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UNI-T

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Made in China



UT161 Series

1000V True RMS Digital Multimeter User Manual

Preface

Thank you for purchasing this brand new product. In order to use this product safely and correctly, please read this manual thoroughly, especially the safety notes.

After reading this manual, it is recommended to keep the manual at an easily accessible place, preferably close to the device, for future reference.

Limited Warranty and Liability

Uni-Trend guarantees that the product is free from any defect in material and workmanship within one year from the purchase date. This warranty does not apply to damage caused by accident, negligence, misuse, modification, contamination or mishandling. The dealer shall not be entitled to give any other warranty on behalf of Uni-Trend. If you need warranty service within the warranty period, please contact your seller directly.

Uni-Trend will not be responsible for any special, indirect, incidental or subsequent damage or loss caused by using this device.

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I. Overview

The UT161B/UT161D/UT161E is a handheld true RMS digital multimeter with high reliability and security (UT161B/UT161D: 6000 counts; UT161E: 22000 counts). With large screen, high resolution analog pointer display, full scale overload protection, and unique appearance design, it becomes a new practical electrical measuring meter. The meter can measure AC/DC voltage/current, resistance, diode, transistor hFE (UT161E), continuity, capacitance, frequency, duty ratio, temperature (UT161D), etc. Featuring data transmission, data hold, relative value measurement, peak measurement (UT161D/UT161E), internal temperature alarm, low battery indication, backlight, auto power off, and NCV functions, the meter is an ideal measuring tool for many application fields.

II. Accessories

Open the package box and take out the meter. Please double check whether the following items are missing or damaged.

1. User manual ---------- 1 pc
2. Test leads ---------- 1 pair
3. Adapter socket (UT161D/UT161E) ---------- 1 pc
4. K-type thermocouple (UT161D) ---------- 1 pc
5. USB cable ---------- 1 pc
6. Download operation guide ---------- 1 pc
7. 1.5V AAA batteries ---------- 4 pcs

If any of the above is missing or damaged, please contact your supplier immediately.

III. Safety Instructions

The meter is designed and manufactured according to IEC61010-1 safety standard, and conforms to CAT III 1000V, CAT IV 600V, and pollution degree 2. If the meter is used in a manner not specified by the manufacturer, the protection provided by the meter may be impaired.

1. Before use, please check if there is any item which is damaged or behaving abnormally. If any abnormal item (such as bare test lead, damaged meter casing, broken LCD, etc.) is found, please do not use the meter.
2. Do not use the meter if the rear cover or the battery cover is not completely covered up, or it may pose a shock hazard!
3. Damaged test leads must be replaced with ones of the same model or same electrical specifications.
4. During measurement, do not touch any exposed wires, connectors, unused inputs or circuits being measured.
5. Use caution when working with voltages above AC 30Vrms, 42Vpeak or DC 60V. Keep fingers behind the finger guards of the test leads to prevent electric shock.
6. If the range of the measured value cannot be determined, the meter must be operated at the maximum range.
7. Do not apply more than the rated voltage or current marked on the meter between the terminals or between any terminal and earth ground.
8. Place the function dial in the correct position before measurement.
9. Before measuring resistance, diode, continuity, or capacitance, switch off the power supply of the circuit, and fully discharge all capacitors.
10. Before measuring current, make sure the fuses are intact.
11. Do not use or store the meter in high temperature, high humidity, flammable, explosive, or strong magnetic field environments.
12. Do not change the internal circuit of the meter to avoid damage to the meter or user!
13. When " " is displayed, please replace the batteries in time to ensure measurement accuracy.
14. Turn off the meter in time after measurement. If the meter is not in use for a long time, please remove the batteries.

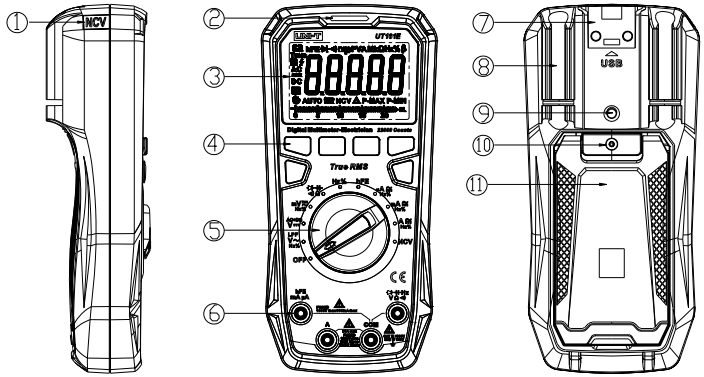
UT161 Series User Manual UNI-T

IV. Electrical Symbols

Symbol	Description
	Warning or Caution
	Caution, possibility of electric shock
	Both direct and alternating current
	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION
	Earth (ground) Terminal
CE	Complies with European Union standards
	Conforms to UL STD 61010-1, 61010-030, 61010-2-033, Certified to CSA STD C22.2 No. 61010-1, 61010-030, 61010-2-033.
CAT III	It is applicable to testing and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.
CAT IV	It is applicable to testing and measuring circuits connected at the source of the building's low-voltage MAINS installation.

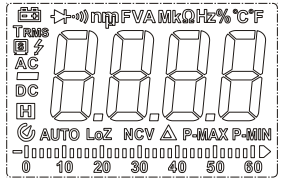
V. External Structure (Picture 1)

1. NCV detector
2. Indicator light
3. LCD display
4. Function buttons
5. Function dial
6. Input terminals
7. USB (Bluetooth) access port
8. Test lead slots
9. Nut for external holder
10. Battery compartment fixing screw
11. Tilt stand

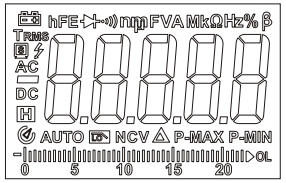


Picture 1

VI. LCD Display (Picture 2, Picture 3)



Picture 2 UT161B/UT161D



Picture 3 UT161E

Symbol	Description
ϟ	Measured voltage is >30V (AC or DC)
H	Data hold
−	Negative reading
AC/DC	AC/DC measurement
	Low battery indication
AUTO	Auto range
	Diode test
	Continuity test
Δ	Relative value measurement
Ω,kΩ,MΩ	Resistance units: ohm, kilohm, megaohm
mV,V	Voltage units: millivolt, volt
μA,mA,A	Current units: microampere, milliampere, ampere
nF,μF,mF	Capacitance units: nanofarad, microfarad, millifarad
Hz,%	Frequency, duty ratio
S	Data transmission
β	Transistor magnification (UT161E)
NCV	Non-contact voltage detection
P-MAX/P-MIN	Peak measurement (UT161D/UT161E)
MAX/MIN	Maximum/Minimum measurement
°C/°F	Celsius/Fahrenheit (UT161D)
LoZ	Low impedance measurement (UT161D)
hFE	Transistor magnification measurement (UT161E)
	Auto power off
TRMS	True RMS

VII. Function Dial and Function Buttons

1. Function Dial

Dial Position	Description
OFF	Power off
LPF V~ Hz%	AC voltage measurement/Low pass filter measurement/ Frequency and duty ratio measurement (UT161E)
AC+DC V⎓	DC voltage measurement/AC+DC measurement (UT161E)
V~ Hz%	AC voltage measurement/Frequency and duty ratio measurement (UT161B)
V⎓≂ Hz%	AC/DC voltage measurement/Frequency and duty ratio measurement (UT161D)
mV⎓≂ Hz%	AC/DC millivolt voltage measurement/Frequency and duty ratio measurement
•))) Ω ⊣◁⊢	Diode test/Continuity test/Resistance measurement/ Capacitance measurement (UT161D/UT161E)
•))) Ω	Continuity test/Resistance measurement (UT161B)
⊣◁⊢	Diode test/Capacitance measurement (UT161B)
hFE	Transistor magnification measurement (UT161E)
Hz%	Frequency and duty ratio measurement
μA⎓≂ Hz%	AC/DC microampere current measurement/ Frequency and duty ratio measurement
mA⎓≂ Hz%	AC/DC milliampere current measurement/ Frequency and duty ratio measurement
A⎓≂ Hz%	AC/DC ampere current measurement/Frequency and duty ratio measurement
NCV	Non-contact voltage detection

2. Function Buttons

Short press: Press a button for less than 2s.
Long press: Press a button for more than 2s.

1) SELECT Button
Short press to switch between functions in each compound function position.

2) RANGE Button
Short press to enter the manual range mode and change the range.
Long press to exit the manual range mode.

3) Hz% USB Button
Short press to switch between frequency and duty ratio measurement.
Long press to turn on/off data communication (note: only available when USB communication module is inserted into the casing).

4) REL Button
Short press to enter/exit the relative value measurement mode.

5) PEAK MAX MIN Button
Short press to cycle through the measured maximum and minimum.
Long press to cycle through the peak maximum and peak minimum (UT161D/UT161E).

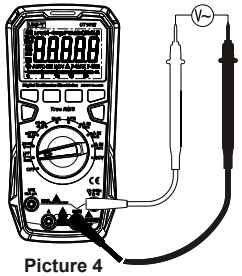
6) MAX MIN Button
Short press to cycle through the measured maximum and minimum (UT161B).

7) HOLD Button
Short press to hold the measurement on the display and " H " will be displayed.
Short press again to cancel data hold.
Long press to turn on/off the backlight.

VIII. Operating Instructions

Please check the internal batteries first. If " " is displayed, replace the batteries in time. Please also pay attention to the warning sign " " beside the input terminals, which indicates that the measured voltage or current must not exceed the values marked on the meter.

1. AC Voltage Measurement (Picture 4)



Picture 4

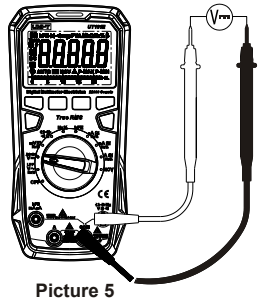
1) Insert the red test lead into the or terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the , , or position.
3) Short press the **SELECT** button to switch to AC voltage measurement or LPF ACV measurement (UT161E, manual maximum range by default) if required.
4) Connect the test leads with the measured load or power supply in parallel.
5) Read the voltage value on the display (if the voltage is >1000V, the red indicator light will be on and the buzzer will sound an alarm).
6) Short press the button to display the frequency/duty ratio of the measured voltage.

Caution:

- Do not input a voltage over 1000V or it may damage the meter.
- Be cautious to avoid electric shock when measuring high voltages.
- After completing the measurement, disconnect the test leads from the circuit under test.

- Before each use, verify meter operation by measuring a known voltage.
- The input impedance of the meter is about 10MΩ. This load effect may cause measurement errors in high-impedance circuits. In most cases, if the impedance of the circuit is below 10kΩ, the error can be ignored (≤0.1%).

2. DC Voltage Measurement (Picture 5)



Picture 5

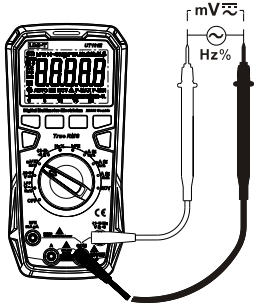
DC Voltage Measurement

1) Insert the red test lead into the or terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the **V⎓**, , or position.
3) Short press the **SELECT** button to switch to DC voltage measurement if required.
4) Connect the test leads with the measured load or power supply in parallel.
5) Read the voltage value on the display (if the voltage is >1000V, the red indicator light will be on and the buzzer will sound an alarm).

AC+DC Voltage Measurement (UT161E)

1) Insert the red test lead into the terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the position.
3) Short press the **SELECT** button to switch to AC+DC voltage measurement.
4) Connect the test leads with the measured load or power supply in parallel.
5) Read the voltage values on the display. The AC and DC voltages are displayed alternately.

3. AC/DC Millivolt Voltage Measurement (Picture 6)



Picture 6

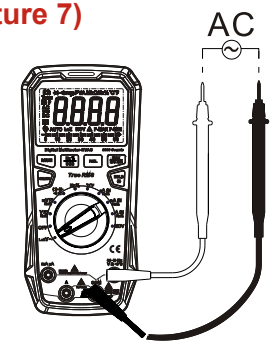
1) Insert the red test lead into the $\frac{}{V\,\Omega\,\cdot))}$ or $\frac{}{V\,\Omega\,\cdot))\,°C}$ terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the $\frac{mV}{Hz\%}$ position.
3) Short press the **SELECT** button to switch to AC/DC millivolt voltage measurement if required.
4) Connect the test leads with the measured load or power supply in parallel.
5) Read the voltage value on the display.
6) When measuring AC millivolt voltage, short press the $\frac{Hz\%}{USB}$ button to display the frequency/duty ratio of the measured voltage.

⚠ Caution:

- Do not input a voltage over 1000V or it may damage the meter.
- Be cautious to avoid electric shock when measuring high voltages.
- After completing the measurement, disconnect the test leads from the circuit under test.
- Before each use, verify meter operation by measuring a known voltage.
- The input impedance of the AC mV range is about 10MΩ. This load effect may cause measurement errors in high-impedance circuits. In most cases, if the impedance of the circuit is below 10kΩ, the error can be ignored (≤0.1%).

- The input impedance of the DC mV range is infinite (about 1GΩ), and it does not attenuate when measuring weak signals, so the measurement accuracy is high. When the test leads are open, there may be a value on the screen, but this is normal and will not affect the measuring result.
- Frequency measurement at 60mV range (AC voltage) is for reference only (UT161B/UT161D).

4. LoZ (low impedance) ACV Measurement (UT161D, Picture 7)



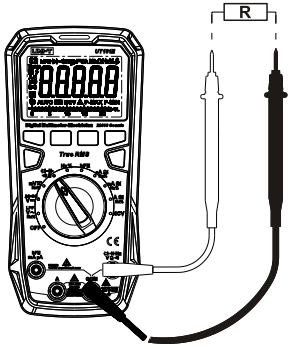
Picture 7

1) Insert the red test lead into the or $\frac{}{V\,\Omega\,\cdot))\,°C}$ terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the **LozV～**position.
3) Connect the test leads with the measured load or power supply in parallel.
4) Read the voltage value on the display.
5) Short press the $\frac{Hz\%}{USB}$ button to display the frequency/duty ratio of the measured voltage.

⚠ Caution:

- Do not input a voltage over 1000V or it may damage the meter.
- Be cautious to avoid electric shock when measuring high voltages.
- After completing the measurement, disconnect the test leads from the circuit under test.
- Before each use, verify meter operation by measuring a known voltage.
- After using the LoZ function, wait 3 minutes before next operation.
- LoZ ACV measurement eliminates ghost voltage for more accurate measurement.

5. Resistance Measurement (Picture 8)



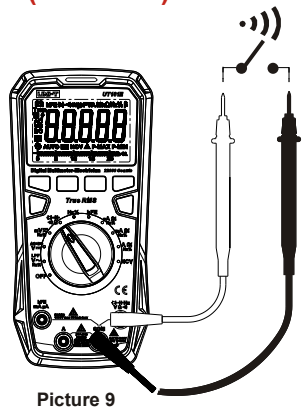
Picture 8

1) Insert the red test lead into the V Ω ·)) Hz or V Ω ·)) °C Hz terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the ·)) Ω or ·)) Ω position.
3) Touch the probes to the test points in the circuit.
4) Read the resistance value on the display.

⚠ Caution:

- Use caution when working with voltages above AC 30Vrms, 42Vpeak or DC 60V. Such voltages pose a shock hazard.
- If the measured resistor is open or the resistance exceeds the maximum range, the LCD will display “OL”.
- Before measuring resistance, switch off the power supply of the circuit, and fully discharge all capacitors.
- When measuring low resistance, the test leads will produce 0.1Ω~0.3Ω measurement error. To obtain accurate measurement, short-circuit the test leads and use the relative value measurement (REL) mode.
- If the resistance is not less than 0.5Ω when the test leads are short-circuited, please check if the test leads are loose or abnormal.
- When measuring high resistance, it is normal to take a few seconds to stabilize the reading.

6. Continuity Test (Picture 9)



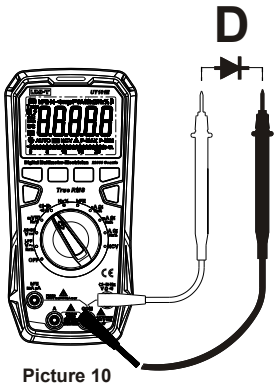
Picture 9

1) Insert the red test lead into the V Ω ·)) Hz or V Ω ·)) °C Hz terminal, and black test lead into the COM terminal.
2) Turn the function dial to the ·)) Ω or ·)) Ω position.
3) Short press the **SELECT** button to switch to continuity test.
4) Touch the probes to the test points in the circuit.
5) Measured resistance <50Ω: The circuit is in good conduction status; the buzzer beeps continuously and the green indicator light is on.

⚠ Caution:

- Use caution when working with voltages above AC 30Vrms, 42Vpeak or DC 60V. Such voltages pose a shock hazard.
- Before testing continuity, switch off the power supply of the circuit, and fully discharge all capacitors.

7. Diode Test (Picture 10)



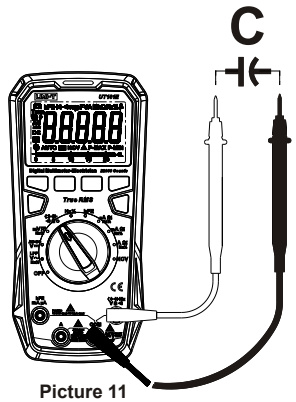
Picture 10

1) Insert the red test lead into the V Ω ·)) Hz or V Ω ·)) °C Hz terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the ⊣◄ or ·)) Ω ⊣ position.
3) Short press the **SELECT** button to switch to diode test if required.
4) Connect the red probe with the diode anode, and black probe with the diode cathode.
5) Read the forward bias value on the display.
6) Measured value <0.12V: The diode may be damaged; the red indicator light is on.
   Measured value within 0.12V~2V: The diode is normal; the green indicator light is on (for reference only).
7) If the diode is open or its polarity is reversed, the LCD will display “OL”. For silicon PN junction, the normal value is generally about 500~800 mV.

⚠ Caution:

- Use caution when working with voltages above AC 30Vrms, 42Vpeak or DC 60V. Such voltages pose a shock hazard.
- Before testing the diode, switch off the power supply of the circuit, and fully discharge all capacitors.

8. Capacitance Measurement (Picture 11)



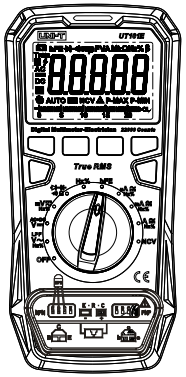
Picture 11

1) Insert the red test lead into the V Ω ·)) Hz or V Ω ·)) °C Hz terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the ⊣◄ or ·)) Ω ⊣ position.
3) Short press the **SELECT** button to switch to capacitance measurement.
4) Touch the probes to the capacitor pins.
5) Read the capacitance value on the display after it gets steady.

⚠ Caution:

- Use caution when working with voltages above AC 30Vrms, 42Vpeak or DC 60V. Such voltages pose a shock hazard.
- Before measuring, fully discharge all capacitors (especially high-voltage capacitors) to avoid damage to the meter and user.
- If the measured capacitor is short-circuited or the capacitance exceeds the maximum range, the LCD will display “OL”.
- When measuring high capacitance, it is normal to take a few seconds to stabilize the reading.
- For small capacitance measurement, the REL mode should be used to avoid the influence coming from distributed capacitance so as to obtain the correct reading.

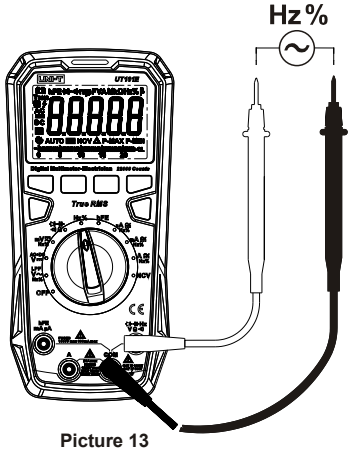
9. Transistor Magnification (hFE) Measu rement (UT161E, Picture 12)



Picture 12

1) Turn the function dial to the **hFE** position.
2) Insert the adapter socket into the input terminals.
3) Insert the three pins of the transistor under test into the corresponding holes of the adapter socket.
4) Read the magnification of the measured transistor.

10. Frequency/Duty Ratio Measurement (Picture 13)



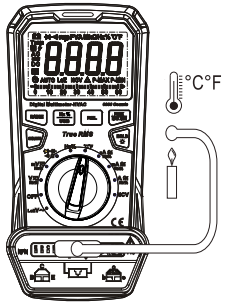
Picture 13

1) Insert the red test lead into the $\frac{\blacktriangleright\!\vdash\!\vdash\!\vdash Hz}{V\,\Omega\,\cdot))}$ or $\frac{\blacktriangleright\!\vdash\!\vdash\!\vdash Hz}{V\,\Omega\,\cdot))\,°C}$ terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the **Hz %** position.
3) Short press the $\frac{Hz\,\%}{USB}$ button to switch to frequency/duty ratio measurement if required.
4) Read the frequency/duty ratio value on the display.

⚠ Caution:

- Use caution when working with voltages above AC 30Vrms, 42Vpeak or DC 60V. Such voltages pose a shock hazard.

11. Temperature Measurement (UT161D, Picture 14)



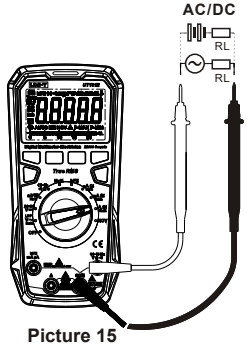
Picture 14

1) Turn the function dial to the **°C°F** position.
2) Insert the K-type thermocouple into the adapter socket, and then insert the adapter socket into the input terminals.
3) Bring the temperature sensing end of the thermocouple close to the object surface under test.
4) Read the Celsius temperature value on the display after it gets steady.
5) Short press the **SELECT** button to switch between °C and °F.

⚠ Caution:

- Only K-type thermocouple is applicable.
- The LCD displays “OL” when the meter is turned on.
- The measured temperature should be less than 230°C/446°F (°F = °C × 1.8 + 32)

12. AC/DC Current Measurement (Picture 15)



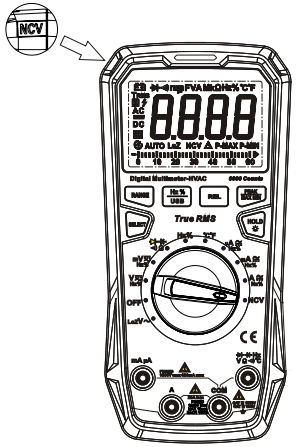
Picture 15

1) Insert the red test lead into the **mA/μA** or **A** terminal, and black test lead into the **COM** terminal.
2) Turn the function dial to the μA Hz% , mA Hz% , or A Hz% position.
3) Short press the **SELECT** button to switch to AC/DC current measurement if required.
4) Connect the test leads with the measured load or power supply in series.
5) Read the current value on the display (if the current is >10A, the red indicator light will be on and the buzzer will sound an alarm).
6) When measuring AC current, short press the Hz% USB button to display the frequency/duty ratio of the measured current.

⚠ Caution:

- To prevent possible electric shock, fire, or personal injury, switch off the power supply of the circuit, and then connect the meter with the circuit in series before measuring the current.
- If the range of the measured current is unknown, select the maximum range and then accordingly reduce.
- There are fuses inside **mA/μA** and **A** input terminals. Do not connect the test leads with any circuit in parallel.
- When the measured current is >5A, each measurement time should be ≤10s and the rest interval should be ≥15 minutes.
- When the temperature in the meter is ≥75°C after measurement of large current, the yellow indicator light will be on, the buzzer will beep, and the LCD will display “CUT”. When the temperature drops to <40°C, the yellow indicator light will be off, and the measurement can be made.

13. Non-Contact Voltage (NCV) Detection (Picture 16)



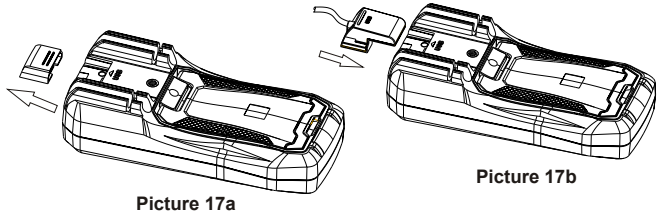
Picture 16

1) Turn the function dial to the **NCV** position.
2) Bring the NCV detector (top left corner of the meter) close to the wire (AC) under test.
3) If the voltage of the wire is ⩾50Vrms (frequency: 50Hz/60Hz), the red indicator light will be on and the buzzer will beep. If no voltage is detected, the LCD will display “EF”. As the intensity of the detected voltage increases, more segments “-” will be displayed, and the frequency for buzzer beeping and red indicator light flashing will be higher.

⚠ Caution:

- The detected voltage level varies with the distance between the NCV detector and the wire under test.
- The detected voltage level is for reference only, not for specific measurement. The frequency of the detected voltage should be 50Hz/60Hz.
- Hold the meter casing for non-contact voltage detection.

14. USB Data Transmission (Picture 17a, Picture 17b)



Picture 17a

Picture 17b

1) Pull out the USB sealing cover at the back of the meter (Picture 17a).
2) Insert the USB communication module into the USB access port of the meter and the LCD will display “S” (Picture 17b).
3) If USB data transmission is not needed during measurement, long press the Hz% / USB button or pull out the USB module to disable data transmission, and “S” will disappear.
4) To recover this function, long press the Hz% / USB button or insert the USB module.
5) The USB communication software can be downloaded from the official website of Uni-Trend (www.uni-trend.com).

15. Others

1) Auto power off: During measurement, if there is no operation for 15 minutes, the meter will automatically shut down to save power; before the automatic shutdown, the buzzer will beep for warning. Users can wake the meter up by pressing the **SELECT** button. To disable the auto-off function, press and hold the **SELECT** button in the off state, and then turn on the meter. To recover the function, restart the meter.
2) Buzzer alarm during measurement: When the input voltage >1000V or current >10A, the buzzer will sound an alarm.
3) Low battery indication: When the battery voltage is ⩽4.6V ±0.2V, “ ” will be displayed.

IX. Specifications

1. General Specifications

1) Max voltage between the input terminal and **COM** terminal: Please refer to the description of input protection voltage for each range.
2) **mA/μA** input terminal protection: (CE) 600mA 1000V fast-acting fuse, Φ6x32mm
3) **A** input terminal protection: (CE) 11A 1000V fast-acting fuse, Φ10x38mm
4) Max display: 6000 (UT161B/UT161D), 22000 (UT161E)
   Analog bar: 31 segments (UT161B/UT161D), 46 segments (UT161E) (conversion rate: 30 times/s).
5) Refresh rate: 2~3 times/s
6) Range: Auto/Manual
7) Polarity display: Auto
8) Over-range Indication: OL
9) Low battery indication: "🪫" is displayed.
10) Operating temperature: 0°C~40°C (32°F~104°F)
11) Storage temperature: -10°C~50°C (14°F ~122°F)
12) Relative humidity: ≤75% at 0˚C~30˚C; ≤50% at 30˚C~40˚C
13) Operating altitude: ≤2000m
14) Electromagnetic compatibility: Conforms to EN61326-1:2006 and EN61326-2-2:2006 standards
15) Battery: 4×1.5V AAA
16) Dimensions: 186mm×89mm×49mm
17) Weight: 400g
18) Safety standard: IEC 61010-1: CAT III 1000V/CAT IV 600V
19) Certification: CE, ETL
20) Pollution degree: 2
21) Information of usage: Indoor and outdoor

2. Electrical Specifications

Accuracy: ± (a% of reading + b digits), 1 year warranty
Ambient temperature: 23°C ± 5°C (73.4°F ± 9°F) Relative humidity: ≤75%

⚠ **Caution:**
To ensure measurement accuracy, the operating temperature should be within 18°C~28°C and the fluctuation range should be within ±1°C. When the temperature is <18°C or >28°C, add temperature coefficient error: 0.1 x (specified accuracy)/ °C.

1) DC Voltage

UT161E		
Range	Resolution	Accuracy
220.00mV	0.01mV	± (0.1%+5)
2.2000V	0.1mV	± (0.05%+5)
22.000V	1mV	
220.00V	10mV	
1000.0V	0.1V	± (0.1%+5)

UT161B/UT161D		
Range	Resolution	Accuracy
60.00mV	0.01mV	± (0.8%+5)
600.0mV	0.1mV	± (0.8%+3)
6.000V	0.001V	± (0.5%+3)
60.00V	0.01V	± (0.5%+3)
600.0V	0.1V	
1000V	1V	± (1.0%+3)

- Input impedance: About 1GΩ for mV range, about 10MΩ for other ranges
- Accuracy guarantee: 1%~100% of range; short circuit allows least significant digit ≤5
- Max input voltage: 1000V (if the voltage is >1000V, the red indicator light will be on and the buzzer will sound an alarm; if the voltage is >1010V , the LCD will display "OL")
- Overload protection: 1000V

2) AC Voltage

UT161E			
Range	Resolution	Frequency response	Accuracy
220.00mV	0.01mV	40Hz~1kHz	± (1.0%+10)
		1kHz~10kHz	± (1.5%+30)
2.2000V	0.1mV	40Hz~1kHz	± (0.8%+10)
		1kHz~10kHz	± (1.2%+50)
		40Hz~100Hz (LPF)	± (1.2%+50)
22.000V	1mV	40Hz~1kHz	± (0.8%+10)
		1kHz~10kHz	± (1.2%+50)
		40Hz~100Hz (LPF)	± (1.8%+50)
220.00V	10mV	40Hz~1kHz	± (0.8%+10)
		1kHz~10kHz	± (2.0%+50)
		40Hz~100Hz (LPF)	± (2.0%+50)
1000.0V	0.1V	40Hz~1kHz	± (1.2%+10)
		1kHz~10kHz	± (3.0%+50)
		40Hz~100Hz (LPF)	

UT161B/UT161D		
Range	Resolution	Accuracy
60.00mV	0.01mV	± (1.2%+5)
600.0mV	0.1mV	± (1.2%+5)
6.000V	0.001V	± (1.0%+3)
60.00V	0.01V	± (1.0%+3)
600.0V	0.1V	± (1.0%+3)
1000V	1V	± (1.2%+5)
LoZ ACV 600.0V (UT161D)	0.1V	± (2.0%+5)
LoZ ACV 1000V (UT161D)	1V	± (2.0%+5)

- Input impedance: About 10MΩ
- Display: True RMS
- Frequency response: 40Hz~500Hz (UT161B), 40Hz~1kHz (UT161D), 40Hz~10kHz (UT161E)
- The AC crest factor can be ⩽3.0 at 3000 counts, and can only be ⩽1.5 at 6000 counts. The additional error should be added according to the crest factor of a non-sinusoidal wave as follows (UT161B/UT161D):

a) Add 4% when crest factor is 1~2
b) Add 5% when crest factor is 2~2.5
c) Add 7% when crest factor is 2.5~3

- The AC crest factor can be ⩽2.0 at 10000 counts, and can only be ⩽1 at 22000 counts. The additional error should be added according to the crest factor of a non-sinusoidal wave as follows (UT161E):

a) Add 4% when crest factor is 1~2
b) Add 5% when crest factor is 2~2.5
c) Add 7% when crest factor is 2.5~3

- Frequency measurement range: 40Hz~500Hz (UT161B), 40Hz~1kHz (UT161D), 40Hz~10kHz (UT161E); input amplitude: ⩾10% of voltage range Duty ratio is for reference only.
- Accuracy guarantee (UT161B/UT161D): 2%~100% of 60mV range, 1%~100% of other ranges; short circuit allows least significant digit ⩽3
- Accuracy guarantee (UT161E): 1%~100% of range at 40Hz~1kHz, 10%~100% of range at 1kHz~10kHz; short circuit allows least significant digit ⩽10
- Max input voltage: 1000V (if the voltage is >1000V, the red indicator light will be on and the buzzer will sound an alarm; if the voltage is >1010V, the LCD will display “OL”)
- Overload protection: 1000V

3) AC+DC Voltage (UT161E)

UT161E			
Range	Resolution	Frequency response	Accuracy
2.2000V	0.1mV	40Hz~500Hz	± (1.8%+70)
22.000V	1mV	40Hz~500Hz	± (1.8%+70)
220.00V	10mV	40Hz~500Hz	± (1.8%+70)
1000.0V	0.1V	40Hz~500Hz	± (4.0%+70)

- AC voltage display: True RMS
- Input impedance: About 10MΩ
- Accuracy guarantee: 10%~100% of range
- For AC voltage, short circuit allows least significant digit ⩽200
- Overload protection: 1000V

4) Resistance

UT161E		
Range	Resolution	Accuracy
220.00Ω	0.01Ω	± (0.5+10)
2.2000kΩ	0.1Ω	
22.000kΩ	1Ω	
220.00kΩ	10Ω	
2.2000MΩ	100Ω	± (0.8+10)
22.000MΩ	1kΩ	± (1.5%+10)
220.00MΩ	10kΩ	± (3.0%+50)

UT161B/UT161D		
Range	Resolution	Accuracy
600.0Ω	0.1Ω	± (1.2%+2)
6.000kΩ	1Ω	± (1.0%+2)
60.00kΩ	10Ω	
600.0kΩ	100Ω	
6.000MΩ	1kΩ	± (1.2%+2)
60.00MΩ	10kΩ	± (2.0%+5)

- Measurement result = displayed value – resistance of shorted test leads
- Open circuit voltage: About 1V
- Accuracy guarantee: 1%~100% of range
- Overload protection: 1000V

5) Continuity and Diode

UT161B/UT161D/UT161E		
Range	Resolution	Remarks
	0.1Ω	Broken circuit: Resistance ⩾70Ω, no beep Well-connected circuit: Resistance <50Ω, audio/visual alarm
	0.001V	Open circuit voltage: About 3V For normal diodes, the buzzer will beep once. For short circuit, the buzzer will beep for a long time.

- Overload protection: 1000V
- When the forward voltage drop is within 0.12V~2V, the buzzer will beep once. When the forward voltage drop is <0.12V, the buzzer will beep for a long time.

6) Transistor Magnification (UT161E)

UT161E		
Range	Resolution	Remarks
1000β	1β	Ib0: About 1.8μA; Vce: About 2.5V

- The displayed value of the transistor magnification is for reference only.

7) Capacitance

UT161E		
Range	Resolution	Accuracy
22.000nF	1pF	± (3.0%+5)
220.00nF	10pF	
2.2000μF	100pF	
22.000μF	1nF	
220.00μF	10nF	± (4.0%+5)
2.2000mF	100nF	
22.000mF	1μF	± (10%+5)
220.00mF	10μF	± (20%+5)

UT161B/UT161D		
Range	Resolution	Accuracy
60.00nF	10pF	± (3%+5)
600.0nF	100pF	
6.000μF	1nF	
60.00μF	10nF	
600.0μF	100nF	
6.000mF	1μF	± (10%+5)
60.00mF	10μF	

- Overload protection: 1000V
- Measurement result = displayed value – capacitance of open-circuit test leads
- For capacitance ⩽1μF (UT161B/UT161D) and ⩽22nF (UT161E), it is recommended to use the REL mode to deduct the open circuit reading.
- Accuracy guarantee: 1%~100% of range
- For ranges of 2.2μF and below, when the accuracy is ⩽3%, 10 digits should be added (UT161E).
- For ranges of 60mF (UT161B/UT161D) and 220mF (UT161E), the measurement time is about 20s.

8) Temperature

Range		Resolution	Accuracy
-40~1000°C	-40~0°C	0.1°C~1°C	± (1.0%+3°C)
	0~300°C		± (1.0%+2°C)
	300~1000°C		± (1.0%+3°C)
-40~1832°F	-40~32°F	0.2°F~2°F	± (1.0%+6°F)
	32~572°F		± (1.0%+4°F)
	572~1832°F		± (1.0%+6°F)

- The measured temperature should be less than 230°C/446°F.

9) DC Current

UT161E		
Range	Resolution	Accuracy
220.00μA	0.01μA	± (0.5%+10)
2200.0μA	0.1μA	
22.000mA	1μA	
220.00mA	10μA	
20.000A	1mA	± (1.2%+50)

UT161B/UT161D		
Range	Resolution	Accuracy
600.0μA	0.1μA	± (1.0%+2)
6000μA	1μA	
60.00mA	10μA	± (1.0%+3)
600.0mA	0.1mA	
6.000A	1mA	± (1.2%+5)
10.00A (UT161B)	10mA	
20.00A (UT161D)	10mA	

- Overload protection:
  mA/μA range: F1 Fuse 600mA 1000V Φ6x32mm
  A range: F2 Fuse 11A 1000V Φ10x38mm
- Open circuit allows least significant digit ⩽5 (UT161B/UT161D) and ⩽10 (UT161E).
- Accuracy guarantee: 1%~100% of range

10) AC Current

UT161E			
Range	Resolution	Frequency response	Accuracy
220μA	0.01μA	40Hz~1kHz	± (0.8%+10)
		1kHz~10kHz	± (3%+50)
2200μA	0.1μA	40Hz~1kHz	± (0.8%+10)
		1kHz~10kHz	± (3%+50)
22mA	1μA	40Hz~1kHz	± (1.2%+10)
		1kHz~10kHz	± (3%+50)
220mA	10μA	40Hz~1kHz	± (1.2%+10)
		1kHz~10kHz	± (3%+50)
20A	1mA	40Hz~1kHz	± (1.2%+10)
		1kHz~10kHz	± (3%+50)

UT161B/UT161D		
Range	Resolution	Accuracy
600.0μA	0.1μA	± (1.2%+5)
6000μA	1μA	
60.00mA	10μA	± (1.5%+5)
600.0mA	0.1mA	
6.000A	1mA	± (2.0%+5)
10.00A (UT161B)	10mA	
20.00A (UT161D)	10mA	

- Display: True RMS
- Frequency response: 40Hz~500Hz (UT161B), 40Hz~1kHz (UT161D), 40Hz~10kHz (UT161E)
- Accuracy guarantee (UT161B/UT161D): 5%~100% of 600.0μA range, 1%~100% of other ranges; open circuit allows least significant digit ≤5
  Accuracy guarantee (UT161E): 1%~100% of range at 40Hz~1kHz, 10%~100% of range at 1kHz~10kHz (the minimum measured current at μA ranges is 30μA); open circuit allows least significant digit ≤10
- The AC crest factor can be ≤3.0 at 3000 counts, and can only be ≤1.5 at 6000 counts. The additional error should be added according to the crest factor of a non-sinusoidal wave as follows (UT161B/UT161D):

a) Add 4% when crest factor is 1~2
b) Add 5% when crest factor is 2~2.5
c) Add 7% when crest factor is 2.5~3

- The AC crest factor can be ≤2.0 at 10000 counts, and can only be ≤1 at 22000 counts. The additional error should be added according to the crest factor of a non-sinusoidal wave as follows (UT161E):

a) Add 4% when crest factor is 1~2
b) Add 5% when crest factor is 2~2.5
c) Add 7% when crest factor is 2.5~3

- Frequency measurement range: 40Hz~500Hz (UT161B), 40Hz~1kHz (UT161D), 40Hz~10kHz (UT161E); input amplitude: ≥50% of current range.
  Duty ratio is for reference only.
- Frequency accuracy: ± (0.1%+4); resolution: 0.1Hz (UT161B/UT161D)
- Overload protection: Same as that for DC current

11) Frequency/Duty Ratio

UT161E		
Range	Resolution	Accuracy
10Hz~220MHZ	0.01Hz~0.01MHz	± (0.01%+5)
0.1%~99.9%	0.1%	± (2%+5)

UT161B/UT161D		
Range	Resolution	Accuracy
10.00Hz~10.00MHZ	0.01Hz~0.01MHz	± (0.1%+4)
0.1%~99.9%	0.1%	± (2%+5)

- Frequency input amplitude:
  ≤100kHz: 200mVrms ≤ input amplitude ≤ 20Vrms
  >100kHz~1MHz: 600mVrms ≤ input amplitude ≤ 20Vrms
  >1MHz (UT161B/UT161D): 1Vrms ≤ input amplitude ≤ 20Vrms
  >1MHz~40MHz (UT161E): 1Vrms ≤ input amplitude ≤ 20Vrms
  >40MHz (UT161E): Not specified
- Duty ratio measurement is only applicable to square waves.
  1Vpp ≤ input amplitude ≤ 20Vpp
  Frequency ≤10kHz, duty ratio: 10.0% ~ 90.0%
- Overload protection: 1000V

12) Indicator Light

Function	Status	Description
NCV	Off	<36V
	On, red	50V~1000V (the red indicator light flashes from slow to fast)
Continuity	Off	OL
	On, red	No continuity (≥70Ω)
	On, green	Continuity (<50Ω)
Diode	Off	>2V
	On, red	Breakdown (<0.12V)
	On, green	Conduction (0.12V~2V)
AC/DC voltage	Off	≤1000V
	On, red	>1000V
Current	Off	≤10A
	On, red	>10A
Internal temperature during AC/DC current measurement	Off	The temperature in the meter drops to <40°C after measurement of large current.
	On, yellow	The temperature in the meter is ≥75°C after measurement of large current.

X. Maintenance

⚠ Warning: Before opening the rear cover or battery cover of the meter, switch off the power supply and remove the test leads.

1. General Maintenance

1) Clean the meter casing with a damp cloth and mild detergent. Do not use abrasives or solvents!
2) If there is any malfunction, stop using the meter and send it for maintenance.
3) The maintenance and service must be implemented by qualified professionals or designated departments.

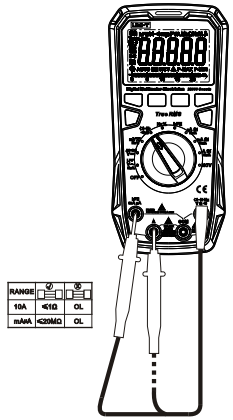
4) Resistance measurement can be used to check the built-in 600mA and 11A fuses. Operation (Picture 18a): Insert the red test lead into the ⏛ terminal or ⏛ terminal.Insert the red probe into the **mA/μA** input terminal to measure the resistance. If the LCD displays “OL”, the 600mA fuse is blown. Insert the red probe into the **A** input terminal to measure the resistance. If the LCD displays “OL”, the 11A fuse is blown.

2. Battery/Fuse Replacement (Picture 18b)

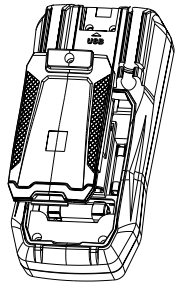
Battery: 4×1.5V AAA batteries
Fuse: F1 Fuse 600mA 1000V Φ6x32mm (mA/μA input terminal)
F2 Fuse 11A 1000V Φ10x38mm (A input terminal)

When “🔋” is displayed, please replace the batteries in time to ensure measurement accuracy.

Replacement steps:
1) Turn the function dial to the "OFF" position, and remove the test leads.
2) Unscrew and remove the battery cover to replace the batteries and fuses.



Picture 18a



Picture 18b

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