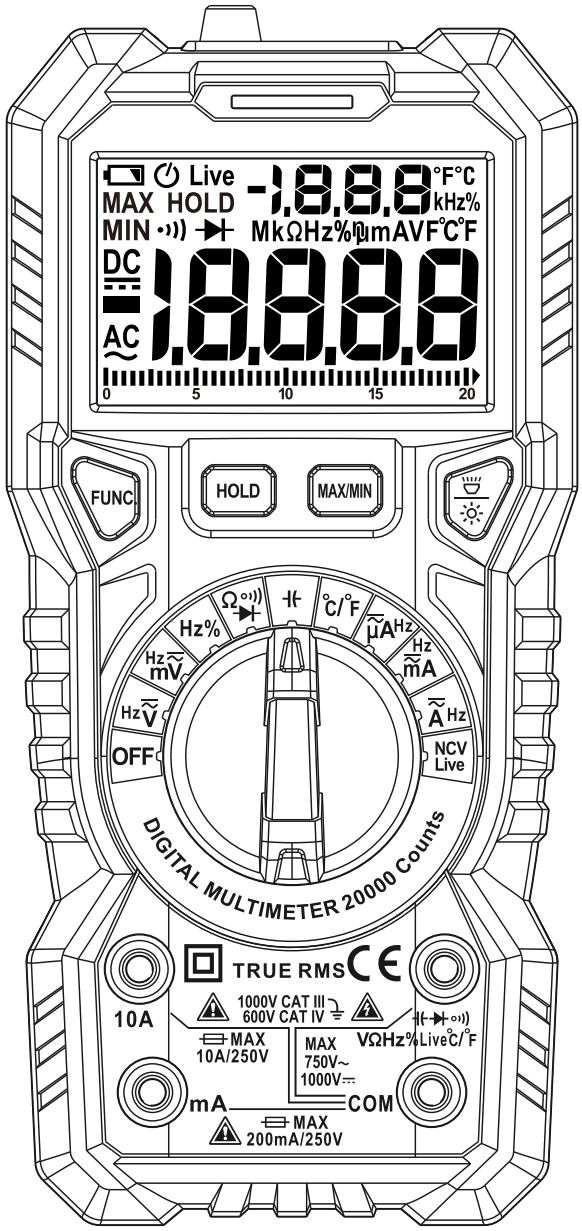
USERS MANUAL

DIGITAL MULTIMETER



⚠ Before using the instrument,please read this manual carefully,and save it well for future using.

Statement

In accordance with the international copyright law, without permission and written consent, do 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.

Safety Statement

⚠ "**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.

Safety Instructions

The instrument is designed according

to the requirements of the international electrical safety standard IEC61010-1 for the safety requirements of the electronic testing instruments. The design and manufacture of instruments strictly comply with the requirements of IEC61010-1 CAT.IV 600V, CAT.III 1000V over voltage safety standards and pollution level 2.

Safety Operation Specifications

⚠ Warning

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

- Please read this manual carefully before using the instrument, and pay special attention to safety warning information.

- Strictly observe the operation of this manual and use this instrument. Otherwise, the protection function of the instrument may be damaged or weakened.
- Please be careful if the measurement exceeds 30V AC true RMS, 42V AC peak or 60V DC. There may be danger of electric shock at this kind of voltage
- By measuring the known voltage to check whether the meter work is normal, if it is not normal or damaged, do not use it again.
- Before using the instrument, please check whether there is any crack or plastic damage in the instrument case. If so, do not use it again.
- Before using the instrument, please

check whether the probe is cracked or damaged. If so, please replace the same type and the same electrical specifications.

- The instrument shall be used in accordance with the specified measurement category, voltage or current rating.
- 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.
- When it shows low battery indicator, please replace the battery in time in case of any measurement error.

- Do not use the instrument around explosive gas, steam or in wet environment.
- When using the probe, please put your fingers behind the finger protector 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.
- Before opening the outer cabinet or battery cover, please remove the probe on the instrument. Do not use the instrument in the circumstances that the instrument is taken apart or battery cover is opened.

- It only meets the safety standards when the instrument is used together with the supplied probe. If the probe is damaged and needs to replace, the probe with same model number and same electrical specifications must be used for replacement.

Safety Symbols

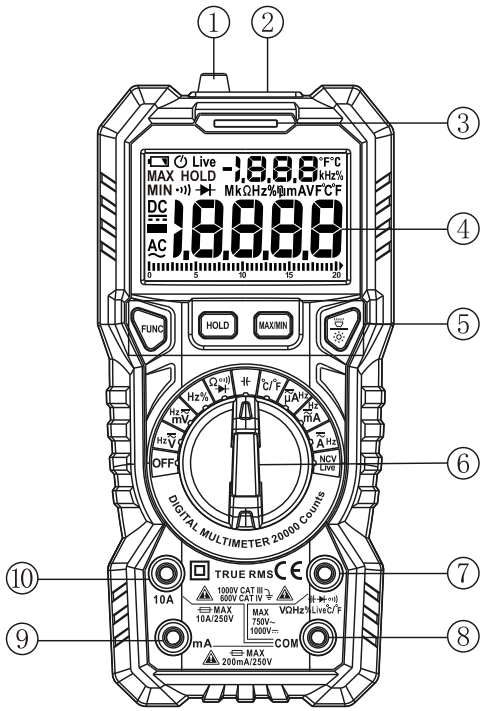
	High voltage warning
	AC (Alternating current)
	DC (Direct current)
	AC or DC
	Warning, important safety signs
	Ground
	Fuse
	Equipment with double insulation/reinforced insulation protection
	Battery under voltage
	Product complies with all relevant European laws

	The additional product label shows that do not discard this electrical/electronic product into household garbage.
CAT. II	Class II measurements are suitable for testing and measuring circuits directly connected to power points (sockets and similarities) of low voltage power installations.
CAT. III	Class III measurement is suitable for testing and measuring circuits connected to the distribution part of low voltage power supply devices in buildings.
CAT. IV	Class IV measurements are suitable for testing and measuring circuits connected to the power supply of low voltage power installations in buildings.

Overview

A new generation of 20,000-count, true RMS, high-performance, automatic range digital altimeter with analog strip. New display and function layout, large LCD display is clearer and better user experience; with high voltage light alarm, input LED prompt function. It is the best choice for professional electricians, enthusiasts or home use.

Instrument panel description



① NCV probe
② Flashlight
③ Red / green light
④ LCD display (Dual color backlight)
⑤ Function keys
⑥ Function knob
⑦ Other measurement input socket
⑧ COM Input socket
⑨ mA/μA Input socket
⑩ 10A Input socket

FUNC. key

When there are multiple measuring functions on a gear, the "FUNC." key switch function is adopted.

Data hold

Press “HOLD” key, enter data hold mode/cancel data hold mode.

Maximum/minimum measurement

Press the MAX/MIN key to enter the maximum measurement, and then press the loop to display the maximum and minimum values. Press and hold for more than 2 seconds to cancel the maximum/minimum measurement mode.

Backlight

Press  key, turn on backlight/turn off backlight.

Flashlight

Press  key, and keep more than 2 seconds to turn on the flashlight / turn off flashlight.

Auto power off

- There will be no operation in 15 minutes, the instrument will turn off automatically to save battery energy. After automatic

shutdown, press any key to restore the working state of the instrument.

- If you press the "FUNC." button and turn on the meter power, the automatic shutdown function will be cancelled. After turning off the meter, the meter is reopened to restore the automatic shutdown function.

Input LED indication function

When power on or function switching, the corresponding input light flashes to prompt the user to insert the input port of the probe.

High voltage/large current prompt function

When the measuring voltage is greater than 80V or the measuring current is greater than 1A, the orange backlight will

light up, prompting the users to be careful.

Measurement operation

⚠ WARNING

- **The voltage above DC1000V or AC750V can't be measured; otherwise the instrument may be damaged.**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.**
- **Test the known voltage with the meter before use, confirm the instrument function is intact.**

DC/AC voltage measurement

1) Turn the knob to "Hz$\tilde{\overline{V}}$" and switching AC or DC voltage function by "FUNC." key
2) Plug the red meter into the " VΩHz%LiveC/F "

input and the black meter into the "COM" input.

3) Contact the probe to the measured circuit (connect to the measured power supply or circuit in parallel), measure the voltage.
4) Read the measurement result on the screen. When measuring AC voltage the frequency is displayed on LCD simultaneously.

Note: When the voltage is greater than 80V, the orange backlight will light up.

DC/AC voltage mV measurement

1) Turn the knob to "Hz mV" and switching AC or DC voltage function by "FUNC." key
2) Plug the red probe into the " VΩHz%LiveC/F " input and the black probe into the "COM" input.

3) Contact the probe to the measured circuit (connect to the measured power supply or circuit in parallel), measure the voltage.
4) Read the measurement result on the screen. When measuring AC voltage the frequency is displayed on LCD simultaneously.

Frequency/Duty measurement

1) Turn the knob to “Hz%” and switching frequency or duty function by "FUNC." key.
2) Plug the red probe into the "  " input and the black probe into the "COM" input.
3) Contact the probe to the measured circuit (connect to the measured power supply or circuit in parallel), measure

the frequency and duty.

4) Read the measurement result on the screen.

DC/AC current measurement

1) Turn the knob to “ $\tilde{\mu}$AHz ” or “ $\overset{Hz}{\tilde{m}}$A ” or “ $\tilde{A}$Hz ” and switching AC or DC current function by "FUNC." key
2) Insert the red probe in “μA/mA” socket or “10A” Socket. Insert the black probe in “COM” socket.
3) Disconnect the power of the tested circuit; connect the meter to the circuit under test, then turn on the circuit power supply.
4) Read the measurement result on the screen. When measuring AC current, the frequency is displayed on LCD simultaneously.

Note: the orange backlight is on when the measured current is greater than 1A.

Resistance measurement

1) Turn the knob to “ Ω ” and switching resistance function by "FUNC." key
2) Plug the red probe into the " VΩHz%LiveC/F " input and the black probe into the "COM" input.
3) Contact the probe to the measured circuit or resistor, measure the resistance.
4) Read the measurement result.

Capacitance measurement

1) Turn the knob to “⊣⊢”.
2) Plug the red probe into the " VΩHz%LiveC/F " input and the black probe into the "COM" input.

3) Contact the probe to the measured capacitor.
4) Read the measurement result on the screen.

Continuity measurement

1) Turn the knob to “ Ω ” and switch to continuity function by "FUNC." key.
2) Plug the red probe into the " VΩHz%LiveC/F " input and the black probe into the "COM" input.
3) Contact the probe to the measured circuit or resistor.
4) If the resistance or circuit of the measured resistance is less than 30Ω, the buzzer will on and the green indicator lights up at the same time. When the resistance is about between 30Ω to 60Ω, the red indicator lights up.

The LCD displays the resistance.

Diode measurement

1) Turn the knob to “ ” and switch to diode measurement function by "FUNC." key.
2) Insert the red probe in “ ” socket. Insert the black probe in “COM” socket.
3) Touch the diode anode with the red probe, the black probe contacts the diode cathode.
4) Read the measurement result on the screen.
5) If the probes is opposite to the diode polarity, the meter displays "OL", which can be used to distinguish the anode and cathode of two.

NCV test

1) Turn the knob to the “NCV Live” and switch to

NCV test function by "FUNC." key. The meter will display "NCV".

2) Then NCV probe gradually approaches the detected point.
3) When the meter senses weak AC signals, the green indicator lights up, at the same time, the beeps send out slow dips.
4) When the meter senses strong AC signals, the red indicator lights up, at same time, the beeps send out fast dips.

Live test

1) Turn the knob to the “NCV Live”, and switch to live wire test function by "FUNC." key. The meter will display "Live".
2) Insert the red probe in “VΩHz%LiveC/F” socket. Then the red probe contact to the test

point.

3) When the meter senses strong AC signals, it will display "Live" and the orange indicator lights up, at same time, the beeps send out fast dips.

Temperature Measurement

1) Turn the knob to the “℃/℉”.
2) Insert the K thermocouple into the instrument. The thermocouple's positive (red) is inserted into the " VΩHz%Live℃/℉ " input, and the negative end (black) is inserted into the "COM" input.
3) Contact the measured object with the thermocouple probe and read the

result from the display.

4) Celsius and Fahrenheit are shown simultaneously on the display.

Note 1 ： The cold junction of thermocouple is placed inside the instrument, and it needs longer heat balance with the measuring environment.

Note 2 ： Using K type thermocouple probe.

General Technical Specifications

- Environment condition of using:
  CAT. IV 600V；CAT. III 1000V；
  Pollution level 2, Altitude < 2000m
  Working environment temperature and humidity：

0~40°C （ <80% RH, <10°C non condensing）

Storage environment temperature and humidity：

-10~60°C （ <70% RH, remove the battery）

- Temperature coefficient：0.1× accuracy /°C （<18°C or >28°C）
- MAX. Voltage between terminals and earth ground：DC1000V/AC750V
- Fuse protection：μA/mA：F200mA/250V 10A：F10A/250V
- Sampling rate: approx. 3 times/second.
- Display: 20000 counts.
- Over range indication: “OL”.
- Low battery indication: “ ” will be displayed.
- Input polarity indication: automatically

display “–”.

- Power requirement: 2 x 1.5V AA batteries.

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%,

accuracy: ± （% reading + word） .

DC voltage

Range	Resolution	Accuracy
200mV	0.01mV	±(0.08% +5)
2V	0.0001V	
20V	0.001V	
200V	0.01V	
1000V	0.1V	

Input impedance：10MΩ

Overload protection: 1000V DC or 750V AC;

AC voltage

Range	Resolution	Accuracy
200mV	0.01mV	±(1.0%+25)
2V	0.0001V	
20V	0.001V	
200V	0.01V	
750V	0.1V	

Input impedance：10MΩ

Overload protection: 1000V DC or 750V AC;

Frequency Response： 40Hz ~ 1kHz ;

TRMS

DC current

Range	Resolution	Accuracy
200μA	0.01μA	±(0.5%+5)
2000μA	0.1μA	
20mA	0.001mA	
200mA	0.01mA	
10A	0.001A	±(1.0%+15)

Overload protection：

μA/mA：F200mA/250V fuse

10A：F10A/250V fuse

Maximum input current：μA/mA: 200mA；A: 10A

When measuring >1A current, the continuous measurement time shall not

exceed 30 seconds. When measuring current again, the instrument shall be cooled for twice the measurement time.

AC current

Range	Resolution	Accuracy
200μA	0.01μA	±(1.0%+25)
2000μA	0.1μA	
20mA	0.001mA	
200mA	0.01mA	
10A	0.001A	±(1.5%+25)

Overload protection：

μA/mA：F200mA/250V fuse

10A： F10A/250V fuse

Maximum input current：μA/mA: 200mA；

A: 10A

Frequency Response：40Hz ~ 1kHz；

TRMS

When measuring >1A current, the continuous measurement time shall not exceed 30 seconds. When measuring current again, the instrument shall be cooled for twice the measurement time.

Resistance

Range	Resolution	Accuracy
200Ω	0.01Ω	±(1.0% +15)
2kΩ	0.0001kΩ	
20kΩ	0.001kΩ	
200kΩ	0.01kΩ	
2MΩ	0.0001MΩ	
20MΩ	0.001MΩ	±(3.0% +25)
100MΩ	0.01MΩ	

Overload protection：250V

Capacitance

Range	Resolution	Accuracy
2nF	0.0001nF	±(4.0%+50)
20nF	0.001nF	
200nF	0.01nF	
2uF	0.0001uF	
20μF	0.001μF	
200μF	0.01μF	
2mF	0.0001mF	
20mF	0.001mF	

Overload protection：250V

Frequency/Duty

Range	Resolution	Accuracy	Sensitivity
200Hz	0.01Hz	±(1.0% +30)	100mV (RMS)
2kHz	0.0001kHz		
20kHz	0.001kHz		
200kHz	0.01kHz		
2MHz	0.0001MHz	±(1.0% +30)	0.8V (RMS)
10MHz	0.001MHz	±(3.0% +30)	
1~99%	0.1%	±(3.0% +30)	

Minimum measurement frequency：5Hz

Overload protection：250V

Frequency measurement in mV gear:

1) Range：10Hz ~ 100 kHz

2) Sensitivity：>10mV RMS, sine wave

Frequency measurement in V gear:

1) Range：10Hz ~ 20 kHz

2) Sensitivity：>0.5V RMS, sine wave

Frequency measurement in current gear:

1) Range：10Hz ~ 20 kHz

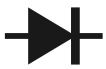
2) Sensitivity：

μA：>100μA RMS, sine wave

m： >10mA RMS, sine wave

A： >1A RMS, sine wave

Diode test

	It displays the approximate forward voltage value of the diode.	MAX test current: about 1.2mA. MAX test voltage: about 3.0V. Overload protection: 250V.

Continuity test

	The resistance is <30, the buzzer will sound and the indicator light is green. When the resistance >30 and <60, the buzz does not ring, the indicator light is red.	Test voltage is about 1.0V. Overload protection: 250V

Temperature

Unit	Resolution	Range and Accuracy	
℃	0.1℃	-40℃~ 0℃	± 3℃
		0 ℃ ~ 400℃	±(1.0%+ 2℃)
		400 ℃ ~ 1000℃	± 2.0%
℉	1℉	-40℉~ 32℉	± 6℉
		32 ℉ ~ 752 ℉	±(1.0%+ 4℉)
		752 ℉ ~ 1832 ℉	± 2.0%

The accuracy does not include the error of the thermocouple probe.

Maintenance

Clean

If there's dust on the terminal or the terminal is wet, it may cause measurement error. Please clean the instrument according to the steps below:

1) Switch off the power supply of the instrument, and remove the test probe.
2) Turn over the instrument and shake out the dust accumulated in the input socket. Wipe the outer cabinet with a damp cloth and mild detergent, do not use abrasive or solvent. Wipe contacts in each input socket with a clean cotton swab soaked in alcohol.

⚠ WARNING

Please always keep the inside of the instrument clean and dry to avoid electric shock or instrument damage.

Replace Battery and Fuse

Replace Battery：

1) Turn off the power supply of the instrument, and remove the probe on the instrument.
2) Use screwdriver to unscrew screws fixing the battery cover, remove the battery cover.
3) Remove old batteries, replace with new batteries of the same specifications. Please note the polarity of the battery according to the positive and negative polarity marks

inside of the battery cover.

4) Install the battery cover to its original position, fix and lock the battery cover with screws.

⚠ **WARNING**

- **To prevent electric shock or personal injury caused by error reading, please replace the battery promptly when the battery power is low. Please do not make battery short circuit or reverse battery polarity to discharge the batteries.**
- **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.

Replace Fuse

1) Turn off the power supply of the instrument, and remove the probe on the instrument.
2) Use screwdriver to unscrew screws fixing the back cover, and remove the back cover.
3) Remove the burnt fuse, replace with new fuse of the same specifications, and ensure that the fuse is clamped in the safety clip.
4) Install the back cover, fix and lock it with screws.

⚠ WARNING

To avoid possible electric shock, personal injury or instrument damage, please use the fuse with same specifications or specified specifications.

EMC&LVD

Designed and Conforms to
IEC61010-1
CAT.III 600V