User's Manual

DP6000 Series

Cable Harness Tester

2023-04-06

Manual version V2.0

Foreword

Thank you for purchasing the " DP6000 Series Wire Harness Tester". To obtain maximum performance from this product, please read this manual first, and keep it handy for future reference.

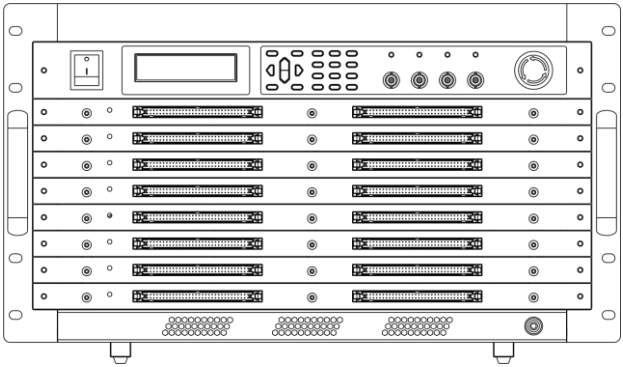
Registered trademarks
Windows and Excel are registered trademarks of Microsoft Corporation in the United States or other countries.

Checking Package Contents

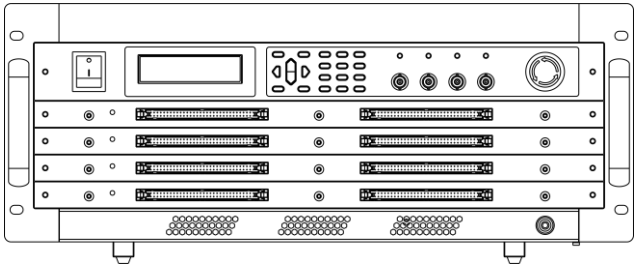
When receiving instrument, please check carefully to ensure that the instrument is not damaged during transit. In addition, special inspections of accessories, panel switches and connectors are required. If the instrument is found to be damaged or it fails to operate as described in the user manual, please contact us.
To transport this instrument, use the original packaging and wrap it in a double carton. Damage during transit is not covered by the warranty.

Check the package contents as follows：

	Item	Quantity
1	DP6000 Wire Harness Tester	1
2	Power cord	1
3	User Manual	1
4	Patrol electric pen	1
5	Network cable	1
6	Certificate of conformance	1



DP6000



DP6000S

Safety Notes

The instrument is designed to conform to IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, using the instrument in a way not described in this manual may negate the provided safety features.

Before using the instrument, be certain to carefully read the following safety notes.

Note

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

Notation

This manual contains information and warnings essential for safe operation of the instrument and for maintaining it in safe operating condition. Before using the instrument, be certain to carefully read the following safety notes.

 Indicates very important message in this manual. When the symbol is printed on the instrument, refer to a corresponding topic in the Instruction Manual.

 Indicates DC (direct current)

 Indicates a fuse

 Indicates earth terminal

In this manual, the risk seriousness and the hazard levels are classified as follows.

Indicates an imminently hazardous situation that will result in death or serious injury to the operator.

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

Indicates a potentially hazardous situation that may result in minor or moderate injury to the operator or damage to the instrument or malfunction.

NOTE Indicates functions of the instrument or relative suggestion of a correct operation.

Accuracy

We define measurement tolerances in terms of f.s. (full scale), rdg. (reading) and dgt. (digit) values, with the following meanings:

f.s.	(Maximum display value)
	This is usually the maximum display value. In the instrument, this indicates the currently used range.
rdg.	(Reading or displayed value)
	The value currently being measured and indicated on the measuring instrument.
dgt.	(Resolution)
	The smallest displayable unit on a digital measuring instrument, i.e., the input value that causes the digital display to show a “1”.

Usage Notes

Installation environment

- ✧ Operating temperature and humidity ranges
  0°C to 40°C 80%RH or less (no condensation)
- ✧ Storage temperature and humidity ranges
  23 ±5°C 80%RH or less (no condensation)

Installing the instrument in inappropriate locations may cause a malfunction of instrument or may give rise to an accident. Avoid the following locations.

- ✧ Exposed to direct sunlight or high temperature
- ✧ Exposed to corrosive or combustible gases
- ✧ Exposed to water, oil, chemicals, or solvents
- ✧ Exposed to high humidity or condensation
- ✧ Exposed to a strong electromagnetic field or electrostatic charge

- ✧ Exposed to high quantities of dust particles
- ✧ Near induction heating systems (such as high-frequency induction Heating systems)
- ✧ Susceptible to vibration

Checking before use

Before using the instrument the first time, verify that it operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your authorized Hopetech distributor or reseller.

CAUTION	Before using the instrument, check that the coating of the test leads or cables are neither ripped nor torn and that no metal parts are exposed. Using the instrument under such conditions could result in electrocution. Contact your authorized Hopetech distributor or reseller in this case

Handling Precautions

DANGER	Do not modify, disassemble, or repair the instrument. This may result in fire, electric shock accident, or injury.
CAUTION	Do not place the instrument on an unstable or slanted surface. It may drop or fall, causing injury or instrument failure.
NOTE	To avoid corrosion and/or damage to the instrument due to battery leakage, remove the batteries from the instrument if it is to be kept in storage for an extended period. Be sure to turn the power off after using it.
DANGER	To avoid electric shock accident and short circuit, please operate the instrument as following: Do not test the voltage over 60 VDC Do not test the terminal-to-ground voltage over 70 VDC. Do not test AC voltage. Be sure to connect the test lead correctly. Wear gloves of rubber or similar materials during measurement.

	Ensure sufficient ventilation when testing batteries in the measurement room to prevent explosions. Sparks may occur when the test leads are connected to batteries, which can ignite any accumulated inflammable gases such as hydrogen.

Handling leads and cables

⚠ CAUTION	When using the instrument, use only the test line 9363-B or test leads specified by our company. To avoid damaging the cables, do not bend or pull the base of cables and the leads. The ends of pin type leads are sharp. Be careful to avoid injury. **To avoid damage to the test leads, when plug/pull the test line, don't hold the cable but connector.**

Chapter 1 Overview

DP6000 series cable harness integrated tester offers rapid inspection of wire and cable harnesses. It can accurately detect the open circuit, short circuit and dislocation in cable harness，helping users to quickly detect problems in the wiring harness. Combined with the supporting upper computer software, DP6000 cable tester can visually display the problems in the wiring harness.

DP6000 cable harness integrated tester is used in the automatic testing of cables and harness in automobiles, flexible circuit boards, etc.

DP6000 distributed cable tester can be built as a distributed test system. Up to 20000 test points can be expandable through the extension interface. It can be used for aircraft, trains, satellites, and other wiring harness testing.

1.1 Brief Introduction

DP6000 cable harness integrated tester has 32/64/128/256 test points. The

tester supports both the inner four-wire and outer four-wire hybrid test method. The device has the following test functions： fast OS test, accurate OS test, two-wire resistance test, four-wire DC on-resistance test, four-wire LCR test, insulation resistance test, AC/DC hipot test and diodes test.

1.2 Performance Features

Distributed

The distributed system with 20000 maximum test points possible.

Modular

Each tester built-in 1 test card and 8 switch array cards. Each switch array card has 128 test points and supports 2-wire and 4-wire mixed testing while users don't need to change the wiring method.

Multifunctional test

The test board integrates OS test, DC resistance test, LCR test, AC/DC insulation withstand voltage test, insulation resistance test and programmable power function

High accurate on-resistance

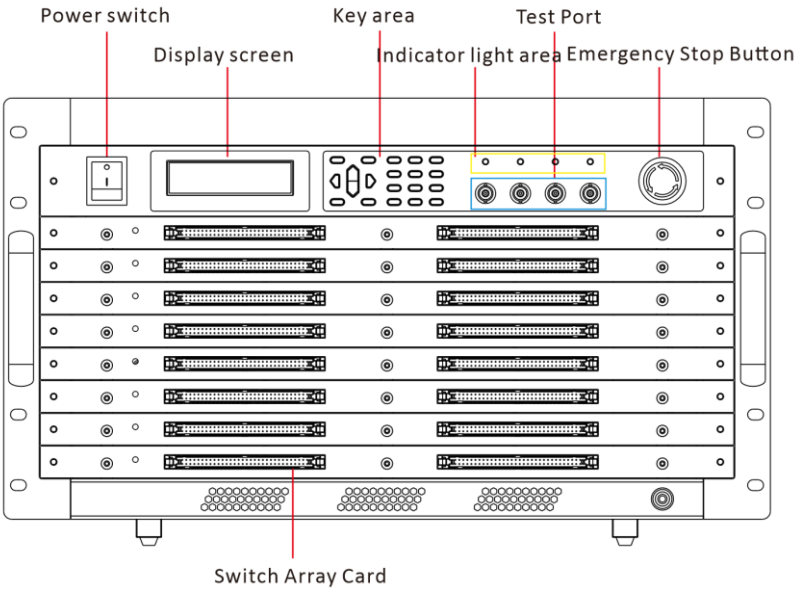
The on-resistance test provides a maximum test current of 1A, with a minimum resistance resolution of 10μΩ.

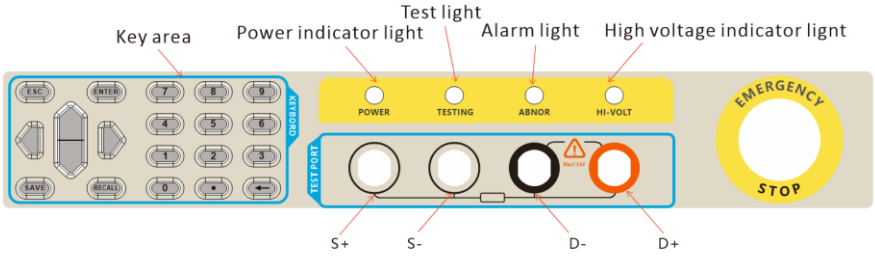
Self-learning function to quickly detect the connection relationship of unknown wiring harnesses

1.3 Names and Functions of Parts

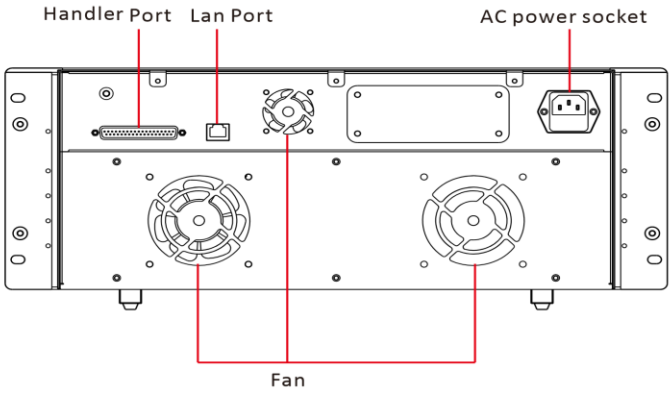
Each DP6000 cable harness integrated tester consists of a test card and a switch array card, the number of switch array cards can be selected（up to 8 cards）， the test card and the switch array card are plugged into the mother card. One test box has 256 test points, which can be used in combination or alone.

Front Panel


Power switch
Display screen
Key area
Indicator light area
Test Port
Emergency Stop Button
Switch Array Card

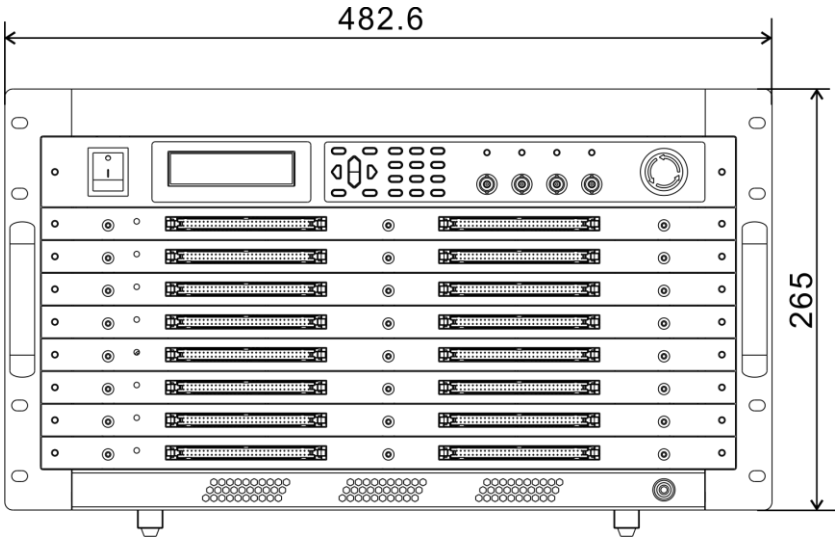

Key area
Power indicator light
Test light
Alarm light
High voltage indicator lignt
POWER
TESTING
ABNOR
HI-VOLT
TEST PORT
EMERGENCY
STOP
S+
S-
D-
D+

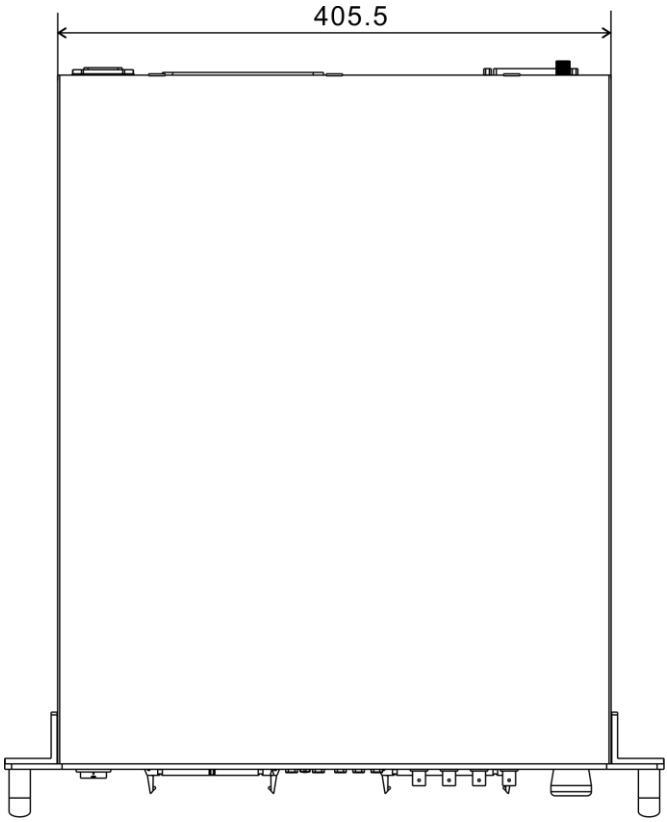
Rear Panel


Handler Port
Lan Port
AC power socket
Fan

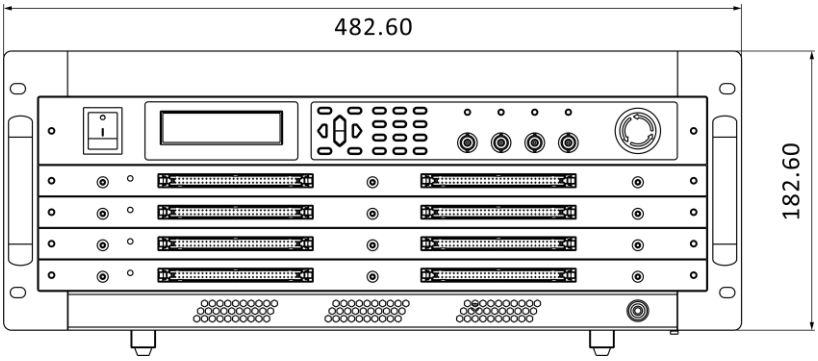
1.4 Dimensions

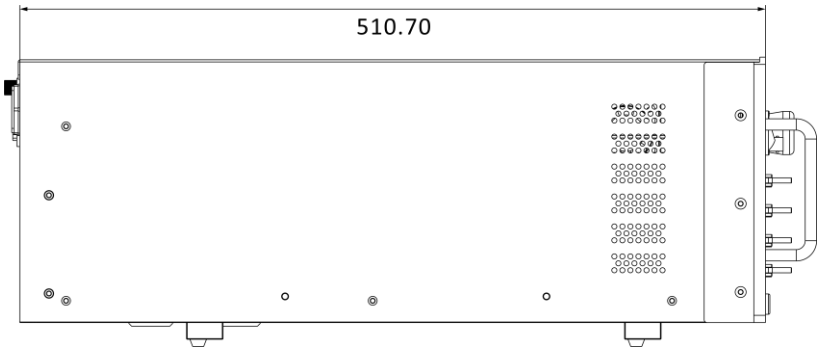
6000 chassis size (more than 256 points)

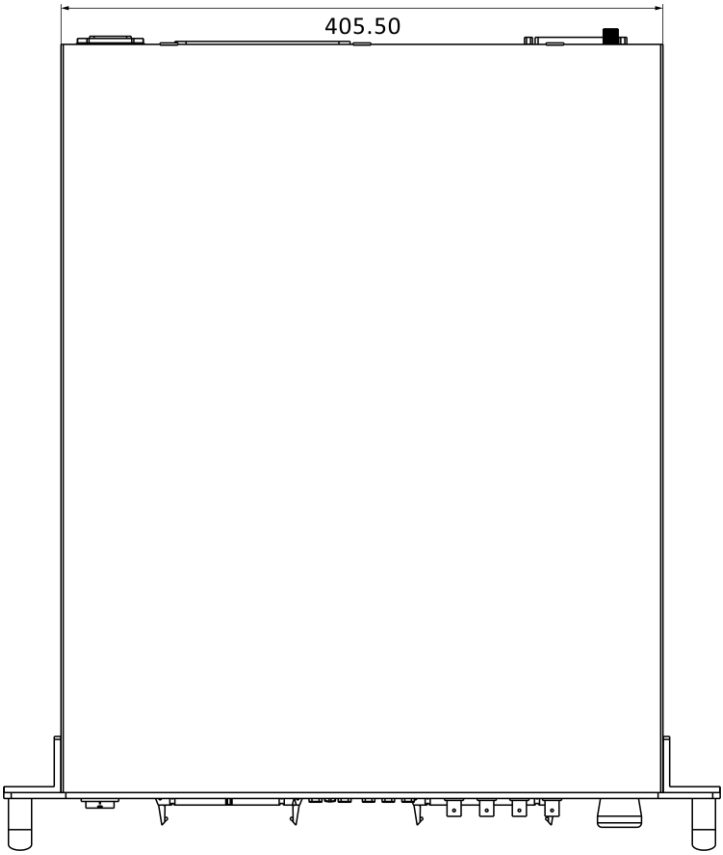




6000S chassis size (256 points and below)




510.70

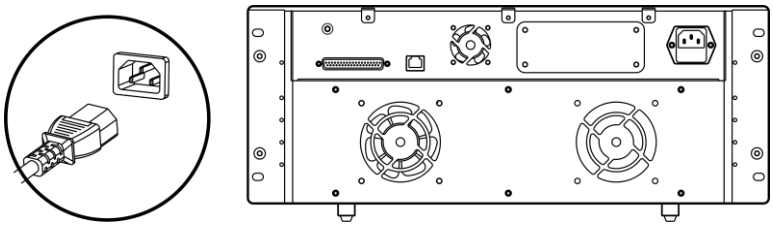

405.50

Chapter 2 Preparing for Measurement

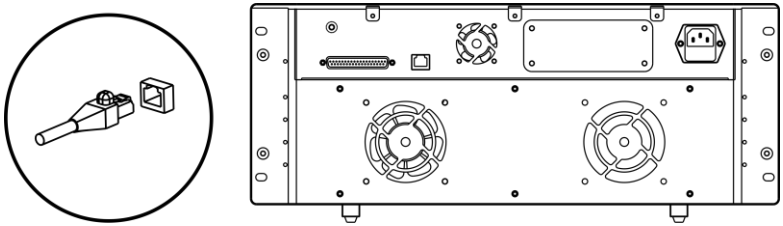
2.1 Test Process Preview

Keep the tester in the power off state and prepare for the test according to the following steps.

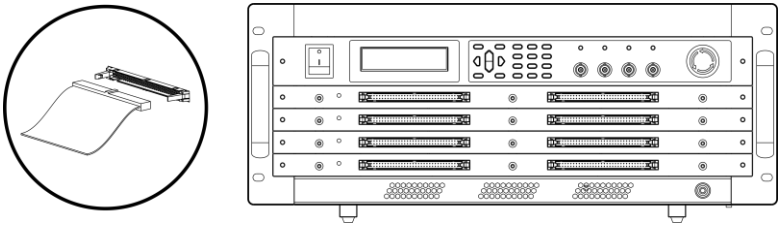
1. Plug in the power cord



2. Turn off the power of the tester and connect it to the computer through the network cable

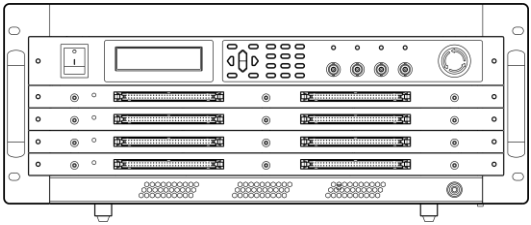


3. Wire the cables/harness to test

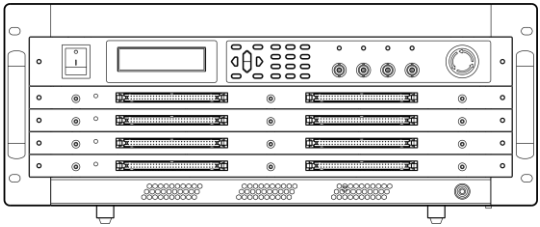


4. Turning the power on

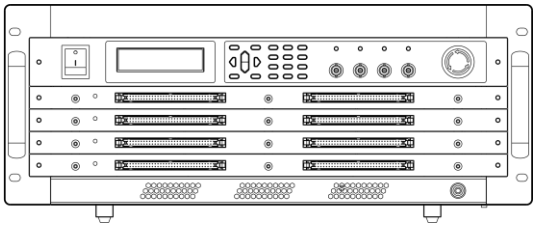
Press the **[POWER]** key in the front panel to on-state



5. Open the software on the computer to set parameters, start test



6. Turn off the power at the end of the test



2.2 Inspection Before Testing

Before use, please confirm that there are no faults caused by storage and transportation, and check and confirm the operation before use. If you confirm that there is a fault, please contact our sales office.

Inspection items	Processing method
Is this instrument damaged or cracked? Is the internal circuit exposed?	Do not use it when there is damage, please send back for repair.

Is there any garbage such as metal pieces attached to the terminal?	If it is attached, wipe it off with a cotton swab, etc.
Is there any coating of the test leads or cables neither ripped nor torn and no metal parts exposed	In the case of damage, it may cause instability or errors in the measured values. If so, replace it with a new one

Confirmation when power is turned on

Inspection items	Processing method
After the power switch on the instrument panel is turned on, is the screen all lit up when the power is turned on, and is the measurement screen displayed normally?	If the display is different, it may be a failure inside this tester, please send it for repair.

2.3 Connection Preparation Before Testing

	• The end of test cable is sharp, be careful not to be scratched • For safety reasons, the test cable shall be used specified by our factory. • To avoid electric shock accident, be sure to connect the test lead correctly.

Preparation

1. Connect the tester and computer through the network cable
2. Connect the tester and the harness under test through the test cable
3. Turn on the power of the tester and computer
4. Do the test setup through software side in PC
5. Start testing through software

*** Precautions**

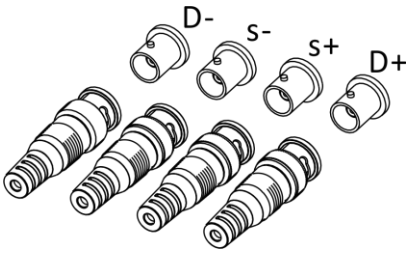
1. Excessive humidity in the testing environment will greatly affect the insulation test results of the tester.
2. It is recommended to use test cables (cables) with good insulation/withstand voltage rating
3. During the test, the test port will generate high voltage, please pay attention to safety

Chapter 3 Calibration and Metrology Function

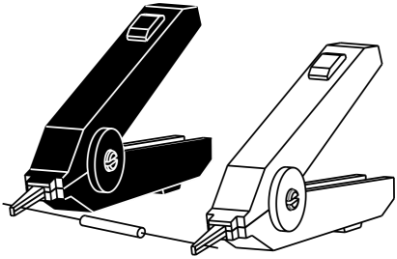
In order to facilitate the calibration and metrology of DP6000 cable tester, it has a metering port on the panel that can be used to connect to test standard, while a menu interface is provided for operation. Please read this chapter in detail for specific operations

Preparation before test

1. Front panel wiring



2. Testing the measured object



3.1 Test Mode Settings

Press the **[RECALL]** key on the test page to switch to the **MODE** page, use the up and down keys to select the test mode, press the **[ENTER]** key to confirm, and back to the test page.

MODE	
▷ 1. DC RES	6. OS RES
2. LCR	7. ESD
3. INSUL RES	8. POINT
4. AC VOLT	9. VERSION
5. DC VOLT	10. IP

The test modes are:

DC RES-DC resistance

LCR

INSUL RES- insulation resistance

AC VOLT- AC hipot voltage

DC VOLT-DC hipot voltage

OS RES-on-resistance

ESD-diode hipot test

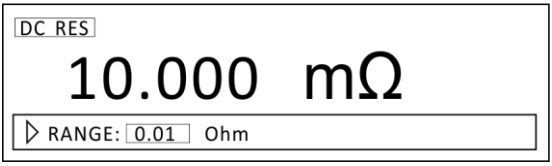
POINT- Find a Point

VERSION- system version information

IP- IP Address

3.2 DC RES-DC Resistance Test

On the **DC RES (** DC resistance) test page, use the up and down keys to set the range：0.01Ω, 0.1Ω, 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ, 100kΩ.



3.3 LCR Test

On the LCR test page，use the left and right keys to select the item，and use the up and down keys to select the range, frequency, test item and test level.

Range：100Ω,1kΩ,10kΩ,100kΩ,AUT；

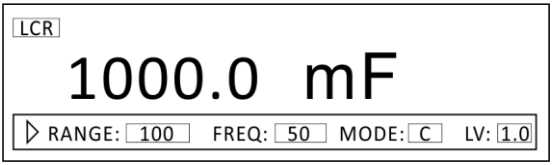
Frequency：50Hz,60Hz,100Hz,120Hz,1kHz,10kHz,50kHz；

Test items：R,C,L,RX;

Test level：0.3V,1.0V.

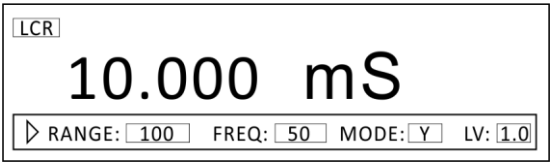

LCR
mH
RANG:
FREQ:
MODE:
LV:

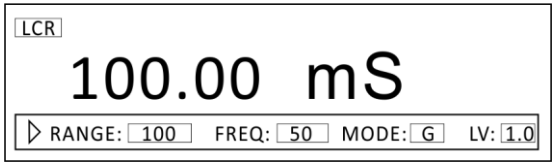

LCR
100.00 Ω
RANGE: 100 FREQ: 50 MODE: R LV: 1.0


LCR
1000.0 mF
RANGE: 100 FREQ: 50 MODE: C LV: 1.0


LCR
1000.0 uH
RANGE: 100 FREQ: 50 MODE: L LV: 1.0


LCR
100.00 Ω
RANGE: 100 FREQ: 50 MODE: Z LV: 1.0


LCR
10.000 mS
RANGE: 100 FREQ: 50 MODE: Y LV: 1.0

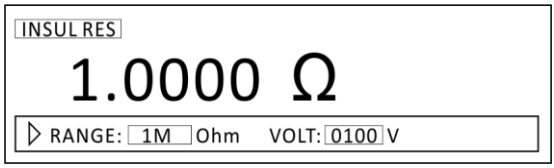


3.4 INSUL RES-Insulation Resistance Test

On the **INSUL RES** (insulation resistance) test page, use the left and right keys to select the item, use the up and down keys to select the range, and use the number keys to enter the voltage value.

Range：1MΩ,10MΩ,100MΩ,1GΩ；

Voltage：30-2000V.



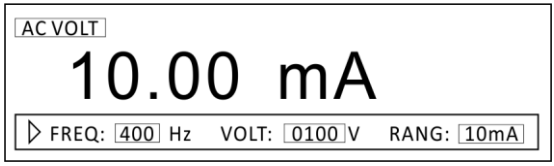
3.5 AC VOLT-AC Hipot Voltage

On the AC **VOLT** (AC hipot voltage) test page, use the left and right keys to select the item, use the up and down keys to select the frequency, range, and use the number keys to enter the voltage value.

Frequency：50Hz,60Hz,400Hz；

Voltage：30-2000V；

Range：10mA.



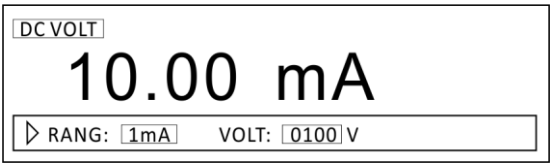
3.6 DC VOLT-DC Hipot Voltage

On the **DC VOLT** (DC hipot voltage) test page, use the left and right keys to select the item, use the up and down keys to select the range, and use the

number keys to enter the voltage value.

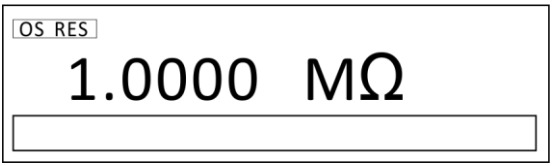
Range：1mA,5mA；

Voltage：30-3000V;



3.7 OS RES-On-resistance Test

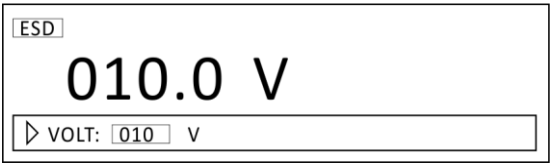
Accurate OS on-resistance test page.



3.8 ESD (Diode Hipot Test)

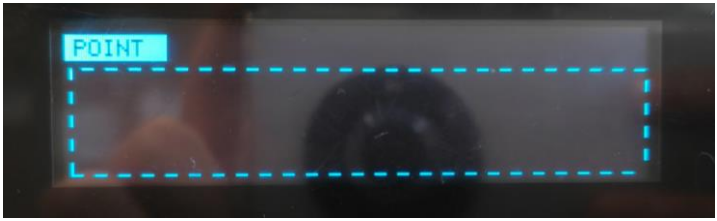
On the ESD (diode hipot test) test page, use the number keys to enter the voltage value.

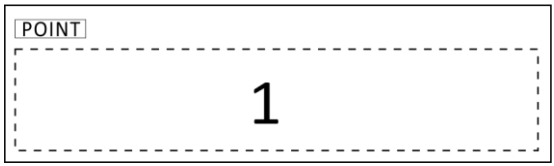
Voltage：1-80V



3.9 POINT- Find a Point

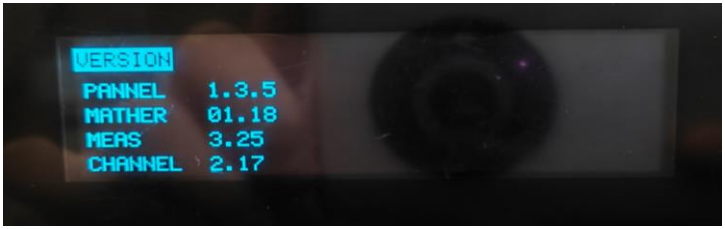
With the support of a point patrol pen, while a point is selected, the **POINT** (find a point) interface will display the information of the current point.

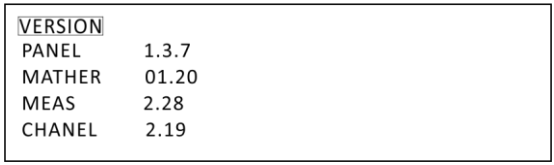




3.10 VERSION- System Version Information

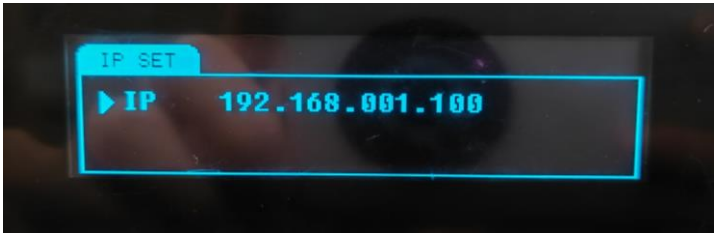
Open the **VERSION** page to view the version information of the tester.

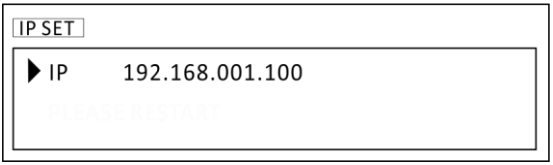




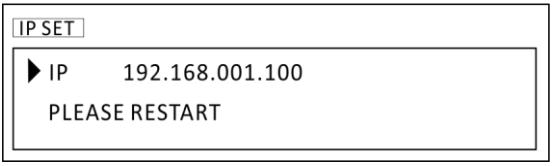
3.11 IP- IP Address

Open to view the tester IP address on Windows.





Press the **[ENTER]** key to confirm the IP setting and the following interface will appear, then restart the device to enable the new IP address.

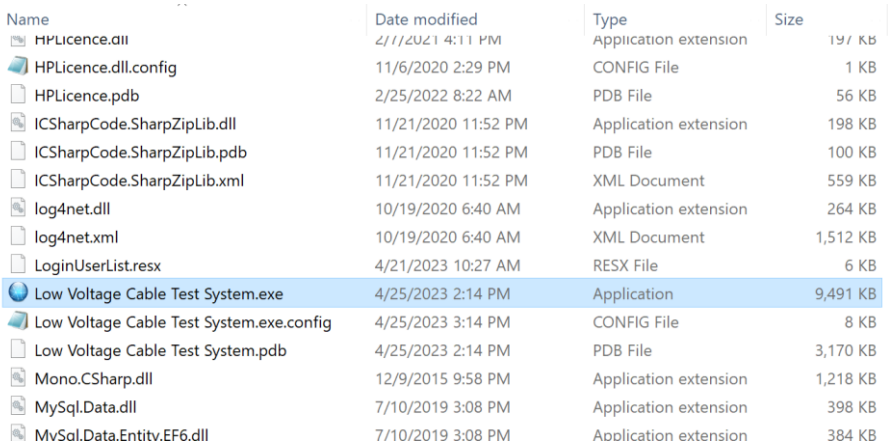


Chapter 4 Software Setup

DP6000 series cable harness comprehensive tester realizes the measurement and switch array switching function. The main test project management, parameter setting and other functions are mainly realized by the host computer software.

Program installation

The DP6000 host computer control software is installation-free, users can directly copy the software folder to the directory you need to install. In the program directory, find the ***Low Voltage Cable Test System*** program file and double-click to run the software.



Name	Date modified	Type	Size
HPLicence.dll	2/7/2021 4:11 PM	Application extension	197 KB
HPLicence.dll.config	11/6/2020 2:29 PM	CONFIG File	1 KB
HPLicence.pdb	2/25/2022 8:22 AM	PDB File	56 KB
ICSharpCode.SharpZipLib.dll	11/21/2020 11:52 PM	Application extension	198 KB
ICSharpCode.SharpZipLib.pdb	11/21/2020 11:52 PM	PDB File	100 KB
ICSharpCode.SharpZipLib.xml	11/21/2020 11:52 PM	XML Document	559 KB
log4net.dll	10/19/2020 6:40 AM	Application extension	264 KB
log4net.xml	10/19/2020 6:40 AM	XML Document	1,512 KB
LoginUserList.resx	4/21/2023 10:27 AM	RESX File	6 KB
Low Voltage Cable Test System.exe	4/25/2023 2:14 PM	Application	9,491 KB
Low Voltage Cable Test System.exe.config	4/25/2023 3:14 PM	CONFIG File	8 KB
Low Voltage Cable Test System.pdb	4/25/2023 2:14 PM	PDB File	3,170 KB
Mono.CSharp.dll	12/9/2015 9:58 PM	Application extension	1,218 KB
MySql.Data.dll	7/10/2019 3:08 PM	Application extension	398 KB
MySql.Data.Entity.EF6.dll	7/10/2019 3:08 PM	Application extension	384 KB

4.1 System Function Items Introduction

Before using the software, you can roughly understand the functions of the software through the following function table

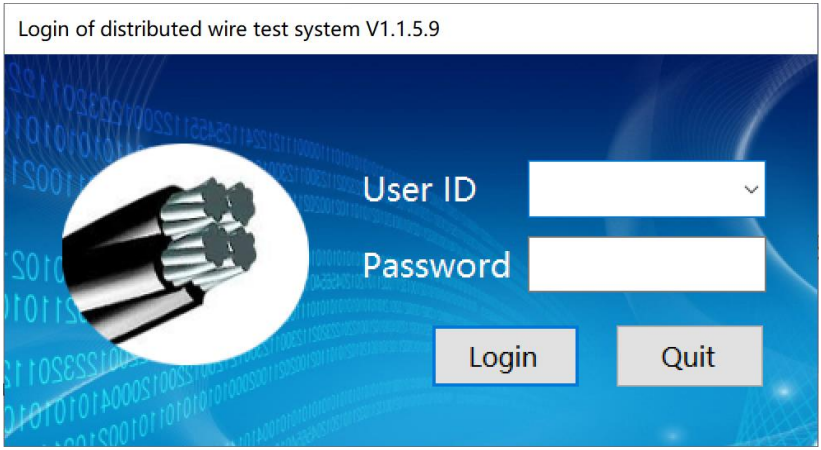
Feature items	Detailed description
1.Project management features	According to the different customer projects, 500 kinds of setting items can be managed separately.
1.1 Create a new project	Create a new project.
1.2 Load the project	Before testing, first load the existing project.
1.3Project Management	According to the needs of customers, configure test items and test parameters.
2. Network segment management	You can configure multiple test segments, each using different test parameters.
2.1Network segment management	Users can freely divide network segments such as OS test, insulation test, and withstand voltage test, which is convenient for various flexible tests.
2.2Test side naming	Users can name the test points for easy management.
3. System function module	
3.1 System self-test	Check whether the system is functioning properly.
3.2 Find something	According to the user's selection, the point information is displayed.
3.3Multimeter function	According to the user's choice, various tests are quickly carried out to facilitate debugging.
3.4Self-learning function	The system automatically learns the conduction network in the current connection, and automatically sets the network table and

	insulation table.
3.5Reporting function	Language reporting function.
4. Test functionality	
4.1 Low voltage test	According to the configuration in the network table, the low-voltage items are tested one by one, and the test resistance value is displayed.
4.2 Insulation test	According to the configuration in the insulation table, insulation tests are performed one by one to show the insulation resistance. Users can choose to perform tests precisely, quickly, or customized.
4.3Withstand voltage test	According to the configuration in the insulation table, the withstand voltage test is carried out one by one to display the leakage current value. Users can choose to perform tests precisely, quickly, or customized.
5. Data saving and query function	
5.1 Data report export	Each time the test is completed, the data report will be printed, the report format can be defined, and the PDF and WORD formats can be printed.
5.2 Database Saving	Each time the test completes, the data is saved to the database.
5.3 Database Query	Users can query historical data in the database and print data reports.
6. Barcode printing function	According to the product, the barcode can be customized and printed.
7. User Management	The system supports three levels of user management, namely administrator, programmer, and operator. Administrators can use all features of the system; Programmers

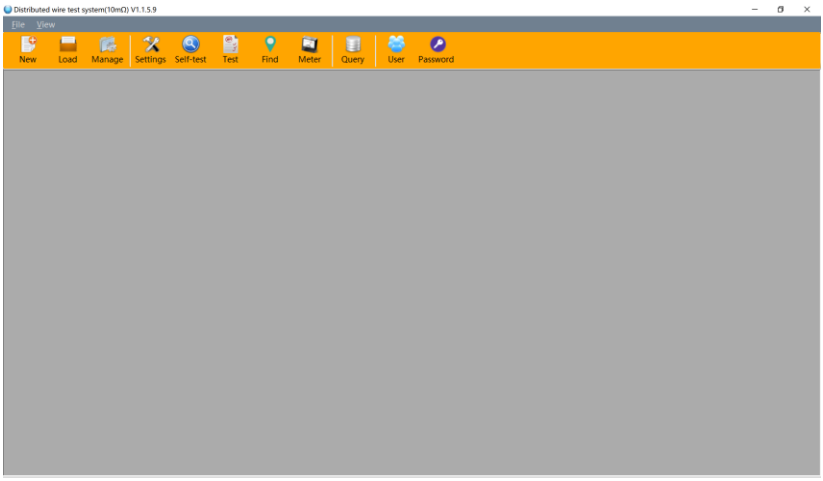
	can configure and manage the project; The operator can only load the project and test.

4.2 Login to System

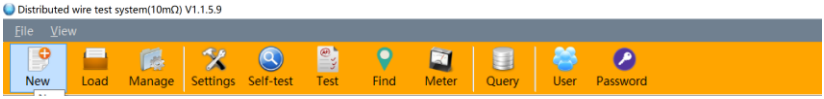
Once the program is running, a login page pops up.



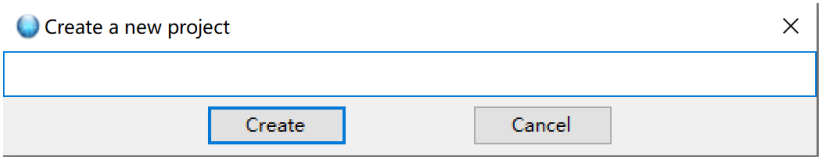
On the login page, select or enter the **[User ID]** admin and **[Password]** 123456 (initial password), click the [Login] button, wait for the system to initialize, and enter the main interface.



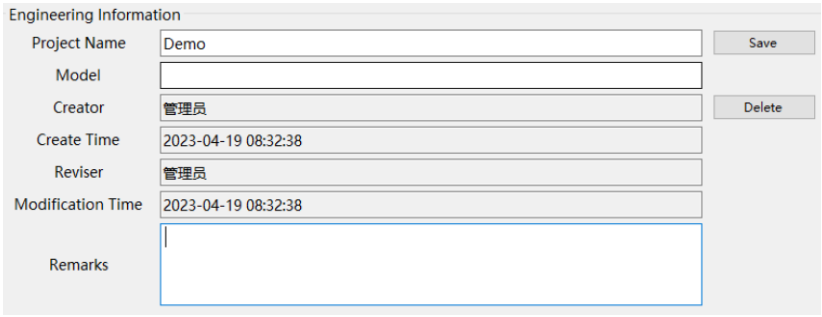
4.3 Create a New Project



Click **[New],** then the interface will pop up Create a New Project dialog box.

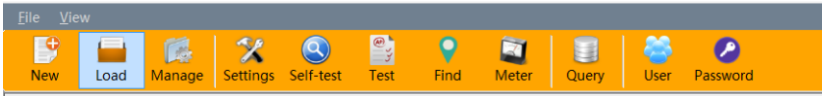


1. Enter a project name, such as "Demo"
2. Click the [Create] button to create

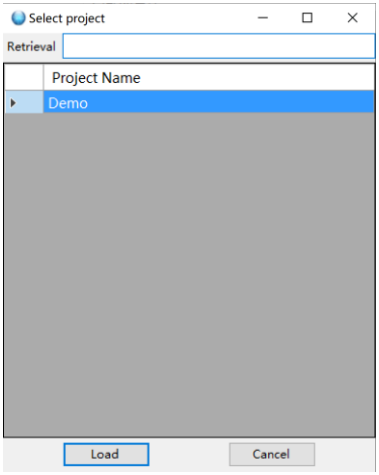


3. Create successfully

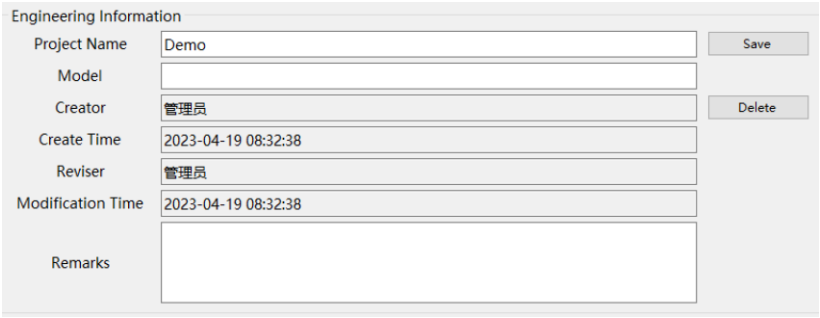
4.4 Load a Project



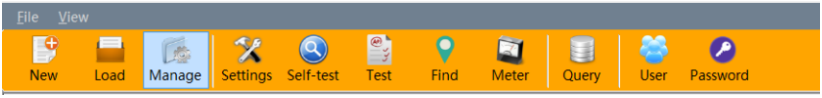
Click **[Load]** to enter the loading project page, select the project name to be loaded, and click **[Load]** to load the existing project.



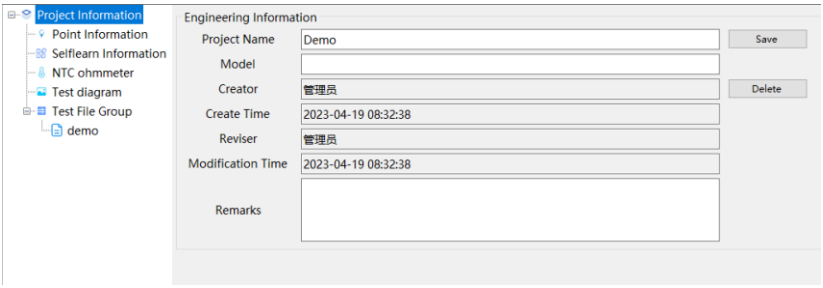
Load successfully



4.5 Project Management

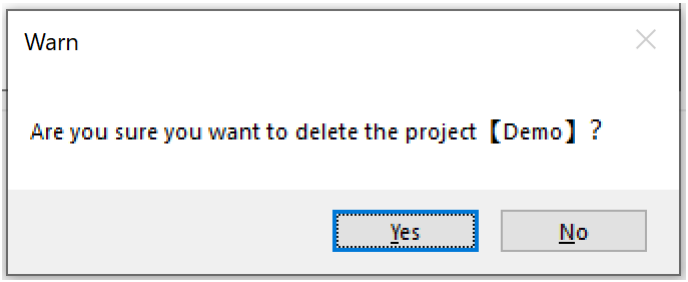


Click **[Manage]** to enter the project management page, display the current project information.

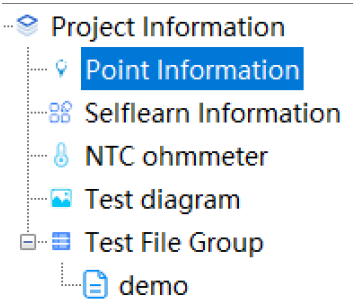


In the project information, you can modify the project name, model, and remarks. Click **[Save]** on the right side to save after editing.

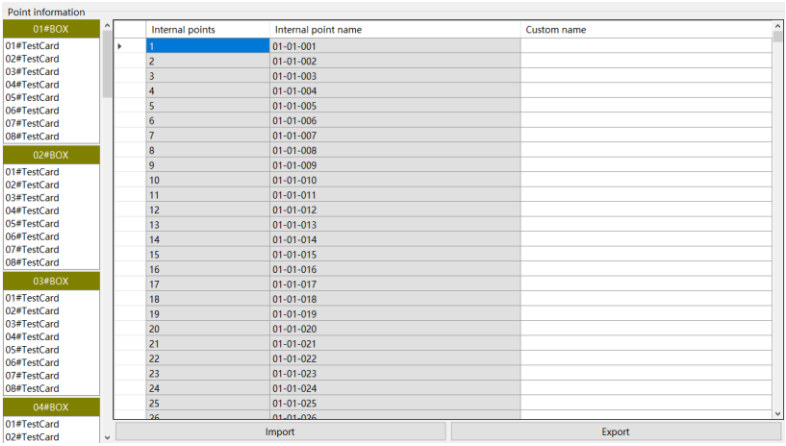
Click **[Delete]** and select **[Yes]** to delete the current project.



4.5.1 Point Information



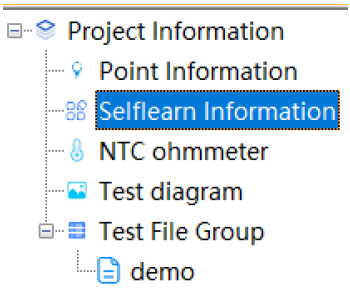
Click **[Point Information]** under the directory of **[Project Information]** to open the point information interface.



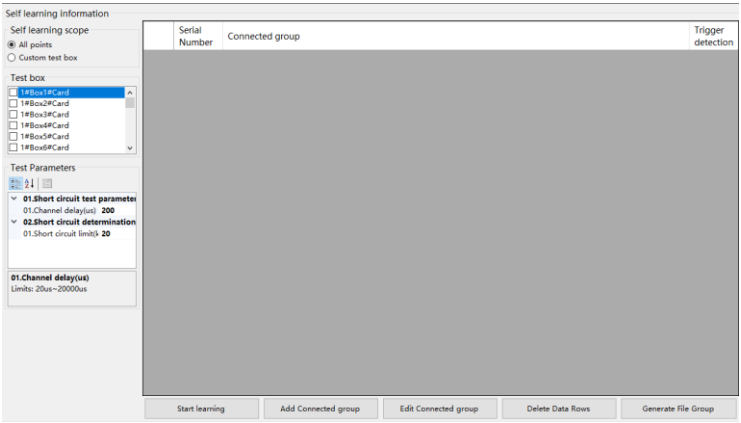
Point information shows 01#, 02#, 03#... 20# box, internal points are 1-20480, internal point name: box+test card+card point, and the custom name can be entered by the user.

You can click **[Import]** or **[Export]**. The data format is in .csv file.

4.5.2 Self-learning Information



Click **[Selflearn Information]** under the directory of **[Project Information]** to open the self-learning information interface.



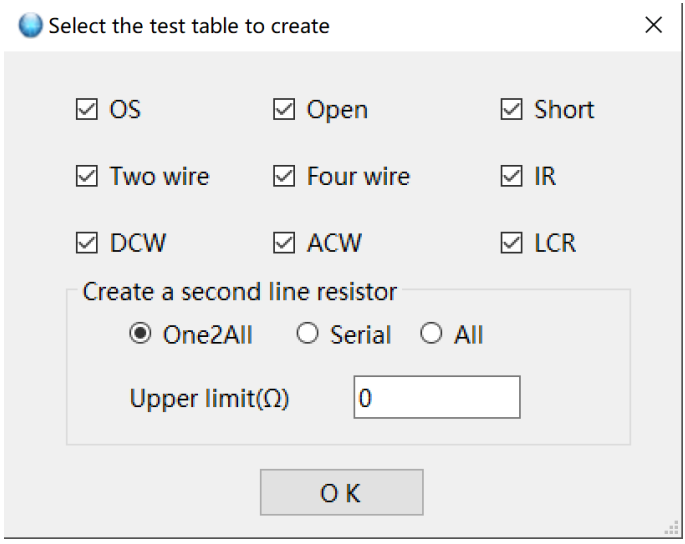
Select self-learning range: all points or custom test box;

Set test parameters: channel delay 20us-20000us, short circuit lower limiting value 2kΩ-1100kΩ.

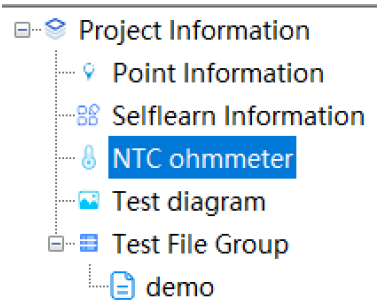
Click **[Start Learning]** to start learning.

After learning, the connection group information will be displayed. Trigger detection can be checked on the right side of the connection group, as the condition of **[Enable Contact Detection]**. **[Enable Contact Detection]** is set in the **[Test Parameter Setting]** interface of **[System Setting]**.

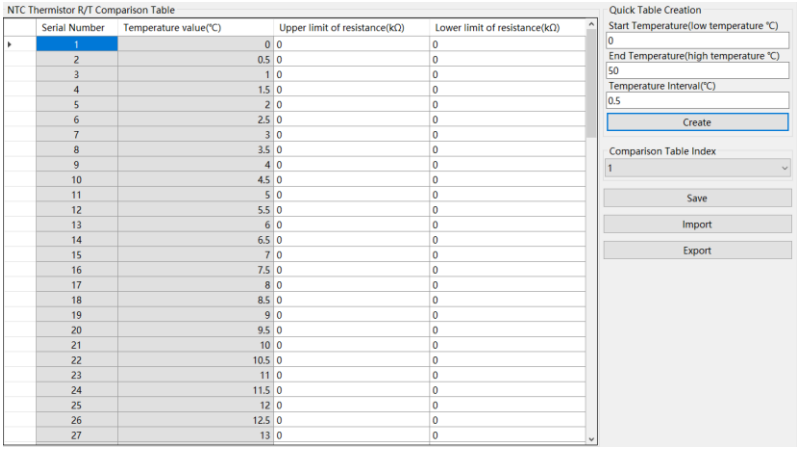
Click **[Generate File Group]** to select the test table to create.



4.5.3 NTC Temperature Resistance Table



Click **[NTC ohmmeter]** under the directory of **[Project Information]** to open the NTC thermistor R/T comparison table and customize the NTC temperature resistance table.

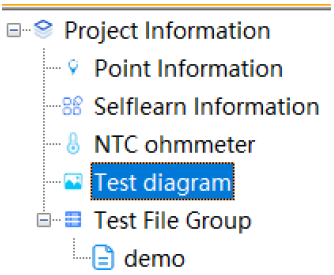


Enter the start temperature, end temperature and temperature interval, then click **[Create]** to quickly create a table.

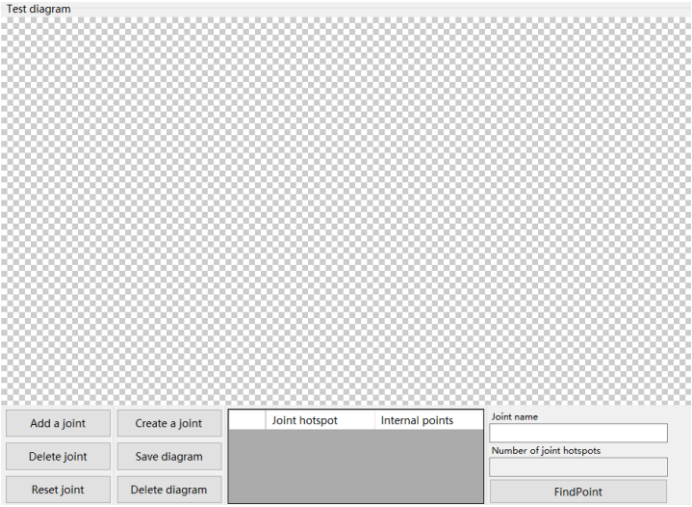
Enter the upper and lower limit resistance value, click **[Save]** on the right to save the data. The resistance values corresponding the upper and lower resistance limits must be complete and there must be no missing temperature values.

Click **[Export]** to export the saved NTC temperature resistance meter data, and click **[Import]** to import the saved data file.

4.5.4 Test Diagram



Click **[Test diagram]** under the directory of **[Project Information]** to open the test diagram.



You can click **[Add a joint]**, **[Delete joint]**, **[Reset joint]**, **[Create a joint]**, **[Save diagram]** or **[Delete diagram]** under the test diagram interface

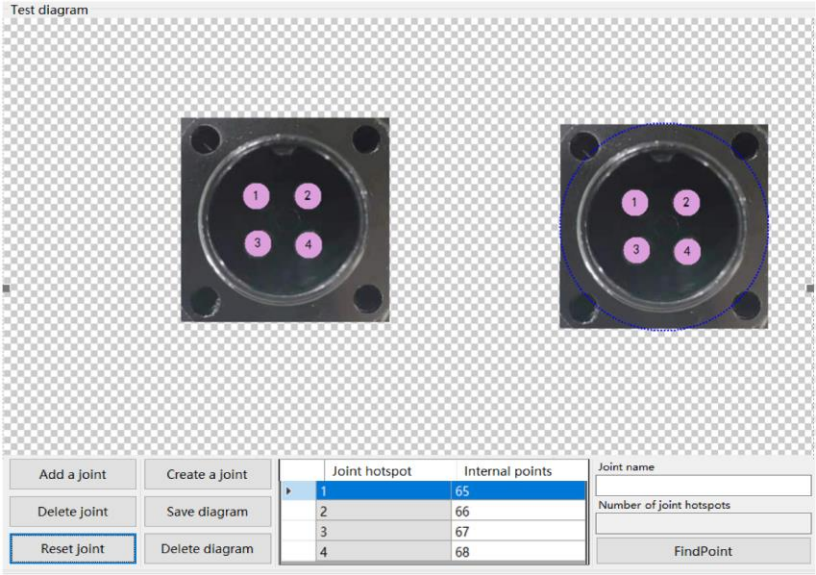
Click **[Add a joint]** to add the saved connector picture

After selecting the connector, click **[Delete joint]** to delete the selected connector

Click **[Reset joint]** to reset the direction of the selected connector

Click **[Save diagram]** to save the set diagram

Click **[Delete diagram]** to delete the current diagram



Click **[Create a joint]** to pop up the following add connector dialog box.

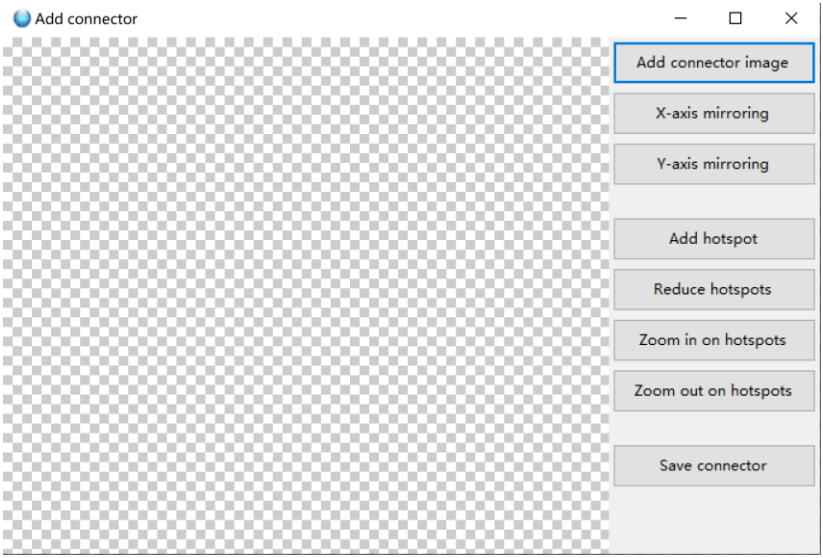
click **[Add connector image]** to select the connector picture to be added

Click **[X-axis mirroring]** or **[Y-axis mirroring]** to rotate the X or Y axis of the connector picture

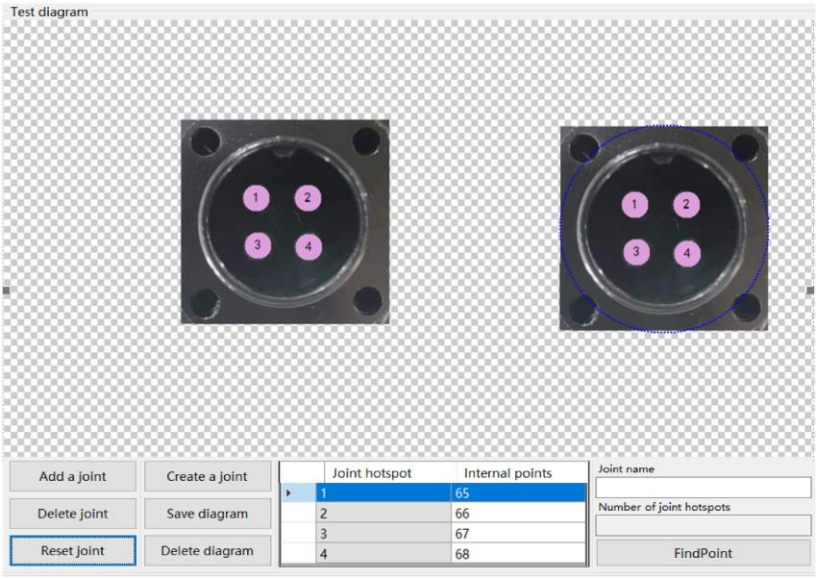
Click **[Add hotspot]** to add the hotspots according to requirements; Click **[Reduce hotspots]** to reduce the hotspots according to requirements

Click **[Zoom in on hotspots]** or **[Zoom out on hotspots]** to enlarge or reduce the hotspot

After the setting is completed, click **[Save Connector]** to save the connector file



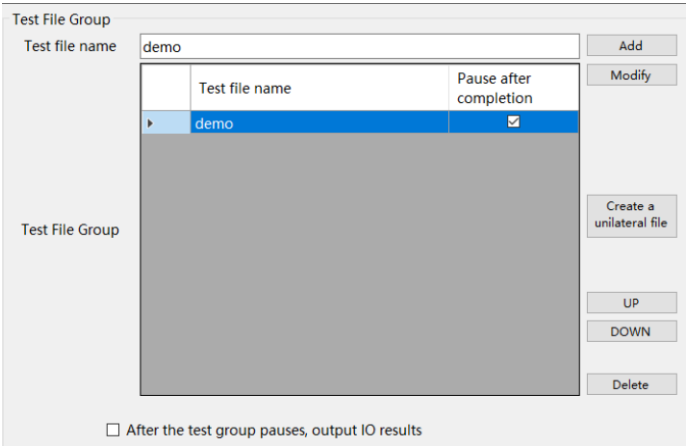
The saved test diagram can visually display the test results in the **[Image Mode]** of the **[Test Mode]** interface. Red wiring indicates that the current hot spot connection test has not passed.



4.5.5 Test File Group

Click **[Test File Group]** under the directory of **[Project Information]** to open

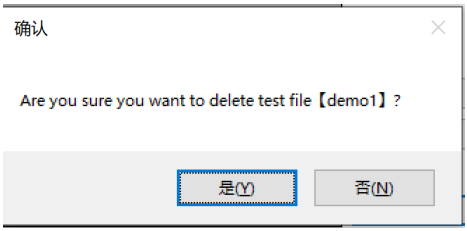
the test file group interface.



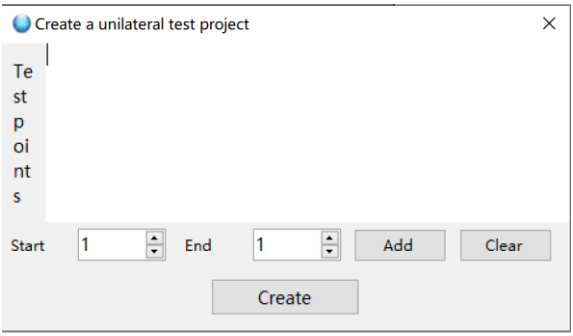
Enter the name of the test file and click the **[Add]** button to add to the test file group;

Select the test file name in the test file group, enter a new name in the test file name above, and click **[Modify]** to change a new name;

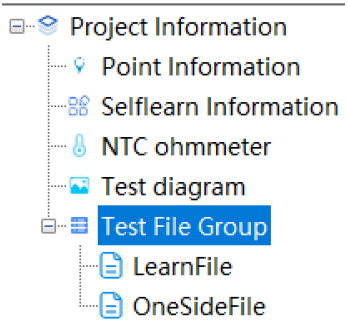
Select the name of the test file in the test file group, click **[Up]** or **[Down]** to switch the name order, click **[Delete]** button to delete the selected test file group, the interface will pop up a confirmation dialog box, and click **[Yes]** to confirm the deletion.



Click **[Create a unilateral file]**, the following dialog box will pop up, select the start point and the end point, click **[Add]** to test points, click **[Create]** to create a unilateral test group.



Click the Test file in the **Test Files Group** in the left column to open the test file page.

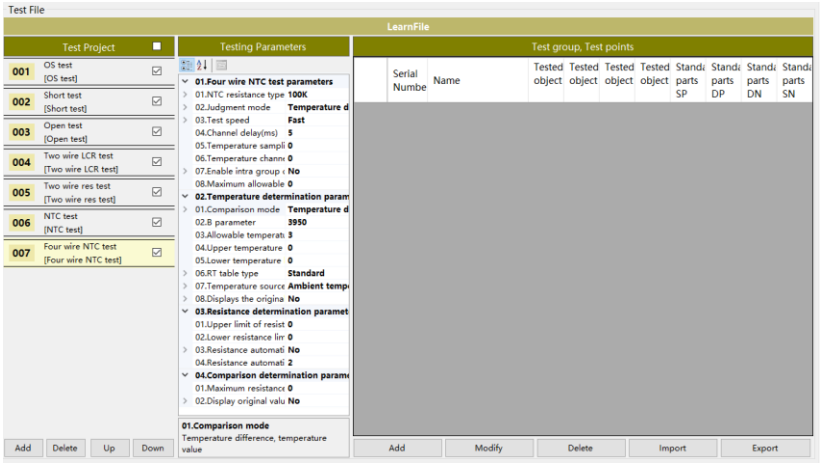


The test file page includes: test project, testing parameters and test group, test points;

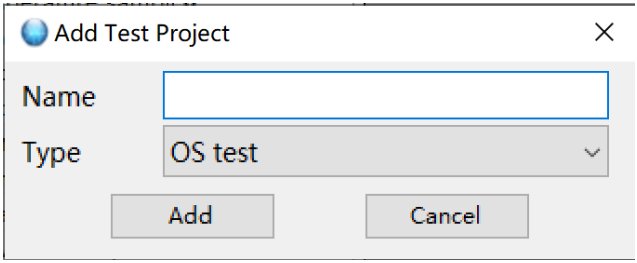
The test project includes **[Add]**, **[Delete]**, **[Up]** and **[Down]**;

Set the parameters of the test project in the testing parameters;

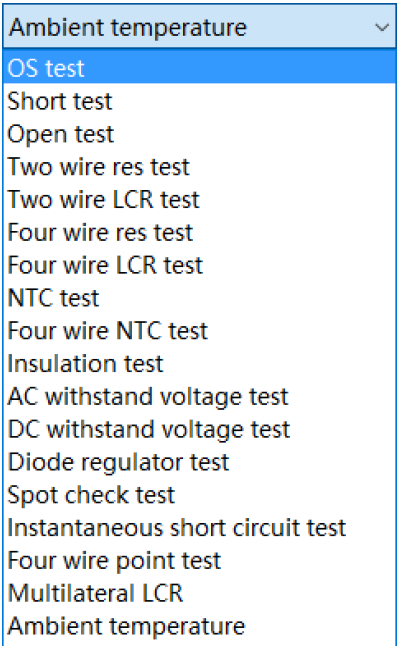
You can **[Add]**, **[Modify]** and **[Delete]** the connected groups in the test groups and test points interface, or click **[Export]** to export the data or **[Import]** to bring data in your template.



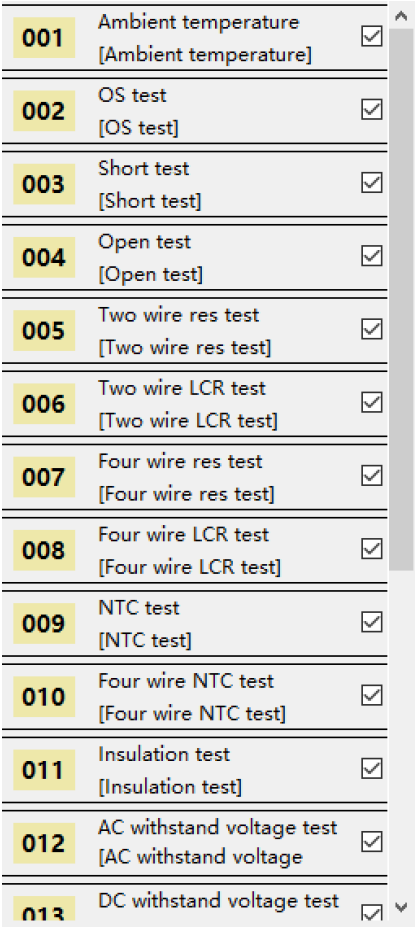
Click the **[Add]** button below the test project, the interface will pop up the add test project dialog box;



Enter the project name and select the project type: OS test, short test, open test, two-wire DC resistance test, two-wire LCR test, four-wire DC resistance test, four-wire LCR test, NTC test, four-wire NTC test, insulation test, AC withstand voltage test, DC withstand voltage test, diode regulator test, spot check test, instantaneous short circuit test, four-wire point test, multi-point LCR and ambient temperature.



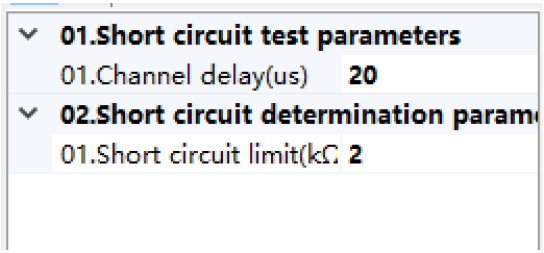
Click the **[Add]** button to add the project to test one by one according to the needs;



1. OS test and short test parameters

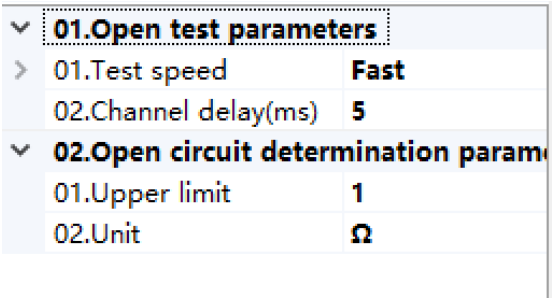
Channel delay：5mS– 200mS

Short circuit lower limit：2kΩ - 200kΩ



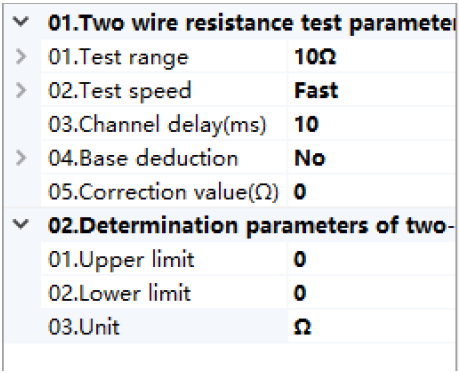
2. Open test parameters

Test speed: fast, medium, slow
Channel delay：5mS - 200mS
Upper limit：1Ω – 1000kΩ
Unit：Ω, kΩ



3. Two wire resistance test parameters

Test range：10mΩ,100mΩ,1Ω,10Ω,100Ω,1kΩ,10kΩ,100kΩ
Test speed: fast, medium, slow
Channel delay：0mS – 200mS
Base deduction: No, Yes
Correction value: - ∞~+∞
Upper limit, lower limit



4. Two wire LCR parameters

Test range：100Ω,1kΩ,10kΩ,100kΩ
Automatic range: on, off

Test frequency：50Hz,60Hz,100Hz,120Hz,1kHz,10kHz

Test speed: fast, medium, slow

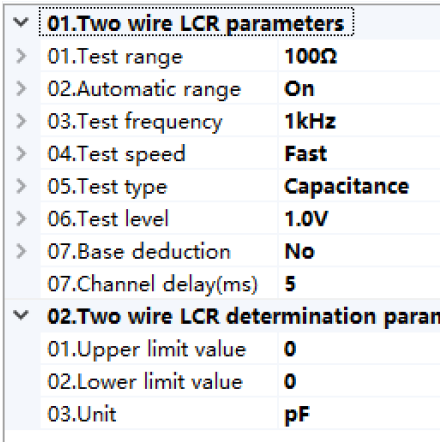
Test type: resistance, capacitance, inductance, impedance, admittance, conductance

Test level：1.0V,0.3V,0.1V

Base deduction: No, Yes

Channel delay：5mS – 200mS

Upper limit value, lower limit value, unit



5. Four wire resistance test parameters

Test range：10mΩ,100mΩ,1Ω,10Ω,100Ω,1kΩ,10kΩ,100kΩ

Test speed: fast, medium, slow

Channel delay: 5mS – 200mS

OVC function: No, Yes

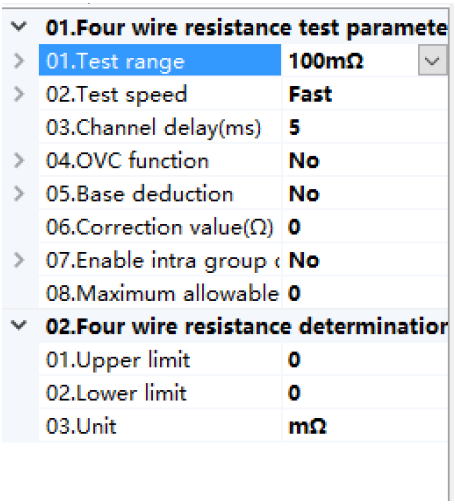
Base deduction: No, Yes

Enable intra group difference：No, Yes

Enable within-group differential comparison: resistance values in the same test group for difference comparison

Corrected value: - ∞~+∞

maximum allowable difference, upper limit, lower limit, unit



The four-wire DC resistance range corresponds to the current value

The corresponding current value of the four-wire DC resistance range	
Range	Current Value
10mΩ	1A
100mΩ	1A
1Ω	100mA
10Ω	10mA
100Ω	1mA
1KΩ	1mA
10KΩ	100uA
100KΩ	10uA

6. Four wire LCR parameters

Test range:100Ω,1kΩ,10kΩ,100kΩ;

Automatic range: on, off;

Test frequency: 50Hz,60Hz,100Hz,120Hz,1kHz,10kHz;

Test speed: fast, medium, slow;

Test type: resistance, capacitance, inductance, impedance, admittance,

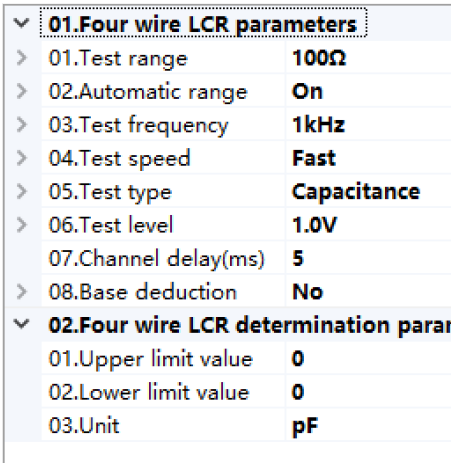
conductance;

Test level：1.0V,0.3V,0.1V；

Channel delay：5mS– 200mS；

Base deduction: No, Yes;

Upper limit value, lower limit value, unit.



7. NTC test or four wire NTC test parameters

NTC resistance type：10K,100K

Judgment mode: temperature determination, resistance determination and comparative judgment

Test speed: fast, medium, slow

Channel delay：5ms – 200ms

Temperature sampling channel

Temperature channel correction value

Enable intra group difference：No, Yes

Maximum allowable difference：a judgment condition setting for intra-group difference comparison

Comparison mode: temperature difference, temperature value

B parameter

Allowable temperature difference(used with the temperature difference in the comparison mode)

Upper temperature limit

Lower temperature limit(used with the temperature value in the comparison mode)

RT table type: standard, custom (need to enter the NTC resistance table

for project management to create)

Temperature source comparison: ambient temperature (generally read directly by USB port temperature probe), standard part temperature (standard part temperature is generally read by temperature sampling channel)

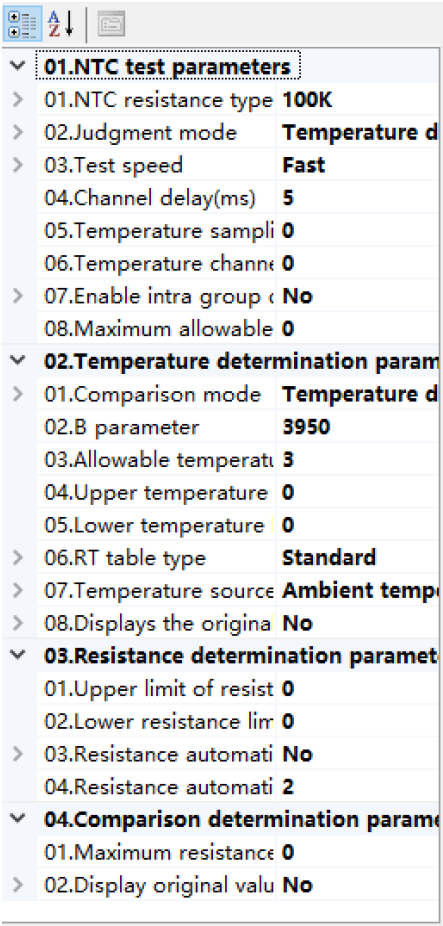
Displays the original temperature(the initial temperature of the test piece): No, Yes

Upper limit of resistance; lower resistance limit

Resistance automatic: No, Yes

Resistance automatic temperature difference; maximum resistance difference

Displays original value: No, Yes



8. Insulation resistance parameters

Test card selection：test card 1, test card 2，etc

Test method: one to all, dichotomy fast

Test range：1MΩ,10MΩ,100MΩ,1GΩ

Test voltage: 30-2000V

Boost time：0.01S – 10S

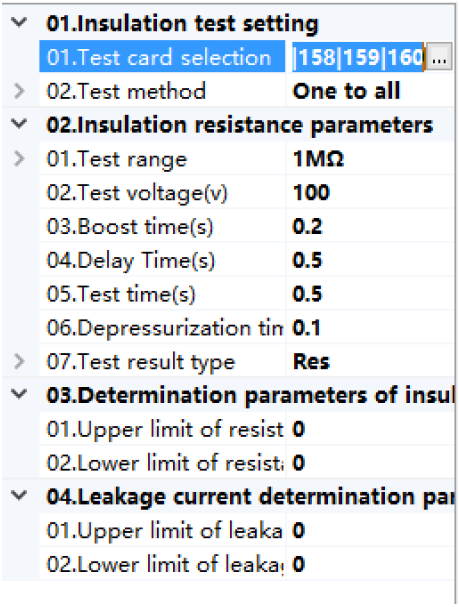
Delay time：0.0S – 99S

Test time：0.1S– 500S

Depressurization time：0.01s – 10s

Test result types: res, current

Test voltage, upper limit of resistance value, lower limit of resistance value, upper limit of leakage current, lower limit of leakage current



9. AC withstand voltage parameters

Test card selection：test card 1, test card 2，etc;

Test method: one to all, dichotomy fast

Test frequency: 50Hz,60Hz,400Hz

Test voltage: 30-2000V

Test range：1mA,5mA

Boost time：0.01S – 10S

Delay time：0.0S – 99S

Test time：0.1S – 500S

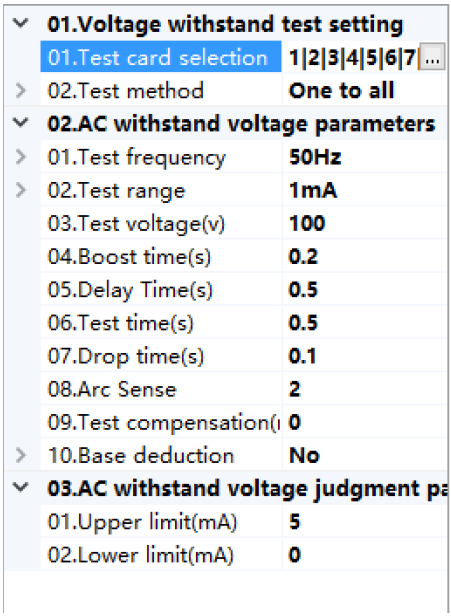
Drop time：0.01S– 10S

Arc sense：0 – 7

Correction value: - ∞~+∞

Base deduction: No, Yes

Test voltage, test compensation, upper limit, lower limit



10. DC withstand voltage parameters

Test card selection：test card 1,test card 2，etc

Test method: one to all, dichotomy fast

Test range：1mA,5mA

Test voltage: 30-2000V

Boost time：0.01S – 10S

Delay time：0.0S– 99S

Test time：0.1S– 500S

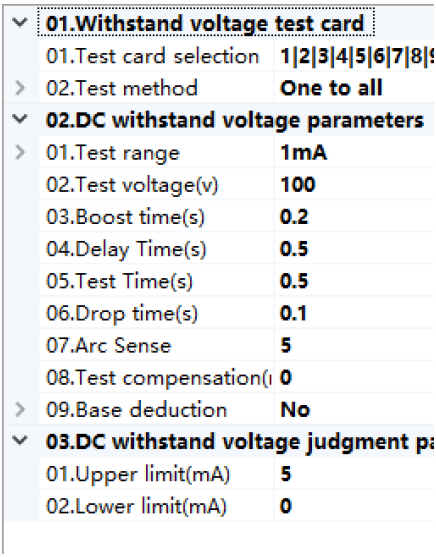
Drop time：0.01S– 10S

Arc sense：0 – 7

Base deduction: No, Yes

Correction value: - ∞~+∞

Test voltage, test compensation, upper limit, lower limit



Arc sensitivity comparison table

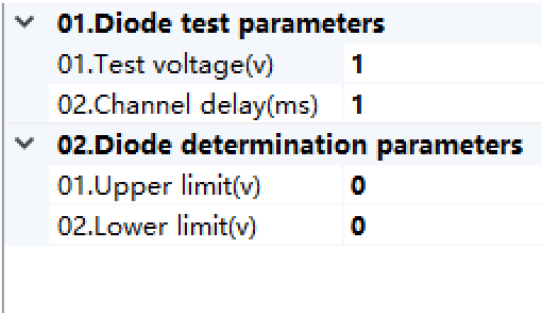
Arc detection sensitivity setting	Detection peak current value
Level 7	5.5mApeak
Level 6	7.7mApeak
Level 5	10mApeak
Level 4	12mApeak
Level 3	14mApeak
Level 2	16mApeak
Level 1	20mApeak

11. Diode regulator parameters

Test voltage：1V – 10V

Channel delay：0mS – 200mS

Upper limit, lower limit

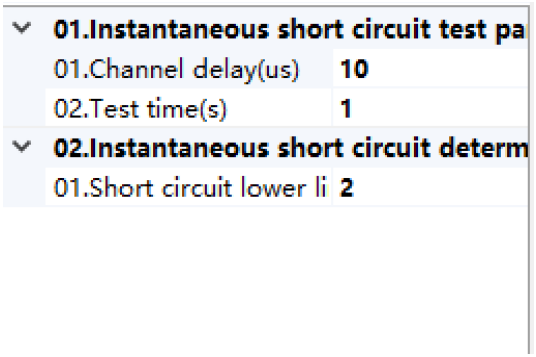


13. Instantaneous short circuit test parameters

Channel delay：5uS – 20000uS

Test time：0.1S – 20.0S

Short circuit lower limit：2kΩ – 1000kΩ



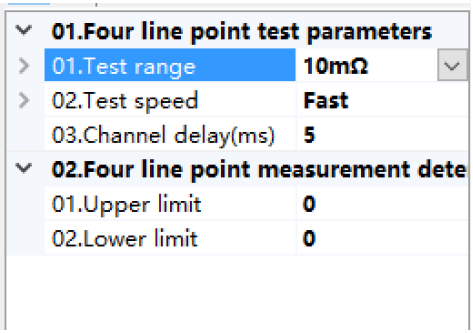
14. Four-wire point test parameters

Test range:10mΩ,100mΩ,1Ω,10Ω,100Ω,1kΩ,10kΩ,100kΩ

Test speed: fast, medium, slow

Channel delay：5ms – 200ms

Upper limit, lower limit



15. Multipoint LCR parameters

Test range：100Ω,1kΩ,10kΩ,100kΩ

Automatic range: on, off

Test frequency：50Hz,60Hz,100Hz,120Hz,1kHz,10kHz

Test speed: fast, medium, slow

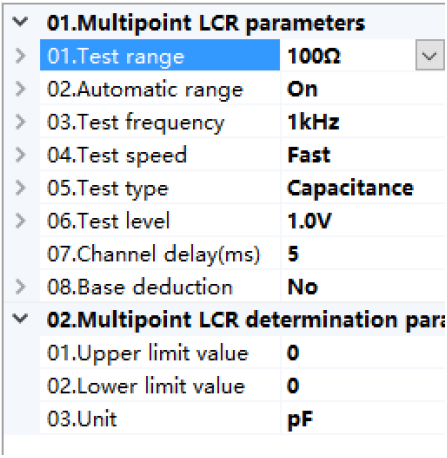
Test type: resistance, capacitance, inductance, impedance, admittance, conductance

Test level：1.0V,0.3V,0.1V

Channel delay：5mS – 200mS

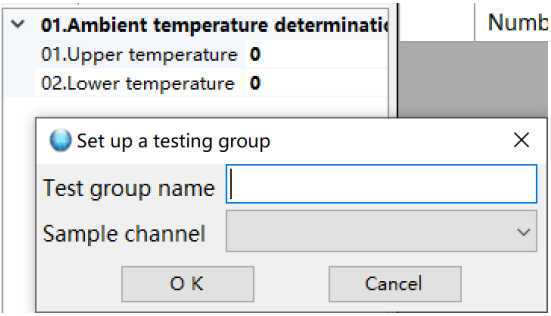
Base deduction: No, Yes

Upper limit value, lower limit value,unit



16. Ambient temperature determination

As needed, add the corresponding number of channels and their channel numbers, and then set the upper and lower temperature limit ranges (Note: In this test project, you need to set the parameters in advance and enable them in the temperature channel settings set by the system), as shown in the figure below



17. Introduction to high voltage/insulation test methods

A. One-to-other: This is the most basic test method of high-voltage insulation test, its action is to connect the point A to be measured to high voltage and other points to ground, observe its leakage current or insulation value, and then connect the point B to be measured to high voltage and other points to ground, observe its leakage current or insulation value, and so on, connect each point to be measured to high voltage and other points to ground, observe its leakage current or insulation value, so that it can be confirmed that the test of high voltage insulation at all points to be measured is no problem, and the number of tests is N times (as shown in the figure below). This test method can accurately find out the insulation and leakage current values at each point, but the disadvantage is that the test speed is slow.

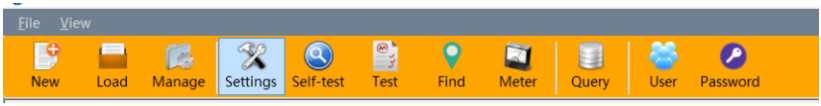
	A	B	C	D	E	F	G	H
Step 1	+	—	—	—	—	—	—	—
Step 2	—	+	—	—	—	—	—	—
Step 3	—	—	+	—	—	—	—	—
Step 4	—	—	—	+	—	—	—	—
Step 5	—	—	—	—	+	—	—	—
Step 6	—	—	—	—	—	+	—	—
Step 7	—	—	—	—	—	—	+	—
Step 8	—	—	—	—	—	—	—	+

B. Rapid dichotomy method: This mode is similar to the rapid classification method, such as 8 test points such as B C D E F G H and so on, when using the test for each line or point, it must be measured 7 times in sequence to distinguish whether the DUT is a good product, but using the rapid dichotomy

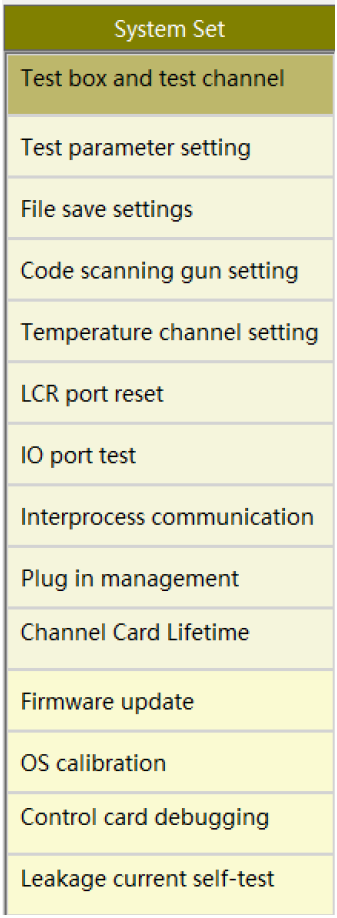
test method, the first time A B C D and E F G H are tested in two piles, the second time A B E F and C D G H are tested in two piles, and the third time A C E G and B D F H are divided into two piles of tests, This only requires three tests to determine whether the analyte is good, and if the analyte has 128 points, use the pair of lines or The point test must be tested 128 times, and the rapid method test only needs 7 times (as shown below), the disadvantage is that the wrong point cannot be known, and the line segment impedance will be slightly lower than the actual value due to the parallel test of the line segment.

	A	B	C	D	E	F	G	H
Step 1	+	+	+	+	—	—	—	—
Step 2	+	+	—	—	+	+	—	—
Step 3	+	—	+	—	+	—	+	—

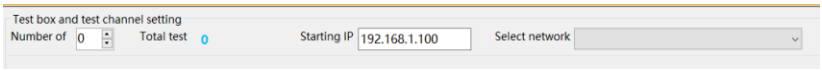
4.6 System Settings



Click **[Settings]** to open the system settings interface, the system settings include: test box and test channel, test parameter setting, file saving settings,code scanning gun setting, temperature channel setting, LCR port reset, IO port test, interprocess communication, plug in management, firmware update, OS calibration, control card debugging and leakage current self-test.



Click **[Test box and test Channel]** to switch to the test box and test channel settings page.



The test box and test channel setting page can select the number of test boxes and test cards, enter the starting IP address and select the network card. The starting IP address is the IP address of the 01# test box, and the network card selects the network card model of the computer.

Click **[Test parameter setting]** to switch to the test parameter setting page;

Set parameter mode: single trigger, cycle trigger, optional to stop the test when the test fails

Test results broadcast: PASS (pass), FALL (fail)

Machine name: define the machine as needed

Enable contact detection: After enabling the DUT contact test card slot, it will be automatically detected

Enable trigger delay: delay time when using external triggering

Enable temperature compensation: fill in the compensation value according to the actual temperature and required temperature of the site

Enable alias function: After this function is selected, you need to define each point on the point learning page on the project management page

The binary test point has been group name to indicate the function:

Automatically clear statistics every other day: check this box to automatically clear the test statistics of the previous day

You can also choose the following function:

[Abnormal detection shall be carried out before four wire test]

[OS test optimization]

[OS null Point Test]

[Code scanning start test]

[No code accident]

[Automatically clear barcode after test]

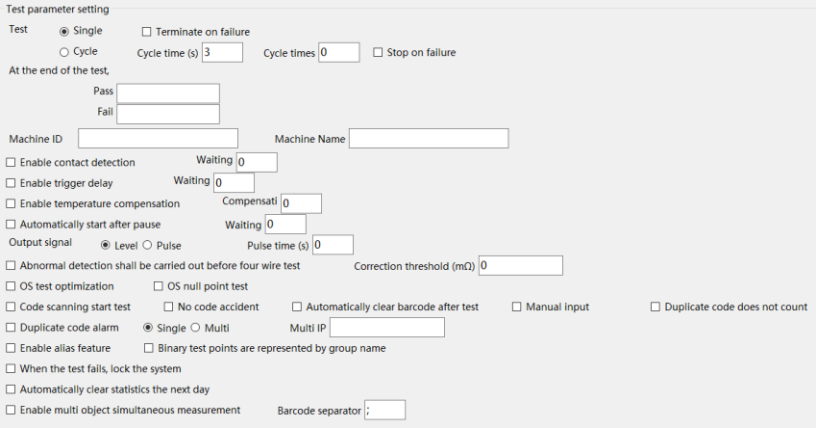
[Manual input]

[Duplicate code does not count]

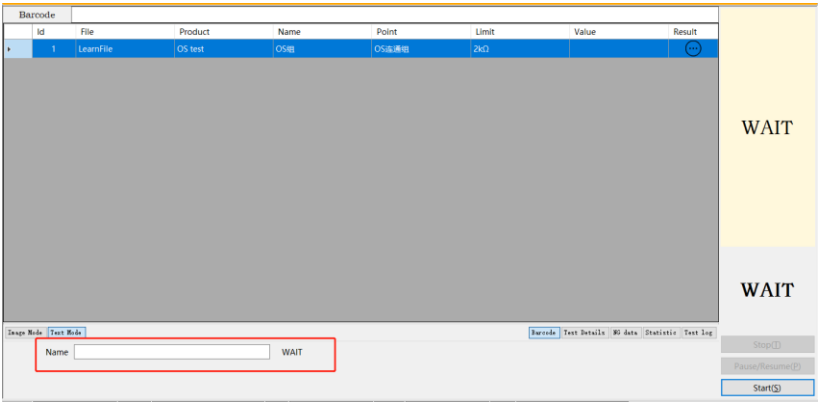
[Duplicate code alarm]

[When the test fails, lock the system]

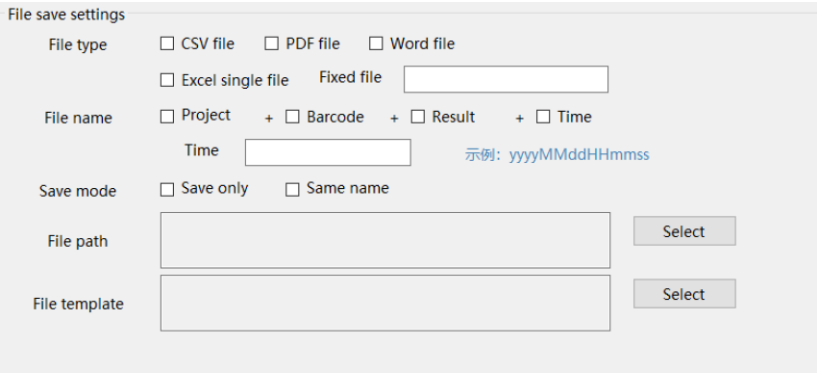
etc.



Enable multi object simultaneous measurement: check this function to test multiple analytes, which can be used in the test mode of the product number, as shown in the figure below.



Click **[File save settings]** to switch to the file save settings page.



File type:. CSV, .PDF, .DOC

(1) Select the required file format according to the requirements, three formats including Excel, PDF and Word.The above three saving formats, will not save the test results in the same table;

(2) Select Excel single file, set the file name, and save the test results to the same Excel table;

File name: Project +Barcode +Rresult +Time

Select the name of the file to be displayed according to the on-site requirements, the timestamp format can be customized, for example "yyyyMMddHHmmss";

Save mode: save only, same name

Save mode: You can select save only and same name;If you select save only,

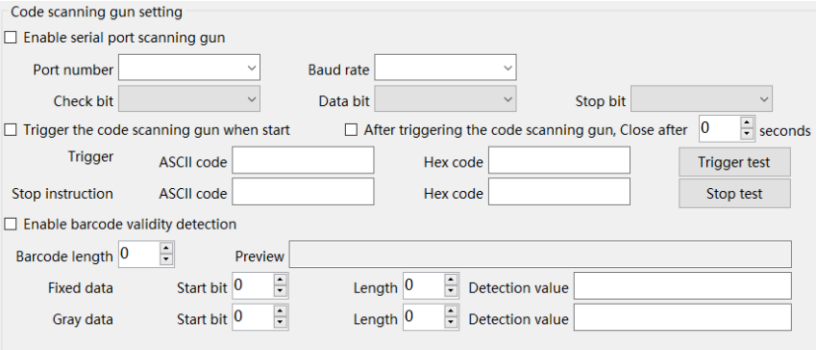
Save only: only the tests with qualified results is saved while the tests with failed results is not saved.

Same name: If the file name is the same, the same name overwrites

File path: the final storage address of the file;

File template： you need to select the data report document from the location of the 5000 software and then select the Report.frx fixed format, if not selected, the file type will not be saved.

Click **[Code Scanning Gun Settings]** to switch to the code scanning gun settings page

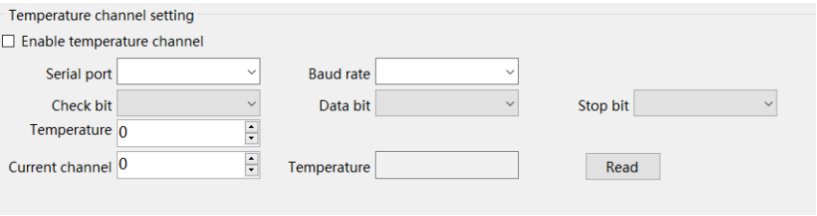


Check **the enable serial port scanning gun**: select **[Port number]**, [Baud rate], **[Check bit]**, [data bit], [stop bit], otherwise the communication will fail;

Check **trigger the code scanning gun when starting the test** : you can set the shutdown time of the code scanning gun after triggering the code scanning gun, or you can select ASCII code or Hex code to set the trigger instruction and the stop instruction.

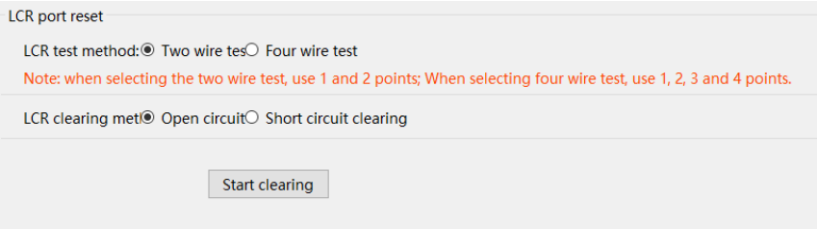
Check **enable barcode validity detection**: the barcode length is optional; The start bit and length of fixed data and grayscale data are optional, and the detection value can be defined;

Click **[Temperature channel setting]** to switch to the temperature channel setting page;



Check the **enable temperature channel,** select the Serial port, Baud rate, Check bit, Data bit, Stop bit of this device, connect the temperature test module for temperature test, or select the corresponding channel to view the real-time temperature; this setting parameter is used in conjunction with the ambient temperature in the test filegroup.

Click **[LCR port reset]** to switch to the LCR port reset setting page;

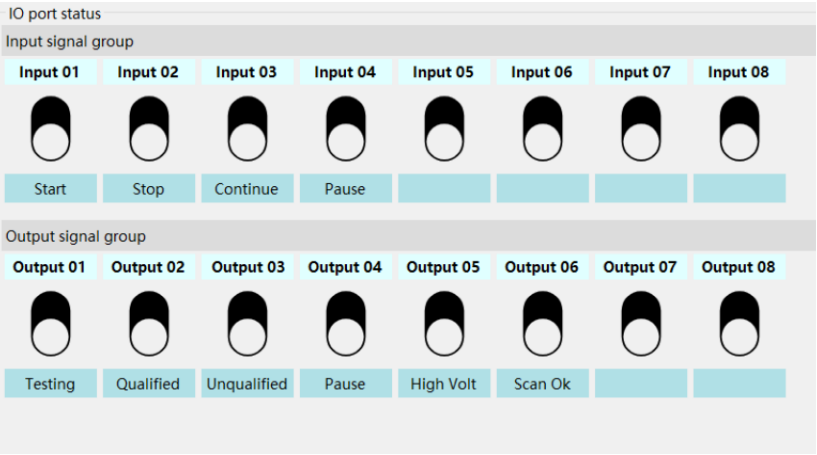


Select LCR test method: Two-wire test or four-wire test;

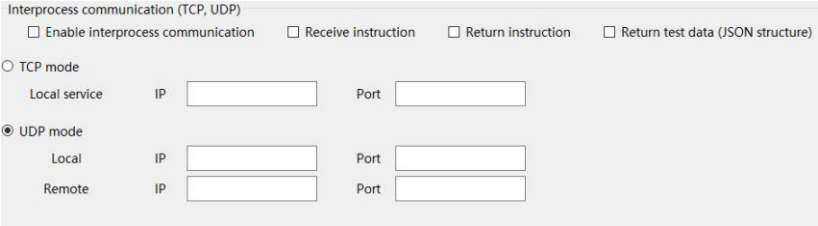
Select LCR clearing method: Open circuit clearing or short circuit clearing;

Click the **[Start clearing]** button to start clearing.

Click **[IO port test]** to switch to the IO port status page; you can view the input and output status and the corresponding channel.



Click **[Interprocess communication]** to switch to the interprocess communication page;

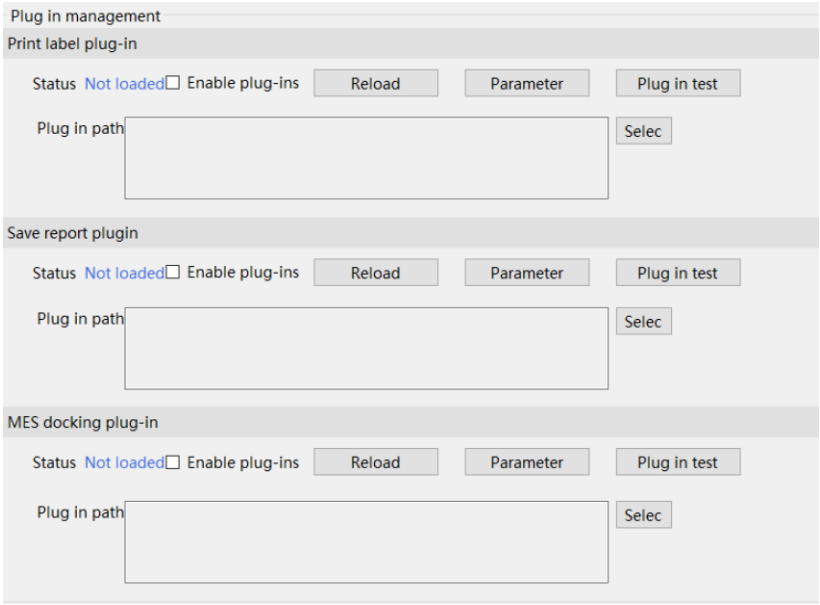


There are TCP and UDP modes for interprocess communication. You can check **[Enable interprocess communication],[Receive instruction],**

[Return instruction] and **[Return test data(JSON structure)].**

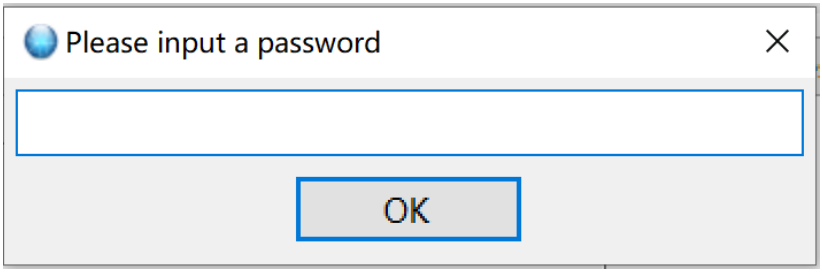
In TCP mode, you need to fill in the IP address and port of the local service program. In UDP mode, you need to fill in the IP address and port of the local program and the remote program.

Click **[Plug in management]** to switch to the plug in management page;

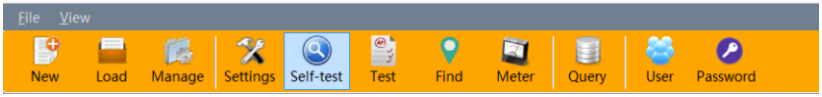


Set and select the parameters and paths of the [Print label plug-in], **[Save report plug-in]** and **[MES docking plug-in]** (Note: the plug-in saves the format document, generally customized according to the on-site requirements), or you can perform the parameter format of each plug-in.

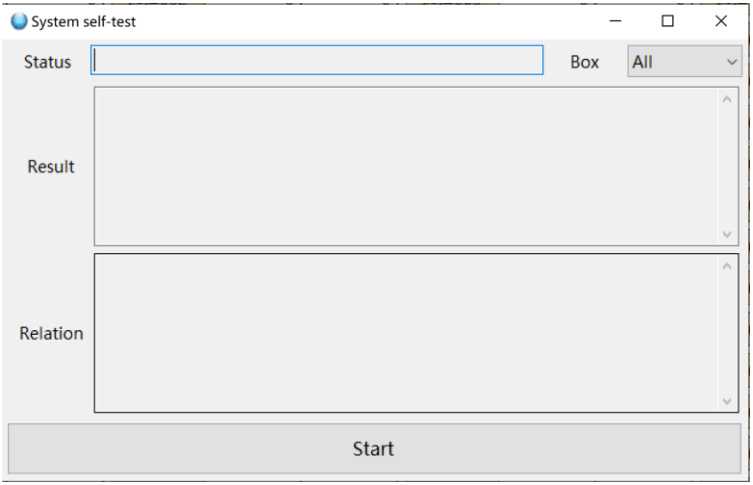
Firmware update, OS calibration, control card debugging, leakage current self-test can only be operated by debugging personnel by entering the passwords.



4.7 System Self-test

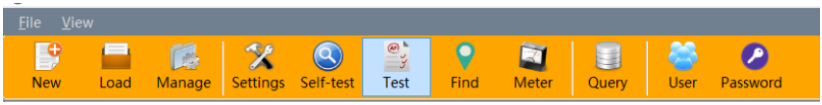


Click**[Self-test]** to pop up the system self-test dialog box.

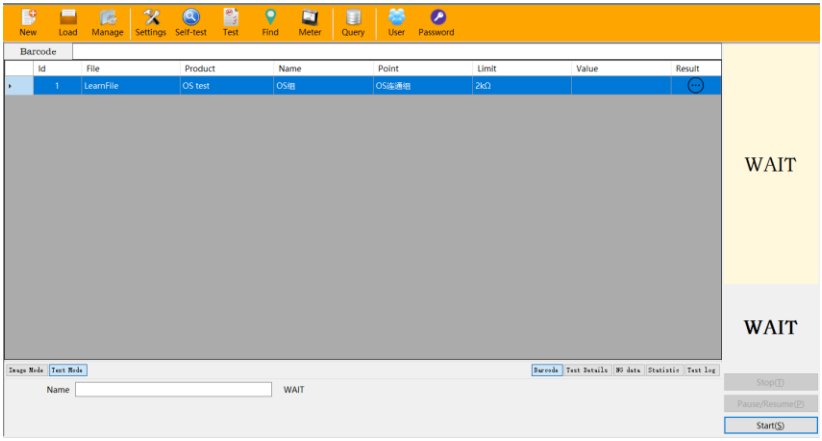


Click **[Start]** to wait for the self-test to complete, the self-test result will be displayed after the self-test is completed (Note: the machine cannot connect the test object during the self-test process, and an empty inspection is required).

4.8 Test Mode



Click **[Test]** to open the test mode page.

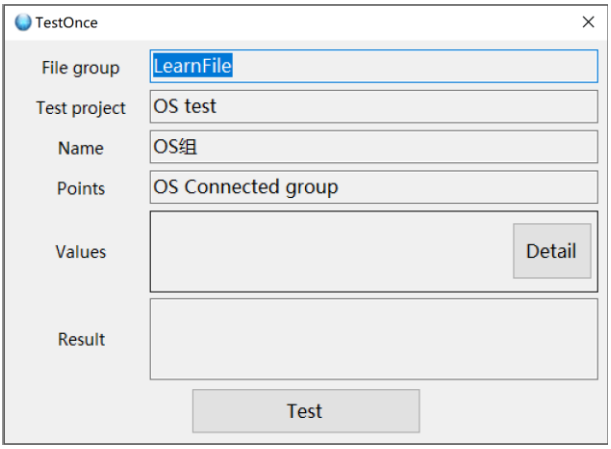


Click the **[Start]** button to start the test.

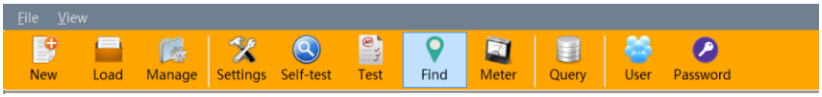
In the test, you can click the **[Pause/Resume]** button to pause or resume the test, or you can also click the **[Stop]** button to stop the test.

In the test mode, the fixture base can be cleared to zero, and right-click the mouse in the test line to see three ways: save LCR data as base, save withstand voltage data as base, and save low-resistance data as base. The three zeroing methods are used with the "Base Deduction" option in the corresponding test mode.

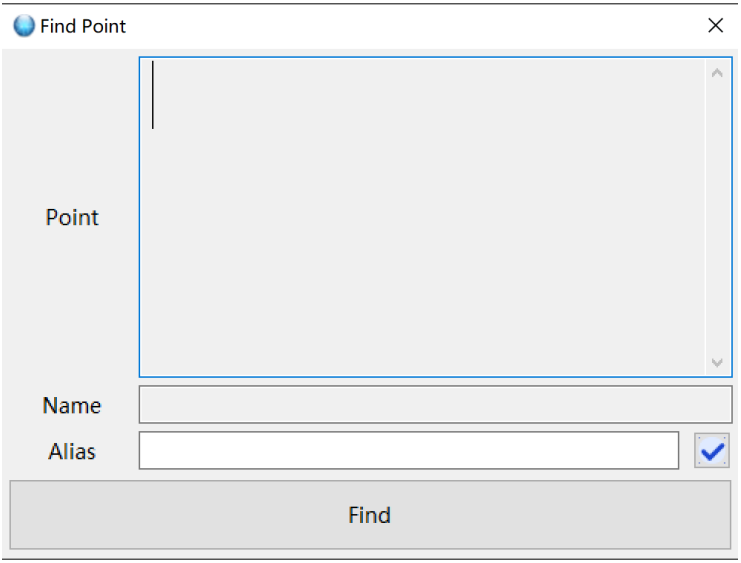
Right-click the test line and select **[Test Current Line]**, then the interface will pop up the following single-line test dialog box. Click **[Test]** to realize single-line test, and click **[Details]** to view detailed test results.



4.9 Find Point



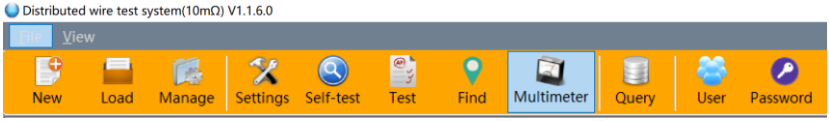
Click **[Find]** to pop up the find point dialog box.



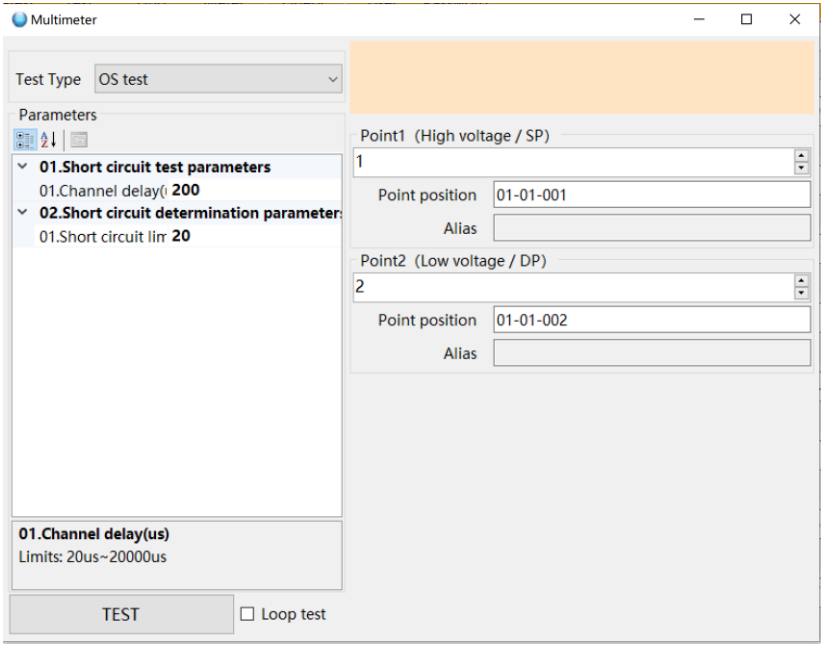
Click the **[Find]** button in the interface, and use the find point pen to select the point you want to find. The interface will display the information of the current point and report the point by voice in real time.

The found point can be named directly in the alias area.

4.10 Multimeter

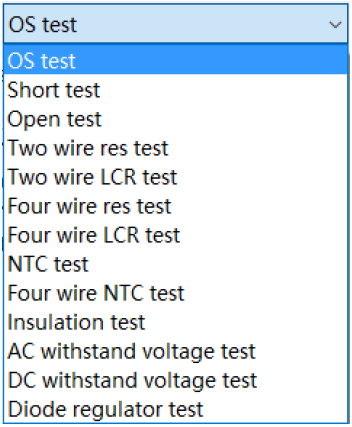


Click **[Multimeter]** to pop up the multimeter test page.



Click the drop-down box on the right of **[Test Type]** to select the test type: OS test, short test, open test, two wire res test, two wire LCR test, four wire res test, four wire LCR test, NTC test, four wire NTC test, insulation test, AC withstand voltage test, DC withstand voltage test and diode regulator test.

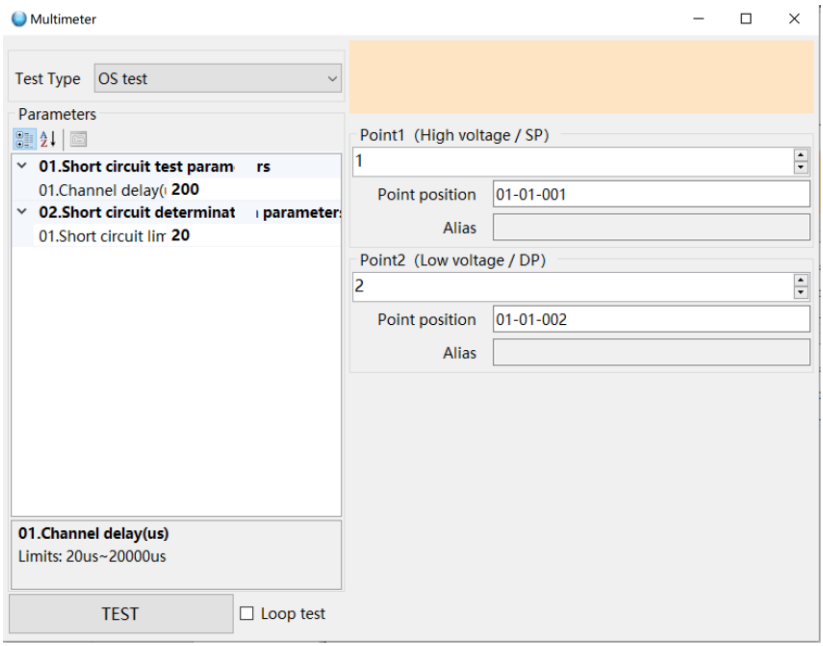
Set the corresponding test parameters in the test parameters box below after selecting the test type.



1. OS test or short circuit test parameters

Channel delay：5mS – 200mS

Short circuit limit: 2kΩ - 200kΩ

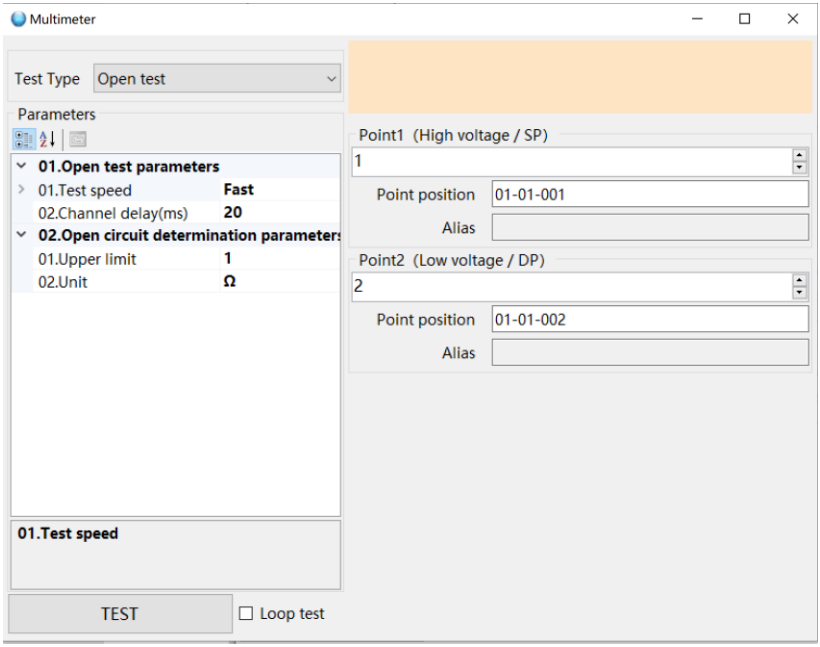


2. Open test parameters

Test speed: fast, medium, slow

Channel delay：5mS - 200mS

Upper limit：1Ω – 1000kΩ



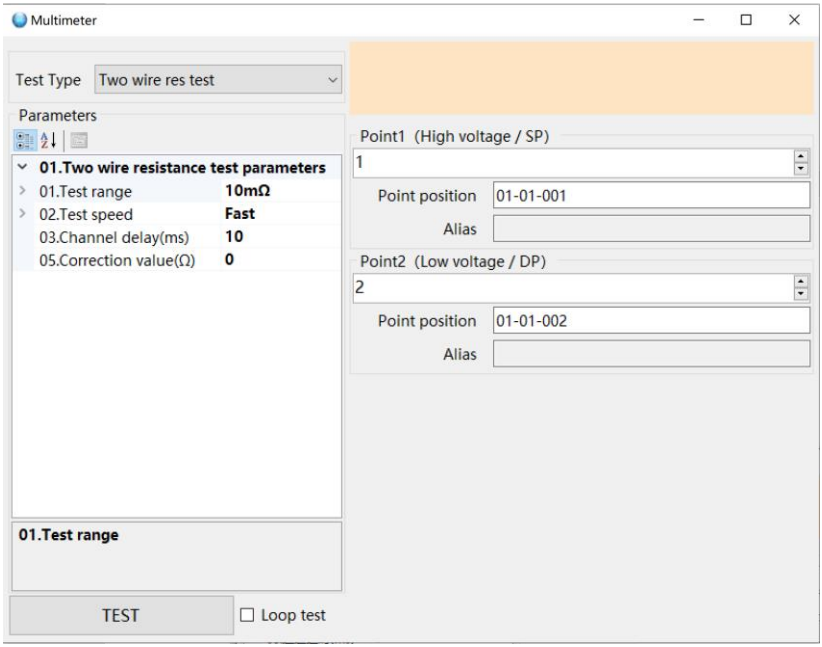
3. Two wire DC resistance test parameters

Test range：10mΩ,100mΩ,1Ω,10Ω,100Ω,1kΩ,10kΩ,100kΩ

Test speed: fast, medium, slow

Channel delay：0mS– 200mS

Correction value: -∞~+∞



4. Two wire LCR parameters

Test range：100Ω,1kΩ,10kΩ,100kΩ

Automatic range: off, on

Test frequency：50Hz,60Hz,100Hz,120Hz,1kHz,10kHz

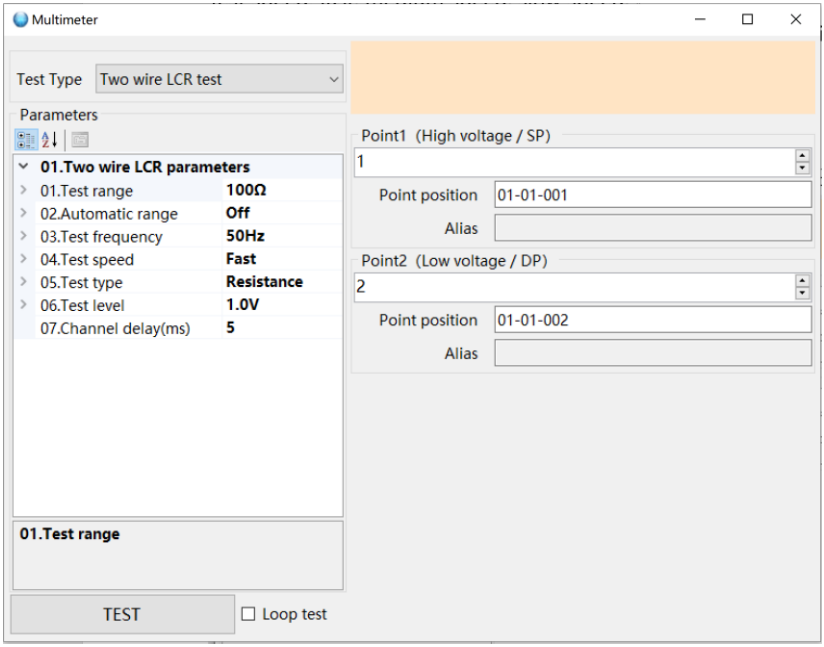
Test speed: fast, medium, slow

Test type: resistance, capacitance, inductance, impedance, admittance, conductance

Test level：1.0V,0.3V,0.1V

Channel delay：5mS – 20mS

Corretion value: -∞~+∞



5. Four wire DC resistance test parameters

Test range：10mΩ,100mΩ,1Ω,10Ω,100Ω,1kΩ,10kΩ,100kΩ

Test speed: fast, medium, slow

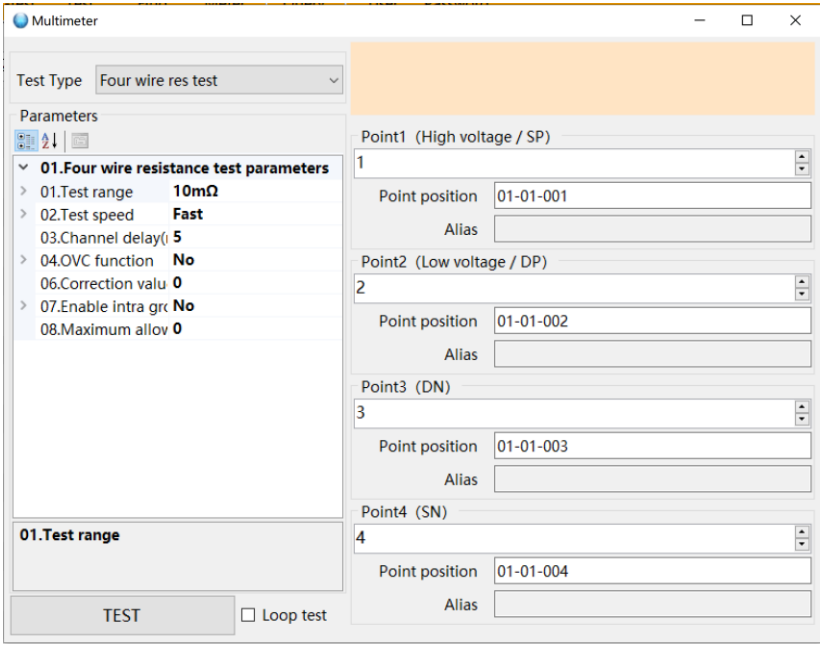
Channel delay：5mS – 200mS

OVC function: no, yes

Enable intra group difference comparison：no, yes

Correction value: -∞~+∞.

Maximum allowable difference



6. Four wire LCR parameters

Test range：100Ω,1kΩ,10kΩ,100kΩ

Automatic range: off, on

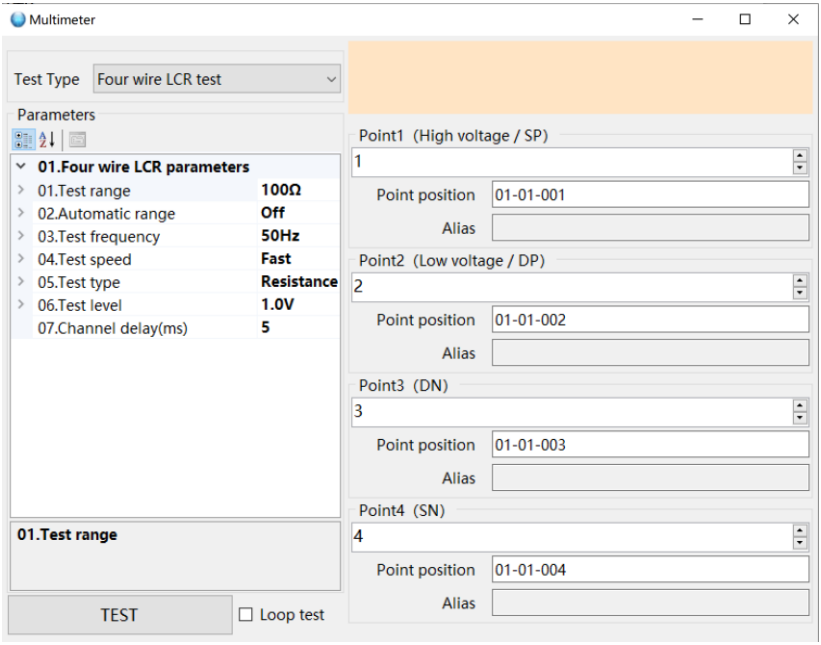
Test frequency：50Hz,60Hz,100Hz,120Hz,1kHz,10kHz

Test speed: fast, medium, slow

Test type: resistance, capacitance, inductance, impedance, admittance, conductance

Test level：1.0V,0.3V,0.1V

Channel delay：5mS – 200mS



7. NTC test parameters and four wire NTC test parameters

NTC resistance type：10K,100K

Judgment mode：temperature determination, resistance determination and comparative judgment

Test speed: fast, medium, slow

Channel delay：5mS - 200mS

Temperature sampling channel: you need to select the serial port number and corresponding parameters in the temperature channel setting set by the system;

Enable intra-group difference comparison: judge the difference between channels in the same test group;

Maximum allowable difference: a judgment condition setting for intra-group difference comparison;

Temperature determination parameters

Comparison mode: temperature difference, temperature value;

B parameter, upper temperature limit, lower temperature limit(used with the temperature value in the comparison mode);

RT table type: standard, custom(need to enter the NTC resistance table for project management to create).

Temperature judgment parameters

Comparison method:temperature value, temperature difference

B parameter

Allowable temperature difference: used with the temperature difference in the comparison mode

Temperature upper and lower limits: used with the temperature value in the comparison mode

RT table type: standard, custom.need to enter the NTC resistance table for project management to create

Temperature comparison source/ambient temperature:generally read directly by USB port temperature probe

Standard part temperature: is generally read by temperature sampling channel

Display the original temperature: the initial temperature of the oject under test

Resistance determination parameters

Upper limit of resistance

Lower limit of resistance

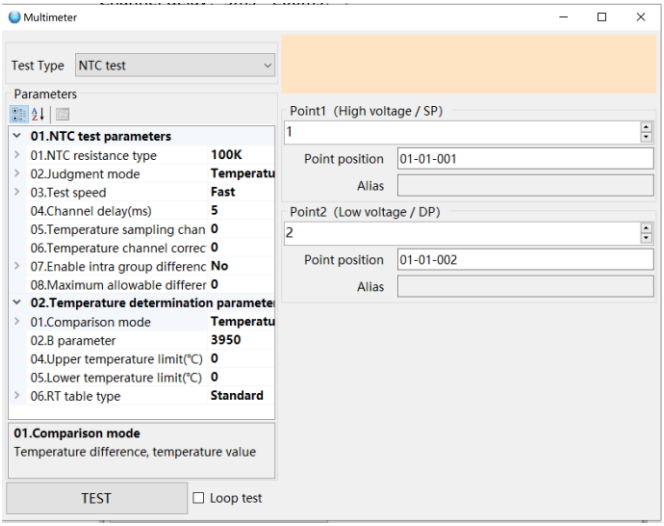
Automatic resistance value: yes, no

Automatic temperature difference of resistance value: parameters are called from RT table

Comparison determination parameters

Maximum resistance difference

Display of original values: yes, no



8. Insulation resistance parameters

1. Insulation test setting

Test card selection: test card 1, test card 2, test card 3, etc;

2. Insulation resistance parameters

Test range：1MΩ,10MΩ,100MΩ,1GΩ；

Test voltage;

Boost time：0.01S – 10S；

Delay time：0.0S – 99S；

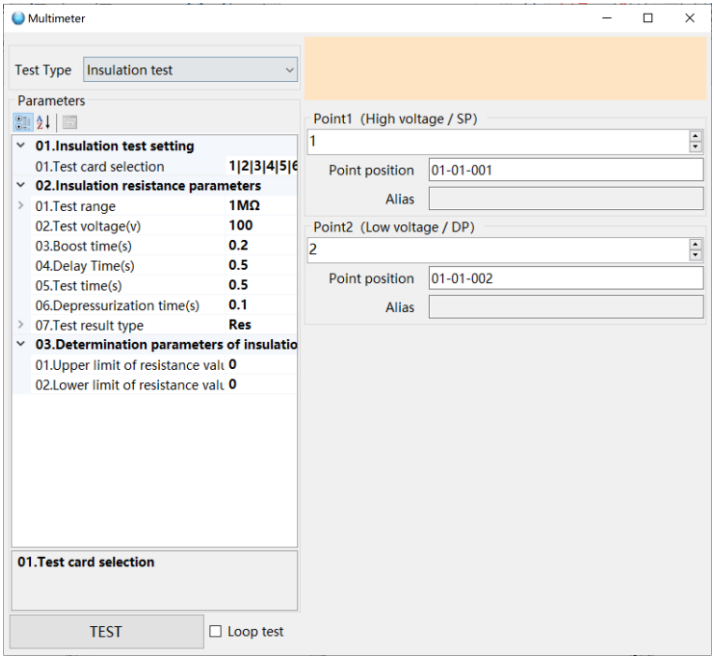
Test time：0.1S – 500S；

Depressurization time：0.01S – 10S；

Test result type: res, current;

3.Determination parameters of insulation

Upper limit of resistance value, lower limit of resistance value



8. AC withstand voltage parameters

1. Voltage withstand test setting

Test card selection: test card 1, test card 2, test card 3, etc;

2. AC withstand voltage parameters

Test frequency：50Hz,60Hz,400Hz

Test range：1mA,5mA

Test voltage

Boost time：0.01S – 10S

Delay time：0.0S – 99S

Test time：0.1S – 500S

Drop time：0.01S – 10S

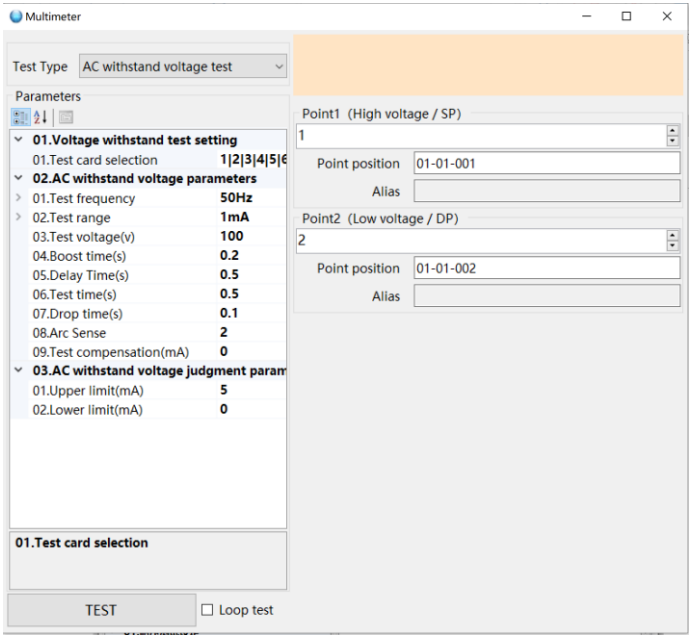
Arc sense：0 – 7

Test compensation

3. AC withstand voltage judgment parameters

Test voltage and temperature compensation value

Upper limit, lower limit



9. DC withstand voltage parameters

1.Withstand voltage test card

Test card selection: test card 1, test card 2, test card 3, etc

2.DC withstand voltage parameters

Test range：1mA,5mA

Test voltage

Boost time：0.01S – 10S

Delay time：0.0S – 99S

Test time：0.1S – 500S

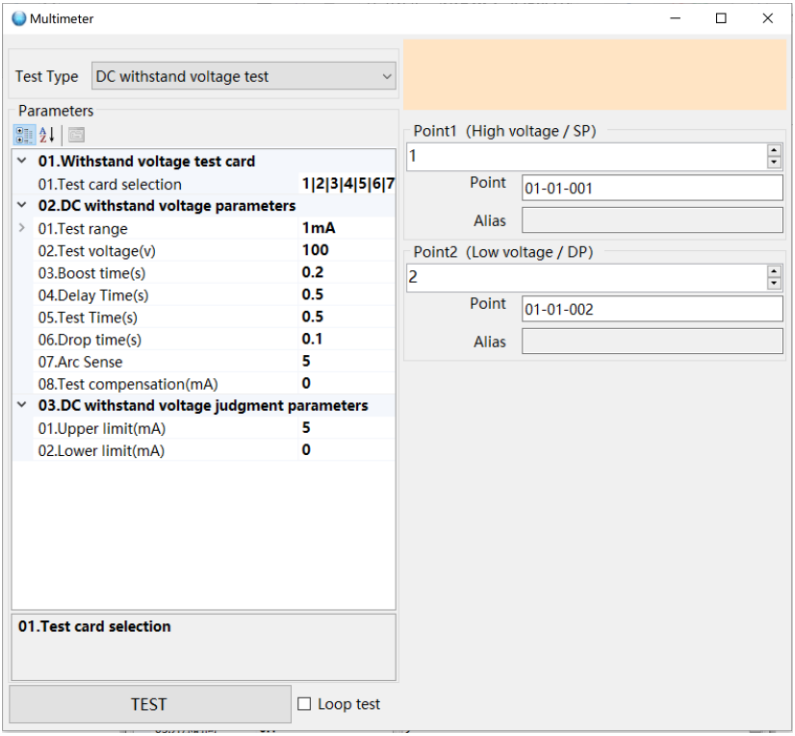
Drop time：0.01S – 10S

Arc sense：0 – 7

Test compensation

3.DC withstand voltage judgment parameters

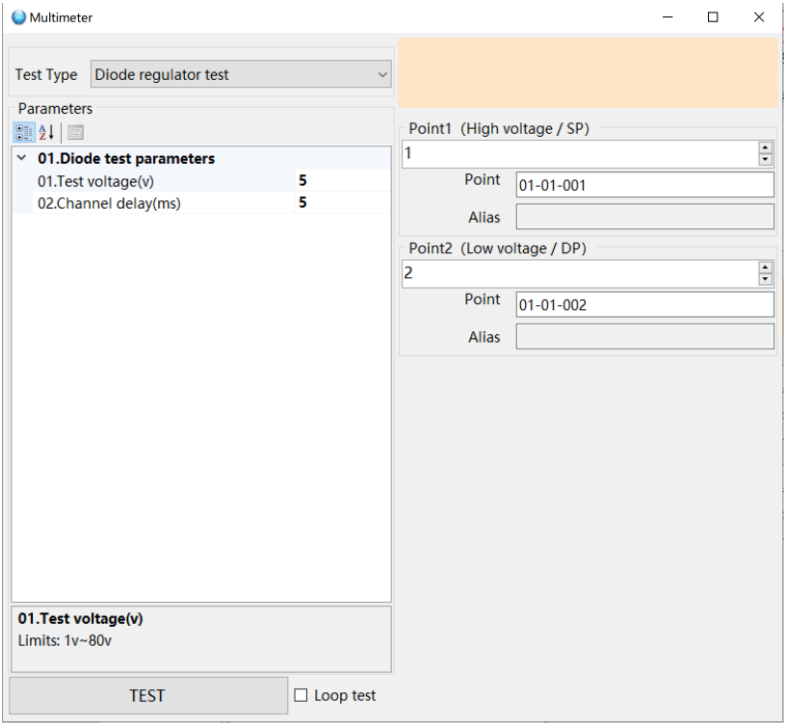
Upper limit, lower limit



11. Diode regulator test parameters

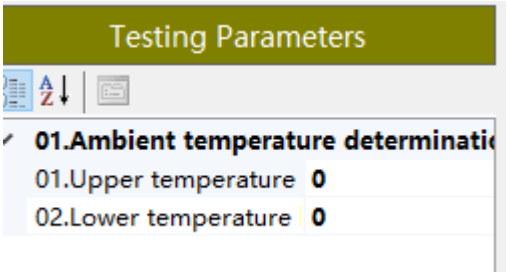
Test voltage：1V – 10V

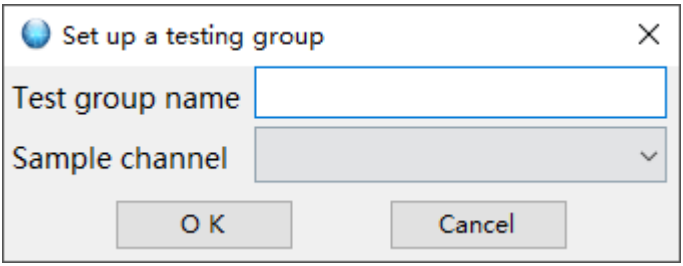
Channel delay：0mS– 200mS



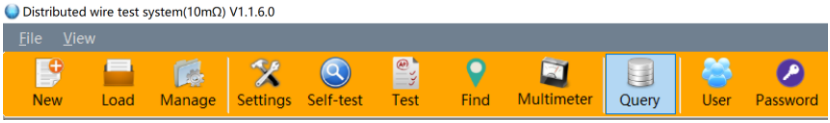
12. Ambient temperature test

As needed, add the corresponding number of channels and their channel numbers, and then set the upper and lower temperature limit ranges (Note: This test project needs to set the corresponding parameters and enable the temperature channel in the temperature channel setting set by the system), as shown below:





4.11 Data query

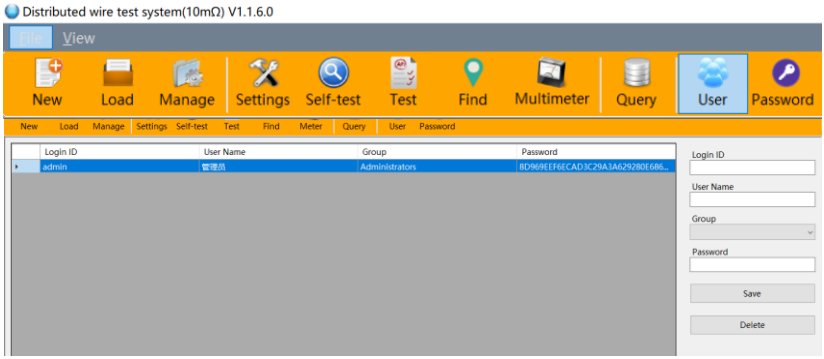


Click **[Query]** to enter the data query interface.

Fill in the test conditions: product number, project name, select test results, start time, and end time, click **[Search Main Table]** to search and display the results.

Select the items you want to operate and click **[Export Data]** to export the current data. Click **[View Details]** to display detailed information.

4.12 User Management



Login ID: the name filled in when logging in;

User name: the name displayed in the status bar after logging in;

User group: divided into three types: administrator, programmer and operator.

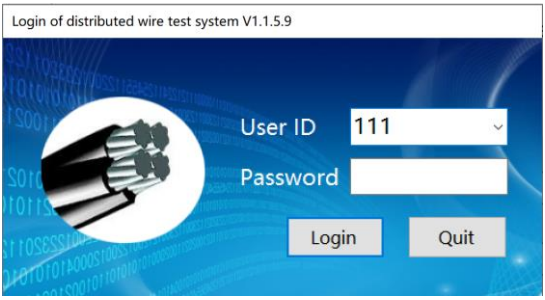
The administrator has the highest authority and can operate all functions.

The programmer has all functions except user management.

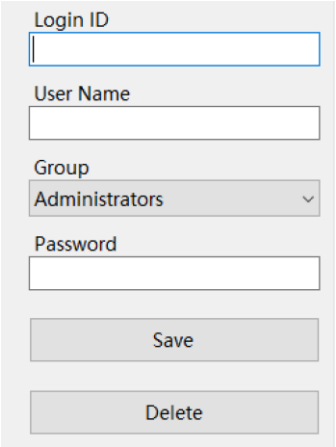
The operator has all functions except user management and project management

Password: the password filled in when logging in

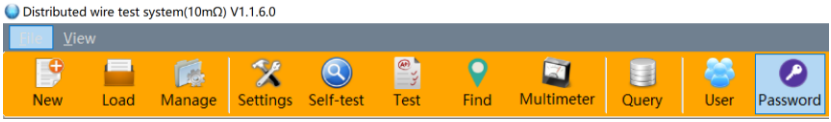
Note: when logging in to operator mode, you need to manually enter the user ID for the first time, as shown in the figure below:



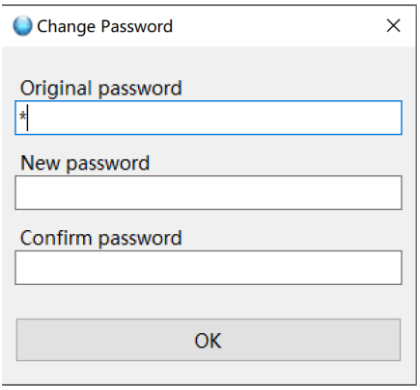
On the right side of the interface, you can add and delete login ID information, select user groups: administrator, programmer and operator, enter login ID, user name and password, click [Save] to save, and click **[Delete]** to delete ID information.



4.13 Change Password



Click **[Password]** ,then the interface will pop up the change password page, enter the original password, new password and confirm password of the login account, and click **[OK]** to change.

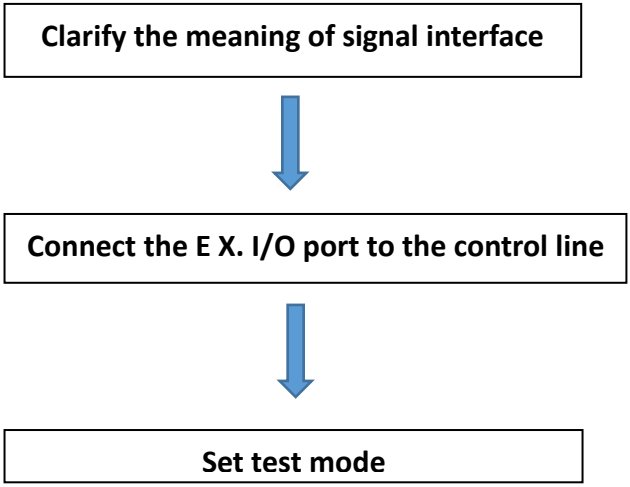


Chapter 5 EXT I/O Port (Handler)

EXT I/O terminals on the back panel of the instrument support external control, provide the output of the test signal, and accept the input signal. Optocouplers are used for all input signals. Understanding the internal circuit

structure and paying attention to safety matters is conducive to better connection to the control system.

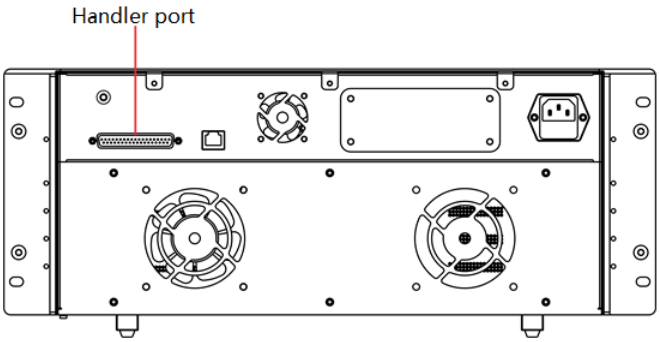
Understanding the internal circuit structure and paying attention to safety precautions are beneficial for better connection to control system.



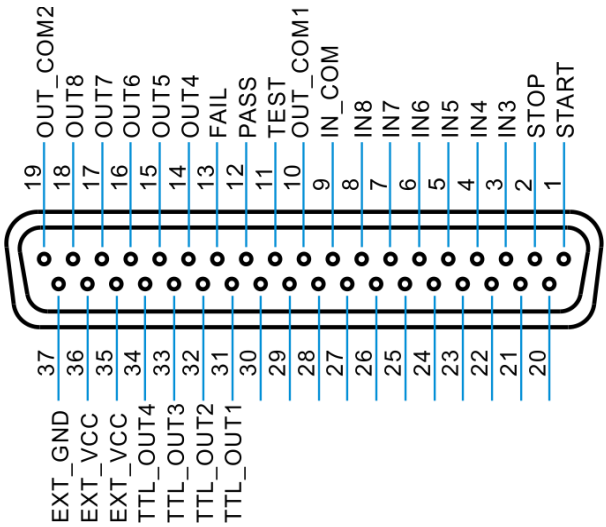
5.1 EXT I/O Ports and Signals

Do not plug and unplug the EXT I/O port during the test
Do not connect IO port to the test port

Port and signal description



Port detailed diagram

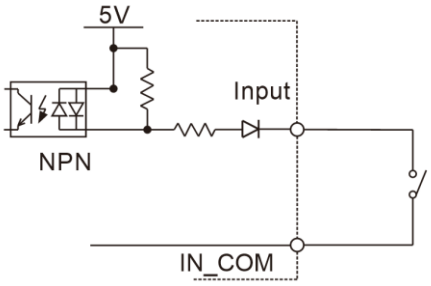


Pin number	Pin name	Pin function	Remarks
1	START	Start the test	Connect external passive contact
2	STOP	Stop the test	
3~8	IN3~IN8	Reserved input port, expandable function	
9	IN_COM	Common port of the input signal	
10	OUT_COM1	11-14 common terminal of	

		output signal	Output relay signal
11	TEST	Output signal during the test	
12	PASS	Output test pass signal	
13	FAIL	Output test fail signal	
14	OUT4	The fourth output signal	
15~18	OUT5~OUT8	Reserved fifth to sixth output	
19	OUT_COM2	Fifth to sixth output common port	
31	TTL_OUT1	Level output signal 1	Output level signal
32	TTL_OUT2	Level output signal 2	
33	TTL_OUT3	Level output signal 3	
34	TTL_OUT4	Level output signal 4	
35,36	EXT_VCC	External power supply positive input	
37	EXT_GND	External power supply negative input	

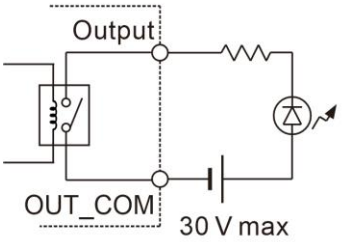
5.2 Port Signal Connection Method

Input circuit connection

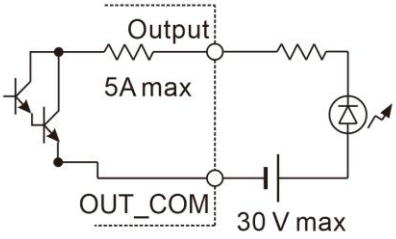


Signal input

Output circuit connection



Relay output



Level output

Chapter 6 Parameters

6.1 Basic Parameters

Basic functions

Model	**DP6000**	**DP6000S**
Measurement methods	Inner four-wire type + outer four-wire type	
Maximum number of test points	256	128
AC high voltage	30-2000V	
DC high voltage	30-2000V	
High voltage output accuracy	±5%	
High voltage measurement accuracy	±5%	
High voltage measurement time	0.1s - 500s	
Test items and scope	O/S, intermittence O/S, quick intermittence open circuit	2kΩ-200kΩ
	Inner four-wire conduction impedance	0.1Ω-1MΩ

	External four-wire connection test	Test range	10μΩ-1000kΩ
		Current signal	≤1A
	AC high-voltage leakage current		0.01mA-10mA
	DC high-voltage leakage current		1μA-5mA
	DC high-voltage insulation		1MΩ-50GΩ
	DC resistance	Measurement range	10mΩ-1MΩ
		level signal	0.5-10V
		current signal	≤10mA
	LCR	Capacitance measurement range	10pF-100μF
		Resistance measurement range	100mΩ-20MΩ
		Inductance measurement range	10nH~100H
		Frequency signal	50Hz/60Hz,100Hz/120Hz/ 1kHz/10kHz
		Range mode	AUTO/HOLD
		Level signal	0.1V-1.0V
	Diode/Zener diode	Test range	0-10V
		Test signal	1mA
	Single-side test		Yes
	O/S Terminal Judge		Yes

Advanced function items	Programmable continuous test/ Automatic point search/ Auto-diagnosis
Test scan mode	Automatic/manual/external
Measurement signal	Low voltage measurement signal
Storage memory	umber of test files up to 500 sets
OS voltage	5V
Control panel	Calibration/metrology
Weight	22kg（6000）/17kg（6000S）
Dimension (W*H*D)	483*265*510（6000）/483*183*510（6000S）

6.2 Accuracy

The following indicators test conditions：

Temperature：20±3℃

Humidity： ＜80%RH

Preheat time: more than 15 minutes

Calibration time: within 1 year

Test Item	Range	Basic accuracy
OS test	2k-200kΩ	±5%
Two-wire on-resistance measurement	0.1Ω~1MΩ	±0.5%+0.05Ω
Four-wire on-resistance measurement	10μΩ~1MΩ	±0.2%+5μΩ
DC resistance test	0.1Ω~1MΩ	<100k:±1% >100k:5%
LCR test	10pF~100uF	±2%
	100mΩ-20M	±2%
	10nH~100H	±2%
Diode test	0~10V	±2%±0.2V
Insulation test	1MΩ~50GΩ	1M~100M: ±2% 100M~1G: ±5% 1G~5G: ±10%
AC leakage test	10μA~10mA	±3%

DC leakage test	1μA~5mA	±3%
AC withstand voltage source	30~2000V AC (50/60Hz)	±3%
Insulation/withstand voltage source	30V~2000V /3000V DC	±3%
Low voltage signal source	5V/10mA	±3%
Low voltage test timing time	10ms ~ 200s	±1%
Voltage/insulation test timing time	0.1s ~ 500s	±1%

Chapter 7 Operations

7.1 DP6000 Tester and Software Basic Operation Process

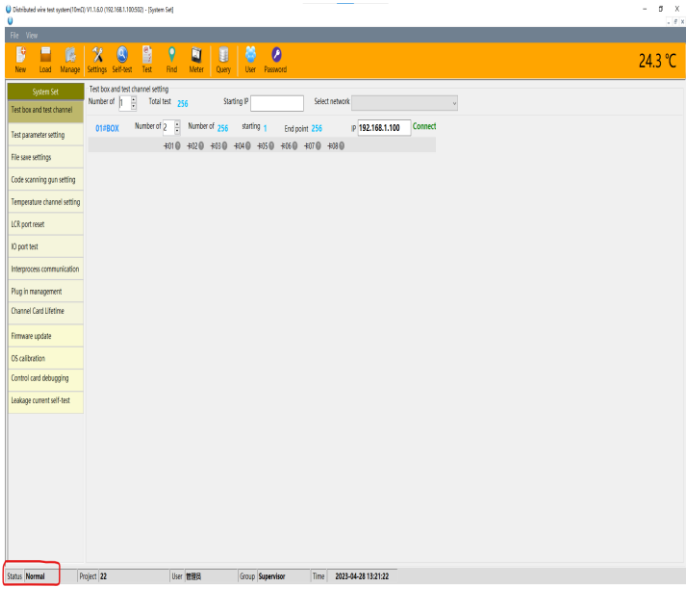
1. Connect the **DP6000** to the power supply;

Connect **DP6000** to the computer through a network cable for communication;

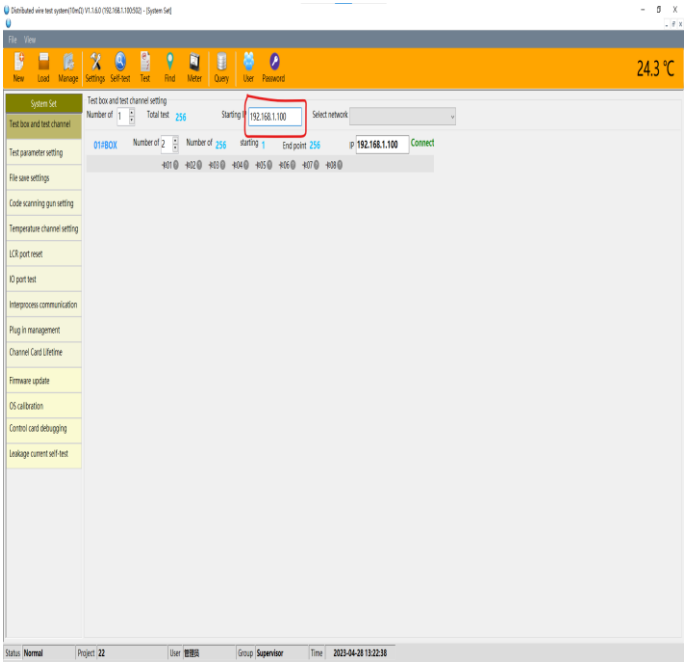
Plug in the test line and test port.

2. Boot the computer and open the software (default user name: admin; Password: 123456)

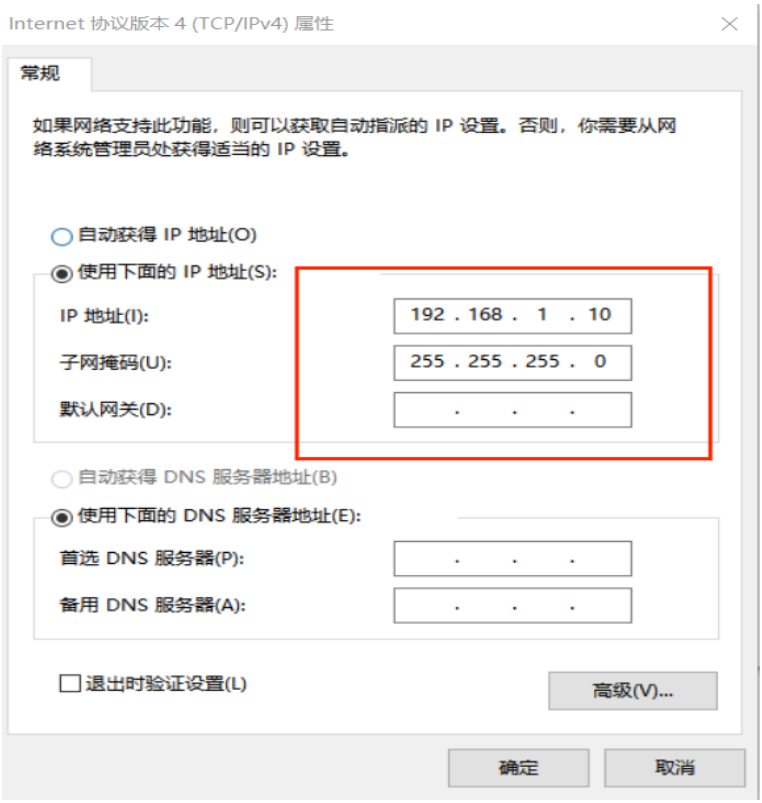
Check if DP6000 tester and computer communicate successfully, showing in the lower left corner of program interface.



If the communication is successful, the project can be established; If it shows ***Waiting for communication***, it means that the device and the computer are not communicating, and the IP address must be changed in the software and on the computer, as shown in the figure



The IP address of the **DP6000** tester can be changed to 192.168.1.100 (the address is the same as the IP address on the device); the computer can be changed to 192.168.1.2 (the IP cannot conflict with other IPs on the computer), as shown below:



Steps to change the IP address of the computer

Go to ***Network*** and ***Internet Settings***, click ***Change Adapter Option***, find ***Ethernet***, right-click ***Properties***, and then select ***Internet Protocol version 4 (TCP/IPv4)*** and double-click, Select the item ***Use the Following IP Address*** to change the IP address.

3. Create a new project or load a project, and then enter the project management for point learning and test item selection (please refer to the above manual for detail steps);

4. Enter the system setting interface to select the test result saving path (please refer to the above manual for detail steps);

5. Enter the test interface to start the test or use contact detection and external trigger detection.

- This manual is edited and revised by the Hope Instrument Electronic, version number V2.0.
- If there is any incorrect or unreasonable point in the manual, please contact us, welcome to call for technical consultation.
- Contact information is subject to change, please pay attention to our website.
- The copyright and interpretation rights of this manual belong to the company.