8100
Performance Verification Manual

Version 2025.2.0

CIRRIS®
A KOMAX COMPANY

Table of Contents

1. Introduction

All Cirris 8100 Base Units ship with a certificate of calibration that's valid for one year. The calibration can be verified using the instructions in this manual in conjunction with an 8100 Performance Check Kit and a calibrated multimeter. The kit includes standards that have been calibrated using instruments with accuracies traceable to the National Institute of Standards and Technology (NIST). The certificate of calibration included with a performance check kit is valid for two years.

1.1 Scope

As described in detail later in this manual, there are two tests that comprise the 8100 Performance Verification - the 8100 Verification Test and the 8100 Zero Ohm Test.

The measurement hardware for an 8100 test system is located in the Base Unit. The 8100 Verification Test is used to ensure that the unit's measurements are within specified tolerances thereby validating that the hardware is functioning properly. Only the performance of the Base Unit is verified in this way.

All the connectors on the Base Unit and on each attached Expansion Unit, are subsequently checked during the Zero Ohm Test to verify that the test system is measuring very low resistance through every connector pin. A typical cause of Zero Ohm failures is connector damage or wear.

Based on these facts, the performance of each Base Unit should be verified separately from other Base Units, but each Base can be attached to as many Expansion Units as desired during the performance verification process. Expansion Units cannot be evaluated separately from a Base Unit.

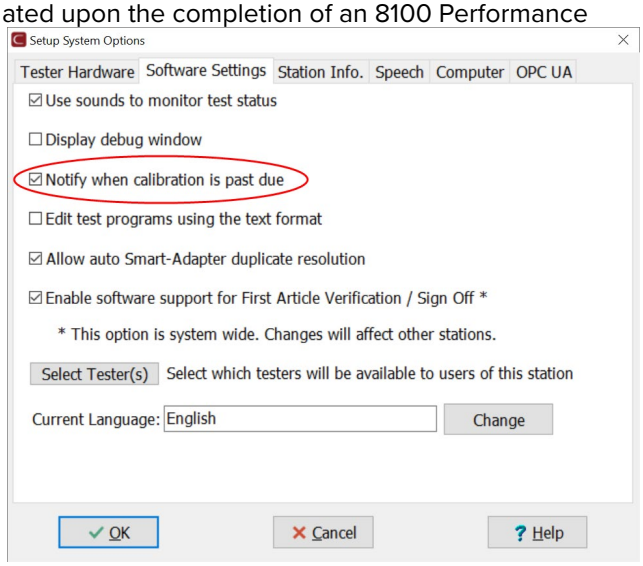
No adjustments are made to the tester during the verification process. If the tester fails the verification, it indicates that a hardware problem exists, which requires service. Contact information for help and technical support can be found in the Help / Support section of this manual.

Finally, it may be helpful to note that 8100 test systems perform an extensive self-test during every startup. The self-test verifies that all the solid state switches in the system's matrix are functioning properly and performs checks of the measurement circuitry. However, the self-test cannot verify measurements in the same way the 8100 Performance Verification Test does or detect connector damage or wear that can be found during the Zero Ohm Test.

1.2 Calibration Date

8100 Base Units store the calibration date internally. The calibration date is the date of the last performance verification test that resulted in a pass condition or the date of the most recent calibration performed at the Cirris factory, whichever occurred last. This date is automatically updated upon the completion of an 8100 Performance Verification test that ends in a pass condition.

Optionally, the Easy-Wire software can notify users at login if the last successful verification occurred longer ago than one year from the current date. To enable this option, from the Easy-Wire **Main Menu** > **Utilities** > **Setup System Options** > under the **Software Settings** tab, select **Notify when calibration is past due**. Click **OK** when finished.



1.3 Verification Interval

Cirris recommends performing the performance verification annually at a minimum. However, some organizations may decide to perform the verification more frequently. The performance verification process can also be used when troubleshooting testing or product issues to verify that the tester is measuring accurately.

1.4 Calibration Records

Documenting the result of the Performance Verification is good practice and may be required by a company's quality system. As will be described in this manual, the user will be prompted to save the results for the 8100 Verification Test in a CSV file format. This file documents the date and time of the test and includes all the pertinent results.

The results of the 8100 Zero Ohm Test are displayed at the end of the test. The results can also be printed or exported following the instructions in this manual.

Additionally, a suggested format for an 8100 Performance Verification Certificate is included in the Appendix.

1.5 Quality System

Some suggestions for good practice can also be found in the appendix.

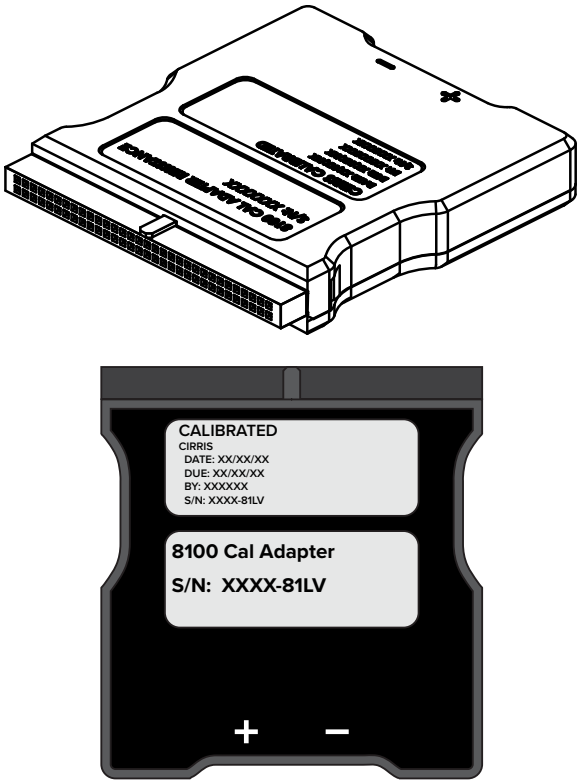
2. Required Items

- The 8100 tester is controlled by the Easy-Wire software. The version of the software must be 2023.2.1.8020 or later. The version can be found on the Easy-Wire Main Menu for quick reference.
- An 8100 Performance Check Kit, which includes two calibrated adapters - the 8100 Cal Adapter and the 8100 Zero Ohm Adapter.

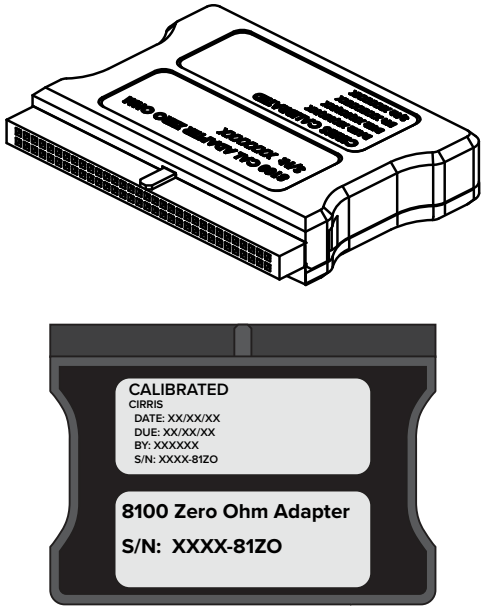
  Important: *Ensure the calibration validity of the standards by verifying that the "due" dates on their calibration stickers extend beyond the current date.*

- A calibrated multimeter capable of measuring DC voltage within the range of .1 to 2.0 volts with an accuracy of ± 1%, such as a Fluke 80 Series meter or equivalent. The input impedance of the meter must be 10 Megohms ± 10%. Bench multimeters, such as Keysight units, typically do not meet this impedance requirement.

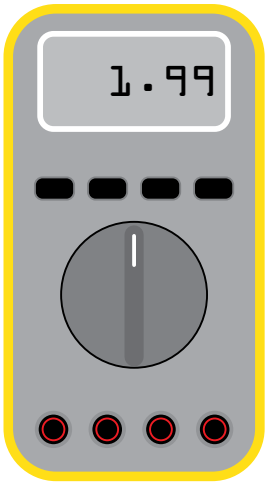
8100 Cal Adapter



8100 Zero Ohm Adapter



Calibrated Meter



3. Preparation

The measurement hardware for an 8100 test system is located in the Base Unit. Therefore, during the verification process it is only necessary to attach the 8100 Cal Adapter to connector J1 on the Base Unit to verify the measurement accuracy of the tester. However, each connector on the Base and on each attached Expansion Unit will be checked using the Zero Ohm adapter to verify that there is very low resistance through every connector pin. The performance of each Base Unit should be verified separately, but each Base can be attached to as many Expansion Units as desired during the process.

3.1 Test System Setup

See the *8100 Getting Started Guide* or *8100 User Manual* for guidance on setting up the 8100 test system. Either document can be downloaded from the 8100 Product Document & Software page on the Cirris web site.

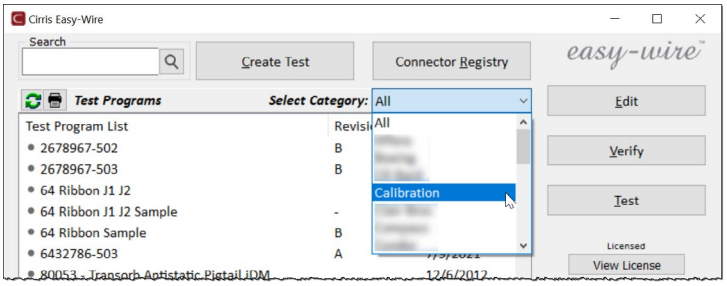
***Note**: Before adding or removing 8100 units from an existing system, close the Easy-Wire software and disconnect the Base USB cable from the PC. After completing the changes, reconnect the Base USB cable and restart the Easy-Wire software.*

Setup:

1. Connect any Expansions that will be included in the verification process to the Base as described in the *8100 Getting Started Guide* or *8100 User Manual*.
2. Remove any test cables that are connected to the Base and Expansion Units.
3. Ensure that the units are connected to the PC controller and power using USB cable(s) as required.
4. Open the Easy-Wire software. Easy-Wire can be opened using the desktop shortcut or from the Windows Start button, expanding the Cirris Systems Corporation content, and selecting Easy-Wire.

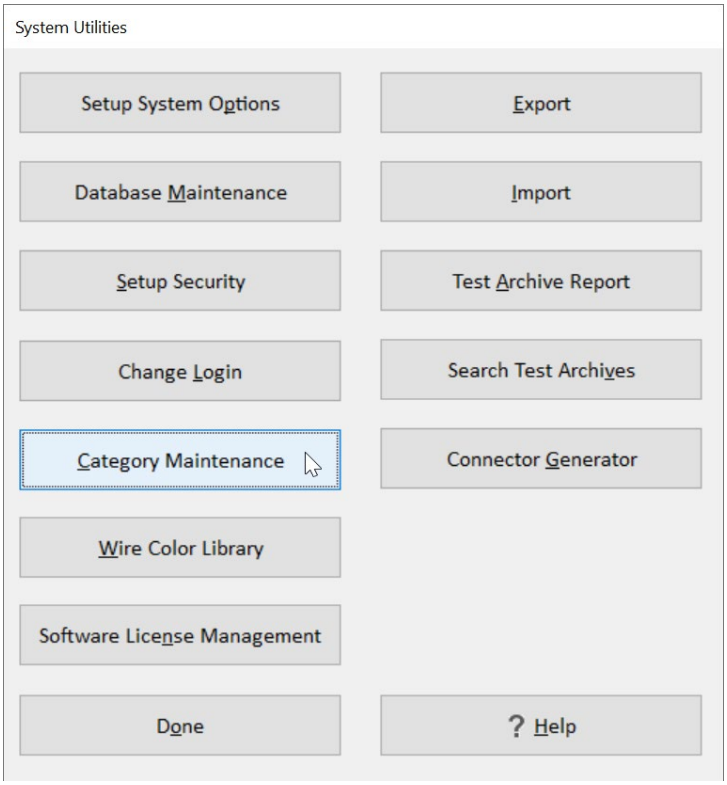
3.2 Create the Calibration Category

On the Easy-Wire **Main Menu**, click the **Select Category** drop-down arrow to see if the **Calibration** category already exists. If it does, skip to this step.



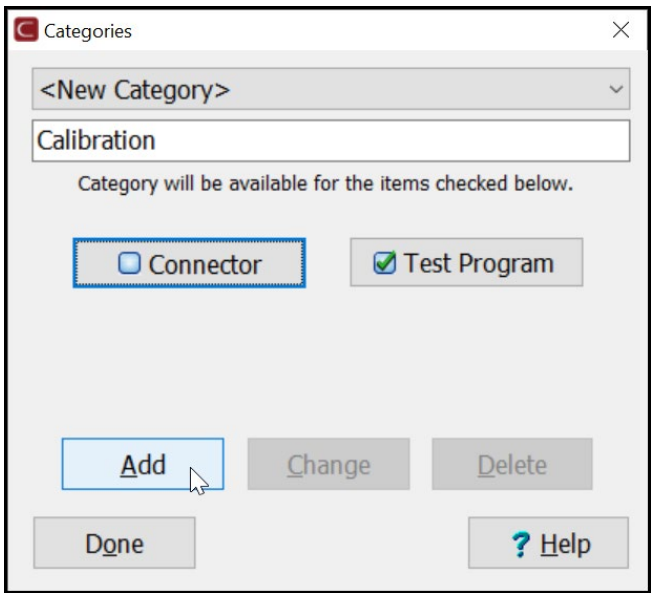
If the Calibration Category does not already exist,

1. From the **Main Menu** > **Utilities > Category Maintenance.**



2. In the Categories dialog, enter **Calibration** as a New Category, select the **Test Program** check box, and click **Add**.

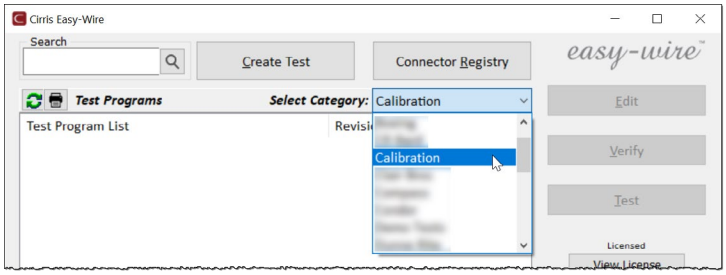
   Return to the Easy-Wire Main Menu.



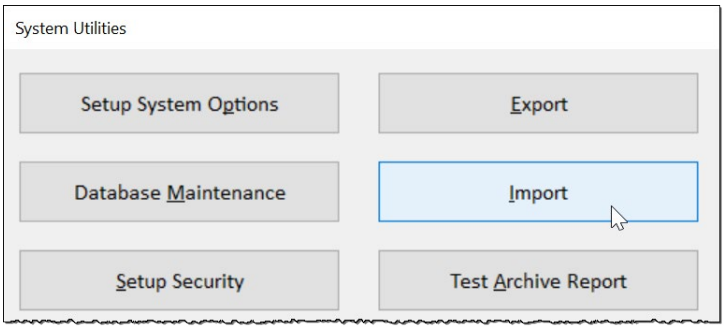
3.3 Import the Calibration Files

Import the 8100 Performance Verification files.

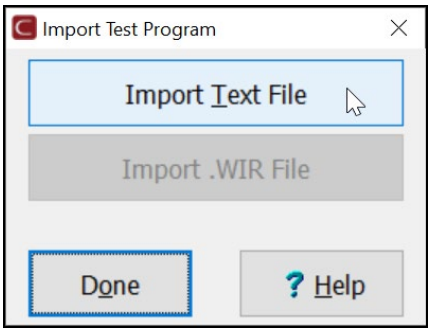
1. On the Easy-Wire Main Menu, select **Calibration** from the **Select Category** drop-down list.



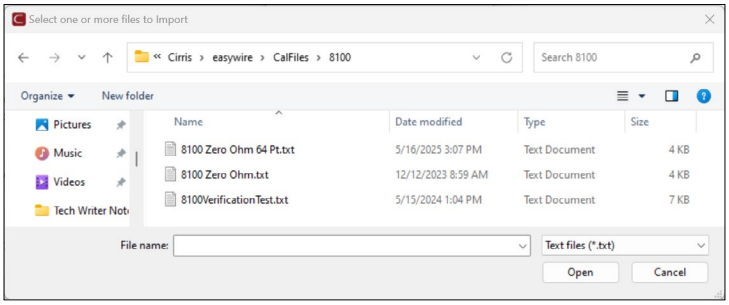
2. From the **Main Menu** > **Utilities** > **Import**.



3. In the Import Test Program dialog, select **Import Text File**.

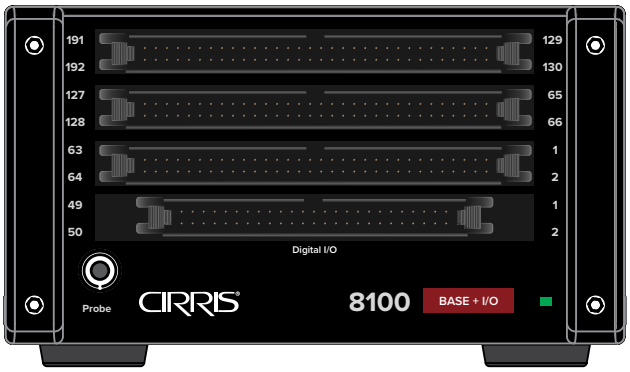


4. Navigate to folder: C:\Users\Public\Documents\Cirris\easywire\CalFiles\8100.



Most users should select the **8100 Zero Ohm.txt** and **8100VerificationTest.txt** files and click **Open** to import the files.

For testers that have only 64 test points *(with or without the Digital I/O option) AND no connected Expansions*, select the **8100 Zero Ohm 64 Pt.txt** and **8100VerificationTest.txt** files and click **Open** to import the files.



For testers with a full Base (192 test points with Digital I/O or 256 Test Points without) or for any Base connected to an Expansion, import the files **8100VerificationTest.txt** and **8100 Zero Ohm.txt**.

For testers with only 64 test points (with or without Digital I/O) AND no connected Expansions, import the files **8100VerificationTest.txt** and **8100 Zero Ohm 64 Pt.txt**.

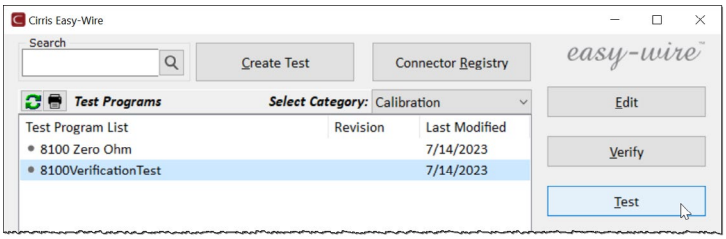
Note: If desired, all three files can be imported and then the programs selected as needed at the time of verification.

5. Easy-Wire will display a message indicating the files were successfully imported. Click **OK** to return to the **Utilities** menu and then **Done** to return to the **Main Menu**.

As the **Calibration** category was selected in Step 1, the test program files will be located in this category.

4. The Verification Test

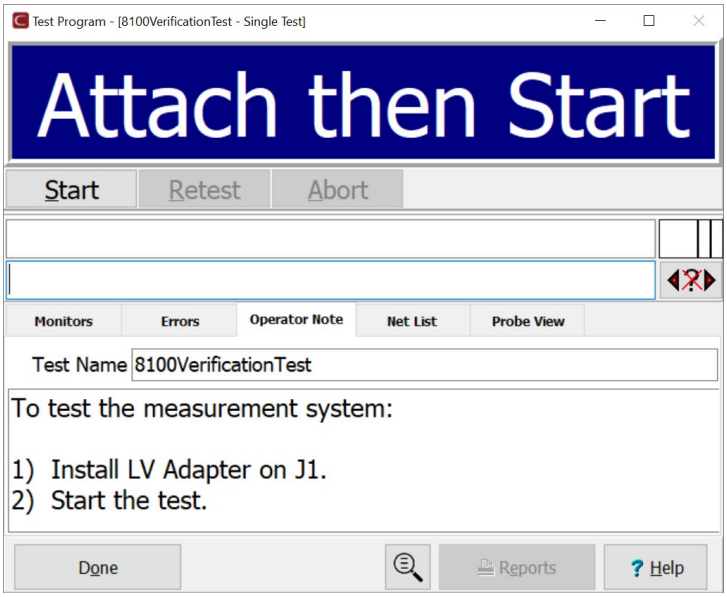
1. From the Easy-Wire **Main Menu**, with the **Calibration** category still selected, highlight the **8100VerficationTest** and click **Test** to open the Test Window.



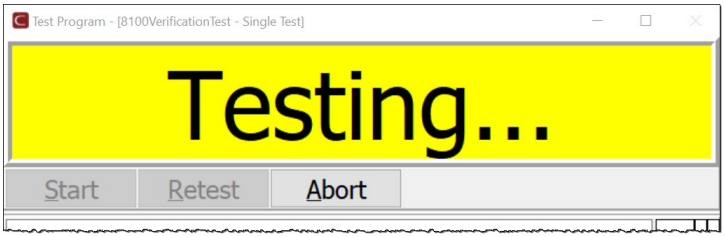
2. Follow the instructions in the Test Window and install the 8100 Cal Adapter on connector J1 on the Base Unit. J1 is the bottom connector on the Base Unit (points 1 - 64).

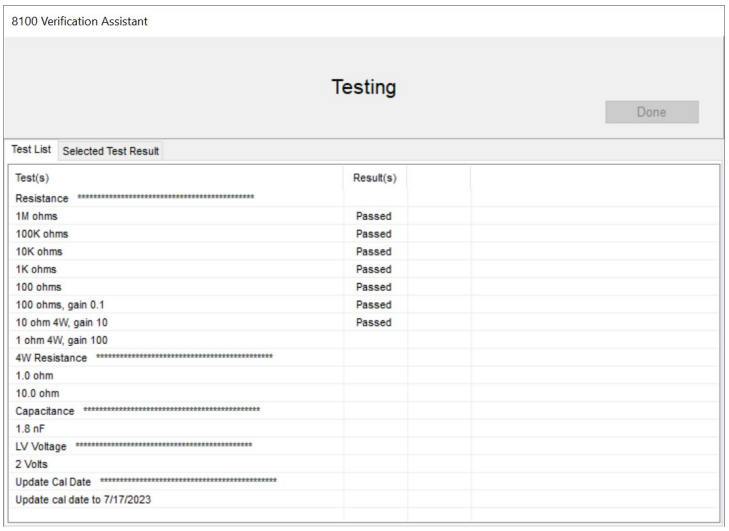
   Click **Start** to begin the verification test.

   *Note: If the tester is equipped with optional Digital I/O, **J1** will be the first connector above the 50-position Digital I/O connector.*



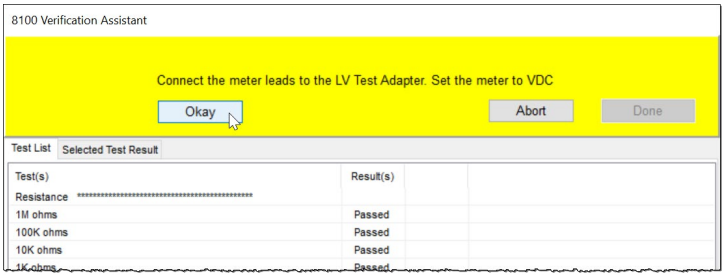
3. The Test Window will display a Testing status and the 8100 Verification Assistant Window will open. The Verification Assistant Window displays results as they are logged, which can take several minutes, and it will display further instructions.



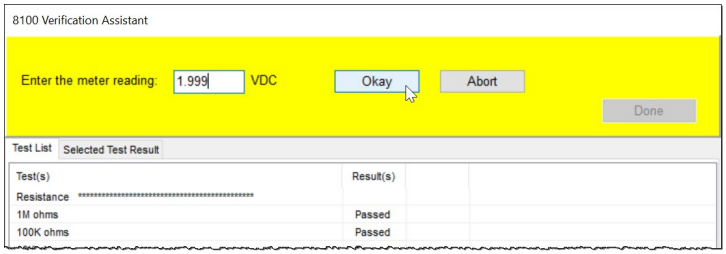


4. When instructed in the 8100 Verification Assistant Window, set the meter to measure DC Voltage and connect the positive (red) meter lead to the jack marked + on the adapter and the negative (black) meter lead to the position marked — on the adapter.

Click **Okay** after the meter is connected and when ready to proceed.

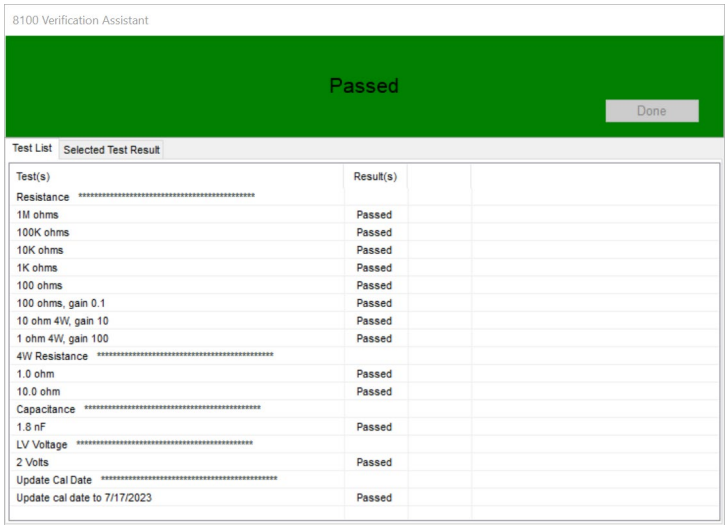


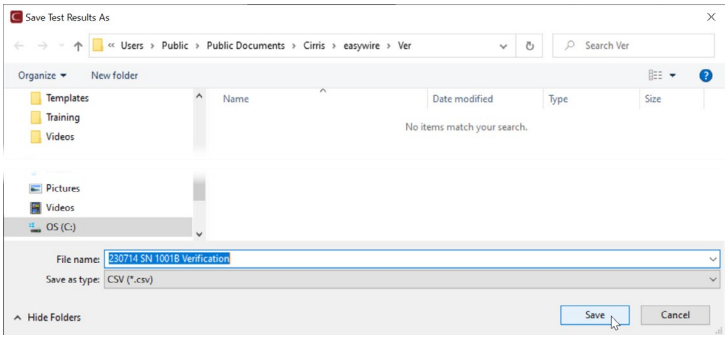
5. As instructed in the 8100 Verification Assistant Window, enter the meter reading in the text box and click **Okay**.



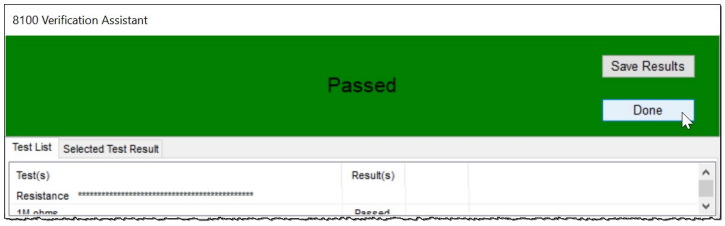
6. If all the measurements, and the meter reading, are within acceptable limits the verification test will pass and the 8100 Verification Assistant Window will display a **Passed** condition. The user will be prompted to save the 8100 Verification Data Report in a CSV formatted file. Navigate to the preferred location and enter the desired name before saving the file.

See an example of the results file on the following page.





Click Done when finished to close the 8100 Verification Assistant Window finish the test.



Example of the Verification Data Report:

easy-wire 8100 Verification Data Report

Cirris Inc.
401 North 5600 West
Salt Lake City UT 84116

Verification Passed Date: 7/14/2023 8:19:31 AM
easy-wire 2023.2.1.8020 measurement system ID 0 with 256 points. Unit ID: 230714 SN 1001B Verification

****
Test Group: Resistance -- Passed
****

Test Name	Test Result	Average Measured	Expected Value	Exp. Max	Exp. Min	Number Samples	Meas. Max	Meas. Min	Std. Dev.	Units	Trouble
1M ohms	Passed										
-Resistance	Passed	1.001	1	1.02	0.98	1000	1.001	1	0	MOhms	
100K ohms	Passed										
-Resistance	Passed	99.9	100	102	98	1000	100	99.9	0	kOhms	
10K ohms	Passed										
-Resistance	Passed	10.01	10	10.2	9.8	1000	10.01	10	0	kOhms	
1K ohms	Passed										
-Resistance	Passed	1	1	1.02	0.98	1000	1.001	0.999	0	kOhms	
100 ohms	Passed										
-Resistance	Passed	100.1	100	102.1	97.9	1000	100.2	100	0	Ohms	
100 ohms gain 0.1	Passed										
-Resistance	Passed	100.1	100	102.1	97.9	1000	100.2	100	0	Ohms	
10 ohm 4W gain 10	Passed										
-4WResistance	Passed	9.993	10	10.201	9.799	1000	10.001	9.988	0.002	Ohms	
1 ohm 4W gain 100	Passed										
-4WResistance	Passed	1.0001	1	1.021	0.979	1000	1.0019	0.9985	0.0005	Ohms	

****
Test Group: 4W Resistance -- Passed
****

Test Name	Test Result	Average Measured	Expected Value	Exp. Max	Exp. Min	Number Samples	Meas. Max	Meas. Min	Std. Dev.	Units	Trouble
1.0 ohm	Passed										
-4WResistance	Passed	1.0004	1	1.021	0.979	1000	1.0019	0.999	0.0005	Ohms	
10.0 ohm	Passed										
-4WResistance	Passed	9.993	10	10.201	9.799	1000	10.002	9.988	0.002	Ohms	

****
Test Group: Capacitance -- Passed
****

Test Name	Test Result	Average Measured	Expected Value	Exp. Max	Exp. Min	Number Samples	Meas. Max	Meas. Min	Std. Dev.	Units	Trouble
1.8 nF	Passed										
-Capacitance	Passed	1.804	1.8	2.03	1.57	1000	1.822	1.783	0.006	nF	

****
Test Group: LV Voltage -- Passed
****

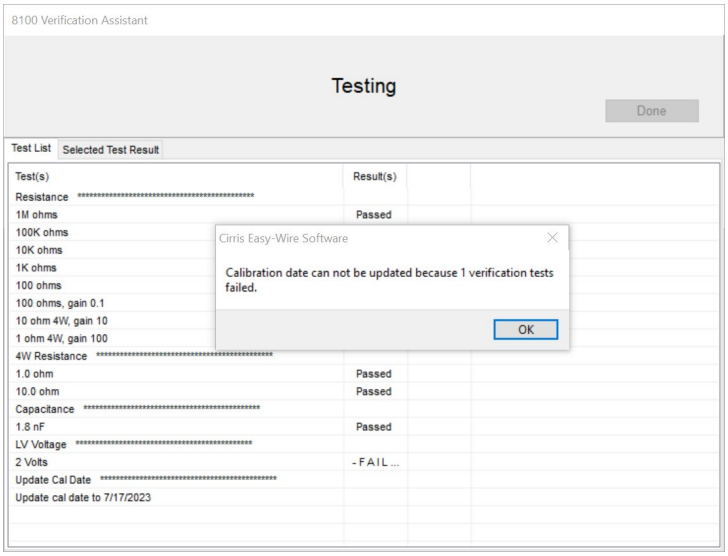
Test Name	Test Result	Average Measured	Expected Value	Exp. Max	Exp. Min	Number Samples	Meas. Max	Meas. Min	Std. Dev.	Units	Trouble
2 Volts	Passed										
-Voltage	Passed	2.0009	2	2.11	1.89	1	2.0009	2.0009	0	V	
-Meter Voltage	Passed	1.999	2	2.11	1.89	1	1.999	1.999	0	V	

****
Test Group: Update Cal Date -- Passed
****

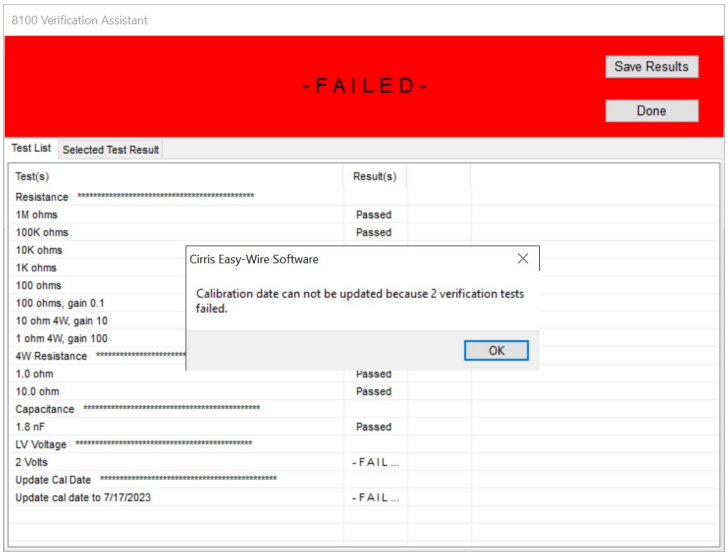
Test Name	Test Result	Average Measured	Expected Value	Exp. Max	Exp. Min	Number Samples	Meas. Max	Meas. Min	Std. Dev.	Units	Trouble
Update cal date to	Passed										

7. If any measurements, or the meter reading, is outside acceptable limits, the verification test will fail. If this occurs, messages are displayed that inform the user that the tester's calibration date cannot be updated.

Click **OK** in to close the each message.



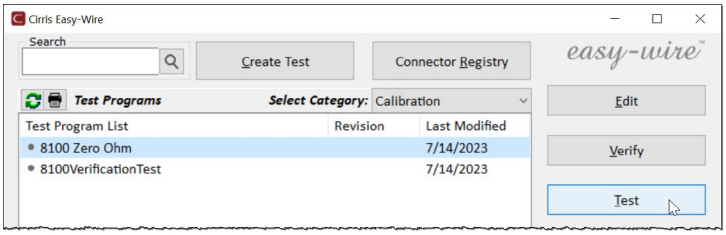
A failed result indicates that the Base Unit requires service. Contact your Cirris representative for assistance.



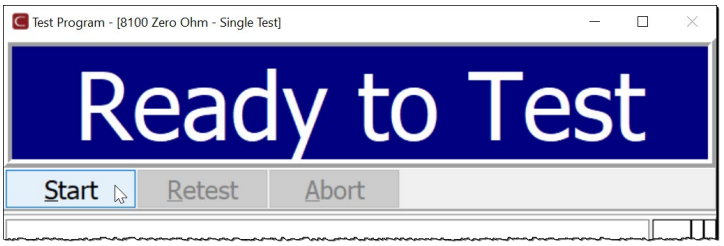
5. The Zero Ohm Test

1. From the Easy-Wire **Main Menu**, with the **Calibration** category still selected, highlight the **8100 Zero Ohm** test and click **Test**.

   If the Base is equipped with only 64 test points AND no Expansions are connected, select the **8100 Zero Ohm 64 Pt** test and click **Test**.



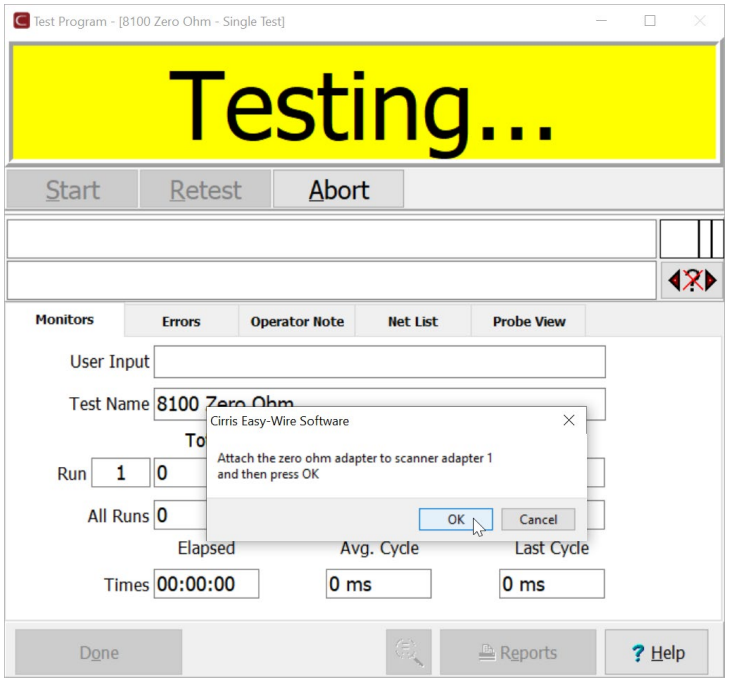
2. When the Test Window opens, click **Start** to begin the test.



3. Follow the instructions in the Test Window and install the 8100 Zero Ohm Adapter on connector J1 of the Base Unit. J1 is the bottom connector on the Base Unit (points 1 - 64).

   *Note: If the tester is equipped with optional Digital I/O, **J1** will be the first connector above the 50-position Digital I/O connector.*

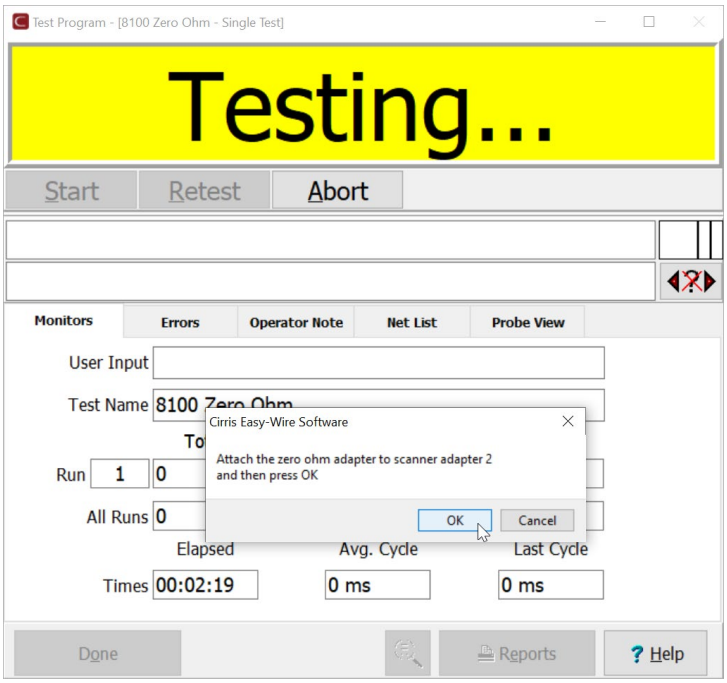
   Click **OK** when ready to proceed.



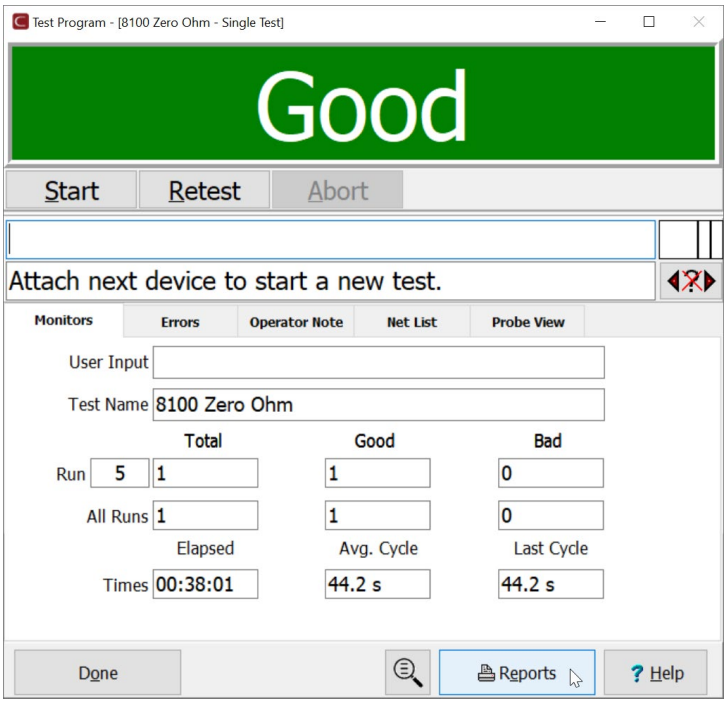
4. As each connector is tested, the user is prompted to advance the 8100 Zero Ohm Adapter to the next connector position in the test system. If the system consists of only a Base, the user will be prompted to move the adapter through all four connectors. If the system includes Expansion Units, the user will prompted to move the adapter until all connectors on the system have been tested.

After attaching the Zero Ohm Adapter as instructed, click **OK** to continue.

Note: If the tester is equipped with only 64 test points, the test is now complete (continue to step 5).

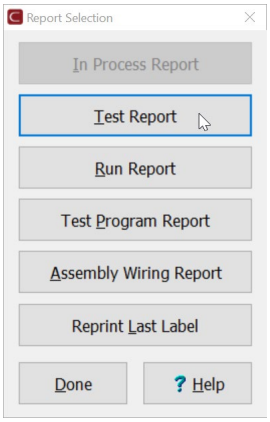


5. If all the connectors pass the test, the Test Window will display a green **Good** header when the test is complete.

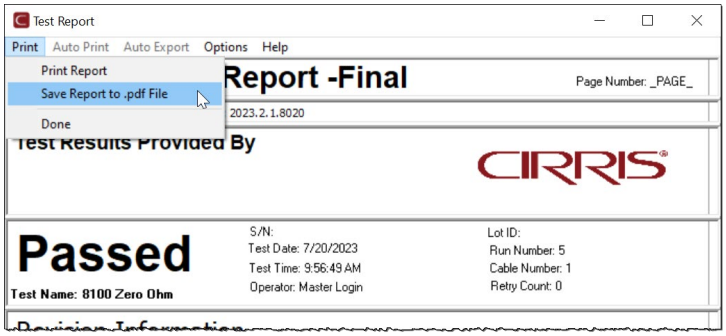


To print or export a copy of the results, click **Reports** and select **Test Report** in the **Report Selection** dialog that opens. Follow the on-screen instructions to save the results before viewing.

Note: *The Zero Ohm Test Program can also be revised to automatically print or export the Test Report at the end of the test. See the video referenced at the bottom of this section for additional information about editing reports. The section on Report Outputs starts at 9:32 of the video.*



When the report opens, select **Print** from the Menu Bar to print a hard copy or save the report to a PDF file.

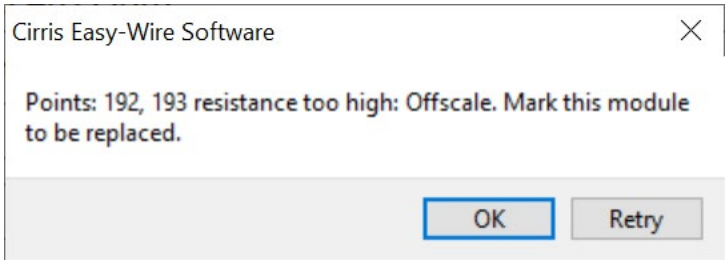


Close the report and select **Done** in the Test Window to return to the Main Menu.

The Test Report can also be accessed from the Easy-Wire database **Main Menu** > **Utilities** > **Search Test Archives** to open the **Report View Options** dialog. The results can be searched here by test date or test name. Click the **Help** button in the dialog window for assistance.

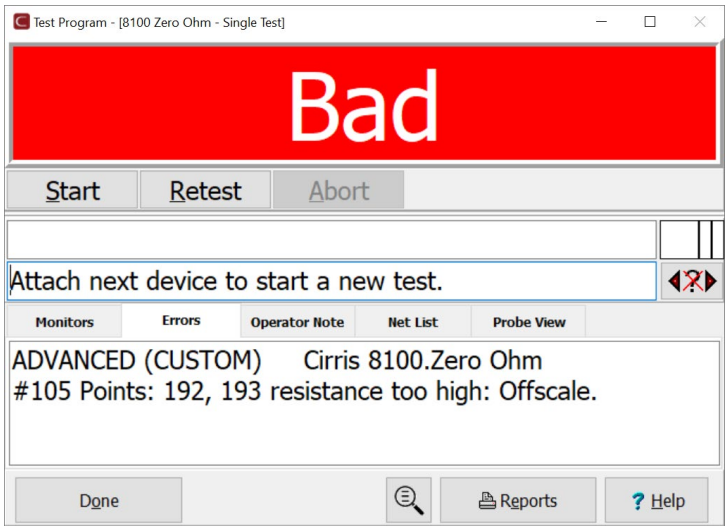
A video that describes editing the Test Report format can be found on the Cirris YouTube channel here.

6. If any points fail the Zero Ohm Test, a message will be displayed showing the point(s) involved and giving the user the option to select **OK** to accept the errors, or **Retry** to try again. Retrying gives the user an opportunity to ensure that the Zero Ohm adapter is properly positioned and securely attached before clicking **Retry**.



7. If the final condition is a failure, the Test Window will display a red **Bad** header and the Errors tab will display a list of the failures.

   Units that include points that fail the Zero Ohm Test should be serviced to resolve the issue. Contact your Cirris representative for assistance.



6. Help / Support

For assistance with any of the topics covered in this manual:

- Contact our Technical Support staff by email at TechSupport@cirris.com
- In the United States, contact our technical support team by telephone at 801-973-4600, extension 666 (or ask for Tech Support)
- Outside the United States, call +1-801-973-4600 or visit www.cirris.com to find the Cirris representative that supports your local territory.
- Visit www.cirris.com/learning-center to access articles on Cirris products and other testing subjects.

7. Appendix

The following references and suggestions may be useful to those new to formal calibration and quality practices.

Quality Standards

The ANSI/NCSL Z540.3 and ISO 17025 standards document requirements for the calibration of measuring and test equipment. The Z540.3 standard can be acquired from the National Conference of Standards Laboratories International (NCSL) at www.ncsli.org. The ISO standard can be acquired from the International Standards Organization (ISO) on their web site www.iso.net. Both standards provide valuable insight into calibration best practices.

Foundational Calibration Principles

Recall System

Use a tickler card file or computerized database recall system to ensure that measurement equipment is calibrated on schedule. This system should include calibration dates, due dates, calibration sources, and any other pertinent information.

Verification Labels

After calibration / verification, the quality standards require that a label indicating the calibration status be affixed to the instrument. This ensures that users will have ready access to the calibration status and helps avoid the inadvertent use of uncalibrated, or out-of-calibration, measurement equipment. The labels should include the instrument serial number, the calibration date, the calibration due date, and the name of the individual that performed the calibration. A good source of inexpensive labels is United Ad Label (www.unitedadlabel.com).

Measurement Uncertainty

Older standards referenced TUR (test uncertainty ratio) or TAR (test accuracy ratio) and suggested a 4:1 ratio between the accuracy of the measurement instrument and the accuracy of the instrument being calibrated. However, current standards emphasize the calculated measurement uncertainty. Many resources addressing the topic are available on the Internet.

Performance Verification Certificate

The Performance Verification Certificate is a record of who, when, and with what equipment the instrument was calibrated / verified. A suggested 8100 Performance Verification Certificate is provided on the next page.

Data Reports

The 8100 Verification Data Report and the Zero Ohm Test Report described previously in this manual record the values measured during the verification process relative to the tester's published specifications. This format is designed to satisfy the data requirements of the standards.

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 acceptable accuracy.

8100 Performance Verification Certificate

Name and Address of Organization:			
Certificate Number:		Performed by:	
Calibration Date:		Due Date:	
Applicable Quality Standard(s):		Procedure: 8100 Performance Verification Manual, Version	
Temperature:		Relative Humidity:	
Tester Serial Number:			
Instrument Used	Serial Number	Calibration Date	Calibration Due Date
8100 Cal Adapter			
8100 Zero Ohm Adapter			
Meter			
Statement of Traceability:			
Certified by:			

8100 Performance Verification Manual
Version 2025.2.0

CIRRIS®
A KOMAX COMPANY

401 North 5600 West
Salt Lake City, Utah 84116
USA.
www.cirris.com