UT197

Industrial Digital Multimeter

User manual

Preface

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

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

Limited warranties and liabilities

Uni-Trend warrants that this product will be free from defects in materials and workmanship for a period of one year from the date of purchase. This warranty does not apply to fuses, disposable batteries, or 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 Uni-Trend. If you need warranty service during the warranty period, please contact your nearest Uni-Trend authorized service center to obtain the product return authorization information; The product is then sent to the service center with a description of the problem with the product.

This guarantee is your sole remedy. Otherwise, Uni-Trend does not provide any express or implied warranties, such as implied warranties for a particular purpose. Uni-Trend shall not be liable for any special, indirect, incidental or consequential damages or losses arising from any cause or speculation. Because some states or countries do not allow limitations on implied warranties and incidental or consequential damages, the above limitations and provisions of liability may not apply to you.

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1. Overview

UT197 is a high-precision true RMS handheld digital multimeter with 600,000 digits counting. Its protection level is IP67. The Meter can withstand a maximum of 5 meters drop. Designed with wide working temperature range, (-40°C~55°C), UT197 meets the needs of users in humid, sandy, cold and other harsh outdoor extreme environment measurements.

It can be applied to the following occasions or fields:

1) Construction and maintenance of electric power engineering
2) Maintenance of power equipment
3) Petrochemical smelting
4) Professional measurement of engineer
5) HVAC
6) New energy and environmental protection
7) Maintenance site of factory
8) Professional application of laboratory

2. Features

1) With IP67 protection level

2) Safety class: CAT IV 1000 V

3) Withstands drops of up to 5 meters (on cement floor at 25°C)

4) Heat-resistant and cold-tolerant, with a wide operating temperature range from -40 °C (can last up to 20 minutes) to +55 °C

5) High-resolution 600000-count display mode (DC voltage only), with accuracy up to 0.015%.

6) True RMS measurement, which can accurately measure the AC voltage and current of nonlinear signals.

7) Measure AC and DC voltages up to 1000 V

8) Measure currents up to 10 A (20 A for 30 seconds)

9) Low impedance automatically identifies DC or AC voltages and prevents false readings caused by false voltages.

9) Low-pass filter (VFD) function ensures accurate voltage and frequency measurement of variable speed drives (VSDs).

11) Resistance, continuity, frequency, and capacitance measurements.

12) Min/max values are provided to record signal fluctuations, and 250uS peak capture function is also provided.

13) Auto backlight and fluorescent buttons for improved visibility.

14) Plug-in UT-CS07 AC/DC clamp to extend the current range to 100A/1000A

15) With Bluetooth communication function, the test results are recorded and reported through the Uni-Trend Smart Measure APP, and meaningful graphs and tables are generated.

3. Unpack to Check

This instruction manual includes relevant safety information and warning tips, etc., please read the relevant content carefully and strictly follow all warnings and precautions. Open the box and take out the meter, carefully inspect the following accessories for missing or damaged, and contact your supplier immediately if you notice any missing or damaged.

1) User manual: 1 pc
2) 1.5V AA battery: 3 pcs
3) Carrying bag: 1 pc
4) Retractable test leads（UT-L98）: 1 pair
5) Alligator clips（ protective sheath，UT-C14）:1 pair
6) Temperature probe: 1 pc
7) AC/DC current probe (UT-CS07): 1 set（optional）
8) Dust plug for input terminal: 2 pcs
9) Lantern tip: 2 pcs
10) Alligator clips (without sheath, UT-C13): 1 pair (optional)
11) Alligator clips (UT-C15): 1 pair (optional)
12) Hook probes (UT-C16): 1 pair (optional)
13) Test probes(UT-C17): 1 pair (optional)
14) Dual-end connecting cable (UT-L99): 1 pair (optional)

4、Safety Information

Please pay attention to the "Warning Signs and Warning Words". A warning indicates a situation or action that poses a danger to the user and may cause damage to the meter or device under test.

This Meter is certified according to IEC/EN61010-1, 61010-2-033, electromagnetic radiation protection EN61326-1 safety standard, and meets the safety standards of double insulation, overvoltage CAT IV 1000V, and pollution level 2, and is used indoors. Failure to follow the instructions may weaken or lose the protection provided to you.

1) Check the meter and test leads before use, beware of any damage or abnormal phenomenon, if you find any abnormal conditions: the test lead is exposed, the case is damaged, the LCD display is not displayed or messy, etc., please do not use. It is strictly forbidden to use a meter without a proper cover, otherwise there is a risk of electric shock.
2) If the test lead is damaged, it must be replaced with a test lead of the same model or electrical specification.
3) When taking measurements, remember not to hold the test lead over the finger guard, and not to touch exposed wires, connectors, unused inputs, or circuits being measured to prevent electric shock.
4) When measuring, it is important to use the correct terminals, function and range.
5) When measuring voltages above 60V DC, 30V AC or 42.4V peak, be cautious and remember not to hold the test lead over the finger guard to prevent electric shock.
6) When measuring current, turn off the power of the circuit before connecting the multimeter to the circuit. Note: the multimeter must be connected in series with the circuit.
7) Do not use the low-pass filter option to verify the presence of dangerous voltages, there may be voltages that exceed the indicated values. First, the voltage is measured without a filter selected to detect the presence of a dangerous voltage. Then select the filter function.
8) Never apply more voltage or current than indicated on the meter between terminals, or between any terminal and ground.
9) Before performing an in-line resistance, diode, or circuit on-off measurement, all power in the circuit where the device under test is located must be cut off and all capacitors must be discharged completely.
10) Before measuring current, you should check whether the fuse of the meter is in good condition, turn off the measured current first, and then turn on the measured current after the meter is reliably connected to the circuit to avoid the risk of sparks.
11) Use only the fuses specified in the manual.
12) When the LCD display shows the "  " sign, the battery should be replaced in time to ensure the measurement accuracy. When the meter is not used for a long time, the battery should be removed.
13) Do not change the internal wiring of the Meter at will, so as not to damage the Meter and endanger safety.

14) Do not store and use this Meter in high temperature, high humidity, flammable, explosive and strong electromagnetic field environments.

15) Please use a soft cloth and neutral detergent to clean the Meter casing, do not use abrasives and solvents to prevent the casing from being corroded, so as not to damage the instrument and endanger safety.

16）Before each use verify tester operation by measuring a known voltage.

17）Never use this Meter on circuits where the voltage exceeds the rated voltage of this Meter.

5、Electrical Symbols

Symbol	Descriptions	Symbol	Descriptions
	Insufficient battery power		Double insulated
	Warning prompts		Grounding
	AC(Alternating Current)		DC（Direct Current）
	Bluetooth wireless communication technology is adopted.		Fuse
	Caution, possibility of electric shock		
	Do not dispose of the device and its accessories in the trash, please dispose of them properly in accordance with local regulations.		
	Complies with European Union directives.		
	Conforms to UL STD 61010-1,61010-2-033, and certified to CSA STD C22.2 NO.61010-1, 61010-2-033		
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.		

6、General Characteristics

1) The overload protection voltage between the input terminal and the ground is 1000V

2) Fuse protection for uA/mA input terminal：Fuse 600mA/1000V Φ6.35×31.8mm(breaking capacity: 10KA） fast-acting porcelain tube

Fuse protection for A terminal：Fuse 11A/1000V Φ10.3×38 mm (breaking capacity: 30KA） fast-acting porcelain tube

3) Display：

Digital 60000-digit counting for main function is displayed, with refresh rate of 5 times/s

Additional function (AC+DC, PEAK, VFD, plug-in current sensor), digital 6000-digit counting for capacitance position is displayed, Refresh rate of 3 times/s

600000-digit counting is displayed in high-resolution DC voltage position, with refresh rate of 3 times/s.

4) Analog bar: 33 segments; updating 32 times per second

5) Range：Automatic or manual

6) Polarity display：Automatic

7) Overrange prompt: “OL”is displayed

8) Operating temperature：-40 °C to +55 °C（When placed at -40 °C from 20 °C, the prototype will work normally for 20 minutes）

Storage temperature：-45 °C to +60 °C

9) Relative humidity: 0 % to 80 % （0 °C to 35 °C）；0 % to 50 %（35 °C to 55 °C）

10) Operating altitude：≤2000m

11) Battery：3 pieces of 1.5V AA alkaline batteries

12) Dimension: 206mm x 93.5mm x 51.6mm

Dimension with holster: 212mm x 103.5mm x 67mm

13) Weight: about 600g (including batteries)

Weight with holster: about 835g (including batteries)

14) IP67 protection level

15) Impact: 5m drop

16) Safety standard: IEC 61010-1: CAT IV 1000V

17）Pollution degree：2

18）Indoor use

19) Electromagnetic compatibility: In the RF field of 1 V/m: total accuracy = specified accuracy + 5% of the range. No specified index for the RF field above 1 V/m.

7. External Structure (Figure 1)

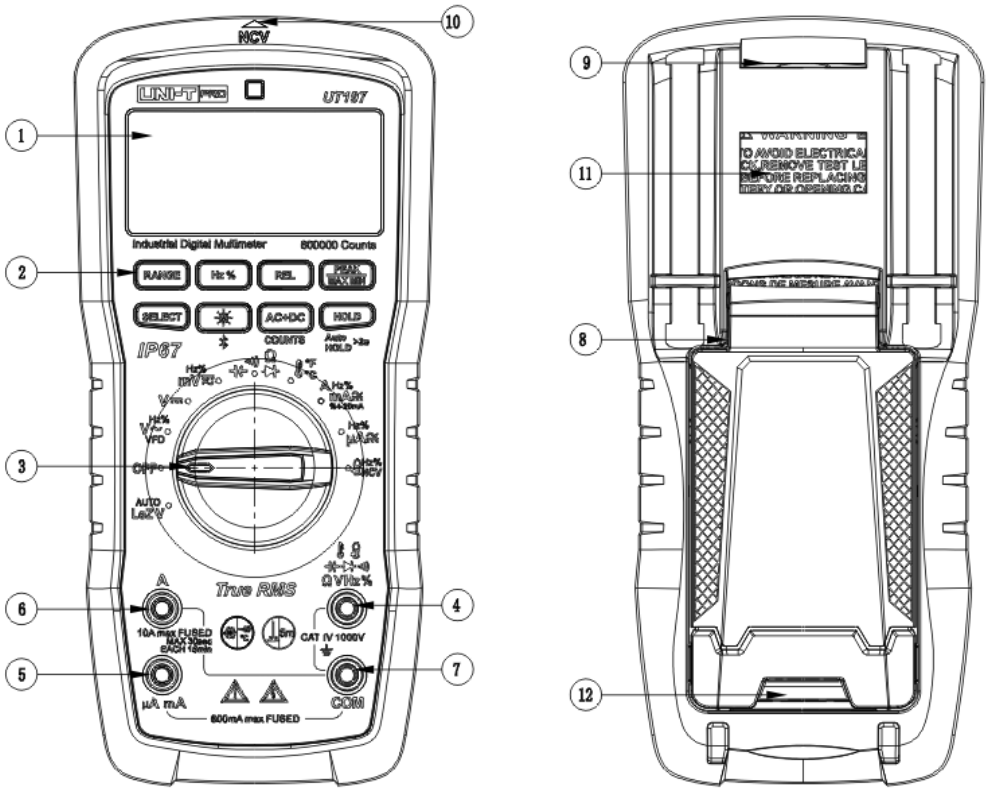


Figure 1

1. LCD display
2. Buttons
3. Functional knob
4. V terminal
5. uA/ mA terminal
6. A terminal
7. COM terminal
8. Protective holster with bracket
9. Magnetic hanger area
10. NCV sensing area
11. Battery cover
12. Fuse cover

8. LCD Display（Figure 2）

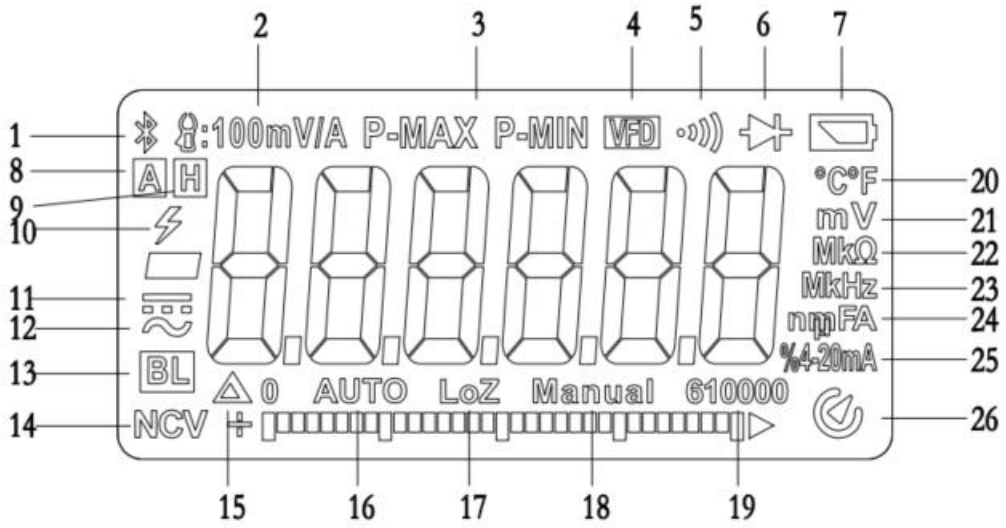


Figure 2

1. : Bluetooth communication symbol
2. :100mV/A: AC/DC current probe range prompt
3. P-MAX P-MIN -MIN: Maximum, Minimum, Peak Maximum, Peak Minimum, etc
4. VFD: Low-pass filter voltage measurement mode prompt
5. :Circuit on-off measurement prompt
6. : Diode measurement prompt
7. :Battery undervoltage prompt
8. A:Auto-hold function prompt
9. H:Hold function prompt
10. : Dangerous voltage prompt
11. :DC measurement prompt
12. : AC measurement prompt
13. BL:Auto backlight function prompt
14. NCV:Non-contact AC voltage sensing prompt
15. : Relative value measurement prompt
16. AUTO: Auto range prompt
17. LoZ:Low impedance automatically identifies DC or AC voltage

18. **Manual** :Manual range prompt
19. **610000** .: Range prompt
20. **°C°F** :Temperature measurement display prompt
21. **mV** :Voltage unit prompt
22. **MkΩ** :Resistance unit prompt
23. **MkHz** :Frequency unit prompt
24. **nμmFA** :Current and capacitance unit prompts
25. **%4-20mA** ：Duty cycle and current conversion ratio unit prompt
26. :Auto shutdown prompt

9. Rotary switch（Figure 3）

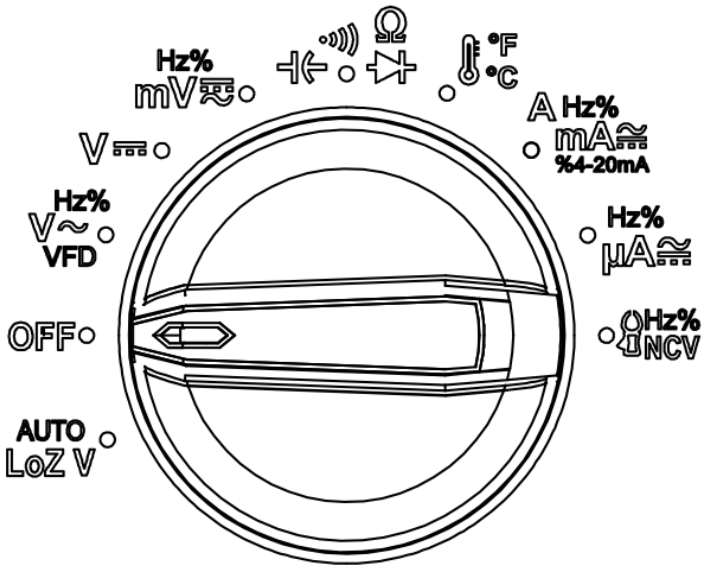


Figure 3

Position	Descriptions
AUTO LoZ V	Low-impedance automatic AC/DC voltage measurement
OFF	Power off
Hz% V~ VFD	AC voltage/low-pass filter VFD, frequency/duty cycle measurements
V⎓	DC voltage measurement

	mV AC/DC voltage measurement, frequency/duty cycle measurement
	Continuity measurement/resistance measurement/diode measurement/capacitance measurement
	Celsius temperature measurement/Fahrenheit temperature measurement
	AC/DC current mA/A measurements, frequency/duty cycle measurements, %4-20mA
	AC/DC current uA measurements, frequency/duty cycle measurements
	Plug-in current probe measurement/NCV inductive detection

10、Functions of Buttons

Buttons	Effective positions	Descriptions
	Composite positions	1. ACV position: short press to select ACV->VFD cyclically; Default position: ACV. 2.ACmV/DCmV position: short press to select ACmV->DCmV cyclically; Default position: ACmV 3. Continuity/Ω/diode/capacitor position: short press to select continuity->Ω->diode->capacitor cyclically; Default position: Continuity. 4.uA position: short press to select DCuA->ACuA cyclically; Default position: DCuA mA position: short press to select DCmA->ACmA->%4-20mA cyclically; Default position: DCmA. A position: short press to select DCA->ACA cyclically; Default position: DCA. 5.°C ºF position: short press cycle to select °C ->ºF cyclically; Default position: °C. 6. / NCV position: short press to select CS_DCA -> CS_ACA-> NCV cyclically; Default position: CS_DCA. 7.Press and hold SELECT, turn the rotary switch to power on, Buzzer prompts 4 sounds, and the product enters the non-sleep mode.

RANGE	ACV、DCV、Ω、uA、mA、A、VFD、	1. In auto range mode, short press the RANGE button once to enter the manual range mode (LCD does not display "AUTO") and be in the current range, continue to short press to select the range cyclically. Press and hold this key in manual ranging mode to exit the manual range and enter the automatic range. 2. Under the functions of HOLD, MAX/MIN, and REL, the Range key has no function.
Hz%	ACV、ACmV、ACuA、ACmA、ACA、VFD、	Short press to cycle through the frequency > duty cycle - > return to the previous position.
REL	V、mV、Ω、CAP、uA、mA、A、℃、°F、	Short press the REL button to enter or exit REL measurement mode. In the relative value measurement mode, the LCD displays "△".
	All positions	Short press to turn the auto backlight function on or off. Long press to turn the Bluetooth communication function on or off.
AC+DC COUNTS	DCV、uA、mA、A、mV	Short press to select AC+DC->DC->AC cyclically, and long press to exit AC+DC mode.
	DCV、DCmV	Long press to select 60,000 counts > 600,000 counts; Default: 60,000 counts.
PEAK MAX MIN	V、mV、uA、mA、A、Ω、VFD、℃、°F、	Short press the MAX/MIN button to capture the maximum/minimum value, and long press to exit the maximum/minimum mode.
	ACV、ACmV、ACuA、ACmA、ACA、VFD、	Under the operation of high-speed ADC, the hardware comparator automatically stores the maximum and minimum values of the ADC, and the pulse width of 250uS can be acquired. Long press to enter the function of capturing AC signal peaks, short press to select P-MAX and P-min cyclically, and long press to exit the function of capturing peak signals.
HOLD Auto HOLD >2s	All positions（Except NCV position）	Short press to enter or exit data hold. When entering data hold, the LCD will display "H", and when exiting data hold, the LCD will not display "H".
	DCV、ACV、uA、mA、A、Ω、CAP、	Long press to enter or exit auto data hold, when entering data hold, the LCD will display "A" and "H", and when exiting data hold, the LCD will not display "A" and "H".

11、Operating Instructions

Please pay attention to check the built-in AA 1.5V x3 batteries before use. If the power is low after the Meter is turned on, the "▭" symbol will be displayed, in order to ensure the test accuracy, the battery must be replaced in time before use. Also pay special attention to the warning symbol "⚠" next to the socket of the test pen, which is a warning that the voltage or current being tested should not exceed the indicated value to ensure the safety of the measurement!

1. Automatic AC/DC voltage（Auto-V LoZ）measurement（Figure 4）

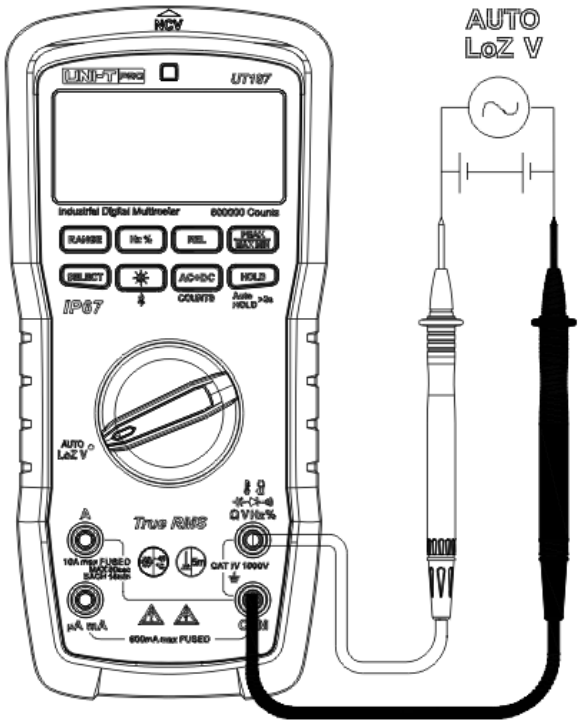


Figure 4

1) Connect the red pen to the "V" terminal and the black test lead to the "COM" terminal.
2) Set the rotary switch to AUTO LoZ V, and then connect the test lead in parallel to the power supply or load to be measured.
3) Read the measured voltage value directly from the display. For Auto-V LoZ measurements, AC or DC voltages are automatically selected based on the low impedance input inducted.

⚠ Warning:

- For Auto-V LoZ voltage measurement, in order to eliminate stray and false voltages, the Auto-V LoZ function of the Meter provides a low impedance (input impedance of about 2kΩ) on the entire

wire

circuit to obtain more accurate measurements.

- Do not input voltages higher than 600V.
- When measuring high voltages, special care should be taken to avoid electric shock.
- When the measured voltage is >30V, the high-voltage alarm symbol is displayed.
- After all the measurement operations are completed, the test lead should be disconnected from the circuit under test.

2. AC voltage measurement（Figure 5）

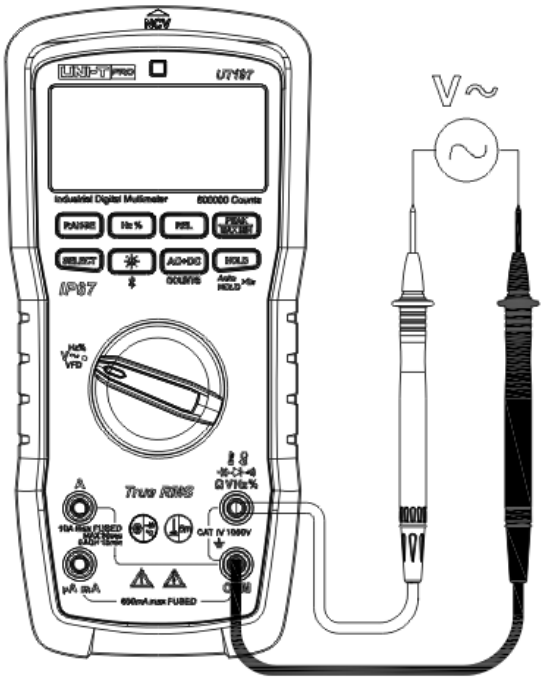


Figure 5

1) Connect the red test lead to the "V" terminal and the black test lead to the "COM" terminal.
2) Set the rotary switch to Hz% V~ VFD,press the SELECT button to select the AC voltage measurement, and then connect the test lead to the power supply or load to be measured.
3) Read the true RMS value of the AC voltage from the display.
4) In the AC voltage range, the VFD low-pass filter function can be selected by pressing SELECT to measure the composite sinusoidal signal generated by the inverter and inverter motor, as shown below (Figure 6).

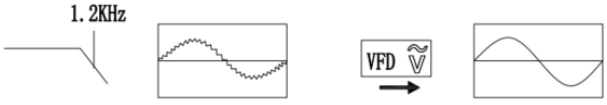


Figure 6

5) Short press the Hz% button to select frequency measurement, and read the frequency value of the current measured voltage from the display.

⚠ Warning：

- Input coupling mode: AC coupling
- The input impedance of the Meter is about 10 MΩ, and the measurement error will be caused when the Meter measures the high-impedance circuit. However, in most cases, the circuit impedance is less than 10kΩ, so the error (0.1% or less) is negligible.
- Do not measure the input voltage that is out of range.
- When measuring high voltages, special care should be taken to avoid electric shock.
- When the measured voltage is > 30V, the high-voltage alarm symbol is displayed; if the measuring voltage is > 1000V in autorange mode, it will turn on a red light alarm.
- After all the measurement operations are completed, the test lead should be disconnected from the circuit under test.

3. DC voltage measurement（Figure 7）

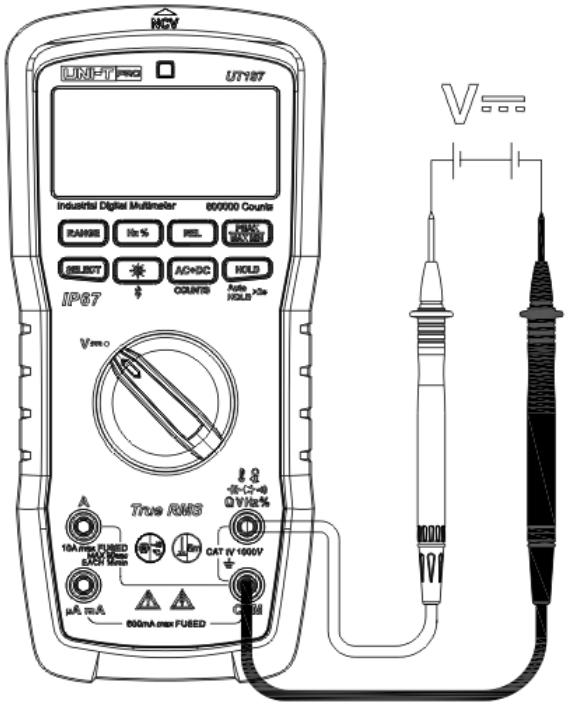


Figure 7

1) Connect the red test lead to the "V" terminal and the black test lead to the "COM" terminal.
2) Set the rotary switch to V⎓, and then connect the test lead in parallel to the power supply or load to be measured.
3) Read the DC voltage value from the display.

4) Long press the "AC+DC COUNTS" button to enter the high-resolution 600000-count display mode, and long press again to exit the high-resolution display mode.

5) Short press the "AC+DC COUNTS" button to enter the AC+DC measurement display mode, short press again to select AC+DC->DC->AC. Long press to exit the AC+DC mode.

⚠ Warning：

- For AC+DC measurement function, no analog bar is displayed and the display count is 6000.
- The input impedance of the Meter is about 10 MΩ, and the measurement error will be caused when the Meter measures the high-impedance circuit. However, in most cases, the circuit impedance is less than 10kΩ, so the error (0.1% or less) is negligible.
- Do not measure the input voltage that is out of range.
- When measuring high voltages, special care should be taken to avoid electric shock.
- When the measured voltage is >30V, the high-voltage alarm symbol is displayed; if the measured voltage is ＞1000V in autorange mode, it will turn on a red light alarm.
- After all measurement operations have been completed, the test lead should be disconnected from the circuit under test.

4. AC mV measurement（Figure 8）

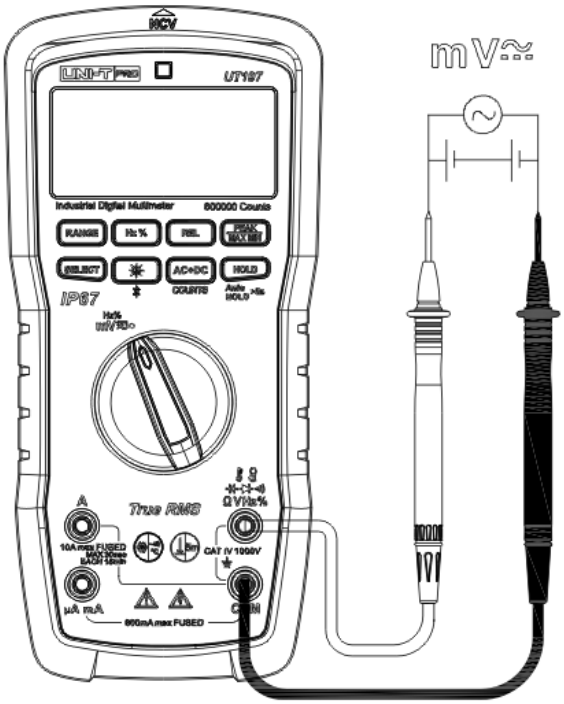


Figure 8

1) Connect the red test lead to the "V" terminal and the black test lead to the "COM" terminal.

2) Set the rotary switch to Hz% mV, press the SELECT button to select the AC mV voltage measurement, and then connect the test lead in parallel to the power supply or load to be measured.

3) Read the true RMS value of the AC mV voltage from the display.

4) Short press the Hz% button to select the frequency or duty cycle measurement, and read the frequency value or duty cycle value of the current measured voltage from the display.

⚠ Warning：

- Do not measure the input voltage that is out of range.
- When measuring high voltages, special care should be taken to avoid electric shock.
- After all the measurement operations are completed, the test lead should be disconnected from the circuit under test.

5. DC mV measurement（Figure 8）

1) Connect the red test lead to the "V" terminal and the black test lead to the "COM" terminal.

2) Set the rotary switch to Hz% mV, press the SELECT button to select the DC mV voltage measurement, and then connect the test lead in parallel to the power supply or load to be measured.

3) Read the DC voltage value from the display.

4) Long press the "AC+DC COUNTS" button to enter the high-resolution 600000-count display mode, and long press again to exit the high-resolution display mode.

5) Short press the "AC+DC COUNTS" button to AC+DC measurement display mode, and short press again to select AC+DC->DC->AC. Long press to exit the AC+DC mode.

⚠ Warning：

- For AC+DC measurement function, no analog bar is displayed and the display count is 6000.
- Do not measure the input voltage that is out of range.
- When measuring high voltages, special care should be taken to avoid electric shock.
- After all the measurement operations are completed, the test lead should be disconnected from the circuit under test.

6. Continuity measurement（Figure 9）

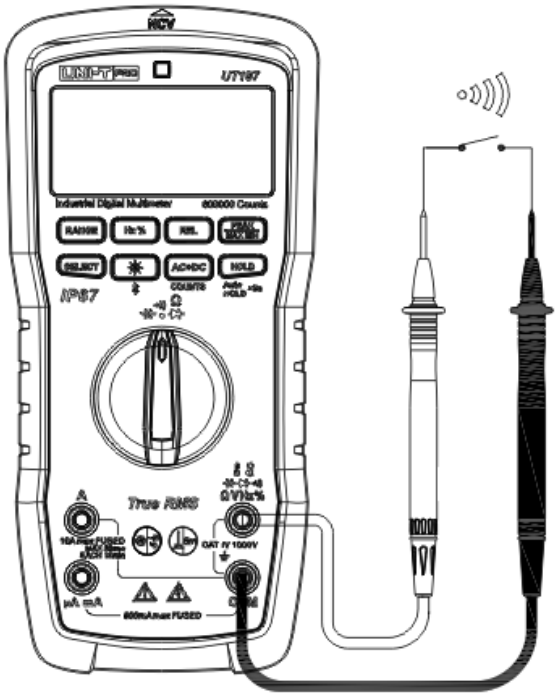


Figure 9

1) Connect the red test lead to the "V" terminal and the black test lead to the "COM" terminal.

2) Set the rotary switch to “  ”, short press the SELECT button to switch to the  continuity measurement, and then connect the test lead in parallel to both ends of the load of the circuit under test.

3) Read the resistance value of the load of the circuit under test directly from the display.

⚠ Warning：

- If the resistance between the two ends of the test is ≤ 20Ω, the buzzer will sound for a long time.
- When checking the continuity of the online circuit, all power supplies in the tested circuit must be turned off before measurement, and all capacitors must be discharged completely.
- For measuring circuit continuity, the open-circuit voltage is about 2V.
- Do not input voltage higher than DC/AC 30V to avoid personal safety.
- After all the measurement operations are completed, the test lead should be disconnected from the circuit under test.

7. Resistance measurement（Figure 10）

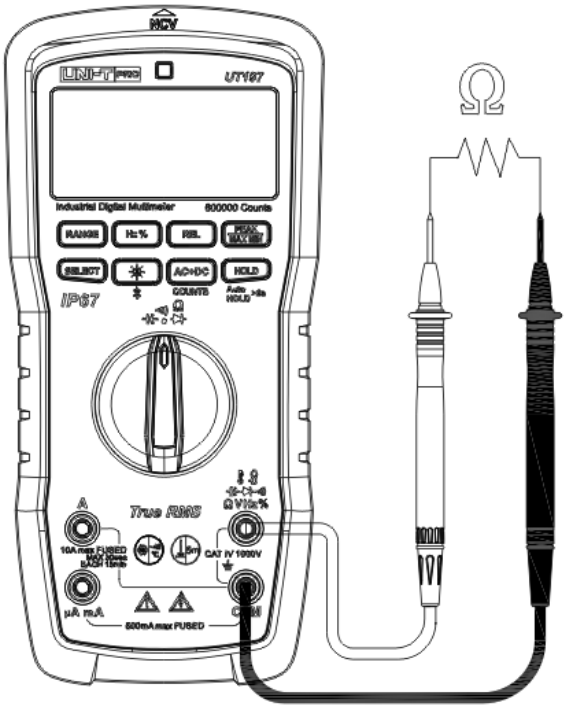


Figure 10

1) Connect the red test lead to the "V" terminal and the black test lead to the "COM" terminal.

2) Set the rotary switch to "  ", short press the SELECT button to switch to the resistance measurement, and then connect the test lead in parallel to both ends of the load of the circuit under test.

3) Read the resistance value of the load of the circuit under test directly from the display.

⚠ Warning：

- If the measured resistor is open or the resistance value exceeds the maximum range of the Meter, "OL" will be displayed.
- When measuring the in-line resistance, all power supplies in the circuit under test must be turned off before measurement, and all capacitors must be discharged completely.
- If the resistance is not less than 0.5Ω when the test lead is shorted, please check whether the watch pen is loose or other reasons.
- When measuring resistance of 1 MΩ or more, it may take a few seconds for the reading to stabilize. This is normal for high-impedance measurements.
- Do not input voltage higher than DC/AC 30V to avoid personal safety.
- After all the measurement operations are completed, the test lead should be disconnected from the circuit under test.

8. Diode measurement（Figure 11）

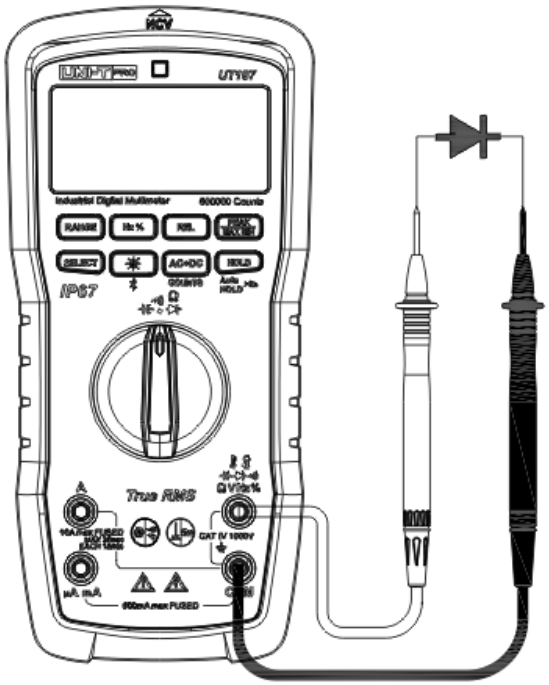


Figure 11

1) Connect the red test lead to the "V" terminal and the black test lead to the "COM" terminal.

2) Set the rotary switch to“  ”, short press the SELECT button to switch to the diode measurement, and then connect the test lead in parallel to both ends of the test diode. The red test lead is connected to the positive pole of the test diode, and the black test lead is connected to the negative end of the diode.

3) Read the approximate forward PN junction voltage of the diode under test directly from the display. The normal voltage of silicon PN junctions is generally about 0.5～0.8V.

⚠ Warning：

- < 0 .12V: The buzzer sounds for a long time; >=0.12v and <2V: the buzzer sounds once.
- If the diode under test is open or the polarity is reversed, "OL" is displayed.
- When measuring an in-line diode, all power supplies in the circuit under test must be turned off and all capacitors must be discharged completely before measurement.
- The open-circuit voltage of the diode test is about 3.2V.
- Do not input voltage higher than DC/AC 30V to avoid personal safety.
- After all the measurement operations are completed, the test lead should be disconnected from the circuit under test.

9. Capacitance measurement（Figure 12）

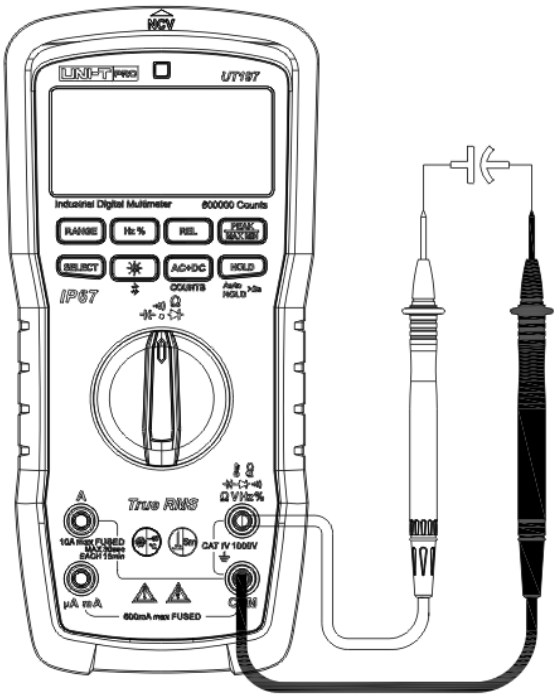


Figure 12

1) Connect the red test lead to the "V" terminal and the black test lead to the "COM" terminal.

2) Set the rotary switch to "  ", short press the SELECT button to switch to the capacitance measurement, and then connect the test lead in parallel to both ends of the capacitance being measured.

3) Read the measured capacitance value directly from the display.

⚠ Warning：

- For measured capacitance less than 100nF, REL mode is recommended.
- If the measured capacitance is short-circuited or the capacitance value exceeds the maximum range of the Meter, "OL" will be displayed.
- All capacitors must be discharged completely before measurement, especially for capacitors with high voltage, to avoid damage to the Meter and personal safety.
- After the measurement operation is completed, please disconnect the test lead from the measured capacitor.

10. Current probe (ACA/DCA) measurement（Figure 13）

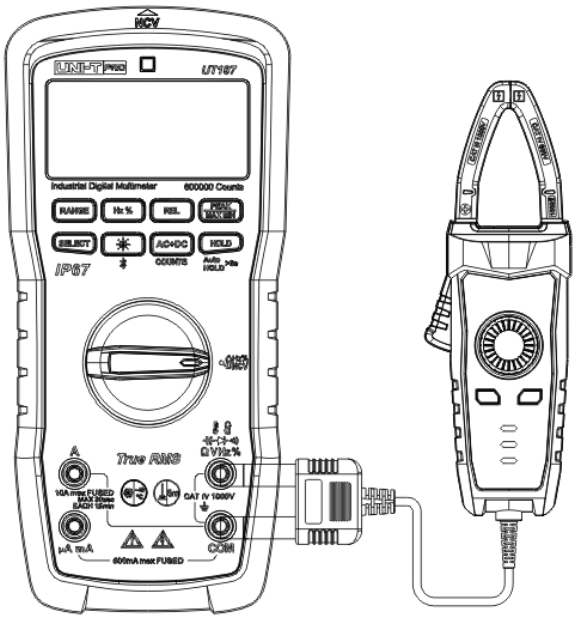


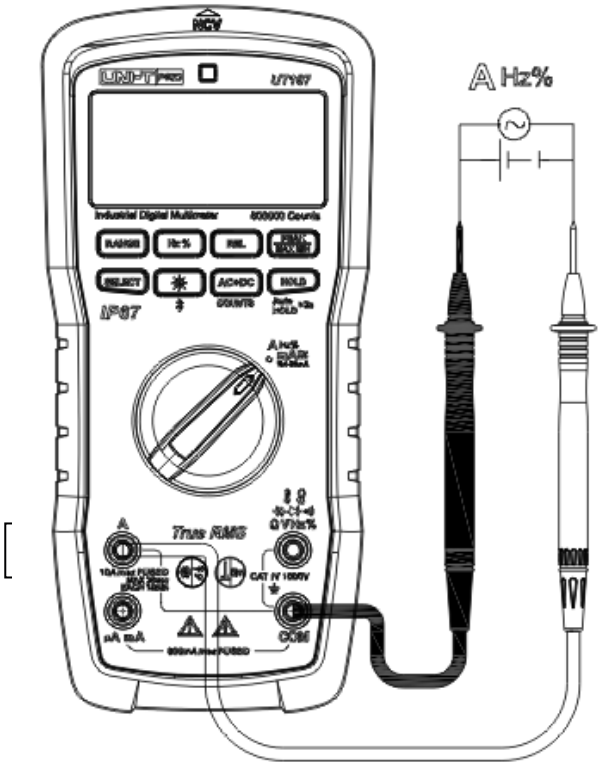
Figure 13

1) Connect the red test lead to the "V" terminal and the black test lead to the "COM" terminal.
2) Set the rotary switch to "Hz% NCV", short press the SELECT button to switch to ACA or DCA measurement, press the RANGE button to select the current probe range 100A (10mV/A) and 1000A (1mV/A), and then clamp the current probe to the conductor to be measured.
3) Read the current value of the current probe directly from the display.
4) At ACA position of the current probe, short press the Hz% button to select frequency or duty cycle measurement, and read the frequency value or duty cycle value of the measured current from the display.

⚠ Warning：

- To ensure the accuracy of the measurement data, the conductor to be measured must be located in the center of the current probe, and if it is not placed in the center of the current probe, it will cause an additional error of ±1.0% of the reading.
- After the measurement operation is completed, the current probe should be disconnected from the Meter.

11. AC/DC A measurement（Figure 14）



1) Set the rotary switch to “A Hz% mA 4-20mA”, connect the red test lead to “A” terminal and the black test lead to “COM” terminal. When connected to“A” terminal, the Meter will automatically switch to A measurement position, then short press the SELECT button to switch to ACA or DCA measurement position.

2) Connect the test lead in series to the circuit to be measured, read the measured current value directly from the display. The AC current measurement is displayed as the true RMS value.

3) In ACA mode, short press the Hz% button to select the frequency or duty cycle measurement, and read the frequency value or duty cycle value of the measured current from the display.

4) Short press the “AC+DC COUNTS” button to enter the AC+DC measurement display mode, short press again to select AC+DC->DC->AC, and long press to exit the AC+DC mode.

⚠ Warning：

- Before measurement, please check whether the fuse of the Meter is in good condition. The detection method is as follows:
  When switching to the non-current positions, connect the test lead to the "A" terminal, if the alarm prompt for misconnection is displayed, the 11A fuse is in good condition, otherwise the fuse is damaged.
- Before the Meter is connected in series to the circuit to be measured, the current in the circuit should be turned off, otherwise there is a risk of sparks.

- Correct terminal, functional position and range must be used for measurement.
- When measuring a current greater than 10A, for safe use, the measurement time should be less than 30 seconds each time, and the interval time should be greater than 15 minutes.
- When the test lead is plugged into the current input port, do not connect the test lead in parallel to any circuit, which will blow the internal fuse of the Meter and damage the Meter.
- After all the measurement operations are completed, please disconnect the measured current source before disconnecting the test leads from the measured circuit.

12. AC/DC mA measurement（Figure 15）

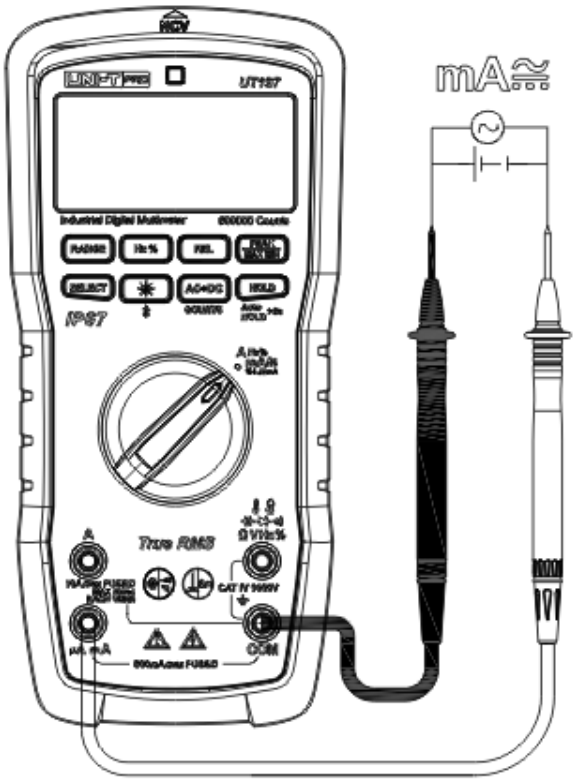


Figure 15

1) Set the rotary switch to“A Hz% mA≂ %4-20mA”, connect the red test lead to “uA mA” terminal and the black test lead to “COM” terminal. When connected to “uA mA” terminal, the Meter will automatically switch to mA measurement position, then short press the SELECT button to switch to ACmA or DCmA measurement position.
2) Connect the test lead in series to the circuit to be measured, read the measured current value directly from the display. The AC current measurement is displayed as the true RMS value.
3) In ACmA position, short press the Hz% button to select the frequency or duty cycle measurement, and read the frequency value or duty cycle value of the measured current from the display.
4) Short press the “AC+DC COUNTS” button to enter the AC+DC measurement display mode, short press again to select AC+DC->DC->AC, and long press to exit the AC+DC mode.

5) Short press the SELECT button to switch to %4-20mA measurement function to display the current conversion ratio, the formula is as follows:

Displayed value %＝（Measured current－4mA）/(20mA-4mA)

⚠ Warning：

●Before measurement, please check whether the fuse of the Meter is in good condition. The detection method is as follows:

When switching to the non-current position, connect the test lead to the "uA mA" terminal, if the alarm prompt for misconnection is displayed, the 600mA fuse is in good condition, otherwise the fuse is damaged.

● Before the Meter is connected in series to the circuit to be measured, the current in the circuit should be turned off, otherwise there is a risk of sparks.

● Correct terminal, functional position and range must be used for measurement

● When the test lead is plugged into the current input port, do not connect the test lead in parallel to any circuit, which will blow the internal fuse of the Meter and damage the Meter.

● After all the measurement operations are completed, please disconnect the measured current source before disconnecting the test leads from the measured circuit.

13. AC/DC uA measurement（Figure 16）

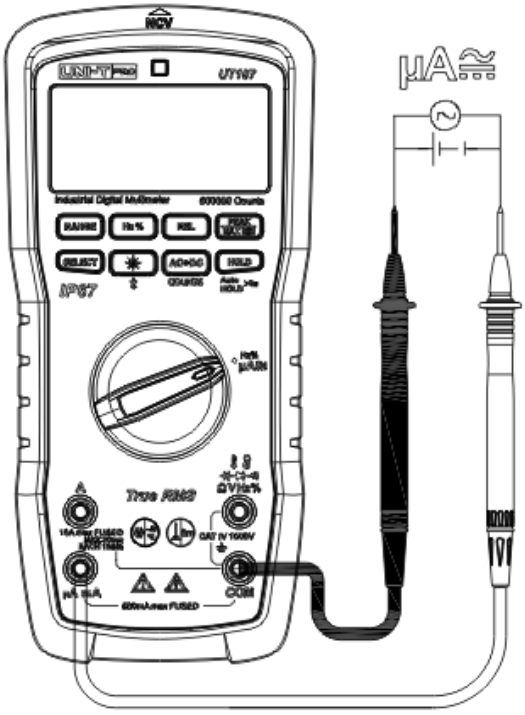


Figure 16

1) Set the rotary switch to“Hz% μA≂”, connect the red test lead to “uA mA” terminal and the black test lead to “COM” terminal. Then short press the SELECT button to switch to ACuA or DCuA measurement position.

2) Connect the test lead in series to the circuit to be measured, read the measured current value

directly from the display. The AC current measurement is displayed as the true RMS value.

3) In ACuA position, short press the Hz% button to select the frequency or duty cycle measurement, and read the frequency value or duty cycle value of the measured current from the display.

4) Short press the "AC+DC" button to enter the AC+DC measurement display mode, short press again to select AC+DC->DC->AC, and long press to exit the AC+DC mode.

⚠ Warning：

- Before measurement, please check whether the fuse of the Meter is in good condition. The detection method is as follows:
  When switching to the non-current position, connect the test lead to the "uA mA" terminal, if the alarm prompt for misconnection is displayed, the 600mA fuse is in good condition, otherwise the fuse is damaged.
- Before the Meter is connected in series to the circuit to be measured, the current in the circuit should be turned off, otherwise there is a risk of sparks.
- Correct terminal, functional position and range must be used for measurement.
- When the test lead is plugged into the current input port, do not connect the test lead in parallel to any circuit, which will blow the internal fuse of the Meter and damage the Meter.
- After all the measurement operations are completed, please disconnect the measured current source before disconnecting the test leads from the measured circuit.

14. Temperature measurement（Figure 17）

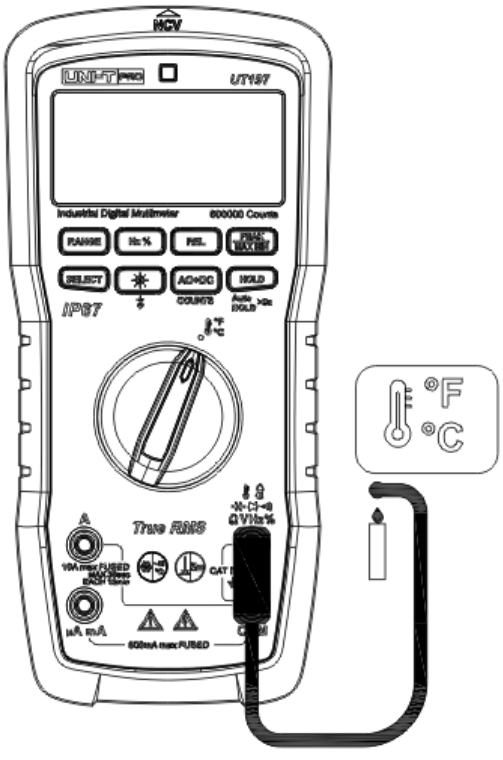


Figure 17

1) Set the rotary switch to "°F °C", then the LCD will show OL. The room temperature will be displayed if the test lead is shorted.
2) Insert the temperature K-type plug into the corresponding hole as shown in the diagram.
3) Use the temperature probe to detect the surface of the measured temperature and reads the measured Celsius temperature directly from the LCD.
4) Press the SELECT button to select Celsius or Fahrenheit temperature.

⚠ Warning：

● The temperature probe fitting is a point-type K-type (nickel-chromium~nickel-silicon) thermocouple, which is only suitable for measurements below 230°C.

15. NCV (Non-contact AC voltage sensing)（Figure 18）

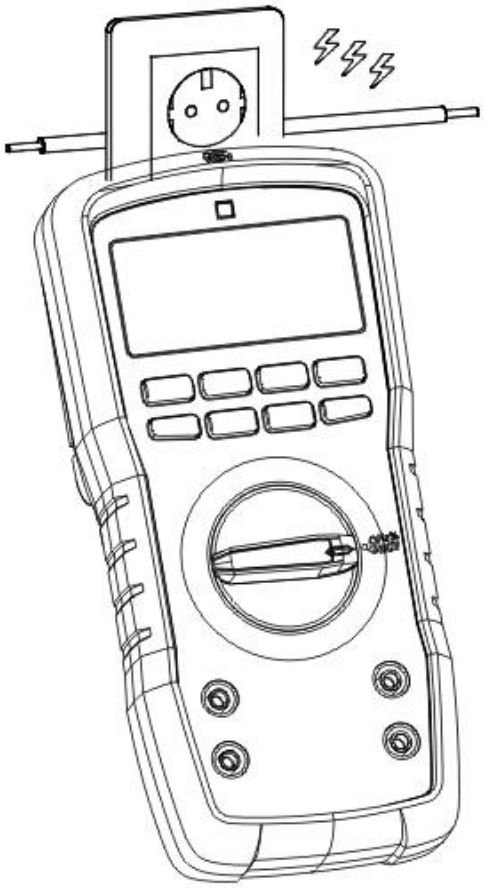


Figure 18

1) Set the rotary switch to "Hz% NCV", then short press the SELECT button to switch to the NCV position.
2) When the sensing end is close to a live electric field such as a socket or insulated wire, the buzzer will sound for a long time and the red light will be lit.

⚠ Warning：

- Please make the NCV sensing end close to the measured electric field, otherwise the measurement sensitivity will be affected.
- When the voltage of the measured electric field is greater than 100V AC, please pay attention to observe whether the conductor of the measured electric field is insulated to avoid injury to personal safety.

16. Descriptions of other functions

1) Disable auto-off function

Hold the "Select" button to disable the automatic shutdown function when the power is turned on, then the buzzer sounds 5 times continuously, and the LCD will not display the "" symbol at the same time.

2) Alarm for misconnecting test leads

If the test lead is plugged into the mA/μA or A terminal, but the rotary switch is not set to the correct current position, the buzzer will give a beep warning and the display will flash to show "InErr". This warning sound is designed to prevent you from testing voltage, continuity, resistance, capacitance, diode, temperature, or current probe while the test lead is plugged into the current input terminal.

3)Wake-up function

In sleep mode, all buttons and rotary switch can wake up the Meter.

4)Automatic backlight function

When the auto backlight function is turned on, the LCD will display the " BL " symbol. The Meter will automatically turn on the backlight in dim environments and in places where the object is not clearly distinguished, and turn off the backlight in bright conditions.

Note: When taking measurement from a dark environment to a bright environment, the backlight will turn off in about one minute.

12、Technical Specifications

Accuracy：± (a% reading + b digit), the warranty period is one year.

Ambient temperature：23℃±5℃

Relative humidity：<75%

⚠ Warning:

Temperature condition of accuracy measurement: For 18°C to 28°C, the ambient temperature fluctuation range is stable within ±1°C. At a temperature < 18 °C or > 28 °C, a temperature coefficient error of 0.1 x (specified accuracy)/°C is added.

1. Auto-V LoZ (Automatic AC/DC voltage)

Range	Resolution	Frequency response	Accuracy±(a% reading + b digit)	Overload protection
600.0V	0.1V	DC	±(0.8%+5）	1000Vrms
		45Hz～1kHz	±(0.8%+5）	

- Input impedance: About 2KΩ
- Accuracy guarantee range：10%～100% of range
- Auto-V LoZ, the AC or DC voltage is automatically selected based on the low impedance input inducted.

2. AC voltage

Range	Resolution	Frequency response	Accuracy±(a% reading + b digit)	Overload protection
600.00mV	0.01mV	45～1kHz	±(0.3%+20）	1000Vrms
		1k～5kHz	±(0.4%+20）	
		5k～20kHz	±(0.5%+30）	
		20k～100kHz	±(2.5%+40）	
6.0000V	0.0001V	45～1kHz	±(0.4%+30）	
		1k～5kHz	±(0.5%+40）	
		5k～20kHz	±(0.7%+40）	
		20k～100kHz	±(4.0%+40）	
60.000V	0.001V	45～1kHz	±(0.4%+30）	
		1k～5kHz	±(0.5%+40）	

		5k～20kHz	±(0.7%+40）
		20k～100kHz	±(4.0%+40）
600.00V	0.01V	45～1kHz	±(0.4%+30）
		1k～5kHz	±(0.5%+40）
		5k～20kHz	±(0.7%+40）
		20k～100kHz	Unspecified
1000.0V	0.1V	45～1kHz	±(0.5%+40）
		1k～5kHz	±(0.8%+40）
		5k～20kHz	Unspecified
		20k～100kHz	Unspecified

- Displaying TRMS value
- Input impedance: ≥10MΩ. Input coupling mode: ACV is AC coupling
- To ensure accuracy, the input signal is required to be 5%-100% (45~5kHz) and 10%-100% (>5kHz) of the current range.

  Note: 10% to 15% of range: 80 counts for accuracy: (>1kHz)
- The AC crest factor can reach 3 at 30,000 counts. By 60,000 counts it drops to about 1.5. For non-sinusoidal waveforms, the additional error is increased by ±2.0 %.
- When measuring the frequency in the voltage range, the reading frequency value must require the input signal to be greater than 10% of the current range, and the reading duty cycle value provides a reference.
- VFD: 1kHz 3db attenuation. Frequency: 45Hz~200Hz. Additional error: ± 2.0%. Count: 6000.

3 .DC voltage

60000 counts:

Range	Resolution	Remark	Overload protection
600.00mV	0.01mV	±(0.03%+5）	1000Vrms
6.0000V	0.0001V	±(0.03%+5）	
60.000V	0.001V	±(0.03%+5）	
600.00V	0.01V	±(0.04%+5）	
1000.0V	0.1V	±(0.15%+5）	

600000 counts:

Range	Resolution	Remark	Overload protection
600.000mV	0.001mV	±(0.015%+10）	1000Vrms
6.00000V	0.00001V	±(0.015%+10）	
60.0000V	0.0001V	±(0.015%+10）	
600.000V	0.001V	±(0.015%+10）	
1000.00V	0.01V	±(0.08%+10）	

●Input impedance: ≥10MΩ

● To ensure accuracy, the input signal shall be 1%-100% of the current range.

● For 600.00mV,the accuracy is guaranteed by using the Relative Mode (REL) function to compensate for short-circuit bias.

4. AC+DC voltage

Range	Resolution	Frequency response	Accuracy ±(a% reading + b digit)	Overload protection
600.0mV	0.1mV	45～1kHz	±(0.8%+5）	1000Vrms
		1k～5kHz	±(1.0%+8）	
		5k～20kHz	±(2.0%+8）	
		20k～40kHz	±(4.0%+8）	
6.000V	0.001V	45～1kHz	±(0.8%+5）	
		1k～5kHz	±(1.0%+8）	
		5k～20kHz	±(2.0%+8）	
		20k～40kHz	±(4.0%+8）	
60.00V	0.01V	45～1kHz	±(0.8%+5）	
		1k～5kHz	±(1.0%+8）	
		5k～20kHz	±(2.0%+8）	
		20k～40kHz	±(4.0%+8）	
60000V	0.1V	45～1kHz	±(0.8%+5）	
		1k～5kHz	±(1.0%+8）	
		5k～20kHz	±(2.0%+8）	
1000V	1V	45～1kHz	±(0.8%+5）	
		1k～5kHz	±(2.0%+8）	

● Input impedance: ≥10MΩ

●To ensure the accuracy, the input signal is required to be 10%-100% of the current range, and the index is only defined for pure DC voltage and pure AC voltage signals, and the mixed signal is calculated according to the formula $\sqrt{ac^2 + dc^2}$

Note: 10% to 15% of range: 80 counts are added for accuracy: (〉1kHz)

● 6000-count; without analog bar displayed.

5. Resistance

Range	Resolution	Remark	Overload protection
600.00Ω	0.01Ω	±(0.07%+10〉	1000Vrms
6.0000kΩ	0.0001kΩ	±(0.07%+2〉	
60.000kΩ	0.001kΩ	±(0.1%+2〉	
600.00kΩ	0.01kΩ	±(0.1%+2〉	
6.0000MΩ	0.0001MΩ	±(0.3%+6〉	
60.00MΩ	0.01MΩ	±(2.0%+6〉	

● For 60MΩ: Humidity is <50%

● For 60M: 6000 counts; for other ranges: 60000 counts

● To ensure accuracy, the input signal shall be 1%-100% of the current range.

Note: 1% to 10% of range: 3 counts are added for accuracy.

6. Capacitance

Range	Resolution	Remark	Overload protection
60.00nF	0.01 nF	±(0.8%+15〉	1000Vrms
600.0nF	0.1 nF	±(0.8%+3〉	
6.000uF	0.001uF	±(1.5%+3〉	
60.00uF	0.01 uF	±(2.5%+3〉	
600.0uF	0.1uF	±(3.5%+3〉	
6.000mF	0.001mF	±(5.0%+5〉	
60.00mF	0.01mF	±(6.5%+5〉	

●6000 counts

●To ensure accuracy, the input signal shall be 5%-100% of the current range.

●If the measured capacitance is ≤ 100nF, it is recommended to use REL mode for measurement.

7. Continuity

Range	Resolution	Remark	Overload protection
600.00Ω	0.01Ω	Circuit disconnected: Resistance value is set at about ≥150Ω (the buzzer keeps silent) Circuit connected: Resistance value set at about ≥150Ω (the buzzer sounds)	1000Vrms

●Open-circuit voltage is about 2 V.

●If the circuit resistance is between 20Ω~150Ω, the buzzer may sound or not.

8. Diode

Range	Resolution	Remark	Overload protection
3.0000V	0.0001V	The forward voltage of silicon PN junction is about 0.5V~0.8V	1000Vrms

9. AC current

Range	Resolution	Frequency response	Accuracy ±(a% reading + b digit)	Overload
600.00uA	0.01uA	45～1kHz	±(0.5%+50)	Fuses F 0.6A H 1000V
		1k～5kHz	±(0.7%+50)	
		5k～10kHz	±(2.0%+50)	
6000.0uA	0.1uA	45～1kHz	±(0.5%+50)	
		1k～5kHz	±(0.7%+50)	
		5k～10kHz	±(2.0%+50)	
60.000mA	0.001mA	45～1kHz	±(0.5%+50)	
		1k～5kHz	±(0.7%+50)	
		5k～10kHz	±(2.0%+50)	
600.00mA	0.01mA	45～1kHz	±(0.5%+50)	
		1k～5kHz	±(0.7%+50)	
		5k～10kHz	±(2.0%+50)	
6.0000A	0.0001A	45～1kHz	±(0.5%+50)	Fuses F 11A H 1000V
		1k～5kHz	±(0.7%+50)	
		5k～10kHz	Unspecified	
10.000A	0.001A	45～1kHz	±(0.5%+50)	

		1k～5kHz	±(0.7%+50）	
		5k～10kHz	Unspecified	

- To ensure accuracy, the input signal shall be 5%-100% of the current range
- For 10A to 20 A, maximum continuous measurement time is 30 seconds, then stop measurement for 15 minutes at least; For> 10.00 A, for reference only; for > 20 A, OL is displayed.
- The AC crest factor can reach 3 at 30,000 counts. By 60,000 counts it drops to about 1.5. For non-sinusoidal waveforms, the additional error is increased by ±2.0 %.
- When measuring the frequency in the current range, the reading frequency value must require the input signal to be greater than 10% of the current range, and the reading duty cycle value provides a reference.

10. DC current

Range	Resolution	Accuracy ±(a% reading + b digit)	Overload protection
600.00uA	0.01uA	±(0.15%+20）	Fuses F 0.6A H 1000V
6000.0uA	0.1uA	±(0.1%+20）	
60.000mA	0.001mA	±(0.15%+20）	
600.00mA	0.01mA	±(0.15%+30）	
6.0000A	0.0001A	±(0.5%+20）	Fuses F 11A H 1000V
10.000A	0.001A	±(0.5%+20）	

- For 10A to 20 A, maximum continuous measurement time is 30 seconds, then stop measurement for 15 minutes at least; For> 10.00 A, for reference only; for > 20 A, OL is displayed.
- 1%-100%To ensure accuracy, the input signal shall be 1%-100% of the current range.

11. % 4-20mA

Range	Resolution	Remark	Overload protection
% 4-20mA	0.01%	The accuracy is determined by the accuracy of DC 60mA.	Fuses F 0.6A H 1000V

- Displayed value %=(measured current value-4mA)/(20mA-4mA)

12. AC+DC current

Range	Resolution	Frequency response	Accuracy±(a% reading + b digit)	Overload protection
600.0uA	0.1uA	45～1kHz	±(1.0%+5）	Fuses F 0.6A H 1000V
		1k～5kHz	±(1.5%+8）	
		5k～10kHz	±(2.5%+8）	
6000uA	1uA	45～1kHz	±(1.0%+5）	
		1k～5kHz	±(1.5%+8）	
		5k～10kHz	±(2.5%+8）	
60.00mA	0.01mA	45～1kHz	±(1.0%+5）	
		1k～5kHz	±(1.5%+8）	
		5k～10kHz	±(2.5%+8）	
600.0mA	0.1mA	45～1kHz	±(1.0%+5）	
		1k～5kHz	±(1.5%+8）	
		5k～10kHz	±(2.5%+8）	
6.000A	0.001A	45～1kHz	±(1.0%+5）	Fuses F 11A H 1000V
		1k～5kHz	±(1.5%+8）	
10.00A	0.01A	45～1kHz	±(1.0%+5）	
		5k～10kHz	±(1.5%+8）	

- To ensure the accuracy, the input signal is required to be 10%-100% of the current range, and the index is only defined for pure DC current and pure AC current signals, and the mixed signal is calculated according to the formula $\sqrt{ac^2 + dc^2}$
- 6000-count; without analog bar displayed.

13. Frequency

Range	Resolution	Accuracy±(a% reading + b digit)	Overload protection
10Hz ～ 1MHz	0.01Hz～ 1kHz	±(0.002%+5）	1000Vrms

- Input amplitude:

  10Hz～1MHz：600mV≤ input amplitude ≤30Vrms
- For mV position, select the frequency by Hz%.

14. Duty cycle

Range	Resolution	Accuracy±(a% reading + b digit)	Overload protection
10%~90%	0.1%	±(1.2%+5）	1000Vrms

- Duty cycle is only available for square wave measurements, and the input amplitude shall be: 10Hz～10kHz：1Vpp≤input amplitude≤20Vpp;
- For mV position, select the duty cycle by Hz%.

15. Temperature

Range	Resolution	Accuracy±(a% reading + b digit)	Overload protection
-40℃~40℃	0.1℃	±(1.0%+30）	1000Vrms
40℃~400℃		±(1.0%+15）	
400℃~1000℃		±(1.0%+15）	
-40°F ~104°F	0.1°F	±(1.0%+60）	
104°F ~752°F		±(1.0%+30）	
752°F ~1832°F		±(1.0%+30）	

- Measure temperature by using a Type K thermocouple.

16. AC/DC current probe

Range	Resolution	Frequency response	Accuracy±(a% reading + b digit)	Overload protection
100.0A (10mV/A)	0.1A	DC 45Hz~400Hz	±(1.5%+5）	1000Vrms
1000A (10mV/A)	1A	DC 45Hz~400Hz	±(2.0%+5）	

- Current range：1A-1000A
- To ensure accuracy for DCA, the input signal shall be 1%~100% of the current range.
- To ensure accuracy for ACA, the input signal shall be 5%~100% of the current range.
- If deviating from the center of the clamp, an additional error of ±2.0% of the reading is added to the specified accuracy.

17. NCV (Non-contact AC voltage sensing)

Range	Remark
NCV	Inductive signal frequency: 50∽60Hz Voltage <30V is not detected: “EF” is displayed. Voltage >100V is detected: "----- " is displayed, and audible and visual alarm is triggered.

13. Bluetooth Software Operation

1. Introduction

UNI-T Smart Measure is a mobile APP, currently supporting mobile phones running on the operating systems of iOS 10.0 or newer and Android 5.0 or newer. Other operating systems are subject to the actual release of the application software.

2. Download UNI-T Smart Measure (iDMM2.0)

① For Android

Method 1: Search “UNI-T Smart Measure” at “Google Play”.

Method 2: Turn on the scanning function of "Google Play", then scan the QR code below.

② For IOS

Method 1: Search "UNI-T Smart Measure" at "App Store".

Method 2: Turn on the scanning function of mobile phone, then scan the QR code below.

For Android

For iOS

3. Use

3.1) Open the Bluetooth functions of both the Clamp Meter and mobile phone, tap the “UNI-T Smart Measure” APP icon on your phone desktop to open the software, then the software enters the navigation interface and searches nearby Bluetooth-enabled meters automatically. After that, select the corresponding meter and make connection. Alternatively, scan the QR code at the meter to make direct connection. In connected state, data communication, measurement result display, button control and other operations can be achieved.

3.2) The “UNI-T Smart Measure” APP has multiple functions including Bluetooth communication, data recording, device management, report generation, data sharing, data synchronizing, and more. For the operating instructions about these functions, please refer to the “UNI-T Smart Measure” User Manual (In the APP, tap the menu button, “Setting” button, and then “Help Guide” button for the User Manual).

4. Uninstallation

Uninstall the software through the uninstallation function of mobile phone.

14、Maintenance and Repair

Warning：Before opening the back cover of the Meter, you should make sure that the power is turned off, and the test leads have been removed from the input terminals and the circuit under test.

1. General maintenance and repair

● For maintenance, please use a damp cloth and mild detergent to clean the Meter housing, and do not use abrasives or solvents.

● If there is any abnormality in the Meter, stop use and send it for maintenance.

● The calibration and repair should be performed by qualified professional maintenance personnel or designated service center.

2. Replace the battery or fuse (Figure 19)

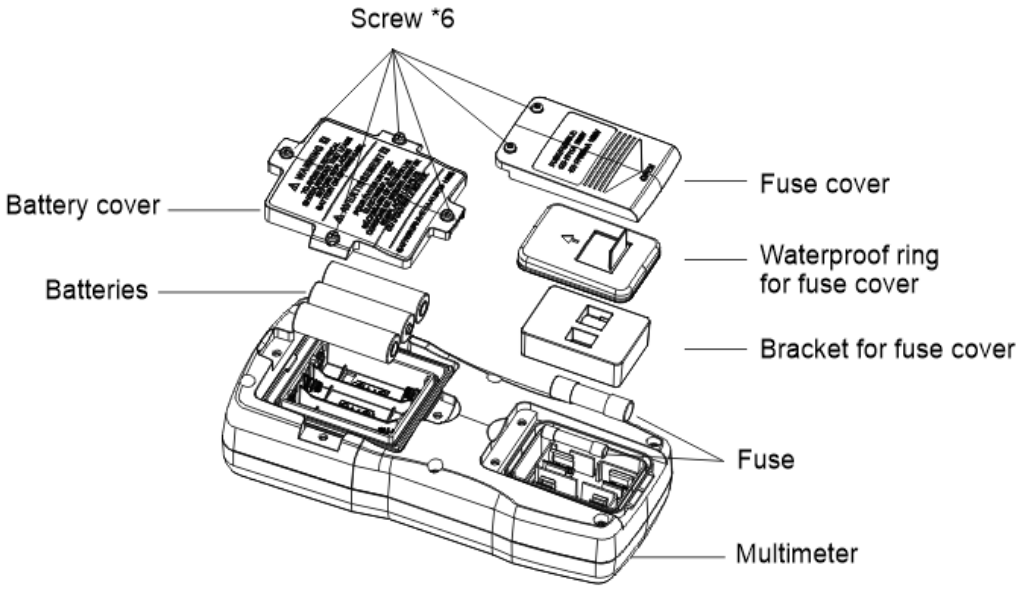


Figure 19

1) When the LCD shows the undervoltage "" symbol, the built-in battery should be replaced immediately, otherwise the measurement accuracy will be affected. Battery specification: AA 1.5Vx3.

● Set the power switch to the "OFF" position and remove the test lead from the input terminal.

● Battery replacement: Loosen the 4 screws fixed on the battery cover (top) with a screwdriver, remove the battery cover, and the battery can be replaced; Pay attention to the positive and negative

polarities when installing a new battery.

⚠ Warning：

Do not mix old and new batteries, do not mix alkaline, carbon, rechargeable batteries.

2) When the voltage is mismeasured or the overcurrent burns out the fuse during operation, some functions of the product cannot work normally, and the fuse should be replaced immediately.

- Set the power switch to the "OFF" position and remove the test lead from the input terminal.
- Use a screwdriver to loosen the 2 screws fixed on the back cover and remove the back cover, and then replace the fuse that has been blown out:

Fuse specifications：F1 Fuse 600mA/1000V Φ10×35mm, breaking capacity: 10KA, ceramic tube

F2 Fuse 11A/1000V Φ10×38mm, breaking capacity: 30KA, ceramic tube

3）Replace the test lead

If insulation on test lead is damaged, replace a new one which should meet IEC/EN 61010-031 standard, rated follow parameters of the product or better.

4）Replace the Current sensor

If insulation on sensor is damaged, replace a new one which should meet IEC/EN 61010-2-032 standard, rated follow parameters of the product or better.

The contents of this manual are subject to change without notice

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