is three tests in one!
This tells us the FUSE
and the Red/White
and the Red wire have continuity

>> Must be some other problem.

If the fuse OR the Red/White wire
OR the Red wire was defective,
the test light would be dark.

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CONTINUITY TEST:

Green wire: continuity

This tells us the Green ground wire has continuity to the battery - terminal.

>> Must be some other problem.

If the Green wire had no connection to the battery - terminal, the test light would be dark.
CONTINUITY TEST:
Light bulb and socket: NO continuity
assuming Green and Red tested good

FUSE
REMOVED

UH OH... this tells us the bulb or socket has no continuity to the battery - terminal.

>> We are close to finding the problem.

Since the test light is dark, either the bulb or the socket has a problem.
CONTINUITY TEST:

Socket ground: continuity

This tells us the socket ground has continuity to the battery terminal, through the Green wire.

>> Must be some other problem.

If the socket had no continuity to the Green wire, or the Green wire had no continuity to the battery, the test light would be dark.
Continuity Test vs. Resistance Test

>> Test Light vs. Multimeter <<

Measuring Volts and Resistance

How-To by Jon Pardue

CONTINUITY TEST:

Socket power: continuity

This tells us the socket power terminal has continuity to the battery + terminal, through the Red, fuse, and Red/White.

>> Must be the BULB.

If the socket power terminal had no continuity to the Red wire, or the Red wire had no continuity to the fuse, or the fuse was blown, or the Red/White lacked continuity to the battery + terminal, the test light would be dark.

6.31
Volt Meter
DC Volts

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CONTINUITY TEST:

Bulb test: continuity

This tells us the bulb has no continuity.

We can see the resistance at the bulb base and socket ground connection is INFINITY.

Bulb filament is OPEN.

Replace bulb.
Continuity Test vs. Resistance Test

>> Test Light vs. Multimeter <<

Measuring Volts and Resistance

How-To by Jon Pardue

the RESISTANCE TEST

using an Ohm meter

some meters display infinity as this symbol ∞

some meters display a 1 in the far left column

Ohm Meter

Self-powered by the internal meter battery

Sends low Voltage through circuit under test

Indicates resistance to flow of electricity

More difficult to interpret results
the RESISTANCE TEST
using an Ohm meter

Let's test a light circuit. The parts:

- 6 Volt Lead Acid Battery
- 6 Volt Light Bulb & Socket
- 10 Amp Glass Fuse
- 16 Gauge Wire

the Tool:

- Ohm Meter
the RESISTANCE TEST

using an Ohm meter

Calibrate your Ohm meter

Short circuit the Ohm meter probes.

Meter indicates the resistance of the probes and test lead wire.

Here we see 1.84 Ohms of resistance.

The probes and test leads display continuity, or what is electrically a short circuit.
the RESISTANCE TEST
using an Ohm meter

Problem circuit: bulb NOT functioning

Use a VOLTAGE test to insure the battery is charged.
In the previous exercise, it tested good:

DO NOT TOUCH THE
OHM METER PROBES TO THE BATTERY TERMINALS.
You will FRY the meter circuits.

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the RESISTANCE TEST
using an Ohm meter

Remove Battery →

BATTERY
6 Volts

Red/White wire: continuity

This tells us
the Red/White wire has continuity
to the fuseholder.

We can see the resistance of the
Red/White is .04 Ohm
because the meter leads
measured 1.84 Ohm.

1.84 + .04 = 188 Ohms

Must be some other problem.

If the Red/White wire was open,
the meter would display INFINITY (open circuit)
the RESISTANCE TEST

using an Ohm meter

Fuse/fuseholder: continuity

This tells us the Red/White wire has continuity to the fuseholder, and the fuseholder has continuity to the Red/White, and the fuse is good.

We can see the resistance of the Red/White + fuseholder + fuse is 1.27 Ohms because the meter leads measured 1.84 Ohms.

1.84 + 1.27 = 3.11 Ohms

Must be some other problem.

If the fuse was open, the meter would display INFINITY (open circuit)
the RESISTANCE TEST

using an Ohm meter

Red: continuity

This tells us
the Red wire has
continuity to the fuseholder.

We can see the resistance of the
Red wire is 0.5 Ohm
because the meter leads
measured 1.84 Ohms.
1.84 + 0.5 = 2.34 Ohms

Must be some other problem.

If the Red was open,
the meter would display INFINITY (open circuit)
the RESISTANCE TEST
using an Ohm meter

Socket power: continuity

This tells us the Red wire has continuity to the socket.

We can see the resistance at the socket power connection is 3.5 Ohms because the meter leads measured 1.84 Ohms.

\[ 1.84 + 3.5 = 5.35 \text{ Ohms} \]

That 18 Ohms of resistance might not prevent the bulb from illuminating but it sure could make it dim. Better plan to service the Green wire/socket connection.

If the fuse was open, the meter would display INFINITY (open circuit)

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HTTP://WWW.PARDUEBROTHERS.COM
the RESISTANCE TEST

using an Ohm meter

Green: continuity

This tells us the Green wire has continuity to the socket.

We can see the resistance of the Green wire is 18 Ohms because the meter leads measured 1.84 Ohms.

\[ 1.84 + 18 = 19.84 \text{ Ohms} \]

That 18 Ohms of resistance might not prevent the bulb from illuminating but it sure could make it dim. 

*Better plan to service the Green wire/socket connection.*

If the fuse was open, the meter would display INFINITY (open circuit)
**the RESISTANCE TEST**

*using an Ohm meter*

Green: Socket ground high resistance

A continuity test will not precisely reveal this problem. If you are really good with your test lamp or meter, you will see a dim lamp or slight Voltage drop.

This blob of factory solder has corroded, and is now resisting the flow of electrons to the Green wire. The last test showed it has an 18 Ohm resistance. This can cause a dim lamp. Desolder, clean and resolder, or replace the assembly.

If the fuse was open, the meter would display INFINITY (open circuit)
Continuity Test vs. Resistance Test
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the RESISTANCE TEST
using an Ohm meter

Bulb: NO continuity

This tells us the bulb has no continuity.

We can see the resistance at the bulb base and socket ground connection is INFINITY.

Bulb filament is OPEN.

>> Replace BULB

If the fuse was open, the meter would display INFINITY (open circuit)