

# UT18E

## Voltage and Continuity Tester

### Operating Manual

#### 1. Symbols referred in the manual

**⚠** The manual includes necessary information regarding the safe usage and equipment maintenance and before use, read through each section of the manual.

**⚠** Failure to read the manual or comprehend the equipment use method specified in the manual would lead to physical injury and equipment damage.

	Dangerous Voltage
	Important Information. Please refer to instruction sheets.
	Double Insulation
	Suitable for living and working
	Do not discard the product as unclassified municipal waste. Put them in the designated battery recycle bin for further disposal.
	EU Certification
	UKCA Certification
CAT III	Measurement category III is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.
CAT IV	Measurement category IV is applicable to test and measuring circuits connected at the source of the building's low-voltage MAINS installation.

#### Symbol on tester panel and its description (Figure 1)

- Test pen L1;
- Test pen L2;
- Voltage indication (LED);
- LCD display;
- High-voltage indication;
- AC indication;
- Continuity indication;
- Polar indication;
- Rotary phase indication;
- RCD indication (LED);
- RCD test button;
- Self-inspection button;
- HOLD mode/backlight button;
- Headlamp
- Test pen cap;
- Battery cover

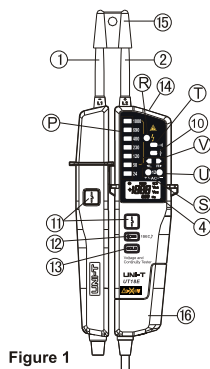


Figure 1

#### Figure 2 provides detailed description of LCD panel.

- Silent mode indication;
- HOLD mode indication;
- Low-voltage battery indication;
- Voltage measurement;
- Frequency measurement;
- DC voltage measurement
- AC voltage measurement;

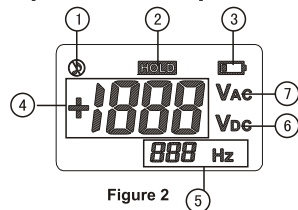


Figure 2

#### 2. Operation instruction and use scope of the tester

Voltage and continuity tester UT18E has such functions as AC/DC (including three-phase alternating current) voltage measurement, three-phase AC phase indication, frequency measurement, RCD test, continuity test, the simple test in case of no battery power supply, self-inspection, silent mode choice, overvoltage indication and low-voltage battery indication. In addition, the flashlight attached to the test pen provides convenient application in a dark environment.

To protect tester and the tester user, the tester is equipped with protecting jacket. The tester should be put on protective jacket after use, and preferably, placed inside tool kit so as to protect it against any damage. Never place the tester into your pocket.

The tester is applicable to various occasions such as the household, factory, electric power department, etc. It has the following characteristics:

- To protect physical injury, it is designed with protecting jacket;
- LED indication;
- LCD voltage and frequency display;
- AC/DC measured up to 1000V;
- Continuity measurement;
- Indicate the phase relationships among three-phase AC;
- Both the buzzing and silent mode is optional;
- Detection without battery ;
- Flashlight function;
- Self-inspection function;

- Low-battery voltage indication and measured voltage over range indication; It cannot be measured and needs to replace the battery.
- RCD test ;
- Automatic standby.

#### 3. Safety precautions

**⚠** To prevent physical injury, electric shock or fire, pay special attention to following items:

- Be sure both the test pen and test instrument is intact before test;
  - Be sure keep your hand only in contact with the handle while using the equipment;
  - Never use the equipment while the voltage is beyond the range (referring to technical specification parameters) and above 1100V;
  - Before use, be sure the equipment can function well;
  - To ensure normal operation of tester, measure a known voltage value in the first.
  - The tester cannot be used any more in case of one or several functional failure(s) or no functional indication.
  - Never test in wet conditions.
  - Display functions well only when the temperature ranges  $-15^{\circ}\text{C}\sim+45^{\circ}\text{C}$  and relative humidity is  $<85\%$ .
  - The instrument must be repaired in case the personal safety of operator cannot be guaranteed.
- 3.1 The safety would be no longer guaranteed in any of the following circumstances:
- Visible damage;
  - Tester's functions are inconsistent with functions that it supposed to have.
  - It had been stored in inappropriate conditions for a long time.
  - Subject to mechanical extrusion in transit.

#### 4. Voltage measurement

Observe safety test regulations specified in item 3.

Voltage gear of tester is composed of a line of LED, including 12V, 24V, 50V, 120V, 230V, 400V, 690V and 1000V. LED would be lighted one after another along with increased voltage, also include the polarity LED indication, AC LED indication, on-off LED indication, RCD LED indication, rotary phase LED indication and high-voltage LED indication.

- Complete self-check of tester before test. After pressing flashlight key 5s, tester would perform AC/DC

full range detection, accompanied by flashing LED (with exception to RCD light) and blinking displayed LCD. If need to exit self-check, just touch the flashlight key. Connect two test pens to the conductor to be measured, select a known voltage for measurement, such as 220V socket, and ensure the measurement accuracy (See Figure 3). The tester cannot measure AC and DC voltage less than 5V and provides no accurate indication while measured voltage is 5Vac/dc. Illuminating continuity light or AC light and beeping buzzer are normal.

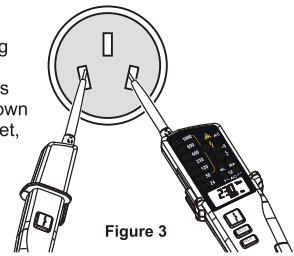


Figure 3

- Tester would provide LED+LCD indication while measuring AC or DC voltage. High-voltage LED would be illuminated and buzzer beeps when measured voltage is extra low voltage (ELV) threshold. If measured voltage continues to increase and exceed input protection voltage of the tester, 12V~1000V LED would keep flashing, LCD displays "OL" and buzzer keeps beeping.
- For measuring DC voltage, if L2 and L1 is connected respectively to the positive and negative pole of the object to be measured, LED would indicate the corresponding voltage, LCD displays "+mVDC" and, on the contrary, the LED indicating negative pole would be illuminated, LCD displays "-mVDC". If need to judge the positive and negative pole of the object to be measured, connect two test pens to the object to be measured randomly, the illuminating positive pole LED or LCD "+" on tester means the terminal connecting to L2 is the positive and the other connecting to L1 is the negative.
- For measuring AC voltage, two test pens may be randomly connected to two ends of the object to be measured, "+", "-" LED would be illuminated, LCD displays "VAC" while LED indicates the corresponding voltage value and LCD displays corresponding voltage value.

Note: For measuring AC voltage, L and R phase inversion indication LED would be illuminated, it means phase indication is unstable, L light or R light is illuminated, and even L and R light would be illuminated alternatively; L and R light would not provide correct and stable indication unless measuring three phase power system.

#### 5. Detection without battery

The tester may perform simple detection while the battery runs out or not battery is provided. Connect two test pens to the object to be measured, when the object has a voltage higher than or equivalent to 50VAC/120VDC, high-voltage LED would be illuminated, indicating dangerous voltage and the LED would gradually brightened along with increased voltage to be measured.

#### 6. Continuity test

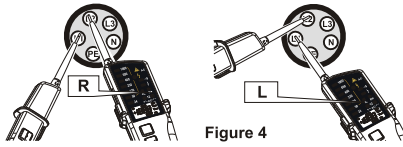
To confirm if the conductor to be measured is electrified, voltage measurement method may be adopted to measure the voltage at both ends of the conductor by using two test pens. Connect two test pens to the both ends of the object to be measured, if the resistance falls within  $0\sim 60\text{k}\Omega$ , continuity LED would be illuminated, accompanied by continuous beeping buzzer; and if resistance falls within  $60\text{k}\Omega\sim 150\text{k}\Omega$ , continuity LED may or may not be illuminated and buzzer may or may not beep; if resistance is  $>150\text{k}\Omega$ , continuity LED may not be illuminated and buzzer would not beep. Before any test, be sure the object to be measured is not electrified.

#### 7. Rotation test (three-phase AC phase indication)

The measurement must be conducted in accordance with the safety test regulations specified in item R, L LED or L and R symbol indication is applicable for rotation test and the test is only applicable for three-phase AC system.

1. Three-phase voltage test range: 100V~400V (50Hz~60Hz);
2. Hold the main body of tester (with finger holding handle), as shown in the following figure, connect test pen L2 to any phase and L1 to any of remaining two phases.
3. R or L LED would be illuminated, and after connecting a test pen to another phase, another LED (L or R) would be illuminated.
4. L or R LED would be illuminated accordingly when the position of two test pens are exchanged.
5. LED would indicate the corresponding voltage or LCD displays corresponding voltage value, the indicated or displayed voltage should be phase voltage against earth but three-phase voltage.

Diagram of three phase electric system testing (Figure 4)



Note: For measuring three-phase AC system, connect three measuring terminals to the corresponding terminal of three-phase system and, since the tester has only two test pen terminals, it is required to form the reference terminal by holding tester handle with finger (through the ground), therefore it would not accurately indicate the phase sequence of three-phase system if not holding the handle or wearing insulating gloves. In addition, it is necessary to ensure the earth terminal (earth wire or shell) of three-phase system in contact with human body while measuring three-phase power system lower than 100V.

### 8. RCD test

To reduce disturbance voltage during voltage measurement, a circuit with impedance lower than the tester under normal measurement mode may be provided between two test pens, namely the RCD circuit system.

For RCD trip test, connect two test pens to the L and PE terminal of 230Vac system under normal voltage measurement mode and press RCD key "⚡" on two test pens, RCD system would trip and the LED indicating RCD would be illuminated if the circuit then generates AC current higher than 30mA. Particularly, if RCD cannot measure for a long time and, at 230V, the testing time should be <10s, cannot conduct continuous measurement and, after once test, wait 60s before next measurement.

Note: In case of no measurement or test, it is normal to have continuously illuminated LED and continuous beeping buzzer after simultaneously pressing RCD keys on two test pens. To avoid functional disorder, do not press two RCD keys under non-RCD testing mode.

### 9. Silent mode selection

It is allowed to enter the silent mode while tester is under standby mode or normally used. After pressing flashlight key about 1s, tester would beep and LCD displays silence symbol "⊘", and tester enters silent mode and, under which mode, all functions are similar to those under normal mode, with exception to the silent buzzer. If need to resume normal mode (buzzing mode), press flashlight key about 1s and, after "beeps", the silence symbol "⊘" on LCD would disappear.

### 10. Application of flashlight function

Flashlight function may be selected if need to use the tester at night or in a dark environment; after light touch on flashlight button on tester panel, the headlamp on the top of tester would be turned on to facilitate your operation and, after operation, turn off the light with a light touch on the button.

### 11. Application of HOLD function

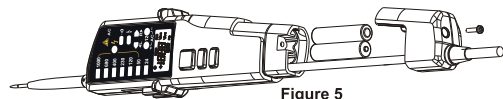
To facilitate reading and recording, hold the measured data (voltage and frequency value) by a light touch on HOLD on tester while using tester; after another light touch, hold status is relieved and restores to normal testing status.

### 12. Battery replacement

low-voltage symbol on LCD during use of tester indicates low-battery voltage and the necessity of battery replacement.

Replace battery according to following procedures (as shown in Figure 5):

- 1) Stop measurement and disconnect two test pens from the object measured;
- 2) Screw out screws securing battery cover with screwdriver;
- 3) Remove battery cover;
- 4) Take out the battery to be replaced;
- 5) Install new battery according to the battery symbol and direction indicated on panel;
- 6) Insert battery cover and secure it with screws.



Note: For environmental protection, batteries may be collected and recycled at fixed collection point while disposing the disposable battery or accumulator containing hazardous waste.

Please follow the local valid recycling regulations and dispose of the batteries replaced as per disposal rules for old battery and accumulator.

### 13. Equipment maintenance

No special maintenance requirement is provided unless the tester should be used as per manual instruction and, in case of any functional abnormality during normal operation, stop using immediately and contact the nearest authorized service center.

### 14. Equipment cleaning

Before cleaning, disconnect tester from the circuit being tested. If the instrument gets dirty during normal use, wipe it with wet cloth or small quantity of gentle household cleanser instead of acid cleanser or solvent. Do not use the tester within 5h after cleaning.

## 15. Technical indicator

Function	Range	Accuracy/Function
LED (AC/DC) Voltage indication (V)	12V	8V±1V
	24V	18V±2V
	50V	38V±4V
	120V	94V±8V
	230V	180V±14V
	400V	325V±15V
	690V	562V±24V
	1000V	820V±30V
Phase rotation test (three-phase voltage)	Voltage range: 100V~400V	✓
	Frequency: 50Hz~60Hz	✓
Continuity test	Accuracy: Rn+50%	✓
	Beeper and LED illumination	✓
RCD test	Voltage range: 230V, Frequency: 50Hz~400Hz	✓
Polarity measurement	Positive & Negative (auto)	✓
Self-check	All LED illuminated or LCD full-display	✓
Detection voltage without battery	100V~1000V AC/DC	✓
Auto range	Full range	✓
Flashlight	Full range	✓
Low-battery voltage indication	About 2.4V	✓
Over voltage protection	About 1100V	✓
Auto standby	Standby current <10uA	✓
Silent mode	Full range	✓
LCD display (voltage)	6V~1000V resolution: 1V	±[1.5%+(1~5) Digits]
LCD display (frequency)	40Hz~400Hz resolution: 1Hz	±(3%+5)

### LCD display accuracy indicator:

6V	12V/24V	50V	120V	230V/400V/690V/1000V
±(1.5%+1)	±(1.5%+2)	±(1.5%+3)	±(1.5%+4)	±(1.5%+5)

## 16. Function and parameter description

- Buzzing and silent mode is optional;
- Response time: LED<0.1s/LCD<1s
- Peak current of test circuit: Is<3.5mA (ac/dc)
- Test time: 30s
- Recovery time: 240s
- RCD test: Range: 230V (50Hz~400Hz); AC Current: 30mA~40mA; Test time <10s, recovery time: 60s;
- Working temperature range: -15°C~+45°C
- Storage temperature range: -20°C~+60°C
- Working humidity range: ≤85% RH
- Use environment: Indoor
- Operating altitude: <2000m
- Safety rating: CAT III 1000V, CAT IV 600V
- Class of pollution: 2
- Compliance: CE, UKCA
- Standards: EN 61010-1:2010 +A1:2019, EN IEC 61010-2-033: 2021 +A11:2021, BS EN 61010-1:2010 +A1:2019, EN 61326-1:2013, EN 61326-2-2:2013, EN 61243-3:2014
- Weight: 277g (inclusive of battery);
- Dimensions: 272×85×31mm
- Battery IEC LR03 (AAA) ×2

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UNI-TREND TECHNOLOGY (CHINA) CO., LTD.

No. 6, Gong Ye Bei 1st Road,  
Songshan Lake National High-Tech Industrial  
Development Zone, Dongguan City,  
Guangdong Province, China

