

Digital Clamp Meter

User's Manual

1. SUMMARIZE

This instrument is a automatic range hand-held True RMS digital clamp meter. The circuit design of the meter takes the large-scale integrated circuit Σ/Δ analog-to-digital converter (ADC) as the core. It can be used to measure AC and DC voltage, AC current, low-impedance Low Z voltage, resistance, diode, continuity test, capacitance, frequency, duty cycle and other parameters, at the same time, it has the relative value measurement, data hold/backlight display, maximum/minimum value measurement, flashlight function, NCV/ live line judgment function, low voltage display and automatic shutdown function.

2. OPEN PACKING FOR CHECKING

Open the box, take out the meter, checking the items below, if there is anything missing or damaging, please contact with your supplier.

- Manual 1pc
- Test lead 1pair
- 1.5V AAA battery LR03 2pcs
- Carrying bag 1pc
- Wrist strap 1pc

3. SAFETY NOTES


The meter's design is in accordance with the CE certification, IEC61010 related terms, in conformity with double insulation, Safety standard for overvoltage CAT III 600V. If you do not use the clamp meter in accordance with the relevant operating instructions, the protection provided by the clamp meter will be weakened or lost.

1. Check the clamp meter and test leads before use to prevent any damage or abnormal phenomenon. If you find test leads and housing insulation is obviously damaged, and the LCD has no display, etc., or you think the clamp meter cannot work properly, please do not use it again.

2. Do not use clamp meter before the back cover and battery cover are not properly covered to avoid electric shock.
3. Remember that the fingers do not exceed the hand part of the test leads when measuring, do not contact exposed electricity wires, connectors, unused inputs or measured circuits to prevent electric shock.
4. The function switch must be placed in the correct position before measurement. It is strictly forbidden to change range during measurement to prevent damage to the clamp meter.
5. Do not apply more than DC1000V/AC 750V voltage between the terminal of the clamp meter and the ground to avoid electric shock and damage to the clamp meter.
6. Be careful when measuring voltage which is higher than 36V DC or 25V AC True RMS to avoid electric shock.
7. Comply with local national safety regulations, and wear personal protective equipment (approved rubber gloves, masks, and flame-retardant clothing, etc.) in case of electric shocks and arcing when the hazardous charged conductor are

exposed.

8. Use the clamp meter according to the instructions of manual, and it is forbidden to measure the voltage or current higher than the allowable input value. Before doing online resistance, capacitance, diode, or circuit continuity measurements, you must first cut off all power supplies in the circuit and discharge all capacitors to avoid the incorrect measurement results.

9. When the LCD displays the " " sign, please replace the battery in time to ensure the measurement accuracy. When you not plan to use this clamp meter for a long time, you should remove the battery.











10. Do not change the internal wiring of the clamp meter to avoid damage of the instrument and hidden danger of the user.

11. Do not store or use the clamp meter in a high temperature, high humidity, flammable, explosive and strong electromagnetic field environment.

12. Use a soft cloth and neutral detergent to clean the shell of clamp meter. Do not use abrasive or solvent to avoid the shell is corroded, and damage to the meter and

personal safety.


4. ELECTRIC SYMBOL

	Warning		DC
	High voltage damage		AC
	Ground		AC and DC
	Dual insulation		Accord with the order of European Union
	Low battery		Fuse

5. GENERALSPECIFICATION

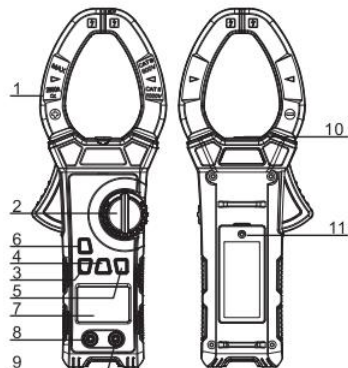
5.1. Max. Display: 5999, sampling rate 3 times / sec.

5.2. Polarity indication: The positive and negative polarities automatically display.

- 5.3. Over load indication: LCD displays OL or -OL
- 5.4. Low battery indication: “” symbol displays
- 5.5. Operation temperature: 0~40°C, relative humidity <75%
- 5.6. Storage environment: -10°C~50°C, relative humidity <80%RH;
- 5.7. Power: 2*1.5V AAA battery LR03
- 5.8. The Max. opening size of the clamp:
Diameter 58mm
- 5.9. Max. measuring current wire: Diameter 52mm
- 5.10. Size: 273×102×47 mm
- 5.11. Weight: approx.420g (including batteries)

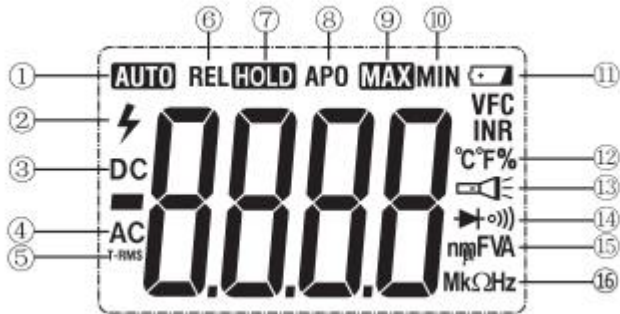
6. APPEARANCE STRUCTURE

- 1. Clamp jaw



2. Range knob
3. Relative value measurement / Torch switch
4. Data hold and backlight
5. Max./Min.value
6. Select key
7. LCD
8. COM terminal
9. Input terminal
10. Torch
11. Battery cover screws

7. DISPLAY SCREEN



1.	Auto range	9.	Maximum measurement
2.	High voltage	10.	Minimum measurement
3.	DC measurement	11.	Low battery
4.	AC measurement	12.	Celsius, Fahrenheit, duty cycle
5.	True RMS value	13.	Torch
6.	Relative value measurement	14.	Diode, continuity test
7.	Data hold	15.	Capacitance, voltage, current.
8.	Auto shut-down	16.	Ohm, Kilo ohm, Mega ohm, Frequency

8. BUTTON FUNCTION

8.1. Data hold button (HOLD B/L)

Short press: Press the HOLD B/L key once to enter the reading hold measurement

mode, at the same time, the “HOLD” character appears on the LCD screen, and press the HOLD B/L button again to exit it and the “HOLD” character will also disappear. Long press the HOLD B/L key to turn on the backlight, and then long press the HOLD B/L key to turn it off. The backlight will be turned off automatically after 15 seconds since you turned it on.

⚠⚠ Warning: Do not use the HOLD function to measure unknown potential to avoid electric shock, fire, or personal injury. After the HOLD function is opened, the display will not change when different potentials are measured.

8.2. Select button (SELECT)

Short press this select key, it can perform switch at resistance/diode/continuity/capacitance range, switch the non-contact electromagnetic induction and live line judgment function at NCV/Live range, switch between frequency and duty cycle test at frequency range.

8.3. Maximum value MAX/Minimum value MIN key

Short press: short press the MAX/MIN key, the LCD will display the "MAX" symbol

and enter the maximum measurement mode, then short press the MAX/MIN key, the LCD will display the "MIN" symbol and enter the minimum measurement mode.

Long press: long press the MAX/MIN key to exit the maximum/minimum measurement mode. MAX/MIN tests are only available for AC/DCV.ACA, LowZ, resistance, diode, continuity.

8.4. Relative value measurement and Torch

Short press: short press this key to enter the relative value measurement function, at the same time, the gear of the range is locked (except capacitance measurement). It has relative value measurement function only in AC current, AC and DC voltage, capacitance.

Long press: Long press this key to turn on/off the flashlight.

8.5. Automatic shutdown function

- In order to save power consumption and prolong battery life, the meter will turn on the APO automatic shutdown function by default after it is turned on. If the user does not operate the meter within 14 minutes, the meter will beep 3 times to

prompt. If there is still no operation, after another 1 minute, the meter will have a long beep before automatically turn off the power. If you want to wake it up, you should turn the range switch to the OFF range, then turn again to the required function range or short press V.F.C key.

- At the shutdown state, press and hold the SELECT/ V.F.C key while turning the range switch. After the meter enters the normal measurement state, the automatic shutdown function can be canceled, and the "APO" symbol will no longer displayed on the LCD screen. When the meter is not at the automatic shutdown mode, if the user does not operate the meter within 15 minutes, the meter will still beep every 15 minutes to remind the user to shut down.

9. OPERATE INSTRUCTIONS


9.1. AC voltage measurement

1. Turn the meter knob to the AC and DC voltage range, Insert the red test lead into

the " $V_{\Omega-H}$ Live "jack and the black test lead into the COM jack.

2. Connect the red and black test lead to the measured circuit and read the reading directly from the display.

 Note:

- Do not input voltage higher than DC 1000V or AC 750V. Although it is possible to measure higher voltage, it may easily damage the meter.
- When measuring high voltage, pay special attention to avoid electric shock.
- Disconnect the test lead from the measured circuit after all measurement operations are completed.
- When the measured voltage is higher than 30V DC/AC safe voltage, the LCD of this meter displays the high-voltage prompt "  " for warning.
- When measuring voltage above 36V, pay attention to wear safety protection equipment.

9.2. Low Z low impedance AC voltage measurement

1. Insert the red test lead into the " $V\Omega-H$ Live" jack and the black test lead into the COM jack.
2. Turn the meter knob to the Low Z low impedance AC voltage measurement range, and connect the test leads in parallel to the measured power supply or load.
3. Read the True RMS of AC voltage directly from the display.

 Note:

- Do not input voltage higher than AC 600V. Although it is possible to measure higher voltage, it may easily damage the meter.
- When measuring high voltage, pay special attention to avoid electric shock.
- Test a known-voltage before use the device, it is to confirm whether the product function is correct.
- After using Low Z low impedance function range, please wait 3 minutes before perform Low Z voltage measurement. ($Low\ Z \leq 3k\ \Omega$), in order to eliminate

false voltages, the Low Z function of the meter will provide a low impedance on the entire wire circuit to obtain more accurate measurements.

- When the measured voltage is higher than 30V AC safe voltage, the LCD of this meter displays the high-voltage prompt " ⚡ " for warning, and pay attention to wear safety protection equipment.

9.3. AC current measurement

1. Turn the dial knob to the current range, press and hold the trigger to open the clamp head and use the clamp head to grab the measured conductor, then slowly release the trigger until the clamp head is completely closed, please make sure whether the measured conductor is clamped in the center of the clamp head, otherwise it will occur an additional error. The clamp meter can only measure one current conductor at a time. If two or more current conductors are measured at the same time, the measurement readings will be wrong.

2. Read the True RMS of AC current directly from the display.

 Note:

- The current measurement function must be operated between 0°C~40°C, hold the trigger and don't release it suddenly, otherwise, it will occur an additional error easily.
- In order to ensure the accuracy of the measurement data, the measured conductor must be placed in the center of the clamp head. Otherwise $\pm 1.0\%$ additional error of the reading will occur.
- When the measured current is 500A-1000A, the continuous test time cannot exceed 60 seconds, and if the measured current is higher than 1000A, the continuous test time cannot exceed 10 seconds.

9.4. Resistance measurement

1. Turn the knob to the " Ω HI" range, the meter defaults to the resistance range.
2. Insert the red test lead into the " $V\Omega$ HI Live" jack and the black test lead into the COM jack.

3. Connect the test lead wire to both ends of the measured resistance.

4. Read the reading directly from the LCD screen.

 Note:

- If the tested resistor is under open circuit or the resistance of the measured resistor exceeds the maximum range of the meter, the display will show "OL"
- When measuring on-line resistance, all power supplies in the measured circuit must be turned off before the measurement, and all capacitors should be released completely. In order to ensure the measurement is correct.
- When measuring low resistance, the test leads will have about 0.1Ω - 0.2Ω measurement error. In order to obtain accurate readings, you can first record the the resistance of the measured resistor after measuring the meter, then subtract the displayed value after the test leads are short-circuited, That is, True RMS of the measured resistance.
- If the resistance value is higher than 0.5Ω when the test leads are short-circuited, you need to check whether the test leads are loose or other reasons.


- When measuring resistance above $1\text{M}\Omega$, it may take a few seconds for the reading to stabilize. It is normal for high resistance measurements. In order to obtain stable readings, you can buy an extra short alligator clip test line instead of our standard test leads to do the measurement.
- Do not input voltage higher than DC 42V or AC 30V to avoid personal safety injury
- Disconnect the test lead from the measured circuit after all measurement operations are completed.

9.5. Diode and continuity test (buzzer function)

1. Insert the red test lead into the " $V\Omega\text{-H}Live$ " jack and the black test lead into the COM jack.
2. Turn the knob to the range $\Omega\text{-H}$, and short press "SELECT" key to switch between diode and continuity test measurement mode.

3. When under continuity test, if the resistance of the tested circuit is less than 50Ω , the built-in buzzer will sound.

4. In the diode measurement mode, connect the red test lead and black test lead to the positive and negative pole of the diode respectively, and the LCD will display the forward voltage drop of the diode.

-  Note:
- If the open circuit or polarity of the measured diode is reversely connected, the display will show "OL".
- When measuring online diode and continuity test, all power supplies in the measured circuit must be turned off before the measurement, and all capacitors should release completely.
- The open circuit voltage of the diode test is about 3.9V, the open circuit voltage of the continuity test is about 2V, and the range of the measurement range is 600Ω .
- Do not input voltage higher than DC 42V or AC 30V to avoid personal safety

injury.

- Disconnect the test lead from the measured circuit after all measurement operations are completed.

9.6. Capacitance measurement

1. Insert the red test lead into the " $V\Omega-HrLive$ " jack and the black test lead into the COM jack.
2. Turn the knob to the resistance range, short press "SELECT" key to switch the capacitance measurement.
3. Connect the test lead to both ends of the measured capacitor and confirm whether the polarity is correct.
4. Read the capacitance value of measured circuit load directly from the LCD display. It is recommended to use a short test line input for capacitance measurement, which can reduce the influence of distributed capacitance
5. When measuring capacitance less than 10nF, you can perform the relative value

measurement to ensure the measurement accuracy, that is, short press REL key for measurement, at the same time, REL characters appear on the screen. Short press it again to exit the relative measurement, and the REL character will disappear

 Note:

- If the tested capacitor is under open circuit or the capacitance of the measured capacitor exceeds the maximum range of the meter, the display will show "OL"
- For capacitance larger than $600\mu\text{F}$, the measurement will take a long time. In order to ensure the accuracy, it is recommended to discharge all the residual charge of capacitors or capacitors in the circuit before the test, and then input the capacitance into the meter for measurement. it is more important for capacitors with high voltage to avoid damage to the meter and personal safety
- Disconnect the test lead from the measured capacitance after all measurement operations are completed.
- It is strictly forbidden to input the voltage higher than 36V AC/DC signal at the capacitance range.

9.7. Live Wire Recognition Live

1. Turn the knob to the NCV range, the meter defaults to the NCV range, short press the SELECT key to switch the Live function, and the LCD displays Live.
2. Insert the red test lead into the " $V\Omega-H$ Live" jack, and touch the measured position with the red test lead.
3. If meter has audible and visual alarm, the tested wire connected to the red test lead is a live wire. If it is no change, the tested wire is not a live line.


 Note:

- The range must be operated in accordance with safety rules.
- This function only detects AC standard main live wire (AC 110V~AC 380V).

9.8. Non-contact AC voltage induction measurement NCV

1. Turn the knob to NCV range, the meter defaults to the NCV range, and the LCD displays NCV.
2. The NCV induction voltage range is 48V~250V. Put the upper part of the clamp

head of the instrument close to the measured charged electric field (AC power line, socket, etc.), when the instrument sensing AC voltage electric field, the meter will display “----” and the buzzer issued "drop, drop" alarm sound. As the intensity of the induction electric field increases, the more horizontal sections of "----" displays on the LCD, and the higher the sound frequency of the buzzer

 Note: When the tested electric field voltage is \geq AC 100V, pay attention to whether the conductor of the measured electric field is insulated to avoid electric shock.

9.9. Frequency measurement

1. Insert the red test lead into the " $V\Omega-H$ Live" jack and the black test lead into the COM jack.
2. Turn the knob to Hz range, and connect the test leads in parallel to the measured signal source.
3. Short press the SELEC key to switch between frequency and duty cycle.
4. Read the measured frequency or duty cycle value directly from the display.

 Note:

- The frequency measurement must meet the requirement of input amplitude a:
10Hz- 100kHz: $1V_{rms} \leq \text{input amplitude} \leq 20V_{rms}$ 。
100kHz-10MHz : $3V_{rms} \leq \text{input amplitude} \leq 20V_{rms}$ 。
- Duty cycle: 10%-90%range , suitable for 10Hz-1kHz square waves; 30%-70%range, suitable for 1kHz-10kHz square waves; input amplitude: $3V_{pp} \leq \text{input amplitude} \leq 20V_{pp}$; do not input voltage higher than $20V_{rms}$ to avoid personal safety injury.
- Disconnect the test lead from the measured circuit after all measurement operations are completed.

10. TECHNICAL CHARACTERISTIC

Accuracy calibration, ambient temperature: $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, humidity less than 75%RH.

10.1. AC voltage (ACV) True RMS measurement

Range	Accuracy	Resolution	Overload protection
6V	$\pm (1.0\%+10)$	0.001V	1000VDC/750VAC
60V		0.01V	
600V	$\pm (1.0\%+12)$	0.1V	
750V		1V	

 Display: Voltage True RMS; Input impedance: $\geq 10\text{M}\Omega$;

Frequency response: sine wave and triangle wave 40Hz~1kHz;

Accurate value is 5% to 100% of the range.

The open circuit of the voltage range allows ≤ 5 words of remaining readings.

10.2. DC voltage (DCV)

Range	Accuracy	Resolution	Overload protection
600mV	$\pm (0.5\%+7)$	0.1mV	1000VDC/750VAC
6V		0.001V	

60V		0.01V	
600V	$\pm (1.0\%+10)$	0.1V	
1000V		1V	

⚠ Input impedance: $\geq 10\text{M}\Omega$;

Accurate value is 5% to 100% of the range.

The open circuit of the voltage range allows ≤ 5 words of remaining readings

10.3. AC current (ACA)

Range	Accuracy	Resolution	Overload protection
600A	$\pm(4.0\%+10)$	0.1A	2000A
2000A		1A	

⚠ Frequency response: 50Hz~60Hz;

Display: the current True RMS;


Accuracy is 5% to 100% of the range.

The open circuit of the current range allows ≤ 10 words of remaining readings;

When the measured current is 500A-1000A, the continuous test time cannot exceed 60seconds. When the measured current is higher than 1000A, the continuous test time cannot exceed 10 seconds.

10.4. Low impedance AC voltage (Low Z V~)

Range	Accuracy	Resolution	Overload protection
6V	$\pm (1.0\%+10)$	0.001V	600V DC/AC
60V		0.01V	
300V	$\pm (1.0\%+12)$	0.1V	

 Display: AC voltage True RMS;

Input impedance: $\leq 3k\Omega$;

Frequency response: sine wave and triangle wave 40Hz~1k Hz;

The accurate value is 5% to 100% of the range, and the voltage range short-circuit allows ≤ 5 words of remaining readings.

10.5. Resistance

Range	Accuracy	Resolution	Overload protection
600 Ω	$\pm (1.0\%+5)$	0.1 Ω	250V DC/AC
6k Ω		0.001k Ω	
60k Ω		0.01k Ω	
600k Ω		0.1k Ω	
6M Ω		0.001M Ω	
20M Ω	$\pm (1.5\%+15)$	0.01M Ω	
60M Ω	$\pm (2.5\%+20)$	0.01M Ω	

Open circuit voltage: about 1V.

The accurate value is 5% to 100% of the range.

10.6. Continuity test

Range	Accuracy	Resolution	Open circuit V	Overload protection
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600 Ω	$\leq 50\Omega$, Consecutive beeps	0.1 Ω	about 2V	250V AC/DC
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10.7. Diode test

Range	Accuracy	Resolution	Overload protection
3.3V	Open circuit voltage is about 3.9V, Measurable PN junction: $\leq 3.9V$ Forward voltage drop. Silicon PN junction voltage value is generally about 0.5~0.8V.	0.001V	250V AC/DC

10.8. Capacitance

Range	Accuracy	Resolution	Overload
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			protection
1nF	$\pm (5.0\%+40)$	0.001nF	250V AC/DC
10nF	$\pm (5.0\%+10)$	0.01nF	
100nF		0.1nF	
1 μ F		0.001 μ F	
10 μ F		0.01 μ F	
100 μ F		0.1 μ F	
1mF		0.001mF	
10mF		0.01mF	


⚠ Measured value = measured display value - test lead open circuit value.

For capacitance $\leq 1\mu\text{F}$, it is recommended to use "REL" measurement mode, deduct the open circuit reading. The accurate value is 5% to 100% of the range.

Large capacitance response time: $\geq 1\text{mF}$ about 8s; measurement error does not include lead distributed capacitance.

10.9. Frequency Hz / Duty Cycle%

Range	Accuracy	Resolution	Overload protection
10Hz-10MHz	$\pm (0.3\%+3)$	0.01Hz-1kHz	250V DC/AC
10.0%-90.0%		0.1%	

 Frequency input amplitude requirements:

10Hz-100 kHz: $1V_{rms} \leq \text{Input amplitude} \leq 20V_{rms}$.

100 kHz-10 MHz: $3V_{rms} \leq \text{Input amplitude} \leq 20V_{rms}$.

Duty cycle:


10%-90% range, suitable for 10Hz-1kHz square wave;

30%-70% range, suitable for 1kHz-10kHz square wave;

Input amplitude : $3V_{pp} \leq \text{Input amplitude} \leq 20V_{pp}$

11. BATTERIES REPLACEMENT

1. Move away the test leads from the circuit under test, pull out the test lead from the input jack, turn the range knob to the “OFF” range to turn off the power.
2. Use a screwdriver to twist off the screws on the battery cover, and remove the battery cover and bracket.
3. Take out the old battery, then replace with a new alkaline battery 1.5V .
4. Close the battery cover and use a screwdriver to tighten the screws on the battery cover.
5. Battery specifications: 2 * 1.5V AAA

Note: When the low voltage '  ' " symbol displays on the LCD, the battery should be replaced immediately, otherwise the measuring accuracy will be affected.

12. MAINTENANCE AND CARE


It is an accurate meter. Do not try to modify the electric circuit.

1. Pay attention to the waterproof, dustproof and break proof of the meter;
2. Please do not store or use it in environment of high temperature, high humidity, high flammability or strong magnetic.
3. Please wipe the meter with a damp cloth and soft detergent, and abrasive and drastic solvent such as alcohol are forbidden.
4. If do not operate for a long time, should take out the battery to avoid leakage.
5. When replacing fuse, please use another same type and specification fuse.

13. Trouble shooting

If the meter cannot work normally, the methods below may help you to solve general problems. If these methods do not work, please contact service center or dealer.

Conditions	Way to solve
No reading on LCD	<ul style="list-style-type: none">● Turn on the power● Set the HOLD key to a correct mode;

	●Replace battery
 signal appears	●Replace battery
Big error value	●Replace battery
LCD displays dark	●Replace battery

The specifications are subject to change without notice.

The content of this manual is regarded as correct, error or omits, please contact with factory.

We hereby will not be responsible for the accident and damage caused by improper operation.

The function stated for this User Manual cannot be the reason of special usage.