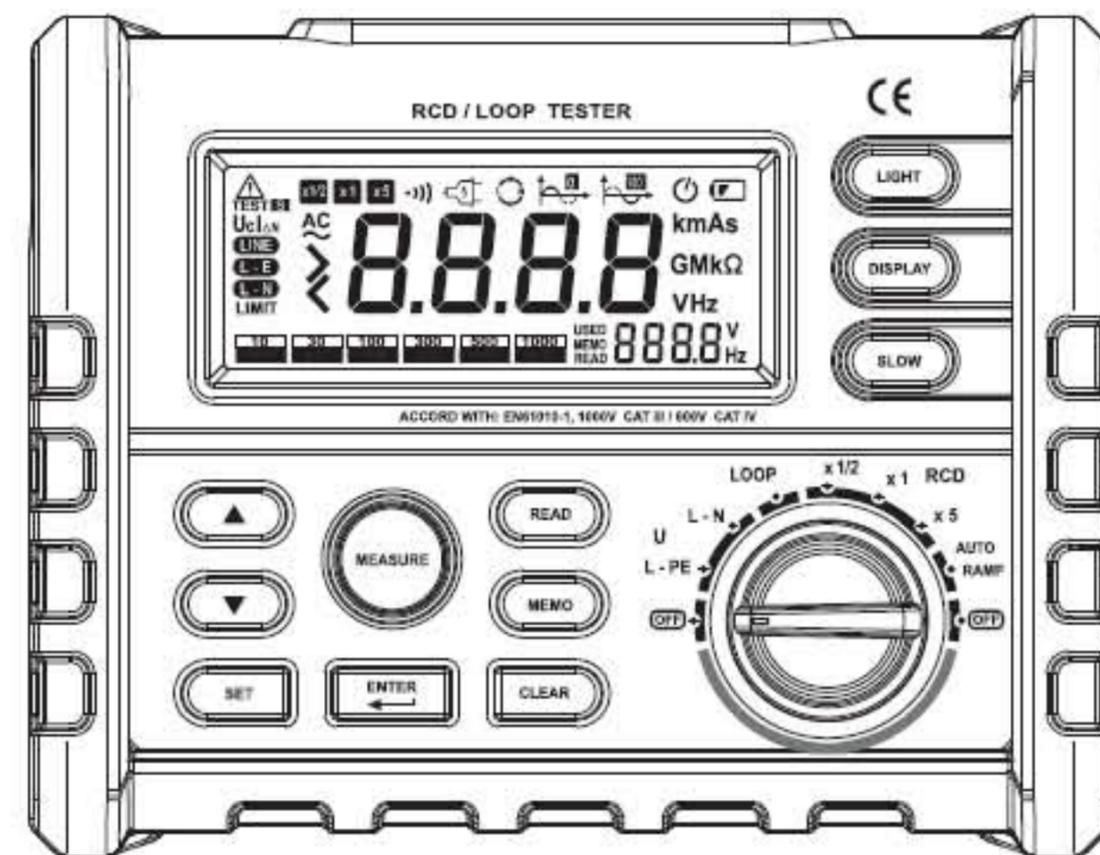


RCD/LOOP TESTER



USERS MANUAL

CE EMC&LVD

Designed and Conforms to
IEC61010-1
100V
CAT III



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- Please read the Operation Manual carefully when using the tester, pay special attention to the content of “warning”. Follow the “warning” description.
- Use caution when the measuring voltage is higher than AC 30V. Do not allow energized parts to touch you. Don't measure the voltage above the allowed input value. The unit should check the tester and test lead before using. Do not measure if there the following exist: bare test lead, damaged enclosure, LCD not displaying, etc.
- Only the tester being used with the provided lead meets the required safety standards. If the test lead should be replaced due to breakage, it should be replaced with the same model and electrical specifications test lead.
- Don't expose the tester to direct sunlight, high temperature or moisture.

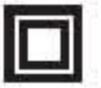
Warning

Please read the Operation Manual carefully before using the tester, paying special attention to the content of safety!

Safety Information

The tester RCD(Residual Current Devices) Tester is produced according to international standard IEC61010-1 and IEC1010-2-032 International Safety Specifications, and complies with double insulation 600V CATIII safety standard.

Safety Marks

	Important safety mark, refer to Operation Manual
	Danger! High Voltage!
	Grounding
	Double Insulation (safety equipment with class II)
	Battery Power

Overview

Thank you for purchasing the RCD Tester designed and produced by our company. To operate the tester performance fully, please read the Operation Manual carefully and keep it close for easy future reference.

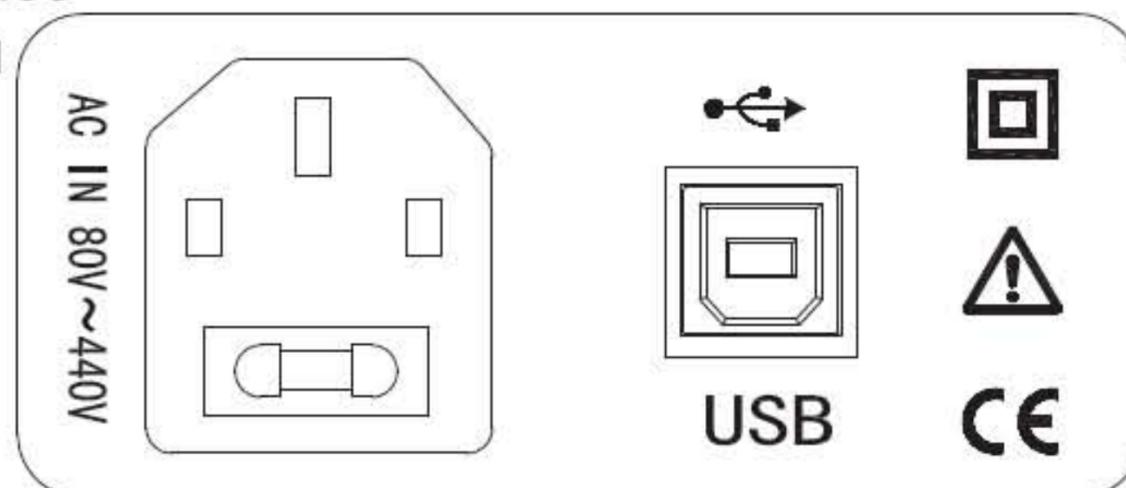
The RCD Tester brings the latest technology into an instrument which is compact, firm, durable, simple to use and convenient to carry. It can measure trip-out current, trip-out time, loop resistance, and online voltage, frequency measurement etc. It is the ideal tool for electrical inspection and repair.

Features

- Trip-out current measurement
- Trip-out time measurement
- Contact voltage measurement
- Loop resistance measurement
- AC voltage measurement: 0V – 440V
- Frequency measurement: DC, 45Hz-65Hz
- Multiplying power of measurement current: 0.5, 1 and 5
- Standard/Selective type current measurement level: 10, 30, 100, 300, 500mA
- 100 groups of test results can be stored
- Data stored in the host machine can be transmitted to a PC via a USB2.0 interface

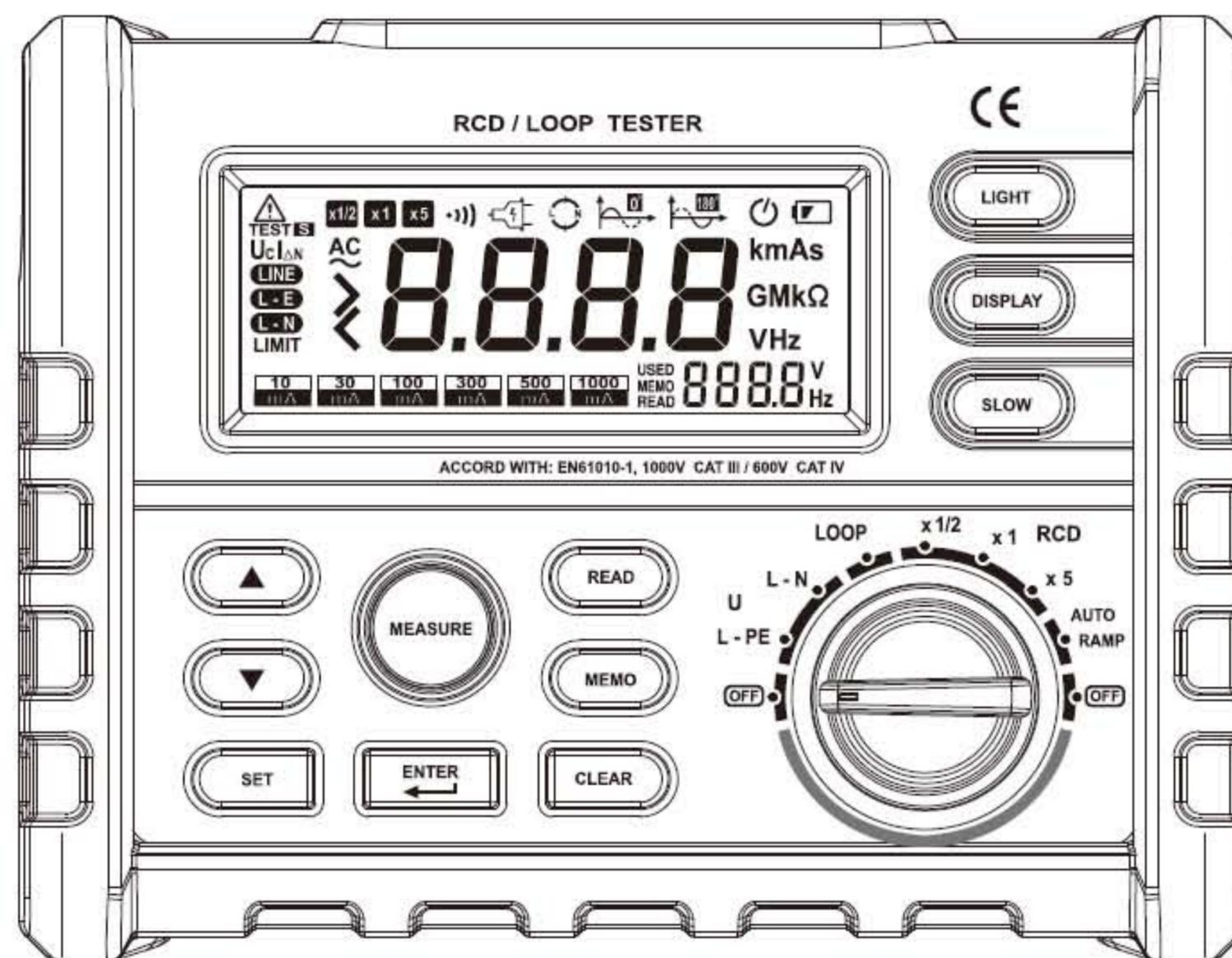
Tester Appearance

Input/output terminal



Input/output terminal	Function Description
AC IN	RCD (Residual Current Devices) test input interface
USB	Transmit data by connecting it to PC using a USB connection

Panel Diagram



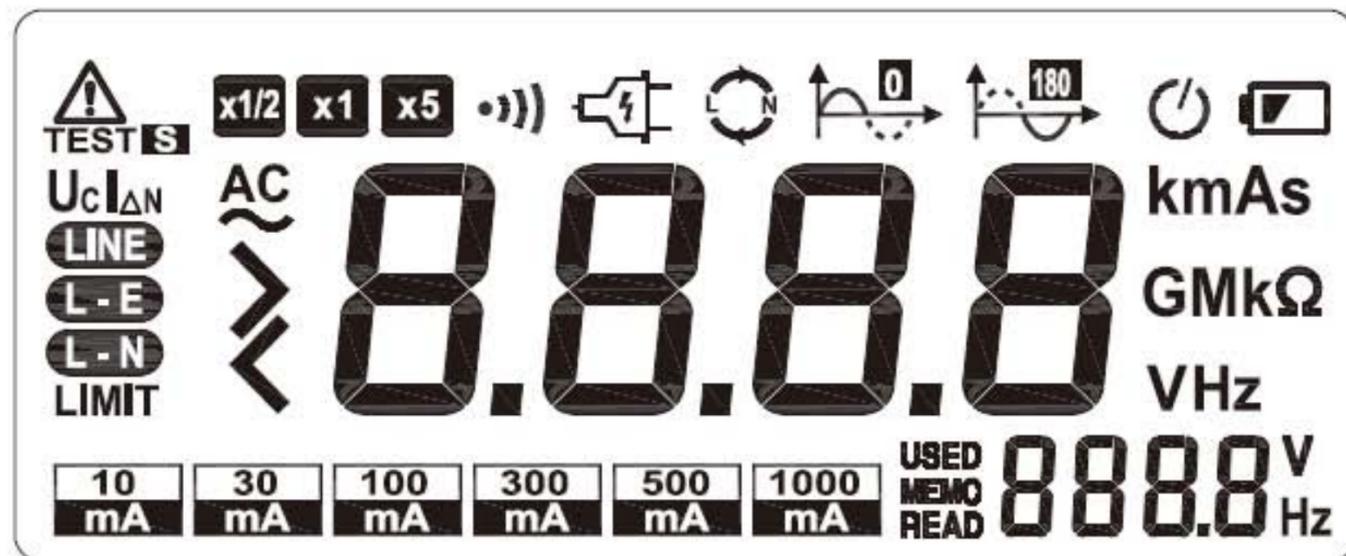
Button switch operation

The following functions can be performed through button operation:

1. **ENTER button** After setting, press to confirm.
2. **DISPLAY button** Press to switch display data.

3. **SET button** Under non-measurement (stand-by) state, press “SET” to set trip-out current, trigger phase, limit voltage, then press ▲ and ▼ to select measuring range, again press SET button to return back.
4. **SLOW button** When measure the time-delayed RCD, you can press this button to display S measurement mode.
5. **READ button** Under stand-by mode, you can press “READ” to display the stored data number, press ENTER to display the stored data, then press “READ” to return back.
6. **CLEAR button** Under the reading data state, you can press “CLEAR”, then press ENTER to clear the measurement data with appointed number stored in the tester.
7. **LIGHT button** Turn on off the LCD light. The LCD light will power off automatically after 30 seconds. Pressing “LIGHT” can cancel the auto power-off function when turning the tester on.
8. **▲search forward button** When reading the stored level, you can press ▲ to search the stored data forward, and display it on the screen. Pressing once, “search forward” will move a group of data forward. When setting the state, it is used to select the current level.
9. **▼search backward button** When reading the stored level, you can press ▼ to search the stored data backward, and display it on the screen. Pressing once, “search backward” will move a group of data backward. When setting the state, it is used to select the current level.
10. **MEMO button** After stop measuring, you can press “MEMO” to display the stored number, and store the retained data in the tester. A maximum of 1000 groups of data can be stored in the tester.
11. **MEASURE button** When making LOOP, RCD and AUTORAMP measurement, you can press “MEASURE” to start. The measurement light will blink when measuring, and will extinguish when finished. (Measurement can't be made when the test lead is not inserted correctly or is disconnected. This button will remain invalid).

Liquid Crystal Display Diagram



Mark on the Display Screen	Description	Mark on the Display Screen	Description
	Auto power-off		AC sign
	Live line to null line, positive direction		The test lead has high voltage
	Live line to null line, negative direction		Plug is connected normally
	Warning indicator		Trigger with 180°
	Battery power indication		Trigger with 0°
$I_{\Delta N}$	Trigger current	TEST	It is testing now
k	Thousand	S	With time-delayed RCD
ms	Millisecond	Uc	Loop voltage
mA	Milli-ampere	Hz	Frequency unit
Ω	Ohm	L-E	Live line to earth
LIMIT	Beyond	L-N	Live line to null line
U	Voltage	READ	Read
V	Voltage unit V	MEMO	Store
USED	It is already used		

Knob Switch Operation

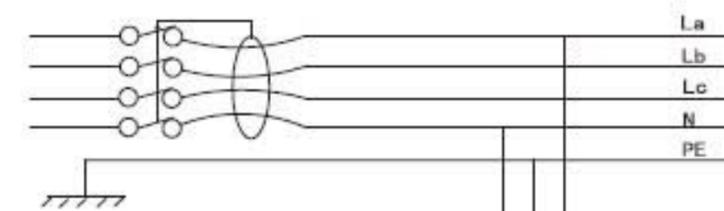
The functional shift knob is used for enabling the tester and entering into the measurement function listed in the following table. Knob Switch Level Description.

Mark	Level	Function
OFF	Power off level	It is used for turning the tester off
L-PE	Voltage level	Measure the voltage of live line to earth line
L-N	Voltage level	Measure the voltage of live line to null line
LOOP	Loop circuit	Measure the loop resistance
$\times 1/2$	$\times 0.5$ level	Multiplying power of triggering current (For example: $30\text{mA} \times 0.5 = 15\text{mA}$)
$\times 1$	$\times 1$ level	Multiplying power of triggering current (For example: $30\text{mA} \times 1 = 30\text{mA}$)
$\times 5$	$\times 5$ level	Multiplying power of triggering current (For example: $30\text{mA} \times 5 = 150\text{mA}$)
AUTORAMP	Automatic current level	Test for triggering current automatically

Note: After the tester automatically powers off, the knob switch should be switched to the OFF position, and will operate normally after 5 seconds.

Measurement of L-PE Live Line Voltage to Earth

1. Follow the figure below, set the functional shift knob to the L-PE level. Connect the test lead well.
2. The tester will automatically and display live line voltage and frequency to earth.
3. Press "MEMO" to store test result.

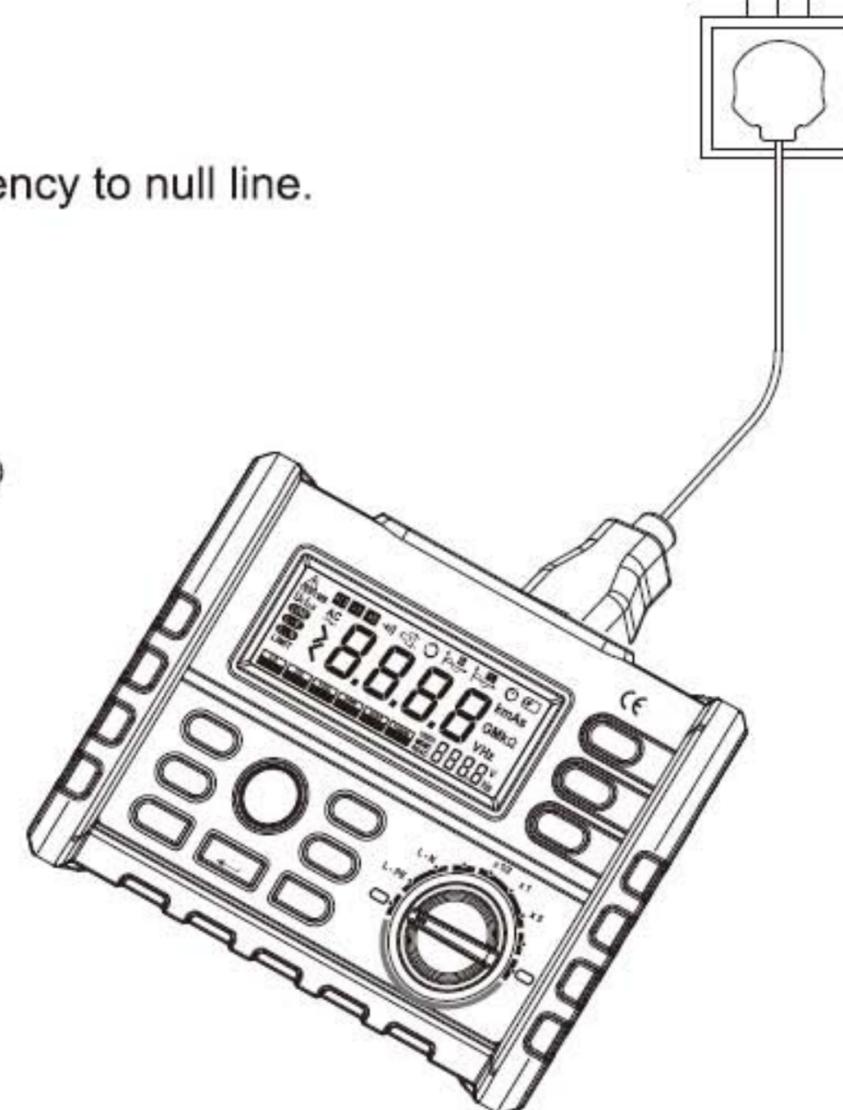


Measurement of L-N Live Line Voltage to Null Line

1. Set the functional shift knob to the L-N level. Connect the test lead well.
2. The tester will automatically work and display live line voltage and frequency to null line.
3. Press "MEMO" to store test result.

LOOP Circuit Measurement

1. Set the knob to LOOP level. Connect the test lead well.
2. Select the test parameter according to actual situation, press SET, then press ▼▲ to select, such as $I\Delta$ (10mA/30mA/100mA/300mA/500mA), then press SET again, press to set alarm voltage (25V or 50V), then press SET or ENTER to return again.
3. Press "MEASURE" to start measuring.
4. Uc result display.
5. Press "DISPLAY" to display RL (loop resistance).
6. If $U_c > U_{lim}$, the alarm will ring, and pressing any button will silence the alarm.
7. Press "MEMO" as required to store test result.
8. If the display shows $\overset{L}{\curvearrowright} \overset{N}{\curvearrowleft}$ then the live line is opposite direction to null line. The measurement will not perform.



RCD Measurement

1. Rotate the knob to one level of $RCD \times 1/2$, $RCD \times 1$, $RCD \times 5$.
2. Select the test parameter according to actual situation, press SET, then press ▼▲ to select, such as $I\Delta$ (10mA/30mA/100mA/300mA/500mA), then press SET again, press to set test current polarity (0° and 180°), then press SET or ENTER to return again.
3. Connect it with test lead, and L (live line), NULL (null line) and GND (ground line) are required.
4. Press "MEASURE" to start measuring.
5. Trip out time will display on the main-screen, while Uc voltage will display on the sub-screen.

6. If trip out time > 300mS (S mode is 500mS), the alarm will ring, and pressing any button will silence the alarm.
7. Press "MEMO" to store the test result.
8. If the display shows  then live line is opposite direction to null line, and the measurement will not perform.

Measurement of AUTORAMP Trigger Current

1. Rotate the knob to AUTORAMP level.
2. Select the test parameter according to actual situation, press SET, then press ▼▲ to select, such as I Δ (10mA/30mA/100mA/300mA/500mA), then press SET again, press to set test current polarity (0° and 180°), then press SET or ENTER to return again.
3. Connect it with the test lead, and live line, null line and ground line are required.
4. Pressing "MEASURE" to start measuring.
5. Measured current and voltage U_c will display on LCD screen.
6. If trigger current > , the alarm will ring, and pressing any button will silence the alarm.
7. Press "MEMO" as required to store the test result.
8. If the display shows  then live line is opposite direction to null line, and the measurement will not perform.

Measurement Data Storage

1. Press "SAVE" after measuring. Measurement data will be stored in the memory.

Read Stored Data

1. When there is stored data in the tester, it will read the data through "READ".
2. Press READ and the LCD will display the stored number.
3. If you want to view the appointed storage recording, press SET and ▲/▼ to select the stored number.
4. Press ENTER and the LCD will display the stored data.
5. Repeat step 2 to step 4, you can read stored data with the next number.
6. If you want to delete the data, press CLEAR. CLR will display, then press ENTER, the data will be deleted. If ENTER is pressed before pressing CLEAR button, the data won't be deleted and the system will return back.
7. Press MEASURE to return back.
8. Pressing MEASURE or using the rotate knob during the above operation will stop the current operation, and return back to normal test state.

Clear Stored Data

1. Under the stand-by state, press CLEAR once.
2. "CLr" will display on the main-screen, the number of storage cells to be cleared will display on the sub-screen.
3. Press ENTER to delete the appointed storage data, the number will automatically after deleting.
4. Under the stand-by state, if the display reads "CLr" when pressing CLEAR, press CLEAR again, "CLr ALL" will display on the LCD.
5. If you press CLEAR again, it will quit the current operation.
6. Press ENTER during the display of "CLr ALL" to clear all data, it will return back to normal test state after completing.
7. Pressing MEASURE or using the rotate knob during the above operation will quit the current operation and return back to normal test state.

Input Voltage

When performing the external alternating voltage measurement, if the input voltage is beyond 440V (RMS), the meter will display ">440V".

When input voltage is beyond 30V, "⚠" will display on the LCD to remind you of safety.

Backlight Indication

Press backlight and it will automatically go off after 30 seconds.

Auto Power Off

1. If there is no operation for 10 minutes, the meter will power off automatically; rotate the switch to OFF position after powering off automatically, and it will operate normally after 5 seconds.
2. Press BACKLIGHT when powering on, Auto Power Off function will be canceled for the meter.
3. Auto Power Off function can't be used under the high voltage state.

Overheating Alarm

When it is too hot inside, the alarm will ring, "HOT" will display on the LCD.

Low Battery Voltage Alarm

When the batter voltage meter is low,  will display on the top right corner. At this time, batter should be replaced.

Battery Replacement

Warning

To avoid the electric shock, before replacing the battery and opening the back cover of meter, please be sure that the meter is powered off and test pen is not connected with any circuit to be tested. Please ensure that battery cover is installed well before using meter. Only a battery with the same model or electrical specifications should be replaced.

If  is displayed on the screen, it means that the battery load voltage is lower than the lowest voltage guaranteeing the measurement error limit, and the meter alarm will sound. The battery should be replaced with a new one. Please replace the battery according to the following steps:

- a) The test pen should be disconnected from the test circuit. Rotate the functional shift knob to “OFF” position, and remove the test pen from the input jack.
- b) Use a screwdriver to remove the battery cover screw and open the battery compartment. The battery cover can be moved downward. Don't use a sharp tool to open it forcibly, otherwise, the enclosure will be damaged.
- c) Take the old batteries and replace them with six 1.5V batteries. Be careful to not mix new batteries with old batteries.
- d) Replace the battery cover and return the screw, securely.

General Features

- Comply with IEC/EN 61010-1 1000V CAT II, 600V CAT III Safety Standards
- Maximum common mode voltage: 600V AC RMS
- Display method: it is displayed on the LCD with maximum value at 6000
- Measuring range selection: auto/manual measuring range
- Frequency detection: auto
- Overrange indication: “>”
- Power supply: 6x1.5V AA battery
- Power consumption: 100mW
- Storage temperature: -20°C~70°C
- Working temperature: 0°C~40°C
- Temperature factor: when the temperature is lower than 18°C or above 28°C, the factor is per (°C) x 0.05 x (appointed accuracy)

- Electromagnetic compatibility: in a 3V/M RF (Radio Frequency) magnetic field, accuracy = appointed accuracy; otherwise, the accuracy is not appointed.
- Storage elevation: 12,000m
- Usage elevation: 2,000m CAT III 600V; 3,000 CAT II600V.
- Size: 200mm×155mm×76mm
- Weight: about 500g (including battery)

Technical Data

Item	Range	Accuracy	Resolution Power
Trip-out time	$\times 1 I_{\Delta N}$ 300ms (slow 500ms) $\times 5 I_{\Delta N}$ 40ms (slow 150ms)	± 3 ms	0.1ms
Trip-out current	$(0.2-1.1) I_{\Delta N}$	$\pm 0.1 I_{\Delta N}$	$0.05 I_{\Delta N}$
Contact voltage	0-99.9V	$\pm (10\% + 0.2V)$	0.01, 0.1V
Alternating voltage $U_{L-N} U_{L-L} U_{L-E}$	0-440V	$\pm (3\% + 3V)$	1V
Frequency	DC, 45-65Hz	± 1 Hz	1Hz
Loop resistance R_L	0-19.9V 10.0-99.9V	$\pm (10\% + 0.2V)$	0.01V 0.1V
R_L test current	$0.5 I_{\Delta N}$	$\pm (10\% + 10d)$	$0.05 I_{\Delta N}$
Multiplying power of test current	x0.5, x1, x5		
Current level ($I_{\Delta N}$)	10mA 30mA 100mA 300mA 500mA		
Trigger phase angle	0° or 180°		

RCD Test Current Selection Table

$I_{\Delta V}$ (mA)	$I_{\Delta x1/2}$ (mA)	$I_{\Delta x1}$ (mA)	$I_{\Delta x5}$ (mA)	Auto (mA)
10	5	10	50	10
30	15	30	150	30
100	50	100	500	100
300	150	300	1500	300
500	250	500	-----	500

Accessories

Content	Number
Operational Manual	1
Battery	1.5V AA Battery x 6
Test Lead	1pc
USB Wire	1pc
Packaging Box	1
CD-ROM	1

Quality Assurance

Thank you for choosing our product. We shall guarantee to keep the product in good repair for one year as of the purchase date. The product is qualified after strict quality testing. Our company will provide complete warranty service according to the Warranty Description.

Warranty Description

Within the warranty period, if the product does not perform as specified, please return the product to us and it will be repaired. Be sure to complete the warranty card on back and package it with the product. Your product will be repaired or replaced for free by our Maintenance Department.

The warranty will be considered null and void if the user attempts any repairs. Warranty service will no longer be provided.

No free warranty service will be provided for the following:

- If failure to use the product or damage is caused by improper operation or used in incorrect conditions, including beyond working load.
- The failure or damage is caused by attempting to repair.
- The failure or damage is caused by artificial factors.
- The failure or damage is caused by natural disaster.