



User Manual

UT5400 Series Electrical Safety Analyzers

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Foreword

Thank you for choosing this UNI-T instrument. For safe and proper use of this instrument, please read this manual carefully, especially the safety instructions section.

After reading this manual, it is recommended to keep the manual in a convenient location, preferably near the device, for future reference.

1. Introduction

This manual describes the safety requirements, installation, and operation of the UT5400 series electrical safety analyzers.

2. Safety Instructions

This chapter contains information and warnings that must be observed. Ensure that the instrument is operated under safe conditions. In addition to the safety precautions indicated in this chapter, you must also follow accepted safety procedures.

Safety Precautions		
Warning	Please follow these guidelines to avoid possible electric shock and risk to personal safety.	
	Users must adhere to standard safety precautions during the operation, servicing, and maintenance of this device. UNI-T will not be liable for any personal safety and property loss caused by the user's failure following the safety precautions. This device is designed for professional users and organizations responsible for measurement purposes. Do not use this device in any manner not specified by the manufacturer. This device is intended for indoor use only, unless otherwise stated in the product manual.	
Safety Statements		
Warning	"Warning" indicates the presence of a hazard. It warns users to pay attention to a certain operation process, operation method or similar. Personal injury or death may occur if the rules in the "Warning" statement are not properly executed or observed. Do not proceed to the next step until you fully understand and meet the conditions stated in the "Warning" statement.	
Caution	"Caution" indicates the presence of a hazard. It warns users to pay attention to a certain operation process, operation method or similar. Product damage or loss of important data may occur if the rules in the "Caution" statement are not properly executed or observed. Do not proceed to the next step until you fully understand and meet the conditions stated in the "Caution" statement.	
Note	"Note" indicates important information. It reminds users to pay attention to procedures, methods, and conditions, etc. The contents of "Note" should be highlighted if necessary.	
Safety Signs		
	Danger	It indicates danger of electric shock, which may cause personal injury or death.
	Warning	It indicates that there are factors you should be cautious of to prevent personal injury or product damage.
	Caution	It indicates danger, which may cause damage to this device or other equipment if you fail to follow a certain procedure or condition. If the "Caution" sign is present, all conditions must be met before you proceed to operation.

	Note	It indicates potential problems, which may cause failure of this device if you fail to follow a certain procedure or condition. If the "Note" sign is present, all conditions must be met before this device will function properly.
	AC	Alternating current of device. Please check the region's voltage range.
	DC	Direct current device. Please check the region's voltage range.
	Grounding	Frame and chassis grounding terminal
	Grounding	Protective grounding terminal
	Grounding	Measurement grounding terminal
	OFF	Main power off
	ON	Main power on
	Power	Standby power supply: When the power switch is turned off, this device is not completely disconnected from the AC power supply.
	Waste	Do not place equipment and accessories in the trash. Items must be properly disposed of in accordance with local regulations.
	EEUP	This environment-friendly use period (EFUP) mark indicates that dangerous or toxic substances will not leak or cause damage within this indicated time period. The environmentally friendly use period of this product is 40 years, during which it can be used safely. Upon expiration of this period, it should enter the recycling system.
Safety Requirements		
Warning		
Preparation before use	Please connect this device to AC power supply with the power cable provided. The AC input voltage of the line reaches the rated value of this device. See the product manual for specific rated value. The line voltage switch of this device matches the line voltage. The line voltage of the line fuse of this device is correct. This device is not intended for measuring the main circuit.	
Check all terminal rated values	Please check all rated values and marking instructions on the product to avoid fire and the impact of excessive current. Please consult the product manual for detailed rated values before connection.	
Use the power cord properly	You can only use the special power cord for the instrument approved by the local and state standards. Please check whether the insulation layer of the cord is damaged, or the cord is exposed, and test whether the cord is conductive. If the cord is damaged, please replace it before using the instrument.	
Instrument Grounding	To avoid electric shock, the grounding conductor must be connected to the ground. This product is grounded through the grounding conductor of the power supply. Please be sure to ground this product before it is powered on.	
AC power supply	Please use the AC power supply specified for this device. Please use the power cord approved by your country and confirm that the insulation layer is not damaged.	
Electrostatic prevention	This device may be damaged by static electricity, so it should be tested in the anti-static area if possible. Before the power cable is connected to this device,	

	the internal and external conductors should be grounded briefly to release static electricity. The protection grade of this device is 4 kV for contact discharge and 8 kV for air discharge.
Measurement accessories	Measurement accessories designated as lower-grade, which are not applicable to main power supply measurement, CAT II, CAT III, or CAT IV circuit measurement. Probe subassemblies and accessories within the range of IEC 61010-031 and current sensors within the range of IEC 61010-2-032 can meet its requirements.
Use the input / output port of this device properly	Please use the input / output ports provided by this device in a proper manner. Do not load any input signal at the output port of this device. Do not load any signal that does not reach the rated value at the input port of this device. The probe or other connection accessories should be effectively grounded to avoid product damage or abnormal function. Please refer to the product manual for the rated value of the input / output port of this device.
Power fuse	Please use a power fuse of exact specification. If the fuse needs to be replaced, it must be replaced with another one that meets the specified specifications by the maintenance personnel authorized by UNI-T.
Disassembly and cleaning	There are no components available for operators inside. Do not remove the protective cover. Qualified personnel must conduct maintenance.
Service environment	This device should be used indoors in a clean and dry environment with ambient temperature from 0 °C to +40 °C. Do not use this device in explosive, dusty, or high humidity conditions.
Do not operate in humid environment	Do not use this device in a humid environment to avoid the risk of internal short circuit or electric shock.
Do not operate in flammable and explosive environment	Do not use this device in a flammable and explosive environment to avoid product damage or personal injury.
Caution	
Abnormality	If this device may be faulty, please contact the authorized maintenance personnel of UNI-T for testing. Any maintenance, adjustment or parts replacement must be done by the relevant personnel of UNI-T.
Cooling	Do not block the ventilation holes at the side and back of this device. Do not allow any external objects to enter this device via ventilation holes. Please ensure adequate ventilation and leave a gap of at least 15 cm on both sides, front and back of this device.
Safe transportation	Please transport this device safely to prevent it from sliding, which may damage the buttons, knobs, or interfaces on the instrument panel.
Proper ventilation	Insufficient ventilation will cause the device temperature to rise, thus causing damage to this device. Please keep proper ventilation during use, and regularly check the vents and fans.
Keep clean and dry	Please take actions to avoid dust or moisture in the air affecting the performance of this device. Please keep the product surface clean and dry.
Note	
Calibration	The recommended calibration period is one year. Calibration should only be conducted by qualified personnel.

2.1 Workstation Arrangement

- **Work Location**

The workstation shall be in an open area that is not routinely accessed by non-authorized personnel, to prevent unauthorized entry. It shall be physically separated from other facilities and clearly identified as a **"High-Voltage Test Workstation."**

During testing, a warning sign reading **"DANGER! TESTING IN PROGRESS. UNAUTHORIZED PERSONNEL KEEP OFF!"** shall be prominently displayed.

- **Input Power Supply**

Ensure that the instrument is properly connected to protective earth (PE) to ensure operational safety. The workstation shall be equipped with an independent power switch installed at a clearly visible location near the workstation entrance and clearly labeled, so that all personnel can readily identify it as the dedicated power switch for the workstation. In the event of an emergency, the power supply can be immediately disconnected before corrective action is taken.

- **Workplace Requirements**

Worktable: Insulated worktables or benches shall be used. Metallic objects are not permitted between the operator and the device under test (DUT).

Layout design: The workplace layout shall be designed so that operators are not required to step over the DUT to operate test instruments.

Organization: The workplace shall be kept clean and orderly. Unused instruments and test leads shall be stored in designated locations. Devices under test, devices awaiting test, and tested devices shall be clearly distinguished and labeled to allow immediate identification by all personnel.

Environmental safety: The test station and surrounding area shall be free of flammable or corrosive gases. Test instruments shall not be operated in the vicinity of flammable materials.

2.2 Operator Requirements

- **Personnel Qualifications**

Operation of this series of test instruments involves risks. Improper operation may result in personal injury or even life-threatening accidents. Therefore, all operators shall receive appropriate training in advance and shall strictly comply with the instructions provided in the user manual.

- **Safety Rules**

Operators shall receive regular safety education and training to ensure a full understanding of standardized safety procedures. The test instruments shall be operated only in accordance with these safety requirements.

- **Attire Code**

Operators shall not wear clothing with metallic decorations, nor carry metallic jewelry, watches, or similar items, as such metal accessories significantly increase the risk of accidental electric shock. When operating the test instruments, all operators shall wear insulating gloves.

- **Medical Restrictions**

This series of test instruments shall not be operated under any circumstances by personnel with heart disease or by individuals using implanted cardiac devices such as pacemakers or cardiac regulators.

2.3 Prohibited Operations

- **Do not rapidly switch the power supply on and off.**

After turning the power switch off, allow an interval of several seconds or longer before switching it on again. Repeated or rapid on/off switching may prevent the instrument's protective circuits from operating correctly.

- **Do not short-circuit the output terminals and ground.**

Handle the instrument's high-voltage test leads with care. Do not short-circuit the output terminals and grounded AC power lines or to other nearby equipment (for example, transmission devices).

If a short circuit occurs, the instrument enclosure may become energized with hazardous high voltage.

- **Do not connect external voltage to the output terminals.**

Do not apply any external voltage to the instrument's output terminals. When the instrument is in a non-discharge state, it does not provide an external discharge path; applying external voltage may result in damage to the instrument.

2.4 Test Precautions

1. **The safety grounding terminal of this tester shall be reliably connected to protective earth (PE).** Connect the high-voltage test leads only when performing a test, and disconnect them promptly when not in use. When handling the test leads (or clips), always hold the insulated parts. **Direct contact with the high-voltage output terminals (or clips) is strictly prohibited.**
2. The high-voltage return terminal of this series is not directly connected to ground. This design enables the measurement of extremely low leakage currents. However, during testing, **the DUT (EUT) shall be completely isolated from the ground conductor and protective earth**; otherwise, the current may not be measurable, or the measurement results may be inaccurate.
3. If you need to leave the operating area temporarily, or if testing will not be performed immediately, the power supply shall be turned off without exception.
4. Under no circumstances shall the operator touch the instrument's test terminals or the EUT during testing, to avoid electric shock.
5. If any abnormal condition occurs, immediately disable the high-voltage output.
6. After completion of a DC withstand voltage test, ensure that the EUT is fully discharged before disconnecting the test leads.

The required discharge time depends on the characteristics of the EUT and the applied test voltage.

Discharge time calculation formula: $t = -\ln(30/U) \times R \times C$

Where,

t: Discharge time

30: Safe residual voltage (30 V)

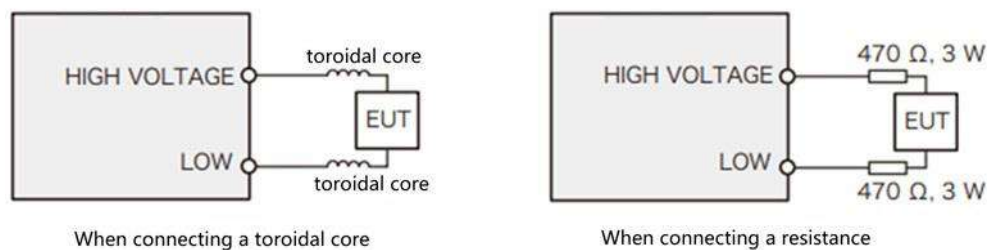
U: Set test voltage

R: Discharge resistance of the instrument after the DC withstand voltage test (approximately 20 kΩ)

C: Capacitance of the DUT

- For an EUT with an input capacitance of 1 μF , the discharge time from 6000 V down to 30 V is approximately 100 ms.
- During withstand voltage testing and insulation resistance testing, noise interference caused by output short circuits or dielectric breakdown of the device under test (DUT) may result in malfunction of nearby electronic equipment. To reduce such interference, connect either a toroidal core or a resistor of approximately 470 Ω (3 W, impulse withstand voltage 30 kV) between the front end of the high-voltage test lead and the DUT, and between the front end of the low-voltage test lead and the DUT. These components shall be installed as close to the EUT as possible.

Figure 2-1 Reduce Noise During Withstand Test



3. UT5400 Series Overview

UT5400 series has four models: UT5430, UT5440, UT5451, UT5452.

UT5400 series electrical safety analyzers integrate five key test functions: AC Withstand Voltage (ACW), DC Withstand Voltage (DCW), Insulation Resistance (IR), AC Ground Bond (AC GB), and Continuity Check (GC). The series provides a high test capacity of 500 VA, supporting a maximum AC output of 5 kV / 100 mA with 1% voltage accuracy, meeting the requirements of high-power withstand voltage testing.

- DC withstand voltage test: Rated output 6 kV / 50 mA, with a minimum leakage current resolution of 0.1 nA.
- Insulation resistance test: Rated output 6 kV / 50 GΩ.
- AC ground bond test: Rated output 40 A / 600 mΩ / 8 V.
- Continuity impedance test: Measurement range 0.001 Ω to 10 kΩ.

The instrument incorporates a multi-layer safety protection architecture, enabling precise, efficient, and safe measurement and analysis of multiple electrical parameters for electronic devices and components. For operation, it features a 5-inch multi-touch display and barcode scanning capability, providing a simpler and more efficient user experience. With a wide range of interface options, the instrument is well suited for integration into automatic test systems requiring high safety and reliability across diverse application scenarios.

3.1 Application Scenarios

Automated test systems, household appliances, transformers, motors, electrical equipment, electric heating appliances, lighting industry, new energy vehicles, electronic components, medical devices, and photovoltaic industry.

3.2 Technical Specifications

Model	AC Withstand Voltage	DC Withstand Voltage	Insulation Resistance	Ground Bond	Continuity	OSC
UT5430	√	√	√	-	√	√
UT5440	√	√	√	√	√	√
UT5451	500VA* ¹	√	√	-	√	√
UT5452	500VA* ¹	√	√	√	√	√
* ¹ : Withstand voltage capacity: 500 VA; short-circuit current: >200 mA.						

AC Withstand Voltage Test (All Models)					
Rated Output	UT5430, UT5440: 5 kV/40 mA				
	UT5451, UT5452: 5 kV/100 mA				
	Range		Resolution	Accuracy	
AC voltage output	0 to 5000 VAC		1 VAC	±(1% × the setting value + 5 V)	
AC voltage measurement	0.000 to 5.000 kV		0.001 kV	±(1% × the reading value + 5 V)	
Output frequency	50 / 60 Hz ± 0.1% , user-defined				
Output waveform	Sine wave, distortion rate: < 2% (when output voltage ≥ 0.5 kV, under no-load or purely resistive load conditions)				
Output adjustment range	±(1% × the setting value + 5 V), from no-load to full load				
Total current Upper/lower limit (Unit: mA)	Auto range	0.000 to 9.999	0.001	±(2% × the setting value + 2 digits)	
		10.00 to 40.00 (UT5430, UT5440)	0.01		
		10.00 to 99.99 (UT5451, UT5452)			
				0.1	±(2% × the setting value + 6 digits)
		100.0 (UT5451,			

		UT5452)		
	Fixed range	0.000 to 3.500	0.001	±(2% × the setting value + 2 digits)
		3.51 to 40.00 (UT5430, UT5440)	0.01	
		3.51 to 99.99 (UT5451, UT5452)		
		100.0 (UT5451, UT5452)	0.1	±(2% × the setting value + 6 digits)
Resistive current Upper/lower limit (Unit: mA)	0.000 to 9.999		0.001	±(3% × the setting value + 50 μA)
	10.00 to 40.00 (UT5430, UT5440)		0.01	
	10.00 to 99.99 (UT5451, UT5452)			
	100.0 (UT5451, UT5452)		0.1	
Total current measurement (Unit: mA)	Auto range	0.000 to 4.000	0.001	±(2% × the reading value + 2 digits)
		3.50 to 40.00 (UT5430, UT5440)	0.01	
		3.50 to 99.99 (UT5451, UT5452)		
	Fixed range	0.000 to 3.500	0.001	±(2% × the reading value + 2 digits)
		0.00 to 40.00 (UT5430, UT5440)	0.01	±(2% × the reading value + 2 digits); when the reading is < 6% of the range, the error increases by ±(0.1% of the range)
		0.00 to 99.99 (UT5451, UT5452)	0.01	±(2% × the reading value + 2 digits); when the reading is < 3% of the range, the error increases by ±(0.1% of the range)
	Resistive current	0.000 to 9.999		0.001

measurement (Unit: mA)	10.00 to 40.00 (UT5430, UT5440)		0.01	applicable for all ranges when PF > 0.1 and V > 250 VAC
	10.00 to 99.99 (UT5451, UT5452)			
Slow rise time	0.1 to 999.9 s		0.1 s	±(0.1% × the setting value + 0.05 s)
Slow fall time	0.0 to 999.9 s (0 = off)			
Test time	Auto range	0, 0.2 to 999.9 s (0 = continuous test)		
	Fixed range	0, 0.1 to 999.9 s (0 = continuous test)		
Continuity	Current: DC 0.1 A ± 0.01 A, fixed			
	Maximum Continuity: 1.0 Ω ± 0.1 Ω			
Arc detection	Range: 1 to 9 (9 = highest sensitivity), off			
Current compensation	UT5430, UT5440: 0.000 to 40.00 mA, (Total current + Current compensation ≤ 20 mA)			
	UT5451, UT5452: 0.000 to 100.0 mA, (Total current + Current compensation ≤ 100 mA)			
DC Withstand Voltage Test (All Models)				
Rated output	6 kV/10 mA			
DC Voltage Output	0 to 6000 V		1 V	±(1% × the setting value + 5 V)
DC Voltage Measurement	0.000 to 6.000 kV		0.001 kV	±(1% × the reading value + 5 V)
Output Ripple	< 4% (6 kV/10 mA resistive load)			
Output adjustment range	±(1% × the setting value + 2 V), from no-load to full load			
Upper/lower limit (Unit: μA)	Auto range	0.0000 to 0.9999	0.0001	Low range enabled when ±(2% × setting value + 10 digits) applies
		1.000 to 9.999	0.001	
		10.00 to 99.99	0.01	
		100.0 to 999.9, low range on	0.1	±(2% × the setting value + 2 digits)
		0.0 to 999.9, low range off		

		1000 to 10000	1	
	Fixed range	0.0000 to 0.3500	0.0001	Low range enabled when $\pm(2\% \times \text{the setting value} + 10 \text{ digits})$ applies
		0.351 to 3.500	0.001	
		3.51 to 35.00	0.01	
		35.1 to 350.0, low range on	0.1	$\pm(2\% \times \text{the setting value} + 2 \text{ digits})$
		0.0 to 350.0, low range off		
		351 to 10000	1	
DC current measurement	Auto range	0.0 to 400.0 nA	0.1 nA	Low range enabled when $\pm(2\% \times \text{the reading value} + 10 \text{ digits})$ applies
		0.350 to 4.000 μA	0.001 μA	
		3.50 to 40.00 μA	0.01 μA	
		35.0 to 400.0 μA , low range on	0.1 μA	$\pm(2\% \times \text{the setting value} + 2 \text{ digits})$
		0.0 to 400.0 μA , low range off		
		0.300 to 4.000 mA	0.001 mA	
		3.50 to 10.00 mA	0.01 mA	
	Fixed range	0.0 to 350.0 nA	0.1 nA	$\pm(2\% \times \text{the reading value} + 10 \text{ digits})$; when the reading is $< 6\%$ of the range, the error increases by $\pm(0.1\%$ of the range)
		0.000 to 3.500 μA	0.001 μA	
		0.00 to 35.00 μA	0.01 μA	
		0.0 to 350.0 μA	0.1 μA	$\pm(2\% \times \text{the reading value} + 2 \text{ digits})$
		0.000 to 3.500 mA	0.001 mA	$\pm(2\% \times \text{the reading value} + 2 \text{ digits})$; when the reading is $< 6\%$ of the range, the error increases by $\pm(0.1\%$ of the range)

		0.00 to 10.00 mA	0.01 mA	$\pm(2\% \times \text{the reading value} + 2 \text{ digits})$; when the reading is $<6\%$ of the range, the error increases by $\pm(0.2\%$ of the range)
Slow rise time	Low range off	0.4 to 999.9 s	0.1 s	$\pm(0.1\% \times \text{the setting value} + 0.05 \text{ s})$
	Low range on	0.5 to 999.9 s		
Slow fall time	0, 1.0 to 999.9 s (0 = off)			
Test time	Low range off	0, 0.4 to 999.9 s (0 = continuous test)		
	Low range on	0, 1.0 to 999.9 s (0 = continuous test)		
Slow-rise upper current (Unit: μA)	0.0000 to 0.9999		0.0001	Low range enabled when $\pm(2\% \times \text{the setting value} + 10 \text{ digits})$ applies
	1.000 to 9.999		0.001	
	10.00 to 99.99		0.01	
	100.0 to 999.9, low range on		0.1	$\pm(2\% \times \text{the setting value} + 2 \text{ digits})$
	0.0 to 999.9, low range off			
	1000 to 10000		1	
Minimum charging current	(0 to 350.0) μA , auto, manual			
Discharge time	No-load: $< 50 \text{ ms}$, capacitive load: $< 100 \text{ ms}$			
Maximum capacitive load	1 $\mu\text{F} < 1 \text{ kV}$, 0.75 $\mu\text{F} < 2 \text{ kV}$, 0.5 $\mu\text{F} < 3 \text{ kV}$, 0.08 $\mu\text{F} < 4 \text{ kV}$, 0.04 $\mu\text{F} < 5 \text{ kV}$, 0.015 $\mu\text{F} < 6 \text{ kV}$			
Continuity	Current: DC 0.1 A $\pm$ 0.01 A, fixed			
	Maximum Continuity: 1.0 $\Omega \pm$ 0.1 Ω			
Arc detection	Range: 1 to 9 (9 = highest sensitivity), off			
Current compensation	0.0 - 10000 μA , (Total current + Current compensation $\leq 10 \text{ mA}$)			
Insulation Resistance Test (All Models)				

Rated output	6 kV/50 GΩ			
DC Voltage Output	10 to 6000 V		1 V	±(1% × the setting value + 5 V)
DC Voltage Measurement	0 to 6000 V		1 V	±(1% × the reading value + 5 V)
Resistance upper/lower limit (Unit: MΩ)	0.10 to 99.99 (Upper limit: 0 = no comparison)		0.01	±(3% × the setting value + 2 digits)
	1.00 to 99.99 (V >1000 V)			
	100.0 to 999.9		0.1	±(5% × the setting value + 2 digits)
	1000 to 50000		1	±(15% × the setting value + 2 digits)
Insulation resistance measurement (Unit: MΩ)	10 to 49 V	0.100 to 9.999 MΩ	0.001	±(15% × the reading value + 2 digits)
		10.00 to 99.99 MΩ	0.01	
		100.0 to 999.9 MΩ	0.1	
	50 to 499 V	0.100 to 9.999 MΩ	0.001	±(7% × the reading value + 2 digits)
		10.00 to 99.99 MΩ	0.01	
		100.0 to 999.9 MΩ	0.1	
	500 to 6000 V	0.100 to 9.999 MΩ	0.001	±(3% × the reading value + 2 digits)
		10.00 to 99.99 MΩ	0.01	
		100.0 to 999.9 MΩ	0.1	
		1000 to 9999 MΩ	1	±(5% × the reading value + 2 digits)
		10000 to 50000	1	±(15% × the reading value + 2 digits)

		MΩ		
Slow rise time	0.1 to 999.9 s		0.1 s	±(0.1% × the setting value + 0.05 s)
Slow fall time	0, 1.0 to 999.9 s (0 = off)			
Test time	0, 0.5 to 999.9 s (0 = continuous test)			
Delay time	0.5 to 999.9 s			
Minimum charging current	(0 to 3.50) μA, auto, manual			
Ground Bond (UT5440, UT5452)				
Rated output	40 A / 600mΩ / 8 V			
Output current	1.00 to 40.00 A	0.01 A	±(2% × the setting value + 2 digits)	
Current measurement	0.00 to 40.00 A	0.01 A	±(3% × the reading value + 3 digits)	
Output voltage (Open-circuit mode)	3.00 to 8.00 VAC	0.01 VAC	±(2% × the setting value +3 digits)	
Output frequency	50 / 60 Hz ± 0.1%, user-defined			
Output current adjustment range	±(1% × the setting value + 0.02 A), within the maximum load limit			
Maximum on-load	1.00 to 10.00 A / 0 to 600 mΩ			
	10.01 to 30.00 A / 0 to 200 mΩ			
	30.01 to 40.00 A / 0 to 150 mΩ			
Resistance upper/lower limit (Unit: mΩ)	1.00 to 5.99 A	0 to 600, 0 = off	1	±(3% × the setting value + 3 digits)
	6.00 to 10.0 A	0 to 600, 0 = off	1	±(2% × the setting value + 2 digits)
	10.01 to 30.00A	0 to 200, 0 = off		
	30.01 to 40.00A	0 to 150, 0 = off		
Resistance measurement (Unit: mΩ)	1.00 to 5.99A	0 to 600	1	±(3% × the reading value + 3 digits)
	6.00 to	0 to 600	1	±(2% × the reading value + 2 digits)

	10.00A			
	10.01 to 30.00A	0 to 200		
	30.01 to 40.00A	0 to 150		
Test time	0,0.5 to 999.9 s (0 = continuous test)		0.1 s	±(0.1% × the setting value + 0.05 s)
Resistance compensation	0 to 200 mΩ		1	±(2% × the setting value + 2 digits)
Ground Continuity Test (All Models)				
Rated output	1 A for 0.000 to 1.000 Ω (Maximum test current: 1 A)			
	0.1 A for 1.01 to 10.00 Ω			
	0.01 A for 10.1 to 100.0 Ω			
	0.001 A for 101 to 1000 Ω			
	0.0001 A for 1001 to 10000			
Resistance upper/lower limit (Unit: Ω)	0.000 to 1.000	0.001	±(1% × the setting value + 15 digits)	
	1.01 to 10.00	0.01	±(1% × the setting value + 3 digits)	
	10.1 to 100.0	0.1		
	101 to 1000	1		
	1001 to 10000	1	±(1% × the setting value + 10 digits)	
Resistance measurement (Unit: Ω)	0.000 to 1.000	0.001	±(1% × the reading value + 15 digits)	
	1.01 to 10.00	0.01	±(1% × the reading value + 3 digits)	
	10.1 to 100.0	0.1		
	101 to 1000	1		
	1001 to 10000	1	±(1% × the reading value + 10 digits)	
Test time	0, 0.4 to 999.9 s (0 = continuous test)		0.1 s	±(0.1% × the setting value + 0.05 s)
Resistance compensation	0.000 to 10.00 Ω		0.001/0.01	±(1% × the setting value + 3 digits)
Open/Short-Circuit Check (All Models)				
Sampling standard Capacitance range	0.001 to 40 nF			

Open-circuit check range	10% to 100%		
Short-circuit check range	100% to 500%		
Input Power			
Voltage (AC)	100 to 120 VAC / 200 to 240 VAC		
Frequency	50 /60 Hz ± 5%		
Apparent power	UT5430, UT5440: 600 VA	Fuse: T6.3A/250VAC (slow-blow)	
	UT5451, UT5452: 1000 VA	Fuse: T10A/250VAC (slow-blow)	
General Specifications			
Display screen	5-inch LCD capacitive touch screen		
Language	English, Traditional Chinese, Simplified Chinese		
Memory groups	Store up to 128 test files, with each file containing up to 200 test steps. Test modes can be combined freely.		
Test data storage	Local	130000	
Breakdown voltage test	√		
Continuous output	√		
Self-detection	√		
Scanner Interface	√		
Advanced user security	Customized permissions and password protection		
GFI (Electric Shock Protection)	Built-in intelligent electric shock protection (GFI) circuit with adjustable detection current. The circuit cuts off the high-voltage output < 1 mS upon detecting an abnormal condition.		
	0.4 to 5.0 mA, 0 = off	0.1 mA	± 0.1 mA
Communication interface	RS232, RS485, USB Host, LAN, Handler		
Communication protocol	SCPI, Modbus-RTU		
Normal operating temperature	0 to 40°C		
	Below 28°C, 30 to 70%RH (No condensation)		
	Above 28°C, 30 to 50%RH (No condensation)		
Storage temperature	-20 to 60°C / < 90%RH (No condensation)		
Dimensions	430 mm (W) x 89 mm (H) x 400 mm (D)		

Weight	UT5430: 12 kg
	UT5440: 16.5 kg
	UT5451: 16.5 kg
	UT5452: 21 kg

Accuracy guarantee temperature range: 25±5°C

Calibration interval: One year

3.3 Key Features

- Complies with general safety standards: CCC, IEC, EN, VDE, BS, UL, and JIS.
- 500 VA test capacity, equipped with a 5-inch LCD capacitive touch screen.
- 2U (8.9 cm) rack height, suitable for industrial and automated test systems.
- Voltage slow rise and slow fall, with adjustable test delay for insulation resistance measurements.
- Preset upper and lower limits, with intelligent evaluation and audio/visual alarms.
- DC withstand voltage test includes a rapid discharge function to eliminate residual charge and reduce electric-shock risk.
- Supports continuous voltage regulation across multiple ACW/DCW test steps without interruption.
- Arc detection function.
- OSC (Open/Short Circuit) check for wiring and connection verification.
- Rear-panel output interface for convenient integration into production-line automated testing.
- Breakdown voltage measurement capability.
- Electric-shock protection circuitry continuously monitors the output path to enhance operator safety.
- Stores up to 128 test files, each containing up to 200 test steps, supporting flexible combinations of test modes.
- Multiple interface options, supporting both SCPI and MODBUS, enabling easy integration into automated test platforms.

4. Panel Overview

4.1 Front Panel

UT5430/UT5451 Front Panel



UT5440/UT5452 Front Panel



No.	Item	Description
1	Power switch	Marked with symbols "1" (ON) and "0" (OFF), controls the instrument's input power.
2	START button	A green momentary pushbutton used to start the test.
3	RESET button	A red momentary pushbutton used for test reset and alarm control. During the test, press this button to stop the current test. In configuration mode, press this button to exit the setting mode, and directly enter the Test interface. During the test, press this button to turn off the alarm and wait for the next test.
4	Data port	Connects a USB flash drive to save test results and configuration parameters.

			USB flash drive capacity: ≤ 32 GB Format: FAT 32
	Barcode port		Connects a barcode scanner. Note: The Code 128 barcode format is recommended.
5	LCD		5-inch capacitive touch screen LCD displays settings and test results.
6	Nameplate		UNI-T Logo and model information.
7	Test indicators(LED)		After the test is completed, if the measured values are within the preset limits, the test result is judged as PASS, and the corresponding indicator illuminates. During the test, if any measured value exceeds the preset limit, the test result is judged as FAIL, and the corresponding indicator illuminates.
8	Terminal UT5430/51	Cont.Check	Continuity check terminal, typically used to test the grounding conductor of the DUT.
		Return	Return terminal.
	Terminal UT5440/52	SENSE+	Positive voltage sensing terminal for ground impedance testing and current output terminal for continuity resistance measurement.
		SENSE-	Measurement loop terminal.
		CURRENT	Current output terminal for ground impedance testing.
		RETURN	Current loop return terminal for ground impedance testing.
9	HV		High voltage output terminal.
10	Rotary knob		Adjusts output voltage finely during insulation withstand voltage testing. Screenshot function: Long-press the knob to save a screenshot to a connected USB flash drive.
11	Function button	Meas	Enters the Test interface.
		Setup	Enters the Parameter Setting interface for the current test step.
		Back	Returns to the previous menu or setting. During communication, the instrument automatically locks; long-press this button to unlock. In the test interface, long press this button to lock.
		Home	Enters the Home interface.

4.2 Rear Panel

UT5430/UT5451 Rear Panel



UT5440/UT5452 Rear Panel



No.	Item		Description
1	Terminal UT5430/51	Cont.Check	Continuity check terminal, typically used to test the grounding conductor of the DUT.
		Return	Return terminal.
	Terminal UT5440/52	SENSE+	Positive voltage sensing terminal for ground impedance testing and current output terminal for continuity resistance measurement.
		SENSE-	Measurement loop terminal.
		CURRENT	Current output terminal for ground impedance testing.
		RETURN	Current loop return terminal for ground impedance testing.
2	HV terminal		High voltage output terminal.
3	Signal output terminal		Remote control signal output terminal. D-type (9-pin) female connector. Uses relay contacts to output function signals such as PASS, FAIL, and PROCESSING for remote control devices. For detailed signal definitions, refer to the <i>Handler Interface</i> .
4	Signal input terminal		Remote control signal output terminal. D-type (9-pin) male connector. Receives control signals (Start, Stop) and remote control inputs for functions such as selecting and executing a specific file. For detailed signal definitions, refer to the <i>Handler Interface</i> .

5	Scanner 1, 2	External multi-channel scanner control interfaces.
6	LAN	Connection port for the LAN interface.
7	RS232/485 interface	Serial communication interface for connecting to a computer.
8	Ventilation hole	Provides heat dissipation for the instrument.
9	Fuse	Holds the input power fuse. When replacing, ensure the fuse matches the instrument's specified rating.
10	Power socket	Standard IEC 320 socket for connecting to NEMA-standard power cords.
11	Ground terminal	Chassis grounding terminal. Ensure the instrument is properly grounded before operation.

5. Inspection and Preparation

5.1 Packing List

Upon receiving the instrument, please check the packaging and list as follows.

1. Inspect the instrument for any damage, scratches, or other defects.
2. Verify all accessories against the packing list to ensure nothing is missing.

If any damage is found or accessories are missing, contact the UNI-T sales department or your local distributor for assistance.

Electrical safety analyzer	1	
Interlock switch	1	Attached to the tester
High-voltage test cable (Black)	2	Available on UT5430/UT5451 only
High-voltage test cable (Red)	1	
Grounding impedance output line	1	Available on UT5440/UT5452 only
Grounding impedance loop line	1	Available on UT5440/UT5452 only
Power cable	1	
Fuse	2 pcs	T6.3A 250V for UT5430/UT5440 T10A 250V for UT5451/UT5452
RS232C communication line	1	
User manual	1	Electronic version, available for download from the official website

5.2 Power Requirements

This series of instruments operates on a single-phase power supply with an input of 100–120 VAC or 200–240 VAC, 47–63 Hz. The instrument automatically detects the input voltage, and no voltage selector switch is required.

Before turning on the power switch, ensure that a fuse of the correct specification is installed. Confirm that the input voltage and fuse rating comply with the specifications marked on the instrument's rear panel.

Model	UT5430/UT5440	UT5451/UT5452
Voltage	100-120 VAC or 200-240 VAC	
Frequency	47-63 Hz	
Power consumption	600 VA	1000 VA
Fuse	T6.3A (250 V)	T10A (250 V)

- The supplied power cord is a three-core cable. Ensure that the power outlet's ground terminal is properly connected before use.
- When replacing the fuse, first disconnect the external power cord. Open the fuse holder located below the power inlet, remove the old fuse, and install a new fuse of the corresponding rating. Reinstall the fuse holder, and the instrument is ready for use.



Warning: Do not use the power cable if it is damaged, as this may cause electric shock or other hazards!

5.3 Environmental Requirements

The environmental requirements for operating the UT5400 series are shown in the table below. During load operation, the cooling fan of the safety analyzer adjusts its speed automatically based on the heat sink temperature.

Operating Environment	Requirements
Operating humidity	20% to 80% (non-condensation)
Operating temperature	0°C to 40°C
Storage temperature	-20°C to 60°C
Altitude	≤2000 meters
Pollution degree	2

5.4 Cleaning

To prevent the risk of electric shock, always disconnect the power cord before cleaning.

Wipe the housing and front panel with a clean, lightly dampened cloth, and ensure they are completely dry to prevent water from entering the instrument.

Do not clean the interior of the instrument.



Caution: Do not use solvents such as alcohol or gasoline for cleaning.

5.5 Daily Check

To prevent accidents, ensure that the following conditions are met before operation

1. The instrument input power supply complies with the specified requirements, and the power configuration is correct.
2. The instrument is reliably connected to protective earth.
3. The test leads are in good condition, with no breaks, cracks, or other damage.

6. Operation Overview

6.1 Power-On

6.1.1 Power Connection

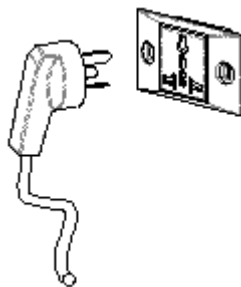
Connect one end of the power cord to the AC power input connector on the rear panel of the tester and plug the other end into a properly grounded mains outlet.

Figure 6-1 Power Connection



For safety and measurement accuracy, ensure that the tester is properly grounded.

Figure 6-2 Ground Connection



(a) Grounding Via Three-core Power Cord



(b) Grounding Via Rear-Panel Ground Terminal

There are two grounding methods, as illustrated in the figure above.

1. The tester is supplied with a three-conductor power cord. When the power cord is connected to a properly grounded power outlet, the tester chassis is automatically grounded.
2. Connect the tester's grounding terminal to the protective earth (PE) conductor of the power supply.

6.1.2 Interlock Switch

Connect the supplied interlock switch to the remote input terminal (SIGNAL INPUT) on the rear panel. This feature is available on the UT5400 series. Before setting any parameters, confirm whether the interlock is enabled.

Figure 6-3 Interlock Switch Installation



If the interlock switch is not installed, the instrument enters an interlock state, emits two beep tones, and displays a warning message on the screen, as shown in the following figure. In this state, the instrument cannot perform any tests.

Figure 6-4 Interlock Warning Message

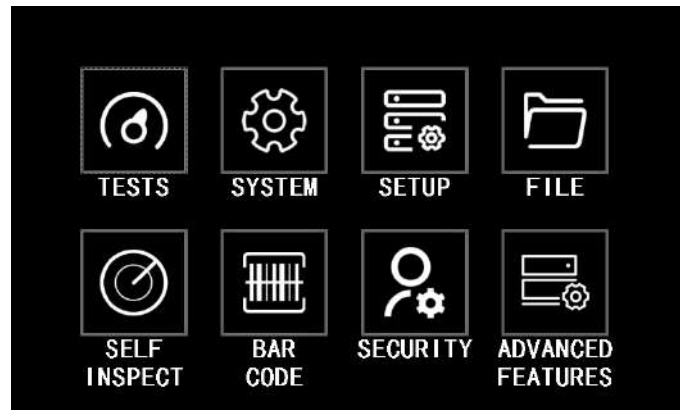


6.1.3 Boot-Up

Turn on the POWER switch located at the lower-left corner of the front panel. After the instrument is powered on, it automatically starts up and performs a self-test.

After boot-up, the instrument enters the Home interface by default. It can be configured in the system settings.

Figure 6-5 Home Interface



6.2 Touch Screen

The UT5400 series is equipped with a touch screen that allows efficient and intuitive configuration of system parameters, test parameters, safety settings, file recall, and other functions.

6.2.1 Tap Gestures

The UT5400 series displays icons and parameters across different interfaces. Tap the corresponding icons or parameters to configure settings, as shown in the figure below.

Figure 6-6 Tap Gestures



6.2.2 Scroll and Swipe Gestures

1. Screens with a scroll bar on the right side indicate that additional parameters are available. Users can view these parameters by scrolling up or down.

2. The <TESTS>, <SETUP>, and <FILE> interfaces support left-right swiping, allowing users to switch quickly between these three interfaces.
3. On the [Test] interface, users can scroll up or down to quickly switch between and select test steps, enabling efficient configuration of step parameters and test execution.

Figure 6-7 Scroll Gestures

Test Type	Voltage Test	Frequency
ACW	1.240 kV	50Hz
UP Limit Total	LOW Limit Total	ARC Detect
10.000 mA	0.000 mA	OFF
UP Limit Real	LOW Limit Real	ARC Level
10.000 mA	0.000 mA	Level 5
Rise Time	Dwell Time	Fall Time
0.1 s	1.0 s	0.0 s

Figure 6-8 Swipe Gestures



6.3 Home Interface

After power-on, the instrument enters the Home interface by default. The Home menu can also be accessed by pressing the Home button from any test interface. The Home menu provides access to all functions and settings of the tester.

Figure 6-9 Home Interface



The system currently supports eight menus, as listed in the table below.

Table 6-1 Home Menu

No.	Menu	Description
1	TESTS	Access the test execution interface to run test procedures.
2	SYSTEM	Configure system parameters, such as language, date/time, and related settings.
3	SETUP	Create and edit test files and configure test items and test sequences. Recall and modify existing test files.
4	FILE	Recall existing test files and configure test items and test sequences.
5	SELF INSPECT	Check the test functions are operating correctly.
6	BAR CODE	Barcode scanning and data association functions.
7	SECURITY	User permission management, instrument locking, and security functions.
8	ADVANCED FEATURES	Breakdown voltage testing. User-defined function.

6.4 System Setting

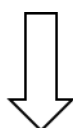
Tap the [SYSTEM] icon on the default home menu to enter the System Settings submenu. All system parameters can be configured in this submenu.

These parameters are the general settings of the instrument and are not related to the functional parameters used for testing.

The storage location of system parameters is entirely separate from that of functional parameters.

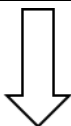
Figure 6-10 System Menu

Language	Touch Beep
English	ON
Warning Beep	Volume
OFF	1
Auto Save	Hardware Button
ON	OFF
Boot Screen	Communication Mode
TESTS	RS232



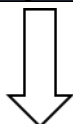
Scroll down

Communication Protocol	Baud Rate
SCPI	9600
Address	PORT
1	502
IP Address	Auto ground interrupt
192.168.30.36	5.0mA
Remote Control	Single step test
OFF	OFF



Scroll down

Test failure stop	Continuous Output
ON	OFF
Screen Saver	RESULT
ON	Final Step
Clear Reset	Date Setting
ON	2025/11/25
Time Setting	Protocol Selection
08:48:32	Protocol Default



Scroll down

Parameter import/export	System Reset
Model	Serial Number
UT5440	CES4025150001
Software Version	Hardware Version
V1.62	V1.00

6.4.1 Language

The instrument supports three languages: Simplified Chinese, Traditional Chinese, and English.

6.4.2 Touch Beep

This function enables or disables the audio prompt that sounds when screen fields or keys are touched.

- ON: A tone is played upon touching a field or key.
- OFF: No audio tone is produced.

6.4.3 Warning Beep

This function enables or disables the beep that is triggered by test abnormalities.

- ON: A beep sounds.
- OFF: No beep is produced.

6.4.4 Volume

The volume level ranges from 1 (minimum) to 9 (maximum).

Enter the desired volume level using the numeric keypad and press the ENTER key. The new alarm volume is applied immediately, and a tone will play at the selected level.

After the setting is confirmed, the instrument automatically saves the volume level to memory.

6.4.5 Auto Save

The instrument can automatically save modified test parameters to the current file. This function is enabled by default.

- ON: Any changes to parameters are automatically saved to the current file when exiting the settings page and entering the Test interface.
- OFF: Automatic saving is disabled, and parameters must be saved manually.

6.4.6 Hardware Button

This instrument supports fine adjustment of the output voltage during insulation withstand voltage tests.

- ON: Users can rotate the rotary knob on the front panel to adjust the output voltage. Clockwise rotation increases the voltage, while counterclockwise rotation decreases it.
- OFF: The function is disabled.

6.4.7 Boot Screen

Set the default interface that appears when the instrument powers on.

Table 6-2 Boot-Up Interface

Type	Description
TESTS	Displays the Test menu by default after boot-up.
Home	Displays the Home menu by default after boot-up.

FILE	Displays the File menu by default after boot-up.
------	--

6.4.8 Communication Settings

Table 6-3 Communication Settings

Item	Setting	Default	Description
Communication Mode	RS232, RS485, LAN	RS232	The instrument supports three types of remote control interfaces: RS232, RS485, and LAN.
Communication Protocol	SCPI, MODBUS (RTU)	SCPI	The instrument supports two communication protocols: SCPI and Modbus (RTU). - SCPI is generally more convenient for computer communication. - Modbus (RTU) is commonly used for industrial control devices, such as PLCs.
Baud Rate	4800, 9600, 19200, 38400, 57600, 115200	9600	Baud rate setting for serial communication. Default configuration: - Data bits: 8 - Stop bits: 1 - Parity: None
Port (RS485)	1-32	1	Sets the local station address when using RS485. - Station 00 can be used for broadcast communication. 1-32: Station address when connected to the bus.
IP Address	192.168.030.036		Modifiable via the numeric keypad. Applicable when communication mode is set to LAN.
Port		502	Default port for LAN communication. Not modifiable.
Protocol Selection	Protocol Default, Protocol e, Protocol A	Default	Allows selection among multiple communication command sets for compatibility with instruments from mainstream brands.

6.4.9 Auto Ground Interrupt

Enter the detection current for the Auto Ground Interrupt function using the numeric keypad.

Setting range: 0.4-5.0 mA. 0 indicates off.

Default setting: OFF

Example: If the current is set to 4 mA, the analyzer will immediately trigger an alarm and stop output if a current exceeding 4 mA is detected, such as accidental human contact during DUT (Device Under Test) measurement.

6.4.10 Remote Control

Select ON or OFF on the screen to enable or disable the Remote Control (PLC) function.

- ON: The analyzer's test start function is controlled via the remote control terminal on the rear panel. The front panel START switch is inactive, while the RESET switch remains fully operational.
- OFF: All test operations are controlled by the front panel START and RESET switches. The remote STOP function on the rear panel remains active.

6.4.11 Single Step Test

- ON: The analyzer performs a step-linked test (multiple test steps within one file). After completing the first step, the START switch must be pressed to proceed to the next step.
- OFF: During a step-linked test, the analyzer automatically proceeds to the next step after completing the current step.
- Default setting: OFF.

6.4.12 Test Failure Stop

This function is used to link individual test steps into a test sequence.

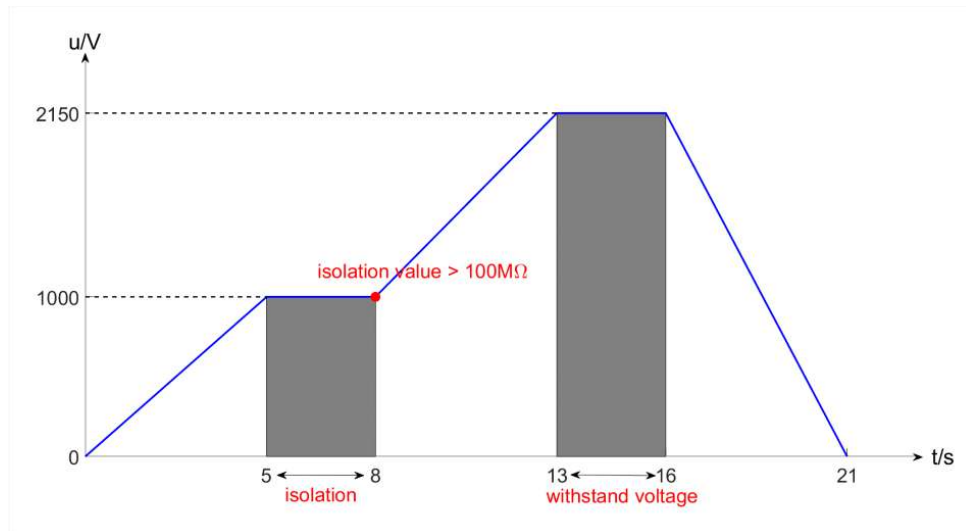
- ON: If a DUT fails during a test step, the test sequence stops at that step. Remaining steps can be executed by pressing the START switch. Pressing RESET first and then START will restart the sequence from the first step.
- OFF: The analyzer continues running the entire test sequence to completion, even if a DUT fails at any step.
- Default setting: OFF.

6.4.13 Continuous Output

This function prevents the test voltage from dropping to 0 V when consecutive steps use the same test parameters.

- ON: If the voltage of Test Step 1 differs from Test Step 2, the voltage ramps directly from Step 1 to Step 2 without dropping to 0 V.
- OFF: After completing Test Step 1, the voltage drops to 0 V before rising to the voltage set for Test Step 2.
- Default setting: OFF.

Figure 6-11 Continuous Output (Uninterrupted Voltage Mode)



6.4.14 Screen Saver

Tap ON or OFF on the screen to enable or disable the screen saver function.

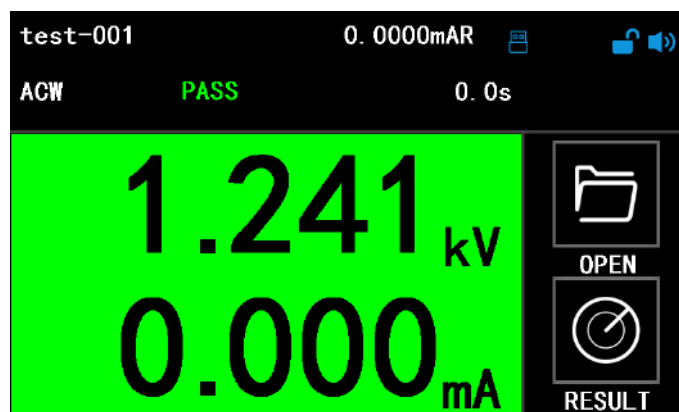
- ON: If the instrument remains idle for more than 30 minutes, the screen saver activates automatically. When the screen saver is active, pressing any key once will wake the screen. After waking, all keys and command operations resume their original functions.
- OFF: The function is disabled.

6.4.15 Test Result

This function specifies how test results are displayed. Three display modes are available: Final Step, All, and Pass/Fail.

Final Step Mode

For single tests or step-linked tests, only the result of the final test step is displayed after the test is completed, as shown in the following figure.



All Mode

For single tests or step-linked tests, the results of all executed test steps are displayed after the test is

completed, as shown in the following figure.

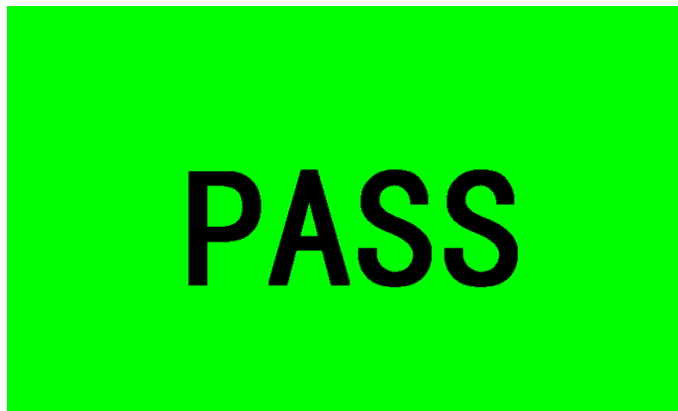
001: ACW PASS 1. 240kV, 0. 000mA 0. 000mAR	002: ACW PASS 1. 241kV, 0. 000mA 0. 000mAR
003: ACW PASS 1. 240kV, 0. 000mA 0. 000mAR	

Pass/Fail Mode

For single tests or step-linked tests, only the overall test result is displayed as PASS or FAIL after completion.

- If any test step fails, the screen displays FAIL.
- If all test steps pass, the screen displays PASS.

The display is shown in the following figure.



6.4.16 Clear Reset

After a clear reset is executed, the instrument restarts and all system configuration parameters are restored to their factory default settings.

6.4.17 Date/Time Setting

The instrument uses a 24-hour clock format. Set the date and time by touching the screen and entering the required values.

6.4.18 System Reset

After a clear reset is executed, the instrument restarts and all system configuration parameters are restored to their factory default settings.

6.4.19 Parameter Import/Export

The instrument supports the import and export of system parameters.

This function allows edited system parameter data to be exported to a USB flash drive for backup purposes or imported into other instruments of the same series.

To use this function, first insert a compatible USB flash drive into the DATA port on the front panel.

Figure 6-12 Parameter Import/Export

File Operation		
Udisk to Local		ESC
Save to Udisk		

Tap Save to Udisk to save the system data to a USB flash drive.

Tap Udisk to Local to load the saved system data from USB flash drive into the instrument.

6.4.20 System Information

System information includes the Model, Serial Number, Software Version, and Hardware Version.

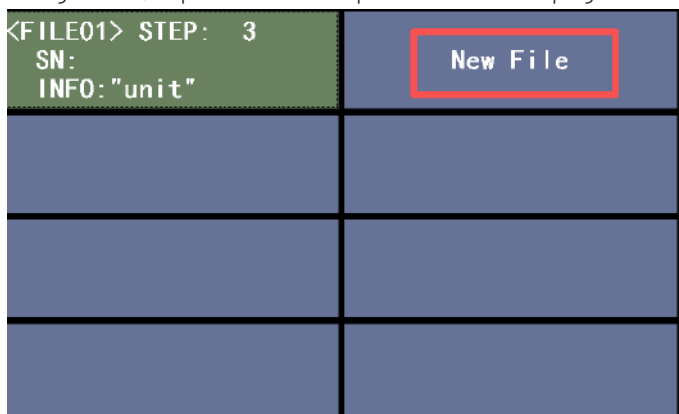
Model	Serial Number
UT5430	CES3025510001
Software Version	Hardware Version
V1. 23	V1. 00

6.5 Setup

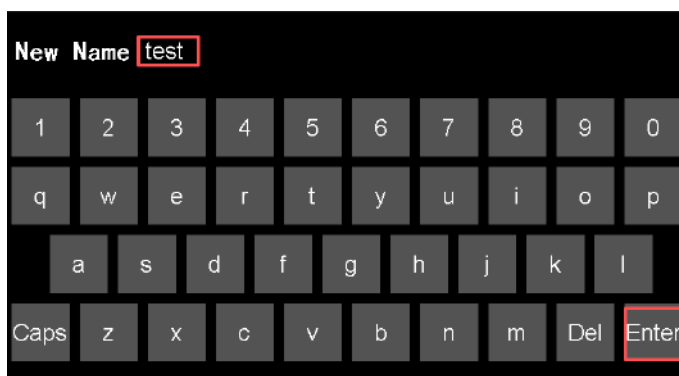
1. In the Home menu, tap SETUP icon to access the parameter setting menu.



2. In the system setting menu, tap New File to open the new file page.



3. On the new file page, use the numeric keyboard to enter the filename, and tap Enter key to complete the setting.



4. The new file is added, as shown in the following figure. In this example, the file number is 02 and the file name is test.

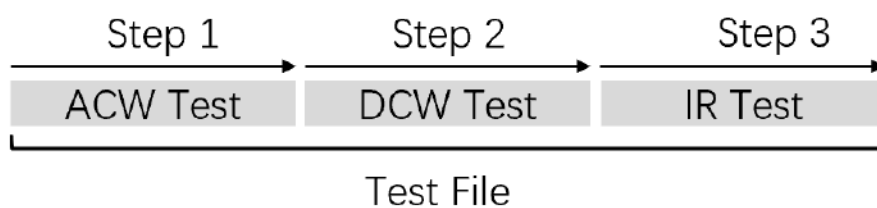
<FILE01> STEP: 3 SN: INFO: "unit"	<FILE02> STEP: 0 SN: INFO: "test"
New File	

6.5.1 Test File and Test Step

An auto test consists of test files and test steps. A test file is a collection of test steps.

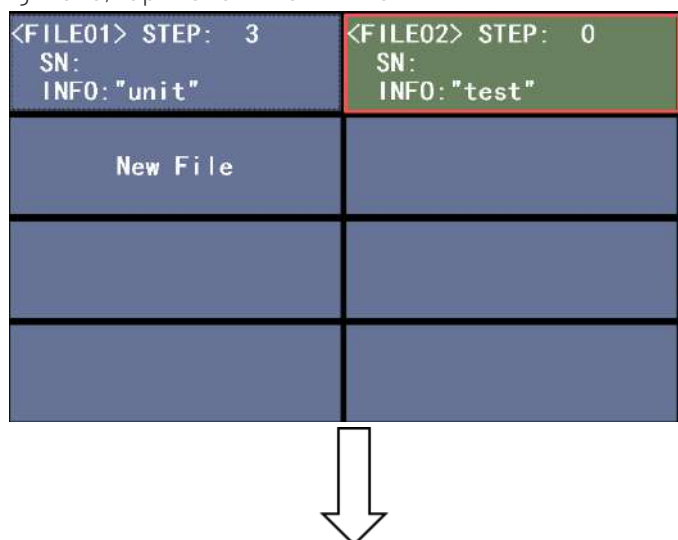
A specific test can be assigned to each step, starting from step 1 and executed sequentially. When the last step is completed, the test file is finished.

Figure 6-13 Test File



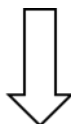
6.5.2 Add Step

1. In the system setting menu, tap the test file <FILE02>.



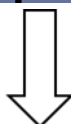
2. In the system setting menu, tap New Item to add a step.

New Item	



3. Tap New Item again to add multiple steps in sequence.

001: ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s	New Item



4. Add four steps, as shown in the following figure.

001: ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s	002: ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s
003: ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s	004: ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s
New Item	

Note: To modify the test parameters of each step, press Meas to return to the measurement setting menu, then scroll up or down to adjust the parameters. For more details, refer to Table 6-13.

6.5.3 Insert/Delete Step

1. In the step setting menu, long-tap the selected test step to delete it. For example, to delete Step <002>, as shown in the following figure.

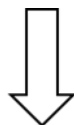
001: ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s	002: ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s
003: ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s	004: ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s
New Item	



2. In the step setting menu, four options are available.
 - Insert up: Inserts a new step immediately above the currently selected step. For example, a step can be inserted between the first and second steps.
 - Delete: Deletes the currently selected step.
 - Insert down: Inserts a new step immediately below the currently selected step. For example, a step can be inserted between the second and third steps.
 - TESTS: Jump to the test interface and run all selected steps.

For example, tap Delete option.

Prompt	[	]
Insert up		
Delete		
Insert down		
TESTS		



3. Tap Enter to confirm.

Prompt	Delete	
Insert up		ESC
Delete		
Insert down		ENTER
TESTS		



4. The second step is deleted, reducing the total number of test steps from 4 to 3.

001:ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s	002:ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s
003:ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s	New Item

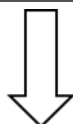
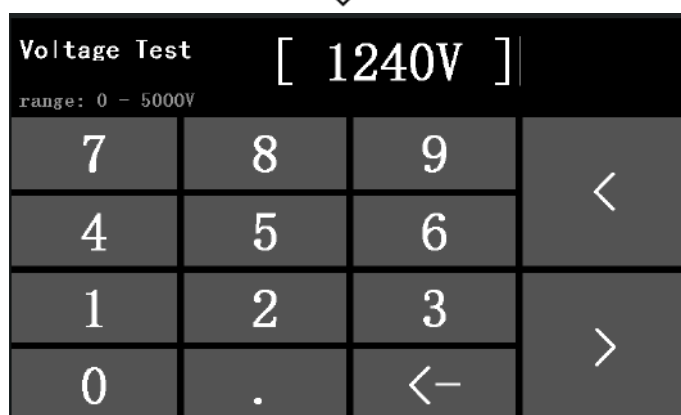
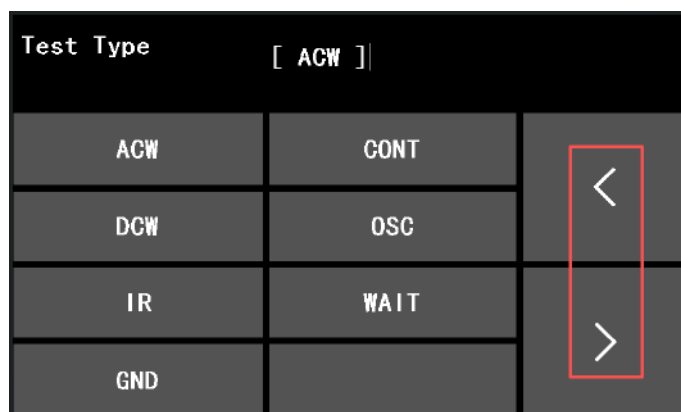
6.5.4 Edit Test Parameter

1. Using Step <001> as an example, tap Step 1 field to enter the parameter setting menu.

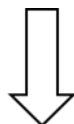
001:ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s	002:ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s
003:ACW 1.240kV 10.000mA, 0.000mA 50HZ, 1.0s	New Item



2. Set each parameter in sequence as required. Tap "<" or ">" to switch between parameters for adjustment.
After modifying a test parameter, tap Enter to confirm. The interface automatically moves to the next test parameter.



3. Optionally, set the prompt information for this test step. Tap Enter to complete the parameter setting.
- After setting prompt information, a dialog box appears before the test of each step. Press START to confirm and start the test.
 - To run multiple steps continuously without pauses, leave the prompt information blank.



4. Access the Parameter interface after configuring the test parameters, or by pressing the Setup

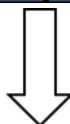
button.

Test Type	Voltage Test	Frequency
ACW	1.240 kV	50Hz
UP Limit Total	LOW Limit Total	ARC Detect
10.000 mA	0.000 mA	OFF
UP Limit Real	LOW Limit Real	ARC Level
10.000 mA	0.000 mA	Level 5
Rise Time	Dwell Time	Fall Time
0.1 s	1.0 s	0.0 s

6.5.5 Test File Setting

Navigate Home→ Setup to enter the test file setting menu. The test file setting supports the following operations: save, delete, read, rename, save to Udisk, U-Disk to local, and product code.

<FILE01> STEP: 3 SN: INFO: "unit"	<FILE02> STEP: 0 SN: INFO: "test"
New File	



Prompt []		
Save	Save to Udisk	
Delete	Udisk to Local	
Read	Product CODE	
Rename		

Table 6-4 Test File Setting

Function	Description
Save	Manually save the file for direct recall upon the next boot.
Delete	Delete the selected file. Note: Files currently in use by the system cannot be deleted.

Read	Recall the selected file.
Rename	Rename the selected file.
Save to Udisk	Export the currently selected test file to a USB flash drive.
Udisk to Local	Import test file data stored on a USB flash drive to the instrument.
Product Code	A unique product code can be set in the file information.

Tap Product Code, use the numeric keyboard or a barcode scanner to enter the product code. SN indicates the product code.



6.5.6 AC Withstand Voltage Test

Press the Setup button to enter the parameter setting menu.

Figure 7-14 AC Withstand Voltage Interface

Test Type	Voltage Test	Frequency
ACW	1.240 kV	50Hz
UP Limit Total	LOW Limit Total	ARC Detect
10.000 mA	0.000 mA	OFF
UP Limit Real	LOW Limit Real	ARC Level
10.000 mA	0.000 mA	Level 5
Rise Time	Dwell Time	Fall Time
0.1 s	1.0 s	0.0 s



UP Limit Real	LOW Limit Real	ARC Level
10.000 mA	0.000 mA	Level 5
Rise Time	Dwell Time	Fall Time
0.1 s	1.0 s	0.0 s
Make Zero	Range	CONTINUITY
0.000 mA	AUTO	OFF
Prompt	Default	

Table 6-5 AC Withstand Voltage Test Setting

Item	Setting	Default	Description
Test Type	ACW, DCW, IR, GND, CONT, OSC, WAIT	ACW	Select the test type.
Voltage Test	(0 to 5000) V	1240 V	Output voltage of AC withstand voltage test.
UP Limit Total	(0.000 to 40) mA	10 mA	Total upper limit of resistive current (UT5430, UT5440)
	(0.000 to 100) mA		Total upper limit of resistive current (UT5451, UT5452)
LOW Limit Total	(0.000 to 40) mA	0 mA	Total lower limit of resistive current (UT5430, UT5440)
	(0.000 to 100) mA		Total lower limit of resistive current (UT5451, UT5452)
UP Limit Real	(0.000 to 40) mA	10 mA	Upper limit of resistive current (UT5430, UT5440)
	(0.000 to 100) mA		Upper limit of resistive current (UT5451, UT5452)
LOW Limit Real	(0.000 to 40) mA	0 mA	Lower limit of resistive current (UT5430, UT5440)
	(0.000 to 100) mA		Lower limit of resistive current (UT5451, UT5452)
Rise Time	(0.1 to 999.9) s	0.1 s	Limits the output voltage ramp-up to the set value.

Dwell Time	(0.2 to 999.9) s, 0=Continuous test	1.0 s	If the range is set to Auto, the dwell time corresponds to the test duration of the current step.
	(0.1 to 999.9) s, 0=Continuous test		If the range is set to Fixed, the dwell time corresponds to the test duration of the current step.
Fall Time	(1.0 to 999.9) s 0=OFF	0.0 s	Limits the output voltage ramp-down to the set value.
ARC Detect	ON/OFF	OFF	Enables or disables the Arc detection function.
ARC Level	1 to 9	5	Alarm sensitivity level for arc detection. Level 9 represents the highest sensitivity.
Make Zero	Zeroable, non-configurable	0 mA	Leakage current zero setting.
			Press the START button to automatically measure and zero the leakage current of test leads and fixture. Note: The DUT must be disconnected, and the test leads must remain open-circuit during zeroing.
			The numeric key 0 can also be used to perform zeroing.
Frequency	50 Hz/60 Hz	50 Hz	Output frequency of AC withstand voltage test.
CONTINUITY	ON/OFF	OFF	Verifies whether the ground wire is properly connected to the device enclosure before high-voltage output is enabled.
Range	Auto, Fixed	Auto	Sets the current range to auto or fixed.
			Auto: The instrument automatically selects the appropriate current range.
			Fixed: The current range is determined by the configured total current upper limit. Fixed mode shortens test time and is suitable for production sorting tests.
Prompt			Enables a prompt message before the current test step starts.
Default			Restores the parameters of the current step to factory default settings.

Arc Level

An arc (ARC) is a physical phenomenon caused by the sudden release of electrical charge energy. Because it does not directly correspond to a specific current value, relying solely on current measurements may lead to misjudgment.

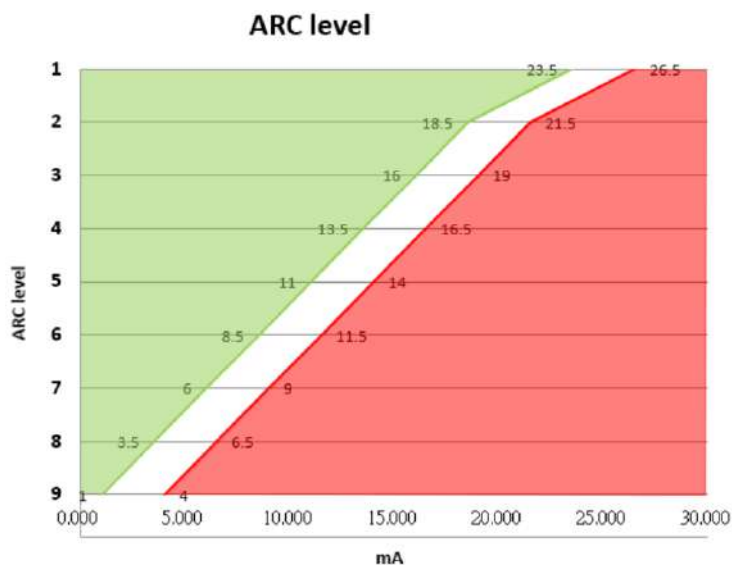
The UT5400 series converts arc energy into an equivalent peak current that the instrument can interpret. This peak current is then compared with the preset reference level to determine whether an arc condition has occurred.

Note: The converted peak current value is used internally for arc detection and is not displayed on the withstand voltage tester.

Due to unavoidable errors in the energy-to-current conversion process, the UT5400 series controls arc detection accuracy within ± 1 level, providing more reliable and precise arc detection performance.

Refer to the figure below for the current values corresponding to each arc level.

Figure 6-15 Arc Level Corresponds to Current Value



6.5.7 DC Withstand Voltage Test

Figure 6-16 DC Withstand Voltage Test Interface

Test Type	Voltage Test	Low Range
DCW	1.500 kV	OFF
UP Limit Total	LOW Limit Total	ARC Detect
10000 uA	0.0 uA	OFF
H-Ramp Limit	L-Charge Limit	ARC Level
10000 uA	0.0 uA	Level 5
Rise Time	Dwell Time	Fall Time
0.4 s	1.0 s	0.0 s

H-Ramp Limit	L-Charge Limit	ARC Level
10000 uA	0.0 uA	Level 5
Rise Time	Dwell Time	Fall Time
0.4 s	1.0 s	0.0 s
Make Zero	Range	CONTINUITY
0.0000 uA	AUTO	OFF
Prompt	Default	

Table 6-6 DC Withstand Voltage Test Setting

Item	Setting	Default	Description
Test Voltage	(0 to 6000)V	1500 V	Output voltage of DC withstand voltage test.

UP Limit Total	(0 to 10000) μ A	10000 μ A	Total upper limit of current (UT5430, UT5440, UT5451, UT5452)
LOW Limit Total	(0 to 10000) μ A	0 μ A	Total lower limit of current (UT5430, UT5440, UT5451, UT5452)
Rise Time	(0.4 to 999.9) s	0.4 s	When the low range is set to off, the output voltage ramps up to the set value over this duration.
	(0.5 to 999.9) s	0.5 s	When the low range is set to off, the output voltage ramps up to the set value over this duration.
Dwell Time	(0.4 to 999.9) s, 0=Continuous test	1.0 s	When the low range is set to off, the dwell time corresponds to the test duration of the current step.
	(1.0 to 999.9) s, 0=Continuous test		When the low range is set to on, the dwell time corresponds to the test duration of the current step.
Fall Time	(1.0 to 999.9) s, 0=OFF	0.0 s	Limits the output voltage ramp-down to the set value.
L-Charge Limit	(0.0 to 350.0) μ A, low range (OFF)	0 μ A	Minimum charge current setting. This function is used to verify whether the test leads or test fixtures are properly connected, thereby ensuring the accuracy of test results. During insulation testing, the leakage current is typically extremely small, making it unreliable to use the lower leakage current limit to determine whether the test leads or fixtures are correctly connected. Because the (DUT) inherently exhibits a certain amount of capacitance, its charging current can be measured and used as a reliable criterion for confirming proper test lead or fixture connection. - Manual setting: Enter the minimum charging current value using the numeric keypad. - Auto setting: First, properly connect the instrument to the DUT using the test leads or fixtures. Ensure that the output voltage and voltage ramp-up time settings are identical to those used in the actual test. After pressing the START key, the analyzer automatically measures the DUT charging current and sets the minimum charging current to approximately half of the measured value.
	(0.0 to 35.0) μ A, low range (On)		
ARC Detect	ON/OFF	OFF	Enables or disables the Arc detection function.
ARC Level	1 to 9	5	Alarm sensitivity level for arc detection.
Zero	Zeroable, non-	0 μ A	Leakage current zero setting.

	configurable		Press the START button to automatically measure and zero the leakage current of test leads and fixture. Note: The DUT must be disconnected, and the test leads must remain open-circuit during zeroing. The numeric key 0 can also be used to perform zeroing.
H-Ramp Limit	(0 to 10000) μ A	0 μ A	The voltage ramp-up upper Limit function monitors the charging current only during the voltage ramp-up period. Its primary purpose is to prevent incorrect judgments caused by the charging current of certain devices under test (DUTs), which may exceed the leakage current upper limit during DC withstand voltage testing. This ensures the accuracy of the leakage current upper limit assessment
CONTINUITY	ON/OFF	OFF	Verifies whether the ground wire is properly connected to the device enclosure before high-voltage output is enabled.
Range	Auto, Fixed	Auto	Sets the current range to auto or fixed. Auto: The instrument automatically selects the appropriate current range. Fixed: The current range is determined by the configured total current upper limit. Fixed mode shortens test time and is suitable for production sorting tests.
Low Range	ON/OFF	OFF	Low current resolution setting. ON: The minimum current resolution is 0.0001 μ A. OFF: The minimum current resolution is 0.1 μ A.
Prompt			Enables a prompt message before the current test step starts.
Default			Restores the parameters of the current step to factory default settings.

6.5.8 Insulation Resistance Test

Figure 6-17 Insulation Resistance Test Interface

Test Type	Voltage Test	L-Charge Limit
IR	0.500 kV	0.0 uA
Upper Limit	Lower Limit	Rise Time
0.00 MΩ	0.10 MΩ	0.1 s
Delay Time	Dwell Time	Fall Time
0.5 s	0.5 s	0.0 s
Prompt	Default	

Table 6-7 Insulation Resistance Test Setting

Item	Setting	Default	Description
Test Voltage	(10 to 6000) V	500 V	Output voltage of insulation resistance test.
Upper Limit	(0.1 to 50000) MΩ, 0=Unlimited	Unlimited	Upper limit of insulation resistance.
Lower Limit	(0.1 to 50000) MΩ	0.1 M	Lower limit of insulation resistance.
Rise Time	(0.1 to 999.9) s	0.1 s	Limits the output voltage ramp-up to the set value.
Delay Time	(0.5 to 999.9) s	0.5 s	The delay time parameter defines the time used as the basis for performing upper and lower limit judgments of insulation resistance. Because most devices under test (DUTs) exhibit capacitance and generate significant charging currents, the delay allows the analyzer to perform the judgment only after the charging current has stabilized. The appropriate delay time should be selected according to the capacitance of the DUT and the required accuracy of the insulation resistance measurement.
Dwell Time	(0.5 to 999.9) s, 0=Continuous test	0.5 s	Indicates the test duration of the current step.
Fall Time	(1.0 to 999.9) s, 0=OFF	0.0 s	Limits the output voltage ramp-down to the set value.

L-Charge Limit	(0.0 to 3.50) μ A	0 μ A	Minimum charge current setting. This function is used to verify whether the test leads or test fixtures are properly connected, thereby ensuring the accuracy of test results. During insulation testing, the leakage current is typically extremely small, making it unreliable to use the lower leakage current limit to determine whether the test leads or fixtures are correctly connected. Because the (DUT) inherently exhibits a certain amount of capacitance, its charging current can be measured and used as a reliable criterion for confirming proper test lead or fixture connection. - Manual setting: Enter the minimum charging current value using the numeric keypad. - Auto setting: First, properly connect the instrument to the DUT using the test leads or fixtures. Ensure that the output voltage and voltage ramp-up time settings are identical to those used in the actual test. After pressing the START key, the analyzer automatically measures the DUT charging current and sets the minimum charging current to approximately half of the measured value.
Range	Auto, Fixed	Auto	Sets the current range to auto or fixed. Auto: The instrument automatically selects the appropriate current range. Fixed: The current range is determined by the configured total current upper limit. Fixed mode shortens test time and is suitable for production sorting tests.
Low Range	ON/OFF	OFF	Low current resolution setting. ON: The minimum current resolution is 0.0001 μA. OFF: The minimum current resolution is 0.1 μA.
Prompt			Enables a prompt message before the current test step starts.
Default			Restores the parameters of the current step to factory default settings.

6.5.9 Grounding Resistance Test

Figure 6-18 Grounding Resistance Test Interface

Test Type	Current Test	Voltage Test
GND	25.000 A	8.000 V
Upper Limit	Lower Limit	Frequency
100 mΩ	0 mΩ	50Hz
Dwell Time	Make Zero	Prompt
1.0 s	0.000 mΩ	
Default		

Table 6-8 Grounding Resistance Test Setting

Item	Setting	Default	Description
Current Test	(1.00 to 40.00) A	25.0 A	Output current of grounding resistance.
Voltage Test	3.00 to 8.00 VAC	8.0 V	The output voltage parameter is primarily used to limit the maximum open-circuit voltage, i.e., to set the output voltage in constant voltage mode. In contrast, constant current mode is used during grounding resistance measurements. To ensure compliance with all range specifications in constant current mode, the output voltage should be set to 8 V.
Upper Limit	0 to 150 mΩ for 30.01 to 40.00 A 0 to 200 mΩ for 10.01 to 30.00 A 0 to 600 mΩ for 1.00 to 10.01 A	100 mΩ	Upper limit of grounding resistance.
Lower Limit	0 to 150 mΩ for 30.01 to 40.00 A 0 to 200 mΩ for 10.01 to 30.00 A 0 to 600 mΩ for 1.00 to 10.01 A	0mΩ	Lower limit of grounding resistance.
Dwell Time	(0.5~999.9) s, 0=Continuous test	1.0 s	Indicates the test duration of the current step.
Frequency	50 Hz/60 Hz	50 Hz	Output frequency of grounding resistance.
Zero	0 to 200 mΩ, Auto	0 mΩ	Test lead zeroing setting - Manual setting: Enter the desired value using the numeric keypad and press ENTER to save the test lead zero adjustment. The adjustable range is 0 to 200 mΩ. - Auto setting:

			1. Connect the test leads, fixtures, and, if applicable, the power cords or connecting wires of DUT in series to form a loop. Include the power cords or connecting wires in the loop if their resistance should be part of the offset. 2. Connect the two ends of the loop to the CURRENT and RETURN terminals of the instrument. 3. Press the START key. The instrument will automatically output the current specified in the test file (according to the output current configuration displayed on the LCD) and measure the resistance of the loop. Zero-Impedance Compensation for Grounding Impedance Test 
Prompt			Enables a prompt message before the current test step starts.
Default			Restores the parameters of the current step to factory default settings.

6.5.10 Ground Continuity Test

Figure 6-19 Ground Continuity Test Interface

Test Type	Upper Limit	Lower Limit
CONT	1000 Ω	0.000 Ω
Dwell Time	Make Zero	Prompt
1.0 s	0.000 Ω	
Default		

Table 6-9 Ground Continuity Test Setting

Item	Setting	Default	Description
Upper Limit	(0 to 10000) Ω	1000 Ω	Upper limit of ground continuity test.
Lower Limit	(0 to 10000) Ω	0 Ω	Lower limit of ground continuity test.
Dwell Time	(0.4 to 999.9) s, 0=Continuous test	1.0 s	Indicates the test duration of the current step.
Zero	0 to 10.00 Ω , Auto	0 Ω	Test lead zeroing setting - Manual setting: Enter the desired value using the numeric keypad and press ENTER to save the test lead zero adjustment. The adjustable range is 0 to 10.00 Ω. - Auto setting: - Connect the test leads, fixtures, and, if applicable, the power cords or connecting wires of DUT in series to form a loop. Include the power cords or connecting wires in the loop if their resistance should be part of the offset. - Connect the two ends of the loop to the CURRENT (or CONT. CHECK) and RETURN terminals of the instrument. - Press the START key. The instrument will automatically output the current specified in the test file (according to the output current configuration displayed on the LCD) and measure the resistance of the loop. UT5430/51 Zero-Impedance Compensation for

			Ground Continuity Test  UT5440/52 Zero-Impedance Compensation for Ground Continuity Test 
Prompt			Enables a prompt message before the current test step starts.
Default			Restores the parameters of the current step to factory default settings.

6.5.11 Open/Short Circuit (OSC) Detection

Figure 6-20 OSC Detection Interface

Test Type	Open Ratio	Short Ratio
OSC	50%	300%
Sampling	Prompt	Default
10.0000 nF		

Table 6-10 OSC Detection Setting

Item	Setting	Default	Description
Open Ratio	10% to 100%, step 1%	50%	Sets the criterion for judging a test result as an open circuit, expressed as a percentage of the measured value relative to the sampled standard value.
Short Ratio	100% to 500%, 0 to OFF, step 10%	300%	Sets the criterion for judging a test result as a short circuit, expressed as a percentage of the measured value relative to the sampled standard value. A setting of 0 disables the function, and no short-circuit judgment is performed.
Sampling	0.001 to 40 nF	10.0 nF	Sets the standard capacitance value for open/short circuit detection. The standard value can be entered manually via the numeric keypad, or obtained automatically through a sampling operation, which assigns the measured value as the standard.
Prompt			Enables a prompt message before the current test step starts.
Default			Restores the parameters of the current step to factory default settings.

Sampling Standard

The standard capacitance value can be manually entered via the numeric keypad or automatically obtained through a sampling operation.

In standard value sampling mode, the instrument outputs an AC signal with a voltage of 100 V and a frequency of 600 Hz. The current flowing through the device under test (DUT) is measured over a 1-second period.

Caution: Voltage is present during sampling. Ensure all proper safety precautions are followed.

The capacitance displayed by the instrument is not the actual capacitance, but a value calculated from the

measured current using impedance conversion. This value should be approximately equal to the actual capacitance connected between the test terminals.

OSC Detection Example

Example: 3-coil inductor

- Capacitance between Terminal 1 and Terminal 2: approx. 300 pF
- Capacitance between Terminal 1 and Terminal 3: approx. 200 pF
- A short circuit may occur between Terminal 2 and Terminal 3.

Setting Steps:

1. Determine the open-circuit reference
Disconnect the DUT and perform sampling to obtain the open-circuit value: $C_s = 100 \text{ pF}$
2. Determine the standard value
Connect the DUT and perform sampling multiple times. Record the sampling range: $C_s = 350\text{--}450 \text{ pF}$
3. Determine the short-circuit reference
Short Terminal 2 and Terminal 3, then perform sampling multiple times to obtain the range: $C_s = 550\text{--}650 \text{ pF}$

Parameter Calculation:

1. Assume the standard value: $C_s = 400 \text{ pF}$
2. OPEN judgment
 - Lower limit: $100 \text{ pF} / 400 \text{ pF} = 25\%$
 - Upper limit: $350 \text{ pF} / 400 \text{ pF} = 88\%$
 - Recommended setting: 60%
3. SHORT judgment
 - Lower limit: $450 \text{ pF} / 400 \text{ pF} = 112\%$
 - Upper limit: $550 \text{ pF} / 400 \text{ pF} = 138\%$
 - Recommended setting: 125%

6.5.12 Delay Time

Figure 6-21 Delay Time Interface

Test Type	Delay Time	Prompt
WAIT	1.0 s	
Default		

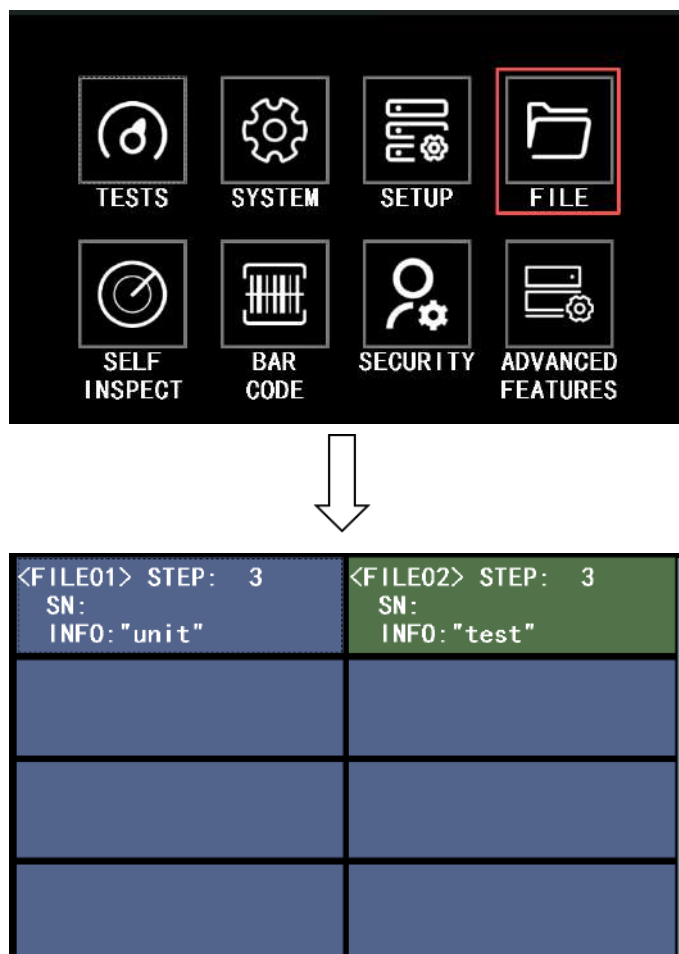
Table 6-11 Delay Time Setting

Item	Setting	Default	Description
WAIT	(0.1 to 999.9) s, 0=Continuous test	1.0 s	Delay time
Prompt			Enables a prompt message before the current test step starts.
Default			Restores the parameters of the current step to factory default settings.

6.6 File Management

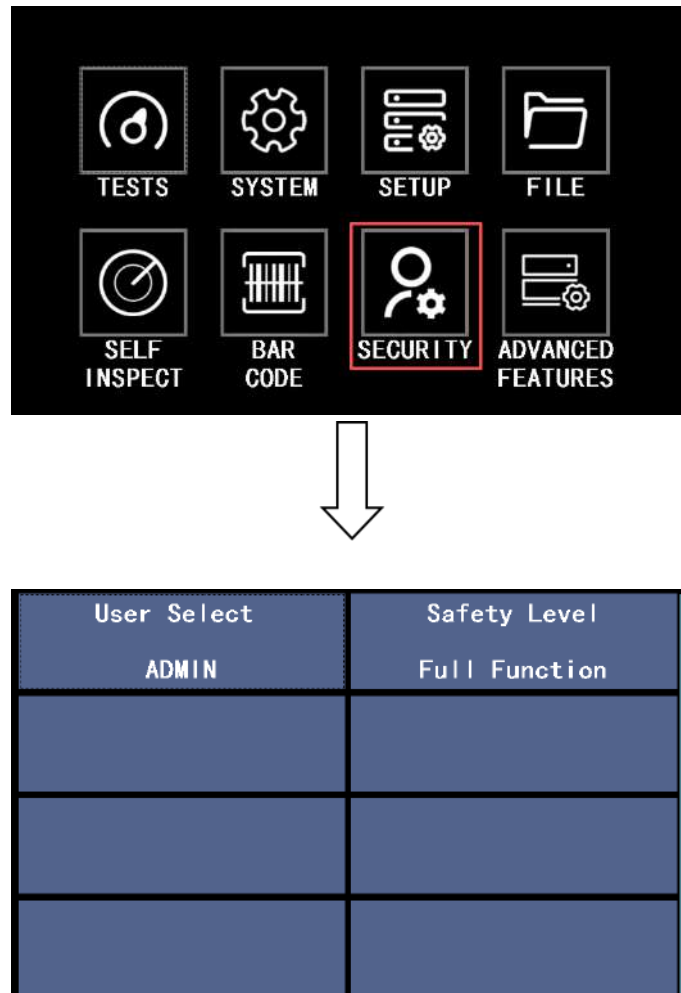
The file management menu allows users to load existing test files and configure test items and procedures. Editing existing test files (delete/rename/save) is not supported on this menu.

To access the File menu, click [OPEN] in the <Meas> menu or [FILE] in the Home menu.



6.7 Security Setting

The instrument supports configurable test permissions and password protection. Users can create accounts with different permission levels as required, ensuring the security and validity of test operations. Access the Security settings menu as shown in the figure below.



As shown in the figure above, the system includes a built-in ADMIN account, which cannot be deleted. This account has full permissions by default, and the default password is 8008.

6.7.1 New User

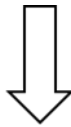
When adding a user to the instrument system, user can edit the account name, set a 4-character password, and configure the security level.

The instrument system supports four security levels:

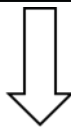
- Test Only: Allows test execution only.
- Load Parameter: Allows test file loading and test execution.
- Edit Parameter: Allows test file editing, test parameter configuration, and test execution.
- Full Function: Provides access to all system functions.

The figure below illustrates the procedure for adding a user named unit with Test Only permission and activating the user's access rights.

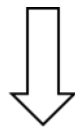
User Select ADMIN	Safety Level Full Function



ADMIN Full Function	New User



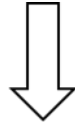
Input Password: ***			
7	8	9	CANCEL
4	5	6	
1	2	3	ENTER
0	.	<-	



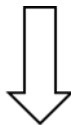
User Name

unit

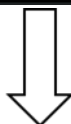
1	2	3	4	5	6	7	8	9	0
q	w	e	r	t	y	u	i	o	p
	a	s	d	f	g	h	j	k	l
Caps	z	x	c	v	b	n	m	Del	Enter



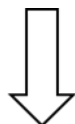
Safety Level	Full Fun
Test Only	ESC
Load Parameter	
Edit Parameter	
Full Function	



User Select	Safety Level
ADMIN	Full Function



ADMIN	unit
Full Function	Test Only
New User	



Input Password: ***			
7	8	9	CANCEL
4	5	6	
1	2	3	ENTER
0	.	<—	



User Select	Safety Level
unit	Test Only

Notes:

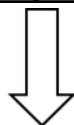
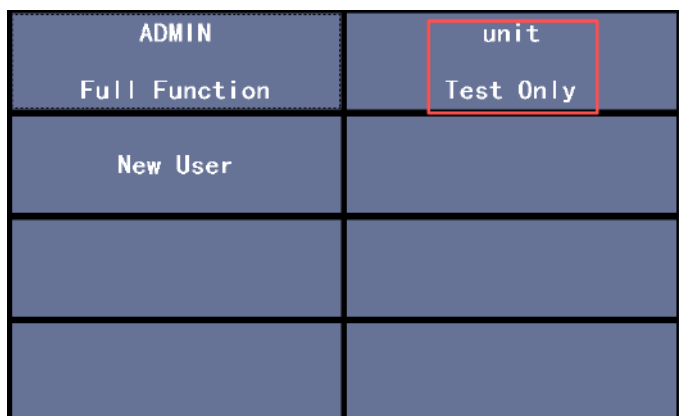
1. All operations described above are performed via the touch screen. Once user settings are completed, the system automatically activates the corresponding user profile at startup.
2. If the message "Current permission does not allow this operation. Press the RESET stop button to exit." appears, it indicates that the current user does not have sufficient access rights to perform the operation. Switch to a user account with higher permissions to proceed.

6.7.2 User Account Deletion

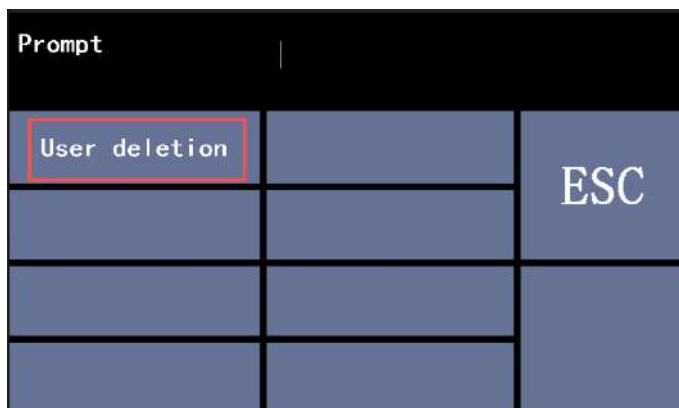
To delete an unused user account, first switch to ADMIN (administrator) mode. Enter the User Account settings page, then long-press(touch and hold)the target user ID to open the deletion interface. Tap Delete to complete the operation.

Setting Steps:

1. Access the User Account settings page and long-press the user ID to be deleted.

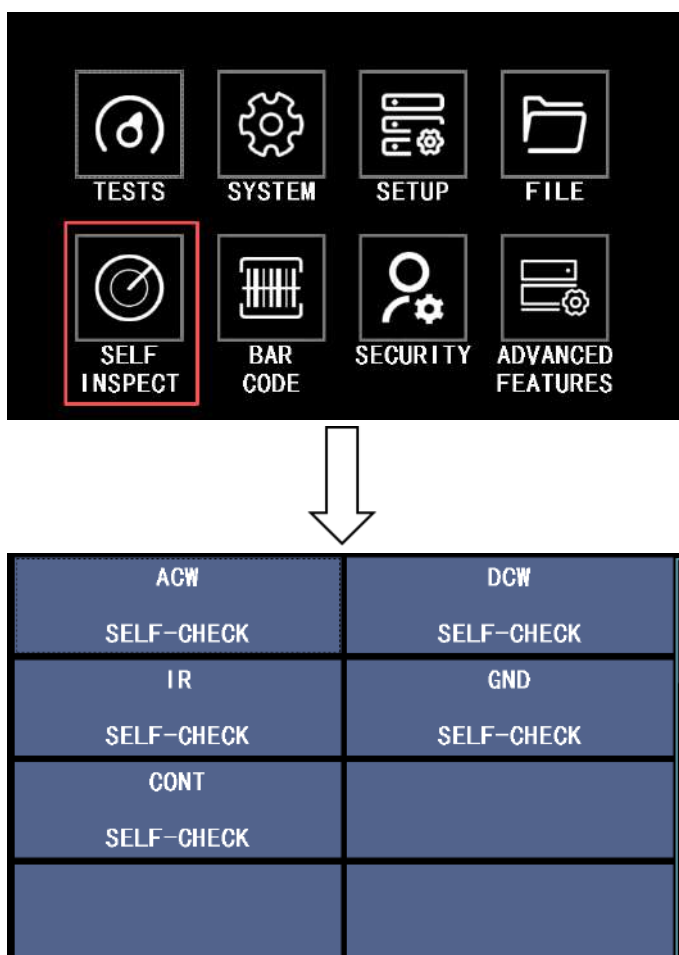


2. Tap Delete to remove the selected user account.



6.8 Self-Inspection

Access the Self-Inspection settings menu as shown in the figure below.



Tap the test item for self-inspection and follow the on-screen instructions to complete the procedure.

6.9 Barcode Setting

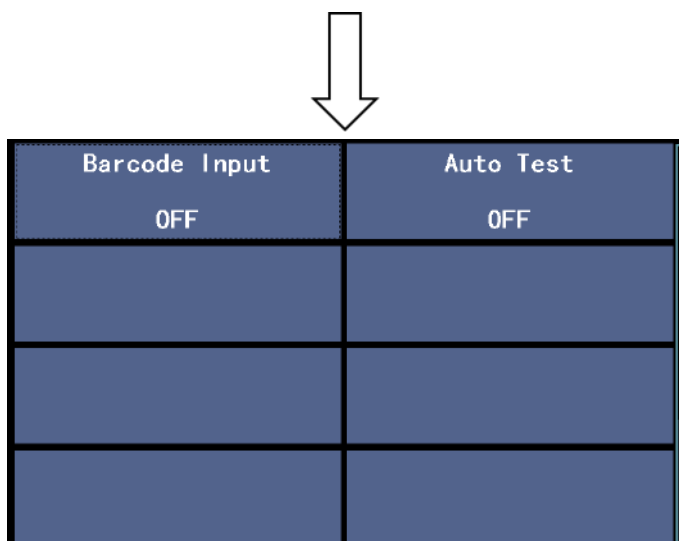
This series supports performing tests after scanning a barcode.

For convenience, different barcode rules can be configured according to user requirements.

Before scanning, press [Meas] button to return to the measurement interface.

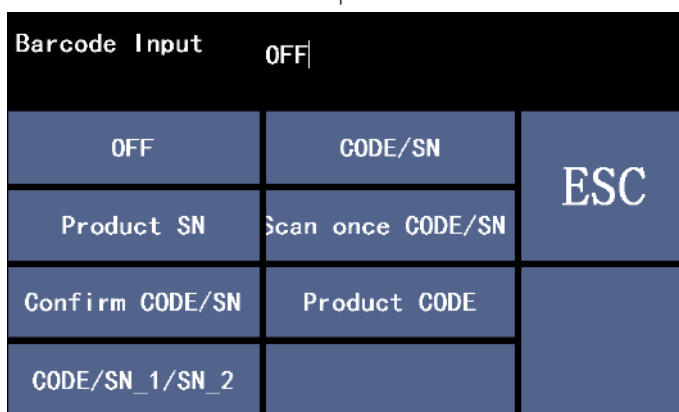
Access the Barcode settings menu as shown in the figure below.





6.9.1 Barcode Input

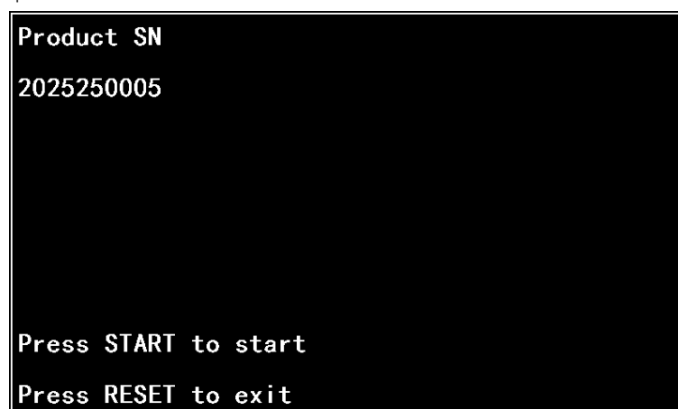
Tap Barcode Input icon to access the Barcode Input menu.



Barcode Input Settings

1. **OFF:** Disables the barcode scanner detection and input function.
2. **Product SN:** Scan a Product SN to enter the barcode scanning interface. If auto-test is enabled, the test starts automatically.

Figure 6-22 Product SN Input Interface



3. Confirm Code/SN

- Requires three sequential scans: Product Code, Product SN, and Confirm Code.
- A unique Product Code can be configured in the file information.
- If a test file with a matching Product Code exists, it will be selected automatically; otherwise, no action is performed.
- If the auto-test is enabled, the test runs automatically only if the Product Code matches the Confirm Code.

Figure 6-23 Confirm Code/SN Interface

```
Product CODE
u2025001
Product SN
2025250002
Confirm CODE
u2025001
Press START to start
Press RESET to exit
```

4. Code/SN1/SN2

- Requires three sequential scans: Product Code, Product Serial Number 1 (SN1), and Product Serial Number 2 (SN2).
- A unique Product Code can be configured in the file information.
- If a test file with a matching Product Code exists, it will be selected automatically; otherwise, no action is performed.
- If auto-test is enabled, the test starts automatically.

Figure 6-24 Code/SN1/SN2 Input Interface

```
Product CODE
u2025003
Product SN 1
2025250001
Product SN 2
2025250002
Press START to start
Press RESET to exit
```

5. Code/SN

- Requires two sequential scans: Product Code and Product Serial Number (SN).
- A unique Product Code can be configured in the file information.
- If a test file with a matching Product Code exists, it will be selected automatically; otherwise, no action is performed.
- If auto-test is enabled, the test starts automatically.

Figure 6-25 Code/SN Interface

```
Product CODE
u2025001
Product SN
2025250001

Press START to start
Press RESET to exit
```

6. Scan once Code/SN

- Scan the Product Code only for the first operation; for subsequent operations, scan the Product SN.
- A unique Product Code can be configured in the file information.
- If a test file with a matching Product Code exists, it will be selected automatically; otherwise, no action is performed.
- If auto-test is enabled, the test starts automatically.

Figure 6-26 Scan once Code/SN Interface

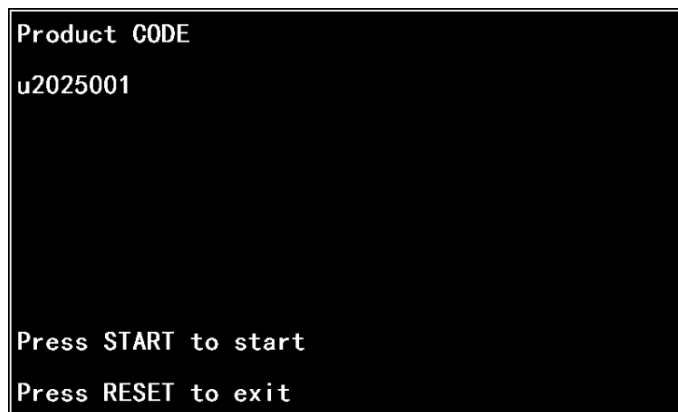
```
Product CODE
u2025001
Product SN
2025250001

Press START to start
Press RESET to exit
```

7. Product Code

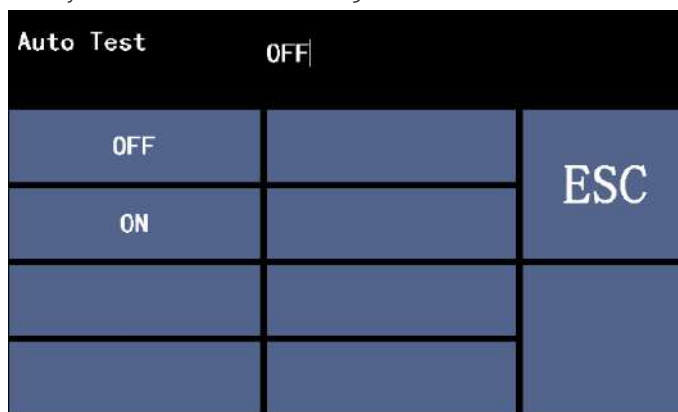
- Only the Product Code is scanned.
- A unique Product Code can be configured in the file information.
- If a test file with a matching Product Code exists, it will be selected automatically; otherwise, no action is performed.
- If auto-test is enabled, the test starts automatically.

Figure 6-27 Product Code Interface



6.9.2 Auto Test

Auto Test: Runs automatically after barcode scanning.



ON: When auto test is enabled, the test is executed automatically immediately after barcode scanning is completed.

OFF: When auto test is disabled, this function is turned off. The test must be initiated manually by pressing the START button after barcode scanning.

Note: Route the barcode scanner cable separately from the high-voltage (H.V.) cable to avoid interference and related issues.

6.10 Test Execution

Tap the tests icon in the Hom menu to open the test interface.

From any other interface, press the [Meas] button or [RESET] button to access the Test menu.

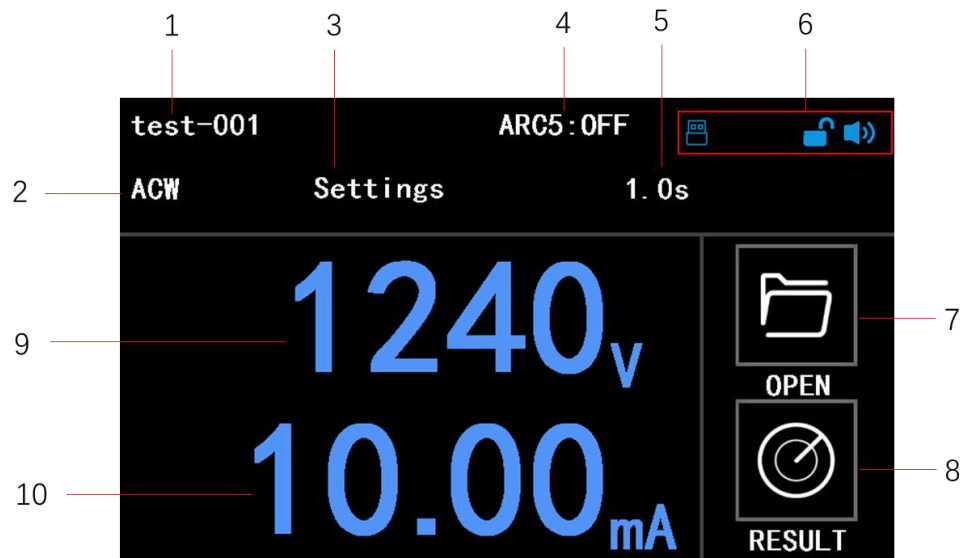


Table 6-12 Test Execution Setting

No.	Item	Description
1	test-001	test: File name 001: Test step (tap to change)
2	AC Withstand	Currently selected test mode (tap to change)
3	Settings	Status bar: Displays configurable parameters for the current mode
4	ARC5: OFF	Arc detection level and activation status (tap to change) Indicates the resistive leakage current during the AC Withstand Voltage Test.
5	1.0 s	Test time (tap to change)
6	USB Status Icon	Indicates the status of connected devices and functions: USB flash drive ready, Barcode scanner ready, LAN connected, Keypad lock status, Buzzer status
7	OPEN	Load test files
8	RESULT	View test results and historical data
9	1240 V	Test voltage (tap to change)
10	10.00 mA	Total leakage current (tap to change)

6.10.1 Open

Tap the OPEN icon to switch to the File management interface, allowing users to quickly switch between test files.

If multiple test files are saved, tap the OPEN icon displays all available test files, allowing the user to select the desired file.

Press the [Meas] button or [RESET] button to access the Test menu.

6.10.2 Result

Tap the RESULT icon to select and view test results, historical records, or the final test step.

- View Test Results: View the results of the current test. Tap any test step to check detailed data.
- View History: Access previous test records.
- Final Test Step: Save only the last test step. The saved data is retained even if the instrument is restarted.
- Clear the Record: Delete all test data stored in the instrument.
- Save to Udisk: Export all test data stored in the instrument to a USB flash drive.

Click <RESULT> in the Home interface to open the Result interface, as shown in the following figure.

Figure 6-28 Result Interface

Prompt []		
View test results STEP: 3	Clear the record	
View History		
Final test step		
Save to Udisk		

Click View History and press Enter to access the historical data.

Figure 6-2926 View History (Data Display)

001:ACW PASS 1. 240kV, 0. 000mA 0. 000mAR	002:ACW PASS 1. 241kV, 0. 000mA 0. 000mAR
003:ACW PASS 1. 240kV, 0. 000mA 0. 000mAR	004:ACW PASS 1. 241kV, 0. 000mA 0. 000mAR
005:ACW PASS 1. 240kV, 0. 000mA 0. 000mAR	006:ACW PASS 1. 240kV, 0. 000mA 0. 000mAR
007:ACW PASS 1. 240kV, 0. 000mA 0. 000mAR	008:ACW PASS 1. 241kV, 0. 000mA 0. 000mAR

Tap any data item to view detailed information.

Figure 6-30 View History (Data Detail)

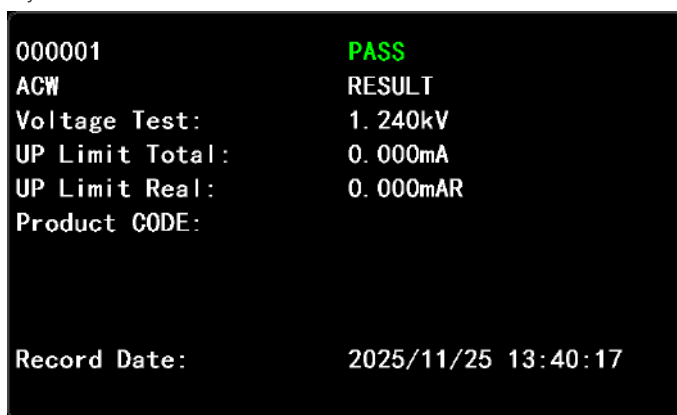
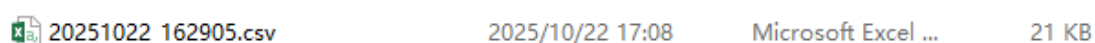


Figure 6-31 Export Test Data to USB



On a Windows system, view the test data by opening the file with a text editor.

Figure 6-32 View Test Data

DATE_TIME	TEST_TYPE	TEST_RESULT	DATA1	DATA2	DATA3
2025/10/22_16:29:05	ACW	PASS	1240.008	0	0
2025/10/22_16:29:04	ACW	PASS	1240.001	0	0
2025/10/22_16:29:02	ACW	PASS	1239.978	0	0
2025/10/22_16:26:27	ACW	PASS	1239.998	0	0
2025/10/22_16:26:25	ACW	PASS	1240.021	0	0
2025/10/22_16:26:24	ACW	PASS	1240.014	0	0
2025/10/22_16:26:22	ACW	PASS	0.99918	0	0

6.10.3 Test Status/Message Description

The following messages may appear on the LCD during test execution.

Dwell

During the test, before the analyzer reads the first test result, the results are continuously updated. The LCD displays Dwell.

Delay

At the initial stage of the test, while the test voltage is ramping up and the analyzer has not yet read the first test result, the LCD displays Delay.

Ramp Up

If the test is configured with a Ramp Up procedure, the results are continuously updated before the analyzer reads the first test result. The LCD displays Ramp Up.

Ramp Down

If the test is configured with a Ramp Down procedure, the results are continuously updated before the analyzer reads the first test result. The LCD displays Ramp Down.

Pass

If no abnormalities occur during the test, the test is considered passed. The LCD displays Pass.

Abort

If the [RESET] button is pressed or the test is interrupted via a remote device. The LCD displays Abort.

HI-LIMIT

If the DUT's test value exceeds the upper limit (excluding AC Withstand Voltage Test), the test is judged as failed, and the LCD displays HI-Limit.

LO-LIMIT

If the DUT's test value falls below the lower limit (excluding AC Withstand Voltage Test), the test is judged as failed, and the LCD displays LO-Limit.

HI LIMIT T

During an AC Withstand Voltage Test, if the DUT's leakage current exceeds the total leakage current upper limit, the test is judged as failed, and the LCD displays HI-Lmt T.

LO LIMIT T

During an AC Withstand Voltage Test, if the DUT's leakage current falls below the total leakage current lower limit, the test is judged as failed, and the LCD displays LO-Lmt T.

HI LIMIT R

During an AC Withstand Voltage Test, if the DUT's leakage current exceeds the true leakage current upper limit, the test is judged as failed, and the LCD displays HI-Lmt R.

LO LIMIT R

During an AC Withstand Voltage Test, if the DUT's leakage current falls below the true leakage current lower limit, the test is judged as failed, and the LCD displays LO-Lmt R.

CONT-Fail

If continuity detection is ON during AC/DC Withstand Voltage Test and the grounding wire test fails, the LCD displays CONT-Fail.

Arc Fail

During AC/DC Withstand Voltage Test, if the leakage current is within the upper limit but the arc current exceeds the set value, the test is judged as failed, and the LCD displays Arc Fail.

Short

If the DUT's leakage current exceeds the analyzer's measurable range and the short-circuit judgment circuit is activated, the test is judged as failed, and the LCD displays Short.

L-Charge Limit

If the leakage current falls below the set charging current during Ramp Up, the test is judged as failed, and the LCD displays L-Charge Limit.

Breakdown

If the DUT's leakage current and arc current far exceed normal measurable values, the test is judged as failed due to dielectric breakdown, and the LCD displays Breakdown.

GND Fault

If the human body accidentally touches high voltage during the test, causing a Smart G.F.I. (Ground Fault Interrupter) stop, the LCD displays GND Fault.

Open Ratio

During open/short circuit detection, this message indicates that the test circuit is judged as open. The measured capacitance value is lower than the set open-circuit judgment percentage relative to the sampled standard value.

Short Ratio

During open/short circuit detection, this message indicates that the test circuit is judged as short. The measured capacitance value is higher than the set short-circuit judgment percentage relative to the sampled standard value.

6.10.4 Test Wiring (UT5430, UT5451)

Test leads can be connected to the test ports on either the front panel or rear panel. These test ports are connected in parallel, and either type can be used according to the application requirements.

The figure below shows the wiring diagram between the instrument and the device under test (DUT). Refer to the diagram and ensure that all connections on the DUT or its test fixture are securely fastened.

Figure 6-33 Wiring with DUT (UT5430, UT5451)



Wiring Steps

1. Connect the red high-voltage test clip to the L (live) and N (neutral) terminals of the DUT.
2. Connect the test return wire to the ground wire or housing of the DUT. As shown in the figure above, it is connected to the DUT's ground wire.
3. If continuity detection between the housing and ground wire is required, connect the CONT. CHECK terminal to the DUT's housing, and connect the test return (RETURN) wire to the DUT's ground wire.

6.10.5 Test Wiring (UT5440, UT5452)

Figure 6-34 Wiring with DUT (UT5430/UT5452)



Wiring Steps

1. Connect the red high-voltage test clip to the L (live) and N (neutral) terminals of the DUT.
2. Connect the current loop terminal and instrument measurement loop terminal for grounding resistance testing to the DUT's ground wire.
3. Connect the current output terminal and positive voltage sampling terminal for grounding resistance testing to the DUT's housing.

After verifying that all connections are correct:

- Press the green [START] button on the front panel to initiate the test.
- Press the red [RESET] button to abort an ongoing test.

6.11 Breakdown Voltage Test (Advanced Feature)

The breakdown voltage test is used to evaluate the ultimate performance limit of the device under test (DUT) under practical conditions. This test is classified as destructive.

During the test, the instrument automatically increases the voltage in steps and records the data at the breakdown point.

Figure 6-27 Normal Withstand Test-Output Waveform

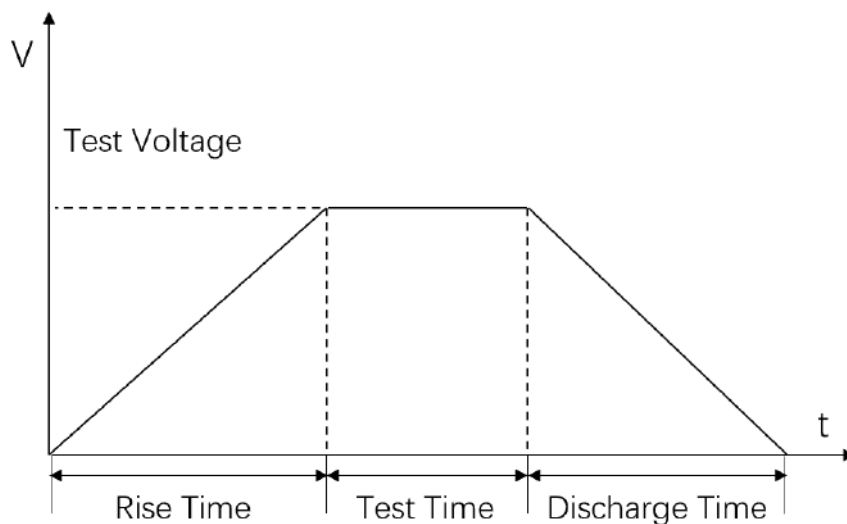
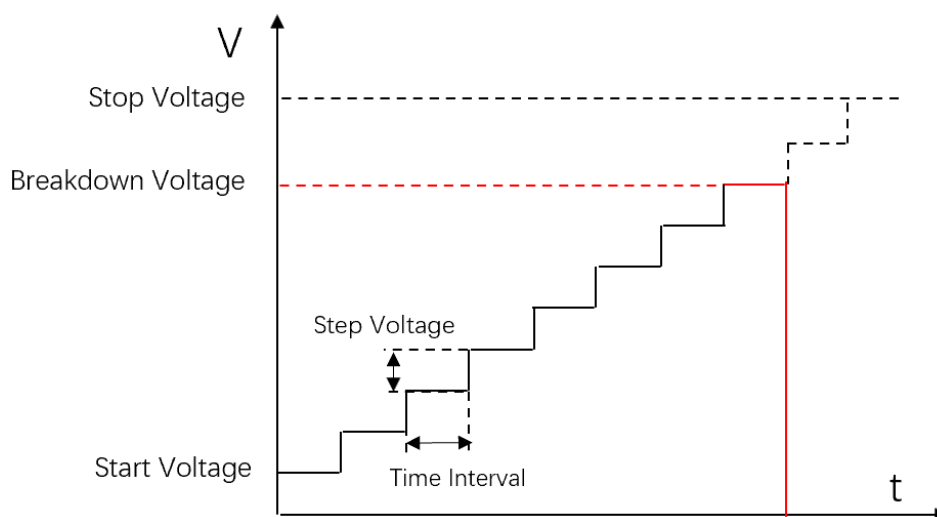
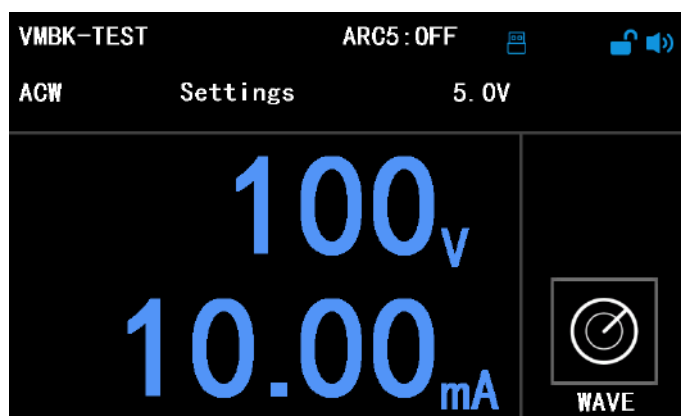


Figure 6-36 Breakdown Voltage Test-Output Waveform



Tap ADVANCED FEATURES to access the breakdown test, as shown in the following figure.





6.11.1 Breakdown Voltage Test Setting

Press [Setup] button on the front panel to enter the <parameter setting> page.

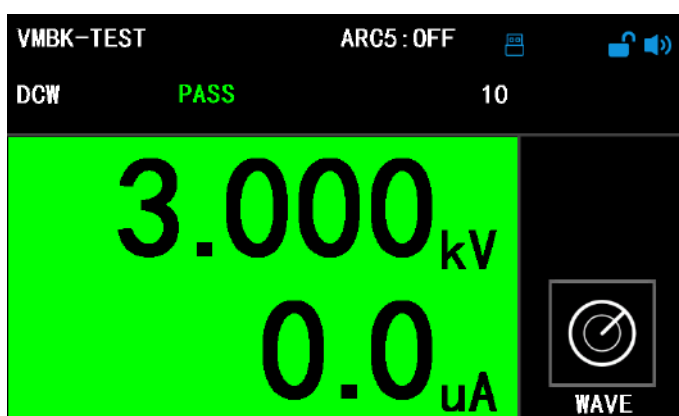
Step Mode	Test Mode	Test Step
Normal Step	ACW	2
Initial Voltage	Final Voltage	ARC Detect
50.0V	100.0V	OFF
LOW Limit Total	UP Limit Total	ARC Level
0.000mA	10.000mA	5
Rise Time	Dwell Time	Frequency
1.0S	1.0S	50HZ

Table 6-13 Breakdown Voltage Test Setting

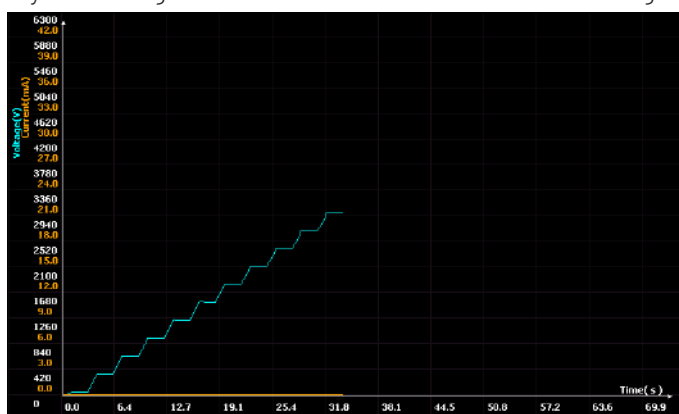
Item	Setting	Description
Step Mode	Voltage Mode/ Normal Mode	Select whether the test progresses by voltage steps or test steps.
Test Mode	ACW/ DCW	Test mode: AC/DC
Test Step	2 to 999	Applicable to Normal Mode only: Set the number of voltage steps.
Voltage Step	(5 to 500) V	Applicable to Voltage Mode only: Set the rise voltage value
Final Voltage	AC: (50 to 5000) V DC: (50 to 6000) V	Stop voltage value
Initial Voltage	50 V to Stop voltage	Start voltage value
Rise Time	AC: (0.2 to 999.9) s DC: (0.4 to 999.9) s	Rise time for each step
Dwell Time	AC: (0.2 to 999.9) s DC: (0.4 to 999.9) s	Test time for each step
UP Limit Total (UT5430/40)	AC: 0 to 40 mA DC: 0 to 10 mA	Determine whether the breakdown occurs based on the upper current limit setting.

		Total upper limit of leakage current
UP Limit Total (UT5451/52)	AC: 0 to 100 mA DC: 0 to 20 mA	Total upper limit of leakage current
LOW Limit Total (UT430/40)	AC: 0 to 40 mA DC: 0 to 10 mA	Total lower limit of leakage current
LOW Limit Total (UT5451/52)	AC: 0 to 40 mA DC: 0 to 20 mA	Total lower limit of leakage current
ARC Detect	ON/OFF	Enables or disables the Arc detection function.
ARC Level	1 to 9	Alarm sensitivity level for arc detection.
Frequency	50 Hz/60 Hz	For ACW mode: Select the test frequency.

6.11.2 Breakdown Voltage Test Result



Tap the curve to display the voltage/current waveform of breakdown voltage test.



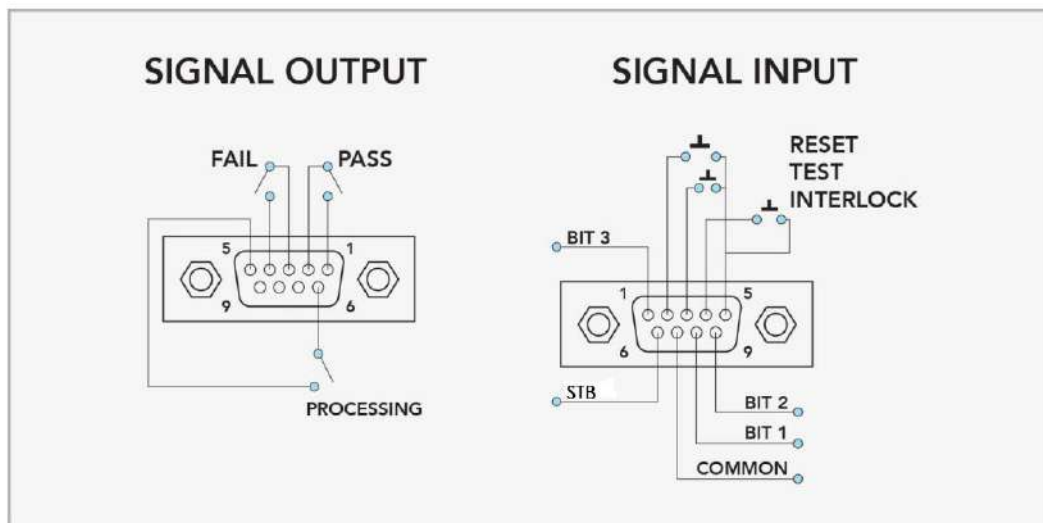
7. Handler Interface

7.1 HANDLER(PLC)

The analyzer is equipped with two 9-pin D-type terminals on the rear panel, which provide remote control input signals and output information.

For optimal performance, it is recommended to use shielded cables for both input control and output signal connections.

Figure 7-1 HANDLER(PLC)Interface



To enable the HANDLER function, set the Remote control in the instrument's system settings to ON.

When Remote control is ON, the panel START button is disabled to prevent malfunctions or hazards caused by simultaneous local and remote operations. The [RESET] button remains functional, allowing the high-voltage output to be turned off at any time.

7.2 HANDLER(PLC)-Signal Output

The following output signals are available on the rear panel of the instrument and are used to indicate the operating status of the instrument.

PASS(Test Passed)

When the instrument determines that the DUT meets the acceptance criteria, the corresponding two pins are short-circuited. This short-circuit output can be used to control external equipment.

Active Duration: From the moment the DUT is judged as passed until the start of the next test.

FAIL(Test Failed)

When the instrument determines that the DUT does not meet the acceptance criteria, the corresponding two pins are short-circuited. This short-circuit output can be used to control external equipment.

Active Duration: From the moment the DUT is judged as failed until the start of the next test.

PROCESSING (Test in Progress)

While the instrument is performing a test, the corresponding two pins are short-circuited. This short-circuit output can be used to control external equipment.

Table 7-1 Handler Signal Output

Handler	Pin	Status	Description
Signal Output	5	PROCESSING	While the instrument is performing a test, the relay closes the connection between PIN5 and PIN6. After the test is completed, the relay returns PIN5 and PIN6 to an open-circuit Status.
	6		
	1	PASS	When the DUT passes the test, the relay closes the connection between PIN1 and PIN2, and this state is maintained. The relay returns PIN1 and PIN2 to an open-circuit state when a new test sequence starts or when the [RESET] button is pressed.
	2		
	3	FAIL	When the DUT fails the test, the relay closes the connection between PIN3 and PIN4, and this state is maintained. The relay returns PIN3 and PIN4 to an open-circuit state when a new test sequence starts or when the [RESET] button is pressed.
	4		



- When the signal output requires a voltage above 220 V or a current above 1 A, the internal relays of the instrument cannot withstand such load. External switching devices should be used for signal conversion.
- The signal output pins have no polarity requirements. In addition, each signal output is electrically isolated and does not share a common ground.

7.3 HANDLER(PLC)-Signal Input

The rear panel of the analyzer is equipped with remote control signal input terminals, allowing an external control device to perform the following operations.

- START: Initiates the test
- RESET: Aborts the test
- INTERLOCK: Controls the instrument interlock function
- Test Configuration: Recalls any set of test parameters from the 10 preconfigured test files

With these functions, an external control device can flexibly operate and configure the analyzer.

Table 7-2 Handler Signal Input

Handler	Pin	Signal	Description
Signal Input	5	COM (Low)	Provides a 0 V reference for START and RESET control signals and serves as the common ground.
	7		
	2	RESET (Stop)	The instrument stops the test when RESET is

		short-circuited to COM.
3	START	The instrument initiates the test when START is short-circuited to COM.
4	INTERLOCK	When INTERLOCK is open-circuited from COM, the instrument is locked and cannot initiate a test, or any ongoing test is immediately stopped. The instrument operates normally only when INTERLOCK is short-circuited to COM.
8	BIT1	File access and control related functions.
9	BIT2	
1	BIT3	
6	STB	



All input signals shall be switching-type inputs. External voltage or current sources must not be connected to these terminals under any circumstances.
Connecting non-switching sources may damage the instrument's internal control circuitry or cause malfunction.

Figure 7-2 Handler Control Sequence

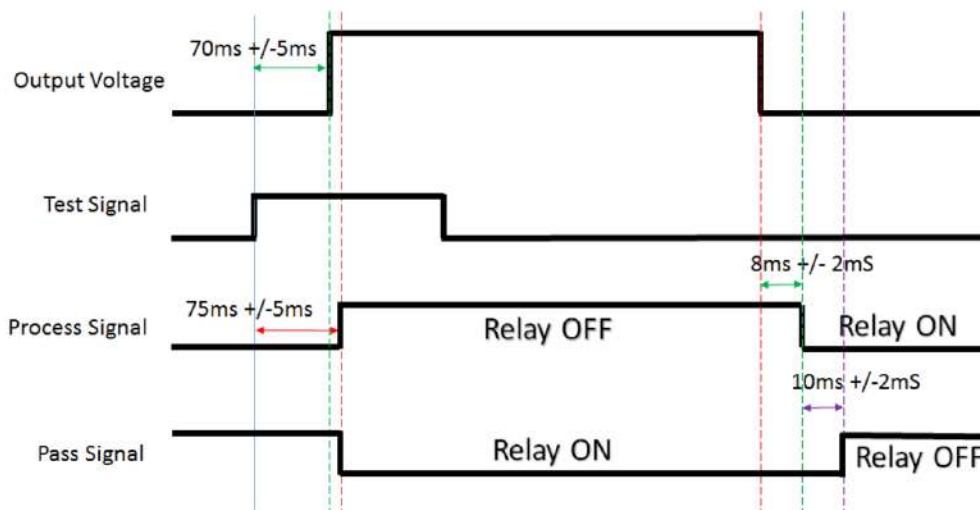


Table 7-3 Start/Stop Test via Handler Interface

Signal	Description
Start the test via HANDLER interface	Verify that the TEST (Progress) signal of the interface is inactive. The START signal will only be accepted when the TEST (Progress) signal is inactive. Once this condition is met, send a START signal with a duration of $>20\text{ms}$ (switching value closure time) to initiate the test.
Stop the test via HANDLER interface	At any time, send a RESET signal with a duration of $>20\text{ms}$ (switching value closure time) to abort the test.

7.4 HANDLER(Signal Input)-Load File and Execute Test

The remote file selection function allows rapid selection and remote initiation of tests.

To access the first 15 preprogrammed test files, connect Pins 1, 6, 8, and 9 to the common pin 5 or 7 (COM) as appropriate.

Table 7-4 Load File and Execute Test via Handler Interface

Switching-Type Inputs				Load File
BIT4	BIT3	BIT2	BIT1	
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	10
1	0	1	1	11
1	1	0	0	12
1	1	0	1	13
1	1	1	0	14
1	1	1	1	15

Notes:

- 0: Pin disconnected from COM. 1: Pin shorted to COM.
- BIT1, BIT2, BIT3, and BIT4 must be set and held for at least 20 ms to ensure the correct test file is selected. Additionally, the delay between each bit must be less than 4 ms.
- A "disconnected" switching value corresponds to an open circuit between the pin and COM, while a "closed" switching value corresponds to a short circuit between the pin and COM.



Do not load a test file while a test is in progress; otherwise, the command will be ignored.

8. Remote Communication

8.1 RS-232C Interface Setting

8.1.1 RS-232 Interface

RS-232 is a widely adopted serial communication standard, also known as the asynchronous serial communication standard. It is used to enable data communication between computers and between computers and peripherals. "RS" stands for "Recommended Standard," and "232" is the standard number. This standard was officially released by the Electronic Industries Association (EIA) of the United States in 1969. It defines a method for transmitting data bit by bit over a data line.

In practice, most serial port configurations do not strictly adhere to the original RS-232 standard, which specified the use of 25-pin connectors for each port. Modern computers, however, generally use 9-pin connectors. Common RS-232 signals are shown in the table below.

Table 8-1 Common RS-232 Signal

Signal	Symbol	25-Core Connector Pin	9-Core Connector Pin
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
Transmitted Data	TXD	2	3
Received Data	RXD	3	2
Signal Ground	GND	7	5

In addition to the standard RS-232 signals, a minimum signal subset can also be used with this instrument.

Table 8-2 RS-232 Minimum Signal Subset

Signal	Symbol	9-Core Connector
Transmitted Data	TXD	2
Received Data	RXD	3
Signal Ground	GND	5

8.1.2 RS-232 Connection



Note: To prevent electric shock, please turn off the power before plugging in the connector.

Figure 8-1 RS-232C Connector, 9-Pin D-Sub Male



To connect this instrument to a PC, use a 9-pin D-sub female to 9-pin D-sub female crossover cable.

RS232 Communication Settings

Transmission Mode: Full-duplex asynchronous communication with start and stop bits.

Communication Protocol: Select RS232 in communication mode.

Baud Rate: Configurable via the Baud Rate in the system setting.

Data Bits: 8 bits

Stop Bits: 1 bit

Parity: None

8.2 RS-485 Interface Setting

RS-485 is a communication interface that supports multi-device communication, allowing one master device to connect in parallel with multiple slave devices.

The instrument is equipped with a standard RS-485 interface and supports the Modbus RTU protocol.

RS-485 communication settings can be configured in the system setting.

Language	Touch Beep
English	ON
Warning Beep	Volume
OFF	1
Auto Save	Hardware Button
ON	OFF
Boot Screen	Communication Mode
TESTS	RS485

The instrument address can be set to a value from 1 to 32, and multiple slave devices must be assigned unique addresses.

For multi-device RS-485 wiring, it is recommended to use a daisy-chain connection and twisted shielded cables for the signal lines.

The instrument's RS-485 interface shares a single DB9 connector with the RS-232 interface. Refer to Figure 8-1 for details.

Pin	Function
8	A
9	B

8.3 LAN Interface

Figure 8-2 LAN Interface on Rear Panel



Connect the LAN cable to the instrument's LAN connector.

Green LED

On (solid): Connected

Blinking: Data communication in progress

Orange LED

OFF: 10BASE-T connection

On (solid): 100BASE-TX connection

8.3.1 LAN Setting

The instrument is equipped with a standard LAN interface, which can be configured in the system setting.

Communication Protocol: Select LAN in the communication mode.

IP Address: Configure the instrument's IP address

Port: 502

Language	Touch Beep
English	ON
Warning Beep	Volume
OFF	1
Auto Save	Hardware Button
ON	OFF
Boot Screen	Communication Mode
TESTS	LAN

Communication Protocol	Baud Rate
SCPI	115200
Address	PORT
1	502
IP Address	Auto ground interrupt
192.168.30.36	5.0mA
Remote Control	Single step test
OFF	OFF

9. Appendix

9.1 Maintenance and Cleaning

(1) General Maintenance

Keep the instrument away from direct sunlight.

Caution

Keep sprays, liquids and solvents away from the instrument or probe to avoid damaging the instrument or probe.

(2) Cleaning

Regularly inspect the instrument based on its operating conditions. Follow the steps below to clean the exterior surfaces:

a. Exterior Cleaning

Use a soft, dry cloth to gently wipe off dust from the outer surface of the instrument.

b. LCD Screen

Take care when cleaning the LCD screen to avoid damaging the transparent surface. Use clean, soft cloth and avoid applying excessive pressure.

c. Dust Filter Screen

Use a screwdriver to remove the screws securing the dust cover.

Carefully remove the dust filter screen and clean it.

After cleaning, reinstall the screen and dust cover in the correct order.

d. Power and Cleaning

Disconnect the power supply before cleaning.

Wipe the instrument with a soft cloth dampened with water. Ensure the cloth is moist but not dripping.

Do not use abrasive or chemical cleaning agents on the instrument or probes.

Warning

Please confirm that the instrument is completely dry before use, to avoid electrical shorts or even personal injury caused by moisture.

Limited Warranty and Liability

UNI-T guarantees that the Instrument product is free from any defect in material and workmanship within three years from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination, or improper handling. If you need a warranty service within the warranty period, please contact your seller directly. UNI-T will not be responsible for any special, indirect, incidental, or subsequent damage or loss caused by using this device. For the probes and accessories, the warranty period is one year. Visit instrument.uni-trend.com for full warranty information.



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