

VA 324 AC/DC Leakage Clamp Meter User Manual



By Rishabh

General Warranty

We warrant that the product will be free from defects in materials and workmanship for a period of 1 year from the date of purchase of the product by the original purchaser from our Company. This warranty only applies to the original purchaser and is not transferable to the third party, and does not apply to fuses, disposable batteries or to any product which has been misused, altered, neglected or damaged by accident or abnormal conditions of operation or handling.

If the product proves defective during the warranty period, we either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by our company for warranty work may be new or reconditioned like new performance. All replaced parts, modules and products become the property of our company.

In order to obtain service under this warranty, Customer must notify our company of the defect before the expiration of the warranty period. Customer shall be responsible for packaging and shipping the defective product to the service center designated by our company, and with a copy of customer proof of purchase.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. We shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than our company representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of not our supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

Please contact the nearest Sales and Service Offices for services.

Excepting the after-sales services provided in this summary or the applicable warranty statements, we will not offer any guarantee for maintenance definitely declared or hinted, including but not limited to the implied guarantee for marketability and special-purpose acceptability. We should not take any responsibilities for any indirect, special or consequent damages.

I. Basic Overview

The AC/ DC clamp ammeter is characterized by high reliability, high safety, high accuracy and small size. Its resolution reaches 1mA and the maximum range is 100A AC\DC. This product has unique VFC start-up mode and can accurately measure the voltage and current of VFC after entering the mode; it has true virtual value response of voltage or current, full range overload protection, reliable measuring precision and unique appearance design so that it becomes a new generation of practical electrical/ electric measuring instrument.

II. General Inspection

After you get a new clamp ammeter, make a check on the instrument according to the following steps:

1. Check whether there is any damage caused by transportation.

If it is found that the packaging carton or the foamed plastic protection cushion has suffered serious damage, do not throw it away first till the complete device and its accessories succeed in the electrical and mechanical property tests.

2. Check the Accessories

The supplied accessories have been already described in the Appendix of this Manual. You can check whether there is any loss of accessories with reference to this description. If it is found that there is any accessory lost or damaged, please get in touch with our distributor responsible for this service or our local offices.

3. Check the Complete Instrument

If it is found that there is damage to the appearance of the instrument, or the instrument can not work normally, or fails in the performance test, please get in touch with our distributor responsible for this business or our local offices. If there is damage to the instrument caused by the transportation, please keep the package. With the transportation department or our distributor responsible for this business informed about it, a repairing or replacement of the instrument will be arranged by us.

III. Safety Information

Safety Considerations

Before any operations, please read the following safety precautions to avoid any possible bodily injury and prevent damage to this product or any other products connected. To avoid any contingent danger, use this product only as specified.

- Limit operation to the specified measurement category, voltage, or amperage ratings.
- **Do not use the clamp ammeter if it is damaged.** Before you use the clamp ammeter, inspect

the case. Look for cracks or missing plastic. Pay particular attention to the insulation surrounding the connectors.

- **Do not use the test leads provided for other products.** Use only the certified test leads specified for this product.
- Inspect the test leads for damaged insulation or exposed metal.
- Before use, verify the clamp ammeter's operation by measuring a known voltage.
- Only the qualified technicians can implement the maintenance.
- **Always use the specified battery type.** The power for the clamp ammeter is supplied with a battery. Observe the correct polarity markings before you insert the batteries to ensure proper insertion of the batteries in the clamp ammeter.
- **Check all Terminal Ratings.** To avoid fire or shock hazard, check all ratings and markers of this product. Refer to the user's manual for more information about ratings before connecting to the clamp ammeter.
- Do not operate the clamp ammeter with the cover or portions of the cover removed or loosened.
- **Use Proper Fuse.** Use only the specified type and rating fuse for the clamp ammeter.
- **Do not operate if in any doubt.** If you suspect damage occurs to the clamp ammeter, have it inspected by qualified service personnel before further operations.
- **To avoid electric shock, do not operate this product in wet or damp conditions.**
- **Do not operate in an explosive atmosphere.**
- **Keep product surfaces clean and dry.**
- Do not apply more than the rated voltage (as marked on the clamp ammeter) between terminals, or between terminal and earth ground.
- When servicing the clamp ammeter, use only the specified replacement parts.
- Use caution when working above 60 V DC, 30 V AC RMS, or 42.4 V peak. Such voltages pose a shock hazard.
- When using the test leads, keep your fingers behind the finger guards on the test leads.
- Remove the test leads from the clamp ammeter before you open the battery cover.
- To avoid false readings, which may lead to possible electric shock or personal injury, replace the battery as soon as the low battery indicator  appears and flashes.
- Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes, or capacitance.
- **Use the proper terminals, function, and range for your measurements.** When the range of the value to be measured is unknown, set the rotary switch position as the highest range, or choose the auto ranging mode. To avoid damages to the clamp ammeter, do not exceed the maximum limits of the input values shown in the technical specification tables.
- Connect the common test lead before you connect the live test lead. When you disconnect the leads, disconnect the live test lead first.
- Before changing functions, disconnect the test leads from the circuit under test.

Measurement Category

The clamp ammeter has a safety rating of 600 V, CAT II and 300 V, CAT III.

Measurement category definition

Measurement CAT I applies to measurements performed on circuits not directly connected to the AC mains. Examples are measurements on circuits not derived from the AC mains and specially protected (internal) mains- derived circuits.

Measurement CAT II applies to protect against transients from energy-consuming equipment supplied from the fixed installation, such as TVs, PCs, portable tools, and other household circuits.

Measurement CAT III applies to protect against transients in equipment in fixed equipment installations, such as distribution panels, feeders and short branch circuits, and lighting systems in large buildings.

Measurement CAT IV applies to measurements performed at the source of the low- voltage installation. Examples are electricity meters and measurements on primary over current protection devices and ripple control units.

Safety Terms and Symbols

Safety Terms

Terms in this Manual. The following terms may appear in this manual:



Warning: Warning indicates the conditions or practices that could result in personal injury or death.



Caution: Caution indicates the conditions or practices that could result in damage to this product or other property.

Terms on the Product. The following terms may appear on this product:

Danger: It indicates an injury or hazard may immediately happen.

Warning: It indicates an injury or hazard may be accessible potentially.

Caution: It indicates a potential damage to the instrument or other property might occur.

Safety Symbols

Symbols on the Product. The following symbol may appear on the product:

	Direct current (DC)		Fuse
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	Alternating current (AC)		Caution, risk of danger (refer to this manual for specific Warning or Caution information)
	Both direct and alternating current	CAT II	Category II overvoltage protection
	Ground terminal	CAT III	Category III overvoltage protection
	Conforms to European Union directives	CAT IV	Category IV overvoltage protection
	Equipment protected throughout by double insulation or reinforced insulation		

IV.Product Panel Diagram

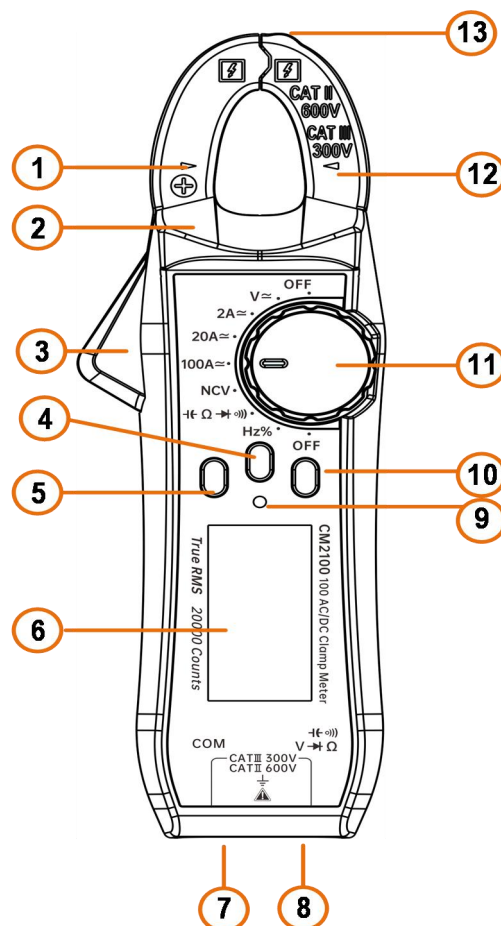


Figure 1

1. Clamp head.
2. Protective baffle plate.
3. Clamp head trigger: Press the trigger to open the clamp head.
4. ZERO button: It is used for making DCA to zero, relative capacitance/voltage

- measurement/ press and hold the button for about 2 seconds to enable.
5. HOLD/ Backlight Button: It is used for locking measured reading / press and hold the button for about 2 seconds to enable/ disable backlight.
 6. LCD display: Displays measurement function, symbols and values.
 7. COM input jack: The black probe is inserted this jack when this product is used to test voltage, resistance/ continuity /capacitance/diode, frequency/duty cycle.
 8. Positive end input jack: The red probe is inserted this jack when this product is used to test voltage, resistance/ continuity /capacitance/diode, frequency/duty cycle.
 9. NCV and alarm indicator: It will flash when the induced AC electric field strength and sensing distance meet the specified value or the measurement of other gear exceeds the range.
 10. SELECT button: Used to select the functions, such as ACV/DCV, resistance/ continuity /capacitance/diode, ACA/DCA, frequency/duty cycle, etc. when AC current and voltage function is selected, if you press and hold this button for 2 seconds to enter or exit the VFC function.
 11. Function Selection knob: Rotate this knob to switch over the corresponding function indicated on the panel.
 12. The geometric center indication mark of the clamp head.
 13. NCV induction antenna.

V. LCD Full-Display Diagram

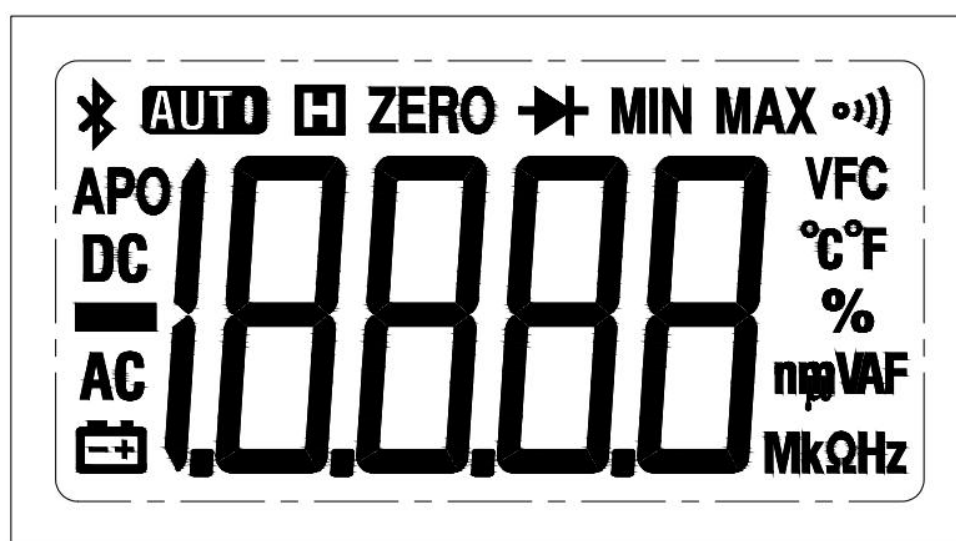


Figure 2

No.	Symbol	Description
1	AUTO	Automatic range
2		Enable reading holding mode
3	ZERO	Zeroing base number
4		Select diode test
5		Select continuity test
6	VFC	Prompt of variable frequency voltage/ current

		measurement
7	°C°F	Measurement unit of temperature, °C/ °F
8	%	Percentage: Select duty cycle measurement
9	mVAF	Measurement unit of voltage, current and capacitance
10	MkΩHz	Measurement unit of resistance and frequency
11	18888	Measured value display; if the measured value is out of range, "OL" will be displayed
12	+	Insufficient battery level
13	AC	AC
14	—	Negative polarity indication of current or voltage
15	DC	DC
16	APO	Automatic shutdown

VI. Operation Instructions

1. Measurement of AC/ DC Voltage

- Select AC or DC voltage function.
- Insert the red probe into the red hole (positive pole) and the black probe into the black hole (COM terminal).
- Get the red and black probes to contact tested parts, such as power outlets, etc. (Figure 3).
- Read the measured value from the LCD screen.

! When it is used to measure voltage, the maximum input voltage value is 600V (AC/ DC) and the measured value cannot exceed this limit, or else it is easy to cause the risk of electric shock and may do damage to the instrument.

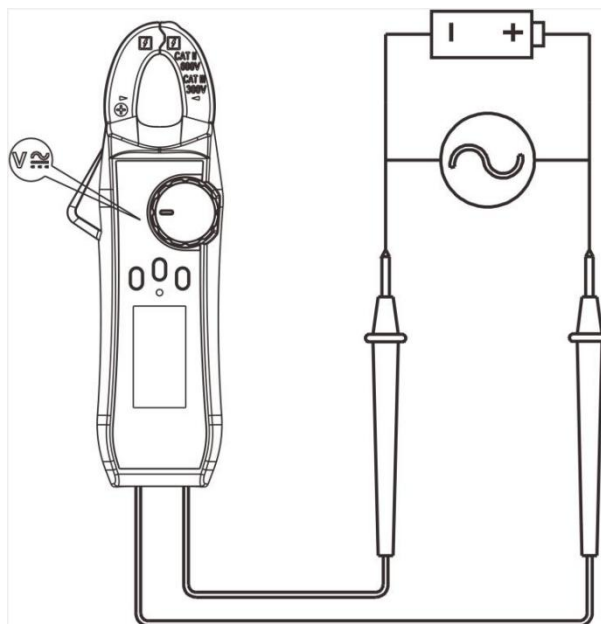


Figure 3

2. Measurement of AC/ DC Current (Figure 4 and 5)

● AC Current

- Select the current range (2A, 20A, 100A): Press SELECT/ V.F.C button to enable the AC current flow function.
- Open the clamp head and hook the wire (single wire) so that the wire is placed in the geometric center position indicated on the clamp head; ensure that the left and right clamp heads are completely closed, and there is no gap between the left and right clamp heads.
- Read the measured data from the LCD.

● DC Current

- Select the current range (2A, 20A, 100A): Press SELECT/ V.F.C button to enable the DC current flow function, and press the ZERO key before measurement to make the reading zero value. Note: Due to the high sensitivity of the product, in order to ensure the accuracy of the measurement reading, the direction of the instrument measurement should be as consistent as possible with the direction of zero.
- Open the clamp head and hook the wire (single wire) so that the wire is placed in the geometric center position indicated on the clamp head; ensure that the left and right clamp heads are completely closed, and there is no gap between the left and right clamp heads.
- Read the measured data from the LCD. A positive reading indicates that the current flows from the positive pole of the clamp head to the negative pole, and a negative reading indicates that the current flows from the negative pole of the clamp head to the positive pole.



Before measuring current, please remove the test probe to avoid electric shock.

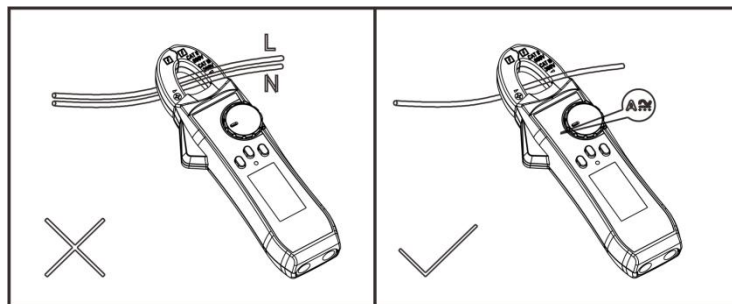


Figure 4

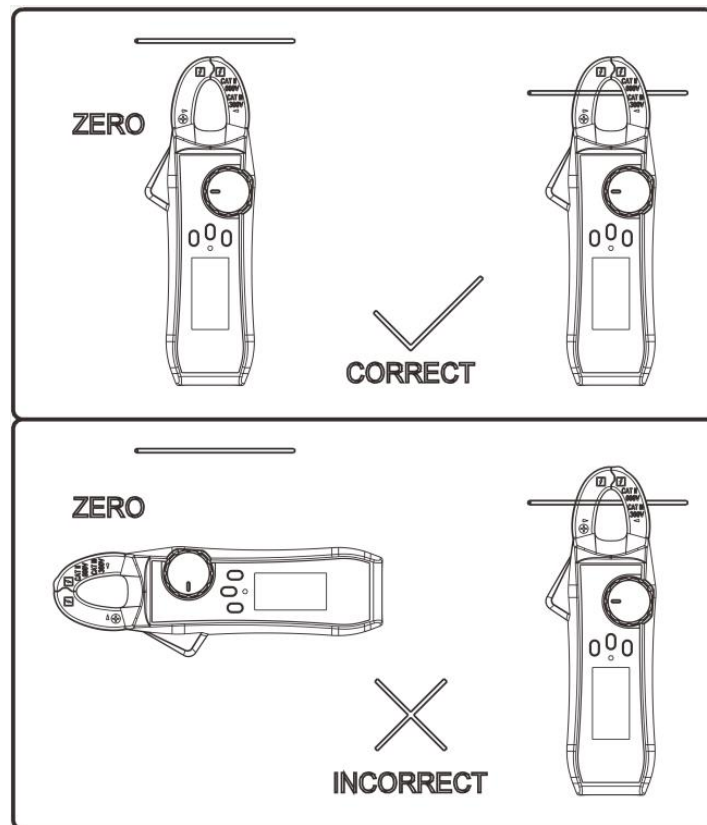


Figure 5

3. Non-Contact Electric Field Measurement and Setting (Figure 6)

If you need to measure whether there is an AC voltage in the space, please select the NCV function and keep the NCV antenna at the front end of the instrument clamp head close to the measured object at a distance of about 8-15mm for induction detection. If the induced voltage is less than 90V, EF will be displayed, and if the induced voltage is greater than 90V, "-" will be displayed; four segments ("- - -") are set according to voltage and there are beeps in different rhythms in different segments, accompanied by a flicker of the NCV indicator to distinguish the intensity of the induced voltage.



When the function is switched to NCV, please remove the test probe to avoid electric shock.

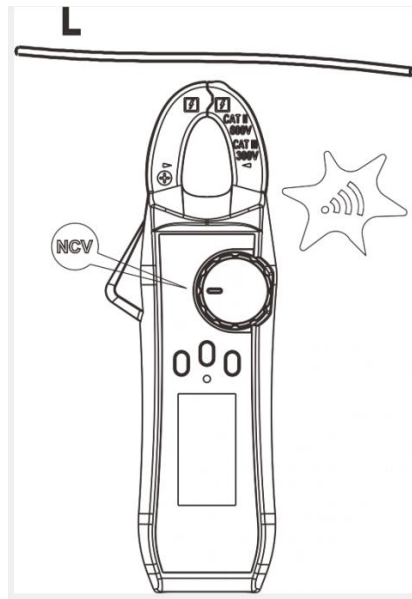


Figure 6

4. Resistance / Circuit ON/OFF/ Diode/ Capacitance

- Select resistance/ continuity /capacitance/diode function.
- Insert the red probe into the red hole (positive pole) and the black probe into the black hole (COM terminal).
- Connect the probes to the tested part for measurement (Figure 7)
- Read the measured data from the LCD screen.

⚠ When the instrument is switched to resistance/ continuity /capacitance/diode function, the input voltage cannot be higher than 60V (DC) or 30V (AC) to guarantee personal safety.

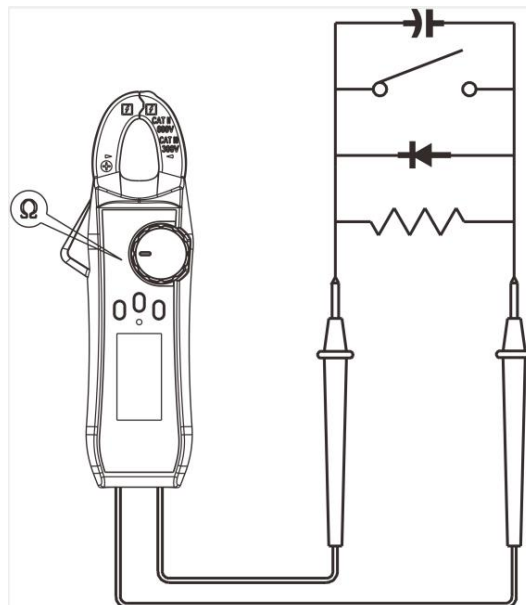


Figure 7

5. Measurement of Frequency and Duty Cycle

- Select frequency/duty cycle function.
- Insert the red probe into the red hole (positive pole) and the black probe into the black hole

(COM terminal).

- Get the red and black probes to contact the tested part, such as power socket (Figure 8).
- Read the measured data from the LCD screen.

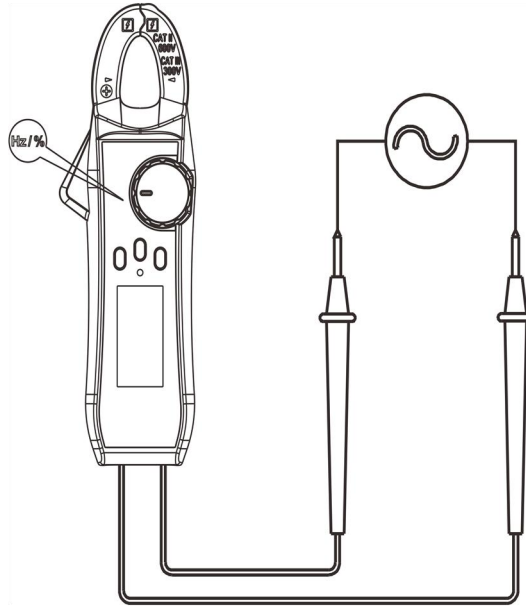


Figure 8

6. Other Functions

- Press and hold the HOLD button for about 2 seconds to turn on or off LCD backlight function.
- Automatic Shutdown: If the knob switch cannot be operated in about 15 minutes in the measurement process, the meter will "automatically shut down" to save energy. In the state of automatic shutdown, turn the knob switch to OFF position and restart the machine, or click any button to wake up the instrument.
- Enable automatic shutdown:
Press and hold the SELECT key, and then turn on the power switch to start up the instrument, then there are three beeps, indicating that the automatic shutdown function is canceled. When the machine is turned off and then turned on, the automatic shutdown function will be restored. About 1 minute before the automatic shutdown of the instrument, the buzzer will ring 3 times continuously for warning, and the buzzer will give a long beep for warning before shutdown. When the automatic shutdown function is canceled, three continuous alarm beeps will be given every 15 minutes.
- Buzzer: There is a "Beep" (about 0.25 seconds) from the buzzer when you press any button or turn the function switch and the function button is effective. In the $\bullet \cdot \cdot \cdot$ mode, if the tested circuit is well conducted ($\leq 50\Omega$), the buzzer will ring continuously; when the measured voltage or current exceeds the range, there are continuous intermittent "Beeps" from buzzer for over-range warning. The functional status is shown as follows:
 - a. When AC/DC voltage $> 600V$, there is beep for warning.
 - b. Low voltage detection: When the battery voltage is lower than 2.5V, the " " battery undervoltage symbol will be displayed, in this case, the measurement accuracy may be reduced and the battery needs to be replaced in time; when the battery voltage is lower than 2.2 V, only the battery undervoltage symbol will be displayed in the full display after boot and

the instrument cannot work.

VII. Technical Specifications

Basic conditions: Ambient temperature: 18 °C~28 °C; relative humidity: not more than 80%.

Note: During AC voltage/ current and capacitance measurement, the measurement accuracy shall be from 5% to 100% range.

Basic Function		Range	Minimum Resolution	Accuracy	
DC Voltage(V)	V	200.00mV	0.01mV	±(0.7%+10dig)	
		2.0000V	0.0001V	±(0.5%+5dig)	
		20.000V	0.001V		
		200.00V	0.01V		
		600.0V	0.1V		
AC Voltage(V)	V	2.0000V	0.0001V	VRMS frequency range: 40Hz-1000 Hz	±(0.8%+10dig) VFC mode± (4%+3)
		20.000V	0.001V		
		200.00V	0.01V		
		600.0V	0.1V		
DC Current(A)	A	2.0000A	0.001A	±(2%+8dig)	
		20.000A	0.01A	±(2%+3dig)	
		100.00A ^[1]	0.1A		
AC Current(A)	A	2.0000A	0.001A	IRMS frequency range: 40Hz-1000 Hz	±(3%+10dig) VFC mode± (4%+10)
		20.000A	0.01A		±(2.5%+5dig) VFC mode± (4%+10)
		100.00A ^[1]	0.1A		
Resistance (Ω)		200.00Ω	0.01Ω	±(0.8%+10dig)	
		2.0000kΩ	0.0001kΩ	±(0.5%+10dig)	
		20.000kΩ	0.001kΩ		
		200.00kΩ	0.01KΩ		
		2.0000MΩ	0.0001MΩ		
		20.000MΩ	0.001MΩ	±(1%+10dig)	
		200.00MΩ	0.01MΩ	±(5.0%+10dig)	
Capacitance(F)		2.000nF	0.001nF	±(4.0%+10dig)	

	20.00nF	0.01nF	$\pm(3.0\%+10\text{dig})$
	200.0nF	0.1nF	
	2.000 μ F	0.001 μ F	
	20.00 μ F	0.01 μ F	
	200.0 μ F	0.1 μ F	
	2.000mF	0.001mF	
	20.00mF ^[2]	0.01mF	
Frequency (Hz) ^[3]	200.00Hz	0.01Hz	$\pm(0.1\%+5\text{dig})$
	2.0000kHz	0.0001kHz	
	20.000kHz	0.001kHz	
	200.00kHz	0.01kHz	
	2.0000MHz	0.0001MHz	
	20.000MHz	0.001MHz	
Duty Cycle(%) ^[4]	0.1%-99.9% (Typical Value:V _{rms} =1V,f=1kHz)	0.1%	$\pm(1.2\%+3\text{dig})$
	0.1%-99.9%(≥1kHz)		$\pm(2.5\%+3\text{dig})$

[1]When selecting 2A small current measurement function, read the reading after the display value tends to be stable to ensure the accuracy of the value.

[2]In capacitance measurement mode, if the range of 20.00mF is selected, the measurement time should last for more than 30 seconds.

[3]During the frequency measurement, the typical waveform is rectangular wave or sine wave. The measured signal meets the following conditions:

Frequency	Amplitude (rms)
1Hz–20MHz	≥1V

[4]During the duty cycle measurement, the typical waveform is rectangular wave.

Note: During resistance and capacitance measurement, it is necessary to consider the effect of the resistance of the test probe on the measured value.

Characteristics	Description
Maximum Reading	19999
Frequency (Hz)	(40-1000)Hz

Numerical Value Conversion Rate	3 times/second
Automatic Range	√(Current excluded)
Opening Sizes	17mm
True Virtual Value	√
VFC	√
Numeric Data Retention	√
Zeroing Measurement	√
LCD Backlight	√
Automatic Shutdown	√
Buzzer ON/ OFF	√
NCV function	√
Low-Voltage Indication	√
Input Protection	√
Input Impedance	≥10MΩ
Over-Range Warm	√
Battery	3V(1.5V×2)AAA Alkaline battery
LCD Sizes	40mm*20mm
Machine Weight	0.19kg
Machine Dimensions	181.26mm*60.3mm*32mm
Working Temperature	0℃~40℃
Storage Temperature	-10℃~60℃
Relative Humidity	≤80%
Altitude	Operating: 3,000 meters Non-operating: 15,000 meters
Test Standard	IEC 61010-1 EMI/EMC (IEC 61326)

VIII. Care and Maintenance



Warning: Before opening the back cover of the instrument, make sure that the power supply should be cut off and that the instrument probes have left the input port and the measured circuit.

1. Regular Care and Maintenance

*Please use a damp cloth and gentle cleaning instead of abrasive materials or solvents to clean the instrument housing, do not use.

*If finding any abnormality in the instrument, immediately stop use it and send it for repair.

* When the check or repair of the instrument is required, it must be done by the qualified professional maintenance personnel or designated maintenance department.

2. Replacement of Battery (see Figure 9)

**When the "⎓" battery undervoltage symbol is displayed on the LCD, the built-in battery must be replaced immediately, otherwise the measurement accuracy will be affected.

* Battery specification: AAA1.5Vx2 cells

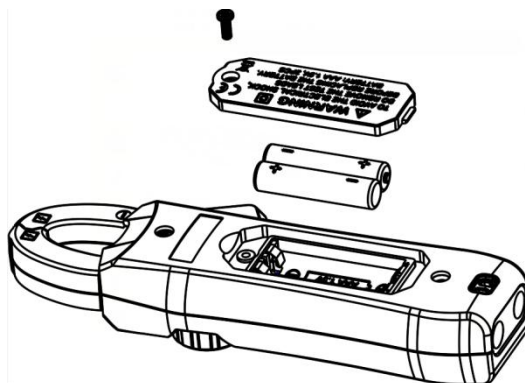


Figure9

Operation Steps:

1. Turn the power switch in the "OFF" position and remove the test probe from the input jack.
2. Unscrew a screw fixing the back cover of the battery with a screwdriver, remove the back cover of the battery, and then remove the old batteries as shown in the figure
- 3 Replace them with 2 new batteries (specification: AAA1.5V)

IX. Appendix

Screwdriver *1

Test pen *1

User's Manual *1

Battery AAA1.5V *2

Cloth bag*1

The contents of the User's Manual are subject to change without prior notice.

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