

Smart Digital AC/DC Clamp Meter Operation Manual

1. Safety information



Please operate this instrument with great care. Improper operation may result in an electric shock or damage to the instrument. Throughout the operation, you should follow the generally accepted safety procedures and take the safety measures as required by the Operation.

Please read carefully this Manual and take the operational methods as specified herein so as to make full use of the instrument's functionalities and ensure safe operation.

This instrument is in strict compliance with the safety requirements as specified in IEC-61010-1, IEC-61010-2-030 and IEC-61010-2-032 for electrical measuring instruments. Its pollution reaches the level of Class II and over-voltage standard is CAT III 600V.

Please strictly follow the guideline for safe operation so as to ensure safety while operating this instrument.

1.1 Preparation

1.1.1 The user must observe the standard safety rules when operating this instrument:

- General protection against electrical shock
- Prevention of unintended use

1.1.2 Upon the arrival of the instrument, check any damage that arises during transportation.

1.1.3 Upon the arrival of the instrument that has been stored and shipped in rough conditions, check and identify any damage.

1.1.4 The instrument must be kept in a good condition. Prior to its use, check the possible damage to insulation part and potential exposed metal wire of the lead.

1.2 Symbols

Note (For important safety information, see Operation Manual)

This symbol indicates that it can be used on a hazardous live conductor.

Double insulation protection (Category II)

CAT III refers to over-voltage level III (installation) as specified in IEC-61010-1 standard. Pollution level 2 refers to the level of impulse withstand voltage protection.

It is compliant with appropriate EU standard.

Grounding

1.3 Maintenance

1.3.1 Do not attempt to open the bottom case to adjust or repair instruments. Such operation can only be executed by an electrician who is fully familiar with the instrument and electric shock risks.

1.3.2 Remove pen-shaped meter from the line to be measured, before opening the instrument's bottom case or battery cover

1.3.3 To avoid an electric shock that results from any false readings, replace existing battery when the symbol is displayed.

1.3.4 Don't use any abrasive agents or solvents when a wet cloth and mild detergent are being employed to clean the instrument.

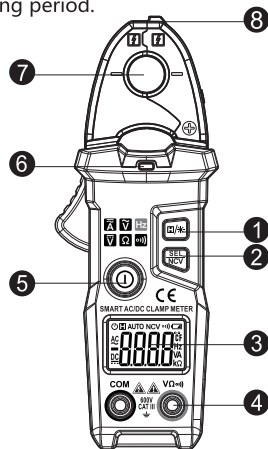
1.3.5 Power off and keep the range switch to the position "OFF" when the instrument is not in use.

1.3.6 Remove battery to avoid any damage to the instrument when the instrument is not in use for a long period.

2. Description

2.1 Components

- 1 Data hold/Backlight key
- 2 SEL/NCV key
- 3 Display screen
- 4 Input socket
- 5 Power key
- 6 NCV/On/Off indicator
- 7 Current clamp head: for current measurement
- 8 NCV sensing area



2.3 LCD monitor



	AC & DC
	On/Off indication
AUTO	Auto scan mode
	auto shutdown indication
	LOW BATTERY
	Hold status
V;A	Volt(Voltage);Ampere(Current)
Ω; kΩ; MΩ	Ohm, kilohm and megohm (Resistance)

Hz	Hertz
NCV	Non-contact voltage detection
Z	DC current return-to zero

3. Specification

The instrument shall be re-calibrated at an interval of one year under the conditions of 18 °C-28 °C and relative humidity of less than 75%.

3.1 Overview

- The instrument is designed to automatically select measurement functions and measuring ranges.
- Full range overload protection.
- Allowable max voltage between terminal to be measured and ground:600V DC or 600V AC
- Working weight: max2000m
- Display unit: LCD
- Max display value:6000 numbers
- Polarity indication: automatic indication. " - " indicates negative polarity.
- Over range indication: '0L' or '-0L'
- Sampling rate: approximately 3 times per second
- Unit display: to display functions and electric quantity
- Automatic shut-down time:10 minutes
- Power supply: 1.5V AAA battery ×2
- Battery under-voltage indication: LCD display symbol .
- Temperature coefficient: less than0.1x accuracy/°C
- Working temperature: 18°C ~ 28°C
- Storage temperature:-10°C ~ 50°C

3.2 Technical parameters

3.2.1 AC current

Measuring range	Resolution	Accuracy
6A	0.001A	±(2.5% Reading + 8digits)
60A	0.01A	
100A	0.1A	

- Minimum input current: 0.02A AC current ,0.001A DC current .
- Max input current: 100A AC/DC current
- Frequency range:45 ~ 65Hz ;

3.2.2 DC current

Measuring range	Resolution	Accuracy
6A	0.001A	±(3% Reading + 8digits)
60A	0.01A	
100A	0.1A	

Note: DC current accuracy means to guarantee the above accuracy when return-to zero mode is enabled.

3.2.3 DC voltage

Measuring range	Resolution	Accuracy
600V	0.1V	±(0.5% Reading + 3digits)

- Minimal input current 0.5V DC
- Maximal input current:600V DC

3.2.4 AC voltage

Measuring range	Resolution	Accuracy
600V	0.1V	±(0.8% Reading + 5 digits)

- Minimal input current:1.0V AC
- Maximal input current:600V AC (valid value)
- Frequency range:45 ~ 65Hz

3.2.5 Frequency

3.2.5.1 Frequency measurement for the current (A level)through clamp head

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

- Measurement range:40Hz ~ 1000Hz
- Input signal range:≥ 0.2A AC current(valid value)

3.2.5.2 Frequency measurement for the current (V level)through clamp head

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

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

3.2.6 Electric resistance

Measuring range	Resolution	Accuracy
6kΩ	0.001kΩ	± (0.8% Reading + 3 digits)

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



3.2.7 Line On/Off test

Measuring range	Resolution	Functions
	1Ω	If the electric resistance of the line measured is less than50Ω,the buzzer inside the instrument may sound.



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

4. Operational guidelines

4.1 Reading hold

During the process of measurement, gently touch the key  if you want to hold readings, and monitor's display value will be locked. Touch again the key , the readings hold will be removed.


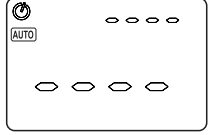
4.2 Backlight

- 1) In the process of measurement, if the measurement environment is too dark, press the key  for more than 2 seconds to enable backlight function. Then about 1 minute later, the backlight function will be automatically disabled.
- 2) During this process, press the key  for 2 seconds to disable backlight.

4.3 auto shutdown

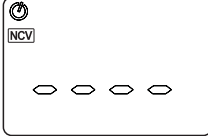
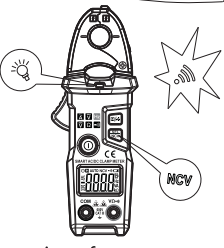
- 1) If no operations occur within 10 minutes after the initialization, the instrument will be in the state of dormancy. auto shutdown at this moment can save power consumption. 2 minutes before shutdown, the buzzer will sound at an interval of 1 minute.
- 2) Press any key after auto shutdown to wake the instrument into operation.
- 3) The function of auto shutdown will be disabled if SEL/NCV key is pressed while the instrument is initialized.

4.4 Preparation for measurement

- 1) Press the power key for 2 seconds to initialize the instrument. If the battery voltage is low (approximately $\leq 2.4V$), the monitor will display the symbol . At this moment, the battery should be replaced. The instrument will be shut down if the power key is pressed after the initialization. 
- 2) After the instrument is started, it will enter DC current mode automatically, and will shift to corresponding measurement function automatically when any AC current, DC current, AC voltage or resistance is detected.

Note: When started, the inside and surrounding of the clamp shall keep

4.5 Non contact voltage detection(NCV)

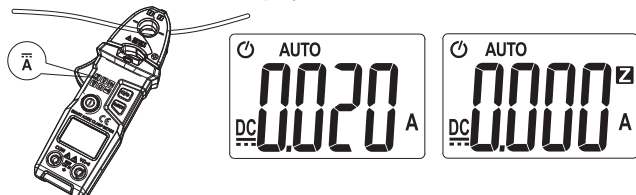
- 1) Press SEL/NVC key for 2 seconds to enable NCV function. Then the instrument will display the diagram on the right. 
- 2) Press NCV key and move NCV sensor closer to the lead line to be measured. The instrument can detect whether the AC voltage of the measured lead line is $>90V$. When the instrument detects AC voltage, the buzzer will sound alarms while backlight flickers. 

Notes:

- 1) Voltage may still remains in the absence of any alarm warning. Operator shall not rely on Non contact voltage detector to judge the presence/absence of voltage. The detection result may be subject to various factors, including socket design and insulation thickness and type.
- 2) In NVC detection mode, the instrument will not measure voltage, resistance and current simultaneously.

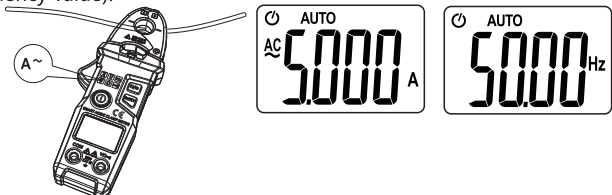
4.6 DC current measurement

- 1) After the instrument is started, it will enter DC current measurement mode by default. For impact of factors such as geomagnetic field etc., DC current of a certain numerical value will display on the instrument, any change in direction of the instrument will also lead to corresponding change in current value; it is required to press SEL key to enable the return-to zero function when using DC current measurement function, in this case, symbol Z will display on the instrument.
- 2) Hold the clamp and open the head, put one conductor of the circuit being measured into the clamp.
- 3) Current value measured will display on the instrument



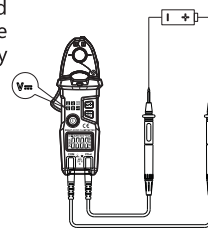
4. Measurement of AC current and AC current frequency

- 1) Hold a trigger, open clamp head, and catch one guide wire of a line to be measured
- 2) When the measured current of the signal is $>0.02A$, the instrument's primary display panel will display the measured current value. Press SEL key to display the frequency value of the measured current (Note: only when the current value is $> 0.2A$, can the instrument display its frequency value).



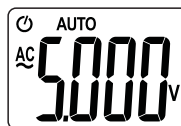
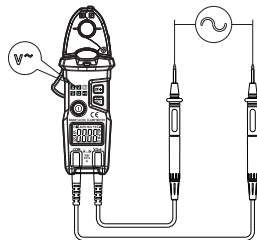
4.8 DC voltage measurement

1) When the pen-shaped meter is connected to the signal to be measured and the measured signal $\geq 0.5V$, the instrument will display the measured DC voltage value. When the measured signal $< 0.5V$, the instrument will accept the resistance as the default resistance and display the internal resistance of the measured signal.



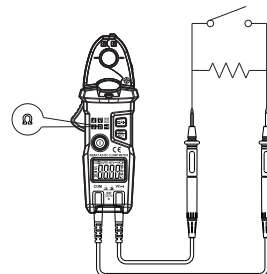
4.9 AC voltage measurement

1) When the pen-shaped meter is connected to the signal to be measured and the measured AC signal $\geq 0.8V$, the instrument will display the measured AC voltage. When HZ key is pressed, it will switch to the frequency value of the voltage. When the measured AC signal $< 0.8V$, the instrument will accept the resistance as the default resistance and display the internal resistance of the measured signal.



4.10 Electric resistance measurement


Connect the pen-shaped meter with the resistance being measured. When the measured resistance is $> 6k\Omega$, the instrument will display - - -; when the measured resistance is less than 50Ω , the buzzer will sound alarms and On/Off indicator will be on simultaneously



5. Maintenance

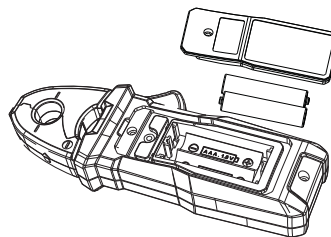
5.1 Battery replacement

Warning Before the instrument's battery cover is opened, remove the pen-shaped meter from the circuit to be measured, so as to avoid the risk of an electric shock.

- 1) If the symbol  appears, it indicates that the battery should be replaced.
- 2) Unscrew the fastening screw on the battery cover and remove it.
- 3) Replace the old battery.
- 4) Mount the battery cover as it is

Note:

Battery polarities cannot be reversed.



5.2 Replacement of pen-shaped meter

Warning The same or equivalent pen-shaped meter must be used to replace the old pen-shaped meter. The pen-shaped meter must be intact. Its grade must be 1000V 10A.

The pen-shaped meter must be replaced if its insulating layer is damaged (e.g. the metal wire of the guide is exposed).

6. Accessories

- | | | | |
|---|------------------|------------------|--------|
| 1 | Pen-shaped meter | Level:1000V 10A | A pair |
| 2 | Operation Manual | | one |
| 3 | battery | 1.5V AAA battery | two |
| 4 | Cloth bag | | one |