PV Safety Comprehensive Tester
User’s Manual
HT9980A/HT9981A

Safety Tips

 Warning  Danger

When the following abnormal situations occur, do stop operating and turn off the power immediately, otherwise, fire and electric shock would be caused. Call your dealer or Hope Electronics representative for help.

- Improper device operation
- Abnormal noise, odors, smoke or flash occurred in operation
- The device produces a high temperature or electric shocks during the operation
- Damage of power cord, power switch or power socket
- Impurities or liquid enter the device

Safety Information

 Warning  Danger

Mishandling during using could result in injury or death, as well as damage to the product. Be certain that you understood the instructions and precautions in the manual before use.

Disclaimer	Before using the product, be sure to carefully read the following safety notes. If users do not observe the following instructions, Hope Electronic Science and Technology will not blame for any of users' loss.
Instrument grounding.	In order to avoid electric shock, please ground the instrument.
Avoid using instrument in the environment with explosive gas	Avoid using the instrument in the environment with explosive gas, vapor or dust environment. Using any electronic instrument in such environment is dangerous.
Do not open the instrument cover	Only authorized service personnel should remove the cover and have internal access to the instrument for repairing. The instrument still has residual charge, which may cause electric shock, after it's shut down in a period of time.
Do not use damaged the instrument	If the instrument has been damaged, the risk will be unpredictable. Please disconnect the power cord and no longer use the instrument. Do not attempt to maintenance the device by yourself.
Do not use unusual instrument work	If the instrument is not working properly, the risk will be unpredictable. Please disconnect the power cord and no longer use the instrument, Do not attempt to maintenance the device by yourself.
Do not exceed the designated use of instrument in manual	Beyond the scope, the protection of instrument provided will be ineffective.

Statement

Limited Security and Responsibility Scope

Hopetech Electronics Technology Co., Ltd ensure that each HT9980A/HT9981A you purchased is fully qualified in terms of quality and measurement. This guarantee does not include fuses.

Hopetech Electronics commits that the instrument has no defects in materials and process, such as product quality problems under warranty. If the product is proved to be defective, Hope Electronics will repair or replace it free of charge.

Since the date of delivery, Hope Electronics commits that the product has two years guarantee, while other accessories have one year. Under warranty, any failure of hardware or software of the product will be due to the quality of the product itself. Users provide the product warranty and maintenance card to get free maintenance which provides from the maintenance department or its authorized maintenance agent of Hope Electronics. Any maintenance beyond the warranty period should be at user's own expense.

For free maintenance product, Hope Electronics commits that it would be repaired and returned to customer within five working days on receipt of the equipment unless otherwise specified. Hope Electronics affords the cost of the return transportation.

Any of the following circumstances occurred; Hope Electronics will not repair for free.

1) Accidental damage caused by transportation
2) Improper installation or instrument failure or damage is caused by non-use work environment
3) Artificial damage to the appearance of the products (such as surface scratches, deformation, etc.)
4) Unauthorized repair, alteration, replacement of instrument and product has been tearing up the warranty seal
5) The fault or damage is caused by irresistible factors (such as lightning strikes)
6) Directly or indirectly damage is caused by improper operation of the user

If mismeasurement or immeasurable is caused by the improper operation of the user, but not the problem of the instrument itself, the cost of transit should be paid by user.

Table of Content

Chapter 1 Safety Rules

Thank you for purchasing our products. Please read this manual before use, and keep it handy for future reference.
In this chapter you will learn the following:

- General provisions
- Care and maintenance
- Test environment
- Operator regulations
- Test safety procedures
- Safety points

1.1 General provisions

Before using this tester, please read the instructions carefully to understand the operating procedures and related safety notes to ensure safety.

Before turning on the input power switch of this tester, please select the correct input voltage (110V or 220V) specifications.

Danger indicates high voltage output, do not contact.

Ground indicates chassis ground symbol

WARNING

WARNING indicates a potentially hazardous situation that will result in death or serious injury to the operator.

The voltage and current generated by the tester are sufficient to cause personal injury. In order to prevent accidental injury or death, be sure to observe the tester clearly before proceeding it.

1.2 Care and Maintenance

1.2.1 User maintenance

To prevent electric shock, non-professionals should not open the cover of the instrument. All parts inside

the instrument must not be changed without permission. If an abnormality occurs to the instrument, please seek the help of Hopetech authorized distributor.

1.2.2 Regular maintenance

For HT9980A/HT9981A tester, input power cords, test leads and related accessories must be carefully inspected and calibrated at least once a year to ensure the safety of the operator and the accuracy of the instrument.

1.2.3 User Modification

The user must not modify the wiring or parts of the instrument, otherwise the company's warranty will be invalidated and Hopetech will take no responsibility for the consequences caused by the modification.

1.3 Test environment

1.3.1 Work Location

When operating this instrument, make sure that the instrument is placed in a place where ordinary personnel cannot touch it at will. If this is not possible in your production line site, the test area must be isolated from other facilities and a " HIGH-VOLTAGE TEST WORK AREA " must be marked. If high-voltage test work area is very close to other work areas, special attention must be paid to safety. During the high voltage test, it must be marked "DANGER! !HIGH-VOLTAGE TEST IN PROCESS, DO NOT ENTER, AUTHERIZED PERSONNEL ONLY "

1.3.2 Input Power

The tester must be well grounded, and the ground wire must be connected before testing to ensure the safety of the operator.
The test zone power supply must have a separate switch installed at the entrance of the test zone to ensure that everyone can identify it. In case of emergency ,the power switch can be turned off immediately.

1.3.3 Workplace

- Use a workbench made of non-conductive material as possible as you can. Do not use any metal between the operator and the test object.
- The operator must not be across the object under test to operate or adjust the tester.
- If the object volume is small, it is better to place it in a non-conductive box.
- The test site must be kept tidy and clean at all time. Do not use this tester near flammable materials. Place unused tester and test leads in a fixed position.

- Make sure that all personnel can immediately tell the object under test, object to be tested, and tested object.
- The test area and the surrounding air must not contain flammable gases, and the tester should not be used near flammable materials.

1.4 Operator Regulations

1.4.1 Qualification of personnel

The voltage and current output by the tester will result in death or serious injury to the operator.

The tester must be used and operated by trained and qualified personnel.

1.4.2 Safety Rules

Operators must be educated and trained regularly to understand the importance of various operating rules and operate the tester in accordance with safety rules.

1.4.3 Dress Code

Operators are not allowed to wear clothes with metal decoration or metal bracelets and watches, which are easy to make an accidental electric shock. The consequences are even more severe when you get an electric shock.

1.4.4 Medical Regulations

The tester must not be operated by a person with a heart attack or with a pacemaker.

1.5 Test Safety Procedure Requirements

Never use the tester on a live circuit board or device! !
During the test, never touch the test object or any objects connected to the test object.

The ground wire of the tester must be connected in accordance with regulations.
When connecting the test line, you must first connect the test end on the tester to object to be tested.
The high-voltage test lead can only be plugged into the high-voltage output before testing. When holding the high-voltage test lead, it must be held in an insulated part, never hold a conductive body.
The operator must be able to operate the tester completely independently. It is not allowed for others to control the switch or remote-control the switch. When the remote control switch is not in use, it should be

placed in a fixed position and cannot be placed at will.

1.6 Safety Points

- Non-qualified operators and unrelated personnel should stay away from the high-voltage test area.
- Always be safe and orderly in the high-voltage test area.
- Never touch the test object or any object connected to the test object during the high voltage test.
- In case of any problems, turn off the high voltage output and input power immediately.
- After the DC withstand voltage and insulation resistance tests, the discharge operation must be performed before the test wire can be removed.

Chapter 2 Safety Regulations

In this chapter you will learn the following:

- The importance of testing
- Hi-pot test
- Advantages and disadvantages of AC test and DC test
- Insulation resistance test

2.1 The Importance of Testing

In today's high consumer awareness, every electrical and electronic product manufacturer must do its best to integrate products safety. Each product must be designed to the best of its ability to prevent the user from being exposed to electric shock. Even if the user makes an error, it should not be shocked. In order to meet generally accepted safety requirements, safety testing must be performed. Current safety regulations organization such as UL, CSA, IEC, BSI, VDE, TUV, and JSI all require manufacturers to design and produce electronics or electrical products using a "withstand voltage insulation tester" for safety testing.

2.2 AC and DC Hi-pot Test

If a product can work normally in a very harsh environment, we can be sure that it will also work in a normal environment. The most common use of a hi-pot test is as follows:

- Functional test at design-determine the conditions under which the product designed can meet its functional requirements
- Specification test during production—Confirm that the product produced can meet the requirements of its specifications.
- Confirmation test during quality assurance-confirm that the quality of the product can meet the safety standards.
- Post-repair safety test—confirm that the repaired product can maintain compliance with safety standards.

Different products have different technical specifications. Basically in the hi-pot test, a voltage higher than the normal working voltage is added on the product tested and this voltage has to last for a period of time. If a component at within the specified time, its leakage current also remains within the specified range, it can be determined that this component works under normal conditions and should be very safe. And excellent design and selection of good insulation materials can protect users from electric shock. The hi-pot test performed by HT9980A/HT9981A tester is generally called "high-voltage dielectric test", referred to as "withstand voltage test" for short. basic

It is specified that the working voltage of the test object is 2 × 1000V, which is used as the test voltage standard. Test voltage for some products may be high

At 2 × working voltage + 1000V. For example, the operating voltage range of some products is from 100V to 240V.

The test voltage may be between 1000V and 4000V or higher. In general, products with a "double insulation" design

The test voltage used may be higher than the 2 × working voltage + 1000V standard.

The withstand voltage test is more precise in product design and sample production than in production. The trial phase has already determined the safety of the product. Although only a few samples are used to judge the product design,
Online testing should also strictly require that all products must pass safety standards to confirm that no defective products will flow out of the production line.
The output voltage of the withstand voltage tester must be maintained in the range of 100% to 120% of the specified voltage. AC withstand voltage test
The output frequency of the meter must be maintained between 40 and 70Hz, and its peak value must not be lower than the root mean square (RMS) voltage value.
1.3 times and its peak value must not be higher than 1.5 times the root mean square (RMS) voltage value.

2.3 Advantages and disadvantages of DC testing

Please confirm with the manufacturers designated by the product under test what voltage the product should use. Some products accept both DC and AC test options, but there are still many products that only accept either DC or AC tests. If safety regulations allow simultaneous DC and AC testing, manufacturers can decide for themselves which test is more suitable for their products. To achieve this, users must understand the advantages and disadvantages of DC and AC testing.

2.3.1 Characteristics and advantages and disadvantages of AC withstand voltage (ACW) test

Features:
Most of the DUTs that do withstand voltage tests will contain some stray capacitor. AC testing may not be fully charged these stray capacitors, so a continuous current will flow through them.

Advantages:

1. Generally speaking, AC testing is easier to be accepted by manufacturers than DC testing. Because most products use AC power and the AC testing can test the positive and negative polarity of the product at the same time. And the testing is consistent with products actual use conditions.
2. Because AC testing can not fully charged the stray capacitors and there is no instant surge current, the full voltage can be added at the beginning of the test instead of increasing the voltage slowly, unless the product is very sensitive to an Impulse voltage.
3. Because AC testing cannot fully charged those stray capacitors, it is not necessary to discharge DUTs after the test.

Disadvantages:

1. The main disadvantage is that if the stray capacitance of the DUT is large or the DUT is a capacitive load, in the case, the generated current will be much larger than the actual leakage current, hence the actual leakage current cannot be known.
2. Another disadvantage, due to the current supplied to the stray capacitance of the DUT, the current required by the instrument will be much higher than when using a DC testing method. This will increase the danger to the operator.

2.3.2 Advantages & Disadvantages of DC Testing

Features:
During the DC hi-pot test, the stray capacitor in the DUT is fully charged.
The capacitance current caused by the DC hi-pot test will drop to zero after the stray capacitance is fully charged.
Advantages:
1. Once the stray capacitor in the DUT is fully charged, only the actual leakage current of the DUT will remain. DC hi-pot test can clearly show the actual leakage current of the DUT.
2. Another advantage, DC hi-hop test only needs to supply the charging current of the DUT in a short time, and other times the current supplied is very small, so the current capacity of the instrument is much lower than the current capacity required during the AC hi-pot test.
Disadvantages: 1. Unless there is no capacitance in the DUT, the test voltage must start from "zero" and slowly increase to avoid excessive charging current. The larger the capacity, the longer the ramp-up time and the lower the voltage that can be increased at one time.
When the charging current is too large, it will definitely cause the tester to misjudge and make the test result incorrect.
2.Because the DC hi-pot test will charge the DUT, after the test it must be discharged the DUT first before next test.
3. Unlike the AC test, the DC hi-pot test can only be tested in a single polarity. If the product is to be used in AC voltage, this disadvantage must be considered. This is also the reason why most safety regulations recommend the use of AC hi-pot testing.
4. In the AC test, the peak value of the voltage is 1.4 times that shown by the meter, which is not possible for ordinary meters, DC hi-pot test can not shown. Therefore, most safety regulations require that if DC hi-pot is used, the test voltage value must be increased to an equal value.

2.4 Insulation resistance test

The insulation resistance test mainly measures the resistance between the live wire of the appliance and the casing. The measurement method is based on the principle of Ohm's Law, adding a voltage between the live wire and the casing, then measure the voltage and current values separately, and then calculate the resistance value according to Ohm's law. Generally, a large constant voltage (500V or 1000V DC) is applied and maintained for a specified period of time and take this as a test standard.If the resistance is kept within the specified specifications within the specified time, it can be determined that it is under normal conditions the appliance should be relatively safe when it is running.
The higher the insulation resistance value, the better the insulation of a product. The insulation resistance value measured by the insulation resistance test is the equivalent resistance values formed between two test points and various related networks connected between them and their surroundings. However, the insulation test cannot detect the following conditions:

- The insulation strength of the insulation material is too weak;
- The insulation strength of the insulation material is too weak;
- Pinholes on the insulator
- Insufficient distance between parts
- Insulator is crushed and cracked
- Each of these conditions can only be detected by a withstand voltage test.

2.5 Ground Resistance Test

The ground resistance test mainly measures the contact resistance between the ground wire of the appliance and the casing. The measurement method is based on the principle of Ohm's law, a current flows on the contact point, then measure the current and voltage value of the contact point separately, and then calculate the resistance value is according to Ohm's law. Generally, a large current flows, which simulates the abnormal current conditions that occur when the appliance is abnormal, take this as a test standard. If the contact resistance of the ground wire on the appliance can pass the test of this harsh environment, the appliance should be safe under normal use conditions

Different products have different technical specifications. Basically, safety regulations require a constant current to flow at the contact point. This current must be maintained for a specified period of time. If the resistance of the contact point is maintained in the specified range within the specified time, It can be determined that the appliance operates under normal conditions, and the appliance should be relatively safe. Appropriate design and proper construction can protect users from the threat of accidental electric shock.

Although contact resistance can be measured with a general resistance meter, the current output by the resistance meter is usually very small, which does not meet the requirements of safety regulations and cannot be recognized by safety inspection agencies. It must be measured with a special ground resistance tester. Usually the user often touches the appliance. Except for the CSA specification, which requires 30 amps, most security inspection agencies require 25 amps, at the same, the current must last 60 seconds and the resistance must be maintained below 100 mΩ.

The specifications of appliances that are not easily touched by the user are generally relatively loose, generally requiring a current of 10 amps, the resistance value of the contact point needs to be less than 500 mΩ, and the time is considered 60 seconds. There are still some international standards that are higher than the above standards, such as take 5 times the rated input current of the appliance as the test standard, the resistance value of the contact point is still 100mΩ and the test time is 60 seconds. Most of these are click-type appliances, which are highly dangerous, so the requirements for specifications are higher than general appliances.

In the current safety regulations in the world, some specifically require that the contact resistance of the ground wire be measured first. The resistance of the contact must meet the requirements before the insulation withstand voltage test can be performed. This is mainly to prevent the misconception that the insulation or withstand voltage is good because the ground wire is not connected properly.

The ground resistance tester has two types of output: AC and DC. Both types can accurately measure the resistance value of the contact point, but the two types have significantly different destructive properties for bad contact points. Because the calculation of resistance value is the effective value of voltage and current, and the remaining effective value is the same as the peak value, however, the peak value of AC is 1.414 times the effective value. Therefore, when AC is at the peak, its current value is also 1.414 of DC. When comparing the energy generated at the contact point with the AC peak point, when calculated according to the power theorem (power = square of the current × resistance), the energy generated by the AC peak instant at the contact point is twice that of DC. .

If you have questions about the operation of the instrument or problems related to the instrument, please feel free to contact us.

Chapter 3 Technical Specification

In this chapter you will learn the following

- Product introduction
- Test parameters

3.1 Product Description

HT9980A and HT9981A as PV safety testers used for photovoltaic module safety parameters, It's also be used for household appliances, electronic instruments, electronic equipment, electronic components, wires and cables and other electrical products withstand voltage, insulation test and ground test.
This series of products have pass / fail judgment function, sound and light alarm function and automatic test time control function, etc. Easy to operate, beautiful appearance, fast over-current cutting speed. It is the ideal hi-pot insulation testing equipment.

3.2 DC Hi-pot Test Parameters

Model	HT9980A	HT9981A	
Voltage output			
Voltage output range	0.010kV to 6.000kV	0.010kV to 9.999kV	
Voltage output accuracy	士(3% set value+5V)	士(3% set value +5V)	
Voltage output resolution	0.001KV	0.001KV	
Output maximum rated power	36VA (6000V 6mA)	20VA (10000V 2mA)	
Output voltage stability	士(1% set value + 5V)	士(1% set value + 5V)	
Voltage display			
Measurement range	0.010kV to 6.000kV	0.010kV to 9.999kV	
Display resolution	0.001kV	0.001kV	
Measurement accuracy	士(3% set value+0.005kV)	士(3% set value+0.005kV)	
Current measurement			
Range	10.00uA-99.99uA	100.0uA-999.9uA	1.000mA-6.000mA
Resolution	0.01uA	0.1uA	0.01mA
Accuracy	士(2% + 2 count)	士(2% + 2 count)	士(2% + 2 count)
Rise time	0.4s to 999.9s		
Test time	0.1s to 999.9s (0 = Continuous)		

Fall time	0.1s to 999.9s (0 = OFF)
Time resolution	0.1s
Time accuracy	±(0.1% set value+0.05 s)
Arc Level	Range:1-9 (0 = OFF)
Discharge time	<50mS(without load connected)
	<100ms (connecting capacitive load (capacitance less than 0.1uF)) Capacitive load maximum 1uF < 1kV 0.75uF < 2kV 0.5uF < 3kV 0.08uF < 4kV 0.04uF < 5kV 0.015uF < 6kV

3.3 Insulation resistance test parameters

Model		HT9981A
Voltage output		
IR	Voltage output range	0.500kV to 3.000kV
	Voltage output resolution	0.001kV
	Voltage output accuracy	土(3% set value+0.005kV)
	Maximum rated power	6VA（3000V6mA）
	Maximum current	6mA
Voltage display		
IR	Range	0.500kV to 3.000kV
	Display resolution	0.001kV
	Measurement accuracy	土(3% set value+5V)
Resistance display		
IR	Measurement range	100KΩ to 99GΩ
	Display mode	100 KΩ～999KΩ；1.00MΩ～9.99MΩ；10.0MΩ～99.9MΩ； 100MΩ～999MΩ；1.00GΩ～9.99GΩ；10GΩ～99GΩ；
	Display accuracy	±(2% display value +3 count) 100KΩ≤R≤9.99GΩ； ±(20% display value +3 count) 10GΩ≤R≤99GΩ； （When the test lead has no swing）
Parameter setting		
	Upper limit setting	100KΩ to 99GΩ

Judgment function	Lower limit setting	100KΩ to 99GΩ
	Judging accuracy	100KΩ≤R≤9.99GΩ ±(3% display value +3 count); 10GΩ≤R≤50GΩ ±(20% display value+3 count);
Timing function	Test time	0.1s to 999.9s
	Time resolution	±(0.1% set value+0.05 s)

3.4 Ground resistance test parameters

Model		HT9980A
Output parameters	Output current range	10A ~ 60A
	Output current accuracy	士(2% set value+5 count)
	Output current resolution	0.01A
	Output maximum rated power	360VA (6V60A)
	Maximum output voltage	6V
	Output voltage ripple	Full load <300mVp-p
	Current stability	±1.0%
Current display	Display range	10A ~ 60A
	Display resolution	0.01A
	Measurement accuracy	士(2% +3 count)
Resistance display	Display range	0.00uΩ ~ 600.00mΩ
	Display resolution	0.01mΩ (600.00mΩ ~ 100.00mΩ); 0.001mΩ (99.999mΩ ~ 10.000mΩ); 0.1uΩ (9.9999mΩ ~ 1.0000mΩ);
	Measurement accuracy	士(2% display value +3 count)
Measurement	Setting range	0 ~ 600.00mΩ (10.00A ~ 20.00A); 0 ~ 300.00mΩ (20.01A ~ 30.00A);

		0 ~ 200.00mΩ (30.01A ~ 40.00A); 0 ~ 150.00mΩ (40.01A ~ 50.00A); 0 ~ 120.00mΩ (50.01A ~ 60.00A);
	Display resolution	0.01mΩ (600.00mΩ ~ 100.00mΩ); 0.001mΩ (99.999mΩ ~ 10.000mΩ); 0.1uΩ (9.9999mΩ ~ 1.0000mΩ);
	Measurement accuracy	士(2% set value+3 count)
Measurement accuracy	Setting range	0 ~ 600.00mΩ (10.00A ~ 20.00A); 0 ~ 300.00mΩ (20.01A ~ 30.00A); 0 ~ 200.00mΩ (30.01A ~ 40.00A); 0 ~ 150.00mΩ (40.01A ~ 50.00A); 0 ~ 120.00mΩ (50.01A ~ 60.00A);
	Display resolution	0.01mΩ (600.00mΩ ~ 100.00mΩ); 0.001mΩ (99.999mΩ ~ 10.000mΩ); 0.1uΩ (9.9999mΩ ~ 1.0000mΩ); 0.01uΩ (999.99uΩ ~ 0.00uΩ);
	Measurement accuracy	士(2% set value+3 count)
Measurement accuracy	Measurement accuracy	0.5s ~ 999.9s (0.0s is Continuous testing)
	Time resolution	0.1s
	Time accuracy	±(0.1% set value+0.05 s)

Model		HT9981A
Output parameter	Output current range	10A ~ 80A
	Output current accuracy	士(2% set value+5 count)
	Output current resolution	0.01A
	Output maximum rated power	360VA (6V80A)
	Maximum output voltage	6V
	Output voltage ripple	Full load <300mVp-p
	Current stability	±1.0%
Current display	Display range	10A ~ 80A
	Display resolution	0.01A
	Measurement accuracy	士(2% set value+3 count)
Resistance display	Display range	0.00uΩ ~ 600.00mΩ
	Display resolution	0.01mΩ (600.00mΩ ~ 100.00mΩ); 0.001mΩ (99.999mΩ ~ 10.000mΩ); 0.1uΩ (9.9999mΩ ~ 1.0000mΩ);
	Measurement accuracy	士(2% set value+3 count)
Resistance upper limit setting	Setting range	0 ~ 600.00mΩ (10.00A ~ 20.00A); 0 ~ 300.00mΩ (20.01A ~ 30.00A); 0 ~ 200.00mΩ (30.01A ~ 40.00A); 0 ~ 150.00mΩ (40.01A ~ 50.00A); 0 ~ 120.00mΩ (50.01A ~ 60.00A); 0 ~ 80.0 mΩ (60.01A ~ 70.00A); 0 ~ 70.0 mΩ (70.01A ~ 80.00A);

	Display resolution	0.01mΩ （600.00mΩ ~ 100.00mΩ）; 0.001mΩ（99.999mΩ ~ 10.000mΩ）; 0.1uΩ （9.9999mΩ ~ 1.0000mΩ）;
	Measurement accuracy	士(2% set value+3 count)
Resistance lower limit setting	Setting range	0 ~ 600.00mΩ （10.00A ~ 20.00A）; 0 ~ 300.00mΩ （20.01A ~ 30.00A）; 0 ~ 200.00mΩ （30.01A ~ 40.00A）; 0 ~ 150.00mΩ （40.01A ~ 50.00A）; 0 ~ 120.00mΩ （50.01A ~ 60.00A）; 0 ~ 80.0 mΩ （60.01A ~ 70.00A）; 0 ~ 70.0 mΩ （70.01A ~ 80.00A）;
	Display resolution	0.01mΩ （600.00mΩ ~ 100.00mΩ）; 0.001mΩ（99.999mΩ ~ 10.000mΩ）; 0.1uΩ （9.9999mΩ ~ 1.0000mΩ）; 0.01uΩ （999.99uΩ ~ 0.00uΩ）;
	Measurement accuracy	士(2% set value+3 count)
Test time	Test time	0.5s ~ 999.9s（0.0S is continuous test）
	Time resolution	0.1s
	Time accuracy	±(0.1% set value+0.05 s)

Chapter 4 Instrument Overview

4.1 Front Panel

4.1.1 Front View

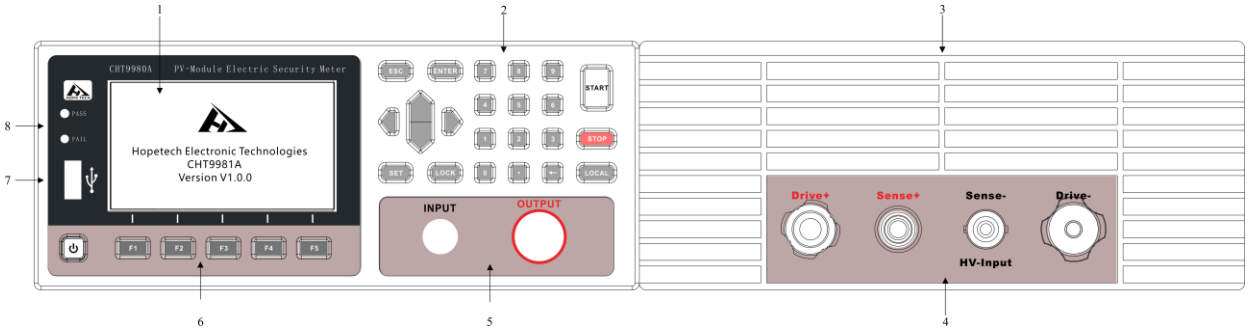


Figure.4.1 Front View

4.1.2 Front Panel Description

1：3 3.5 inch TFT display

2：Key area

3：Front panel ventilation area

4: Ground resistance test terminal

Drive+ current output positive end

Sense+ voltage sampling positive end

Sense- voltage sampling negative end (HV-Input withstand current return terminal)

Drive- Negative terminal of current output

5: Hi-pot test terminal

OUTPUT OUTPUT high voltage output

INPUT current return

6: Function key area

7: USB socket

8: indicator position

PASS: Pass indicator

FAIL: Failed indicator

4.2 Rear Panel

4.2.1 Schematic diagram of the rear panel

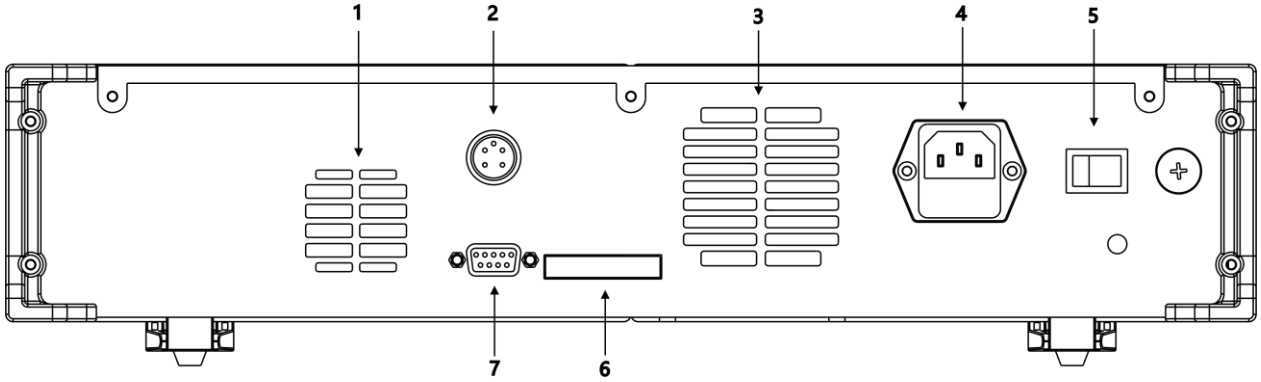


Figure 4.2 Schematic diagram of the rear panel

4.2.2 Rear panel description

1: grounded heat sink

2: Air outlet

3: Hi-pot heat sink

4: Input power socket

Standard input power socket provides working power for the instrument.

5: power switch

6: remote control terminal

7: Serial communication D-type terminal

It is a standard 9-pin D-type terminal block that provides RS232 or RS485 communication.

4.3 Instrument Size

The instrument dimensions are as follows:

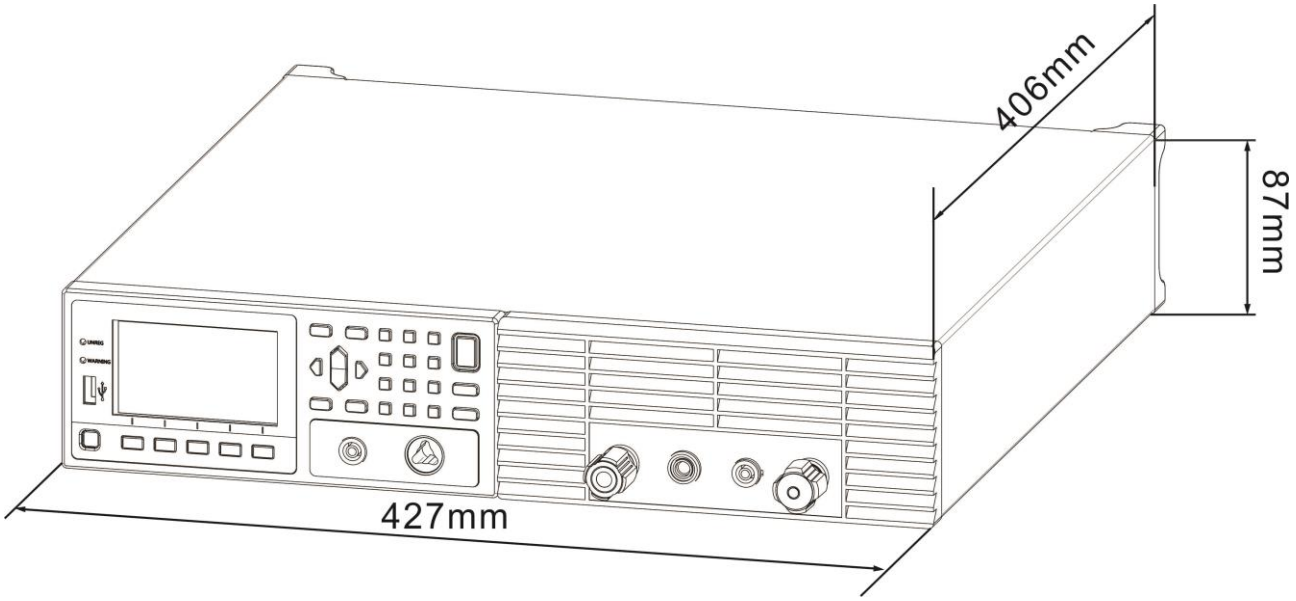


Figure 4.3 Dimensions of the chassis

Chapter 5 Operating Procedures and Steps

5.1 Instructions

This series of hi-pot tester is mainly used for general production line or quality inspection, its operation and setting are very simple. Irrational settings and operations will not respond.

5.2 Steps

Follow these procedures and steps to operate the instrument:

1. Before connecting the input power cord of the instrument to the mains power supply, please turn off the input of the instrument first and switch the" Voltage Select "switch on the rear panel to the correct input voltage position. Check the fuse specification correct or not at the same time. In the end, connect the ground wire to the "ground terminal" on the rear panel of the instrument.
2. Connect the input power cord to the power socket of the instrument. Do not connect the high-voltage test lead to the high-voltage output terminal of the instrument first.
3. Connect all the test leads of the object to be tested, then connect the loop line to the measured end of the instrument, and finally connect the test leads to the high-voltage terminals of the instrument. Check all test leads are connected properly.

4. Turn on the input "power switch" of the instrument, and the startup interface is as follows:

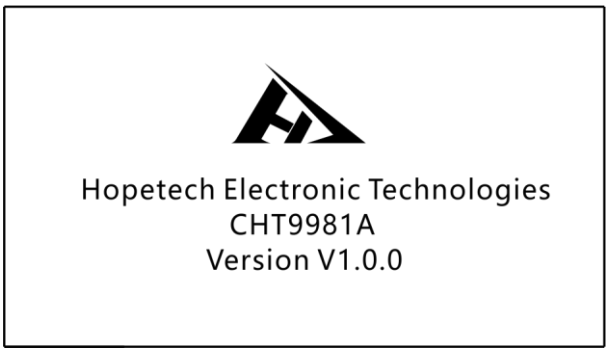
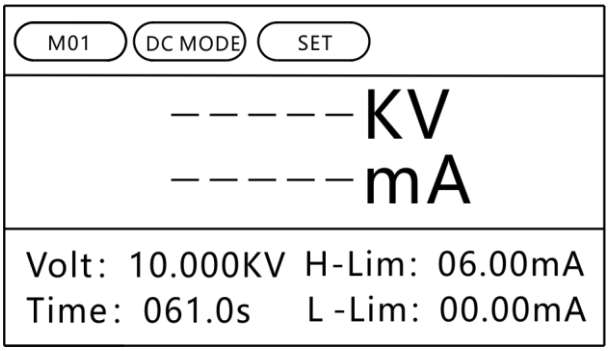
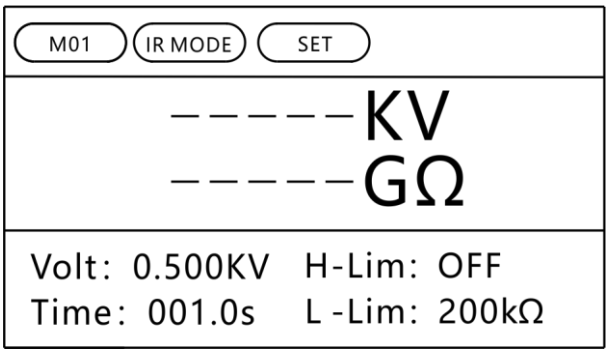


Figure 5.1 Startup interface

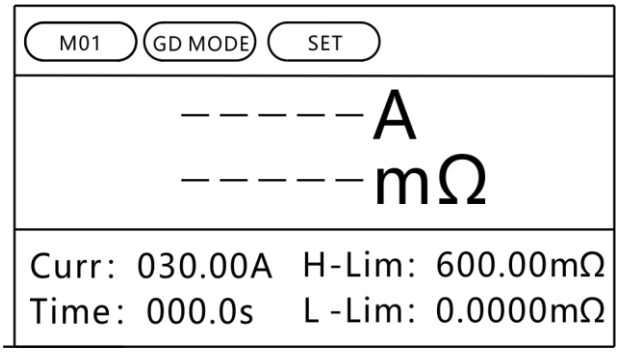
5. After booting, the instrument will save the last test group number and mode. Enter the test and parameter setting mode, at this time the display will appear:



5.2 DC Hi-pot Test Interface



5.3 Insulation Resistance Test Interface



5.4 Ground Resistance Test Interface

If you want to reset the test parameters, press the "SET" key to set the parameters. For detailed setting methods and steps, please refer to the description of "Test parameter setting".

5. Press the "START" button again to output high voltage / current. At this time, the "DANGER" high voltage indicator on the panel will flash. The timer also starts counting. Do not touch the object under test while the test is in progress.

6. After the test is completed, the instrument will automatically turn off the output. If the test is qualified, the “PASS” green indicator light will be on and a “beep, beep” sound will be emitted, indicating that object under test passed the test and the test comparison result is qualified. The LCD display will show “PASS” and the test result data. If the test is unqualified, the “FAIL” red indicator light will be on and a “beep” sound will be heard until press any key to stop the sound. “FAIL” confirm that the object under test completed the test and the test comparison result is unqualified. The LCD display will show “FAIL” and the test result data. Press the "STOP" switch, the program will immediately clear the test results and

return to the test interface.

7.If you want to stop the test while the test is in progress, press the "STOP" switch. The instrument will immediately stop the test and the display will retain the current test value. If you want to continue the test, you can press the "STOP" button to back to the test interface, and then press the "START" button to start the test. Or directly press the "START" button to start directly.

8. If the test of the DUT fails, the instrument will immediately stop the test and the display will show its status and the values at the time of FAIL. At this time, the “FAIL” red indicator light will be on and a long “beep” warning sound will keep screaming. You can press the "STOP" button to turn off the alarm sound. To continue the test, press the "Start" switch again. For the display information of various LCD displays, please refer to the description of "Display Information".

9. If you want to operate the tester with an external remote control, connect the remote control to the remote input terminal on the rear panel. The functions of the TEST and RESET on the remote control are completely same to the start and reset switches on the front panel of the instrument. Since the start and reset switch of this instrument and the TEST and RESET switches on the remote control can be operated simultaneously, the remote control of the device must be kept in a safe place so that non-operators cannot have access to the remote control to avoid accidents.

10．This tester has the output of monitoring signals for PASS (test passed), FAIL (test failed) and PROCESSING (test in progress) and the signals can be connected to the control center for monitoring.

Chapter 6 Remote Input and Output Signals

6.1 Input and Output Signals

On the back panel of the tester, there are remote monitoring and remote control terminal blocks. This allows to connect tester to the monitoring center for monitoring its working state and you can also use the remote control to operate the tester. This terminal is a standard 9-PIN D-type terminal block, which contains three monitoring signal outputs such as PROCESSING (test in progress), PASS (test passed), FAIL (test failed) and two remote control inputs of TEST (start) and RESET (reset).

Wiring comparison chart

Pin No.	1	2	3	4	5	6	7	8	9	10
Function	START	STOP	COM	TEST-A	TEST-B	PASS-A	PASS-B	FAIL-A	FAIL-B	NC

6.2 Remote control output signal wiring and description

This tester provides three "normally open" (NO) contact signals, which are provided by three relays inside the tester. The capacity of the contacts is AC125V l.0A / DC125V 0.5A. These contacts have no positive and negative polarity restrictions, and each signal is independently wired and has no common ground. The terminal block is labeled with a pin number. The wiring of the output signal is as follows:
TEST signal: The output signal is connected between PIN4 and PIN5.
PASS signal: The output signal is connected between PlN6 and PIN7.
FAIL signal: The output signal is connected between PlN8 and PIN9.

6.3 Remote Control Input Signal Wiring Instructions

This tester is equipped with a remote control contact, and the TEST and RESET functions of the instrument can be operated by an external remote control device. A "momentary contact" switch must be used as the controller. Please pay special attention that you must never connect any other power source. If you connect other power sources, it will cause damage to the internal circuit of the tester or malfunction. Pin numbers are attached to the terminal block. The detailed wiring is as follows:

1. START control: The control switch is connected between PIN1 and PIN3

2. STOP control: switch is connected between PIN2 and PIN3

3. PIN3 is the common ground of the remote operation circuit

Chapter 7 Automatic Discharge Circuit

7.1 Discharge Principle

After the test, especially the DC hi-pot test, a large amount of power will remain on the test object and in the circuit, which must be discharged first then the test lead can only be removed. After the tester completes the test, the program automatically drives the discharge circuit. All the electrical energy remaining on the test object and the circuit is discharged in about 0.2 seconds. The total capacitance that the discharge circuit can withstand is as follows:

Maximum discharge capacitance: 0.2uF ----- When the output voltage is ≤1KV
0.1uF ----- When the output voltage is ≤2KV
0.06uF ---- When the output voltage is ≤3KV
0.05uf --- When the output voltage is ≤4KV
0.04uf --- When the output voltage is ≤5KV
0.0l5uF --- When the output voltage is ≤6KV

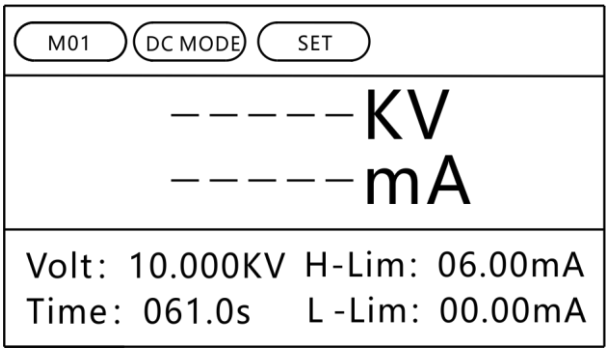
7.2 Precautions

- If the capacitance range corresponding to the above output voltage is exceeded, the auto-discharge circuit will be injured and cause failure. Please pay special attention not to exceed the allowable capacitance of the discharge.
- Please note that if the input power is turned off in the middle, the automatic discharge circuit will not work, and the DUT will not be discharged. Avoid turning off the input power while the test is in progress.

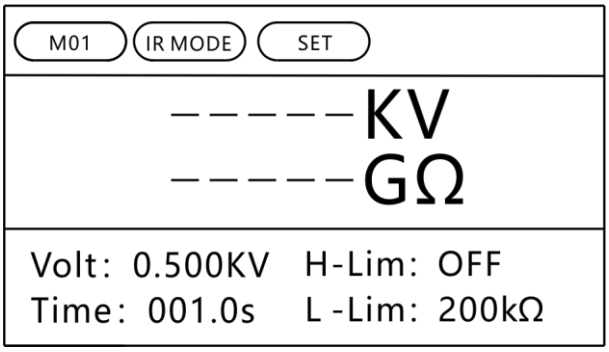
Chapter 8 Test Parameter Setting

8.1 Test Parameter Description

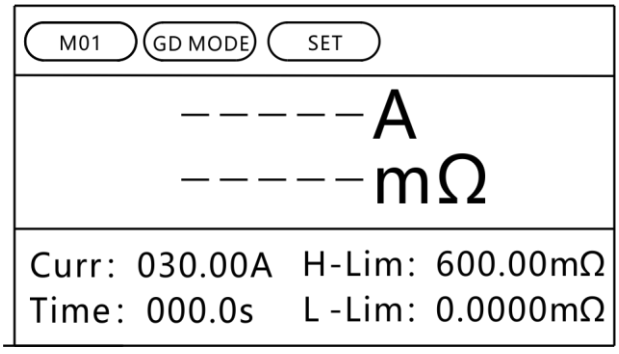
After power-on, the program will automatically enter the parameters set during the last test before the last shutdown, and the LCD display will show



8.1 DC hi-pot test interface



8.2 Insulation Resistance Test Interface



8.3 Ground Resistance Test interface

Prompt description:

- M01: current test group number
- M01 +: the current test group number and continuous test function are

turned on

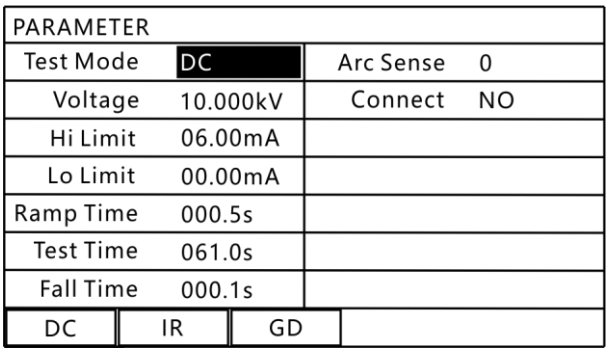
- DC MODE: DC hi-pot test mode
- IR MODE: Insulation resistance test mode
- GD MODE: ground resistance test mode
- SET: Prompt information, indicating that it is currently under test or parameter setting status

Variable description:

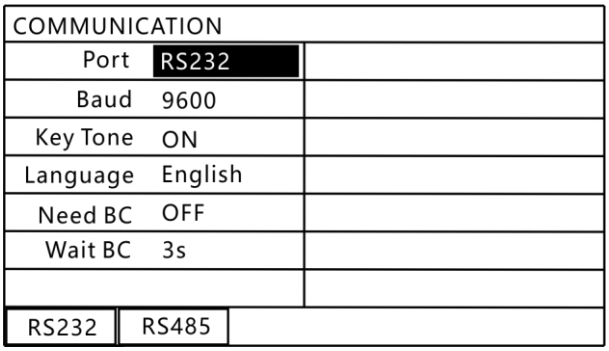
- Voltage / current: set output voltage / current value
- Time: set the test time
- Upper limit: upper limit set value
- Lower limit: lower limit set value

The “SET” key is used to set parameter item. In the test and parameter setting mode, each time the “SET” key is pressed, the parameter setting is turned to the next setting item. After pressing the "Esc" key, the set test parameters will be automatically stored in the memory; the test parameters stored in the memory will be retained without being cleared after the input power is turned off, unless they are manually reset.

This tester has a total of 2 setting items, which can be displayed cyclically with the "Set" button. The two setting items are shown below:



8.4 Measurement Parameter Setting Interface



8.5 System Parameter Setting Interface

The “▲” and “▼” keys are operation keys for group selection and selection of setting parameters.

In the window of output voltage, leakage current or insulation resistance upper limit,

leakage current or insulation resistance lower limit, rise time, test time, fall time, delay judgment time, select the parameter to be set and use the “Input” function key to confirm the setup parameter, then use the numeric keys to set the required value, and then press the "Enter" key.

In the process of test parameter setting, if it is not necessary to reset all, you can press the "EXIT" key to exit the test parameter setting mode after any step is completed. Test parameters are stored in memory. The program does not accept unreasonable settings and inputs. The "X" in the following parameter setting instructions represents any number between 0-9.

Note: After the value is set, when the “SET” or “EXIT” key is pressed and the buzzer sounds short, you must check whether the input value is within the setting range.

8.2 Measurement Parameter Setting

Press “Set” in the interface to be tested to enter the measurement parameter setting page, as shown below:

PARAMETER			
Test Mode	DC	Arc Sense	0
Voltage	10.000kV	Connect	NO
Hi Limit	06.00mA		
Lo Limit	00.00mA		
Ramp Time	000.5s		
Test Time	061.0s		
Fall Time	000.1s		
DC	IR	GD	

8.6 Measurement Parameter Setting Interface

1. Test mode selection (DC Hi-pot test and insulation resistance test)

Press the "▲" or "▼" key to select the content to be set, as shown below:

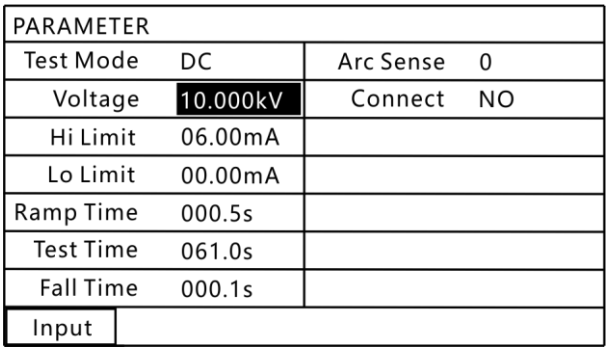
PARAMETER			
Test Mode	DC	Arc Sense	0
Voltage	10.000kV	Connect	NO
Hi Limit	06.00mA		
Lo Limit	00.00mA		
Ramp Time	000.5s		
Test Time	061.0s		
Fall Time	000.1s		
DC	IR	GD	

8.7 "Test Mode" Setting Interface

In this interface, select the test mode using the function keys at the bottom of the screen.

2. Test output voltage setting (DC Hi-pot test and insulation resistance test)

Use the "▲" or "▼" key on the measurement parameter setting interface to select the "test voltage" setting content, as shown in the figure below:



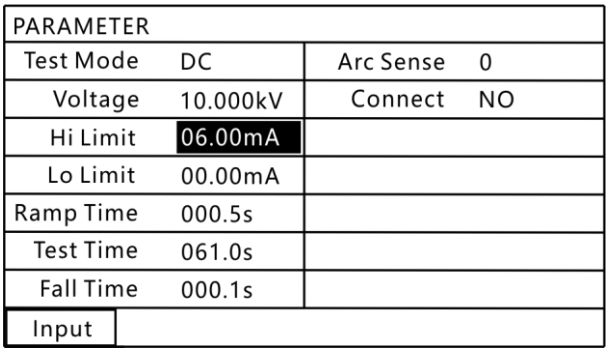
8.8 "Test voltage" setting interface

In this interface, press the "Input" key, the first digit of the voltage value will be displayed in reverse, and use the numeric keys to set the required voltage value. After setting, press “Enter” to confirm. To cancel the setting, press the "Esc" key to exit the current setting.

Note: If the set voltage value is not in the range, the instrument will automatically determine that it is not in the range and will automatically restore the set value to the previous set value.

3. Test current comparator upper limit setting (DC hi-pot test)

Use the "▲" or "▼" key on the measurement parameter setting interface to select the "judge value upper limit" setting content, as shown in the figure below:



8.9 Hi-pot test "Judge value upper limit" setting interface

In this interface, press the "Input" key, the first digit of the voltage value will appear in reverse, and use the numeric keys to set the upper limit of the required judgment value. After setting, press the “Enter” key to confirm. To cancel the setting, press the "Esc" key to exit the current setting

Note: If the set upper limit set value is not in the range, the instrument will automatically determine that it is not in the range and will automatically restore the set value to the previous set value.

4. Test current comparator lower limit setting (DC hi-pot test)

Use the "▲" or "▼" key on the measurement parameter setting interface to select the setting content of " judgment value lower limit ", as shown in the figure below:

PARAMETER			
Test Mode	DC	Arc Sense	0
Voltage	10.000kV	Connect	NO
Hi Limit	06.00mA		
Lo Limit	00.00mA		
Ramp Time	000.5s		
Test Time	061.0s		
Fall Time	000.1s		
Input			

8.10 lower limit "judgment value lower limit" setting interface

In this interface, press the "Input" key, the first digit of the voltage value appears in reverse, and use the numeric keys to set the required lower limit of the judgment value. After setting, press “Enter” to confirm. To cancel the setting, press the "Esc" key to exit the current setting.

Note: If the set lower limit setting value is not in the range, the instrument will automatically determine that it is not in the range and will automatically restore the setting value to the previous setting value.

5. Hi-pot test rise time setting (DC Hi-pot test)

Use the "▲" or "▼" key on the measurement parameter setting interface to select the "rise time" setting content, as shown in the figure below:

PARAMETER			
Test Mode	DC	Arc Sense	0
Voltage	10.000kV	Connect	NO
Hi Limit	06.00mA		
Lo Limit	00.00mA		
Ramp Time	000.5s		
Test Time	061.0s		
Fall Time	000.1s		
Input			

8.11 Hi-pot test "Rise time" setting interface

In this interface, press the "Input" key, the first digit of the voltage value will appear in reverse, and use the numeric keys to set the required rise time. After setting, press “Enter” to confirm. To cancel the setting, press the "Esc" key to exit the current setting.

The hi-pot rise time setting is a set value for which the output voltage value rises within this time.

For example:

Setting the output voltage to 3.000kV requires a voltage rise rate of

500V / S;

Calculate Ramp T = 3000V / (500V / S) = 6S;

Ramp T is set to 6.0S

6. Hi-pot test time setting (DC Hi-pot test)

Use the "▲" or "▼" key on the measurement parameter setting interface to select the "test time" setting content, as shown in the figure below:

PARAMETER			
Test Mode	DC	Arc Sense	0
Voltage	10.000kV	Connect	NO
Hi Limit	06.00mA		
Lo Limit	00.00mA		
Ramp Time	000.5s		
Test Time	061.0s		
Fall Time	000.1s		
Input			

8.12 Hi-pot test "Test Time" Setting Interface

In this interface, press the "Input" key. The first digit of the voltage value will be displayed in reverse. Use the numeric keys to set the required test time. After setting, press “Enter” to confirm. To cancel the setting, press the "Esc" key to exit the current setting.

7. Fall time setting (DC hi-pot test)

Use the "▲" or "▼" key on the measurement parameter setting interface to select the "fall time" setting content, as shown in the figure below:

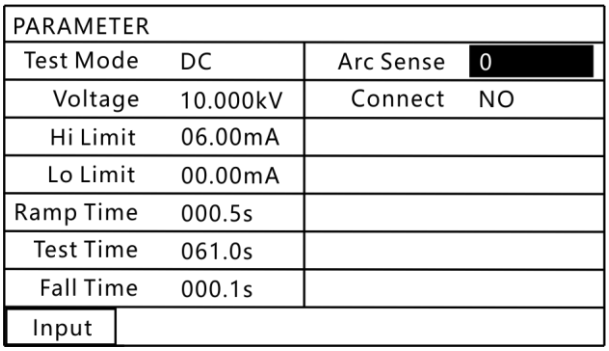
PARAMETER			
Test Mode	DC	Arc Sense	0
Voltage	10.000kV	Connect	NO
Hi Limit	06.00mA		
Lo Limit	00.00mA		
Ramp Time	000.5s		
Test Time	061.0s		
Fall Time	000.1s		
Input			

8.13 Hi-pot test "fall time" setting interface

In this interface, press the "Input" key. The first digit of the voltage value will be displayed in reverse. Use the numeric keys to set the required fall time. After setting, press “Enter” to confirm. To cancel the setting, press the "Esc" key to exit the current setting.

8. Arc sensitivity setting (DC Hi-pot test)

Use the "▲" or "▼" key on the measurement parameter setting interface to select the "Arc Sensitivity" setting content, as shown in the figure below:



8.14 Hi-pot test "Arc Sensitivity" Setting Interface

In this interface, press the "Input" key. The first digit of the voltage value will be displayed in reverse. Use the numeric keys to set the required arc sensitivity. After setting, press “Enter” to confirm. To abandon the setting, press the "Esc" key to exit the current setting.

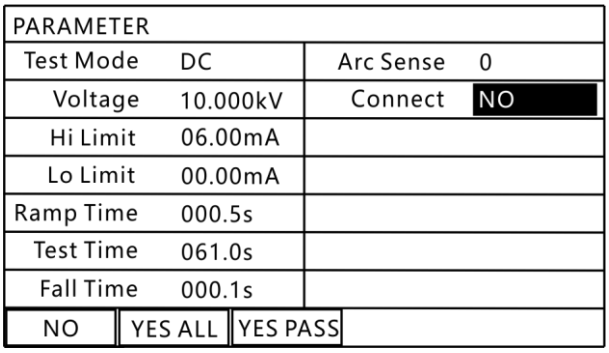
Arc sensitivity setting options:

0: Turn off the arc alarm function

1-9: Turn on the arc alarm function, the higher the number, the higher the sensitivity

9. Continuous test function setting (AC and DC Hi-pot test and insulation resistance test)

Use the "▲" or "▼" key on the measurement parameter setting interface to select the "continuous test" setting content, as shown in the figure below:



8.15 Hi-pot test "Connect" setting interface

Connect setting options:

NO: Disable the continuous test function of this group

YES PASS: Enable the continuous test function of this group and connect to the next group of tests when the test passes.

YES ALL: Enable the continuous test function of the group, no matter the test results is pass or fail and connected to the next group of tests.

The continuous function of this group is enabled, that is, the connection to the next group is completed when the conditions of this group of tests are satisfied.

For example, to test the connection of M1, M2 and M3, you only need to enable the

continuous test function of M1 and M2.

10. Test resistance comparator upper limit setting (insulation resistance test)

In the insulation resistance test mode, use the "▲" or "▼" key to select the setting of the "upper limit of judgment value" on the measurement parameter setting interface, as shown in the figure below.

PARAMETER			
Test Mode	IR	Ramp Time	000.5s
Voltage	0.500KV	Test Time	001.0s
Range	AUTO	Fall Time	000.1s
Hi Enable	OFF	Connect	NO
Hi Limit	010.00GΩ		
Lo Limit	200.00kΩ		
Wait Time	000.8s		
Input			

8.16 Insulation resistance "judgment value upper limit" setting interface

In this interface, press the "Input" key, the first digit of the voltage value will appear in reverse, and use the numeric keys to set the upper limit of the required judgment value. After setting, press “Enter” to confirm. To cancel the setting, press the "Esc" key to exit the current setting.

Note: If the set upper limit set value is not in the range, the instrument will automatically determine that it is not in the range and will automatically restore the set value to the previous set value.

11. Set lower limit of test resistance comparator (insulation resistance test)

In the insulation resistance test mode, use the "▲" or "▼" key to select the setting content of "lower limit of judgment value" in the measurement parameter setting interface, as shown below:

PARAMETER			
Test Mode	IR	Ramp Time	000.5s
Voltage	0.500KV	Test Time	001.0s
Range	AUTO	Fall Time	000.1s
Hi Enable	OFF	Connect	NO
Hi Limit	010.00GΩ		
Lo Limit	200.00kΩ		
Wait Time	000.8s		
Input			

8.17 Insulation resistance "judgment lower limit" setting interface

In this interface, press the "Input" key, the first digit of the voltage value appears in reverse, and use the numeric keys to set the required lower limit of the judgment value. After setting, press “Enter” to confirm. To cancel the setting, press the "Esc" key to exit the current setting.

Note: If the set lower limit setting value is not in the range, the instrument will automatically determine that it is not in the range and will automatically restore the

setting value to the previous setting value.

12. Test range value setting (insulation resistance test)

In the insulation resistance test mode, use the "▲" or "▼" key to select the "test range" setting content in the measurement parameter setting interface, as shown below:

PARAMETER			
Test Mode	IR	Ramp Time	000.5s
Voltage	0.500KV	Test Time	001.0s
Range	AUTO	Fall Time	000.1s
Hi Enable	OFF	Connect	NO
Hi Limit	010.00GΩ		
Lo Limit	200.00kΩ		
Wait Time	000.8s		
AUTO	100GΩ	300MΩ	30MΩ NEXT

8.18 Insulation resistance “Range” setting interface

Use the function key under this interface to select the required test range.

The test range has the following options:

AUTO: range auto mode, the measurement starts from the 30MΩ range by default.

300kΩ: measurement from 300kΩ range

3MΩ: measurement from 3MΩ range

30MΩ: measurement from 30MΩ range

300MΩ: measurement from 300MΩ range

100GΩ: measurement from 100GΩ range

Note: When the range setting is not “AUTO”, the range is also automatic. But the measurement starts from the selected range by default.

13.Resistance comparator upper limit enable setting(insulation resistance test)

In the insulation resistance test mode, use the "▲" or "▼" key to select the setting of the "Hi Enable" setting in the measurement parameter setting interface, as shown below:

PARAMETER			
Test Mode	IR	Ramp Time	000.5s
Voltage	0.500KV	Test Time	001.0s
Range	AUTO	Fall Time	000.1s
Hi Enable	OFF	Connect	NO
Hi Limit	010.00GΩ		
Lo Limit	200.00kΩ		
Wait Time	000.8s		
ON	OFF		

8.19 Insulation resistance “Hi Enable” setting interface

In this interface, press the "Enter" key and use the "▲" or "▼" key to select to select

the range.

Hi-EN has the following options:

OFF: Disable comparator upper limit function

NO: Enable comparator upper limit function

14. Waiting time setting (insulation resistance test)

In the insulation resistance test mode, use the "▲" or "▼" key to select the setting of the "wait time" on the measurement parameter setting interface, as shown below:

PARAMETER			
Test Mode	IR	Ramp Time	000.5s
Voltage	0.500KV	Test Time	001.0s
Range	AUTO	Fall Time	000.1s
Hi Enable	OFF	Connect	NO
Hi Limit	010.00GΩ		
Lo Limit	200.00kΩ		
Wait Time	000.8s		
Input			

8.20 Insulation Resistance “Wait Time” Setting Interface

In this interface, press the "Enter" key and use the "▲" or "▼" key to select the range. After the selection is completed, press "Enter" to confirm. To cancel the setting, press the "Esc" key to exit the current setting.

The insulation resistance wait time is between the start of the test and the wait time until the comparator function is turned off.

Note: If the set time setting value is not in the range, the instrument will automatically determine that it is not in the range and will automatically restore the setting value to the previous setting value.

15. Test current setting (ground resistance test)

In the ground resistance test mode, use the "▲" or "▼" key to select the "test current" setting content in the measurement parameter setting interface, as shown below:

PARAMETER			
Test Mode	GD	Channel	FRONT
Current	030.00A		
Hi Limit	600.0000mΩ		
Lo Limit	000.0000mΩ		
Test Time	000.0s		
Open Alarm	OFF		
Connect	NO		
Input			

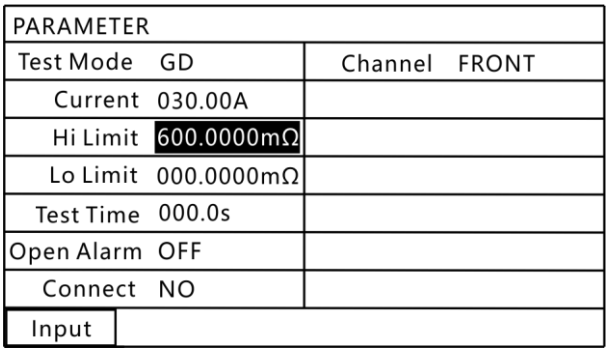
8.21 Ground Resistance "Test Current" Setting Interface

In this interface, press the "Input" key and use the numeric keys to set the test current. After the selection is complete, press "Enter" to confirm. To cancel the setting,

press the "Esc" key to exit the current setting.

16. Judgment value upper limit setting (ground resistance test)

In the ground resistance test mode, use the "▲" or "▼" key to select the "Judgment value upper limit" setting content in the measurement parameter setting interface, as shown below:

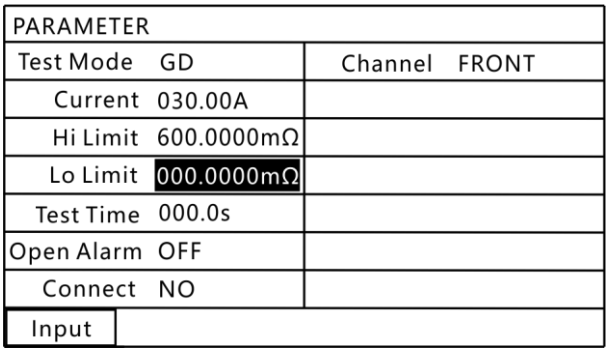


8.22 Ground Resistance “Judgment Value Upper Limit” Setting Interface

In this interface, press the "Input" key and use the numeric keys to set the upper limit of the judgment value. After the selection is complete, press "Enter" to confirm. To cancel the setting, press the "Esc" key to exit the current setting.

17. Judgment value lower limit setting (ground resistance test)

In the ground resistance test mode, use the "▲" or "▼" key to select the setting content of "lower limit of judgment value" in the measurement parameter setting interface, as shown below:

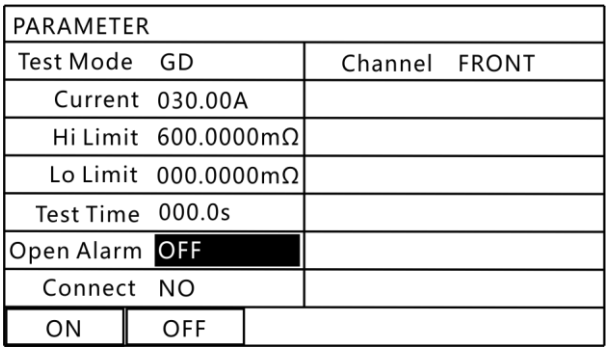


8.23 Grounding resistance "judgment lower limit" setting interface

In this interface, press the "Input" key and use the numeric keys to set the lower limit of the judgment value. After the selection is complete, press "Enter" to confirm. To cancel the setting, press the "Esc" key to b exit the current setting.

18. Open circuit alarm setting (ground resistance test)

In the ground resistance test mode, use the "▲" or "▼" key to select the "open circuit alarm" setting content in the measurement parameter setting interface, as shown in the figure below:



8.24 Ground Resistance "Open Circuit Alarm" Setting Interface

In this interface function keys to set the desired parameters.

Chapter 9 System Parameter Setting

9.1 System parameter description

Press the "Set" key in the test parameter setting interface to enter the system parameter setting interface, as shown below:

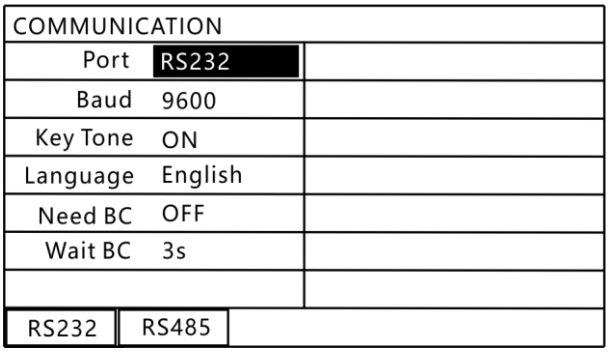
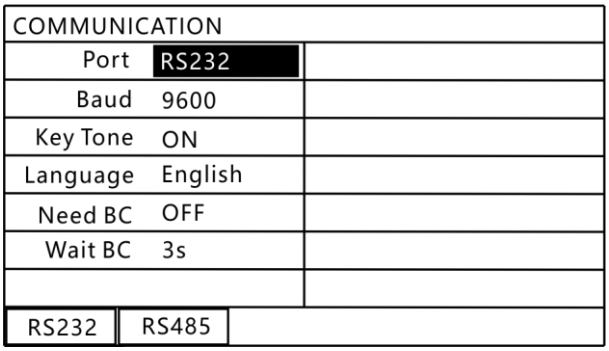


Figure 9.1 System parameter setting interface

9.2 System Parameter Setting

1. Communication port selection

Press the "▲" or "▼" key to select the content to be set, as shown below.



9.2 "Communication Mode" Setting Interface

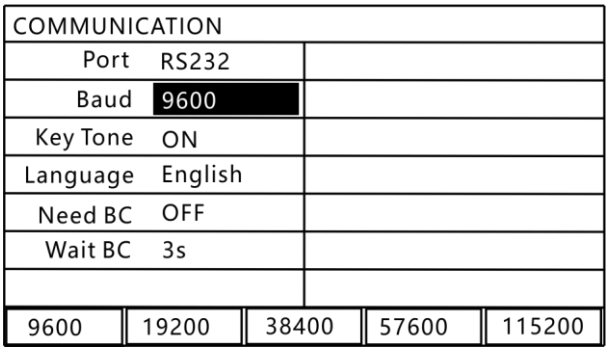
In this interface, use the function keys to select the required communication port.
Communication mode setting options:

RS232: Open RS232 communication port

RS485: Open RS485 communication port

2. Instrument communication baud rate setting

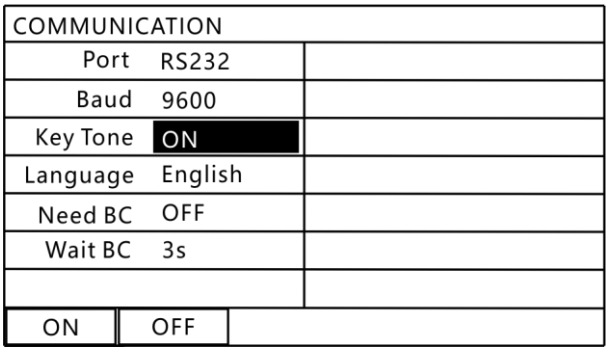
Press the "▲" or "▼" key to select the content to be set, as shown below.



9.3 "Baud rate" setting interface

In this interface, use the function keys to select the required communication rate.
Baud rate setting options:
9600: communication baud rate is 9600;
19200: communication baud rate is 19200;
38400: communication baud rate is 38400;
57600: the communication baud rate is 57600;
115200: communication baud rate is 115200;

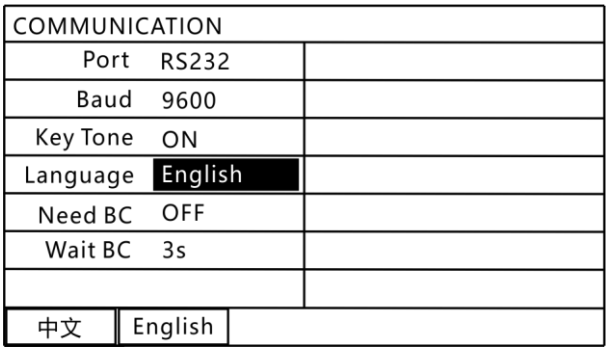
3.Key sound setting
Press the "▲" or "▼" key to select the content to be set, as shown below.



9.4 "Key Tone" Setting Interface

In this interface, use the function keys to select the required option.
Key Tone setting options:
OFF: turn off the button sound;
NO: turn on the button sound;

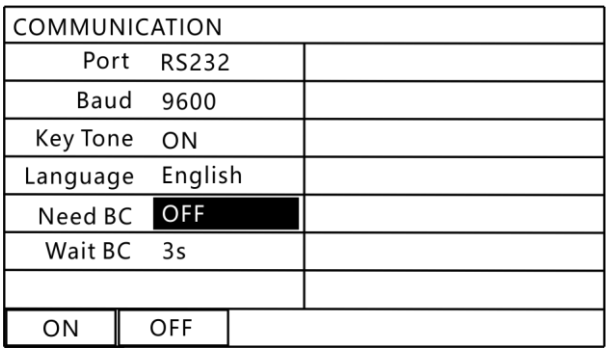
4. Language setting
Press the "▲" or "▼" key to select the content to be set, as shown below.



9.5 "Language" Setting Interface

In this interface, use the function keys to select the required option.
Language setting options:
Chinese: Chinese operation interface;
English: English interface;

5. No Test without Code Setting
Press the "▲" or "▼" key to select the content to be set, as shown below

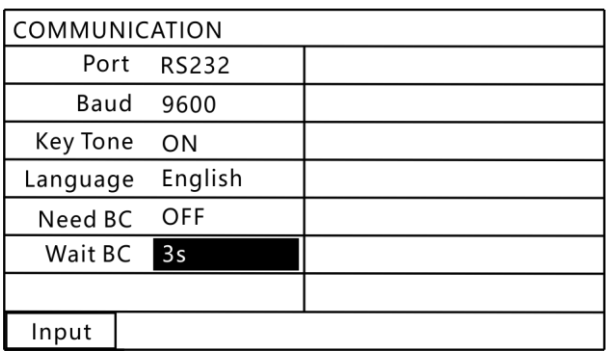


9.6 " No Test without code" setting interface

In this interface, use the function keys to select the required option.
No code no test setting options:
ON: need a computer to receive the bar code, the instrument will start the test;
OFF: does not require bar code, start the test instrument

6.Waiting time for code setting

Press the "▲" or "▼" key to select the content to be set, as shown below.



9.7 "Waiting Time" Setting Interface

In this interface, press the "Input" key and use the numeric keys to set the waiting time for code. After the selection is complete, press "Enter" to confirm. To cancel the setting, press the "Esc" key to exit the current setting.
Waiting time for code is the time required to wait for the code to be scanned when no test without code is measured and set to "ON". After this time, the instrument will give a disqualified signal.

Chapter 10 Maintenance Guide

10.1 Routine maintenance

1. The tester should be used in a well-ventilated, dry, dust-free, and strong electromagnetic interference environment.
2. If the tester is not used for a long time, it should be powered on periodically. It is usually powered on once a month for at least 30 minutes.
3. After the tester works for a long time (8 hours), the power should be turned off for more than 10 minutes to keep the tester in good working condition.
4. After long-term use of the test leads, poor contact or open circuit may occur, it should be regularly repaired.

10.2 Simple troubleshooting

Failure	Processing methods
After booting, there is no display and the buttons do not respond	Please check whether the power supply is normal and whether the fuse on the rear panel is blown. If it is blown, replace the fuse.
After starting, the high-voltage indicator is off, but there is test voltage	The high voltage indicator is broken.
The alarm indicator is off after the test fails	Alarm indicator is broken
After starting, the voltage is normal but no current output	Please check whether the test lead is open, the measured object is not in good contact, or the measured object is open.

If any fault cannot be removed in time, please contact our company or Hoptech's authorized distributor as soon as possible for further support.

10.3 Quality Assurance

We guarantees that the products manufactured by Hopetech are subject to strict quality confirmation. The factory quality guarantee period for products is two years. Product manufacturing defects or failures during this period will be repaired free of charge.
For users who modify the circuit, function by themselves or beyond quality warranty period, the maintenance fee will be charged according to the actual situation.