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1. The Statement

In accordance with the international copyright law, without permission and written consent, shall not copy the contents of this manual in any form (including storage and retrieval or translation into languages of other countries or regions). The manual is subject to change in future edition without prior notice.

Caution



“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



“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 portable digital multimeter. It has stable performance, high precision, low power consumption, novel structure. Safe and reliable, it's an ideal measuring 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 the user to pay attention to operation safety, so it's more safe and rest assured for user to use.

This manual includes the relevant safety information, warning notices and so on, please read the related 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 standard IEC61010 and in conformity with double insulation, over-voltage standard 600V CAT III and pollution level 2 safety standards.

Please follow the manual to use the instrument, otherwise the protection function provided by the instrument may be reduced or invalid.

4. Safety Operation Specification



Warning

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

- ⇒ Before using the instrument, please read the "Safety Instructions" in advance. Use the instrument in strict accordance with the provisions, otherwise the protection ability provided by the instrument may be reduced or invalid.
- ⇒ Check the external shell firstly before using the instrument. Check whether there are any cracks or defects on the plastic parts. Please carefully check the insulator near the input terminal.
- ⇒ If the instrument is not working properly or damaged, please do not use.
- ⇒ Do not touch the electrified body with more than 30V true effective value AC, 42V AC peak or 60V DC.
- ⇒ The instrument shall be used according to the specified measurement category, voltage or current rating.
- ⇒ When it shows low battery indication, 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.
- ⇒ The voltage applied between input terminals or between

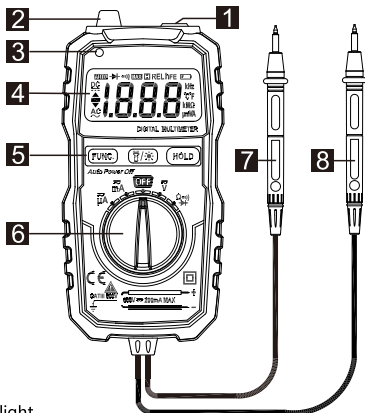
each terminal and earth point cannot exceed the specified ratings of the instrument.

- ⇒ Measure a known voltage to determine whether the instrument works properly.
- ⇒ When measuring, correct input terminal, function shift and range shift must be used.
- ⇒ Do not use the instrument around explosive gas, steam or in wet environment.
- ⇒ Do not use damaged probe. Check whether the insulation layer of the probe is damaged, whether there' s any exposed metal or sign of wear. Check the continuity of the probe.
- ⇒ When measuring, please connect the zero line or the ground line firstly, then connect the live wire; but when disconnecting, please cut off 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 with the measured object.
- ⇒ Do not use the instrument in the environment of exceeding the measurement category (CAT) rating of a single element with the lowest rating among the instrument, probe or accessories.

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
	Low battery
	Conform with European Union standard
	It shows that do not discard this electrical/electronic product into household garbage.
CAT II	CAT II measurement is applicable for testing and measuring circuits directly connecting to the supply point (socket and similarities) of low voltage power supply.
CAT III	CAT III measurement is applicable for testing and measuring circuits connecting to the distribution section of building low voltage power supply.
CAT IV	CAT IV measurement is applicable for testing and measuring circuits connecting to the power supply of building low voltage power supply.

6. Instrument Familiarization



1 Spotlight

2 Non-contact voltage induction zone

3 Non-contact voltage light indicator

4 Display

5 Buttons

FUNC. : Function selection button

☀/☀ : Turn on/off backlight and spotlight, press and hold for 2 seconds, the backlight lights up and turns off automatically after about 15 seconds or press and hold for 2 seconds again to turn off by manual.

HOLD : Data hold button

6 Rotary switch

In 15 minutes of any operation, the instrument will automatically shut down to save energy; to cancel the automatic shutdown function, press the HOLD key to boot, the automatic shutdown function is cancelled. In the automatic shutdown mode, press the function keys or dial switch, the instrument will automatically boot

7 Red probe**8 Black probe****7. Method of Measurement****7.1 AC and DC Voltage Measurement**

1. Scroll the rotary switch to $V \sim$, press "FUNC." button, select DC voltage or AC voltage measurement.
2. Connect the probe in parallel to the circuit or power supply to be measured, measure the voltage.
3. Read the measurement results from the display. When measuring DC voltage, the display also shows the voltage polarity of the red probe test point.

Warning

- ◆ Do not input voltage higher than 600V, it's possible to 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 the measurement operation, make sure to disconnect the probe and the measured circuit.

7.2 AC and DC Current Measurement

1. Scroll the rotary switch to $\overline{mA}$ or $\overline{\mu A}$, press "FUNC." button, select DC current or AC current measurement.
2. Cut off the power supply of the circuit under test. Discharge all the high voltage capacitors on the circuit under test.
3. Disconnect the circuit to be measured. 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 results from the display. If it only displays "OL", it means the input exceeds the measurement range of the instrument. When measuring the DC and AC, it also shows the voltage polarity of red probe test point on the display.
5. Cut off the power supply of the circuit under test. Remove the probe of the instrument and restore the circuit.

Warning



- ◆ To prevent possible electric shock, fire or personal injury, when measuring the current, firstly disconnect the power supply of the circuit under test, and fully discharge all the high voltage capacitors, then connect the instrument to the circuit in series.
- ◆ Do not input above 200mA maximum measurement current value of the instrument, otherwise it may burn the fuse in the instrument.
- ◆ After completed all the measurement operation, make sure to disconnect the probe and the circuit under test.

7.3 Resistance Measurement

1. Scroll rotary switch to , (if not resistance measurement function, please press "FUNC." button to switch to resistance measurement function)
2. Connect the probe to the circuit under test in parallel to measure the resistance.
3. Read the measurement results from the display.

Warning

- ◆ To prevent possible electric shock, fire or personal injury, before measuring the resistance, please disconnect the power supply of the circuit under test firstly, and fully discharge all the high voltage capacitors.
- ◆ After completed all the measurement operation, make sure to disconnect the probe and the circuit under test.

7.4 Diode Test

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

Warning

- ◆ To prevent possible electric shock, fire or personal injury, before measuring the diode or connectivity, please disconnect the power supply of the circuit to be measured firstly, and fully discharge all the high voltage capacitors.
- ◆ If the measured diode is open circuit or in reverse polarity, the instrument will display "OL" .
- ◆ After completed all the measurement operation, make sure to disconnect the probe and the circuit under test.

7.5 Connectivity Test

1. Scroll the rotary switch to Ω_{on} , press "FUNC." button to switch to connectivity function
2. Connect the instrument to both ends of the circuit to be measured, when the resistance of the measured circuit is less than 50Ω , the buzzer will sound.

Warning



- ◆ To prevent possible electric shock, fire or personal injury, before measuring the diode or connectivity, please disconnect the power supply of the circuit to be measured firstly, and fully discharge all the high voltage capacitors.
- ◆ After completed all the measurement operation, make sure to disconnect the probe and the circuit under test.

7.6 Non-contact Voltage Detection

1. Scroll the rotary knob of the instrument to any shift except OFF shift.
2. Put the non-contact voltage induction zone of the instrument close to the live wire of the AC voltage (less than 5mm).
3. Light indicator of the non-contact voltage of the instrument will light up, it shows that there's AC voltage on the live fire.

8. General Specifications

- 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's <80% RH,

<10°C)

Storage environment temperature and humidity: -10~60°C
(<70% RH, remove the battery)

- Temperature coefficient: $0.1 \times \text{accuracy} / ^\circ\text{C}$
- Maximum voltage allowed between the measuring terminal and the ground: 600V DC or AC RMS
- Fuse protection: fuse FF250mA/250V
- Sampling rate: about 3 times/second.
- Display: 3 1/2 bit LCD
- Over range indication: LCD display will show "OL" .
- Low battery indication: when the battery voltage is lower than the normal working voltage, " " will be displayed on the LCD display.
- Input polarity indication: automatically display "—"
- Power requirement: 2x1.5V AAA batteries
- Dimension: 128x61x25mm

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

Input impedance: 10MΩ

Maximum input voltage: 600V DC or AC 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: 600V DC or AC RMS.

Frequency range: 40Hz~400Hz;

9.3 DC Current

Range	Resolution	Accuracy
200uA	0.1uA	$\pm (1.8\% \text{ reading} + 5)$
2000uA	1uA	
20mA	0.01mA	
200mA	0.1mA	

Input protection: FF250mA/250V fuse.

9.4 AC Current

Range	Resolution	Accuracy
200uA	0.1uA	$\pm (2.0\% \text{ reading} + 5)$
2000uA	1uA	
20mA	0.01mA	
200mA	0.1mA	

Input protection: FF250mA/250V fuse.

9.5 Resistance

Range	Resolution	Accuracy
200Ω	0.1 Ω	± (1.0% reading+3)
2kΩ	0.001 kΩ	
20kΩ	0.01 kΩ	
200kΩ	0.1 kΩ	
2MΩ	0.001MΩ	
20MΩ	0.01 MΩ	± (1.2% reading+15)

Input protection: Maximum 600V DC or AC RMS.

9.6 Diode

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

Input protection: Maximum 600V DC or AC RMS.

9.7 Buzzer on/off

Function	Description	Testing environment
	When the built-in buzzer sounds, the measured resistance is less than 50Ω.	Test current: 1mA; open circuit voltage: about 2.8V.

Input protection: Maximum 600V DC or AC RMS.

10. Instrument Maintenance

This section provides the basic maintenance information, including description of replacing fuse and batteries.

Do not try to repair the instrument unless you are experienced repair person and have associated calibration, performance test and maintenance information.

Warning

To prevent possible electric shock, fire or personal injury:

- ◆ When the cabinet is opened, do not use the instrument to do any measurement operation.
- ◆ Remove the input signal before cleaning the instrument.
- ◆ Specified replacement parts shall be used. Please ask the qualified technicians to repair the instrument.

10.1. General Maintenance

Use a damp cloth and a small amount of detergent to clean the outer casing of the instrument. Please do not use abrasive or chemical solvents.

10.2. Replace Fuse and Battery

Warning



- ◆ To prevent electric shock or personal injury caused by error reading, when it displays “” on the screen, the batteries should be replaced in a timely manner.
- ◆ 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.
- ◆ Use the fuse with specified amperage, fuse ratings, voltage rating and fuse speed.
- ◆ To avoid electric shock or personal injury, before opening the back cover to replace batteries, the instrument should be shut down and check to ensure that the probe has already been disconnected from the measuring circuit.

Please follow the following steps to replace the battery:

- ❶ Turn off the power supply of the instrument.
- ❷ Disconnect the probe from the circuit under test.
- ❸ Loosen the screws fixing the back cover, remove the back cover.
- ❹ Remove the old batteries, replace with new batteries.
- ❺ Mount the back cover, tighten the screws.

Please follow the following steps to replace the fuse:

- ❶ Turn off the power supply of the instrument.
- ❷ Disconnect the probe from the circuit under test.
- ❸ Loosen the screws fixing the back cover, remove the back cover.
- ❹ Remove the damaged fuse, replace with new fuse.
- ❺ Mount the battery cover, tighten the screws.