USERS MANUAL

DIGITAL MULTIMETER

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

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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.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 you do, 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.

ϟ	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
CE	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.

Safety Symbols

Overview

A new generation of high performance digital multimeter. The new display and function layout show clearer and better user experience. It is the best choice for professional electricians, enthusiasts or families.

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、uA Input socket
⑩ 10A Input socket

FUNC. keys

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 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 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

DC/AC voltage measurement

1) Turn the knob to "Hz V" and Switching AC or DC voltage function by "FUNC." key
2) Insert the red probe in "VΩHz%LiveC/F" socket，insert the black probe in "COM" socket。
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.

⚠**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.**

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) Insert the red probe in "VΩHz%LiveC/F" socket，insert the black probe in "COM" socket。
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.

⚠**WARNING**

- **The voltage above DC1000V or AC 750V 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.**

Frequency/Duty measurement

1) Turn the knob to "Hz%" and Switching Frequency or duty function by "FUNC." key
2) Insert the red probe in "VΩHz%LiveC/F" socket，insert the black probe in "COM" socket。

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.

⚠**WARNING**

- **The voltage above 10V 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.**

⚠**Caution:**

To avoid damaging instruments or equipment, do not enter frequency or duty cycle signal greater than 10V valid value.

DC/AC current measurement

1) Turn the knob to "μAHz" or "mAHz" or "AHz" and Switching AC or DC current function by "FUNC." key
2) Insert the red probe in "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.
5) Read the measurement result on the screen. When measuring AC current, the frequency is displayed on LCD

simultaneously.

⚠**WARNING**

- **The voltage above 250V 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 current with the meter before use; confirm the instrument function is intact.**
- When measuring large current, continuous measurement should be no longer than 15 seconds

⚠**Caution:**

To avoid damaging the instrument or equipment, check the fuse before measuring and ensure that the measured current does not exceed the rated maximum current; use the correct input.

Resistance measurement

1) Turn the knob to "Ω" and Switching resistance function by "FUNC." key
2) Insert the red probe in "VΩHz%LiveC/F" socket，insert the black probe in "COM" socket。
3) Contact the probe to the measured circuit or resistance,

measure the resistance.
4) Read the measurement result.

⚠**WARNING**

When measuring resistance on the line, disconnect the power supply and discharge all the high-voltage capacitors. Otherwise, the instrument may be damaged and may be struck by electric shocks.

Continuity measurement

1) Turn the knob to "Ω" and Switch to Continuity function by "FUNC." key.
2) Insert the red probe in "VΩHz%LiveC/F" 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.

⚠**WARNING**

When measuring Continuity on the line, disconnect the power supply and discharge all the high-voltage capacitors. Otherwise, the instrument may be damaged and may be struck by electric shocks.

Diode measurement

1) Turn the knob to "Ω" and Switch to diode measurement function by "FUNC." key.
2) Insert the red probe in "VΩHz%LiveC/F" 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.

⚠**WARNING**

When measuring diode on the line, disconnect the power supply and discharge all the high-voltage capacitors. Otherwise, the instrument may be damaged and may be

Capacitance measurement

1) Turn the knob to"⊣⊢".
2) Insert the red probe in "VΩHz%LiveC/F" socket，insert the black probe in "COM" socket。
3) Contact the probe to the measured circuit or Capacitance, measure the resistance.
4) Read the measurement result on the screen.

⚠**WARNING**

When measuring Capacitance on the line, disconnect the power supply and discharge all the high-voltage capacitors. Otherwise, the instrument may be damaged and may be

struck by electric shocks.

NCV test

1) Turn the knob to the "NCV Live" and Switch to NCV test function by "FUNC." key. 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.

⚠**WARNING**

In order to avoid possible accidents such as electric shock or personal injury, please follow the safety regulations.

Live test

1) Turn the knob to the" NCV Live", and Switch to live test function by "FUNC." key. Meter will display "LIVE".
2) Insert the red probe in "VΩHz%LiveC/F"socket, Then the probe contact to the test point
3) When the meter senses weak AC signals, the green indicator lights up, at 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.

⚠**WARNING**

In order to avoid possible accidents such as electric shock

or personal injury, please follow the safety regulations.

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%LiveC/F" 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.

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.

⚠**WARNING**

When measuring temperature with thermocouple, the probe of thermocouple can't touch the charged object, otherwise it may damage the instrument and may suffer electric shock or personal injury.

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： mA： F600mA/250V fuse
  10A：F10A/250V fuse
- Sampling rate: about 3 times/second.
- Display: 6000 counter readout. Automatically display the unit symbols according to the shift of the measurement function.
- Over range indication: it displays "OL".
- Low battery indication: when the battery voltage is lower than the normal working voltage, "▭" will be displayed.
- Input polarity indication: automatically display "–".
- Power requirement: 2 x 1.5V AAA 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
600mV	0.1mV	±(0.5% reading+3)
6V	0.001V	
60V	0.01V	
600V	0.1V	
1000V	1V	

Input impedance：10MΩ； Maximum input voltage: 1000V DC
Overload protection: 1000V DC or 750V AC;

AC voltage

Range	Resolution	Accuracy
600mV	0.1mV	±(0.8% reading+5)
6V	0.001V	
60V	0.01V	
600V	0.1V	
750V	1V	

Input impedance：10MΩ； Maximum input voltage: 750V AC
Overload protection: 1000V DC or 750V AC;
Frequency Response：10Hz ~ 1kHz：True-RMS

DC current

Range	Resolution	Accuracy
600μA	0.1μA	±(1.2% reading+3)

6000μA	1μA	±(1.2% reading+3)
60mA	0.01mA	
600mA	0.1mA	
10A	0.01A	

Overload protection：μA/mA：F600mA/250V fuse
10A： F10A/250V fuse
Maximum input current：mA: 600mA： A: 10A
When measuring large current, continuous measurement should be no longer than 15 seconds

AC current

Range	Resolution	Accuracy
600μA	0.1μA	±(1.5% reading+3)
6000μA	1μA	
60mA	0.01mA	
600mA	0.1mA	
10A	0.01A	

Overload protection：μA/mA：F600mA/250V fuse
10A： F10A/250V fuse
Maximum input current：mA: 600mA： A: 10A
Frequency Response：10Hz ~ 1kHz：True-RMS
When measuring large current, continuous measurement should be no longer than 15 seconds

Resistance

Range	Resolution	Accuracy
600Ω	0.1Ω	±(1.0% reading+3)

6kΩ	0.001kΩ	±(1.0% reading+3)
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	±(1.5% reading+3)
60MΩ	0.01MΩ	

Overload protection：250V

Capacitance

Range	Resolution	Accuracy
10nF	0.001nF	±(4.0% reading+5)
100nF	0.01nF	
1000nF	0.1nF	
10μF	0.001μF	
100μF	0.01μF	
1000μF	0.1μF	
10mF	0.001mF	±(5.0% reading+5)
100mF	0.01mF	

Overload protection：250V
Note: the parameters do not include errors caused by the capacitance of the pen capacitor and the substrate.

Frequency/Duty

Range	Resolution	Accuracy
10Hz	0.001Hz	±(1.0% reading+3)
100Hz	0.01Hz	

1000Hz	0.1Hz	±(1.0% reading+3)
10kHz	0.001kHz	
100kHz	0.01kHz	
1000kHz	0.1kHz	
10MHz	0.001MHz	±(3.0% reading+3)
1~99%	0.1%	

Hz/duty：
1) Range：0 ~ 10MHz
2) Voltage sensitivity：0.2~10V AC
3) Overload protection：250V;
V：
1) Range：0 ~ 100 kHz
2) Voltage sensitivity：0.5~600V AC3);
μA、mA、A：
1) Range：0 ~ 100 kHz
2) Voltage sensitivity：≥ 1/4 Full range
3) Overload protection：μA/mA：F600mA/250V fuse；
A： F10A/250V fuse

Diode test

	Function	
⊳|	It displays the approximate forward voltage value of the diode.	Forward DC current is about 2.5mA Reverse DC voltage is about 3V Overload protection:250V

Continuity test

	Function	
•)))	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.	Reverse DC voltage is about 3V Overload protection:250V

Temperature

Range	Resolution	Accuracy	
℃	1℃	-20℃ ~ 0℃	± 5.0%reading or ± 3℃
		0℃ ~ 400℃	± 1.0% reading or ± 2℃
		400℃ ~ 1000℃	± 2.0% reading
℉	1℉	-4℉~ 32℉	± 5.0% reading or ± 6℉
		32℉~ 752℉	± 1.0% reading or ± 4℉
		752℉~ 1832℉	± 2.0% reading

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.

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