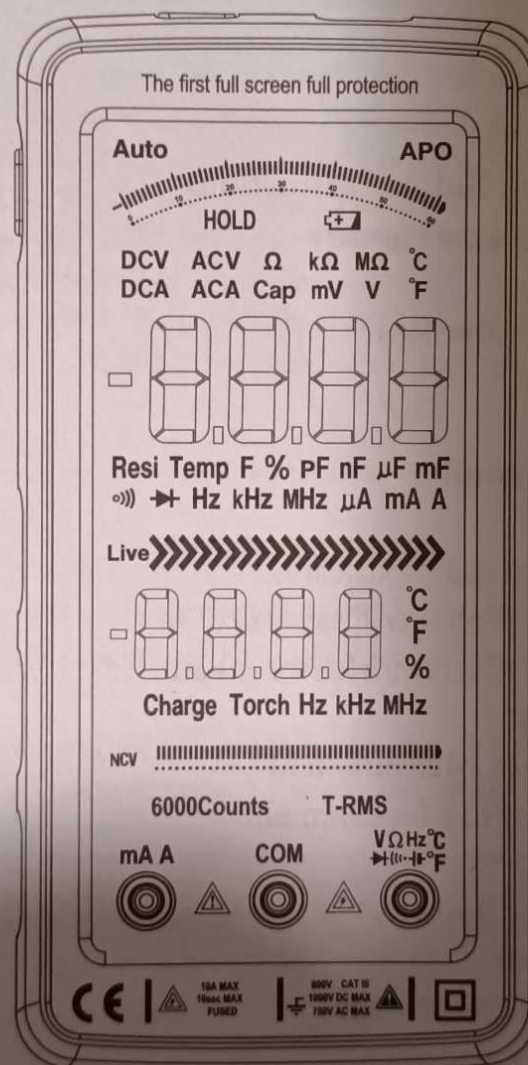


Smart Meter User Manual



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This device is a 3 5/6 digital multimeter with stable performance and reliable quality. The meter adopts LCD display screen with analog bar display. Users in the process of use, truly achieve continuous power operation, do not need to turn the dial to select functions. According to the input ac/DC voltage/resistance will be automatically identified and measured. It can be used to measure DC voltage, AC voltage sine RMS, DC current, AC current sine RMS, resistance, capacitance, Live-line indication, duty ratio, diode on/off test, symbol unit data hold and automatic power off. The meter is equipped with a high performance MCU processor. It is powered by high-capacity rechargeable batteries with full functions and accurate measurement. The multimeter is an ideal tool for laboratory, factory, radio enthusiasts and household.

1. Safety Information

Warning

Pay attention that wrong operations may cause electric shock or damage to the meter. Please follow the normal safety regulations and user manual when using this product.

In order to take full advantages of the functions and ensure safety, please read the instructions in this manual carefully.

The meter complies with the general technical conditions of GB/T 13978-2008 digital multimeter and complies with the safety requirements of GB4793.1-1995 (IEC-61010-1, IEC-61010-2-032) electronic measuring requirements. It is a secondary pollution. The overvoltage standard is CAT III 600V.

Please follow the safety instructions to ensure safe use of the device.

With appropriate use and protection, the multimeter will give you a satisfactory service.

1.1 Preparations

1.1.1 When using the meter, the user must follow the standard safety rules:

- General anti-shock protection
- Avoid misuse of the meter.

1.1.2 After receive the meter, please check if it is damaged in transit.

1.1.3 Store under rough conditions or after shipment, please check to see if the product is damaged or not.

1.1.4 The probe pens must be in good condition. Before use, please check if the probe pens insulation is damaged, the wire is exposed or not.

1.1.5 Using the original probe pens will ensure safety. If not, the same type or same grade ones will be needed.

1.2 Using

1.2.1 When using the meter, please make sure the functions and measuring ranges are correct,

1.2.2 Don't exceed the protection measuring range.

1.2.3 Do not touch the top of the test leads (metal part) while the meter is connected to the measurement circuit.

1.2.4 During measurement, please take care to keep finger behind stylus guard if the measured voltage is above 60V DC or 30V AC (RMS).

1.2.5 Do not measure the voltage if the voltage between the measuring terminal and ground exceeds 1000VDC And 750V AC.

1.2.6 Before turning the switch to change the measurement function, please remove the test leads from the circuit which is under test.

1.2.7 Do not measure resistors, capacitors, diodes and on/off when they are charged.

1.2.8 Be careful to avoid the instrument connected to the voltage power when measuring range under current, resistance, capacitance, diode and circuit on/off.

1.2.9 Do not measure the capacitance until the capacitor is fully discharged.

1.2.10 Do not use this meter near explosive gases, vapors or dust.

1.2.11 If there is any abnormal or faulty performance of the meter, stop to use it.

1.2.12 Do not use the device unless the instrument case and battery cover are fully fastened in place.

1.2.13 Do not store or use the meter in direct sunlight, hot or humid conditions.

1.3 Symbols

 Warning (an important safety symbol, please refer to Operation Manual before operating the meter.)

 It can be used on hazardous live conductors.

 Double insulation protection (class II)

CAT III Overvoltage (installation) class III in accordance with IEC-61010-1 Pollution degree 2 refers to the level of impulse withstand voltage protection provided.

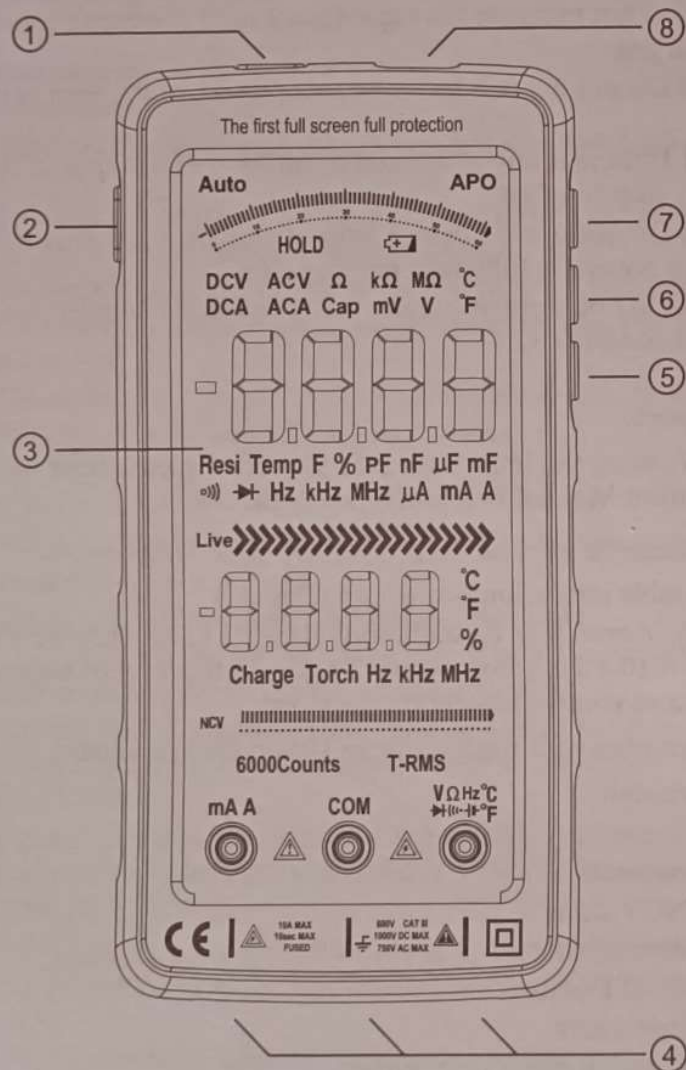
 Complies with the European Union (EU) standard

 Ground.

2.1 Components

- 1) NCV Zone
- 2) Power button
- 3) LCD Display
- 4) Input jack
- 5) Capacitor function button,
- 6) Data holding、Torch and backlight

- 7) Selection button
- 8) Torch and function indicator



2.2 Switch and button and description

Power button: Press this button more than 3 second, then can open and close the power

Selection button: select function manually

Function keep and Torch: press this button, keep the data holding, press again then clear the data holding. Press long than 3 second, then open the torch. Press again then close the torch. Torch cannot close automatically need close manually.

Capacitance button: shortly press one time enter to capacitance mode, press again enter to auto mode cycle

3. Specifications

The meter should be designated one year as a cycle and re-calibrated at 18 °C ~ 28 °C and relative humidity less than 75%.

3.1 Summary

Manual range and Auto range.

Full range overloaded protection.

The maximum voltage allowed between the measuring terminal and ground: 1000V DC or 750V AC

Fuse protection: uA、mA Gear fuse:FF630mA/250V; A Gear fuse: FF20A/250V

Working height: Max 2000m

Monitor: 6000 counts LCD monitor with analog bar.

Maximum display value: 5999 digits

Polarity indication: automatic indication, '-' indicates negative polarity.

Over-range display: '0L' or '-0L'.

Sampling time: about 3 times / second

Unit display: a function, power unit display.

Automatic power off time: about 15 minutes when no signal

Battery type: 3.7V/2800mA rechargeable battery

Temperature coefficient: less than $0.1 \times \text{accuracy} / ^\circ\text{C}$

Working temperature: $18^\circ\text{C} \sim 28^\circ\text{C}$

Storage temperature: $-10^\circ\text{C} \sim 50^\circ\text{C}$

Size: $150(\text{L}) \times 75(\text{W}) \times 24(\text{H})\text{mm}$

Weight: about 2000g (including battery)

4. Test range

4.1 DC Voltage

Measuring Range	Resolution	Accuracy
6V	0.001V	$\pm (0.5\% \text{ readings} + 3 \text{ digits})$
60V	0.01V	
600V	0.1V	$\pm (0.8\% \text{ readings} + 10 \text{ digits})$
1000V	1.0V	

- Input sensitivity: 0.8V DC voltage

- input resistance: $10\text{M}\Omega$

- Maximum input voltage: 750V AC (RMS) or 1000V DC

4.2 AC Voltage

Measuring Range	Resolution	Accuracy
6V	0.001V	$\pm (0.8\% \text{ readings} + 3 \text{ digits})$
60V	0.01V	
600V	0.1V	$\pm (1.0\% \text{ readings} + 10 \text{ digits})$
750V	1.0V	

- Input sensitivity: 0.8V AC voltage

- Input resistance: $10\text{M}\Omega$

- Maximum input voltage: 750V AC (RMS) or 1000V DC

- Frequency range: 50 ~ 1000Hz True RMS

4.3 AC and DC Current

Measuring Range	Resolution	Accuracy
6000mA	1mA	$\pm (1.0\% \text{ readings} + 5 \text{ digits})$
10A	0.01A	$\pm (2.5\% \text{ readings} + 10 \text{ digits})$

- measuring range fuse (FF20A/250V)

- Maximum input current : 10A DC or AC RMS;

- When the measurement current is greater than 5A, the continuous measurement time shall not be longer than 15 seconds, and the current measurement shall be stopped for more than 1 minute after measurement ;

- Frequency response: 40Hz ~ 1000Hz true RMS (AC current only).

4.4 Resistance

Measuring Range	Resolution	Accuracy
600 Ω	0.1 Ω	$\pm (0.8\% \text{ readings} + 3 \text{ digits})$
6k Ω	0.001k Ω	
60k Ω	0.01k Ω	
600k Ω	0.1k Ω	
6M Ω	0.001M Ω	$\pm (1.2\% \text{ readings} + 3 \text{ digits})$
60M Ω	0.01M Ω	$\pm (2.5\% \text{ readings} + 5 \text{ digits})$

- Open circuit voltage: about 1.0V

- Overload protection: 250V DC or AC (RMS)

4.5 Capacity

Measuring Range	Resolution	Accuracy
60.00nF	0.01nF	$\pm (4.0\% \text{ readings} + 20 \text{ digits})$
600.0nF	0.1nF	
6.000 μ F	0.001 μ F	
60.00 μ F	0.01 μ F	
600.0 μ F	0.1 μ F	
6.000mF	0.001mF	$\pm (5.0\% \text{ readings} + 5 \text{ digits})$
60.00mF	0.01mF	
100.0mF	0.1mF	For reference

- Overload protection: 250V DC or AC (RMS)
- Input voltage range: 200mV~10V ac (As the measured frequency increases, the input voltage should also increase)

4.6 Diode Test

Measuring Range	Resolution	Function
	0.001V	Display approximate diode forward voltage value

- Forward DC current is about 1mA
- Reverse DC voltage about 3.2V
- Overload protection: 250V DC or AC (RMS)

4.7 Circuit On/Off Test

Measuring Range	Resolution	Function
	0.1 Ω	1) If the resistance of the circuit to be tested is less than 50 Ω , buzzer attached to the instrument may sound. If less than 10 Ω , the buzzer must sound.

- Open circuit voltage: about 1.0V
- Overload protection: 250V DC or AC (RMS)

4.8 Temperature Test

Measuring Range	Accuracy	Resolution
-40°C — 300°C	$\pm (1.0\% + 4d)$	1°C
301°C — 1000°C	$\pm (1.9\% + 5d)$	1°C
-40°F — 600°F	$\pm (1.2\% + 6d)$	1°F
601°F — 1832°F	$\pm (1.9\% + 6d)$	1°F

- Overload protection: 250V DC or AC (RMS)

4.9 Frequency

Measuring Range	Accuracy	Resolution
9.999Hz	0.001Hz	$\pm (0.8\% \text{ readings} + 3 \text{ digits})$
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999kHz	0.001kHz	
99.99kHz	0.01kHz	
999.9kHz	0.1kHz	

- Maximum Frequency: 1MHz
- Sensitivity: 2.0V rms

5. Operation Instructions

5.1 Data hold

In the process of measurement, if need to hold the reading, you can press HOLD key to display.

The displayed value of the device will be locked, and then to press the key again to release the reading hold.

5.2 Torch

1) If the ambient light is too dark, difficulties to get resulting, press the Torch tag more than 3seconds, press again then close the torch

5.3 Automatic Power Off

1) If there is no operation for any 15 minutes after power-on, the meter will go to sleep state to automatically shut down to save power. One minute before the shutdown, the buzzer has 5 prompts, and then goes to sleep after a long time before shutdown. (Note: there is still 3 ~ 6uA working current after automatic shutdown, it is better to go to OFF or unplug the battery for a long time)

2) After automatically shut down, press the power key, the meter resumes working status.

3) If the "SEL" key is pressed while powering on, the auto power off function will be canceled.

5.4 Buzzer

When any key is pressed or the function switch is turned on, if the function key is active, the buzzer beeps (about 0.25 seconds). If the measured voltage or current is greater than the set alarm value, for example, the AC voltage is greater than 750V, the DC When the voltage is higher than 1000V the buzzer will continue to sound as over-range warning. The buzzer will continuously emit 5 sounds about 1 minute before the auto-off and the buzzer will give a long sound warning; When the auto power off function is canceled, the buzzer will be issued five consecutive warnings every 5 minutes.

5.5 Measurement Preparation

1) Press the power key more than 3 second, If the battery voltage is low you should recharge the battery.

2) "△" symbol indicate that the input voltage or current should not exceed the indicated value, which is to protect the internal circuit from damage.

3) Set the switch to the desired measurement function and range.

5.6 AC & DC voltage/ Resistance/ Circuit On/Off Test measurements

△ Warning

Risk of electric shock

Pay special attention to avoid electric shock when measuring high voltage.

Do not enter voltages above 1000V DC or 750V rms to prevent electric shock or damage to the meter.

Do not apply voltages in excess of 1000VAC or 750VAC between the common terminal and earth ground in case of electric shock or damage to the meter.

1) Press power key more than three second enter to Auto mode

2) Connect black test leads to COM and red test lead to input voltage /resistance/ Circuit On/Off jack , the other end of the lead to the power supply and resistance of the circuit to be tested. Test lead reliably contact test point. Meter automatically judge AC voltage, DC voltage, resistance, and automatically display the polarity of DC voltage signal.

3) When the measuring voltage is greater than about 0.8V, whether ac voltage or DC voltage, the instrument will compare with the size of the DC component and AC component, take its

larger component, and then according to the size of the measured value in 6V/60V/600V/750V/1000V (maximum AC voltage 750V, maximum DC voltage 1000V) between automatic switch, Then the measured measurement value is displayed on the liquid crystal. When the measured resistance is less than about 50 Ω , the built-in buzzer sounds

Note:

- 1) Indicates the maximum input voltage is 750V AC or 1000V DC.
- 2) If the meter measured high voltage, please be careful shock
- 3) Disconnect the test lead from the circuit under test after all measurement operations have been completed

5.7 AC & DC Current Measurement

Warning

Risk of electric shock

Do not attempt to make current measurements on the circuit when the voltage between the open circuit voltage and ground exceeds 250V. If the fuse is blown during measurement, it may damage the meter or yourself.

To avoid damage to the meter or the device under test, check the fuse of the meter before making current measurements. When measuring, use the correct input sockets, function gears and measuring range. When the test pen is inserted in the current input socket, do not connect the other end of the test pen to any circuit in parallel

- 1) Connect the black test lead to the COM input socket. connect the red test lead to the current input socket; the meter can identify the AC or DC current automatically
- 3) Disconnect the circuit under test. Connect the black test lead to the disconnected (lower voltage) end of the circuit, and connect the red test lead to the other end of the disconnected circuit (which has a higher voltage).

- 4) Connect the circuit power, and then read the displayed readings. If the display only shows "OL", this means that the input exceeds 10A

5.8 Diode Test

Warning

Risk of electric shock.

To avoid damage to the meter or the device under test, all power to the circuit under test should be cut off and all high voltage capacitors fully discharged before measuring the resistance.

Test a diode outside the circuit

- 1) Insert the red and black test lead into the COM jack, Connect the other end of the red test lead to the diode anode and the other end of the black test lead to the diode cathode for testing.
- 2) Connect the other end of the red stylus to the diode anode and the other end of the black stylus to the diode cathode for testing.
- 3) The meter shows the approximate forward voltage drop of the diode under test. If the polarity of the test leads is reversed, the meter will display "OL."

In the circuit, the normal diode should produce a forward voltage drop of 0.5V to 0.8V; however, the reverse bias reading will depend on the change in resistance of the other channels between the two test leads

5.9 Capacitance Measurement

⚠ Risk of electric shock.

To avoid damage to the meter or the device under test, disconnect all power to the circuit under test and fully discharge all high-voltage capacitors before measuring capacitance. DC voltage gear to determine the capacitor has been discharged.

- 1) Insert the red and black test lead into the **input** jack, Press "SEL" button to the capacitance test
- 2) After the capacitor is completely discharged, the other end of the red and black pen is connected to both ends of the capacitor to be measured. And the LCD reads the measured capacitance value

Note:

- 1) To improve the accuracy of measurements below 10nF, subtract the distribution capacitance of the meter and leads.
- 2) When measuring large capacitance, stable reading takes a certain amount of time.
- 3) When measuring polar capacitor, pay attention to the corresponding polarity to avoid damaging the instrument.

5.10 Temperature Measurement

⚠ Warning

Do not enter a temperature higher than 60V AC voltage 30V AC voltage to avoid damage or instrument damage

- 1) Press the power key 3 second, press **SEL** to Temperature Measurement mode, select the Celsius or Fahrenheit as required.
- 2) Connect the negative terminal (black) and the positive terminal (red) of the K type thermocouple to the **COM** jack and

input jack separately.

- 3) The other end of the thermocouple (test side) close to the surface of the measured object.
- 4) To be read by the liquid crystal display to read the measured temperature value.

Note:

K-type thermocouple distribution of the highest measurement temperature of 250

5.11 Frequency test

- 1) Insert the red and black test lead into the **input** jack, Press "SEL" button to the frequency test
- 2) Connect the other ends of the red and black watch pens to both ends of the signal source or load for measurement
- 3) The measured frequency value is read by the LCD

5.12 Firing line and NCV test

- 1) Press power button more than 3 second, press SEL button to enter electroprobe test mode
- 2) The non-contact voltage zone of the instrument is close to the live line of AC voltage (less than 5mm). When the weak signal is detected, the display screen of the instrument pair will show "--L" and the red indicator light will light up. As the signal increases, the instrument display screen will display "--H", while the red indicator light is on, the closer to the AC voltage line, the buzzer will give out a higher frequency alarm sound
- 3) Press SEL button, switch to the wire on the liquid crystal display Live characters, red test lead (COM black test lead must pull out) close to the fire test points, and a reliable contact with that point, if the test point to the line of fire, instrument display screen will show "-- -- H", red light is on at the same time, the continuation of the alarm buzzer

Note:

- 1) Stylus detection can be influenced by socket design, insulation thickness and type of factors. Voltage may still exist even without indication. Do not rely on a stylus detector to determine whether a shielded line has voltage.
- 2) External interference sources (such as the flashlight and motor) may trigger the probe by mistake.

6 Maintenance

6.1 Battery Replacement

⚠ To avoid false readings that could result in electric shock or personal injury, replace the battery immediately with the “” symbol on the meter's display.

The meter is powered by rechargeable battery, which does not need to be replaced, but it still needs to be charged in time to avoid running out of power, which makes it difficult to recharge again. Please refer to the charging method of mobile phone for details.

6.2 Probes Replacement

⚠ Warning

When changing the test leads, the same or equivalent test lead must be replaced. The pen must be in good condition, the level of the pen: 1000V 10A.

If the pen insulation is damaged, such as wire exposed, you must replace the pen.

7 Appendix

- | | | |
|----|-------------------|-------------------------|
| 1) | Probes | Grade: 1000V 10A 1 pair |
| 2) | User Manual | 1 pc |
| 3) | Temperature probe | 1 pair |

* The contents of this manual are subject to change without notice *

* The contents of this manual are considered correct. Please contact the manufacturer if the user finds errors, omissions, etc.*

* The company is not responsible for accidents and hazards caused by user's wrong operations *

* The functions described in this manual do not justify the use of the product for special purposes *