

# USER'S MANUAL








## CLAMP MULTIMETER

### 1. SAFETY OPERATION RULE

The meter's design and production follow the standard of IEC61010-1, IEC61010-2-032, IEC 61010-031, IEC61010 CATIII 600V and Grade II pollution. Read the following before operation.

- 1.1 Use the meter in accordance with the standards or requirements of this manual, otherwise the protection function provided by the instrument may be damaged or declined.
- 1.2 To avoid electric shock, be careful when measuring the voltage higher than 30V AC 60V DC RMS
- 1.3 Do not input the voltage over the limit value between the terminals or between each terminal and ground.
- 1.4 Check whether the meter works properly by measuring the voltage or current which were known beforehand. Do not use any more if it is improper or damaged.
- 1.5 Please check the meter before operation, if the shell is cracked or the plastic parts are damaged, please stop using it again.
- 1.6 Before operation, please check the test leads, if there are cracks or damage on it, please replace the test leads with same model or the same electrical specifications.
- 1.7 Do not measure over range of the meter, accessories as probe, and CAT Level.
- 1.8 When inserting the test leads in the input jack, do not measure the current
- 1.9 Do not operate with the meter independently
- 1.10 Please comply with local and national safety regulations. Wear personal protective equipment (such as approved rubber gloves, face masks, and flame-retardant clothing etc.) to prevent the injury from electric shock and arc when charged conductors are exposed.
- 1.11 When the low battery symbol appears, please replace the battery in time to avoid the wrong values
- 1.12 Do not use the meter in a humid environment with steam etc., or in the air with explosive gas.
- 1.13 When using the test leads, please hold your finger behind the finger protective equipment of the probe.
- 1.14 Please connect the neutral wire or ground wire first under measurement, and then connect the live wire; when the measurement ends, please disconnect the live wire first, and then disconnect the neutral wire and ground wire.
- 1.15 Before opening the shell or battery cover, remove all probes or test leads. Do not use the meter when it is disassembled or the battery cover opened.

### 2. Electric symbols

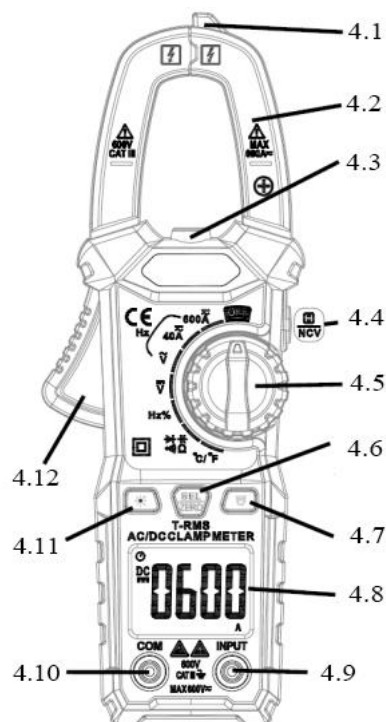
	HIGH VOLTAGE WARNING
	AC
	DC
	AC and DC
	Warning/Safety signs
	GND
	Fuse

### 3. Summarize

It is a new advanced and multifunctional RMS digital clamp meter, make your work relaxing, more efficient and safer. It can measure ACV and DCV, ACA, frequency, duty cycle, resistance, capacitance, temperature, diode, continuity, NCV etc.



## 4. Panel description

- 4.1 NCV probe
- 4.2 Clamp
- 4.3 Torch
- 4.4 Data hold and NCV key
- 4.5 Range knob
- 4.6 Function select key
- 4.7 Switch for torch
- 4.8 LCD
- 4.9 Input terminal
- 4.10 COM terminal
- 4.11 Backlight key
- 4.12 Trigger



## 5. Operating instructions




### ACA measurement

- 1) Turn the knob to the proper range  $\tilde{A}$  (40A or 600A), press the  key to switch to the ACA function.
- 2) Press the trigger to open the clamp jaw, use the jaw to clamp the conductor under tested and then release the trigger slowly until the clamp jaw is closed completely. Please confirm if such conductor is clamped in the center of the clamp jaw because the conductor not placed in the center will cause additional error.
- 3) Get the reading from LCD
- 4) Press the  key to check the frequency or LPF function.

### Warning

- ◆ Be cautious when measuring high voltage, to avoid the electric shock or injury.
- ◆ Before operation, measure the voltage or current with the meter that were known beforehand to check if the meter function is fine.
- ◆ In order to ensure the accuracy, the conductor under tested should be clamped in the center of the clamp jaw, otherwise it will cause additional error.

### DCA measurement


- 1) Turn the knob to the proper  $\tilde{A}$  range (40A or 600A), press the  key to switch to the DCA function.
- 2) When it do not shows zero on the LCD, please press and hold the  key for more than 2 seconds to reset, then the LCD will display zero on it.
- 3) Press the trigger to open the clamp jaw, use the jaw to clamp the conductor under tested and then release the trigger slowly until the clamp jaw is closed completely. Please confirm if such conductor is clamped in the center of the clamp jaw because the conductor not placed in the center will cause additional error.
- 4) Get the reading from LCD.
- 5) Press the  key to check the frequency or LPF function.

### Warning

- ◆ Be cautious when measuring high voltage, to avoid the electric shock or injury.
- ◆ Before operation, measure the voltage or current with the meter that were known beforehand to check if the meter

function is fine.

- ◆ In order to ensure the accuracy, the conductor under tested should be clamped in the center of the clamp jaw, otherwise it will cause additional error.

**Note:** Before measuring DCA, please be sure that press and hold the  key for more than 2 seconds to reset


### DCV measurement

- 1) Turn the knob to the  $\bar{V}$  range.
- 2) Insert the black test lead to “COM” terminal and the red one to “INPUT” terminal.
- 3) Connect the test leads to the power under tested or load in parallel.
- 4) Get the reading from LCD.
- 5) When the measuring value is more than 80V, the orange backlight will shows.

### Warning

- ◆ Do not measure the voltage higher than 600V, otherwise the meter may be damaged.
- ◆ Be cautious when measuring high voltage, to avoid the electric shock or injury.
- ◆ Before operation, measure the voltage or current with the meter that were known beforehand to check if the meter function is fine.
- ◆ After completing all the measuring operations, disconnect the test leads with the circuit under tested in time.


### ACV measurement

- 1) Turn the knob to the  $\tilde{V}$  range.
- 2) Insert the black test lead to “COM” terminal and the red one to “INPUT” terminal.
- 3) Connect the test leads to the power under tested or load in parallel.
- 4) Get the reading from LCD.
- 5) When the measuring value is more than 80V, the orange backlight will shows.
- 6) Press the  key to check the frequency or LPF function.

### Warning

- ◆ Do not measure the voltage higher than 600V, otherwise the meter may be damaged.
- ◆ Be cautious when measuring high voltage, to avoid the electric shock or injury.
- ◆ Before operation, measure the voltage or current with the meter that were known beforehand to check if the meter function is fine.
- ◆ After completing all the measuring operations, disconnect the test leads with the circuit under tested in time.



### Frequency/duty cycle measurement

- 1) Turn the knob to the Hz% range.
- 2) Insert the black test lead to “COM” terminal and the red one to “INPUT” terminal.
- 3) Connect the test leads to the power under tested or load in parallel.
- 4) Get the reading from LCD. Press the  key to check the frequency or duty cycle.

### Warning

- ◆ Before operation, measure the voltage or current with the meter that were known beforehand to check if the meter function is fine.
- ◆ After completing all the measuring operations, disconnect the test leads with the circuit under tested in time.



## Resistance measurement

- 1) Turn the knob to the  range, press  key to switch to the resistance.
- 2) Insert the black test lead to “COM” terminal and the red one to “INPUT” terminal.
- 3) Connect the test leads to the circuit under tested and both ends of the resistance in parallel.
- 4) Get the reading from LCD.

### Warning

- ◆ When measuring resistance online, be sure the power has been off and all capacitors are fully discharged. Otherwise it may cause the damage of the meter and electric shock.
- ◆ After completing all the measuring operations, disconnect the test leads with the circuit under tested in time.



## Continuity measurement

- 1) Turn the knob to the  range, press  key to switch to the continuity.
- 2) Insert the black test lead to “COM” terminal and the red one to “INPUT” terminal.
- 3) Connect the test leads to the circuit under tested and both ends of the resistance in parallel.
- 4) If the resistance under tested or the resistance in the circuit is less than about  $30\ \Omega$ , the buzzer will sound.

### Warning

- ◆ When measuring continuity online, be sure the power has been off and all capacitors are fully discharged. Otherwise it may cause the damage of the meter and electric shock.
- ◆ After completing all the measuring operations, disconnect the test leads with the circuit under tested in time.



## Diode measurement

- 1) Turn the knob to the  range, press  key to switch to the diode.
- 2) Insert the black test lead to “COM” terminal and the red one to “INPUT” terminal.
- 3) Under the range diode, connect the red test lead to the positive of the diode and the black test lead to the negative of the diode.
- 4) Get the reading from LCD.
- 5) If connect the inverse polarity of test lead and diode, it will show “OL” on the LCD.

### Warning

- ◆ When measuring diode online, be sure the power has been off and all capacitors are fully discharged. Otherwise it may cause the damage of the meter and electric shock.
- ◆ After completing all the measuring operations, disconnect the test leads with the circuit under tested in time.

## Capacitance measurement


- 1) Turn the knob to the  range, press  key to switch to the capacitance.
- 2) Insert the black test lead to “COM” terminal and the red one to “INPUT” terminal.
- 3) Connect the test leads to the both ends of capacitor under tested in parallel.
- 4) Get the reading from LCD after it is stable.

### Warning

- ◆ When measuring capacitance online, be sure the power has been off and all capacitors are fully discharged. Otherwise it may cause the damage of the meter and electric shock.
- ◆ After completing all the measuring operations, disconnect the test leads with the circuit under tested in time.

△ Note: When measuring the capacitance more than 100uF, it needs more time to get the correct reading.

### Temperature measurement

- 1) Turn the knob to the °C/°F range.
- 2) Insert the K-type thermocouple into the meter, then insert the black negative thermocouple to “COM” terminal and the red positive one to “INPUT” terminal.
- 3) The thermocouple probe is in contact with the object under tested, then get the reading from LCD
- 4) Press  key to switch the temperature units °C/°F.


### △ Warning

- ◆ When measuring the temperature with a thermocouple, the probe of the thermocouple must not come into contact with the electric objects, otherwise it may cause the damage of the meter and electric shock.





△ Note:


The thermocouple cold end compensation is placed inside the meter, and it will take a long time to reach thermal equilibrium with the environment.

### Non-contact ACV test (NCV)

- 1) In any range, press and hold the  key for more than 2 seconds. After a beep sounds, and the meter displays the "NCV" symbol, then enter the NCV detecting function. Press and hold the key for more than 2 seconds or turn the knob to exit the NCV detecting function.
- 2) Then slowly move the NCV sensor close to the object under tested.
- 3) When the weak signal of electromagnetic field exists, the "---L" mark is displayed, at the same time the buzzer emits a slow beep.
- 4) When the strong signal of electromagnetic field exists, the "---H" mark is displayed, the orange backlight will shows, at the same time the buzzer emits a quick beep.

### Other function:

- ◆ Back light: Press the  key to turn the backlight on or off, or the backlight will be automatically turn off after 20 seconds.
- ◆ Torch: Press the  key to turn the torch on or off.
- ◆ Data hold: Press the  key to turn the data hold function on or off.
- ◆ NCV: In any range, press and hold the  key for more than 2 seconds can turn on and off the NCV function, or turn the knob can also close the NCV function.
- ◆ Auto shutdown function: If the meter is idle for 15 minutes after it is turned on, it will automatically shut down to save battery energy. After auto power off, press any key to turn it on.

Press and hold the  key and turn on the power, the auto shutdown function will not work. Restart the meter again, and the automatic shutdown function will be recovered.

## 6. General features

Environmental conditions:

Over-voltage standard: CAT.III 600V

Pollution level: 2

Altitude: <2000m

Working temperature and humidity: 0~40°C (<80% RH, <10°C non-condensing)

Storage 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 measuring terminal and ground: 600V

Sampling rate: about 3 times/s

Max display: 4000 counts. LCD will automatically display the unit symbols according to the measuring function range which is selected.

Over range indication: LCD displays the symbol “OL”

Low battery indication: LCD displays the symbol 

Polarity indication: Automatic negative polarity indication

Power: 2\*1.5V AAA batteries

## 7. Technical characteristics

Accuracy is effective within one year after calibration

Ambient temperature: 18°C~ 28°C, relative humidity: ≤80%

### DCV

Range	Resolution	Accuracy
400mV	0.1mV	±(0.5%+5d)
4V	0.001V	
40V	0.01V	
400V	0.1V	
600V	1V	

Input impedance: 10MΩ

Overload protection: 600V; Max measuring voltage: 600V

### ACV

Range	Resolution	Accuracy
4V	0.001V	±(1.0%+5d)
40V	0.01V	
400V	0.1V	
600V	1V	

Input impedance: 10MΩ


Overload protection: 600V; Max measuring voltage: 600V

Frequency range: 40Hz ~ 1k Hz    Response: True RMS

### DCA

Range	Resolution	Accuracy
40A	0.01A	50~60Hz: ±(2.5%+5d)
400A	0.1A	
600A	1A	

Max measuring current: 600A;

Note: To ensure the accuracy above please press the  key to reset.

## ACA

Range	Resolution	Accuracy
40A	0.01A	50~60Hz: $\pm(2.5\%+5d)$ Other: $\pm(3.0\%+10d)$
400A	0.1A	
600A	1A	


Max. measuring current: 600A; Frequency range: 40Hz ~ 1kHz; Response: True RMS

## Resistance


Range	Resolution	Accuracy
400Ω	0.1Ω	$\pm(1.0\%+5d)$
4kΩ	0.001kΩ	
40kΩ	0.01kΩ	
400kΩ	0.1kΩ	
4MΩ	0.001MΩ	
40MΩ	0.01MΩ	

Overload protection: 250V

## Continuity test:

Function	Resistance: <30Ω, the buzzer will sound
	Testing voltage: about 1V Overload protection: 250V

## Diode

Function	Displays the approx. value of the diode positive voltage
	Measuring voltage: about 3.0V Overload protection: 250V

## Capacitance

Range	Resolution	Accuracy
10nF	0.001nF	$\pm(4.0\%+5d)$
100nF	0.01nF	
1000nF	0.1nF	
10μF	0.001μF	
100μF	0.01μF	
1000μF	0.1μF	
10mF	0.001mF	

Overload protection: 250V;

The accuracy above excluded the error caused by the capacitance of test lead.

## Frequency / duty cycle

Range	Resolution	Accuracy
10Hz	0.001Hz	$\pm(1.0\%+3d)$
100Hz	0.01Hz	
1000Hz	0.1Hz	
10kHz	0.001kHz	
100kHz	0.01kHz	
1000kHz	0.1kHz	

10MHz	0.001MHz	±(3.0%+3d)
1~99%	0.1%	

Overload protection: 250V

At the Hz/% range:

- 1) Measurement range: 0~10MHz
- 2) Voltage range: 0.2~10V AC (The voltage should be larger with the frequency under tested increasing)

At the V range:

- 1) Measurement range: 0~10kHz
- 2) Voltage range: 0.5~600V AC (The voltage should be larger with the frequency under tested increasing)

At the A range:

- 1) Measurement range: 0~10kHz
- 2) Signal range:  $\geq 1/4$  of measurement range (The current should be larger with the frequency under tested increasing)

Temperature

Range	Resolution	Accuracy	
°C	1°C	-20°C ~ 0°C	± 3°C
		0°C ~ 400°C	± (2.0%+3)
		400°C ~ 1000°C	
°F	1°F	-4°F ~ 32°F	± 5°F
		32°F ~ 752°F	± (2.0%+3)
		752°F ~ 1832°F	

Note: The accuracy above exclude the error caused by thermocouple probe

## 8. Maintenance:

### Warning

To avoid the electric shock, please remove the test leads before opening the battery cover or back cover.


- ◆ The maintenance to the meter must be served by the qualified person or maintenance department.
- ◆ Clean the case with a damp cloth and detergent, do not use abrasives and alcohol etc. Wipe each jack with a clean swab soaked in alcohol

## 9. Install and replace the batteries

Please install and replace the batteries according to the steps below:

- 1) Turn off the meter, and remove the test lead.
- 2) Remove the screw on the battery cover with a screwdriver and take out the battery cover
- 3) Remove the old battery, and install the new battery according to the battery polarity marked in the battery box.
- 4) After installing the new battery, close the battery cover and tighten the screws.

### Warning

- ◆ To avoid the wrong readings that may cause the electric shock or personal injury, when the LCD displays the  symbol the battery should be replaced immediately.
- ◆ Please use the batteries with same mode or same specification.
- ◆ In order to ensure the safe operation and maintenance of the meter, when it is idle for a long time please remove the battery to avoid the battery leakage.