

USERS MANUAL

Intelligent digital clamp multimeter



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



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

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1. Safety Information

Warnings

 Warning



Pay special attention to use of this instrument, for improper use may cause electric shock or damage to instrument. During use, observe usual safety regulations and observe safety measures regulated in use manual.

In order to make full use of instrument functions and guarantee safe operation, please carefully read and observe use methods in this manual.

Instrument complies with safety requirements on electronic measuring instrument of EN-61010-1, EN-61010-2-030 and EN-61010-2-032, level II pollution, and over-voltage standard is CAT II 600V.

Please observe safety operation guide, and guarantee to use instrument in a safe manner.

1.1 Preparation

1.1.1 When using this instrument, users must observe standard safety rules:


- General electric shock prevention.
- Prevention of misuse of instrument.


1.1.2 After receiving the instrument, check whether it is damaged during transportation.


1.1.3 After storing and shipping under adverse conditions, check whether the instrument has been damaged.

1.1.4 Pens of the instrument must be in good condition. Before use, check whether insulation of pens is damaged, and whether metal wire is exposed.


1.2 Symbol

 Note (refer to use manual for important safety information)

 Able to be used on dangerous electrified conductors.

 Dual-insulation protection (Category II)

CAT II Over-voltage according to IEC-61010-1 standard (installation), level II, pollution degree 2 refers to protection level of pulse withstand voltage provided.


 Comply with EU standard.

 Grounded

1.3 Maintenance

1.3.1 Do not try to open bottom case to adjust or repair instrument, for such operation could only be conducted by technicians fully understanding the instrument and electric shock danger.

1.3.2 Before opening instrument bottom case or battery cover, remove the pens from the wire being measured.

1.3.3 In order to avoid electric shock possibly caused by error reading, when symbol " " displays on instrument, replace battery immediately.

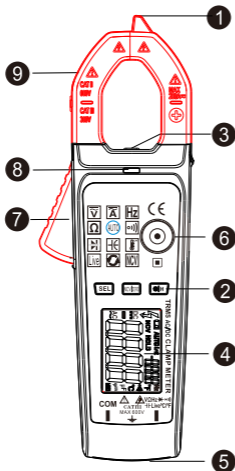
1.3.4 Use wet cloth and gentle detergent to clean the instrument, and do not use any abrasive or solvent.

1.3.5 Power off when the instrument is not used, and rotate range switch to OFF position.

1.3.6 If the instrument is not used for a long time, take out the battery to avoid any damage to the instrument.

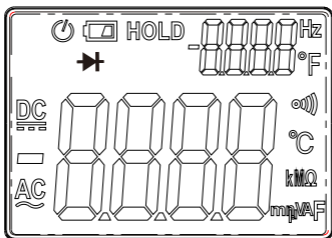
2. Description

2.1 Part name



- 1 Non-contact voltage detecting & inducing area
- 2 Function key
- 3 electric torch
- 4 Liquid crystal display (LCD)
- 5 Trigger
- 6 On/off key
- 7 Trigger
- 8 alarm light
- 9 Current clamp: Used in current measurement

2.2 LCD display




~ ≡	AC & DC
⦿	Connection/Disconnection indication
AUTO	Automatic range mode
⏻	Automatic shutdown indication
🔋	Low battery
⏻	Reading hold state
V,A	Volt (voltage), ampere (current)
Ω, kΩ, MΩ	Ohm kilohm and megohm (resistance)
Hz	hertz
➔	DIODE
nF uF mF	Microfarad
°C °F	Centigrade and Fahrenheit

3. Specification

The instrument specifies one year as a cycle, and shall be re-calibrated under $18^{\circ}\text{C} \sim 28^{\circ}\text{C}$, with relative humidity less than 75%.

3.1 Overview

- Select measurement function and range automatically.
- Overload protection throughout the range.
- Max. voltage between measurement terminal and ground: 600V DC or 600V AC
- Operating height: Max. 2000m
- Display: LCD
- Max. display value: 6000 digit.
- Polarity indication: Automatic indication, and '–' indicates negative.
- Over range display: '0L' or '-0L' .
- Sampling time: About 3 times/second., bargraph 10 times/second
- Unit display: Function and electricity quantity unit display.
 - Automatic shutdown time: 15 minutes
 - Power supply: 1.5V AAA battery $\times 2$
 - Battery under-voltage indication: LCD display  symbol
- Temperature coefficient: Less than $0.1 \times \text{accuracy}/^{\circ}\text{C}$.
- Operating temperature: $18^{\circ}\text{C} \sim 28^{\circ}\text{C}$.
- Storage temperature: $-10^{\circ}\text{C} \sim 50^{\circ}\text{C}$.

3.2 Technical indexes

3.2.1 AC current

Range	Resolution	Accuracy
60A	0.01A	± (2.5% reading + 8 digits)
200A	0.1A	

- Min. input current: 0.2A AC current.
- Max. input current: 200A AC current.
- Frequency range: 40 ~ 1000Hz;

3.2.2 DC current(Optional features)

Range	Resolution	Accuracy
60A	0.01A	± (2.5% reading +8 digits)
200A	0.1A	

- Min. input current: 0.2A DC current
- Max. input current: 200A DC current

3.2.3 DC voltage

Range	Resolution	Accuracy
6V	0.001V	± (0.5% reading + 3 digits)
60V	0.01V	
600V	0.1V	

- Min. input voltage 0.5 V DC
- Max. input voltage: 600V DC

3.2.4 AC voltage

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

- Min. input voltage: 0.5 V AC
- Max. input voltage: 600V AC (valid value)
- Frequency range: 40 ~ 1000Hz

3.2.5 Line on-off test

Range	Resolution	Function
•))	1Ω	If resistance of the line being measured is less than 50Ω, buzzer in instrument will make continuous alarming sounds.


- Overload protection: 600V DC or AC (valid value)

3.2.6 Resistance

Range	Resolution	Accuracy
600Ω	0.1Ω	± (0.8% reading + 3 digits)
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	
60MΩ	0.01MΩ	

Overload protection: 600V DC or AC (valid value)

3.2.7 DIODE

Range	Resolution	Accuracy	Testing environment
Diode test 	1 V	0.001V	Testing current: about 1mA; Open circuit voltage : about 2.8V。 The display shows an approximation of the diode forward pressure drop

- Overload protection: 250V DC or AC (valid value)

3.2.8 Capacitor

Range	Resolution	Accuracy
60.00nF	0.01nF	±(2.5%reading+ 20 digits)
600.0nF	0.1nF	
6.000uF	1nF	
60.00uF	10nF	
600.0uF	100nF	
6.000mF	1μF	
60.00mF	10μF	

- Overload protection: 250V DC or AC (valid value)

3.2.9 Temperature

Range	Resolution	Accuracy
-50~1300 °C	1°C	± (1% reading + 3°C)
(-58~2372 °F)	1°F	± (1% reading + 3°F)

The precision does not include the error of the thermocouple probe

- Overload protection: 250V DC or AC (valid value)

3.2.10 Frequency

3.2.10.1 Clamp frequency measurement (via gear A):

Range	Resolution	Accuracy
60.0Hz	0.1Hz	± (1.0%reading+ 5digits)
1000Hz	1Hz	

- Measurement range: 40Hz ~ 1000Hz
- Input signal range: ≥ 1/4 Full- scale Value



3.2.10.2 Via gear V:

Range	Resolution	Accuracy
60.0Hz	0.1Hz	± (1.0%reading+ 5digits)
1000Hz	1Hz	


- Measurement range: 40Hz ~ 1000Hz
- Input signal range: ≥ 0.8 AC voltage (valid value)



4. Operation guide

4.1 Reading hold


During measurement, if it is required to hold reading, touch  button, value on display will be locked, touch  button again, to cancel reading hold.

4.2 Backlight/Light

- 1) During measurement, if environment light is too dark, causing it difficult to read you could press  key for more than 2 seconds, to open backlight or light, which will turn off in about 15 seconds automatically.

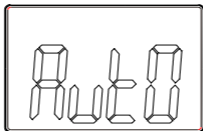
- 2) Pressing  the button for more than 2 seconds will turn off the backlight
- 3) Press "  " the button for 2 seconds, turn on the flashlight, and turn it off automatically after about 15 minutes.

4.3 Automatic shutdown

- 1) If there's no operation within 15 minutes after start, instrument will enter standby state, and shut down to save energy.
- 2) After automatic shutdown, Press the "  " button, to wake the instrument enter work state.

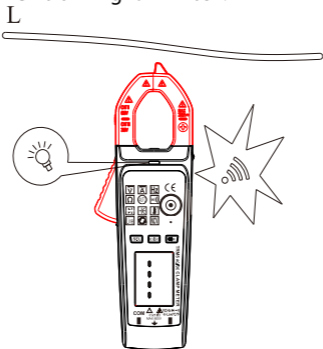
4.4 To measure

- 1) Touch the electric source button to start the machine. If the battery voltage is insufficient, the display will display a low voltage symbol, at which point the battery should be replaced. Press the power button again to shut down the machine.
- 2) When the instrument is not measured, it will enter the automatic scanning state. The instrument is shown as follows:



4.5 NCV (Non -contact voltage detection)

Switch the rotation switch to any gear, hold down the "NCV" key to display EF, and bring the NCV sensor close to the conductor under test, instrument could detect whether the lead being measured is >90V AC voltage. When instrument detects AC voltage, instrument buzzer will alarm and NCV alarm light will flash.



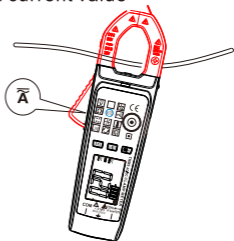
Note:

- 1) Even if there' s no alarm indication, voltage may still exist. Do not depend on non-contact voltage detector to judge whether there's voltage in the lead. Detection operation may be impacted by factors like different socket designs and insulation thickness types etc.

4.6 AC/DC current measurement

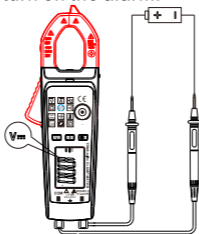
(Dc current optional)

- 1) Hold the trigger open clamp head and clamp one lead of the cable under test into the clamp head.
- 2) When the measured signal is greater than 0.2A, the meter displays the measured current value
- 3) Before measuring DC current, press "ZERO" to set the reading to "0" before measuring



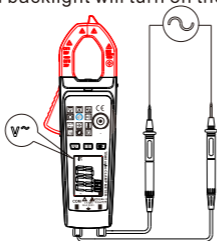
4.7 DC voltage measurements

- 1) Connect the gauge pen to the measured signal. When the measured signal is greater than 0.5V, the meter will display the current DC voltage value. When the measured signal is less than 0.5V, the meter will default to the resistance value and display the internal resistance value of the measured signal. When the measured signal voltage is greater than 42V, the red backlight will turn on the alarm.



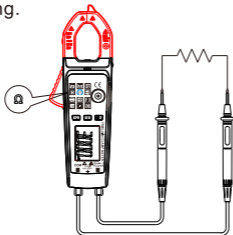
4.8 AC voltage measurement

1) Connect the meter pen to the measured signal. When the measured signal is greater than 0.5V, the meter will display the current AC voltage value and the frequency value of the voltage. When the measured signal is less than 0.5V, the meter will default to the resistance value and display the internal resistance value of the measured signal. When the measured signal voltage is greater than 42V, the red backlight will turn on the alarm.



4.9 Resistance, on off measurement

1) Pen connection resistance measurement, the instrument shows resistance, when measuring the resistance is greater than 60 M Ω instrument will show a "----". When measuring the resistance is less than 50 Ω , buzzer alarm lamp, instrument lights flashing.



4.10 Single watch pen wire test

1. Press "SEL" button to switch to LIVE mode, and the meter shows LIVE.
2. Insert the meter stylus into the power socket. If the instrument detects ac voltage, it will display the voltage signal strength based on the detected signal strength. The instrument induction LCD segment code will display the voltage signal strength. The red backlight is lit up and the buzzer emits an alarm of varying intensity.

4.11 Capacitance measure

1. Press "SEL" key to switch to capacitance
2. Measure the capacitance with both ends of the test pen and read the measurement from the LCD.

Notice:

- ① When measuring large capacitors, it takes time to stabilize the reading
- ② When measuring the capacitance with polarity, pay attention to the corresponding polarity to avoid damaging the instrument.

4.12 Temperature measurement

Press "SEL" key to switch TEMP, and the red plug of the thermocouple is inserted into the °C/°F end. The black plug can be inserted into the COM jack. When the reading is stable, the temperature value can be read directly from the display screen.

Notice:

- ① The maximum temperature of the randomly packaged K-type thermocouple is 250°C, and the instantaneous measurement can be up to 300°C.

5. Maintenance


5.1 Change battery

 Warnings

Warning



Before opening battery cover of the instrument, remove the pens from the circuit being measured, to avoid electric shock.

- 1) If symbol "  " appears, it indicates to change the battery.
- 2) Unfasten bolts on battery cover of instrument and remove the cover.
- 3) Change the old battery.
- 4) Place the battery cover.

 Note:

Do not reverse battery polarity.

5.2 Change pens

 Warnings

Warning



When changing the pen, it is required to replace with an identical pen or a pen of the same level. The pen must be in good condition, and level of the pens is: 1000V 10A.

If insulation layer of the pen is damaged, or metal wire of the lead exposes, it is required to change the pen.

6. Accessories

- | | | | |
|----|------------|-------------------------------|----------|
| 1) | Pens | Level: 1000V 10A | One pair |
| 2) | Use Manual | | One copy |
| 3) | Battery | 1.5V AAA battery | 2PCS |
| 4) | Cloth bag | | 1PCS |
| 5) | K-Type | Optional function accessories | 1PCS |