P/N:110401107604X

UNI-T®

UT136B+/C+ Digital Multimeter User Manual

I. Introduction

The new generation of UT136+ series digital multimeter has an innovative industrial design which ensures that the product can withstand a drop of 2 meters height. Large LCD screen provides a clear display and its 4 times/second sampling rate provides users with more accurate readings. UT136+ series is designed to work safely in CAT II 1000V/CAT III 600V environment. This series is suitable for civil/commercial use such as HVAC technicians and electricians.

2. Features

- Ergonomic design, comfortable and solid.
- Can withstand a drop of 2 meters height.
- 4 times/second sampling rate.
- Full protection which can withstand overvoltage shock up to 1kV, and designed with overvoltage and overcurrent alarm.
- Fast capacitance measurement, response time < 3s when capacitance ≤1mF, response time is about 6s when capacitance ≤10mF.
- Low power consumption, automatic power saving prolongs battery life up to 400 hours.

3. Accessories

Open the package box and take out the device. Please check whether the following items are deficient or damaged:

1) User manual ---------- 1 pc
2) Test leads ---------- 1 pair
3) Protective case ---------- 1 pc
4) Thermocouple ---------- 1 pc (only for UT136C+)

⚠ Warning: Before using the instrument, please read the "Safety operation guidelines" carefully.

4. Safety Operation Guidelines

1) Safety Certification

- Design according to IEC61010-1: 2010, 61010-2-030:2010, 61010-2-033:2012, 61326-1:2013, 61326-2-2:2013.
- Complies with the safety standards of CAT II 1000V/ CAT III 600V and material contamination grade II.

2) Safety Instructions and Precautions

- Do not use the device if the rear cover is not covered up or it will pose a shock hazard.
- Do not use the device if the device or test leads appear damaged or if you suspect that the device is not operating properly. Pay particular attention to the insulation layer.
- Keep the fingers behind the finger guard during operation.
- Do not input voltage over 1000V between the instrument terminal and ground to prevent electric shocks or damages to the instrument.
- Be cautious to prevent electric shock if the measured DC voltage > 60V or AC voltage > 30Vrms.
- Do not input overrange value.
- Functional dial should be switched to proper position.
- Do not switch the functional dial during measurement.
- Do not change the internal circuit of the device in order to avoid the damage to the device and users.
- Use the same specification fuse for replacement.
- To avoid false reading, replace the battery when the battery indicator " " appears.
- Do not use or store the device in high temperature and high humidity environment, the performance of the device may deteriorate after exposure to moisture.
- Use damp cloth to clean the case; do not use detergent containing solvents or abradants.

5. Electrical Symbols

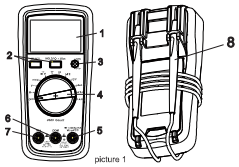
	Low battery		Double insulation
	AC/DC		High voltage hazard
	Warning		Grounding

6. General Specifications

1) Max voltage between input terminal and ground: 1000Vrms.
2) 10A terminal: Fuse 10A H 250V fast-acting fuse Φ5x20mm.
3) mA/uA terminal: Fuse 0.5A H 250V fast-acting fuse Φ5x20mm.
4) Max Display Value: 4000; Overrange display "OL", refresh 4 times/second.
5) Measuring range: Auto Range.
6) Backlight: Manual, automatic shut down when 5 mins inactive, long press HOLD/Light to turn on/off the backlight.
7) Polarity: Negative input display "—" symbol.
8) Data hold indicator:
9) Low battery indicator:
10) Battery: AA battery (zinc manganese) 1.5V x 2
11) Operating temperature: 0℃~40℃ (32℉~104℉)
Storage temperature: -10℃~50℃ (14℉~122℉)
Relative humidity: 0℃~below 30℃ ≤75%; 30℃~40℃ ≤50%.
12) Electromagnetic compatibility:
RF≤1V/m, overall accuracy=specified accuracy+5% of range.
RF>1V/m, no specified calculation.

7. External Structure and Test Leads Storage (picture 1)

1	LCD display	2	Functional buttons
3	Transistor input terminal	4	Functional switch
5	VΩmA input terminal	6	COM input terminal
7	10A current input terminal	8	Test leads



picture 1

8. Functional Buttons

- SELECT: Press to cycle through the AC/DC mV range, AC/DC current range, diode/continuity, and temperature function (Only for mV、、、、、℃℉).
- **HOLD/☼**: Press the button to perform data hold/cancel data hold. Press this button ≥2s to turn on/off the backlight.

9. Measurement Instructions

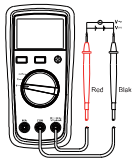
Please check the attached AA 1.5Vx2 batteries first. To avoid false reading, replace the battery if the battery low power symbol " " appears. Also pay special attention to the warning sign "⚠" besides the test lead plug, it indicates that the tested voltage or current must not exceed the values listed on the device.

1) AC/DC Voltage Measurement (see picture 2)

- Switch the dial to AC voltage position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured voltage (parallel to the load).

⚠Notes:

*. Do not input voltage over 1000Vrms, or it may pose shock hazard. If the measured voltage range is not known before the measurement, set the switch to the highest range, and then gradually reduce the measuring range according to the actual reading (LCD display 0L indicates over-range, need to increase the measuring range). Measurement accuracy might be affected when large circuit impedance is present.
*. Be cautious when measuring high voltage.
*. Before using the device, it is suggested to measure a known voltage for verification.



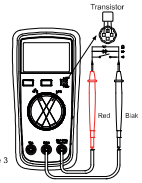
picture 2

2) Resistance Measurement (see picture 3)

- Switch the dial to resistance position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends ends of the measured voltage (parallel to the load).

⚠ Notes:

*. To avoid instrument damage and injury to users, before measuring the resistance online, all power supplies in the circuit must be turned off and the residual charge on all capacitors must be released.
*. If the resistance when shorted is more than 0.5Ω, please check if test leads are loosened or damaged.
*. If the resistor is open or over the range, the "OL" symbol will be displayed on the screen.
*. When measuring low resistance (V1), the test leads may produce 0.1Ω~0.2Ω measurement error. To obtain accurate measurement, short the test leads to obtain the resistance value (V2). Result=V1-V2.
*. When measuring high resistance, it may take a few seconds to stabilize reading, which is a normal phenomenon.
*. Do not input over 60V DC or 30V AC.



picture 3

3) Continuity Measurement (see picture 3)

- Switch the dial to continuity position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both measured ends.
- When measured resistance > 51Ω, circuit is in open status and the buzzer will make no sound.
When measured resistance ≤10Ω, circuit is in good conduction status and the buzzer will be beeping continuously.

⚠ Notes:

*. To avoid instrument damage and injury to users, before measuring the continuity online, all power supplies in the circuit must be turned off and the residual charge on all capacitors must be released.

4) Diode Measurement (see picture 3)

- Switch the dial to diode position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the PN junction.
- "OL" symbol appears when the diode is open or polarity is reversed. For silicon PN junction, normal value: 500~800mV (0.5~0.8V).

⚠ Notes:

*. To avoid instrument damage and injury to users, before measuring the PN junction online, all power supplies in the circuit must be turned off and the residual charge on all capacitors must be released.
*. Voltage for testing diode is about 3 V.

5) hFE Measurement (see picture 3)

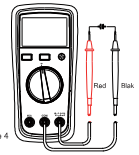
- Switch the dial to "hFE" position.
- Insert the transistor (PNP or NPN type) poles (B, E, C) into the corresponding socket, the hFE value will be displayed on the screen.

6) Capacitance Measurement (see picture 4)

- Switch the dial to capacitance position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured capacitor.
- When there is no input, the screen will also show a fixed reading which is the inherent capacitance value of the device. For small capacitance (<200nF) measurement, the measured value must subtract the inherent capacitance value to ensure the measurement accuracy.

⚠ Notes:

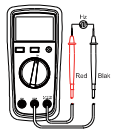
*. If the tested capacitor is shorted or its capacitance is over the specified range, "OL" symbol will be displayed on the screen.
*. When measuring large capacitance, it may take a few seconds to obtain steady readings.
*. Before measuring large capacitance (>1mF), please fully discharge the capacitors, or the LCD will display "DIS" symbol. This is extremely important for capacitors with high voltage to avoid shock hazard.



picture 4

7) Frequency Measurement (see picture 5)

- Switch the dial to Hz position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured signal source.



picture 5

⚠ Notes:

* When there is no input, the device may be influenced by the strong power frequency. There may be a reading of 50Hz or 60Hz which will not affect the measurement accuracy.
* Do not input over 60V DC or 30V AC.

8) Temperature Measurement (Celsius/Fahrenheit, only for UT136C+, see picture 6)

- Switch the dial to temperature position.
- Plug the K-type thermocouple into the device and put the probe on the object. Read the temperature on the screen after the value is stable.

⚠ Notes:

* The device will display "OL" when it turns on. And it is only suitable for the K type (Ni-Cr~Ni-Si) thermocouple, which is a temperature sensor. The measured temperature should be less than 250℃/ 482℉ (℉=℃*1.8+32).
* When the device is moved to another space, it is suggested to use it after 1.5 hours for accurate reading.

picture 6

9) AC/DC current Measurement (see picture 7)

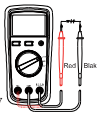
- Switch the dial to AC/DC current position.
- Insert the red test lead to the "VΩmA" jack or the "10A" jack, black to the "COM" jack, then connect the test leads with the circuit in series.
- Press SELECT to switch between ACA and DCA.

⚠ Notes:

* Before measuring, switch off the power supply of the circuit, and carefully check the input terminals and the dial position.
* If the range of the measured current is unknown, select the maximum range and then accordingly reduce.
* If the "VΩmA", "10A" input is overloaded, the internal fuses will break and must be replaced.

a.VΩmA terminal fuse specification: Fuse 0.5A/250V Φ5x20mm.
b.10A terminal fuse specification: Fuse 10A/250V Φ5x20mm.

* To avoid instrument damage and injury to users, do not connect the test leads in parallel to any voltage circuit during the current test.
* If the tested current is close to10A, each measurement time should be less than10 seconds and the next test should be after 15 minutes.



picture 7

10) NCV Measurement (only for UT136B+, see picture 8)

picture 8

- To sense whether there is AC voltage or electromagnetic field in the space, please switch the dial to the NCV position.
- Place the front end of the device near the measured object. "-"symbol indicates the intensity of the electric field. More "-" (up to 4 segments) and the higher the buzzer frequency, the higher the electric field intensity.
- Display of electric field intensity.

* When electric field intensity is 0~100mV, LCD displays "EF".
* When electric field intensity is 100~200mV, LCD displays "-".
* When electric field intensity is 200~300mV, LCD displays "--".
* When electric field intensity is 300~400mV, LCD displays "---".
* When electric field intensity is >400mV, LCD displays "----".

11) Others

*. The device enters normal measurement status in 2 seconds after start-up.
*. The device automatically shuts down if there is no operation for 30 minutes. You can wake up the device by pressing any key, the buzzer will beep once. To disable auto shutdown, switch the dial to OFF position, long press SELETE or HOLD button and turn on the device.
*. The buzzer will beep once (about 0.25s) at any valid press or switch of the dial.
*. Input voltage ≥30V (AC /DC), buzzer will intermittent beep and "⚠" symbol appears.
*. Buzzer beeps continuously 1 minute before automatic shutdown.
*. Low voltage detection: Battery voltage < 2.4V, " " under-voltage symbol appears, but it can still work normally; after about 10s, " " flickers for about 40s and displays "Lo.bt" while " " flickers. Then the device will automatically shut down in about 2 minutes.

10. Technical Specifications

*. Accuracy: ±(a% of reading +b numerical value in least significant digit slot), 1 year warranty
*. Ambient temperature: 23℃±5℃ (73.4℉±9℉), relative humidity: ≤75%

⚠ Notes:

. To ensure accuracy, operating temperature should be within 18℃~28℃ and fluctuation range should be within ±1℃. Temperature Coefficient= 0.1(specified accuracy)/℃ (<18℃ or>28℃).

1) DC Voltage Measurement

Range	Resolution	Accuracy
400.0mV	0.1mV	±(0.7%+3)
4.000V	0.001V	±(0.5%+2)
40.00V	0.01V	±(0.7%+3)
400.0V	0.1V	±(0.7%+3)
1000V	1V	±(0.7%+3)

⚠Input impedance:

*. Input impedance: About 10MΩ, at 400mV range ≥1000MΩ. Results might be unstable at mV range when no load is connected. The value becomes stable once the load is connected (Least significant digit ≤±3).
*. Max input voltage: ±1000V, when the voltage ≥1010V, "OL" symbol appears.
*. Overload protection: 1000Vrms (AC/DC).

2) AC Voltage Measurement

Range	Resolution	Accuracy
400.0mV	0.1mV	±(1.0%+3)
4.000V	0.001V	±(0.7%+3)
40.00V	0.01V	±(1.0%+3)
400.0V	0.1V	±(1.0%+3)
1000V	1V	±(1.0%+3)

* Input impedance: about 10MΩ, at 400mV range ≥1000MΩ.
* Frequency response: 40Hz ~1kHz, display sine wave true RMS (average response).
* Max input voltage: ±1000V, when the voltage ≥1010V, "OL" symbol appears.
* Overload protection: 1000Vrms (AC/DC).

3) Resistance Measurement

Range	Resolution	Accuracy
400.0Ω	0.1Ω	±(1.0%+2)
4.000kΩ	0.001kΩ	±(0.8%+2)
40.00kΩ	0.01kΩ	±(0.8%+2)
400.0kΩ	0.1kΩ	±(0.8%+2)
4.000MΩ	0.001MΩ	±(1.2%+2)
40.00MΩ	0.01MΩ	±(1.5%+5)

* Measurement result = reading of resistor – reading of shorted test leads
* Overload protection: 1000Vrms (AC/DC).

4) Continuity, Diode and Transistor

Position	Resolution	Remark
•)))	0.1Ω	**Set Value** Open circuit: resistance>50Ω, no beep.Well-connected circuit: resistance≤10Ω, continuous beeps.
▶|	0.001V	Open circuit voltage :3V, test current: about 1mA.Silicon PN junction voltage: 0.5 ~ 0.8V.
hFE	1ß	Transistor amplification factor: 1~1000β (measurement condition: Ibo≈20uA, Vce≈3V)

⚠ Overload protection: 1000Vrsm (AC/DC)

5) Capacitance Measurement

Position	Resolution	Remark
4.000nF	0.001nF	±(4%+10)
40.00nF	0.01nF	±(4%+10)
400.0nF	0.1nF	±(4%+10)
4.000μF	0.001μF	±(3%+5)
40.00μF	0.01μF	±(3%+5)
400.0μF	0.1μF	±(3%+5)
4.000mF	0.001mF	±(4%+10)
40.00mF	0.01mF	±(10%)

*. Overload protection: 1000Vrms (AC/DC).
*. When the capacitance ≤200nF, to ensure accuracy, measurement result = reading of capacitance – device inherent capacitance value.

6) Temperature Measurement (Only for UT136C+)

Position			Resolution	Remark
℃	-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)

*. Overload protection: 1000Vrms (AC/DC).
*. K-type (Ni-Cr~Ni-Si) thermocouple is only applicable for temperature less than 250℃/482℉.

7) DC current Measurement

Position		Resolution	Remark
μA	400.0μA	0.1μA	±(1.0%+3)
	4000μA	1μA	
mA	40.00mA	0.01mA	
	400.0mA	0.1mA	
A	4.000A	0.001A	±(1.2%+5)
	10.00A	0.01A	

⚠ Overload protection: 250Vrms

*. μA mA range: F1 Fuse 0.5A/250V Φ5x20mm.
*. 10 A range: F2 Fuse 10A/250V Φ5x20mm.

8) AC current Measurement

Position		Resolution	Remark
μA	400.0μA	0.1μA	±(1.2+5)
	4000μA	1μA	
mA	40.00mA	0.01mA	
	400.0mA	0.1mA	
A	4.000A	0.001A	
	10.00A	0.01A	±(2.0%+5)

Frequency response: 40~1kHz.

*. Display: RMS. Accuracy guarantee range: 5 ~100% of the range, shorted circuit allows least significant digit < 2.
*. Input current > 10.10A, "OL" symbol appears.
*. Overload protection: Refer to DC current measurement.

9) Frequency Measurement

Measuring Range	Resolution	Accuracy	Description
400.0Hz~ 40.00MHz	0.1Hz~ 10kHz	±(0.1%+4)	Measurement sensitivity:10Hz~40MHz ≤100kHz: 200mVrms ≤Input amplitude ≤30Vrms >100kHz~1MHz: 600mVrms ≤Input amplitude ≤30Vrms >1MHz~10MHz: 1Vrms ≤Input amplitude ≤30Vrms >10MHz: 1.8Vrms ≤Input amplitude ≤30Vrms

⚠ Overload protection: 1000Vrms (AC/DC).

11. Maintenance

⚠ Warning: Before opening the rear cover, switch off the power supply (remove test leads from the input terminal and the circuit).

1) General Maintenance

* Clean the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
* If there is any malfunction, stop using the device and send it to maintenance.
* The maintenance and service must be implemented by qualified professionals or designated departments.

2) Replace Battery or Fuse (see picture 9a, picture 9b)

* To avoid false reading, replace the battery when the battery indicator " " appears.
Battery Specification: AA 1.5Vx2
* Switch the dial to "OFF" position, remove the test leads from the input terminal, remove the protective cover also.
* Loosen the screw on battery cover (top), remove the cover to replace the battery (Please identify the positive and negative pole).

- When the fuse is burned out due to wrong measurement of voltage or over-current, some functions may not work properly, and the fuse should be replaced immediately.

* Switch the dial to "OFF" position and remove the test leads from the input terminal, remove the protective cover also.
* Loosen the both screws on the rear cover, and then remove the rear cover to replace the fuse.
* Fuse specification:
F1 Fuse 0.5A/250V Φ5x20mm ceramic tube
F2 Fuse 10A/250V Φ5x20mm ceramic tube

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