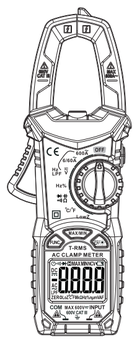
User manual

AC DIGITAL CLAMP METER



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

Safety Statement

The design and manufacture of clamp meters conform to IEC 61010-1, IEC 61010-2-032, IEC 61010-031 International Electrical Safety Standards, Compliance with IEC 61010 CAT.III 600V measurement category and pollution grade 2.

⚠Warning ***Read this manual before using the instrument.***

Safety Operation Specifications

"**Warning**" mark indicates the condition and operation which may cause danger to users.

"**Caution**" mark refers to the condition and operation which may cause damage to the instrument or equipment.

⚠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
- Voltage applied between terminals or between each terminal and grounding point shall not exceed the rated value.
- 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 are cracks in the instrument shell or plastic parts damaged. If so, please do not use 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
- Do not exceed the lowest rated Category of Measurement (CAT) rating in products, probes or accessories
- Do not measure the current when the probe is inserted into the input jack
- Don't work alone

- 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 neutral wire or the ground wire firstly, then connect the live wire; When disconnecting, please disconnect the live wire firstly, then disconnect the neutral wire and ground wire
- 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
	low battery
CE	Product complies with all relevant European laws
	The additional product label shows that do not discard this electrical/electronic product into household garbage.

Overview

A new generation of true RMS double impedance high performance digital clamp meter, which integrates multiple functions, makes your work easier, more efficient and safer.

High impedance voltage measurement

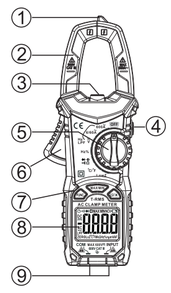
When measuring in the circuit, it has little effect on the performance of the circuit. This is the effect required for most voltage measurement applications, especially for sensitive electronic or control circuits.

Low impedance voltage measurement

It can safely troubleshoot sensitive electronic or control circuits and circuits that may contain false voltages, and can more reliably determine whether there is a voltage on the circuit.

Measurable AC/DC voltage, AC current, frequency, duty cycle, resistance, capacitance, temperature, diode, continuity, NCV, etc.

Instrument panel description



① NCV probe
② Clamp
③ Flashlight
④ Data hold/NCV key
⑤ Knob switch
⑥ Trigger
⑦ Function key
⑧ Display screen
⑨ Measuring input jack

Function key

FUNC.: Function select
MAX/MIN: MAX/MIN
☼/🔦: Flashlight/Backlight
H NCV: Data hold/NCV key

Other function

- Max/Min measurement：press MAX/MIN key View Maximum and Minimum，press MAX/MIN key and keep more than 2 seconds to exit the maximum and minimum measurements
- Backlight ： press ☼/🔦 key to turn on or off the backlight, or automatically turn off the backlight after 10 seconds

- Flashlight：press ☼/🔦 key and keep more than 2 seconds to turn on or off flashlight
- Data hold：press H NCV key to turn on or off data hold
- Non-contact AC Voltage Detection (NCV):
  At any position, press the " H NCV " key and hold for more than 2 seconds to turn NCV on or off. NCV function can also be turned off by pressing any key or turning knob switch.
- Auto power off：
  No operation in 15 minutes. The instrument will shut down automatically to save battery energy. After automatic shutdown, press any key to restore the working state of the instrument.
  If you press the "FUNC." key and keep, Then turn on the meter power, the automatic shutdown function will be cancelled. Reboot can restore automatic shutdown function.

Measurement operation

1) AC current measurement
2) Turn the knob to Ã， and select Proper range(6A,60A or 600A),
3) Then press the trigger to open the clamp, clamp the

conductor to be tested, slowly release the trigger until the clamp are completely closed, and determine whether the conductor to be tested is clamped in the center of the pliers, if the conductor is not in the center of the pliers, additional errors will occur.
4) Read the measurement results from the display screen
5) When the measurement result is greater than 1A, the orange backlight will on.
6) When measuring AC current, press "FUNC." key to view frequency or LPF function measurement.

⚠Warning

- When measuring high voltage, pay special attention to safety, so as not to be subjected to electric shock or personal injury.
- In order to ensure the measurement accuracy, the measured conductor must be placed in the center of the clamp, otherwise additional errors will occur.

AC/DC voltage measurement

1) Turn the knob to V̄ ṽ , Switching AC or DC Current Measurement Function by Pressing "FUNC." Key
2) Insert the red probe in "INPUT" jack，insert the black probe

in "COM" jack
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.
5) When the measurement result is greater than 80V, the orange backlight will on.
6) When measuring AC voltage, press "FUNC." key to view frequency or LPF function measurement.
7) When low impedance measurements are required, the knob is turned to LowZ position. Switching AC or DC Voltage Measurement Function by Pressing "FUNC." Key

⚠Warning

- The voltage above 600V 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.

⚠Caution

High impedance voltage measurement：10MΩ
Low impedance voltage measurement：300kΩ

Frequency/duty measurement

1) Turn the knob to Hz%, Switching frequency or duty Measurement Function by Pressing "FUNC." Key
2) Insert the red probe in "INPUT" jack，insert the black probe in "COM" jack
3) Contact the probe to the measured circuit (connect to the measured power supply or circuit in parallel).
4) Read the measurement result on the screen.

⚠Warning

- The voltage above 600V 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.

⚠Caution：To avoid damaging the instrument or equipment, do not input a voltage greater than 10V.

Resistance measurement

1) Turn the knob to ⇥⇤ Ω, Switching resistance Measurement Function by Pressing "FUNC." Key
2) Insert the red probe in "INPUT" jack，insert the black probe in "COM" jack

3) Contact the probe to the measured circuit or resistance.
4) Read the measurement result on the screen.

⚠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.

⚠Caution：To avoid damaging the instrument or equipment, do not input a voltage greater than 10V.

⚠Note：When measuring resistance on a circuit, the reading may be affected by other circuits.

Continuity test

1) Turn the knob to ⇥⇤ Ω, Switching continuity test Function by Pressing "FUNC." Key
2) Insert the red probe in "INPUT" jack，insert the black probe in "COM" jack
3) Contact the probe to the measured circuit or resistance.
4) If the resistance or circuit of the measured resistance is less than 30Ω, the buzzer sounds and the orange backlight on; the screen displays the resistance

⚠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.

⚠Caution：To avoid damaging the instrument or equipment, do not input a voltage greater than 10V.

⚠Note：When measuring resistance on a circuit, the reading may be affected by other circuits.

Diode test

1) Turn the knob to ⇥⇤ Ω, Switching diode test Function by Pressing "FUNC." Key
2) Insert the red probe in "INPUT" jack，insert the black probe in "COM" jack。
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 struck by electric shocks.

⚠Caution：To avoid damaging the instrument or equipment, do not input a voltage greater than 10V.

Capacitance measurement

1) Turn the knob to ⇥⇤ Ω, Switching capacitance Function by Pressing "FUNC." Key
2) Insert the red probe in "INPUT" jack，insert the black probe in "COM" jack。
3) Contact the probe to the measured circuit or Capacitance,
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.

⚠Caution：To avoid damaging the instrument or equipment, do not input a voltage greater than 10V.

⚠Note：When measuring capacitance greater than 100uF, it will take a long time to measure correctly.

Temperature measurement

1) Turn the knob to ℃/℉
2) Insert the K-type thermocouple into the instrument, the positive pole (red) of the thermocouple into the "INPUT" jack, and the negative pole (black) into the "COM" input.
3) Contact the thermocouple probe with the measured object and read the results from the display screen
4) Press the FUNC. key to select the temperature unit.

⚠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.

⚠Note：

It takes a long time for the cold end of thermocouple to be restored in the instrument to achieve thermal balance with the environment.

Non-contact AC Voltage Detection (NCV)

1) At any position, hold down the H NCV key for more than 2 seconds, "click" a sound, the instrument shows the "NCV" character, and then enter the NCV detection function.

2) Then NCV probe gradually approaches the detected point.
3) When the signal of weak electromagnetic field is sensed, the character "--- L" is displayed, and t a slow beeping sound.
4) When the signal of strong electromagnetic field is sensed, the character "--- Hl" is displayed, and t a fast beeping
5) Press H NCV key more than 2 seconds or turn knob to exit NCV detection function

General Technical Specifications

- Environment condition of using:
  CAT.III 600V
  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：600V
- 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: 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+5)
6V	0.001V	
60V	0.01V	
600V	0.1V	

Input impedance：10MΩ(LowZ：300 kΩ)
Overload protection: 600V; Maximum input voltage: 600V

AC voltage

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

Input impedance：10MΩ(LowZ：300 kΩ)
Overload protection: 600V; Maximum input voltage: 600V
Frequency Response：10Hz ~ 1kHz：TRMS

AC current

Range	Resolution	Accuracy
6A	0.001A	40~400Hz：±(2.5% reading +5) other：±(3.0% reading +10)
60A	0.01A	
600A	0.1A	

Maximum current：600A Frequency Response：40Hz ~ 1kHz：TRMS

Resistance

Range	Resolution	Accuracy
600Ω	0.1Ω	±(1.0% reading +5)
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	
60MΩ	0.01MΩ	

Overload protection: 250V

Continuity

	<30Ω, the buzzer sounds and the orange backlight on	Test Voltage Approx. 1V Overload protection：250V

Diode

▶|	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

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	
100mF	0.01mF	

Overload protection: 250V

Frequency/Duty

Range	Resolution	Accuracy
10Hz	0.001Hz	±(1.0% reading +3)
100Hz	0.01Hz	
1000Hz	0.1Hz	
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 ACV);
A：
1) Range：0 ~ 100 kHz
2) Current sensitivity：≥ 1/4 Full range

Temperature

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

Note: The above accuracy does not include the error of thermocouple probe.

Maintenance

⚠Warning

To avoid electric shock, remove the test probe before opening the battery cover or back cover。

General maintenance

- Maintenance and service of this instrument must be carried out by professional qualified maintenance personnel or maintenance department.
- Use wet cloth or mild detergent regularly to clean the shell. Do not use abrasives or solvents. Wipe the contacts in the socket with a clean cotton swab soaked in alcohol.

Battery Installation or Replacement

The instrument uses two AAA 1.5V batteries. Please install or replace the batteries according to the following steps.

1) Turn off the power of the instrument and remove the probe
2) Use screwdriver to unscrew the screw that fixes the battery cover and remove the battery cover
3) Remove the old battery and install the new battery according to the polarity of the battery marked in the battery box

4) After installing the new battery, cover the battery cover and lock the screw

⚠Warning

- To avoid the possibility of electric shock or personal injury caused by incorrect reading, replace the battery immediately when the " " sign is displayed on the display screen.
- Please use the same type of batteries, do not use substandard batteries
- In order to ensure safe operation and maintenance of the instrument, please take out the battery when not in use for a long time, in order to prevent damage to the product caused by battery leakage.

EMC&LVD IEC61010-1 600V CAT II RoHS CE

V04 H01-04-0015

75X105mm 折页形式 双面印刷