FLUKE®

6200-2

Appliance Tester

Users Manual

September 2013, Rev. 1, 8/2022 (English)

LIMITED WARRANTY AND LIMITATION OF LIABILITY

Each Fluke product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is 2 years and begins on the date of shipment. Parts, product repairs, and services are warranted for 90 days. This warranty extends only to the original buyer or end-user customer of a Fluke authorized reseller, and does not apply to fuses, disposable batteries, or to any product which, in Fluke's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation or handling. Fluke warrants that software will operate substantially in accordance with its functional specifications for 90 days and that it has been properly recorded on non-defective media. Fluke does not warrant that software will be error free or operate without interruption.

Fluke authorized resellers shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of Fluke. Warranty support is available only if product is purchased through a Fluke authorized sales outlet or Buyer has paid the applicable international price. Fluke reserves the right to invoice Buyer for importation costs of repair/ replacement parts when product purchased in one country is submitted for repair in another country.

Fluke's warranty obligation is limited, at Fluke's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to a Fluke authorized service center within the warranty period.

To obtain warranty service, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that service center, with a description of the difficulty, postage and insurance prepaid (FOB Destination). Fluke assumes no risk for damage in transit. Following warranty repair, the product will be returned to Buyer, transportation prepaid (FOB Destination). If Fluke determines that failure was caused by neglect, misuse, contamination, alteration, accident, or abnormal condition of operation or handling, including overvoltage failures caused by use outside the product's specified rating, or normal wear and tear of mechanical components, Fluke will provide an estimate of repair costs and obtain authorization before commencing the work. Following repair, the product will be returned to the Buyer transportation prepaid and the Buyer will be billed for the repair and return transportation charges (FOB Shipping Point).

THIS WARRANTY IS BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. FLUKE SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, ARISING FROM ANY CAUSE OR THEORY.

Since some countries or states do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any provision of this Warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision.

Fluke Corporation
P.O. Box 9090
Everett, WA 98206-9090
U.S.A.

11/99

Table of Contents

Introduction

The Fluke model 6200-2 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
- Load/Leakage
- 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.

Fluke Corporation
P.O. Box 9090
Everett WA 98206-9090
U.S.A.

Fluke Europe B.V.
P.O. Box 1186
5602 BD Eindhoven
The Netherlands

+1-425-446-5500 fluke-info@fluke.com

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
6200-2 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.

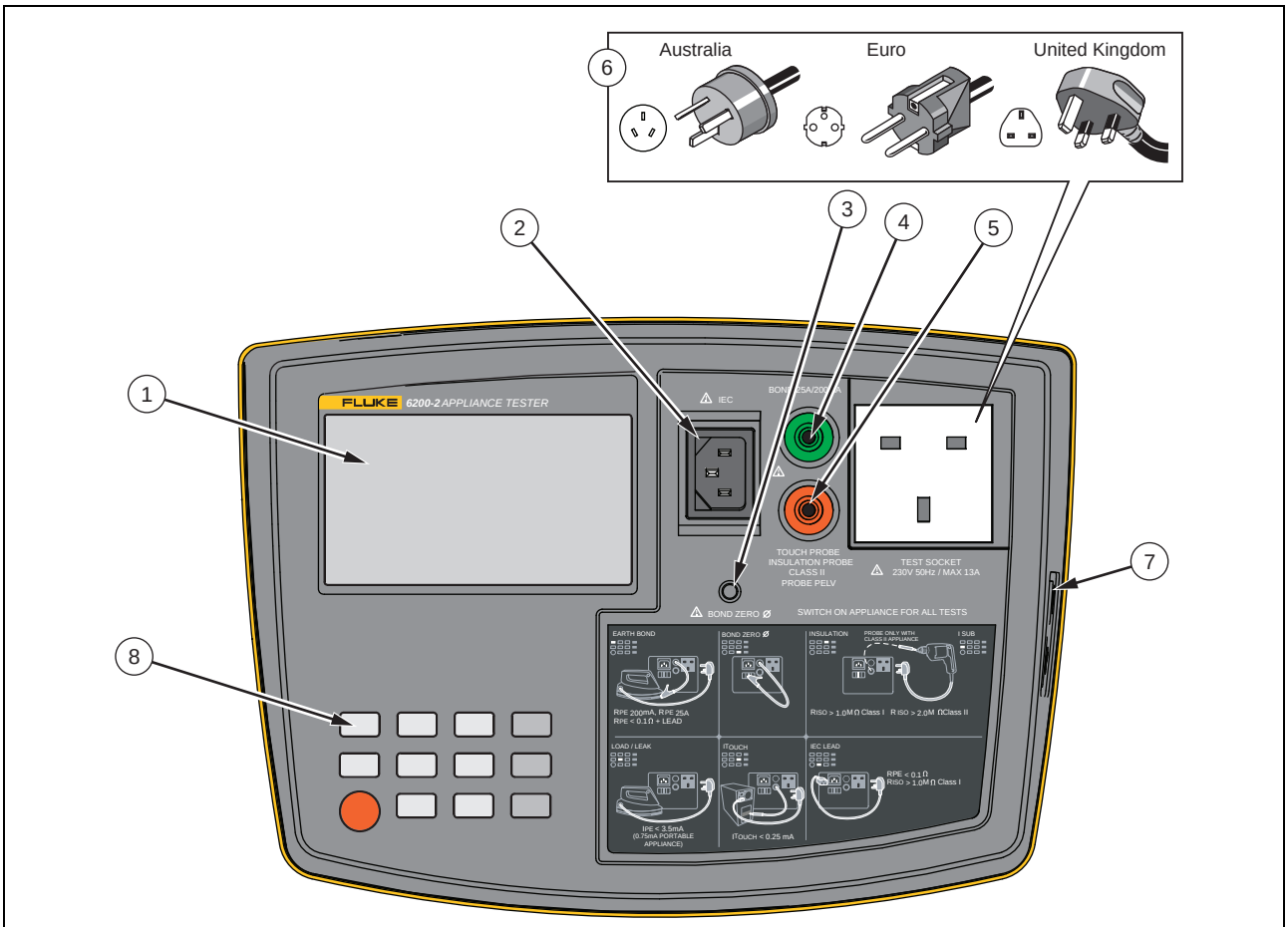
Features

The Tester can do all the tests required for Class I and Class II appliances and conforms to safety standard EN61010. All features for manual tests an low volume applications are accessible from the front panel.

Front Panel

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

Table 3. Front Panel

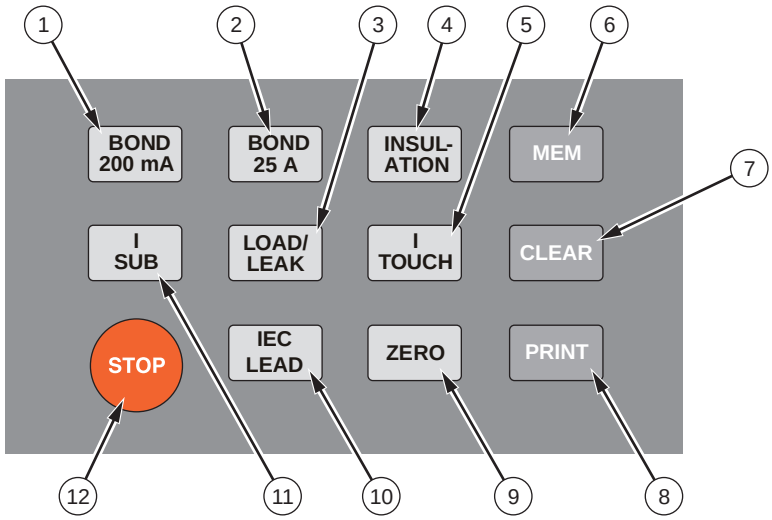


Item	Description	Item	Description
①	Liquid Crystal Display (LCD)	⑤	Socket to connect test probe for Insulation test, Touch Current test, Substitute Leakage test and PELV test
②	Socket to connect IEC lead for IEC Lead test		
③	Earth connection to zero the Earth Bond test lead	⑥	Appliance Test Socket
④	Socket to connect test lead and alligator (crocodile) clip for Earth Bond test	⑦	2 USB Ports
		⑧	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 the 200 mA Earth Bond test	⑦	Clear stored data
②	Start the high current Earth Bond test	⑧	Print test results
③	Start the combined Load/Earth Leakage Current test	⑨	Start zeroing the Earth Bond test
④	Start the Insulation test	⑩	Start the IEC Lead test
⑤	Start the Touch Current test	⑪	Start the Substitute Leakage Current test
⑥	Store test results	⑫	Stop the current action and return to idle screen

Beeper

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

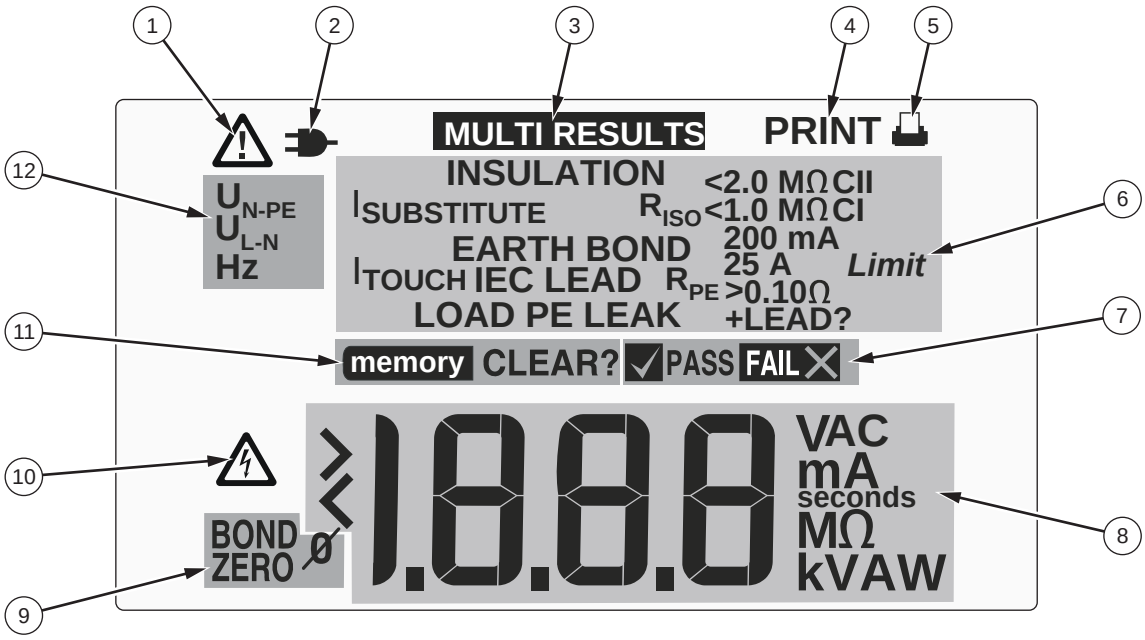
Table 5. Beeper Sounds

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.
1 long beep	A continuous non-live test has been started.
2 beeps + 1 long beep	A continuous live test has been started.
Continuous two tone sound	Dangerous condition! Unplug the unit immediately!

Display Symbols

Table 6 is a list of the beeper sounds from the Tester.

Table 6. Display Features



Item	Description	Item	Description
①	Caution! Risk of Electric Shock. Refer to Manual.	⑨	Bond test zero function. Ø displays if the bond test has been zeroed.
②	Check the mains polarity.	⑩	Caution! Risk of Electric Shock.
③	Multiple test results show in succession.	⑪	Displays when you store/clear results.
④	Printing results.	⑫	Neutral-Protective Earth voltage too high. Mains voltage out of limits. Mains frequency out of limits.
⑤	Fluke printer is connected.		
⑥	Tests and limits.		
⑦	A single test has passed or failed.		
⑧	Readout and measurement units field, error message field. > result overflow < or underflow		

Power-Up and Warning Display Messages

⚠⚠ Warning

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

- **Read the safety information before you power up the Tester.**
- **Connect an approved three-conductor mains power cord to a grounded power outlet.**
- **Do not use a two-conductor mains power cord unless you install a protective ground wire to the Product ground terminal before you operate the Product.**
- **Make sure that the Product is grounded before use.**

The Tester will power up when you connect it to the mains supply.

Disconnect the mains plug to power down the Tester.

At power up the Tester performs a self-test and shows the software version.

After power up, the display indicates the mains supply voltage. This screen is referred to throughout this manual as the idle screen.

If the Tester detects special conditions at power up, such as a dangerous condition, a warning message indicates the condition.

Table 7 is a list of the messages that can show when you power up the Tester. The values are examples and can differ from actual values shown on the display.

Table 7. Display Messages

Display	Explanation
St	Self-test.
1.18	Software version is shown after power on.
230 V^{AC}	Mains supply voltage, idle screen.
U_{N-PE} 50 V^{AC}	Mains problem, unplug unit! No test possible.
U_{L-N} 195 V^{AC}	Mains voltage too low. No test possible.
U_{L-N} 265 V^{AC}	Mains voltage too high. No test possible.
< 48 **Hz**	Mains frequency too low. No test possible.
> 52 **Hz**	Mains frequency too high. No test possible.
⚠ **memory**	Memory full.
⚠ **memory** →75	Memory nearly full (>75 %).
⚠ + number	Tester failure, contact Fluke support.
⚠ + number	Dangerous Tester failure. Unplug the Tester, prevent it from being used, and contact Fluke for repair.

Table 7. Display Messages (cont.)

Display	Explanation
⚠ $U_{N\text{-}PE}$→11	The Neutral-Earth voltage is dangerously high. Unplug the Tester!
⚠ ⊃→15	The mains polarity is incorrect. Unplug the Tester!
⚠ $U_{N\text{-}PE}$→11	Mains supply earth connection is missing/open circuit. Unplug the Tester!

Tester Setup

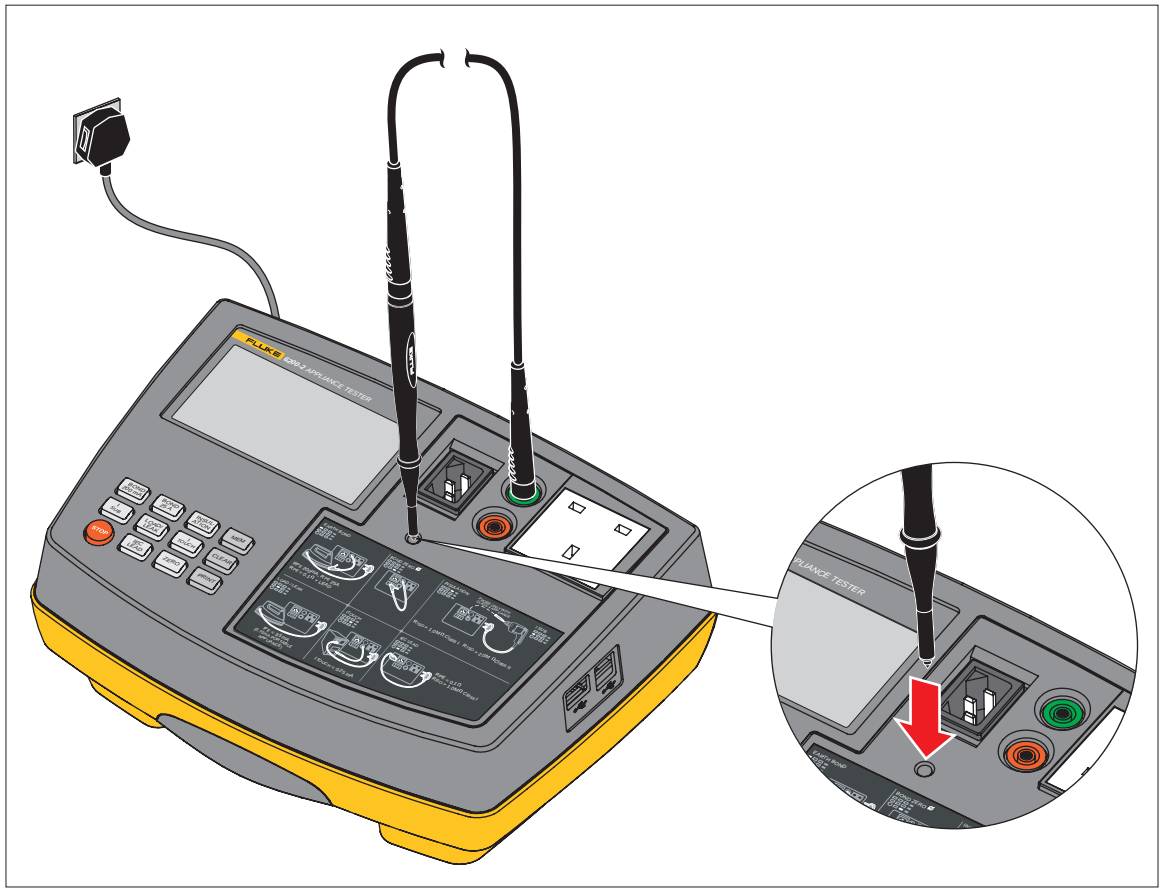
The only requirement to set up the Tester is to zero the earth bond test. For correct earth bond test results, you must zero the earth bond lead to eliminate its resistance:

- when you set up your new Tester. Earth bond tests are locked out unless the bond zero icon ∅ 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. Attach the probe to the test lead and insert the test lead plug into the EARTH BOND socket, see Figure 1.
2. Firmly attach the probe to the BOND ZERO connector on the Tester.
3. Push ZERO. The display shows a countdown for the test progress.
4. When zero is complete, test lead resistance is subtracted from the bond test result. A readout of >1.99 cannot be compensated for and the bond test is locked out.

Figure 1. Bond Zero Connections



The Tester saves the zero value so you will not need to repeat the operation every time you use the Tester. If the Earth Bond test has been zeroed, the idle screen and subsequent earth bond test results are marked with Ø, for example:

Ø → 0.09 Ω

Safe Appliance Tests

⚠⚠ Warning

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

- **Before you start 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.**
- **During tests, do not touch the appliance as some tests involve high voltages and high currents.**
- **The tests should only be performed by competent persons who are familiar with the requirements of the type of tests suitable for portable appliances.**

- **It is potentially hazardous for both user and appliance should the wrong type of tests be undertaken or if a test is carried out in an incorrect sequence.**
- **It is important that you fully understand the various tests required and how they should be performed.**
- **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 tests fail, further tests must be stopped and any faults must be rectified.**
- **During the load/leakage test and the touch current test, the appliance is energized at mains voltage. For this purpose, switch on the appliance. Appliances driven by motors or equipped with heating units may present a danger during a test (comply with appliance instruction manual!). Please ensure that the appliance is in a safe condition to operate and secure before tests.**

You can do tests in a single test mode or in a continuous test mode.

Single Test Mode

To do a single non-live test, push the test button and then release it.

To do a single live test (load/leakage and touch current), hold down the test button and release it after the second beep, before you hear a third long beep.

The Tester connects the test supply, performs one test, disconnects the test supply, and holds the result on the display.

Continuous Test Mode

To start a continuous non-live test, hold down the test button for at least 2 seconds. You will hear a long beep to indicate the Tester is in the continuous mode.

To start a continuous live test (load/leakage and touch current) hold down the test button until you hear two beeps followed by a third beep.

The Tester connects the test supply, makes the first test, and displays the first result. Then the Tester continues to measure and display results without disconnecting the test supply. The maximum test time is 8 minutes. After which the test terminates.

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

Note

1. *Fuse/L-N Pre-Test is performed as part of live tests (Touch Current and Load/Leakage Current Test). The pre-test verifies the fuse and lead continuity with a low voltage signal across the appliances phase and neutral pins.*

   Very low power appliances, or appliances with electronically controlled on/off switches or with an inductance may fail this test. In this case the symbol FAIL ✕ *will appear.*

   To enable you to test these appliances you can skip the Fuse/L-N Loop Pre-test. To perform the test on appliances that fail the Fuse/L-N Loop Pre-test:

- *Release the appropriate function key, push and hold it until your hear the second indication beep, but release it before the third long beep.*
- *To start a continuous test release the appropriate function key, push and hold it until your hear a third long beep.*

2. *The measurement unit blinks for an active measurement (for example, Ω, MΩ, mA) during a continuous test.*
3. *The IEC-Lead test cannot be done in the continuous test mode.*

Stop a Test

Push STOP to immediately end a test that is in progress, make the Tester safe, and then show the idle screen. Test results do not show on the display.

How to Save Test Results

To save the result after a test is complete, push MEM. The actual test result is saved into memory. The display shows the number that has been assigned to the record, for example: **memory** 5.

For detailed information refer to *Memory*.

Visual Inspection

Before any 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.

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 that have current ranges of 200 mA and 25 A (UK, NL, AU) or 10 A (DE).

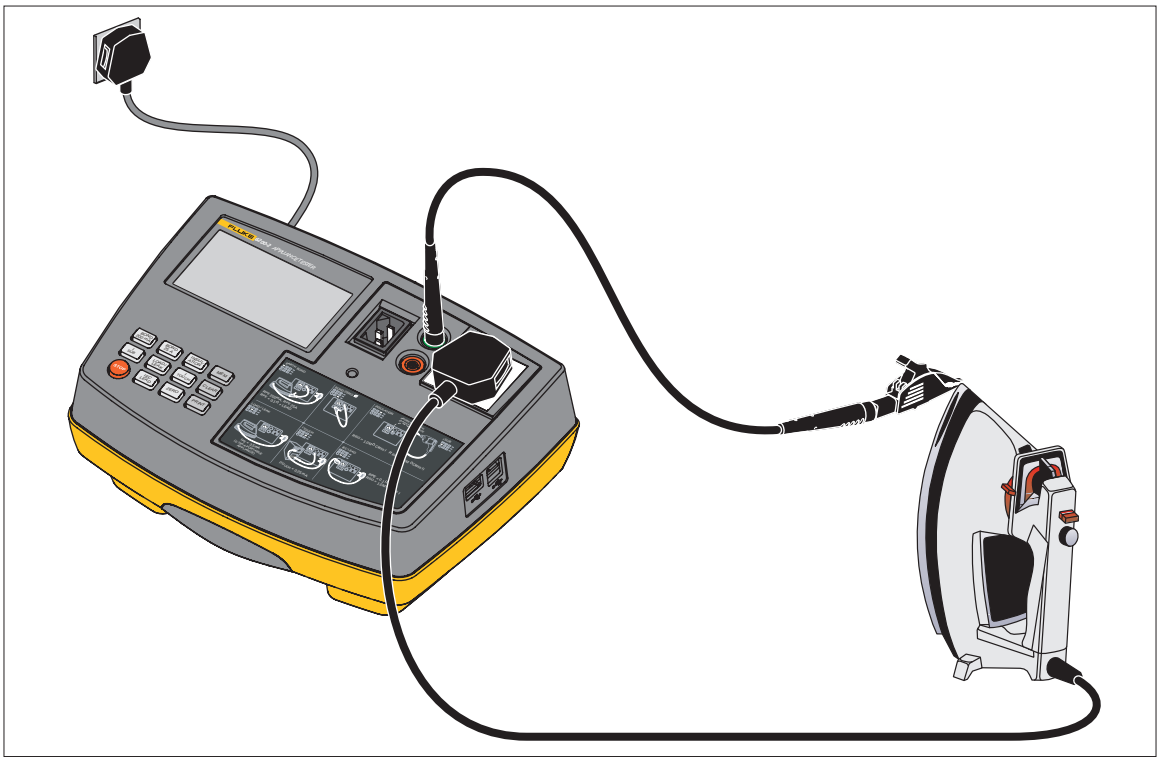
Remarks:

- To enable the bond test and to obtain correct bond test results you must have zeroed the test lead, see Figure 1.
- High current bond test 25 A (UK, NL, AU) and 10 A (DE).
- High current bond test will periodically drop back to 200 mA test to prevent the Tester from overheating.
- You should use the 200 mA test current for certain appliances. Please refer to the appliance test standards and guidance material.

To perform the Earth Bond test:

1. Connect the appliance and the earth bond test lead as indicated on the Tester, see Figure 2. Connect the crocodile clip to an exposed conductive part on the appliance. Do not use the probe for a bond test >10 A. The probe is rated for 10 A only.

Figure 2. Bond Test Connections



2. Push [BOND 200 mA] or [BOND 25 A] to start the 200 mA test or the high current test:
   - **Single test** push momentarily
   - **Continuous test** hold down >2 seconds

   The display shows the test progress.
3. During the measurement, flex the flexible cord along its length to help find any broken conductors or poor quality joints.

   Continuous test only:
4. Push [BOND 200 mA] or [BOND 25 A] or 10 A/25 A bond test to stop the test.
5. When the test is finished, remove the earth bond lead from the appliance.
6. Push [MEM] to store the test result, if required.

Note

If a double beep sounds the earth bond test lead has not been zeroed (no Ø symbol on the LCD). You must zero the test lead, see Figure 1.

Insulation Test (R_{ISO})

⚠⚠ Warning

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

- **The test voltage is 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.**

⚠ Warning

To prevent personal injury, do not perform the insulation test on Class I appliances that failed the bond test.

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 under test (Class II) and the Live and Neutral pins of the appliance (pins are connected together within the Tester for this test).

The insulation test is prevented if the Tester detects a terminal voltage >30 Vrms before initiation of the test.

Note

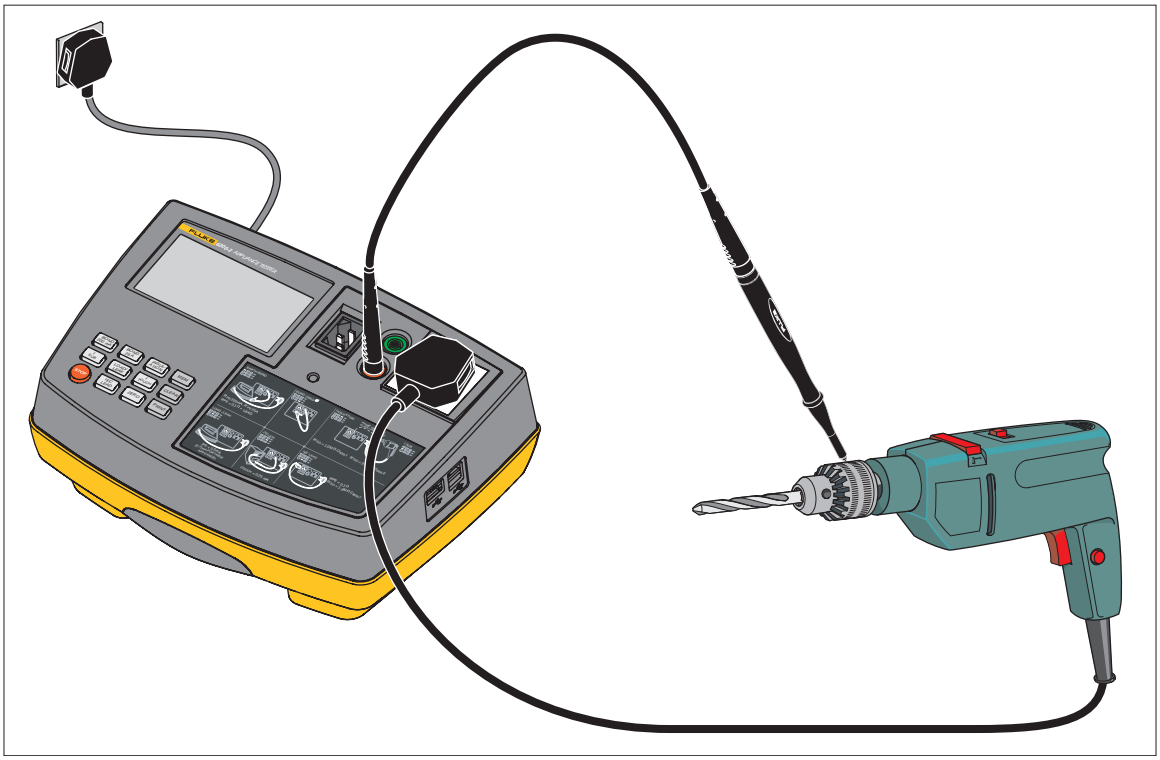
The insulation test may be not suitable for some types of appliances. For these appliances an alternative test may be conducted, such as a touch current, leakage current, or suitable leakage current test. Refer to standards and reference material for the safe applicability of these alternative tests.

To perform the Insulation test:

1. Connect the appliance and the probe as shown on the Tester.

   See Figure 3. For Class I appliances, no probe is required. For Class II appliances, apply the probe to any exposed metalwork on the appliance.

Figure 3. Insulation and Substitute Leakage Test Connections Class II



2. Push INSUL-ATION to start the test:
   - **Single test** push momentarily
   - **Continuous test** hold down >2 seconds

   The display shows the test progress.

Continuous test only:

3. Push INSUL-ATION to stop the test.
4. Push MEM to store the test result, if required.
5. For Class II, continue the test for all exposed metal parts on the appliance.

Substitute Leakage Current Test ($I_{SUBSTITUTE}$)

The test measures the leakage current between:

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

or

- the test probe to be applied 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 the standards and guidance material for the safe applicability of this test.

To perform the Substitute Leakage Current test:

1. Connect the appliance and the probe as shown on the Tester. See Figure 3.
   - For Class I appliances no probe is required.
   - For Class II appliances apply the probe to any exposed metalwork on the appliance.
2. Push [I SUB] to start the test:
   - **Single test** push momentarily
   - **Continuous test** hold down >2 seconds

Continuous test only:

3. Push [I SUB] to stop the test.
4. Push [MEM] to store the test result, if required.
5. For Class II, continue the test for all exposed metal parts on the appliance.

Touch Current Test (I_{TOUCH})

⚠⚠ 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.

⚠ 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.

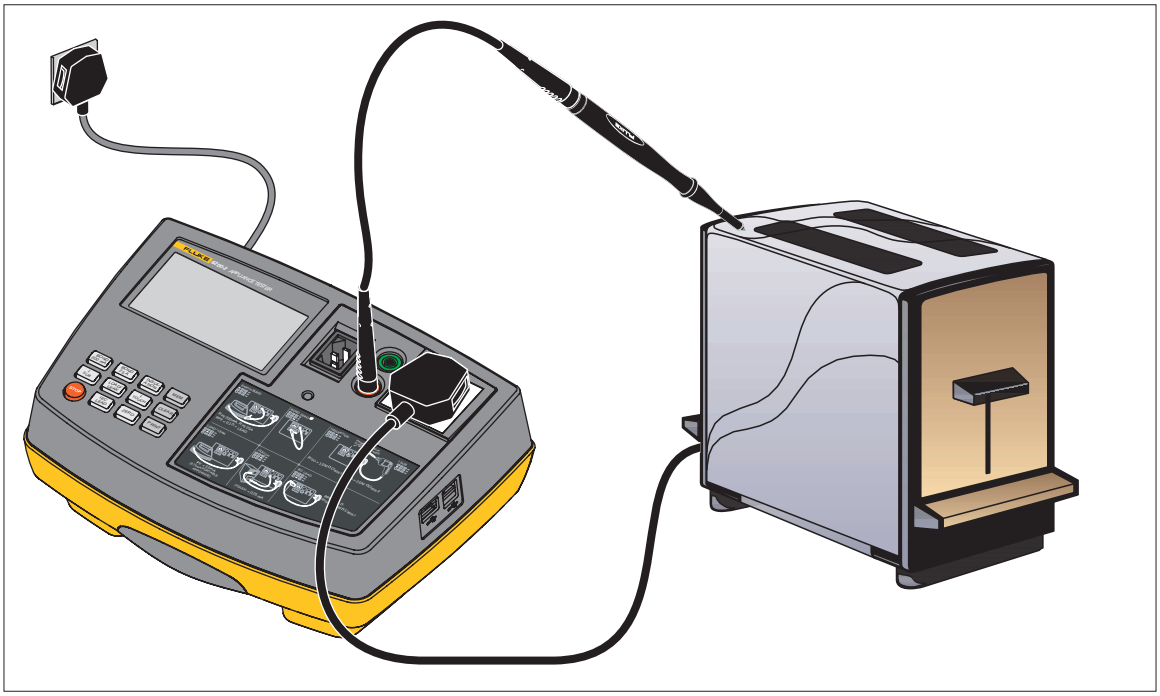
The Touch Current test consists of:

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

To perform the Touch Current test:

1. Connect the appliance and the test probe as indicated on the Tester, see Figure 4.
   - For Class II appliances apply the probe to any exposed metalwork on the appliance.
   - For Class I appliances apply the probe to any exposed metalwork on the appliance that is not connected to earth.

Figure 4. Touch Current Connections



2. Push [TOUCH] to start the test:
   - **Single test** - hold down the button and release it after the second beep, before you hear a third long beep
   - **Continuous test** - hold down the button and release it after you hear a third long beep

Continuous test only:

3. Push [TOUCH] to stop the test.
4. Push [MEM] to store the test result, if required.
5. Continue the test for all exposed metal parts on the appliance.

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.

Very low power appliances, or appliances with electronically controlled on/off switches or with an inductance, may fail this test. In this case, the symbol FAIL ✕ appears. To test these appliances you can skip the Fuse/L-N Loop Pre-test.

To perform the test on an appliance that does fail the Fuse/L-N Loop Pre-test:

1. Release [TOUCH].
2. Push [TOUCH] again before the FAIL ✕ indication is removed from the display (push as described in step 2 of the test procedure).

Note

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

Load/Leakage Current Test

⚠ 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 are passed before you do this test.

⚠ 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:

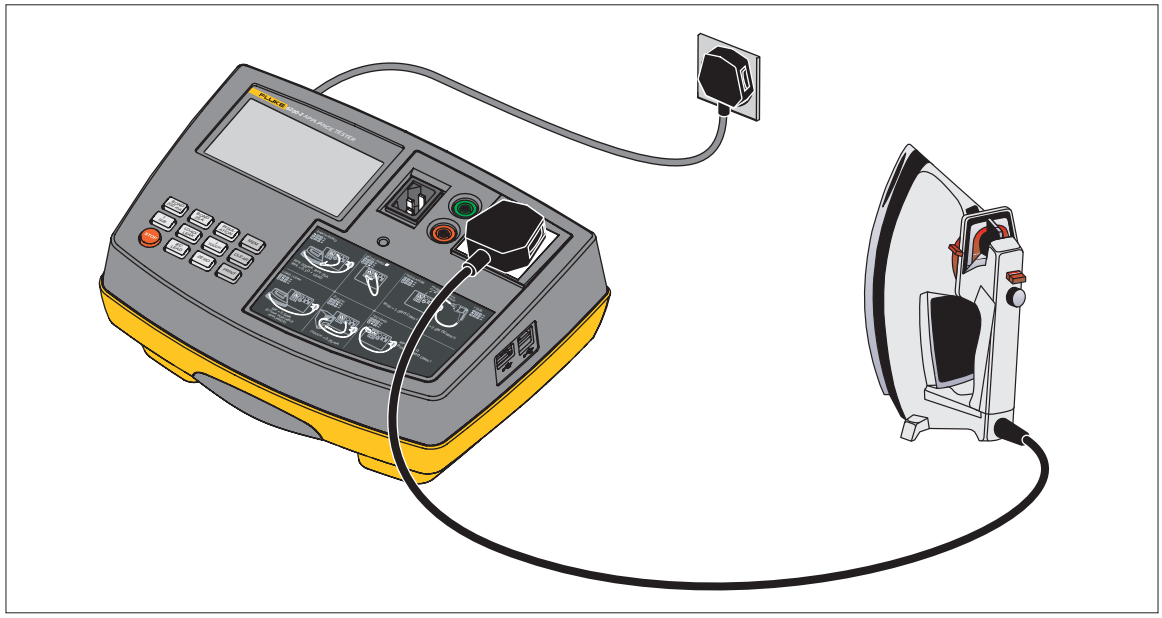
- a fuse and L-N loop pre-test.
- measurements of the appliance power consumption and load current at full mains voltage.
- measurement of the earth leakage current (differential measurement) at full mains voltage.

The measurements will be done in one test sequence.

To perform the Load/PE Leakage test:

1. Connect the appliance and the test lead as indicated on the Tester, see Figure 5.

Figure 5. Load/Leakage Connections



2. Push LOAD/LEAK to start the test:

- **Single test** - hold down the button and release it after the second beep, before you hear a third long beep.
- **Continuous test** - hold down the button and release it after you hear a third long beep.

Continuous test only:

3. Push LOAD/LEAK to stop the test.
4. Push MEM to store the test result, if required.

Note

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

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.

Very low power appliances, or appliances with electronically controlled on/off switches or with an inductance, may fail this test. In this case the symbol FAIL will appear.

To enable you to test these appliances you can skip the Fuse/L-N Loop Pre-test. To perform the test on appliances which fail the Fuse/L-N Loop Pre-test:

1. Release LOAD/LEAK.
2. Push LOAD/LEAK again before the FAIL indication is removed from the display (push as described in step 2 of the test procedure).

IEC Lead Test

The IEC lead test is for:

- Earth bond resistance.
- Insulation resistance Live-Neutral against earth.
- Live-Neutral lead/fuse continuity and polarity (UK and AU).

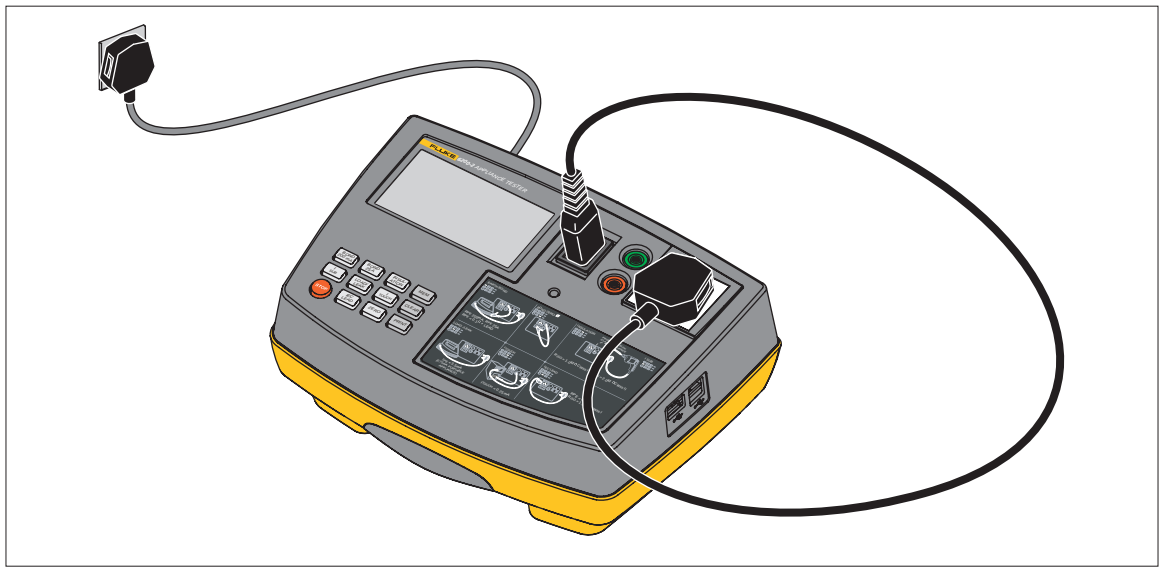
If there is a swapped polarity condition and a continuity failure in the same test, a failed polarity message displays.

You can use the EXTL100 adapter (optional accessory) to test extension leads.

To perform the IEC Lead test:

1. Connect the IEC lead as indicated on the Tester, see Figure 6.

Figure 6. IEC-Lead Test Connections



2. Push IEC LEAD to start the test.
   - The IEC Lead test is done only in the single test mode.
   - Earth bond, insulation, L-N open, L-N short and L-N polarity (UK and AU) results show on the display.
3. Push MEM to store the test result, if required.

Note

1. *In the case that an earth bond limit of >1 Ω or an insulation test limit of <2* MΩ *are met, the IEC Lead test is prevented.*
2. *In the case that an earth bond limit is met, but is <1 Ω, the symbol* FAIL *shows, and the complete IEC Lead test sequence is performed.*
3. *If the insulation test value falls below the limit of 1* MΩ *both symbols* **<1 MΩ CI** *and* **<2 MΩ CII** *show on the display.*

PELV Test

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

To perform the PELV test:

1. Push STOP to revert to the idle screen if it is not already shown.
2. Connect the test probe to the Tester PROBE PELV input and connect the appliance to a mains supply socket.
3. Apply the test probe to the test point.

   The display shows the test result. If PELV is above the acceptable limit, then >PEL VAC shows on the display instead of the mains voltage.

4. Push MEM to store the test result, if required.

Memory

The Tester has a non-volatile memory to save a minimum of 100 test results. The power-on screen shows a message if the memory is full or nearly full:

memory > 75→ Internal memory is nearly full (>75 %)

memory > → Internal memory is completely full

If one of these messages is shown you should print the stored test results (see *Print Test Results*) and then clear the store.

Save Test Results

Note

The test continues to save the result while in the continuous test mode.

To save a test result to memory, push MEM. The display shows the number that has been assigned to the record for 2 seconds, for example **memory** 5, then:

- It reverts to the idle screen if a test was finished.
- In the continuous test mode, it shows the next result.
- If you push MEM again while the record number shows, the result will not be stored.
- If you store a result in the continuous test mode during the test, the displayed result is stored without a test interruption.
- If you push MEM in the continuous test mode before a new result is available, the display shows **memory** 0 and the beeper sounds twice.
- If the result cannot be saved because the memory is full, you must clear the memory, repeat the test, and then store the result.

Clear Memory

The clear function clears all memory locations. It is disabled during any appliance test.

If you want to preserve the results, print the results before you clear the memory.

To clear the memory, hold CLEAR for more than 5 seconds. The display shows the progress. If a double beep sounds, the clear action was incomplete.

Print Test Results

The print function prints all the stored results (first to last) to the optional Fluke printer. Printing is disabled during any appliance test.

To print the results:

1. Connect the printer to the Tester USB type A connector.
2. Push PRINT to start printing. The display shows the progress.

If the beeper sounds, and is turned off when you push PRINT, the Tester could not find the printer. In this case, the idle screen does not show .

If printing fails:

- Verify that the Fluke printer is connected to the Tester and that the printer power is on.
- Verify that you used the correct USB port.
- Verify that the printer dip-switch settings are in the default position (see Fluke printer Users Guide).

Maintenance

There are no user replaceable parts in the Tester.

⚠⚠ 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.**

How to Clean

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. Periodically zero the earth bond test (see *Tester Setup*).

Calibration

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

Accessories

Table 8 and Table 9 list the part numbers of the accessories.

To order the accessories contact your local Fluke representative (see *Contact Fluke*).

Table 8. Standard Accessories

Item	Part Number
Alligator (Crocodile) Clip	2407510
Test probe for touch current	1276841
Users Manual[1] (this manual)	
[1] Can be downloaded from your regional Fluke website, start at www.fluke.com.	

Table 9. Optional Accessories

Item	Part Number
Printer	4325128
EXTL100 Extension Lead Test Adapter	2414348
TA700 Appliance Adapter for 110V tools	2389678
6200/6500 Accessory Kit	3833611

Specifications

General Specifications

Size (LxWxH) ..... 200 mm x 275 mm x 114 mm
Weight ..... 3.13 kg
Power Supply ..... 230 V + 10 % to -15 %, 50 Hz ±2 Hz
Power consumption (Tester) ..... 13 W typical (idle) 60 W maximum
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 ..... IP-40 (enclosure), IP-20 (connectors)

Electromagnetic Compatibility ..... IEC 61326-1: Basic 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, 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 MΩ // 2.2 nF
Maximum Input Mains Voltage ..... 264 V

Earth Bond Test (R_{PE})

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
UK, NL, AU ..... 25 A ac ±20 % into 25 mΩ at 230 V
DE ..... 10 A ac ±10 % into 0 Ω 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 (R_{ISO})

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 19.99 MΩ)
0.1 MΩ (20.0 MΩ to 99.9 MΩ)
1 MΩ (100 MΩ to 299 MΩ)
Test Voltage ..... 500 V dc -0 % + 25 % at 500 kΩ load
Test Current ..... >1 mA at 500 kΩ load, <15 mA at 0 Ω
Auto discharge time ..... <0.5 s for 1 µF
Max. Capacitive Load ..... operational up to 1 µF

Substitute Leakage Current Test (I_{SUB})

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), <3.5 mA at 0 Ω

Touch Current Test (I_{TOUCH})

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 ..... 0.0 VA to 3.2 kVA
- AU ..... 0.0 VA to 2.4 kVA
- DE, NL ..... 0.0 VA to 3.7 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 (I_{PE})

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.

IEC Lead Test

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

PELV Test

Display ..... "> PEL" indicator only
Accuracy at 50 Hz ..... ±(2 % + 3 counts)
Overload protection ..... 300 Vrms
Warning threshold ..... 25 Vrms

Test Limits for PASS result

	UK	AU	DE	NL
Earth Bond 200mA	<0.10 Ω	<1.0 Ω	<0.30 Ω	<0.30 Ω
Earth Bond 25A	<0.10 Ω	<1.0 Ω	NA	<0.30 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

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 %