Preface

Thank you for purchasing a brand-new Uni-Trend meter, in order to use this Meter correctly, please read the full text of this manual carefully before use, especially the "Safety Information" section.

If you have read the full text of this manual, it is recommended that you keep it in a safe place, preferably with the Meter or in a place where you can access it at any time, so that you can refer to it in future use.

Limited warranties and Limited liability

The Company warrants that this product will be free from any defects in materials and workmanship for a period of one year from the date of purchase. This warranty does not apply to damage caused by accident, negligence, misuse, modification, contamination and abnormal operation or handling. The Distributor is not entitled to any other warranties in the name of the Company. If warranty service is required during the warranty period, please contact the nearest authorized service center to obtain the product return authorization information, and then send the product to the service center with a description of the product problem.

This guarantee is your sole remedy. Otherwise, the Company disclaims all warranties, express or implied, such as those applicable to a particular purpose. The Company shall not be liable for any special, indirect, incidental or consequential damages or losses arising from any cause or presumption, and the above limitations and provisions of liability may not apply to you because some states or countries do not allow limitations on implied warranties and incidental or consequential damages.

1. Overview

UT281D/E is a stable, safe, and reliable 10,000A (UT281D is 6,000A) AC true RMS digital Rogowski coil clamp meter (hereinafter referred to as the flexible clamp meter). The entire circuit design centers around a large-scale integrated A/D converter, with full-range overload protection circuitry and a unique appearance design, making it a superior-performance and more practical next-generation electrical measuring meter. The UT281D Rogowski coil is 550mm (21 inches) long, and the UT281E Rogowski coil is 1,100mm (43 inches) long. This series of meters can be used to measure: AC/DC voltage, resistance, circuit continuity, frequency, AC current, and surge measurements. They are equipped with functions such as data hold, data storage, undervoltage indication, backlight, and auto power-off.

They can be used as specialized measuring tools for testing, maintenance, and repairs in various substations, smelting, communications, manufacturing, petroleum, defense, power, electrical work, photovoltaic stations, and electrical circuit equipment, more effectively meeting measurement requirements in factory automation, distribution, and electromechanical applications.

2. Features

1） The device is lightweight, making it convenient for one-handed and high-altitude operations.
2） Comprehensive protection against incorrect operation, capable of withstanding energy surges up to 1000V (30KVA), with overvoltage and overcurrent alarms.
3） UT281E current ranges: 10A, 100A, 1000A, 10kA with automatic range selection (UT281D current ranges: 60A, 600A, 6000A with automatic range selection), frequency response up to 45Hz–500Hz, also features surge measurement capability.
4） Designed with overvoltage and overcurrent alarms.
5） Large red backlight indication.
6） Functions for data hold, storage, viewing, and deletion.
7） Dual display function: AC voltage–frequency (secondary display), flexible coil AC current–frequency (secondary display)
8） Circuit features automatic power-saving mode, with power consumption less than 10μA when automatically turned off, effectively extending battery life.

Please read carefully the relevant contents about "safety" and "warning" included in this manual, and strictly abide by all the precautions of the warnings.

⚠WARNING: Before using the meter, please read the "Safety Information" carefully.

3. Unpack to Check

This user manual includes relevant safety information and warnings. Please read the relevant content carefully and strictly follow all warnings and precautions. When opening the packaging box and taking out the meter, please carefully check whether the following accessories are missing or damaged. If any item is missing or damaged, please contact your supplier immediately.

1. User manual： 1 pc
2. Test leads：1 pair
4.1.5V AAA battery： 3 pcs

4. Safety Information

Please pay attention to the 'Warning Labels and Warning Statements'. Warnings indicate situations or actions that pose a danger to the user or may cause damage to the meter or the device being tested.

This meter is designed according to IEC/EN61010-1, 61010-2-032 electromagnetic radiation protection and EN61326-1 safety standards, and complies with safety standards for double insulation, overvoltage categories CAT III 1000V, CAT IV 600V, and Pollution Degree 2, for indoor use. Failure to use the meter in accordance with the relevant operating instructions may reduce or eliminate the protection provided by the meter.

1. Before use, check the meter and test leads for any damage or abnormal conditions. If any abnormalities are found—such as exposed test leads, damaged casing, an LCD that does not display or displays incorrectly, etc.—do not use it.
2. Do not use the meter if the cover is not properly in place, as there is a risk of electric shock.
3. Damaged test leads must be replaced, and only test leads of the same model or with

the same electrical specifications should be used

4. While the meter is measuring, do not touch exposed wires, connectors, unused input terminals, or the circuit being measured.
5. When measuring voltages higher than 30V DC or 30V AC, be extremely careful, and be sure not to let your fingers exceed the protective finger guard on the test leads to prevent electric shock.
6. When the range of the measured value is unknown, the meter must be set to the maximum range.
7. Never apply voltages or currents exceeding those indicated on the meter between terminals, or between any terminal and ground.
8. During measurement, the functional switch must be in the correct position. Before changing the functional switch, disconnect the test leads from the circuit being measured. Do not change the range while measuring to prevent damage to the meter.
9. Before performing online measurements of resistance, diodes, or circuit continuity, you must first cut off all power supplies in the circuit of the device under test and discharge all residual charges in the capacitors.
10. Do not use the low-pass filter function to verify the presence of dangerous voltages, as voltages exceeding the indicated value may exist. First, measure the voltage without selecting the filter to check for the presence of dangerous voltages. Then select the filter function.
11. Only use test leads that have the same rated voltage, frequency, category, and rated current as the meter, and that are approved by safety certification authorities.
12. Before opening the battery cover, remove the test leads from the meter.
13. When using the probe, fingers should be held behind the probe finger guard.
14. Do not store or use the meter in high temperature, high humidity, flammable, explosive, or strong electromagnetic field environments.
15. Do not change the internal wiring of the meter without authorization to avoid damaging the meter and endangering safety.
16. When the LCD display shows the " " symbol, the batteries should be replaced promptly to ensure measurement accuracy.
17. Turn off the power immediately after measurement. If not used for a long time, remove the batteries.
18. Before use, please measure the known intrinsic voltage or current of the product to ensure the product is working properly.
19. Use in compliance with IEC/EN/UL 61010-031 standards, with the same or higher electrical specifications.
20. Do not use beyond the rated frequency.

5. Electrical Symbols

	Do not place equipment and its accessories in trash. Items must be properly disposed of in accordance with local regulations.		Battery

~	AC (Alternating Current)	⎓	DC (Direct Current)
≂	AC (Alternating Current)/DC (Direct Current)	⚠	Warning
⚠	High voltage	⏚	Grounding
⧈	Double insulated	▭	Low battery
⊘	Do not apply around or remove from UNINSULATED HAZARDOUS LIVE conductors, which may render electric shock, electric burn, or arc flash.	🔒/🔓	Clamp locked/unlocked
CAT III	It is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.		
CAT IV	It is applicable to test and measuring circuits connected at the source of the building's low-voltage MAINS installation.		
CE	Comply with European Union standards		
ETL c us Intertek 4007682	Conforms to UL STD 61010-1, 61010-2-032, certified to CSA STD C22.2 NO.61010-, 61010-2-032		

6. General Characteristics

1. Maximum voltage between the signal input terminal and the COM terminal: Please refer to the input protection voltage description for each range.
2. Display count: 6000
3. Display updates approximately 2～3 times per second
4. Range: Auto
5. Polarity display: Auto
6. Overrange indication: Displays "OL"
7. Errors caused by the measurement position: When measuring current, if the source being tested is not placed at the center of the clamp, additional reading errors may occur. Please refer to the description of additional errors regarding positions A, B, and C in the "Technical Specifications" section.
8. Impact resistance: Can withstand impact from a 1m drop
9. Low battery warning: ≤3.6V approximately
10. Power supply: 3 AAA 1.5V batteries
11. Auto power-off function: The meter will automatically power off if no button is pressed within approximately 15 minutes. This function can also be turned off if needed
12. Operating temperature: 0℃～40℃ (32℉～104℉)

13. Storage temperature: -10℃～50℃ (14℉～122℉)
14. ≤75% (0℃～30℃ below); ≤50% (30℃～40℃)
15. Altitude: Not exceeding 2000m
16. Electromagnetic compatibility: According to standards EN61326-1; EN61326-2-2
17. Weight: 258.4g
18. Safety standard: IEC 61010-1: CAT III 1000V / CAT IV 600V
19. Pollution Degree: 2

7. External Structure (Figure 1)

1. Coil lock
2. LCD display
3. Functional buttons
4. Functional switch
5. Input terminal
6. Fixing screw for battery compartment

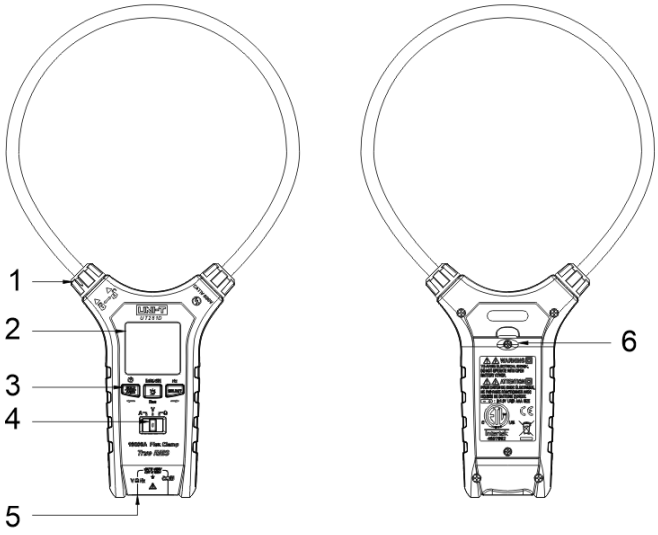


Figure 1

8. Functional Switch and Buttons

Positions	Descriptions
V	AC/DC voltage measurement
A	AC current measurement
Ω	Continuity/Resistance measurement

Descriptions:
Short press: Press the button and hold for less than 2 seconds
Long press: Press the button and hold for 2 seconds or more

1. HOLD SAVE:
   1）Short press to hold and store data
   2）Long press to turn on/off

2. SELECT Hz:
   1) Voltage mode: Short press to cycle through ACV and DCV
   2) Frequency mode: In AC voltage mode, long press to enter frequency measurement; in AC current mode, short press to enter frequency measurement.
   3) Inrush measurement: Short press to switch ranges
3. :
   1）Short press to turn the backlight on and off.
   2）Long press to enter the INRUSH function. Short press again to refresh the current measurement value, long press to exit the current mode.
4. SELECT Hz + HOLD SAVE:
   1) Long press the SELECT and HOLD buttons simultaneously to enter the stored data viewing mode, and use the arrow directions to scroll through the stored data.
   2) Long press the " " button (ESC) to clear all data, automatically returning to the measurement interface. To exit the current viewing function interface, long press the SELECT and HOLD buttons simultaneously.
   3) Short press the ESC button twice consecutively to clear a single data entry.
5. + HOLD SAVE:
   1） In the powered-on state, long press the backlight button and the HOLD button simultaneously to disable the auto power-off function.

9. Operating Instructions

First, please check the built-in AAA 1.5V×3 batteries. If the meter does not have enough power when turned on, a " " symbol will appear on the display, indicating that the batteries need to be replaced before use. Also, pay attention to the symbol "⚠" next to the test lead socket, which warns you to be careful that the voltage being tested does not exceed the indicated value to ensure measurement safety!

1. AC/DC Voltage and Frequency Measurement

1) Set the functional switch to the AC/DC voltage position.
2) This position defaults to the AC voltage mode. To measure DC voltage, short press the "SELECT" button to enter the DC voltage mode.
3) In the AC voltage mode, long press "SELECT" to activate the frequency measurement function.
4) Insert the red test lead into the red (V) socket, and the black test lead into the black (COM) socket, then touch the two ends of the voltage to be measured with the test leads (connected in parallel to the load)
5) The clamp will automatically select the appropriate range. The main display will show the true RMS value of the AC voltage, and the secondary display will show the frequency.

⚠WARNING:
*.When measuring high voltage, pay special attention to safety to avoid electric shock!
*.Before use, you can test a known voltage to confirm whether the product is functioning properly!

2. AC Current and Frequency Measurement

1) Set the functional switch to the AC current position.
2) Rotate the coil lock to unlock, fully clamp the coil around the conductor to be measured, then rotate the lock to secure the coil. (Note: The clamp must be fully closed, see Figures 2.1 and 2.2)
3) The meter can only measure one current conductor at a time. If measuring two or more current conductors simultaneously, the measurement reading will be incorrect. (see Figure 2.3)
4) The meter will automatically select the appropriate range. The main display will show the true RMS value of the AC current, and the secondary display will show the frequency.
5) In the AC current position, short press "SELECT" to enter current frequency measurement.
6) In the AC current position, long press "INRUSH" to select inrush current measurement. At this time, start the electrical device to measure the instantaneous starting current of the device. The inrush current measurement has ranges of 600A (UT281E 100A) and 6000A. Short press "SELECT" to switch ranges.
7) Do not perform the following improper operations. (see Figure 2.4)

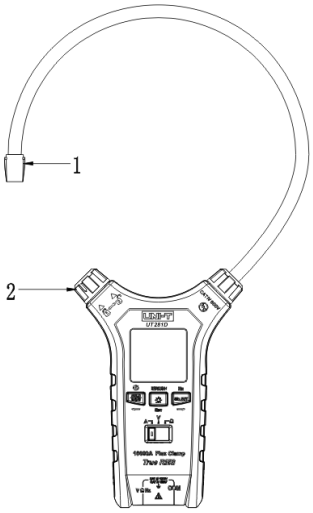


Figure 2.1

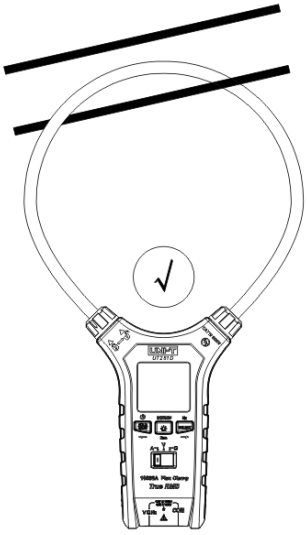


Figure 2.2

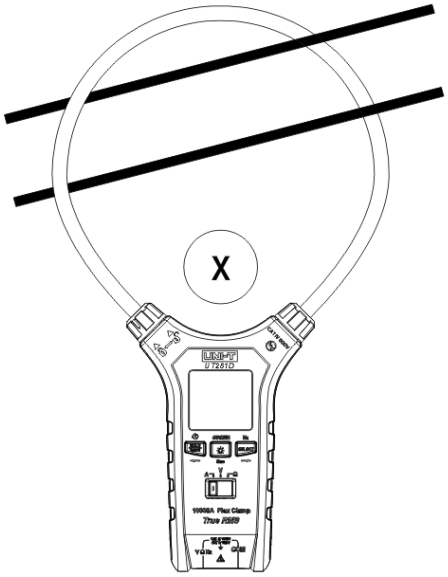


Figure 2.3

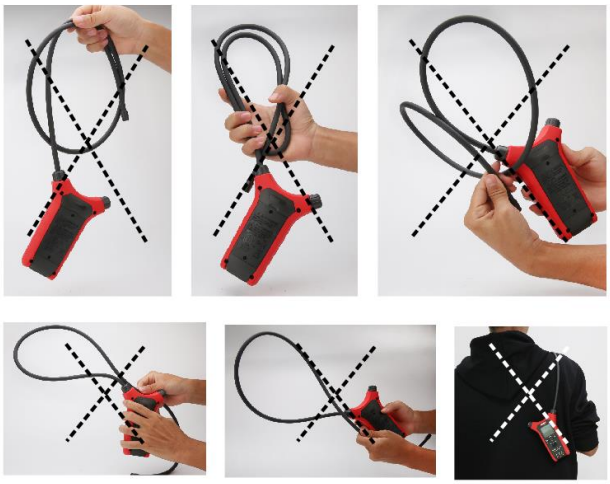


Figure 2.4

⚠WARNING:

*.The current measurement function must be operated between 0°C and 40°C. Hold the handle firmly and do not release it suddenly. The instrument's measurements are sensitive to mechanical stress to varying degrees, and impact can cause short-term reading changes.

*.To ensure accurate measurement data, the conductor being measured must be placed in the center of the clamp. If it is not positioned in the center of the clamp, corresponding additional reading errors will occur. Please refer to the description of additional errors regarding positions A, B, and C in the “Technical Specifications” section.

*.When the meter already shows 'OL', further testing should be avoided, as prolonged testing may damage the meter. At this time, a meter with a higher range should be used for measurement.

*.When installing and removing flexible coil, the device to be tested should be powered off first, or when operating on hazardous live equipment, a safe operating procedure should be used.

*.If there are accessible dangerous moving parts in the device being measured, personal protective equipment should be used.

3. Continuity and Resistance Measurement (Figure 1)

1) Set the functional switch to the resistance measurement position.
2) This position defaults to automatic identification mode, which can automatically identify circuit continuity and measure resistance.
3) Insert the red test lead into the red (Ω) socket and the black test lead into the black (COM) socket, then have the tips of the two test leads contact the two ends of the object to be measured (in parallel with the object). For continuity measurement, if the resistance between the two endpoints being measured is ≥50Ω, the circuit is considered open, and the buzzer is silent; if the resistance between the two endpoints being measured is ≤30Ω, the circuit is considered to have good conductivity, and the buzzer sounds continuously.
4) Read the measured resistance value directly from the display.

⚠WARNING:
*.When measuring the continuity or resistance of a circuit online, to prevent damage to the meter and injury to the user, all power in the circuit to be measured must be turned off before measurement, and all residual charges on capacitors must be discharged before proceeding with the measurement.
*. If the resistance value is not less than 0.5Ω when the test leads are short-circuited, the test leads should be checked for looseness or other abnormalities.
*.If the resistance being measured is open or exceeds the meter's range, the display will show "OL".
*. When measuring low resistance, the test leads can cause a measurement error of 0.1Ω to 0.2Ω. To obtain an accurate value, you can subtract the resistance measured when the red and black test leads are short-circuited from the measured resistance to get the final resistance value.
*. When measuring high resistance, it is normal take a few seconds for the reading to stabilize.
*. Do not apply a voltage higher than 30V DC or AC to avoid personal injury.

4. Data Hold/Storage/Viewing/Deletion

1) Data Hold and Storage: During measurement, short press the 'HOLD SAVE' button, and the LCD will display the ' H ' symbol, holding the current measurement data and automatically number and store it. Short press the 'HOLD SAVE' button again to cancel the data hold.
2) Data Viewing: During the measurement process, long press the "HOLD SAVE" and "SELECT Hz" buttons simultaneously. The LCD will display the "RECALL" symbol, entering the data viewing interface. Scroll through the stored data according to the arrow direction on the panel.
3) Data Deletion: In the data viewing interface, long press the '☼' button (Esc), the LCD will flash 'NULL' three times, the buzzer will sound, and the system will automatically return to the measurement interface, indicating that all stored data has been deleted. To delete a single piece of data, select the data to be deleted, then short press the '☼' button (Esc) twice consecutively. The LCD will display 'NULL' for 1 second, the main display will show '----', and the secondary display will show the number of the deleted data, indicating that the single data entry has been successfully deleted.

⚠WARNING:
*.When the stored data reaches 999 entries, the LCD flashes “FULL” indicating that the data storage is full, and the data needs to be cleared before it can continue to store.
*.When entering the data viewing interface, the LCD flashes “NULL”and the system automatically returns to the measurement interface, indicating that the data storage is empty.
*.For AC voltage and current data storage and viewing, the secondary display shows the number for about 1 second, then switches to the current AC voltage and current frequency value. During DC voltage, resistance, frequency, and inrush current measurements, the secondary display shows the number for about 1 second before turning off.

5. Other Functions

1) Auto Power-Off: During measurement, if there is no operation for 15 minutes, the meter will "automatically power off" to enter energy-saving mode. In the auto power-off state, long press the "HOLD SAVE" button again to restart. To disable the auto power-off function, simultaneously long press the "HOLD SAVE" and "☼" buttons while the meter is on. The symbol "APO" will disappear accompanied by three beeps, indicating that the auto power-off function is disabled. Restarting the meter will enable the auto power-off function.
2) High Voltage Alarm: In ACV/DCV mode, when the measured value is ≥30V or exceeds the range showing "OL", the LCD displays the high voltage warning symbol "⚠".
3) High Voltage Over-Range Alarm: In ACV/DCV mode, when the measured voltage is ≥600V, and the white backlight is off, the red backlight flashes; when the white backlight is on, the red/white backlight alternates flashing.
4) OL is displayed when ACV/DCV is >1010V and ACA is >6100A.
5) Low voltage detection: When the battery is ≤ approximately 3.6V, the low battery symbol “▭” is displayed.
6) Undervoltage power-off function: When the battery voltage is ≤ approximately 3.3V, the undervoltage symbol “▭” is displayed; at this time, the LCD screen shows the “Lbt” interface, and after several seconds, the buzzer continuously emits a “beep beep” sound. After three times, the meter automatically powers off.
7) Dual display function: AC voltage-frequency (secondary display), flexible coil AC current-frequency (secondary display).
8) Buzzer: When any active button is pressed or the functional switch is toggled, the buzzer will emit a "Beep" sound (about 0.25 seconds). When measuring voltage or current, the buzzer will also emit a continuous intermittent "Beep" sound to indicate an over-range warning.

10. Technical Specifications

Accuracy: ± (a% of reading + b digits), guaranteed for 1 year

Ambient temperature: 0℃～40℃ (32℉～104℉)

Relative humidity: ≤75%

⚠**WARNING:**

- The temperature condition for accuracy is 18°C to 28°C, with environmental temperature fluctuations kept stable within ±1°C. When the temperature is <18°C or >28°C, the additional temperature coefficient error is: 0.2 x (specified accuracy)/°C.

1. DC Voltage Measurement

Range	Resolution	Accuracy
6.000V	0.001V	±（0.8%+2）
60.00V	0.01V	
600.0V	0.1V	
1000V	1V	±（1.0%+2）

*.Input impedance of voltage is about 10MΩ. 'OL' is displayed when the maximum value is ≥1010V.
*.Overload protection: 1000Vrms (DC/AC)
*.Guaranteed accuracy range: 1～100% of range
*.The offset in open circuit state is ≤3 counts. The reading is zero in short circuit state.

2. AC Voltage Measurement

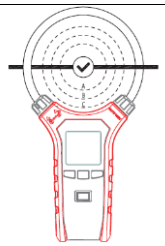
Range	Resolution	Accuracy
6.000V	0.001V	±（1.0%+3）
60.00V	0.01V	
600.0V	0.1V	
1000V	1V	±（1.2.%+3）

*.Input impedance of voltage is about 10MΩ. 'OL' is displayed when the maximum value is ≥1010V.
*.Frequency response: 45Hz～500Hz, sine wave RMS (True RMS response)
*.Overload protection: 1000Vrms (DC/AC)
*.Guaranteed accuracy range: 5～100% of range
*.The offset in open circuit state is ≤10 counts (without connecting test leads). In open circuit state, the reading is ≤2 counts.

3. UT281D/E+ AC Current Measurement

Range		Resolution	Accuracy	Remark
UT281D	UT281E+			
60.00A	10.00A	0.01A	±（2.0%+5）	The specifications in this table are for the central position. Please refer to the specifications regarding positions A, B, and C in the table below.
600.0A	100.0A	0.1A		
6000A	1000A	1A	±（2.5%+5）	
/	10.00KA	0.01KA		
Inrush current measurement		Measurement range: 5.00A~6000A	±10%	

Additional accuracy with the best measurement at	Position	UT281D	UT281E+	
	√	Best measurement at the center position: ± (2.0%+5)		
	Position A	35mm (1.4 inches): Add 1.0%	50mm (1.97 inches): Add 2.0%	

the central position (no other external electric or magnetic fields)	Position B	50mm (2.0 inches): Add 1.5%	100mm (3.94 inches): Add 2.5%	
	Position C	60mm (2.4 inches): Add 2.0%	150mm (5.91 inches): Add 3.0%	

*.Frequency response: 45Hz～500Hz
*.Overload protection: Not specified
*.Guaranteed accuracy range: 10%～100% of range
*.The offset of the clamp without input is ≤5 counts.
*.Inrush current measurement: For the 600A range (UT281E: 100A range), the trigger value is 5A; for the 6000A range, the trigger value is 20A, with a trigger time approximately within 100ms.

4. Resistance Measurement

Range	Resolution	Accuracy
600.0Ω	0.1Ω	±（1.0%+5）
6.000kΩ	0.001kΩ	
60.00kΩ	0.01kΩ	
600.0kΩ	0.1kΩ	
6.000MΩ	0.001MΩ	±（2.0%+5）
60.00MΩ	0.01MΩ	±（2.5%+5）

*.Range: Measured value = Displayed value - Value of the shorted test leads
*.Overload protection: 600Vrms (DC/AC)
*.Guaranteed accuracy range: 1～100% of the range

5. Frequency Measurement

Range	Resolution	Test sensitivity	Accuracy
Measurement range of voltage frequency: 10.0Hz～30.0kHz	0.1Hz～0.1kHz	10.0Hz～30.0kHz	±（0.5%+3)
Measurement range of current frequency: 10.0Hz～1000Hz	0.1Hz～0.1kHz	10.0Hz～1000Hz	±（0.5%+3)

*.Overload protection: 600 Vrms (DC/AC)
*.Frequency mode:
Voltage frequency ≤ 30 kHz, 2 Vrms ≤ input amplitude ≤ 240 Vrms
Current frequency ≤ 1000 Hz, input amplitude ≥ 1 A.

11. Maintenance and Repair (Figure 6)

⚠WARNING: Before opening the Meter's back cover or battery cover, make sure the power is off and the test leads are disconnected from the input terminals and the circuit being tested.

1. General maintenance and repair

- For maintenance, please clean the meter casing with a damp cloth and mild detergent. Do not use abrasives or solvents.
- If any abnormalities are found in the meter, stop use immediately and send it for repair.
- When calibration or repair of the meter is necessary, it should be done by qualified professional maintenance personnel or designated service centers.

2. Battery installation and replacement

The built-in battery of this product is specified as: AAA battery

When the LCD shows a low battery warning, the built-in batteries should be replaced immediately; otherwise, it will affect measurement accuracy.

Please install or replace the batteries in the following order:

a.Turn off the meter and remove the test leads connected to the input terminals.

b.Place the meter with the panel facing down, loosen the battery compartment screws, remove the battery cover, take out the batteries, and install the new batteries according to the polarity indication.

c.After installing the new batteries, put the battery cover back on and fasten the screws.

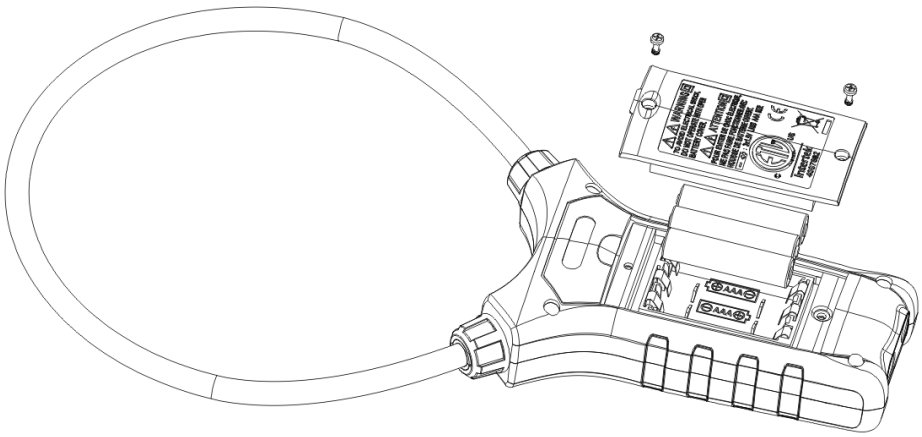


Figure 3