Signature 1100R+

Performance Verification Manual

Version 2018.2.0

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CIRRIS®

(ISO 9001 Certified)

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Performance Verification Manual

Version 2018.2.0

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Introduction

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

You should run performance verification on your 1100R+ tester at least once a year, and any time you suspect that the tester is not operating properly. If any 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 calibration standards such as ANSI/NCSL Z540-1, and ISO 10012-1, see the appendix of this manual.

Disclaimer

All calibration procedures are performed in-house at the factory. Older versions of the software may use the word “calibration” during the verification process. Note that in these instances “calibration” means “verification”.

Parts List

Make sure you received the following parts:

- **Zero Ohm Adapter**

- **Resistor Leak Adapter**

- **Capacitance/Fourwire Adapter**

Setting Up

Performance Verification Certificate and Data Sheet

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

Install Add-on Scanners

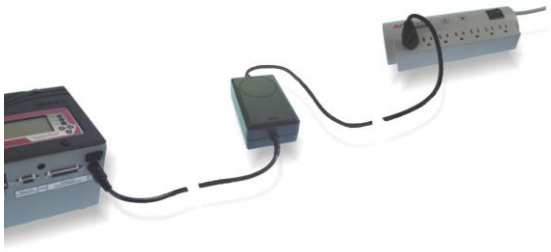
The examples in this manual use an 1100R+ with no expansion boxes.

1. Install any add-on scanners you want to use. For instructions, see the 1100R+ Getting Started Guide.

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.*

Plug in the Tester

1. Connect the power cord to the power supply and connect the power supply to the tester. Plug the tester into a grounded power outlet.



Signal Routing Sytem Test

1. From the tester's Main Menu, press **Set Up Test Program, Create New Test,** and then press **Set Learn Settings.** Set the Learn Settings to the following values:

Learn Settings	
Setting	**Value**
Connection Resistance	.1 Ω
LV Insulation Resistance	5M Ω
Set Components	OFF for all components

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

3. Press the BACK button and then press **LEARN.** The tester will learn the cable and display the CABLE LEARNED screen. The screen will display TEST:7F5527-6M020 where 7F5527-6M020 is the cable signature. Write the signature you see on the verification sheet. Compare it with the Correct Signature shown on the sheet and check off either Pass or Fail.

4. Remove the Zero Ohm Adapter and place it in the J3-J4 position as shown.

5. From the Main Menu, press Set Up Test Program, Create New Test, and then press LEARN. The tester will learn the cable and display the CABLE LEARNED screen. The screen will display TEST:94C424-6M020 where 94C424-6M020 is the cable signature. Write the displayed signature on the verification sheet. Compare it with the Correct Signature shown on the sheet and check off either Pass or Fail.

6. If you have installed expansion boxes, continue the verification test by moving the Zero Ohm Adapter to each of the "J" positions and running the test. For each test, press Set Up Test Program, Create New Test, and then press LEARN. The tester will learn the cable and display the CABLE LEARNED screen. The screen will display TEST:xxxxxx-xxxxx where xxxxxx-xxxxx is the cable signature. Write the displayed signature on the verification sheet. Compare it with the Correct Signature shown on the sheet and check off either Pass or Fail.

The following table lists the correct signatures for all the adapter "J" positions.

"J" Position for Zero Ohm Adapter	**Correct Signature**		**"J" Position for Zero Ohm Adapter**	**Correct Signature**
J1-J2	7F5527-6M020		J17-J18	8CE799-6M020
J3-J4	94C424-6M020		J19-J20	18483C-6M020
J5-J6	5CC1A1-6M020		J21-J22	3476BF-6M020
J7-J8	D3A34A-6M020		J23-J24	B5D5D5-6M020
J9-J10	51A15E-6M020		J25-J26	1E83A5-6M020
J11-J12	C50EFB-6M020		J27-J28	8A2C00-6M020
J13-J14	E93078-6M020		J29-J30	A61283-6M020
J15-J16	719A99-6M020		J31-J32	3BA461-6M020

Resistance Measurement System Test

1. From the Main Menu, press **Set Up Test Program**, and then **Create New Test.**

2. Press **Set Learn Settings** and set the Learn Settings to the following values:

Learn Settings	
Setting	**Value**
Connection Resistance	.1 Ω
LV Insulation Resistance	5M Ω
Set Components	OFF for all components

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

4. From the Main Menu, press **Set Up Test Program, Create New Test,** and then press **LEARN.** The tester will not learn the cable and display the LEARN ERRORS screen. Press **View Errors,** to view the resistance errors.

5. Write the displayed resistance value on the Displayed Value blank found on the data sheet. Compare the resistance value displayed by the tester with the Resistor Value shown in the table on the data sheet. This value is also shown in the table below.

    - If the displayed resistance falls between the MAXimum and MINimum resistance limits shown in the table, check off Pass.

    - If the displayed resistance value falls outside the resistance limits shown in the table, check off Fail.

6. Continue scrolling through all the errors until you have recorded and checked all of the values shown below.

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

Resistance Threshold System Test

500k Threshold Test

1. From the Main Menu, press **Set Up Test Program** and then **Create New Test.**

2. Press **Set Learn Settings** and set the Learn Settings to the following values:

Learn Settings	
Setting	**Value**
Connection Resistance	100k Ω
LV Insulation Resistance	500k Ω
Set Components	OFF for all components

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

4. With the values set, press **LEARN.** The tester will learn the cable and display the CABLE LEARNED screen.

5. The tester should display TEST:EB4F69-6H6E0. Write the displayed signature on the verification sheet under Insulation Resistance Test at 500k ohms. If the displayed signature matches the correct signature, check off Pass. Otherwise, check off Fail.

6. Press **TEST:EB4F69-6H6E0** to test the resistance threshold at 500k ohms.

7. The tester will display FAILED: LOW VOLTAGE. Press **View Errors** to view the High Resistance Error.

8. Verify the tester reports the High Resistance Error is between J1B016 and J1A016 and check off Pass or Fail on the verification sheet under Insulation Resistance Test at 500k ohms. The actual value for the error will be different on each tester.

1M Threshold Test

1. From the Main Menu, press **Set Up Test Program** and then **Create New Test.**

2. Press **Set Learn Settings** and set the Learn Settings to the following values:

Learn Settings	
Setting	**Value**
Connection Resistance	500k Ω
LV Insulation Resistance	1M Ω
Set Components	OFF for all components

3. Make sure the Resistor Leak Adapter is installed in the J1-J2 position.

4. With the values set, press LEARN. The tester will learn the cable and display the CABLE LEARNED screen.

5. The tester will display TEST:75698A-6K6H0. Write the displayed signature on the verification sheet under Insulation Resistance Test at 1M ohms. If the displayed signature matches the correct signature, check off Pass. Otherwise, check off Fail.

6. Press **TEST:75698A-6K6H0** to test the resistance threshold at 1M ohms.

7. The tester will display FAILED: LOW VOLTAGE. Press the View Errors button to view the High Resistance Error.

8. Verify the tester reports the High Resistance Error is between J1A022 and J1A023 and check off Pass or Fail on the verification sheet under Insulation Resistance Test at 1M ohms. The actual value for the error will be different on each tester.

5M Threshold Test

1. From the Main Menu, press **Set Up Test Program** and then **Create New Test.**

2. Press **Set Learn Settings** and set the Learn Settings to the following values:

Learn Settings	
Setting	**Value**
Connection Resistance	1M Ω
LV Insulation Resistance	5M Ω
Set Learn Components	OFF for all components

3. Make sure the Resistor Leak Adapter is installed in the J1-J2 position.

4. From the Main Menu, press Set Up Test Program, Create New Test, and then press LEARN. The tester will learn the cable and display the CABLE LEARNED screen.

5. The tester should display TEST:CEF39B-6M6K0. Write the displayed signature on the verification sheet under Insulation Resistance Test at 1M ohms. If the displayed signature matches the correct signature, check off Pass. Otherwise, check off Fail.

6. Press **TEST:CEF39B-6M6K0** to test the resistance threshold at 5M ohms.

7. The tester should display FAILED: LOW VOLTAGE. Press the View Errors button to view the High Resistance Error.

8. Verify the tester reports the High Resistance Error is between J1A020 and J1A021 and check off Pass or Fail on the verification sheet under Insulation Resistance Test at 5M ohms. The actual value for the error will be different on each tester.

Capacitance Measurement System Test

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

2. From the Main Menu, press Set Up Test Program and then Create New Test. Set the Learn Settings to the following values:

Learn Settings	
Setting	**Value**
Connection Resistance	1 Ω
LV Insulation Resistance	100k Ω
Set Learn Components	Capacitor ON OFF for all other components

3. From the Main Menu, press Set Up Test Program, Create New Test, and then press LEARN. The tester will learn the cable and display the CABLE LEARNED screen.

4. The tester should display TEST:3F6323-MULTI. Write the displayed signature on the verification sheet under Capacitance Measurement Test. If the displayed Signature matches the correct signature, check off Pass. Otherwise, check off Fail.

5. At the CABLE LEARNED screen, press Verify Test. Verify the tester reports five connections.

    - 1 J1A001 J1A002 J1A003 J1A004
    - 2 J1A005 J1A006
    - 3 J1A007 J1A008
    - 4 J1A009 J1A010
    - 5 J1A011 J1A012

    Check off Pass or Fail for each connection on the verification sheet under Capacitance Measurement Test.

6. Continue scrolling to verify the tester reports the correct capacitance measurement for points J1A005 and J1A011. Write the displayed capacitance value on the verification sheet. Compare this capacitance value with the value shown below. If the displayed capacitance falls between the Maximum and Minimum limits, check off Pass. Otherwise, check off Fail.

Correct Capacitance	Minimum Limit	Maximum Limit
1.41 µF	1.27 µF	1.55 µF

4-Wire Measurement System Test

1. Install the Capacitance/4-Wire adapter in the J1-J2 position on the tester as shown.

2. At the Main Menu, press **Set Up Test Program,** press the down button, and then press **Load 4W Cal Test.** The tester will display TEST RETRIEVED.

3. At the TEST RETRIEVED screen, the tester should display TEST:7427A0-MULTI. Write the displayed signature on the verification sheet under Fourwire Test. If the displayed signature matches the correct signature, check off Pass. Otherwise, check off Fail.

4. From the Main Menu, press **TEST:7427A0-MULTI** to test the fourwire resistance measurement system.

5. The tester will display FAILED: LOW VOLTAGE. Press the View Errors button to view the error.

6. Verify the tester reports a BAD 4W RESISTOR error between J1A001 and J1A003. The tester expects a measured value of 0.2 ohms (±2% ±.005 ohm). It should display a measured value between 0.191 and 0.209 ohms. Check off Pass or Fail on the verification sheet under “4-Wire Measurement System.”

Appendix

The following information can be used 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 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. You can also review the ISO standards from the International Standards Organization (ISO) at their web site www.iso.net.

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 a 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.
- **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 insturment 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. An 1100R+ 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 an 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 to be recorded in relation to the instrument specifications. A verification data report can fill this requirement. You can photocopy the 1100R+ Verification Data Report from the Appendix and fill it out.

- **Traceability**
  Traceability refers to each unbroken link of valid verificationsoh going back to national standards such as those maintained by the NIST in the United States. To maintain traceablity, 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 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, contact Cirris for a copy of the position paper from the National Conference of Standards Laboratories.

1100R+ Performance Verification Certificate

Name and Address of Organization:	
Certificate Number:	**Performed by:**
Verification Date:	**Due Date:**
Applicable Quality Standard(s):	**Procedure:** 1100R+ Performance Verification Manual Version _____
Temperature:	**Relative Humidity:**
Tester Serial Number:	

Instruments used:	**Serial Number**	**Cal. Date**	**Due Date**
Zero Ohm Adapter			
Resistor Leak Adapter			
Capacitance/Fourwire Adapter			

Statement of Traceablility:

Certified by:

1100R+ 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	7F5527-6M020			
J3-J4	94C424-6M020			
J5-J6	5CC1A1-6M020			
J7-J8	D3A34A-6M020			
J9-J10	51A15E-6M020			
J11-J12	C50EFB-6M020			
J13-J14	E93078-6M020			
J15-J16	719A99-6M020			
J17-J18	8CE799-6M020			
J19-J20	18483C-6M020			
J21-J22	3476BF-6M020			
J23-J24	B5D5D5-6M020			
J25-J26	1E83A5-6M020			
J27-J28	8A2C00-6M020			
J29-J30	A61283-6M020			
J31-J32	3BA461-6M020			

Resistance Measurement System

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

Resistance Threshold System

- **500k Ω Test**

Correct Signature	Displayed Signature	Pass	Fail
EB4F69-6H6E0			

High Resistance Error between:	Pass	Fail
J1B016 and J1A016		

- **1M Ω Test**

Correct Signature	Displayed Signature	Pass	Fail
75698A-6K6H0			

High Resistance Error between:	Pass	Fail
J1A022 and J1A023		

- **5M Ω**

Correct Signature	Displayed Signature	Pass	Fail
CEF39B-6M6K0			

High Resistance Error between:	Pass	Fail
J1A020 and J1A021		

Capacitance Measurement System

Correct Signature	Displayed Signature	Pass	Fail
3F6323-MULTI			

Connection List	Pass	Fail
1 J1A001 J1A002 J1A003 J1A004		
2 J1A005 J1A006		
3 J1A007 J1A008		
4 J1A009 J1A010		
5 J1A011 J1A012		

Correct Capacitance	Minimum Capacitance	Maximum Capacitance	Displayed Value	Pass	Fail
1.41 µF	1.27 µF	1.55 µF			

4-Wire Measurement System

Correct Signature	Displayed Signature	Pass	Fail
7427A0-MULTI			

Bad 4W Resistor Error between J1A001 and J1A003	Minimum Value	Maximum Value	Pass	Fail
0.2 Ω ± 2 % ± 0.005 Ω	0.191 Ω	0.209 Ω		