1000V/2500V/5000V series Insulation Resistance Tester Manual



Safety Requirements & Safety Warnings:

This series of insulation resistance tester is designed and produced according to the safety standard IEC1010. Strictly follow the safety standards of double insulation CAT III 1000V CAT IV and pollution degree 2. To protect your safety, please read the manual before using it.

Precautions:

Safety Symbol Description:

Caution! Refer to the user’s manual before using this meter. Double Insulation

Warning! Dangerous Voltage (Risk of electric shock).

Danger: To avoid serious or fatal damage that may be caused by certain states and wrong operations.

Warning: indicates avoiding the risk of electric shock.

Caution: indicates avoiding damage to the instrument and making accurate measurements.

· Do not test in flammable locations, sparks may cause an explosion.

· Do not operate the instrument if the instrument surface is wet or if the operator’s hands are wet.

· When testing voltage, there is a possibility of personal injury due to accidental short-circuit between metal parts and test leads.

· Do not exceed the maximum allowable range of the measuring range during measurement.

· Do not open the battery cover during measurement.

· When performing insulation measurement, do not touch the line under test.

Warning

· If the instrument is abnormal, please stop using it. For example: Broken instrument or exposed metal parts, please do not use it in this situation.

· When the test lead is inserted into the instrument interface and connected to the circuit for testing, do not press the function button, but exit the measurement first, and then change the test item. ·

Do not install substitute parts or make any unauthorized changes to the instrument.

· Do not replace the battery when the instrument is wet.

· Make sure all test leads are securely connected to the meter’s test sockets.

· Make sure the instrument is turned off before opening the battery cover.

Caution:

· Before measuring, confirm that the function button is selected to the appropriate position.

· After use, press and hold the “OFF” button to turn off the unit. If you do not use it for a long time, please take out the battery and storage it.

· Do not storage for a long time in high temperature, humidity, places where condensation may occur, or in direct sunlight.

· Please use a damp cloth or detergent to clean the instrument case, do not use abrasives or solvents to wipe the instrument case and accessories.

· When the instrument is wet, please dry it before use or storage.

General:

Insulation resistance tester (or high voltage insulation meter) is a special instrument for measuring insulation resistance. It is an ideal test instrument for measuring insulation resistance of large transformers, transformers, generators, high-voltage motors, power capacitors, power cables, arresters, etc.

· Automatic release voltage function.

· Suitable for measuring insulation resistance of various electrical equipment and insulating materials such as transformers, motors, cables, switches, electrical appliances, etc. It is suitable for the maintenance, repair, test and verification of various electrical equipment.

· Rated output voltage variable

The rated output voltage can be switched by the function buttons "▲" "▼":

1000V switches between 50V, 100V, 250V, 500V, 1000V

2500V switches between 250V, 500V, 1000V,2000V, 2500V.

5000V switches between 500V, 1000V, 2500V, 5000V.

· High voltage indication

There is a red LED light in the machine indicating that there is high voltage output in the instrument, there is a danger of electric shock, the operator should pay special attention to safety.

· Low battery voltage indication " ".

· Battery-driven, easier to use.

· 2000 digits with bar graph display, easy to read the data.

Measuring range:

1000V: 0.1MΩ~20GΩ

2500V: 1MΩ~200GΩ

5000V: 10M~200GΩ, automatic range conversion.

· Easy to operate and carry.

· Strong load capacity, <1.8mA output short-circuit current.

· Complete protection circuit, not afraid of voltage counterattack, output short circuitprotection.

· It can measure AC/DC voltage 10V-600V, AC voltage frequency 40Hz ~ 70Hz.

· Dust-proof and moisture-proof structure, suitable for outdoor operation.

· Dimensions: 180X140X70 (mm)

· Weight: about 800g (including battery)

A. Specification:

Function	1000V	2500V	5000V
Output voltage	50V-1000V 5 groups of voltage	250V-2500V 5 groups of voltage	500V-5000V 4 groups of voltage
Resistance Range	0.1MΩ~20GΩ	1MΩ~200GΩ	10MΩ-200GΩ
AC/DC Voltage	10V-600V	10V-600V	10V-600V
100 data storage	•	•	•
Backlight	•	•	•
Absorption ratio	•	•	•
Polarization	•	•	•
Auto range	•	•	•
Low battery indication	•	•	•
Auto discharge	•	•	•
Display of test voltage	•	•	•
high voltage indication	•	•	•
Display of measurement time	•	•	•
Max. Display	2000	2000	2000

B. Technical Data

Working conditions: 0°C~35°C, relative humidity 75% or less, 2000 meters above sea level

Output voltage: ±10% (output load >=1000MΩ)

Short circuit current: about less than 1.8mA;

Low battery indication: Display shows

Insulation resistance: >=500MΩ (1000V);

Withstand voltage: AC 2KV 50Hz 1 minute;

Working temperature and humidity: working temperature 0°C~40°C, relative humidity 85% or less;

Table 1. 1000V technical parameters Output voltage: ±10%

50V/100V/250V/500V/1000V

Output voltage	Measuring range	Accuracy	Short-circuit current
50V/100V	0.1MΩ-20GΩ	± (5%+10)	**<1. 8mA**
250V	0.4MΩ-20GΩ	± (5%+10)	
500V	1MΩ~20GΩ	± (5%+10)	
1000V	2MΩ~20GΩ	± (5%+10)	
AC Voltage Test	10-600V	+ (1%+5)	
DC Voltage Test	10-600V	± (0. 8%+5)	

Table 2. 2500V technical parameters

Output voltage: ±10%

250V/500V/1000V/2000V/2500V

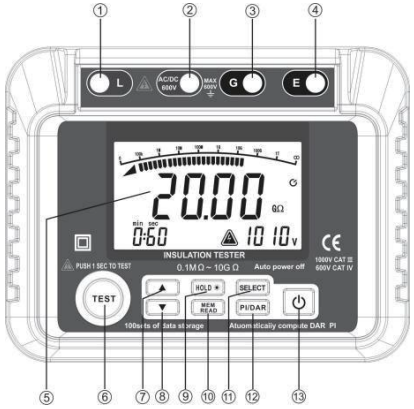
Output voltage	Measuring range	Accuracy	Short-circuit current
250V	2MΩ-20GΩ	± (5%+10)	1. 8mA
500V/1000V	1MΩ-20GΩ	± (5%+10)	
2000V	3MΩ-200GΩ	+ (5%+10)	
2500V	5MΩ-200GΩ	± (5%+10)	
AC Voltage Test	10-600V	± (1%+5)	
DC Voltage Test	10-600V	+ (0.8%+5)	

Table 3. 5000V technical parameters

Output voltage: ±10%

500V/1000V/2500V/5000V

Output voltage	Measuring range	Accuracy	Short-circuit current
500V/1000V	1MΩ-20GΩ	± (5%+10)	2. 0mA
2500V	10MΩ-200GΩ	± (10%+5)	
5000V	10MΩ-2TΩ	± (10%+5)	
AC Voltage Test	10-600V	± (1%+5)	



C. Appearance

1. Insulation resistance measurement high voltage output jack L
2. Positive terminal of AC/DC voltage measurement
3. Voltage measurement input negative shielding end G (shielding end)
4. Insulation resistance measurement sampling jack E

5. Display LCD screen
6. Insulation resistance measurement high voltage start button
7. Insulation resistance voltage selection button "▲"
8. Insulation resistance voltage selection button "▼"
9. Data hold/backlight button,
10. Data read/save button
11. Function selection button; can choose between insulation resistance/AC voltage/DC voltage functions
12. Polarization index DAR and absorption ratio PI buttons
13. Power switch button: Press and hold for more than 2 seconds to turn on, and then press and hold for more than 2 seconds to turn off.

D. Safety Precautions

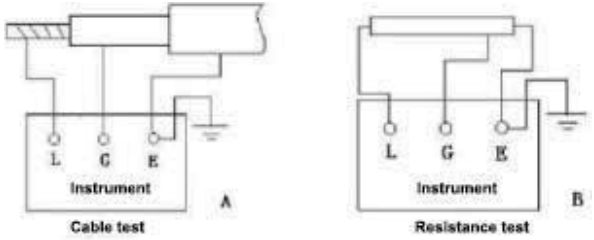
1. Be sure to read this manual carefully before use, and follow the instructions in sequence.
2. Do not use accessories not provided by the original factory to avoid danger.
3. During the test, there is a DC high voltage output on the measuring terminals E and L of the instrument. It is strictly forbidden to touch the human body to avoid electric shock.
4. In order to avoid the error caused by the insulation leakage of the test rod itself, the test rod connected to the measuring end L of the instrument should be suspended as much as possible, so as not to touch the external objects or the test wire of the E end.
5. When the insulation resistance value of the measured object is high, and the measurement has serious word jumping phenomenon, you can connect the shield terminal "G" of the instrument. For example: when measuring the insulation between the cable core and the cable shell, in addition to connecting the two ends of the object to be measured to the "E" and "L" ends, then connect the inner layer of insulation between the cable shell and the core to the shield of the instrument Terminal "G" to eliminate measurement errors due to surface leakage (as shown in below picture). The method of adding a shielding box can also be used, that is, placing the object under test in a metal shielding box, and then connecting the shielding box to the shield "G" terminal of the instrument.
6. After the test is completed, remove the connecting wire.
7. The instrument should not be used and stored in sunlight, high temperature and high humidity places.
8. The long-term short-circuit of the measuring end shall not exceed 60s;
9. The measurement continuous working time should not exceed 30 minutes;

E. Insulation resistance measurement

▲Attention

a. When measuring insulation resistance, please place the two test leads strictly apart, do not twist them together.
b. Do not short-circuit the two test leads and the high-voltage output in the high-voltage output state before measuring the insulation resistance.
c. Do not take measurements if the battery cover is open.
Plug the red test lead into the meter's "L" input jack and the black test lead into the "E" input jack.

1. Test connection
Connect the wiring of the "E" end jack of the meter (black test lead with alligator clip) to one end of the object to be tested; clip the wiring of the "L" end jack of the meter (red test lead with alligator clip) to the other end of the tested object, You can also hold the test rod with one hand to make the test needle contact the other end of the object to be tested.
When operating with one hand, the other hand or other parts of the body should not be in contact with any part of the test circuit. One is for safety, and the other is not to affect the test line. The accuracy of the measurement; the wiring of the G end jack of the instrument is a shielded wire (with a large
Test clip), connected to the surface of the DUT to prevent surface leakage from affecting the test impedance (as shown in Figure A and Figure B).



2.Selection of rated voltage
Press the "▲""▼"key on the instrument panel to select the appropriate voltage.
1000V can choose 50V/100V/250V/500V/1000V
2500V can choose 250V/500V/1000V/2000V/2500V
5000V can choose 500V/1000V/2500V/5000V
3.Insulation resistance measurement
Press and hold the " " button for >=2 seconds to turn on the machine. After turning on the machine, it is recognized as insulation resistance measurement, and the display shows"---".
Press the "▲" and "▼" keys on the instrument panel to select the appropriate voltage, and the selected voltage is displayed in the lower right corner of the display, connect the test lead of the test rod to the two ends of the test object, press the "TEST" button on the instrument panel to output the insulation resistance test voltage, and the test light in the button emits a red warning, the lower right corner of the display screen displays the insulation resistance test voltage, and the display .The measurement time is displayed at the bottom left of the screen, and the insulation resistance value is displayed in the middle of the screen. Press the "TEST" button again to end the measurement, and the test light in the "TEST" button goes out, and the measured value of insulation resistance remains in the middle of the display.
Notice
*Before testing, make sure there is no electricity in the circuit under test, do not measure live equipment or insulation with circuits.
*After the measurement, do not touch the circuit with your hands, the stored capacitance of the circuit can cause clicks.
*Do not measure if the battery cover is open.

F.Absorption ratio DAR measurement

When the insulation resistance measurement time is greater than 1 minute, the measurement is ended. Press the "DAR/PI" key on the instrument panel and the display will display the "DAR" symbol. The instrument will automatically calculate the absorption ratio and display it in the lower left corner of the display; The ratio of the insulation resistance value at 1 minute to the insulation resistance value at 30 seconds.

G. Polarization Index PI Measurement

After the insulation resistance measurement time is greater than 10 minutes, the measurement is ended. Press the "DAR/PI" key on the instrument panel until the display shows the "PI" symbol. The instrument will automatically calculate the polarization index value and display it in the lower left corner of the display; "Polarization" The index PI" is the ratio of the insulation resistance value at 10 minutes to the insulation resistance value at 1 minute.
Insulating materials all have the absorption process and polarization process of charge after adding high voltage. The power system requires that the polarization index should be measured in the insulation test of the main transformer, cable,
motor, etc., and this data can be used to judge the quality of insulation, quality and aging problems.

PI (Polarization Index Measurement)	10 minutes insulation resistance / 1 minute insulation resistance			
PI (Polarization Index Measurement)	≥4	4—2	2.0—1.0	≤1.0
Judgement standard	best	good	warning	bad
DAR (absorption ratio measurement)	1 minute insulation resistance / 15 seconds insulation resistance			
DAR (absorption ratio measurement)	≥1.4	1.25—1.0		≤1.0
Judgment standard	best	good		bad

H. AC voltage test

1. After power on, press the "SELECT" key on the instrument panel to select AC voltage measurement, the display shows the voltage "AC" unit symbol V.
2. Insert the red test lead into the "AC/DC600V" jack, and the black test lead into the "G" jack.
3. Touch the two test leads to the two ends of the voltage to be measured, and the display shows the measured AC voltage in volts.

Notice:
*The measured voltage should not exceed the rms value of 600V AC voltage, and the frequency of the AC voltage is 40Hz to 70Hz. The data error measured beyond this frequency range will exceed the technical specifications of the machine.
*After completing all measurements, disconnect the test leads from the circuit under test and remove the test leads from the instrument input
*Do not measure if the battery cover is open.

I. DC Voltage Test
1. After power on, press the "SELECT" key on the instrument panel to select DC voltage measurement, the display shows the voltage "DC" unit symbol V.
2. Insert the plug end of the red test lead into the "AC/DC600V" jack, and the plug end of the black test lead into the "G" input jack.
3. Put the two test leads in contact with the two ends of the voltage to be measured, and the measured DC voltage in volts will be displayed on the display.

Notice:
*The measured voltage should not exceed the rms value of 600V DC voltage.
*After completing all measurements, disconnect the test leads from the circuit under test and remove the test leads from the instrument input
*Do not measure if the battery cover is open.

J.Data Hold/Backlight Operation
1. Press the "HOLD/*" button for more than 2 seconds, the backlight will be on; press the "HOLD/*" button again for more than 2 seconds, the backlight will be off;
2. Press "HOLD/*" to hold data, press again to exit data hold.

K. Store data/read data

1. Store data
After measuring the insulation resistance value, press the "HOLD/*" key to keep the measurement data first, the display shows the "HOLD" symbol, and then press "MEM READ" to save the data, the "MEM" symbol is displayed at the bottom of the display to store the current measurement data, Long press the "MEM READ" key to exit the storage, repeating this operation, the instrument can store 100 sets of data.
2.Read data After power on, press the "MEM READ" button, the "READ" symbol will be displayed at the bottom of the display to enter the reading data, press the button "▲""▼" to read up and down other stored data; long press "MEM READ" to exit the data reading.
3. Delete data
After power on, press the" MEM READ button, the "READ" symbol will be displayed at the bottom of the display to enter the data reading mode, press "⏻" to delete the current data, after the data is deleted, the display will display "--", press the "▲""▼" button to go up Scroll down to other groups of data, and then press the "⏻" key to delete the data to be deleted in other groups; press
"DAR/PI" to delete all data.

L. Shut down

After the test is completed, press and hold the "⏻" key for more than 2 seconds, the LCD screen will not display, and the power of the instrument will be turned off. For capacitive loads, the residual charge on the test product should be discharged first to prevent the residual charge discharge from hurting people. Then remove the test leads.

M. Replacement battery

If "E3" is displayed on the LCD during use, the battery capacity is insufficient, please replace the battery. Before replacing the battery, make sure the test leads are disconnected and the power is turned off.
1. Stop all test work and disconnect the test leads from the item under test.
2. Disconnect the test leads from the meter.
3. Remove the battery cover from the back of the meter.
4. Put in 8 batteries. The model is (AA) /1.5V, pay attention to the position and polarity of the batteries.
5. Install the battery cover and screw on the battery cover.