

**Cirris 1100H+ with Easy-Wire**  
**Performance Verification Manual**  
Version 2024.1.0



**1100H+ with Easy-Wire**  
Performance Verification Manual  
Version 2024.1.0  
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## Introduction

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The 1100H+ Performance Verification Kit allows you to verify the calibration and proper operation of the 1100H+ tester. Each performance verification kit has a life cycle of two years from the time of purchase. At the end of two years, you can recalibrate or replace the kit. The components for this performance verification kit are tested with instruments traceable to the National Institute of Standards and Technology (NIST).

1100H+ Performance verification should be done annually and any time the tester is not operating properly. If a step in the performance verification procedure fails, send the tester back to Cirris for repair. No external adjustments can be made to fix the tester.

For information on setting up a quality system that meets national quality standards such as ANSI/NCSL Z540-1, and ISO 10012-1, see the appendix of this manual.

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## Hipot Warning!

**Possible electric shock!**



Cirris hipot testers are designed to be safe for operators. Injuries from hipot testing are rare; however, not every hipot test situation is safe. Hipot testing is not a danger to healthy individuals. At times an occasional mild electric shock may be experienced. Small shocks only occur during a hipot test when the operator touches an energized connection point. Any shock from the tester may result in a hipot test failure.

### Medical Warning!

A child or individual wearing a cardiac pacemaker, an insulin pump, or an electronically controlled medical device should NOT perform Hipot testing.

For more information on improving hipot safety visit:  
[www.cirris.com/testing/guidelines/hipot\\_safety.html](http://www.cirris.com/testing/guidelines/hipot_safety.html)

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## Setting Up

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### Performance Verification Certificate and Data Sheet

You will find the 1100H+ Performance Verification Certificate and Verification Data Sheet at the end of this manual. You can record verification data on these documents for your records. If you use these documents, make photocopies to maintain master copies for future use.

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### Install Add-On Scanners

The examples in this manual use an 1100H+ with no expansion boxes.

Install add-on scanners if you have any. For instructions, see your 1100H+ User Manual.



**Note:** Before performing any of the tests in this manual, remove all adapters from the tester (including from the add-on boxes) except for the adapters needed for verification. Failing to remove unnecessary adapters could result in the wrong signature and cause a failure even when the tester is functioning correctly.

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### Plug in the Tester

Plug one end of the power cord into the tester. Plug the other end into a grounded outlet.



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### Parts List

Make sure you received the following parts:

- ☐ Zero Ohm Adapter



- ☐ Capacitance/Fourwire Adapter



- ☐ Resistor Leak Adapter



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## Required Tools (not provided by Cirris)

### ❑ Volt Meter



Fluke 70/80 Series (or equivalent)  
Input Resistance:  $10\text{M } \Omega \pm 10\%$   
(avoid using a bench top meter)

### ❑ High Voltage Probe



Fluke 80K-6 (or equivalent)  
Input Resistance:  $>50\text{M } \Omega$   
(use alligator clip test lead from tip  
to terminal on PCB)

**Caution!** Your volt meter may become damaged if you do not take the following precautions:

- High voltage verification requires measurements that are beyond the range of most volt meters. A high voltage probe is required for all measurements.
- Test voltages of 2000 VDC may be used. Measurement equipment must be able to safely withstand over 2500 VDC, and input resistance must be no less than 50M ohms.

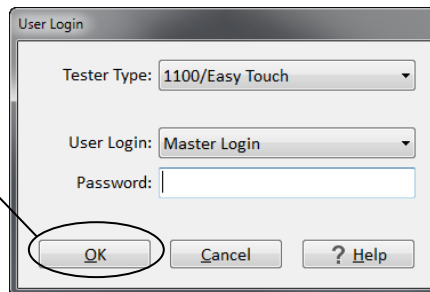
## Creating a Category

In the Easy-Wire™ software, you can organize test programs into groups by assigning them to different categories. You can also create custom test program categories. The steps below illustrate how to create a category for your verification test files.

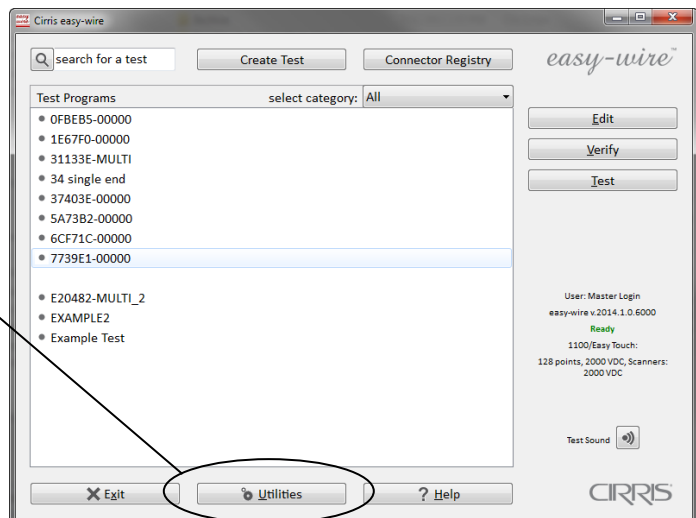
1. On the back of your 1100H+ tester, push in the power button for a few seconds to power on the tester.



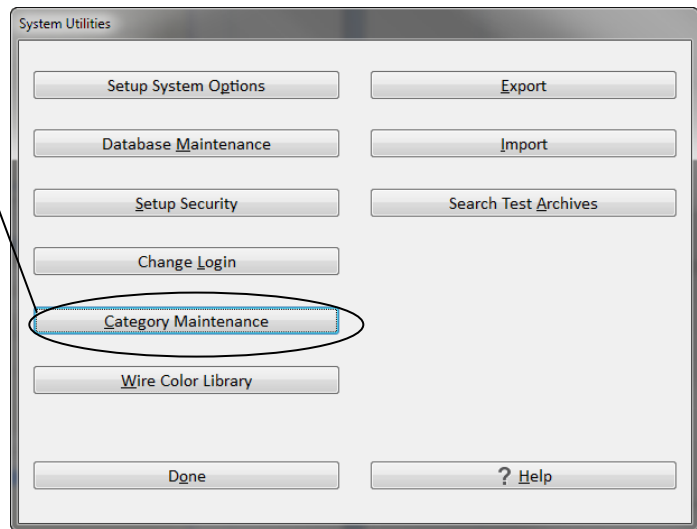
2. When the “User Login” window opens, log in to Easy-Wire.



3. In the Easy-Wire main menu, press ‘Utilities’.

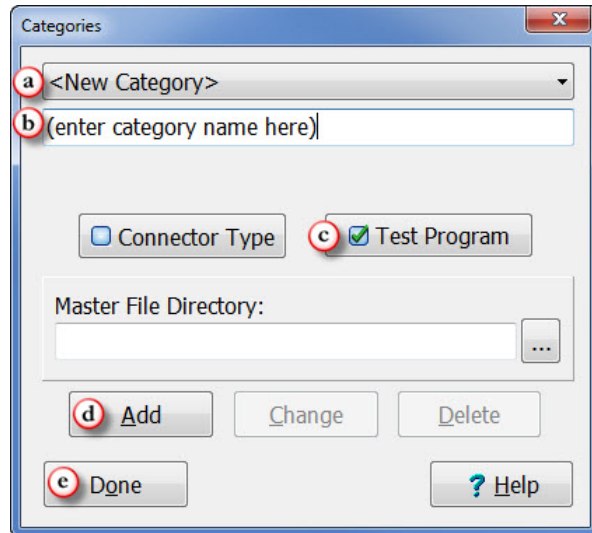


4. Press **'Category Maintenance'**.

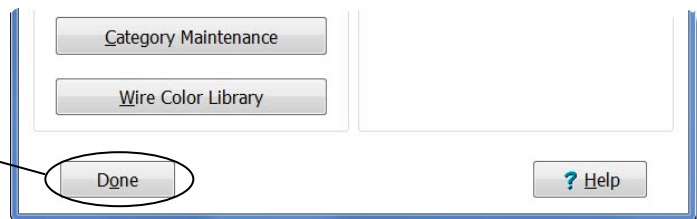


5. In the "Categories" window, do the following:

- a. Select <New Category> in the first text box.
- b. Enter a name, such as Verification, for the category in the second text box.
- c. Check the "Test Program" box.
- d. Press **'Add'**.
- e. Press **'Done'**.



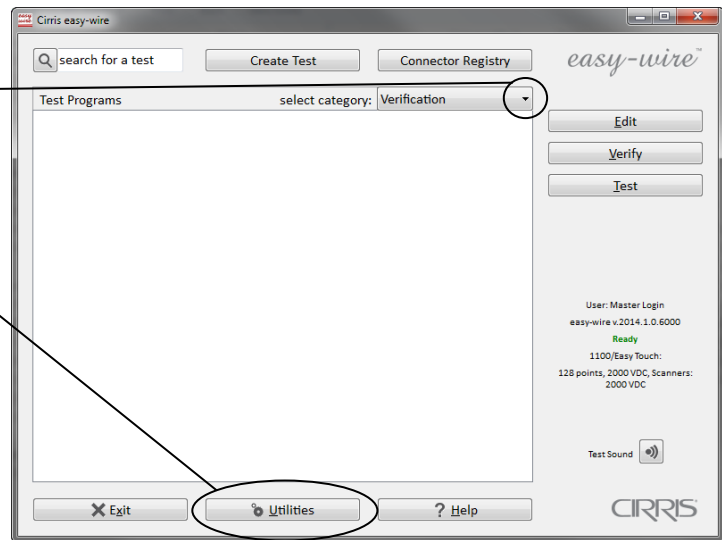
6. Press **'Done'** to return to the main menu.



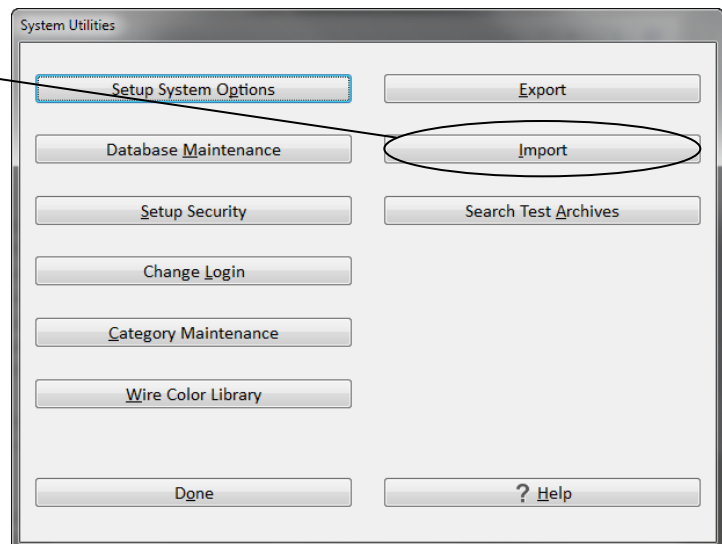


## Importing the Test Files

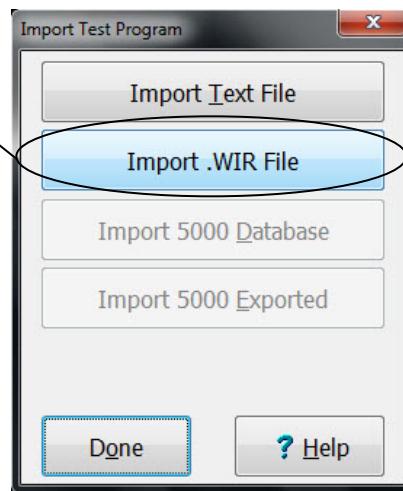
1. In the Easy-Wire main menu, select the category you created in the previous section and press **'Utilities'**.



2. Press **'Import'**.

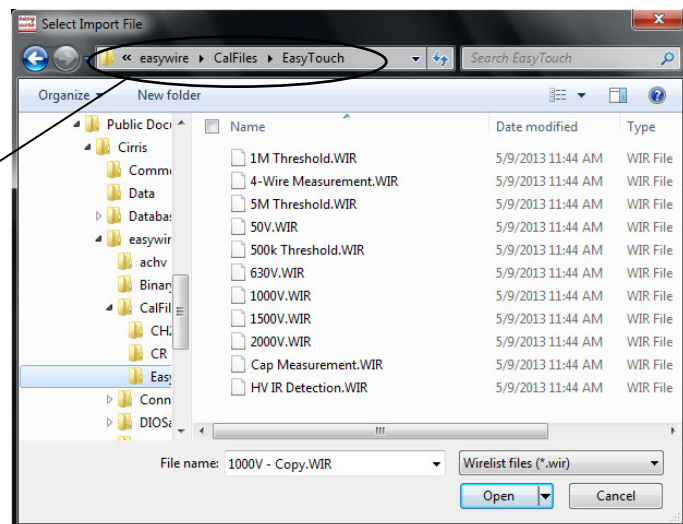


3. Press 'Import .WIR File'.

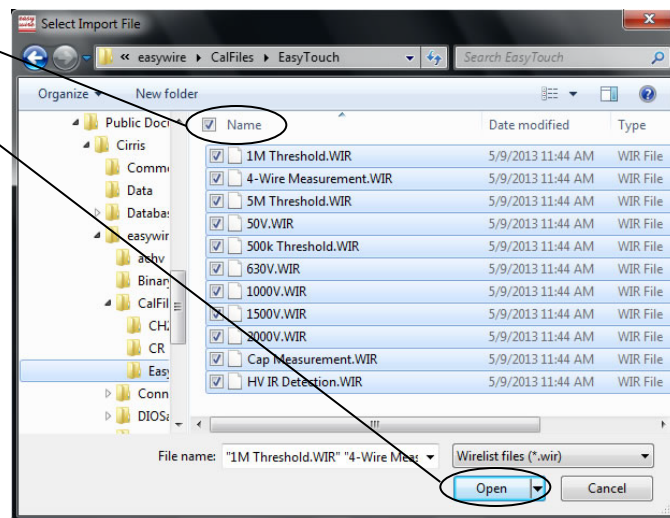


4. Navigate to the file path below:

C:\Users\Public\  
Public Documents\  
Cirris\easywire  
\CalFiles\1100H+

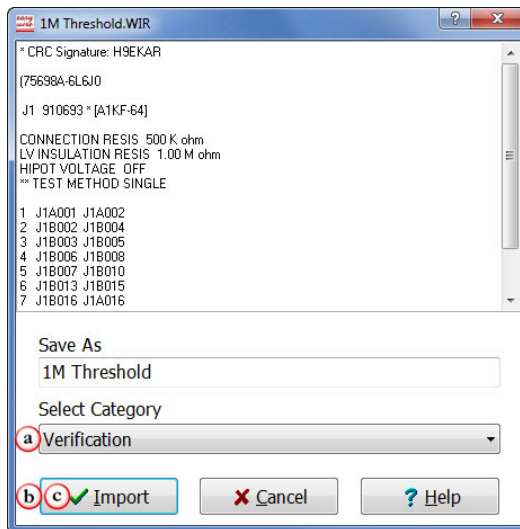


5. Press the "Name" check box to select all of the verification files as shown, and press 'Open'.

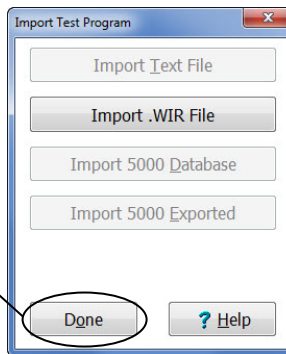


6. The first test will be displayed.  
Do the following:

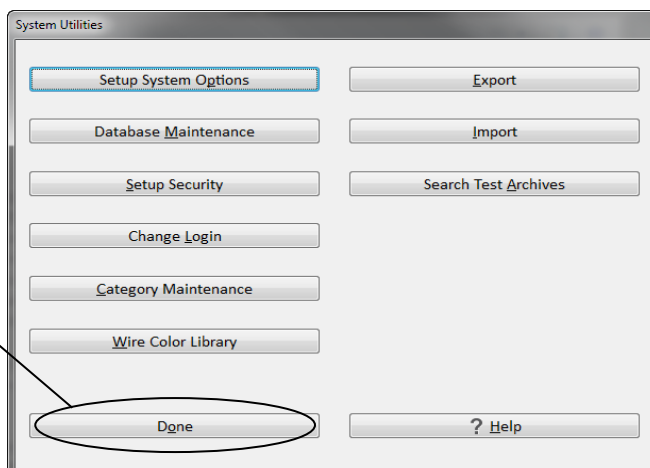
- a. From the drop down menu, select the verification file category you created.
- b. Press **'Import'**.
- c. The next test will be displayed. Continue to press **'Import'** until each file has been imported.



7. Press **'Done'**.



8. Press **'Done'** to return to the main menu.



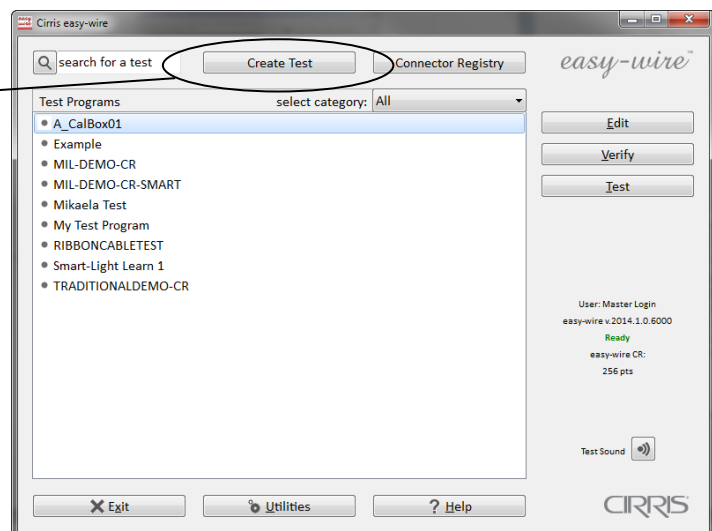
**Note:** To ensure that you always have the correct test files, re-import the files any time you update Easy-Wire or if you have not run the test in a while. Re-importing test files guarantees version control.

# Signal Routing System Test

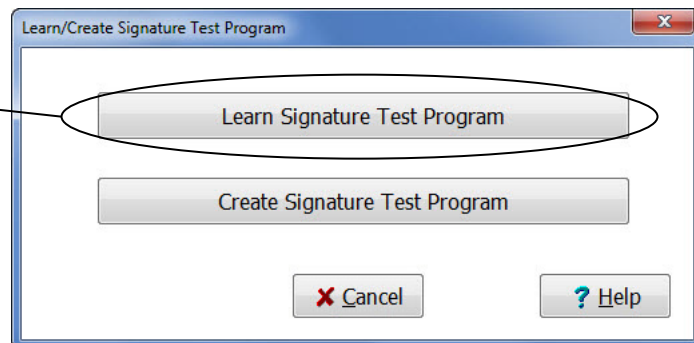
1. Install the Zero Ohm Adapter in the J1-J2 position as shown.



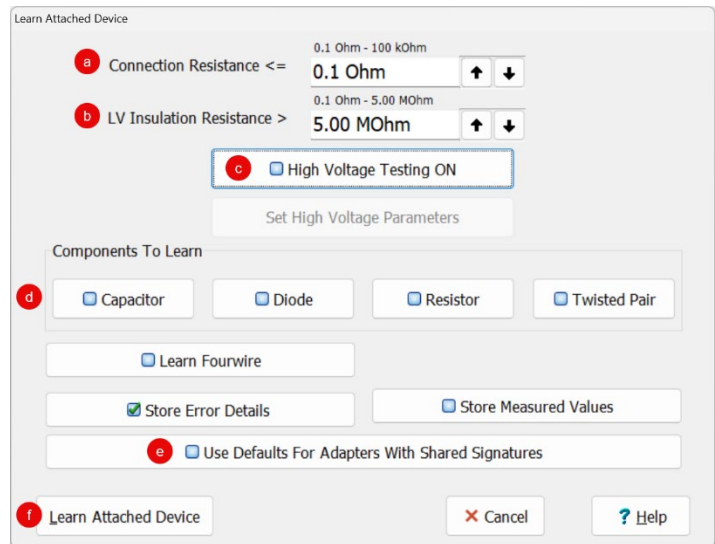
2. In the Easy-Wire main menu, press **'Create Test'**.



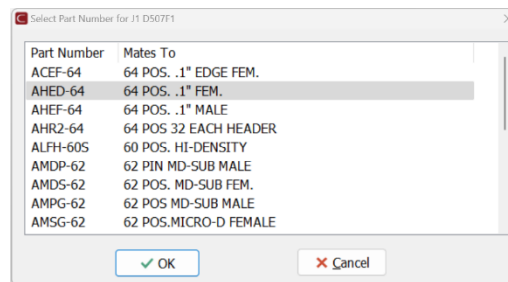
3. Press **'Learn Signature Test Program'**.



4. In the “Learn Attached Device” window, do the following:
  - a. Set the “Connection Resistance” to **0.1 Ohm**.
  - b. Set the “LV Insulation Resistance” to **5.00 MOhm**.
  - c. **Clear** the “High Voltage Testing ON” checkbox.
  - d. **Clear** all component boxes.
  - e. If your software contains the “**Use Defaults For Adapters With Shared Signatures**” box, make sure it is NOT checked.
  - f. Click ‘**Learn Attached Device**’.



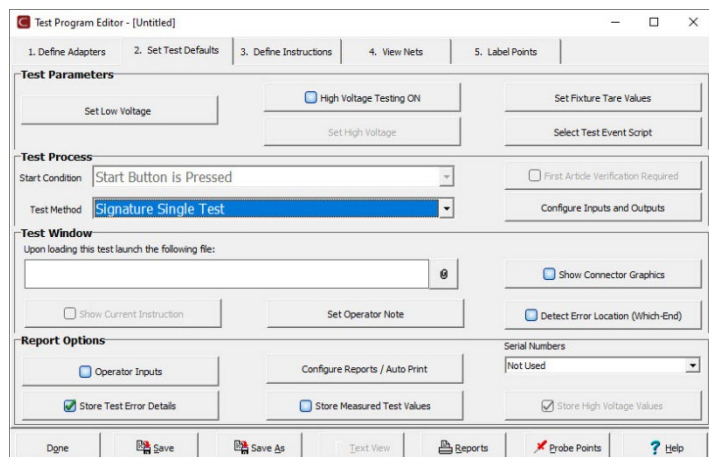
5. In the window that opens, select **AHED-64** as the adapter type and click **OK**.



6. In order to view the signature of the adapter, you must be in a Signature Mode test.

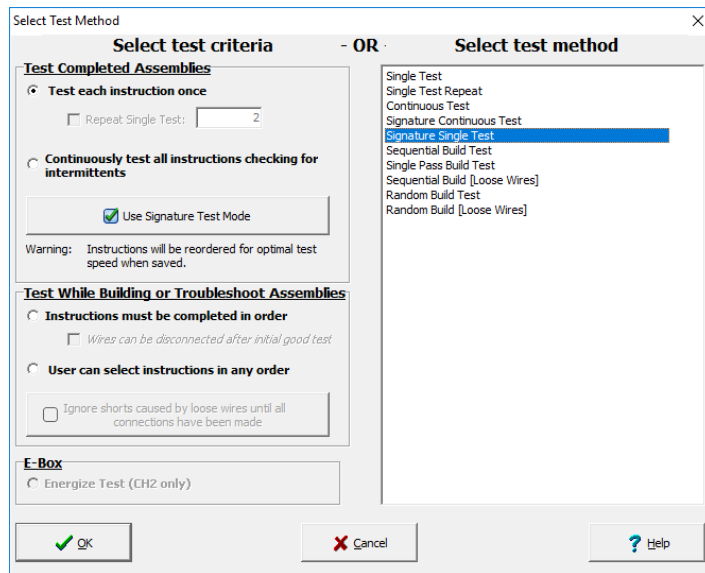
Go to Tab 2 Set Test Defaults to verify that the Test Method is set to **Signature Single Test** or **Signature Continuous Test**.

If you are not in a Signature Test method, click on the drop-down box next to Test Method

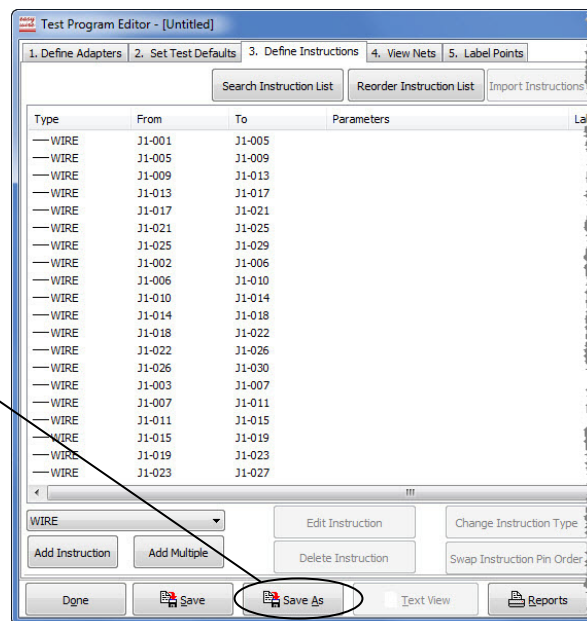


7. A separate window will open and display multiple test options. In the “Select Test Method” column, select a Signature test.

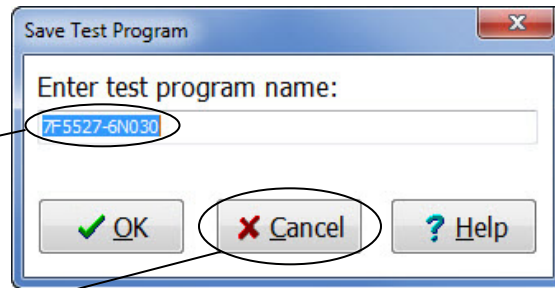
- **Continuous Test:** Similar to a Single Test but continues repeating until all errors are solved. A Continuous Test allows the operator to move the cable around in an effort to catch intermittent failures such as loose connections. Test will continue to run until the Stop button is pressed.
- **Signature Single Test:** The tester will perform the specified low voltage tests once. This method is fastest.



8. To view the signature, press ‘**Save As**’, but do not save the test!

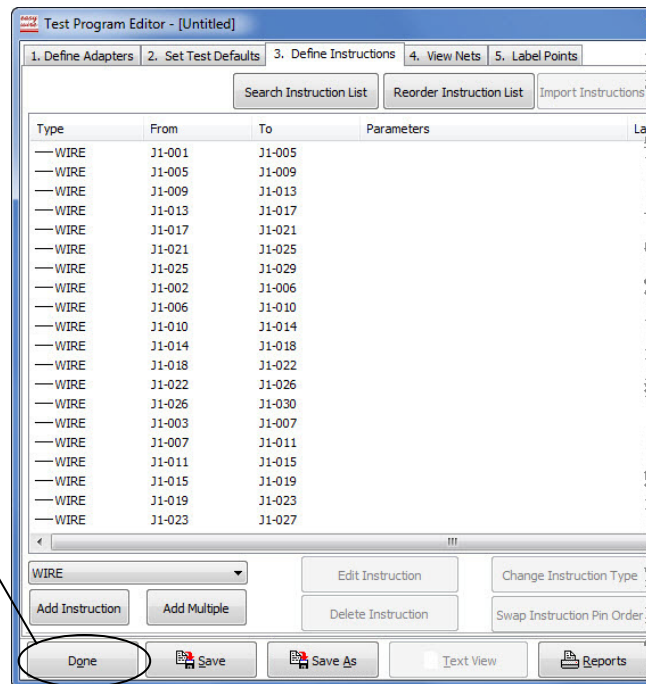


9. If the displayed signature matches the correct signature on the verification data sheet under “Signal Routing System Test”, check off Pass; otherwise, check off Fail.

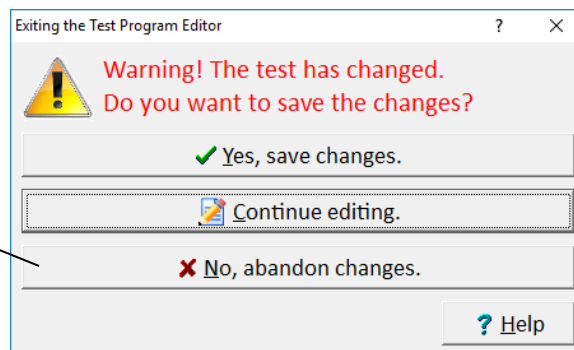


10. When you are finished viewing the signature, press **‘Cancel’**.

11. In the Test Program Editor, press **‘Done’**.



12. Select “Abandon changes and return to the main menu” and press **‘OK’**.



- 
13. Install the Zero Ohm Adapter in the J3-J4 position, and repeat steps 2-9. In step 7, you can compare the signature with correct signature in Table 1 on the next page.



- 
14. If you installed add-on scanners, move the Zero Ohm Adapter to each subsequent "J" position and repeat steps 2-9 for each test.

Table 1 lists the correct signatures for the adapter "J" positions.

Zero Ohm "J" Position Signatures			
"J" Position	Correct Signature	"J" Position	Correct Signature
J1-J2	7F5527-6N030	J17-J18	8CE799-6N030
J3-J4	94C424-6N030	J19-J20	18483C-6N030
J5-J6	5CC1A1-6N030	J21-J22	3476BF-6N030
J7-J8	D3A34A-6N030	J23-J24	B5D5D5-6N030
J9-J10	51A15E-6N030	J25-J26	1E83A5-6N030
J11-J12	C50EFB-6N030	J27-J28	8A2C00-6N030
J13-J14	E93078-6N030	J29-J30	A61283-6N030
J15-J16	719A99-6N030	J31-J32	3BA461-6N030

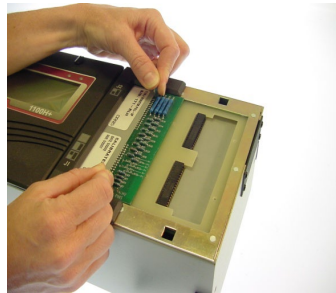
Table 1

- 
15. Remove the Zero Ohm Adapter.
-

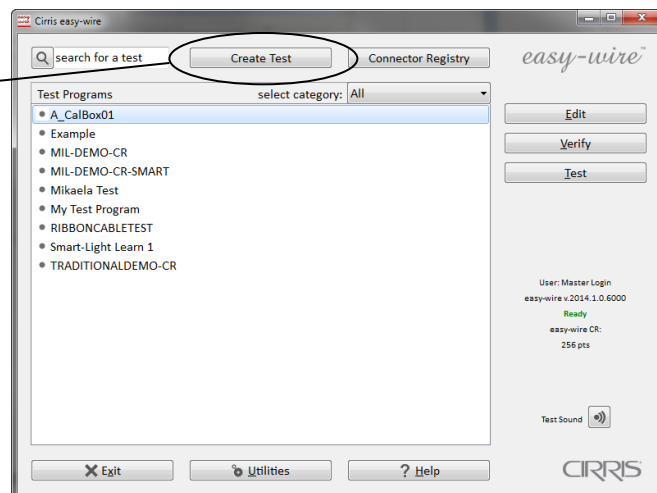


# Resistance Measurement System Test

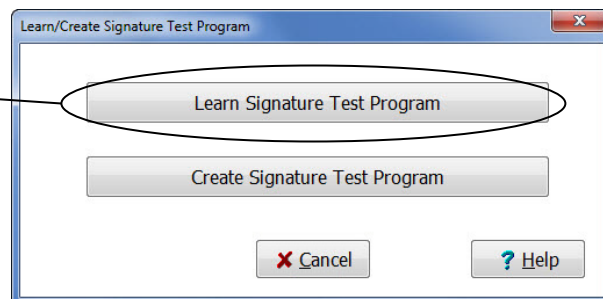
1. Install the Resistor Leak Adapter in the J1-J2 position as shown.



2. In the Easy-Wire main menu, press **'Create Test'**.



3. Press **'Learn Signature Test Program'**.



4. In the “Learn Attached Device” window, do the following:
  - a. Set the “Connection Resistance” to 0.1 Ohm.
  - b. Set the “LV Insulation Resistance” to 5.00 MOhm.
  - c. Clear the “High Voltage Testing ON” checkbox.
  - d. Clear all component check boxes.
  - e. If your software contains the “**Use Defaults For Adapters With Shared Signatures**” box, make sure it is NOT checked.
  - f. Click ‘**Learn Attached Device**’.

Learn Attached Device

a Connection Resistance <= 0.1 Ohm 0.1 Ohm - 100 kOhm

b LV Insulation Resistance > 5.00 MOhm 0.1 Ohm - 5.00 MOhm

c ☐ High Voltage Testing ON

Set High Voltage Parameters

Components To Learn

d ☐ Capacitor ☐ Diode ☐ Resistor ☐ Twisted Pair

☐ Learn Fourwire

☒ Store Error Details ☐ Store Measured Values

e ☐ Use Defaults For Adapters With Shared Signatures

f Learn Attached Device Cancel Help

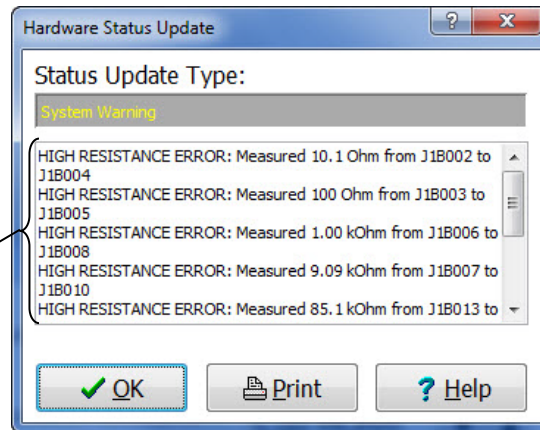
5. In the window that opens, select **AHED-64** as the adapter type and click **OK**.

Select Part Number for J1 D507F1

Part Number	Mates To
ACEF-64	64 POS. .1" EDGE FEM.
<b>AHED-64</b>	<b>64 POS. .1" FEM.</b>
AHEF-64	64 POS. .1" MALE
AHR2-64	64 POS 32 EACH HEADER
ALFH-60S	60 POS. HI-DENSITY
AMDP-62	62 PIN MD-SUB MALE
AMDS-62	62 POS. MD-SUB FEM.
AMPG-62	62 POS MD-SUB MALE
AMSG-62	62 POS.MICRO-D FEMALE

OK Cancel

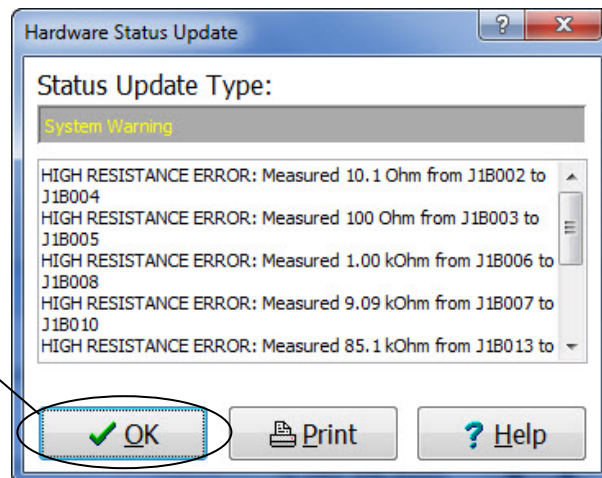
6. Record each Measured value in the “Hardware Status Update” window on the verification data sheet under “Resistance Measurement System Test”. If the value is between the minimum and maximum limits shown in Table 2 below, check off Pass; otherwise, check off Fail.



Resistance Measurement			
Resistor Positions	Correct Resistance	Minimum Limit	Maximum Limit
J1B002-J1B004	10.00 $\Omega$	9.80 $\Omega$	10.20 $\Omega$
J1B003-J1B005	100.0 $\Omega$	98.9 $\Omega$	101.1 $\Omega$
J1B006-J1B008	1,000 $\Omega$	989.9 $\Omega$	1,010.1 $\Omega$
J1B007-J1B010	9,090 $\Omega$	8,999 $\Omega$	9,181 $\Omega$
J1B013-J1B015	85.00K $\Omega$	84.15K $\Omega$	85.85K $\Omega$
J1B016-J1A016	404.1K $\Omega$	363.69K $\Omega$	444.51K $\Omega$
J1A020-J1A021	3.806M $\Omega$	3.4254M $\Omega$	4.1866M $\Omega$
J1A022-J1A023	592.0K $\Omega$	532.8K $\Omega$	651.2K $\Omega$

Table 2

7. When you are done recording the measured values, press 'OK'.



- 
8. Press **'Cancel'** to return to the main menu.

The screenshot shows a software dialog box titled "Learn Attached Device". It contains several configuration options:

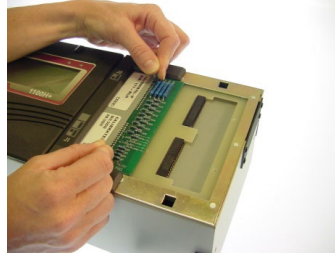
- Connection Resistance**: Set to " $\leq 0.1 \text{ Ohm}$ " with a range of "0.1 Ohm - 100 kOhm" and up/down arrows.
- LV Insulation Resistance**: Set to " $> 5.00 \text{ MOhm}$ " with a range of "0.1 Ohm - 5.00 MOhm" and up/down arrows.
- High Voltage Testing**: A checkbox labeled "High Voltage Testing ON" is checked.
- Set High Voltage Parameters**: A button.
- Components To Learn**: A section containing four checkboxes: "Capacitor", "Diode", "Resistor", and "Twisted Pair", all of which are checked.
- Learn Fourwire**: A checkbox that is checked.
- Store Error Details**: A checkbox that is checked.
- Store Measured Values**: A checkbox that is checked.
- Use Defaults For Adapters With Shared Signatures**: A checkbox that is checked.
- Buttons at the bottom**: "Learn Attached Device", "Cancel" (with a red X icon), and "Help" (with a question mark icon).

A line from the instruction "Press 'Cancel' to return to the main menu." points directly to the "Cancel" button.

# Resistance Threshold System Test

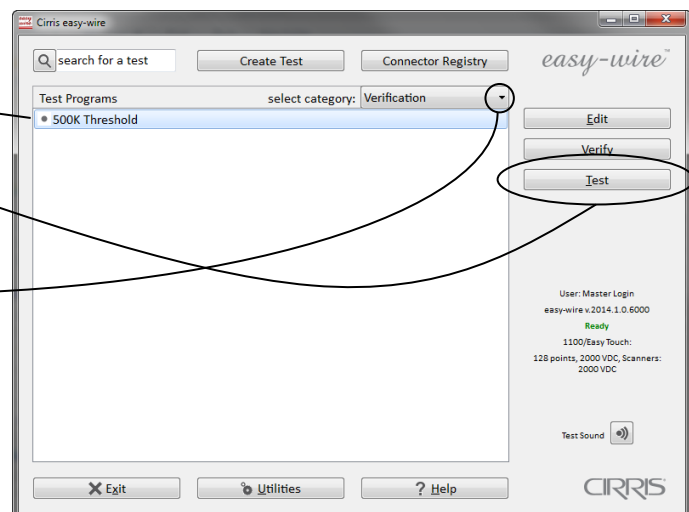
## 500k $\Omega$

1. Ensure that the Resistor Leak Adapter is in the J1-J2 position as shown.

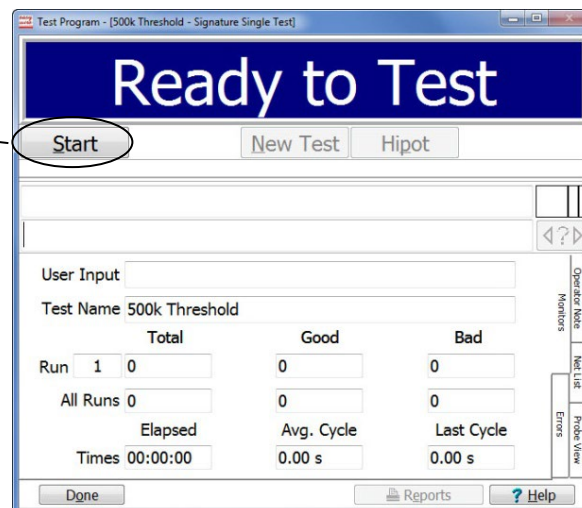


2. In the Easy-Wire main menu, select "500k Threshold" from the list, and press 'Test'.

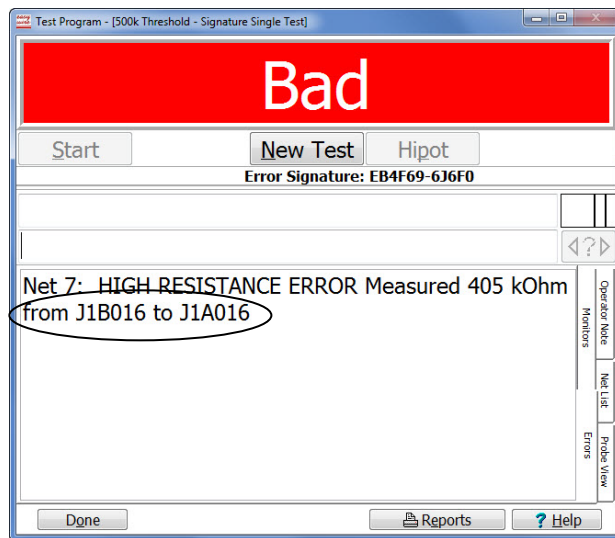
**Note:** The proper category must be selected to view the verification files as a group.



3. When the information bar at the top displays "Ready to Test", press 'Start'.

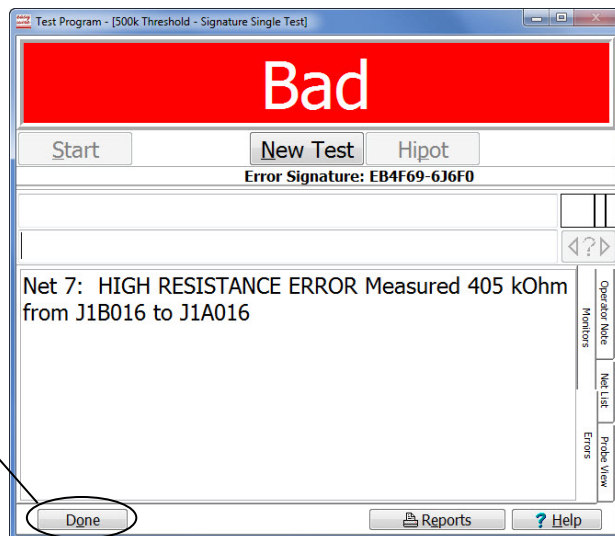


4. The test window should display “HIGH RESISTANCE ERROR”. If the failed points are from J1B016 to J1A016, check off Pass on the verification sheet under “Resistance Threshold System Test, 500k  $\Omega$ ”; otherwise check off Fail.



**Note:** The actual measured value for this part of the test is irrelevant and does not need to be recorded.

5. Press ‘Done’ to return to the main menu.



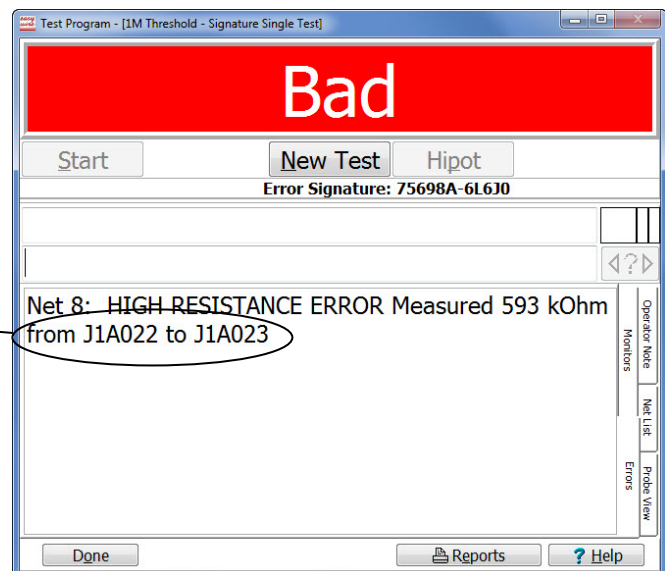
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## 1M $\Omega$

---

1. Ensure that the Resistor Leak Adapter is in the J1-J2 position as shown.
2. In the Easy-Wire main menu, select "1M Threshold" and press **'Test'**.
3. When the information bar at the top displays "Ready to Test", press **'Start'**.

4. The test window should display "HIGH RESISTANCE ERROR". If the failed points are from J1A022 to J1A023, check off Pass on the verification sheet under "Resistance Threshold System Test, 1M  $\Omega$ "; otherwise check off Fail.



**Note:** The actual measured value for this part of the test is irrelevant and does not need to be recorded.

5. In the test window, press **'Done'** to return to the main menu.
-

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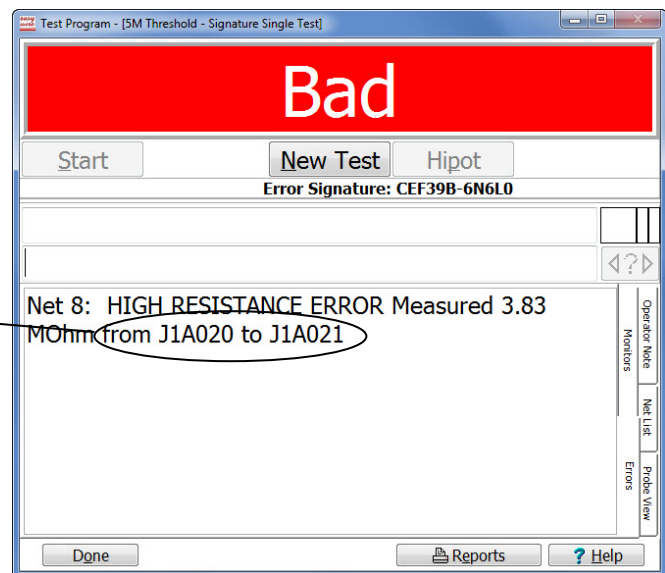
## 5M $\Omega$

1. Ensure that the Resistor Leak Adapter is in the J1-J2 position as shown.

- 
2. In the Easy-Wire main menu, select “5M Threshold” and press **‘Test’**.

- 
3. When the information bar at the top reads “Ready to Test”, press **‘Start’**.

- 
4. The test window should display “HIGH RESISTANCE ERROR”. If the failed points are from J1A020 to J1A021, check off Pass on the verification sheet under “Resistance Threshold System Test, 5M  $\Omega$ ”; otherwise check off Fail.



**Note:** The actual measured value for this part of the test is irrelevant and does not need to be recorded.

- 
5. In the test window, press **‘Done’** to return to the main menu.
-



# HV System Test

## Before you Begin Testing

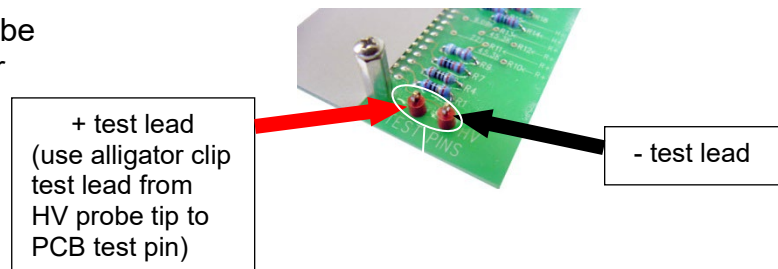
1. Ensure that the Resistor Leak Adapter is in the J1-J2 position as shown.



2. Plug the high voltage probe into the Voltmeter.

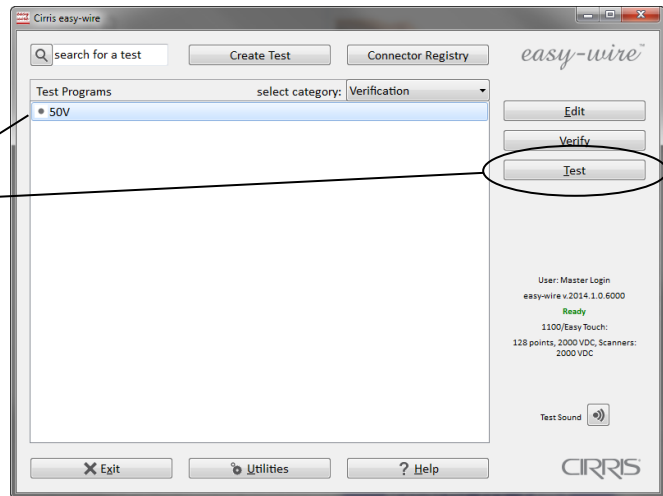


3. Connect your high voltage probe to the test pins on the Resistor Leak adapter as shown.

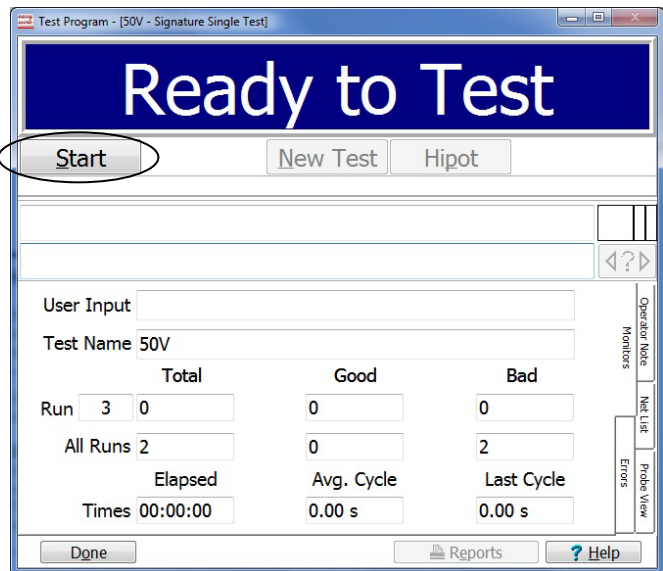


## 50 Volt

1. In the Easy-Wire main menu, select "50V" and press **'Test'**.



2. When the information bar at the top displays "Ready to Test", press **'Start'**.



### Be ready to read the meter!

When you do the next step, a voltage will appear on the meter. The value will only display for a few seconds.

- When the information bar displays “Ready to Hipot”, press ‘**Hipot**’ and read the meter.

- Record the voltmeter value on the verification data sheet under “HV System Test, 50 Volt.” If the voltmeter value is between the minimum and maximum limits shown in Table 3, check off Pass; otherwise, check off Fail.

50 Volt Test		
Correct Voltage	Minimum Limit	Maximum Limit
50 V	42.5 V	57.5 V

Table 3

**Note:** The hipot test takes up to 120 seconds to complete. If the hipot test is still running after this time frame, press ‘**Abort**’ to stop the test.

- When the information bar displays “Good” or “Bad”, press ‘**Done**’ to return to the main menu.

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## 630 Volt

1. In the Easy-Wire main menu, select “630V” and press **‘Test’**.
2. When the information bar displays “Ready to Test”, press **‘Start’**.

### Be ready to read the meter!

When you do the next step, a voltage will appear on the meter. The value will only display for a few seconds.

3. When the information bar displays “Ready to Hipot”, press **‘Hipot’** and read the meter.
4. Record the voltmeter value on the verification data sheet under “HV System Test, 630 Volt”. If the voltmeter value is between the minimum and maximum limits shown in Table 4, check off Pass; otherwise, check off Fail.

630 Volt Test		
Correct Voltage	Minimum Limit	Maximum Limit
630 V	593.5 V	666.5 V

Table 4

**Note:** The hipot test takes up to 120 seconds to complete. If the hipot test is still running after this time frame, press **‘Abort’** to stop the test.

5. When the information bar displays “Good” or “Bad”, press **‘Done’** to return to the main menu.
-

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## 1000 Volt

**Caution!** Be certain your high voltage probe has >50 MΩ of input resistant and can withstand at least 1500 VDC. Your voltmeter may become damaged if you do not take these precautions!

1. In the Easy-Wire main menu, select “1000V” and press **‘Test’**.
2. When the information bar displays “Ready to Test”, press **‘Start’**.

### Be ready to read the meter!

When you do the next step, a voltage will appear on the meter. The value will only display for a few seconds.

3. When the information bar displays “Ready to Hipot”, press **‘Hipot’** and read the meter.

4. Record the voltmeter value on the verification sheet under “HV System Test, 1000 Volt.” If the voltmeter value is between the minimum and maximum limits shown in Table 5, check off Pass; otherwise check off Fail.

1000 Volt Test		
Correct Voltage	Minimum Limit	Maximum Limit
1000 V	945 V	1055 V

Table 5

**Note:** The hipot test takes up to 120 seconds to complete. If the hipot test is still running after this time frame, press **‘Abort’** to stop the test.

5. When the information bar displays “Good” or “Bad”, press **‘Done’** to return to the main menu.
  6. Disconnect the clip leads from the Resistance Leak Adapter.
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## 1500 Volt

**Caution!** Be certain your high voltage probe has >50 MΩ of input resistant and can withstand at least 1500 VDC. Your voltmeter may become damaged if you do not take these precautions!

7. In the Easy-Wire main menu, select “1500V” and press **‘Test’**.

8. When the information bar displays “Ready to Test”, press **‘Start’**.

### Be ready to read the meter!

When you do the next step, a voltage will appear on the meter. The value will only display for a few seconds.

9. When the information bar displays “Ready to Hipot”, press **‘Hipot’** and read the meter.

10. Record the voltmeter value on the verification sheet under “HV System Test, 1500 Volt.” If the voltmeter value is between the minimum and maximum limits shown in Table 6, check off Pass; otherwise check off Fail.

1500 Volt Test		
Correct Voltage	Minimum Limit	Maximum Limit
1500 V	1420 V	1580 V

Table 6

**Note:** The hipot test takes up to 120 seconds to complete. If the hipot test is still running after this time frame, press **‘Abort’** to stop the test.

11. When the information bar displays “Good” or “Bad”, press **‘Done’** to return to the main menu.

12. Disconnect the clip leads from the Resistance Leak Adapter.
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## 2000 Volt (Optional)

**Caution!** Be certain your high voltage probe has >50 MΩ of input resistant and can withstand at least 2000 VDC. Your voltmeter may become damaged if you do not take these precautions!

13. In the Easy-Wire main menu,  
select “2000V” and press **‘Test’**.

14. When the information bar displays  
“Ready to Test”, press **‘Start’**.

### **Be ready to read the meter!**

When you do the next step, a voltage will appear on the meter. The value will only display for a few seconds.

15. When the information bar displays  
“Ready to Hipot”, press **‘Hipot’**  
and read the meter.

16. Record the voltmeter value on  
the verification sheet under “HV  
System Test, 2000 Volt.” If the  
voltmeter value is between the  
minimum and maximum limits  
shown in Table 7, check off Pass;  
otherwise check off Fail.

2000 Volt Test		
Correct Voltage	Minimum Limit	Maximum Limit
2000 V	1895 V	2105 V

**Table 7**

**Note:** These measurements only apply if you have a 2000 V  
1100H+ Unit with 2000 V scanners.

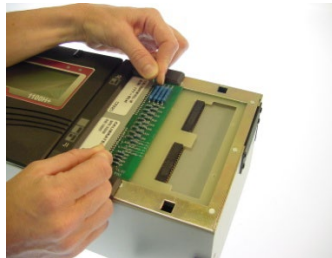
**Note:** The hipot test takes up to 120 seconds to complete. If the hipot test is still running after this time frame, press **‘Abort’** to stop the test.

17. When the information bar displays  
“Good” or “Bad”, press **‘Done’**  
to return to the main menu.

18. Disconnect the clip leads from the  
Resistance Leak Adapter.
-

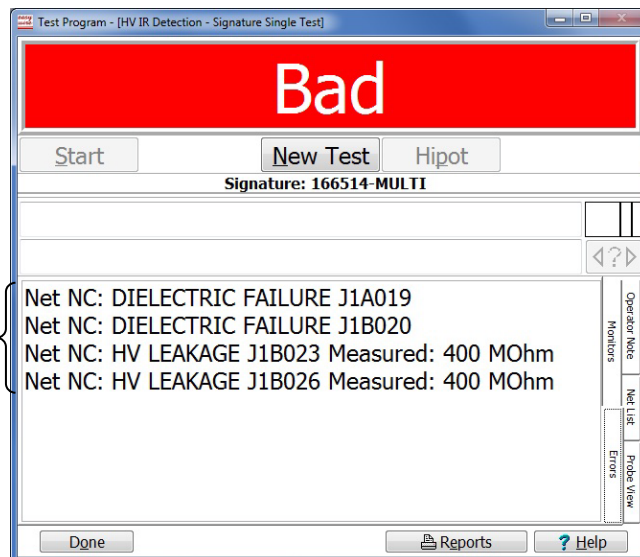
# HV Insulation Resistance Detection System Test

1. Ensure that the Resistor Leak Adapter is in the J1-J2 position as shown.



2. In the Easy-Wire main menu, select "HV IR Detection" and press **'Test'**.
3. When the information bar displays "Ready to Test", press **'Start'**.
4. When the information bar displays "Ready to Hipot", press **'Hipot'**.

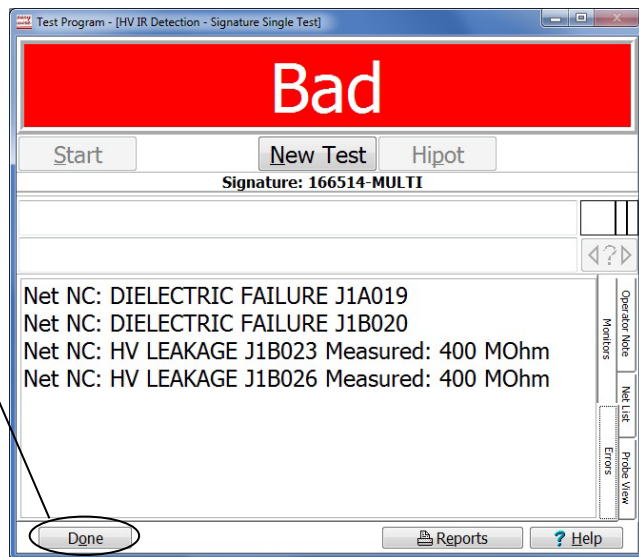
5. If the test window only reports the four high voltage errors shown, check of Pass on the verification sheet under "HV Insulation Resistance Detection System Test; otherwise, check off Fail.





**Note:** The actual measured value for the error will vary on each tester.

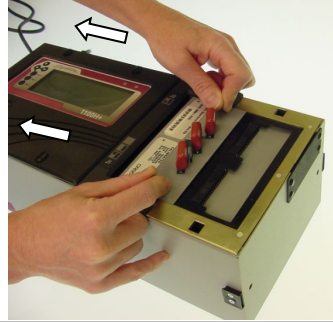
6. In the test window, press **'Done'** to return to the main menu.



7. Remove the Resistant Leak Adapter from the tester.

# Capacitance Measurement System Test

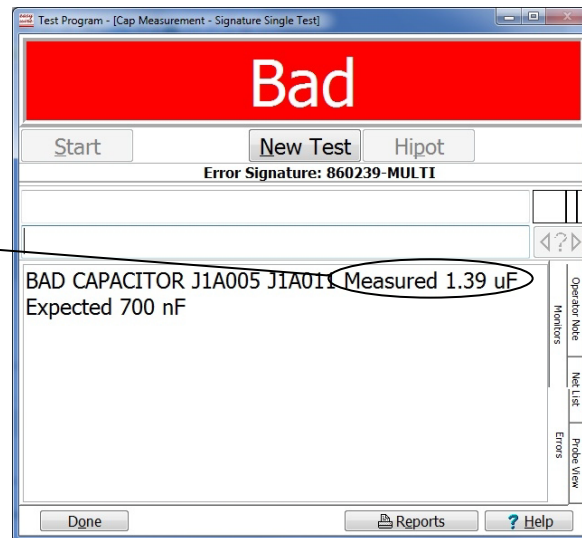
1. Install the Capacitance/4-Wire Adapter in the J1-J2 position as shown.



2. In the Easy-Wire main menu, select "Cap Measurement" and press **'Test'**.
3. When the information bar displays "Ready to Test", press **'Start'**.

4. The information bar will display "Bad." Record the Measured Value on the verification data sheet under "Capacitance Measurement System."

Check off Pass if the measured value is between the minimum and maximum limits shown in Table 8. Otherwise check off Fail.



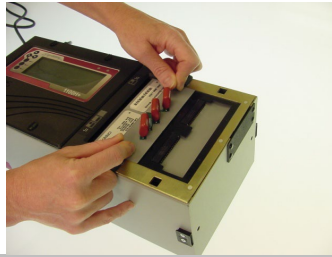
Capacitance Measurement		
Correct Capacitance	Minimum Capacitance	Maximum Capacitance
1.41 $\mu$ F	1.27 $\mu$ F	1.55 $\mu$ F

Table 8

- 
5. In the test window, press '**Done**' to return to the main menu.
-

## 4-Wire Measurement System Test

1. Ensure that the Capacitance/4-Wire Adapter is in the J1-J2 position as shown.



2. In the Easy-Wire main menu, select "4-Wire Measurement", and press **'Test'**.

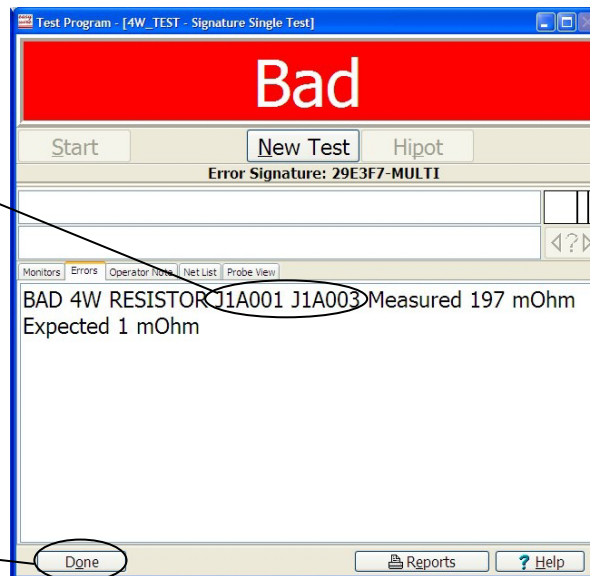
3. When the information bar reads "Ready to Test", press **'Start'**.

4. The information bar will read "Bad".

5. Verify that the "Bad 4W Resistor" reads J1A001 and J1A003.

6. On the verification data sheet under "4-Wire Measurement System", check off Pass if the measured value is between 195 and 205 mOhm. Otherwise check off Fail.

7. Press **'Done'**.



8. Remove the Capacitance/4-Wire Adapter from the tester.



## Appendix

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The following information can be used as a guide for setting up a formal quality system in your organization.

### Quality Standards

These standards are quality system requirements for organizations that perform quality tests and use calibrated equipment. Establishing a quality system according to the quality standards ensures that tests are done competently and lends credibility to the organization. In the United States, common quality standards include ANSI/NCSL Z540-1, ISO/IEC Guide 25, ISO 10012-1, and the former MIL-STD 45662A.

You can review the ANSI/NCSL Z540 standard referred to above, as well as other helpful metrology information, from the National Conference of Standards Laboratories International (NCSL) at 1-303-440-3339 or [www.ncsli.org](http://www.ncsli.org). You can also review the ISO standards from the International Standards Organization (ISO) at their web site [www.iso.org](http://www.iso.org).

In the metrology industry, the word “standards” often refers to a centralized, most accurate unit of measurement regulated by countries. The National Institute of Standards and Technology (NIST) maintains the *national standards* for measurements in the United States.

### Good Quality Practices

Quality standards, such as ANSI/NCSL Z540-1 and ISO 10012-1, require several good practices for the calibration industry including the following areas:

#### Recall System

How do you ensure that your company will remember to send an instrument in for calibration? Use a card file or computerized database recall system. This system includes calibration dates, due dates, calibration sources, and other instrument records. The recall system ensures that instruments are recalibrated in a timely manner.

#### Verification Labels

How do you know if calibration has been verified without looking for the paperwork? When an instrument’s calibration is verified, the quality standards require the instrument to be labeled as such. These labels, which are applied to instruments, have fields for the instrument serial number, verification date, verification due date, and by whom. A good source of inexpensive labels is United Ad Label at 1-800-992-5755.

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### **Accuracy Ratios**

Can you use a ruler to calibrate your digital calipers? The answer is no. Wherever possible, quality standards require an accuracy ratio of at least four to one. In other words, the instrument being used to measure the calibrated instrument should be at least four times as accurate as the calibrated instrument.

### **Performance Verification Certificate**

How do you know that an instrument has been verified? The Performance Verification Certificate is a record of who, when, and by what equipment the instrument was verified. The 1100H+ Performance Verification Certificate is provided on the next page.

### **Verification Data Report**

How accurate is the calibrated test instrument in relation to its published specifications? Some organizations require the measured values of a calibrated instrument to be written down when that instrument is calibrated. Calibration laboratories typically charge extra to create a data report. However, when an instrument is found to be out-of-tolerance, the quality standards require the out-of-tolerance data be recorded in relation to the instrument specifications. A verification data report can fill this requirement. You can photocopy the 1100H+ Verification Data Report from the Appendix and fill it out.

### **Traceability**

Traceability refers to each unbroken link of valid verifications going back to national standards such as those maintained by the NIST in the United States. To maintain traceability, qualified personnel must perform the performance verification under controlled conditions, using correctly calibrated instruments with correct test accuracy ratios.

Several years ago NIST numbers (ie. reference numbers issued on NIST reports) were commonly copied on successive calibration certificates as a means of showing traceability. This practice has been discontinued. Therefore, if you are writing a performance verification procedure, do not require NIST numbers be copied on reports to show traceability. NIST numbers are sometimes confused with other numbers that calibration laboratories create for reference such as “asset numbers”, “NIST trace numbers”, “ID numbers”, and report numbers. For more information regarding the discontinued use of NIST numbers Cirris can provide a copy of the position paper from the National Conference of Standards Laboratories.

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# 1100H+ Performance Verification Certificate

<b>Name and Address of Organization:</b>			
<b>Certificate Number:</b>		<b>Performed by:</b>	
<b>Date:</b>		<b>Due Date:</b>	
<b>Applicable Quality Standard(s):</b>		<b>Procedure:</b> 1100H+ Performance Verification- Version _____	
<b>Temperature:</b>		<b>Relative Humidity:</b>	
<b>Tester Serial Number:</b>			
<b>Instruments used:</b>	<b>Serial Number</b>	<b>Cal. Date</b>	<b>Due Date</b>
Zero Ohm Adapter			
Resistor Leak Adapter			
Capacitance/Fourwire Adapter			
Voltmeter			
<b>Statement of Traceability:</b>			
<b>Certified by:</b>			

# 1100H+ Verification Data Sheet

Date: \_\_\_\_\_

Tester Serial Number: \_\_\_\_\_

Tests Performed By: \_\_\_\_\_

## Signal Routing System

J Position for Adapter	Correct Signature	Displayed Signature	Pass	Fail
J1-J2	7F5527-6N030			
J3-J4	94C424-6N030			
J5-J6	5CC1A1-6N030			
J7-J8	D3A34A-6N030			
J9-J10	51A15E-6N030			
J11-J12	C50EFB-6N030			
J13-J14	E93078-6N030			
J15-J16	719A99-6N030			
J17-J18	8CE799-6N030			
J19-J20	18483C-6N030			
J21-J22	3476BF-6N030			
J23-J24	B5D5D5-6N030			
J25-J26	1E83A5-6N030			
J27-J28	8A2C00-6N030			
J29-J30	A61283-6N030			
J31-J32	3BA461-6N030			

## Resistance Measurement System

Resistor Positions	Correct Resistance	Minimum Limit	Maximum Limit	Displayed Value	Pass	Fail
J1B002-J1B004	10.00 $\Omega$	9.80 $\Omega$	10.20 $\Omega$			
J1B003-J1B005	100.0 $\Omega$	98.9 $\Omega$	101.1 $\Omega$			
J1B006-J1B008	1,000 $\Omega$	989.9 $\Omega$	1,010.1 $\Omega$			
J1B007-J1B010	9,090 $\Omega$	8,999 $\Omega$	9,181 $\Omega$			
J1B013-J1B015	85.00K $\Omega$	84.15K $\Omega$	85.85K $\Omega$			
J1B016-J1A016	404.1K $\Omega$	363.69K $\Omega$	444.51K $\Omega$			
J1A020-J1A021	3.806M $\Omega$	3.4254M $\Omega$	4.1866M $\Omega$			
J1A022-J1A023	592.0K $\Omega$	532.8K $\Omega$	651.2K $\Omega$			



## Resistance Threshold System

- 500 k $\Omega$  Test

High Resistance Error between:	Pass	Fail
J1B016 and J1A016		

- 1 M $\Omega$  Test

High Resistance Error between:	Pass	Fail
J1A022 and J1A023		

- 5 M $\Omega$  Test

High Resistance Error between:	Pass	Fail
J1A020 and J1A021		

## HV System Test

- 50 Volt Test

Correct Voltage	Minimum Voltage	Maximum Voltage	Displayed Value	Pass	Fail
50 V	42.5 V	57.5 V			

- 630 Volt Test

Correct Voltage	Minimum Voltage	Maximum Voltage	Displayed Value	Pass	Fail
630 V	593.5 V	666.5 V			

- 1000 Volt Test

Correct Voltage	Minimum Voltage	Maximum Voltage	Displayed Value	Pass	Fail
1000 V	945 V	1055 V			

- 1500 Volt Test

Correct Voltage	Minimum Voltage	Maximum Voltage	Displayed Value	Pass	Fail
1500 V	1420 V	1580 V			

- **2000 Volt Test (Optional)**

Correct Voltage	Minimum Voltage	Maximum Voltage	Displayed Value	Pass	Fail
2000 V	1895 V	2105 V			

### HV Insulation Resistance Detection System

Dielectric Failure at:	Pass	Fail
J1A019		

Dielectric Failure at:	Pass	Fail
J1B020		

HV Leakage at:	Pass	Fail
J1B023 (measured value: 360-440M $\Omega$ )		

HV Leakage at:	Pass	Fail
J1B026 (measured value: 360-440M $\Omega$ )		

### Capacitance Measurement System

Correct Capacitance	Minimum Capacitance	Maximum Capacitance	Displayed Measured Value	Pass	Fail
1.41 $\mu$ F	1.27 $\mu$ F	1.55 $\mu$ F			

### 4-Wire Measurement System

Bad 4W Resistor Error between J1A001 and J1A003	Minimum Value	Maximum Value	Pass	Fail
0.2 $\Omega$ $\pm$ 2% $\pm$ 0.001 $\Omega$	0.195 $\Omega$	0.205 $\Omega$		