UT39E+
Handheld 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.

I. Overview

The UT39E+ is a 20000-count true RMS multimeter with high resolution, high accuracy, and manual range. Aside from normal features of multimeters, this meter also includes 0.1nS~100nS conductance measurement, which is converted to 10MΩ~10GΩ according to the inverse ratio of resistance. This function expands the resistance measurement range and enables high resistance measurement. Designed according to CAT II 1000V/CAT III 600V safety rating, the meter comes with overvoltage and overcurrent alarms, optimized NCV function, and full-featured false detection protection for high voltages.

II. Features

- 20000-count display, true RMS measurement, and fast ADC (3 times/s)
- Conductance measurement (0.1nS~100nS), converted resistance: 10MΩ~10GΩ
- Optimized NCV function: EFHI mode to distinguish neutral and live wires, EFLo mode for low electric fields, and audio/visual alarm
- Frequency measurement for sinusoidal waves and non-sinusoidal waves (such as crystal frequency)
- Max measurable AC/DC voltage: 1000V; max measurable current: 20A
- Current (AC/DC) mode memory function
- Low power consumption (generally: 1.5mA; sleep state: 5μA) to effectively extends the battery life to 500 hours
- Full-featured false detection protection, for up to 250V overvoltage surge for current function and 1000V for the others, and overvoltage and overcurrent alarms
- 1m drop protection

III. 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. K-type thermocouple ---------- 1 pc

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

⚠ **Before using the meter, please read the "Safety Instructions" carefully.**

IV. Safety Information

1. Safety Standards

1) The meter is designed according to EN 61010-1:2010; EN 61010-2-030:2010; and EN 61010-2-033:2012 standards.
2) The meter conforms to double insulation, CAT II 1000V/CAT III 600V overvoltage standard, and pollution degree 2.

2. Safety Instructions

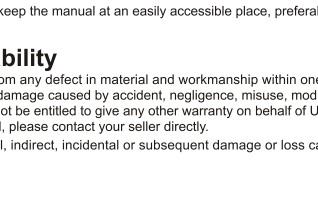
1) Do not use the meter if the rear cover or the battery cover is not completely covered up, or it may pose a shock hazard!
2) Check and make sure the insulation of the meter and test leads is in good condition without any damage before use. If the insulation of the meter casing is found to be significantly damaged, or if the meter is considered to be malfunctioning, please do not continue to use the meter.
3) Keep fingers behind the finger guards of the test leads when using the meter.
4) Do not apply more than 1000V between any terminal and earth ground to prevent electric shock and damage to the meter.
5) Use caution when working with voltages above AC 30Vrms, 42Vpeak or DC 60V. Such voltages pose a shock hazard.
6) The measured signal is not allowed to exceed the specified limit to prevent electric shock and damage to the meter !
7) Place the function dial in the correct position before measurement.
8) Never turn the function dial during measurement to avoid damage to the meter!
9) Do not change the internal circuit of the meter to avoid damage to the meter or user!
10) Damaged fuses must be replaced with fast-acting ones of same specifications.
11) When "🪫" is displayed, please replace the batteries in time to ensure measurement accuracy.
12) Do not use or store the meter in high temperature, high humidity, flammable, explosive, or strong magnetic field environments.
13) Clean the meter casing with a damp cloth and mild detergent. Do not use abrasives or solvents!

V. Electrical Symbols

Symbol	Description	Symbol	Description
⚠	Caution, possibility of electric shock	⎓	Direct current
~	Alternating current	⏚	Earth (ground) terminal
⧈	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION	⚠	Warning or Caution

VI. External Structure (Picture 1)

1. Protective cover
2. LCD display
3. Function buttons
4. Transistor test port
5. Function dial
6. Input terminals
7. Hook
8. Test lead slots
9. Battery cover
10. Tilt stand



Picture 1

VII. Function Buttons

1. SEL/Δ Button: Press this button to enter/exit the relative value measurement mode during capacitance measurement; press this button to switch between functions in each compound function position; press and hold this button and then turn on the meter to disable the auto-off function.
2. HOLD/☼ Button: Press this button to perform/cancel data hold; press this button for ≥ 2s to turn on/off the backlight.

VIII. Operating Instructions

Please check the internal 2×1.5V AA 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/DC Voltage Measurement

1) Turn the function dial to the AC/DC voltage position.
2) Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and make the probes in contact with both ends of the measured voltage (parallel connection to the load).

⚠ **Caution:**

- Do not input a voltage over 1000V, or it may damage the meter and hurt the user.
- If the range of the measured voltage is unknown, select the maximum range and then accordingly reduce (if the LCD displays "OL", it indicates that the voltage is over range).
- The input impedance of the meter is 10MΩ. This load effect may cause measurement errors in high-impedance circuits. If the impedance of the circuit is ⩽10kΩ, the error can be ignored (⩽0.1%).
- Be cautious to avoid electric shock when measuring high voltages.
- Before each use, verify meter operation by measuring a known voltage.

2. Resistance Measurement

1) Turn the function dial to the resistance measurement position.
2) Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and make the probes in contact with both ends of the measured resistance (parallel connection to the resistance).

⚠ **Caution:**

- Before measuring resistance, switch off the power supply of the circuit, and fully discharge all capacitors.
- If the resistance is not less than 0.5Ω when the test leads are shorted, please check if the test leads are loose or abnormal.
- If the measured resistor is open or the resistance exceeds the maximum range, the LCD will display "OL".
- When measuring low resistance, the test leads will produce 0.1Ω~0.2Ω measurement error. To obtain the final accurate value, the resistance of shorted test leads should be subtracted from the measured resistance value.
- When measuring high resistance, it is normal to take a few seconds to stabilize the reading.

3. Continuity Test

1) Turn the function dial to the continuity test position.
2) Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and make the probes in contact with the two test points.
3) When measured resistance ⩾50Ω, the circuit is broken and the buzzer makes no sound. When measured resistance ⩽10Ω, the circuit is in good conduction status and the buzzer beeps continuously along with a red LED indication.

⚠ **Caution:**

- Before testing continuity, switch off the power supply of the circuit, and fully discharge all capacitors.

4. Diode Test

1) Turn the function dial to the diode test position.
2) Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and make the probes in contact with the two endpoints of the PN junction.
3) 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 500mV~800mV (0.5V~0.8 V). The moment the reading is displayed the buzzer beeps once. Long beep indicates the short circuit of the test lead.

⚠ **Caution:**

- Before testing the PN junction, switch off the power supply of the circuit, and fully discharge all capacitors.
- The test voltage is about 3.3V/1.2mA.

5.Transistor Magnification (hFE) Measurement

1) Turn the function dial to the "**hFE**" position.
2) Insert the base (B), emitter (E) and collector (C) of the transistor under test into the four-pin test port accordingly. The hFE approximation of the transistor will be shown on the display.

6.Capacitance Measurement

1) Turn the function dial to the capacitance measurement position.
2) Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and make the probes in contact with the two endpoints of the capacitance.
3) When there is no input, the meter displays a fixed value (intrinsic capacitance). For small capacitance measurement, this fixed value must be subtracted from the measured value to ensure measurement accuracy. So, please use the relative value measurement (REL) mode to automatically subtract the fixed value.

⚠ **Caution:**

- If the measured capacitor is shorted 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.
- Before measuring, fully discharge all capacitors (especially high-voltage capacitors) to avoid damage to the meter and user.

7.AC/DC Current Measurement

1) Turn the function dial to the current measurement position.
2) Press the SEL/Δ button to select AC or DC measurement if necessary.
3) Insert the red test lead into the "**μAmA**" or "**A**" terminal, black test lead into the "**COM**" terminal, and connect the test leads to the power supply or circuit under test in series.

⚠ **Caution:**

- Switch off the power supply of the circuit, make sure the input terminals and dial position are correct, and then connect the meter to the circuit in series.
- If the range of the measured current is unknown, select the maximum range and then accordingly reduce.
- If the "**μAmA**" or "**A**" terminal is overloaded, the built-in fuse will be blown and must be replaced.
- Do not connect the test leads to any circuit in parallel during current measurement to avoid damage to the meter and user.
- When the measured current is close to 20A, each measurement time should be <10s and the rest interval should be >15 minutes.

8. Temperature Measurement

1) Turn the function dial to the temperature measurement position.
2) Insert the K-type thermocouple into the "**VΩ**" and "**COM**" terminals, and fix the temperature sensing end of the thermocouple on the object under test.

⚠ **Caution:**

- The LCD displays "OL" when the meter is turned on. Only K-type thermocouple is applicable, and the measured temperature should be less than 250°C/482°F (°F = °C × 1.8 + 32).

9. Frequency Measurement

1) Turn the function dial to the "**Hz**" position.
2) Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and connect the test leads to both ends of the signal source in parallel (measuring range: 10Hz~2MHz).

⚠ **Caution:**

- The output signal of the measurement should be <30V, otherwise the measurement accuracy will be affected.

10. Conductance measurement

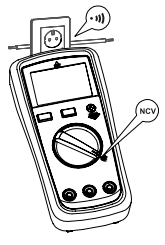
1) Turn the function dial to the "**nS**" position.
2) Insert the red test lead into the "**VΩ**" terminal, black test lead into the "**COM**" terminal, and connect the test leads to both ends of an object whose impedance is within 10MΩ~10GΩ in parallel (measuring range: 0.1nS~100nS).

⚠ **Caution:**

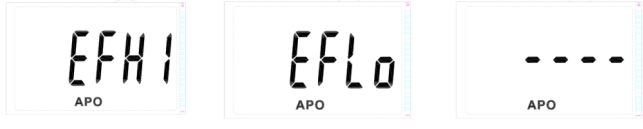
- If the impedance of the measured object is <10MΩ, the LCD will display "OL".

11. Non-Contact Voltage (NCV) Sensing (Picture 2)

1) To sense whether there is AC voltage or electric field in the space, please turn the function dial to the "**NCV**" position.
2) The sensing sensitivity is divided into two levels ("EFHI" and "EFLo"). The meter defaults to "EFHI". Select different sensitivity levels according to the intensity of the measured electric field. When the electric field is around AC 220V (50Hz/60Hz), select "EFHI"; when the electric field is around AC 110V (50Hz/60Hz), select "EFLo".
3) Bring the front end of the meter close to a socket or insulated wire. When an electric field is sensed, the LCD will display the segment "-", the buzzer will beep, and the red LED will flash. As the intensity of the measured electric field increases, more segments (up to "----") will be displayed, and the frequency for buzzer beeping and red LED flashing will be higher (vice versa).
4) The diagram of the segment indicating the intensity of the electric field sensing is shown below.



Picture 2



⚠ **Caution:**

- During NCV measurement, select the appropriate sensitivity level corresponding to the intensity of the electric field to distinguish neutral and live wires.
- Observe whether the conductor of the measured electric field is insulated to avoid personal injury.

12. Others

1) Auto Power Off (APO)

a. During measurement, if there is no operation of the function dial for 15 minutes, the meter will automatically shut down to save power. Users can wake it up by pressing any button or turning the function dial, and the buzzer will beep once.

b. To disable the auto-off function, press and hold the SEL/△ button in the off state, and turn on the meter. To recover the function, restart the meter.

2) Buzzer Alarm

a. The buzzer beeps once (about 0.25s) at any valid press of buttons or turning of the function dial.

b. The buzzer beeps continuously when the input voltage ≥1000V or input current ≥19A, indicating that it is at the range limit.

c. The buzzer makes five consecutive beeps about 1 minute before auto power off, and makes one long beep when the meter shuts down.

3) Low Battery Detection

a. Battery voltage <2.5V: "▭" is displayed and the meter still works.

b. Battery voltage <2.2V: "▭" is displayed and the meter cannot work.

IX. Specifications

1. General Specifications

1) Max voltage between any terminal and earth ground: 1000V
2) ⚠ **A** terminal protection: 20A H 250V fast-acting fuse
3) ⚠ **mA/μA** terminal protection: 200mA H 250V fast-acting fuse
4) Max display: 19999
5) Over-range indication: "OL"
6) Refresh rate: 3 times/s
7) Range: Manual
8) Backlight: Manually turn on/off. If on, the backlight automatically goes out after 30s of no use.
9) Polarity display: Auto. "—" is displayed for negative input.
10) Data hold indication: "H" is displayed.
11) Low battery indication: "▭" is displayed.
12) Audio/Visual alarm: Continuity and NCV measurement are accompanied by beeps and LED light indication.
13) Battery: 2×1.5V AA
14) Operating temperature: 0°C~40°C (32°F~104°F)
Storage temperature: -10°C~50°C (14°F ~122°F)
Relative humidity: ≤75% (0°C~30°C); ≤50% (30°C~40°C)
Operating altitude: ≤2000m
15) Dimensions: 175mm×83mm×53mm
16) Weight: About 330.8g (including batteries)

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.
Temperature coefficient: 0.1 x (specified accuracy)/°C (<18°C or >28°C)

1) DC Voltage

Range	Resolution	Accuracy
200.00mV	0.01mV	± (0.05%+3)
2.0000V	0.0001V	± (0.1%+3)
20.000V	0.001V	
200.00V	0.01V	
1000.0V	0.1V	

- Input impedance: About 10MΩ
- Accuracy guarantee: 1%~100% of range
- Max input voltage: 1000V (if ≥1100V, "OL" is displayed)
- Overload protection: 1000V

2) AC Voltage

Range	Resolution	Accuracy
200.00mV	0.01mV	± (1.0%+20)
2.0000V	0.0001V	± (0.5%+10)
20.000V	0.001V	
200.00V	0.01V	
1000.0V	0.1V	± (1.0%+10)

- Input impedance: About 10MΩ
- Frequency response: 45Hz~400Hz, sine wave RMS (mean response)
- Accuracy guarantee: 5%~100% of range
- Max input voltage: 1000V (if ≥1100V, "OL" is displayed)
- Overload protection: 1000V

3) Resistance

Range	Resolution	Accuracy
200.00Ω	0.01Ω	± (0.5%+10)
2.0000kΩ	0.0001kΩ	± (0.3%+2)
20.000kΩ	0.001kΩ	
2.0000MΩ	0.0001MΩ	
20.000MΩ	0.001MΩ	± (1.2%+20)
200.00MΩ	0.01MΩ	± (5.0%+30)

- Measurement result = displayed value – resistance of shorted test leads
- Overload protection: 1000V

4) Capacitance

Range	Resolution	Accuracy
20.000nF	0. 001nF	± (4%+20)
200.00nF	0. 01nF	
2.0000μF	0. 0001μF	
20.000μF	0. 001μF	
200.00μF	0. 01μF	
2000.0μF	0. 1μF	±10%

- For capacitance ≤100nF, it is recommended to use the REL mode to ensure measurement accuracy.
- Overload protection: 1000V

5) Continuity and Diode

Range	Resolution	Remarks
•))	0.1Ω	Broken circuit: Resistance ≥50Ω, no beep Well-connected circuit: Resistance ≤10Ω, consecutive beeps
▶|	0.001V	Open circuit voltage: About 3.3V (test current is about 1.5mA) For silicon PN junction, the normal value is generally about 0.5V~0.8V.

- Overload protection: 1000V

6) Temperature

Range			Resolution	Accuracy
℃	-40～1000℃	-40～40℃	1℃	± 4℃
		＞40～500℃		±(1.0%+5)
		＞500～1000℃		±(2.0%+5)
℉	-40～1832℉	-40～104℉	1℉	± 5℉
		＞104～932℉		±(1.5%+5)
		＞932～1832℉		±(2.5%+5)

- The measured temperature should be less than 250°C/482°F.

7) DC Current

Range	Resolution	Accuracy
2000.0μA	0.1μA	±（0. 5%+5）
20.000mA	0.001mA	±（0. 8%+5）
200.00mA	0.01mA	
2.0000A	0.0001A	±（2. 0%+10）
20.000A	0.001A	

- Overload protection: 250Vrms

8) AC Current

Range	Resolution	Accuracy
2000.0μA	0.1μA	±（0. 8%+10）
20.000mA	0.001mA	
200.00mA	0.01mA	
2.0000A	0.0001A	±（2. 5%+10）
20.000A	0.001A	

- Frequency response: 45Hz~400Hz
- Input ≥19A: Alarm sound; input >19.999A: "OL" is displayed.
- Overload protection: 250Vrms

9) NCV

Range	Sensing sensitivity level	Accuracy
NCV	EFLo	To sense AC voltages above 24V±7V
	EFHi	To sense AC voltages above 48V±9V, to identify whether the mains socket is charged, or to distinguish neutral and live wires of the socket

- Test results may be affected by different socket designs or wire insulation thickness.

10) Frequency

Range	Resolution	Accuracy
0. 00Hz～2. 0000MHz	0. 01Hz～0. 001MHz	±（0. 1%+3）

- Input amplitude:
≤100kHz: 200mVrms ≤ input amplitude ≤ 30Vrms
>100kHz~2MHz: 500mVrms ≤ input amplitude ≤ 30Vrms
- Overload protection: 1000V

11) Conductance

Range	Resolution	Accuracy
0. 1～100nS	0. 1nS	±（1. 0%+3）

- Overload protection: 1000V

12) Transistor Magnification (hFE)

Range	Resolution	Accuracy
0～1000 β	1 β	Approximation: 0~1000β

X. Maintenance

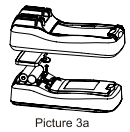
⚠ Warning: Before opening the rear cover or battery cover, switch off the power supply and remove the test leads.

1. General Maintenance

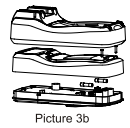
1) Clean the meter casing with a damp cloth and mild detergent. Do not use abrasives or solvents!
2) If there is any malfunction, stop using the meter and send it for maintenance.
3) The maintenance and service must be implemented by qualified professionals or designated departments.

2. Battery/Fuse Replacement

1) Battery Replacement (Picture 3a)
a. Turn the function dial to the "OFF" position, remove the test leads from the input terminals, and remove the protective cover.
b. Unscrew and remove the battery cover.
c. Replace with 2×1.5V AA batteries, observing correct polarity.
d. Secure the battery cover and tighten the screw.


Picture 3a

2) Fuse Replacement (Picture 3b)
a. Turn the function dial to the "OFF" position, remove the test leads from the input terminals, and remove the protective cover.
b. Unscrew and remove the rear cover.
c. Replace the blown fuse (specifications: F1 Fuse 200mA 250V Φ5x20mm ceramic tube; F2 Fuse 20A 250V Φ5x20mm ceramic tube)
d.Secure the rear cover and tighten the two screws.


Picture 3b

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