UNI-T

UT502A

Operating Manual

Insulation resistance tester

1. Overview

UT502A Insulation Resistance Tester is designed with brand-new design and combination of massive integrated and digital circuits; it can measure insulation resistance, low resistance, AC voltage, etc, and enjoys high degree of accuracy, stable performance, easy operation and reliability. It is used for insulation resistance measurement for insulation materials and various kinds of electric equipments such as transformer, electric machines, cables, switches, electrical appliances, a ideal tool for electric equipment maintenance, testing and inspection.

2. Safety Information

The instrument is designed and manufactured in compliance with IEC61010 standard. The manual covers safety information related to the safe operations and conditions of the instrument. please read carefully before using the instrument.

⚠ Warning

- Please read through and comprehend this Manual before using the device.
- Use always as specified in the manual, and keep it for future use.
- Wrong operation may cause accident and damage to instrument during test.

⚠ On this instrument indicates for safe operation, user shall carry out operation according to relevant instructions in this Manual.

⚠	Danger	conditions and actions that may cause serious or fatal damage.
⚠	Warning	Alerts users to avoid electric shock.
⚠	Caution	conditions and actions that may cause damage to the instrument or affect accurate measurement.

⚠ Danger

- Do not measure circuit with voltage over 750VAC.
- Do not test in flammable place. The spark may cause explosion.
- Do not operate the instrument if the surface is humid or operator's hand is wet.
- Do not touch conductive part of test leads when measuring.
- When test leads are shorted and connected to the instrument, do not press TEST key.
- Do not open battery cover during test.
- Do not touch the tested line during insulation measurement.

⚠ Warning

- If the instrument goes wrong, please stop using it. Eg: the instrument was damaged or had exposed metal.
- Be extremely careful when the instrument is working under voltage exceeding 33Vrms,46.7Vacrms or 70Vdc. The voltage may cause electric shock.
- When high resistance measurement is conducted, electric charge storage in circuit under test must be discharged.
- Do not replace battery when instrument is wet.
- Make sure secure connection between test leads and test ports of device.
- Make sure instrument is shutdown before opening battery cover.

⚠ Caution

- Circuit under test must be completely discharged and isolated from power circuit before measuring resistance.
- If test lead or adaptor need to be replaced due to damage, replace it with test lead or adaptor of the same model or electrical specification.
- Do not use the instrument if low battery indicator shows (▭). If the instrument will not be used for a long time, please take out the battery and keep it properly.
- Do not keep or operate the instrument in high temperature, high humidity, inflammable, explosive and strong electromagnetic field environment.
- Clean instrument housing with wet cloth or cleaning agent. Do not use abrasives or solvent.
- When instrument is wet, dry it before storage.

3. Electrical Symbols

⚡	Risk of electric shock
⧈	Double insulation or reinforced insulation
~	AC
⏚	Grounding

4. Technical Specifications

Accuracy: ±(a% of reading + b digits), calibration per year.
Working conditions:

Temperature: 23±5℃
Humidity : 45～75%RH

Insulation Resistance Measurement

Rated voltage	500V	1000V	2500V
Measurement range	0.00MΩ ~ 5.00GΩ	0.00MΩ ~ 5.00GΩ	0.00MΩ ~ 20.0GΩ
Open circuit voltage	DC 500V+10%	DC 1000V+10%	DC 2500V+10%
Rated measurement current	Under 500KΩ 1.00mA~1.10mA	Under 1MΩ 1.00mA~1.10mA	Under 2.5MΩ 1.00mA~1.10mA
Short circuit current	Approx. Less than 1.8mA		
Accuracy range	0.00MΩ~99.9MΩ: ±(3%+5)		
	100MΩ~10GΩ: ±(5%+5)		
	10.0GΩ~20.0GΩ: ±(10%+5)		

Polarization Index/Dielectric Absorption Ratio Measurement

PI Measurement	10min insulation resistance/1min insulation resistance			
PI Value	Greater than or equal to 4	4---2	2.0---1.0	Less than or equal to 1.0
Criterion	Best	Good	Warning	Bad
DAR Measurement	1min insulation resistance/30s insulation resistance			
DAR Measurement	1min insulation resistance/15s insulation resistance			
DAR Value	Greater than or equal to 1.4	1.25--1.0		Less than or equal to 1.0
Criterion	Best	Good		Bad

Low Resistance Measurementc

Open-circuit voltage	Approx. 5.0V
Measurement range	0.00~200Ω
Resolution ratio	0.01Ω
Accuracy	± (2%+3)Ω

Voltage Measurement

	AC voltage
Measurement range	30~750V (50/60Hz)
Resolution	1V
Accuracy	± (2%+3)

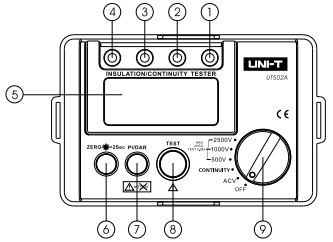
- Display: LCD, maximum reading is 1999
- Low battery indication: " ▭ " .
- Overload indication: ">22.0GΩ" shows under insulation resistance measurement.
- Automatic range
- Unit display: display the unit and function simultaneously
- Automatic voltage release
- Backlight for work on dark sites
- Red light for warning
- Work condition: 0℃～ 40℃/ relative humidity is 85% or less
- Storage condition: -20℃～ 60℃/relative humidity is 90% or less. (Altitude: <2000m)
- Dimension: 150mm(L)x100mm(W)x71mm(D)
- Current consumption: about 200mA (under maximum 2500V output) (about 10mA under normal condition)
- Accessories: test leads, alkaline battery 1.5V (AA battery)X6, operating manual, carrying case.

Weight	0.7kg (including battery)
Power	alkaline battery 1.5V (AA battery)X6

- Safety compliances: Overvoltage CATIII 600V, Pollution Degree 2 as per IEC61010

5. Tester's Structure(Front View)

1 EARTH: sampling jack of insulation resistance measurement
2 G. Negative jack of voltage measurement input
3 V: Positive jack of voltage measurement input
4 LINE: high voltage output jack for insulation resistance measurement
5 Display LCD screen
6 Backlight button
7 Switch button for PI/DAR
8 TEST button
9 Rotary knob



Front View

LCD Display

6. Buttons and Rotary Knob

1. PI/DAR button: measures polarization index/dielectric absorption ratio.
2. ZERO/LIGHT button: turns on/off the backlight or resets the display to zero for low resistance measurement.
3. TEST button: turns on/off insulation and low resistance measurement.
4. Rotary knob set to ACV: to measure AC voltage.
5. Rotary knob set to CONTINUITY: to measure low resistance.

6. Rotary knob set to 500V/1000V/2500V:
to select test voltage for insulation resistance measurement.

7. Preparations before Measurement

If low battery indicator shows on upper left corner of LCD after the meter is turned on, it means battery is almost used up and need to be replaced.

Low voltage symbol	Battery voltage
▭	7V or even less

8. AC Voltage Measurement (See Figure 1)

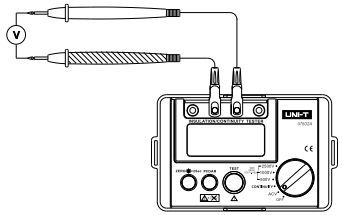


Figure 1

(1) Set the rotary knob to ACV.
(2) Insert the red test lead into "V" jack and the black test lead into "G" jack.

⚠ Caution

* Do not input voltage higher than 750Vrms. It is possible to display higher voltage, but it may damage the instrument.
* Please take extreme caution in order to avoid electric shock when measuring high voltage.
* Disconnect test leads and tested circuits and remove test leads away from input jacks after completing the measurement.
* If battery cover is opened, do not measure.

9. Low Resistance Measurement (See Figure 2)

⚠ Wiring method:

(1) Before insulation resistance measurement, the circuit under test shall be discharged completely and be totally isolated from power circuit.
(2) Insert red test lead into EARTH port, black test lead into G port.
(3) Connect red, black alligator clip or test probe with the circuit under test.

With the instrument connected to tested circuit as described above, turn rotary switch to CONTINUITY, press TEST, ground continuity measurement will be conducted.

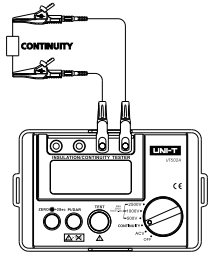


Figure 2

10. Insulation Resistance Measurement (See Figure 3)

⚠ Caution:
Before test, make sure no electricity exist in circuit under test. Do not measure insulation of charged equipment or line.

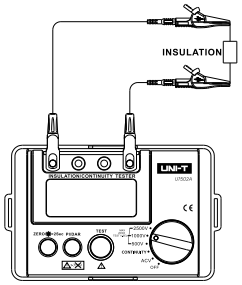


Figure 3

* Do not measure when the battery cover is opened.

⚠ Caution:

Do not short-circuit the test leads under high-voltage output status or make insulation measurement after high voltage has already been output.

● Turn the knob to select test voltage 500V/1000V/2500V.

(1) Before measuring insulation resistance, the circuit-under-test must be fully discharged and isolated from power circuit.
(2) Insert red test lead into "LINE" input port, black test lead into "EARTH" input port.
(3) Connect red, black alligator clip with circuit-under-test, positive voltage output is from LINE port.

● Continuous measurement

With the knob already set to test voltage 500V/1000V/2500V, then press TEST button,the instrument will be self-locked to measure continuously. The test voltage will be output and TEST button will light up. With the measurement finished, press TEST button to unlock and stop the measurement.

⚠ Caution:

* Before test, make sure no electricity exist in circuit under test. Do not measure insulation of charged equipment or line.
* In completion of test, do not touch circuit. Stored capacity in the circuit may cause electric shock.
* When red and black clips are connected to the circuit under test, high voltage is output from LINE jack and the current from EARTH jack.
* Do not measure when the battery cover is opened.

● Polarization index measurement

Under insulation measurement mode, press PI/DAR button once to select PI parameter, the screen displays Time 1(1min)/ Time2(10mins), then press TEST to start PI measurement.

● Dielectric absorption ratio measurement

Under insulation measurement mode, press PI/DAR button two times to select DAR parameter, the screen displays Time 1(30s)/ Time2(1min), then press TEST to start DAR measurement. Press TEST three times to select another DAR, the screen shows Time 1(15s)/Time2(1min), press to begin another DAR measurement.

11. Battery Replacement (See Figure 4)

⚠ Danger

To avoid possible electric shock, remove wire from the instrument when replacing battery.

Figure 4

⚠ Caution

* Mixed use of new and old batteries is not allowed.
* Please note battery polarity when installing battery.

⚠ Danger

* Do not measure when battery box is open.
* If "▭" appears on LCD, it means battery shall be replaced. Please follow the steps below:

(1) Turn off power (set the knob to OFF), and move test lead line away.
(2) Loosen screw on battery box, move the cover, and replace 6 batteries.
(3) After replacing battery, make sure screw is secured.

12. Maintenance

Cleaning the housing

- Clean the instrument surface with soft cloth or sponge dampened with clean water.
- To avoid damage to the instrument, do not submerge it into the water.
- If the instrument is wet, dry it before storage.
- When it is necessary to verify or repair instrument, please deliver the instrument to qualified professional serviceman or designated repairing department.

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Manufacturer:
Uni-Trend Technology (China) Limited
No 6, Gong Ye Bei 1st Road
Songshan Lake National High-Tech Industrial Development Zone, Dongguan City
Guangdong Province
China
Postal Code:523 808

Headquarters:
Uni-Trend Group Limited
Rm901, 9/F, Nanyang Plaza
57 Hung To Road
Kwun Tong
Kowloon, Hong Kong
Tel: (852) 2950 9168
Fax: (852) 2950 9303
Email: info@uni-trend.com
http://www.uni-trend.com