

The Kiln Corner—

Using the Multimeter to Test a Kiln's Elements

by Arnold Howard

Photography Courtesy of Paragon Industries, L.P.

Though I work for Paragon Industries, L.P., the information in this column applies to all brands of glass kilns. Feel free to send questions for this column no matter what brand of kiln you own.

Can you use a voltmeter to test a kiln's heating elements?

Often customers who phone us for kiln advice tell us, "I know the elements are okay, because I've checked them with a voltmeter." Voltage at the element connectors, however, does not mean the element is okay.

Test the elements with an ohmmeter, not a voltmeter. A voltmeter will read voltage across the two connectors of an element even if the element is broken. This is because a voltmeter reads the voltage that is available at the element connectors. A break in the element does not cut off the power coming to the element from a relay or switch.

How do you adjust a multimeter to the ohmmeter setting for testing kiln elements?

First, select ohms on your meter. Ohms are represented by the omega (horseshoe) symbol. With the probes plugged into the correct terminals on the meter, place the ohms range switch in the lowest setting.

Unplug the kiln or disconnect the power. This is important. Do not check ohms on anything that is plugged in. The external electricity running through the probes while your meter is set for ohms will ruin your meter.

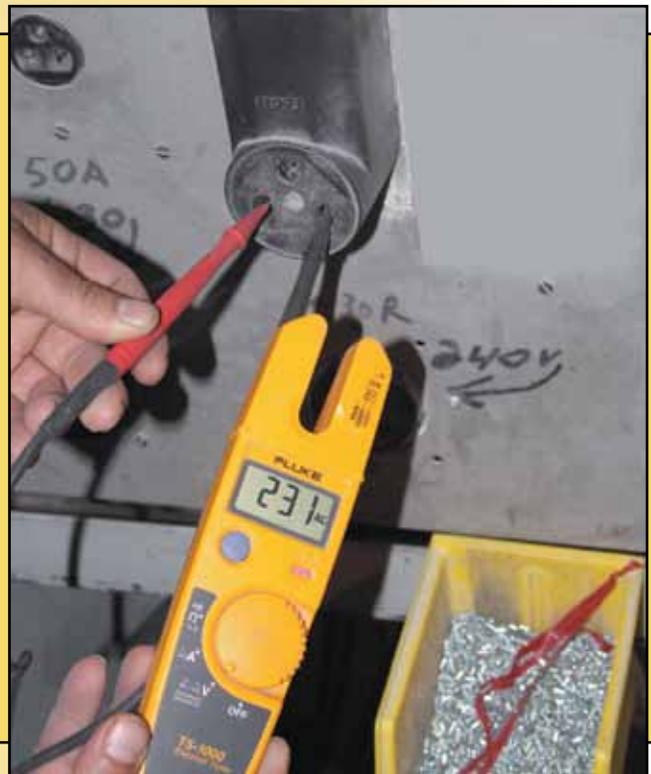
Each element has two element connectors. Find the connectors for the element you are testing. Place a probe on each element connector. The meter will show the ohms for that element.

What can I do to make sure that my ohmmeter is accurate?

Corrosion where the probes touch the element connectors can cause inaccurate readings. Sand a spot on the brass element connectors with emery cloth to remove the corrosion.



Shown here is a 120-volt SC-2 kiln that has two elements wired in parallel. Note that the two wires have been disconnected from the upper right element connector before testing with an ohmmeter. This was necessary to prevent the ohmmeter from giving a false reading.



Use a voltmeter to test wall outlets and an ohmmeter to test elements. The multimeter shown here has three modes--voltmeter, ohmmeter, and ammeter.

There are two element connectors for each element that you test. In rare cases you will have to temporarily disconnect a lead wire that goes from one of the element connectors to the switch or relay. Multiple elements wired in parallel to a single switch or relay can cause false readings. This is because the electricity from the ohmmeter battery can go past a broken element and through another element wired in parallel. Check the kiln's wiring diagram to determine whether you should disconnect wires from an element connector.

A broken element can occasionally show continuity on an ohmmeter, because as the element cools, the broken ends touch. With the ends touching, electricity can still travel through the element. Yet when you fire the kiln, the element will produce little, if any, heat. In this case, the resistance will be much higher than the resistance shown in the kiln's wiring diagram.

As elements wear out, does resistance increase or decrease?

The higher the number of ohms, the greater the resistance, and the slower the elements will fire. As heating elements age, the element wire becomes thinner. This increases the resistance, or number of ohms.



Caution: Please observe safety precautions when using a multimeter. Disconnect the power before opening the kiln's switch box.

Arnold Howard writes instruction manuals and advertisements for Paragon Industries, L.P. His hobbies are glass fusing and karate. He also enjoys studying history and watching classic movies. You can reach him at ahoward@paragonweb.com with questions for future columns. Visit www.paragonweb.com to sign up for his kiln newsletter.

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THE HEAT IS ON!

CRUCIBLE 18 for Hot Glass



The Crucible 18 is heavily insulated for melting glass. Built with a solid stainless steel jacket wrapped around a 1" thick ceramic fiber blanket and 3" thick brick walls, the heat is held within the kiln. A 1" thick ceramic fiberboard gasket sets in the top of the firing chamber and retains the heat in the kiln when gathering glass from the crucible. An additional bonus is the separate 3" thick brick kiln floor bottom. It can be turned over or easily replaced if damaged.

The Crucible runs on four sets of elements for rapid heat up. Two sets are required to maintain temperature, and two sets are in reserve to prevent unwanted cooling if an element is lost while firing. Equipped with an electronic controller, a type K or type S thermocouple can be installed at the time of ordering. For more information contact your Olympic Kilns distributor or Olympic for a distributor near you.

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