User's Guide

Rev.E3

Firmware Description:
Applicable to the main program RevA1.0 and above

AT9236

Electrical Safety Performance Comprehensive Analyzer

- AC Withstand Voltage Test Rated Output：5kVac/100mA
- DC Withstand Voltage Test Rated Output：6kVdc/10mA
- Insulation Test Rated Output：2.5kVdc/9999MΩ
- ARC Detector Function
- Automatic Over-voltage And Over-current Protection For Safer Use
- DC Rapid Discharge Technology
- 5-inch TFT-LCD Screen
- RS232C/RS485、HANDLER、USB HOST

ONMEAS®

Rev.A1

AT9236

Hipot Tester



User's Guide

Scan QR code for operation video

Safety Information

⚠WARNING⚠DANGEROUS： If you detect any of the following unusual conditions listed, immediately stop operation and disconnect the power cable. Please contact the Sales Department of Onmeas Instrument for repair at once. If you continue to operate without repairing the instrument, there is a potential fire or shock hazard for operators.

- Abnormal operation of the instrument.
- Unusual noise, odor, smoke or sparks emitted by the instrument during operation.
- Excessive temperature or electric shock from the instrument during operation.
- Damage to the power cable, power switch or power outlet.
- Foreign substance or liquid into the instrument

⚠WARNING⚠DANGEROUS： To avoid possible electric shock and personal safety, follow these guidelines.

Disclaimer	Please read the following safety information carefully before starting to use the instrument. Onmeas Instrument will not be responsible for any personal safety and property damage caused by the user's failure to comply with the following terms.
Instrument ground	To prevent the danger of electric shock, please connect the power ground wire.
Do not use the instrument in an explosive atmosphere	Do not use the instrument in a flammable and explosive gas, vapor or dusty environment.Using any electronic device in such an environment is a risk to personal safety.
Do not open the instrument case	Non-professional maintenance personnel should not open the instrument case in an attempt to repair the instrument.The instrument may still have undischarged charges for a period of time after it is turned off, which may cause an electric shock hazard to persons.
Do not use the instrument in areas with strong magnetic or electric fields	Using the instrument in areas with strong magnetic or electric fields may lead to instrument malfunction and even fire due to electromagnetic pulses.
Do not use instruments that work abnormally	If the instrument is not working properly and its danger is unpredictable, disconnect the power cord, do not use it, and do not attempt to repair it yourself.
Do not use the instrument in a manner other than that specified in this manual	Beyond the range, the protection provided by the instrument will be invalid.

Limited Warranty And Limitation Of Liability

Onmeas Ltd. ((shortened form Onmeas)) guarantees that every instrument you purchase is fully qualified in quality and measurement. This warranty does not cover fuses and damage caused by negligence, misuse, contamination, accidental or abnormal use.This warranty applies only to the original purchaser and is not transferable.

Onmeas provides a one-year free warranty from the date of shipment, which also includes VFD or LCD. During the warranty period, the instrument is damaged due to improper operation by the user, and the maintenance cost shall be borne by the user.After one years until the life of the instrument, Onmeas will provide maintenance for a fee.For VFD or LCD replacement, the fee is charged at the current cost price.

If the product is found to be damaged, please contact Onmeas for information on agreeing to return or exchange.After that, please send this product to the seller for return.Be sure to state the reason for the damage to the product, and prepay postage and insurance to the destination.For the repair or replacement of the product within the warranty period, Onmeas will be responsible for the return shipping cost.For the repair of non-guaranteed products, Onmeas will estimate the repair cost, and only carry out the repair under the premise of obtaining your consent. All costs incurred by the repair will be borne by the user, including the return shipping cost.

THIS WARRANTY IS BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ONMEAS SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, WHETHER ARISING FROM BREACH OF WARRANTY OR BASED ON CONTRACT, TORT, RELIANCE OR ANY OTHER THEORY.

People’ s Republic of China
Jiangsu Province
Onmeas Ltd
October,2009
Rev.A3

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1.The Install and Setup Wizard

Thank you for buying our company's products! Please read this chapter carefully before use.
You will learn the following in this chapter：

- Packing list
- Power supply
- Operation environment
- Cleaning

1.1 Packing List

Before formally using the instrument, please first:

1. Check whether the appearance of the product is damaged to damage, scratches and other bad phenomena;

2. Check whether the instrument accessories are lost against the instrument packing list.

If there is any damage or insufficient accessories, please contact the Onmeas equipment sales department or the seller immediately.

1.2 Power Supply

AT9236 can only be used in the following power supply condition:
Voltage：220VAC (1±10%)
Frequency：50Hz (1±10%)



WARNING： To prevent the risk of electric shock, ensure that the power ground is properly connected. If the user has replaced the power cord, ensure that the new power cord is reliably grounded.

1.3 Operation Environment

AT9236 must be used in the following environmental conditions:
Temperature：0°C～55°C，
Humidity：23°C, < 70% RH

1.4 Cleaning

To prevent the risk of electric shock，Before cleaning, the power cable must be unplugged
Please use a clean cloth dipped in a little clean water to wipe the housing and panel for cleaning.
Do not attempt to clean the internal of instrument.



NOTE： Instruments should not be cleaned with solvents (alcohol or gasoline, etc.).

2.Safety Rules

You will learn the following in this chapter:

- Workstation arrangement
- Operator regulations
- Prohibited operations
- Precautions during testing



WARNING: This instrument generates a test high voltage of 5kV that can cause personal injury or even death. When operating the instrument, extreme caution must be exercised and all the notes, warnings and other instructions given in this chapter must be followed.

2.1 Workstation Arrangement

- Work Location

  The workstation must be situated in an open area not traversed by general personnel, ensuring non-staff remain distant from the workstation.The workstation must be segregated from other facilities and clearly marked with the designation"**High Voltage Test Workstation**". During testing, signage must be displayed stating: "**DANGER! TEST IN PROGRESS. UNAUTHORIZED PERSONNEL KEEP OUT**!"

- Input Power Supply

  Ensure **the instrument is connected to electrical ground (earth)** for safety purposes. The workstation must be equipped with an independent power switch, which shall be installed in a conspicuous position at the workstation entrance and clearly labeled for easy identification by all personnel. In case of an emergency, the power supply must be switched off immediately before handling the incident.

- Workplace

  Insulated workbenches or tables must be used. No metal objects are allowed between the operator and the device under test. The workplace layout shall **avoid requiring the operator to step over the device under test to operate the test instrument**.The workplace must be kept neat and clean. Unused instruments and test leads shall be stored in designated locations. It is mandatory to clearly distinguish devices under test, devices to be tested, and tested devices for all personnel.The test station and its surrounding area shall be free of flammable and corrosive gases. The instrument must not be used near flammable materials.

2.2 Operator Regulations

- Personnel Qualifications

  The operation of this series of testers involves hazards. Incorrect operation may cause personal injury, or even life-threatening consequences. Therefore, operators must receive prior training and strictly comply with the user manual.

- Safety Rules

Operators must be provided with safety education and training at all times to ensure they understand the importance of standardized safe operations and operate the tester in accordance with the safety rules.

- Dress Code

  Operators shall not wear clothing with metal decorations, nor carry metal jewelry, watches, or similar items, as these metal accessories are highly likely to cause accidental electric shock. **Operators must wear insulating gloves when operating the tester.**

- Medical Restrictions

  This series of testers must never be operated by personnel with heart disease, or those wearing cardiac regulators or pacemakers.

2.3 Prohibited Operations

- Do not switching the power supply on and off repeatedly

  After turning off the power switch, ensure an interval of several seconds or longer before switching it on again. Do not repeatedly switch the power on and off frequently; otherwise, the instrument's protection mechanisms may fail to perform their protective functions fully. Do not turn off the power switch while the instrument is generating test voltage, except under special or emergency circumstances.

- Do not short-circuit the output terminals to ground

  Handle the instrument's high-voltage test leads with care, and avoid short-circuiting them to nearby AC power cables connected to ground or other adjacent equipment (e.g., transmission devices). In case of a short circuit, the instrument's housing may be charged with dangerous high voltage.

- Do not connect external voltage to the test terminals

  Do not connect any external voltage to the instrument's output terminals. The instrument has no external discharge function when in a non-discharge state, and connecting external voltage to the output terminals may damage the instrument.

2.4 Precautions During Testing

- Operators must wear insulating gloves
- If leaving the operation area temporarily or not performing the test immediately, the power supply must be turned off.
- During the test, it is strictly forbidden to touch the instrument's test terminals and the device under test to avoid electric shock.
- Operators must ensure that they have full independent control over the tester's control switch and remote control switch. Remove the remote control switch when not in use. Unauthorized and irrelevant personnel shall stay away from the high voltage test area.
- The tester's safety grounding terminal must be reliably connected to the earth. Connect the high voltage test cables only during testing, and remove them promptly when not in use. Always hold the insulated parts when handling the test cables (clamps); never touch the high-voltage output terminals (clamps) directly.
- In case of an abnormality, press the [STOP] button immediately to terminate the test and turn off the power supply.

3.Overview

You will learn the following in this chapter

- Introduction
- Main functions

3.1 Introduction

Thank you for buying the AT9236 Electrical Safety Performance Comprehensive Analyzer.

The AT9236 Electrical Safety Performance Comprehensive Analyzer is an instrument that integrates multiple testing functions such as electrical strength (AC/DC withstand voltage) and insulation resistance. It is an important testing equipment for various electrical manufacturers and quality inspection departments.

- Rapid Testing

  This series of testers uses high-speed microprocessors as the control core and can measure various safety and regulatory parameters of the tested object in real-time. They can complete three tests in as little as 4 seconds, especially meeting the requirements of production lines for fast testing.

- Simple Operation

  This series of testers adopts a 5-inch LCD screen, which can quickly complete various test condition settings and tests using various physical buttons and numeric keyboards, and the operation is simple; The large screen display can display test information and data in more detail on one page.

- Intelligent Discrimination

  This series of testers has an intelligent upper and lower limit judgment function, which can automatically identify defective products and provide sound and light alarms.

- Reliable Operation

  The entire circuit of this series of testers adopts various anti interference measures, with strong anti-interference ability. Adopting sine pulse width modulation (SPWM) technology to generate 50Hz or 60Hz standard sine waves, which are driven and output by high-power MOS transistors, achieving contact less regulation of high voltage. At the same time, it has hardware and software protection, greatly improving the reliability of the instrument.

- Use Safety

  Automatic over-voltage and over-current protection for safer use.

3.2 Main Functions

1. Integrated multi-functional design with AC/DC withstand voltage test, insulation resistance test and ARC detection.
2. Charging lower limit and DC open-circuit detection technology.
3. DC rapid discharge technology, which completes rapid discharge within 0.2 seconds.
4. Capable of storing and editing 10 test groups, with 9 steps per group.
5. Data logging function, built-in date chip and support for USB flash drive storage.

6. Flexible product test control methods: 2 optional handling modes for failed steps and 2 optional display modes for test results, meeting diverse requirements.
7. Support for multiple communication methods such as RS232/RS485, with professional upper computer software for control.

4.Startup

You will learn the following in this chapter:

- Front panel—Introducing the keys and test terminals.
- Rear panel—Introducing the power supply and interface information.
- Accessories—Introducing the assorted accessories supplied with the instrument and the methods for connecting them to the instrument.
- Power on—Covering the power-on self-test procedure and instrument default values.
- Starting a test—Including instructions on how to connect to the test terminals.

4.1 Front Panel

Figure 4- 4- 1 Front Panel

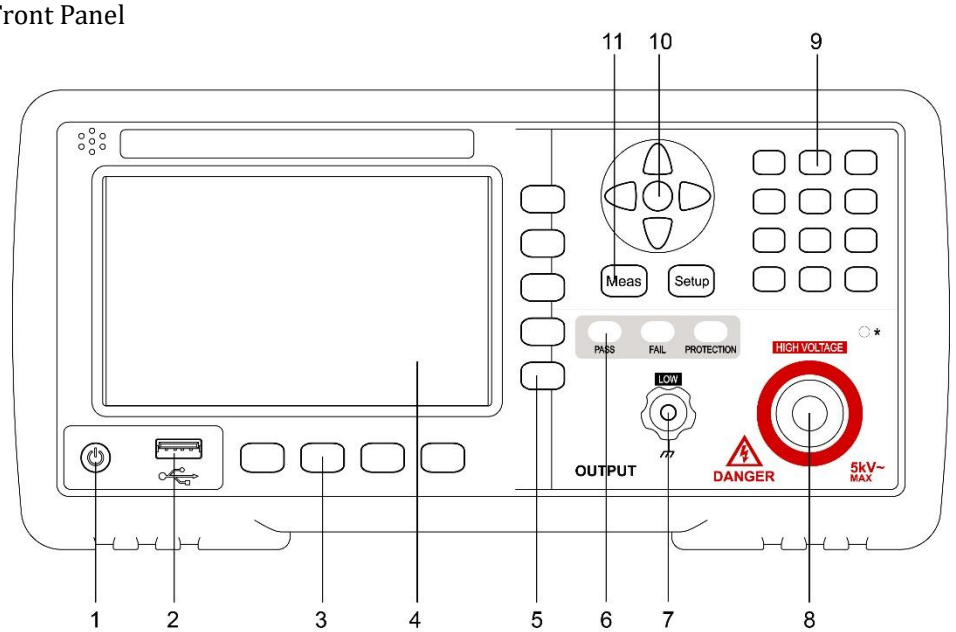


Table 4- 4- 1 Description Of Front Panel

NO.	Function
1	Power Switch
2	USB Disk Port
3	Start、Stop
4	LCD Display
5	Soft Key
6	PASS 、FAIL 、PROTECTION Indicator Light
7	Test Low Terminal 、Test Current Return Terminal
8	Output Voltage High Terminal 、High Voltage Hazard Indicator Light
9	Numeric Key
10	Cursor key
11	Main Functional Key：MEASURE and SETUP

4.2 Rear Panel

Figure 4- 4- 2 Rear Panel

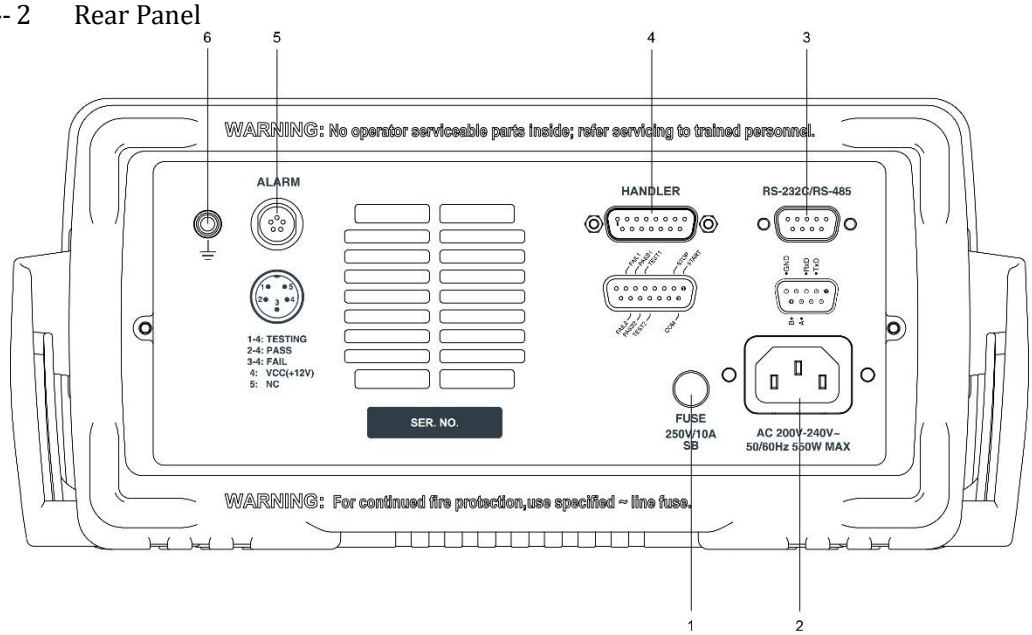


Table 4- 4- 2 Description of Rear Panel

No.	Function
1	Fuse（10A）Box
2	Power Outlet
3	RS232/RS485 Interface
4	HANDLER (PLC) Interface
5	ALARM interface
6	Grounding Terminal

4.3 Accessories

4.3.1 High Voltage Test Clips (Standard Accessory)

When performing a withstand voltage test, clamp the high voltage test clips onto the test points to conduct the test.

Red High Voltage Test Clip: Connect to the high voltage output terminal on the front panel or rear panel.
Black High Voltage Test Clip: Connect to the return terminal for withstand voltage test on the front panel or rear panel.

Figure 4- 3 High Voltage Clips



4.3.2 High Voltage Test Rod (Standard Accessory)

When performing a withstand voltage test, use the high-voltage test probe to spot test the test points that are difficult to clamp.

High Voltage Test Probe: Connect to the high voltage output terminal on the front panel or rear panel.

Figure 4- 4 High Voltage Rod



4.3.3 Alarm Indicator Light (Optional)

The alarm indicator light is used to provide three types of alarm signals: the green light indicates a passed test; the yellow light indicates a test in progress; the red light indicates an alarm,signifying a failed test. Simply plug the 5P aviation connector of the alarm indicator into the 5P aviation socket on the rear panel.

Figure 4- 5 Tri-colour alarm light



4.3.4 Remote Control Box (Optional)

Simply plug the 3P aviation connector of the remote control box into the 3P aviation socket for the remote

control box on the rear panel.

Figure 4- 6 Remote Control



4.3.5 RS232 Interface(Standard Accessory)

For port communication. Plug one end of the communication cable connector into the communication interface on the rear panel and the other end into the serial port of the computer to enable online communication.

Figure 4- 7 RS232 Interface



4.4 Startup

4.4.1 Start

The button marked "+" at the bottom left of the front panel is the power switch, The instrument adopts a programmable power switch, which is a touch-sensitive electronic switch.
When the indicator light is on, it indicates that the instrument is powered on.

NOTE: The interval between power-on and power-off must be longer than 1 second.

4.4.2 First Power On Test

After confirming that the instrument is intact and has been installed in the working position， Follow the steps below to perform the inspection:

（1） Connect only the power cable of the instrument (do not connect any other test cables), then turn on the power switch of the tester.

（2） The instrument enters the <MEASURE DISPLAY PAGE>,Press the [Start] key directly to start the test，the test results are as follows：

a. Insulation resistance display ----;(----indicates that the measured insulation resistance exceeds 10 G)

b. Withstand voltage display: a small breakdown current or zero value.it indicates that the instrument is basically functional.

（3） If there is no display when the instrument is powered on for the first time, check and confirm that the power cord is securely connected.If malfunctions such as failure to start, no key response, or no audible relay action occur during the test startup, please contact Onmeas Company for technical support.

4.5 Test Preparation

(1) Connect the high voltage test probe (or red high voltage test clip) to the L and N terminals of the Device Under Test.

(2) Connect the test circuit to the ground wire or the housing of the Device Under Test.

5.[SETUP] Page

You will learn the following in this chapter:

- Current Step Test Mode Setting
- AC Withstand Voltage Test Mode Parameter Setting
- DC Withstand Voltage Test Mode Parameter Setting
- Insulation Resistance Test Mode Parameter Setting
- Edit Test Steps
- File Management — Save and Recall Test Schemes

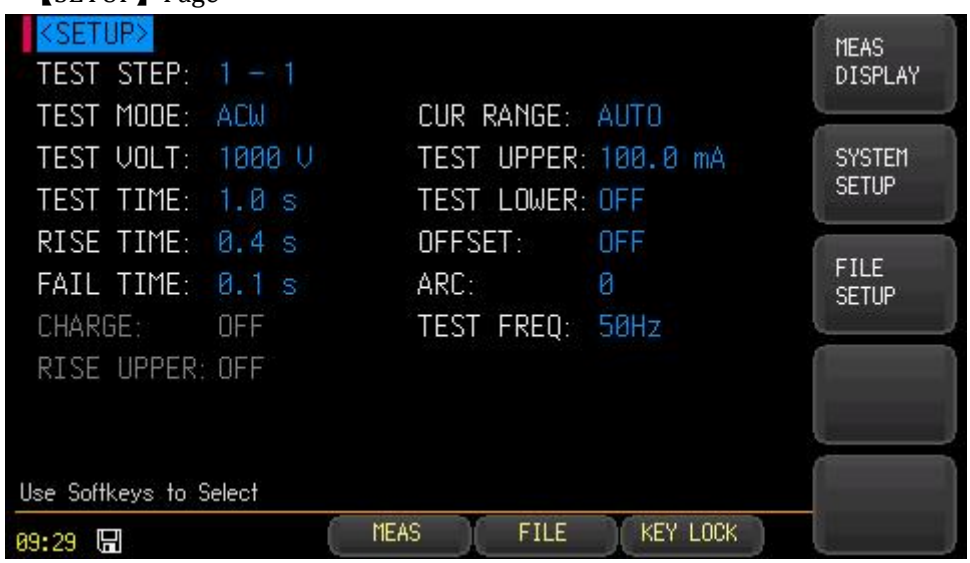
When the high voltage output stops，Simply press the【Setup】key and the instrument will enter the main setup page.

SCPI Command: `DISP:PAGE SETUP`

5.1 Current Step [Test Mode] Setting

The instrument can set the test mode for the current step.

Figure 5- 1 【SETUP】Page



■ **Steps of setting the current step test mode:**

Step 1 Enter the 【SETUP】page.

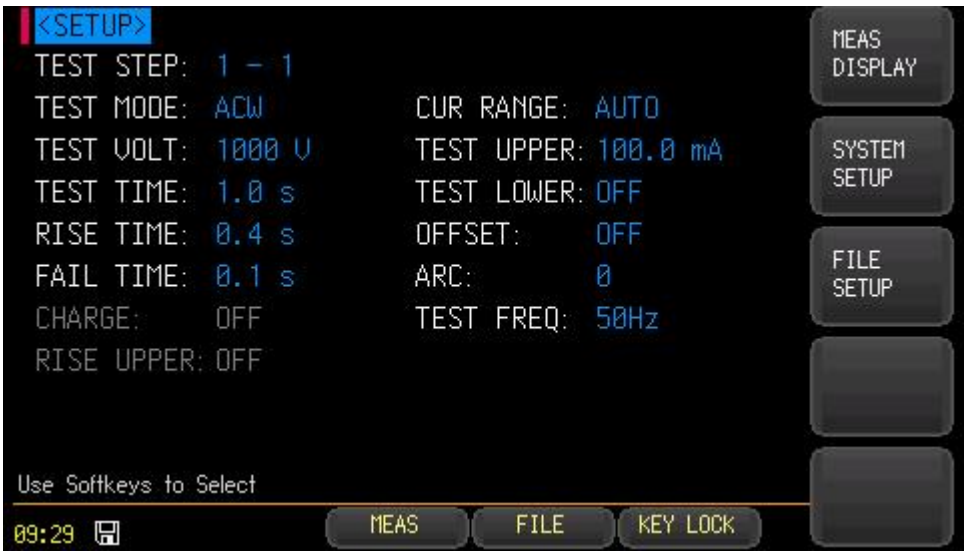
Step 2 Use the cursor key to select the【TEST MODE】field;

Step 3 Use the function key to select.

Soft key	Function
ACW	Set the test mode of the current step to AC withstand voltage test
DCW	Set the test mode of the current step to DC withstand voltage test
IR	Set the test mode of the current step to insulation resistance test

5.2 ACW Test Mode Parameter Setting

Figure 5- 2 【ACW】Setting

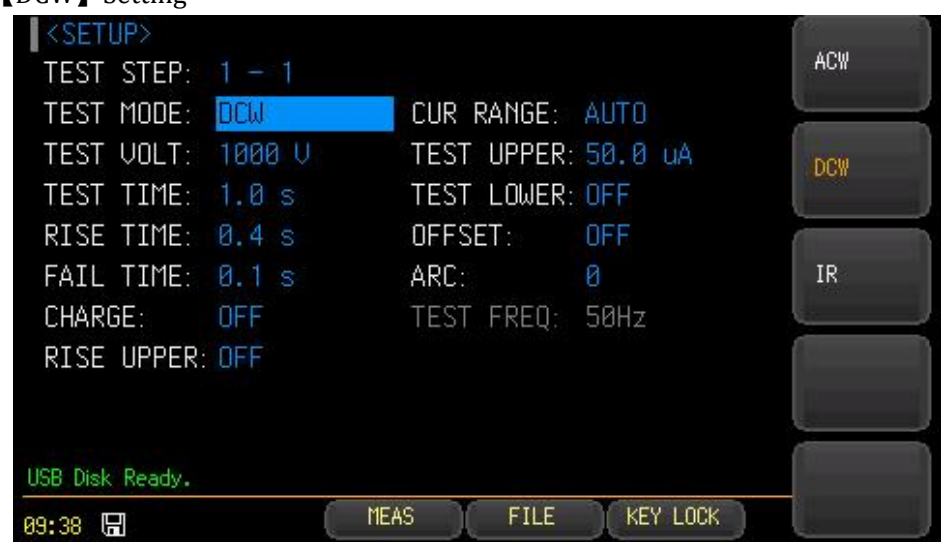


Item	Input Range	Default Value	Description
TEST VOLT	(100~5000)V	1000V	Output voltage for AC withstand voltage test
TEST UPPER	(0.001~100.0) mA	5.000mA	Upper alarm limit for breakdown current
TEST LOWER	0.001mA~Upper limit , OFF	Off	Lower alarm limit for breakdown current
TEST TIME	(1.0~999.9),Continuous Test	1.0 s	Test duration for the current step
RISE TIME	(0.1~999.9)s	0.1s	Time period for the limited voltage to rise gradually
FAIL TIME	(0.1~999.9)s, OFF	OFF	Time period for the limited voltage to fall gradually
CUR RANGE	Auto Range NOM Range	Auto	Set the current gear to AUTO range or NOM range. When set to AUTO range, the instrument will automatically select the appropriate current gear. When set to NOM range, a value needs to be set in the Test Upper to determine the current gear, which is designed to shorten the test time.
TEST FREQ	50Hz , 60Hz	50Hz	Output frequency for AC withstand voltage test
OFFSET	Off, On, Test	Off	Leakage current zero setting. Press the [Auto Test] key on the side panel to allow the analyzer to automatically measure the leakage current of the test lines and fixtures and perform zero - adjustment.

<table>
<tr><td></td><td></td><td></td><td>Note: The test lines connected to the device under test must be disconnected first.Press the [OFF] key on the side panel to clear the setting.</td></tr>
<tr><td>ARC</td><td>0~9</td><td>0</td><td>Alarm level for arc test.The arc alarm level can be preset and discriminated. The preset range is Level 0, 1 to 9. Level 0 means the arc detection function is disabled, and Level 9 represents the highest sensitivity. The peak current corresponding to each alarm level is shown in the table below:
<table>
<tr><th>ARC Level</th><th>Threshold Peak Current (mA)</th></tr>
<tr><td>9</td><td>2.8</td></tr>
<tr><td>8</td><td>5.5</td></tr>
<tr><td>7</td><td>7.7</td></tr>
<tr><td>6</td><td>10</td></tr>
<tr><td>5</td><td>12</td></tr>
<tr><td>4</td><td>14</td></tr>
<tr><td>3</td><td>16</td></tr>
<tr><td>2</td><td>18</td></tr>
<tr><td>1</td><td>20</td></tr>
</table>
</td></tr>
</table>

5.3 DCW Test Mode Parameter Setting

Figure 5- 3 【DCW】Setting

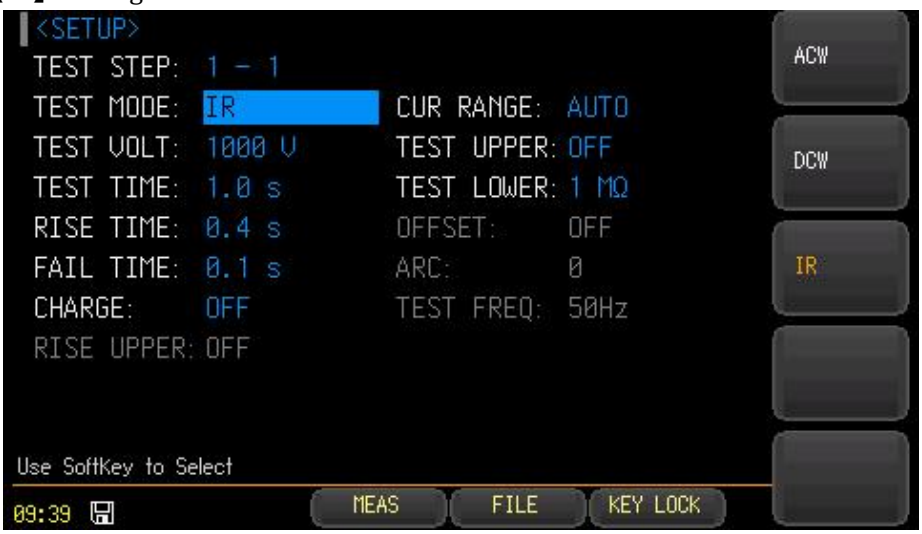


Item	Input Range	Default Value	Description
OUTPUT RANGE	(100~6000)V	1000V	Output voltage for AC withstand voltage test
TEST UPPER	(0.1~10000)uA	500.0uA	Breakdown current alarm upper limit

TEST LOWER	0.1 uA ~Upper limit，Off	Off	Breakdown current alarm lower limit
TEST TIME	(1.0~999.9)s，Continuous test	1.0 s	Test time for the current step
RISE TIME	(0.4~999.9)s	0.4s	Time period during which the limited voltage ramps up slowly
FAIL TIME	(0.1~999.9)s，Off	Off	Time period during which the limited voltage ramps down slowly
CUR RANGE	Auto Range , NOM Range	Auto Range	Set the current gear to Auto range or NOM range. When set to Auto, the instrument will automatically select the appropriate current gear. When set to Fixed, a value needs to be set in the test upper to determine the current gear, which is intended to shorten the test time.
ARC	0~9	0	Alarm level for ARC detection test
OFFSET	Off, On, Test	Off	Leakage current zeroing setting. Press the [TEST] key on the side panel to allow the analyzer to automatically measure the leakage current of test leads and fixtures and perform zeroing. Note: The test leads connected to the device under test must be disconnected first.Press the [OFF] key on the side panel to clear the zeroing setting.
RISE UPPER	Off, On	Off	When the rise upper is enabled, the DC withstand voltage test will determine whether the measured current value exceeds the breakdown current alarm upper limit during the ramp-up period. When the rise upper is disabled, the DC withstand voltage test will not determine whether the measured current value exceeds the breakdown current alarm upper limit during the ramp up time.
CHARGE	Off, On (0.1–3500) μA, Test	Off	Minimum charge current setting. It is used to detect the connection integrity of test leads or test fixtures, ensuring the accuracy of test results. Since the leakage current during DC withstand voltage testing is typically extremely low, the lower limit of leakage current cannot be reliably used as a criterion to verify the connection status of test leads or test fixtures. Given that the device under test inherently exhibits a certain level of capacitance, the charging current of the device under test can be detected and used as a basis to verify the connection integrity of test leads or test fixtures.

5.4 IR Test Mode Parameter Setting

Figure 5- 4 【IR】Setting

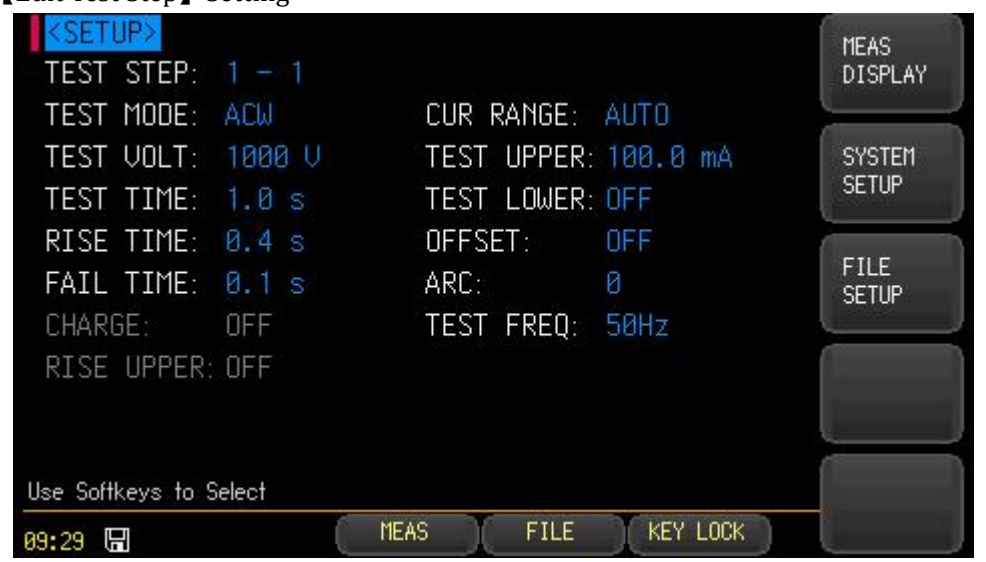


Item	Input Range	Default Value	Description
TEST VOLT	(100~2500)V	1000V	Output voltage for AC withstand voltage test
TEST UPPER	(Test lower limit~9999)MΩ，Off	Off	Insulation resistance alarm upper
TEST LOWER	(1~9999)MΩ	1MΩ	Insulation resistance alarm lower
TEST TIME	(1.0~999.9)s，Continuous test	1.0 s	Test duration for time-delayed judgment of insulation resistance
RISE TIME	(0.1~999.9)s	0.4s	Time period during which the limited voltage ramps up gradually
FAIL TIME	(0.1~999.9)s,Off	Off	Time period during which the limited voltage ramps down gradually
CUR RANGE	Auto range,NOM range	Auto	Set the current gear to Auto range or NOM range. When set to **Auto range**, the instrument will automatically select the appropriate current gear. When set to NOM range, a value needs to be set in the test lower limit to determine the current gear, which is intended to shorten the test time.
CHARGE	Off， Manual input (0.001-3.5)uA， Auto Test	Off	Minimum charge current setting. It is used to detect the connection integrity of test leads or test fixtures, ensuring the accuracy of test results. Since the leakage current during insulation testing is typically extremely low, the lower limit of leakage current cannot be reliably used as a criterion to verify the connection status of test leads or test fixtures. Given that the device under test

			inherently exhibits a certain level of capacitance, the charging current of the device under test can be detected and used as a basis to verify the connection integrity of test leads or test fixtures. ➢ To manually set the minimum charge current value, enter the value using the numeric key. ➢ To automatically set the minimum charge current value, first properly connect the instrument and the device under test to the test leads or fixtures, and confirm that the set output voltage and rise time parameters are completely consistent with the data to be used for actual testing in the future.

5.5 Edit Test Step

Figure 5- 5 【Edit Test Step】Setting



■ **Steps for setting the test mode of the current step**

Step 1 Enter the <SETUP>page.

Step 2 Use the cursor keys to select the [TEST STEP] field. The label of the test step is displayed as: Total Number of Test Steps — Current Set Step Number.

Step 3 Use the function key to select.

Soft keys	Function
INSERT	Add a new test step after the current step. The new step and subsequent steps will be shifted backward by one position in sequence.
DELETE	Delete the current test step. The subsequent steps will be shifted forward by one position in sequence.
NEW	Create a new test program.
PREV	Navigate the page to the display interface of the step preceding the current step.

NEXT	Navigate the page to the display interface of the step following the current step.
SAVE	Enter the <File> page, which is used to save and recall test schemes.

5.6 File

When the high voltage output is stopped, press the **[FILE SETUP]** key to enter the **<FILE>** page.
SCPI Command: **DISP:PAGE CATAlog**

File management allows users to save settings to 10 files for easy retrieval during power-on or specification changes.
On the File page, you can configure the following items:
[AUTO RECALL] - Specify the file to be called during instrument power-on
[AUTO SAVE] - Enable real-time saving of modified parameters to the current file
[FILE] - Specify the file for saving, retrieving or deleting

Figure 5- 6 <File>Page



5.6.1【AUTO RECALL】

The Auto Recall option allows specifying the file to be called during instrument power-on.

■ **Steps to set Auto recall:**

Step 1 Enter the <FILE SETUP> page

Step 2 Use the cursor key to select the【AUTO RECALL】filed;

Step 3 Use the function key to select

Soft keys	Function
File 0	Load the settings of File 0 during power-on
Current file	Load the settings of the current file number during power-on

5.6.2【AUTO SAVE】

When the Auto Save option is enabled, the parameters set by the user will be automatically saved to the current file.

■ **Steps for setting Auto Save ：**

Step 1 Enter the <FILE>page

Step 2 Use the cursor key to select the 【AUTO SAVE】field;

Step 3 Use the function key to select

Soft keys	Function
On	The parameters set by the user will be automatically saved to the current file
Off	The parameters set by the user can only be saved to the file manually; otherwise, they will be lost at the next power on.

5.6.3【File 0】~【File 9】

Users can specify 10 files (0 to 9) for saving, loading and deleting.

■ **Steps to set files:**

Step 1 Enter the <File Setup>page

Step 2 Use the cursor key to select【File 0】~【File 9】filed;

Step 3 Use the function key to select

Soft keys	Function
SAVE	Save all settings to the current file
LOAD	Load the file parameters into the system
Delete	The file data will be deleted

6.[Meas] Page

You will learn the following in this chapter:

- Description of the measure display page
- Description of the test results
- Display of step results and group results

When the high voltage output is stopped，Press the【Meas】key to enter the【Measure display】page

SCPI Command: `DISP:PAGE MEAS`

6.1 Description Of The Measure Display Page

Figure 6- 1 Product Test Interface Under Test



After all settings are completed, press the [Meas] key to enter the [Meas Display] page and activate the standby mode for testing. Connect the test probe and test leads of the instrument to the Device Under Test properly.Verify that all wiring connections are correct, then press the [Start] key to initiate the test for the current group. If the test conditions remain unchanged, simply press the [Start] key to perform repeated tests. The test can be stopped at any time by pressing the [Stop] key during the testing process.

6.1.1 Test

At this time, the test in progress indicator (red) on the front panel is lit, and the alarm light interface outputs the "Test in Progress" signal simultaneously.

6.1.2 Test Pass

When all test items pass, the PASS indicator (green) on the front panel is lit, the buzzer beeps once, and the alarm light interface outputs the "Passed" signal.

6.1.3 Test Fail or Abnormal Condition

If any test fails or an abnormal condition occurs during the test,ALARM indicator (red) is lit, the buzzer beeps three times, and the alarm light interface outputs the "Fail" signal.

Test Fail and Abnormal Protection Description Table	
Over Upper Limit	Measured value exceeds the set upper limit
Over Lower Limit	Measured value is lower than the set lower limit
Charge Lower	Current falls below the set minimum charging current during DC withstand voltage/insulation resistance testing
ARC	Current arc exceeds the upper limit
Short Circuit	Instrument output current exceeds the internal fixed current limit (non-adjustable)
Breakdown	Interruption caused by grounding failure
Over-Voltage	Output voltage is significantly higher than the set output voltage

6.2 Step and Group Result Display

Result display is available in two modes:

Mode	Description
STEP RESULT	Step Test Result Displays the result of the failed step or the first step after the test process is completed
GROUP RESULT	Group Test Result Presents the test result of each step in the test group in the form of a list after the test process is completed

For the selection of the two modes, please refer to 【RESULT SHOW】in【SYSTEM SETUP】

Figure 6- 2 Step Result Display



Figure 6- 3 Group Result Display



7.[SYSTEM] Page

You will learn the following in this chapter:

- <SYSTEM CONFIG>
- <SYSTEM INFORMATION>

When the high voltage output is stopped，press the【SYSTEM】key to enter【SYSTEM】page.

SCPI Command: `DISP:PAGE SYSTEM`

7.1 SYSTEM Page

The system page includes the following settings

- Data/Time
- Account
- Control
- Beep
- Failure
- Result Display
- Baud Rate Settings
- Command Handshake
- Result Transmission

All settings on the system configuration page are automatically saved in the system and loaded on the next startup.

Figure 7- 1 <SYSTEM> page



7.1.1 Modify Data and Time

The instrument uses a 24-hour clock format.

■ **Modify Data:**

Step 1 Enter the <SYSTEM CONFIG> page

Step 2 Use the cursor key to select the【DATA】filed

Step 3 Use the function key to select:

Soft keys	Function
YEAR INCR+	+1year
YEAR DECR-	-1 year
MONTH INCR+	+1 month
MONTH DECR-	-1 month
DAY INCR+	+1 day
DAY DECR-	-1 day

■ **Modify Time:**

Step 1 Enter the <SYSTEM> page

Step 2 Use the cursor key to select the【TIME】filed

Step 3 Use the function key to set time:

Soft keys	Function
HOUR INCR+	+1 hour
HOUR DECR-	-1 hour
MINUTE INCR+	+1 minute
MINUTE DECR-	-1 minute
SECOND INCR+	+1 second
SECOND DECR-	-1 second

7.1.2 【ACCOUNT】Settings

The instrument offers two selectable user modes:

- Administrator - All functions are accessible to the administrator except the [System Service] page. Parameters set by the administrator are saved to the system memory with a 5-second delay for loading upon the next startup.
- User - The user may operate all functions except the [System Service] and [File] pages. Data modified by the user will revert to the administrator-set values upon the next startup.

■ **Change Account:**

Step 1 Enter the <SYSTEM CONFIG> page

Step 2 Use the cursor key to select the【ACCOUNT】filed

Step 3 Use the function key to change:

Soft Keys	Function
Administrator	Except the [System Services] page, other functions are open to the administrator. If you forget your password, please contact our Sales Department.
User	[System Services] page and [File] page cannot be operated, other functions can be operated, and the set data will not be saved.

■ **Step to set password for administrator:**

Step 1 Enter the <SYSTEM CONFIG> page

Step 2 Use the cursor key to select the【ACCOUNT】filed

Step 3 Use the function key to select

Soft keys	Function
Change password	Input 9 digits numeric password. If you forget the password, please contact our sales department.
Delete password	The administrator account will no longer be protected by a password.

7.1.3【CONTROL MODE】setting

Set the control mode for the instrument' s startup test; only trigger signals under the current control mode will be accepted.

■ **Control mode setting:**

Step 1 Enter the <SYSTEM> page

Step 2 Use the cursor key to select the【CONTROL MODE】filed

Step 3 Use the function key to select

Soft keys	Function
LOCAL	Controlled by the [Start] button on the instrument front panel
PLC	Controlled by control signals from HANDLER or REMOTE
BUS	Controlled by commands sent though RS232/485

7.1.4【BEEP】Settings

Set the volume of the instrument' s beep, which is mainly used for prompts upon test completion or test abnormality.

■ **Beep setting:**

Step 1 Enter the <SYSTEM CONFIG> page

Step 2 Use the cursor keys to select【BEEP】

Step 3 Use the function key to select key beep

Soft keys	Function
HIGH	High tone alert on test complete or error
LOW	Low tone alert on test complete or error
OFF	No audio alert on test complete or error

7.1.5【FAILURE MODE】Setting

There are two types of Failure Modes: Abort and Continue.

■ **Failure mode setting:**

Step 1 Enter the <SYSTEM> page

Step 2 Use the cursor keys to select【FAILURE MODE】

Step 3 Use the function key to select

Soft keys	Function
Continue	If a test step fails during the test, the current test step will be aborted and the next test step will proceed.

Abort	If a test step fails during the test, the entire test process will be aborted immediately. Pressing the [Start] key at this point will restart the entire test process.

7.1.6【Result Display】Setting

There are two modes for the Result Display item: Single-step Test Result and Group Test Result.

■ **Result Display Setting:**

Step 1 Enter the <SYSTEM> page

Step 2 Use the cursor keys to select【Result Display】

Step 3 Use the function key to select

Soft keys	Function
STEP	After the test process is completed, the display stays on the test result of the failed step or the first step.
GROUP	After the test process is completed, the test result of each step in the test group is presented in the form of a list.

7.1.7【BAUD】Setting

The instrument has a built-in RS-232 interface. Upon detecting a signal change on the RS-232 interface, the instrument immediately communicates with the host computer at the set baud rate, with the keyboard locked simultaneously.

To ensure proper communication, confirm that the baud rate of the host computer is consistent with that of the instrument; otherwise, communication will not be possible.

The instrument' s RS-232 interface is programmed using the SCPI language.

The RS-232 configuration is as follows:

- Data Bit: 8-bit
- Stop Bit: 1-bit
- Parity: None
- Baud rate: configuration

■ **Set the baud rate:**

Step 1 Enter the <SYSTEM> page

Step 2 Use the cursor keys to select【BAUD】field

Step 3 Use the function key to select

Soft keys	Function
1200	Use this baud rate if you use a communication converter with optocoupler isolation.
9600	
38400	
57600	
115200	For communication with the host computer, it is recommended to use this high speed baud rate.

7.1.8 Command Handshake

When Command Handshake is enabled, all commands sent from the host computer to the instrument will be

returned to the host computer as-is before any data is returned.

When Command Handshake is disabled, commands sent from the host computer to the instrument will be processed immediately.

■ **Steps for Setting Command Handshake:**

Step 1 Enter the <SYSTEM> page

Step 2 Use the cursor keys to select【Command Handshake】field

Step 3 Use the function key to select

Soft keys	Function
OFF	Command Handshake is not used. Set it to Off if there are no special requirements.
ON	

7.1.9 Result Transmission

The instrument supports the function of automatically sending data to the host computer. After each test is completed, the data will be sent to the host computer automatically without the need for the host to send the FETCH? command.

After each test is completed, the instrument will send the test results and comparator results to the host computer; for the format, please refer to the Fetch? subsystem.

■ **Steps for setting【Result Transmission】:**

Step 1 Enter the <SYSTEM> page

Step 2 Use the cursor keys to select【Result Transmission】field

Step 3 Use the function key to select

Soft keys	Function
FETCH	Retrieve all measurement data using the FETCH? command
Auto	Automatically send data to the host computer after each test is completed

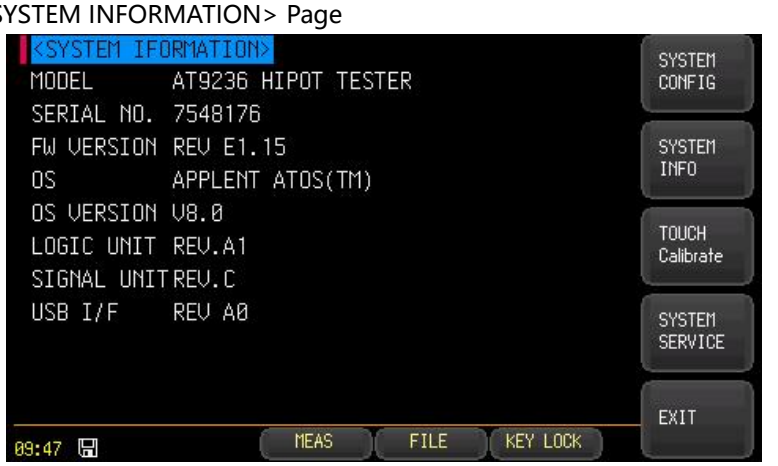
7.2 System Information Page

Enter the <SYST> page，press the function key to select【SYSTEM INFORMATION】。

SCPI Command: `DISP:PAGE SYSTEMINFO`

No user-configurable options are available on the System Information page.

Figure 7-2 <SYSTEM INFORMATION> Page



8.Service Interface

You will learn the following in this chapter:

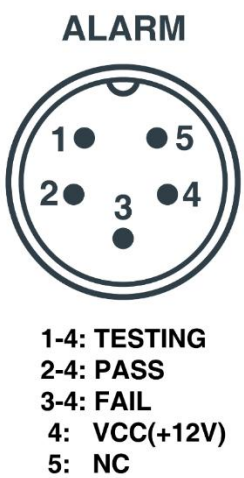
- Alarm light interface
- Communication Interface
- HANDLER (PLC)

The instrument provides users with fully functional interfaces. Through these interfaces, the instrument can conveniently realize automatic control functions with the control components of the use’ s system.

8.1 Alarm Light Interface

The alarm light interface is an active signal output interface, adopting a 5-pin aviation connector (M), as shown in the figure:

Figure 8- 1 Alarm Light Interface Socket（M）



Pin Definition:

1) Pin 1 - 4 ： Testing in progress

2) Pin 2 - 4 ： Test result passed

3) Pin 3 - 4 ： Test result failed,or abnormal alarm

4) Pin 4 : Common terminal （high-side power，+12VSW)

5) Pin 5 :Empty pin

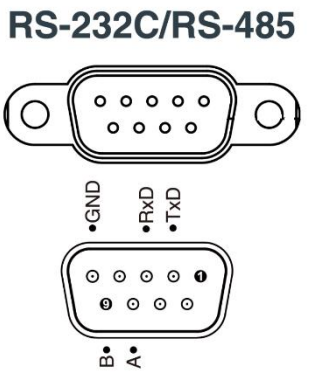
The optional accessory is a three-color alarm light (refer to "4.3.3 Alarm Light"). Simply plug the 5P aviation plug of the three-color alarm light into the 5P alarm light interface socket on the rear panel.

During power-on self-test, Pin 1 – 4, Pin 2 – 4, and Pin 3 – 4 will conduct simultaneously. At this time, the maximum total output current is 450 mA, and the single channel current is 150 mA. Please note this if you make a custom alarm light!

8.2 Communication Interface

This instrument is equipped with an RS232 communication interface (RS485 optional). The host computer can connect to this interface to realize the control of the instrument. A 9-pin D-sub connector (F) is adopted, with the signal definitions shown in the figure:

Figure 8- 2 Communication Interface (See "9.1.1 RS232C Connection" for pin definitions)



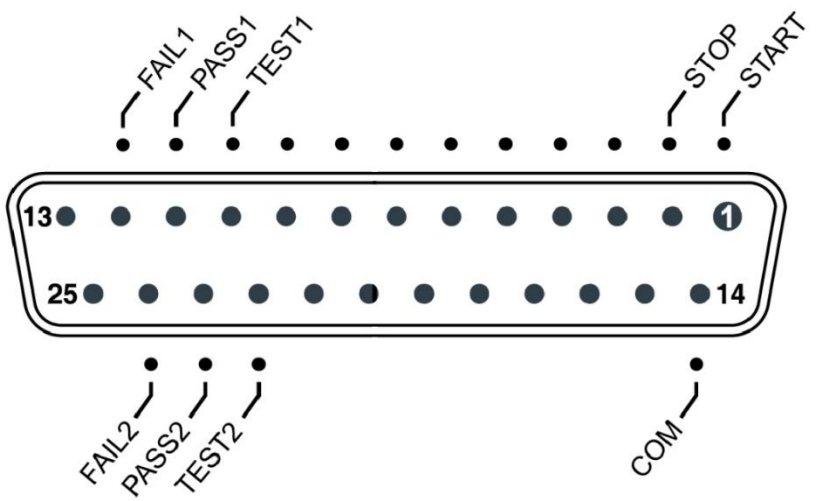
When using the communication function, please follow the correct sequence for connecting to the computer: Turn off the instrument power supply → Connect the communication cable → Turn on the computer power supply first → Turn on the tester only after the computer has booted up completely.

8.3 HANDLER (PLC)

This series of testers is equipped with a 25-pin D-sub terminal block, which provides PLC remote control input and output control signals (compatible with PLC controllers), as shown in the figure. These terminal blocks are mated with standard 25-pin D-sub connectors, which shall be provided by the user.

For optimal performance, it is recommended to use shielded cables as the connection lines for control and output signals. To prevent the shielded cables from forming a loop that may impair the shielding effect, the shielding braid at only one end of the shielded cable shall be grounded.

Figure 8- 3 Terminal Block



To use the HANDLER function, the Control Mode in the instrument system configuration must be set to PLC; otherwise, the HANDLER function will be unavailable. When the Control Mode is set to PLC, the "START" button on the front panel will be disabled to prevent hazards caused by repeated start-up operations.

Table 8- 1 PLC Port Pin Definitions

Input/Output	Pin	Name	Description
Signal Input	14	COM Common Low Terminal	Provides 0V signal for start and stop
	1	START Start Signal	Instrument measurement starts when START is shorted to COM
	2	STOP Reset(Stop) Signal	Instrument measurement stops when STOP is shorted to COM
Signal Output	10	TEST1	TEST1 is shorted to TEST2 during instrument measurement;TEST1 is open-circuited to TEST2 upon measurement completion
	22	TEST2	
	11	PASS1	PASS1 is shorted to PASS2 when the test result is passed
	23	PASS2	
	12	FAIL1	FAIL1 is shorted to FAIL2 when the test result is failed
	24	FAIL2	

All input signals adopt digital switch input (e.g. PLC). Under no circumstances connect any other voltage or current sources to the input terminals. Connection of other power sources will cause damage or malfunction of the internal control circuit of the instrument.

Figure 8- 4 PLC Timing Diagram

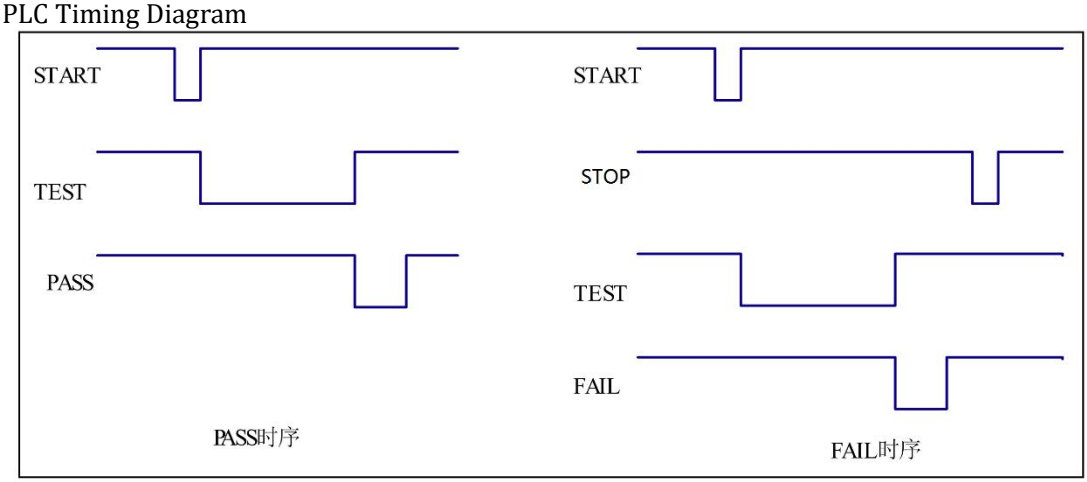


Table 8- 2 PLC Timing Description

Signal	Description

Starting a Test via the PLC Port	1. Check the validity of the **TEST** signal at the interface; the **START** signal may only be sent when the **TEST** signal is inactive. 2. When the requirement in Clause 1 is met, send a **START** signal with a duration of 40 ms to 200 ms (i.e., the switch contact closure time) to initiate the test.
Stopping a Test via the PLC Port	Send a STOP signal with a duration of 40 ms to 200 ms (i.e., the switch contact closure time) at any time to abort the test.
Signal Output-TEST	The relay will connect PIN10 and PIN22 when the instrument is performing a test. The relay will return PIN10 and PIN22 to an open-circuit state upon test completion.
Signal Output - PASS	The relay will connect PIN11 and PIN23 and maintain this state when the device under test passes the test. The relay will return PIN11 and PIN23 to an open-circuit state when another test program is initiated or the stop switch is pressed.
Signal Output - FAIL	The relay will connect PIN12 and PIN24 and maintain this state when the device under test fails the test. The relay will return PIN12 and PIN24 to an open-circuit state when another test program is initiated or the stop switch is pressed.

9.Remote Control

You will learn the following in this chapter:

- Introduction to RS-232
- RS-232 connection
- Select the Baud Rate
- Software protocol

The instrument communicates with a computer though its standard RS-232 interface to implement all instrument functions. With standard SCPI commands, users can also easily program various data acquisition systems tailored to their own needs.

9.1 RS-232C

RS-232 is a widely adopted serial communication standard at present, also known as an asynchronous serial communication standard. It is used to realize data communication between computers, as well as between computers and peripheral devices. RS is the abbreviation of "Recommended Standard", and 232 is the standard number. This standard was officially released by the Electronic Industries Alliance (EIA) of the United States in 1969. It specifies that data is transmitted bit by bit through a single data line.

Most serial port configurations are usually not strictly based on the RS-232 standard: a 25-pin connector was used for each port (now computers basically use a 9-pin connector). The most commonly used RS-232 signals are shown in the table below:

Table 9- 1 Common RS-232 Signal

Signal	Symbol	DB-25	DB-9
Request to Send	RTS	4	7
Clear to Send	CTS	5	8
Data Set Ready	DSR	6	6
Data Carrier Detect	DCD	8	1
Data Terminal Ready	DTR	20	4
Transmit Data	TXD	2	3
Receive Data	RXD	3	2
Ground	GND	7	5
Request to Send	RTS	4	7

In addition, RS-232 also has a minimum subset, which is also the connection method adopted by the instrument.

Table 9- 2 RS-232 Minimum Subset of Standard

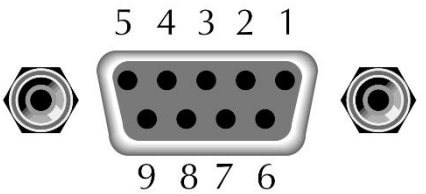
Signal	Symbol	DB-9
Transmit Data	TXD	2
Receive Data	RXD	3
Ground	GND	5

9.1.1 RS232C Connection

The RS-232 interface can be interconnected with the serial interface of a controller (e.g., a personal computer or an industrial control computer) though a straight-through DB-9 cable.

Warning: The instrument is not compatible with null modem cables.
You may either make a 9-pin straight-through cable yourself or purchase one from Onmeas Ltd.
Notes for user-made 3-wire cables:
When using the built-in DB9 port of a PC, you may need to short-circuit pins 4-6, as well as pins 7-8 on the DB-9 connector (pin) of the computer.

Figure 9- 1 RS-232 on the Rear Panel



Suggestion： To avoid electrical shock, turn off the instrument power supply before inserting or removing the connector.

- Default communication settings of the instrument:
  Transmission mode：Full-duplex Asynchronous communication with start bit and stop bit
  Data bit：8-bit
  Stop bit：1-bit
  Parity：None

9.2 Handshake Protocol

Since the instrument adopts the minimum subset of the RS-232 standard and does not use hardware handshake signals, software handshake can be enabled on the instrument to reduce possible data loss or data errors during communication. Software engineers using high-level languages must strictly comply with the following handshake protocol when developing computer communication software:

- The instrument command parser only accepts ASCII format, and command responses are also returned in ASCII code.
- The command string sent by the host must end with NL (' \n '). The instrument command parser will not execute the command string until the terminator is received.
- The instrument can be configured with command handshake: after receiving each character, the instrument immediately echoes the character back to the host. The host can only send the next character after receiving this echoed character.

Tip ： If the host fails to receive data returned from the instrument, you can try the following solutions:

1. If the software handshake is disabled, please enable it by referring to the <SYSTEM> page of the instrument.
2. Check for serial port connection faults by inspecting the cable connections.
3. Check for communication format errors in the high-level language program on the

computer side. Verify that the serial port number, communication format, and baud rate are consistent with those set on the instrument.

4. If the instrument is still parsing the previous command, the host will not receive a response. Please try again later.

If the problem persists, please contact Onmeas Instruments technical engineers immediately.

9.3 SCPI Language

SCPI - Standard Commands for Programmable Instruments is a universal command set adopted by Onmeas Instruments for test and measurement equipment.

SCPI also known as TMSL-Test and Measurement System Language was extended and developed by Agilent Technologies based on IEEE 488.2, and has since been widely adopted by test equipment manufacturers.

Reference: 

The built-in command parser of the instrument is responsible for parsing various user command formats. Since the command parser is based on the SCPI protocol but not fully compliant with it, please read the chapter "SCPI Command Reference" carefully before starting operation.

10. SCPI Command Reference

You will learn the following in this chapter:

- Command Parser -- Learn about the rules of the command parser.
- Command Syntax – Writing rules for command lines
- Query Syntax – Writing rules for query commands
- Query Response – Format of query responses
- Command Reference

This Chapter provides all the SCPI commands used by the instrument, and by these SCPI commands give complete control of all functions of the instrument.

10.1 Command String Parsing

The host can send a string of commands to the instrument, and the instrument command parser starts resolving after capturing the end character (\ n) or the input buffer overflows.

For example: Valid Command String:

AAA:BBB CCC;DDD EEE;:FFF

The instrument command parser is responsible for all commands resolution and execution, and you must first learn about its resolution rules before writing a program.

10.1.1 Command Paring Rules

1. The command parser parses and responds to ASCII code data.
2. **SCPI command string must use NL (' \n ' ASCII 0x0A) as the terminator**. The command parser will start executing the command string only after receiving the terminator or when the buffer overflows.
3. If the command handshake opens, the command parser immediately returns the character to the host after each character received, and the host can only continue to send the next character sent after receiving the character.
4. Upon detecting an error during parsing, the command parser immediately terminates the parsing process and invalidates the current command.
5. Upon detecting a query command during parsing, the command parser terminates the parsing of the current command string, and the subsequent character strings are ignored.
6. The command parser performs case-insensitive parsing of command strings.
7. The command parser supports abbreviated forms of commands; refer to subsequent chapters for the abbreviation specifications.

10.1.2 Symbol Conventions and Definitions

This chapter uses symbols that are not part of the command tree, just to get a better understanding of the command string.

< > Text in the pointed brackets indicates the parameters of the command

[ ] Text in square brackets indicates optional commands

{} When the braces contain several parameter items, it means that only one item can be selected from

them.

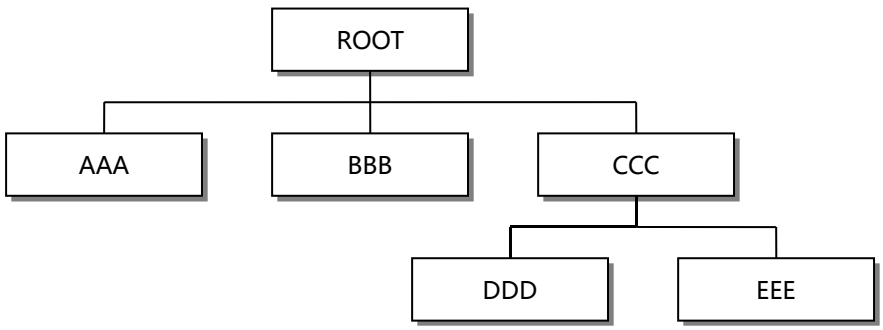
( ) The abbreviated form of the parameters is placed in parentheses.

The abbreviated form of the capital letter command.

10.1.3 Command Tree Structure

For the SCPI command using the tree structure, it can go down three levels (note: the command parser of this instrument can go down down any layer), here the highest level is called the subsystem command. The subordinate command is valid only if the subsystem command is selected, and the SCPI uses a colon (:) to separate high-level and low-level commands.

Figure 10- 1 Command Tree Structure



For Example:

ROOT:CCC:DDD ppp

ROOT Subsystem

CCC Second stage

DDD Third stage

PPP Parameter

10.2 Commands and Parameters

A command tree consists of commands and [parameters], separated by a space (ASCII: 20H).

For Example: AAA:BBB 1.234

Command [Parameter]

10.2.1 Commands

Command words can be a long command format or short form, which allows engineers to better understand the meaning of the command string; the short form is suitable for writing.

10.2.2 Parameters

- Single command word command,with no parameters.

  For example: AAA:BBB
- The parameter can be a string,and its short rules still follow the command short rule in the previous section

  For example: AAA:BBB 1.23
- The Parameter can be in a numerical form
  - *<integer>* Integer 123, +123, -123
  - *<float>* Floating point number

1. <fixfloat>: Fixed-floating point number: 1.23, -1.23
2. <Sciloat>: Scientific notation floating point number: 1.23E+4, +1.23e-4
3. <mpfloat>: Multiplier-represented floating point number: 1.23k, 1.23M, 1.23G, 1.23u

Table 10- 1 The Fold Rate Abbreviation

Figure	Multiplier
1E18 (EXA)	EX
1E15 (PETA)	PE
1E12 (TERA)	T
1E9 (GIGA)	G
1E6 (MEGA)	MA
1E3 (KILO)	K
1E-3 (MILLI)	M
1E-6 (MICRO)	U
1E-9 (NANO)	N
1E-12 (PICO)	P
1E-15 (PEMTO)	F
1E-18 (ATTO)	A



Note: Multipliers are not case sensitive and their notation differs from the standard name.

10.2.3 Separator

The instrument command parser accepts only the allowed delimiters, otherwise the delimited command parser produces the Invalid separator error. These delimiters include:

; Semicolon:used to separate two commands.
For example: AAA:BBB 100.0 ; CCC:DDD

: Colcolon,which separates the command tree,or command tree restart.
For example: AAA : BBB : CCC 123.4; : DDD : EEE 567.8

? Question mark, used for the query.
For example: AAA ?

□ Spare space:used to separate the parameter.
For example: AAA:BBB□1.234

10.3 Command Reference

All commands are interpreted in the order of subsystem commands, and all subsystems are listed below.

- Display Display Page Subsystem
- Function Measurement Function Subsystem
- COM Parator Sorting Subsystem
- SYSTEM Subsystem
- FETCH Subsystem

Common commands

- IDN? Instrument Information Query Subsystem

10.4 Display Page Subsystem

DISPLAY subsystem can be used to switch between different display pages or display a string of text on the page prompt bar.

Figure 10- 2 DISPLAY Subsystem Tree

DISPLAY	**:PAGE**	**{MEASUREMENT(MEAS),SETUP(MSET),SYSTEM(SYST), CATAlog(CATA),SYSTEMINFO(SINF)}**
	:LINE	**<string>**

10.4.1 DISPLAY:PAGE

DISP:PAGE is used to switch to the specified page.

Command syntax: **DISPLAY:PAGE <Page Name>**

Parameter: <Page Name> including:

MEASUREMENT(MEAS)	Measurement display Page
SETUP(MSET)	Setup Page
SYSTEM(SYST)	System Page
CATALOG(CATA)	Catalog page
SYSTEMINFO(SINF)	System information page

For example: Send>**disp:page setup**<NL> // Switch to the setup page

Query Syntax: **DISP:PAGE?**

Query Response:
<Page Name>abbreviation
meas
mset
syst
file
sinf

For example:
Send>**disp:page?**
Return>**meas**
Send>**disp:page meas;page?**
Return>**meas**

10.4.2 DISP:LINE

DISP:LINE is used to display a string of text in the prompt bar at the bottom of the page. The text can contain a maximum of 30 characters and will remain displayed for 10 seconds.

Command Syntax: **DISPLAY:LINE <*string*>**

Parameter: **<string> Maximum 30 characters**

For Example: Send>**DISP:LINE "This is a Comment."**

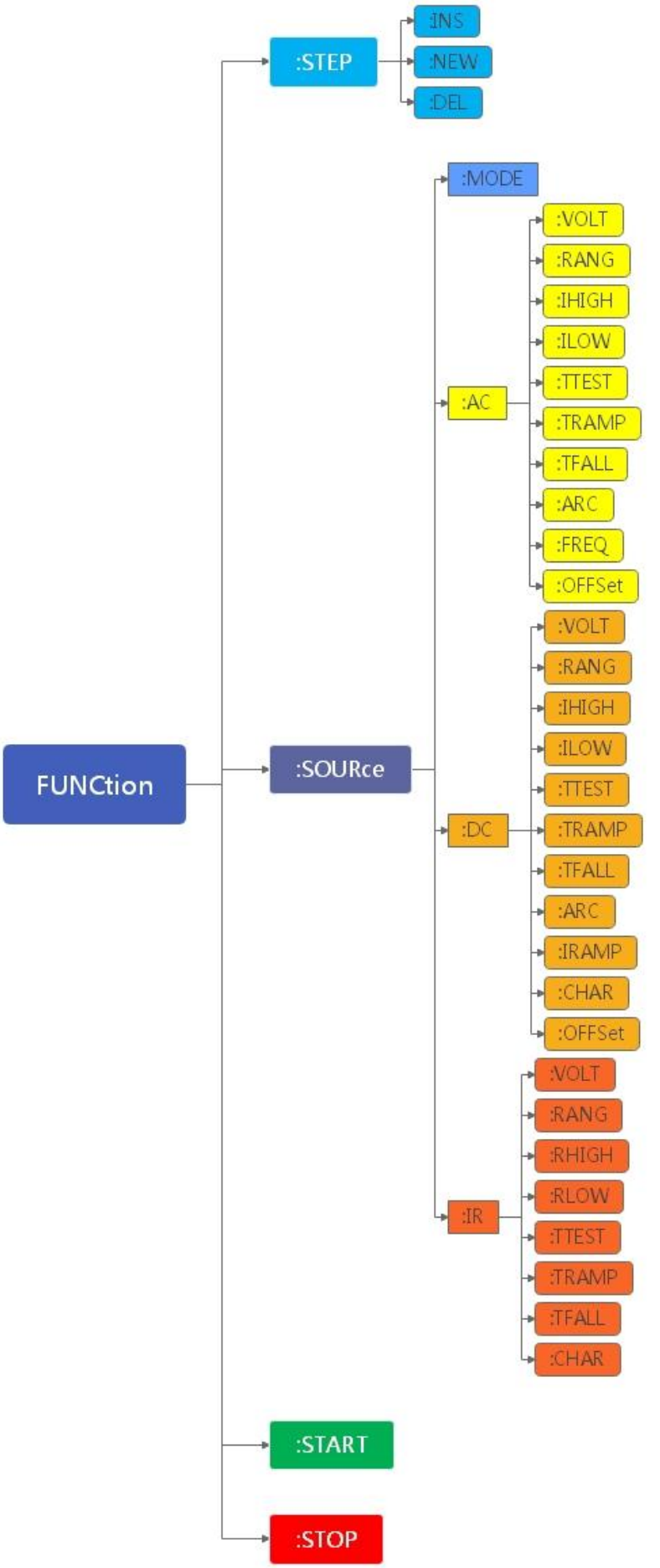
Query Syntax: **DISPLAY:LINE?**

Query Response: Text in the prompt bar on the screen; returns NULL if the prompt bar is empty.

10.5 Function Measurement Functional Subsystem

FUNCTION Subsystem commands are mainly used to set the test parameters for the instrument's test functions.

Figure 10- 3 Function Subsystem tree



10.5.1 FUNCtion: START

Command Syntax:	**FUNCtion:START <step>**
For example:	Send>**FUNCtion:START** 0 //Start the test and execute Step 1 independently Send>**FUNCtion:START** //Start the test and run from Step 1
NOTE:	**(一)、[Control Mode] in [System Configuration] must be set to [Bus].** **(二)、The instrument is in the [Measurement Display] interface.** Only when the above two conditions are met will the test start command take effect!

10.5.2 FUNCtion: STOP

Command syntax:	**FUNCtion:STOP**
For example:	Send>**FUNCtion:STOP** //Stop the test, function equivalent to the [Stop] key
NOTE:	**(一)、[Control Mode] in [System Configuration] must be set to [Bus]** **(二)、The instrument is in the [Measurement Display] interface** Only when the above two conditions are met will the stop test command take effect!

10.5.3 Test Step Command Set

FUNC:STEP? Used to query the total number of test steps and the current test step.

Query syntax:	**FUNC:STEP?**
Query response:	**Total Steps – Current Step** **TOTAL <1-9> - STEP <1-9>**
For example:	Send> **FUNC:STEP?** Return> **TOTAL 7 - STEP 5**

FUNC:STEP:INS Add a new test item to the existing test scheme.

Command syntax:	**FUNC:STEP:INS**
For example:	Send> **FUNC:STEP:INS** //Add a new test item

FUNC:STEP:DEL Delete the current test item from the existing test scheme.

Command syntax:	**FUNC:STEP:DEL**
For example:	Send> **FUNC:STEP:DEL** //Delete the current test item

FUNC:STEP:NEW Create a new empty test scheme for compiling a completely new test scheme.

Command syntax	**FUNC:STEP:NEW**
For example:	Send> **FUNC:STEP:NEW** //Create a new empty test scheme

10.5.4FUNCtion:SOURce:MODE

FUNCtion:SOURCE :MODE Used to set/query the test mode of the current test step.

Command syntax:	**FUNCtion:SOURce:MODE <n>,{AC,DC,IR}**
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data Precision: 1**

	Here, n represents the current step and shall not exceed the total number of steps.
Parameter2:	**{AC,DC,IR}** **Data type: character** **Here, AC stands for AC Withstand Voltage, DC for DC Withstand Voltage, and IR for Insulation Resistance.**
For example:	Send> FUNCtion:SOURce:MODE 1,IR //Set the test mode of Step 1 to Insulation Resistance Send> FUNCtion:SOURce:MODE 3,DC //Set the test mode of Step 3 to DC Withstand Voltage
Query syntax:	**FUNCtion:SOURce:MODE? <n>**
Query response:	**{ACW,DCW,IR}**
For example:	**Send>** FUNCtion:SOURce:MODE? 1 **Return>**IR

10.6 AC Withstand Voltage Setting Function Command Set

10.6.1 FUNCtion: SOURce:AC:VOLT

FUNCtion: SOURce:AC:VOLT is used to set/query the voltage for AC withstand voltage testing.

Command syntax:	**FUNCtion:SOURce:AC:VOLT <n>,**<Voltage value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Voltage Value>** **Data Type: Floating point number Data Range: 100~5000 Data Precision: 1** **Unit: V**
For example:	Send> FUNC:SOUR:AC:VOLT 4,500 //Set the AC withstand voltage of Step 4 to: 500V
Query syntax:	**FUNC:SOUR:AC:VOLT? <n>**
Query response:	**<Voltage Value>**
For example:	Send> **FUNC:SOUR:AC:VOLT? 4** Return> **500**

10.6.2 FUNCtion: SOURce:AC:RANG

FUNCtion: SOURce:AC:RANG Used to set/query the current range for AC withstand voltage testing.

Command syntax:	**FUNCtion:SOURce:AC:RANG <n>,{AUTO,NOM}**
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data Precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**{AUTO,NOM}** **AUTO:** Auto Range NOM: Fixed Range
For example:	Send> FUNC:SOUR:AC:RANG 1,NOM //Set the current range of AC withstand voltage for Step 1 to: Fixed Range
Query syntax:	**FUNC:SOUR:AC:RANG? <n>**
Query response:	**{AUTO,NOM}**
For example:	Send> **FUNC:SOUR:AC:RANG? 1** Return> **nom**

10.6.3 FUNCtion: SOURce:AC: IHIGH

FUNCtion: SOURce:AC: IHIGH Used to set/query the current range for AC withstand voltage testing.

Command syntax:	**FUNCtion:SOURce:AC:IHIGH <n>,**<Current Value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data Precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Current Value>** **Data Type: Floating Point number Data Range: 0.001~100.000 Data Precision: 0.001 Unit: mA**
For example:	Send> FUNC:SOUR:AC:IHIGH 1,20 //Set the upper current limit of AC withstand voltage for Step 1 to 20 mA
Query syntax:	**FUNC:SOUR:AC:IHIGH? <n>**
Query response:	**<Current value>**
For example:	Send> **FUNC:SOUR:AC:IHIGH? 1** Return> **5.000**

10.6.4 FUNCtion: SOURce:AC: ILOW

FUNCtion: SOURce:AC: ILOW Used to set/query the lower current limit for AC withstand voltage testing.

Command syntax:	**FUNCtion:SOURce:AC:ILOW <n>,**<Current Value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data Precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Current Value>** **Data Type: Floating Point Number Data Range: 0.000~Upper limit value Data Precision: 0.001 Unit: mA** **Where 0.000 indicates disable**
For example:	Send> FUNC:SOUR:AC:ILOW 1,10 //Set the lower current limit of AC withstand voltage for Step 1 to 10 mA
Query syntax:	**FUNC:SOUR:AC:ILOW? <n>**
Query response:	**<Current Value>**
For example:	Send> **FUNC:SOUR:AC:ILOW? 1** Return> **0.000**

10.6.5 FUNCtion: SOURce:AC: TTEST

FUNCtion: SOURce:AC: TTEST Used to set/query the test time for AC withstand voltage testing.

Command syntax:	**FUNCtion:SOURce:AC:TTEST <n>,**<Time Value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Time Value>** **Data Type: Floating Point Number Data Range: 0.0, 1.0 ~ 999.9 Data precision: 0.1** **Unit: s** **Where 0.0 indicates continuous testing**
For example:	Send> FUNC:SOUR:AC:TTEST 1,100 //Set the ramp-down time of AC withstand voltage for Step 1 to 100 s

Query syntax: **FUNC:SOUR:AC:TTEST? <n>**

Query response: **<Time Value>**

For example: Send> **FUNC:SOUR:AC:TTEST? 1**
Return> **1.0**

10.6.6 FUNCtion: SOURce:AC: TRAMP

FUNCtion: SOURce:AC: TRAMP Used to set/query the ramp up time for AC withstand voltage testing.

Command syntax: **FUNCtion:SOURce:AC:TRAMP <n>**,<Time Value>

Parameter 1: **<n>**
Data Type: Integer Data Range: 1~9 Data precision: 1
Here, n represents the current test step and shall not exceed the total number of steps.

Parameter 2: **<Time Value>**
Data Type: Floating Point Number Data Range: 0.1~999.9 Data Precision: 0.1 Unit: s

For example: Send> FUNC:SOUR:AC:TRAMP 1,20 //Set the ramp-up time of AC withstand voltage for Step 1 to 20 s

Query syntax: **FUNC:SOUR:AC:TRAMP? <n>**

Query response: **<Time Value>**

For example: Send> **FUNC:SOUR:AC:TRAMP? 1**
Return> **1.0**

10.6.7 FUNCtion: SOURce:AC: TFALL

FUNCtion: SOURce:AC: TFALL Used to set/query the ramp down time for AC withstand voltage testing.

Command syntax: **FUNCtion:SOURce:AC:TFALL <n>**,<Time Value>

Parameter 1: **<n>**
Data Type: Integer Data Range: 1~9 Data precision: 1
Here, n represents the current test step and shall not exceed the total number of steps.

Parameter 2: **<Time Value>**
Data Type: Floating Point Data Range: 0.0~999.9 Data Precision: 0.1 Unit: s
Where 0.0 indicates disable.

For example: Send> FUNC:SOUR:AC:TFALL 1,100 //Set the ramp-down time of AC withstand voltage for Step 1 to 100 s

Query syntax: **FUNC:SOUR:AC:TFALL? <n>**

Query response: **<Time Value>**

For example: Send> **FUNC:SOUR:AC:TFALL? 1**
Return> **1.0**

10.6.8 FUNCtion: SOURce:AC: ARC

FUNCtion: SOURce:AC: ARC Used to set/query the ARC detection level for AC withstand voltage testing.

Command syntax: **FUNCtion:SOURce:AC:ARC <n>**,<ARC Level>

Parameter 1: **<n>**
Data Type: Integer Data Range: 1~9 Data precision: 1
Here, n represents the current test step and shall not exceed the total number of steps.

Parameter 2: **<ARC Level>**

	Data Type:Integer Data Range: 0~9 Data Precision: 0 Unit: None **Where 0 indicates disable.**
For example:	Send> FUNC:SOUR:AC:ARC 1,2 //Set the arc detection level of AC withstand voltage for Step 1 to 2
Query syntax:	**FUNC:SOUR:AC:ARC? <n>**
Query response:	**<ARC Level>**
For example:	Send> **FUNC:SOUR:AC:ARC? 1** Return> **5**

10.6.9 FUNCtion: SOURce:AC: FREQ

FUNCtion: SOURce:AC: FREQ Used to set/query the output frequency for AC withstand voltage testing.

Command syntax:	**FUNCtion:SOURce:AC:FREQ <n>,{50,60}**
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**{50,60}** **50: 50Hz** **60: 60Hz**
For example:	Send> FUNC:SOUR:AC:FREQ 1,60 //Set the output frequency of AC withstand voltage for Step 1 to 60 Hz
Query syntax:	**FUNC:SOUR:AC:FREQ? <n>**
Query response:	**{50,60}**
For example:	Send> **FUNC:SOUR:AC:FREQ? 1** Return> **50**

10.6.10 FUNCtion: SOURce:AC: OFFSet

FUNCtion: SOURce:AC: OFFSet Used to set/query the compensation zero for AC withstand voltage testing.

Command syntax:	**FUNCtion:SOURce:AC:OFFSet <n>,{GET,OFF}**
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**{GET,OFF}** **GET: Automatically set the line resistance zero value (Valid only in the [Setup] page)** **OFF: Disable compensation zero**
For example:	Send> FUNC:SOUR:AC:OFFSet 1,OFF //Set the compensation zero of AC withstand voltage for Step 1 to disable Send> FUNC:SOUR:AC:OFFSet 1,GET //Automatically set the compensation zero value of AC withstand voltage for Step 1 in the [Setup] page.
Query syntax:	**FUNC:SOUR:AC:OFFSet? <n>**
Query response:	**<float>** Compensation zero value Data Precision: 0.001 Unit: mA
For example:	Send> **FUNC:SOUR:AC:OFFSet? 1** Return> **0.01**

10.7 DC Withstand Voltage Setting Function Command Set

10.7.1 FUNCtion: SOURce:DC:VOLT

FUNCtion: SOURce:DC:VOLT Set/Query the voltage of DC withstand voltage.

Command syntax: **FUNCtion:SOURce:DC:VOLT <n>,**<Voltage Value>

Parameter 1: **<n>**
Data Type: Integer Data Range: 1~9 Data precision: 1
Here, n represents the current test step and shall not exceed the total number of steps.

Parameter 2: **<Voltage Value>**
Data Type: Floating point number Data Range: 100~6000 Data Precision: 1
Unit: V

For example: Send> FUNC:SOUR:DC:VOLT 1,6000 //Set the DC withstand voltage in Step 1 to 600 V.

Query syntax: **FUNC:SOUR:DC:VOLT? <n>**

Query response: **<Voltage Value>**

For example: Send> **FUNC:SOUR:DC:VOLT? 1**
Return> **6000**

10.7.2 FUNCtion: SOURce:DC:RANG

FUNCtion: SOURce:DC:RANG Set/Query the current range for DC withstand voltage.

Command syntax: **FUNCtion:SOURce:DC:RANG <n>,{AUTO,NOM}**

Parameter 1: **<n>**
Data Type: Integer Data Range: 1~9 Data precision: 1
Here, n represents the current test step and shall not exceed the total number of steps.

Parameter 2: **{AUTO,NOM}**
AUTO: Auto Range
NOM: NOM Range

For example: Send> FUNC:SOUR:DC:RANG 1,NOM //Set the DC withstand voltage current range in Step 1 to: NOM Range

Query syntax: **FUNC:SOUR:DC:RANG? <n>**

Query response: **{AUTO,NOM}**

For example: Send> **FUNC:SOUR:DC:RANG? 1**
Return> **nom**

10.7.3 FUNCtion: SOURce:DC: IHIGH

FUNCtion: SOURce:DC: IHIGH Set/Query the upper current limit for DC withstand voltage.

Command syntax: **FUNCtion:SOURce:DC:IHIGH <n>,**<Current Value>

Parameter 1: **<n>**
Data Type: Integer Data Range: 1~9 Data precision: 1
Here, n represents the current test step and shall not exceed the total number of steps.

Parameter 2: **<Current Value>**
Data Type: Floating Point Number Data Range: 0.1~10000.0 Data Precision: 0.1
Unit: uA

For example: Send> FUNC:SOUR:DC:IHIGH 1,600 //Set the upper current limit of DC withstand voltage in Step 1 to 600 μA.

Query syntax: **FUNC:SOUR:DC:IHIGH? <n>**

Query response:	**<Current Value>**
For example:	Send> **FUNC:SOUR:DC:IHIGH? 1** Return> **500.0**

10.7.4 FUNCtion: SOURce:DC: ILOW

FUNCtion: SOURce:DC: ILOW Set/Query the lower current limit for DC withstand voltage.

Command syntax:	**FUNCtion:SOURce:DC:ILOW <n>,**<Current Value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Current Value>** **Data Type : Floating Point Number Data Range : 0.0~Upper Limit Value Data Precision: 0.1 Unit: uA** **Where, 0.0 represents Off**
For example:	Send > FUNC:SOUR:DC:ILOW 1,10 //Set the lower current limit of DC withstand voltage in Step 1 to 10 μA.
Query syntax:	**FUNC:SOUR:DC:ILOW? <n>**
Query response:	**<current value>**
For example:	Send > **FUNC:SOUR:DC:ILOW? 1** Return > **0.0**

10.7.5 FUNCtion: SOURce:DC: TTEST

FUNCtion: SOURce:DC: TTEST Set/Query the test time for DC withstand voltage.

Command syntax:	**FUNCtion:SOURce:DC:TTEST <n>,**<Time Value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Time Value>** **Data Type: Floating Point Number Data Range: 0.0, 1.0 ~ 999.9 Data Precision: 0.1** **Unit: s** **Where, 0.0 represents continuous test.**
For example:	Send > FUNC:SOUR:DC:TTEST 1,100 //Set the test time of DC withstand voltage in Step 1 to 100 s.
Query syntax:	**FUNC:SOUR:DC:TTEST? <n>**
Query response:	**<Time Value>**
For example:	Send > **FUNC:SOUR:DC:TTEST? 1** Return > **1.0**

10.7.6 FUNCtion: SOURce:DC: TRAMP

FUNCtion: SOURce:DC: TRAMP Set/Query the ramp up time for DC withstand voltage

Command syntax:	**FUNCtion:SOURce:DC:TRAMP <n>,**<Time value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Time Value>**

	Data Type: Floating Point Number Data Range: 0.4~999.9 Data Precision: 0.1 Unit: s
For example:	Send > FUNC:SOUR:DC:TRAMP 1,0.4 //Set the ramp up time for DC withstand voltage in Step 1 to 0.4 s.
Query syntax:	**FUNC:SOUR:DC:TRAMP? <n>**
Query response:	**<Time Value>**
For example:	Send > **FUNC:SOUR:DC:TRAMP? 1** Return> **1.0**

10.7.7 FUNCtion: SOURce:DC: TFALL

FUNCtion: SOURce:DC: TFALL Set/Query the ramp-down time for DC withstand voltage.

Command syntax:	**FUNCtion:SOURce:DC:TFALL <n>,**<Time Value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Time Value>** **Data Type: Floating Point Number Data Range: 0.0~999.9 Data Precision: 0.1 Unit: s** **Where, 0.0 represents Off**
For example:	Send > FUNC:SOUR:DC:TFALL 1,100 //Set the ramp-down time for DC withstand voltage in Step 1 to 100 s.
Query syntax:	**FUNC:SOUR:DC:TFALL? <n>**
Query response:	**<Time Value>**
For example:	Send > **FUNC:SOUR:DC:TFALL? 1** Return> **1.0**

10.7.8 FUNCtion: SOURce:DC: ARC

FUNCtion: SOURce:DC: ARC Set/Query the ARC value for DC withstand voltage.

Command syntax:	**FUNCtion:SOURce:DC:ARC <n>,**<ARC Value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<ARC Value>** **Data Type: Integer Data Range: 0~9 Data Precision: 0 Unit: none** **Where, 0 represents Off**
For example:	Send > FUNC:SOUR:DC:ARC 1,2 //Set the ARC Level of DC withstand voltage in step 1 to 2.
Query syntax:	**FUNC:SOUR:DC:ARC? <n>**
Query response:	**<ARC Value>**
For example:	Send > **FUNC:SOUR:DC:ARC? 1** Return > **5**

10.7.9 FUNCtion: SOURce:DC: IRAMP

FUNCtion: SOURce:DC: IRAMP Set/Query the ramp-up upper limit for DC withstand voltage.

Command syntax:	**FUNCtion:SOURce:DC:IRAMP <n>,{ON,OFF}**

Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**{ON,OFF}** ON: Ramp up upper comparison on OFF: Ramp up upper comparison off
For example:	Send > FUNC:SOUR:DC:IRAMP 1,ON //Set the ramp-up upper limit comparison for DC withstand voltage in Step 1 to ON.
Query syntax:	**FUNC:SOUR:DC:IRAMP? <n>**
Query response:	**{ON,OFF}**
For example:	Send> **FUNC:SOUR:DC:IRAMP? 1** Return> **ON**

10.7.10 FUNCtion: SOURce:DC: CHARSET

FUNCtion: SOURce:DC: CHARSET Set/Query the charging lower for DC Withstand Voltage.

Command syntax:	**FUNCtion:SOURce:DC:CHARSET <n>,<Charging Lower>**
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Charging Lower>** **Data Type: Floating point number Data Range: 0.1~3500 Data Precision: 0.1 Unit: uA**
For example:	Send> FUNC:SOUR:DC:CHARSET 1,300 //Set the charging lower of DC withstand voltage in Step 1 to 300 μA.

10.7.11 FUNCtion: SOURce:DC:CHAR

FUNCtion: SOURce:DC:CHAR Set/Query the charging lower limit for DC withstand voltage.

Command syntax:	**FUNCtion:SOURce:DC:RANG <n>,{GET,OFF}**
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**{GET,OFF}** **GET: Automatically set the minimum charging current(Valid only in the <Settings> interface)** **OFF: Turn off the charging lower**
For example:	Send > FUNC:SOUR:DC:CHAR 1,OFF //Set the charging lower limit for DC withstand voltage in Step 1 to Off. Return > FUNC:SOUR:AC:CHAR 1,GET //In the <Setup>page, automatically set the charging lower limit for DC withstand voltage in Step 1.
Query syntax:	**FUNC:SOUR:DC:CHAR? <n>**
Query response:	**<float> Data Precision: 0.1 Unit: uA**
For example:	Send> **FUNC:SOUR:DC:CHAR? 1** Return > **300.0**

10.7.12 FUNCtion: SOURce:DC: OFFSet

FUNCtion: SOURce:DC: OFFSet Set/Query the offset for DC withstand voltage.

Command syntax:	**FUNCtion:SOURce:DC:OFFSet <n>,{GET,OFF}**
Parameter 1:	**<n>**

	Data Type: Integer Data Range: 1~9 Data precision: 1
	Here, n represents the current test step and shall not exceed the total number of steps.
Parameter 2:	**{GET,OFF}** **GET: Automatically set the line resistance zero value (Valid only in the <Settings> interface)** **OFF: Turn off the offset**
For example:	Send > FUNC:SOUR:DC:OFFSet 1,OFF //Set the offset for DC withstand voltage in Step 1 to off. Send > FUNC:SOUR:DC:OFFSet 1,GET //In the <Setup> interface, automatically set the offset value for DC withstand voltage in Step 1.
Query syntax:	**FUNC:SOUR:DC:OFFSet? <n>**
Query response:	**<float> offset value Data Precision: 0.1 Unit: uA**
For example:	Send> **FUNC:SOUR:DC:OFFSet? 1** Return> **0.8**

10.8 Insulation Resistance Setting Function Command Set

10.8.1 FUNCtion: SOURce:IR:VOLT

FUNCtion: SOURce:IR:VOLT Set/Query the voltage for insulation resistance.

Command syntax:	**FUNCtion:SOURce:IR:VOLT <n>,**<Voltage Value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Voltage Value>** **Data Type: Floating point number Data Range: 100~2500 Data Precision: 1** **Unit: V**
For example:	Send > FUNC:SOUR:IR:VOLT 1,2500 //Set the voltage for insulation resistance in Step 1 to 2500 V.
Query syntax:	**FUNC:SOUR:IR:VOLT? <n>**
Query response:	**<Voltage Value>**
For example:	Send> **FUNC:SOUR:IR:VOLT? 1** Return > **2500**

10.8.2 FUNCtion: SOURce:IR:RANG

FUNCtion: SOURce:IR:RANG Set/Query the current range for insulation resistance.

Command syntax:	**FUNCtion:SOURce:IR:RANG <n>,{AUTO,NOM}**
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**{AUTO,NOM}** **AUTO:** Auto Range NOM: NOM Range
For example:	Send> FUNC:SOUR:IR:RANG 1,NOM //Set the range of insulation resistance in Step 1 to :NOM range
Query syntax:	**FUNC:SOUR:IR:RANG? <n>**
Query response:	**{AUTO,NOM}**
For example:	Send> **FUNC:SOUR:IR:RANG? 1** Return> **nom**

10.8.3 FUNCtion: SOURce:IR: RHIGH

FUNCtion: SOURce:IR: IHIGH Set/Query the resistance upper limit for insulation resistance.

Command syntax: **FUNCtion:SOURce:IR:RHIGH <n>,**<Voltage Value>

Parameter 1: **<n>**
Data Type: Integer Data Range: 1~9 Data precision: 1
Here, n represents the current test step and shall not exceed the total number of steps.

Parameter 2: **<Voltage Value>**
Data Type: Floating point number Data Range: 0~9999 Data Precision: 1
Unit: Ω
Where,0 represents off

For example: Send > FUNC:SOUR:IR:RHIGH 1,1.0E8 //Set the upper limit of insulation resistance in step 1 to 100MΩ.

Query syntax: **FUNC:SOUR:IR:RHIGH? <n>**

Query response: **<Voltage Value>**

For example: Send> **FUNC:SOUR:IR:RHIGH? 1**
Return> **5.0e8**

10.8.4 FUNCtion: SOURce:IR: RLOW

FUNCtion: SOURce:IR: RLOW Set/Query the resistance lower limit for insulation resistance.

Command syntax: **FUNCtion:SOURce:IR:RLOW <n>,**<Resistance Value>

Parameter 1: **<n>**
Data Type: Integer Data Range: 1~9 Data precision: 1
Here, n represents the current test step and shall not exceed the total number of steps.

Parameter 2: **<Current Value>**
Data Type: Floating point number Data Range: 0~upper limit value
Data Precision: 1 Unit: Ω

For example: Send> FUNC:SOUR:IR:RLOW 1,1.0E7 //Set the lower of insulation resistance in Step 1 to 10MΩ

Query syntax: **FUNC:SOUR:IR:RLOW? <n>**

Query response: **<Resistance Value>**

For example: Send> **FUNC:SOUR:IR:RLOW? 1**
Return> **1.0e7**

10.8.5 FUNCtion: SOURce:IR: TTEST

FUNCtion: SOURce:IR: TTEST Set/Query the test time for insulation resistance.

Command syntax: **FUNCtion:SOURce:IR:TTEST <n>,**<Time Value>

Parameter 1: **<n>**
Data Type: Integer Data Range: 1~9 Data precision: 1
Here, n represents the current test step and shall not exceed the total number of steps.

Parameter 2: **<Time Value>**
Data Type: Floating point number Data Range: 0.0，1.0～999.9 Data Precision: 0.1 Unit: s
Where, 0.0 represent continuous test

For example: Send> FUNC:SOUR:IR:TTEST 1,100 //Set the test time of insulation resistance in Step 1 to 100 s.

Query syntax:	**FUNC:SOUR:IR:TTEST? <n>**
Query response:	**<Time Value>**
For example:	Send> **FUNC:SOUR:IR:TTEST? 1** Return> **1.0**

10.8.6 FUNCtion: SOURce:IR: TRAMP

FUNCtion: SOURce:IR: *TRAMP* Set/Query the ramp-up time for insulation resistance.

Command syntax:	**FUNCtion:SOURce:DC:TRAMP <n>**,<Time>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Time Value>** **Data Type: Floating Point Number Data Range: 0.4 ~ 999.9 Data Precision: 0.1** **Unit: s**
For example:	Send> FUNC:SOUR:IR:TRAMP 1,0.4 //Set the ramp-up time of insulation resistance in Step 1 to 0.4 s.
Query syntax:	**FUNC:SOUR:IR:TRAMP? <n>**
Query response:	**<Time Value>**
For example:	Send> **FUNC:SOUR:IR:TRAMP? 1** Return> **1.0**

10.8.7 FUNCtion: SOURce:IR: TFALL

FUNCtion: SOURce:IR: TFALL Set/Query the ramp-down time for DC withstand voltage.

Command syntax:	**FUNCtion:SOURce:IR:TFALL <n>**,<Time Value>
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**<Time Value>** **Data Type: Floating Point Number Data Range: 0.0 ~ 999.9 Data Precision: 0.1** **Unit: s** **Where, 0.0 represents off**
For example:	Send> FUNC:SOUR:IR:TFALL 1,100 //Set the ramp down time of insulation resistance in Step 1 to 100 s.
Query syntax:	**FUNC:SOUR:IR:TFALL? <n>**
Query response:	**<Time Value>**
For example:	Send> **FUNC:SOUR:IR:TFALL? 1** Return> **1.0**

10.8.8 FUNCtion: SOURce:IR: CHARSET

FUNCtion: SOURce:IR: *CHARSET* Set/Query the charging lower limit for insulation resistance.

Command syntax:	**FUNCtion:SOURce:IR:CHARSET <n>,<Charging lower limit>**
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**

Parameter 2:	**<Charging Lower Limit>** **Data Type:Floating point number Data Range: 0.001 ~ 3.5 Data Precision: 0.001** **Unit: uA**
For example:	Send> FUNC:SOUR:IR:CHARSET 1,0.1 //Set the charging lower limit of insulation resistance in Step 1 to 0.1 μA.

10.8.9 FUNCtion: SOURce:IR:CHAR

FUNCtion: SOURce:IR:CHAR Set/Query the charging lower limit for insulation resistance.

Command syntax:	`FUNCtion:SOURce:IR:RANG <n>,{GET,OFF}`
Parameter 1:	**<n>** **Data Type: Integer Data Range: 1~9 Data precision: 1** **Here, n represents the current test step and shall not exceed the total number of steps.**
Parameter 2:	**{GET,OFF}** **GET: Auto-set the minimum charging current (Valid only in the <Setup> interface)** **OFF: Turn off the charging lower**
For example:	Send > FUNC:SOUR:IR:CHAR 1,OFF //Set the charging function of insulation resistance in Step 1 to OFF. Send > FUNC:SOUR:IR:CHAR 1,GET //In the <Setup> interface, auto-set the charging lower limit value of insulation resistance in Step 1.
Query syntax:	`FUNC:SOUR:IR:CHAR? <n>`
Query response:	**<float> Data Precision: 0.001 Unit: uA**
For example:	Send> `FUNC:SOUR:IR:CHAR? 1` Return> `0.1`

10.9 SYSTem Subsystem

SYSTem Subsystem is used to set system-related parameters.

Figure 10- 4 SYSTem Subsystem

SYSTem	***:SHAKEHAND(SHAK)***	***{ON,OFF}***
	:SENDmode (SEND)	***{Auto,Fetch}***
	:CONTrolmode(CONT)	***{LOCAL,PLC,BUS}***
	:BEEPmode(BEEP)	***{HIGH,LOW,OFF}***
	:FAILmode(FAIL)	***{CON,ABORT}***
	:RESULT	***{Group,Step}***

10.9.1 SYSTem:SHAKhand

After the communication handshake is enabled, the instrument will return the received command to the host as is, and then send back the data.

Command Syntax:	`SYSTem:SHAKhand {ON,OFF}`
For Example:	Send >`SYST:SHAK ON`
Query Syntax:	`SYSTem:SHAKhand?`
Query Response:	`{on,off}`

10.9.2 SYSTem:SENDmode

Used to set the acquisition mode of measurement results.

Command Syntax: **SYSTem:CONTrolmode {auto,Fetch}**

Parameter: **{auto,Fetch}**

Here, **auto**: Auto return result

Fetch: Return result though FECH?

For example: Send > SYSTem:SENDmode Auto

Query Syntax: **SYSTem:SENDmode**?

Query Response: **{auto,Fetch}**

For example: Send > **SYSTem:SENDmode**?

Return > **auto**

10.9.3 SYSTem: CONTrolmode

Used to set the control mode for instrument test initiation

Command Syntax: **SYSTem:CONTrolmode {LOCAL,PLC,BUS}**

Parameter: **{LOCAL,PLC,BUS}**

Here, LOCAL: Local control

PLC: plc control

BUS: Bus control

For example: Send > SYSTem: CONT PLC

Query Syntax: **SYSTem:CONTrolmode**?

Query Response: **{LOCAL,PLC,BUS}**

For example: Send> **SYSTem:CONT**?

Return> **PLC**

10.9.4 SYSTem: BEEPmode

Used to set the buzzer volume of the instrument

Command Syntax: **SYSTem:BEEPmode { HIGH,LOW,OFF }**

Parameter: **{ HIGH,LOW,OFF }**

Here, **HIGH**: high volume

LOW: low volume

OFF: off

For example: Send > SYSTem:BEEP HIGH

Query Syntax: **SYSTem:BEEP**?

Query Response: **{ HIGH,LOW,OFF }**

For example: Send > **SYSTem:BEEP**?

Return > **HIGH**

10.9.5 SYSTem: FAILmode

Used to set the fail mode of the instrument

Command Syntax: **SYSTem: FAILmode { CON, ABORT }**

Parameter: **{ CON, ABORT }**

Here, **CON**: Continus

	ABORT: Abord
For example:	Send> SYSTem:FAIL CON
Query Syntax:	**SYSTem:FAIL**?
Query Response:	**{ CON, ABORT }**
For example:	Send> **SYSTem:FAIL**? Return> **CON**

10.9.6 SYSTem: RESULT

Used to set the result display mode of the instrument

Command Syntax:	**SYSTem: RESULT { GROUP, STEP }**
Parameter:	**{ GROUP, STEP }** Here, **GROUP**: Group Display Results **STEP**: Step Display Results
For example:	Send> SYSTem: RESULT STEP
Query Syntax:	**SYSTem: RESULT**?
Query Response:	**{ GROUP, STEP }**
For example:	Send > **SYSTem: RESULT**? Return> **STEP**

10.10 FILE(MMEM) Subsystem

FILE(MMEM) Subsystem is used for file management, which can save user parameters to the internal flash memory or read flash memory files into the system.

Figure 10- 5 FILE(MMEM)Subsystem Tree

FILE **MMEM**	**:SAVE**	**<No Parameter> Or <File Number0-9>**
	:LOAD	**<No Parameter> Or <File Number0-9>**
	:DELete	**<File Number 0-9>**

10.10.1 FILE?

FILE? This command is used to query the file number used by the system.

Query Syntax:	**FILE?**
Query Response:	<int>: Integer, 0 – 9, File Number
For example:	Send> **FILE?** Return> 1

10.10.2 FILE:SAVE

FILE:SAVE The current settings can be saved to the current file or a specified file.

Command Syntax:	**FILE:SAVE** **FILE:SAVE <File No. 0-9>**
For example:	Send>**FILE:SAVE** //Save to the current file Send>**FILE:SAVE 1** //Save to file 1

10.10.3 FILE:LOAD

FILE:LOAD reads file data into the system.

Command Syntax:

```
FILE:LOAD
FILE:LOAD <File No. 0-9>
```

For example:

```
Send >FILE:LOAD        //Read the current file data into the system
Send >FILE:LOAD 1      //Read the file 1 data into the system
```

10.10.4 FILE:DELETE

FILE:DELete deletes the data of the specified file.

Command Syntax:

```
FILE: DELete
FILE: DELete <File No. 0-9>
```

For example:

```
Send>FILE: DELete        //Delete the current file
Send>FILE: DELete 1      //Delete the file 1
```

Note: Deleting the current file will not affect the system parameters.

10.11 FETCH Subsystem

Figure 10- 6 FETCH? Subsystem tree

FETCh?	

FETCh? is used to retrieve test data.(Only available on the <Meas Display> or <Group Result Display> page.) Prior to using this command, set the [Result Sending] field under the <System Config> page to [FETCH]. If the [Result Sending] field is set to [Auto], the instrument will automatically return the test results upon completion of the test.

Command Syntax:

```
FETCh?
```

<Test Steps>,<Test Mode>,<Actual Test Voltage>,<Actual Measured Current or Resistance>, <Judgment Result After Completion of Each Test Step>;

Test Steps	Data Type:Integer Data Range:1~9 Data Accuracy:1
Test Mode	{ACW,DCW,IR}
Actual Test Voltage	Data Unit: kV
Actual Measured Current or Resistance	When Test mode is ACW, Data Unit: mA When Test Mode is DCW, Data Unit: uA When Test Mode is IR, Data Unit: MΩ
Judgment Result After Completion of Each Test Step	1: Steps not yet completed in testing; this item is absent. The data returned at this stage is: <Test Step>,<Test Mode>,<Voltage>,<Current or Resistance>; 2: All completed test steps return data: {PASS,HIGHFAIL,LOWFAIL, ARCFAIL,SHORTFAIL, GFIFAIL,CHARFAIL,VERR} PASS:Test Passed; HIGHFAIL:Exceeded upper limit; LOWFAIL:Below lower limit; ARCFAIL:Arc Protection Triggered; SHORTFAIL:Short-circuit protection triggered; GFIFAIL: Breakdown protection triggered; CHARFAIL: Below charging limit; VERR: Over-voltage;

For example:

Send> **FETCh?**

Receive>1,IR,1.00,40,PASS;2,ACW,5.00,0.129,PASS;3,DCW,5.00,125.7,PASS;

Test Steps: 1, Test mode: IR , actual test voltage: 1kV, measured resistance: 40MΩ, Judgment: Pass;

Test Steps: 2, Test mode: ACW , actual test voltage: 5kV, measured resistance: 0.129mA, Judgment: Pass;
Test Steps: 3, Test mode: DCW, actual test voltage: 5kV, measured resistance: 125.7uA, Judgment: Pass;

10.12 IDN? Subsystem

Figure 10- 7 IDN? Subsystem Tree



The *IDN? query returns the instrument ID.

Query Syntax: **IDN?**

Query Response: **<Manufacturer>,<MODEL>,<SN>,<Revision>**
Manufacturer, model serial no. revision

For example: Send> **IDN?**
Return> **ONMEAS,AT9236,2005001,REV B2.4**

11. Specifications

You will learn about the following in this chapter:

- Qualification
- General specifications
- Environment requirements
- Outline dimension

11.1 Qualification

The following data were measured under the following conditions:

Temperature condition：23℃±5℃

Humidity condition：65% R.H.

Pre-heating time：>60 minutes

Calibration time：12 months

11.2 General Specifications

AT9236		
Test Function	Test Name	
AC WITHSTAND VOLTAGE TEST	Rated Output	5kVac/100mA
	Actual Output	500VA， ≥90%
	AC voltage output	Range:(100 ~ 5000) V, Resolution: 1V,Accuracy：±（2%×Set value +5V)
	Voltage output stability	±（0.4%×Set Value+1V)/minute,no load、full load
	Output frequency	50Hz / 60Hz，accuracy： ±0.1Hz
	Output waveform distortion	Resistive load：<2%
	Output adjustment	±（2%×Set value+5V)
	Short-circuit current	>200mA
	AC voltage	Range: (0.10 ~ 5.00) kV, Resolution：0.01kV, Accuracy：±(1.5%×Reading+1dgt)
	Upper limit of current	Range: 0.00~100.00）mA, Resolution：0.01mA,Judgment error： ±（2%×Set value+5dgt)
	Lower limit of	Range: （0.000~9.999）mA, Resolution：0.001mA，Judgment error： ±（2%

	current	×Set value+5dgt)
	AC current measurement	Range：0.000~3.500/3.00~100.00 mA, Resolution： 0.001/0.01 mA Accuracy： ± (2%×Reading+5 dgt)
	Ramp up and ramp down time	Range:(0.1~999.9) s, Resolution：0.1s，Accuracy： ± (0.2% ×Set Value+1dgt)
	Duration	Range：infinite length,(1.0 ~999.9) Resolution：0.1s，Accuracy： ± (0.2% × Set value+1dgt)
	ARC Detector	1 ~9 (9 is the most sensitive)，0 represents the function of turning off the ARC
	Current compensation	0.000~100.00mA，Total current+Compensation current＜100mA，Automatic
DC WITHSTAND VOLTAGE TEST	Rated Output	6kVdc / 10mA
	Actual Output	60VA， ≥90%
	DC voltage output	Range：(100 ~ 6000) Vdc，Resolution：1V，Accuracy：±(2%×Set value+5V)
	Voltage output stability	Range: (0.10 ~ 6.00) kVdc，Resolution：10V，Accuracy：±(1.5% × Reading+1dgt)
	Output frequency	＜5% (6kV/1mA Resistive load)
	Output adjustment	± (2%×Set value+5V)，no load to full load
	Upper limit of current	Range: (0~9999) μA/10mA，Resolution：1μA/0.01mA， Judging error： ± (2%×Set value+5 dgt)
	Lower limit of current	Range: (0.0~999.9) μA，Resolution： 1μA，Judging error： ± (2%×Set value+5 dgt)
	DC current measurement	Range：0.0~350.0/300~3500/3000~9999 μA/10mA， Resolution： 0.1/1/10μA/0.01mA，Judging Error： ± (2%×Reading+5 dgt)
	Ramp up time	Range: (0.4 ~999.9) s Resolution： 0.1s Accuracy： ± 0.2% ×Set value+1 dgt
	Duration	Range: (0.5~999.9) s，infinite length Resolution： 0.1s Accuracy： ± 0.2% ×Set value+1 dgt
	Slow descent time	Range：Off， (1.0~999.9) s Resolution： 0.1s Accuracy： ± 0.2% ×Set value+1 dgt
	ARC Detector	1 ~9 (9 is the most sensitive)， 0 represents the function of turning off the arc
	Current compensation	(0 ~200.0) μA，Auto,Manual
	Slowing increasing upper limit current	On/off，with an upper limit current of 12mA when on
	Charging lower limit current	(0~3500) μA，Auto、Manual
	Discharge time	≤200ms

	Max capacitive load	1uF < 1kV， 0.75uF < 2kV， 0.5uF < 3kV， 0.08uF < 4kV， 0.04uF < 6kV
INSULATION RESISTANCE TEST	Rated Output	2.5kVdc/9999MΩ
	DC voltage output	Range:(100 ~ 2500) Vdc，Resolution： 1V，Accuracy： ± (2%×Set value+5V)
	DC voltage measurement	Range：(100 ~ 2500) Vdc，Resolution：10V，Accuracy： ± (2%×Reading+5V)
	Drop voltage	Not less than 90% of rated voltage, drop resistance 10MΩ（1% Range）
	Upper limit of voltage Lower limit of voltage	Range： （1 ~9999） MΩ，Resolution： 1MΩ Judgment error： （100-499） V， 1~1000,±(8%×Set value+2 dgt) 1000~2000,±(12%×Set value+2 dgt) （500-2500V）， 1~199,±(2%×Set value+2 dgt)， 200~999, ± (5%×Set value+2 dgt) 1000~9999, ± (15%×Set value+2 dgt)
	Insulation resistance	Range： （1 ~9999） MΩ，Resolution： 1MΩ Judgment error： （100-499） V， 1~1000,±(8%×Reading+2 dgt) 1000~2000,±(12%×Reading+2 dgt) （500-2500V）， 1~199,±(2%×Reading+2 dgt)， 200~999, ± (5%×Set Value+2 dgt) 1000~9999, ± (15%×Set Value+2 dgt
	Ramp up time	Range： (0.1 ~999.9) s Resolution： 0.1s Accuracy： ± 0.2% ×Set Value+1 dgt
	Duration	Range： (0.5~999.9) s，Infinite length Resolution： 0.1s Accuracy： ± 0.2% ×Set value+1 dgt
	Ramp down time	Range：Off， (1.0~999.9) s Resolution： 0.1s Accuracy： ± 0.2% ×Set value+1 dgt
	Discharge time	≤200ms
	Charging lower limit current	（0~3.500） μA，Auto、Manual

General Specification	
Enteral Interfaces	USB-HOST 、 RS232/RS485 、HANDLER 、Warning lights、External Remote Control
Dimension Weight	Outline Dimension（mm）：246(W)x112(H)x536.3(D) 20kg

11.3 Environment Requirements

Environment:

	Index:	Temperature: 18℃~28℃	Humidity: ≤65% RH
	Operation:	Temperature: 10℃~40℃	Humidity: 10~80% RH
	Storage:	Temperature: 0℃~50℃	Humidity: 10~90% RH

Power Supply: Power Supply Voltage: 220Vac，Maximum allowable Error: ±10%

Power Supply Frequency: 50Hz/60Hz，Maximum Allowable Error: ±5%

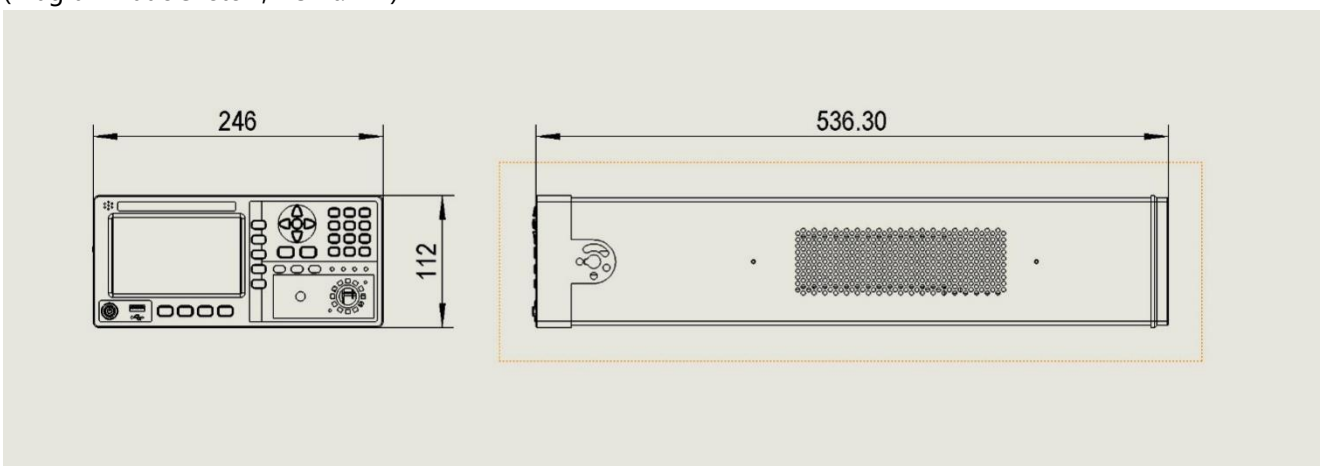
Fuse: 250V 10A Slow melting

Power: Maximum 550VA

Weight: About 40 KG

11.4 Outline Dimension

(Diagrammatic Sketch , Unit:mm)



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