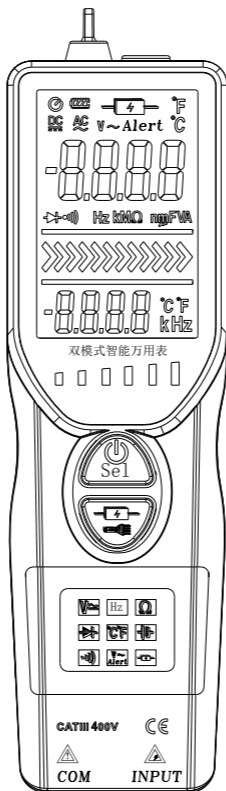


Dual mode smart meter User Manual



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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 13978-92 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 II 400V.

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 400 V.

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 II 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. Descriptions

- The meter is a portable, professional measuring instrument, with LCD digital display, and a backlight. Users can read the data easily. One-handed operation of the range switch facilitates measurement, with overload protection and low battery indication. Whether for professionals, factories, schools, hobbyists or families, it is an ideal multifunction instrument.

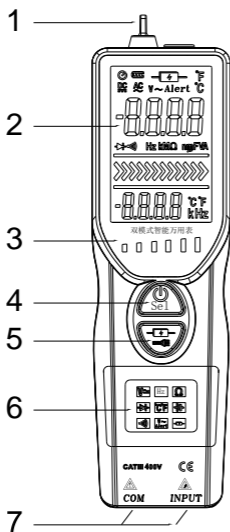
- The meter is for AC current, DC current, AC voltage sine wave True RMS, DC voltage, duty cycle, resistance, capacitance frequency, measurement and firing line, diode test, temperature measurement.

- Meter is with automatic range function.


- Meter has a reading hold function.
- Meter with automatic shutdown function.


2.1 Components

- 1) NCV Zone
- 2) LCD Monitor
- 3) Voltage indicator
- 4) Power button and function selection
- 5) Live wall measurement mode/Torch light switch
- 6) Measuring indicator
- 7) Test probe jack

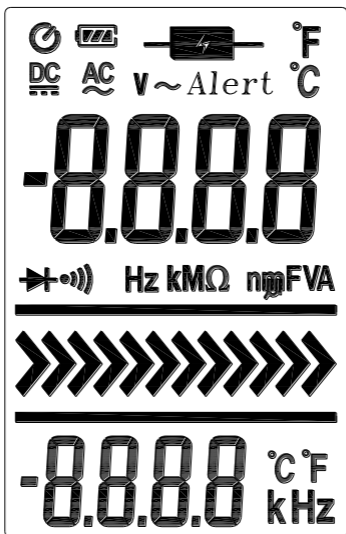









2.2 Switch and button and description

8)  Button: Power button and function selection

9)  Button: Live wall measurement mode/Torch light switch

2.3 LCD Display



	AC
	DC
	Automatic Power off
	BATTERY WEEK
	Live wall measurement mode
V ~ Alert	Voltage indicator alert
°C	Temperature for °C
°F	Temperature for °F
	Circuit On/Off Test
	Diode, On/off
Hz, kHz	Hertz, kilohertz(frequency)
Ω , k Ω , M Ω	Ohm, kilo-ohm, megaohm (resistance)
nF, μ F, mF	NaFala, micro-Farah, millifara(capacity)
mV, V	Voltage
A	Current

3. Specifications

Auto range.

Full range overloaded protection.

The maximum voltage allowed between the measuring terminal and ground: 400V DC or 400V AC

Working height: Max 2000m

Monitor: 6000 counts LCD monitor.

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

Power: DC 3V

Battery type: 1.5V AAA battery

Battery under-voltage indication: LCD display .

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

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

Storage temperature: $-10^{\circ}\text{C} \sim 50^{\circ}\text{C}$ (without battery)

Size: $150 \text{ (L)} \times 42 \text{ (W)} \times 20 \text{ (H)} \text{ mm}$

Weight: about 95g (including battery)

3.2 Technical Specifications

Ambient temperature: $23 \pm 5^{\circ}\text{C}$ Relative humidity $< 75\%$

3.2.1 DC Voltage

Measuring Range	Resolution	Accuracy
6V	0.001V	$\pm (0.5\% \text{ reading} + 5\text{digit})$
60V	0.01V	
400V	0.1V	$\pm (0.8\% \text{ reading} + 5\text{digit})$

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

- Minimum voltage: 0.9V DC voltage
- Maximum input voltage:400V AC(RMS) and 400V DC

Note:

In the small voltage range, the test leads not connected measured circuit, the meter may be beating the readings,

This is normal because of the high sensitivity of the meter, which does not affect the actual measurement results.

3.2.2 AC Voltage

Measuring Range	Resolution	Accuracy
6V	0.001V	± (0.8% reading + 3digit)
60V	0.01V	
400V	0.1V	± (1.0% reading + 10digit)

- Input resistance: 10MΩ
- Minimum voltage: 1.0V AC voltage
- Maximum input voltage: 400V AC(RMS)and 400V DC
- Frequency range: 50 ~ 1000Hz True RMS

Note:

In the small voltage range, the test leads not connected measured circuit; the meter may be beating the readings,

This is normal because of the high sensitivity of the meter, which does not affect the actual measurement results.

3.2.3 Resistance

Measuring	Resolution	Accuracy
-----------	------------	----------

Range		
600Ω	0.1Ω	± (0.8% reading + 3digit)
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	± (1.2% reading + 3digit)
20MΩ	0.01MΩ	

- Open circuit voltage: about 1.0V

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

3.2.4 Capacity

Measuring Range	Resolution	Accuracy
60.00nF	0.01nF	± (3.0% reading + 5digit)
600.0nF	0.1nF	
6.000μF	0.001μF	
60.00μF	0.01μF	
600.0μF	0.1μF	
6.000mF	0.001mF	
60.00mF	0.001mF	± (5.0% reading + 5digit)

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


- Input voltage range: 200mV~10V ac (As the measured frequency increases, the input voltage should also increase)

3.2.5 Frequency

Measuring Range	Resolution	Accuracy
10Hz	0.01Hz	$\pm (0.8\% \text{ reading} + 3\text{digit})$
100Hz	0.1Hz	
1kHz	1Hz	


- Open circuit voltage: about 1.0V
- Overload protection: 250V DC or AC (RMS)
(With the increase of the measured frequency, the input voltage should also increase)

3.2.6 Diode Test

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

- Forward DC current is about 1mA
- Reverse DC voltage about 3.0V
- Overload protection: 250V DC or AC (RMS)

3.2.7 Circuit On/Off Test

Measuring Range	Resolution	Function
	0.1 Ω	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)

3.8、 Voltage indicator Alert (V~Alert)

Measuring Range	Instruction
Low range	Display 1/3 analog bar, Buzzer alert , Voltage indicator green light
Middle range	Display 2/3 analog bar, Buzzer alert higher , Voltage indicator green and orange light
High range	Display full analog bar, Buzzer alert highest , Voltage indicator green , orange and red light

- Voltage range: 90V ~ 1000V AC voltage

07

3.9、 Live wall measurement

Measuring Range	Instruction
Low range	Display 1/3 analog bar, Buzzer alert, Voltage indicator green light
Middle range	Display 2/3 analog bar, Buzzer alert higher, Voltage indicator green and orange light

High range	Display full analog bar, Buzzer alert highest, Voltage indicator green ,orange and red light
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- Voltage range: 6V ~ 1000V AC voltage


3.2.10 Temperature Test

Measuring Range	Accuracy	Resolution
0°C – 300°C	±(1.0%+4d)	1°C
301°C – 1000°C	±(1.9%+5d)	1°C
32°F – 600°F	±(1.2%+6d)	1°F
601°F – 1832°F	±(1.9%+6d)	1°F

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

4. Operation Instructions

4.1 AC & DC voltage/ Resistance/ Connectivity testing

4.1.1 Connect the red test probe input jack , press  power on , the meter on AUTO working mode.

4.1.2 The test probe parallel connect to voltage source and resistance。Meter can auto recognize the AC voltage DC voltage and resistance. Can display the frequency value of AC single.

4.1.3 If the meter measured reading less than 50Ω , it will be issued a "beep" alarm sound.

4.1.4 Can read the value form the LCD display

 Alert:

1. Do not input higher than 400V voltage. it can be test but that is possible to burn the meter

2. when test high voltage, please take care for electric shock.

3. when finish test, please broke the link of the testing

4.2 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 test lead into the **input** jack, black link COM jack, Power on and press "SEL" to \rightarrow mode for testing.

2) Connect 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.

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

4.3 Circuit On/Off 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 should be fully discharged before the beep on-off test.

On-off test:

1) Insert the red test lead into the **input** jack, black link COM jack, Power on and press “SEL” to \rightarrow mode for testing.

2) Connect other end of the red test lead and the other end of the black test lead to the resistance for testing.

If the resistance of the circuit under test is less than 50Ω , the buzzer inside the meter may sound. When the built-in buzzer sounds and the indicator lights,

Notes

- on-off test can start test when power on meter
- If the test leads are open or the measured line resistance is greater than 60Ω , the display shows "OL"

4.4 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 gesr to determine the capacitor has been discharged.

The meter capacitance test range 60.00nF、600.0nF、6.000uF、60.00 uF、600.0 uF、6000 uF、60mF。

- 1) Insert the red test lead into the **input** jack, black link COM jack, Power on and press “SEL” to capacitance mode for testing.
- 2) After the capacitor is fully discharged, connect the other end of the red and black test leads to the two ends of the capacitor under test. The measured capacitance value is read by LCD display.

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.

4.5 Frequency test

⚠ Risk of electric shock.

Please measure less than 250V AC voltage frequency to avoid electric shock

- 1) Insert the red test lead into the **input** jack, black link COM jack, Power on and press “SEL” to frequency mode for testing.
- 2) Connect the other end of the red and black test leads to the two ends of the single or loading to test
- 3) Can get the frequency value form the LCD display.

Notes

Test range is 10Hz ~ 6000Hz, when the frequency less than 10Hz, the LCD display show 000.0”;

4.6 Temperature Measurement

Warning


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

- 1) Power on the meter and press “SEL” to temperature mode
- 2) Connect the negative terminal (black) and the positive terminal (red) of the K type thermocouple to the **COM** input 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°C

4.7 Socket null or live line recognize and wall live line recognize /test

4.7.1 Press  power on the meter

4.7.2 Put the meter NCV zone to live (firing) line (<5mm,) the meter display the value line, near the Live line the value line is higher and the alarm sound more clear. at same time , the voltage indicator light will be on

4.7.3 Long press the  button, switch to wall live line test mode, the meter display the value line more ,near the wall Live line the value line is higher and the alarm sound more clear . at same time , the voltage indicator light will be on

Note


1) NCV and live line test may effect by socket style, Insulation thickness. Even on indicator but the voltage maybe have .do not judge the shielded line voltage by NCV testing.

2) When meter input the voltage , the voltage light can be on because the induced voltage

3External environment interference source(flashlight, electrical machine)may effect NCV testing value

5 Maintenance

5.1 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.

To avoid electric shock or personal injury, shut off the machine and check that the test pen has been disconnected from the measurement circuit before opening the battery cover to replace the new battery.

Please follow the steps below to replace the battery

- 1) Turn off the meter power.
- 2) Remove all test leads from the input socket.
- 3) Unscrew the cover battery cover screw and remove it.
- 4) Remove the battery cover.
- 5) Replace the new 6F22 9V battery
- 6) Install the battery cover as it is and tighten the screw.

Note:

The polarity of the battery can not be installed reversely.

5.2 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.

6. Appendix

1)	Probes	Grade: 1000V 1 pair 10A
2)	User Manual	1 pc
3)	Temperature probe	1 pair
4)	Battery	1.5V AAA 2pc

* 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 *

Warranty Instructions:

Product certification is required when your device in the use of the failure to seek maintenance services. And at the same time, please provide your purchase invoice.

(1) When your device fails to use, please contact our repair service department as soon as possible, to avoid delaying your use and warranty period.

(2) The manufacturer provides users one year warranty from the date of purchase. Within warranty period time, we will provide free warranty service after the company professional confirm that the defectives not caused by users' wrong operation.

(3) If the product is out of warranty valid time, we will charge your maintenance fees (repair fee + component fee).

(4) Within the warranty period time, we will charge maintenance cost according the following situations:

- *Users improper use of device or damage caused by accident leads to damaged components and burned board.
- *The device has been opened, inspected, or modified by those who are not the company professionals.
- * Failures caused by not following instruction manuals.
- * The device was not manufactured by the company.
- * Shipping cost and other related costs due to maintenance are to the users' account.
- * Batteries, testing leads and related functional accessories are out of warranty policy.