



## Performing low voltage Continuity tests with high voltage Hipot tests

Manufacturers of heating elements, cable harnesses, and aerospace cables must commonly perform point-to-point Continuity tests and Hipot tests as part of their routine production line tests. The linking of a Continuity test and Hipot test when voltages exceed 1000 volts has previously only been available through custom test systems. We understand that some of our customers require a bench top style solution so to address this, a 2000 Ohm Continuity range was added to the HypotULTRA Series. This enables point-to-point Continuity tests and Hipot tests at voltages up to 5,000 volts to be performed.

Our [HypotULTRA Series](#) of dielectric analyzers are unique in their ability to link point-to-point Continuity tests with Hipot tests at voltages in excess of 1000 volts. Cable harness testers are commonly available but they are typically limited in their maximum Hipot test voltage. The HypotULTRA Series is available in three models. The 7820 is an AC Hipot, model 7850 has AC/DC/IR capabilities and model 7800 is an AC/500VA/DC/IR instrument. The HypotULTRA Series has two separate Continuity test modes. The first test mode allows the operator to perform a simultaneous [Ground Continuity Test](#) with a 1 ohm maximum limit along with the Hipot test. This method of Continuity testing is ideal for testing appliances and other products where the safety agency calls out for a basic Continuity test to be performed on the safety ground circuit. The second test mode is the new 2000 Ohm Continuity test mode. This mode can be selected as a separate test and point-to-point Continuity tests can be performed through the optional 4 or 8 port internal scanner. The use of an internal scanner further automates the Continuity test in that the measurement points can be changed via the scanner. This is ideal for multi-point Continuity tests that are commonly required on cables assemblies and heating elements. The internal scanner outputs are conveniently located on the rear panel of the instrument. You can choose an internal scanner with either 4 or 8 testing ports to be built into the HypotULTRA. If additional testing ports are required, the HS-8A and the HS-16 external scanners also allow point-to-point Continuity tests and Hipot tests through the switching matrix. This will allow for an unlimited number of Continuity tests to be performed.

### How the 2000 Ohm Limit was Determined

A 2000 ohm limit was selected to meet the typical maximum resistance range of the heating elements. The primary application for Continuity tests are heating element manufacturers. This is because it is very common for these

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manufacturers to routinely perform a Continuity test on their products rather than an active or Functional Run test. The Continuity test provides several advantages over the Functional Run test. During the Continuity test, an

operator does not have to allow the element to heat up before measuring input current or power. This is determined by squaring the voltage and then dividing that by the resistance ( $E^2/R$ ). This is a time savings procedure for the manufacturer. In addition to that, it also increases operator safety. Without having to perform the Functional Run test, there is less opportunity for an operator to come in contact with an energized circuit that could be carrying either high voltage or high current. Also, since there is no need for the elements to heat up, this eliminates the opportunity for an operator to burn themselves on these elements. The Continuity test will also verify that the terminations are properly installed. It is best to use an internal or external scanner for this application. This will allow the Continuity test and the Hipot test to be linked together without having to make multiple connections to test multiple points.

## **Accessories Designed for Continuity Testing**

### **Adapter Box P/N 38480**

The HypotULTRA Series is shipped with the standard adapter box P/N 36544, which connects to either the front or rear terminals on the standard instrument, allowing the operator to perform a Continuity test on the ground conductor of an appliance at the same time that a Hipot test is being conducted. An optional Universal Adapter Box P/N 38480, which is terminated in three HV leads all of which can be plugged into the HV scanner, is also available. The adapter Box is connected to three channels on the scanner and the plug end of the cord set is connected to the adapter box while the other end of the cord set is connected to three other channels. The Line, Neutral, and Ground connections are checked by performing a three step point-to-point Continuity test through the scanner. Next, a two-step Hipot test is linked to the Continuity test to Hipot both the Line to Neutral and Ground connections as well as the Neutral to Line and Ground connections. This accessory is ideal for cord set manufacturers who are performing a Continuity or polarization tests on the cord sets as well as a Hipot test.

### **AUTOWARE® 3 Software**

The HypotULTRA Series is compatible with the latest version of Autoware®3. This automation and data capturing software is used to control the HypotULTRA and Continuity tests through the internal and external scanners. Like our other versions of the Windows-based AUTOWARE control software, this program allows instrument control through USB/RS-232 or GPIB interfaces using

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automated PC control to set-up the test programs and eliminate operator error. The ASCII format allows import of the test data into any spreadsheet, word processing or database program.

This is just one of the many solutions Associated Research has developed based on the needs of our customers. Since 1936, we have led the way in developing the latest technology. Visit our website at [arisafety.com](http://arisafety.com) or call our toll free number 1-800-858-TEST (8378) and ask for a demonstration of our HypotULTRA Series.

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