

Digital AC/DC Clamp Meter Manual

1. SUMMARY

This 3 1/2 Digit Highly Stable clamp meter uses two AAA (1.5V) batteries. It has a LCD with 20 mm digit display, which makes the reading clearer and the operation more convenient. It can test DCV, ACV, DCA, ACA, resistance, temperature, diode, continuity, as well as non-contact AC voltage test. It is equipped with clamp jaw lighting, Backlight, unit symbol display, True RMS, MAX, MIN, data hold function, auto power off and warning functions. It works in both auto range and manual range. To assure high accuracy and resolution, it adopts a micro processor which drives the LCD directly and a dual integral A/D converter IC. It is an ideal tool for labs, factories radio-technology and household.

2. SAFETY NOTICE

The instrument is designed according to IEC1010 standard (safety standard issued by International Electro technical Committee). Please read the followings carefully before operation.

1. Check the connection and insulation of test leads to avoid electric shock.
2. To avoid electric shock and damage to the meter, do not input voltage higher than DC 1000V or AC 750V during measurement.
3. Be seriously cautious when working with voltages above DC 60V or AC 36V.
4. Select correct function and range to avoid shock and fault operation.
5. Please move the test leads away from test points when switching the range.
6. Please don't input voltage in current terminal.
7. Please don't change the circuit randomly to avoid damaging the meter and danger.
8. Introduction for safety symbols:
 “△” Existing High Voltage, “⚡” GND “⊞” Dual Insulation, “△” Operator must refer to manual, “🔋” Low battery indication.

3. FEATURES

1. General Features

- (1) Display: LCD.
- (2) Max display: 2,000 (3 1/2 digits, auto polarity, and unit symbol display).
- (3) Measurement method: Analog to digital converter (in micro processor ADC+MCU).
- (4) Sampling rate: approx. 3 times/sec.
- (5) Over-range display: “OL” displayed.
- (6) Low battery indicator: “🔋” displayed.
- (7) Working environment: (0~40)°C, relative humidity: <80%.
- (8) Store condition: (-10~50)°C, relative humidity: <80%.
- (9) Power: 2 X 1.5V batteries (AAA).
- (10) Dimension: 270mm×123mm×35mm (length × width × height).
- (11) Clamp open: Max. Open: 52mm.
- (12) Weight: approx. 280g (including battery).
- (13) Accessories: user manual, test leads, temperature sensor TP01 banana probe, black pouch, gift box, two 1.5V AAA batteries.

2. Technical Features

- (1) Accuracy: ±(a% × reading data + digits). To assure accuracy, the environment temperature should be (23±5)°C, relative humidity be <75%.

One year accuracy guarantee since production date.

(2) DC Voltage (DCV)

Range	Accuracy	Resolution
200mV	±(1.0%+5)	0.1 mV
2V		1 mV
20V		10 mV
200V		100 mV
1000V	±(1.0%+5)	1V

Input impedance: at 200mV range >40MΩ, at other ranges is 10MΩ.

Overload protection: 1000Vrms.

(3) AC Voltage (ACV)

Range	Accuracy	Resolution
2V	±(1.0%+5)	1mV
20V		10mV
200V		100mV
750V		1V

Input impedance: 10MΩ.

Overload protection: 1000Vrms.

Frequency response: 750V at 40Hz~1kHz, other ranges 40Hz~2kHz.

Display: True Rms Response (calibration base on Sine Wave RMS).

(4) DC Current (DCA)

Range	Accuracy	Resolution
20A	±(2.0%+5)	10mA
200A		100mA
1000A		1A

Overload protection: 1200A (input time <60 seconds).

NOTE: Clear to zero before measurement, The testing object shall be placed in the middle of the clamp jaw.

(5) AC Current (ACA)

Range	Accuracy	Resolution
20A	±(2.0%+5)	10mA
200A		100mA
1000A		1A

Frequency response: Since Wave and Triangular Wave are 40Hz-1kHz, Others is 40Hz-2kHz.

Overload protection: 1200A (Do not input more than 60 seconds)

Attention: The target Current Conductor should be placed in the middle of Clamps.

(6) Resistance (Ω)

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

Open-circuit Voltage: 500mV, Overload protection: 250Vrms.

NOTE: DO NOT input any voltage value at this range!

(7) Diode and Continuity Test

Range	Description	Test Conditions
→	Diode forward voltage drop	Forward DC current is approx 0.8mA, reverse voltage is approx 2.2V.
∞))	When the resistance under test is less than 50Ω, buzzer sounds continuously.	Open circuit voltage: 2V

Overload protection: 250Vrms.

WARNING: Do not apply any voltage at this range.

(8) Temperature (°C/°F)

Range	Accuracy	Resolution
-40°C~1000°C	<400°C: ±(1.0%+5) ≥400°C: ±(1.5%+15)	1°C
-40°F~1832°F	<750°F: ±(1.0%+5) ≥750°F: ±(1.5%+15)	°F

Thermocouple: K type (Nickel-chromium-Nickel silicon).

WARNING: Do not apply any voltage at this range!

4. OPERATION

4.1 Panel Description

(1) Jaw: 0 to 1000A AC/DC current and NCV detecting device.

(2) Hand protection: A safe design to protect users from touching the dangerous area.

(3) Clamp gunlock: Pressing the gunlock can turn on or off the clamp.

(4) Clamp light: Opening the clamp light can light up the tested area in the dark to prevent the danger.

(5) NCV indicator: Detect the existence of the high voltage around to prevent the electric shock.

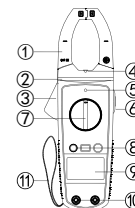
(6) HOLD* button:

Data Hold function: Press this key to enter HOLD mode. The current value will be hold, and symbol “H” will be displayed; Press this key again to exit the HOLD mode.

* Backlight display function: Backlight control key, press it for more than 2 minutes to turn on Backlight (it will be shown on LCD) then press it for more than 2 minutes again to make it off. Backlight function will be off automatically when you release backlight control key after 30 minutes.

(7) Function choosing switch: Used to select the function, range or turn on or turn off the clamp meter.

Switch position	Function
⌚	AC and DC current measurement
V~	AC and DC voltage measurement
NCV	Non-contact voltage detect
Ω	Resistance measurement
→ ∞))	Diode/Continuity measurement.
°C/°F	Temperature measurement.



(8) Function buttons:

MAX/MIN key:

After pressing this key, the A / D converter continues to work, and the display value is always updated and the maximum or minimum value retained; Press for more than 2 seconds, will release the maximum /minimum data hold mode.

RANGE/REL key:

1). This is a key for Selecting function, it is RANGE function, to choose from auto range or manual range. The meter is default in auto range. The symbol “AUTO” appears on LCD. Press this key for one time to switch to manual range. Press it again for one time to increase on step from low to high. Press it for more than two seconds to return to AUTO range.

2). In A~ measurements, it is REL function. Press this key to clear “of reading” and enter relative value measurement. REL symbol will appear on the LCD. Press this key again to exit REL measurement. In A~ measurements, if the display dose not return to zero before measurement, press this key to return to zero before measurement.

SELECT / ⏏ key:

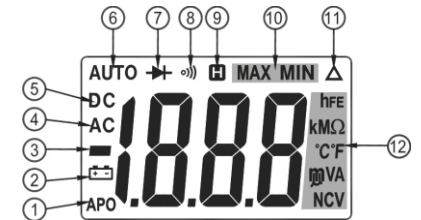
1) This is a key for Selecting function, base on a working principle of Trigger action. Short press this key to choose measurement modes: Choose DC or AC at “⌚”, choose “→|∞))” at “→|∞))”, choose “°C” or “°F” when at Temperature range.

2) The Meter will be Auto power off when it is not being using within 15 minutes, then it will be entering into sleeping mode, the Buzzer will makes 5 times of alarm reminder within 1 minute before Auto-power off; Please press this “SELECT” function or Power on/off button to turn on the Power if you want to restart it.

3) Press this key and put it on Hold and then turn on the Power to awake it from sleeping mode, and then Auto-power off function will be canceled.

4) Illuminating lamp control key, press it for more than 2 minutes to turn on Illuminating lamp, and then press it for more than 2 minutes again to make it off.

LCD display: Displaying the measurement value and unit.



Item	Function	Description
1	APO	Auto power off function has been activated.
2	🔋	Low battery indication. Warning: To avoid error readings, which could lead to possible electric shock or personal injury, please replace the battery in time.
3	-	Indicates negative readings.
4	AC	AC voltage or current measurement.
5	DC	DC voltage or current measurement.
6	AUTO	Auto ranging mode
7	→	Diode test.
8	∞))	Continuity beeper is on.
9	HOLD	Data hold function is active
10	MAX/MIN	MAX, MIN value.
11	Δ	Relative measurement.
12	hFE NCV °C/°F MΩ, kΩ, Ω mV, V uA, mA, A	Null. Non-contact voltage detecting. Temperature unit: °C/°F. Resistance unit: MΩ, kΩ, Ω. Voltage unit: mV, V. testing Current unit: uA(Null), mA(Null), A

(9) V/Ω input terminal: Measurement inputs positive terminal (red test lead).

COM input terminal: Measurement inputs negative terminal (black test lead).

(10) Carrying belt.

4.2 DCA MEASUREMENT

(1). Turn the rotary function switch to “⌚” position. The meter is default at DCA measurement after power on. Press SELECT to switch to DC measurement.

(2). The meter defaults Auto Range mode, and display symbol "AUTO" on LCD, press the "RANGE" key to switch to Manual range mode, 20A, 200A, 1000A DCA ranges selectable.

(3). Press REL to clear to zero before measurement. Press the clamp gunlock to open the clamp jaw to get testing wire inserted in the middle and clipped completely.

(4). Take the testing conductor current value on display. To ensure measurement accuracy, please check to ensure that the testing wire is placed in the middle of clamp jaw. Measure one wire in one time. If measure more than one wires in one time, the reading will be inaccurate.

(5). When the meter is used in a strong magnetic field, the readings could be unstable or inaccurate.

NOTE:

1) The meter uses Hall component to detect current. Hall component is a sensitive component. It is magnetic sensitive. It is also sensitive to temperature and mechanical stress. Any impact on it would cause the changes on reading in a short time. This causes some remaining values on the DC ampere reading when there is no current. To get accurate reading, press REL key to clear reading before measurement, and the testing wire must be placed in the middle of the clamp jaw.

2) Press the clamp gunlock to open the clamp jaw to get testing wire inserted in the middle and clipped completely. Ensure that the testing wire is placed in the middle of clamp jaw. Otherwise there will be additional accuracy $\pm 1.0\%$ of reading. Read the measurement current value of the testing wire on the LCD.

3) In the measurement of the DC current, if the reading is positive value, the current is top to down (bread is top, bottom cover is down).

4) The max testing current is 1000A. Exceeding the rated current for long time will damage the meter.

Follow below instructions to get more accurate DC current measurement:

① Switch off the testing wire.

② Press the clamp gunlock to open the clamp jaw to get testing wire inserted in the middle and clipped completely. Ensure that the testing wire is placed in the middle of clamp jaw.

③ When the meter reading is stabilized in the minimum value, press the REL key to clear it.

④ Switch on the testing wire. Read after clamp meter remains stable.

⑤ When measuring current, to get more accurate readings, the ambient temperature must be 0 to 40°C.

4.3 ACA measurement

(1) Turn the rotary function switch to $A \approx$ position. The meter is default at DCA measurement after power on. Press SELECT to switch to AC measurement.

(2). The meter defaults Auto Range mode, and display symbol "AUTO" on LCD, press the "RANGE" key to switch to Manual range mode, 20A, 200A, 1000A DCA ranges selectable.

(3). Press the clamp gunlock to open the clamp jaw to get testing wire inserted in the middle and clipped completely.

(4). Take the testing conductor current value on display. To ensure measurement accuracy, please check to ensure that the testing wire is placed in the middle of clamp jaw. The most precise reading, should user put the wire in the middle of the close jaw.

Note:

1. Firstly users should select the highest range, if users are not sure about the range of current under test, and then select the proper range based on displaying value.

2. If the LCD displays "OL", it means the current is over range. Should the user select a higher range.

3. When AC current measurement, the current gear will automatically return to zero, so AC Current Gear does not need to press the REL key to clear.

4. Maximum input current is 1000A. Current higher than that would damage the fuse, and may cause damage to the circuit of meter.

4.4 DCV measurement

(1) Insert the black test lead into "COM" jack and read one into "V/ Ω " jack.

(2) Turn the function swift to " $V \approx$ " range. This meter defaults to ACV measurement. Press "SELECT" to choose DV or AC measurement.

(3) This meter defaults Auto Range mode and displays "AUTO" on the LCD. Press "RANGE" key to swift to Manual Range mode. The selectable ranges are 200mV, 2V, 20V, 200V and 1000V.

(4) Connect test lead to the test point, LCD will display voltage and polarity of the test point connected by red test lead.

Note:

1. Under Manual Range mode, if the LCD display "OL", it means over range, user should turn to a higher range.

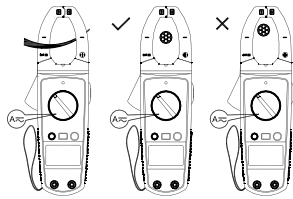
2. Do not input a voltage over 1000V or it may cause damage to the circuit of the meter.

3. Be careful while measuring a high voltage circuit. DO NOT touch the high voltage circuit.

4. The buzzer will beep to alert the user when the measuring voltage is over 1000V.

4.5 ACV measurement

(1) Insert the black test lead into "COM" terminal, and the red one into "V/ Ω " terminal.



(2) Set the rotary switch to " $V \approx$ " range. This meter defaults ACV measurement mode. Press "SELECT" key to turn to DC or AC measurement mode.

(3) Auto R ange is the original states of this meter. It will display "AUTO" symbol on LCD. Press "RANGE" key to change to Manual Range mode. 2V, 20V, 200V, 750V ranges are selectable.

(4) Connect test leads to the test point. LCD will display voltage of the two test points.

Note:

1. Under Manual Range mode, if LCD displays "OL", it means over range, user should select a higher range.

2. Do not input a voltage over AC 750V. It may cause damage to the circuit of the meter.

3. Be careful while measuring a high voltage circuit. Do not touch the high voltage circuit.

4. The buzzer will beep to alert the user, when the measuring voltage is over AC750V.

4.6 Non-Contact Voltage Detecting

WARNING

This Function might be disturbing by different external Sources, then might be incurred a wrong alarm reminder, test result is just for reference when using this function.

Turn Switch button to "NCV" position, the Target Circuit to be placed on the top of Meter, Meter will shows strong and weak signals, meanwhile, Beeper will makes "tick-tick-tick" of alarm reminder.

Note:

1. Even if there is no any indication, the voltage might still be there. Do not rely on NCV detector as the only way to judge whether a Voltage is still existed on the Wire lead or not.

2. Voltage detecting may be affected by power socket design, type of insulation and its thickness and other factors.

3. Interference sources at the external environment such as flashing light, motor might cause a wrong signal for a wrong judgement.

4.7 Resistance measurement

(1) Insert the black test lead into "COM" terminal and the red one into "V/ Ω " terminal.

(2) Set the rotary switch to " Ω " range.

(3) Auto range is the original state of this meter. Press "RANGE" key can choose manual range.

Note:

1. Please select the highest range, if the value of resistance is unknown, and then select the proper range based on the displayed value.

2. The LCD displays "OL" when the resistance is over the selected range and the knob should be adjusted to a higher range. When measuring value is over 1M Ω , the reading will take a few seconds to be stable. This is normal for high resistance measurement.

3. When input terminal is in open circuit, LCD will display "OL".

4. Before measuring in line resistor, make sure that the power is off and all capacitors have discharged completely.

5. When there is a big error, it may be affected by other online component or there is voltage on the resistor.

6. Do not apply any voltage at resistance range.

4.8 Diode and Continuity test

(1) Insert the black test lead into "COM" terminal and the red one into "V/ Ω " terminal (the polarity of red lead is "+").

(2) Set the rotary switch to " $\rightarrow \text{||} \rightarrow$ " range . The original state is diode measurement mode.

(3) Forward measurement: Connect red test lead to the positive polarity and the black test lead to the cathode polarity of the diode. LCD will display the approx. value of forward voltage drop.

(4) Backward measurement: connect red test lead to the cathode polarity and the black test lead to positive polarity of the diode. LCD will display "OL".

(5) The complete diode testing includes forward and backward measurement, if the result doesn't meet the descriptions above; it means the diode is broken.

(6) Press SELECT key to select the continuity measurement mode.

(7) Connect test leads to two points of tested circuit, if the resistance is less than 50 Ω , the buzzer sounds.

Note:

1. Don't input voltage at " $\rightarrow \text{||} \rightarrow$ " range.

2. When test circuits, make sure the power is off and all capacitors are discharged. Any negative potential or AC signal will make the buzzer sounds.

4.9 Temperature measurement

(1) Turn Switch button to "°C/°F", press "SELECT" key to choose °C or °F measurement mode.

(2) Insert the black plug of the thermocouple sensor into "COM" and red one into "V/ Ω " jack, and put the working terminal (temperature measuring end) of

thermocouple on the surface or inside the object to be tested. Then you can read temperature from the screen, and the data is in Centigrade.

Note:

1. If insert the thermocouple oppositely, it will display the wrong value. When the temperature is rising, the value will be down.

2. When the input terminal is open circuit, it will display the environment temperature.

3. Don't change the temperature probe randomly, or the accuracy will not be guaranteed.

4. Don't input voltage at temperature range.

4.10 AUTO POWER OFF

(1) The meter will auto power off if there is no any operation in 15 minutes and come into dormant mode. The beeper will sound five times within 1 minute before power off.

(2) Press "SELECT" key and turn on the meter or press "SELECT" when the meter is dormant mode to wake up the meter and the "AUTO POWER OFF" function will be cancelled.

5. MAINTENANCE

The meter is a precise instrument. Random changes to the circuits would be avoided.

Note:

1. DO NOT put voltage higher than DC 1000V or AC 750V rms.

2. DO NOT apply voltage in current, resistance, diode and continuity range.

3. DO NOT make any measurements when the battery isn't installed or the back cover isn't fixed.

4. Before replacing battery or fuse, please remove the test leads from the measuring point and turn off the power.

5. Keep the meter away from water, dust and shock.

6. DO NOT use the meter under high temperature, high humidity, combustible, explosive and strong magnetic environments.

7. Clean the case with a damp cloth and mild detergent only. DO NOT use abrasives or alcohol or any other strong solvents to clean the meter.

8. To avoid leakage damage, please take out the battery if the meter will not be used for a long time.

9. When " batt " symbol is displayed, you should replace the battery according to the following steps:

a) Unscrew the screw on the battery door and remove the cover.

b) Replace the old battery with a new one (1.5V). (For long life, it's better to use alkaline battery.)

c) Replace the battery door and tighten the screw.

6. TROUBLE SHOOTING

If the meter does not work properly, please check the meter as following steps:

(If the problems still Persists, please contact the repairing center or the local dealer.)

Fault	Checking site and Solution
No reading on LCD	<input type="checkbox"/> Power Switch: Turn on the power
	<input type="checkbox"/> Battery: Replace the battery
	<input type="checkbox"/> Hold Key: Release the HOLD key
batt signal displaying	<input type="checkbox"/> Battery: Replace battery
Big error value	<input type="checkbox"/> Battery: Replace battery

The specifications are subject to changes without prior notice.

The content of this manual is regarded as correct. If users find out any mistakes or omissions, please kindly contact the manufacturer.

The manufacturer will not be responsible for accidents and damage caused by improper operations.

The functions described in this User Manual shall not be considered as the reason for any special usages.

