Jinko金科

USER MANUAL

JK7123

Program Controlled
Withstand Voltage Insulation Ground Tester

Vear2.0

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Chapter I Safety Rules

The contents of this manual are subject to change without notice.
If the manual is not exhaustive, please contact us directly.

Rules and matters that should be noticed before high voltage test! !! !!

1.1 General provisions

Before using this tester, please read the instructions carefully to understand the operating procedures and related safety signs to ensure safety.
Before turning on the input power switch of this unit, please select the correct input voltage (110V or 220V) specifications.

Danger sign indicates high voltage output, please avoid contact.

Chassis ground symbol

WARNING

WARNING Be aware that the operations, applications, or conditions you perform are very dangerous and could result in injury or death.

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

1.2 Maintenance and upkeep

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 replaced without permission. If an abnormality occurs to the instrument, please seek the help of the company's designated distributor.

1.2.2 Regular maintenance

This series of testers, 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 by himself, otherwise the company's warranty will be invalidated and he will not be held responsible for the consequences.

1.3 Test environment

1.3.1 Working position

When operating the instrument, make sure that the instrument is placed in a place where ordinary personnel cannot touch it at will. If this is not possible due to production line arrangements, the test area must be isolated from other facilities and a "high-voltage test work area" must be marked. If the high-voltage test 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! During high voltage test, non-workers should not approach."

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 area power supply must have a separate switch installed at the entrance to the test area to ensure that everyone can identify it. In the event of an emergency, the power can be turned off immediately.

1.3.3 Workplace

Use a workbench with non-conductive material where possible. Do not use any metal between the operator and the test object. The position of the operator must not be across the object to be operated and adjusted. If the volume of the object to be measured is small, place the object to be tested in a non-conductive box as much as possible.

The test site must be kept tidy and clean at all times, and must not be cluttered. Place unused instruments and test leads in a fixed position. Make sure that all personnel can immediately separate the test object, test object and test 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 are sufficient to cause personal injury or fatality during electric shock due to incorrect operation, and must be used and operated by qualified personnel.

1.4.2 Safety Code

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

1.4.3 Clothing regulations

Operators are not allowed to wear clothes with metal decoration or metal bracelets and watches, as these metal accessories are likely to cause 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 procedures

Never use the tester on a live circuit board or device! !!

The ground wire of the tester must be connected in accordance with regulations. When connecting the test line, you must first connect the terminal under test on the tester to the 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, and must not be held on a conductive body. The operator must be able to operate completely independently. The switch and remote control switch cannot be controlled by others. The remote control switch should be placed in a fixed position when not in use.

WARNING During the test, never touch the test object or anything connected to the test object.

1.6 The following safety points must be kept in mind

- Non-qualified operators and unrelated personnel should stay away from the high-voltage test area.
- Always maintain a safe and orderly condition in the high-voltage test area.
- Do not touch the test object or any objects 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 test, the discharge operation must be performed before the work of removing the test lead.

Chapter II　Introduction to Safety Regulations

1.1 The importance of testing

In today's high consumer awareness, every manufacturer of electrical and electronic products must do its best to make the product safe. 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. At present, safety enforcement units, such as UL, CSA, IEC, BSI, VDE, TUV, and JSI, require manufacturers to use "withstand voltage insulation testers" for safety testing when designing and producing electronic or electrical products.

2.2 Withstand voltage test

If a product can work normally in a very harsh environment, it can be determined that it can also work normally in a normal environment. The most common use cases for withstand voltage tests are:

• Functional testing at design time—determine the conditions under which the product designed can meet its functional requirements.

• Specification test during production — confirm that the produced product can meet the requirements of its specifications.

• Confirmation test during quality assurance—confirm that the quality of the product can meet the safety standards.

• Safety test after repair—confirm that the repaired product can maintain compliance with safety standards.

Different products have different technical specifications. Basically, during the withstand voltage test, a voltage higher than the normal working voltage is added to the product to test. This voltage must last for a period of time. If a component stays within a specified range for a specified period of time, it can be determined that the component works under normal conditions and should be very safe. And good design and selection of good insulation materials can ensure that users are protected from electric shock.

The withstand voltage test performed by this instrument is generally called "high-voltage dielectric test", referred to as "withstand voltage test" for short. The basic requirement is 2 × the working voltage of the object to be tested + 1000V, as the test voltage standard. The test voltage of some products may be higher than 2 × working voltage + 1000V. For example, the operating voltage range of some products is from 100V to 240V, and the test voltage of such products may be between 1000V and 4000V or higher. In general, products with a "double insulation" design may use a test voltage that is higher than the 2 × working voltage + 1000V standard.

The withstand voltage test is more precise in the product design and sample production than in

the formal production test, because the product's safety is determined at the design and test stage. Although only a few samples are used for product design judgment, online testing during production should 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. The output frequency of the AC withstand voltage tester must be maintained between 40 and 70 Hz, and its peak value must not be less than 1.3 times the root mean square (RMS) voltage value, and its peak value must not be higher than the root mean square (RMS) voltage. 1.5 times the value.

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

2.3.1 Characteristics of AC withstand voltage (ACW) test
Most of the DUTs that do withstand voltage tests will contain some stray capacitance. These stray capacitors may not be filled with AC tests, and a continuous current will flow through these capacitors.

2.3.1.1 Advantages of AC Withstand Voltage (ACW) Test
1. Generally speaking, AC test is easier to be accepted by the safety unit than DC test. The main reason is that most products use AC power, and the AC test can test the positive and negative polarity of the product at the same time, which is completely consistent with the environment in which the product is used, which is in line with actual use conditions.
2. Because the stray capacitors cannot be filled during the AC test, but there will be no instant surge current, so the test voltage does not need to rise slowly. You can add the full voltage at the beginning of the test, unless the product sensitive.
3. Since the AC test cannot fill those stray capacitors, it is not necessary to discharge the test object after the test, which is another advantage.

2.3.1.2 Disadvantages of AC Testing
1. The main disadvantage is that if the stray capacitance of the DUT is large or the DUT is a capacitive load, the current generated will be much larger than the actual leakage current, so the actual leakage current cannot be known.
2. Another disadvantage is that because the current required by the stray capacitance of the DUT

must be supplied, the current required by the instrument will be much larger than the current used in the DC test. This will increase the danger to the operator.

2.3.2 Characteristics of Direct Current (DC) Test

During the DC withstand voltage test, the stray capacitance on the DUT is filled. The capacitive current caused by the DC withstand voltage test will drop to zero after the stray capacitance is filled.

2.3.2.1 Advantages of Direct Current (DC) Testing

1. Once the stray capacitance on the DUT is full, only the actual leakage current of the DUT will remain. The DC withstand voltage test can clearly show the actual leakage current of the DUT.
2. Another advantage is that only the charging current of the DUT needs to be supplied in a short time, and the current required at other times is very small, so the current capacity of the instrument is much lower than the current capacity required during the AC withstand voltage test. .

2.3.2.2 Disadvantages of Direct Current (DC) Testing

1. Unless there is no electric capacity on the DUT, the test voltage must start from "zero" and rise slowly to avoid excessive charging current. The larger the electric capacity, the longer the ramp-up time, the longer it can increase The lower the voltage. When the charging current is too large, it will definitely cause the tester to misjudge and make the test result incorrect.
2. Since the DC voltage test will charge the test object, after the test, the test object must be discharged before the next step.
3. Unlike the AC test, the DC withstand voltage test can only be tested with a single polarity. If the product is to be used under AC voltage, this disadvantage must be considered. This is why most safety agencies recommend the use of AC withstand voltage tests.

In the AC test, the peak value of the voltage is 1.4 times that displayed by the meter, which is not displayed by ordinary meters, and cannot be reached by DC withstand voltage. Therefore, most safety regulations require that if a DC withstand voltage test is used, the test voltage must be increased to an equivalent value.

2.4 Insulation resistance test

The insulation resistance test mainly measures the resistance between the live wire of the appliance and the case. The measurement method is based on the principle of Ohm's law, adding a voltage between the live wire and the case, and then measuring the voltage and current values, and then calculating the resistance value according to Ohm's law. Usually, a larger constant voltage (500V or 1000V DC) is applied and maintained for a specified period of time as the test standard. If the resistance is kept within the specified specifications within the specified time, it can be determined that the appliance is operating under normal conditions, and the appliance

should be safer.
The higher the insulation resistance value, the better the insulation of the product. The insulation resistance value measured by the insulation resistance test is the equivalent resistance value formed by various related networks connected between the two test points and their surroundings.
However, the insulation test cannot detect the following conditions:
The insulation strength of the insulating material is too weak;
Pinholes on the insulator;
Insufficient distance between parts;
The insulator is crushed and cracked;
Each of these conditions can only be detected by a withstand voltage test.

2.5 AC ground resistance test

The ground resistance test mainly measures the resistance of the contact point between the ground wire of the appliance and the cabinet. The measurement method is based on the principle of Ohm's law, a current flows on the contact point, and then the current and the voltage value of the contact point are measured separately, and then the resistance value is calculated according to Ohm's law. Usually a large current flows, which simulates the abnormal current conditions that occur when the appliance is abnormal, 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 safer 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 within 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, 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. For the devices that the general user will often touch, except for the CSA specification, which requires 30 amps, most security inspection agencies require 25 amps. At the same time, 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, and the resistance value of the contact point needs to be less than 500 mΩ, but the time is still 60 seconds. There are still some international standards that are higher than the above standards, and the test value is 5

times the rated input current of the appliance, and the resistance value of the contact point is still 100mΩ, and the test time is 60 seconds. Most of these are electrical appliances, which are 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 misconception that the insulation or voltage resistance 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 effective value of DC is the same as the peak value, but 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 Times. When comparing the energy generated by the AC peak point to the contact point, the energy generated by the AC peak moment at the contact point is twice the DC value when calculated according to the power theorem (power = current squared X resistance).

Although the current security inspection agency allows two types of ground testers to be used, AC ground resistance testers are particularly recommended in the selection of ground resistance tester specifications. Secondly, most of the general appliances use mains power as the power supply, and mains power is AC power, so the AC ground resistance tester is used as the test standard, which fully meets the actual conditions of use.

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

Chapter III Technical Specifications

3.1 Product Introduction

Programmable withstand voltage insulation grounding tester is a testing instrument for testing the safety parameters of electronic products. Can be used for household appliances, electronic instruments, electronic equipment, electronic components, wire and cable and other electrical products withstand voltage and insulation testing.

This series of products have pass / fail judgment function, sound and light alarm function and automatic test time control function, etc., simple operation, beautiful appearance, fast over-current cutting speed and other advantages. Is the ideal withstand voltage insulation testing equipment.

3.2 Technical indicators

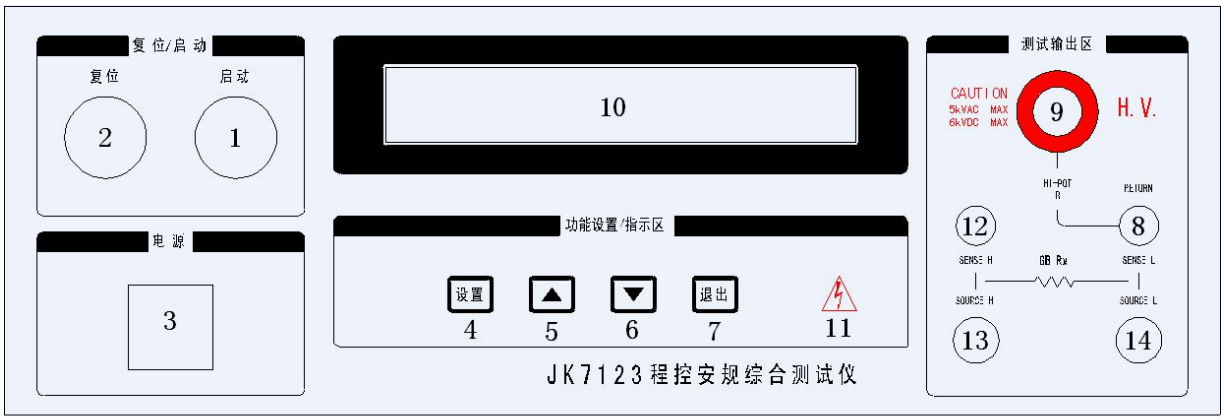
Function	Function Description
Input characteristics	Voltage: 220VAC，± 10%, single phase, Optional Frequency:47-63Hz Fuse:4A/250VAC
AC withstand voltage test	Rated output:5KV AC
Output frequency	50 or 60Hz,optional
Output waveform	sine wave1.3<crest factor<1.5
Leakage current High limit	Range:0.01-20.00mA Resolution:0.01mA Accuracy ±(2% set value+2 characters)
Leakage Current Low limit	Range:0.00-20.00mA Resolution:0.01mA Accuracy：±(2% set value +2 characters)
DC withstand voltage test	Rated output:6KV DC
Leakage current High limit setting	Range:0.01-10.00mA Resolution:0.01mA Accuracy：±(2% set value+2 characters)
Leakage current Low limit setting	Range:0.00-10.00mA Resolution:0.01mA Accuracy ±(2% set value +2 characters)
Voltage setting	Range:0-5000V AC 0-6000V DC Resolution:1V Accuracy：±(2% set value +5V)
Voltage stability	±(1% set value+5V)
Ramp time	Range:0.1-999.9S
	Resolution:0.1S
	Accuracy:±(0. 1% set value+0. 05 S)
Test time	Range:0.5-999.9S，0 is continuous test
	Resolution:0.1S
	Accuracy：±(0. 1% set value+0. 05 S)

Voltage display	Range:0-5.00KV AC 0-6.00KV DC Resolution: 0.01KV Accuracy：±(3% set value+3 character)
Current display	Range:0.01-20.00mA AC 0.01-10.00mA DC Resolution:0.01mA Accuracy ±(2% set value+3 characters)
Insulation resistance test	Rated output:1000V DC
Voltage setting Range	Range:500 - 1000V DC Resolution:1V Accuracy:±(2% set value+5V)
Voltage display	Range:0.50KV – 1.00KV DC Resolution:0.01KV Accuracy±2% set value
Resistance display	Range:1.000 - 2000MΩ Accuracy:±(5% set value +3 characters)（1-1000MΩ） ±(10% set value+3 characters)(1000-2000MΩ)
Resistance high limit setting	0-2000MΩ，0 is not judged
Resistance low limit setting	1.0-999.9MΩ
judge delay time	Range:0.8 - 999.9 S,0 is continuous judgment Resolution:0.1S Accuracy:±(0. 1% set value+0. 05 S)
Ground resistance test	Voltage output<7VAC
Peak current display	3.0~30.0A, ±(3% display value+3 characters)
Ground resistance Upper limit setting	1～300 mΩ（3～10A） 1～120 mΩ（11～30A）
Resistance display	0～300mΩ
Test time	0.5～999.9 S, 0 is continuous

Chapter IV Panel Description

4.1 Front panel structure

4.1.1 Schematic diagram of the front panel



4.1.2 Front panel description

1. Start switch

The green momentary contact switch contains a PASS indicator. Its functions are:

As a start switch for test voltage output;

When the DUT passes the test, this green indicator light will be on.

2. Reset switch

The red momentary contact switch contains a FAIL indicator. Its functions are:

In the setting mode, as a switch to leave the setting mode;

When the test is in progress, it can be used as a switch to interrupt the test;

At the end of the test, as a switch to exit the test and display the next test state;

When the DUT fails the test, this red indicator light will be on.

3. Switch

The working power input switch of the instrument.

4. SET key

In the state to be tested, it is used as a function key to enter the setting mode;

In the setting mode, it is used as a function key for selecting test parameter items;

In the calibration mode, it is used as the function key to select the calibration parameter item;

As a function key for viewing test results when connected to a test.

5. + Key

In the state to be tested, the function key selected as the parameter group;

During parameter setting, it is used as the function key for inputting various test parameter data;

Function key input as standard value in calibration mode.

6. -key

In the state to be tested, the function key selected as the parameter group;

During parameter setting, it is used as the function key for inputting various test parameter data;

Function key input as standard value in calibration mode.

7. EXIT key

In the setting mode, as a function key to leave the setting mode and save the setting value;

In the calibration mode, it is used as a function key to close the output and save the standard value.

8. Measured terminal

As the loop test end of the DUT, test the withstand voltage and insulation resistance in combination with 9, and test the ground resistance in combination with 12, 13, and 14.

9. High voltage output

Special output terminal can withstand high voltage within 10KV. As the high-voltage test end of the test piece.

10. LCD display

20-character x 2-line backlit LCD display for displaying setting data or test results.

11. Test in progress

When the instrument starts to output voltage, the indicator light in the high-voltage sign will flash, indicating that "high-voltage output is dangerous."

12. Ground resistance detection high-end

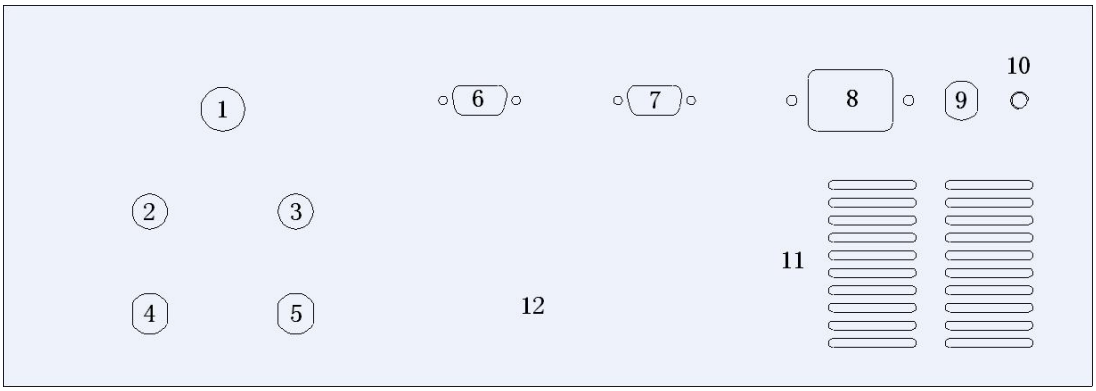
Combine with 8 to detect ground resistance.

13/14. Ground resistance current output

Output 3-30A AC current

4.2 JK7123 rear panel structure

4.2.1 Schematic diagram of JK7123 rear panel



4.2.2 Description of the rear panel

1 ~ 5 output interface (spare) same as before

6. Remote control signal terminal (PLC) interface

It is a standard 9PIN D-type terminal block. Provide normally open (N.O.) contacts for remote monitoring signals of PASS (test passed), FAIL (test failed) and control contacts for TEST (reset) and RESET (reset).

7.RS232 interface

It is used to connect to a computer and use the supporting software to set parameters and change the test status of the instrument.

8. Input power socket

The standard input power socket provides working power for the instrument, and the input power voltage is AC220V.

9. Input power fuse holder

Note that you must first turn off the input power switch and disconnect the power plug before you can replace the fuse, and the standard specification fuse (10A / 250VAC) should be replaced.

10．Ground

The ground terminal of the machine body must be properly connected to ensure the safety of the operator.

11. Instrument vent

Used to dissipate heat inside the instrument.

12. Nameplate

Display the factory date, instrument number and company name

Chapter V　Operating Procedures and Steps

5.1 Operation Instructions

This series of withstand voltage 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 Operation steps

Follow this procedure and steps to operate the instrument:

1. Before connecting the input power cord plug of this instrument to the mains power supply, please turn off the input “power switch” of this instrument.

And switch the "voltage selection" switch on the rear panel to the correct input voltage position, and check whether the specifications of the fuse are correct. Then 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 DUT, then connect the loop wires to the tested end of the instrument, and finally connect the high-voltage test leads to the high-voltage terminals of the instrument, and check whether all the test leads are all connected OK.

Turn on the input “power switch” of the instrument. After the program displays the instrument model, it will automatically display the group and test parameter information of the last test of the instrument, and enter the test and parameter setting mode. At this time, the display will show:

AC withstand voltage test

ACW	SETUP	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	SETUP	XXX.XS
MX	X.XXKV	XX.XXmA

Insulation resistance test

IR	SETUP	XXX.XS
MX	X.XXKV	XXXXMΩ

Ground resistance test

GND	SETUP	XXX.XS
MX	XX.XXA	XXXmΩ

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 settings".

5． Press the "Start" switch again to output high voltage. At this time, the high voltage indicator next to the red "  " symbol on the panel will flash, and the timer will start to count at the same time. 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, the green indicator light on the start switch will light up, and a "beep, beep" sound will be emitted at the same time, indicating that the test object passes the test, and the display will show "PASS" and test result data. To continue the test, press the Start switch again. To view the original setting, press the "Reset" switch, and the program will immediately clear the test result and display the original setting.

7. If you want to stop the test during the testing, please press the "Reset" switch, the instrument will stop the test immediately, and the display will retain the current test value. To continue the test, press the Start switch and the program will restart the test from its original starting point.

8. If the test of the DUT fails, the instrument will immediately stop the test and the display will show its status and the value at the time of the failure. At this time, the indicator light in the red reset switch will light up, and at the same time, it will continue to emit a beep warning sound. You can press the "Reset" switch to turn off the alarm sound. To continue the test, press the "Start" switch again. For information on the various monitors, refer to the description of "Monitor Information".

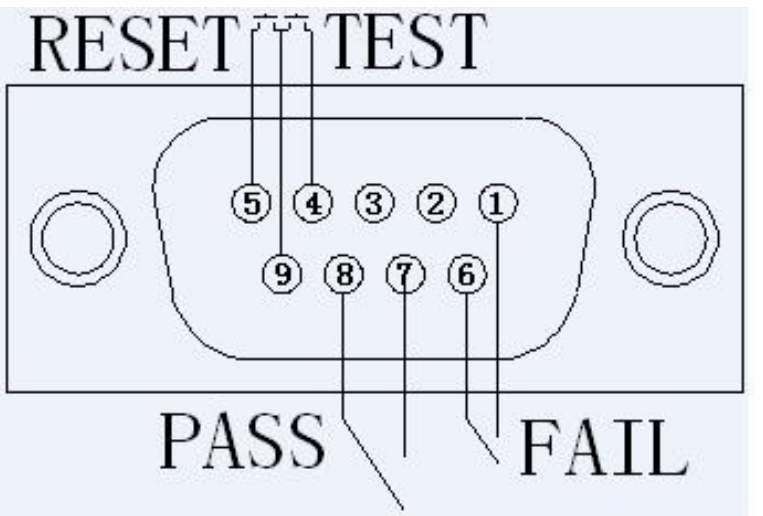
9. If you want to use an external remote control to operate the tester, connect the remote control to the remote input terminal on the rear panel. The functions and functions of the TEST and RESET switches on the remote control are exactly the same as the start and reset switches on the front panel of the instrument. Since the start and reset switch of the instrument and the TEST and RESET switches of the remote control can be operated at the same time, the remote control must be properly stored, and non-operators should not have the opportunity to touch the remote control to avoid accidents.

10． This tester has the output of PASS (test passed) and FAIL (test failed) signals. These signals can be connected to the control center to monitor and remotely monitor the signals of the instrument.

Chapter VI 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. It can connect the working state of the instrument to the monitoring center for monitoring, and can be connected to the remote control for operation. This terminal is a standard 9PIN D-type terminal block, which contains two monitoring signal outputs such as PASS (test passed) and FAIL (test failure) and two remote control input signals of TEST (start) and RESET (reset).



6.2 Remote output signal wiring and description

This tester provides two "normally open" (NO) contact signals, which are provided by two relays inside the instrument. The capacity of the contacts is AC250V l.0A / DC250V 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 marked with a pin number, and the wiring of the output signal is as follows:

PASS signal: The output signal is connected between PlN7 and PIN8.

FAIL signal: The output signal is connected between PlN1 and PIN6.

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 to never connect any other power source, if you connect other power sources, it will cause damage to the internal circuit of the instrument or malfunction. Pin numbers are attached to the terminal block. The detailed wiring is as follows:

1. TEST control: The control switch is connected between PIN4 and PIN9
2. RESET control: switch is connected between PIN5 and PIN9

Chapter VII Automatic Discharge Circuit

7.1 Discharge Principle

After the test, especially the DC withstand voltage test, a large amount of electrical energy will remain on the test object and the circuit, and the test line must be removed before the work of removing the test line. After the tester completes the test, the program automatically drives the discharge circuit. Within 0.2 seconds, all the electrical energy remaining on the test object and the circuit is completely discharged. The total capacitance that the discharge circuit can withstand is as follows:

Maximum discharge capacity:

0.2uF ----- When 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 a malfunction. Please pay special attention not to exceed the allowable capacitance of 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 VIII Test Parameter Setting and Display

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 will display:

AC withstand voltage test

ACW	SETUP	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	SETUP	XXX.XS
MX	X.XXKV	XX.XXmA

Insulation resistance test

or

IR	SETUP	XXX.XS
MX	X.XXKV	XXXXM Ω

Ground resistance test

GND	SETUP	XXX.XS
MX	XX.XXA	XXXm Ω

Prompt description:

ACW: stands for AC withstand voltage test

DCW: stands for DC withstand voltage test

IR: Insulation resistance test

GND: ground resistance test

SETUP: Prompt message, indicating that it is currently under test or parameter setting status

Variable description:

MX: Parameter group (1-15)

XXX.X S: test time

X.XX KV: set value of output voltage

XX.XX mA: Leakage current upper limit set value

XXXX M Ω : Insulation resistance upper limit setting value

XX.XXA: AC current value

XXXm Ω : ground resistance upper limit

(The following variables are the same as above)

The “SET” key is a parameter item setting key. When 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 "EXIT" key, the set test parameters are automatically stored in the memory; pressing the "Reset" switch makes the setting invalid. 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.

The "+" and "-" keys are operation keys for group selection and input keys for parameter values.

"+" Key: The number will increase when you press this key, and "-" key: The number will decrease when you press this key. Each time you press the "+" and "-" keys, the last digit on the display will "increase 1" or "decrease 1". If you continue to press the increase or decrease more than 10, it will quickly "increase 10" or "decrease" 10 ", if you press and hold the increase or decrease more than 100 continuously, it will quickly" increase 100 "or" decrease 100 ", and release the button to return to the original speed state.

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, the program will automatically enter the test mode and set the 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.

8.2 Test parameter setting:

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

AC withstand voltage test

ACW	SETUP	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	SETUP	XXX.XS
MX	X.XXKV	XX.XXmA

Insulation resistance test

or

IR	SETUP	XXX.XS
MX	X.XXKV	XXXXM Ω

Ground resistance test

GND	SETUP	XXX.XS
MX	XX.XXA	XXXm Ω

1.Group setting

Press the "+" or "-" key, the program will automatically display the parameters set in the previous or next group.

2. Test parameter setting

The parameter setting is to use the "SET" key as the selection key of the parameter item, and each time you press it, you will enter the next parameter item. The AC / DC withstand voltage test sequence is: test mode selection, output voltage setting, leakage current upper limit setting, leakage current lower limit setting, slow rise time setting, test time setting, output frequency selection (DC voltage withstand voltage test without (This item), arc sensitivity setting and connection test setting; the insulation resistance test sequence is: test mode selection, output voltage setting, insulation resistance upper limit setting, insulation resistance lower limit setting, delay judgment time setting and connection test setting set. The ground resistance test sequence is output current setting, ground resistance upper limit setting, ground resistance lower limit setting, test time setting, output frequency setting and connection test setting.

3. Test Mode Selection

After pressing the "SET" key, the program will enter the test mode selection, and the LCD will display:

AC withstand voltage test

Test Mode = ACW Select by ∧ or ∨

or

DC withstand voltage test

Test Mode = DCW Select by ∧ or ∨

Insulation resistance test

or

Test Mode = IR Select by ∧ or ∨

or

Ground resistance test

Test Mode = GND Select by ∧ or ∨

Please use the "+" or "-" key on the panel to enter the test mode to be set: ACW, DCW, IR or GND.

4. Output voltage and current setting

After selecting the test mode and pressing the "SET" key, the program will enter the output voltage setting mode of AC / DC withstand voltage or insulation resistance test or the output current mode of ground resistance test.

AC withstand voltage test

Voltage = XXXXV Range:0-5000

Or

DC withstand voltage test

Voltage = XXXXV Range:0-6000

Insulation resistance test

or

Voltage = XXXXV Range:500-1000

or

Ground resistance test

Current = XX.XXA Range:3.00-30.00

Please use the "+" or "-" key on the panel to input the desired output voltage or current.

5. Leakage current or insulation resistance upper limit (HI-Limit) setting

After setting the output voltage and pressing the "SET" key, the program will enter the leakage current or insulation resistance upper limit setting mode or ground resistance upper limit setting mode of the AC / DC withstand voltage test. The LCD will display:

AC withstand voltage test

HI-Limit = XX.XXmA Range: 0.01-12.00

or

DC withstand voltage test

HI-Limit = XX.XXmA Range: 0.01-6.00

Insulation resistance test

or

```
HI-Limit =    XXXXM Ω
Range:   0-2000   0=OFF
```

or

Ground resistance test

```
HI-Limit =    XXXm Ω
Range:1-300
```

Please use the "+" or "-" key on the panel to enter the upper limit value to be set. If the upper limit of the insulation resistance is set to "0", the program does not determine the upper limit of the insulation resistance.

6. Leakage current or insulation resistance lower limit (LO-Limit) setting

After the leakage current or insulation resistance upper limit setting of AC / DC withstand voltage test is completed and the “SET” key is pressed, the program will enter the leakage current or insulation resistance lower limit setting mode or ground resistance lower limit setting of AC / DC withstand voltage test. Mode, LCD display will show:

AC withstand voltage test

```
LO-Limit =    X.XXmA
Range:   0.00-12.00
```

or

DC withstand voltage test

```
LO-Limit =    X.XXmA
Range:   0.00-6.00
```

Insulation resistance test

or

```
LO-Limit =    XXX.XM Ω
Range: 1.0-999.9
```

or

Ground resistance test

```
LO- Limit =    XXXmA
Range: 0-300
```

Please use the "+" or "-" key on the panel to enter the lower limit value to be set.

7. Ramp Time setting

After the AC / DC withstand voltage current leakage limit is set and the “SET” key is pressed, the program will enter the ramp-up time setting mode.

AC/DC withstand voltage test

```
Ramp Time= XXX.XS
Range: 0.1-999.9
```

Note: This function is not available in the insulation and ground resistance test. The program will automatically skip this setting and go directly to the next setting. Please use the "+" or "-" key on the panel to enter the slowly rising time to be set, the unit is second.

8.Dwell Time setting

After the ramp-up time setting of the AC / DC withstand voltage test is completed and the “SET” key is pressed, the program will enter the test time setting mode, and the LCD will

display:

AC/DC withstand voltage or Ground test

Dwell Time = XXX.XS
0.5-999.9 0=Constant

Note: The insulation resistance test does not have this function, the program will automatically skip this setting and go directly to the next setting. Please use the "+" or "-" key on the panel to enter the test time value to be set, the unit is second. If the test time is set to "0", the test will continue without stopping unless the test object fails or the test is stopped manually. Otherwise it will not be aborted automatically.

9. Delay Time setting

After setting the lower limit of insulation resistance and pressing the "SET" key, the program will enter the setting mode of the delay judgment time, and the LCD will display:

Insulation resistance test

Delay Time = XXX.XS
0.8-999.9 0=Constant

Note: AC / DC withstand voltage test and ground resistance test do not have this function, the program will automatically skip this setting and go directly to the next setting. Please use the "+" or "-" key on the panel to enter the delay judgment time value to be set, the unit is second. If the test time is set to "0", the test will continue without stopping unless the test object fails or the test is stopped manually. Otherwise it will not be aborted automatically. The delay judgment time is set because most of the test objects are capacitive and generate a large charging current. The delay judgment time allows the instrument to make a judgment after the charging current is stable.

10. Output frequency (Frequency) setting

After the AC withstand voltage test time is set and the “SET” key is pressed, the program will enter the output frequency selection mode, and the LCD will display:

AC withstand voltage and Ground resistance test

Frequency = 50 Hz
Select by ∧ or ∨

Note: The DC withstand voltage and insulation resistance test does not have this function, the program will automatically skip this setting and go directly to the next setting. Please use the "+" or "-" key on the panel to select the output frequency as "50" or "60" Hz.

11. Arc Sense Setting

After setting the output frequency and pressing the "SET" key, the program will enter the arc sensitivity setting mode, and the LCD will display:

AC withstand and DC withstand voltage mode

Arc Sense= X
Range:0-9 0=OFF

Please use the "+" or "-" key o sitivity value to be set.The arc sensitivity is divided into 1-9, e highest sensitivity, 1 is the lowest sensitivity, 0 is the arc condition of the object to be detected. When the range of X is 1-9, the corresponding arc peaks are: 20mA, 18mA, 16mA, 12mA, 10mA, 7.7mA, 5.5mA, 2.8mA, and the factory default setting is 0.

Note: This mode is only available for AC withstand voltage and DC withstand voltage.

12. Connect test settings

After the AC / DC withstand voltage arc sensitivity or insulation resistance delay judgment time is set and the “SET” key is pressed, the program will enter the connection test setting mode, and the LCD will display:

CONNECT = YES
Select by ∧ or ∨

Please use the "+" or "-" key on the panel to select the connection test as "YES" or "NO". If the connection test is set to "YES", after this test is completed, it will automatically connect to the next group to continue the test. The maximum number of connections is 3 times. If set to "NO", the test will stop immediately after the completion of this test, and will not be connected to the next group of tests. When the connection test is set to "YES", the program will automatically display the symbol "_" after the group, which means that it will connect to the next group of tests after this group of tests.

This is the last step of parameter setting. You can press the "SET" key again to return to the first parameter setting step. Press the "EXIT" key to save the data or press the "Reset" key to save the data without leaving the parameter setting mode. The program automatically calls the test parameters of the current group, enters the test mode, and prepares for testing.

8.3 LCD information

The following are the various types of information that will appear on the display when the instrument performs AC / DC withstand voltage or insulation resistance tests, as described below.

1. Test and parameter setting mode (SETUP)

The following display information indicates that the instrument has entered the test and parameter setting mode of AC / DC withstand voltage or insulation resistance or ground resistance:

AC withstand voltage test

ACW SETUP XXX.XS

or

DC withstand voltage test

DCW SETUP XXX.XS

MX	X.XXKV	XX.XXmA

Insulation resistance test

IR	SETUP	XXX.XS
MX	X.XXKV	XXXXMΩ

MX	X.XXKV	XX.XXmA

Ground resistance test

GND	SETUP	XXX.XS
MX	XX.XXA	XXXmΩ

If you press the "Start" switch, the instrument will start the test. If you press the "SET" key, the instrument will immediately enter the parameter setting mode and you can set the parameters.

2. Test aborted (ABORT)

If the AC / DC withstand voltage or insulation resistance or ground resistance test is in progress and the test is interrupted by pressing the "Reset" switch or using a remote control, the LCD will display:

AC withstand voltage test

ACW	ABORT	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	ABORT	XXX.XS
MX	X.XXKV	XX.XXmA

Insulation resistance test

or

IR	ABORT	XXX.XS
MX	X.XXKV	XXXXMΩ

Ground resistance test

GND	ABORT	XXX.XS
MX	XX.XXA	XXXmΩ

Press the "Reset" key to enter the test mode; press the "Start" key to restart the test.

3. Ramp test (RAMP)

During the slow rise of the AC / DC withstand voltage test, the program does not make a lower limit determination, the test results will be continuously updated, and the display will show:

AC withstand voltage test

ACW	RAMP	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	RAMP	XXX.XS
MX	X.XXKV	XX.XXmA

4. AC / DC withstand voltage test (DWELL) or insulation resistance delay determination (DELAY)

During the test, the test results will be continuously updated and displayed:

AC withstand voltage test

ACW	DWELL	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	DWELL	XXX.XS
MX	X.XXKV	XX.XXmA

Insulation resistance test

IR	DELAY	XXX.XS
MX	X.XXKV	XXXXMΩ

Ground resistance test

GND	DWELL	XXX.XS
MX	XX.XXA	XXXmΩ

5. Leakage current or insulation resistance upper limit failure (HI-Failt)

If the DUT is doing AC / DC withstand voltage or insulation resistance test, if the leakage

current or insulation resistance value exceeds the upper limit set value, it will be determined by the program as a test failure caused by the leakage current or insulation resistance upper limit. If its leakage current Or the insulation resistance value is still within the upper detection range of the instrument, the display will show:

AC withstand voltage test

ACW	HI-Fail	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	HI-Fail	XXX.XS
MX	X.XXKV	XX.XXmA

Insulation resistance test

or

IR	HI-Fail	XXX.XS
MX	X.XXKV	XXXXM Ω

Ground resistance test

GND	HI-Fail	XXX.XS
MX	XX.XXA	XXXm Ω

If its leakage current or insulation resistance value exceeds the upper detection range of the instrument, the display will show:

AC withstand voltage test

ACW	HI-Fail	XXX.XS
MX	X.XXKV	>12 mA

or

DC withstand voltage test

DCW	HI-Fail	XXX.XS
MX	X.XXKV	>6 mA

Insulation resistance test

IR	HI-Fail	XXX.XS
MX	X.XXKV	>2000M Ω

or

Ground resistance test

GND	HI-Fail	XXX.XS
MX	XX.XXA	>300m Ω

6. Leakage current or insulation resistance lower limit failure (LO-Fail)

If the DUT is doing AC / DC withstand voltage or insulation resistance test, the leakage current or insulation resistance value is less than the lower limit set value, it will be judged by the program as a test failure caused by the leakage current or insulation resistance lower limit. If the insulation resistance value Still within the detection range of the instrument, the display will show:

AC withstand voltage test

ACW	LO-Fail	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	LO-Fail	XXX.XS
MX	X.XXKV	XX.XXmA

Insulation resistance test

or

IR	LO-Fail	XXX.XS
MX	X.XXKV	XXXXM Ω

Ground resistance test

GND	LO-Fail	XXX.XS
MX	XX.XXA	XXXm Ω

If the insulation resistance value exceeds the detection range of the instrument, the display will

show:

Insulation resistance test

IR	LO-Fail	XXX.XS
MX	X.XXKV	<1MΩ

7. Voltage breakdown (BREAK)

If the leakage current of the object under test during the AC / DC withstand voltage test is far beyond the range that the instrument can measure, and the arc current is far beyond the normal value that the instrument can measure, it will be judged by the program as resistant. The test failed due to a crash, and the LCD will display:

AC withstand voltage test

ACW	BREAK	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	BREAK	XXX.XS
MX	X.XXKV	XX.XXmA

8. Overcurrent failure (OVER)

If the output current of the DUT during the AC / DC withstand voltage test exceeds the normal output range of the instrument, it will be determined by the program as a test failure caused by overcurrent, and the display will show:

AC withstand voltage test

ACW	OVER	XXX.XS
MX	X.XXKV	>12 mA

or

DC withstand voltage test

DCW	OVER	XXX.XS
MX	X.XXKV	>6 mA

Ground resistance overcurrent failed (OVER)

If the output current of the DUT during the ground resistance test exceeds the normal output range of the instrument, it will be judged by the program as a test failure caused by overcurrent, and the display will show:

GND	OVER	XXX.XS
MX	>25A	XXXmΩ

9. Passed the test (PASS)

If there is no abnormal phenomenon in the whole process of AC / DC withstand voltage or insulation resistance test, the test object is deemed to pass the test, and the display will show:

AC withstand voltage test

ACW	PASS	XXX.XS
MX	X.XXKV	XX.XXmA

or

DC withstand voltage test

DCW	PASS	XXX.XS
MX	X.XXKV	XX.XXmA

Insulation resistance test

IR	PASS	XXX.XS
MX	X.XXKV	XXXXMΩ

Ground resistance test

GND	PASS	XXX.XS
MX	XX.XXA	XXXmΩ

Chapter IX Calibration Procedures and Procedures

Before leaving the factory, the instrument has been calibrated in accordance with the relevant national standards and regulations. The accuracy of the instrument and the meter fully meets the specifications of the national standard. It is recommended that the instrument be calibrated at least once a year. To ensure the accuracy of the meter.

9.1 Enter calibration mode:

Please press and hold the "SET" key on the front panel, and then turn on the power switch of the machine. The LCD display will show:

Calibration Mode
<SET> to Select

The instrument has now entered the calibration mode, please release the button. Press the "SET" key to select the correction parameter items, which are AC withstand voltage correction, AC withstand voltage correction for each current level, DC withstand voltage correction (type does not have this item), and DC withstand voltage correction for each current level (type without this Item), insulation resistance voltage correction, insulation resistance correction.

9.2 AC withstand voltage correction

Press the "SET" key, the program enters the AC withstand voltage correction mode, and the display will show:

CAL ACW V = 4000V
<TEST> to Calibrate

"H.V." and "terminal under test" on this instrument are connected to a standard high-voltage voltmeter that can measure 6000VAC. If the standard high-voltage meter specifically states "high and low-end", please connect the high-end point. To H. of this instrument V. To the terminal, connect the low end to the "tested end" of the instrument to avoid inaccurate or damaged high voltage voltmeter. Then press the "Start" key. At this time, the calibration program of this instrument will automatically output a voltage of about 4000VAC, and the display will show:

CAL ACW V = XXXXV
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard voltage into the calibration program, press the "+" key to increase the number, and the "-" key to decrease the number. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.3 Correction of AC withstand voltage 10mA

Press the "SET" key, the program enters the AC voltage withstand current 10mA correction mode, and the display will show:

CAL ACW I1 = 10.00mA
<TEST> to Calibrate

Please connect the standard AC ammeter and a resistor of about 100K Ω / 10W in series first, and then connect it between the "H.V." and the "measured end" of the instrument. The ammeter depends on the "measured end". Please press the "Start" key, and the calibration procedure of this instrument will automatically output a current of about 1000VAC / 10.00mA, and the display will show:

CAL ACW I1 = XX.XXmA
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard value of the standard ammeter into the calibration program, the unit is mA. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.4 Correction of AC withstand voltage 2mA

Press the "SET" key, the program enters the AC withstand voltage and current 2mA correction mode, and the display will show:

CAL ACW I2 = 2.000mA
<TEST> to Calibrate

Please connect the standard AC ammeter with a resistor of about 500K Ω / 2W in series first, and then connect it between the "H.V." and the "measured end" of the instrument. The ammeter rests on the "measured end" side. Please press the "Start" key, the calibration procedure of this instrument will automatically output a current of about 1000VAC / 2.000mA, and the display will show:

CAL ACW I2 = XX.XXmA
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard value of the standard ammeter into the calibration program, the unit is mA. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.5 DC withstand voltage correction

Press the "SET" key, the program enters the DC withstand voltage correction mode, and the display will show:

CAL DCW V = 4000V
<TEST> to Calibrate

"H.V." and "measured end" on this instrument are connected to a standard high voltage voltmeter that can measure 6000 VDC. If the standard high voltage electricity meter specifically states "high and low end", please connect the high end To H. of this instrument V. To the terminal, connect the low end to the "tested end" of the instrument to avoid inaccurate or damaged high voltage voltmeter. Then press the "Start" key. At this time, the calibration program of this instrument will automatically output a voltage of about 4000VDC, and the display will show:

CAL DCW V = XXXXV
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard voltage into the calibration program, and its unit is V. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.6 DC voltage withstand current 6mA correction

Press the "SET" key, the program enters the DC withstand voltage 6mA correction mode, and the display will show:

CAL DCW I1 = 6.00mA
<TEST> to Calibrate

Please connect a standard DC ammeter with a resistor of about 100KΩ / 10W in series first, and then connect it between the “H.V.” and the “measured end” of the instrument. Please press the "Start" key, and the calibration program of this instrument will automatically output a current of about 600VDC / 6.00mA, and the display will show:

CAL ACW I1 = X.XXmA
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard value of the standard ammeter into the calibration program, the unit is mA. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.7 Correction of DC withstand voltage 2mA

Press the "SET" key, the program will enter the DC withstand voltage 2mA correction mode, and the display will show:

CAL DCW I2 = 2.000mA
<TEST> to Calibrate

Please connect a standard DC ammeter with a resistor of about 500KΩ / 2W in series first, and then connect it between the "H.V." and the "terminal under test" of this instrument. Please press the "Start" key. At this time, the calibration program of this instrument will automatically output a current of about 1000VDC / 2.000mA, and the display will show:

CAL DCW I2 = XX.XXmA
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard value of the standard ammeter into the calibration program, the unit is mA. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.8 Insulation resistance voltage correction:

Press the "SET" key, the program enters the insulation resistance voltage correction mode, and the display will show:

CAL IR V = 1000V
<TEST> to Calibrate

Connect a standard voltmeter that can measure 1000VDC to "H.V." and "terminal under test" on this instrument. If the standard voltmeter specifically indicates "high and low", please connect the high-end H. This instrument V. To the terminal, connect the low end to the "tested end" of the instrument to avoid inaccurate or damaged voltmeter. Then press the "Start" key. At this time, the calibration program of this instrument will automatically output a voltage of about 1000VDC, and the display will show:

CAL IR V = XXXXV
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard voltage into the calibration program, and its unit is V. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.9 Insulation resistance 0.5MΩ correction:

Press the "SET" key, the program enters the insulation resistance correction mode of 0.5MΩ, and the display will show:

```
CAL IR R1 = 0.500MΩ
<TEST>  to  Calibrate
```

Connect a standard resistance of about 500KΩ / 2W to the "H.V." and "terminal under test" on this instrument, and then press the "Start" key. At this time, the calibration program of this instrument will automatically output a voltage of about 1000VDC , The display will show:

```
CAL IR R1 = X.XXXMΩ
<EXIT>  to  Save
```

Please use the "+" or "-" key on the panel to input the standard resistance into the calibration program, the unit is MΩ. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.10 Insulation resistance 5MΩ correction:

Press the "SET" key, the program enters the insulation resistance 5MΩ correction mode, and the display will show:

```
CAL IR R2 = 5.000MΩ
<TEST>  to  Calibrate
```

Connect a standard resistance of about 5MΩ / 0.25W to "H.V." and "terminal under test" on this instrument, and then press the "Start" key. At this time, the calibration program of this instrument will automatically output a voltage of about 1000VDC. Voltage, the display will show:

```
CAL IR R2 = X.XXXMΩ
<EXIT>  to  Save
```

Please use the "+" or "-" key on the panel to input the standard resistance into the calibration program, the unit is MΩ. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to

turn off the output.

9.11 50MΩ correction of insulation resistance:

Press the "SET" key, the program will enter the insulation resistance 50MΩ correction mode, and the display will show:

CAL IR R3 = 50.00MΩ
<TEST> to Calibrate

Connect a standard resistance of about 50MΩ / 0.25W to "H.V." and "Measured End" on this instrument, and then press the "Start" key. At this time, the calibration program of this instrument will automatically output a voltage of about 1000VDC. Voltage, the display will show:

CAL IR R3 = XX.XXMΩ
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard resistance into the calibration program, the unit is MΩ. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.12 500MΩ correction of insulation resistance:

Press the "SET" key, the program enters the insulation resistance 500MΩ correction mode, and the display will show

CAL IR R4 = 500.0MΩ
<TEST> to Calibrate

Connect a standard resistance of about 500MΩ / 0.25W to "H.V." and "terminal under test" on this instrument, and then press the "Start" key. At this time, the calibration program of this instrument will automatically output a voltage of about 1000VDC. Voltage, the display will show:

CAL IR R4 = XXX.XMΩ
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard resistance into the calibration program, the unit is MΩ. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not

saved, press the "Reset" switch to turn off the output.

CAL GND V = 6.000V
<TEST> to Calibrate

9.13 Correction of AC voltage to ground

Press the "SET" key, the program enters the ground resistance AC voltage correction mode, and the display will show:

Connect a standard voltmeter capable of measuring 10VAC to the test end of the instrument, and then press the "Start" key. At this time, the calibration program of the instrument will automatically output a voltage of about 6VAC, and the display will show:

CAL GND V = X.XXXV
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard voltage into the calibration program, press the "+" key to increase the number, and the "-" key to decrease the number. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.14 Correction of ground resistance AC current

Press the "SET" key, the program enters the ground resistance AC current correction mode, and the display will show:

CAL GND I = 25.00A
<TEST> to Calibrate

Connect a standard ammeter capable of measuring 30AAC to the test end of the instrument, and then press the "Start" key. At this time, the calibration program of the instrument will automatically output a current of about 25AAC, and the display will show:

CAL GND I = XX.XXA
<EXIT> to Save

Please use the "+" or "-" key on the panel to input the standard value of the standard ammeter into the calibration program, the unit is A. Please confirm the number is correct before pressing the "EXIT" key to close the output and save the input data. If the data is not saved, press the "Reset" switch to turn off the output.

9.15 Calibration completed

After the calibration is completed, the input power must be turned off and then on again, otherwise the test mode cannot be entered. The program does not accept unreasonable input.

9.14 Please pay special attention to the following:

(1) "Start" correction voltage output.

(2) "Reset" does not save the data and turns off the output.

(3) "EXIT" saves the data and closes the output.

(4) After calibration, the input power must be turned off and then on again, otherwise the instrument cannot enter the test mode.

(5) The stored calibration data will be stored in the memory, and it will not change or disappear unless it is changed again.

(6) It is recommended that the calibration period of this instrument is one year.

Chapter X　Maintenance Guide

10.1 Daily 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 meter in good working condition.

4． After long-term use of the test leads, poor contact or disconnection may occur, which should be regularly repaired.

10.2　Simple fault handling

Malfunction	Solution
After power on, there is no display and the buttons do not respond.	Please check whether the power supply is normal and the fuse on the rear panel is blown. If it is blown, please replace the fuse.
After starting, the high-voltage indicator is off, but there is a test voltage.	The high-voltage indicator is broken.
After the test fails, the alarm indicator is off.	The alarm indicator is broken.
After start up, the voltage is normal but no current is output.	Please check whether the test leads are 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 the company as soon as possible and we will provide you with services in a timely manner.

10.3 Quality Assurance

The company guarantees that the products manufactured by it are subject to strict quality confirmation, and the quality guarantee period of the factory products is one year. Any manufacturing defects or failures during this period are repaired free of charge.

For users who modify the circuit, function or the quality warranty period by themselves, the maintenance fee will be charged according to the actual situation.

Accessories

The instrument comes with the following items when it leaves the factory:

1.Power cord x 1e

2.Test lead x 1 set

3.Instruction manual x 1

4.Warranty card x 1

5. Certificate of conformity x 1

6.Test report x 1