



KTS1625

Digital Multifunction Tester

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Users Manual



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Digital Multifunction Tester

Users Manual

English

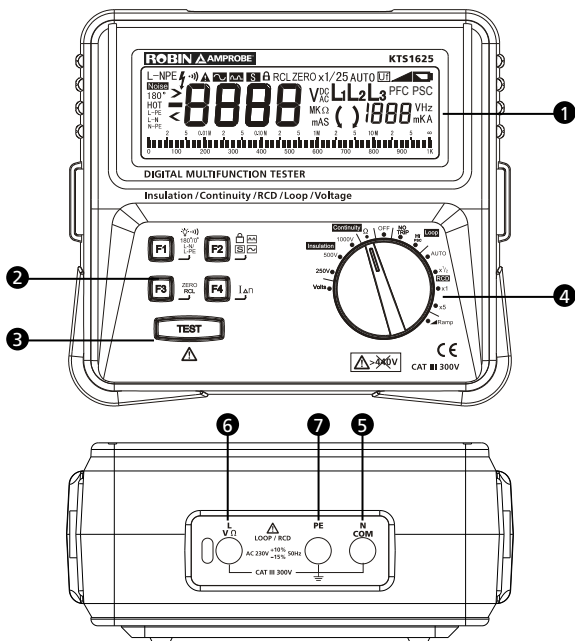
Limited Warranty and Limitation of Liability

Your Amprobe product will be free from defects in material and workmanship for 1 year from the date of purchase, unless local laws require otherwise. This warranty does not cover fuses, disposable batteries or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Amprobe's behalf. To obtain service during the warranty period, return the product with proof of purchase to an authorized Amprobe Test Tools Service Center or to an Amprobe dealer or distributor. See Repair Section for details. THIS WARRANTY IS YOUR ONLY REMEDY. ALL OTHER WARRANTIES - WHETHER EXPRESS, IMPLIED OR STATUTORY - INCLUDING IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, ARE HEREBY DISCLAIMED. MANUFACTURER SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

Repair

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

KTS1625 Digital Multifunction Tester



① LCD Display

② Function Buttons (F1, F2, F3, F4)

F1: Display Backlight

Continuity Buzzer

0° or 180° phase selection for RCD test

L - N or L - PE loop test

F2: Lock Test

RCD 30s count-down test

Sine wave selection for RCD test

Half-wave selection for RCD test

F3: Test Lead resistance zero

Test data recall for RCD Auto Test

F4: IΔn selection for RCD Test

③ Test Button

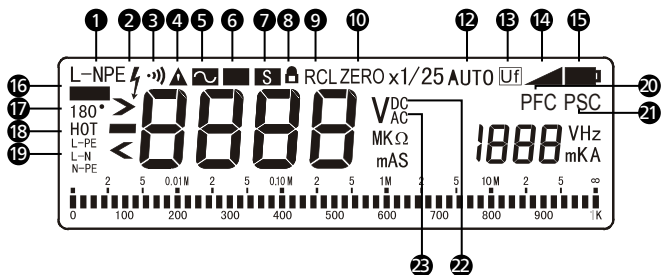
④ Rotary Switch

⑤ COM / N Terminal(Black)

⑥ L / V / Ω Terminal(Red)

⑦ PE terminal(Green)

Screen Display



- 1 L – N or L – PE Loop Test
- 2 Presence of Hazardous Voltages
- 3 Continuity Buzzer
- 4 Over-temperature! Allow the Tester to cool down
- 5 Sine wave signal (AC Current)
- 6 Half-wave Signal
- 7 30s Count-down Test
- 8 Test Lock for Continuous Measurement
- 9 Test Data Recall For RCD Auto Test
- 10 Test Lead Resistance Zero
- 11 RCD Test at X1/2, X1, X5
- 12 RCD Auto Test
- 13 Fault Voltage Between N and PE Conductor Exceeds 50V
- 14 RCD Ramp Test
- 15 Low Battery Indicator
- 16 Noise Between N and PE Conductor
- 17 RCD Test Phase Selection 0° / 180°
- 18 Over-temperature! Allow the Tester to cool down
- 19 Wiring correction Check for Loop and RCD Test
- 20 Prospective Earth Fault Current
- 21 Prospective Short-Circuit Current
- 22 DC Voltage
- 23 AC Voltage

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SYMBOLS

	Caution ! Risk of electric shock.
	Caution! Refer to the explanation in this Manual
	The equipment is protected by double insulation or reinforced insulation
	Do not use in distribution systems with voltages higher than 440V
	Earth (Ground)
	Battery
	Complies with European Directives
	Do not dispose of this product as unsorted municipal waste. Contact a qualified recycler.

SAFETY INFORMATION

The Meter complies with:

EN 61010-1 3rd Edition, Category III 300 Volts, Pollution degree 2, IP40 as per EN 60529

EN 61010-2-030

EN 61010-2-31 for test leads

EMC EN 61326-1

EN 61557-1/-2/-3/-4/-6/-10

Measurement Category III (CAT III) is for measurements performed in the building installation. Examples are measurements on distribution boards, circuit-breakers, wiring, including cables, bus-bars, junction boxes, switches, socket-outlets in the fixed installation, and equipment for industrial use and some other equipment, for example, stationary motors with permanent connection to the fixed installation.

CENELEC Directives

The instruments conform to CENELEC Low-voltage directive 2006/95/EC and Electromagnetic compatibility directive 2004/108/EC

Warning: Read Before Using

- *To avoid possible electrical shock or personal injury, follow these instructions and use the Meter only as specified in this manual.*
- *Do not use the Tester or test leads if they appear damaged, or if the Meter is not operating properly. If in doubt, have the Tester serviced.*
- *Always use the proper function and range for measurements.*
- *Before rotating the function range selection switch, disconnect test probe from circuit under test.*
- *Verify the Tester's operation by measuring on a known voltage source.*
- *Do not apply more than the rated voltage, as marked on the Tester, between the test probe or between any test probe and earth ground.*
- *Use the Tester with caution for voltages above 30 Vac rms, 42 Vac peak, or 60 Vdc. These voltages pose electrical shock hazards.*
- *Disconnect circuit power and discharge all high-voltage capacitors before testing insulation resistance and continuity.*
- *Do not use the Tester around explosive gas or vapor.*
- *When using the test leads, keep your fingers behind the finger guards.*
- *Remove test leads from the Tester and turn off the Tester before opening the Tester case or battery door.*
- *Do not use in distribution systems with voltages higher than 440V AC or DC.*
- *Follow the operating manual at all times when using the Tester and have the operating manual in an easily accessible place.*
- *Incorrect operation will cause incident and damage to the Tester.*
- *Before and after testing, confirm that no hazardous voltage at the terminals presents.*

UNPACKING AND INSPECTION

Your shipping carton should include:

- 1 KTS1625 Digital Multifunction Tester
- 1 3-Wire Mains Test Cord Set
- 1 Test Lead set (Red, Black, Green)
- 1 Test Probe set (Red, Black, Green)
- 1 Alligator clip set (Red, Black, Green)
- 1 Red Test probe with Remote Test Button
- 8 1.5V alkaline AA battery
- 1 Users manual
- 1 Strap
- 1 Carrying case

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

FEATURES

Safety and performance are two most critical requirements for every electrical system. The quality of insulation, properly working grounding system and active protection are “must have” to assure safety of the people, electrical systems and buildings against electrocution, fire, and other equipment damage. They are critical to prevent loss of productivity due to power interruption.

Robin-Amprobe KTS1625 is a multifunction installation tester measuring various parameters of the electrical system to provide complete safety analysis. It features loop impedance measurements as well as measurement of continuity and insulation resistance of motors, transformers or wires, testing of RCD systems, measuring voltage and frequency.

- **Insulation Resistance Functions:**

- Tests insulation of wires, cables, transformers and electrical motors
- Selectable test voltages 250V, 500V and 1000V
- Test button lock for dielectric absorption ration test
- Automatic discharge of test object after completion of measurement

- **Continuity Functions:**
 - Earth continuity @ 200mA
- **Line / Loop Impedance Functions:**
 - Prospective Fault Current
 - Prospective Short-Circuit current
- **RCD Functions:**
 - Phase switch selection 0° and 180° for positive and negative semi-cycle testing
 - RAMP Slope measurement
 - 30 Seconds Countdown Measurement
 - RCD Half-Wave test
 - Auto RCD test
- Designed to allow testing to BS7671 IEE 17th Edition regulations
- Voltage and Frequency Measurements
- Instant correct wiring status check
- Dual measurement result display
- Large, backlit display
- Low Battery Indication
- Safety CAT III 300V

MAKING MEASUREMENT



1. Use the proper function and range for measurements.
2. To avoid possible electrical shock, personal injury or damages to the Tester, disconnect circuit power and discharge all high-voltage capacitors before testing insulation resistance and continuity.
3. Connecting test leads:
 - Connect PE test lead (green) to the circuit before connecting the live leads;
 - After measurement, remove live leads before removing PE test lead from the circuit

Rotary Switch Positions

Switch Position		Measurement Function
Volts		AC Voltage / Frequency measurement.
Insulation	250V	Insulation Resistance at DC 250V.
	500V	Insulation Resistance at DC 500V.
	1000V	Insulation Resistance at DC 1000V.
Continuity	Ω	Continuity measurement.
Loop	NO TRIP	L – PE(PSC) or L – N(PFC) Loop impedance NO TRIP mode
	Hi PSC	L – PE Loop Impedance and Prospective Short-Circuit Current
RCD	Auto	Automatic tripping test for unknown RCD.
	X ½	Non-Tripping RCD test.
	X 1	Tripping RCD test.
	X 5	Fast tripping RCD test.
	Ramp	Ramp Test, 50%~110% Default nominal residual currents ($I\Delta n$). Increasing by 10%, total 7 steps of residual current.

Function Buttons

TEST Button

Press TEST button to begin selected measurement function on the rotary switch.

F1 Button

	Press > 2 sec to turn the display backlight on or off.
	Insulation resistance < 2M Ω buzzer will sound. Continuity test < 20 Ω buzzer will sound.
180°/0°	RCD test phase selection (0 or 180 degrees).
L-N/L-PE	Loop Impedance (L-PE) or Line Impedance (L-N) measurement for NO TRIP mode.

F2 Button

	"Test Lock" for continuous measurement. Press F2 to enable Test Lock mode ( symbol is shown on the screen) and press TEST button for continuous measurement. Under Test Lock mode, TEST button will hold for Dielectric Absorption Ratio Test (DAR) purpose. DAR value can be calculated by $\text{Riso}(1\text{min})/\text{Riso}(30\text{s})$. To exit Test Lock mode, press F2 or turn rotary switch to another function position.
	Selective mode. A 30 second time delay.
	AC current to test type AC (standard AC RCD).
	Half-wave current to test type A (pulse-DC sensitive RCD).
Press F2 to select the RCD test-current waveform:	
 	Delayed response to test S-type AC (time delayed AC RCD)
	Half-wave current to test type A (pulse-DC sensitive RCD)
 	Delayed response to S-type A (time delayed pulse-DC sensitive RCD)
	AC current to test type AC (standard AC RCD)

F3 Button

ZERO	Test Lead / Probe Zeroing. Press F3 to zero the test lead / probe. Can subtract up to 10Ω of lead resistance. Buzzer audio warning sound for lead resistance $>10\Omega$. Error message and buzzer audio sound for resistance $>10\Omega$.
RCL	Data recall for RCD Auto test. Press F3 to scroll the test results.

F4 Button

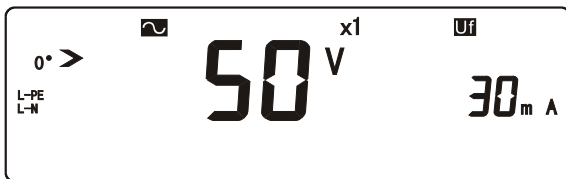
Press F4 to select $I_{\Delta n}$ (RCD current rating 10, 30, 100, 300, or 500 mA).

Error message display

1. **Over-temperature:** wait while the temperature cools down for next measurement



2. **Fault Voltage:** Check voltage between N and PE conductor.



Measuring AC Voltage



- To avoid personal injury or damage to the tester, do not apply voltage higher than 440V.
- Connecting test leads:
 - Connect COM test lead (black) to the circuit before connecting the live leads;
 - After measurement, remove live leads before removing COM test lead from the circuit

To measure voltage and frequency:

1. Turn the rotary switch to Volts position.
2. Use red and black (V – COM) terminals for this test. You can use test leads or 3-wire mains test cord when measuring AC voltage.
The primary display shows the Voltage.
The secondary (smaller digits on the right side) display shows the Frequency.

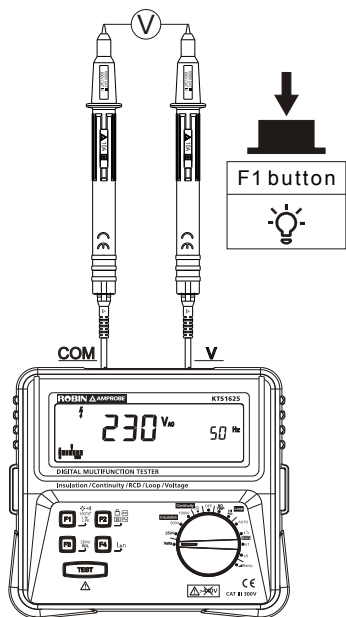


Figure 1: Measuring AC voltage by test leads

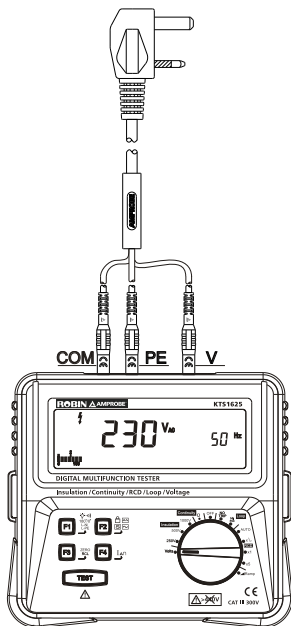


Figure 2: Measuring AC voltage by 3-wire mains test cord

Measuring Insulation Resistance



- Make sure disconnecting circuit power and de-energize the circuit before test.
- When measuring insulation resistance, make sure test leads are separated and are not twisted together.
- Do not short circuit two test leads when output DC voltage presents at the output terminals.
- Do not measure insulation resistance at live high voltage circuit.
- Do not carry out measurement when the battery compartment is open or accessible.

- When the measurement is completed, do not touch the circuit as the circuit may store energy, which may cause electric shock. Allow time for circuit to discharge
- Warning buzzer will sound when the Tester detects a voltage >30Vac or dc. Display shows ⚡ symbol and the detected voltage.

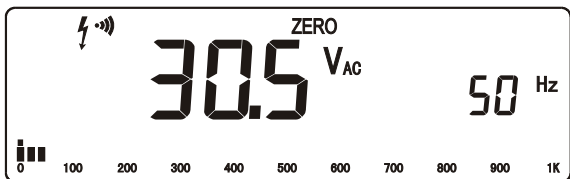


Figure 3: Tester detects a voltage >30Vac

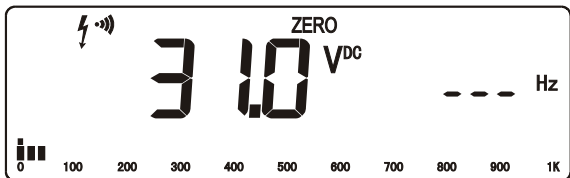


Figure 4: Tester detects a voltage >30Vdc

To measure voltage and frequency:

1. Turn the rotary switch to Insulation position (250V, 500V, or 1000V).
2. Use the red and black (L – N) terminals for this test with test leads.
3. Press F1 to activate ⚡, buzzer will sound when resistance < 2MΩ.
4. Press F2 to activate Test Lock mode for continuous measurement.

Note: Testing is inhibited if voltage is detected in the circuit under measurement.

5. Press TEST button to begin measurement.
The primary display shows the insulation resistance.
The secondary (smaller digits on the right side) display shows the actual test voltage.

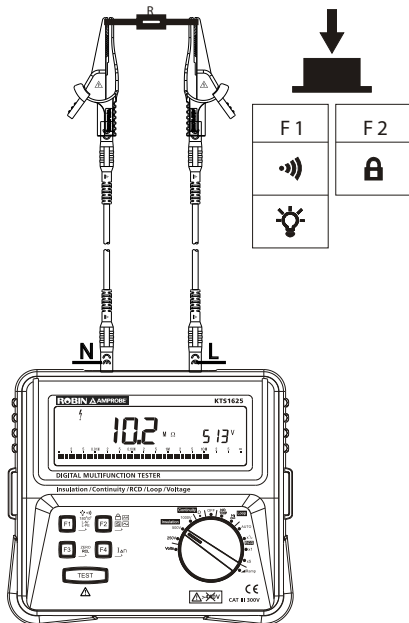


Figure 5: Measuring insulation resistance

Measuring Continuity



- Disconnect circuit power and de-energize the circuit before test.
- Do not measure continuity at live high voltage circuit.
- Do not carry out measurement when the battery compartment is open or accessible.
- Warning buzzer will sound when the Tester detects a voltage >30Vac or dc. Display shows ⚡ symbol and the detected voltage.

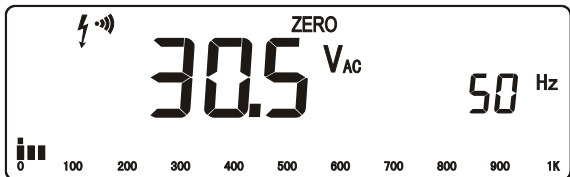


Figure 6: Tester detects a voltage >30Vac

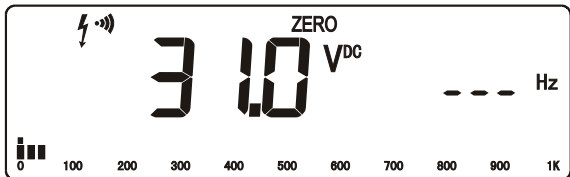


Figure 7: Tester detects a voltage >30Vdc

To measure continuity:

1. Turn the rotary switch to Continuity position.
2. Use the red and black (Ω – COM) terminals for this test with test leads.
3. Before making a continuity measurement, use ZERO function to zero the test leads.

Test lead resistance zeroing:

Step 1: Connect test leads to Ω and COM terminals and short-circuit the test leads/probes.

Step 2: Press and hold F3 (ZERO) button. The measured resistance of the test leads is shown on the primary display until a beep is heard and the ZERO annunciator appears. When Display shows 0.00 Ω , test lead resistance zero is complete.

The tester measures test leads / probe resistance, stores the reading in memory, and subtracts it from readings. The resistance value of test leads / probe is saved even when the Tester is switched off. When the next time you switch on the Tester, you do not need to repeat test lead / probe zeroing step every time you use the Tester. When using a different set of test leads / probes, zeroing has to be repeated.

Note: The ZERO function can subtract up to 10 Ω of lead resistance. Warning buzzer audio sound for lead resistance >10 Ω .

4. Press TEST button

The primary display shows the continuity resistance.

The secondary (smaller digits on the right side) display shows the actual output DC voltage.

When $\cdot)))$ symbol on screen, buzzer threshold $\leq 20\Omega$

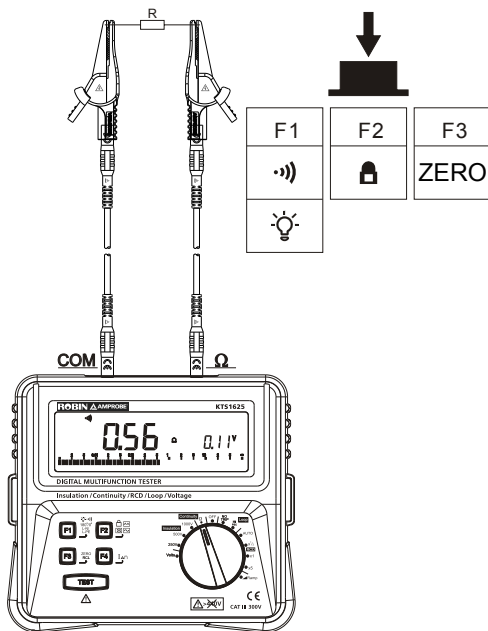


Figure 8: Measuring continuity

Measuring Loop Impedance



- The Tester is designed for measurement on single phase system only – AC 230V, 50Hz (operating voltage range: AC 230V +10%/-15%, 50Hz).
- Make sure the wiring is correct and the ground wire is reliably connected earth. The tester displays symbols of "L-PE", "L-N" and "N-PE" to indicate the correct wiring connections. Blinking of symbols "L-PE" or "L-N" or "N-PE" indicates incorrect wiring.
- Make sure the grounding of the socket-outlet is connected to Earth. The symbol of "L-PE" and "N-PE" on the display means grounding wire is not connected to earth or not well-connected to earth.
- When measuring the loop impedance/prospective short-circuit current, make sure line and neutral wires are connected correctly. Pay attention to the wiring symbols on display.
- Use Volts function to check the circuit voltage before the measurement.
- "HOT" symbol on screen indicates over-temperature. Allow time for the Tester to cool down for next measurements.

Connecting to the circuit

Correct wiring: "L-PE" and "L-N" symbols are displayed – proceed to test

Incorrect wiring: when wiring symbols are blinking on display – STOP!
Check the wiring connections.

- "L-PE" and "L-N" symbols blinking indicate missing L wiring connection or incorrect wiring of line conductor
- "L-PE" and "N-PE" symbols blinking indicate missing PE wiring connection or incorrect wiring of PE conductor
- "L-N" and "N-PE" symbols blinking indicate missing N wiring connection or incorrect wiring of N conductor

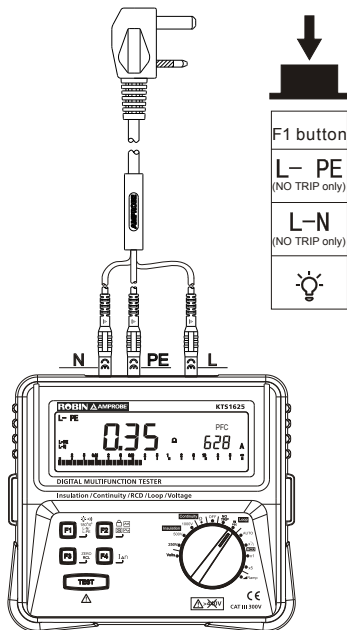


Figure 9: Measuring Loop by 3-wire mains test cord

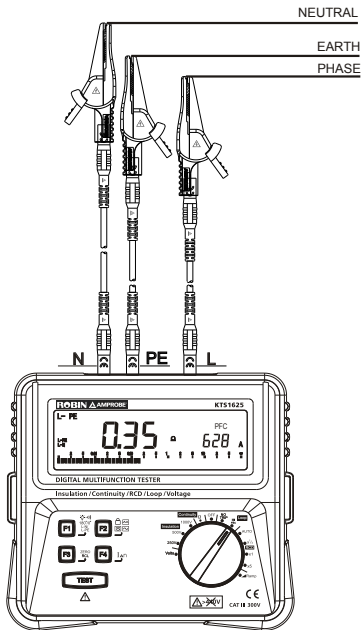


Figure 10: Measuring Loop by test leads

Loop Impedance (Line to Protective Earth L-PE)

To measure L-PE loop impedance:

1. Turn the rotary switch to Hi PSC position.
2. Use the red, green and black (L – PE – N) terminals for this test. You can use test leads or mains test cord when measuring loop impedance. Check the signs of wiring connection before proceeding test.
3. Press TEST button
 - The primary display shows the L-PE loop impedance.
 - The secondary (smaller digits on the right side) display shows PEFC.

Measuring loop impedance NO TRIP mode:

To prevent tripping RCDs in the circuit:

- Use the NO TRIP function for loop measurements.
- An RCD with a nominal fault current of 15mA or above will trip.

To measure L-PE loop impedance NO TRIP mode:

1. Turn the rotary switch to NO TRIP position. L-PE symbol on the screen (upper-left corner) indicates L-PE loop impedance.
2. Use the red, green and black (L – PE – N) terminals for this test. You can use test leads or mains test cord when measuring loop impedance. Check the signs of wiring connection before proceeding test.
3. Press TEST button
The primary display shows the L-PE loop impedance.
The secondary (smaller digits on the right side) display shows PFC.

To measure L-N loop impedance NO TRIP mode:

1. Turn the rotary switch to NO TRIP position.
2. Press F1 button to select L-N loop impedance measurement. L-N symbol displays on the screen (upper-left corner).
3. Use the red, green and black (L – PE – N) terminals for this test. You can use test leads or mains test cord when measuring loop impedance. Check the signs of wiring connection before proceeding test.
4. Press TEST button
The primary display shows the L-N loop impedance.
The secondary (smaller digits on the right side) display shows PSC.

Measuring RCD Tripping Time



- The Tester is designed for measurement on single phase system only – AC 230V, 50Hz (operating voltage range: AC 230V +10%/-15%, 50Hz).
- Any test and measurement procedures in circuits equipped with residual current devices should only be performed after having consulted the operator terminals (data processing systems, material processing, motors, etc.).
- Equipment, which is connected downstream of a residual current protective device (RCD) may cause a considerable extension of the operating time. Examples of such equipment might be connected capacitors or running motors.
- The protective earth must be free of external voltage for the RCD test. However if an extraneous voltage is present (>50V fault voltage), the

Tester indicates >50V Uf having been generated by the measurement. The measurement interruption caused by excess of Uf is only generated by the actual voltage present between the neutral conductor (N) and the protective earth (E).

- Time-delayed residual current devices trip at nominal residual current within 130...500ms, for double nominal fault current within 60...200ms.
- Such RCDs are implemented as main residual current protection devices (please refer to IEC 61008-1) and are marked with the symbol " S ".
- At a measuring circuit without probe, available voltages between PE and earth can influence the measurement.
- Before using the N-conductor as probe check that all neutral points have low ohm resistance to the main neutral line. A available voltage of the N conductor to the earth can influence the measurement.
- The measuring function uses the N-conductor as a probe. Check first the connection between the neutral point of the distribution system and earth before the test is started. A possible voltage between the N-conductor and earth may influence the measurements.
- Leakage currents in current circuits following the RC circuit breaker may have an influence on the test as well as a voltage between protective conductor or neutral conductor and ground.
- Attached loads or operating supplies which contains capacitors or circulating machines can elongate the trip time.
- Measurements may be influenced by potential fields of other grounding systems.
- Measurements must be carried out in compliance with the respectively valid standards and regulations.
- Make sure the wiring is correct and the ground wire is reliably connected earth. The tester displays symbols of "L-PE", "L-N" and "N-PE" to indicate the correct wiring connections. Blinking of symbols "L-PE" or "L-N" or "N-PE" indicates incorrect wiring.

Connecting to the circuit

Correct wiring: "L-PE" and "L-N" symbols are displayed – proceed to test

Incorrect wiring: when wiring symbols are blinking on display – STOP!

Check the wiring connections.

- "L-PE" and "L-N" symbols blinking indicate missing L wiring connection or incorrect wiring of line conductor

- “L-PE” and “N-PE” symbols blinking indicate missing PE wiring connection or incorrect wiring of PE conductor
- “L-N” and “N-PE” symbols blinking indicate missing N wiring connection or incorrect wiring of N conductor

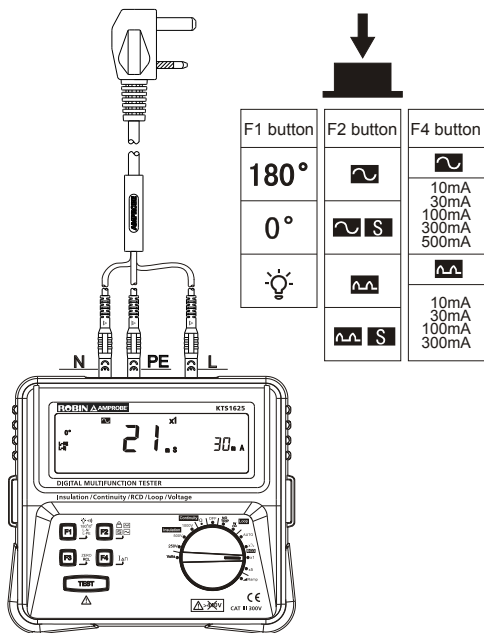


Figure 11: Measuring RCD trip time by 3-wire mains test cord

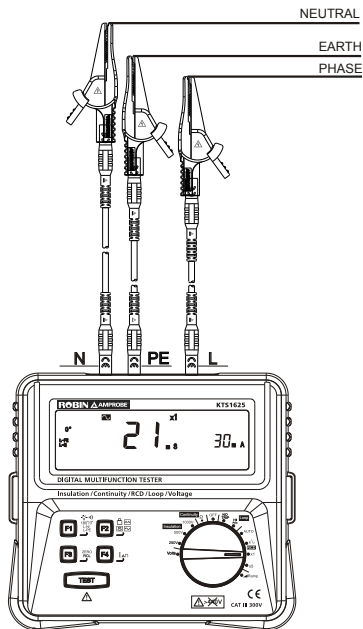


Figure 12: Measuring RCD trip time by test leads

To perform Auto RCD test:

1. Turn the rotary switch to AUTO position.
2. Use the red, green and black (L – PE – N) terminals for this test. You can use test leads or mains test cord when measuring loop impedance. Check the signs of wiring connection before proceeding test.
3. Press F4 button to select tripping current

	10mA, 30mA, 100mA
	10mA, 30mA

4. Press F2 to select waveform or selective mode (a 30 second time delay)

 	Delayed response to test S-type AC (time delayed AC RCD)
	Half-wave current to test type A (pulse-DC sensitive RCD)
 	Delayed response to S-type A (time delayed pulse-DC sensitive RCD)
	AC current to test type AC (standard AC RCD)

5. Press TEST button

Auto RCD test automatically performs a sequence of 6 RCD trip time tests with a single press on TEST button.

Auto RCD test sequence:

$\frac{1}{2}I_{\Delta n} / 0^\circ \rightarrow \frac{1}{2}I_{\Delta n} / 180^\circ \rightarrow I_{\Delta n} / 0^\circ \rightarrow I_{\Delta n} / 180^\circ \rightarrow 5I_{\Delta n} / 0^\circ \rightarrow 5I_{\Delta n} / 180^\circ$

Each time the RCD trips, re-set RCD to continue unfinished the test sequence until the whole sequence is completed.

When AUTO test is completed, "RCL" symbol is displayed on screen. Press F3 to display the measurement results. The measurement result is displayed in the order of the test sequence. Press F3 again to show the next measurement result.

To measure RCD tripping time (X1/2, X1, X5):

1. Turn the rotary switch to the desired test current multiplier (X1/2, X1 or X5) position.

Normally X1 is used for this test.

X1/2 for non-tripping test. RCD shall not open.

X1 for tripping test. RCD shall open.

X51 for fast tripping test. RCD shall open.

2. Use the red, green and black (L – PE – N) terminals for this test.
You can use test leads or mains test cord when measuring loop impedance. Check the signs of wiring connection before proceeding test.
3. Press F4 button to select tripping current

X1/2, X1	
	10mA, 30mA, 100mA, 300mA, 500mA
	10mA, 30mA, 100mA, 300mA

X5	
	10mA, 30mA, 100mA
	10mA, 30mA

4. Press F1 button to select test current phase 0° or 180°.
5. Press F2 button to select waveform or selective mode

 	Delayed response to test S-type AC (time delayed AC RCD)
	Half-wave current to test type A (pulse-DC sensitive RCD)
 	Delayed response to S-type A (time delayed pulse-DC sensitive RCD)
	AC current to test type AC (standard AC RCD)

6. Press TEST button
The primary display shows the L-PE loop impedance.
The secondary (smaller digits on the right side) display shows PFC.

To perform RAMP test:

1. Turn the rotary switch to RAMP position.
2. Use the red, green and black (L – PE – N) terminals for this test. You can use test leads or mains test cord when measuring loop impedance.
Check the signs of wiring connection before proceeding test.
3. Press F4 button to select tripping current
4. Press F2 to select waveform or selective mode
5. Press TEST button

Using Test Probe with Remote Test Button

This test probe with remote test button allows users to perform measurement by pressing TEST button on the probe when both hands are holding test probes during measurement.

Below measurements can be made by using the test probe with remote test button:

- Continuity
- Insulation resistance

⚠ WARNING

Follow the instructions in "Measuring Insulation Resistance" section and "Measuring Continuity" section before marking measurements.

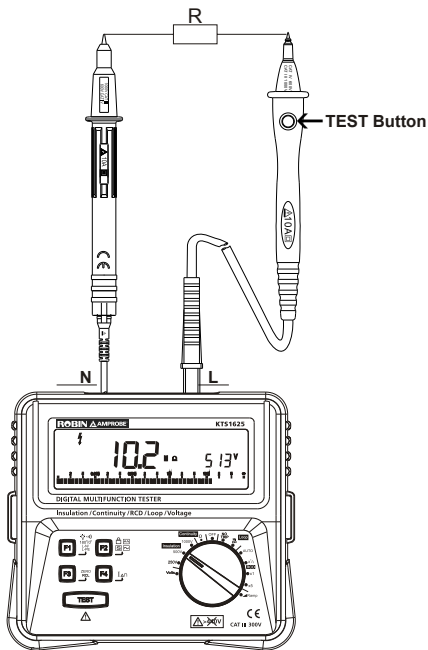


Figure 13: Testing with test probe with remote test button

SPECIFICATION

Ambient temperature: 23°C $\pm$ 5°C (73.4°F $\pm$ 9°F); Relative temperature: $\leq$ 75%

Accuracy: $\pm$ (% of reading + LSD)

Display: maximum reading is 9999.

Over-range indication: maximum reading

Operating Condition: 0°C to +40°C, <85% Relative Humidity

Storage Condition: -20°C to +60°C, <90% Relative Humidity

Dimension (L x W x D): 189 x 167 x 85mm (7.43 x 6.65 x 3.35in)

Weight: approx. 1.3 kg (2.87 lb) with batteries installed

Low Battery warning indication: "  "

Power Supply: Alkaline Battery 1.5V (AA Battery or equivalent) x 8pcs

The number of possible tests with a fresh set of batteries is >1000.

Fault Voltage detection: 50Vrms.

AC Voltage Measurement

Range	Resolution	Accuracy	Overload Protection
0 – 400V	1V	$\pm$ (5% Rdg +2 LSD) @ 45 – 65Hz	440Vrms

Insulation Resistance Measurement

DC Test Voltage	Resolution	Test Current	Accuracy
250V	1V	$\geq$ 1mA@ 0.25M Ω	0 to +10%
500V		$\geq$ 1mA@ 0.5M Ω	
1000V		$\geq$ 1mA@ 1M Ω	

Measuring Range (auto ranging)	Resolution	Accuracy
0.00M Ω – 9.99M Ω	0.01M Ω	$\pm$ (5% Rdg + 5 LSD)
10.0M Ω – 99.9M Ω	0.1M Ω	
100M Ω – 1999M Ω	1M Ω	

Note: Buzzer threshold: 2M Ω

Live circuit detection: >30Vac or dc

Continuity Measurement

Range (Auto ranging)	Range	Test Voltage	Accuracy
1.99Ω	0.01Ω	>4Vdc	± (2% Rdg +5 LSD)
19.9Ω	0.1Ω	>4Vdc	
199Ω	1Ω	>4Vdc	

Note: Measuring current (short-circuited) ≥ 200mA

Nominal open-circuit output voltage: 5Vdc

Buzzer threshold: 20Ω

Live circuit detection: >30Vac or dc

Test probe zeroing: can subtract up to 10Ω of lead resistance.

Loop Impedance Measurement

Operating Rated Voltage: 195 – 253Vac, 45 – 65Hz

Range	Resolution	Accuracy
Line Impedance (L-N) @25A	0.01Ω - 1.99Ω 2.0Ω - 19.9Ω 20Ω - 2000Ω	± (5% Rdg +5 LSD)
Loop Impedance (L-PE) @25A	0.01Ω - 1.99Ω 2.0Ω - 19.9Ω 20Ω - 2000Ω	± (5% Rdg +5 LSD)
Loop impedance without tripping @15mA	1.00Ω - 1.99Ω 2.0Ω - 19.9Ω 20Ω - 2000Ω	± (5% Rdg +12 LSD + Noise Margin (1.00 - 1.99Ω))
Prospective Short Circuit Current @25 A	0.00A~1.99A 2.0A~19.9A 20A~199A 200A~1.99kA 2.0kA~26kA	PSC accuracy derived from measured loop impedance specification and measured voltage specification
Prospective Earth Fault Current @25 A	0.00A~1.99A 2.0A~19.9A 20A~199A 200A~1.99kA 2.0kA~26kA	PFC accuracy derived from measured loop impedance specification and measured voltage specification

RCD Measurement

Operating Rated Voltage: 195 – 253Vac, 45 – 65Hz

Function		RCD Test Current Selection					Accuracy
		10mA	30mA	100mA	300mA	500mA	
RCD AUTO test		✓	✓	✓			0% to +10% at X1 and X5
		✓	✓				-10% to 0% @ 1/2X
RCD RAMP test		✓	✓	✓	✓	✓	50%~110% Default nominal residual currents (I _{Δn}). Increasing by 10%, total 7 steps of residual current.
		✓	✓	✓	✓	✓	
X1/2		✓	✓	✓	✓	✓	-10% to 0%
		✓	✓	✓	✓	✓	
X1		✓	✓	✓	✓	✓ 1)	0% to +10%
		✓	✓	✓	✓	✓ 1)	
X5		✓	✓	✓			0% to +10%
		✓	✓	✓			
Note: 1) Selective mode only.							

Function	RCD type *	Tripping Time Measurement Range	Accuracy
X1/2	G	2000ms	± (2% Rdg +2 LSD)
X1/2	S	2000ms	
X1	G	300ms	
X1	S	500ms	
X5	G	40ms	
X5	S	40ms	

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

EN 61557 Measurement Range

Function	Display Range	EN 61557 Measurement Range Operating Error	Nominal Values
Volts EN 61557-1	100Vac – 400Vac, 45Hz – 65Hz	10Vac – 400Vac, 45Hz – 65Hz $\pm(5\% + 2 \text{ LSD})$	$U_N = 230\text{Vac}$ $f = 50\text{Hz}$
Insulation EN 61557-2	0.05M Ω - 1000M Ω	0.25M Ω - 1000M Ω $\pm(5\% + 5 \text{ LSD})$	$U_N = 250/500/1000\text{Vdc}$ $I_N = 1.0\text{mA}$
Loop EN 61557-3	Hi Current 0.01 Ω - 2000 Ω	0.5 Ω - 2000 Ω $\pm(5\% + 5 \text{ LSD})$	$U_N = 230\text{Vac}$ $f = 50\text{Hz}$ $I_k = 26\text{kA}$
	NO TRIP 1 Ω - 2000 Ω	1 Ω - 2000 Ω $\pm(5\% + 12 \text{ LSD})$	
Continuity EN 61557-4	0.00 Ω - 199 Ω	0.2 Ω - 199 Ω $\pm(2\% + 5 \text{ LSD})$	$U_0 = 5\text{Vdc (typical)}$ $I_N \geq 200\text{mA}$
$\Delta T, I\Delta_N$ EN 61557-6	ΔT 0ms – 2000ms	20ms – 2000ms $\pm(2\% + 2 \text{ LSD})$	$\Delta T = 10/30/100/300/500\text{mA}$
	$I\Delta_N$ 10mA / 30mA / 100mA / 300mA / 500mA	10mA / 30mA / 100mA / 300mA / 500mA $\pm(10\% + 2 \text{ LSD})$	$I\Delta_N = 10/30/100/300/500\text{mA}$

MAINTENANCE AND REPAIR

If the Tester fails to operate, check battery, test leads, etc., and replace as necessary.

Double check the followings:

1. Check the battery. Replace the battery immediately when the symbol "  " appears on the display.
2. Review the operating instructions for possible mistakes in operating procedure.

Except for the replacement of the battery, repair of the Tester should be performed only by an Authorized Service Center or by other qualified instrument service personnel.

The front panel and case can be cleaned with a mild solution of detergent and water.

Apply sparingly with a soft cloth and allow to dry completely before using. Do not use aromatic hydrocarbons, Gasoline or chlorinated solvents for cleaning.

BATTERY AND FUSE REPLACEMENT



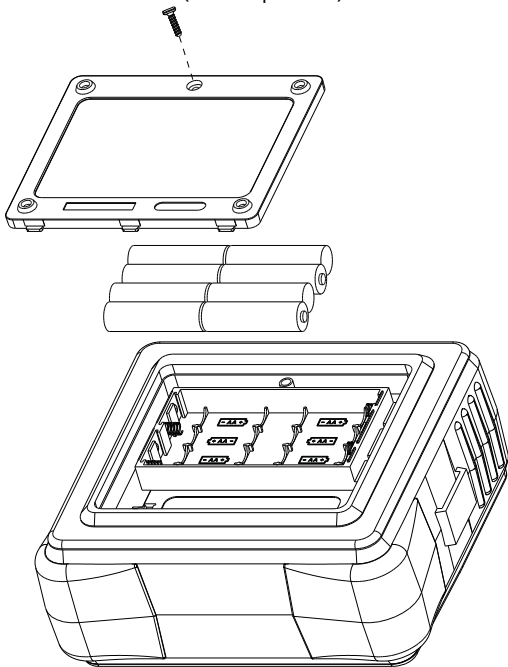
WARNING

To avoid shock, injury, or damage to the Tester, disconnect test leads/test cord before opening case.

Replacing BATTERY follow below steps:

1. Disconnect the test lead probe from measuring circuit.
2. Turn the rotary switch to OFF position.
3. Remove the screws from the battery cover and open the battery cover
4. Remove the batteries and replace with 8 x 1.5V Alkaline Batteries (AA or equivalent). Pay attention to the polarity signs.
5. Put the battery cover back and re-fasten the screw.

Battery: 1.5V Alkaline Batteries (AA or equivalent).



- **Catalog**
- **Application notes**
- **Product specifications**
- **User manuals**



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