Operating Manual of Crenova 6016A Clamp Digital Multimeter

I. Overview

Crenova 6016A is a battery-driven 3 1/2 digital clamp meter for automatic range conversion which is characterized by stable performance and high reliability. This meter applies 16mm word height LCD with distinct readings, and features maximum hold, data hold and automatic on-off function.

This clamp meter can be used for measuring parameters such as DC voltage, AC voltage, resistance, diode and on-off test. The complete meter is cored by dual integral A/D conversion of large scale integrated circuit and features automatic range conversion function. It is a high-performance meter well received by lab, factory, radio amateur and family.

⚠ **Warning: before using the clamp meter, please read through "Safety Precautions".**

We have already sent an online manual to you, please check your email.You can reply us in the email about any question. Thank you.

II. Open-case inspection

Open the packing case and check if the following items are missing or damaged.

- One 6016A+ digital clamp meter
- One pair of 1.5v AAA Batteries
- One pair of test leads

III. Safety precautions

Please note "warning sign ⚠ and warning words". It means cases or behavior which may pose danger to user or cause damage to the clamp meter or device under test.

This meter is strictly in line with GB4793 Safety Requirements on Electronic Measuring Instrument, IEC61010 and IEC1010-2-032 safety standard. It complies with safety standard for double insulation, over-voltage CAT III 300V and pollution class 2.

Before use, please read through the operating manual.

1.When voltage above 30V, AC power line with inductive load is measured. When AC power line during electric fluctuation is measured, please be cautious of electric shock.

2.Before measuring, check if the measurement function switch is at correct position. Check test leads for reliable contact, correct connection and good insulation to avoid electric shock.

3.Clamp meter only meets safety standard when used with its supporting test leads. When test lead line is damaged, please replace with lead line of the same model or the same electric specification.

4.Do not replace the battery inside with other non-confirmed or non-recognized one. Use battery of the same model or electric specification only. Before replacing, the test lead must be away from the measurement point and make sure the input end has no signal.

5.When do electrical measurements, human body should have no direct contact with earth. Do not touch any metal terminal, output terminal or lead clamp which have exposed ground potential.

6.Do not store or use it in high temperature, high humidity, inflammable, explosive environment or high magnetic field.

7.Measure limit voltage which is beyond allowed range will cause damage to the clamp meter and injury to operator. Allowable limit voltage is indicated on the surface of clamp meter. Do not measure input signal which beyond this standard so as to prevent electric shock or damage to the clamp meter.

8.Do not apply 600V above voltage between clamp meter terminal and earth so as to prevent electric shock or damage to the clamp meter.

9.Do not attempt to calibrate or repair the clamp meter. When necessary, it should be done by personnel with specialized training or qualification.

10.When measuring, function/range selection switch must be at correct range gear. When shifting function/range selection switch, please disconnect the line of test lead from the object under test, and make sure the input end has no signal input. Do not shift function/range selection switch during measurement.

11.When LCD shows "⊟", please replace battery in time to make sure measurement accuracy.

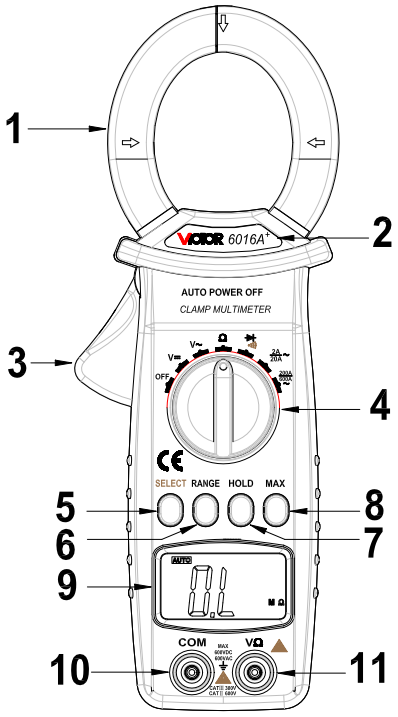
12.Do not change clamp meter circuit without permission, so as to prevent damage to clamp meter or safety risk.

IV. Safety symbols

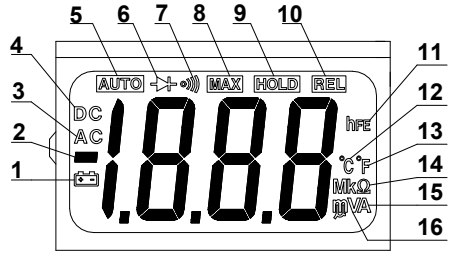
⚠	**Warning**	⎓	**DC**
⚠	**High voltage**	~	**AC**
⏚	**Earth**	≂	**AC/DC**
▣	**Double insulation**	CE	**European Union directive conformity**
⊟	**Battery under-voltage**	▭	**Fuse**

V. Surface structure

1.Clamp sensor/Jaw;
2.Instrument meter;
3.Trigger;
4.Function/range switch; for selecting measurement functions and ranges.
5.(SELECT) shift key of diode/buzzer;
6.(RANGE) shift key of auto/manual;
7.(HOLD) data hold key;
8.(MAX) maximum hold key;
9.LCD display screen;
10.COM input hole: negative input end, insert black test lead in;
11.VΩ input hole: measure voltage, resistance, diode and positive input end of on-off test, insert red test lead in;



VI. Display symbols



1.Low battery indicator;
2.Negative polarity indicator;
3.AC signal measurement indicator;
4.DC signal measurement indicator;
5.Automatic range indicator;
6.Diode measurement indicator;
7.Continuous inspection indicator;
8.Maximum measurement indicator;
9.Data hold indicator ;
10.Relative value measurement indicator;
11.Triode measurement indicator;
12.Degree centigrade measurement indicator;
13.Fahrenheit measurement indicator;
14.Resistance measurement unit (Ω ohm, kΩ kiloohm, MΩ megohm);
15.Current measurement unit (A ampere, mA milliampere, uA microampere);
16.Voltage measurement unit (V volt, mV millivolt, uV microvolt).
Note: item 10, 11, 12 and 13 are not available for 6016A^{+}.

VII. Key functions and auto power-off

(1) **SELECT：** Press the button to select indicated measurement function when there are two or more measurement functions on the same gear. It shifts between diode and buzzer measurements.

(2) **RANGE:** The meter is in automatic range when starts up, press the "RANGE" button to activate manual range mode. In the mode of manual range, each press lets the meter skip to the previous shift. When it goes to the highest shift, it goes back to the lowest shift automatically. The procedure repeats again in the same order. Press the "RANGE" button over 2 seconds, it will exit from manual range measurement mode and shift to automatic range measurement mode.

(3) **HOLD:**Press the "HOLD" button, the measurement value showed on the screen will be locked. Press this button again, it will unlock and enter the state of regular measurement.

(4) **MAX：** Press the "MAX" button, the display screen will show maximum value of the whole measurement process automatically. Press this button again, it will cancel maximum reading hold status and enter the state of regular measurement.

(5) **Auto power-off function:** In measurement process, if function button or function/range selection switch has no operation within 15 minutes, the meter will "power-off automatically". In the mode of auto power-off, press function button (valid operation) or rotate function/range selection switch, the meter will "power on automatically" and enter the measurement mode. Press and hold "HOLD" button when start up, the auto power-off function will be canceled.

⚠ Note: "Auto power off" refers to a dormant state. In dormant mode, small current (about 5μA) will be consumed. If it will not be used for a long time, please cut off power and take the battery out.

(6) **Buzzer:** Press any one of functional buttons at any gear, if the button is effective, the buzzer will beep. (2/20A buzzer will make no sound , and keep silence if the operation is invalid.) About 1

minute before automatic power off, the buzzer will send 5 beeps continuously for warning; before power off, the buzzer will send a long beep for warning. When resistance of on-off measurement is lower than 70Ω, buzzer beeps.

⑺ Valid Operation: Not all buttons worked at any gear. The clamp meter only worked when the operation is valid. You may select the relative operation or wake up clamp meter in dormant mode under the valid operation, as shown in table below (● means valid):

Key	SELECT	RANGE	HOLD	MAX
V⎓	**Invalid**	●	●	●
V~	**Invalid**	●	●	●
Ω	**Invalid**	●	●	**Invalid**
⊣◀ ·))	●	**Invalid**	●	**Invalid**
2/20A	**Invalid**	●	●	●
200/600A	**Invalid**	●	●	●

VIII. Features

1.General features

1-1. Display mode: LCD

1-2. Maximum display: 1999（3 1/2）digit automatic polarity display and unit display;

1-3.Measurement mode: dual integral A/D conversion;

1-4. Conversion rate: 3 times/second;

1-5. Over range display: “OL” is shown at the top of the display;

1-6. Low voltage display: “⊟” appears (about 2.4V);

1-7.Auto power off function;

1-8.Maximum opening jaw size: 32mm diameter;

1-9.Estimated maximum size of electric current wire: 30mm diameter;

1-10.Effects of magnetic fields: the meter can be affected by magnetic fields nearby. The display may be unstable or indicate incorrect measurement values;

1-11.Test position error: when measuring current, place measurement object in the center of clamp jaw, otherwise it may generate certain additional error;

1-12. Working environment: 0～40℃, relative humidity ＜80%;

1-13.Storage environment: -10～50℃, relative humidity ＜80%;

1-14. Power source: two 1.5V batteries (“AAA”7#);

1-15. Dimension (size): 210mm×76mm×37mm (L×W×H)

1-16. Weight: about 180g (batteries included).

2.Technical features

Accuracy is ± (% reading + number of digits)
for ensuring accuracy.
Ambient temperature: (23±5)℃, relative
humidity ＜75%.
Warranty is one year, starting on shipping date.

2-1.DC voltage measurement (see Figure 1)

A）Rotate function/range selection switch to V⎓ .

B）Insert red test lead and black test lead to VΩ and COM input jacks respectively.

C) Connect test end of the test lead with circuit under test or power supply in parallel. Polarity of red test lead and voltage value under test will be indicated on the display screen at the same time.

D）Read the measured value from the display screen.

DC Voltage (DCV) technical indicator:

Range	Accuracy	Resolution
200mV	±(0.5%+4d)	0.1mV
2V		1mV
20V		10mV
200V		100mV
600V	±(1.0%+6d)	1V

Input impedance: 10MΩ

Overload protection: 600V DC or AC peak;

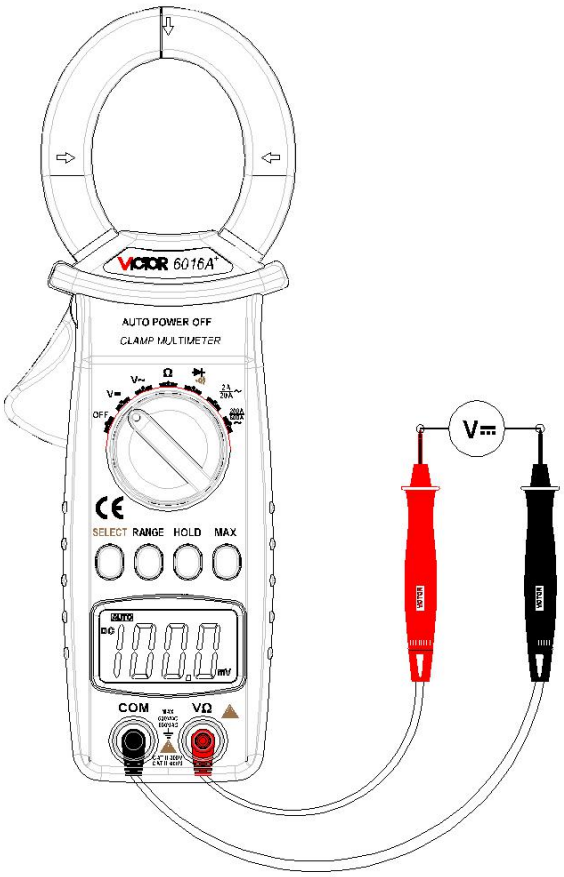


Figure 1

2-2. AC voltage measurement (see Figure 2)

A）Rotate function/range selection switch to V~ .

B）Insert red test lead and black test lead into VΩ and COM input jacks.

C）Connect test end of the test lead with circuit under test or power supply in parallel.

D）Read the measured value from the display screen.

Technical index of AC Voltage (ACV):

Range	Accuracy	Resolution
200mV	±(1.5%+20d)	0.1mV
2V	±(0.8%+10d)	1mV
20V		10mV
200V		100mV
600V	±(1.0%+10d)	1V

Input impedance: 10MΩ.

Frequency response: 40～200Hz.

Display: average value response (calibrate by effective value of sine wave).

Overload protection: 600V DC or AC peak;

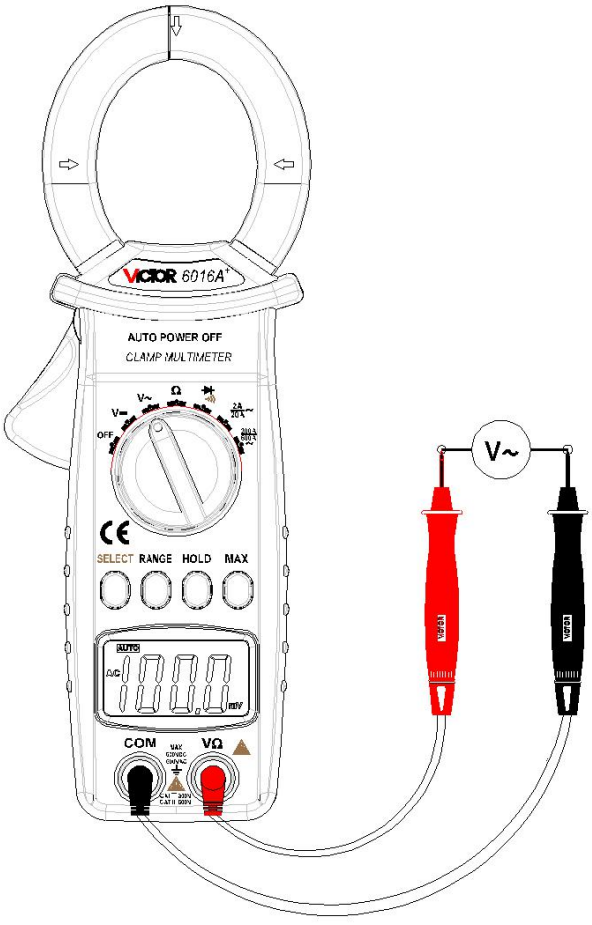


Figure 2

⚠ Note:
·Do not measure DC voltage or AC peak voltage higher than 600V.
·When measuring high voltage, please pay more attention to prevent electric shock.
After measuring, disconnect test lead from circuit under test immediately.

2-3. Resistance measurement (see Figure 3)

A)Rotate function/range selection switch to Ω gear.
B）Insert red test lead and black test lead to VΩ and COM input jacks respectively.
C）Connect test end of test leads with resistance under test. The resistance value will be indicated on the display screen.
D）Read the measured value from the display screen.
⚠Note: when testing resistance, turn off power supply of the circuit, and fully discharge capacitance.

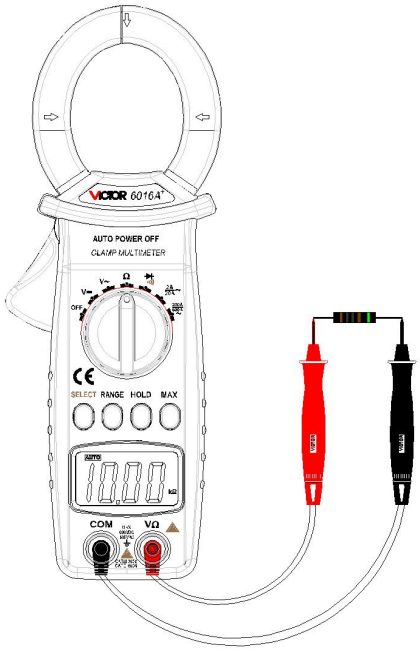


Figure 3

If resistance is under an open-circuit or resistance exceeds maximum range of the clamp meter, the instrument will indicate “OL”.
When resistance above 1MΩ, it will take the meter several seconds to make readings stable. It is normal for high resistance measurement.
When measuring resistance, do not input voltage value. Do not attempt to take any measurement that exceeds the limits. Exceeding the limits could cause electrical shock and damage to the clamp meter.
·After measuring, disconnect test lead from circuit under test immediately.

Technical index of resistance (Ω)

Range	Accuracy	Resolution
200Ω	±(0.8%+5d)	0.1Ω
2kΩ	±(0.8%+4d)	1Ω
20kΩ		10Ω
200kΩ		100Ω
2MΩ		1KΩ
20MΩ	±(1.2%+10d)	10KΩ

Open-circuit voltage: 200mV Overload protection: 250V DC or AC peak.
Note: When using 200Ω range, you may short-circuit test lead first. When measuring the resistance of the lead, please deduct it from actual measurement.

2-4. Diode measurement and on-off test

2-4-1. Diode measurement (see Figure 4)

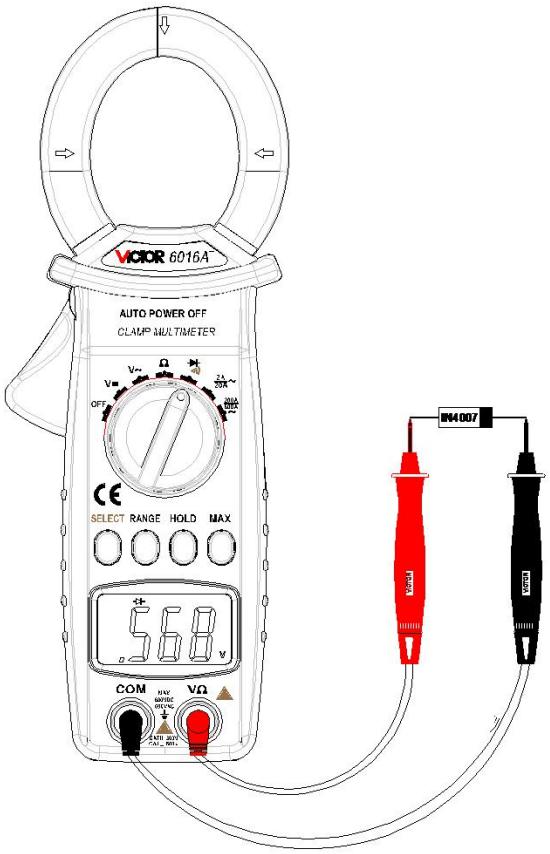


Figure 4

A)Rotate function/range selection switch to ⊣◀·))) .

B)Insert red and black test leads to VΩ and COM input jacks respectively.

C)Connect red test lead with positive pole of diode and black test lead with negative pole of diode.

D)Read the measured value from the display screen.

Note: if diode is under an open-circuit or polarity connection is wrong, the display screen will show "OL". When measuring diode under the circuit, turn off power supply of the circuit and fully discharge capacitance. After measuring, disconnect test lead from circuit under test immediately.

2-4-2. On-off test (see Figure 5)

A)Rotate function/range selection switch to ⊣◀·))) .

B)Press SELECT button to select on-off measurement function.

C)Insert red and black test leads to VΩ and COM input jacks respectively.

D)Connect test lead with both ends of circuit under measurement in parallel.

E）If resistance between both ends of circuit is lower than 60Ω, built-in buzzer beeps.

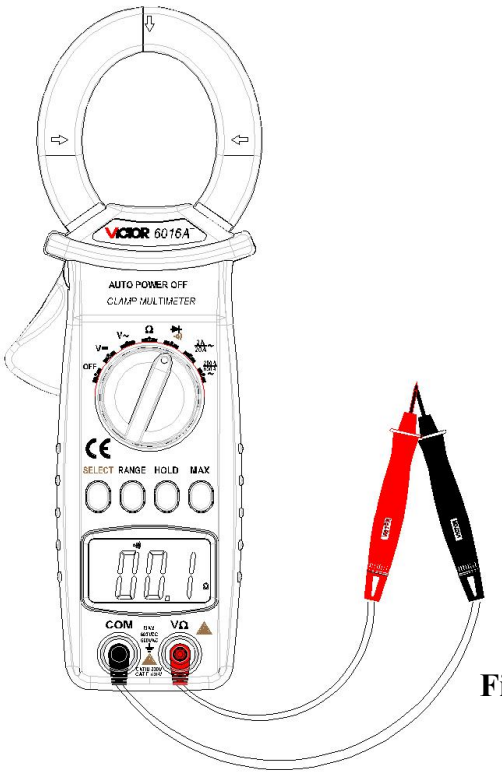


Figure 5

Technical index of diode and on-off test

Overload protection: 250V DC or AC peak.

⚠Note:

·If circuit under measurement is in open-circuit mode, the display screen will show “OL”.

When testing circuit on-off, cut off its power and fully discharge capacitance.

·After measuring, disconnect test lead from circuit under measurement immediately.

Range	Resolution	Description
Diode	1 mV	Open-circuit voltage is about 1.4V, forward voltage drop is about 0.5~0.8V.
On-off test	0.1Ω	Open-circuit voltage is about 0.45V, when it is lower than 70Ω, the buzzer beeps.

2-5.AC measurement (see Figure 6)

A)Rotate function/range selection switch to “2/20A” or “200/600A”.

B)Press and hold clamp jaw trigger to open clamp jaw. Pick up conductor under measurement by clamp jaw, then release trigger slowly until clamp jaw is fully closed. Please make sure the conductor is in the center of clamp jaw, otherwise it will cause additional error. The clamp meter can only measure one current conductor at one time. If measuring two or more conductors at the same time, the readings will be incorrect.

Technical index of ACA:

Range	Accuracy	Resolution
2A	±(3.5%+15d)	0.001A
20A	±(3%+10d)	0.01A
200A	±(3%+10d)	0.1A
600A	±(3.5%+15d)	1A

Note: frequency response: 50Hz;
Maximum input 600A, input time should not exceed 1 minute.
At AC gear, if clamp meter is near to a strong magnetic field,
it will indicate unstable or incorrect induction reading,
but it will not affect measurement result.

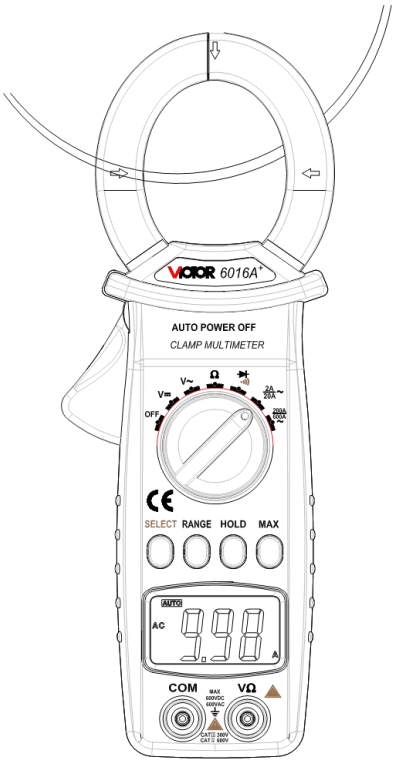


Figure 6

IX. Service and maintenance

⚠Warning:

Before open the bottom cover, please remove test rod first to avoid electric shock.

1**.Ordinary servicing**

1-1. This clamp meter is a high precision instrument. User is not allowed to modify circuit;

1-2. Please keep it from water and dust, do not bump or drop the meter;

1-3. Do not store or use the clamp meter in high temperature, high humidity, inflammable, explosive environment or strong magnetic field;

1-4. Please use wet cloth and gentle cleaning agent to clean surface of the clamp meter. Do not use strong solvent such as abradant or ethyl alcohol;

1-5. If the meter will not be used for a long time, please take batteries out in case of leaking liquid of batteries, which will corrode the clamp meter;

1-6. Do not let the peak value of DC or AC voltage input higher than 600V;

1-7.Do not measure voltage on current gear, resistance gear, diode gear and buzzer gear;

1-8.Do not use the clamp meter if the battery is not installed or rear cover is not tightened.

2.**Install or replace batteries**

When the meter is in use, please be noted that the service condition of 1.5V batteries. If the screen shows , please replace batteries according to Figure 7.

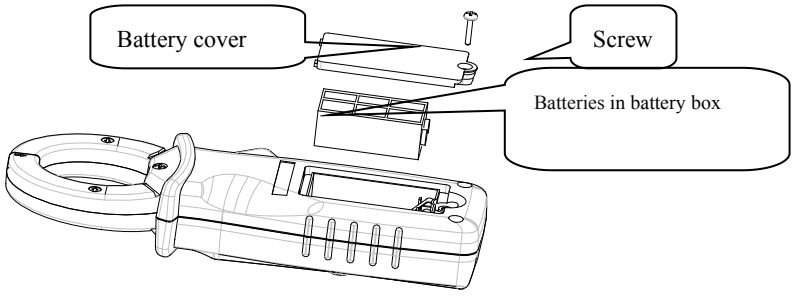


Figure 7

Please follow steps below:

2-1.Turn off the clamp meter, and remove test lead or the clamped current conductor at input end;

2-2.Make panel face down, and unscrew battery cover, remove the battery cover and take the battery box out;

2-3.Remove old batteries from the battery box and install new batteries according to polarity indication;

2-4.Please use batteries with the same model. Do not insert improper batteries;

2-5.After installing new batteries, put battery box inside the device, close the battery cover and secure the screw.

Content in this manual is considered correct. If users find any errors or omissions, please contact the manufacturer;

Please read the Safety note and Warning carefully, the company shall not be held liable for any accidents or damages caused by user’ s wrong/improper operation.