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1. The Statement

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“Caution” mark refers to the condition and operation which may cause damage to the instrument or equipment.

It requires that you must be careful during the execution of the operation. If incorrectly perform the operation or do not follow the procedure, it may damage the instrument or equipment. In the circumstances that such conditions are not met or not fully understood, please do not continue to perform any operation indicated by the caution mark.



“Warning” mark indicates the condition and operation which may cause danger to users.

It requires that you must pay attention during the execution of this operation. If incorrectly perform the operation or do not follow the procedure, it may result in personal injury or casualties. In the circumstances that such conditions are not met or not fully understood, please do not continue to perform any operation indicated by the warning mark.

Before using the instrument, please read this manual carefully and pay attention to the relevant safety warning information.

2. Overview

The instrument is a pen type digital multimeter. It has stable performance, high precision, low power consumption, novel structure. Safe and reliable, it is an ideal measurement instrument for the majority of users.

The instrument can measure DC voltage, AC voltage, DC current, AC current, resistance, diode and connectivity; with non contact voltage detection function, timely remind users to pay attention to the operation safety and allow users to use more safely and assuredly.

This manual includes the relevant safety information and warnings, please read the contents carefully before using the instrument, and strictly follow all warnings and precautions.

3. Safety Instructions

The instrument is designed and manufactured strictly in accordance with the safety standards of IEC61010, and complies with safety standards of double insulation, over-voltage standard 600V CAT III and pollution level 2.

Use the instrument strictly following the manual, otherwise the protection function provided by the instrument may become weakened or invalid.

4. Safety Operation Specification



Warning

In order to avoid possible electric shock or personal injury, please abide by the following specifications :

- ⇒ Before using the instrument, please read "Safety Instructions" firstly, otherwise the protection function provided by the instrument may become weakened or invalid.
- ⇒ Check the outer cabinet firstly before using the instrument. Check whether there are any cracks or damage on the plastic parts. Please carefully check the insulator around the input terminals.
- ⇒ If the instrument works improperly or it has been damaged, please do not use.
- ⇒ Do not touch the charged body with voltage exceeding 30V AC true RMS, 42V AC peak or 60V DC.
- ⇒ The instrument shall be used in accordance with the specified measurement category, voltage or current rating.
- ⇒ When it shows low battery indicator, please replace the battery in time in case of any measurement error.
- ⇒ Please comply with local and national safety code. Wear personal protection equipment (such as approved rubber gloves, masks and flame retardant clothes, etc.) to prevent being damaged by electric shock and electric arc due to exposed hazardous live conductor
- ⇒ Input measurement voltage should not exceed the rated value regulated by the instrument.
- ⇒ Measure a known voltage to verify whether the instrument works properly.
- ⇒ Do not use the instrument around explosive gas, steam or in wet environment.
- ⇒ Check whether there' s any damage, metal exposed or sign of

wear on the insulating layer of the probe. Check the connectivity of the probe.

- ⇒ When measuring, please connect the zero line or the ground line firstly, then connect the live wire; but when disconnecting, please disconnect the live wire firstly, then disconnect the zero line and ground line
- ⇒ When measuring, please put your fingers behind the finger protector of the probe.
- ⇒ Before opening the back cover of the instrument, please disconnect the probe and the measured object.
- ⇒ Please do not use the instrument in the circumstance of a single element whose rating is the lowest in the instrument, probe or accessories exceeding the measurement category (CAT) ratings.

5. Electrical Symbols

	High voltage warning
	AC (Alternating current)
	DC (Direct current)
	AC or DC
	Warning, important safety signs
	Ground
	Fuse
	Equipment with double insulation or reinforced insulation protection
	Conform with European Union standard
	It shows that do not discard this electrical/electronic product into household garbage.
CAT II	CAT II measurement is suitable for test and measurement of the circuits which is directly connected to the power point (socket and equivalent) of the low voltage power supply.
CAT III	CAT III measurement is suitable for test and measurement of the circuits which is connected to the low voltage power source device distribution part of the buildings.
CAT IV	CAT IV is suitable for test and measurement of the circuits which is directly connected to the low voltage power device power supply of the buildings.

6. Instrument Description

1 Test probe

2 Light

3 Non-contact voltage induction area

4 Non-contact voltage indicator

5 Rotary switch

6 Display

7 Button:

HOLD : Data hold

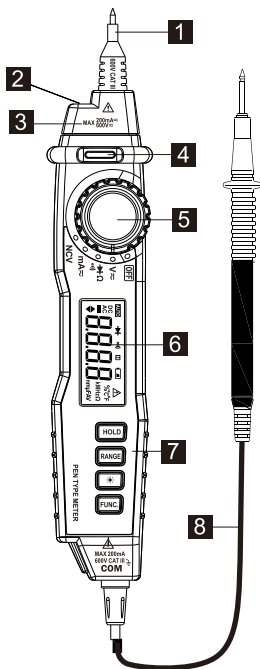
RANGE : Range select

***** : Backlight and light.

Press and hold more than 2 seconds to turn on the backlight and light; press and hold more than seconds again to turn off.

FUNC :functions select

8 Black probe



7. Measurement Operation

7.1 Manual and Automatic Range

The instrument is equipped with manual and automatic range. In automatic range mode, the instrument will select the best range for the input signal detected, so it is convenient that the user does not need to re-select range when changing the measuring signal. The instrument can also be set to manual range. It is defaulted as automatic range mode after the unit is turned on or function is switched, the instrument displays "AUTO" symbol. The operations of entering or quitting manual range are as follows:

1. In automatic range mode, press  button, "AUTO" symbol hides.
2. Press  button to increase the range, when reached the maximum range, the instrument will return to the minimum range.
3. Press and hold  button for 2 seconds to quit manual range mode, the instrument displays "AUTO" symbol.

Note

There is only one range for connectivity and diode function.

7.2 Manual and Automatic Range

If there's no operation 15 minutes after turned on, the instrument will make five short sounds. A minute later make a long sound and turn off automatically.

After turn off automatically, if toggle the switch or press any button among "FUNC." and "HOLD", the instrument will return to work.

If press the "FUNC." button to turn on, and cancel automatic shutdown function.

7.3 AC and DC Voltage Measurement

1. Scroll the rotary knob to $V \approx$, press "FUNC." button, and select DC or AC voltage measurement.
2. Connect the probe to the measured circuit or power supply in parallel, measure the voltage.
3. Read the measurement result on the screen. When measuring DC voltage, the display also shows the voltage polarity of the red probe test point.

Warning



- ◆ Do not input voltage above 600V, it may display higher voltage but there may be risk of damaging the instrument.
- ◆ When measuring high voltage, be careful to avoid electric shock.
- ◆ After completed all measurement operation, disconnect the probe and the measured circuit.

7.4 AC and DC Current Measurement

1. Scroll the rotary knob to $mA \approx$, press "FUNC." button, and select DC or AC current measurement.
2. Cut off the power supply of the measured circuit. Discharge all the high voltage capacitors on the measured circuit.
3. Disconnect the circuit to be tested. Connect the instrument to the circuit to be measured in series.
4. Connect to the power supply of the circuit, and then read the measurement result on the screen. If the display only shows "OL", it means that the instrument exceeds the measurement range of the instrument. When measuring the DC current, the display also shows the voltage polarity of the red probe test point.
5. Disconnect the circuit to be tested. Remove the probe of the instrument and restore the circuit.



- ◆ To avoid possible electric shock, fire or personal injuries, when measuring current, disconnect the power supply of the measured circuit firstly, and fully discharge all high voltage capacitors, then connect the instrument to the circuit in series.
- ◆ Do not input current above 200mA the maximum measurement current value of the instrument, otherwise the fuse in the instrument may be burned.
- ◆ After completed all the measurement operation, disconnect the connection between the probe and the measured circuit.

7.5 Resistance Measurement

1. Scroll the rotary switch to Ω (if it's not resistance measurement function, please press "FUNC." button to switch to resistance measurement function)
2. Connect the probe to the circuit to be measured in parallel, and measure the resistance.
3. Read the measurement result on the screen.



- ◆ To avoid possible electric shock, fire or personal injuries, before measuring the resistance, please disconnect the power supply of the circuit to be measured firstly, and fully discharge all high voltage capacitors.
- ◆ After completed all the measurement operation, disconnect the connection between the probe and the measured circuit.

7.6 Diode Test

1. Scroll the rotary switch to , press "FUNC." button and switch to diode function.
2. Contact the red probe to the anode of the measured diode, and the black probe to the cathode of the measured diode, the reading on the screen is the approximate value of the diode forward voltage drop. If connect reversely, it will display "OL" .

Warning



- ◆ To avoid possible electric shock, fire or personal injuries, before measuring the diode or connectivity, please disconnect the power supply of the circuit to be measured firstly, and fully discharge all high voltage capacitors.
- ◆ If the diode to be tested is open circuit or with reverse polarity, the instrument will display "OL" .
- ◆ After completed all the measurement operation, disconnect the connection between the probe and the measured circuit.

7.7 Connectivity Test

1. Scroll the rotary switch to , press "FUNC." button and switch to connectivity function.
2. Contact the probe to both ends of the measured circuit, when the resistance of the measured circuit is below 50Ω , the buzzer will sound.

Warning



- ◆ To avoid possible electric shock, fire or personal injuries, before measuring the diode or connectivity, please disconnect the power supply of the circuit to be measured firstly, and fully discharge all high voltage capacitors.
- ◆ After completed all the measurement operation, disconnect the connection between the probe and the measured circuit.

7.8 Non-contact Voltage Detection

1. Scroll the rotary knob of the instrument to NCV.
2. Approach the non-contact voltage induction area of the instrument to the live wire of the AC voltage (less than 5mm).
3. The non-contact voltage indicating light of the instrument will light up, at the same time there' s beep tone, which shows that there' s AC voltage on the fire wire.

8. General Technical Specification

- Environment condition of using:
IEC/EN 61010-1 600V CAT III, Pollution level 2
Altitude < 2000 m
Working environment temperature and humidity: 0~40°C
(Do not consider when it is below 80% RH, below 10°C)
Storage environment temperature and humidity:-10~60°C
(Remove the battery when it is below 70% RH)
- Temperature coefficient: 0.1x accuracy/°C
- Maximum voltage allowed between the measuring terminal and the ground: DC or AC 600V RMS
- Fuse protection: fuse FF250mA/250V
- Sampling rate: about 3 times/second
- Display: 3 1/2 LCD screen
- Super range indication: the LCD screen will display "OL"
- Low battery indication: when the battery voltage is lower than the normal working voltage, "" will be displayed on the screen.
- Input polarity indication: automatically display "-"
- Power supply: 2x1.5V AAA batteries
- Dimension: 225x38x26mm

9. Accuracy Specifications

The accuracy applies within one year after the calibration.

Reference condition: the environment temperature 18°C to 28°C,
the relative humidity is no more than 80%.

9.1 DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	$\pm (0.5\% \text{ reading} + 3)$
2V	0.001V	
20V	0.01V	
200V	0.1V	
600V	1V	$\pm (0.8\% \text{ reading} + 5)$

Input impedance: 10M Ω

Maximum input voltage: DC or AC 600V RMS

9.2 AC Voltage

Range	Resolution	Accuracy
2V	0.001V	$\pm (0.8 \text{ reading} + 3)$
20V	0.01V	
200V	0.1V	
600V	1V	$\pm (1.0\% \text{ reading} + 5)$

Input impedance: 10M Ω

Maximum input voltage: DC or AC 600V RMS.

Frequency range: 40Hz~400Hz;

9.3 DC Current

Range	Resolution	Accuracy
20mA	0.01mA	$\pm (1.8\% \text{ reading} + 5)$
200mA	0.1mA	

Input protection: FF250mA/250V fuse.

9.4 AC Current

Range	Resolution	Accuracy
20mA	0.01mA	$\pm (2.0\% \text{ reading } + 5)$
200mA	0.1mA	

Input protection: FF250mA/250V fuse.

9.5 Resistance

Range	Resolution	Accuracy
200 Ω	0.1 Ω	$\pm (1.0\% \text{ reading } + 3)$
2k Ω	0.001 k Ω	
20k Ω	0.01 k Ω	
200k Ω	0.1 k Ω	
2M Ω	0.001M Ω	
20M Ω	0.01 M Ω	$\pm (1.2\% \text{ reading } + 15)$

Input protection: Maximum DC or AC600V RMS

9.6 Diode

Function	Range	Resolution	Test Environment
Diode test 	1 V	0.001V	Testing current: about 1mA; open circuit voltage: about 2.8V. The display will show the approximate value of diode forward voltage drop.

Input protection: Maximum DC or AC600V RMS

9.7 Buzzer on/off

Function	Description	Test Environment
	When the built-in buzzer sounds, the measured resistance is no more than about 50Ω.	Test current: about 1mA; open circuit voltage: about 2.8V.

Input protection: Maximum DC or AC600V RMS

10. Instrument Maintenance

This section provides basic maintenance information and description of battery replacement.

Unless you are experienced repair personnel and have associated calibration, performance test and repair data, otherwise, do not try to repair the instrument.

Warning



To prevent possible electric shock, fire or personal injury:

- ◆ When opening the cabinet, do not use the instrument to do any measurement operation.
- ◆ Remove the input signal before cleaning the instrument.
- ◆ Shall use specified replacement parts. Please ask qualified technical personnel to repair the instrument.

10.1 General Maintenance

Clean the outer cabinet of the instrument with a damp cloth and a small amount of mild detergent. Do not use abrasive or solvent.

10.2 Replace Battery



- ◆ To prevent electric shock or person injury due to reading error, when it shows “” on the display, batteries should be replaced timely.
- ◆ To ensure safety operation and product maintenance, when the instrument will not be used for an extended period of time, please remove the batteries to avoid any product damage caused by battery leakage.
- ◆ In order to prevent electric shock or person injury, before opening the back cover to replace batteries, the instrument should be shutdown, check and ensure that the probe has already been disconnected from the measured circuit.

Please follow the below steps to replace batteries:

- ❶ Turn off the power supply of the instrument.
- ❷ Disconnect the probe with the measured circuit.
- ❸ Loose the screws used for fixing the battery cover by screw knife, remove the battery cover.
- ❹ Remove the old batteries and replace with new ones.
- ❺ Mount the battery cover, tighten the screws.