Cirris 3300 Series
User Manual

for 3300 & 3350 Testers

CIRRIS SYSTEMS

Table of Contents

1. Help/Support

Cirris 3300 Series testers will help ensure the quality of your cables. The tester will safely check electrical connections in your device for accuracy in minimal time.

For assistance with your Cirris test system, you may:

- Visit www.cirris.com/learning-center to read articles on Cirris software and other testing subjects.
- Contact our technical support team: 1-800-441-9910 (ask for Tech Support).
- In the USA, call 1-800-441-9910 toll-free.
- Outside the USA, visit our Cirris website at www.cirris.com to find the Cirris office nearest to you

2. Safety

Please make the following safety information available to any person who comes in contact with Cirris equipment.

Cirris Systems will not be held liable for injuries suffered if the tester is not properly maintained or safety guidelines are not followed.

2.1 Workplace Maintenance

Set up your tester away from normal employee activity. Make sure high voltage warning signs are visible. Use a non-conductive workbench or table. Keep all unnecessary metal away from the work area. Any metal within the work area should be grounded.

Keep the area around the tester clean and organized. Once a device is tested, be sure to place it in an appropriate area where it is obvious to the operator and any observers which devices need to be tested, which devices have been tested, and if the device passed or failed the test.

2.2 Intended Use

Your 3300 Series tester is intended to be used indoors at a temperature of 50 to 104 degrees Fahrenheit (10 to 40 degrees Celsius). Best performance can be obtained at a relative humidity of less than 70%. Insulation Resistance measurements will degrade at over 70% relative humidity.

Never apply live voltages to the test points or probe input of your Cirris tester. Power supplies and other accessories not approved by Cirris may cause damage or present a hazard. If you use a Cirris product in a manner not specified in this manual, the protection provided by the product may be impaired.

> ***Warning:*** *If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.*

2.3 Warning Signs

This symbol, found on the front of the tester, indicates that high voltage is involved and that there is a risk of electric shock.

2.4 High Voltage Warning

High voltage testing does not present a danger to healthy individuals; however, occasional mild electric shock may be experienced. Small shocks only occur during a high voltage test when someone touches an energized connection point. Any shock from the tester may result in a high voltage test failure.

Cirris high voltage (hipot) testers are designed to be safe for operators. However, certain situations may be potentially hazardous. For ideas on improving high voltage safety, visit www.cirris.com/safety.

2.5 Medical Warning

A child or individual wearing a cardiac pacemaker, an insulin pump, or any electronic controlled medical device should NOT perform high voltage testing.

2.6 Manual Handling

Before lifting or carrying the tester, Cirris recommends removing all wires and cables from the front connectors. Be sure the power cord is unplugged when moving the tester.

2.7 User Precautions

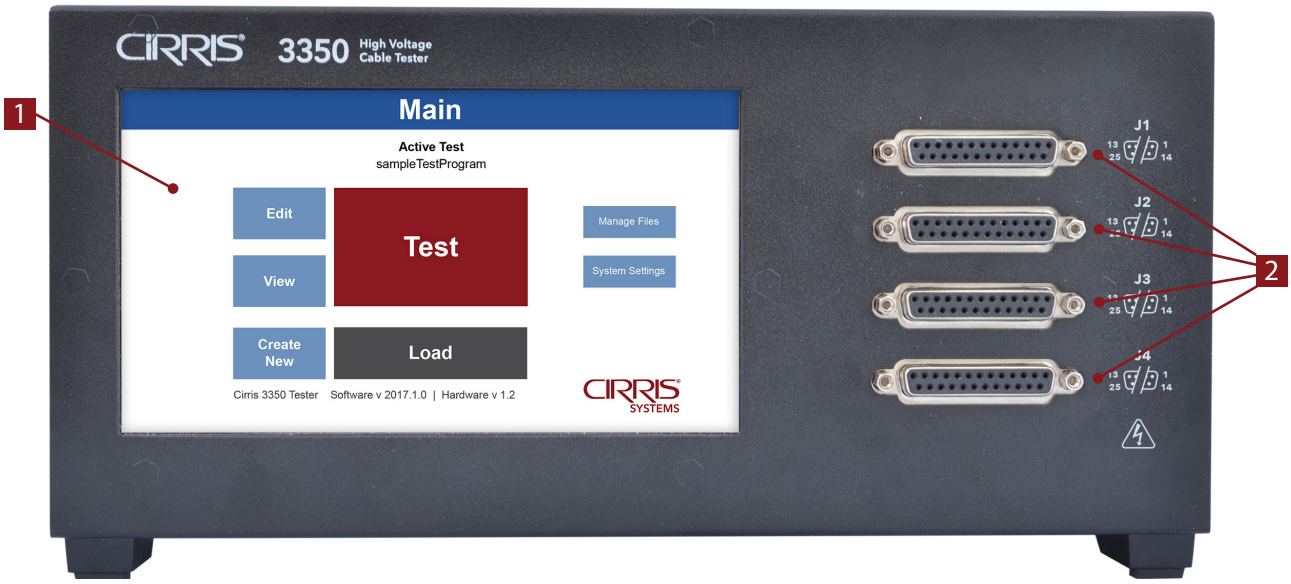
Cirris provides safety switches and other tools to keep operators safe during high voltage testing. See cirris.com/safety for more information on these safety products.

3. Hardware Overview

You should have received:

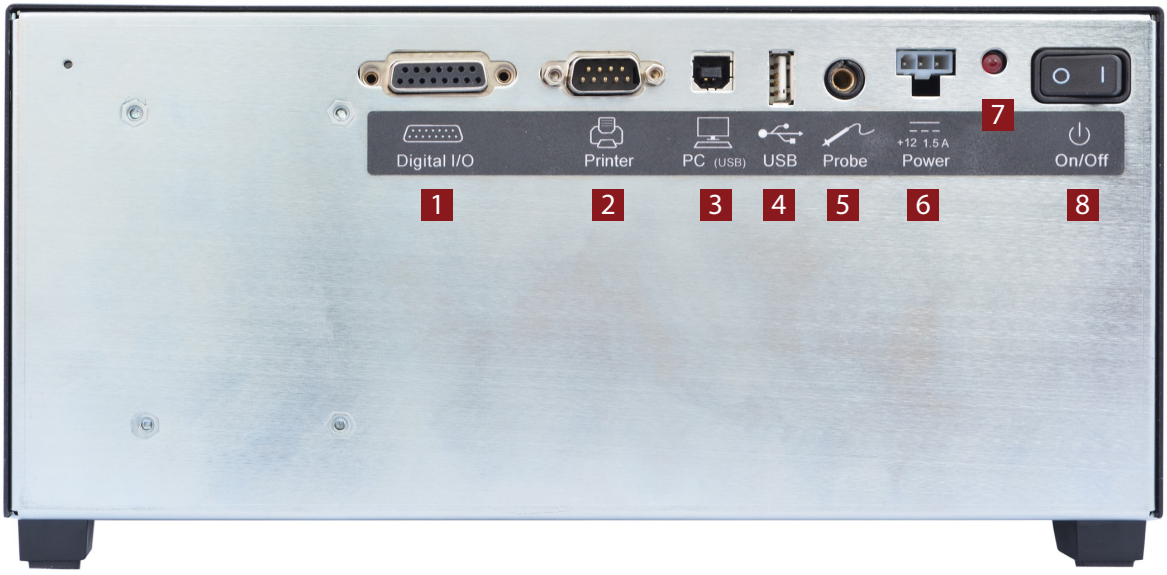
- Cirris 3300 Low Voltage or 3350 High Voltage Cable Tester
- Power cord
- PC (USB B) cable
- Probe
- USB flash drive containing software/documentation

Note: *If you ordered a training cable, the cable will be included along with a training guide.*



1. **Capacitive Touch Screen**
2. **DB-25 Female Interface Connectors:** The 3300 Series testers are available with either two or four BD-25 female interface connectors (50 or 100 test points).

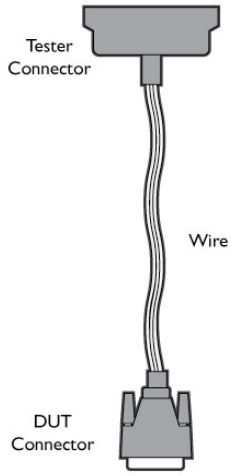
To help with visibility and usability, the front feet on the tester can raise the tester into a tilting position.



1. **Digital I/O Port**
2. **Printer Port**
3. **PC Port (USB B)**
4. **USB Port (USB A)**
5. **Probe Port**
6. **Power Cord Port**
7. **Power Light Indicator**
8. **Power Switch**

4. Fixturing

Rarely are cables built with connectors that can attach directly to the tester. For this reason, fixturing must be built to provide a way to connect the device-under-test (DUT) to the tester.



Fixturing refers to the interface between the DUT and the tester. Fixturing can be a significant portion of the investment in a test system. Good fixturing is an essential part of ensuring the accuracy of test results and maximizes the test station's throughput. This means fixturing needs to be at least as good, if not better than the quality of your device-under-test. Remember, you want to test the device-under-test, not the fixturing.

Cirris could make generic mating cables. These cables have one end that connects to the tester while the other end has unterminated wires.

4.1 Mating Cycles

The quality of parts you use to build fixturing will affect the life of your fixturing. A connector can only take so many cycles before it no longer functions like it is supposed to.

Lower quality connectors (typically with tin plating) may be rated for as few as 10 to 50 cycles, while more expensive connectors (typically with gold plating) are generally rated for 500 cycles. These official ratings, however, specify how many mating cycles you can expect to endure while still maintaining the specified contact resistance in the connector datasheet. In practice, these connectors can endure far more mating cycles and still perform adequately for test measurements.

If you are focused on having very precise resistance measurements in your testing, you will want to carefully consider the materials you use for fixturing, and maintain a maintenance schedule to ensure connectors are replaced before they cause errors in your resistance measurements. For more information on mating cycles, search for "Mating Cycles" at cirris.com.

4.2 Four-Wire Kelvin Testing

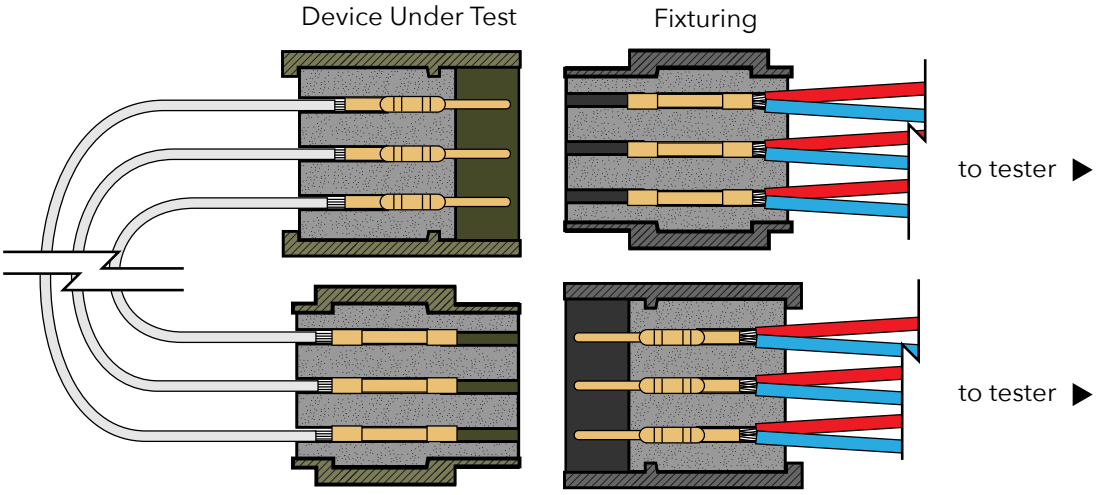
To measure resistance, the tester sends a current through a wire and measures how much the voltage drops. It then calculates the resistance using Ohm's Law. Since voltage is measured through the fixturing, any resistance caused by fixturing is included within that measurement. Four-wire (4-wire) Kelvin testing eliminates the resistance of fixturing and can measure resistances down to .001 Ohm. The cost of this measurement accuracy is that twice as many test points are required.

The four-wire measurement requires two correctly paired test points for every connection.

- One test point supplies current (referred to as "force")
- The other senses voltage (referred to as "sense")

For the purpose of four-wire testing using the 3300 Series, test points are considered either Type 1 (T1) or Type 2 (T2) points. Each four-wire pair from the tester must have one of each point. The tester uses T1 points as either force or sense; it uses T2 points as the compliment.

The following illustration shows a common way wires attached to the T1 and T2 test points could connect to the pins and cavities in the Mates-to-DUT connector.



On a 3300 Series tester, you can tell which type each test point is by probing the point while setting up a Learn.

1. From the Main Menu, press Create New.

2. From the Learn menu, press Learn/Test Settings, then press Components.

3. In the Components menu, press Learn Four-Wire and press OK. (Press OK again to return to the Learn menu.

4. With only your fixturing attached to the tester, press Learn Attached Device. A window will appear instructing you to Attach Four Wire Fixture. When this window appears, touch the tip of the probe to a pin on your connector. You will hear a tone and see a window specifying if the point is Type 1 or Type 2.

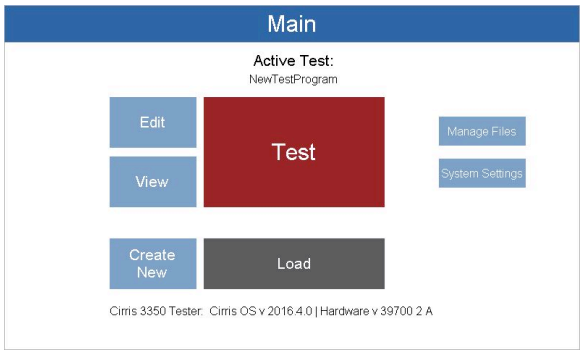
   Note: *Once the test program is Learned with four-wire included, the netlist will only show one test point of each four-wire pair. It will count the first test point it finds. This means If the points are wired in numerical order, the tester will count every other point. (J1-001, J1-003, J1-005…) If you want the tester to list each test point in numerical order, you will need to make sure that each four-wire pair contains the test point you want to be numbered and a separate test point elsewhere on the tester (for example, on a different connector).*

The location where the four-wire pair physically joins the test point connection of the device-under-test should be placed as close to the device-under-test as possible. The tester will measure any resistance from the fixturing exposed after the four-wire pair joins together.

For more information on 4-Wire Kelvin testing, visit cirris.com and search 4-Wire Kelvin Testing.

5. Tester Setup/Main Menu

1. Connect the power cord to your tester.
2. Plug the power cord into a grounded outlet (surge protector recommended).
3. Connect the probe to the tester.
4. Press the power switch to turn on the tester.
5. The tester will perform a self-test (see *page 25*).
6. After startup, the Main Menu will appear.



- **Active Test:** Displays the name of the currently loaded test program.
- **Edit:** Press to change settings for a loaded test program.
- **View:** Press to view loaded test program.
- **Test:** Press to perform a test using the loaded test program.
- **Create New:** Press to create a new test program.
- **Load:** Press to load an existing test program to edit, view, or test.
- **Version Information:** Displays software and hardware version.
- **Manage Files:** Press to copy or delete test files.
- **System Settings:** Press to perform a variety of tasks relating to the setup and maintenance of the tester software.

6. Test Program Basics

6.1 Create a New Test Program

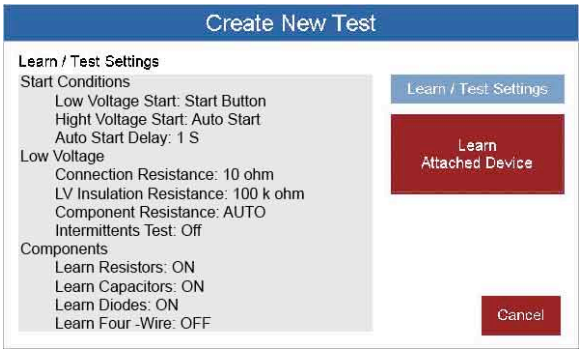
A test program must be created before testing a cable. This is done by attaching a known-good sample cable to the tester, adjusting the test settings, and performing a Learn. The tester will create a list of test instructions based on the specified settings and the Learn. Cables will be tested using the instructions created from the sample cable.

> ***Note:*** *It is also possible to create a test program using a text editor on a computer. The simplest way to do this is by creating a test program, copying it to a computer, and modifying it in a text editor.*

1. Attach the fixturing and cable to the tester. From the Main Menu, press Create New.

2. The summaries on the left side of the screen describe the current test program settings. Press Learn / Test Settings to adjust the settings per the cable specifications (voltage, components, etc.).

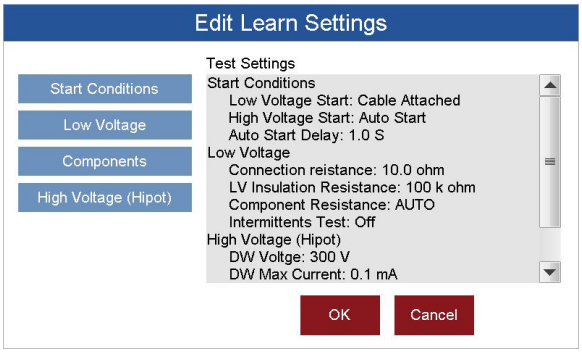
   Note: *Test settings for a new program are based on the settings of the last test created.*



6.1.1 Learn / Test Settings

Use the options on the left to adjust the settings for the new test program. If necessary, these settings can be adjusted later by selecting Edit from the Main Menu.

- Start Conditions
- Low Voltage
- Components*
- High Voltage (Hipot) – 3350 only



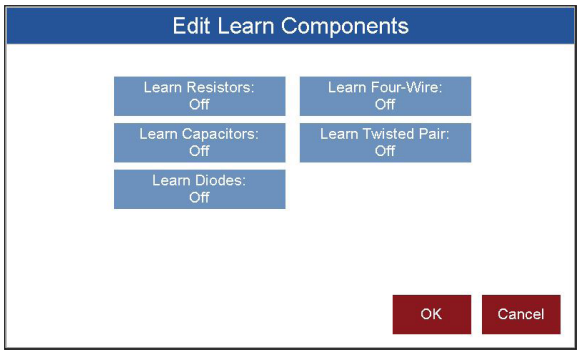
*Components can only be edited when creating a new test program. This setting cannot be altered after a test program has been Learned, except by using a text editor on a computer.

When you have finished specifying the required test settings, press OK to return to the Learn menu.

> ***Note:*** *Default test settings for a new program are based on the settings of the last test created.*

6.1.2 Components

This option can only be added or removed from a test program during the Learn process.



- Learn Resistors
- Learn Capacitors
- Learn Diodes
- Learn Four-Wire
- Learn Twisted Pair – 3350 only

Select the required component to add it to the test program.

- **On:** The component type will be Learned by the tester.
- **Off:** The tester will treat the component as a wire or link.

6.1.3 Perform a Learn

1. When the displayed settings match the required specifications, press Learn. The tester will scan the attached cable and create a test program.

2. In the Learned Test Program window, verify the test instructions match the required specifications.
   If the test program is correct, select one of the following options:
   - **Save:** Saves the test program with a default name and location and returns to the main menu.
   - **Save As:** Allows you to choose a name and location for the test program.
   - **Cancel:** Return to the Learn screen without saving.

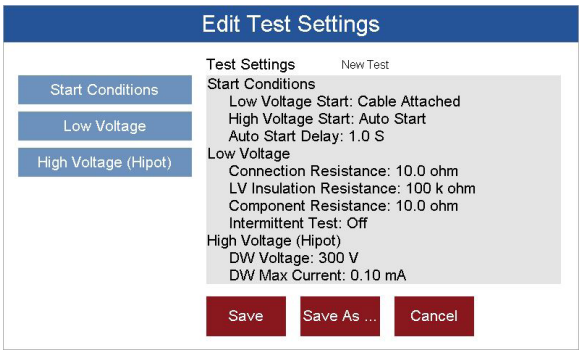
   If the test program is not correct, press Cancel to return to the Learn menu. From there you can adjust the test settings and perform a new Learn.

   Note: *If you save the test location in the default location, the test program will be overwritten the next time you press Save when creating a new test program.*

3. In the Save As screen, enter a new name for the test program by selecting the text box next to File. A keyboard will appear on the screen to enter a name for the test program. Press OK to finish and return to the main menu.

6.2 Edit a Test Program

Load an existing test program and select Edit. The options allowed for revision are the same as those explained in the following sections.



Components cannot be revised at this point. If you need to revise components, you will need to create a new test program.

> ***Note:*** *It is possible to create a test program using a text editor on a computer. The simplest way to do this is by creating a test program and modifying it on a PC.*

Alter the specifications for the Test Program, including:

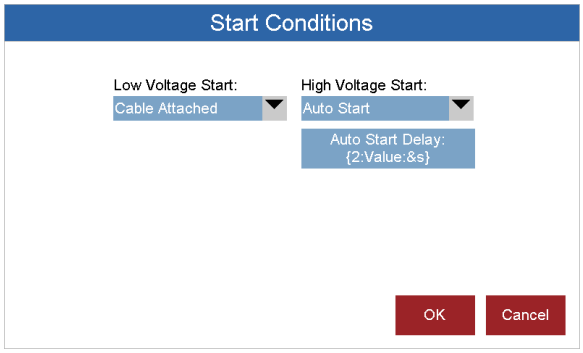
- Start Conditions
- Low Voltage
- High Voltage (Hipot) – 3350 only

After revising a test, you have the option to Save, Save As, or Cancel the changes.

- **Save:** Saves the test program with a default name and location and returns to the main menu.
- **Save As:** Allows you to choose a name and location for the test program.
- **Cancel:** Return to the Learn screen without saving.

7. Start Conditions

Specify which method you would like to use to begin each test.



■ ***Low Voltage Start***:

- **Start Button:** Test begins when a cable is attached and Start Test is pressed or an external switch is triggered with Digital I/O. This lets the operator make sure the device is firmly attached before starting the test. It also lets the operator test a cable that has no connections.
- **Cable Attached:** Test will begin automatically when a device is connected to the tester. This condtion is generally used for testing a high volume of simple cables because it eliminates the time it takes to push buttons on the tester screen to start each test. However, with this start condition one of the following actions is required for a bad cable.
  - Press FInish Test: If the device contains an error, the low voltage test will not complete until you press the Finish Test button. Once pressed, a Bad test will be recorded.
  - Remove cable: If the device contains an error and you remove the device before pressing the Finish Test button, then no test will be recorded.

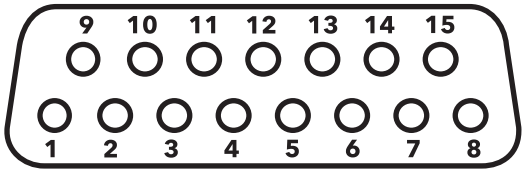
■ ***High Voltage Start – 3350 only***:

- **Start Button:** Test will begin when a cable is attached and Start Test is pressed or an external switch is triggered with Digital I/O. The This lets the operator maintain safety while performing a high voltage test. It also lets the operator test a cable that has no connections.
- **Auto Start:** Specify how many seconds required before the high voltage test automatically begins. This is frequently used to allow operators sufficient time to ensure their hands are free of the tester before the high voltage test begins.

7.1 External Start (Digital I/O)

With digital I/O, the tester can start a test based on input from an external switch, such as a foot pedal. The tester can also output information to devices such as LEDs.

The digital I/O port is located on the back of the tester. The pinout is as follows:

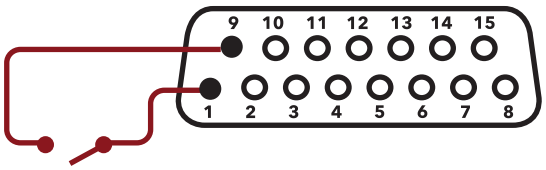


Pin	Function	Pin	Function	Pin	Function
1	Input Switch LV Start	6	N/A	11	N/A
2	Input Switch HV Start	7	Output for Good test	12	N/A
3	N/A	8	Output for Bad test	13	N/A
4	N/A	9	Power + 5 VDC, 100 mA max	14	N/A
5	N/A	10	N/A	15	N/A

To use the External Switch input, you must set the tester's Start Condition to Press Button.

7.1.1 Inputs

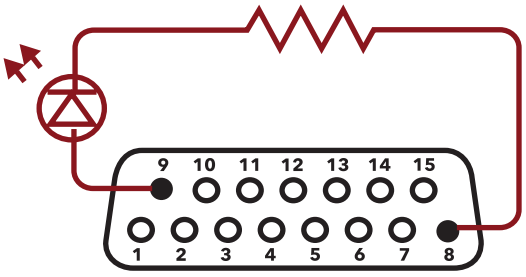
The 3350 tester has two inputs. The low voltage input is on pin 1 of the digital I/O connector. If a DC +5 volt (logic high) is applied to pin 1, the tester behaves as if START TEST were pressed. You can use the DC +5 volt power source on the digital I/O connector to supply the DC +5 voltages through the switch circuit. Make sure you wire your external switch so it is normally open. Do not apply an AC voltage to the input.



Example of Digital I/O input wired with start switch.

7.1.2 Outputs

The tester's outputs are "sinking" (open collector) outputs. When activated they will connect (or sink) to ground, in effect turning ON the output circuit. The outputs can sink up to a nominal 24 volts at 500 milliamps. To limit the output current, always ensure adequate resistance between power supply and the output.



Example of Digital I/O outout wired with LED.

As an example, let's say you want to light an LED to indicate a bad test. You will want to connect the LEDs to pins 8 and 9 (+5V). The LED requires only 20 mA, so we can use the +5 DC volt supply on the digital I/O port to power our circuit. Use a resistor in series with the LED to limit the current going through it. How do you choose the resistor? The LED in this instance has a forward bias voltage drop of two volts; therefore, three volts must drop across the current limiting resistor. Knowing the voltage drop is 3 volts across the resistor and the desired current is 20 mA, Ohms Law can be used to determine the resistor value.

V/I = R

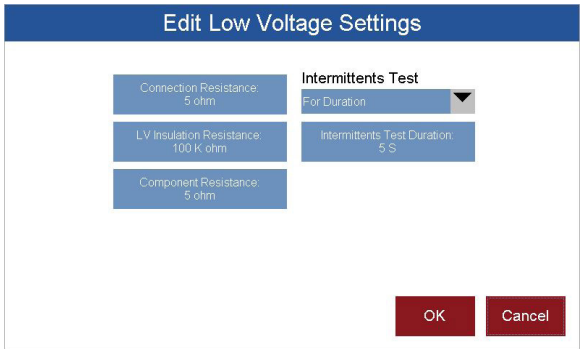
3V/20mA = 150 Ohms

Note: The above formula is meant as an example if using the information from the above paragraph.

When a test completes, the tester will pull the output to ground allowing current to flow in the circuit, and the LED will turn on. If the test fails, pin 8 will be pulled low. Pin 7 will be pulled low when a test passes. These results will only activate when all tests finish (including after the intermittents test is completed).

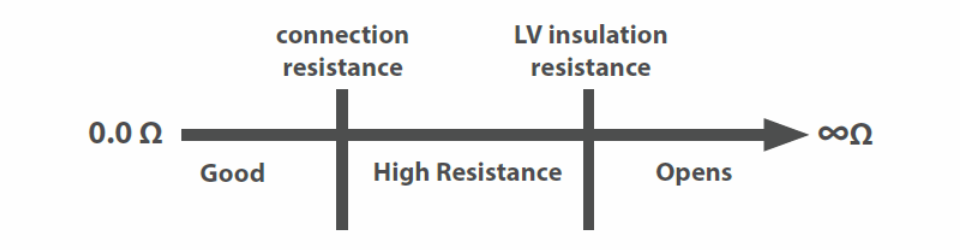
8. Low Voltage

A low voltage test is always performed before a high voltage test. The following settings control how the low voltage test is performed:



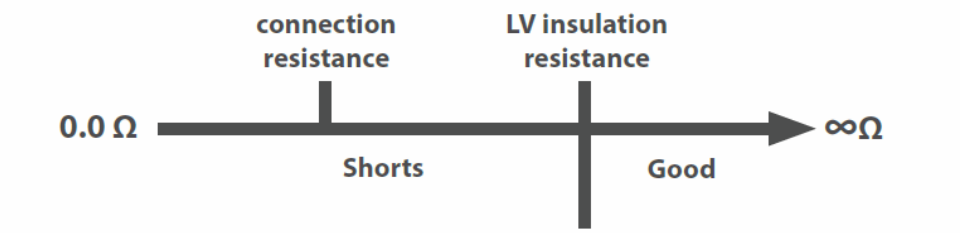
■ ***Connection Resistance***: This setting will be used to determine if the device passes or fails (i.e. connections with resistances measured above this value will fail).

- Range: 0.1 – 5.0 M ohm
- As shown in the graphic, expected connections—connections measured below or equal to the Connection Resistance value—will pass while any measurement above this value will fail. A resistance measured above this value, but below the LV Insulation Resistance value, will be reported as a High Resistance error while a measurement above the LV Insulation Resistance Value will be reported as an Open.



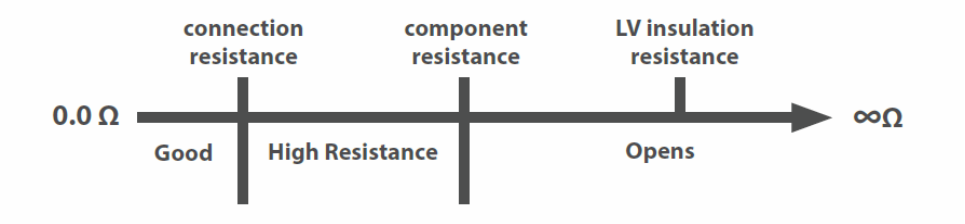
■ ***LV Insulation Resistance***: Intended connections above this value are considered open during a low-voltage test (and ignored during a Learn).

- Range: 0.1 – 5.0 M ohm
- As shown in the graphic below, during a shorts test (checking for unintended connections), resistance measurements above the LV insulation resistance value will pass. Any connections detected below this value will be reported as shorts.

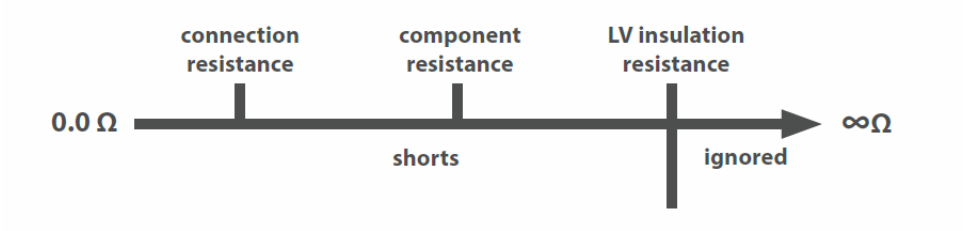


■ ***Component Resistance***: (This value is only used when there are components in the test) This value is auto-set during the Learn process, and should be 5-25% less than the lowest component found in the device being tested.

- Range: 0.1 – 5.0 M ohm
- The following graphic shows how component LV settings define errors for intended connections if there are components in the test. This value has no impact on whether an intended connection passes or fails, but does influence whether a failing connection is labeled as High Resistance or Open.



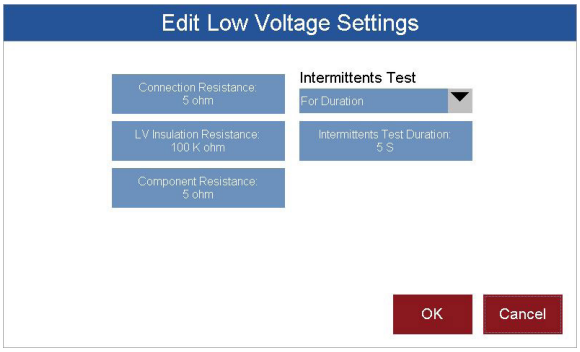
- As shown in the graphic below, the Component Resistance value has no impact on the shorts test.



8.1 Intermittents Test

An intermittents test repeatedly performs a low voltage test to give the operator time to catch problems that might be intermittent. The operator can move the cable around to catch intermittent failures such as loose connections.

- **OFF:** No intermittents test is performed.
- **Press to Stop:** The intermittents test continues until the operator presses the End Test button.
- **For Duration:** Set an amount of time for the intermittent test. Test duration cannot last longer than 120 seconds.



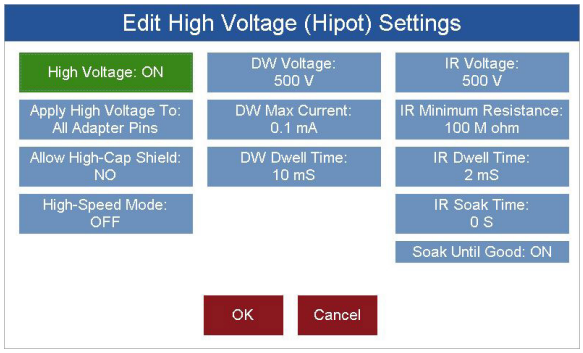
9. High Voltage (Hipot) - 3350 only

High Voltage or "hipot" testing is used to find defects and contaminants that could cause the cable to fail. Appendix A of this manual has guildlines to help determine high voltage specifications. See *page 30.*

WARNING: Read the Safety chapter of this manual (*page 2*) before performing high voltage testing.

> ***Note:*** *If a high voltage setting button is yellow, it means there is a conflict with other parameters. If you press the OK button you will receive further information about the conflict.*

9.1 High Voltage Testing



High voltage settings can only be edited when High Voltage is turned ON.

- **ON:** The tester will perform a high voltage test on the device-under-test after a successful low voltage test.
- **OFF:** The tester will not perform a high voltage test.

■ ***Apply High Voltage to***: This setting determines which test points get high voltage applied to them during the high voltage test.

- **All Adapter Pins:** All test points in thh tester interface connectors will be involved in the test.
- **Connections Only:** High Voltage is applied only to test points that have connections defined in the test program.

■ ***Allow High-Cap Shield***: This option allows the user to continue high voltage testing a device that would normally fail the test due to a single over-current error. This error is presumed to be caused by a highly capacitive shield around the device.

- **YES:** Test continues with a single over-current error.
- **NO:** Test fails when any error occurs.

> ***Note:*** *High Cap Shield is available to assist with highly capacitive shields, which would fail with standard high voltage settings. By turning on the High Capacitance Shield setting you can successfully test a cable with a high capacitive shield.*

■ ***High-Speed Mode***: The HV test applies a voltage to multiple nets simultaneously while still ensuring that each net is tested against every other net, thus speeding up the test process. If an error is found, each net is tested individually to locate the exact net that has the error.

- **ON:** Tester applies HV to nets in groups for faster testing.
- **OFF:** Tester applies HV to each net one at a time while all other nets are pulled to ground.

> ***WARNING!*** *High-Speed Mode with highly capacitive devices can slow testing. Highly capacitive nets may cause over-current failures, meaning the nets will need to be tested individually. This could cause the test to slow down significantly.*

9.2 Dielectric Withstand Test

In a Dielectric Withstand test (DW test), a voltage much higher than the normal operating voltage is applied between points on the device-under-test. This ensures the wire insulation can withstand a higher amount of voltage (such as a surge) without failing.

DW Voltage: Amount of voltage for DW test.

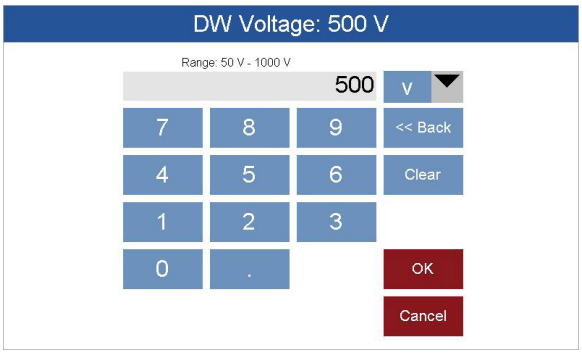
- **Range:** 50 V – 1000 V

DW Max Current: Max current level allowed during DW test.

- **Range:** 0.10 m – 1.50 m A

DW Dwell Time: The amount of time DW Voltage is applied.

- **Range:** 10 m – 120 S



9.3 Insulation Resistance Test

An Insulation Resistance (IR) Test measures the overall electrical insulation resistance to ensure that it meets the specified value. For an assembly to pass the IR test, the measured insulation resistance must be equal or greater than the Insulation Resistance setting for the test.

IR Voltage: Amount of voltage for IR Test.

- **Range:** 50 V – 1000 V

IR Minimum resistance: Minimum resistance needed for insulation to pass the test.

- **Range:** 5.0 M – 1000 M ohm

IR Dwell Time: The amount of time the IR Resistance value must remain good to pass the test (this is how long the test will run after soak time). The reported resistance value for the IR test is an average of the measurements taken over this time.

- **Range:** 2 m – 1 S

Note: *Because the reported value is an average of this time, this setting can also be used to filter out noise caused by the AC power coming into the tester. Use 17 mS to filter out 60 Hz noise and 20 mS to filter out 50 Hz noise.*

IR (Max) Soak Time: The amount of time that the tester applies voltage before doing the final IR measurement. The test can be configured to soak for a period or until the cable tests good. This setting is useful in humid environments or when the cable insulation has problems with dielectric absorption.

- **Range:** 10 m – 120 S

Note: *When an IR Max Soak Time is set, the tester continues to monitor the Dielectric Withstand Current. If the Dielectric Withstand Current is exceeded, the tester reports a "Dielectric Failure".*

Soak Until Good: Applies a voltage to the cable until the tester measures IR values that exceed the IR Minimum Resistance or reaches the IR (Max) Soak Time.

- **ON:** Applies voltage until the tester measures IR values that exceed the IR Minimum Resistance (i.e. could take less time than Max Soak Time).
- **OFF:** Always applies voltage for duration of IR (Max) Soak Time.

10. Run Test

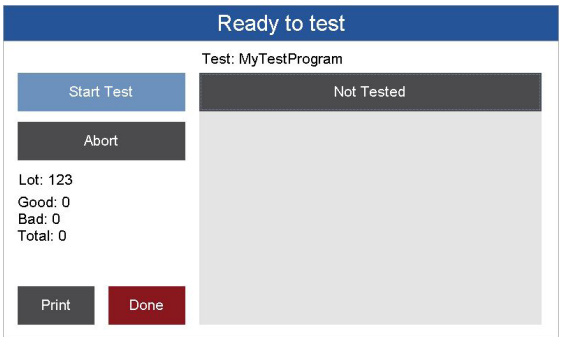
The tester performs three tests in the following order:

- **Low Voltage Test:** Tests for continuity and basic isolation
- **High Voltage Test – 3350 only:** Tests for thorough isolation
- **Intermittents Test:** Tests for intermittent errors that could arise while the cable is being moved

Test window overview: The test window displays user instructions, test results, and other information.

User Instruction/Test Status: The box at the top of the screen displays instructions for the user or shows the status of the tester.

- Attach Cable
- Ready to Test
- Testing
- Test Complete



Test Results: This box will display one of three statuses:

- Not Tested
- Passed
- Failed

Result Details: Results from each test (low voltage, high voltage, intermittent) will appear in this window including error details.

Start Test button: This button is active when the start condition is set to Press Button.

Abort button: Ends test at any point. The aborted test will not be recorded as though it were never tested.

Lot: The Lot ID will act as an identifier to the batch of cables being tested.

Good/Bad/Total: Counts number of cables tested including how many cables passed and failed.

Test name: The name given to the test when the test program was created will display here.

10.1 Perform a Test

1. From the Main Menu, verify the required test program is loaded (the name of the test program is found at the top of the main menu screen) and then press Test.

2. You may have to enter a Lot ID. This ID can be any combination of letters and numbers. It will be used to identify the batch of cables being tested. For more information on Lot ID, see *page 21*.

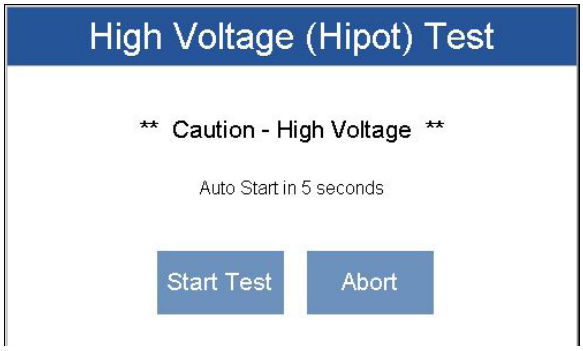
3. Depending on the chosen start condition, attach a cable or press Start. (The blue bar at the top of the window will prompt which action to take or the current step the test is on.)

10.1.1 Low Voltage Test

4. The tester will perform a low voltage test, checking for opens and shorts. For simple cables, this test can take less than a second. Don't be alarmed if the test passes without ever seeing the Low Voltage testing screen.

5. When the low voltage test finishes, either the intermittents test will begin, or, if you are using the 3350, a window will prompt you to begin the High Voltage (Hipot) Test (if a High Voltage test was included in the test program).

10.1.2 High Voltage Test – 3350 only



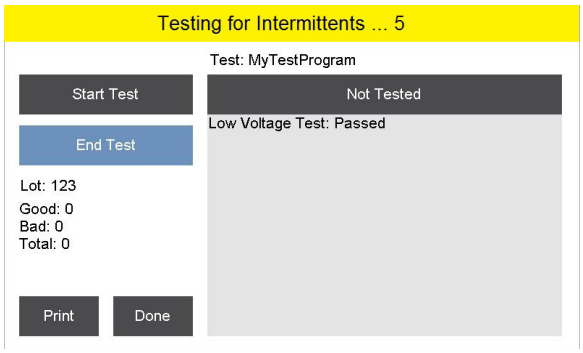
6. Depending on the chosen start method, press Start HV Test or wait for the test to automatically begin.

WARNING! *To prevent possible injuries, do not touch the assembly during the high voltage test.*

7. The tester will perform a high voltage test, checking for current leakage, and dielectric failures.

8. When the High voltage (hipot) test finishes, the Intermittents Test will begin (if an Intermittents Test was included in the test program).

10.1.3 Intermittents Test



9. The Intermittents Test allows the user to check for potential defects by moving the cable while the tester continuously checks continuity. If any failure is detected—even momentarily, the test will fail.

10.1.4 Finishing a Test

10. Upon completing the test(s), you may want a printed report summarizing the results. If auto-print was selected from the System Settings menu, a report will print automatically, otherwise press Print (see *page 21* for printing instructions).

11. Remove the cable to complete the test. The results of the test will remain on the screen until the next cable is attached. The Batch Info will be updated to show the results of the test.

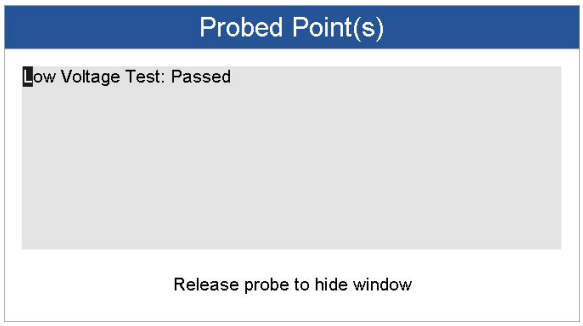
12. At the end of the test—pass or fail—you have the option to retest the cable. Make any necessary adjustments to the hardware and press Retest. Pressing retest will remove the last recorded test from the Lot information. The retest option is only available until the cable has been removed.

10.1.5 Test Results

Test results are displayed in the box on the right side of the screen. Results are displayed next to each test. If an error occurred, the details of the error will be displayed. See *page 32* to learn about interpreting test results.

10.1.6 Using the Probe

In the test window, probe any point on the attached connector to show information pertaining to the probed point. Release the probe to hide the window.

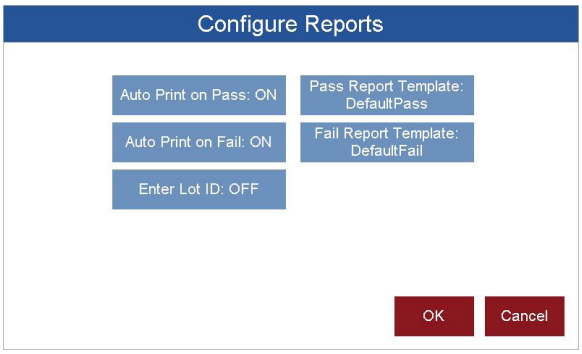


11. Printing

11.1 Printing Options

Printing options are located within the System Settings menu. Press Configure Reports to setup printing. The 3300 Series testers prints labels and test results using any Zebra Programming Language (ZPL) capable printer.

In the Configure Reports menu, you can control the following printing functions:



Auto Print on Pass:

- **ON:** Report prints after every Good test.
- **OFF:** No report prints after a Good test.

Auto Print on Fail:

- **ON:** Report prints after every Bad test.
- **OFF:** No report prints after a Bad test.

Note: *If Auto Print is turned OFF and you still wish to print a report, Press the Print button to print out the results of the last test performed.*

Enter Lot ID:

- **ON:** A Lot ID is a unique ID of your choosing for a group or batch of cables. The ID can appear on reports to help you keep track of different batches of cables. When this setting is enabled, the user must enter a Lot ID before the test window will open.
- **OFF:** No Lot ID is required before testing and won't appear on reports.

Pass Report Template:

- Select the report to be printed after each test passes.

Fail Report Template:

- Select the report to be printed after each test fails.

11.2 Customize Reports

Default labels are included with the tester. These labels print on a 4x2 size label and include test results, test program name, date, and time. You can also create your own labels with custom text and graphics.

■ *Building Labels*

- To design labels, download the free software, Zebra Designer V2.
- Once you have completed your label design, print the label, selecting the Print to File option to obtain a .prn label file.

■ *Tokens*

Specific information included on the label from the tester such as test results, time, and date is written on the label in the form of tokens. Tokens must be written in a Zebra font on the label exactly as shown below.

Available tokens include:

- {TestName}
- {Date}
- {Time}
- {ErrorList}
- {PassFail}
- {TesterID}
- {TesterType}
- {LotID}

Once a label is designed with the information needed, the label design can be transferred to the tester.

1. Connect the tester to the PC via USB where the label is saved. Make sure the tester is turned off when it is connected to the computer.

---

2. On your PC, navigate to the tester in File Explorer. When connected to a computer, the tester will show up as a removable storage device. Add your custom label (.prn file) to the desired location within the tester file. (It does not matter where you place it, as you will be able to navigate to find it on the tester).

Note: *If the tester is running, you will not be able to access it through a PC.*

1. With the label added to the tester, turn the tester on.

---

2. From the Main Menu, press System Settings and then Configure Reports.

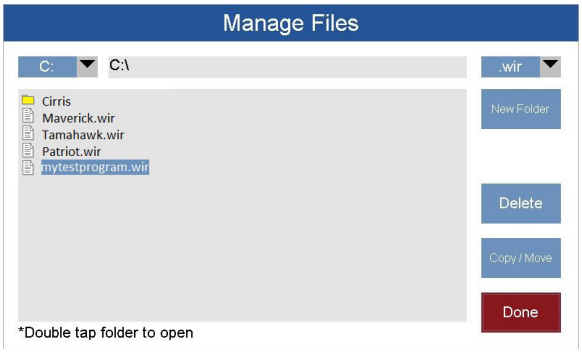
---

3. Press either Pass Report Template or Fail Report Template. Navigate to where you saved the label file. Select it and press Load.

Note: *When you select a report, this same report will be used for all test programs until you change the report selection.*

12. Manage Files

All test programs, report templates, and other files can be accessed through the Manage Files menu. From this screen, test programs can be organized into different folders, copied, and deleted.



Scrolling: For longer lists, touch the up or down arrows to scroll through the list of folders and test programs.

Filter files: Use the drop-down list to filter files. The * symbol shows all files.

Open a folder: Double-tap on a folder to open it.

Create a new folder: Press the New Folder button, type the name of the new folder, and press Done.

Return to the previous folder: Double-tap the top folder in the list labeled with "< >" to return to the previous folder.

Move a test program: Select a test program and press the Copy/Move button. Navigate to the folder where you wish to save the test program and press Move. The test program will no longer reside in the previous location but will only be found in the new location.

Copy a test program: Select a test program and press the Copy/Move button. Navigate to the folder where you wish to save the copied test program and press Copy. The test program can now be found in both the previous location and the new location.

Delete a test program: Select a program or file and press Delete. Verify that you want to delete the program or file and confirm by pressing Continue.

> ***WARNING!*** *There is no recovery option after a test program or folder is deleted. Verify the file selected before you delete any files.*

12.1 Test Program Backup via PC Connection

By connecting your tester to a PC using the PC port (USB B), you can move files to and from the PC like you would with a USB flash drive. This allows you to back up test programs, organize files, and customize labels and reports.

1. Connect the PC cable to your tester and plug it into your PC.

2. Make sure the tester is turned off.

3. When connected to the PC, the tester will behave like a USB drive. You will be able to view and organize files using your computer's file management system. For example:

   a. Organize test programs into folders for easy access.

   b. Copy your test programs to your PC to use as backup copies.

   c. Edit test programs using a text editor and save the revised test program to your tester.

4. When finished, remove the PC cable, or turn the tester back on. Either action will disconnect the tester from the PC.

WARNING! *Do not format your drive. Formatting your drive will permanently erase all test programs and test settings. If this happens, you must contact Cirris to make your tester operational again.*

12.2 Test Program Backup via USB Drive

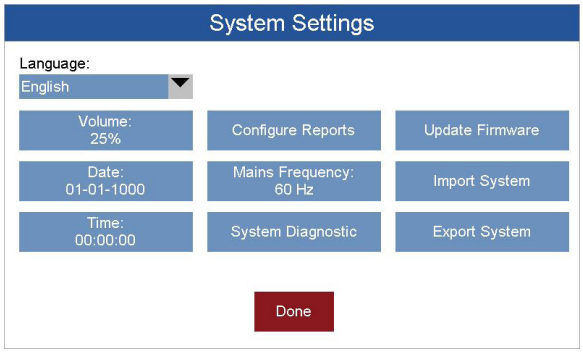
To back up test programs:

1. Insert a USB drive into the USB port on your tester.
2. Copy your test programs onto the USB drive (for information on copying files, see above).
3. With the test programs on the USB drive, you can save them onto a PC for safe keeping or for editing through a text editor.

Other USB drive uses:

- Update Firmware
- Copy test programs between 3300 Series testers
- Copy test programs between the tester and a PC

13. System Settings



- **Change Language:** Change the language of the Cirris OS software.
- **Volume:** Adjust tester volume.
- **Date:** Set the date and adjust the layout.
- **Time:** Set the clock for your local time and adjust the layout.
- **Configure Reports:** Set up print preferences and select report templates.
- **Mains Frequency:** Also known as Power Line Frequency, you will want to set this value to 50 or 60Hz depending on your country's AC line frequency. The Correct selection will improve test measurement accuracy.
- **System Diagnostic:** Run a self-test to verify the test system is functioning as it should, verify your tester is calibrated, see the last verification date, and find your tester's serial number.
- **Update Firmware:** Insert a USB drive containing firmware update into the tester and press continue.
- **Import/Export System:** Copy your settings, test reports, and firmware to transfer it to another tester.

13.1 Configure Reports

Set up printing preference, turn on Lot ID option, and select reports. See Printing on *page 21*.

13.2 System Diagnostic

Upon startup, the tester will run a self-test to verify that the system is functioning correctly. If you suspect anything wrong with the tester, you can run a self-test. If the tester fails a self-test, a window will open with a description of the details of the failure.

Note the details of the failure and call Cirris Tech Support at 1-800-441-9910.

13.3 Update Firmware

After an update is released, you will be given instructions to visit cirris.com to download the necessary firmware.

1. Download the update from cirris.com onto a USB drive.
2. Insert the USB drive into the tester and select Update Firmware from the System Settings menu.
3. The tester will automatically update the firmware and the system will reboot.
4. Remove the USB drive when finished.

13.4 Import/Export System

Rather than set up each system individually, this feature allows you to clone the system on one tester and copy it onto another tester.

> ***Note:*** *Firmware cannot be copied from the 3300 to the 3350 or vice versa. Information can only be coped between series models.*

■ *Export System*:

1. Insert a USB flash drive into the back of the tester.
2. Press the Export System button.
3. The tester will clone the system and export the files to the USB flash drive.
4. When the export is finished, remove the USB flash drive.

■ *Import System*

1. Insert USB flash drive containing the exported system into your tester.
2. Press the Import System button.
3. Read the warning message carefully and press the OK button to continue.
4. When the import is finished, remove the USB flash drive.

> ***WARNING!*** *Importing files will delete current files from the tester to which the files are being copied. Make sure to have all test programs and other data saved in a separate location before using Import System.*

14. Factory Defaults

The following table lists the settings for the 3300 Series testers and their corresponding factory defaults.

Start Conditions	
Low Voltage Start	Start Button
High Voltage Start	Auto Start
HV Auto Start Delay	1.0 S

LV Settings	
Connection Resistance	10.0 ohm
LV Insulation Resistance	100 k ohm
Component Resistance	10.0 ohm

HV Settings – 3350 only	
High Voltage Test	OFF
Apply High Voltage To	ALL
Allow High-Cap Shield	NO
High-Speed Mode	OFF
DW Voltage	500 V
DW Max Current	1.5 mA
DW Dwell Time	10 mS
IR Voltage	500 V
IR Minimum Resistance	100 M ohm
IR Dwell Time	2 mS
IR Soak Time	0 mS
Soak Until Good	OFF

Intermittents Settings	
Setting	OFF
Delay	5 S

Components Settings	
All	OFF

Configure Reports	
Auto Print on Pass	OFF
Auto Print on Fail	OFF
Pass Report Template	DefaultPass.prn
Fail Report Template	DefaultFail.prn
Lot ID	OFF

System Settings	
Mains Frequency	60 Hz
Volume	20
Date	MM_DD_YY
Time	24

15. Troubleshooting

Visit www.cirris.com/learning-center for articles on troubleshooting. If you need additional help, contact Cirris Technical Support at techsupport@cirris.com or 1-800-441-9910.

A high percentage of tests fail

Too many tests failing could be caused by several possibilities.

- **Error in the Learned device:** If a bad cable (meaning a cable with mistakes or defects) is used as the primary cable to create the test program, then all good cables will fail because they are tested using bad test instructions.
- **Fixturing:** Failures can be caused if the fixturing is not built and connected correctly. See the Fixturing section of this manual for help (*page 6*).
- **Tester Interface/Unit:** A problem with the tester may occur on the tester interface (the part of the tester visible to the user), or within the tester unit (the wiring and other pieces contained inside the chassis). Problems with the tester interface might be repairable by the user while problems with the tester unit should be evaluated by the tester manufacturer. If you suspect a problem with your tester unit, verify your tester is calibrated. You can purchase a verification kit from Cirris.
- **High Voltage – 3350 only:** To troubleshoot a high voltage failure such as a dielectric failure, remove the device-under-test and Learn a new test program with the same high voltage settings. The tester may display a warning indicating no cables are attached. Proceed to perform the Learn and test. If the same dielectric failure occurs, the problem is either with the test fixture or the tester interface. Detach the fixturing and perform the Learn and test again. If the dielectric failure does not appear, the problem is located in the fixturing. If the error appears, the tester interface is the source of the problem.
- **Environment:** Occasionally failures can be caused by factors in the environment such as humidity and materials. For example:
  - **Humidity:** Humidity related IR failures will usually report as an IR or HV leakage failure. High humidity can allow moisture paths for small amounts of current to flow between unintended connections.
  - **Materials:** Consider the materials selected, the type of environment you operate in, and the number of cycles the fixturing can endure. If there is any question of suitability in materials, try looking at the manufacturer's specifications.
    Nylon, for instance, is notorious for causing high voltage problems. Using nylon insulation or connector housings in humid temperatures will cause IR problems in your cables. Use a material such as Teflon or PVC. They may cost more than nylon, but they will save you money by giving you cables that work in humid conditions.

No Sound

The tester uses sound prompts to provide feedback to the operator. If the tester is not making any sound, check the tester volume.

1. From the Main Menu, press System Settings.
2. Press the Volume button.
3. If the volume is set to 0, the tester will not make any sounds. Enter a number between 1-100.

16. Appendix A – High Voltage Guidelines (3350 only)

Use the following guidelines to determine high voltage specifications:

- High voltage settings specified by a customer.
- Engineering specifications.
- Manufacturers specifications for wire and connectors.
- Voltage applied to a cable may be limited by the spacing between pins in a connector and the separation of the conductors in a cable.
- High voltage settings affect the available selections for the Insulation Resistance Settings (see *page 17*).
- Highly capacitive cables may limit the amount of high voltage that can be applied to the cable.

HV Insulation Resistance

The "HV Insulation Resistance" settings are limited by the high voltage settings. The table below shows the available Insulation Resistance settings at each of the high voltage settings.

Voltage	Min IR (Meg)	Max IR
100 V	10	100
200 V	20	200
300 V	30	300
400 V	40	400
500 V	50	500
600 V	60	600
700 V	70	700
800 V	80	800
900 V	90	900
1000 V	100	1000

HV Insulation Resistance Guidelines

IR Settings may be based on any of the following factors:

- **Contamination:** Consider lowering the IR threshold if your DUT has issues such as fingerprints and mold release.
- **Humidity:** A humid environment can aggravate the effects of contamination between contacts and affect insulation.

Duration

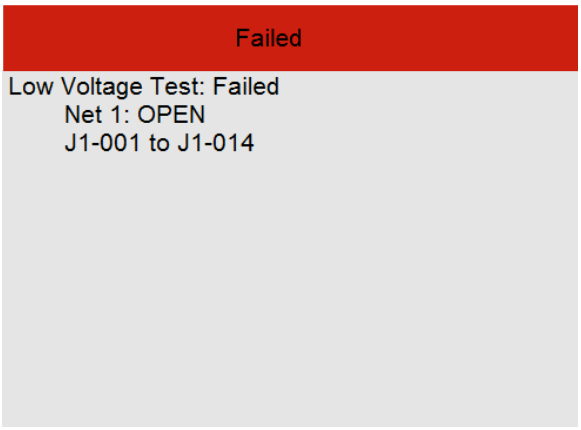
- The default setting for this parameter of 0.010 seconds (10 milliseconds) should be adequate to test most cables. A longer duration will increase the total high voltage test time.
- A shorter Duration with a shorter soak time or not having soak time is more likely to fail due to humidity related problems since absorbed moisture may not have time to be "dried out" before the Insulation Resistance Test.
- A longer Duration provides a more stringent test for predicting dielectric failures (exhibited as sudden arcs); however, equivalent dielectric errors can be found by compensating a shorter Duration with a higher High Voltage setting.
- A longer Duration may be better for predicting some types of insulation failures and may increase the chance of detecting a breakdown condition.

17. Appendix B – Interpreting Test Results

When an assembly fails a test, the Test window will display information about the errors that caused the failure. The following examples show frequent errors operators may encounter:

■ *Low Voltage Errors*

When the tester detects a low voltage error, the screen will display detailed information about the error.



The first line explains the low voltage test failed.

The second line describes the type of error.

- **Open Error:** The intended electrical path contains a gap across which electric current cannot pass.
- **Short Error:** An unintended connection between 2 or more points. This failure indicates insufficient insulation between unintended connections.

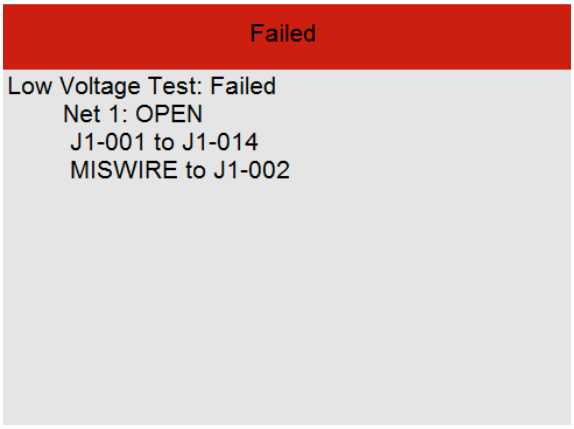
The third line defines the location of the error.

For example, the above image shows an ***Open error between test points J1-001 and J1-014***.

In the case of a miswire, a fourth line will provide the location

- **Miswire Error:** An unintended connection which is the result of unexpected contact. This error is often referred to as an Open and a Short combined.

For example, the image to the right shows an Open error between test points J1-001 and J1-014 and a short from J1-014 to J1-002.



■ *Component Errors*

When the tester creates a new test program containing a component, it will measure the component value in the sample device and assign a default tolerance range. During a test, if the tester measures a value outside of the tolerance range, the component instruction will fail with an error message that indicates the value measured, as well as the expected value.

Note: *You can change the expected component value and the tolerance range by editing the test program in a text editor.*

■ *High Voltage Errors – 3350 only*

Overcurrent Error:

- The current has exceeded an internal limit during the ramp phase for the net or point given in the error message. This often means that there is an unintended connection in the device so that more current is flowing than expected as the tester ramps up to the test voltage.
- This error could also be caused when the tester was charging the net or point given in the error message and the capacitance in the DUT was too high. A limit is in place to ensure safety while testing, so testing is immediately halted when the limit is reached.

Dielectric Failure Error:

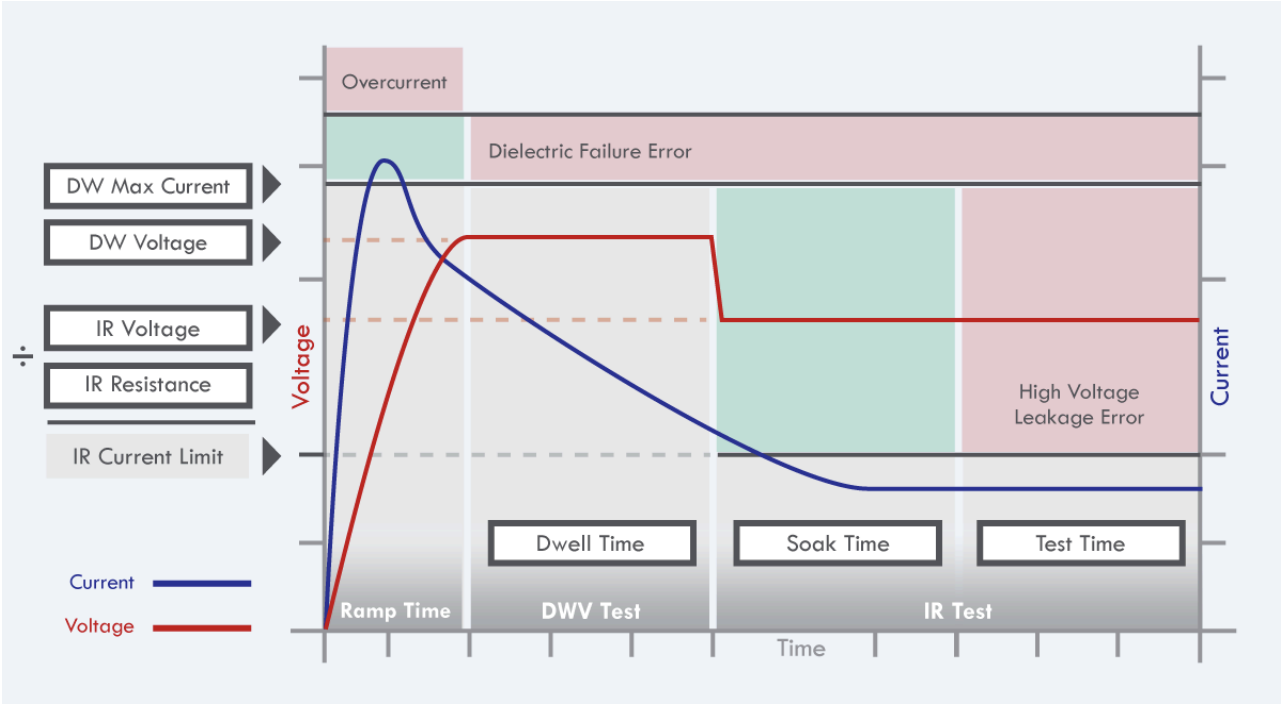
- An arc occurred during the high voltage test of the net or point given in the error message. This error will occur anytime the current exceeds the 'DW Max Current' test setting.
- This error most often occurs in pairs – that is two different nets will fail. This generally means that the arc is occurring between these two nets. If the error occurs only on a single net it may be the result of a highly capacitive net such as a shield. The 3350 tester has a setting that can overcome an error caused by highly capacitive shields. See *page 16*.

■ *Leakage Error*

This error indicates that the current leakage is higher than specified by the IR Resistance test setting. The current limit may be calculated by the equation Current Limit = IR Voltage / IR Resistance. The current exceeding this limit means that the insulation did not meet the specified threshold.

■ *HV Errors Graph*

The graph represents a normal, good set of high voltage tests. The red line represents voltage while the blue line represents current. If the blue current line ever enters one of the pink regions, the specified error will result.



18. Frequently Asked Questions

How can I know what values to use in each setting?

If settings are not specified in the cable build instructions and you are hesitant about using the default settings in the software, you can turn to the industry accepted wire assembly guide, A-620. More information about this guide can be found by visiting cirris.com.

You can also calculate some settings using tools such as the Cirris calculators found at cirris.com.

Is High Voltage dangerous?

Cirris testers are designed to comply with product safety regulations. Some of these regulations reduce the chance of receiving a harmful electrical shock. However, during a high voltage test, there may be some risk. Children and those with pacemakers should not perform high voltage testing. For more ideas on high voltage and safety, visit cirris.com.

How do I calibrate my tester?

Every Cirris tester that leaves our factory is calibrated in compliance with ANSI/NCSL Z540-1-1994 and ISO-10012 to standards traceable to the NIST in the United States. For more information, visit cirris.com.

The calibration of the tester should be verified annually.

To verify calibration and functionality, you can purchase a Performance Check Kit from Cirris. In addition to the performance check kit, you will need a calibrated voltmeter.

Where do I find current manuals?

The most current manuals can be found by contacting Cirris.

18.1 Service and Maintenance

■ *General Maintenance*

Do not remove the tester cover. Removing the tester cover will void your warranty. The 3300 Series tester contains no internal user serviceable parts. Cleaning or routine maintenance of internal parts should be done at Cirris.

Any exterior cleaning should be done using a clean, damp rag. Avoid using cleaning agents or chemicals on any part of the unit.

■ *Touchscreen Maintenance*

The 3300 Series tester uses a capacitive touch screen interface. Over time the screen can become dirty. Do not use chemicals or liquids to clean the screen. Use a microfiber cloth to clean fingerprints and dust off the touch screen.

18.2 Connector Maintenance

The DB-25 Connectors on the front of your tester are made to be durable, but over time the connectors can be damaged either from age or abuse/misuse. To protect your tester's connectors:

- Never insert foreign objects into your connectors.
- Keep the connectors free of dust and debris.
- Be mindful of bent pins or other problems with mating connectors.

18.3 Repair

Should your tester require repair, contact your Cirris representative for a free estimate. Depending on the extent of the damage, you may have to send your tester to Cirris headquarters.

19. Specifications

Test Points

50 or 100 point options

Low Voltage Test

2 Wire

- **Voltage:** 4 V max
- **Current:** 3 µA to 6 mA
- **Resistance:** 0.1 Ω to 100 kΩ ± 1% ± 0.1 Ω, 100 kΩ to 5 MΩ ± 10%

4 Wire

- **Voltage:** 4 V max
- **Current:** 1 mA to 1 A
- **Resistance:** 0.001 Ω to 10 Ω ± 2% ± 0.001 Ω

Component Tests

- **Diodes:** Silicon, LEDs
- **Resistors:** 0.1 Ω to 100 kΩ ± 1% ± 0.1 Ω, 100 kΩ to 5 MΩ ± 10%
- **Capacitors:** 5 nF to 100 µF ±10% ± 0.02 nF
- **Twisted Pairs:** Verify proper pairing in twisted pair cables

High Voltage Test – 3350 only

Insulation Resistance Test

- **Voltage:** 50 to 1000 VDC ± 5% ± 5 V
- **Resistance:** 5 MΩ to 1000 MΩ ± 10%

Dielectric Withstand Test

- **Voltage:** 50 to 1000 VDC ± 5% ± 5 V
- **Current Limit:** 0.1 mA to 1.5 mA
- **Max Capacitance Per Net:** 150 nF @ 300 VDC, 90 nF @ 500 VDC, 45 nF @ 1000 VDC
- **HV Energy Limit:** 35 mJ
- **HV Charge Limit:** 45 µC

Digital Input/Output

One input for starting/resetting a test, two outputs for good/bad test results

Test Point Interface

100 test points via 4 DB-25 connectors

User Interface

- **Display:** 7" color graphical display with capacitive touch screen (800 X 480-pixel resolution)
- **Memory:** Internal memory for test program storage
- **File transfer:** Transfer test programs either by connecting directly to a PC or using a USB flash drive.
- **Printing:** Label printing using any Zebra Programming Language (ZPL) capable printer

Power

105 - 240 V, 50-60 Hz

Size

- **Height:** 14.33 cm (5.65")
- **Depth:** 15.62 cm (6.15")
- **Width:** 28.96 cm (11.40")

Weight

Approximately 3.6 kg (8 lbs)

All Cirris products are manufactured in Salt Lake City, Utah, United States of America.

Cirris 3300 Series User Manual
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