User manual

AC/DC DIGITAL CLAMP METER

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

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Safety Information

⚠ ***WARNING***

Please read this manual carefully before using this product.

"**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
- Use the instrument strictly according to this instruction, otherwise the protection function provided by 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
⎓	DC
≂	AC or DC
⚠	Warning, danger
⏚	Ground
⧈	Double insulation/reinforced insulation protection
	Low battery
CE	Product complies with all relevant European laws
VFD	Frequency converter
Inrush	Inrush current measurement
LoZ V	Low Input Impedance Voltage Measurement
	The additional product label shows that do not discard this electrical/electronic product into household garbage.

Overview

This meter is a double impedance high performance true RMS digital clamp meter, which integrates multiple functions, makes your work easier, more efficient and safer.

It can measure AC/DC voltage, AC/DC current, frequency, duty, resistance, capacitance, temperature, diode, NCV, VFD, inrush current, etc.

High Input Impedance Voltage Measurement:

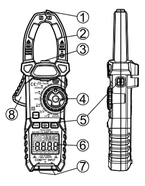
When measuring in a circuit, it has little effect on circuit performance. This is the desired effect for most voltage measurement applications and is especially important for sensitive electronic or control circuits.

Low Input Impedance Voltage Measurement(LoZ V):

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.

Panel description

① NCV senser
② Clamp
③ Flashlight
④ Knob switch
⑤ Function key
⑥ Display
⑦ Measuring input jack
⑧ Trigger



Function operation

FUNC：Function selection key

When there are multiple functions in one position, press this key to switch.

RNG：Range selection key

When the meter is turned on, the meter defaults to the AUTO range mode and displays the "auto" character.

It is effective in 60/600A, ACV, DCV and resistor functions. Press this key to enter the manual range mode, continue to press to enter the higher range until the highest range, and

press again to return to the lowest range. In manual range mode, press this key for more than 2 seconds to return to automatic range.

Max/Min View Key

At current, voltage, resistance and temperature functions. Press this key to cycle through the maximum and minimum values; Press this key for more than 2 seconds to exit this mode. After entering this mode, the meter will automatically switch to manual range.

When entering the maximum/minimum viewing mode, first press the range key to switch to the most suitable range.

Relative Value On/DC Current Zero Key

In DC current measurement mode, this key is zero.

Before measuring DC current, if the display is not ZERO, press this key to turn on ZERO function first, and the display screen will display the "zero" character

In the current, voltage, resistance, capacitance and temperature, this key is the relative value key. Press this key to turn on relative value measurement, the display screen will display "REL", and press it again to exit the relative value measurement function.

Data Hold/Flashlight Key

Press this key to turn on data hold, and the display screen displays "H" character to show data locking. Press again to cancel; Press this key for more than 2 seconds to turn on or off the flashlight.

Operations

Auto power off

No operation in 15 minutes. The meter will power off automatically to save battery energy. After automatic power off, press any key to power on.

If you press the "FUNC" key and keep, Then turn on the meter power, the auto power off function will be cancelled.

Inrush current measurement

1) Turn the knob to Ã, and select Proper range(60/600A or 1000A), Press FUNC key until the "inrush" character is displayed
2) Then press the trigger to open the clamp, clamp the conductor to be tested, and then 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.

3) Turn on the equipment to be tested (such as motor) and then trigger the meter by inrush current
4) Read the measurement results on the display

⚠ ***WARNING***

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury。**

⚠ **Note**

- **Please place the measured conductor in the center of the clamp head, otherwise additional error will occur**
- **The measuring time of inrush current is about 100ms**

VFD current measurement

1) Turn the knob to Ã, and select Proper range(60/600A or 1000A), Press FUNC key until the "VFD" character is displayed
2) Then press the trigger to open the clamp, clamp the conductor to be tested, and then 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.

3) Read the measurement results on the display

⚠ ***WARNING***

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury**
- **Please do not use VFD function to verify the presence of dangerous voltage or current, which may exceed the indicated value to avoid electric shock or personal injury.**

⚠ **Note**

- **Please place the measured conductor in the center of the clamp head, otherwise additional error will occur**

AC/DC current measurement

1) Turn the knob to Ã, and select proper range(60/600A or 1000A), Press FUNC key until the "DC/PPS" / "AC" character is displayed
2) When measuring DC current and the display screen shows

that it is not ZERO, first press the REL key to clear it. The display screen shows the character "Zero"

3) Then press the trigger to open the clamp, clamp the conductor to be tested, and then 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 on the display

⚠ ***WARNING***

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury**
- **Please do not use VFD function to verify the presence of dangerous voltage or current, which may exceed the indicated value to avoid electric shock or personal injury.**

⚠ **Note**

- **Please place the measured conductor in the center of the clamp head, otherwise additional error will occur**

VFD Voltage measurement

1) Turn the knob to V̄ or LoZ V̄, Press FUNC key until the "VFD" character is displayed
2) Insert red probe to "INPUT" jack, insert black probe to "COM" jack.
3) Connect the probe with voltage source or both ends of load in parallel for measurement
4) Read the measurement results on the display

⚠ ***WARNING***

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury**
- **Please do not use VFD function to verify the presence of dangerous voltage or current, which may exceed the indicated value to avoid electric shock or personal injury.**

⚠ **CAUTION**

- **When using LoZ V̄ (low input impedance) measurement, the continuous measurement time cannot exceed 1 minute.**
- **Do not use LoZ mode to measure voltage in circuits that may be damaged by the low impedance of this mode。**

AC/DC Voltage measurement

1) Turn the knob to V̄ or LoZ V̄, Press FUNC key until the "DC/PPS" or "AC" character is displayed
2) Insert red probe to "INPUT" jack, insert black probe to "COM" jack.
3) Connect the probe with voltage source or both ends of load in parallel for measurement
4) Read the measurement results on the display

⚠ ***WARNING***

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury**
- **Please do not use VFD function to verify the presence**

of dangerous voltage or current, which may exceed the indicated value to avoid electric shock or personal injury.

⚠ **CAUTION**

- **When using LoZ V̄ (low input impedance) measurement, the continuous measurement time cannot exceed 1 minute.**
- **Do not use LoZ mode to measure voltage in circuits that may be damaged by the low impedance of this mode。**

⚠ **NOTE**

- **High input impedance：approx. 10MΩ**
- **Low input impedance：approx. 300kΩ**

Frequency/duty measurement

1) Turn the knob to Hz%
2) Insert red probe to "INPUT" jack, insert black probe to "COM" jack.
3) Connect the probe with voltage source or both ends of load in parallel for measurement
4) Read the measurement results on the display

⚠ ***WARNING***

- **Before use, use the meter to test the known voltage or current, and confirm that the meter is in good condition**
- **Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury**

Resistance measurement

1) Turn the knob to Ω
2) Insert red probe to "INPUT" jack, insert black probe to "COM" jack.
3) Connect the probe to the both ends of resistor or circuit to be tested for measurement.
4) Read the measurement results on the display

⚠ ***WARNING***

- **When measuring circuit impedance, determine that the power supply is disconnected and the capacitor in the circuit is completely discharged**

Continuity test

1) Turn the knob to Ω, Press FUNC key until the "•))" Symbol is displayed
2) Insert red probe to "INPUT" jack, insert black probe to

"COM" jack.

3) Connect the probe to the both ends of resistor or circuit to be tested for measurement.
4) If the resistance value of the tested resistor or circuit is less than about 30Ω, and the LED indicator light is on at the same time, The resistance value will be displayed

⚠ ***WARNING***

- **When measuring circuit continuity, determine that the power supply is disconnected and the capacitor in the circuit is completely discharged**

Diode test

1) Turn the knob to Ω, Press FUNC key until the "▶|" Symbol is displayed
2) Insert red probe to "INPUT" jack, insert black probe to "COM" jack.
3) Connect the red probe to diode anode and connect the black probe to diode cathode.
4) Read the measurement results on the display

⚠ ***WARNING***

- **When measuring diode, determine that the power supply is disconnected and the capacitor in the circuit**

is completely discharged

Capacitance measurement

1) Turn the knob to Ω, Press FUNC key until capacitance function
2) Insert red probe to "INPUT" jack, insert black probe to "COM" jack.
3) Connect the probe to the both ends of capacitance to be tested for measurement.
4) Read the measurement results on the display

⚠ ***WARNING***

- **When measuring capacitance, determine that the power supply is disconnected and the capacitor in the circuit is completely discharged**

Temperature measurement

1) Turn the knob to °C/°F
2) Insert the K-type thermocouple , 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
4) Read the measurement results on the display

⚠ ***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 meter to achieve thermal balance with the environment.

Non-contact AC Voltage (NCV) Detection

1) Turn the knob to NCV/LIVE, the "NCV" symbol is displayed
2) Then NCV sensor gradually approaches the detected point.
3) When a weak electromagnetic field signal is sensed, the "---L" character is displayed, the buzzer emits a slow beep sound, and the green LED indicator light is on.
4) When a strong electromagnetic field signal is sensed, the "—H" character is displayed, the buzzer emits a quick beep sound, and the red LED indicator light is on

⚠ **NOTE**

When using NCV function, please remove the probe, otherwise the detection Sensitivity will be affected..

Live Detection

1) Turn the knob to NCV/LIVE, Press FUNC key until the "LIVE" Symbol is displayed
2) Insert red probe to "INPUT" jack.
3) Connect the red probe to the conductor to be tested for measurement
4) When a low voltage is detected, the "---L" character is displayed, the buzzer emits a slow beep sound, and the green LED indicator light is on
5) When a high voltage is detected, the "—H" character is displayed, the buzzer gives a quick beep sound, and the red LED indicator light is on. In general, the fire line detected at this time

⚠ **NOTE**

When using Live function, please remove the black probe, otherwise the detection Sensitivity will be affected..

General Technical Specifications

- Environment condition of using:

Safety：IEC 61010-1，Pollution level 2

IEC 61010-2-032: CAT Ⅲ 1000V / CAT Ⅳ 600V
IEC 61010-2-033: CAT Ⅲ 1000V / CAT Ⅳ 600V
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：
  AC750V or DC1000V
- Display: 6000 counter readout. Automatically display the unit symbols according to the shift of the measurement function.
- Over range indication: displays "OL".
- Low battery indication: when the battery voltage is lower than the normal working voltage, "▭" will be displayed.
- Input polarity indication: automatically display "–".
- Clamp opening size：40mm
- Auto power off：approx. 15 minutes
- Power: 2 x 1.5V AAA alkaline 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 current

Range	Resolution	Accuracy
60A	0.01A	±(2.5%reading+8)
600A	0.1A	
1000A	1A	

MAX current：1000A

NOTE：Press ZERO key to clear before measurement.

AC current

Range	Resolution	Accuracy
60A	0.01A	±(2.5%reading+8)
600A	0.1A	VFD：±(5.0%reading+10)
1000A	1A	INRUSH：±(5.0%reading+10)

MAX current：1000A ：True RMS

Frequency range：0.1~600A：40Hz~400Hz；
600~1000A：40Hz~60Hz

DC voltage

Range	Resolution	Accuracy
600mV	0.1mV	±(0.5%reading+5)
6V	0.001V	
60V	0.01V	
600V	0.1V	
1000V	1V	±(0.8%reading+5)

Input impedance：10MΩ(LoZ:300kΩ)

Overload protection: AC750V/DC1000V

Maximum input voltage: AC750V/DC1000V

Note: In the small voltage range, when the probe is not connected to the measuring circuit, the meter display reading may not be zero, which is normal and will not affect the normal measurement.

AC voltage

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

750V	1V	±(1.0%reading+5)
VFD(750V)	0.1V	±(2.0%reading+5)

Input impedance：10MΩ(LoZ:300kΩ)

Overload protection: AC750V/DC1000V

Maximum input voltage: AC750V/DC1000V

Frequency range: 40Hz ~ 1kHz; True RMS

Note: In the small voltage range, when the probe is not connected to the measuring circuit, the meter display reading may not be zero, which is normal and will not affect the normal measurement.

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

Diode

▶|	It displays the approximate forward voltage value of the diode.	Forward DC current is about 1.5mA Reverse DC voltage is about 3V Overload protection:250V

Continuity

•))	<approx. 30Ω, the buzzer sounds and the LED light on	Test Voltage Approx. 1V 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	±(5.0%reading+10)

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%	

Overload protection：250V;

Hz/Duty：

1) Range：0 ~ 10MHz
2) Voltage sensitivity：0.5~10V AC (As the frequency increases, the voltage should increase accordingly.)

Through mode V：

1) Range：10Hz ~ 10 kHz
2) Voltage sensitivity：>0.5V AC (As the frequency increases,

the voltage should increase accordingly.)

Clamp measuring frequency：

1) Range：10Hz ~ 1 kHz
2) Current sensitivity：>20A (As the frequency increases, the current should increase accordingly.)

Temperature

	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 precision does not include the error of thermocouple probe.

Maintenance

⚠ Warning

To avoid electric shock, remove the 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 meter uses three AAA 1.5V alkaline batteries. Please install or replace the batteries according to the following steps.

1) Turn off the power of the meter 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 1000VCAT III RoHS CE

SIZE:75x105mm