FLUKE®

6500-2

Appliance Tester

Users Manual

September 2013, Rev. 2, 8/2022 (English)

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Introduction

The Fluke model 6500-2 Appliance Tester (the Tester or Product) is designed to carry out these tests that ensure the integrity of electrical equipment / portable appliances:

- Earth Bond (R_{PE})
- Insulation (R_{ISO})
- Substitute Leakage Current
- Touch Current
- Leakage
- Appliance Power and Load current
- RCD
- IEC Lead
- PELV

Contact Fluke

Fluke Corporation operates worldwide. For local contact information, go to our website: www.fluke.com.

To register your product, or to view, print, or download the latest manual or manual supplement, go to our website.

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Unpack the Tester

The purchase of a Tester includes the items listed in Table 1. If the Tester is damaged or an item is missing, contact the place of purchase immediately.

Table 1. Shipment Box Contents

Description	QTY
6500-2 Appliance Tester	1
Alligator (Crocodile) Clip	1
Test Lead	1
Test Probe for Touch Current	1
Hard Case	1
Quick Reference Card	1
Safety Information	1

Safety Information

A **Warning** identifies hazardous conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

⚠⚠ Warning

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

- **Read all safety information before you use the Product.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Do not use the Product if it operates incorrectly.**
- **Do not use and disable the Product if it is damaged.**
- **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 this Product indoors only.**
- **Do not use the Product around explosive gas, vapor, or in damp or wet environments.**
- **Use only the mains power cord and connector approved for the voltage and plug configuration in your country and rated for the Product.**
- **Replace the mains power cord if the insulation is damaged or if the insulation shows signs of wear.**
- **Carefully read all instructions.**
- **Do not apply more than the rated voltage, between the terminals or between each terminal and earth ground.**

- **Limit operation to the specified measurement category, voltage, or amperage ratings.**
- **Measure a known voltage first to make sure that the Product operates correctly.**
- **Use only current probes, test leads, and adapters supplied with the Product.**
- **Do not use a current measurement as an indication that a circuit is safe to touch. A voltage measurement is necessary to know if a circuit is hazardous.**
- **Keep fingers behind the finger guards on the probes.**
- **The Product shall not be used for measurements in electrical installations.**
- **When conducting tests, do not touch the appliance as some tests involve high voltages and high currents.**
- **Never open the Product's case because dangerous voltages are present. There are no user-replaceable parts in the Product.**
- **The Product has been set for a nominal 240 V ac, 50 Hz operation, it must never be connected to a higher voltage.**
- **The Product may only be connected to a correctly wired mains socket protected for a maximum current rating of 10 A (AU), 13 A (UK), or 16 A (DE, NL).**
- **The mains supply is never to be connected to the IEC lead test connector or to the appliance test connector.**
- **If the Product continuously emits a two-tone sound, you should unplug it immediately as this indicates a dangerous condition.**

Symbols

Table 2 lists the symbols that can be used on the Product or in this document.

Table 2. Symbols

Symbol	Description
	Consult user documentation.
	WARNING. RISK OF DANGER.
	WARNING. HAZARDOUS VOLTAGE. Risk of electric shock.
	Conforms to European Union directives.
	Double Insulated (Class II) Equipment
	Earth Ground
	This product complies with the WEEE Directive and its marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Do not dispose of this product as unsorted municipal waste. For information about take-back and recycling programs available in your country, see the Fluke website.

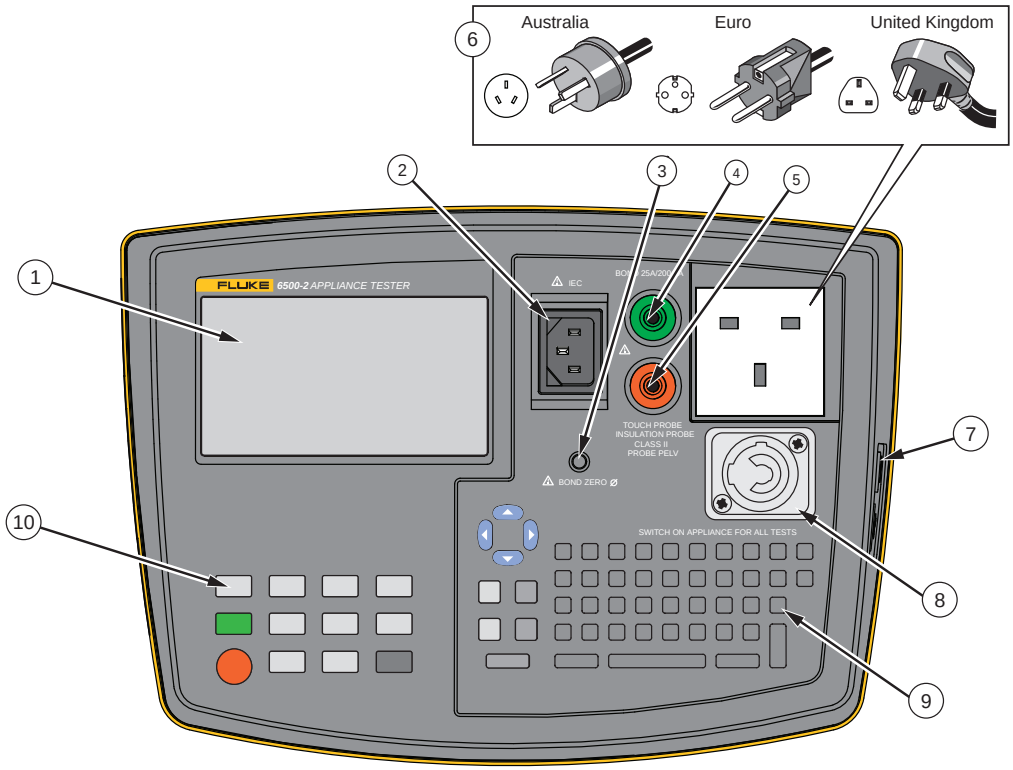
Features

The Tester can do all the tests required for Class I and Class II appliances and conforms to safety standard EN61010. This Tester can check large numbers of appliances with its wide range of pre-set tests. USB memory is available to store and transfer test results.

Front Panel

The connectors, controls, and indicators of the Tester are listed in Table 3

Table 3. Front Panel

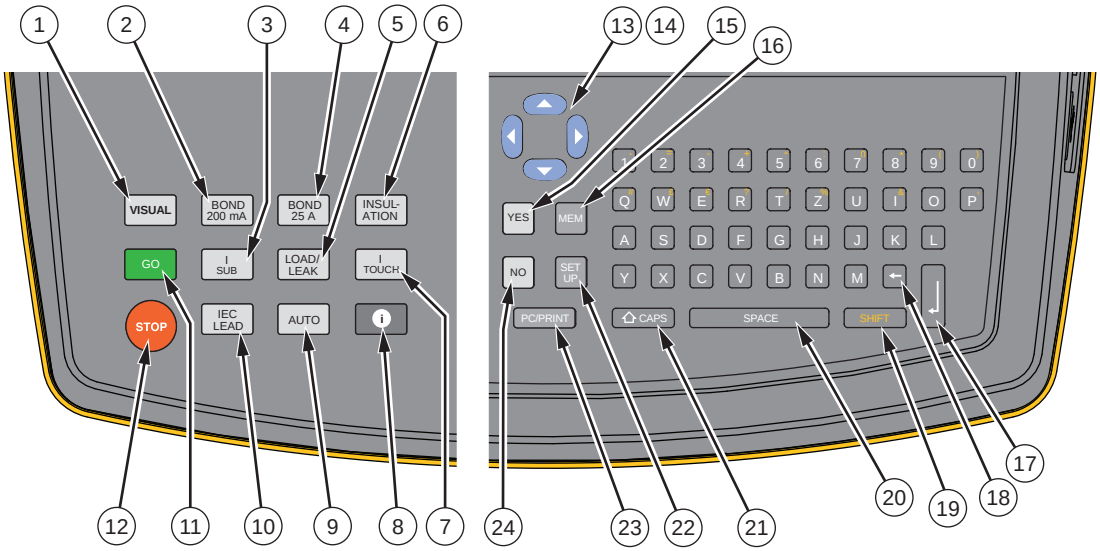


Item	Description
①	Liquid Crystal Display (LCD)
②	Socket to connect IEC lead for IEC Lead test
③	Earth connection to zero the Earth Bond test lead
④	Socket to connect test lead and alligator (crocodile) clip for Earth Bond test
⑤	Socket to connect test probe for Insulation test, Touch Current test, Substitute Leakage test and PELV test
⑥	Appliance Test Socket
⑦	2 USB Ports
⑧	110 V Appliance Test Adapter Socket (for UK)
⑨	QWERTY keypad
⑩	Pushbuttons (see Table 4)

Pushbuttons

Table 4 is a list of the pushbuttons that control operation of the Tester.

Table 4. Pushbuttons



Item	Description	Item	Description
①	Start Visual Inspection test	⑬	Scroll up/down to highlight options in screen instructions (↑, ↓)
②	Start the 200 mA Earth Bond test	⑭	Move left/right to change options in screen instructions (←,→)
③	Start the Substitute Leakage Current test	⑮	Accept a proposed action
④	Start the high current Earth Bond test	⑯	Store test results or view auto-test sequences
⑤	Start the combined Load/Earth Leakage Current test	⑰	Enter typed data
⑥	Start the Insulation test	⑱	Backspace
⑦	Start the Touch Current test	⑲	Assign special characters to keys
⑧	Provide help on current selection	⑳	Type the space character
⑨	Start AUTO test	㉑	Use capital characters
⑩	Start the IEC Lead test	㉒	Select the setup menu
⑪	Start/Enter selection	㉓	Download/Print test results and auto-tests
⑫	Stop the current action and return to idle screen	㉔	Reject a proposed action

Beeper

Table 5 is a list of the beeper sounds from the Tester.

Table 5. Beeper Sounds

Sound	Explanation
Click	A key is pushed.
1 beep	A test passed.
2 beeps	• A test failed. • Warning, see display. • The STOP button is pushed, the current action is aborted.
Long beep	Test will start in continuous mode.
Continuous two tone sound	Dangerous condition! Unplug the unit immediately!

Display Symbols

Table 5 is a key to the display symbols and their definitions.

Table 6. Display Features

Symbol	Description
⚠	Caution! Risk of Electric Shock.
⚠	Caution! Risk of Danger. Refer to Manual.
∅	Bond test lead has been zeroed.
☒	Auto-test or manual test failed.
☑	Auto-test or manual test passed.
LMT	Applicable limit is exceeded.
🖷	The printer/PC is connected.
I II	Class I, Class II
→←↑↓	Use buttons ◀ ▶ ▲ ▼
Lock-out on	Manual tests are locked out.

Power

The Tester will power up on 230 V or 110 V mains. An adapter cable is required with 110 V. Disconnect the mains plug to power down the Tester.

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, read the safety information before you power up the Tester.

On power up the display does a self-test. During this test it shows the Fluke model 6500-2 and the software version, for example, V1.18.

After a successful self-test, the Tester shows the IDLE screen with the current date and time, most recently entered site name, live neutral voltage, neutral-earth voltage, line frequency, and that the bond test has been zeroed.

If there is an error, a self-explanatory message shows on the display. Follow the display instructions for the error message.

Basic Setup Functions

This section describes how to set the parameters of the basic functions.

Note

For help, press [i]. When done, press [i] again to return to the screen.

How to Zero the Earth Bond Leads

For correct Earth Bond test results you must zero the earth bond lead to eliminate its resistance:

- When you set up your new Tester. Earth Bond tests are locked out unless the bond zero icon (Ø) is on.
- Occasionally, dependent on the condition of the bond socket and the test lead plug, a dirty plug/socket can result in a significant contact resistance.

To zero the test lead:

1. Push [SET UP] to open the setup menu.
2. Push ▲ or ▼ to highlight BOND ZERO set.
3. Push [GO] to open the setup menu and follow the screen instructions:
   - Attach the probe to the test lead and insert the test lead plug into the EARTH BOND socket, see Figure 1.
   - Firmly attach the probe to the BOND ZERO Ø connector on the Tester and push [GO].

Note

To remove the Bond Zero symbol (Ø), follow the same above procedure but do not attach the Earth Bond probe to the zero socket. The display shows >1.99 and removes the Bond Zero symbol.

Figure 1. Bond Zero Connections

When finished the Tester shows the bond zero symbol **Ø**, and the resistance value of the test lead, for example, **R_{PE} 0.09** Ω. It will subtract this value from bond test results. As it saves this zero value you will not need to repeat the operation every time you use the Tester.

If the display shows the message **R_{PE} >1.99** Ω the lead resistance is more than **1.99** Ω and cannot be zeroed. Earth bond tests will now be locked out. If the Earth Bond test lead has been zeroed, the IDLE screen and the earth bond test results screen will show the zero symbol **Ø**.

Date and Time

The Tester has a date and time clock.

To set the date and the time:

1. Push SET UP to open the setup menu.
2. Use ▼ ▲ to highlight DATE/TIME set.
3. Push GO to open the next menu and follow the screen instructions.

Site/Customer Text

To set the site and customer text:

1. Push SET UP to open the setup menu.
2. Use ▼ ▲ to highlight SITE/CUSTOMER.
3. Push GO to open the next menu and follow the screen instructions.

User ID

Entry of a USER ID is for reference only.

To set the USER ID text:

1. Push SET UP to open the setup menu.
2. Use ▼ ▲ to highlight USER ID.
3. Push GO to open the next menu and follow the screen instructions.

Advanced Setup Functions

This section describes how to set the parameters for advanced functions.

Access Code

The factory-set access code is 9999. You need the access code to enter or edit auto-tests, to lock or unlock manual tests, and to edit the access code. If you forget your access code, contact Fluke product support.

To change the access code:

1. Push SET UP to open the setup menu.
2. Use ▼ ▲ to highlight ACCESS CODE.
3. Push GO to open the next menu and follow the screen instructions.

Fast or Standard Test Mode

In the standard test mode the Tester provides help information during the tests. In the fast mode this information is bypassed where possible to save test time. See also *Test Modes: Standard or Fast*.

To select the fast or standard mode:

1. Push SET UP to open the setup menu.
2. Use ▼ ▲ to highlight FAST MODE.
3. Push GO to open the menu.
4. Enter the access code for example, 9 9 9 9 (factory default).
5. Push GO to accept the access code.
6. Push ▶ to select test mode.

Create/Edit the Auto-Test Sequence

The Tester is provided with factory programmed automatic test sequences, see *Auto-Test Mode* for more information. You can create new autotest sequences (max. 50) and edit the auto-tests that you create.

To create or edit auto-tests:

1. Push SET UP to open the setup menu.
2. Use ▼ ▲ to highlight AUTO-TEST.
3. Push GO to open the menu.
4. Enter the access code, for example, 9 9 9 9 (factory default).
5. Push GO to accept the access code.

   In the next step you must enter a 3-digit test number:

   - Enter a new auto-test number to make a new user programmed auto-test (use numbers from 100 to 999, see Table 8 and Table 9 for reserved numbers).
   - Enter the number of a factory programmed auto-test to make a copy of it, edit the copy, and store it as a new user programmed auto-test. See Table 8 and Table 9 for the factory programmed tests.
   - Enter the number for a user-programmed auto-test to edit the test.

To continue:

6. Enter the test number, for example, 1 2 3.
7. Push GO to accept the number.
   - If you entered a factory programmed number do steps 8 and 9 to make a copy.
   - If you entered a new auto-test number or a user programmed auto-test number, go to step 10.
8. Enter the number to be assigned to the copy of the factory programmed auto-test, for example, 4 5 6.
9. Push GO to accept the new auto-test number and enter the setup/instruction screen.
10. Use ▼ to begin the test setup.
11. Use ▼ ▲ to select the test parameter to be change. Use ◀ ▶ to change the test parameter. For a list of the test parameters, see Table 7.
12. Push GO when finished with the test parameters to exit the setup screen.
13. Use ◀ to review/edit the test parameters, or push MEM to save the test parameters.
14. Use ▼ to enter the text for an auto-test description.
15. Push GO to accept the text entry and save the auto-test sequence.

Note

See Table 8 and Table 9 for auto test numbers.

User programmed tests are stored in chronological order and not in numeric order.

A standard text will be used when STOP is pushed during text entry mode.

To view saved auto-tests see *Auto-Test Sequences*.

Table 7. Test Parameters

	Region		
Tests	**UK, AU**	**DE**	**NL**
Visual check	(Skipped) - SELECTED	(Skipped) - SELECTED	(Skipped) - SELECTED
Bond			
Current	200 mA - 25 A	200 mA - 10 A	200 mA - 25 A
Repeat [1]	R0 - R1 - R2 - R3	R0 - R1 - R2 - R3	R0 - R1 - R2 - R3
Limit	0.1 Ω to 19.9 Ω	0.1 Ω to 19.9 Ω	0.1 Ω ...19.9 Ω
Duration	(Skipped) - 5 s to 60 s	(Skipped) - 5 s to 60 s	(Skipped) - 5s....60s

Table 7. Test Parameters (cont.)

	Region		
Tests	**UK, AU**	**DE**	**NL**
Insulation			
Repeat	R0 - R1 - R2 - R3	R0 - R1 - R2 - R3	R0 - R1 - R2 - R3
Safety Class [2]	I - II	I - II	I - II
Voltage	250, 500	250, 500	250, 500
Limit	0.1 MΩ to 290 MΩ	0.1 MΩ to 290 MΩ	0.1 MΩ to 290 MΩ
Duration	0.2 (Skipped) - 5 s to 60 s	0.2 (Skipped) - 5 s to 60 s	0.2 (Skipped) - 5 s to 60 s
Substitute Leakage			
Limit	0.5 mA to 19.5 mA	0.5 mA to 19.5 mA	0.5 mA to 19.5 mA
Safety Class [2]	I - II	I - II	I - II
Duration	(Skipped) - 5 s to 60 s	(Skipped) - 5 s to 60 s	(Skipped) - 5 s to 60 s
Load/leakage			
Limit Load	0 VA to 3200 VA	0 VA to 3200 VA	0 VA to 3200 VA
Limit Leakage	0.5 mA to 19.5 mA	0.5 mA to 19.5 mA	0.5 mA to 19.5 mA
Duration	(Skipped) - 5 s to 60 s	(Skipped) - 5 s to 60 s	(Skipped) - 5 s to 60 s
Touch Current			
Repeat	R0 - R1 - R2 - R3	R0 - R1 - R2 - R3	R0 - R1 - R2 - R3
Limit	0.25 mA, 0.5 mA to 1.9 mA	0.1 mA to 1.9 mA	0.25 mA, 0.5 mA to1.9 mA
Duration	(Skipped) - 5 s to 60 s	(Skipped) - 5 s to 60 s	(Skipped) - 5s to 60s
IEC Lead			
Limit R_{pe}	0.1 Ω to 19.9 Ω	0.1 Ω to 19.9 Ω	0.1 Ω to 19.9 Ω
Duration [2]	(Skipped) - 5 s to 60 s	(Skipped) - 5 s to 60 s	(Skipped) - 5 s to 60 s
Limit R_{ISO}	fixed at 2 MΩ	fixed at 2 MΩ	fixed at 2 MΩ

[1] The repeat test parameters R0, R1, R2, and R3 define how many times a test will be repeated. When you select for example R1, the test will be repeated once (two tests).
[2] The selected class for the isolation test also applies to the substitute leakage test.
[3] The IEC lead test can only be selected if all other tests, except for the visual check, are skipped.

Manual Test Limit

To set the manual test limits you need your access code (factory default 9 9 9 9):

1. Push SET UP to open the setup menu.
2. Use ▼ ▲ to highlight MANUAL LIMITS.
3. Push GO to open the next menu and follow the screen instructions.

   To restore the factory set limits push NO.

   For a list of the test parameters, see Table 7.

Lock/Unlock Manual Tests

To unlock/lock manual tests (you need your access code, factory default is 9 9 9 9):

1. Push SET UP to open the setup menu.
2. Use ▼ ▲ to highlight MANUAL TEST LOCK.
3. Push GO to open the next menu and follow the screen instructions.

Appliance Tests

All tests can be done with the Tester powered by 230 V mains or 110 V mains with the exception of the RCD test that is 230 V only. An adapter is required for 110 V (UK only). For the majority of tests, you can use the auto-test mode and follow the on-screen instructions.

The manual test mode is for applications where one particular test must be repeated several times in a row and to quickly carry out a test.

⚠⚠ Warning

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

- **Before any tests, you are strongly advised to make reference to the Electricity at Work Regulations 1989 and any relevant publications from the Health and Safety Executive.**
- **The appliance must be switched on for all tests. When conducting tests, do not touch the appliance as some tests involve high voltages and high currents.**
- **The tests should only be done by competent persons who are familiar with the requirements of test types suitable for portable appliances.**
- **It is potentially hazardous for both user and appliance should the wrong type of tests be undertaken or if testing is carried out in an incorrect sequence.**
- **It is important that you fully understand the various tests required and how they should be done.**
- **The appliance must have passed the visual inspection, the earth bond test (Class I), and the insulation test (in this sequence) before any other test. If any of these fail further testing must be stopped and any faults must be rectified.**

- **During the load/leakage test and the touch current test, the appliance will be energized at mains voltage. For this purpose, switch on the appliance. Appliances driven by motors or equipped with heating units may present a danger for the person testing (comply with the appliance instruction manual). Make sure that the appliance is in a safe condition to operate and secure before the test.**

How to Stop a Test

Push STOP to immediately stop a test in progress, make the Tester safe, and then show the IDLE screen.

Test Modes: Single - Continuous Test

You can do manual tests in a single test mode or in a continuous test mode. A test in the auto-test mode will always be a single test.

Single Test

To do a single manual test:

1. Push a test button to select a test.
2. Push and release GO to start the test.

   The Tester connects the test supply, does one test, disconnects the test supply and holds the result on the display. In the auto-test mode the Tester will proceed with the next test.

Note

To start the Visual Inspection test, push VISUAL.

Continuous Test

To start a continuous manual test:

1. Push a test button to select the test.
2. Push and hold GO for >2 seconds. Tests that energize the appliance must be acknowledged with the YES key.

   In such cases, the continuous test starts when you push YES for >2 seconds after you push GO. The continuous test starts when you hear a long beep.

   The Tester connects the test supply, makes the first test, and shows the first result on the display. Then the Tester continues to make measurements and show results without disconnecting the test supply. The maximum run time is 8 minutes, after which, the test will stop.

To stop a continuous test, push the selected test button or push GO again. The Tester disconnects the test supply and holds the last test result on the display.

Note

You cannot do the IEC-Lead and RCD tests in the continuous test mode.

Test Modes: Standard or Fast

In the standard test mode, the Tester shows instructions on how to do a test. The factory-set mode is the standard mode.

In the fast test mode, screen instructions will be bypassed where possible. During auto-tests in the fast mode, the visual test is assigned a pass and the test screen is not shown. Earth bond, insulation, and substitute leakage tests are done without stopping. Tests that energize the appliance must be acknowledged with the YES key before the test will start.

To select the fast mode or standard mode, see *Fast or Standard Test Mode*.

Auto-Test Mode

The Tester provides a number of factory programmed auto-tests, see Table 8 (Class I appliances) and Table 9 (Class II appliances). An auto-test consists of a number of single tests that will be carried out in the programmed order. The test limits are pre-set and the test result will give a pass/fail indication.

See *Create/Edit the Auto-Test Sequence* for more information on how to create new auto-tests. Auto-tests are locked out unless the Earth Bond test lead resistance has been zeroed out, see *How to Zero the Earth Bond Leads*. When any test fails during an auto-test, further tests cannot be carried out. You can do an auto-test in the standard mode or in the fast mode.

To start an auto-test, push AUTO to select the auto-test mode and follow the screen instructions. See *Test Descriptions* for more information about the individual tests. When the auto-test is finished a pass (☑) or a fail (☒) indication is shown. You can review the results before you save the results.

Table 8. Factory Programmed Auto-Tests for Class 1 Appliances

Test	Country	Visual Inspection	Earth Bond 200 mA (Ω)	Earth Bond 10 A (Ω)	Earth Bond 25 A (Ω)	Insulation (MΩ)	Touch Current (mA)	Substitute Leakage (mA)	Load/Leakage (VA/mA)
131	UK	YES	NO	NA	0.10	1.00	NO	NO	3000/3.5
132	UK	YES	NO	NA	0.10	1.00	NO	NO	3000/0.75
133	UK	YES	0.10	NA	NO	1.00	NO	NO	3000/3.5
134	UK	YES	0.10	NA	NO	1.00	NO	NO	3000/0.75
135	UK	YES	NO	NA	0.10	1.00	NO	NO	NO
136	UK	YES	0.10	NA	NO	1.00	NO	NO	NO
137	UK	YES	NO	NA	0.10	1.00 (250 V)	NO	NO	NO
138	UK	YES	0.10	NA	NO	1.00 (250 V)	NO	NO	NO
139	UK	YES	NO	NA	0.5	1.00	NO	NO	3000/3.5
140	UK	YES	0.5	NA	NO	1.00	NO	NO	3000/3.5
141	UK	YES	NO	NA	0.5	1.00	NO	NO	NO

Table 8. Factory Programmed Auto-Tests for Class 1 Appliances (cont.)

Test	Country	Visual Inspection	Earth Bond 200 mA (Ω)	Earth Bond 10 A (Ω)	Earth Bond 25 A (Ω)	Insulation (MΩ)	Touch Current (mA)	Substitute Leakage (mA)	Load/Leakage (VA/mA)
142	UK	YES	0.5	NA	NO	1.00	NO	NO	NO
143	UK	YES	NO	NA	0.5	1.00 (250 V)	NO	NO	NO
144	UK	YES	0.5	NA	NO	1.00 (250 V)	NO	NO	NO
145	DE	JA	0.30	NEIN	NA	1.00	NEIN	NEIN	3700/3.5
146	DE	JA	NEIN	0.30	NA	1.00	NEIN	NEIN	3700/3.5
147	DE	JA	0.30	NEIN	NA	0.30	NEIN	3.50	NEIN
148	DE	JA	0.30	NEIN	NA	NEIN	NEIN	NEIN	3700/3.5
149	DE	JA	0.30	NEIN	NA	NEIN	0.50	NEIN	3700/3.5
150	DE	JA	0.30	NEIN	NA	1.00	NEIN	3.50	NEIN
151	DE	JA	1.00	NEIN	NA	1.00	NEIN	3.50	NEIN
152	DE	JA	0.30	NEIN	NA	1.00 (250 V)	NEIN	NEIN	3700/3.5
153	DE	JA	NEIN	0.30	NA	1.00 (250 V)	NEIN	NEIN	3700/3.5
145	NL	JA	0.20	NA	NEE	1.00	NEE	NEE	3700/1.0
146	NL	JA	NEE	NA	0.20	1.00	NEE	NEE	3700/1.0
147	NL	JA	0.20	NA	NEE	1.00	NEE	7.00	NEE
148	NL	JA	0.20	NA	NEE	NEE	NEE	NEE	3700/1.0
149	NL	JA	0.20	NA	NEE	NEE	1.00	NEE	NEE
150	NL	JA	NEE	NA	0.20	1.00	NEE	1.00	NEE
151	NL	JA	NEE	NA	0.78	1.00	NEE	1.00	NEE
152	NL	JA	NEE	NA	0.20	1.00 (250 V)	NEE	NEE	NEE
153	NL	JA	0.20	NA	NEE	1.00 (250 V)	NEE	NEE	NEE
181	AU	YES	NO	NA	1.00	1.00	NO	NO	3000/5.0
182	AU	YES	NO	NA	1.00	NO	NO	NO	3000/5.0
183	AU	YES	1.00	NA	NO	1.00	NO	NO	3000/5.0
184	AU	YES	0.10	NA	NO	NO	NO	NO	3000/5.0
185	AU	YES	NO	NA	1.00	1.00	NO	NO	NO
186	AU	YES	1.00	NA	NO	1.00	NO	NO	NO
187	AU	YES	NO	NA	1.00	1.00 (250 V)	NO	NO	NO
188	AU	YES	1.00	NA	NO	1.00 (250 V)	NO	NO	NO

Table 9. Factory Programmed Auto-Tests for Class II Appliances

Test	Country	Visual Inspection	Earth Bond 200 mA (Ω)	Earth Bond 10 A (Ω)	Earth Bond 25 A (Ω)	Insulation (MΩ)	Touch Current (mA)	Substitute Leakage (mA)	Load/Leakage (VA/mA)
231	UK	YES	NO	NA	NO	2.00	0.25	NO	3000/0.25
232	UK	YES	NO	NA	NO	2.00	0.25	NO	NO
233	UK	YES	NO	NA	NO	2.00	NO	NO	NO
234	UK	YES	NO	NA	NO	2.00	NO	NO	3000/0.25
235	UK	YES	NO	NA	NO	2.00 (250 V)	NO	NO	3000/0.25
236	UK	YES	NO	NA	NO	2.00	0.50	NO	3000/3.5
237	UK	YES	NO	NA	NO	2.00	0.50	NO	NO
238	UK	YES	NO	NA	NO	2.00	NO	NO	3000/3.5
241	DE	JA	NEIN	NEIN	NA	2.00	0.50	NEIN	3700/.5
242	DE	JA	NEIN	NEIN	NA	2.00	NEIN	0.50	NEIN
243	DE	JA	NEIN	NEIN	NA	NEIN	0.50	NEIN	3700/.5
244	DE	JA	NEIN	NEIN	NA	NEIN	NEIN	NEIN	3700/.5
241	NL	JA	NEE	NA	NEE	2.00	NEE	NEE	3700/0.5
242	NL	JA	NEE	NA	NEE	2.00	NEE	0.50	NEE
243	NL	JA	NEE	NA	NEE	2.00	0.50	NEE	NEE
244	NL	JA	NEE	NA	NEE	NEE	NEE	NEE	3700/.5
281	AU	YES	NO	NA	NO	1.00	1.00	NO	3000/1.0
282	AU	YES	NO	NA	NO	NO	1.00	NO	3000/1.0
283	AU	YES	NO	NA	NO	1.00	NO	NO	3000/1.0
284	AU	YES	NO	NA	NO	NO	NO	NO	3000/1.0
285	AU	YES	NO	NA	NO	1.00	1.00	NO	NO
286	AU	YES	NO	NA	NO	NO	1.00	NO	NO
287	AU	YES	NO	NA	NO	1.00	NO	NO	NO

Note

Test numbers 239 to 240 are reserved for future factory programmed tests.

Table 10. IEC Lead Test

Test	Country	Visual Inspection	Earth Bond	Insulation (MΩ)
301	UK	YES	0.5	500 V
302	UK	YES	0.5	250 V

Note

Use EXTL100 for extension cords and Test 302 for surge protected extension cords.

Manual Test Mode

To lock/unlock manual tests, see *Lock/Unlock Manual Tests*.

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, NEVER carry out the TOUCH CURRENT and LOAD/LEAKAGE test unless you have first carried out a thorough visual inspection, followed by a test of the earthing (Class I appliances), and then a test of the insulation. You must verify that these tests are passed before you start this test.

Table 11 shows the factory-set manual test limits.

Table 11. Factory-Set Manual Test Limits

TEST LIMITS				
	UK	**AU**	**DE**	**NL**
Earth Bond 200mA	<0.10 Ω	<1.0 Ω	<0.30 Ω	<0.20 Ω
Earth Bond 25A	<0.10 Ω	<1.0 Ω	NA	<0.20 Ω
Earth Bond 10A	NA	NA	<0.30 Ω	NA
Insulation Class I	>1 MΩ	>1 MΩ	>1 MΩ	>1 MΩ
Insulation Class II	>2 MΩ	>1 MΩ	>2 MΩ	>2 MΩ
Substitute Leakage Class I	<3.5 mA	<1.0 mA	<1.0 mA	<1.0 mA
Substitute Leakage Class II	<0.50 mA	<1.0 mA	<0.50 mA	<0.50 mA
Leakage Current	<3.5 mA	<5.0 mA	<3.5 mA	<1 mA
Touch Current	>0.5 mA	>1.0 mA	<0.50 mA	<0.50 mA
IEC lead Earth Bond	<0.10 Ω	<1.0 Ω	<0.30 Ω	<0.20 Ω
IEC lead Insulation	>2MΩ	>1 MΩ	>1 MΩ	>1 MΩ

To change the test limits, see *Manual Test Limit*.

Earth Bond tests are locked out if you did not zero the earth bond test lead resistance, see *How to Zero the Earth Bond Leads*.

You can do manual tests in the standard mode or in the fast mode. See *Fast or Standard Test Mode* and *Test Modes: Standard or Fast* for more information.

To do a manual test:

1. Select the required test key. Follow the screen instructions.
2. Push and release GO for a short single test.
3. Push and hold GO for >2 seconds for a continuous test (not applicable for a visual inspection and IEC lead test). Tests that energize the appliance must be acknowledged with YES. In such cases, the continuous test starts when you push YES for >2 seconds after you push GO. The continuous test starts when the Tester makes a long beep.

To stop a continuous test, push the selected test key or push GO again.

For more information on the individual tests see *Test Descriptions*.

After a test, you can save the result (see *Save Test Results*).

Test Descriptions

All tests can be done with the Tester powered by 230 V mains or 110 V mains with the exception of RCD, which is 230 V only. For 110 V mains tests, the 110 V adapter kit is required. This kit includes an adapter that powers the Tester and connects to the 110 V connector on the front panel.

Note

Tests at 110 V are only available when the Tester is powered by 110 V mains. When using the 110 V front panel adapter, remove all connections to the 230 V test socket.

Visual Inspection Test

Visually inspect the appliance before you start an electrical test.

Check the appliance for:

- Condition of the appliance cables, for example, no cuts, cracks or any physical damage to the outer insulation layer
- Condition of the plug, cable securely attached, no signs of overheating and that the correct value of fuse is fitted
- Any signs of damage, and that any mains or control switches will physically switch on and off
- Any sockets for signs of overheating or physical damage

Note

A Visual test pass result must be accepted with YES or 'Y' on the keyboard.

Earth Bond Test (R_{PE})

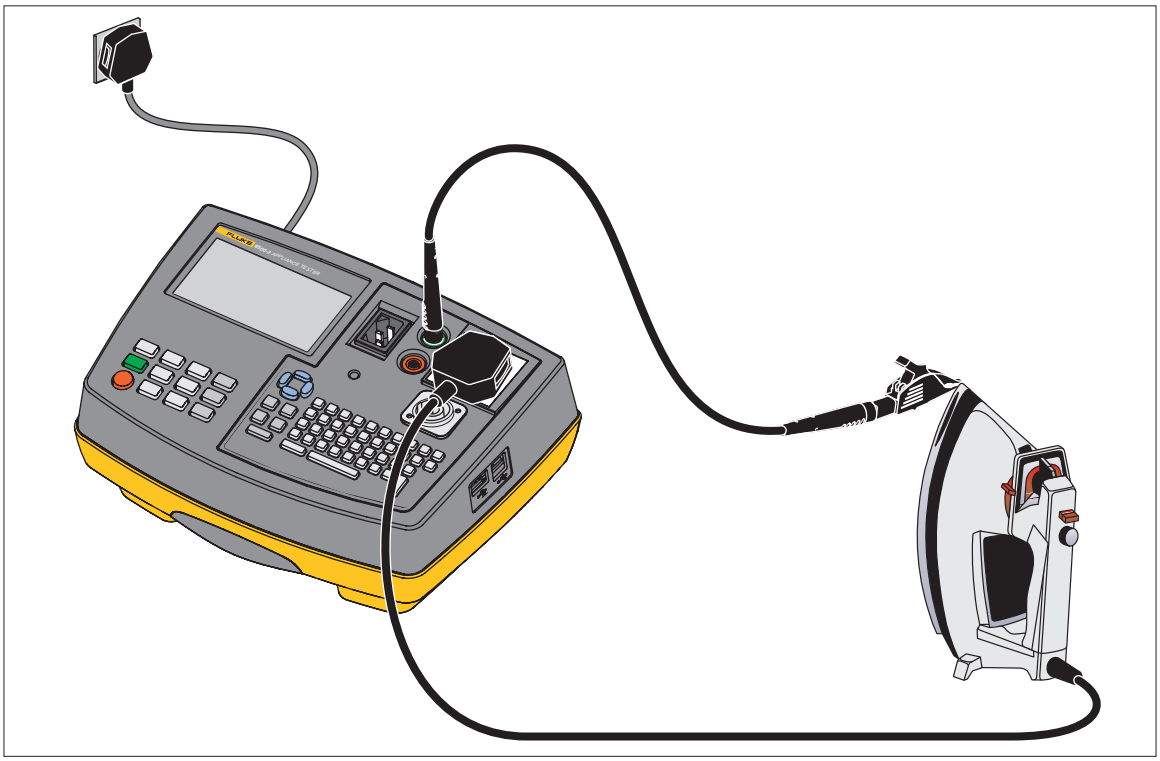
The test checks the resistance between the earth pin of the appliance cable plug and the exposed metalwork on the appliance. The test applies to Class I appliances. There are two current ranges for Earth Bond test:

- 200 mA
- 10 A (DE) or 25 A (UK, NL, AU)

Remarks:

- To enable the bond test and to obtain correct bond test results, you must zero the test lead, see *How to Zero the Earth Bond Leads*.
- You should use the lower current 200 mA for certain appliances. Refer to the appliance test standards and guidance material.
- Connect the appliance and the earth bond test lead as indicated on the display. Clip the alligator (crocodile) clip to an exposed conductive part on the appliance that requires a test, see Figure 2.
- Do not use the test probe for a bond test >10 A. The probe is rated for 10 A only.
- During the measurement, flex the flexible cord along its length to help find any broken conductors or poor quality joints.
- Continuous high current bond test will periodically drop back to 200 mA test to prevent the Tester from overheating.

Figure 2. Bond Test Connections



Note

In the case that an Earth bond test fails during an Auto Test, the pass/fail limit can be recalculated. Push SET UP and enter the length and cross section of the mains lead.

Insulation Test (R_{ISO})

⚠⚠ Warning

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

- **The test voltage can be 500 V dc. Do not touch the appliance during the insulation test! If the test fails, any metal parts of the appliance could become live!**
- **Always make sure that the test has completed before disconnecting the appliance leads to ensure that all capacitances have discharged.**
- **Do not do the Insulation test on appliances that failed the bond test or the visual inspection test.**

The Insulation test can be done with 250 V or 500 V. After the selection of an insulation test from the keypad, use ◀ and ▶ to set either 250 V or 500 V. The test checks the resistance of the insulation between:

- the earth pin of the appliance cable plug (Class I)

or

- the test probe to be applied to the appliance (Class II) and the Live and Neutral pins of the appliance (pins are connected together within the Tester for this test).

The insulation test will be inhibited if the Tester detects a terminal voltage >30 Vrms before initiation of the test.

Note

The insulation test may be unsuitable for some types of appliances. For these appliances an alternative test may be conducted such as a touch current, leakage current, or substitute leakage current test. Refer to standards and reference material for the safe applicability of these alternative tests.

Remarks:

- Connect the appliance and the test probe as indicated on the display, see Figure 3 and Figure 4.
- For Class I appliances no probe is required.
- For Class II appliances apply the test probe to any exposed metalwork on the appliance. Do the test for all exposed metal parts on the appliance.

Figure 3. Insulation Test Connections Class 1

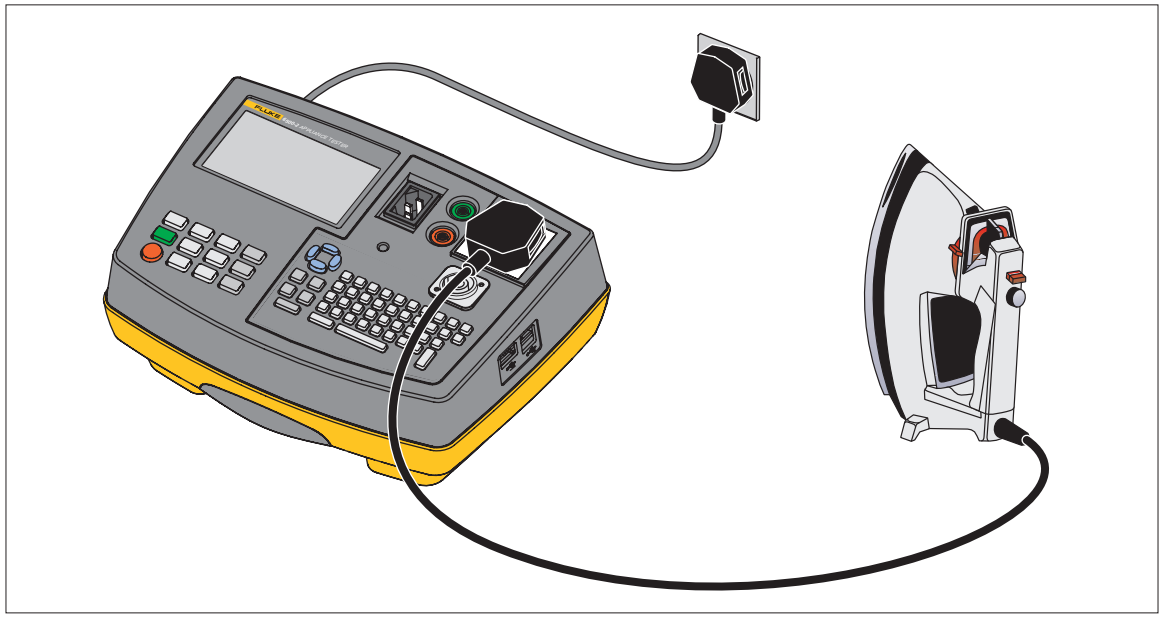
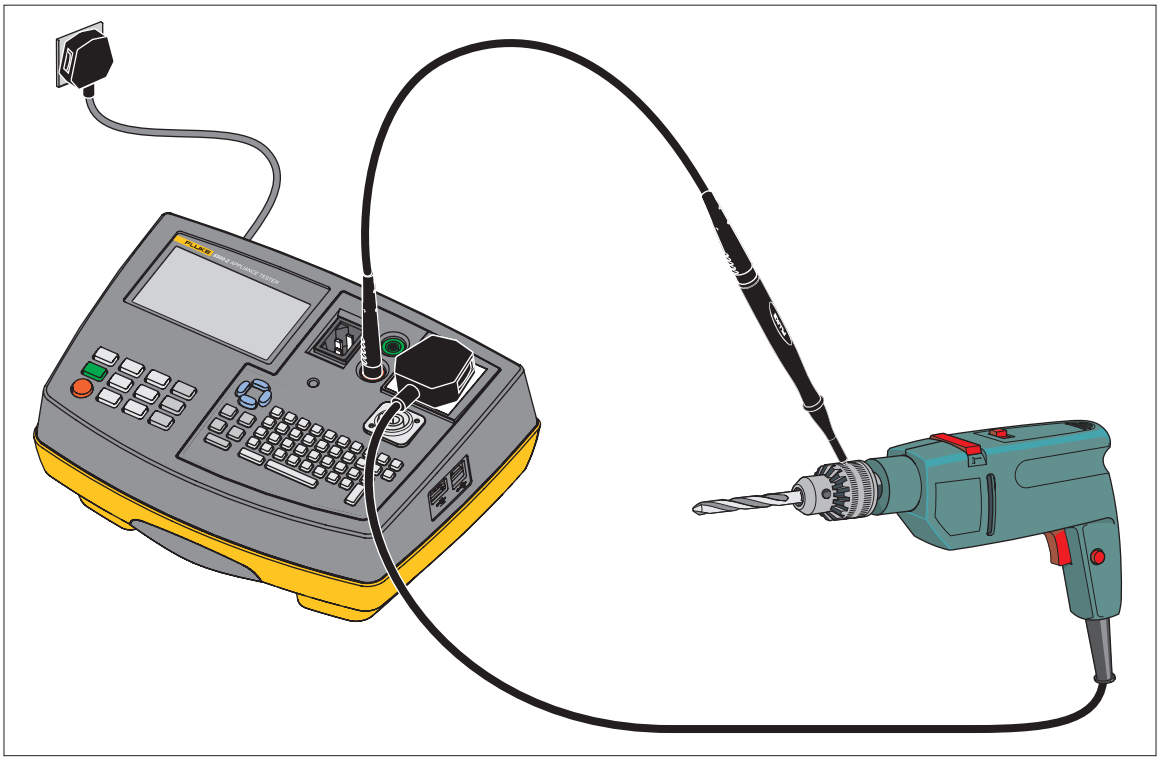


Figure 4. Insulation Test Connections Class II



Substitute Leakage Current Test (I_{SL})

The test measures the leakage current between:

- the earth pin of the appliance cable plug (Class I)

or

- the test probe attached to the appliance under test (Class II) and the Live and Neutral pins of the appliance (pins are connected together within the Tester for this test). Refer to standards and guidance material for the safe applicability of this test.

Remarks:

- Connect the appliance and the test probe as indicated on the display, see Figure 5 and Figure 6.
- For Class I appliances no test probe is required.
- For Class II appliances apply the test probe to any exposed metalwork on the appliance. Do the test for all exposed metal parts on the appliance.

Figure 5. Substitute Leakage Test Connection Class

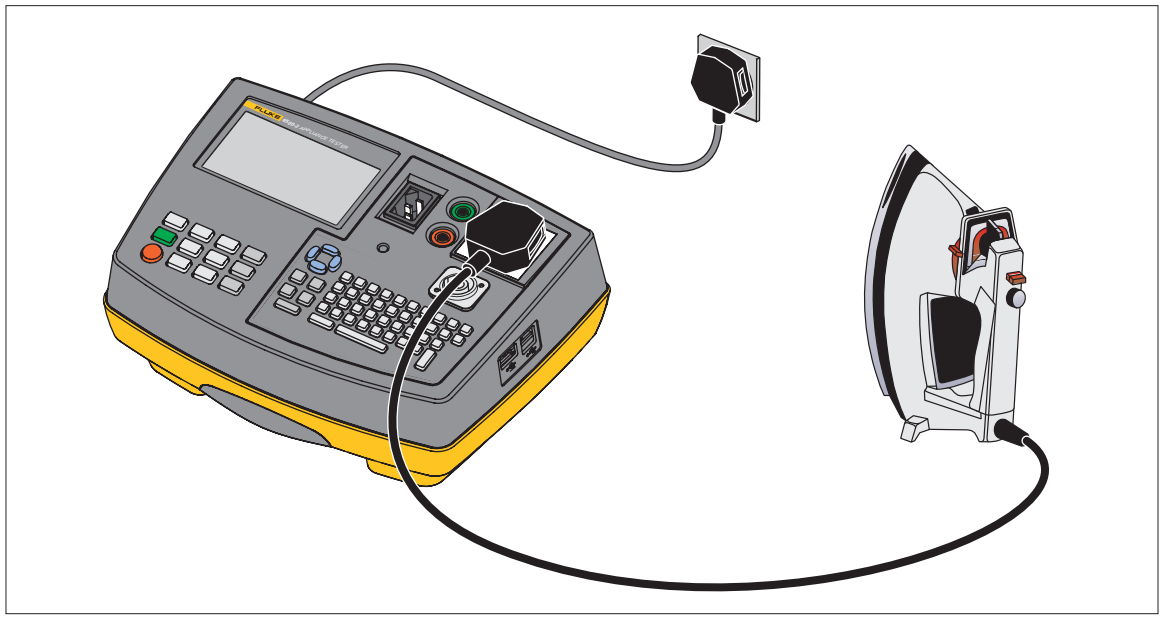
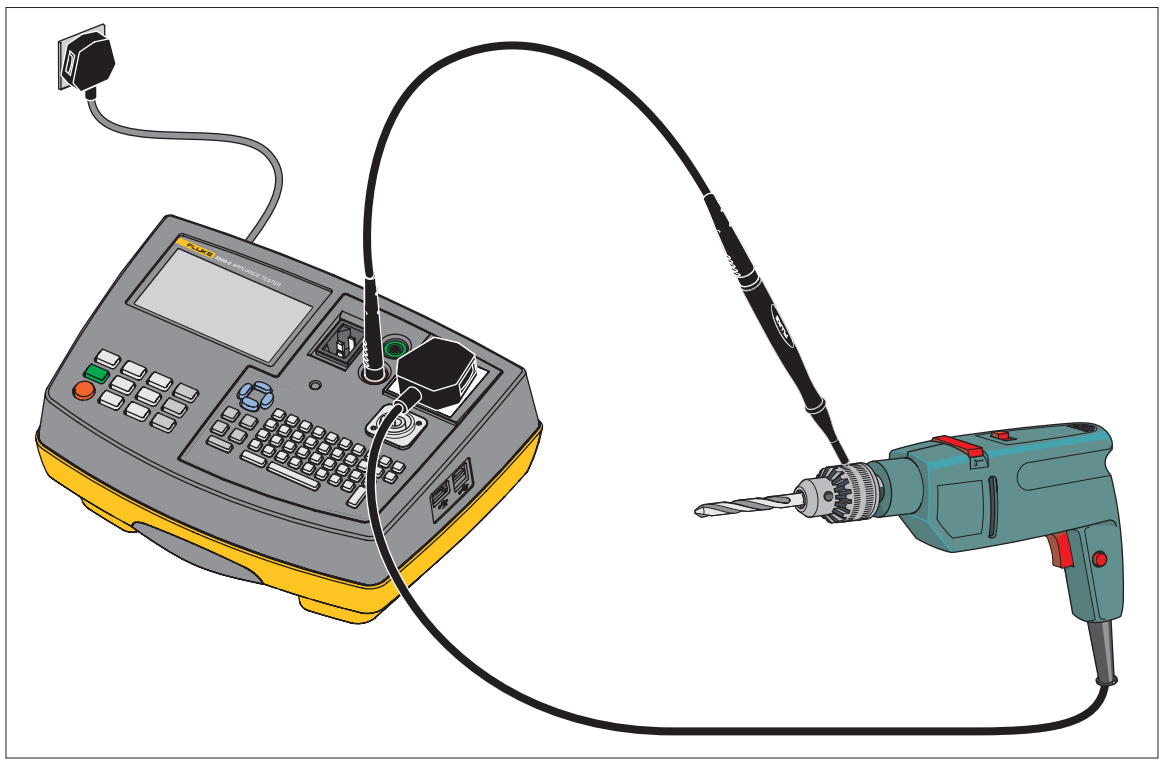


Figure 6. Substitute Leakage Test Connections Class II



Touch Current Test (I_{TC})

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, NEVER carry out this test unless you have first carried out a thorough visual inspection, followed by a test of the earthing (Class I appliances), and then a test of the insulation. You must verify that these tests have passed before you start this test.

The appliance must be tested in both polarities of mains supply for non-polarized sockets/plugs.

⚠ Warning

Live test. The appliance will be energized at mains voltage. For this purpose, switch on the appliance. Appliances driven by motors or equipped with heating units may present a danger for the person testing (comply with the appliance instruction manual). Make sure that the appliance is in a safe condition to operate and secure it before a test.

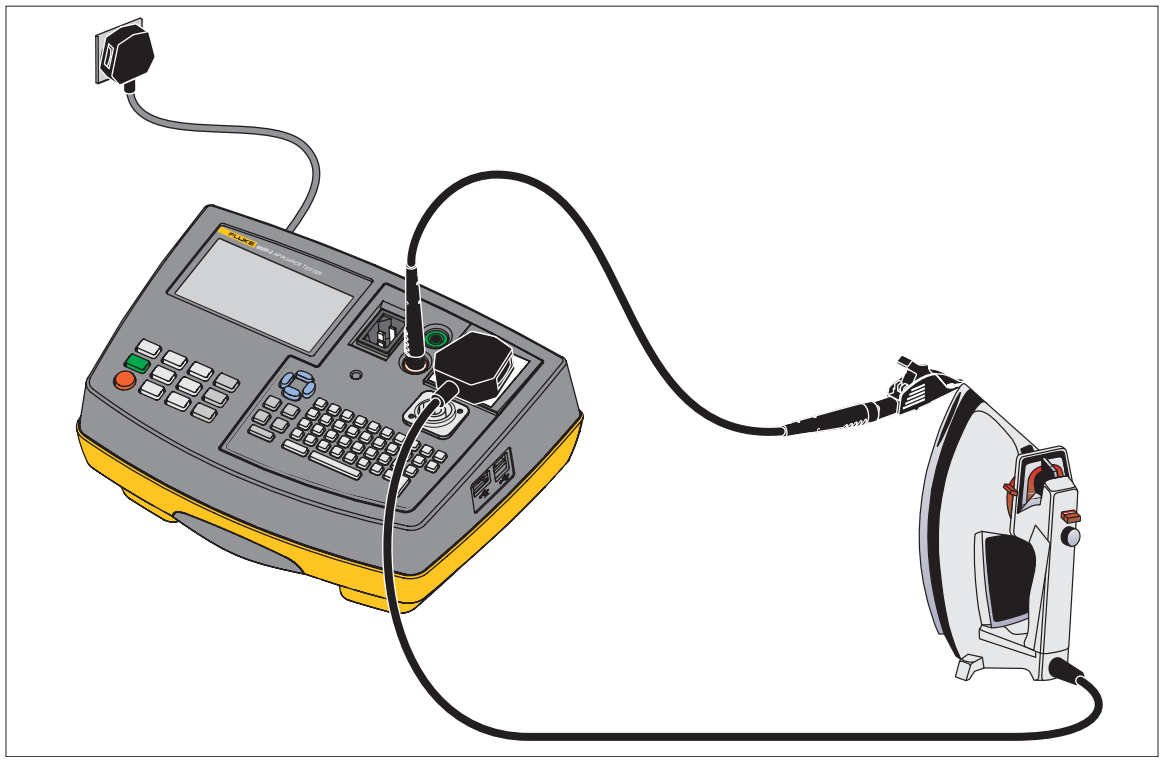
The Touch Current test consists of:

- a fuse and L-N loop pre-test
- a leakage current measurement with ~2 kW resistance connected between earth and exposed conductive parts on the appliance through the test probe. The measurement is done by the direct method.

Connect the appliance and the test probe as indicated on the display (see Figure 7) and apply the test probe to:

- any exposed conductive part on Class II appliances
- any exposed conductive parts that are not connected to earth on Class I appliances

Figure 7. Touch Current Test Connections



Live tests must be accepted with [YES]. The Tester will prompt you when you push [GO].

Fuse/L-N Pre-test

The pre-test verifies the fuse and lead continuity with a low voltage signal across the appliance phase and neutral pins.

If the pre-test fails, the display shows a self-explanatory message.

A fail may indicate that the fuse is blown or that there is an open circuit in the L-N conductors. In this case, push [MEM] to store the fail result.

The test could also fail because you forgot to switch the appliance on. In this case, switch the appliance on and repeat the test.

Very low power appliances, or appliances with electronically controlled on/off switches or with an inductance, may fail this test.

To test these appliances:

1. Push [GO] to continue with the test.
2. Give a pass assignment to the Fuse/L-N loop Pre-test.

Note

Accidental measurement of a defective unit may trip a RCCB (residual current circuit breaker).

Load/ Leakage Current (I_{PE}) Test

⚠ Warning

NEVER carry out this test unless you have first carried out a thorough visual inspection, followed by a test of the earthing (Class I appliances), and then a test of the insulation. You must verify that these tests are passed before you start this test.

The appliance must be tested in both polarities of mains supply for non-polarized sockets/plugs.

⚠ Warning

Live test. The appliance will be energized at mains voltage. For this purpose, switch on the appliance. Appliances driven by motors or equipped with heating units may present a danger for the person testing (comply with the appliance instruction manual). Ensure that the appliance is in a safe condition to operate and secured before a test.

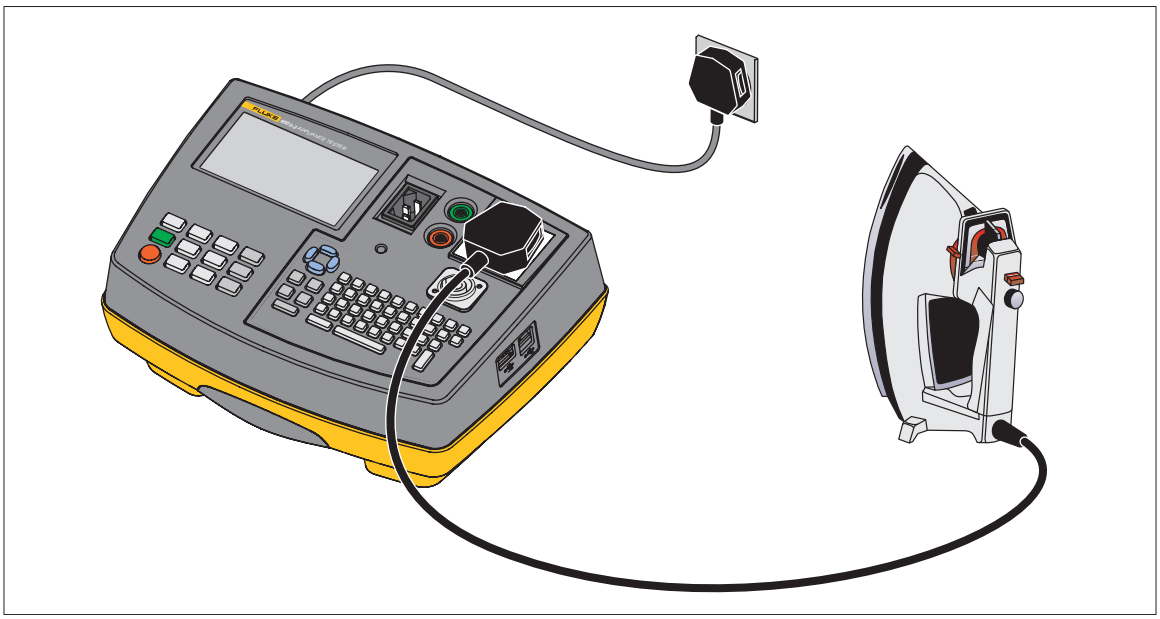
The Load/PE Leakage test consists of:

- Fuse and L-N loop pre-test.
- Measurements of the appliance power consumption and load current at full mains voltage.
- Measurement of the earth leakage current (differential measurement) at full mains voltage.

The measurements will be done in one test sequence.

Connect the appliance as indicated on the display (see also Figure 8).

Figure 8. Load/Leakage Test Connections



Live tests must be accepted with [YES]. The Tester will prompt you when you push [GO].

Fuse/L-N Pre-test

The pre-test verifies the fuse and lead continuity with a low voltage signal across the appliance phase and neutral pins.

If the pre-test fails, the display shows a self-explanatory message.

A fail may indicate that the fuse is blown or that there is an open circuit in the L-N conductors. In this case, push MEM to store the fail result.

The test could also fail because you forgot to switch the appliance on. In this case switch the appliance on and repeat the test.

Very low power appliances, or appliances with electronically controlled on/off switches or with an inductance, may fail this test.

To test these appliances:

1. Push GO to continue with the test.
2. Give a pass assignment to the Fuse/L-N loop Pre-test.

Note

Accidental measurement of a defective unit may trip a RCCB (residual current circuit breaker).

RCD Test

The RCD test measures the trip time of general-purpose AC RCD modules. These modules have a rated residual operating current of 30 mA. A Sinusoidal waveform at 230 V mains is used for the test. RCD tests are not allowed at 110 V mains. Tests at 50 %, 100 %, and 500 % of the rated residual current can be done manually or with an auto test. These same tests can also be done at 0 ° and 180 ° phase.

To do a RCD test:

1. Connect the RCD module to the 230 V test socket.
2. Connect output of the RCD module to IEC connector with the IEC lead. See Figure 9.

Note

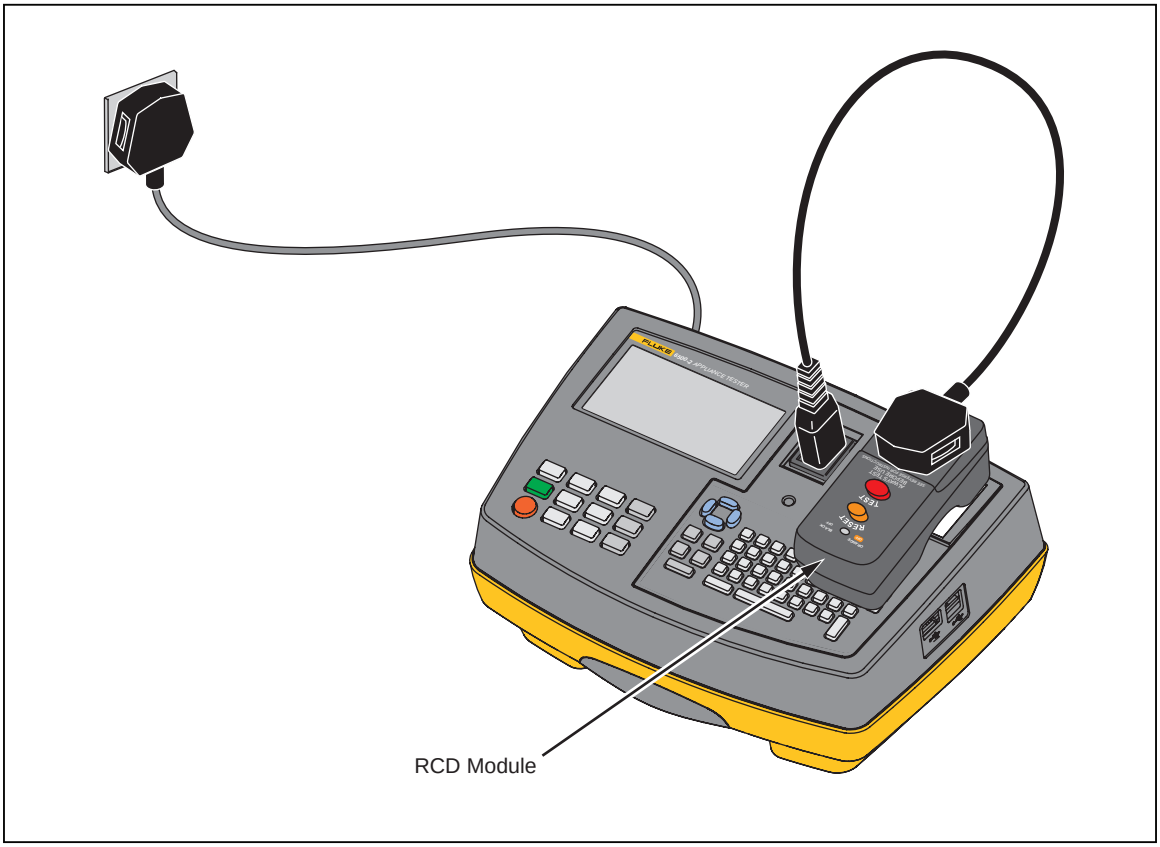
Make sure the IEC lead completes the IEC lead test before this test.

3. Select LOAD/LEAK test button then RCD.
4. Use ◀ ▶ to select the RCD auto test or individual manual tests.
5. Push GO to start test.

Note

Tests at 50 % of rated residual current (15 mA) should not trip the RCD. Tests at 100 % (30 mA) and 500 % (150 mA) should trip the RCD. A message shows on the display to reset the RCD if you start a test and the RCD trips.

Figure 9. General Purpose AC RCD Module Test



IEC Lead Test

The IEC lead test measures the IEC lead for:

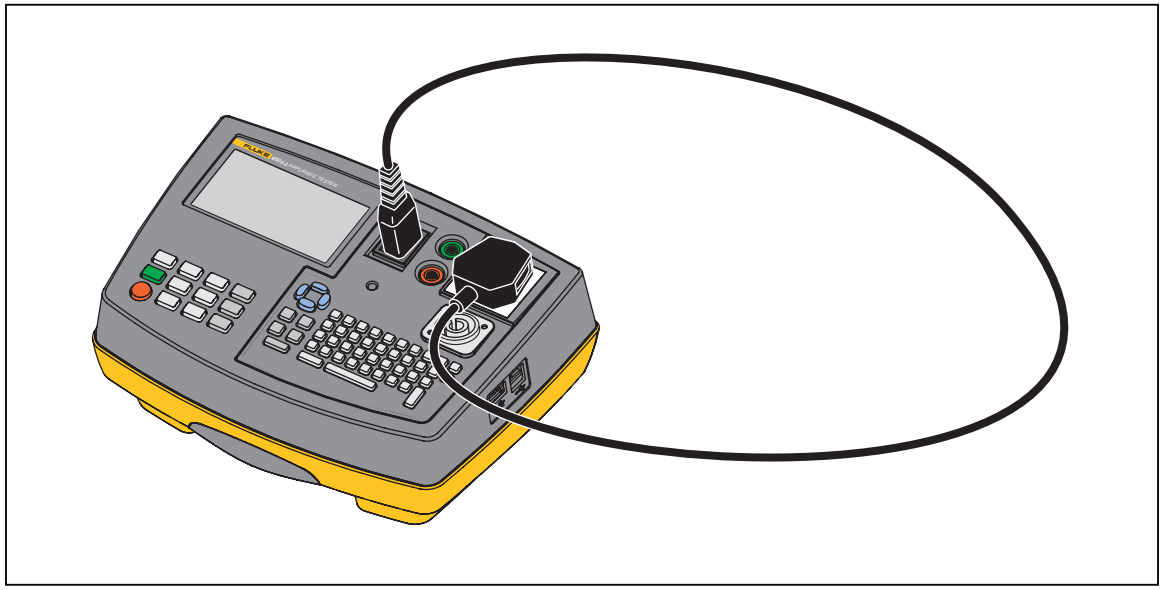
- Earth bond resistance and insulation.
- Live-neutral lead/fuse continuity and polarity (UK and AU).

If there is a swapped polarity condition and a continuity failure in the same test, a failed polarity message shows.

The IEC lead test is a single test mode only. The IEC lead test does not include a visual test in Manual mode. To include a visual test, program a new Auto Test to include an IEC test and a visual test, so results can be saved.

Connect the IEC lead as indicated on the display (see Figure 10).

Figure 10. IEC Lead Test Connection



PELV Test

The PELV (Protective Extra Low Voltage) test measures the voltage on the **PROBE PELV** input when the IDLE screen shows.

To do the PELV test:

1. Push STOP to go back to the IDLE screen if it is not shown.
2. Connect the test probe to the Tester **PROBE PELV** terminal and connect the appliance to a mains supply socket.
3. Apply the test probe to the test point.
4. Push MEM to store the test result, if required.

The display can show information, such as:

PELV 30.0 V	PELV FAIL result, the threshold (25V) is exceeded.
PELV >39.9 V	PELV overrange.
230 V 50 Hz	If the PELV threshold is not exceeded the display shows the mains voltage and frequency (PASS result)
PELV 30.0 V	PELV FAIL result, the threshold (25V) is exceeded.

Tip:

- To store a PELV FAIL result, push MEM and GO.
- To store a PELV PASS result, push MEM and select menu item **SAVE PELV pass result**.

Memory

The Tester has a non-volatile memory to save test results and auto-test sequences. In addition to test results and auto-tests, you can view saved results, delete individual result records, clear the entire memory, and review auto-tests.

Save Test Results

In the auto-test mode and in the manual single test mode, you can save test results when a test has finished.

In the manual continuous test mode, you can save the test result on the display. The display reverts to the test screen after the results have been saved.

Note

In continuous test mode, the test continues as you save the result.

Manual tests are saved individually as repeat tests when given the same appliance number by the DMS software. They do not display as one combined test.

Proceed as follows to save the results:

1. Push MEM to open the Save result screen and enter appliance information.
2. Push GO to save test results and information.

The Save result screen has four fields that you can enter data into. The data can be inserted via the keyboard or the Fluke barcode scanner.

`Appliance ID`	← Mandatory field
`Location`	← Optional field
`Description`	← Optional field
`Note`	← Optional field

Appliance ID

When you push MEM, the Appliance ID field will:

- automatically increase by 1 from the last stored value if you use numeric only appliance ID references
- show the last appliance ID if you use alphanumeric ID references

Location

When you push MEM, the display shows the last stored location as long as the Tester has not been powered down.

Note

After you save the results, the display shows the record number in the top right. If the display shows the warning:

⚠ the store is full

*You must save the data to a PC or USB drive and clear the memory (*Print - Download Data*).*

If you push MEM when the IDLE screen shows on the display, a PELV test pass result can be saved. See also PELV Test*.*

Test Result Records

You can select the result records you want to view by record number, by date, by site, and by keyword search.

To view result records:

1. From the IDLE screen, push MEM to open the memory menu. Follow the screen instructions.

   Push STOP to go back to the IDLE screen.
2. Use ▼ ▲ to highlight VIEW RESULT records.
3. Push GO to enter the view function. Follow the screen instructions.

Auto-Test Sequences

To view an auto-test sequence:

1. From the IDLE screen, push MEM to open the memory menu. Follow the screen instructions.

   Push STOP to go back to the IDLE screen.
2. Use ▼ ▲ to highlight VIEW AUTO-TESTS.
3. Push GO to enter the view function. Follow the screen instructions.

Delete Test Result Records

You can select the result records you want to delete by record number, by date, by site, and by keyword search.

To delete test result records:

1. From the IDLE screen, push MEM to open the memory menu.

   To go back to the IDLE screen, push STOP.

2. Use ▼ ▲ to highlight **DELETE a record**.

3. Push GO to enter the delete function and follow the screen instructions.

Note

Result records are not renumbered when a record in the middle of the store is deleted.

Deletion of individual records (test values) does not free memory space. ALL individual data records must be deleted or the ENTIRE memory must be deleted to free memory space, see Clear Memory*.*

Clear Memory

To free the entire memory you must use menu function MEM - <CLEAR the store>. This will delete all result records. Additionally a <CLEAR the store> function is automatically done after all individual records are deleted. Automatic test procedures will not be cleared.

⚠ Caution

To prevent data loss, make sure that the contents have been downloaded to a PC and/or backed-up on a USB drive before you clear the store or delete records.

To clear the memory:

1. From the IDLE screen, push MEM to open the memory menu.

   Push STOP to go back to the IDLE screen.

2. Use ▼ ▲ to highlight **CLEAR**.

3. Push GO to enter the clear menu and follow the screen instructions.

Print - Download Data

The print option allows Result and Auto Test printing with the Fluke USB thermal printer.

The PRINT/DOWNLOAD functions enable you to:

- Print some or all test results
- Print all auto-tests
- Download some or all test results to a PC
- Download some or all test results to a USB drive

Only results or auto-tests that have been stored can be printed or downloaded.

You can download results in two formats:

- .dms for Fluke DMS software
- .csv (comma separated values)

Print Test Results

To print one test result record or a range of test result records:

1. Connect the printer USB cable to the Tester USB type A port.
2. Push PC/PRINT to open the print/download menu.
3. Use ▼ ▲ to highlight **PRINT RESULTS** (not available if no results are saved).
4. Push GO to open the print results menu and follow the screen instructions.

Print Auto-Tests

To print all user programmed auto-tests:

1. Connect the printer USB cable to the Tester USB type A port.
2. Push PC/PRINT to open the print/download menu.
3. Use ▼ ▲ to highlight **AUTO-TESTS PRINTOUT**.
4. Push GO to start a print request.

Download Test Results to a PC

To download:

1. Connect the USB cable from the PC to the Tester type B connector.
2. Select PC when the popup window asks if connection is to PC or printer/barcode scanner.
3. Select data to download to PC and push GO. On PC there will be a new drive letter (example, D:).
4. Open the destination drive to find the downloaded data file.

Note

Tests are not allowed when USB is connected to PC.

The USB port supports data download only. Data cannot be uploaded back to the Tester.

Transfer Results to USB Flash Drive

To transfer a range of test results to a USB flash drive:

1. Connect the USB flash drive to the Tester.
2. Select data to download to the USB flash drive and push GO. Data downloads to the USB flash drive.
3. Highlight **Transfer data to USB flash drive** (not available if no results are saved).
4. Open the transfer menu and follow the screen instructions.

Maintenance

⚠⚠ Warning

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

- **Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.**
- **Disconnect the mains power cord before you remove the Product covers.**
- **Use only specified replacement fuses.**
- **Use only specified replacement parts.**
- **Have an approved technician repair the Product.**

There are no user replaceable parts in the Tester. Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture on the earth bond test lead plug can result in a contact resistance that affects the readout. As a result, periodically zero the earth bond test (see *How to Zero the Earth Bond Leads*).

Calibration

It is recommended that the Tester is calibrated at least once every 12 months to ensure the accuracy of the Tester is maintained at high level. Calibration must be carried out by qualified personnel. Contact your local Fluke representative for calibration (see *Contact Fluke*).

Accessories

Table 12 and Table 13 are lists of the part numbers for accessories.

Contact your local Fluke representative to obtain the accessories, see *Contact Fluke*.

Table 12. Standard Accessories

Description	Part Number
AC86, Alligator (Crocodile) Clip	2407510
TP38, Touch Current Probe	1276841
USB Cable (0.9 m / 1 ft)	4379738
Users Manual	Can be downloaded from your regional Fluke website, start at www.fluke.com

Table 13. Optional Accessories

Item	Part Number
Barcode Scanner [1]	4325143
Printer	4325128
EXTL100 Extension Lead Test Adapter	2414348
110 V Adapter Kit (for UK)	4372377
6200/6500 Accessory Kit	3833611
DMS 0702/PAT, Software for Appliance Testers	2634439
DMS COMPL, Software for Appliance Testers and Installation Testers	2634442

[1] The Fluke Barcode Scanner is a plug and play device and does not require any setup procedure. The Scanner is active when the Tester is in a screen that allows barcode input such as the Auto Test & Saving screen.
The Barcode scanner only supports the data entry of bar codes and does not support data retrieval. To scan a barcode place the barcode scanner approximately 1 inch from the barcode and press the scan button.

Specifications

General Specifications

Size (LxWxH)	200 mm x 275 mm x 114 mm
Weight	3.13 kg
Power Supply	230 V +10 % -15 %, 50 Hz ±2 Hz or 110 V +10 % -15 %, 50 Hz ±2 Hz (Not DE)
Power Consumption (Tester)	13 W typical (idle) 60 W max. during 25A Bond Test
Operating temperature	0 °C to +40 °C
Storage temperature	-10 °C to +60 °C
Relative Humidity	non condensing <+10 °C 95 % from +10 °C to +30 °C 75 % from +30 °C to +40 °C
Operating Altitude	0 m up to 2000 m
Ingress Protection	IEC 60529: IP 40 (enclosure), IP 20 (connectors)
Electromagnetic Compatibility	IEC 61326-1: Portable Electromagnetic Environment; IEC 61326-2-2 CISPR 11: Group 1, Class A

Group 1: Equipment has intentionally generated and/or use conductively coupled radio frequency energy which is necessary for the internal functioning of the equipment itself. Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted and radiated disturbances.

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Safety	IEC 61010-1: Overvoltage Category II, Pollution degree 2. IEC 61557 parts 1,2,4,6,10 CAT II 300 V

Test Specifications

The accuracy specification for the display range is defined as ±(%reading + digit counts) at 23 °C ±5 °C, ≤75 % RH. Between 0 °C and 18 °C and between 28 °C and 40 °C, accuracy specifications may degrade by 0.1 x (accuracy specification) per °C.

The measurement range meets the service operating errors specified in EN61557-1: 1997, EN61557-2: 1997, EN61557-4: 1997, EN61557-6: 1997, DIN VDE0404-2.

Power-on Test

The test indicates reversed L-N, missing PE, and measures the mains voltage and frequency.

Operational Error Measurement Range	195 V to 253 V
Display Range	90 V to 264 V
Accuracy at 50 Hz	±(2 % +3 counts)
Resolution	0.1 V
Input Impedance	>1 MW // 2.2 nF
Maximum Input Mains Voltage	264 V

Earth Bond Test

Operational Error Measurement Range .... 0.2 Ω to 1.99 Ω
Operational Error ..... 10.0 %
Accuracy (after Bond Test zeroing) ..... ±(5 % + 4 counts)
Display Range ..... 0 Ω to 19.99 Ω
Resolution ..... 0.01 Ω
Test Current ..... 200 mA ac -0 % +40 % into 1.99 Ω
25 A ac ±20 % into 25 mW at 230 V
Open Circuit Voltage ..... >4 V ac, <24 V ac
Bond Test Zeroing ..... can subtract up to 1.99 Ω
Used Current for Bond Test Zeroing ..... 10 A

Insulation Test

Operational Error Measurement range ..... 0.1 MΩ to 5 MΩ
Operational Error ..... 9.0 %
Accuracy ..... ±(5 % + 2 counts) from 0.1 MΩ to 50 MΩ
±(10 % + 2 counts) from 50 MΩ to 299 MΩ
Display Range ..... 0 MΩ to 299 MΩ
Resolution ..... 0.01 MΩ (0 MΩ to 9.99 MΩ)
0.1 MΩ (10 MΩ to 99.9 MΩ)
1 MΩ (100 MΩ to 299 MΩ)
Test Voltage ..... 500 V dc –0 % +25 % at 500 kW load or 250 Vdc -0 % +25 % at 250 kW load
Test Current ..... >1 mA at 500 V/500 kW or 250 V/250 kW load, <15 mA at 0
Auto discharge time ..... <0.5 s for 1 µF
Max. Capacitive Load ..... operational up to 1 µF

Substitute Leakage Current Test

Operational Error Measurement Range .... 0.25 mA to 19.00 mA
Operational Error ..... 10 %
Accuracy ..... ±(5 % + 5 counts)
Display Range ..... 0 mA ac to 19.99 mA ac
Resolution ..... 0.01 mA
Test Voltage ..... 100 V ac ±20 % (at nominal mains input voltage)

Touch Current Test

Operational error Measurement Range .... 0 mA ac to 1.99 mA ac
Operational error ..... 6.0 %
Accuracy ..... ±(4 % +2 counts)
Display Range ..... 0.1 mA ac to 3.5 mA ac
Resolution ..... 0.01 mA
Internal Resistance (via probe) ..... 2 kΩ
Measurement method ..... Probe
The appliance under test is energized at mains potential.

Load/Leakage Test: Load Current

Display Range
- UK ..... 0 A to 13 A
- AU ..... 0 A to 10 A
- DE, NL ..... 0 A to 16 A

Accuracy ..... ±(4 % +2 counts)
Resolution ..... 0.1 A
The appliance under test is energized at mains potential.

Load/Leakage Test: Load Power

Display Range
- 230 V Mains
  - UK ..... 0 VA to 3.2 kVA
  - AU ..... 0 VA to 2.4 kVA
  - DE, NL ..... 0 VA to 3.7 kVA
- 110 V Mains ..... 0 V to 1.5 kVA

Accuracy ..... ±(5 % +3 counts)
Resolution ..... 1 VA (0 VA to 999 VA)
0.1 kVA (>1.0 kVA)
The appliance under test is energized at mains potential.

Load/Leakage Test: Leakage Current

Operational Error Measurement Range .... 0.25 mA to 19.00 mA
Operational error ..... 12.0 %
Accuracy ..... ±(4 % + 5 counts)
Display Range ..... 0.25 mA to 19.99 mA
Resolution ..... 0.01 mA
The appliance under test is energized at mains potential.

RCD Test: Trip Current

Operational Error ..... ±10 %
Nominal ..... 30 mA
Accuracy ..... ±5 %

RCD Test: Trip Time

Standard requirement ..... 61557 Part 6; tolerance of rated test current 0 % to +10 %
Operational Error ..... ±10 %
RCD Type ..... AC General-Purpose 30 mA
Display Range ..... 310 ms
Resolution ..... 0.1 ms
Accuracy ..... 3 ms
Trip Time Limit at 100 % (30 mA) ..... 300 ms
Trip Time Limit at 500 % (150 mA) ..... 40 ms

PELV Test

Display Range ..... 10.0 V to 39.9 V
Resolution ..... 0.1 V
Accuracy at 50 Hz ..... ±(2 % +3 counts)
Overload protection ..... 300 Vrms
Warning threshold ..... 25 Vrms

IEC Lead Test

Test current ..... 10 A ac
Test voltage ..... 500 V dc

Variation Factor Errors

Variation Factor	Designation	% Variation Error
Position	E1	0.0 %
Supply Voltage	E2	5.0 %
Temperature	E3	5.5 %
Current Consumption	E4	1.5 %
Magnetic Fields	E5	2.5 %
Impedance	E6	1.0 %
Capacitance	E7	2.0 %
Current Waveshape	E8	1.0 %