INSTRUCTION MANUAL

MT329

HANDHELD MULTIFUNCTION INSTALLATION TESTER

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1. SAFETY

1.1. International Safety Symbols

⚠ This symbol, when adjacent to another symbol or terminal, indicates that the user must refer to this manual for further information.

⚠ This symbol, when adjacent to a terminal, indicates that hazardous voltages may be present under normal use.

⧈ Double insulation.

1.2. Safety Notes

- Do not exceed the maximum allowable input range of any function.
- Do not apply voltage to the meter when the resistance function is selected.
- Set the selector switch to OFF when the meter is not in use.
- Remove the battery if the meter is to be stored or not in use for longer than 60 days.

1.3. ⚠ Warnings

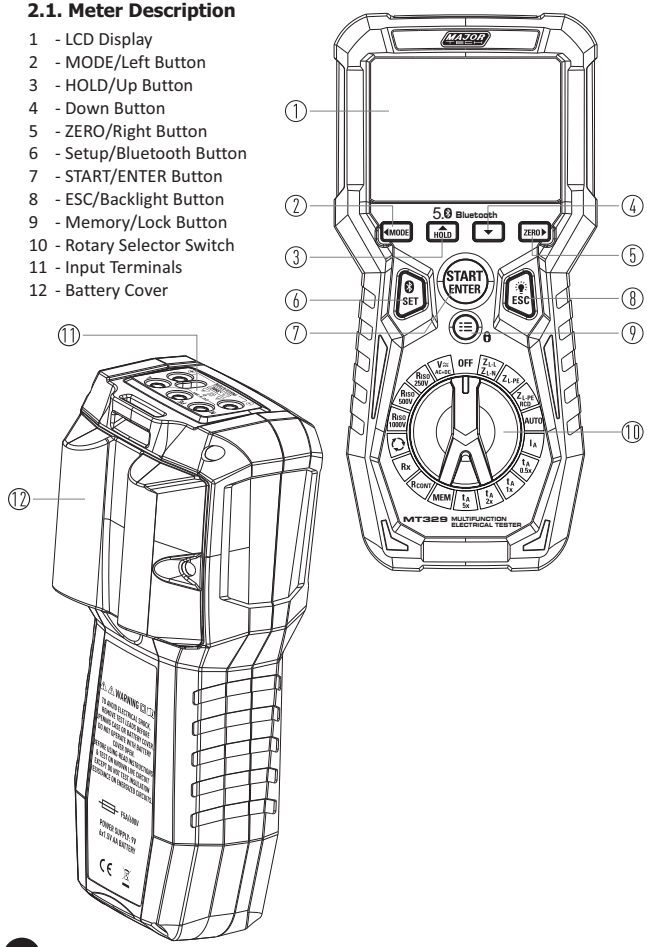
- Set the selector switch to the appropriate position before measuring.
- When measuring voltage, do not switch to current or resistance modes.
- Do not measure voltage on a circuit where the voltage exceeds 550V.
- Always disconnect the test leads from the circuit under test before changing functions.

1.4. ⚠ Cautions

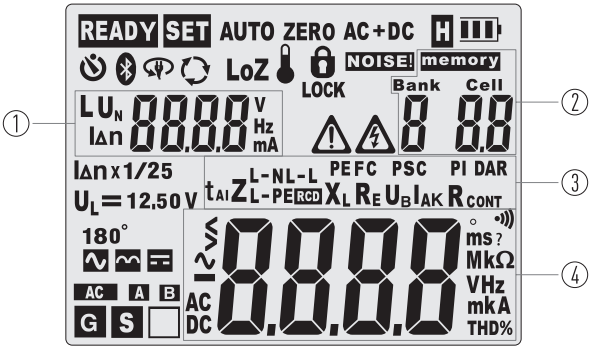
- Improper use of this meter can cause damage to equipment or the instrument, and may result in shock, injury, or death. Read and understand this user manual before operating the meter.
- Always remove the test leads before replacing the battery or fuses.
- Inspect the test leads and the meter for any damage before use. Repair or replace any damaged components before operating the meter.
- Exercise extreme caution when measuring voltages greater than 25V AC RMS or 35V DC, as these voltages pose a shock hazard.
- Voltage checks on electrical outlets can be challenging and potentially misleading due to the uncertainty of contact with recessed electrical contacts. Use alternative methods to ensure that the terminals are not live.
- Using the equipment or its accessories in a manner not specified by the manufacturer may impair their protective features.
- The meter should be operated only by qualified personnel with relevant certifications for measuring electrical installations. Unauthorized operation may damage the device and pose a hazard to the user.
- The instrument must not be used on mains or equipment in environments with special conditions, such as those posing fire or explosion hazards.

2. DESCRIPTION
2.1. Meter Description

1 - LCD Display
2 - MODE/Left Button
3 - HOLD/Up Button
4 - Down Button
5 - ZERO/Right Button
6 - Setup/Bluetooth Button
7 - START/ENTER Button
8 - ESC/Backlight Button
9 - Memory/Lock Button
10 - Rotary Selector Switch
11 - Input Terminals
12 - Battery Cover



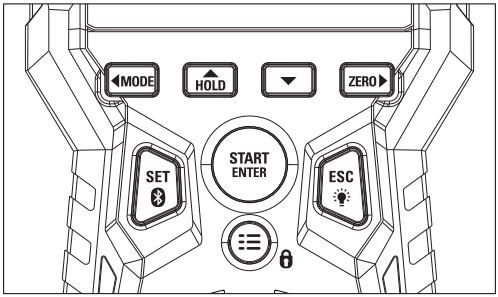
2.2. Display Icons Description



READY	Ready to Test
SET	Set Up
AUTO	Auto Range Mode
ZERO	Test Leads Zeroed
AC+DC	AC+DC Mode
H	Data Hold
	Battery Level Indicator
	Auto Power-Off
	Bluetooth Indicator
	The L & N conductors are reversed
	Phase Sequence Test
LoZ	Low Impedance Test
	High Temperature Warning

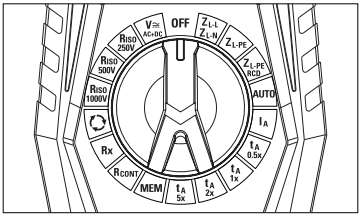
NOISE	High Noise in Measurement
LOCK	Test Button Locked
	WARNING!
	Dangerous Voltage
IΔn x1/25	RCD Current Multiplication Factor
U = 12,50 V	RCD Touch Voltage Setting
180°	Current Waveform
AC A B	RCD Type
G S	RCD Test Type
①	Secondary Display Area
②	Memory Indication Area
③	Tertiary Display Area
④	Main Display Area

2.3. Button Description



MODE	**Mode:** Switches between different measurement modes. Voltage mode only. **Left:** Toggles display results or adjusts setting options.
HOLD	**HOLD:** Keeps the measurement on the display as it was at the time the button is pressed. **Up:** Adjusts setting options.
▼	**Down:** Adjusts setting options.
ZERO	**Zero:** Zeroes test lead resistance. **Right:** Toggles display results or adjusts setting options.
SET	**Set:** Go to Setup. **Bluetooth:** Long press to switch Bluetooth On/Off.
START ENTER	**Start:** Begin testing. **Enter:** Confirm setup options.
ESC	**Esc:** Exit setup **Backlight:** Long press to toggle backlight On/Off.
	Memory: Access stored data. **Lock:** Lock the test button during insulation resistance testing to allow continuous testing until the button is pressed again.

2.4. Selector Switch Description



V_{AC+DC}	**Voltage:** Measures AC or DC voltage between two points in a circuit.
R_{ISO} 250V R_{ISO} 500V R_{ISO} 1000V	**Insulation Resistance:** Measures the resistance of insulation materials using selectable test voltages
↻	**Phase Sequence Test:** Checks the correct sequence of a three-phase power supply.
Rx	**Low-Current Resistance:** Measures resistance with a minimal test current of 200µA.
R_{CONT}	**Continuity Measurement:** Tests for electrical continuity with a test current of ±200mA.
MEM	**Memory:** Stores and recalls measurement results for later review.
Z_{L-L} Z_{L-N}	**Line Impedance:** Measures impedance between line-to-line and line-to-neutral conductors
Z_{L-PE}	**Loop Impedance - High Current Trip Mode:** Measures impedance between line and protective earth using high current for enhanced accuracy.
$Z_{L-PE\ RCD}$	**Loop Impedance - No Trip Mode (Z L-PE RCD):** Measures impedance between line and protective earth without tripping the RCD.
AUTO	**RCD Auto Test:** Automatically tests RCD tripping current and time characteristics.
I_A	**RCD Tripping Current:** Measures the current at which the RCD trips.
t_A 0.5x t_A 1x t_A 2x t_A 5x	**RCD Tripping Time:** Measures the time taken for the RCD to trip when subjected to the test current.

3. MEASUREMENTS

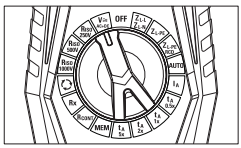
WARNING: During measurements (Fault loop impedance, RCD), avoid touching earthed and accessible parts in the tested electrical installation to prevent shock. During measurements, do not switch the selector switch as this may damage the meter and pose a hazard to the user.

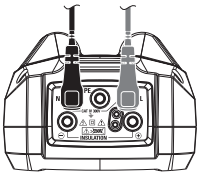
Press and hold the **Setup/Bluetooth** Button while switching on the meter to enter the setup menu. In the setup menu, you can configure parameters such as Auto Power Off, Backlight time, and Buzzer (**"BEEP"**) settings according to the following algorithm:

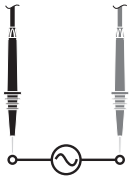
Parameter	--- 900 600 300	--- 90 60 30	 OFF on
Symbol (s)	OFF	bLt	bEEP

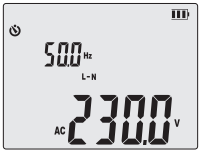
3.1. Voltage and Frequency Measurement

1. **Set the Selector Switch:** Turn the selector switch to the Voltage ($\underset{AC+DC}{V\cong}$) position.
2. **Connect the Test Leads:** Connect the test leads to the meter and the circuit under test as shown in the below diagram.
3. **Read the Measurement Results:** Observe the voltage and frequency readings on the display. Press the **MODE** button to switch between measurement modes. Use the **HOLD** button to freeze the reading on the display.



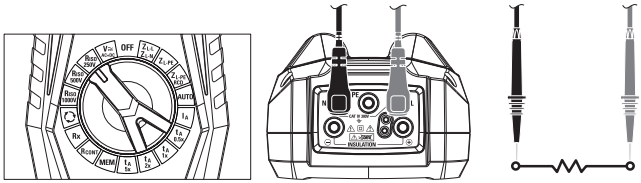






3.2. Insulation Resistance Measurement

1. **Set the Selector Switch:** Turn the knob switch to the **RISO 250V**, **RISO 500V** or **RISO 1000V** position.
2. **Connect the Test Leads:** Connect the test leads as shown in the figure below.
3. **Initiate Measurement:** Press and hold the **START/ENTER** button to begin the measurement. Alternatively, press the **MEMORY** button to enable the **LOCK** button, then press the **START/ENTER** button for continuous measurement. Press the **START/ENTER** button again to cancel the measurement
3. **Read the Measurement Results:** Observe the measurement on the display.



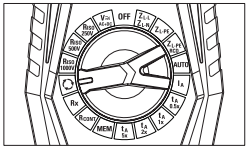
3.3. Phase Sequence Test

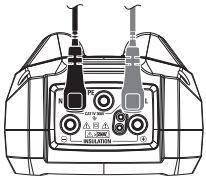
1. **Set the Selector Switch:** Turn the switch to the Phase Sequence position ( ).
2. **Initial Connection:** When **"PH 1"** is blinking, connect the N terminal to the neutral wire and the L terminal to one of the live wires.
3. **Phase 1 Connection:** The LCD will display **"PH 1 Hold"**, and the buzzer will sound. Maintain the connections until the LCD starts blinking **"PH 2"**.
4. **Phase 2 Connection:** Within 10 seconds of **"PH 2"** blinking, connect the L terminal to another live wire. The LCD will display **"PH 2 Hold"**, and the buzzer will sound. Keep the **N** and **L** terminals connected until the LCD shows the final result.
5. **View Results**: Check the LCD display for the phase sequence results.

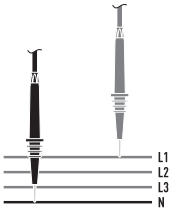
The possible results are as follows:

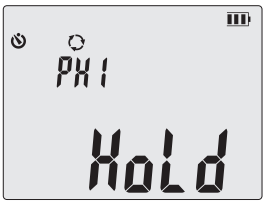
1 1 -	Same Phase Sequence
1 2 3	Positive Phase Sequence
2 1 3	Inverse Phase Sequence
tout	Test Timeout

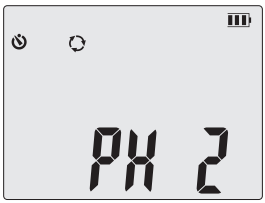
6. Press the **START/ENTER** Button to start a new measurement.
Note: For this test, ensure that the input AC voltage is within the range of 100 to 550V and the frequency is between 45 and 65Hz.

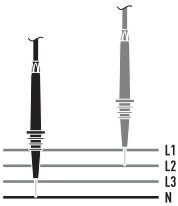


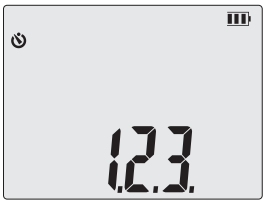






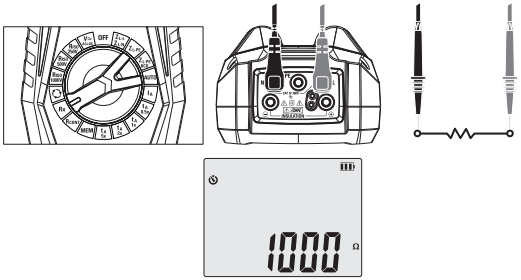






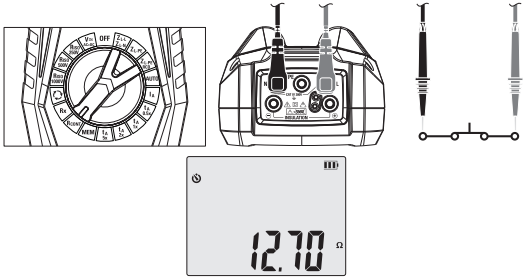
3.4. Low-Current Resistance Measurement

1. Set the selector switch to the **Rx** Position.
2. Connect the meter as shown in the figure below.
3. The tester will immediately and continuously test while this function is selected, you can view the test results. Press the **ZERO** Button to compensate for current resistance (zeroing the test leads). When the LCD displays **"AUTO ZERO"**, this indicates that the test leads have been zeroed out, and you can proceed with testing. Press the **ZERO** Button again to cancel the test lead compensation if needed.



3.5. Continuity Measurement (±200mA)

1. Set the selector switch to the **RCONT** Position.
2. Connect the meter as shown in the figure.
3. Press the **START/ENTER** Button to begin testing, and view the test results. Press the **ZERO** Button to compensate for current resistance (zeroing the test leads). When the LCD displays **"AUTO ZERO"**, this indicates that the test leads have been zeroed out, and you can proceed with testing. Press the **ZERO** Button again to cancel the test lead compensation if needed.



3.6. Measurements of Fault Loop Parameters

WARNING: If the mains under test includes residual current devices (RCDs), they should be bypassed during measurement. Note that bypassing may alter the circuit, causing results to differ slightly from actual values. After completing the measurement, restore the mains to its original state and verify the operation of the residual current device.

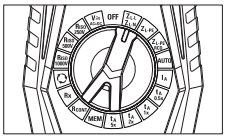
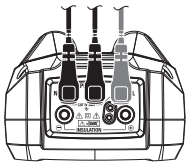
- **Loop Impedance:** Measures the source impedance between Line (L) and Protective Earth (PE). This measurement helps determine the Prospective Earth Fault Current (PEFC), which is the current that could potentially flow if the phase conductor were shorted to the protective earth conductor. The tester calculates PEFC by dividing the measured mains voltage by the loop impedance. This function applies a test current that flows to earth. If RCDs are present in the circuit, they may trip; to prevent this, use the **ZL-PE RCD** function on the selector switch.
- **Line Impedance:** Measures the source impedance between Line conductors or between Line and Neutral. This measurement helps determine the Prospective Short Circuit Current (PSC), which is the current that could potentially flow if the phase conductor were shorted to the neutral conductor or another phase conductor. The tester calculates PSC by dividing the measured mains voltage by the line impedance.

3.6.1. Zeroing the Test Leads

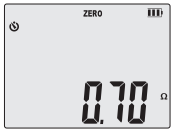
WARNING: To prevent possible electrical shock, fire, or personal injury, do not use in CAT III or CAT IV environments without the protective cap installed on the test leads.

- Test leads have a small amount of inherent resistance that may affect measurements; zeroing is recommended before performing continuity or loop impedance tests.
- The tester measures the lead resistance, stores the value, and subtracts it from the reading. The resistance value is retained after the tester is turned off.
- As long as the tester and test leads remain functionally the same, there is no need to repeat the zeroing operation.
- Zeroing will not work if the test lead resistance is greater than 3Ω.
- If the tester battery voltage is too low, the display shows "**Lo BATT**," and the tester will not zero.

1. Turn the selector switch to the **ZL-L/ZL-N**, **ZL-PE**, or **ZL-PE RCD** position.
2. Connect the meter as shown in the figure.
3. Press and hold the **ZERO** Button until the LCD displays the resistance value of the test leads and the **"ZERO"** symbol. This indicates that the compensation is complete.


4. If the LCD is displaying **“ZERO”**, press the **ZERO** Button again to cancel the zeroing of the test lead resistance.

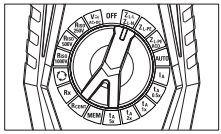
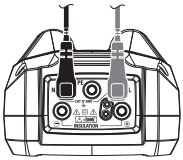
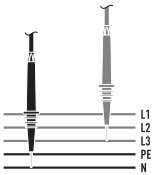


3.6.2. Measurement of Fault Loop Parameters in L-N, L-L, and L-PE Systems

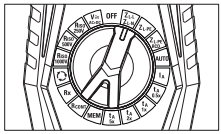
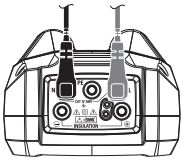
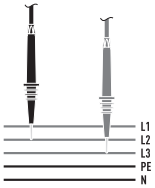
- RCDs present in the circuit may trip during measurement.
- To prevent RCDs from tripping, use the **ZL-PE RCD** function.

1. Turn the selector switch to the **ZL-L/ZL-N** or **ZL-PE** position as required.
2. Connect the leads as shown in the below figures according to the selected selector switch setting.

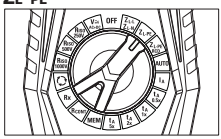
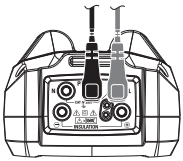
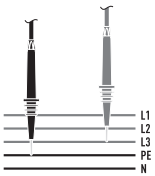
ZL-N

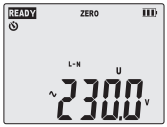
ZL-L

ZL-PE

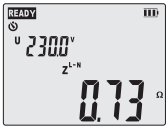




3. The LCD displaying "**READY**" indicates that the instrument is set up and ready for measurement.

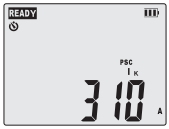


4. Press the **START/ENTER** Button to begin the measurement. Read the measurement results and press the ◀ **MODE** or **ZERO** ▶ Button to view other results.

Power supply voltage U and loop impedance Zs



Short circuit current I_K



When the LCD displays "**READY**," press the **START/ENTER** Button to perform the measurement again. Press the **ESC** Button to exit and return to the measured voltage.

Note: Performing a large number of tests in a short period can cause excessive heating of the meter's components, making the meter's casing warm. This is normal, the meter features automatic overheat protection to manage and control excessive heat.

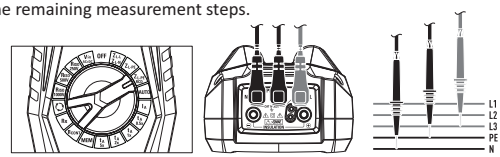
Additional Display Information

READY	Indicates that the instrument is set up and ready for measurement.
L-n	Voltage between the **L** and **N** terminals is out of measurement range.
L-PE	Voltage between the **L** and **PE** terminals is out of measurement range.
Err	Indicates a measurement error.
ErrU	Indicates a measurement error due to a loss of voltage after the measurement.
E00	Indicates a short circuit or damage to the meter.
ULn	Indicates that the neutral conductor is not connected.
NOISE!	Indicates significant disturbances in the mains during measurement, which may cause substantial errors in the results.
	Indicates that the internal temperature of the meter has exceeded the allowable limit, and measurements are temporarily disabled.
	Indicates that the **L** and **N** conductors are reversed (Voltage measured between the **PE** and **N** conductors).

3.6.3. Measurement of Fault Loop Impedance in L-PE Systems Protected by an RCD

- This feature measures fault loop impedance without altering the power supply, provided the residual current device (RCD) is rated at a minimum of 30mA.
- If the **L** and **N** terminals are reversed, the tester will automatically adjust and continue the test. The LCD will display the "↻" symbol.

1. Set the selector switch to the **ZL-PE RCD** Position.
2. Connect the test leads as shown in the figure below.
3. Follow the same procedure as described for measurements in **L-N** or **L-L** systems for the remaining measurement steps.



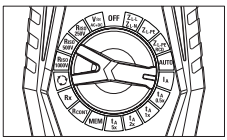
Notes:

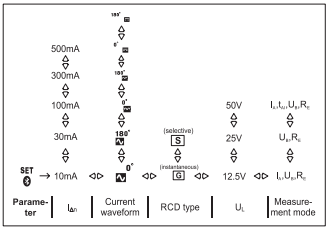
- Additional information and error messages displayed by the meter are the same as those for **L-N** and **L-L** measurements.
- The measurement takes up to approximately 35 seconds. You can stop the measurement by pressing the **ESC** Button.
- In installations with 30mA residual current devices, the combined leakage currents and test current may cause the RCD to trip. If this occurs, try reducing the installation's leakage current (e.g., by disconnecting loads).

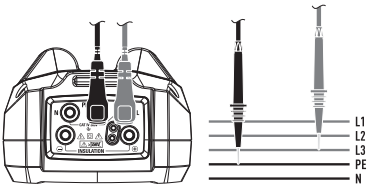
3.7. Measurement of Residual Current Device Parameters

3.7.1. Measurement of RCD Tripping Current

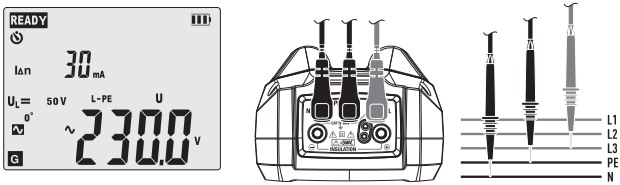
1. Set the selector switch to the **IA** Position.
2. Configure the parameters according to the below algorithm and general parameter settings.
3. Connect the test leads according to the applicable RCD Type, as shown in the figure below.
4. The LCD displaying "**READY**" indicates that the instrument is set up and ready for measurement.







Type A/AC RCD

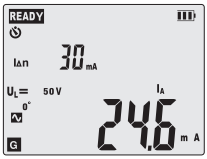


Type A/AC/B RCD

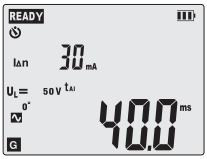
5. Press the **START/ENTER** Button to begin the measurement.
6. Read the measurement results and press the ◀ **MODE** or **ZERO** ▶ Button to view other results.

Notes:

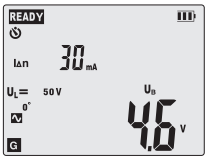
- If only the measurement of U_B, R_E is selected, these values are measured with a 0,41IΔn current without tripping the RCD.
- If the RCD trips during the measurement, press the **ESC** Button to proceed to the next measurements.



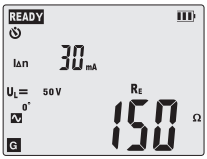
I_A Current



Tripping time t_{AI} at the I_A Current



Touch Voltage U_B



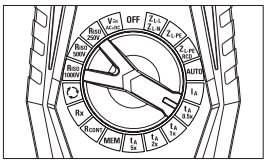
Protective Conductor Resistance for RCD-R_E

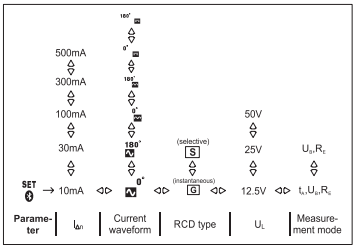
Additional Display Information

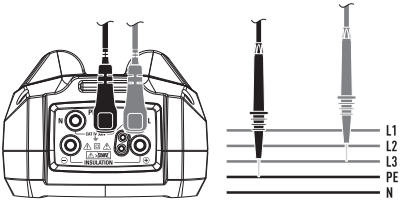
READY	Meter is set up and ready for measurement.
L-PE	Voltage between the **L** and **PE** terminals is out of measurement range.
Ub	Safe touch voltage has been exceeded.
ErrU	Indicates a measurement error due to a loss of voltage after the measurement.
rcd	RCD did not trip or the RCD tripped while measuring U_B and/or R_E.
rE	RE measurement range exceeded.
ErrE	After measuring U_B and/or R_E , the t_A measurement could not be performed because the R_E and voltage values were insufficient to generate the required current
	Temperature inside the meter has exceeded the allowable limit, and measurements are temporarily disabled.
	L and **N** conductors are reversed (Voltage detected between **PE** and **N** conductors).

3.7.2. Measurement of RCD Tripping Time

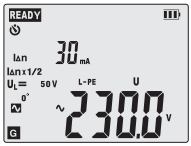
1. Set the selector switch to the **t_A** Position with the desired I**Δ**n multiplication factor.
2. Configure the parameters according to the below algorithm and general parameter settings.
3. Connect the test leads according to the applicable RCD Type, as shown in the figure on **page 20**.
4. The LCD displaying "**READY**" indicates that the instrument is set up and ready for measurement.

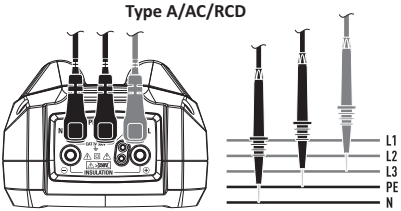






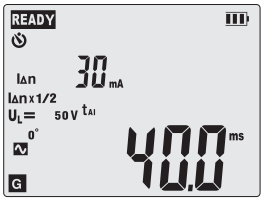
Type A/AC/RCD



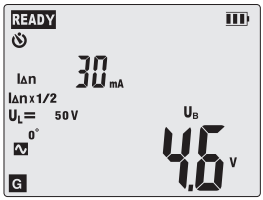


Type A/AC/B RCD

5. Press the **START/ENTER** Button to begin the measurement.
6. Read the measurement results and press the ◀**MODE** or **ZERO**▶ Button to view other results.

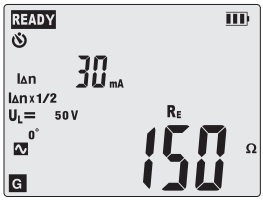


Tripping Time IΔn



Touch Voltage U_B

Notes and information displayed by the meter are the same as in section **3.7.1**.

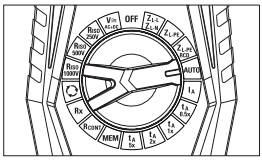


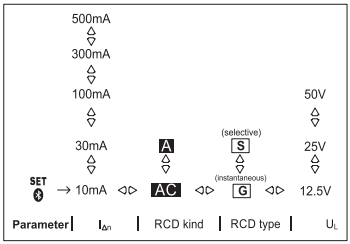
Protective Conductor Resistance for RCD-R_E

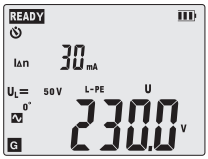
3.7.3. Automatic Measurement of RCD Parameters

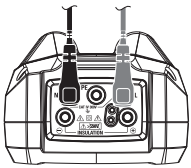
- The instrument automatically measures the RCD tripping time t_A, tripping current I_A, touch voltage U_B and earth resistance R_E.
- In this mode, you only need to initiate the measurement and reset the RCD each time it trips; no manual activation is required for each measurement.

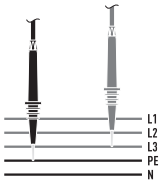
1. Set the selector switch to the **AUTO** Position.
2. Set the parameters according to the following algorithm and the rules for setting the general parameters as shown below.
3. Connect the test leads as shown in the figure below.
4. Reset the RCD each time it trips.



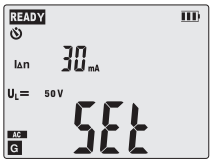


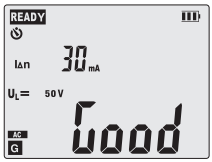






5. Press the **START/ENTER** Button to perform the measurement.
6. Reset the tested RCD each time it trips. The LCD displays “SEt” after each trip.
7. View the main measurement result Good or bAd.





8. Use the **ENTER** Button to save the results in memory, the ◀ **MODE** and **ZERO** ▶ to view the result components or the **ESC** Button to go to the voltage display mode.

Additional Information

Good	RCD is in good working order.
bAd	RCD is defective.
SEt	RCD needs to be reset.

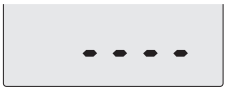
4. STORING MEASUREMENT RESULTS

- The instrument can store up to 1000 sets of measurements, organized into multiple groups.
- The entire memory is divided into 10 memory Banks, each with 99 memory Cells. Each result can be saved in a specified memory Bank and selected memory Cell.
- Turning off the power to the instrument does not erase the stored measurement results.
- The memory function is valid for the following functions: **RCONT, Loop/Line Impedance**, and **RCD**.

4.1. Saving Measurement Results to Memory

- After the measurement, press the **☰ Memory** Button to enter the memory mode.

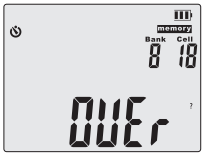
2. Press the **Setup/Bluetooth** Button to select Bank or Cell, use the **HOLD** ▲ and ▼ Buttons to adjust the Bank or Cell, if measurement data is stored in the Cell, press the ◀ **MODE** or **ZERO** ▶ Buttons to view the stored measurement data.



Cell is empty

Cell is not empty

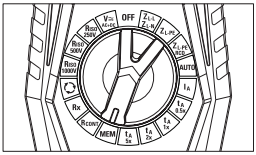
3. Press the **☰ Memory** Button to store data to the current unit. Attempting to overwrite existing results will trigger a warning message.

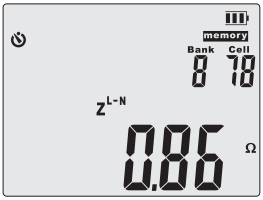


4. Press the **☰ Memory** Button to overwrite the result or the **ESC** Button to cancel the operation.

4.2. Accessing Stored Measurements

1. Switch on the meter. Set the Selector switch to the **MEM** Position.
2. Press the **ESC** Button to select the Bank or Cell, press the **HOLD** ▲ and ▼ Buttons to adjust the Bank or Cell, and press the ◀ **MODE** or **ZERO** ▶ Buttons to view the stored measurement data.

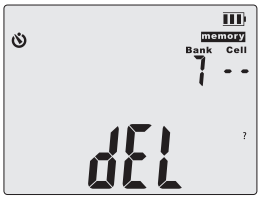


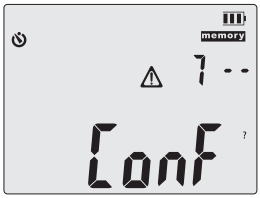


4.3. Deleting Stored Measurements

4.3.1. Clearing Memory Banks

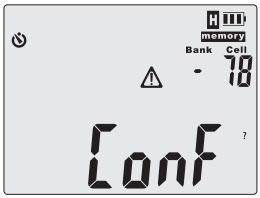
1. Switch on the meter. Set the selector switch to the **MEM** Position.
2. Press the ☰ **Memory** Button to adjust the Cell until it displays "dEL".
3. The "dEL" and "Conf" symbols will be displayed, and will require your confirmation to proceed with the deletion.
4. Press the ☰ **Memory** Button to delete the result or the **ESC** Button to abort.





4.3.2. Clearing the Whole Memory

1. Switch on the meter. Set the selector switch to the **MEM** Position.
2. Press the ☰ **Memory** Button to adjust the Cell to display "dEL".
3. The remaining steps follow the same procedure as Clearing the Memory Bank.



5. SPECIFICATIONS

5.1. Voltage Measurement

Range	Resolution	Basic Uncertainty
0.0V~550.0V	0.1V	±(2.0% + 3 digits)

Frequency Range: 45 to 65Hz

5.2. Phase Sequence Test

- Test Voltage Range: 100V to 550V AC.
- Test Frequency Range: 45Hz to 65Hz

5.3. Insulation Resistance

Terminal Voltage	Range	Resolution	Accuracy	Test current
250V (0% to 20%)	0.250 to 4.000MΩ	0.001MΩ	±(2% + 15 digits)	1mA at a load of 250kΩ
	4.01 to 40.00MΩ	0.01MΩ	±(2% + 10 digits)	
	40.1 to 400.0MΩ	0.1MΩ	±(3% + 5 digits)	
	401 to 4000MΩ	1MΩ	±(4% + 5 digits)	
500V (0% to 20%)	0.500 to 4.000MΩ	0.001MΩ	±(2% + 10 digits)	1mA at a load of 500kΩ
	4.01 to 40.00MΩ	0.01MΩ	±(2% + 10 digits)	
	40.1 to 400.0MΩ	0.1MΩ	±(2% + 5 digits)	
	401 to 4000MΩ	1MΩ	±(4% + 5 digits)	
1000V (0% to 20%)	1.000 to 4.000MΩ	0.001MΩ	±(3% + 10 digits)	1mA at a load of 1MΩ
	4.01 to 40.00MΩ	0.01MΩ	±(2% + 10 digits)	
	40.1 to 400.0MΩ	0.1MΩ	±(2% + 5 digits)	
	401 to 4000MΩ	1MΩ	±(4% + 5 digits)	

5.4. Low-Current Resistance Measurement

Range	Resolution	Basic Uncertainty
0.0 to 4.9Ω	0.1Ω	±(3.0% + 3 digits)
5.0 to 49.9Ω	0.1Ω	
50 to 500Ω	1Ω	
500 to 2000Ω	1Ω	

- Voltage on Open Terminals: 4...9V
- Short-circuit Current (ISC): <8mA
- Buzzer works for Measured Resistances of < 30Ω ± 50%
- Test leads resistance compensation **(ZERO)**

5.5. Continuity Measurement of Protective Earth Conductors and Equipotential Bonding (±200mA current)

Range	Resolution	Basic Uncertainty
0.00 to 19.99Ω	0.01Ω	±(2.0% + 3 digits)
20.0 to 199.9Ω	0.1Ω	
200 to 400Ω	1Ω	

- Voltage on Open Terminals: 4...9V
- Output Current at R<2Ω: min 200mA (ISC: 200...250mA)
- Test lead resistance compensation **(ZERO)**
- Measurements for both current polarities

5.6. Z_{L-PE}, Z_{L-N}, Z_{L-L} Fault Loop Impedance Measurement

- The line resistance can be calibrated to zero before testing. (<3Ω)

5.6.1. Z_s Fault Loop Impedance Measurement

Range	Resolution	Basic Uncertainty
0.0 to 19.99Ω	0.01Ω	±(5.0% + 5 digits)
20.0 to 199.9Ω	0.1Ω	
200 to 9999Ω	1Ω	

- Voltage Range: 180V to 270V (ZL-PE) and 180V to 550V (For ZL-N / ZL-L)
- Frequency Operating Range: 45Hz to 65Hz
- Maximum Test Current: 18.3A at 550V (3X10ms)

5.6.2. Short-Circuit Current (I_K) Measurement

- **L-PE** Protected Earth Fault Current **PEFC**.
- **L-L (L-N)** Short-Circuit Current **PSC**.
- Calculate the measuring range based on the measuring range of Z_s and the rated voltage.

Range	Resolution	Basic Uncertainty
0.110 to 1.999A	0.001A	Calculated on the basis of uncertainty for the fault loop.
2.00 to 19.99A	0.01A	
20.0 to 199.9A	0.1A	
200 to 1999A	1A	
2.00 to 19.99kA	0.01kA	
20.0 to 40.0kA	0.1kA	

5.7. Z_{L-PE} Fault Loop Impedance Measurement with RCD (Without Tripping the RCD)

5.7.1. Z_S Fault Loop Impedance Measurement

Range	Resolution	Basic Uncertainty
0.0 to 19.99Ω	0.01Ω	±(6.0% + 10 digits)
20.0 to 199.9Ω	0.1Ω	±(6.0% + 5 digits)
200 to 1999Ω	1Ω	

- Does not trip RCD's rated at $I\Delta n \geq 30mA$
- Voltage Operating Range: 180V to 270V
- Frequency Operating Range: 45Hz to 65Hz

5.7.2. Short-Circuit Current I_k Measurement

- Calculate the measuring range based on the measuring range of Z_S and the rated voltage.

Range	Resolution	Basic Uncertainty
0.110 to 1.999A	0.001A	Calculated on the basis of uncertainty for the fault loop.
2.00 to 19.99A	0.01A	
20.0 to 199.9A	0.1A	
200 to 1999A	1A	
2.00 to 19.99kA	0.01kA	
20.0 to 20.0kA	0.1kA	

5.8. Measurement of RCD Parameters

- Voltage Operating Range:180...270V (Type B RCD: 180 to 270V)
- Voltage Operating Range: 100...270V (Type A/AC RCD: 100 to 270V)
- Frequency Operating Range: 45Hz to 65Hz

5.8.1. RCD Tripping Test and t_A Tripping Time Measurement (For t_A Measurement Function)

RCD Type	Multiplication Factor Setting	Measurement Range	Resolution	Basic Uncertainty
General (G)	0.5 I∆n	10 to 300ms	0.1ms	±(2% + 10 digits)
	1 I∆n	10 to 300ms		
	2 I∆n	10 to 150ms		
	5 I∆n	10 to 40ms		
Selective (S)	0.5 I∆n	10 to 500ms		
	1 I∆n	10 to 500ms		
	2 I∆n	10 to 200ms		
	5 I∆n	10 to 150ms		

- For I∆n=10mA and 0.5I∆n the uncertainty is ± 2% m.w. ±3 digits
- Residual Current feed accuracy: For 1*I I∆n, 2* I∆n and 5* I∆n.....0~8%; For 0,5* I∆n ..... -8~0%

5.8.2. RMS Leakage Current During RCD Tripping Time Measurement

$I_{\Delta n}$	Multiplication Factor Setting											
	0.5			1			2			5		
	∿	⩙	⎓	∿	⩙	⎓	∿	⩙	⎓	∿	⩙	⎓
10	5	3.5	5	10	20	20	20	40	40	50	100	100
30	15	10.5	15	30	42	60	60	84	120	150	210	300
100	50	35	50	100	140	200	200	280	400	500		
300	150	105	150	300	420	600						
500	250	175	250	500								
1000	500	350	500									

5.8.3. RE - Protective Conductor Resistance for RCD

Selected RCD Rated Current	Measurement Range	Resolution	Test Current	Basic Uncertainty
10mA	10 to 5000Ω	10Ω	4mA	0 to 10% ± 8 digits
30mA	10 to 1660Ω		12mA	0 to 10% ± 5 digits
100mA	1 to 500Ω	1Ω	40mA	0 to 5% ± 5 digits
300mA	1 to 166Ω		120mA	
500mA	1 to 100Ω		200mA	
1000mA	1 to 50Ω		400mA	

- The RCD test is only allowed if the product of the selected current and the grounding resistance is less than 50V.

5.8.4. Measurement of Touch Voltage U_B referred to Rated Residual Current

Measurement Range	Resolution	Test Current	Basic Uncertainty
0 to 9.9V	0.1V	0.4 X $I_{\Delta n}$	0 to 10% ± 5 digits
10.0 to 99.9V			0 to 15%

5.8.5. RCD I_A Tripping Current Measurement for Sinusoidal Residual Current

Selected RCD Rated Current	Measurement Range	Resolution	Test Current	Step Size	Basic Uncertainty
10mA	3.0 to 11.0mA	0.1mA	0.3 X $I_{\Delta n}$ to 1.1 X $I_{\Delta n}$	10 % of $I_{\Delta n}$	±10% $I_{\Delta n}$
30mA	9.0 to 33.0mA				
100mA	30 to 110mA	1mA			
300mA	90 to 330mA				
500mA	150 to 550mA				

- You can start the measurement from either the positive or negative half-period of the applied residual current.
- Specified Trip Current Ranges (EN 61008-1): 50 % to 100 % for Type AC.

5.8.6. RCD I_A Tripping Current Measurement for Unidirectional Pulsating Residual Current

Selected RCD Rated Current	Range	Resolution	Test Current	Step Size	Basic Uncertainty
10mA	3.0 to 21.0mA	0.1mA	0.30 x $I_{\Delta n}$ to 2.1 x $I_{\Delta n}$	10 % of $I_{\Delta n}$	±10% $I_{\Delta n}$
30mA	9.0 to 45.0mA				
100mA	30 to 150mA	1mA	0.30 x $I_{\Delta n}$ to 1.5 x $I_{\Delta n}$		
300mA	90 to 450mA				

- You can start the measurement from either the positive or negative half-period of the applied residual current.
- Specified Trip Current Ranges (EN 61008-1): 35% to 140% for Type A (>10mA)
  35% to 200% for Type A (≤10mA)

5.8.7. RCD I_A Trip Current Measurement for Smooth DC Residual Current

Selected RCD Rated Current	Measurement Range	Resolution	Test Current	Step Size	Basic Uncertainty
10mA	2.0 to 21.0mA	0.1mA	0.20x IΔn to 2.1x IΔn	5% of IΔn	±10% IΔn
30mA	6.0 to 63.0mA				
100mA	20 to 210mA	1mA			
300mA	60 to 630mA				

- You can start the measurement from either the positive or negative half-period of the applied residual current.
- Specified Trip Current Ranges (EN 61008-1): 50% to 200% for Type B

6. General Specifications

Function	Range
Display	LCD Segment
Fuse	5A, 600V
Insulation Type	Double Insulated to PN-EN61010-1 and IEC61557 Standard
Measurement Category	CAT IV 300V and CAT III 600V
IP Rating	IP65
Operating Altitude	2000m
Auto Time Off	300, 600, 900 seconds and None
Operating Humidity	Max 80% up to 31°C decreasing linearly to 50% at 40°C
Storage Humidity	<80%
Operating Temperature	0°C to 40°C
Storage Temperature	-10°C to 60°C
Batteries	6 x AA Alkaline Batteries (LR6)
Dimensions	212 x 101 x 71mm
Weight	822g

7. APP DOWNLOAD

- Download Meter-X APP to connect with the meter to get more functionality.
- Search the APP name Meter-X on App Store (for iOS) or Google play (for Android) or scan the QR code to download the APP.

8. PRODUCT REGISTRATION

Register your new Major Tech product today to activate your warranty and stay up-to-date with the latest software and firmware updates, ensuring optimal performance and security. By registering, you'll also gain access to exclusive offers and trade-in opportunities, helping you get the most value from your purchase. In addition, you'll receive important safety and recall notifications to keep you informed and protect your device. Should the need arise, registering allows you to directly discuss potential warranty claims with a Major Tech representative, and even report if your product has been sold or stolen, ensuring you receive the support you need.

Scan to Register & Activate Warranty

9. WARRANTY

Warranty Coverage

Major Tech warrants its test instruments to be free from defects in materials or workmanship under normal use and service for a period of two (2) years from the date of shipment. This warranty is extended exclusively to the original purchaser, provided the online Product Registration has been completed on either www.major-tech.com or www.majortech.com.au, depending on which country the product was purchased. This warranty is non-transferable.

Exclusions

This warranty does not cover:

- Disposable batteries and fuses
- Damage caused by leaking batteries (damaging the meter and components)

- Normal wear and tear of mechanical components
- Failures caused by use outside the product's specifications
- Any product which, in the opinion of Major Tech, has been misused, contaminated, or damaged due to neglect.

Check Procedure

Prior to contacting Major Tech or a distributor regarding a warranty claim, please check the following:

- Batteries are installed correctly
- Battery condition – either replace disposable batteries or ensure rechargeable batteries are charged where applicable
- Test leads are inserted in the correct terminals and are fully inserted, no damage to test leads.

Contact Information

For any warranty claims or inquiries, please contact either Major Tech or the distributor from whom the product was purchased.

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