



PURKEYS

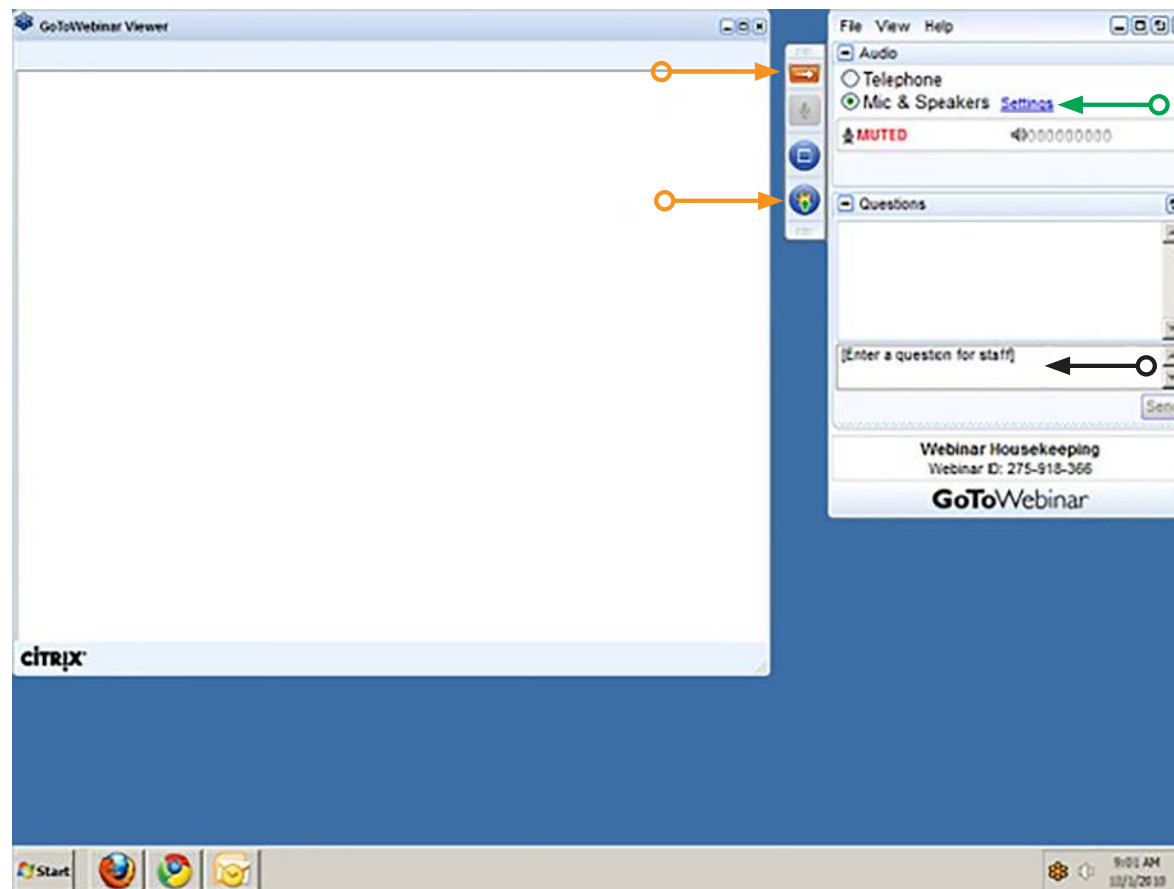
Multimeter Training And Tips

WATT Keeps You Trucking

House Cleaning

REMINDER:

This Webinar is being Recorded
Please Turn Off Cell Phones



About the Presenter



Larry Rambeaux | National Truck & Fleet Sales Representative

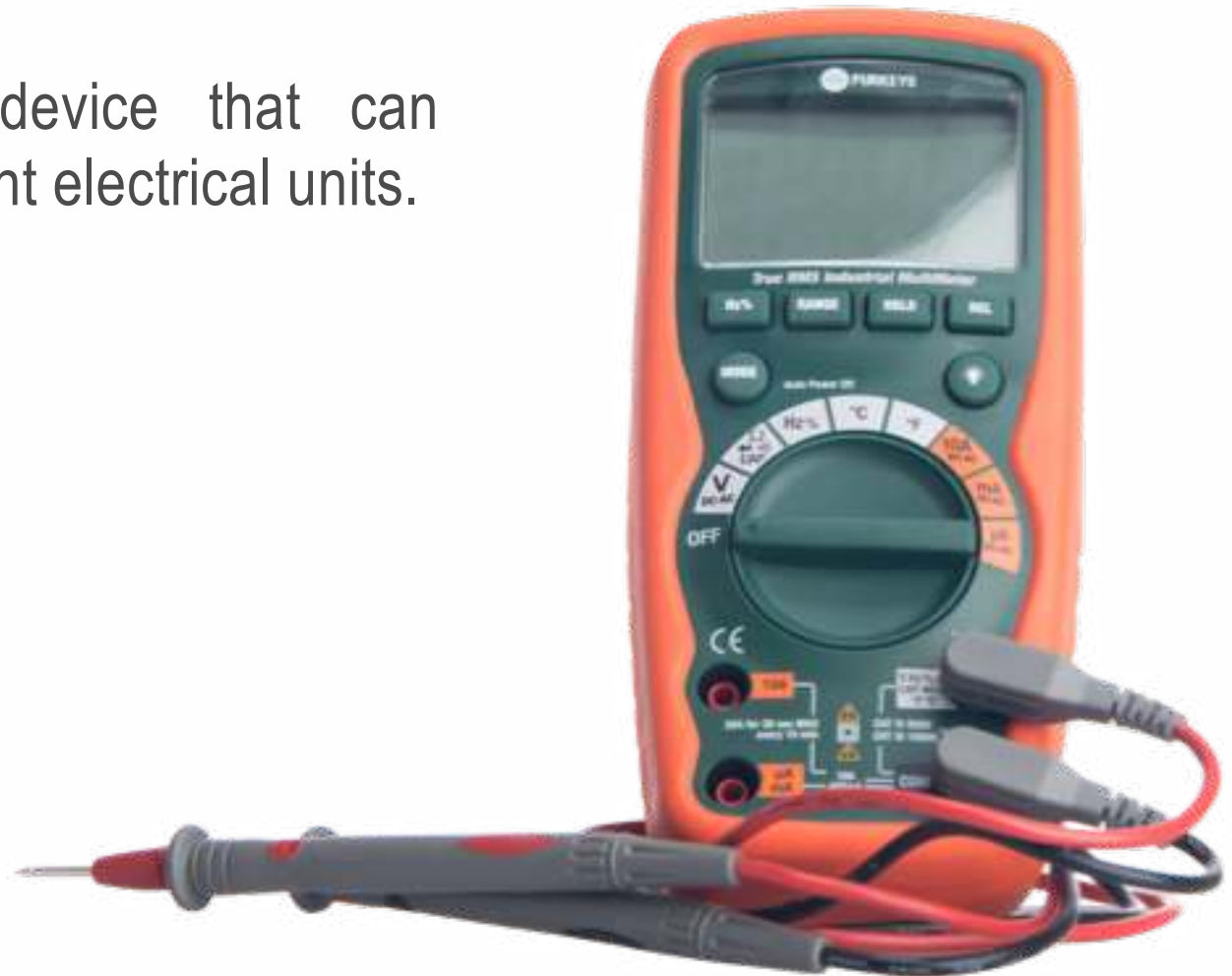
Larry has over 20 years' experience working with heavy duty fleets. He is an outstanding trainer and uses his extensive experience to help his customers make the best choices for their electrical needs.

He has been awarded the prestigious Recognized Associate Award from the Technology & Maintenance Council. Larry's knowledge of electrical systems enables him to help his customers identify and remedy a fleets' electrical issues.

1-800-219-1269
lrambeaux@purkeys.net

What is a Multimeter?

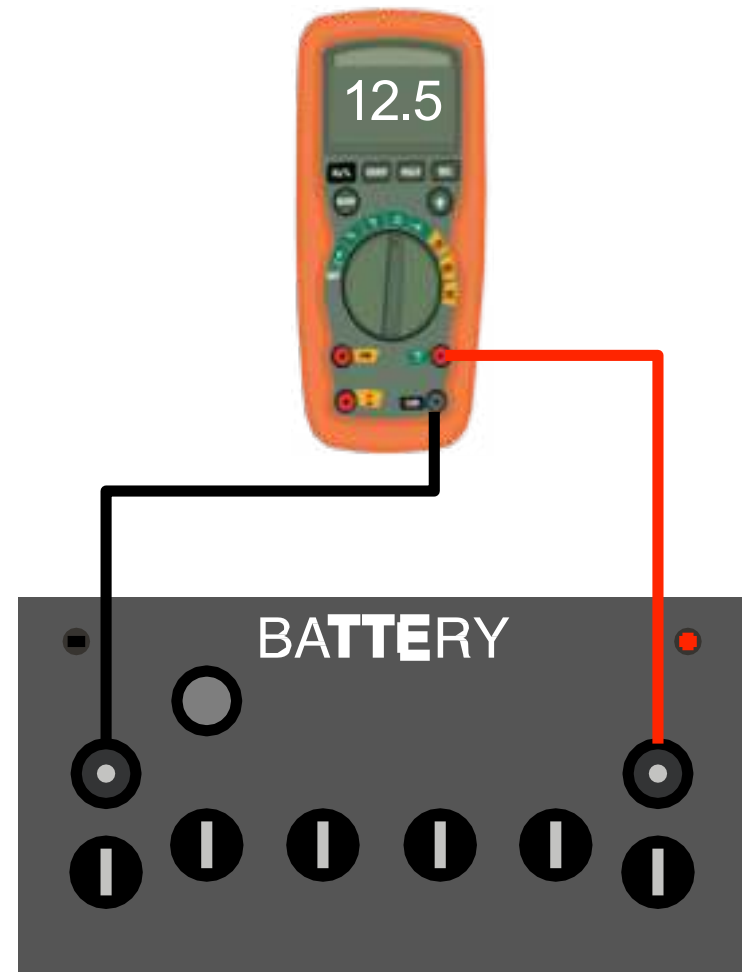
A Multimeter is a device that can measure many different electrical units.



What a Voltmeter Does

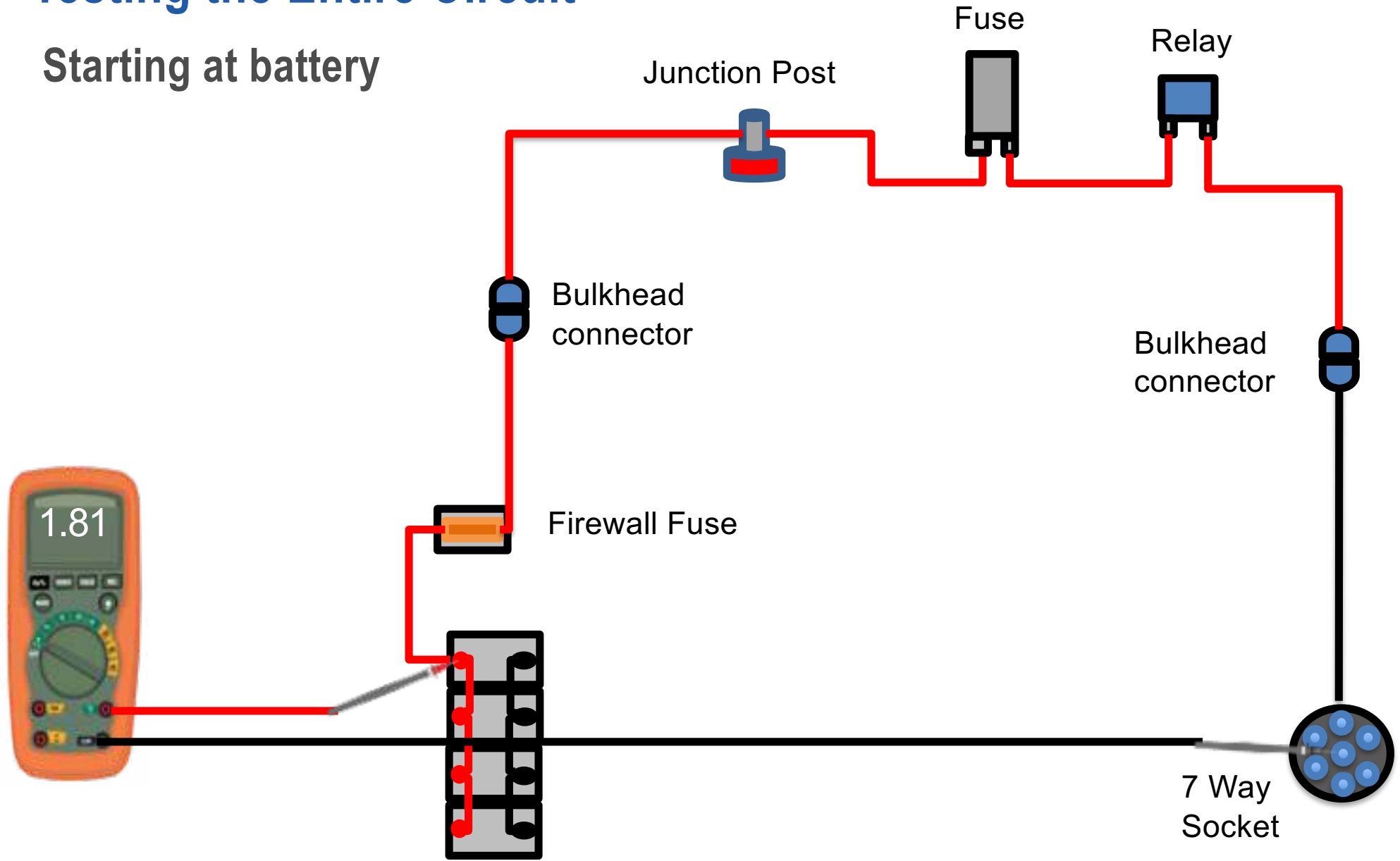
The voltmeter reads the voltage difference between 2 points.

- Red Lead = 12.5
- Black Lead = 0
- **Equals: 12.5**



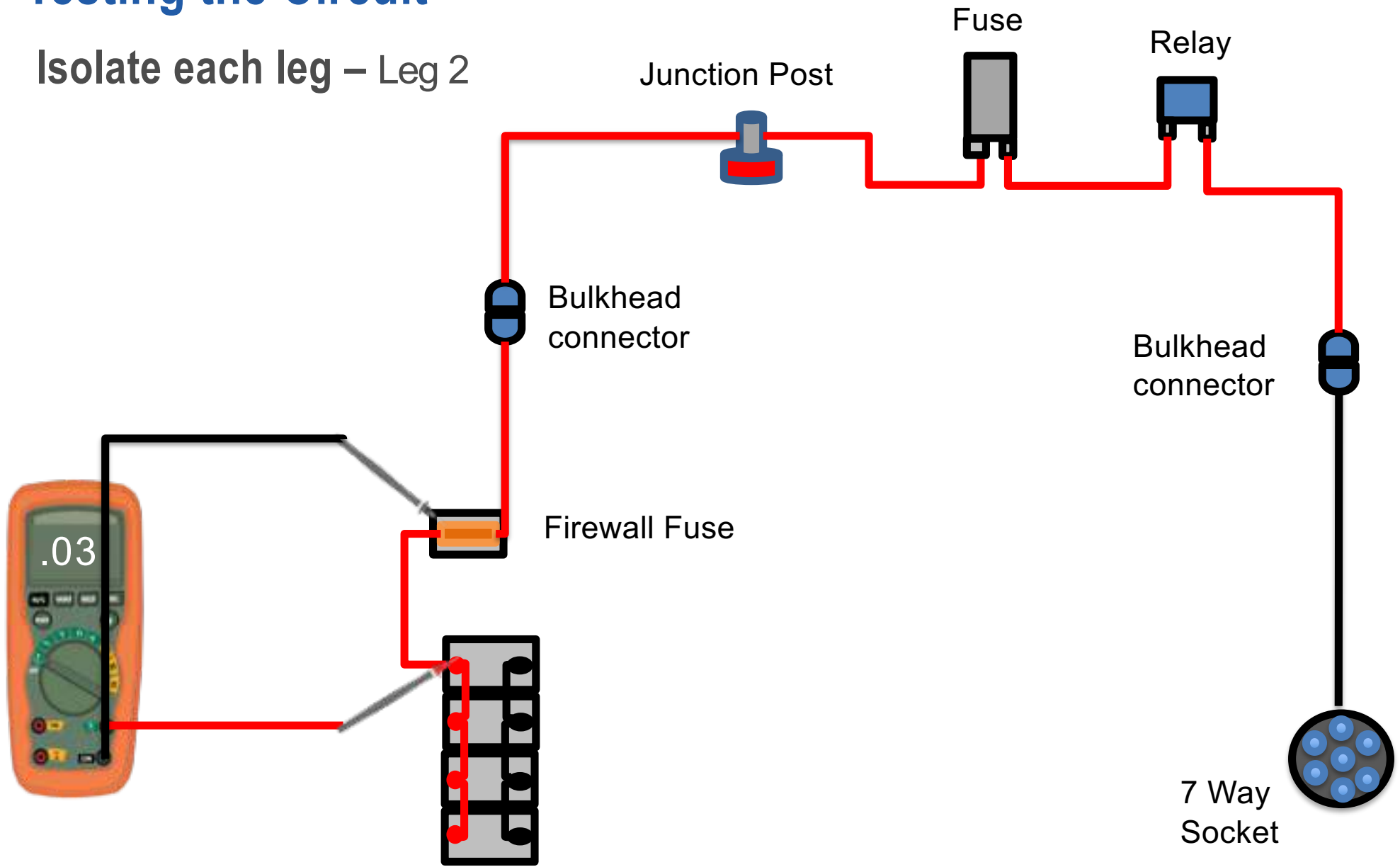
Testing the Entire Circuit

Starting at battery



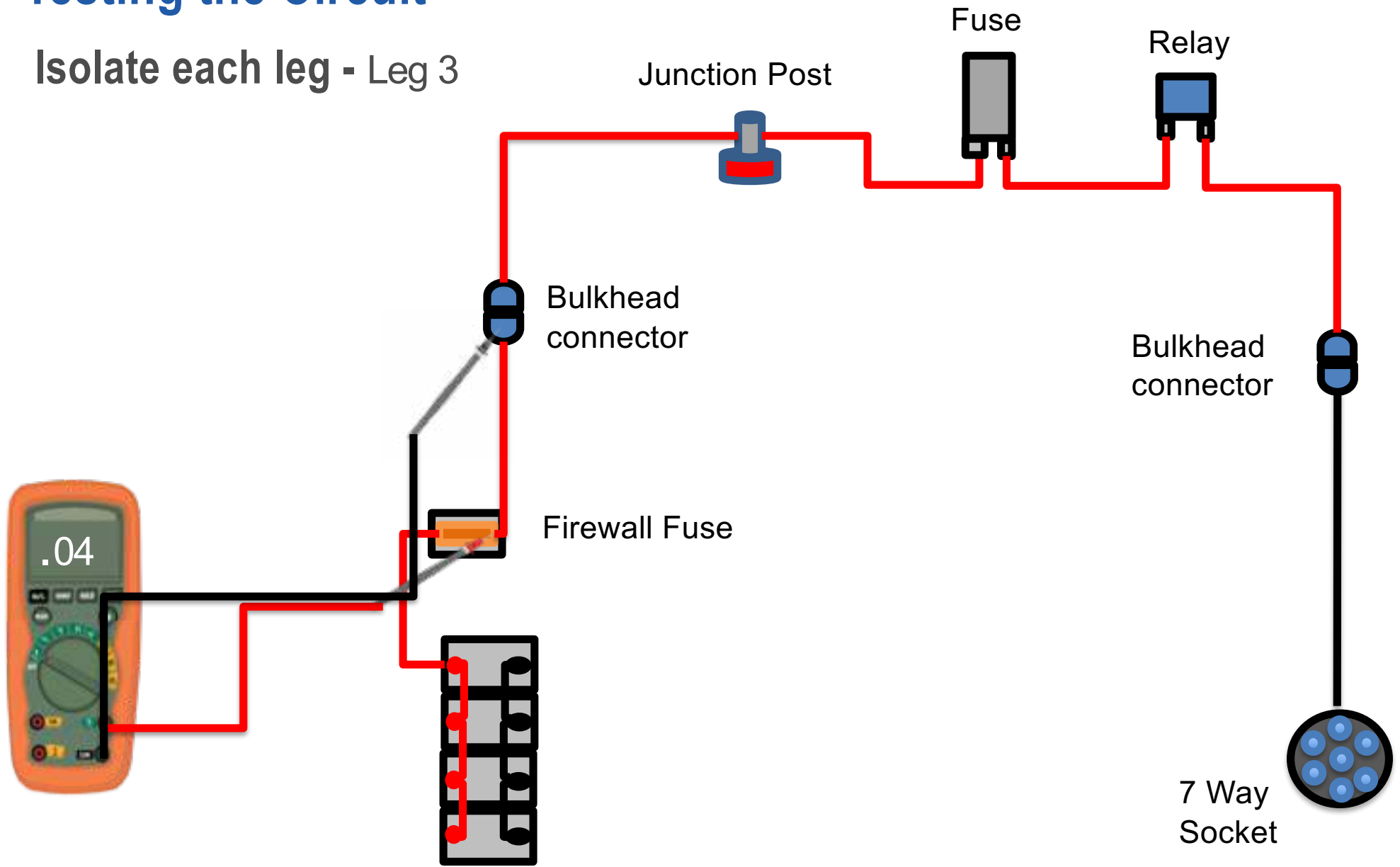
Testing the Circuit

Isolate each leg – Leg 2



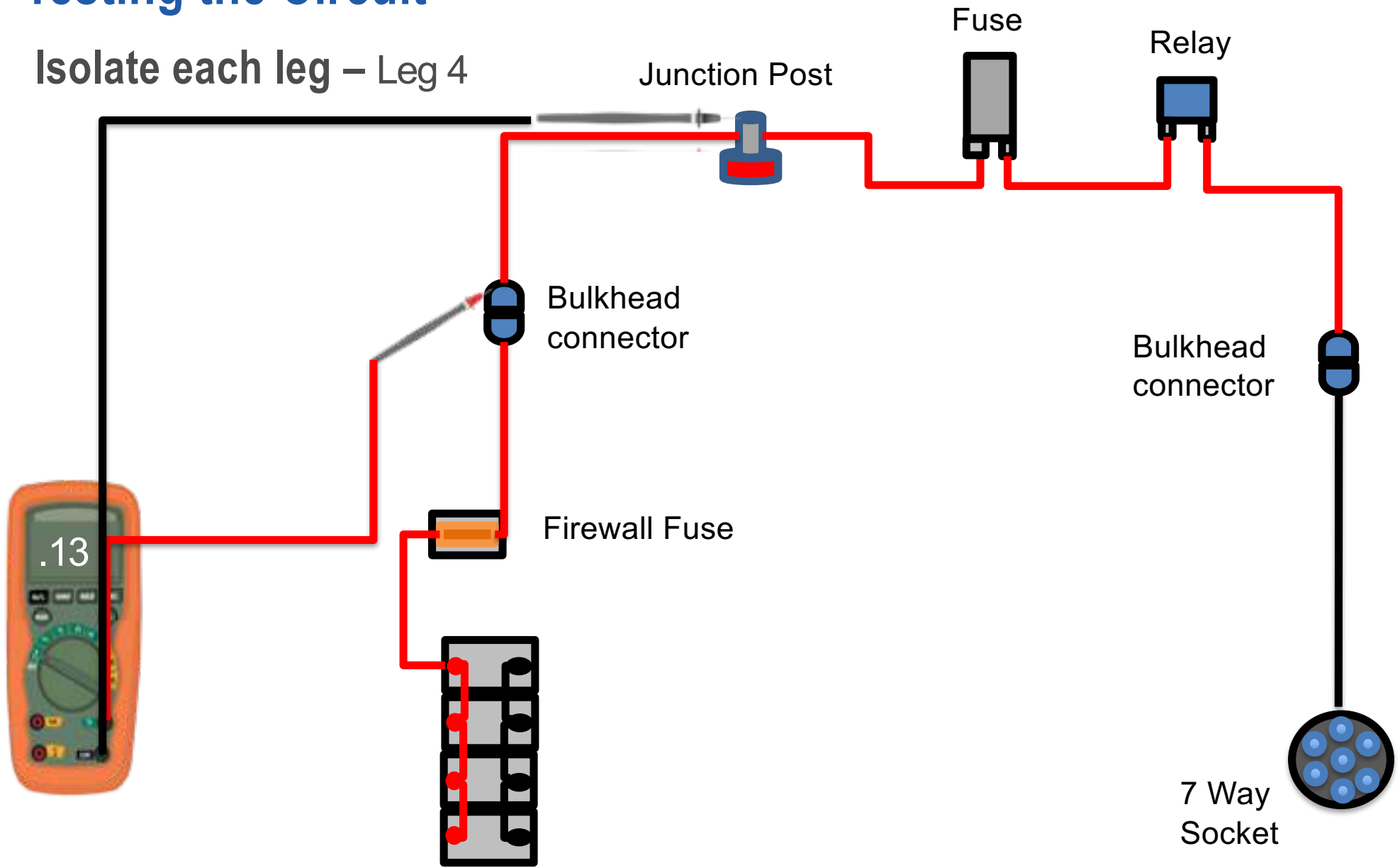
Testing the Circuit

Isolate each leg - Leg 3



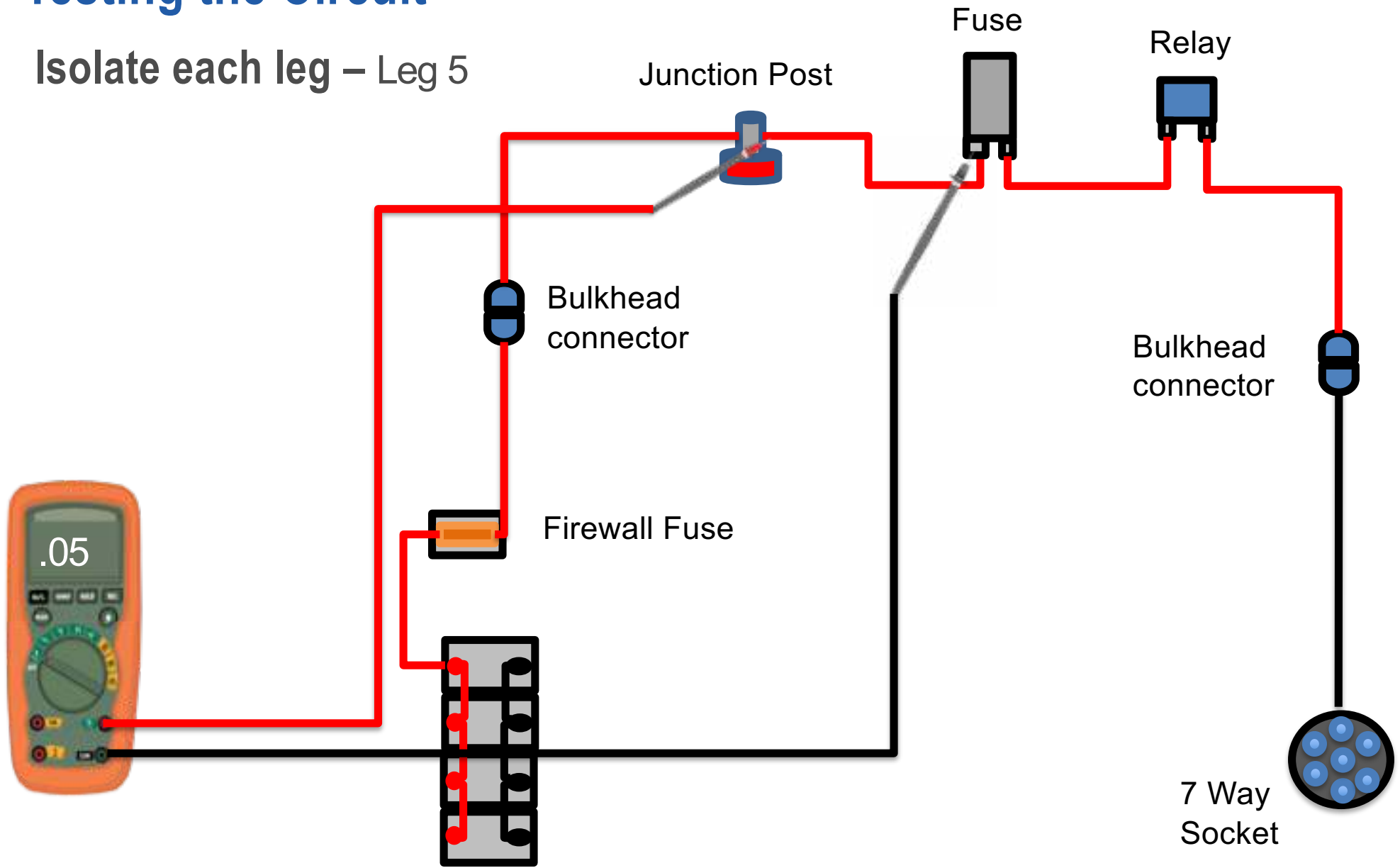
Testing the Circuit

Isolate each leg – Leg 4



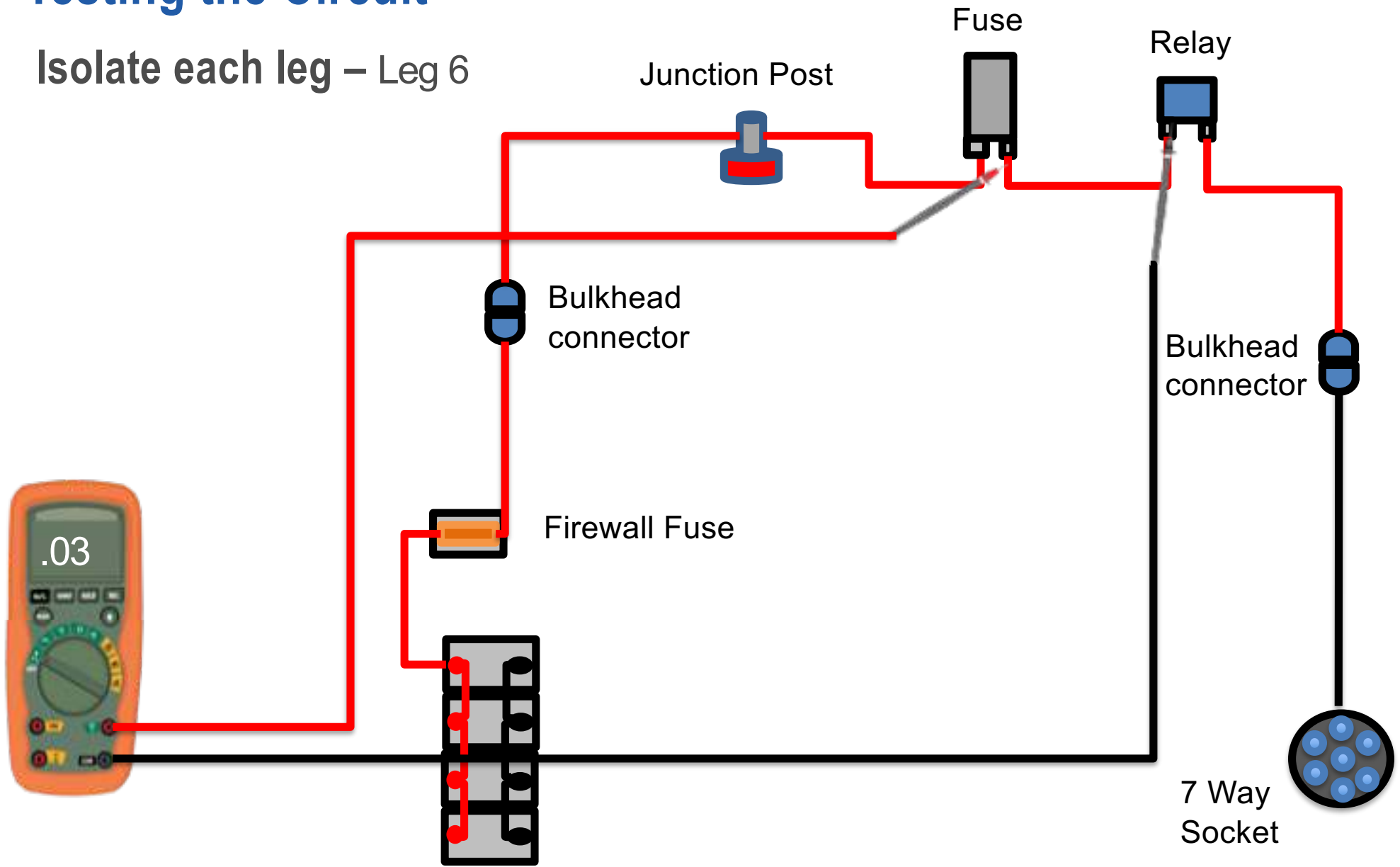
Testing the Circuit

Isolate each leg – Leg 5



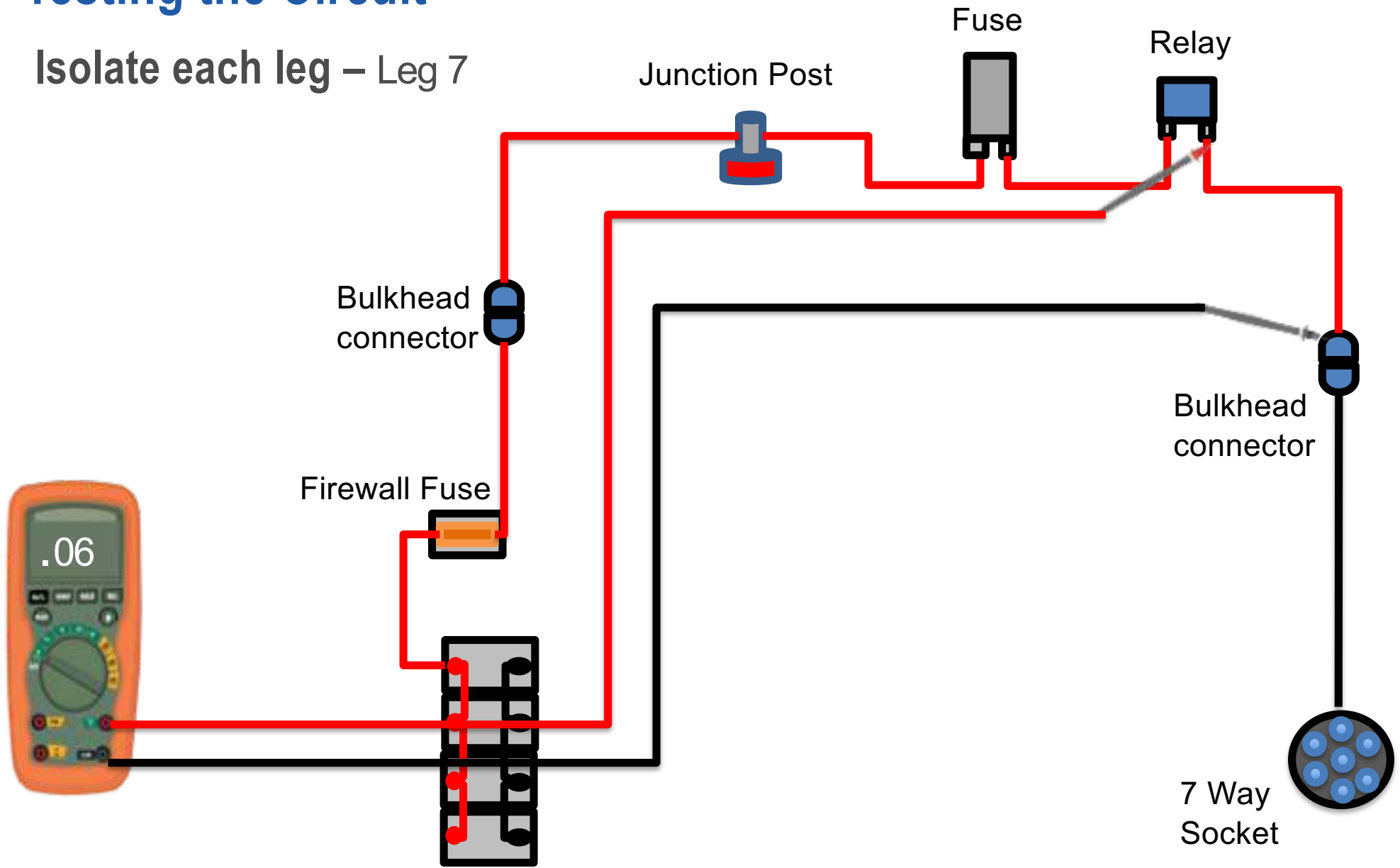
Testing the Circuit

Isolate each leg – Leg 6



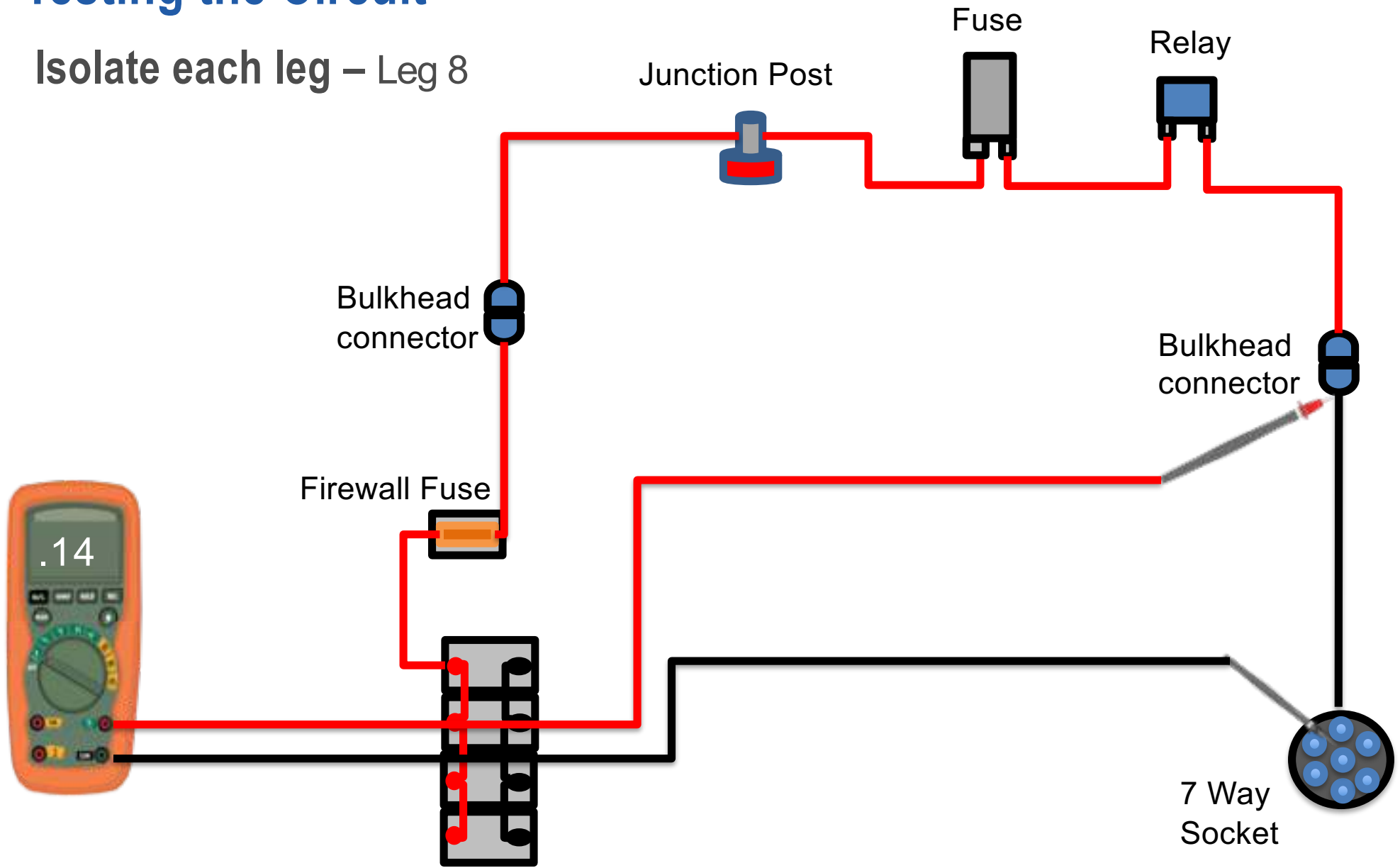
Testing the Circuit

Isolate each leg – Leg 7



Testing the Circuit

Isolate each leg – Leg 8



Summary of drops

Leg 1	1.81
Leg 2	.03
Leg 3	.04
Leg 4	.13
Leg 5	.05
Leg 6	.03
Leg 7	.06
Leg 8	.14
Total drop= 2.29 volts	

Ohmmeter

Only Measures Resistance

Ohmmeter

Good

30 Amp Relay, Checking Coil Resistance

$$\frac{V}{R} = I$$

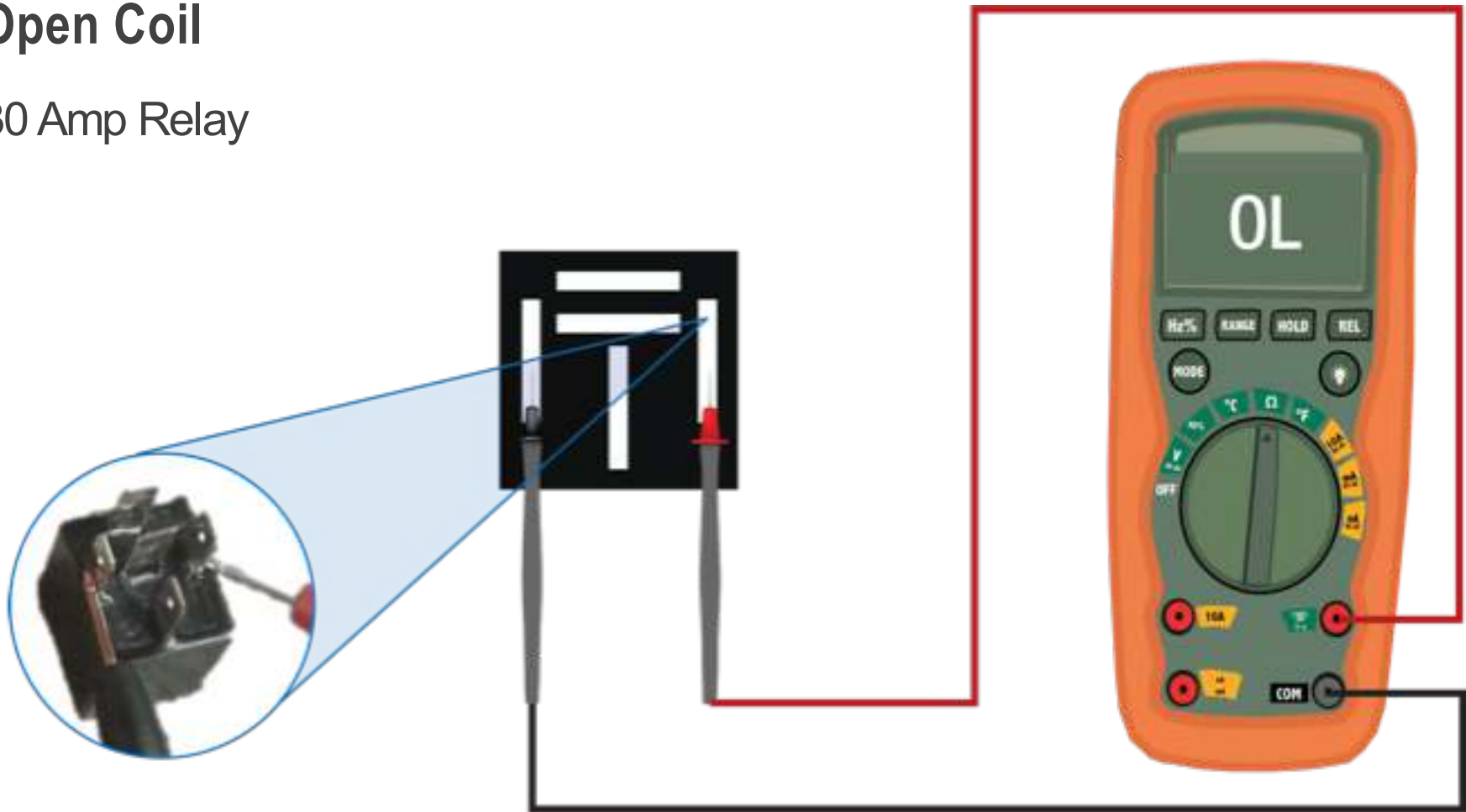
$$\frac{12.5}{102} = .12$$



Ohmmeter

Open Coil

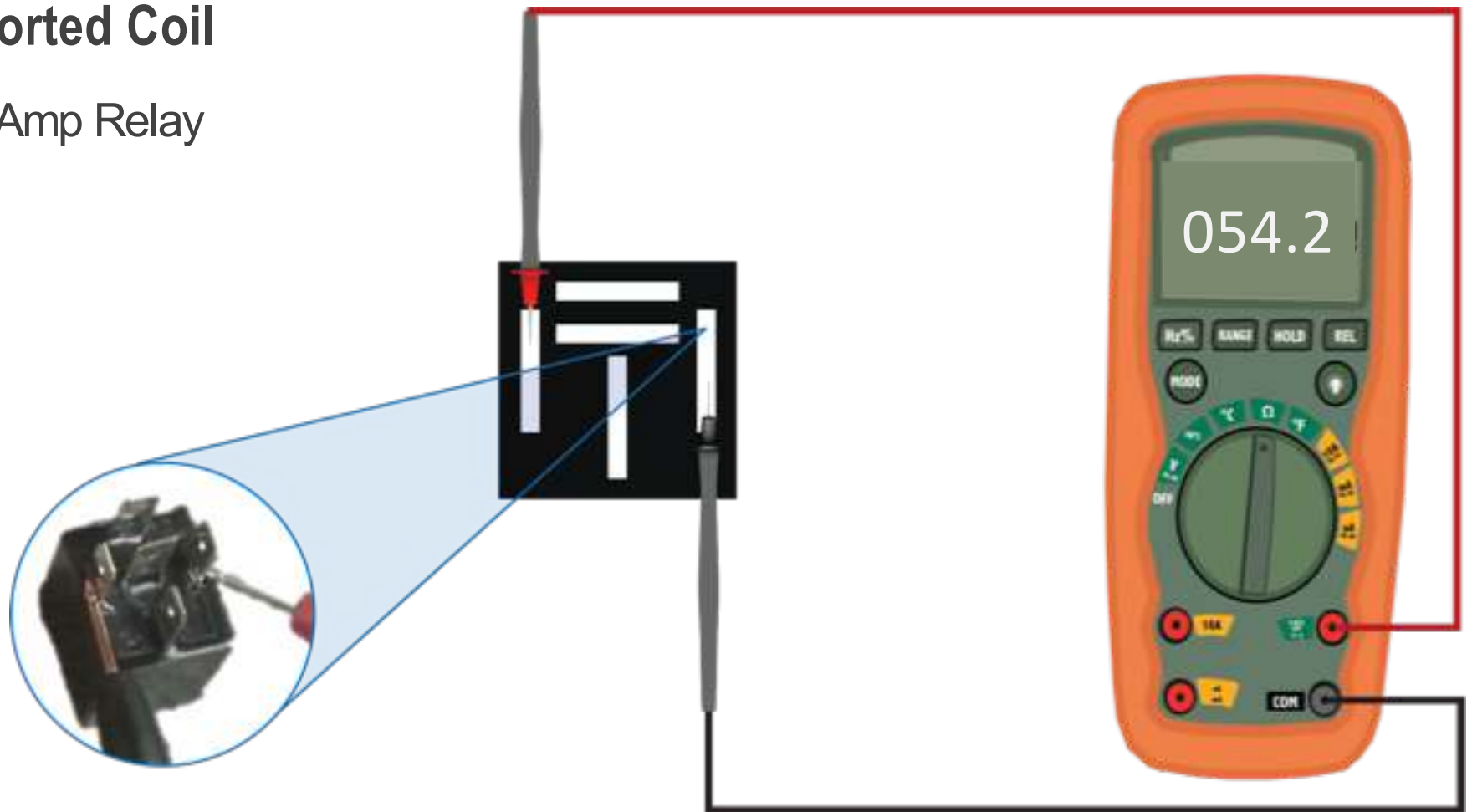
30 Amp Relay



Ohmmeter

Shorted Coil

30 Amp Relay



Ohmmeter

Good

30 Amp Relay

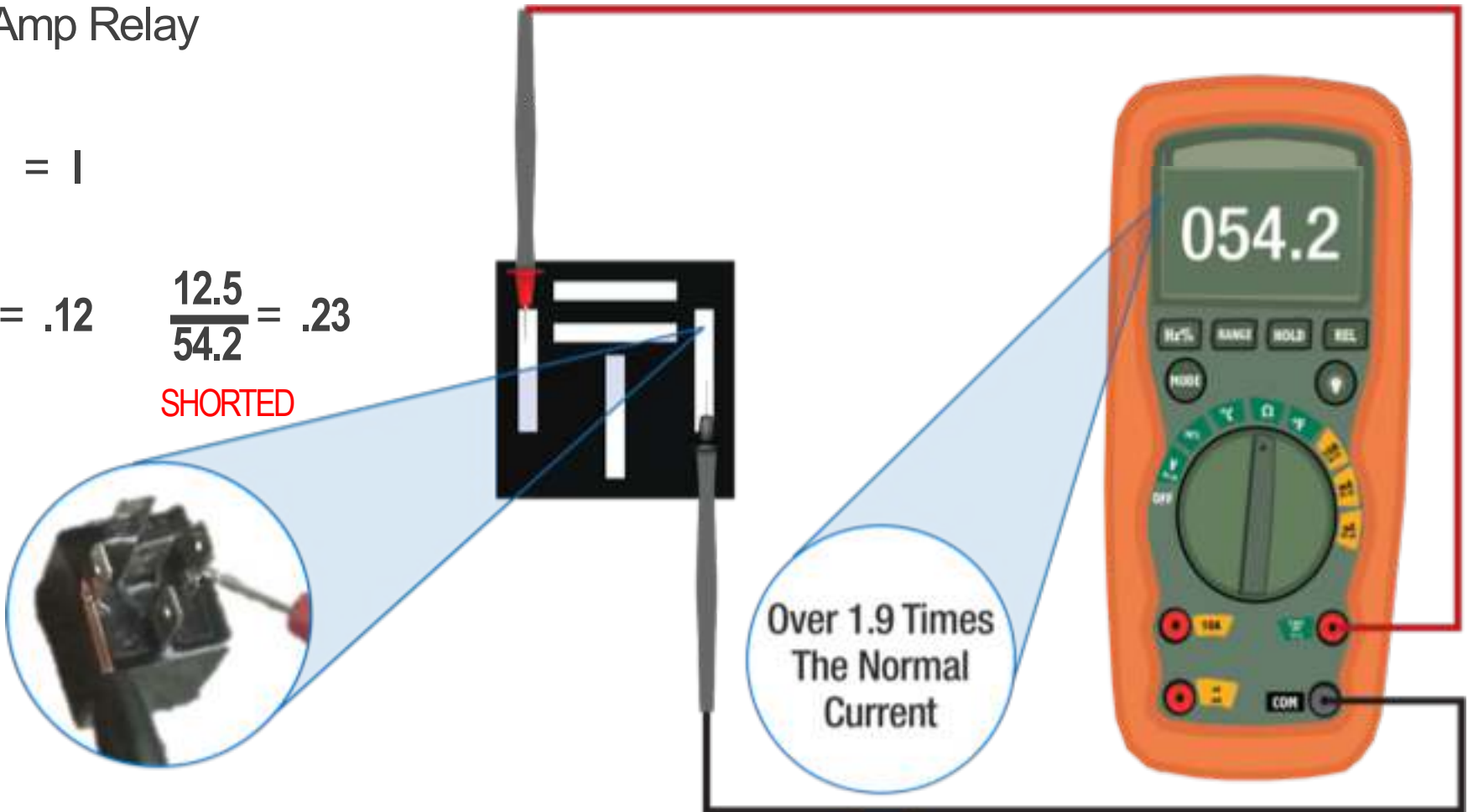
$$\frac{V}{R} = I$$

$$\frac{12.5}{102} = .12$$

GOOD

$$\frac{12.5}{54.2} = .23$$

SHORTED

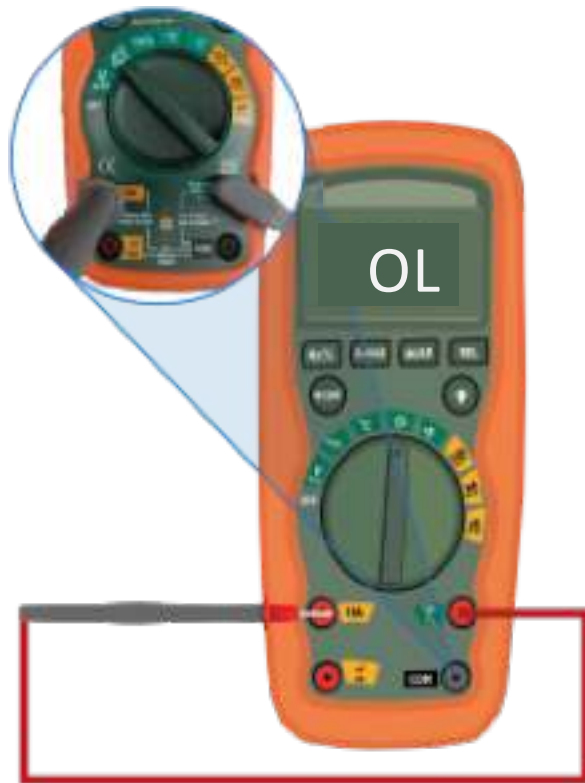


Ammeter

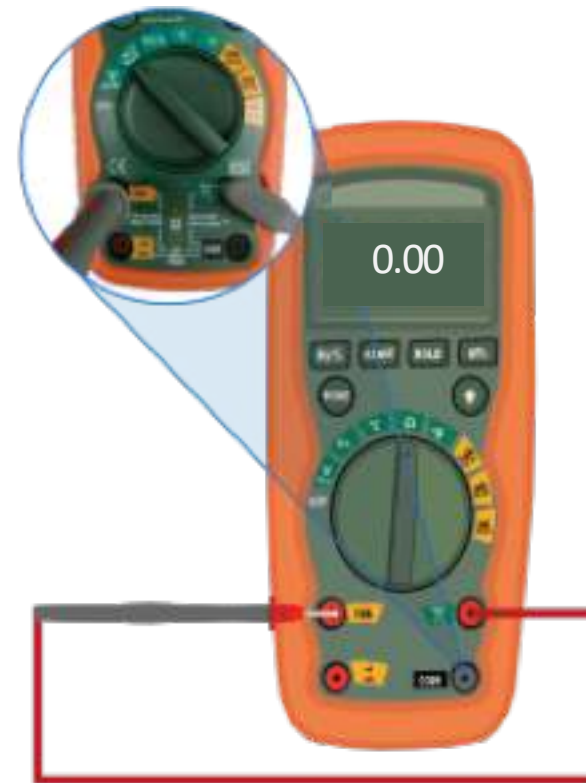
Ammeter Only Measures Current Flow

Pre-Check Multimeters

Test Fuses (10 amp)



✗ DEFECTIVE



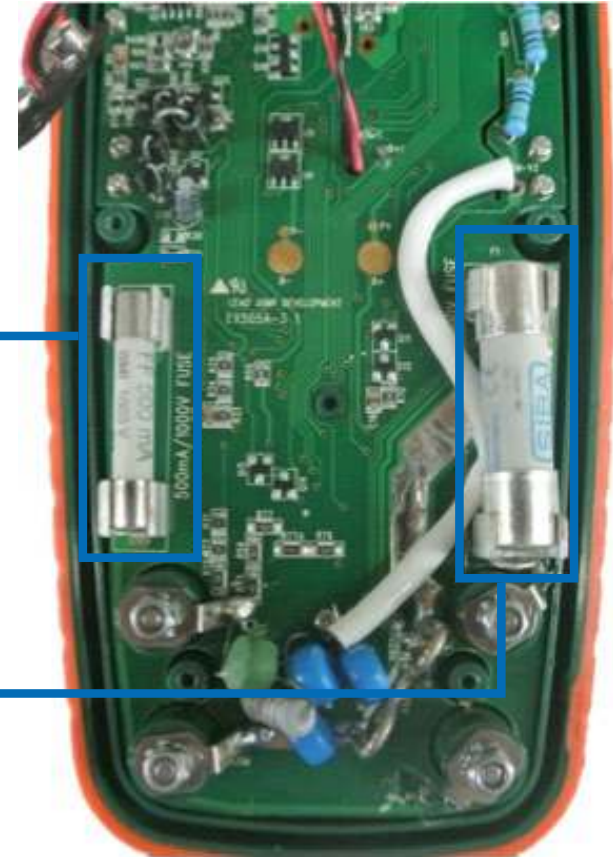
✓ CORRECT

Pre-Check Multimeters

Replacing Fuses

.400 mA Fuse

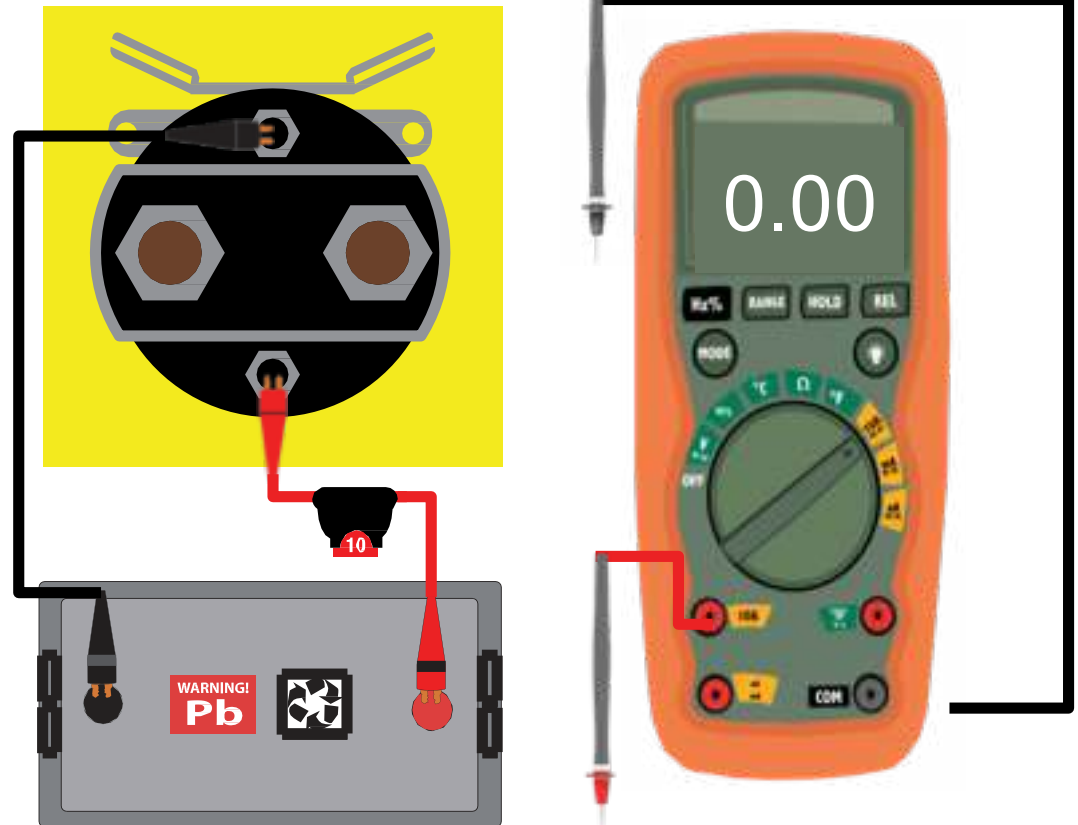
10A Fuse



Solenoid Coil Testing, Measuring Amperage

Current checks should be performed with all power connected.

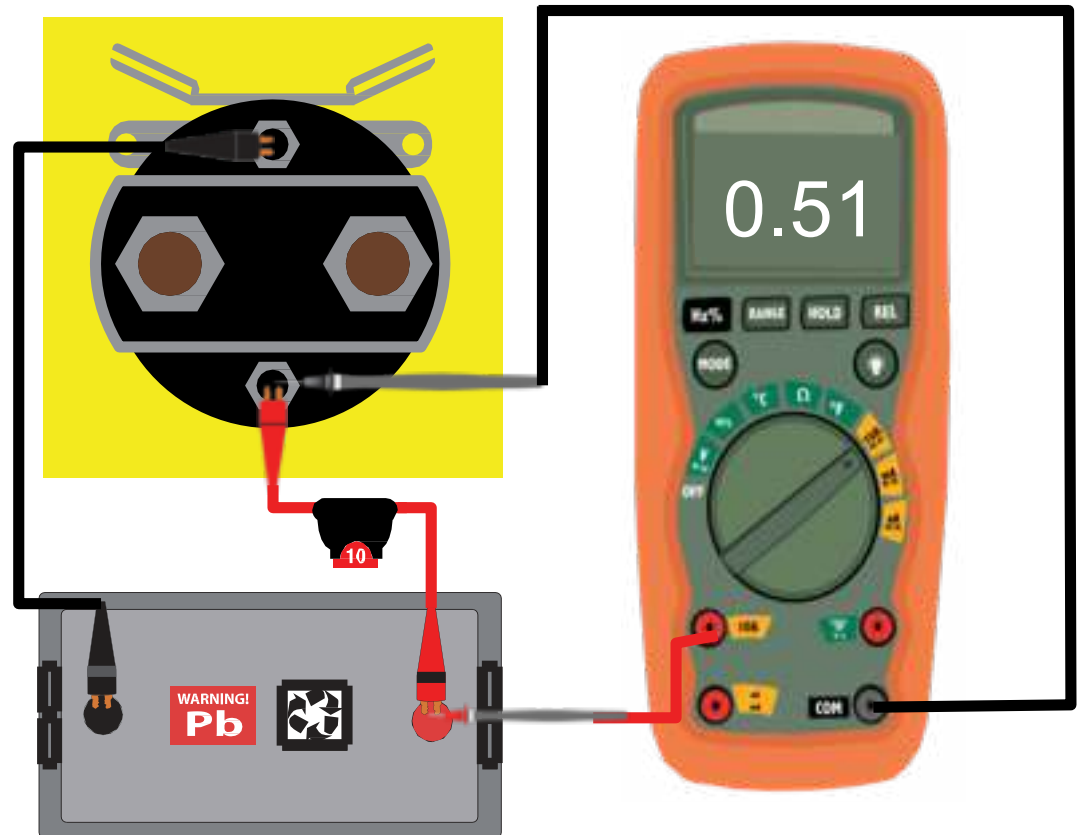
Before using your meter, use a fuse holder with a 10 amp fuse (or whatever your meter is rated at) installed inline to make sure the coil is not defective and pulling excessive current, if the fuse blows DO NOT use your meter as the high current will blow your meters internal fuse.



Solenoid Coil Testing, Measuring Amperage

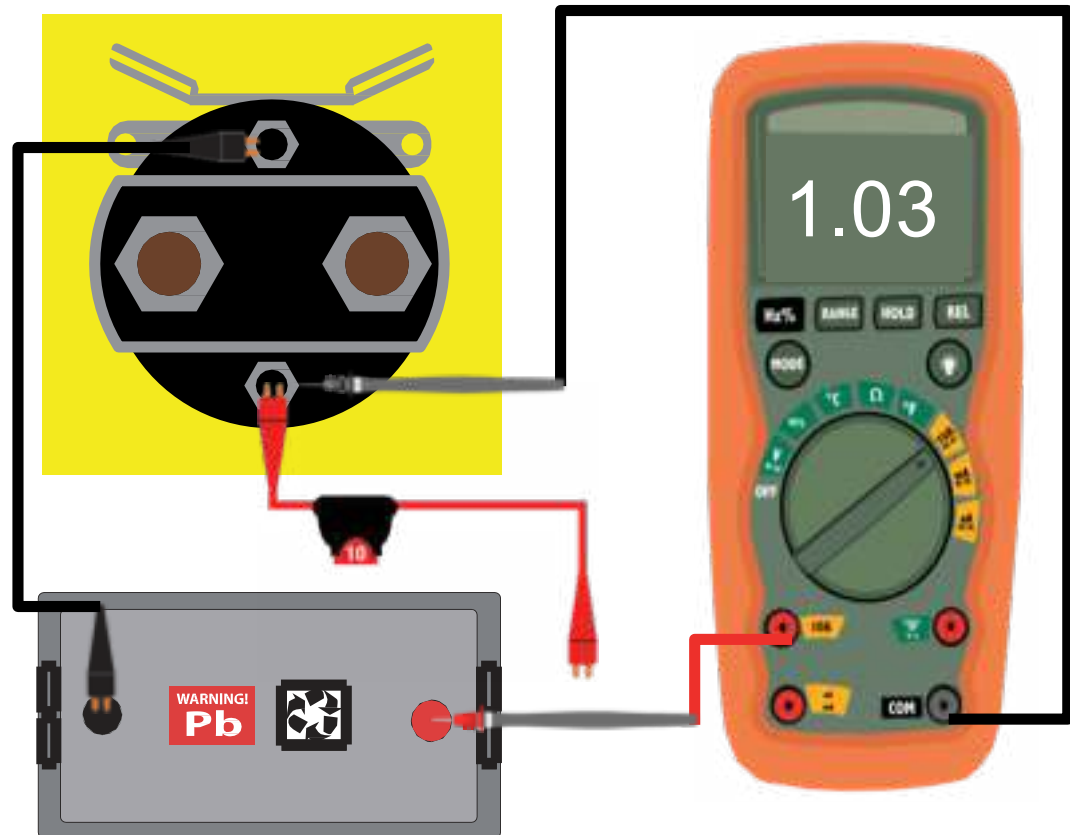
Current checks should be performed with all power connected

Before using your meter, use a fuse holder with a 10 amp fuse (or whatever your meter is rated at) installed inline to make sure the coil is not defective and pulling excessive current, if the fuse blows DO NOT use your meter as the high current will blow your meters internal fuse.



Solenoid Coil Testing, Measuring Amperage

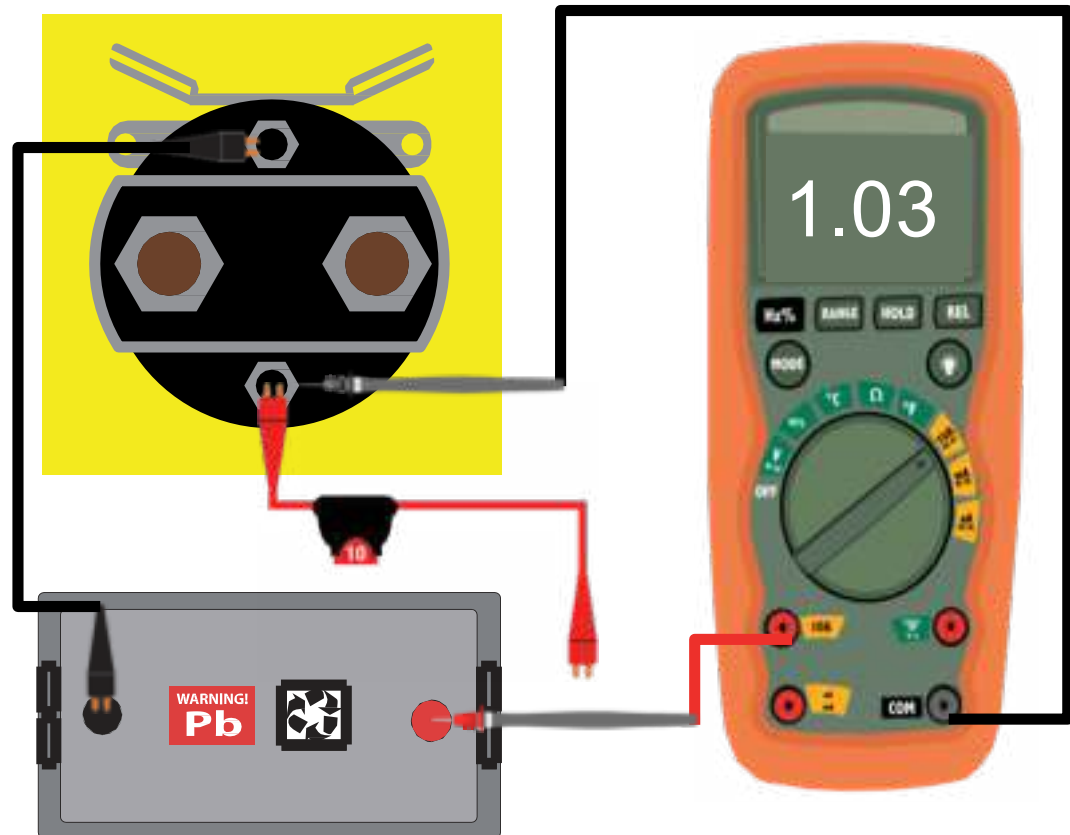
Range .98 to 1.08 Amps.



Solenoid Coil Testing, Measuring Amperage

$$\frac{V}{I} = R$$

$$\frac{12.5}{1.03} = 12.13$$



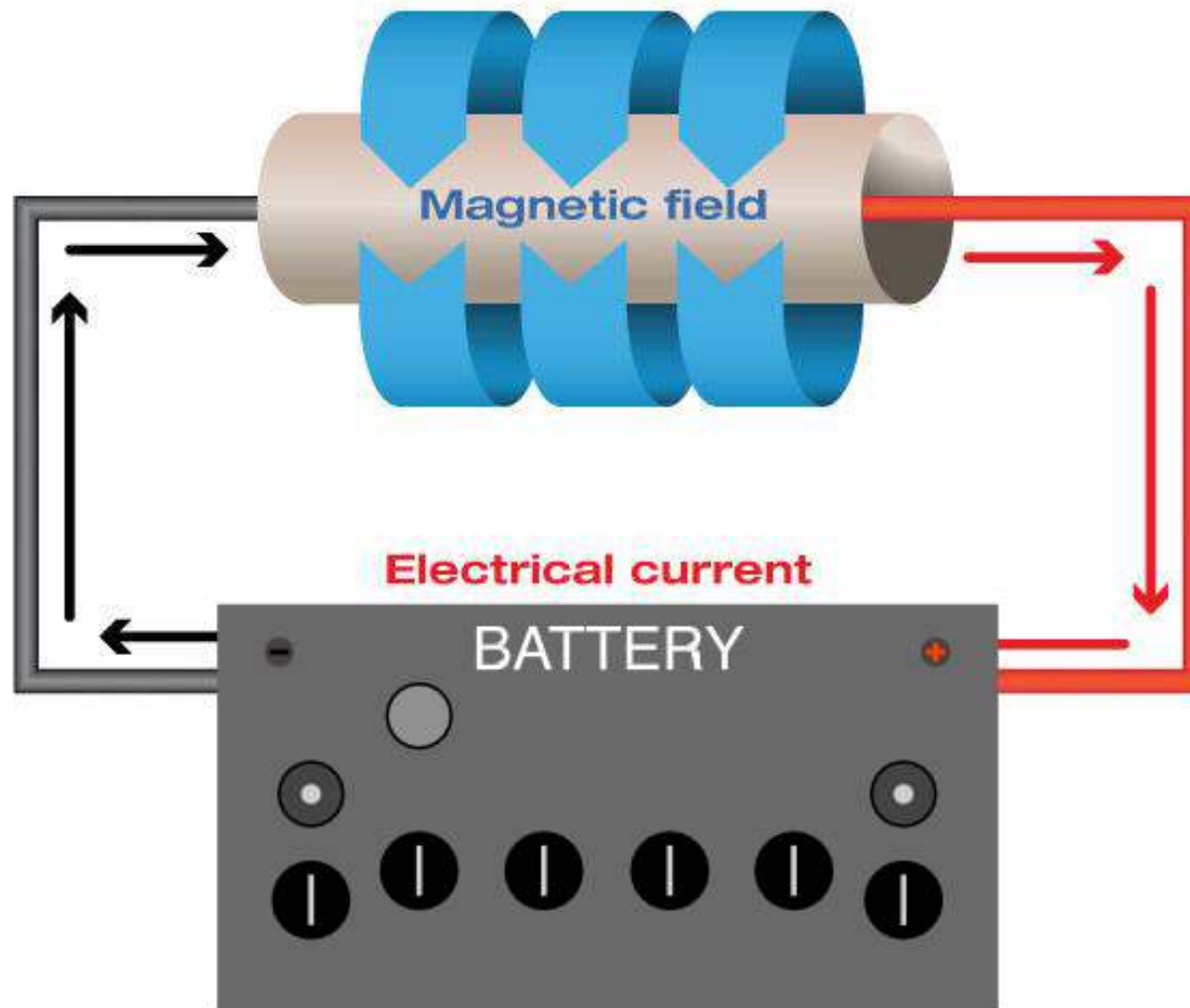
Clip-On Ammeter



Clip Around Wire/Cable Being Measured

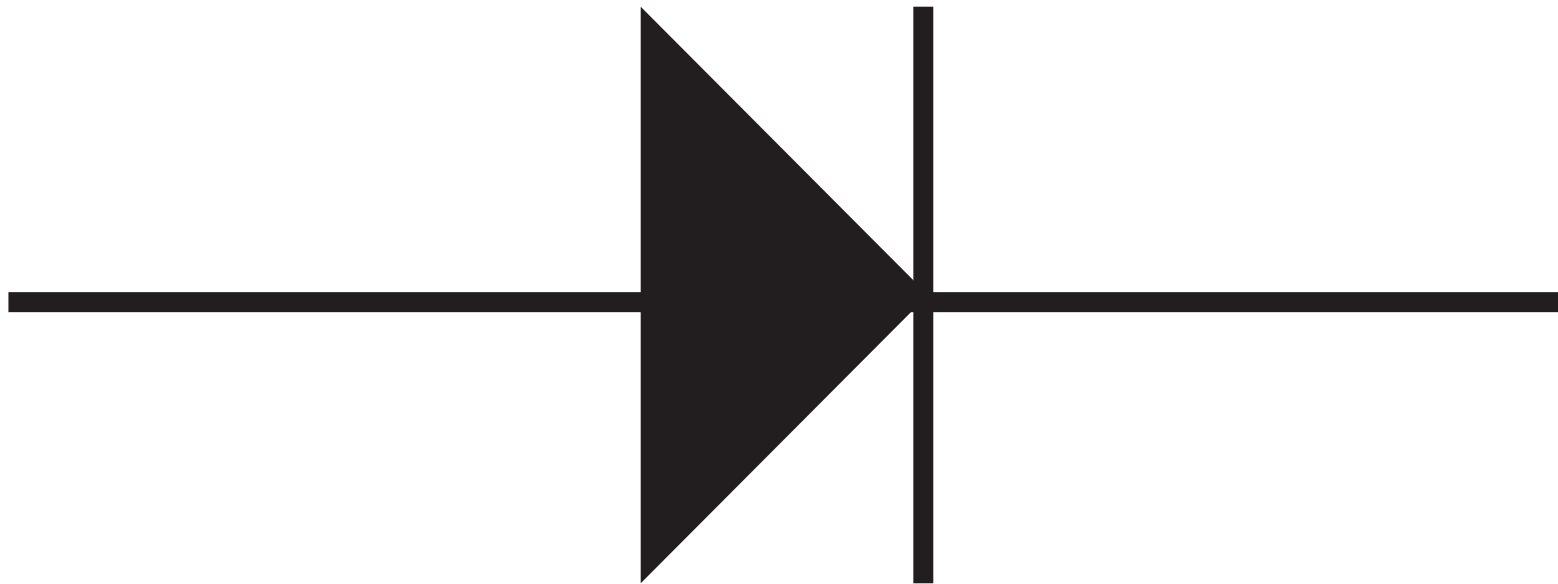
- Jaws Must Close Completely
- Must Zero Out Each Time
- Observe Arrow to Direction of Current Flow

Magnetic Flux



Diode Check

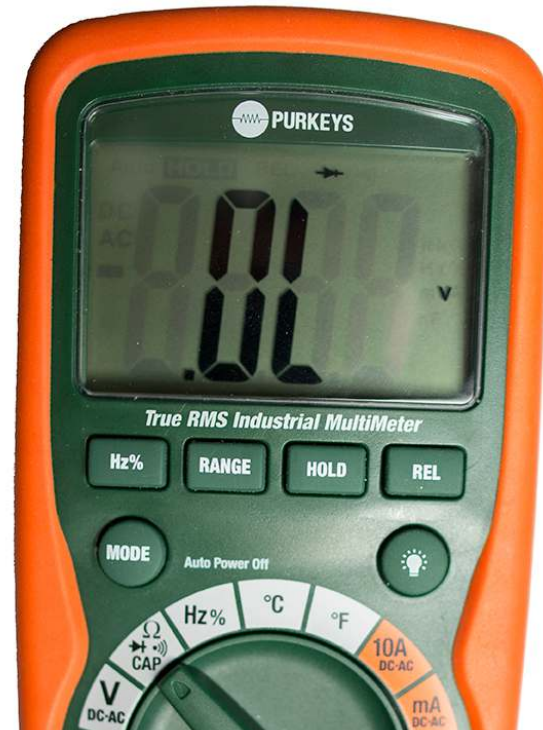
Electrical One-Way Check Value



Diode Testing

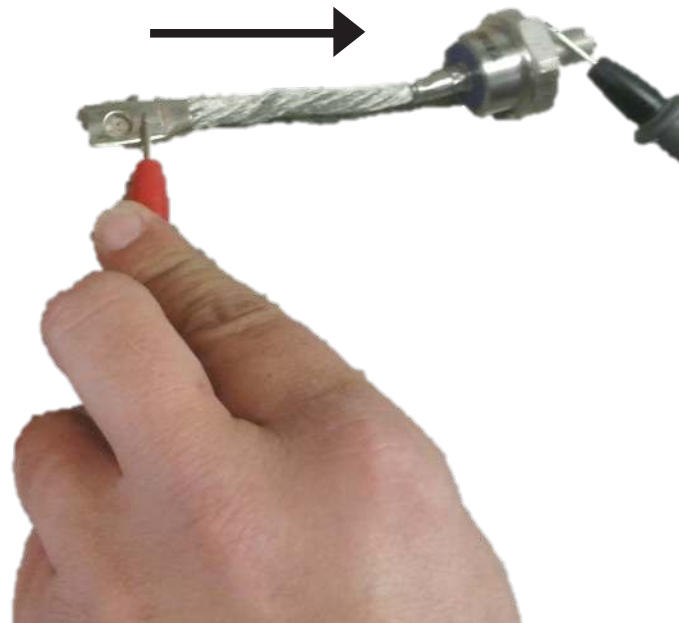
Digital Multimeter MUST Be Set to Test Diode

- Press Mode Until You See Diode Symbol
- Must Provide Enough Voltage to Forward Bias Diode



Diode Testing

Current Flows This Direction .2 to .6 Voltage Drop



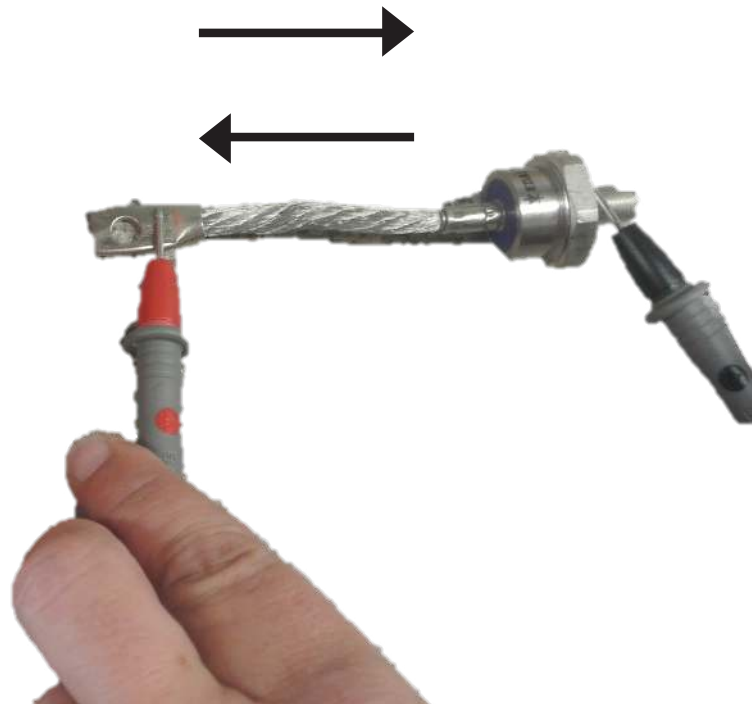
Diode Testing

Open



Diode Testing

Shorted



Diode Testing

Continuity Test – (beeps)

- If all but one of the strands are broken it will still show continuity.
- It will not handle the current load.



Questions & Answers

Thank you!