Signature 1000HN Cable Analyzer Performance Verification Manual

Version 4.0
Major Revision
1 December, 1999

CIRRIS
An ISO 9001 Certified Company

Signature 1000HN Cable Analyzer Performance Verification Manual

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1991 Parkway Boulevard
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United States of America

Visit our web site at www.cirris.com

I Need Your Help!

As Senior Editor, it's my responsibility to constantly improve the manuals and other documentation we include with our equipment. We try hard, but we know we'll never please everyone. If you were in my chair, how would you change the documentation to make it better? Here's your chance to take gripes, suggestions and (we hope) praise directly to the guy who can change things. Please fax or mail this form to me, or contact me by e-mail.

Thanks!

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1000HN Performance Verification Manual (Version 4.0)

Attach more pages if needed

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Table of Contents

General Information

Firmware

The firmware version your analyzer is equipped with is displayed as the analyzer powers up.

If you need to upgrade the firmware in your Cirris 1000HN, telephone Cirris at 801-973-4600 or 800-441-9910.

Things to remember

- You should check the calibration of your 1000HN at least once per year. Also check the calibration whenever you suspect the analyzer may not be working properly. You **cannot** adjust the calibration yourself. If the analyzer does not pass the calibration tests, telephone Cirris at 801-973-4600 or 800-441-9910.

- Keep the adapter receptacles and the area surrounding the analyzer free from dust, metal particles, and other debris. Keep all liquids away from your 1000HN. Liquid spills can pose a health hazard, can severely damage the analyzer, and will immediately void its warranty.

- **If you are wearing a cardiac pacemaker, an insulin pump, or any other electronically controlled medical device**, you should not do high voltage testing using the Cirris 1000HN.

Your packing list

In addition to your analyzer (with its wall transformer power supply) and this manual, you will need a Zero Ohm Adapter, and a 1000H/2000H Resistance Adapter.

Important Note!: For hipot testing at 630 volts DC, you will need a special voltmeter. This voltmeter must be capable of measuring at least 700 volts DC. Many ordinary voltmeters cannot safely measure this much voltage.

Set Up the Analyzer, Perform the Calibration

Set up the hardware

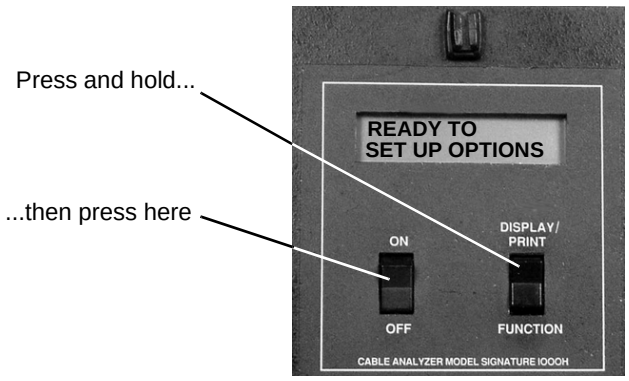
To prepare the analyzer's hardware for calibration, do these things:

- Install an expansion box if you want to use one. For information on how to do this, see your *1000HN User's Guide*. **Note**: In our examples, we'll use a 1000HN with no expansion box.
- Make sure the analyzer is turned off, then connect the power cord to the analyzer, and plug the wall transformer into a live, well-grounded wall outlet.

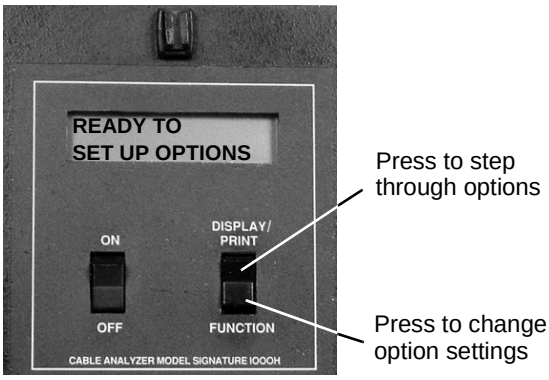
Set the options for testing signal routing

To set the test options for testing signal routing, do these things:

1. Press in and hold the Display/Print switch as you turn on the analyzer by pressing the On switch. Hold Display/Print until **Ready To Set Up Options** appears.



2. Once **Ready To Set Up Options** appears in the display, release Display/Print.



3. Select the **Create Test From** option by pressing Display/Print.

   • If the setting is **SAMPLE CABLE**, go on to the next option by pressing Display/Print

   • To change the option setting, press Function until **SAMPLE CABLE** appears, then go on to the next option by pressing Display/Print.

4. Continue stepping through the options by pressing Display/Print, changing the settings as necessary by pressing Function, until all the options are set as shown in this table: When you are done, **Ready to Learn** will appear on the display.

First Option Settings for Calibration	
Option	**Setting**
Create Test From	SAMPLE CABLE
Connection Resistance	<.5Ω
Hipot Voltage	OFF
Error Tones are	HIGH
Sorted Wire List is	OFF
Count All Cables is	OFF
Auto Print is	OFF

5. Turn the analyzer off.

What to do if you go past the value you want

If you want to go backward through either the options or settings, press in and hold the Memory button on the back of the analyzer, while pressing Display/Print or Function. **Note**: All options or settings will roll over to the beginning when you are going forward or backward.

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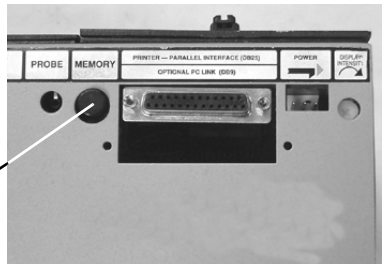


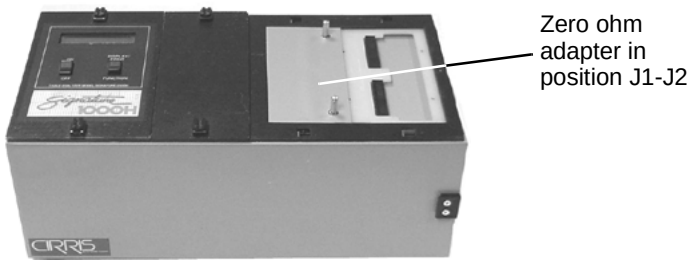
Get your data sheets ready

To make keeping track of your test results easy, we have provided a set of data sheets beginning on page 19. **PHOTOCOPY** these! That way, you will have clean sets of data sheets available whenever you need them. As you go through the calibration tests on your 1000HN, write your test results onto the photocopies.

Test the Signal Routing System

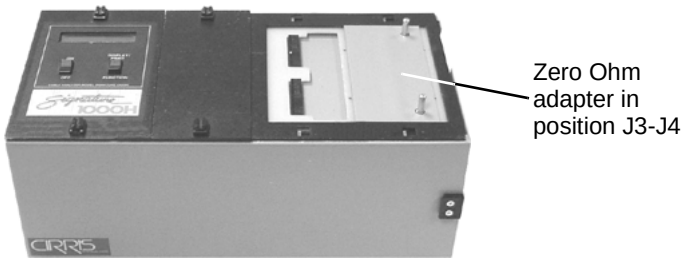
To test the signal routing system in your Cirris 1000HN, do these things:

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

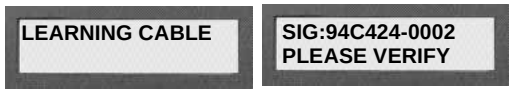


2. Turn on the analyzer. The analyzer will prompt **Learning Cable** for several seconds, then the prompt should change to **SIG:7F5527-0002 Please Verify**. Write the signature you see into the first row of Table 1 on the data sheet, compare it with the Correct Signature shown in the table, and check off either Pass or Fail. Turn off the analyzer.

3. Install the Zero Ohm Adapter in position J3-J4 as shown here.



4. Turn on the analyzer. The analyzer will prompt **Learning Cable** for several seconds, then the prompt should change to **SIG:94C424-0002 Please Verify**. Write the signature you see into Table 1 on the data sheet, compare it with the Correct Signature shown in the table, and check off either Pass or Fail. Turn off the analyzer..



5. If you have installed an expansion box, continue moving the Zero Ohm Adapter from "J" position to "J" position. At each "J" position, turn on the analyzer. If you are not using an expansion box, go directly to "Test the Resistance Measurement System."

    - Turn off the analyzer before you move the Zero Ohm Adapter to the next "J" position

    - Read the signature from the display, write it into Table 1 on the data sheet, compare the signature you see with the Correct Signature shown in the table on the data sheet, then check off Pass or Fail.

To make things easier, this table shows what the correct signatures should be for the two "J" positions on the expansion box.

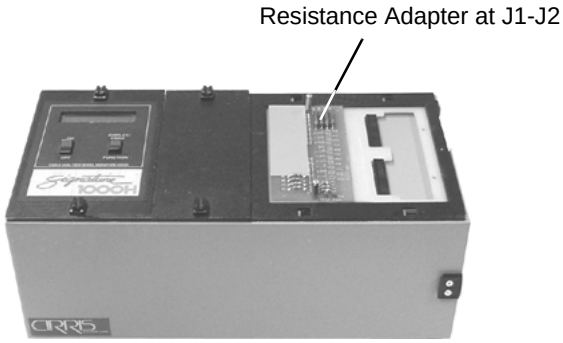
Zero Ohm Adapter in "J" Position	Correct Signature
J5-J6	5CC1A1-0002
J7-J8	D3A34A-0002

Test the Resistance Measurement System

To test the Resistance Measurement system in your Cirris 1000HN, do these things:

1. Check the test option settings. They should **not** have changed. See page 9 for details on how to do this.

2. Install the 1000H/2000H Resistance Adapter in position J1-J2 as shown here.



3. Turn on the analyzer. The analyzer will prompt **Learning Cable** for several seconds. The prompt will then change to **Learned Cable Resistance Error**.

4. Press Display/Print. The analyzer will prompt with a "J" value and the first of seven resistance values. Write the displayed resistance value into the Resistance Seen blank on row 1 of Table 2 in the data sheet. Compare the resistance value prompted by the analyzer with the Correct Resistance shown in the table on the data sheet. This value is also shown in the table below.

    - If the displayed resistance falls either on the Correct Resistance or 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.

5. Continue pressing Display/Print, working your way through six additional resistance values. Record them on the data sheet, compare the values as usual, and complete the usual check-off steps. Pressing Display/Print an eighth time should cause the prompt to change to **Learned Cable Resistance Error**.

6. Turn the analyzer off.

To make things easier, this table shows the correct resistances and the allowable ranges for each of the "J" positions.

"J" Position	Correct Resis.	MINimum Limit	MAXimum Limit
J1A002-J1A003	22.1 ohms	21 ohms	23.2 ohms
J1B002-J1B004	10.0 ohms	9.5 ohms	10.5 ohms
J1B003-J1B005	100 ohms	95 ohms	105 ohms
J1A004-J1A005	44.2 ohms	42.0 ohms	46.4 ohms
J1B006-J1B008	1000 ohms	950 ohms	1050 ohms
J1A006-J1A007	221 ohms	210 ohms	232 ohms
J1A008-J1A009	510 ohms	485 ohms	536 ohms
Only 7 "J" positions should be displayed. The analyzer's prompt then returns to "Learned Cable Resistance Error." All of the "J" position information list must match that shown here.			

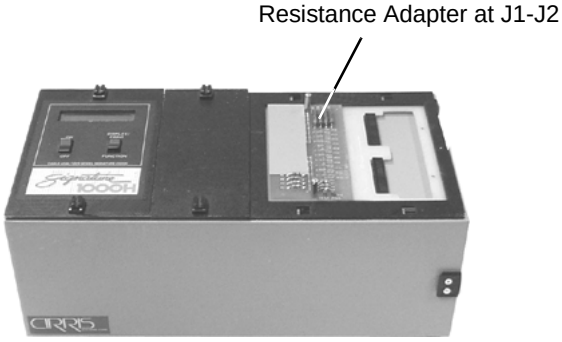
Test the Hipot System

Safety Warnings!! The remaining sections of the 1000HN performance verification procedure involve working with high voltages. These tests should be performed by someone experienced in working with such voltages.

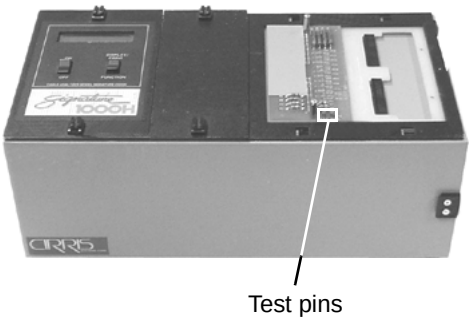
- **NO ONE** who is wearing a cardiac pacemaker, an insulin pump, or any electronically controlled medical device should do hipot testing using the Cirris 1000HN Cable Analyzer.
- For hipot testing at 630 volts, a ***special*** voltmeter will be required. This voltmeter must be capable of measuring at least 700 volts DC. Many common voltmeters cannot measure this much voltage.
- When you are measuring hipot voltages, begin the hipot test, measure the voltage with your voltmeter, then turn the analyzer off ***immediately***. High voltage may still be applied to the test points even when it is not showing on your voltmeter.

To test the hipot system in your Cirris 1000HN, do these things:

1. Be sure you have turned off the analyzer. The resistor adapter should still be installed in position J1-J2 as shown here.



2. Connect your voltmeter's probes to the test pins on the Resistance adapter. Be careful to get the polarity right!



3. Set your voltmeter's controls to measure at least 75 volts DC.

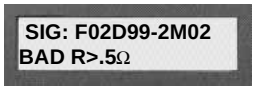
4. Reset the options to the settings shown in this table. (If you need instructions on how to do this, see page 9.) **Important!** Be careful setting the options. A mistake could cause the analyzer to apply high voltages when you don't expect them.

Option	Setting
CREATE TEST FROM	SAMPLE CABLE
CONNECTION RESIS.	<.5Ω
HIPOT VOLTAGE	50 Volts
INSULATION RESIS.	5MΩ
HIPOT DURATION	10 SEC.
APPLY HIPOT TO	ALL ADAPTER PINS
AUTO HIPOT	OFF
ERROR TONES	HIGH
SORTED WIRE LIST	OFF
COUNT ALL CABLES	OFF
AUTO PRINT	OFF

5. Turn on the analyzer. The analyzer will prompt **Learned Cable Resistance Error**.

6. Press in the Memory button on the back of the analyzer. The analyzer should prompt **SIG:F02D99-2M02 Please Verify**. Write the displayed signature into Table 3 on your data sheet. Compare the signature seen with the correct signature, then check off "Pass" or "Fail."

7. Press the Memory button one more time to verify the signature. The analyzer should prompt **SIG: F02D99-2M02 BAD R> .5Ω** .



8. Press Function to start the hipot test. The analyzer will prompt **Hipot Test**. Immediately read the voltage on your voltmeter (you have 10 seconds to do so).

9. Record the measured voltage in Table 4 on the data sheet, then turn off the analyzer. Do **NOT** wait for the hipot test to finish. Compare the results with the correct value in the data sheet table, then check off "Pass" or "Fail."

High voltage verification

To verify performance at high voltage, do these things

1. Reset the options (see page 9 for instructions on how to do this) to the settings shown below.

Option	Setting
CREATE TEST FROM	SAMPLE CABLE
CONNECTION RESIS.	<0.5Ω
HIPOT VOLTAGE	630 Volts
INSULATION RESIS.	5MΩ
HIPOT DURATION	10 SEC.
APPLY HIPOT TO	ALL ADAPTER PINS
AUTO HIPOT	OFF
ERROR TONES	HIGH
SORTED WIRE LIST	OFF
COUNT ALL CABLES	OFF
AUTO PRINT	OFF

Note! You have set the hipot voltage to 630 volts. **Be careful**. This can be a dangerous voltage to you and to your equipment.

2. Press Memory on the back of the analyzer. The analyzer should prompt **SIG: F02D99-EM02 Please Verify**. Write the displayed signature into Table 5 on the data sheet, then compare the values and check off either Pass or Fail as usual.

3. Press the Memory button a second time. The prompt should change to **SIG: F02D99-EM02 BAD R>.5Ω**.

4. Press Function. The analyzer will prompt **Hipot Test**.

5. Read the hipot voltage on your voltmeter (you have ten seconds to do so). Write the measured voltage into Table 6 on the data sheet, then turn off the analyzer.

Important! Turn off the analyzer after you have recorded the measured voltage. Do not wait for the test to finish. Compare the measured voltage with the correct values in Table 6, then check off "Pass" or "Fail" as usual.

6. **Important!** Disconnect your voltmeter.

Test the Insulation Resistance Detection System

To test the Insulation Resistance Detection system, do these things:

1. Reset the options to the settings shown here (see page 9 for instructions on how to do this).

Option	Setting
CREATE TEST FROM	SAMPLE CABLE
CONNECTION RESIS.	<.5Ω
HIPOT VOLTAGE	630 Volts
INSULATION RESIS.	500MΩ
HIPOT DURATION	100mS.
APPLY HIPOT TO	ALL ADAPTER PINS
AUTO HIPOT	OFF
ERROR TONES	HIGH
SORTED WIRE LIST	OFF
COUNT ALL CABLES	OFF
AUTO PRINT	OFF

2. Turn the analyzer on. It should prompt **Learned Cable Resistance Error**.

3. Press Memory on the back of the analyzer. The prompt should change to **SIG:F02D99-E462 Please Verify**. Write the displayed signature into Table 7 on the data sheet, then compare it with the correct signature. Check off "Pass" or "Fail" as usual.

4. Press Memory again. The analyzer should prompt **SIG:F02D99-E462 BAD R>.5Ω**

5. Press Function. Testing will begin.

6. The analyzer should prompt **Failed Hipot Test**.

7. Press and release Display/Print to display the first of two "NCJ" values. Write this value into row one of Table 8 on the data sheet.

8. Press and release Display/Print again to view the second and last of two "NCJ" values. Write this value into row two of Table 8 on the data sheet. Compare both "NCJ" values you saw with the correct values in the table, then check off "Pass"

or “Fail” as usual.

9. Turn off the analyzer.

Note: Be sure to reset the options to those settings shown in your build list or specification sheet before you use the analyzer to test cables again.

Conclusion

You have now completed the performance verification tests on your Cirris 1000HN. If the analyzer passed all of the tests, it is working correctly.

If the analyzer did not pass all of these tests, please telephone us at Cirris at 801-973-4600, or 800-441-9910. Please have the data sheet you filled out during the performance verification procedure handy. Be prepared to give as complete a description as you can of the failure(s) or other problems you encountered while verifying your analyzer’s performance.

Data Sheet Master

PHOTOCOPY THIS! This data sheet gives you an easy way to record your calibration testing results as you work through the procedure. Photocopy this double-sided sheet, then write your results onto the copies instead of onto this original. That way you will have a supply of data sheets ready whenever you need them.

File copies? A good way to keep track of the calibrations you do on your Cirris 1000HN is to simply file the completed data sheets away for permanent reference. We recommend this as a good way to start a "calibration trail" on your analyzer.

Calibration Data Sheet for Cirris 1000HN

Test Date:___/___/___
Operator:_____
Analyzer Number:_____

Test the Signal Routing System

Table 1

Zero Ohm Adapter Position	Signature Seen	Correct Signature	Pass	Fail
J1-J2		7F5527-0002		
J3-J4		94C424-0002		
J5-J6		5CC1A1-0002		
J7-J8		D3A34A-0002		

Test the Resistance Measurement System

Table 2

Row	"J" Position	Resis. Seen	Correct Resis.	MIN Limit	MAX Limit	Pass	Fail
1	J1A002 J1A003		22.1Ω	21.0Ω	23.2Ω		
2	J1B002 J1B004		10.0Ω	9.5Ω	10.5Ω		
3	J1B003 J1B005		100Ω	95Ω	105Ω		
4	J1A004 J1A005		44.2Ω	42.0Ω	46.4Ω		
5	J1B006 J1B008		1000Ω	950Ω	1050Ω		
6	J1A006 J1A007		221Ω	210Ω	232Ω		
7	J1A008 J1A009		510Ω	485Ω	536Ω		

Only 7 "J" positions should be displayed. The analyzer's prompt should then return to "LEARNED CABLE RESISTANCE ERROR." All of the "J" position information displayed must match that shown here.

Turn Data Sheet Over

Test the Hipot System

Table 3

Signature Seen	Correct Signature	Pass	Fail
	F02D99-2M02		

Table 4

Voltage Seen	Correct Voltage	MIN Limit	MAX Limit	Pass	Fail
	50 VOLTS	45 VOLTS	55 VOLTS		

Table 5

Signature Seen	Correct Signature	Pass	Fail
	F02D99-EM02		

Table 6

Voltage Seen	Correct Voltage	MIN Limit	MAX Limit	Pass	Fail
	630 VOLTS	567 VOLTS	693 VOLTS		

Table 7

Signature Seen	Correct Signature	Pass	Fail
	F02D99-E462		

Table 8

Row	“NCJ” Value Seen	‘NCJ” Correct Value	Pass	Fail
1		NC J1B023		
2		NC J1B026		
Only two values should display. Check for extra or missing values. The Values Seen and Correct Values must match exactly for the analyzer to pass these tests.				

End of Data Sheet

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