UT197PV
Professional Multimeter-Solar Pro
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 "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 access 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, then send the product to the service center with a description of the problem with the product.
This warranty 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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一、 Overview

UT197PV is a 6000-count true RMS handheld digital multimeter designed with power measurement function. 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), UT197PV meets the needs of users in humid, sandy, cold and other harsh 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

二、 Features

1) Protection level: IP67
2) Safety class: CAT IV 1000V, CAT III 1500V
3) Withstands drops of up to 5 m (concrete floor at 25 °C)
4) Heat- and cold-resistant, with a wide operating temperature range from -40 °C (can last up to 20 minutes) to +55 °C
5) True RMS measurement, which can accurately measure the AC voltage of nonlinear signals.
6) Measure up to 1500 V AC and up to 2500 V DC
7) Automatically identifies DC or AC voltages at low impedance, while preventing incorrect readings caused by false voltages.
9) The low-pass filter (VFD) function ensures accurate voltage and frequency measurement of variable speed drive (VSD).
9) Resistance, continuity, frequency, and capacitance measurements
10) Min/Max to record signal fluctuations; 250uS peak capture
11) Auto backlight and fluorescent buttons for improved visibility
12) UT-CS07 plug-in AC/DC current sensor (current range: 100A/1000A), which can measure DC power, AC power and power factor.
13) With Bluetooth communication function, the test results are recorded and reported through the APP “Uni-Trend Smart Measure”, and significant graphs and tables are generated.

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三、Unpack to check

This user manual includes relevant safety information and warnings, etc., please read the relevant contents 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 lead（UT-L98）： 1 pair
5) Threaded-bore alligator clip（with protective holster，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) Threaded-bore alligator clip（without protective holster，UT-C13）： 1 pair（optional）
11) Alligator clip（UT-C15）： 1 pair（optional）
12) Hook probe（UT-C16）： 1 pair（optional）
13) Test probe（UT-C17）： 1 pair（optional）
14) Dual-end connecting cable（UT-L99）： 1 pair（optional）

四、Safety Information

Please pay attention to the "Warnings". 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 compatibility EN61326-1 safety standard, meets the safety standards of double insulation, overvoltage CAT IV 1000V, CAT III 1500V, 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. Use test leads that meet EN 61010-031 standard, with identical electrical specifications or better.
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) Please use correct terminals, function and range for measurement.
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) 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.
7) Never apply more voltage or current than indicated on the meter between terminals, or between any terminal and ground.
8) 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.

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9) When the LCD display shows the "  " symbol, 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.
10) Do not change the internal wiring of the Meter at will, so as not to damage the Meter and endanger safety.
11) Do not store and use this Meter in high temperature, high humidity, and flammable, explosive and strong electromagnetic field environments.
12) 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.
13）Please measure the known voltage inside the product before use to ensure that the product is working properly.
14）Never use this Meter on circuits where the voltage exceeds the rated voltage of this Meter.
15）if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

五、Electrical Symbols

Symbols	Descriptions
	Insufficient battery power
	Warning
	AC (Alternating Current)
	DC（Direct Current）
	Bluetooth wireless communication technology is adopted.
	Double insulated
	Grounding
	High voltage warning
	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.

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六、General Specifications

1) The overload protection voltage between the voltage input terminal and the ground is 1500V DC/AC, and the overload protection voltage between AC/DC voltage position and power position is 2500V DC and 1500V AC.
2) The overload protection voltage between the input terminal of plug-in current sensor and the ground is 1500V DC/AC.
3) Display: 60000 counts, 5/second of refresh rate
4) 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：0 °C to +40 °C
   Cold and heat resistant：-40 °C to +55 °C （When placed at -40 °C from 20 °C, the prototype can work normally for 20 minutes）
   Storage temperature：-45 °C to +60 °C
9) Relative humidity: 0 % to 75 % （0 °C to 30 °C）；0 % to 50 %（30 °C to 60 °C）
10) Operating altitude：≤2000m
11) Battery: 3 × 1.5V AA alkaline battery
12) Dimension: 206mm x 93.5mm x 51.6mm
    Dimension with protective holster: 220mm x 103.5mm x 67mm
13) Weight: about 600g (including batteries)
    Weight with protective holster: about 835g (including batteries)
14) Protection level: IP67
15) Impact: 5m drop
16) Safety standard: EN/IEC 61010-1: CAT IV 1000V , CAT III 1500V
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

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七、**External Structure** (Figure 1)

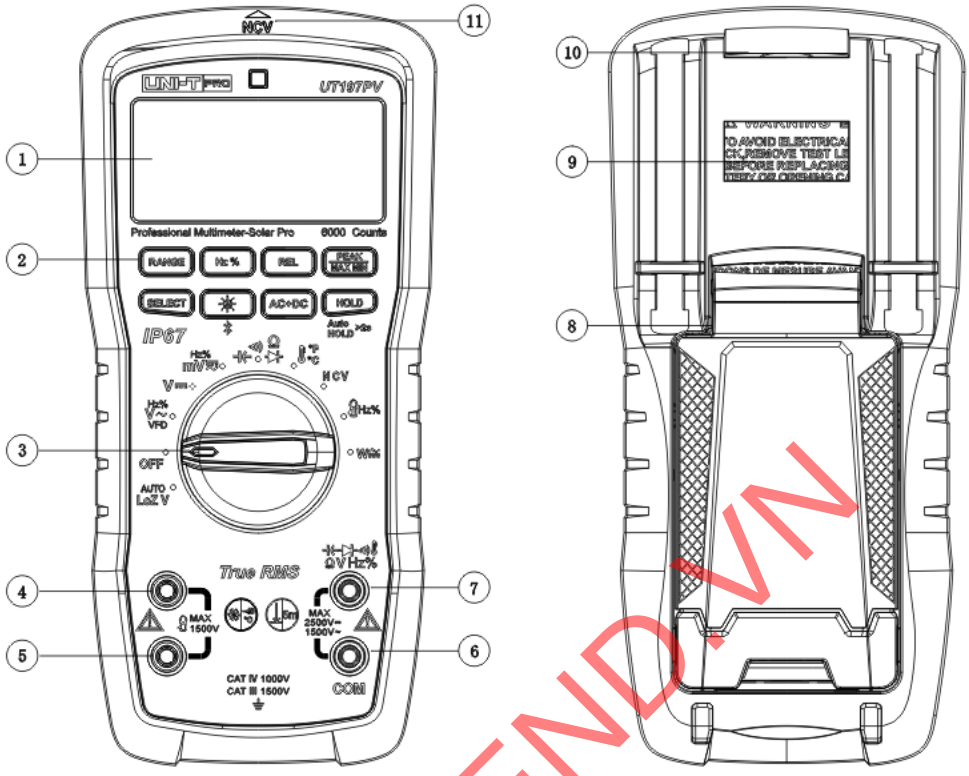

Figure 1

1. LCD screen
2. Buttons
3. Rotary switch
4. Positive input terminal for plug-in current sensor
5. Negative input terminal for plug-in current sensor
6. COM terminal
7. V terminal
8. Protective holster with bracket
9. Battery cover
10. Magnetic hanger area
11. NCV sensing area

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八、LCD Screen（Figure 2）

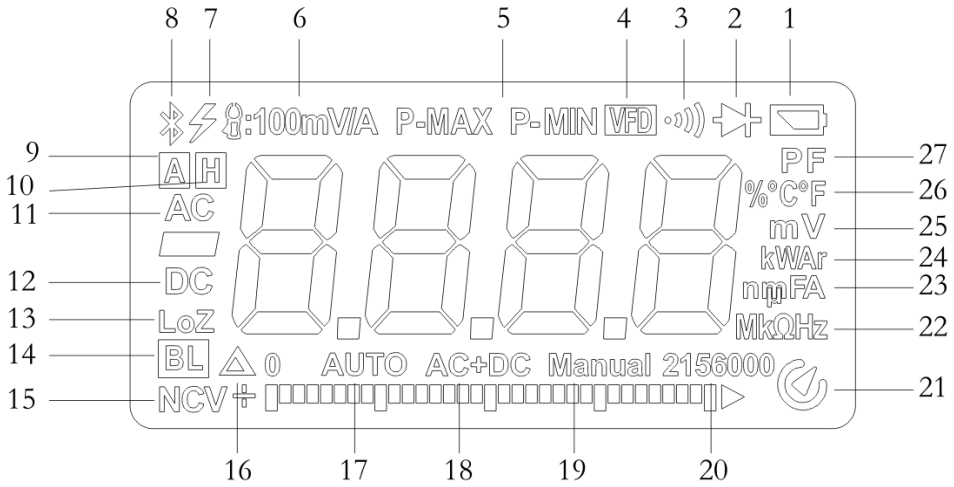

Figure 2

1 ry undervoltage prompt

2. :Diode measurement prompt
3. :Circuit continuity measurement prompt
4. VFD:LPF voltage measurement mode
5. P-MAX P-MIN:Maximum, Minimum, Peak Maximum, Peak Minimum, etc
6. :100mV/A:AC/DC current probe range prompt
7. :Dangerous voltage prompt
8. :Bluetooth communication symbol
9. A:Auto-hold function prompt
10. H:Hold function prompt
11. AC:AC measurement prompt
12. DC:DC measurement prompt
13. LoZ: Low-impedance automatic AC/DC voltage measurement
14. BL:Auto backlight function prompt
15. NCV: Non-contact AC voltage sensing prompt
16. : Relative value measurement prompt
17. AUTO： Auto range prompt
18. AC+DC:AC+DC measurement mode prompt
19. Manual :Manual range prompt
20. 2156000:Range prompt
21. :Auto shutdown prompt
22. MkΩHz:Resistance/frequency unit prompt
23. nmμFA:Current/capacitance unit prompt
24. kWAr:Power unit prompt
25. mV :Voltage unit prompt
26. %°C°F:Duty cycle/temperature measurement display prompt
27. PF:Power factor measurement display prompt

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九、Rotary Switch （Figure 3）

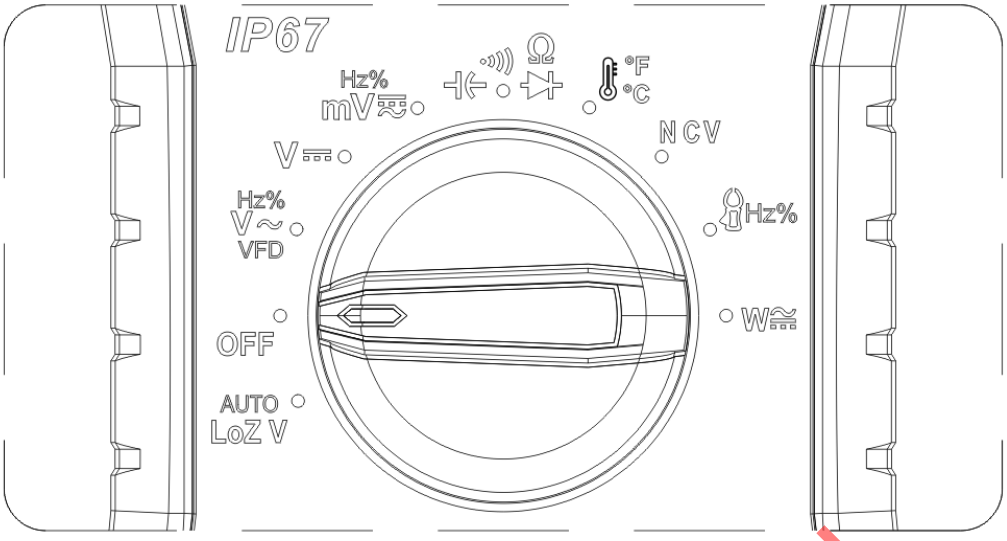

Figure 3

Positions	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
Hz% mV	mV AC/DC voltage measurement, frequency/duty cycle measurement
Ω	Continuity measurement/resistance measurement/diode measurement/capacitance measurement
°F °C	Celsius temperature measurement/Fahrenheit temperature measurement
NCV	Non-contact voltage sensing (NCV)
Hz%	Plug-in current probe measurement, frequency/duty cycle measurement
W	AC/DC power measurement

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十、Functions of Buttons

Buttons	Effective positions	Descriptions
SELECT	Composite positions	1. ACV position: short press (<2s) to select ACV->LPF ACV cyclically. Default position: ACV. 2. ACmV/DCmV position: short press (<2s) to select ACmV->DCmV cyclically. Default position: ACmV 3. Continuity/Ω/diode/capacitor position: short press (<2s) to select continuity->-Ω->diode->capacitor->continuity cyclically. Default position: Continuity. 4. ℃ position: short press (<2s) to select °C ->ºF cyclically. Default position: °C. 5. W position: short press (<2s) to select DC power->Active power->Reactive power->Apparent power->Power factor. Default position: DC power 6. Press and hold SELECT, turn the rotary switch to power on, Buzzer prompts 4 sounds, and the product enters the non-sleep mode.
RANGE	V、Ω、VFD、、W	1. At VFD,, and W positions, there is no automatic range position, and you can short press to select range cyclically. 2. In auto range mode, short press the RANGE button once to enter the manual range mode (LCD does not show "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. 3. Under the HOLD, MAX/MIN, and REL functions, the Range button is disabled.
Hz%	ACV、ACmV、VFD、	Short press (<2s) to cycle through the frequency > duty cycle - > return to the previous position.
REL	V、VFD、mV、Ω、CAP、℃、°F、	Short press (<2s) the REL button to enter or exit REL measurement mode. In the relative value measurement mode, the LCD shows "△".
	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	DCV、mV	Short press (<2s) to the AC+DC measurement, short press (<2s) to select AC+DC->DC->AC cyclically, and long press to exit the AC+DC mode.
PEAK MAX MIN	V、mV、Ω、VFD、℃、°F、	Short press the MAX/MIN button to capture the maximum/minimum value, and long press to exit the maximum/minimum mode.
	V、mV、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.

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HOLD Auto HOLD >2s	All positions （Except NCV position）	Short press to enter or exit data hold. When entering data hold, the LCD will show "H", and when exiting data hold, the LCD will not show "H".
	ACV、DCV、Ω、CAP、W	Long press to enter or exit auto data hold, when entering data hold, the LCD will show “A" and "H", and when exiting data hold, the LCD will not show "A" and "H".

十一、Operating Instructions

Please pay attention to check the built-in AA 1.5V x3 batteries before use. If the battery power is insufficient after the Meter is turned on, the "" symbol will be displayed, in order to ensure the test accuracy, the batteries must be replaced in time before use. Also pay special attention to the warning symbol "⚠" next to the socket of the test lead, which warns 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）**

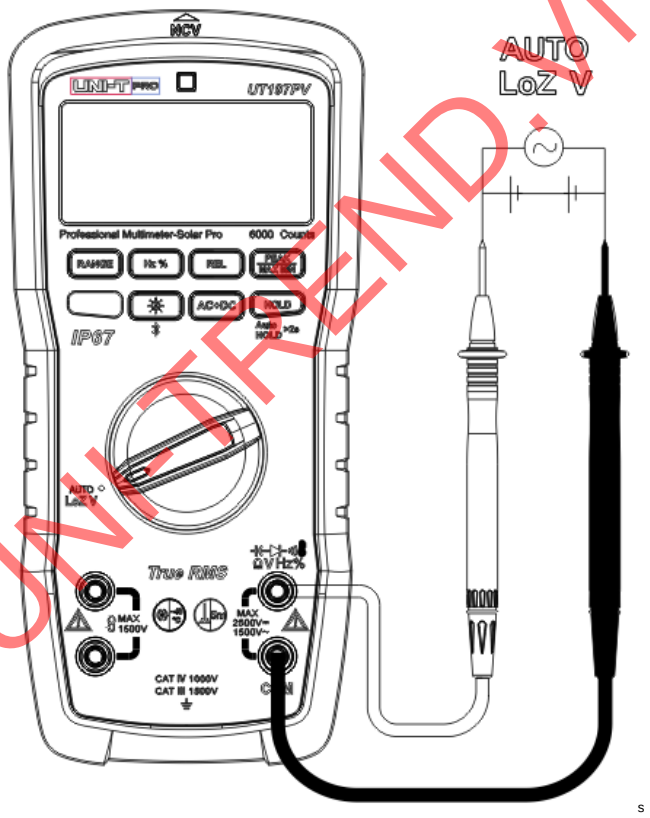

Figure 4

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 induced.

⚠ 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.

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- Do not input voltages higher than 1500V.
- 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）

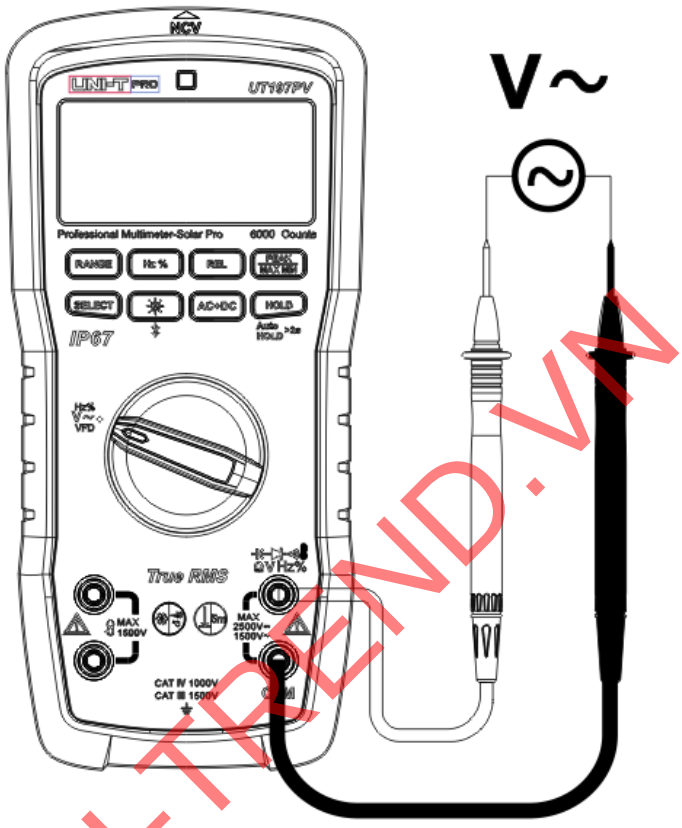

Figure 5

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 , 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)

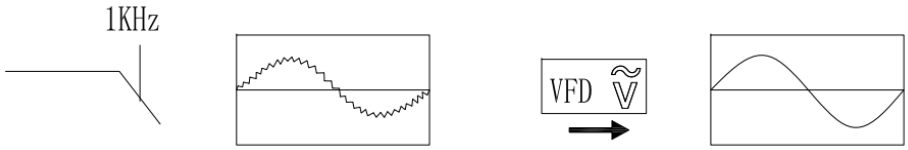

Figure 6

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

⚠ Warning：

- Input coupling mode: AC coupling

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- 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 > 1500V 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）

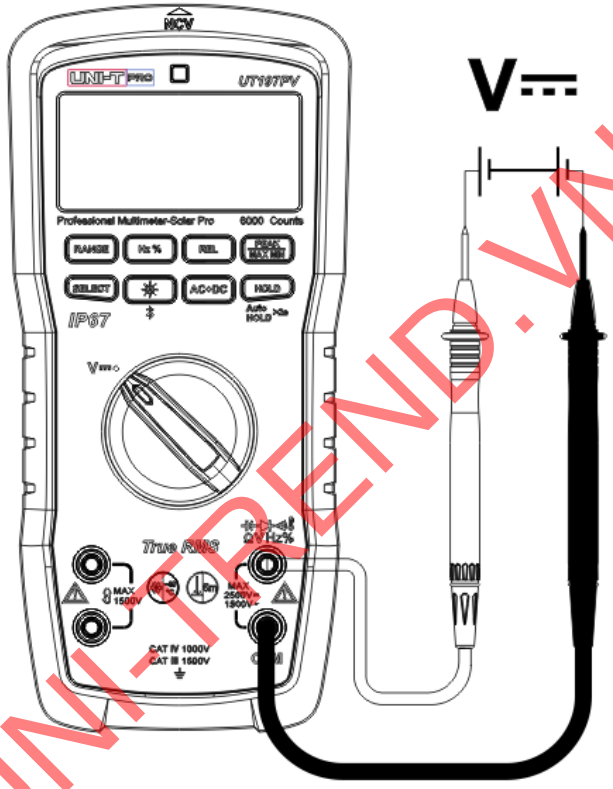

Figure 7

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⎓, then connect the test lead in parallel to the power supply or load to be measured.
3) Read the DC voltage from the display.
5) Short press the "AC+DC" button to enter the AC+DC measurement display mode, short press again to select AC+DC->DC->AC->return to the previous position.

⚠ Warning：

- For AC+DC measurement function, no analog bar is displayed.
- 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

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- When the measured voltage is >30V, the high-voltage alarm symbol is displayed; if the measured voltage is ＞2500V in autoranging mode, it will turn on a red light alarm.
- After all measurement operations are completed, please disconnect the test lead from the circuit under test.

4. AC mV measurement（Figure 8）

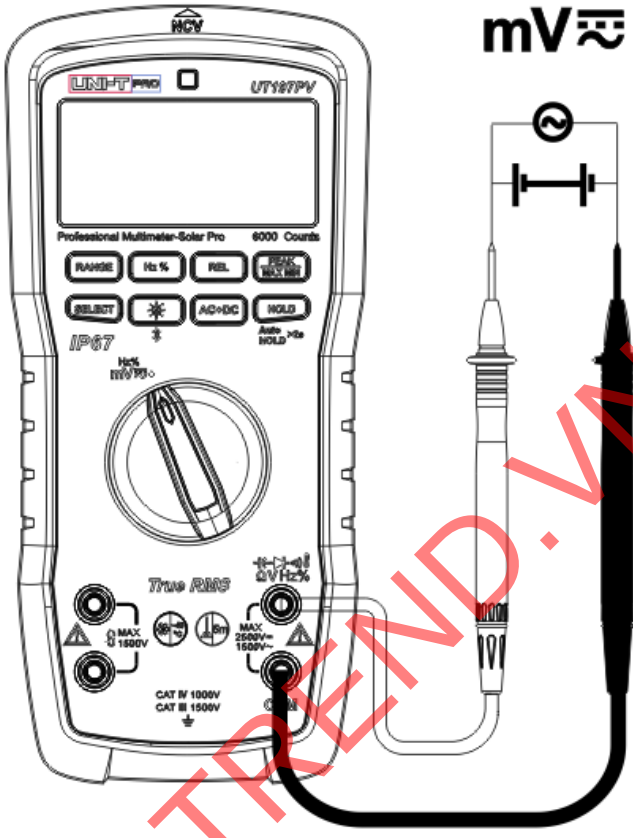

Figure 8

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 or duty cycle 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, please disconnect the test lead 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.

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4) Short press the "AC+DC" button to enter the AC+DC measurement display mode, short press again to select AC+DC->DC->AC->return to the previous position.

⚠ 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, please disconnect the test lead from the circuit under test.

6. Continuity measurement (Figure 9)

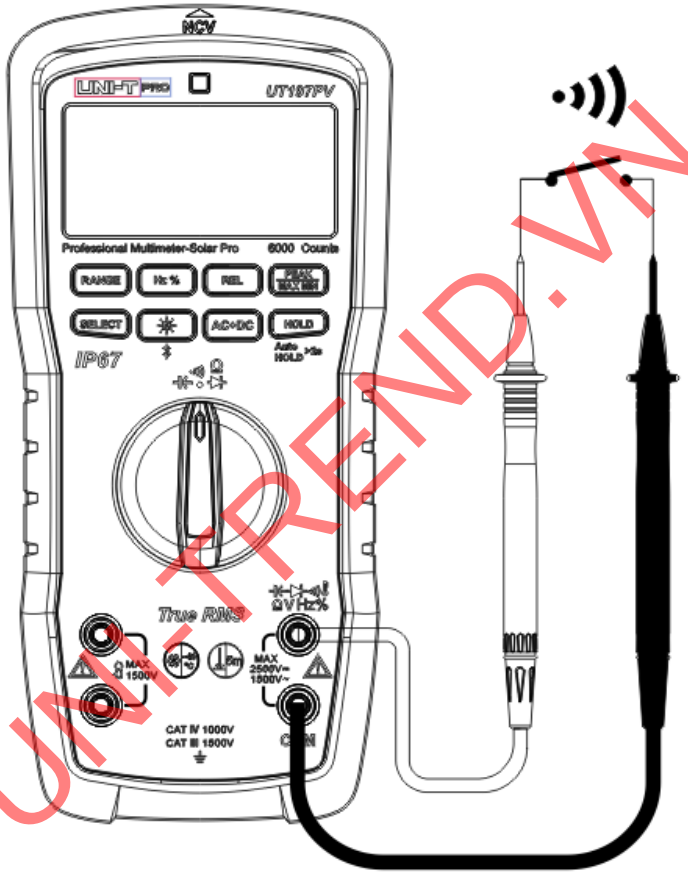

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Figure 9

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 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, please disconnect the test lead from the circuit under test.

7. Resistance measurement （Figure 10）

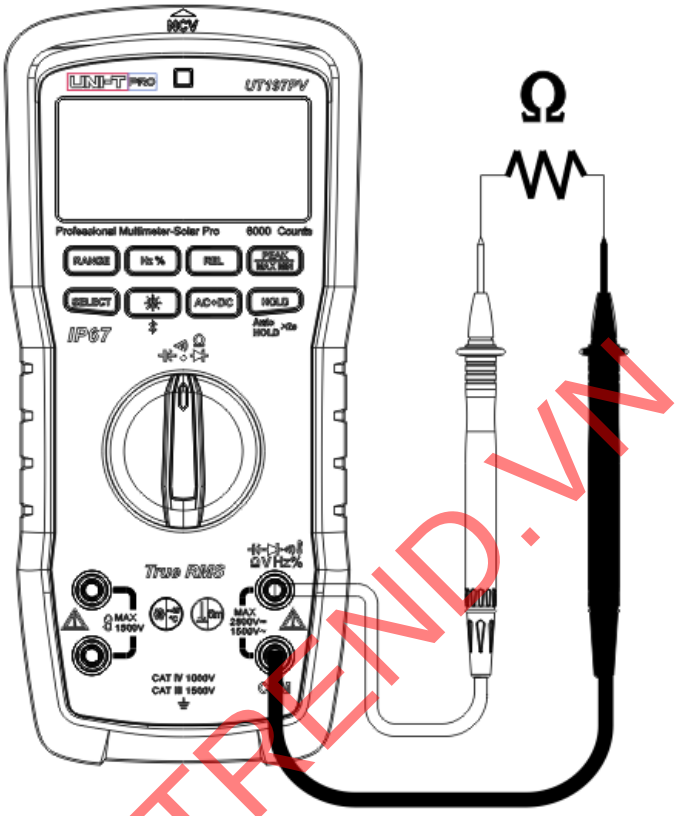

Figure 10

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 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, please disconnect the test lead from the circuit under test.

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8. Diode measurement （Figure 11）

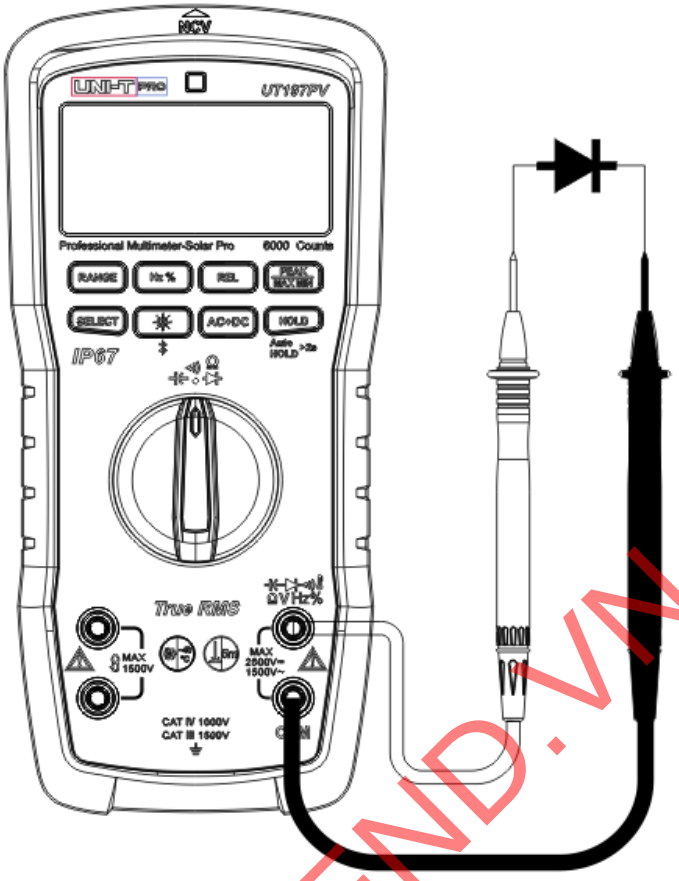

Figure 11

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, please disconnect the test lead from the circuit under test.

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9. Capacitance measurement（Figure 12）

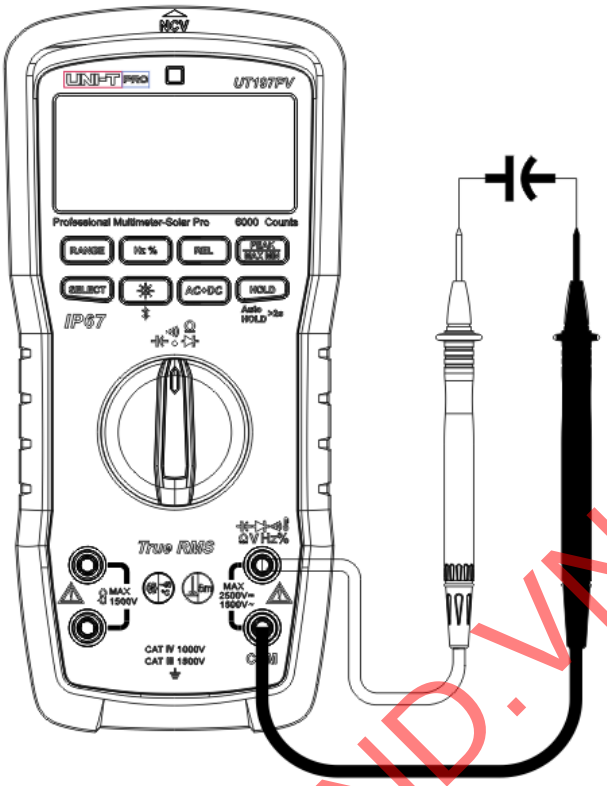

Figure 12

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 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 injury.
- After the measurement operation is completed, please disconnect the test lead from the measured capacitor.

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

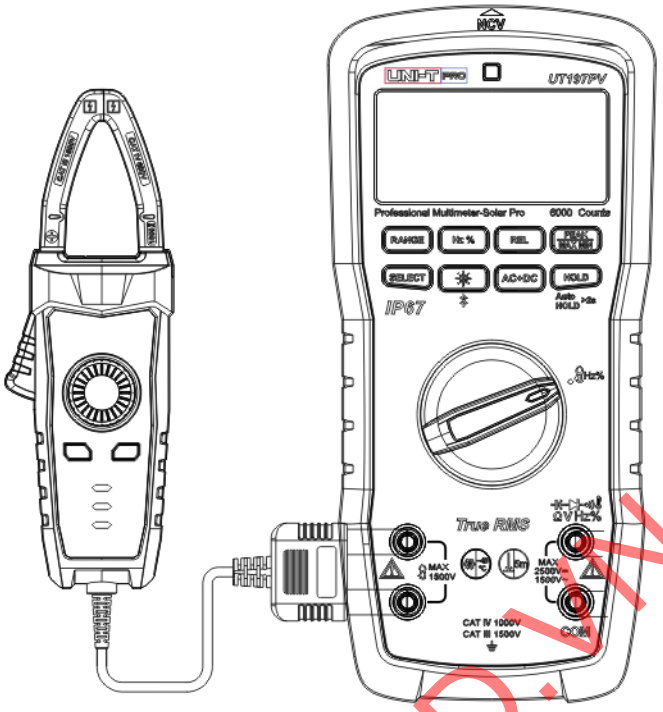

Figure 13

1) Connect the red and black test leads into the corresponding terminals of the current sensor.
2) Set the rotary switch to "Hz%", then ACA and DCA are identified automatically. Press the RANGE button to select the current sensor ranges of 100A (10mV/A) and 1000A (1mV/A), and then clamp the current sensor to the conductor to be measured.
3) Read the current of the current sensor directly from the display.
4) In the ACA position of the current sensor, short press the Hz% button to select the frequency or duty cycle measurement, and read the frequency or duty cycle of the present measured current from the display.

⚠ Warning：

- To ensure accurate measurement, the conductor to be measured must be located at the center of the current sensor, if not placed at the center of the current sensor, it will cause an additional error of ±2.0% of the reading.
- After the measurement operation is completed, please disconnect the current sensor from the Meter.

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11. AC/DC power measurement （Figure 14）

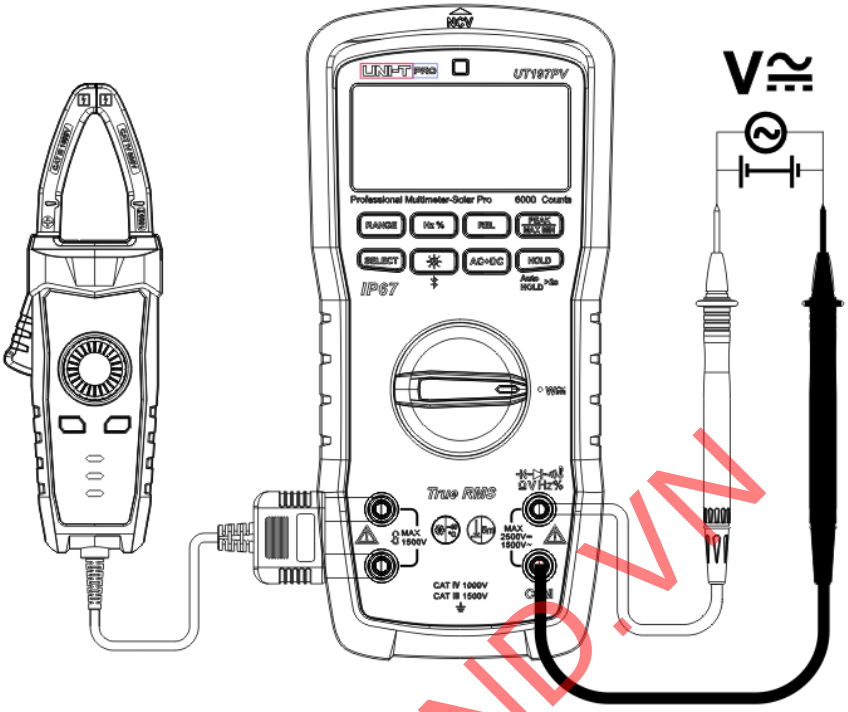

Figure 14

1) Connect the red test lead for measuring voltage into the "V" terminal, the black test lead into the "COM" terminal, and the red and black test leads of the current sensor into the corresponding terminals of the current sensor.
2) Set the rotary switch to "W", press the RANGE button to select the current sensor ranges of 100A (10mV/A) and 1000A (1mV/A), then clamp the current sensor to the conductor to be measured, and short press the SELECT button to switch DC power and AC power measurements (active power, reactive power, apparent power, and power factor are displayed in turn).
3) Read the current measured value directly from the display.

⚠ Warning：

- Please select correct terminal, position and range for measurement.
- After all the measurement operations are completed, please turn off the measured current source before disconnecting the test leads from the measured circuit.

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12. Temperature measurement （Figure 15）

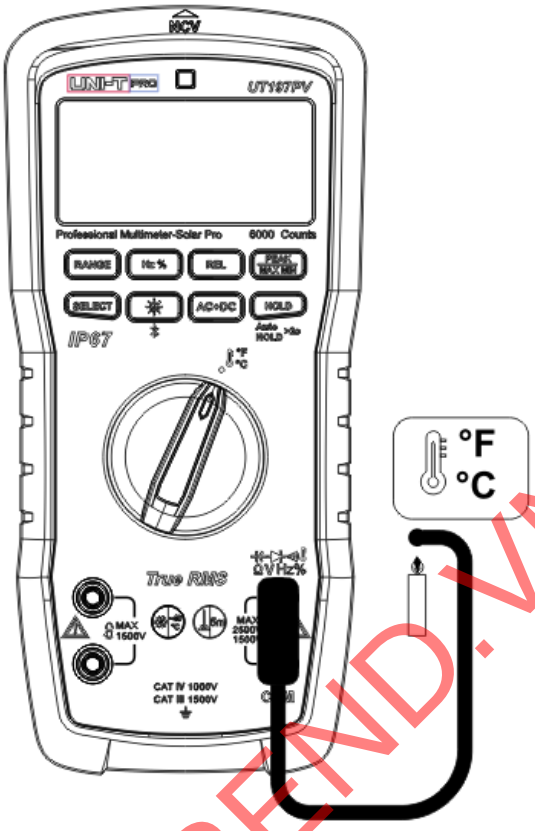

Figure 15

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.

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15. Non-contact AC voltage sensing (NCV) （Figure 16）

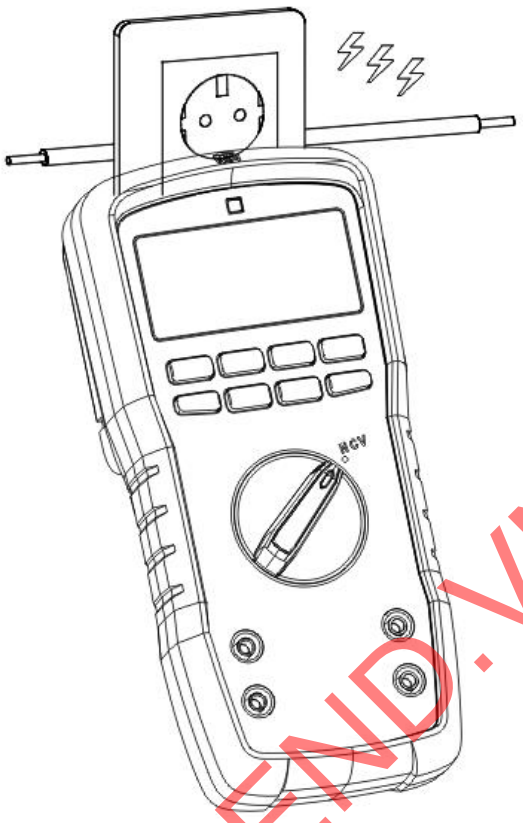

Figure 16

1) Set the rotary switch to "NCV" to enter 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 personal injury.

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16. Other functions

1) Disable auto-off function

Press and hold the "Select" button to disable the automatic shutdown function when the power is turned on, then the buzzer sounds 4 times continuously, and the "" symbol is not shown on the LCD.

2)Wake-up function

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

3) Automatic backlight function

When the automatic backlight function is turned on, the LCD will show 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.

十二、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: For 18°C to 28°C, the fluctuation range of the ambient temperature is stable within ±1°C. At a temperature < 18 °C or > 28 °C, a temperature coefficient error of 0.2 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	±(1.5%+5）	1500V DC 1500V AC
		45Hz～400Hz	±(1.5%+5）	
1500V	1V	DC	±(1.8%+5）	
		45Hz～400Hz	±(1.8%+5）	

- Input impedance: About 2KΩ
- Accuracy guarantee range: 5%～100% of range
- For Auto-V LoZ, the AC or DC voltage is automatically selected based on the low impedance input induced.

2. AC voltage

Range	Resolution	Frequency response	Accuracy±(a% reading + b digit)	Overload protection
600.0mV	0.1mV	45～500Hz	±(0.8%+5）	1500V DC 1500V AC
		500～1kHz	±(1.8%+5）	
6.000V	0.001V	45～500Hz	±(0.8%+5）	2500V DC 1500V AC
		500～1kHz	±(1.8%+5）	
60.00V	0.01V	45～500Hz	±(0.8%+5）	
		500～1kHz	±(1.8%+5）	
600.0V	0.1V	45～500Hz	±(0.8%+5）	
		500～1kHz	±(1.8%+5）	
1500V	1V	45～500Hz	±(0.8%+5）	
		500～1kHz	±(1.8%+5）	

- Displaying TRMS value
- Input impedance: ≥10MΩ. Input coupling mode: ACV is AC coupling

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- To ensure accuracy, the input signal is required to be 5%-100% of the current range.
- The AC crest factor can reach 3 at 3000 counts. By 6000 counts it drops to about 1.5. For non-sinusoidal waveforms, the additional error is increased by ±2.0%.
- When measuring frequency in the voltage range, the input signal shall be greater than 10% of the current range for reading frequency, and the duty cycle read provides a reference.
- VFD: 1 kHz 3db attenuation. Frequency: 45Hz~200Hz. Additional error: ± 2.0%. After entering VFD, the Meter will enter manual ranging.

3. DC voltage

Range	Resolution	Accuracy±(a% reading + b digit)	Overload protection
600.0mV	0.1mV	±(0.3%+5)	1500V DC 1500V AC
6.000V	0.001V	±(0.2%+5)	2500V DC 1500V AC
60.00V	0.01V	±(0.2%+5)	
600.0V	0.1V	±(0.2%+5)	
2500V	1V	±(1.0%+5)	

- Input impedance: ≥10MΩ
- Offset under short circuit condition: <5 counts
- 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	45～500Hz	±(1.5%+5)	1500V DC 1500V AC
		500～1kHz	±(2.5%+5)	
6.000V	0.001V	45～500Hz	±(1.5%+5)	
		500～1kHz	±(2.5%+5)	
60.00V	0.01V	45～500Hz	±(1.5%+5)	
		500～1kHz	±(2.5%+5)	
600.0V	0.1V	45～500Hz	±(1.5%+5)	
		500～1kHz	±(2.5%+5)	
1500V	1V	45～500Hz	±(1.5%+5)	
		500～1kHz	±(2.5%+5)	

- 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 $\sqrt{ac^2+dc^2}$ .The mixed signal shall be less than or equal to the maximum value of the current range.
- Offset under short circuit condition: <5 counts
- 6000-count; without analog bar displayed.

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5. Resistance

Range	Resolution	Accuracy ±(a% reading + b digit)	Overload protection
600.0Ω	0.1Ω	±(0.8%+5）	1500V DC 1500V AC
6.000kΩ	0.001kΩ	±(0.5%+5）	
60.00kΩ	0.01kΩ	±(0.5%+5）	
600.0kΩ	0.1kΩ	±(0.5%+5）	
6.000MΩ	0.001MΩ	±(0.5%+5）	
60.00MΩ	0.01MΩ	±(2.5%+5）	

- Humidity for 60MΩ: <50%
- Measured value=Displayed value-Value of shorted test lead. For 600.0Ω, REL mode is recommended.
- To ensure accuracy, the input signal shall be 1%-100% of the current range.

6. Capacitance

Range	Resolution	Accuracy ±(a% reading + b digit)	Overload protection
60.00nF	0.01 nF	±(3.0%+10）	1500V DC 1500V AC
600.0nF	0.1 nF	±(3.0%+5）	
6.000uF	0.001uF	±(3.0%+5）	
60.00uF	0.01 uF	±(3.0%+5）	
600.0uF	0.1uF	±(3.0%+5）	
6.000mF	0.001mF	±(10.0%+5）	
60.00mF	0.01mF	±(10.0%+5）	

- Offset under open circuit condition: ≤20 counts
- To ensure accuracy, the input signal shall be 5%-100% of the current range.
- For measured capacitance ≤100nF, REL mode is recommended.

7. Continuity

Range	Resolution	Remark	Overload protection
600.0Ω	0.1Ω	Circuit disconnected: Resistance value is set at about ≥250Ω (the buzzer keeps silent) Circuit connected: Resistance value set at about ≤20Ω (the buzzer sounds)	1500V DC 1500V AC

- Open-circuit voltage is about 2 V.
- For circuit resistance of 20Ω to 150Ω, the buzzer may or may not sound.

8. Diode

Range	Resolution	Accuracy ±(a% reading + b digit)	Overload protection
3.000V	0.001V	±(1.0%+5）	1500V DC 1500V AC

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- The open-circuit voltage is about 3V.
- If the test is normal (0.12V-2V), the buzzer will make a sound, and if there is a short circuit, the buzzer will sound for a long time.

9. Frequency

Range	Resolution	Accuracy ±(a% reading + b digit)	Overload protection
10Hz～1MHz	0.01Hz～1kHz	±(0.02%+5)	1500V DC 1500V AC

- Input amplitude:
  10Hz～1MHz: 800mV≤ Input amplitude ≤30Vrms
- For mV position, the frequency is selected by Hz%.

10. Duty cycle

Range	Resolution	Accuracy ±(a% reading + b digit)	Overload protection
10%~90%	0.1%	±(3.0%+30)	1500V DC 1500V AC

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

11. Temperature

Range	Resolution	Accuracy ±(a% reading + b digit)	Overload protection
-40.0℃~40.0℃	0.1℃	±(1.0%+30)	1500V DC 1500V AC
40.0℃~400.0℃		±(1.0%+15)	
400.0℃ ~999.9℃		±(1.0%+15)	
-40.0°F ~104.0°F	0.1°F	±(1.0%+60)	
104.0°F ~752.0°F		±(1.0%+30)	
752.0°F ~999.9°F		±(1.0%+30)	
1000°F ~1832°F	1°F	±(1.0%+30)	

- Use a Type K thermocouple to measure temperature.

12. AC/DC current sensor

Range	Resolution	Frequency response	Accuracy ±(a% reading + b digit)	Overload protection
100.0A (10mV/A)	0.1A	DC	±(0.8%+5)	1500V DC 1500V AC
		45Hz~400Hz	±(1.0%+5)	
1000A (1mV/A)	1A	DC	±(0.8%+5)	
		45Hz~400Hz	±(1.0%+5)	

- Defined by the FLUKE standard source, the input signal shall be 10%-100% of the current range to ensure accuracy.

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- For ACA+Hz% measurement, the input signal shall be greater than 10% of the current range for reading frequency, and the duty cycle read provides a reference.
- If deviating from the center of the clamp, an additional error of ±2.0% of the reading is added to the specified accuracy.
- Identifying AC/DC current automatically.

13. Non-contact AC voltage sensing (NCV)

Range	Remark
NCV	Signal frequency sensed: 50∽60Hz Detected voltage<30V: "EF" is displayed. Detected voltage>100V: "----" is displayed, and an audible and visual alarm is triggered.

4 . AC/DC power

DC power:

Range	Resolution	Accuracy ±(a% reading + b digit)	Overload protection
60.00kVA (10mV/A)	0.01	±(3.0%+5）	Voltage terminal 2500V DC 1500V AC Current sensor terminal: 1500V DC 1500V AC
250.0kVA (10mV/A)	0.1	±(3.0%+5）	
600.0kVA (1mV/A)	0.1	±(3.0%+5）	
2500kVA (1mV/A)	1	±(3.0%+5）	

AC power:

	Range		Resolution	Frequency response	Accuracy ±(a% reading + b digit)	Overload protection
Active power	10mV/A	60.00kW	0.01	45Hz~65Hz	±(3.0%+5）	Voltage terminal: 2500V DC 1500V AC Current sensor terminal: 1500V DC 1500V AC
		150.0kW	0.1		±(3.0%+5）	
Reactive power		60.00KVAr	0.01		±(5.0%+5）	
		150.0KVAr	0.1		±(5.0%+5）	
Apparent power		60.00kVA	0.01		±(3.0%+5）	
		150.0kVA	0.1		±(3.0%+5）	
Power factor		-1 ～ 1	0.01		When the power factor is not equal to ±1, the power factor index is calculated according to the phase angle error of 3°.	
Active power	1mV/A	600.0kW	0.1		±(3.0%+5）	
		1500KW	1		±(3.0%+5）	
Reactive power		600.0KVAr	0.1		±(5.0%+5）	
		1500KVAr	1		±(5.0%+5）	
Apparent power		600.0kVA	0.1		±(3.0%+5）	
		1500KVA	1		±(3.0%+5）	

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Power factor		-1 ～ 1	0.01		When the power factor is not equal to ±1, the power factor index is calculated according to the phase angle error of 3°.	

- When the displayed power factor is equal to ±1, the active power and power factor indexes are calculated according to the accuracy. Otherwise, the active power and reactive power indexes are calculated according to the phase angle error of 3 degrees.
- When 10mV/A is selected for the current sensor, the input current is >10A and the voltage is >30V. When 1mV/A is selected for the current sensor, the input current is > 100A and the voltage is > 30V.
- The accuracy is defined by the FLUKE standard source, the designed phase angle of the product is based on the voltage, and the phase angle outputted by FLUKE source is based on the current. Please pay attention to the positive and negative inputs.
- When using a plug-in current sensor to induce current input, the phase angle error is added by 5 degrees.
- Offset: 5 counts (within the specification)

十三. Bluetooth Software

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 released application software.

2. Download iDMM2.0

① For Android

Option 1: Search for "Uni-Trend Smart Measure" on the official website of Uni-Trend to download and install.

Option 2: Open the mobile phone browser, then scan the following QR code to download and install. Do not scan by WeChat.

Option 3: Search for "Uni-Trend Smart Measure" in major app stores to download, such as: Google Play, Tencent App Treasure, Huawei App Store, Xiaomi App Store, VIVO App Store, and OPPO App Store.

To ensure that the latest version is downloaded, we strongly recommend Option 1 or Option 2.

② For IOS

Option 1: Search for "Uni-Trend Smart Measure" in the "App Store" to download and install.

Option 2: Turn on the QR code scanning function of the mobile phone system, then scan the following QR code to download and install.

For Android

For iOS

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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.

十四、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 damp cloth and mild detergent to clean the Meter housing, and do not use abrasives or solvents
- If any abnormality occurs at the Meter, please stop use and send it for maintenance.
- The calibration and repair should be performed by qualified professional maintenance personnel or designated service center

2. Battery replacement（Figure 17）

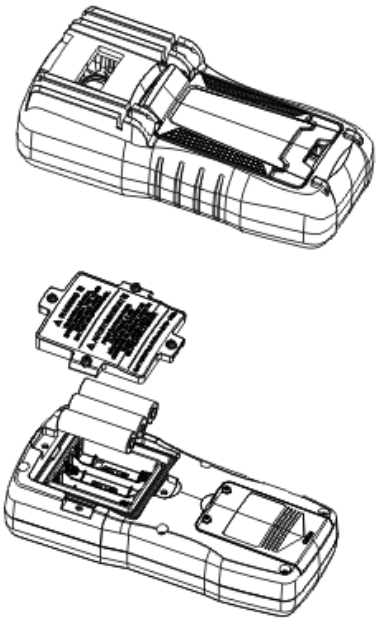

Figure 17

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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）Replace the test lead

If the insulation of the test lead is damaged, please replace a new one in time.

⚠ Warning：

The test lead should meet the EN 61010-031 standard, and the specifications should meet the CAT IV 1000V, 10A or higher.

The contents of this manual are subject to change without further notice.

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