Telaris Multifunction Electrical Installation Tester Series

Telaris ProInstall-100-EUR
Telaris ProInstall-200-EUR
Telaris ProInstall-100-D
Telaris ProInstall-200-D
Telaris ProInstall-100-CH
Telaris ProInstall-200-CH
Telaris ProInstall-100-DK

English

Users Manual

7/2013, 6001109 A

Limited Warranty and Limitation of Liability
Your Amprobe product will be free from defects in material and workmanship for one year from the date of purchase unless local laws require otherwise. This warranty does not cover fuses, disposable batteries or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on the behalf of Amprobe. To obtain service during the warranty period, return the product with proof of purchase to an authorized Amprobe Service Center or to an Amprobe dealer or distributor. See Repair Section for details. THIS WARRANTY IS YOUR ONLY REMEDY. ALL OTHER WARRANTIES - WHETHER EXPRESS, IMPLIED OR STATUTORY - INCLUDING IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, ARE HEREBY DISCLAIMED. MANUFACTURER SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

Repair
All Amprobe tools returned for warranty or non-warranty repair or for calibration should be accompanied by the following: your name, company's name, address, telephone number, and proof of purchase. Additionally, please include a brief description of the problem or the service requested and include the test leads with the meter. Non-warranty repair or replacement charges should be remitted in the form of a check, a money order, credit card with expiration date, or a purchase order made payable to Amprobe.

In-warranty Repairs and Replacement – All Countries
Please read the warranty statement and check your battery before requesting repair. During the warranty period, any defective test tool can be returned to your Amprobe distributor for an exchange for the same or like product. Please check the "Where to Buy" section on www.Amprobe.com for a list of distributors near you. Additionally, in the United States and Canada, in-warranty repair and replacement units can also be sent to an Amprobe Service Center (see address below).

Non-warranty Repairs and Replacement – United States and Canada
Non-warranty repairs in the United States and Canada should be sent to an Amprobe Service Center. Call Amprobe or inquire at your point of purchase for current repair and replacement rates.

USA:
Amprobe
Everett, WA 98203
Tel: 877-AMPROBE (267-7623)

Canada:
Amprobe
Mississauga, ON L4Z 1X9
Tel: 905-890-7600

Non-warranty Repairs and Replacement – Europe
European non-warranty units can be replaced by your Amprobe distributor for a nominal charge. Please check the "Where to Buy" section on www.Amprobe.eu for a list of distributors near you.

Amprobe Europe*
Beha-Amprobe
In den Engematten 14
79286 Glottertal, Germany
Tel.: +49 (0) 7684 8009 - 0
www.Amprobe.eu
*(Correspondence only – no repair or replacement available from this address. European customers please contact your distributor.)

CONTENTS

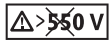
INTRODUCTION

The Amprobe Model Telaris ProInstall-100 and Telaris ProInstall-200 are battery powered electrical installation testers. This manual applies to all models. All figures show the Model Telaris ProInstall-200.

These testers are designed to measure and test the following:

- Voltage and Frequency
- Insulation Resistance (EN61557-2)
- Continuity (EN61557-4)
- Loop/Line Resistance (EN61557-3)
- Residual Current Devices (RCD) Tripping Time (EN61557-6)
- RCD Tripping Current (EN61557-6)
- Earth Resistance (EN61557-5)
- Phase Sequence (EN61557-7)

SYMBOLS

	Caution! Risk of electric shock.
	Caution! Refer to the explanation in this manual.
	Double insulated (Class II) equipment
	Earth (Ground).
	Fuse.
CE	Conforms to requirements of European Union and European Free Trade Association.
	Do not use in distribution systems with voltages higher than 550 V.
CAT III / CAT IV	CAT III Testers are designed to protect against transients in fixedequipment installations at the distribution level; CAT IV Testers are designed to protect against transients from the primary supply level (overhead or underground utility service).
	Do not dispose this product as unsorted municipal waste. Contact aqualified recycler.

SAFETY INFORMATION

A Warning identifies hazardous conditions and actions that could cause bodily harm or death.

A Caution identifies conditions and actions that could damage the tester or cause permanent loss of data.

⚠⚠Warnings: Read Before Using

To prevent possible electrical shock,fire,or personal injury:

- Use the product only as specified, or the protection supplied by the product can be compromised.

- Do not use the product around explosive gas, vapor or in damp or wet environments.
- Do not use test leads if they are damaged. Examine the test leads for damaged insulation, exposed metal, or if the wear indicator shows. Check test lead continuity.
- Use only current probes, test leads, and adapters supplied with the product.
- Measure a known voltage first to make sure that the product operates correctly.
- Do not use the product if it is damaged.
- Have an approved technician repair the product.
- Do not apply more than the rated voltage between the terminals or between each terminal and earth ground.
- Remove test leads from the tester before the tester case is opened.
- Do not operate the product with covers removed or the case open. Hazardous voltage exposure is possible.
- Use caution when working with voltages above 30 V ac rms, 42 V ac peak, or 60 V dc.
- Use only specified replacement fuses.
- Use the correct terminals, function, and range for measurements.
- Keep fingers behind the finger guards on the probes.
- Connect the common test lead before the live test lead and remove the live test lead before the common test lead.
- Replace the batteries when the low battery indicator shows to prevent incorrect measurements.
- Use only specified replacement parts.
- Do not use the tester in distribution systems with voltages higher than 550 V.
- Comply with local and national safety codes. Use personal protective equipment (approved rubber gloves, face protection, and flame-resistant clothes) to prevent shock and arc blast injury where hazardous live conductors are exposed.

UNPACKING AND INSPECTION

Your shipping carton should include:

1 Telaris ProInstall-100 or Telaris ProInstall-200
6 batteries 1.5V AA Mignon
3 Test leads
1 Mains test lead
3 Alligator clips
3 Test probe
1 Remote probe
1 CD-ROM with user manual
1 Carrying case
1 Padded Strap

If any of the items are damaged or missing, return the complete package to the place of purchase for an exchange.

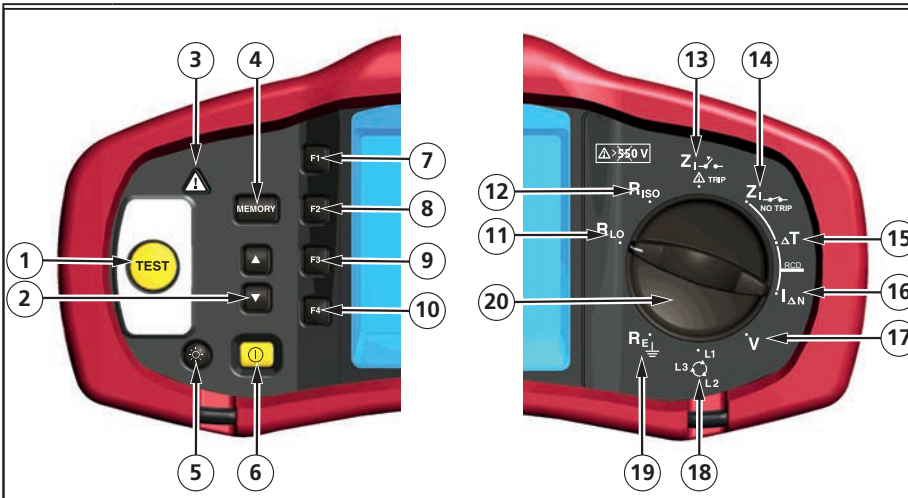
OPERATING THE TESTER

Using the Rotary Switch

Use the rotary switch (Figure 1 and Table 4) to select the type of test you want to perform.

Understanding the Pushbuttons

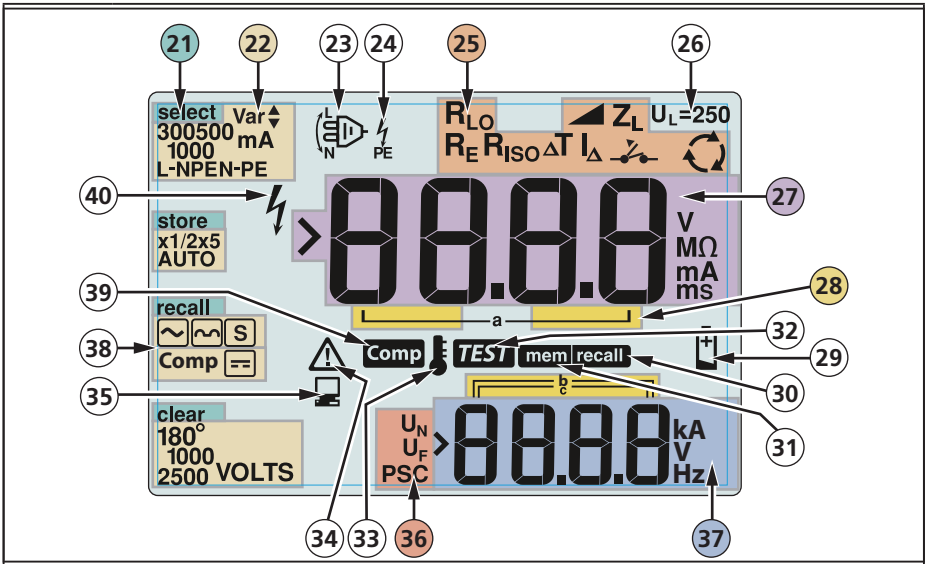
Use the rotary switch to select the type of test you want to perform.Use the pushbuttons to control operation of the tester, select test results for viewing, and scroll through selected test results.



Number	Measurement Function
1	Starts the selected test. The TEST key is surrounded by a “touch pad”. The touch pad measures the potential between the operator and the tester’s PE terminal. If you exceed a 100 V threshold, the ⚠ symbol above the touch pad is illuminated.
2	• Scroll memory locations. • Set memory location codes.
3	Above the touch pad is illuminated.
4	• Enters Memory mode. • Activates memory soft key selections (F1, F2, F3, or F4).
5	Turns the backlight on and off.
6	Turns the tester on and off. The tester will also shut off automatically is there is no activity for 10 minutes.
7	• Loop input select (L-N, L-PE). • Voltage input select (L-N, L-PE, N-PE). • RCD current rating (10, 30, 100, 300, 500, 1000 mA • Memory SELECT.
8	• RCD Current multiplier (x1/2, x1, x5) • Memory STORE.
9	• Select RCD: Type AC (sinusoidal), Type AC Selective, Type A (half-wave), Type A Selective, Type B (smooth DC), or Type B Selective. • Memory RECALL.
10	• RCD test polarity (0, 180 degrees). • Insulation test voltage (100, 250, 500, or 1000 V). • Memory CLEAR.

11	Continuity.
12	Insulation resistance.
13	Loop impedance — Hi current trip mode
14	Loop impedance — No trip mode.
15	RCD tripping time.
16	RCD tripping level.
17	Volts
18	Phase rotation.
19	Earth resistance.
20	Rotary switch.

Understanding the Display

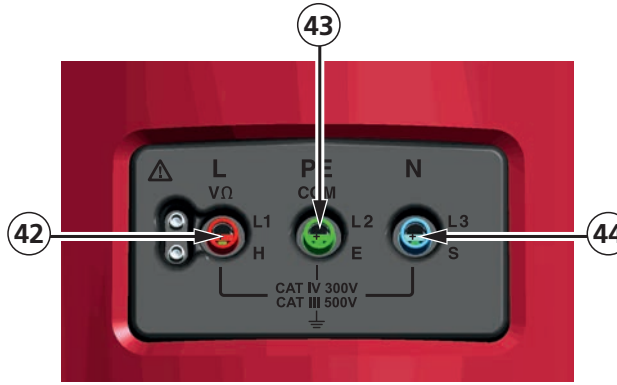


Number	Description
21	Displays the selected Memory mode. Memory modes are: Select (F1), Store (F2), Recall (F3), or Clear (F4).
22	Configuration options. Settings you can make within the measurement functions. For example, in the RCD Tripping Time function (ΔT) you can press F2 to multiply the test current by x1/2, x1, x5 and you can press F3 to select the type of RCD you are testing.
23	Arrows above or below the terminal indicator symbol indicate reversed polarity. Check the connection or check the wiring to correct.
24	Terminal indicator symbol. A terminal indicator symbol with a dot (O) in the center indicates the terminal is used for the selected function. The terminals are: • L (Line) • PE (Protective Earth) • N (Neutral)

<table>
<tr><td>25</td><td>Indicates the selected rotary switch setting. The measurement value in the primary display also corresponds to the switch setting. Rotary switch settings are:
<table>
<tr><td>R_{ISO}</td><td>Insulation</td><td>ΔT</td><td>RCD trip time</td></tr>
<tr><td>R_{LO}</td><td>Continuity</td><td>I_{Δ}</td><td>RCD trip current</td></tr>
<tr><td>Z_I</td><td>Loop no trip</td><td>R_E</td><td>Earth</td></tr>
<tr><td>Z_I</td><td>Loop hi current trip</td><td></td><td>Phase Rotation</td></tr>
</table></td></tr>
<tr><td>26</td><td>Indicates the preset fault voltage limit. The default setting is 50 V. Some locations require the fault voltage be set to 25 V, as specified by local electrical codes. Press F4 when you turn on the tester to toggle the fault voltage between 25 V and 50 V. The value you set will appear on the display and will be saved when you turn the tester off.</td></tr>
<tr><td>27</td><td>Primary display and measurement units.</td></tr>
<tr><td>28</td><td>Memory locations. See page 37 for detailed information on using memory locations.</td></tr>
<tr><td>29</td><td>Low battery icon. See “Testing and Replacing the Batteries” on page 41 for additional information on batteries and power management.</td></tr>
<tr><td>30</td><td>Appears when you press the Recall button and you are looking at stored data.</td></tr>
<tr><td>31</td><td>Appears when you press the Memory button.</td></tr>
<tr><td>32</td><td>Appears when you press the Test button. Disappears when the test is completed.</td></tr>
<tr><td>33</td><td>Appears when the instrument is overheated. The Loop test and RCD functions are inhibited when the instrument is overheated.</td></tr>
<tr><td>34</td><td>Appears when an error occurs. Testing is disabled. See “Error Codes” on page 16 for a listing and explanation of possible error codes.</td></tr>
<tr><td>35</td><td>Appears when the instrument is uploading data using Amprobe PC software.</td></tr>
<tr><td>36</td><td>Name of the secondary measurement function.
U_N - Test voltage for insulation test.
U_F - Fault voltage. Measures neutral to earth.
PSC - Prospective Short Circuit. Calculated from measured voltage and impedance</td></tr>
<tr><td>37</td><td>Secondary display and measurement units. Some tests will return more than one result or return a computed value based on the test result. This will occur with:
• Volts
• Insulation tests
• Loop / line impedance
• RCD switching time
• RCD tripping current</td></tr>
<tr><td>38</td><td>Press F3 to compensate the test lead for the continuity function.</td></tr>
<tr><td>39</td><td>Appears when a compensation value for the test exists.</td></tr>
<tr><td>40</td><td>Potential danger. Appears when measuring or sourcing high voltages.</td></tr>
</table>

Input Terminals

Use the rotary switch to select the type of test you want to perform.



Number	Description
42	L (Line)
43	PE (Protective Earth)
44	N (Neutral)

Using the IR Port

The Model Telaris ProInstall-100 and Telaris ProInstall-200 have an IR (infrared) port, see Figure 23, which allows you to connect the tester to a computer and upload test data using a Amprobe PC software. This automates your troubleshooting or recording process, reduces the possibility of manual error and allows you to collect, organize, and display test data in a format that meets your needs. See "Uploading Test Results" on page 40 for additional information on using the IR port.

Error Codes

Various error conditions are detected by the tester and are indicated with the ⚠ icon, "Err", and an error number on the primary display. See table below. These error conditions disable testing and, if necessary, stop a running test.

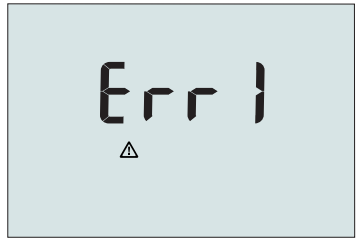


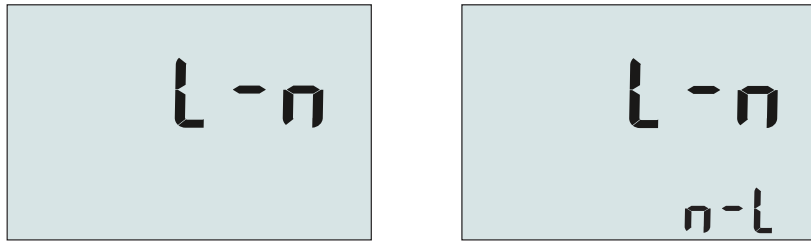
Figure 6. Error Display

Error Condition	Code	Solution
Self-test Fails	1	Return the tester to a Amprobe Service Center.

Over-temp	2	Wait while the tester cools down.
Fault Voltage	4	Check the installation, in particular, the voltage between N and PE.
Excessive Probe Resistance	6	Put the stakes deeper into the soil. Tamp down the soil directly around the stakes. Pour water around the stakes but not at the earth ground under test.

Power-On Options

To select a power-on option, press ⏻ and the function key simultaneously and then release the ⏻ button. Power-on options are retained when the tester is turned OFF. See Table below.



UK - Mode Selected

Automatic Lead Swapping Mode Selected

Figure 7. Lead Swapping Modes

Keys	Power-on Options
⏻ F3	Line and Neutral Swap mode. Two modes of operation are available. You can configure the tester to operate in L-n mode or L-n n-L mode, see Figure 7. • In L-n mode, the L and N phase conductors must NEVER be reversed. This is a requirement in some regions including the UK. The icon appears on the display indicating that the system L and N conductors are swapped and testing is inhibited. Investigate and rectify the cause of this system fault before proceeding. L-n mode also changes the RCD x1/2 trip time duration to 2 seconds as required in the UK. • In L-n n-L mode, the unit allows the L and N phase conductors to be swapped and testing will continue. Note: In locations where polarized plugs and outlets are used, a swapped lead icon ( ) may indicate that the outlet was wired incorrectly. Correct this problem before proceeding with any testing.
⏻ F4	Fault voltage limit. Toggles the fault voltage between 25 V and 50 V. The default is 50 V.
⏻ MEMORY	View the tester serial number. Primary display shows the initial four digits and the secondary display shows the next four digits.
⏻ ☼	Continuity beeper toggle. Toggles the continuity beeper on and off. The default is on.

Measuring Volts and Frequency

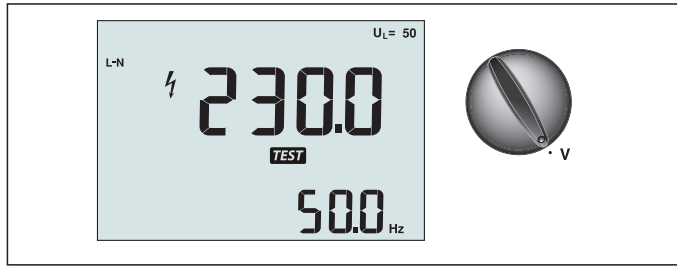


Figure 8. Volts Display/Switch and Terminal Settings

To measure voltage and frequency:

1. Turn the rotary switch to the V position.
2. Use all (red, blue, and green) terminals for this test. You can use test leads or mains cord when measuring AC voltage.
   - The primary (upper) display shows the AC voltage. The tester reads AC voltage to 500 V. Press F1 to toggle the voltage reading between L-PE, L-N, and N-PE.
   - The secondary (lower) display shows mains frequency.

Measuring Insulation Resistance

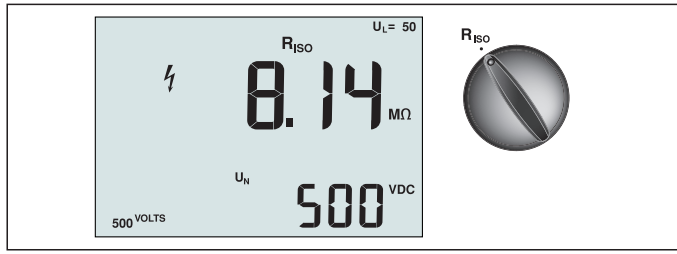


Figure 9. Insulation Resistance Display/Switch and Terminal Settings

⚠⚠Warning
To avoid electric shock, measurements should only be performed on de-energized circuits.

To measure insulation resistance:

1. Turn the rotary switch to the R_{ISO} position.
2. Use the L and PE (red and green) terminals for this test.
3. Use the F4 to select the test voltage. Most insulation testing is performed at 500 V, but observe local test requirements.
4. Press and hold (TEST) until the reading settles

   Note: Testing is inhibited if voltage is detected in the line.
   - The primary (upper) display shows the insulation resistance.
   - The secondary (lower) display shows the actual test voltage.

   Note: For normal insulation with high resistance, the actual test voltage (UN) should always be equal to or higher than the programmed voltage. If insulation resistance is bad, the test voltage is automatically reduced to limit the test current to safe ranges.

Measuring Continuity

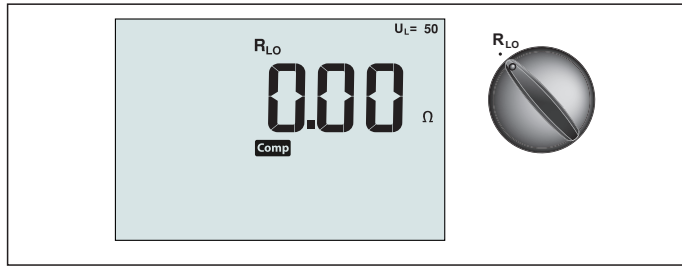


Figure 10. Continuity Zero Display/Switch and Terminal Settings

A continuity test is used to verify the integrity of connections by making a high resolution resistance measurement. This is especially important for checking Protective Earth connections.

Note: In countries where electrical circuits are laid out in a ring, it is recommended that you make an end-to-end check of the ring at the electrical panel.

⚠⚠Warning

- **Measurements should only be performed on de-energized circuits.**
- **Measurements may be adversely affected by impedances or parallel circuits or transient currents.**

To measure continuity:

1. Turn the rotary switch to the RLO position.
2. Use the L and PE (red and green) terminals for this test.
3. Before making a continuity test, short connect the test leads. Press and hold F3 until the comp annunciator appears. The tester measures probe resistance, stores the reading in memory, and subtracts it from readings. The resistance value is saved even when power is turned off so you don't need to repeat the operation every time you use the instrument.

   Note: Be sure the batteries are in good charge condition before you compensate the test leads.
4. Press and hold (TEST) until the reading settles. If the continuity beeper is enabled, the tester beeps continuously for measured values less than 2 Ω and there is no stable reading beep for measured values greater than 2 Ω. If a circuit is live, the test is inhibited and the AC voltage appears in the secondary (lower) display.

Measuring Loop/Line Impedance

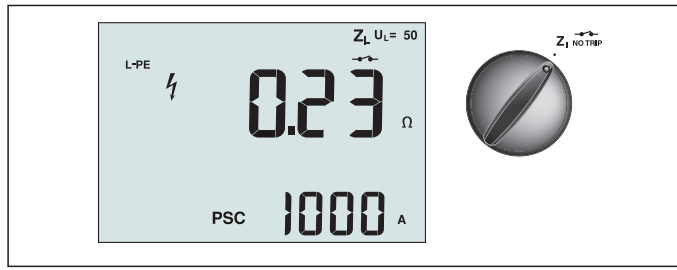


Figure 11. Loop/Line Impedance/Switch and Terminal Settings

Loop Impedance (Line to Protective Earth L-PE)

Loop impedance is source impedance measured between Line (L) and Protective Earth (PE). You can also ascertain the Prospective Earth Fault Current (PSC) that is the current that could potentially flow if the phase conductor is shorted to the protective earth conductor. The tester calculates the PSC by dividing the measured mains voltage by the loop impedance. The loop impedance function applies a test current that flows to earth. If RCDs are present in the circuit, they may trip. To avoid tripping, always use the Zl No Trip function on the rotary switch. The no trip test applies a special test that prevents RCDs in the system from tripping. If you are certain no RCDs are in the circuit, you can use the Zl Hi Current function for a faster test.

Note: If the L and N terminals are reversed, the tester will auto-swap them internally and continue testing. If the tester is configured for UK operation, testing will halt. This condition is indicated by symbol ( ).

To measure loop impedance no trip mode:

⚠⚠Warning

To prevent tripping RCDs in the circuit:

- **Always use the Z_I NO TRIP position for loop measurements.**
- **Preload conditions can cause the RCD to trip.**
- **An RCD with a nominal fault current of 10 mA will trip.**

Note: To do a Loop impedance test in a circuit with a 10 mA RCD, we recommend a trip time RCD test. Use a nominal test current of 10 mA and the factor x ½ for this test.

If the fault voltage is below 25 V or 50 V, dependent on the local requirement, the loop is good. To calculate the loop impedance, divide the fault voltage by 10 mA (Loop impedance = fault voltage x 100).

1. Turn the rotary switch to the Z_I NO TRIP position.
2. Connect all three leads to the L, PE, and N (red, green, and blue) terminals of the tester. Only the calibrated test lead which are in scope of supply must be used! The resistance of the calibrated test leads is subtracted from the result automatically.
3. Press F1 to select L-PE. The display shows the Z_L and ⊸● indicator.
4. Connect all three leads to the L, PE, and N of the system under test or plug the mains cord into the socket under test.

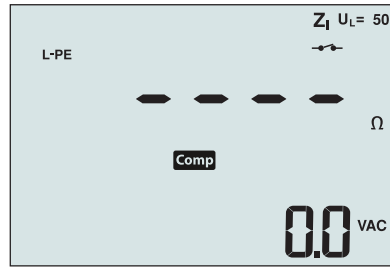


Figure 12. Display After Zeroing

4. Press and release TEST. Wait for the test to complete. The primary (upper) display shows the loop impedance. The secondary (lower) display shows the prospective short current (PSC) in amps or kilo amps.

This test will take several seconds to complete. If the mains is disconnected while the test is active, the test automatically terminates.

Note: Errors may occur due to preloading the circuit under test.

To measure loop impedance—Hi current trip mode:

If no RCDs are present in the system under test, you can use the high current Line Earth (L-PE) loop impedance test.

1. Turn the rotary switch to the Z_{I} TRIP position.
2. Connect all three leads to the L, PE, and N (red, green, and blue) terminals of the tester. Only the calibrated test lead which are in scope of supply must be used! The resistance of the calibrated test leads is subtracted from the result automatically.
3. Press F1 to select L-PE. The appears to indicate that hi current trip mode is selected.
4. Repeat Steps 4 through 8 from the preceding test.

⚠⚠Warning

The symbol on the LCD indicates the high current loop mode - any RCDs in the system will trip - ensure there are no RCDs present.

Line Impedance

Line impedance is source impedance measured between Line conductors or Line and Neutral. This function allows the following tests:

- Line to Neutral loop impedance.
- Line to Line impedance in 3-phase systems.
- L-PE loop measurement. This is a way of making a high current, 2-wire loop measurement. It cannot be used on circuits protected by RCDs because it will cause them to trip.
- Prospective Short Circuit Current (PSC). PSC is the current that can potentially flow if the phase conductor is shorted to the neutral conductor or another phase conductor. The tester calculates the PSC current by dividing the measured mains voltage by the line impedance.

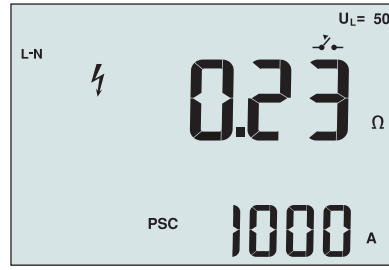


Figure 14. Line Impedance Display

To measure line impedance:

1. Turn the rotary switch to the Z_{I} TRIP position. The LCD indicates that the high current loop mode is selected by displaying the symbol.
2. Connect the red lead to the L (red) and the blue lead to the N (blue). Only the calibrated test lead which are in scope of supply must be used! The resistance of the calibrated test leads is subtracted from the result automatically.
3. Press F1 to select L-N.

⚠⚠Warning

At this step,be careful not to select L-PE because a high current loop test will take place. Any RCDs in the system will trip if you proceed.

Note: Connect the leads in a single-phase test to the system live and neutral. To measure line-to-line impedance in a 3-phase system, connect the leads to 2 phases.

4. Press and release TEST. Wait for the test to complete.
   - The primary (upper) display shows the line impedance.
   - The secondary (lower) display shows the Prospective Short Circuit Current (PSC).

Use the connection shown in Figure 15 when measuring in a 3-phase 500 V system.

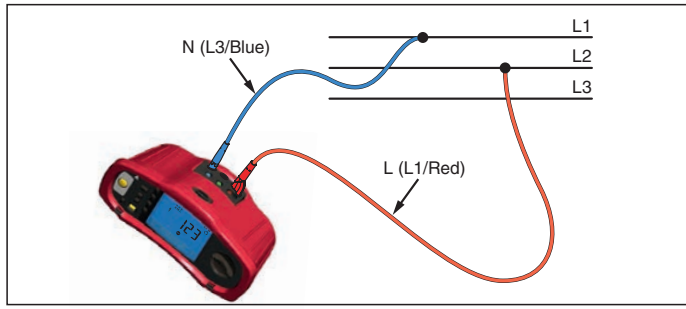


Figure 15. Measuring in a 3-Phase System

Measuring RCD Tripping Time

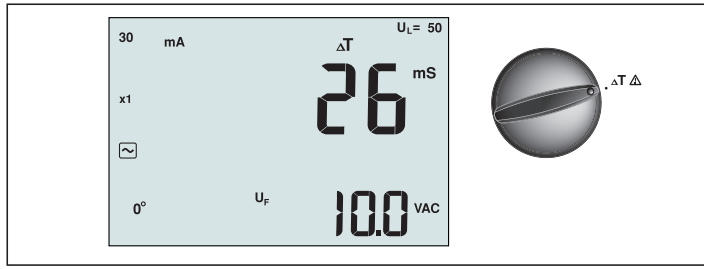


Figure 16. RCD Tripping Time Display/Switch and Terminal Settings

In this test, a calibrated fault current is induced into the circuit, causing the RCD to trip. The meter measures and displays the time required for the RCD to trip. You can perform this test with test leads or using the mains cord. The test is performed with a live circuit.

You can also use the tester to perform the RCD tripping time test in Auto mode, which makes it easier for one person to perform the test.

Note: When measuring trip time for any type of RCD, the tester first does a pretest to determine if the actual test will cause a fault voltage exceeding the limit (25 or 50 V).

To avoid having an inaccurate trip time for S type (time delay) RCDs, a 30 second delay is activated between the pretest and the actual test. This RCD type needs a delay because it contains RC circuits that are required to settle before applying the full test.

⚠⚠Warning

- **Leakage currents in the circuit following the residual current protection device may influence measurements.**
- **The displayed fault voltage relates to the rated residual current of the RCD.**
- **Potential fields of other earthing installations may influence the measurement.**
- **Equipment (motors,capacitors) connected downstream of the RCD may cause considerable extension of the tripping time.**

Note: If the L and N terminals are reversed, the tester will auto-swap them internally and continue testing. If the tester is configured for UK operation, testing will halt and you will need to determine why the L and N are swapped.

This condition is indicated by symbol ( ).

Type A and type B RCDs do not have the 1000 mA option available.

To measure RCD tripping time:

1. Turn the rotary switch to the **ΔT** position.
2. Press F1 to select the RCD current rating (10, 30, 100, 300, 500, or 1000 mA).
3. Press F2 to select a test current multiplier (x ½, x 1, x 5, or Auto). Normally you will use x 1 for this test.
4. Press F3 to select the RCD test-current waveform:

– AC current to test type AC (standard AC RCD) and type A (pulse-DC sensitive RCD)

– Half-wave current to test type A (pulse-DC sensitive RCD)

– Delayed response to test S-type AC (time delayed AC RCD)

– Delayed response to S-type A (time delayed pulse-DC sensitive RCD)

– Smooth-DC current to test type B RCD

– Delayed response to S-type B (time delayed smooth-DC current RCD)

5. Press F4 to select the test current phase, 0° or 180°. RCDs should be tested with both phase settings, as their response time can vary significantly depending on the phase

   Note: For RCD type B ( ) or S-type B ( ), you must test with both phase settings, all three test leads are required.

6. Press and release (TEST). Wait for the test to complete.
   - The primary (upper) display shows the trip time.
   - The secondary (lower) display shows the fault voltage related to the rated residual current.

To measure RCD tripping time using Auto mode:

1. Plug the tester into the outlet.
2. Turn the rotary switch to the ΔT position.
3. Press F1 to select the RCD current rating (10, 30, or 100 mA).
4. Press F2 to select Auto mode.
5. Press F3 to select the RCD test-current waveform.
6. Press and release TEST

   The tester supplies ½x the rated RCD current for 310 or 510 ms (2 seconds in the UK). If the RCD trips, the test terminates. If the RCD does not trip, the tester reverses phase and repeats the test. The test terminates if the RCD Trips.

   If the RCD does not trip, the tester restores the initial phase setting and supplies 1x the rated RCD current. The RCD should trip and the test results appear in the primary display.
7. Reset the RCD.
8. The tester reverses phases and repeats the 1x test. The RCD should trip and the test results appear in the primary display.
9. Reset the RCD.
10. The tester restores the initial phase setting and supplies 5x the rated RCD current for up to 50 ms. The RCD should trip and the test results appear in the primary display.
11. Reset the RCD.
12. The tester reverses phase and repeats the 5x test. The RCD should trip and the test results appear in the primary display.
13. Reset the RCD.
    - You can use the ▲ ▼ arrow keys to review test results. The first result shown is the last measurement taken, the 5x current test. Press the down arrow ke ▲ ▼ to move backward to the first test at ½x the rated current.
14. Test results are in temporary memory. If you want to store the test results, press MEMORY and proceed as described in "Storing and Recalling Measurements" on page 37 of this manual.
    Note: You must store each result separately after you select it with the arrow keys.

Measuring RCD Tripping Current

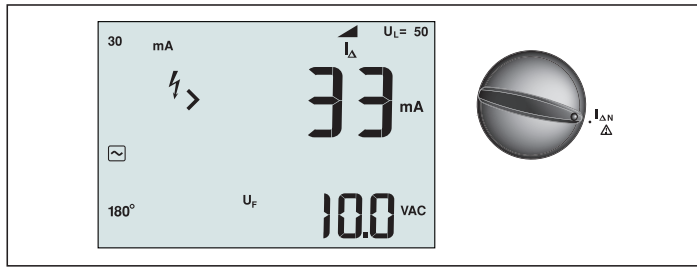


Figure 17. RCD Tripping Current/Switch and Terminal Settings

This test measures the RCD tripping current by applying a test current and then gradually increasing the current until the RCD trips. You can use the test leads or mains cord for this test. A 3 wire connection is required for testing of RCD type B.

⚠⚠Warning

- **Leakage currents in the circuit following the residual current protection device may influence measurements.**
- **The displayed fault voltage relates to the rated residual current of the RCD.**
- **Potential fields of other earthing installations may influence the measurement.**

Note: If the L and N terminals are reversed, the tester will auto-swap them internally and continue testing. If the tester is configured for UK operation, testing will halt and you will need to determine why the L and N are swapped.

This condition is indicated by symbol ( ).

Type A and type B RCDs do not have the 1000 mA option available.

To measure RCD tripping current:

1. Turn the rotary switch to the $I_{\Delta N}$ position.
2. Press F1 to select the RCD current rating (10, 30, 100, 300, or 500 mA).
3. Press F2 to select the RCD test-current waveform:

– AC current to test type AC (standard AC RCD) and type A (pulse-DC sensitive RCD)

– Half-wave current to test type A (pulse-DC sensitive RCD)

S – Delayed response to test S-type AC (time delayed AC RCD)

S – Delayed response to S-type A (time delayed pulse-DC sensitive RCD)

– Smooth-DC current to test type B RCD

S – Delayed response to S-type B (time delayed smooth-DC current RCD)

4. Press F4 to select the test current phase, 0° or 180°. RCDs should be tested with both phase settings, as their response time can vary significantly depending on the phase.

   Note: For RCD type B ( ) or S-type B (S), you must test with both phase settings, all three test leads are required.

5. Press and release TEST. Wait for the test to complete.
   - The primary (upper) display shows the trip time.

RCD testing in IT systems

RCD testing at locations with IT systems requires a special test procedure because the Protective Earth connection is grounded locally and is not tied directly to the power system.

The test is conducted at the electrical panel using probes. Use the connection shown in Figure 18 when performing RCD testing on IT electrical systems.

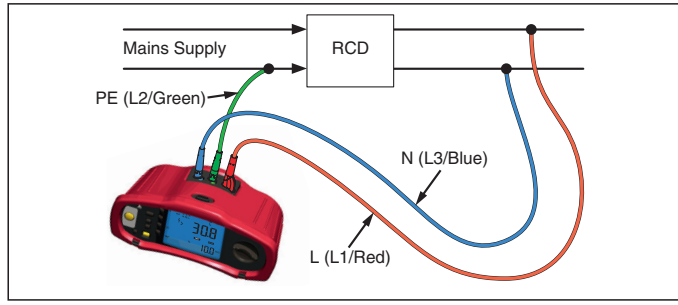


Figure 18. Connection for RCD Testing on IT Electrical Systems

The test current flows through the upper side of the RCD, into the L terminal, and returns though the PE terminal.

Measuring Earth Resistance

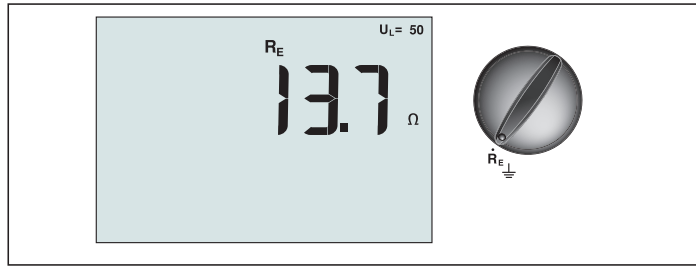


Figure 19. Earth Resistance Display/Switch and Terminal Settings

The earth resistance test is a 3-wire test consisting of two test stakes and the earth electrode under test. This test requires an accessory stake kit. Connect as shown in Figure 20.

- Best accuracy is achieved with the middle stake at 62 % of the distance to the far stake. The stakes should be in a straight line and wires separated to avoid mutual coupling.
- The earth electrode under test should be disconnected from the electrical system when conducting the test. Earth resistance testing should not be performed on a live system.

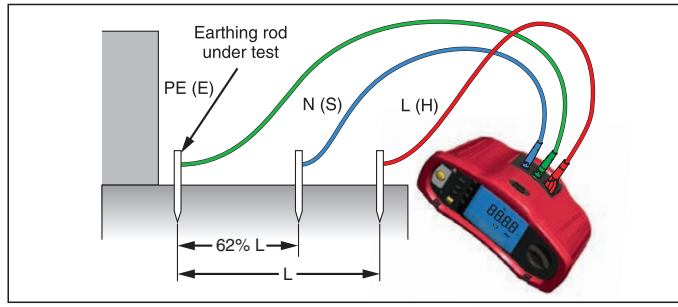


Figure 20. Earth Resistance Test Connection

To measure earth resistance:

1. Turn the rotary switch to the R_E position.
2. Press and release (TEST) . Wait for the test to complete.
   - The primary (upper) display shows the earth resistance reading.
   - Voltage detected between the test rods will be displayed in the secondary display. If greater than 10 V, the test is inhibited.
   - If the measurement is too noisy, Err 5 will be displayed. (The measured value accuracy is degraded by the noise). Press the down arrow (▼) to display the measured value. Press the up arrow (▲) to return to the Err 5 display.
   - If the probe resistance is too high, Err 6 is displayed. Probe resistance may be reduced by driving the test stakes further into the earth or wetting the earth around the test stakes.

Testing Phase Sequence

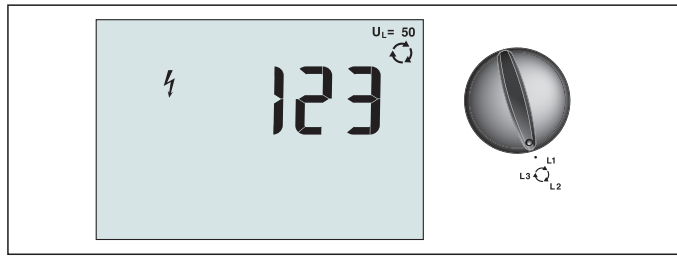


Figure 21. Phase Sequence Display/Switch and Terminal Settings

Use the connection shown in Figure 22 for a phase sequence test connection.

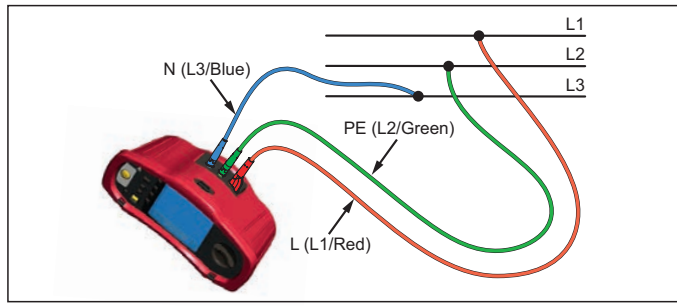


Figure 22. Phase Sequence Test Connection

To perform a phase sequence test:

1. Turn the rotary switch to the ↻ position.
2. The primary (upper) display shows:
   - 123 for correct phase sequence.
   - 321 for reversed phase sequence.
   - Dashes (---) instead of numbers if insufficient voltage is sensed.

Memory mode

You can store measurements on the tester:

- Telaris ProInstall-100 – up to 399
- Telaris ProInstall-200 – up to 1399

The information stored for each measurement consists of the test function and all user selectable test conditions.

Data for each measurement is assigned a data set number, data subset number, and a data id number. Memory location fields are used as described below.

Field	Description
a	Use the data set field (a) to indicate a location such as a room or electrical panel number.
b	Use the data subset field (b) for circuit number.
c	The data id number field (c) is the measurement number. The measurement number automatically increments. The measurement number can also be set to a previously used value to overwrite an existing measurement.

To enter Memory mode:

1. Press the MEMORY to enter Memory mode.

   The display changes to a memory mode display. In Memory mode, the MEMORY icon appears on the display.

   The primary numeric display shows the data set number (a, 1-9999). The secondary numeric display shows the data subset number (b, 1-9999). The data id number (c, 1-9999) appears after you press F1 several times. One of the memory locations, a, b, or c, will flash to indicate that you can change the number using the arrow keys ▲▼.

2. To enable the data subset number to be changed, press F1. The data subset number will now be flashing. To enable the data sub number to be changed, press F1 again. The data set number will now be flashing. Press F1 again to change the data id number.

3. Press the down arrow key (▼) to decrement the enabled number or press the up arrow key (▲) to increment the enabled number. For storing data, the number can be set to any value, overwriting existing data is allowed. For recalling data, the number can only be set to used values.

   Note: If you press the up or down arrow key (▲▼) once, the number increments or decrements by one. To accelerate the increment or decrement function, press and hold the up or down arrow.

Storing a Measurement

To store a measurement:

1. Press MEMORY to enter Memory mode.
2. Press F1 and use the arrow keys (▲▼) to set the data identity
3. Press F2 to save the data.
   - If memory is full, FULL will appear on the primary display. Press F1 to choose another data identity, press MEMORY to exit Memory mode.

- If the memory is not full, the data will be saved, the tester will automatically exit Memory mode and the display will revert back to the previous test mode.
- If the data identity has been previously used, the display will show STO? Press F2 again to store the data, press F1 to choose another data identity, press MEMORY to exit Memory mode.

Recalling a Measurement

To recall a measurement:

1. Press MEMORY to enter Memory mode.
2. Press F3 to enter the Recall mode.
3. Use F1 and the arrow keys (▲ ▼) to set the data identity. If no data has been saved, all fields will be dashes.
1. Press F3 to recall the data. The tester display will revert to the Test mode used for the recalled test data, however, the MEMORY icon still appears, indicating the tester is still in Memory mode.
2. Press F3 to toggle between the data id screen and the recalled data screen to check the recalled data id or to select more data to recall.
3. Press MEMORY to exit Memory mode at any time.

Clearing Memory

To clear all memory

1. Press MEMORY to enter Memory mode.
2. Press F4. The primary display will show Clr?
3. Press F4 again to clear all memory locations. The Tester returns to the measurement mode.

Uploading Test Results

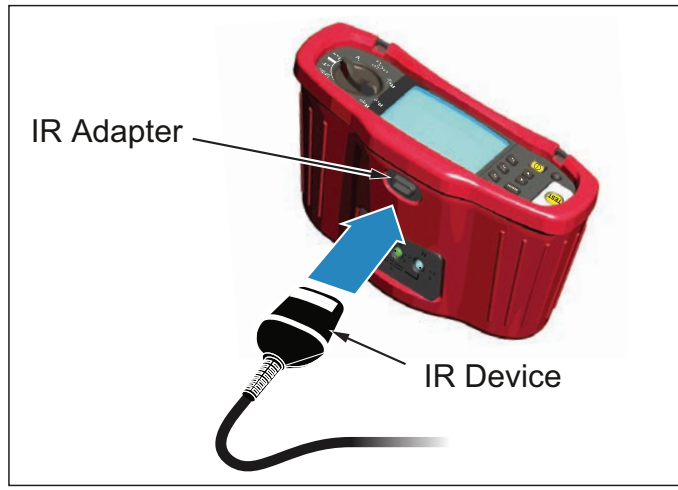


Figure 23. Attaching the IR Adapter

To upload test results:

1. Connect the IR serial cable to the serial port on the PC.
2. Attach the IR adapter and the device to the tester as shown in Figure 23.
3. Start the Amprobe PC software program.
4. Press ⏻ to turn on the tester.
5. Refer to the software documentation for complete instructions on how to upload data from the tester.

MAINTAINING THE TESTER

Cleaning

Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.

Dirt or moisture in the terminals can affect readings.

To clean the terminals:

1. Turn the meter off and remove all test leads.
2. Shake out any dirt that may be in the terminals.
3. Soak a new swab with alcohol. Work the swab around each terminal.

Testing and Replacing the Batteries

Battery voltage is continuously monitored by the tester. If the voltage falls below 6.0 V (1.0 V/cell), the low battery icon appears on the display, indicating that there is minimal battery life left. The low battery icon continues to appear on the display until you replace the batteries.

⚠⚠Warning

To avoid false readings,which could lead to possible electric shock or personal injury, replace the batteries as soon as the battery icon ( ) appears.

Be sure that the battery polarity is correct. A reversed battery can cause leakage.

Replace the batteries with six AA batteries. Alkaline batteries are supplied with the tester but you can also use 1.2 V NiCd or NiMH batteries. You can also check the battery charge so that you can replace them before they discharge.

⚠⚠Warning

To avoid electrical shock or personal injury,remove the test leads and any input signals before replacing the battery. To prevent damage or injury,install ONLY specified replacement fuses with the amperage,voltage,and speed ratings shown in the General Specifications section of this manual.

To replace the batteries (refer to Figure 24):

1. Press ⏻ to turn the tester off.
2. Remove the test leads from the terminals.
3. Remove the battery door by using a standard-blade screwdriver to turn the battery door screws (3) one-quarter turn counterclockwise.
4. Press the release latch and slide the battery holder out of the tester.

5. Replace the batteries and the battery door.
   Note: All stored data will be lost if the batteries are not replaced within approximately one minute
6. Secure the door by turning the screws one-quarter turn clockwise.

Figure 24. Replacing the Batteries

Testing the Fuse

1. Turn the rotary switch to R_{LO} switch setting.
2. Short the leads and press and hold TEST
3. If the fuse is bad, FUSE or Err1 will appear on the display to indicate the tester is damaged and needs repair. Contact Amprobe Service for repair (see Contacting Amprobe).

DETAILED SPECIFICATIONS

Features

Measurement Function	Telaris ProInstall-100	Telaris ProInstall-200
Voltage & Frequency	√	√
Wiring polarity checker	√	√
Insulation Resistance	√	√
Loop & Line Resistance	√	√
Prospective Short-Circuit current (PSC/IK)	√	√
RCD switching time	√	√
RCD tripping level	√	√
Automatic RCD test sequence	√	√
Test pulse current sensitive RCDs (Type A)	√	√
Test smooth dc sensitive RCDs (Type B)	None	√
Earth Resistance	None	√
Phase Sequence Indicator	√	√
Other Features		
Illuminated Display	√	√
Memory	√	√
Memory,Interface		
Computer Interface	√	√
Software	√	√
Included Accessories		
Soft case	√	√
Remote control probe	√	√

General Specifications

Specification	Characteristic
Size	11 cm (L) x 26 cm (W) x 13 cm (H)
Weight (with batteries)	1.5 kg
Battery size,quantity	Type AA, 6 ea.
Battery type	Alkaline supplied. Usable with 1.2 V NiCd or NiMH batteries (not supplied)
Battery life (typical)	200 hours idling
Fuse	T3.15 A, 500 V, 1.5 kA 6.3 x 32 mm
Operating Temperature	0 °C to 40 °C
Relative Humidity	80% 10 to 30°C; 70% 30 to 40°C
Operating Altitude	0 to 2000 meters
Sealing	IP 40
EMC	Complies with EN61326-1: 2006

Safety	Complies with EN61010-1 Ed 3. Overvoltage Category: 500 V/CAT III 300 V/CAT IV Measurement Category III is for measurements performed in the building installation. Examples are distribution panels, circuit breakers, wiring and cabling. Category IV equipment is designed to protect against transients from the primary supply level, such as an electrical meter or an overhead or underground utility service. Performance EN61557-1, EN61557-2, EN61557-3, EN61557-4, EN61557-5, EN61557-6, EN61557-7 Second edition. EN61557-10 First edition.
Pollution Degree	2
Maximum voltage between any terminal and earth ground	500 V

Electrical Measurement Specifications

The accuracy specification is defined as ±(% reading +digit counts) at 23 °C ±5 °C, ≤80 % RH. Between -10 °C and 18 °C and between 28 °C and 40 °C, accuracy specifications may degrade by 0,1 x (accuracy specification) per °C. The following tables can be used for the determination of maximum or minimum display values considering maximum instrument operating uncertainty per EN61557-1, 5.2.4.

Electrical Measurement Specifications

Range	Resolution	Accuracy 50 Hz – 60 Hz	Input Impedance	Overload Protection
500 V	0.1 V	2% + 3digits	3.3 MΩ	660 V rms

Continuity Testing (R_{LO})

Range (Autoranging)	Resolution	Open Circuit Voltage	Accuracy
20 Ω	0.01 Ω	>4 V	±(3 % + 3 digits)
200 Ω	0.1 Ω	>4 V	±(3 % + 3 digits)
2000 Ω	1 Ω	>4 V	±(3 % + 3 digits)
Note: The number of possible continuity tests with a fresh set of batteries is 2500.			

Range R_{LO}	Test Current
7.5 Ω	210 mA
35 Ω	100 mA
240 Ω	20 mA
2000 Ω	2 mA

Test Probe Zeroing	Press the F3 to compensate the test probe. Can subtract up to 2 Ω of lead resistance. Error message for >2 Ω.
Live Circuit Detection	Inhibits test if terminal voltage >10 V ac detected prior to initiation of test.

Insulation Resistance Measurement (R_{ISO})

Test Voltages	100-250-500-1000 V
Accuracy of Test Voltage (at rated test current)	+10 %, -0 %

Test Voltage	Insulation Resistance Range	Resolution	Test Current	Accuracy
100 V	100 kΩ to 20 MΩ	0.01 MΩ	1 mA @ 100 kΩ	±(5 % + 5 digits)
	20 MΩ to 100 MΩ	0.1 MΩ		±(5 % + 5 digits)
250 V	10 kΩ to 20 MΩ	0.01 MΩ	1 mA @ 250 kΩ	±(5 % + 5 digits)
	20 MΩ to 200 MΩ	0.1 MΩ		±(5 % + 5 digits)
500 V	10 kΩ to 20 MΩ	0.01 MΩ	1 mA @ 500 kΩ	±(5 % + 5 digits)
	20 MΩ to 200 MΩ	0.1 MΩ		±(5 % + 5 digits)
	200 MΩ to 500 MΩ	1 MΩ		±10 %
1000 V	100 kΩ to 200 MΩ	0.1 MΩ	1 mA @ 1 MΩ	±(5 % + 5 digits)
	200 MΩ to 1000 MΩ	1 MΩ		±10 %
Note: The number of possible insulation tests with a fresh set of batteries is 1750.				

Auto Discharge	Discharge time constant <0.5 second for C = 1 µF or less.
Live Circuit Detection	Inhibits test if terminal voltage >30 V prior to
Maximum Capacitive Load	Operable with up the 5 µF load.

No Trip and Hi Current Modes RCD/FI

Mains Input Voltage Range	100 - 500 V ac (50/60 Hz)
Input Connection (soft key selection)	Loop Impedance: phase to earth
	Line impedance: phase to neutral
Limit on Consecutive Tests	Automatic shutdown when internal components are too hot. There is also a thermal shutdown for RCD tests.
Maximum Test Current @ 400 V	12 A sinusoidal for 10 ms
Maximum Test Current @ 230 V	7 A sinusoidal for 10 ms

Range	Resolution	Accuracy [1]
20 Ω	0.01 Ω	No Trip mode: ±(4 % + 6 digits)
		Hi Current mode: ±(3 % + 4 digits)
200 Ω	0.1 Ω	±(5 %)
2000 Ω	1 Ω	±6 %[2]
Note: [1] Valid for resistance of neutral circuit <20 Ω and up to a system phase angle of 30 °. [2] Valid for mains voltage >200 V.		

Prospective Short Circuit Current Test (PSC/I_K)

Computation	Prospective Short Circuit Current (PSC/IK) determined by dividing measured mains voltage by measured loop (L-PE) resistance or line (L-N) resistance, respectively.	
Range	0 to 10 kA	
Resolution and Units	Resolution	Units
	I_K <1000 A	1 A
	I_K >1000 A	0.1 kA
Accuracy	Determined by accuracy of loop resistance and mains voltage measurements.	

RCD Testing

RCD Types Tested

RCD Type[6]		Telaris ProInstall-100	Telaris ProInstall-200
AC[1]	G[2]	√	√
AC	S[3]	√	√
A[4]	G	√	√
A	S	√	√
B[5]	G		√
A	S		√
Note: [1] AC – Responds to ac [2] G – General, no delay [3] S – Time delay [4] A – Responds to pulsed signal [5] B – Responds to smooth dc [6] RCD test inhibited for V >265 ac RCD tests permitted only if the selected current, multiplied by earthing resistance, is <50V.			

Test Signals

RCD Type	Test Signal Description
AC (sinusoidal)	The waveform is a sinewave starting at zero crossing, polarity determined by phase selection (0 ° phase starts with low to high zero crossing, 180 ° phase starts with high to low zero crossing). The magnitude of the test current is $I_{\Delta}n$ x Multiplier for all tests.
A (half wave)	The waveform is a half wave rectified sinewave starting at zero, polarity determined by phase selection (0 ° phase starts with low to high zero crossing, 180 ° phase starts with high to low zero crossing). The magnitude of the test current is 2.0 x $I_{\Delta}n$ (rms) x Multiplier for all tests for $I_{\Delta}n$ = 0.01A. The magnitude of the test current is 1.4 x $I_{\Delta}n$ (rms) x Multiplier for all tests for all other $I_{\Delta}n$ ratings.
B (DC)	This is a smooth DC current according to EN61557-6 Annex A

RCD Types Tested

Test Function	RCD Current Selection					
	10 mA	30 mA	100 mA[1]	300 mA[1]	500 mA[1]	1000 mA[2]
X ½, 1	√	√	√	√	√	√
X 5	√	√	√			
Ramp	√	√	√	√	√	√
Auto	√	√	√			

Note:
Mains voltage 100 V – 265 V ac, 50/60 Hz
[1] Type B RCDs require mains voltage range of 195 V – 265 V.
[2] Type AC RCDs only.

Current Multiplier	*RCD Type	Measurement Range		Trip Time Accuracy
		Europe	UK	
X ½	G	310 ms	2000 ms	± (2% Reading + 2ms)
X ½	S	510 ms	2000 ms	± (2% Reading + 2ms)
X 1	G	310 ms	310 ms	± (2% Reading + 2ms)
X 1	S	510 ms	510 ms	± (2% Reading + 2ms)
X 5	G	50 ms	50 ms	± (2% Reading + 2ms)
X 5	S	160 ms	160 ms	± (2% Reading + 2ms)

Note:
*G – General, no delay
*S – Time delay

Maximum Trip Time

RCD	$I_{\Delta N}$	Trip Time Limits
AC G, A, B	X 1	Less than 300 ms
AC G-S, A-S, B-S	X 1	Between 130 ms and 500 ms
AC G, A, B	X 5	Less than 40 ms
AC G-S, A-S, B-S	X 5	Between 50 ms and 150 ms

RCD/FI-Tripping Current Measurement/Ramp Test ($I_{\Delta N}$)

Current Range	Step Size	Measurement Range		Measurement Accuracy
		Type G	Type S	
30 % to 110 % of RCD rated current[1]	10 % of $I_{\Delta N}$[2]	300 ms/step	500 ms/step	±5 %

Notes
[1] 30 % to 150 % for Type A $I_{\Delta N}$ >10 mA
30 % to 210 % for Type A $I_{\Delta N}$ = 10 mA
20 % to 210 % for Type B
Specified trip current ranges (EN 61008-1):
50 % to 100 % for Type AC
35 % to 140 % for Type A (>10 mA)
35 % to 200 % for Type A (≤10 mA)
50 % to 200 % for Type B
[2] 5% for Type B

Earth Resistance Test

Telaris ProInstall-200 only. This product is intended to be used to measure installations in process plants, industrial installations, and residential applications.

Range	Resolution	Accuracy
200 Ω	0.1 Ω	±(3 % + 5 digits)
2000 Ω	1 Ω	±(5 % + 10 digits)

Range: $R_E + R_{PROBE}$ [1]	Test Current
2200 Ω	3.5 mA
16000 Ω	500 µA
52000 Ω	150 µA

Note
[1] Without external voltages

Frequency	Output Voltage
128 Hz	25 V

Live Circuit Detection	Inhibits test if terminal voltage >10 V ac is detected prior to start of test.

Phase Sequence Indication

Icon	icon Phase Sequence indicator is active.
Display of Phase Sequence	Displays "1-2-3" in digital display field for correct sequence. Displays "3-2-1" for incorrect phase. Dashes in place of a number indicate a valid determination could not be made.
Mains Input Voltage Range (phase-tophase)	100 to 500 V

Mains Wiring Test

Icons ( ) indicate if L-PE or L-N terminals are reversed. Instrument operation is inhibited and an error code is generated if the input voltage is not between 100 V and 500 V. The UK Loop and RCD tests are inhibited if the L-PE or the L-N terminals are reversed.

Operating Ranges and Uncertainties per EN 61557

FUNCTION	DISPLAY RANGE	EN 61557 MEASUREMENT RANGE OPERATING ERROR	NOMINAL VALUES
R_{LO}	0,00 Ω - 2000 Ω	0,3 Ω - 2000 Ω ± (10% + 3 dgt)	4,0 VDC < U_Q < 12 VDC R_{LO} ≤ 2,00 Ω I_N ≥ 200 mA
R_{ISO}	0,00 MΩ - 1000 MΩ	1 MΩ - 200 MΩ ± (12% + 3dgt) 200 MΩ - 1000 MΩ ± (15% + 5 dgt)	U_N = 100 / 250 / 500 / 1000 VDC I_N = 1,0 mA
Z_I	Z_I (NO TRIP) 0,00 Ω - 2000 Ω	0,5 Ω - 2000 Ω ± (15% + 8 dgt)	U_N = 230 / 400 VAC f = 50 / 60 Hz I_{PSC} = 0 A - 10,0 kA
	Z_I (HI CURRENT) 0,00 Ω - 2000 Ω	0,3 Ω - 200 Ω ± (10% + 5 dgt)	
$T, I_{\Delta N}$	T 0,0 ms - 2000 ms	25 ms - 2000 ms ± (10% + 2 dgt)	T@ 10 / 30 / 100 / 300 / 500 / 1000 mA
	$I_{\Delta N}$ 3 mA - 550 mA	3 mA - 550 mA ± (10% + 2 dgt)	$I_{\Delta N}$ = 10 / 30 / 100 / 300 / 500 mA
Volts	0,0 VAC - 500 VAC	50 VAC - 500 VAC ± (3% + 3 dgt)	U_N = 230 / 400 VAC f = 50 / 60 Hz
Phase			1 : 2 : 3
R_E	0,0 Ω - 2000 Ω	10 Ω - 2000 Ω ± (10% + 3 dgt)	f = 123 Hz

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