

UT18A/B/C/D/E 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
	Conforms to UL STD 61010-1, 61010-2-030, 61010-2-033, 61010-031, Certified to CSA STD C22.2 No. 61010-1, 61010-2-030, 61010-2-033, 61010-031.
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)

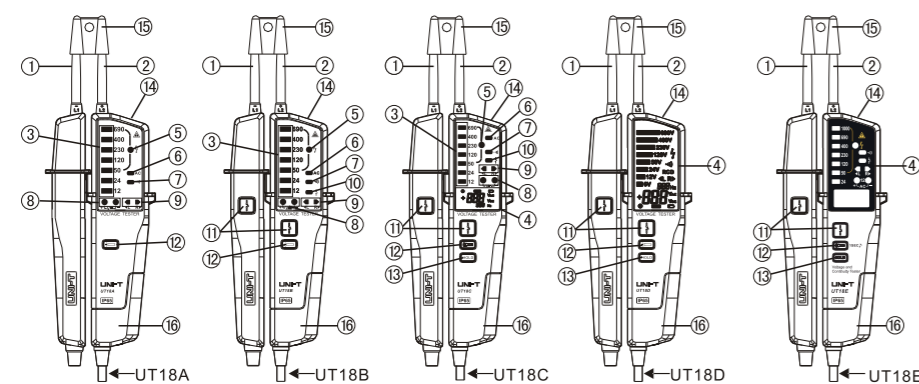


Figure 1

1	Test pen L1;	7	Continuity indication;	13	HOLD mode/backlight button;
2	Test pen L2;	8	Polar indication;	14	Flashlight
3	Voltage indication (LED);	9	Rotary phase indication;	15	Test pen cap;
4	LCD display;	10	RCD indication (LED);	16	Battery cover
5	High-voltage indication;	11	RCD test button;		
6	AC indication;	12	Flashlight/self-inspection button;		

Figure 2 provides detailed description of LCD panel.

1. Silent mode indication;
2. HOLD mode indication;
3. Low-voltage battery indication;
4. Voltage measurement;
5. Frequency measurement;
6. DC voltage measurement
7. AC voltage measurement;
8. Voltage indication (LCD segment code);
9. High-voltage indication;
10. Continuity indication;
11. RCD indication;
12. Rotary phase indication

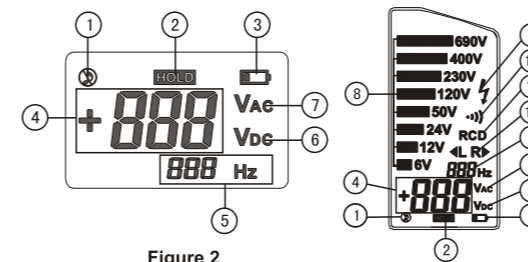


Figure 2

2. Operation instruction and use scope of the tester

Voltage and continuity tester includes four models: UT18A, UT18B, UT18C, UT18D and 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, more particularly, 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:

1. To protect physical injury, it is designed with protecting jacket;
2. LED indication (UT18A/B/C/E);
3. LCD voltage and frequency display (UT18C/D/E);
4. AC/DC measured up to 690V, UT18E can reach 1000V;
5. Continuity measurement;
6. Indicate the phase relationships among three-phase AC;
7. Both the buzzing and silent mode is optional;
8. Detection without battery (UT18A/B/C/E);
9. Flashlight function;
10. Self-inspection function;
11. Low-battery voltage indication and measured voltage over range indication (When the UT18E is low-battery voltage, it cannot be measured and needs to replace the battery);
12. RCD test (UT18B/C/D/E);
13. Automatic standby.

3. Safety precautions

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

- Before using a voltage detector with audible indicator at locations with a high background noise level, it has to be determined whether the audible signal is perceptible.
 - The voltage detectors are designed to be used by skilled persons and in accordance with safe methods of work.
 - The different indicating signals of the voltage detector (including the ELV limit indication) are not to be used for measuring purposes.
 - 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 800V;
 - 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°C ~ +45°C and relative humidity is <85%.
 - The instrument must be repaired in case the personal safety of operator cannot be guaranteed.
- 1 The safety would be no longer guaranteed in any of the following circumstances:
- 1) Visible damage;
 - 2) Tester's functions are inconsistent with functions that it supposed to have.
 - 3) It had been stored in inappropriate conditions for a long time.
 - 4) 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 or LCD segment codes, including 6V (UT18D), 12V, 24V, 50V, 120V, 230V, 400V, 690V and 1000V (UT18E only). LED (or LCD segment code) would be lighted one after another along with increased voltage, and so will the polarity LED (or LCD segment code) indication, AC LED (or LCD segment code) indication, on-off LED (or LCD segment code) indication, RCD LED (or LCD segment code) indication, rotary phase LED (or LCD segment code) indication and high-voltage LED (or LCD segment code) indication.

1. 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 or high-voltage symbol (UT18D) and beeping buzzer are normal.

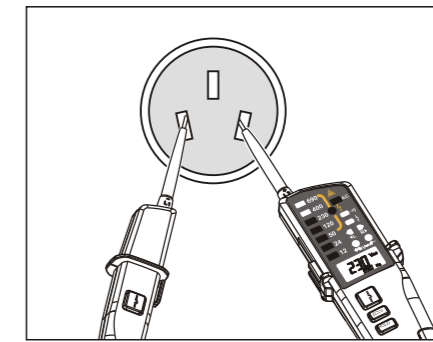


Figure 3

2. Tester would provide LED indication (UT18A/B), LED+LCD indication (UT18C/E) and LCD indication (UT18D) 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 (UT18A/B/C/D:750Vac/dc, UT18E:1015Vac/dc) of the tester, Corresponding LED would keep flashing (UT18A/B/C/E), LCD displays "OL" (UT18C/D/E) and buzzer keeps beeping.

3. 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 the voltage, meanwhile the LED indicating positive pole would be illuminated, LCD displays "+VDC" and, on the contrary, the LED indicating negative pole would be illuminated, LCD displays "-VDC". 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.
4. For measuring AC voltage, two test pens may be randomly connected to two ends of the object to be measured, AC LED would be illuminated ("+", "-" LED illuminate indicate AC at the same time, only for UT18E) 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 (UT18A/B/C/E) or L and R symbol (UT18D) would be illuminated, it means phase indication is unstable, L light (L symbol) or R light (R symbol) is illuminated, and even L and R light (L and R symbol) would be illuminated alternatively; L and R light (L and R symbol) 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 50V AC/120V DC, high-voltage LED would be illuminated, indicating dangerous voltage and the LED would gradually brightened along with increased voltage to be measured. The function is applicable only to UT18A/B/C/E.

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 0~100kΩ, continuity LED(UT18A/B/C)or continuity symbol "∞" (UT18D) would be illuminated, accompanied by continuous beeping buzzer; and if resistance falls within 100kΩ~150kΩ, continuity LED(UT18A/B/C)or continuity symbol "∞" (UT18D) may or may not be illuminated and buzzer may or may not beep; if the resistance falls within 0~60kΩ, continuity LED(UT18E)or continuity symbol "∞" would be illuminated, accompanied by continuous beeping buzzer; if resistance falls within 60kΩ~150kΩ, continuity LED(UT18E)or continuity symbol "∞" may or may not be illuminated and buzzer may or may not beep; if resistance is >150kΩ, continuity LED(UT18A/B/C/E) or continuity symbol "∞" (UT18D) may not be illuminated and buzzer would not beep. Before any test, be sure the object to be measured red 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 3.

In the case of strong electric field interference or strong radiation test phase sequence, the test results may be unstable.

- 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: 57V~400V (50Hz~60Hz) (100V~400V only for UT18E).
 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)

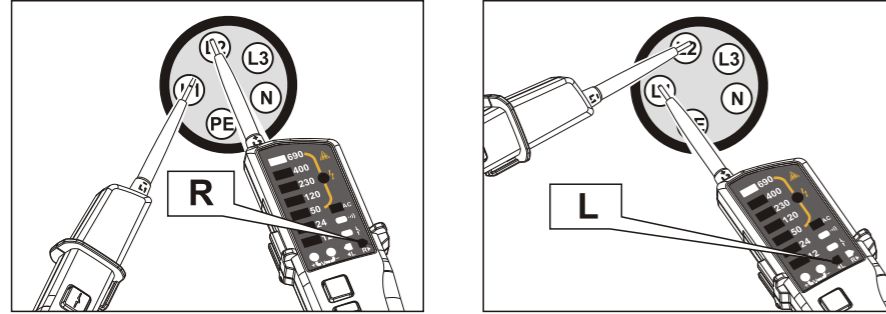


Figure 4

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 (UT18B/C/E) or RCD symbol (UT18D) 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 "⊘" (UT18C/D/E), 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 "bleeps", 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.

16. Technical indicator

Function	Range	UT18A	UT18B	UT18C	UT18D	UT18E
LCD segment (AC/DC) LED (AC/DC) Voltage indication (V)	6V			5V±1V	5V±1V	5V±1V
	12V	8V±2V	8V±2V	8V±1V	8V±1V	8V±1V
	24V	18V±2V	18V±2V	18V±2V	18V±2V	18V±2V
	50V	38V±4V	38V±4V	38V±4V	38V±4V	38V±4V
	120V	94V±8V	94V±8V	94V±8V	94V±8V	94V±8V
	230V	180V±14V	180V±14V	180V±14V	180V±14V	180V±14V
	400V	325V±15V	325V±15V	325V±15V	325V±15V	325V±15V
	690V	562V±24V	562V±24V	562V±24V	562V±24V	562V±24V
	1000V					820V±30V
Phase rotation test (three-phase voltage)	Voltage range: 57V~400V Frequency: 50Hz~60Hz	✓	✓	✓	✓	✓ (100V~400V only for UT18E)
Continuity test	Resistance range: 0~100KΩ Buzzing and LED illumination	✓	✓	✓	✓	✓ (0~60KΩ, only for UT18E)
RCD test	Voltage range: 230V Frequency: 50Hz~400Hz		✓	✓	✓	✓
Polarity measurement	Positive and negative pole	✓	✓	✓	✓	✓
Self-check	All LED illuminated or LCD full-display	✓	✓	✓	✓	✓
Detection without battery	Range: 50VAC~690VAC 120VDC~690VDC	✓	✓	✓	✓	✓ (1000V only for UT18E)

11. Application of backlight (only applicable for UT18D)

LCD displayed data may be hard to read at night or in a dark environment, allow the display clearly visible by turning on backlight on tester. Backlight would be turned on after pressing HOLD about 1s and, after operation, turn off the light after pressing HOLD about 1s. If tester enters standby mode while backlight is on, the light would remain illuminated when tester is awakened. The backlight cannot be turned off unless pressing HOLD about 1s again.

12. Application of HOLD function (UT18C/D/E)

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.

13. Battery replacement

Before using the voltage detector, Touch and hold the two probe tips together. If "⚡" shows and you hear the beeper, or in the silent mode, "⊘" is on. This makes sure that the battery source is not exhausted, otherwise, the battery source is exhausted.

Continuously flashing negative LED (UT18A/B) or low-voltage symbol on LCD (UT18C/D/E) 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; and
- 6) Insert battery cover and secure it with screws.

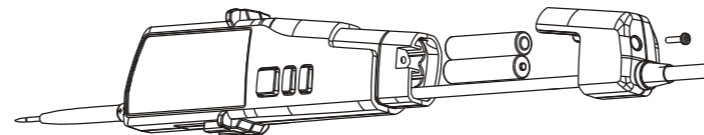


Figure 5

Warning:

To avoid electric shock, make sure the probes are disconnected from the measured circuit before removing the rear cover. Make sure the rear cover is tightly screwed before using the instrument.

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.

14. Equipment maintenance

No special maintenance requirement is provided unless UT18A/B/C/D/E 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.

15. 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.

Special functions

Function	Specification	UT18A	UT18B	UT18C	UT18D	UT18E
Waterproof	Ip65	✓	✓	✓	✓	✓
Auto range	Full range	✓	✓	✓	✓	✓
Flashlight	Full range	✓	✓	✓	✓	✓
Low-battery voltage indication	About 2.4V	✓	✓	✓	✓	✓
Over voltage protection	About 750V	✓	✓	✓	✓	✓ (1015V only for UT18E)
Auto standby	Standby current <10uA	✓	✓	✓	✓	✓
Silent mode	Full range	✓	✓	✓	✓	✓
Backlight	Full range					✓
LCD display (voltage)	6V~690V			±(1.5%+1)	±(1.5%+1)	±(1.5%+1) (1000V only for UT18E)
LCD display (frequency)	40Hz~400Hz			±(3%+5)	±(3%+5)	±(3%+5)

LCD display accuracy indicator:

Range (AC/DC)	6V	12V/24V	50V	120V	230V/400V/690V	1000V
UT18C	±(1.5%+1)	±(1.5%+2)	±(1.5%+3)	±(1.5%+4)	±(1.5%+5)	
UT18D	±(1.5%+1)	±(1.5%+2)	±(1.5%+3)	±(1.5%+4)	±(1.5%+5)	
UT18E	±(1.5%+1)	±(1.5%+2)	±(1.5%+3)	±(1.5%+4)	±(1.5%+5)	±(1.5%+5)

17. Function and parameter description

- LED voltage range: 12V~690V AC/DC, 1000V AC/DC (only for UT18E)
- LED voltage indication point: 12V, 24V, 50V, 120V, 230V, 400V, 690V, 1000V (only for UT18E)
- LCD voltage range: 6V~690V AC/DC (UT18C/D), 1000V AC/DC (only for UT18E); resolution: 1V, voltage accuracy: ±(1.5%+1~5 Digits);
- Frequency measurement range: 40Hz~400Hz, resolution: 1Hz, accuracy: ±(3%+5 Digits)
- Voltage measurement: Auto
- Buzzing and silent mode is optional;
- Polarity indication: Auto
- Range selection: Auto
- 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); Current: AC30mA~40mA; Test time <10s, recovery time: 60s;
- Over voltage protection: 750V AC/DC (1015V AC/DC only for UT18E)
- On-off test: 0 kΩ...100kΩ (0KΩ...60KΩ only for UT18E); Accuracy: Rn+50%;
- Rotation test (three-phase AC) Voltage range: 57V~400V; Frequency range: 50 Hz~60Hz (100V~400V only for UT18E);
- Simple test (without battery) Voltage range: 50VAC ~ 690VAC, 120VDC ~ 690VDC (UT18A/B/C, 1000V only for UT18E);
- Working temperature range: -15℃~+45℃
- Storage temperature range: -20℃~+60℃
- Working humidity range: ≤85% RH
- Over voltage protection class: CAT III 690V, CAT IV 600V, (UT18E: CAT III 1000V, CAT IV 600V)
- Class of pollution: 2
- Safety rules: IP65, EN61010-1, EN61243-3:2010
- Weight: 238g (UT18A), 272g (UT18B/C), 295g (UT18D), 277g (UT18E) (inclusive of battery);
- Dimensions: 272×85×31mm
- Battery: IEC LR03 (AAA) x 2

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