

UNI-T®

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User Manual

UT5140 Ground Bond Tester

REV 1.0

December 2025

Foreword

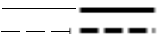
Thank you for choosing this UNI-T instrument. For safe and proper use of this instrument, please read this manual carefully, especially the safety instructions section.

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

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.
CAT I		Secondary electrical circuit connected to wall sockets through transformers or similar equipment, such as electronic instruments and electronic equipment; electronic equipment with protective measures, and any high-voltage and low-voltage circuits, such as the copier in the office.
CAT II		Primary electrical circuit of the electrical equipment connected to the indoor socket via the power cord, such as mobile tools, home appliances, etc. Household appliances, portable tools (e.g., electric drill), household sockets, sockets more than 10 meters away from CAT III circuit or sockets more than 20 meters away from CAT IV circuit.
CAT III		Primary circuit of large equipment directly connected to the distribution board and circuit between the distribution board and the socket (three-phase distributor circuit includes a single commercial lighting circuit). Fixed equipment, such as multi-phase motor and multi-phase fuse box; lighting equipment and lines inside large buildings; machine tools and power distribution boards at industrial sites (workshops).
CAT IV		Three-phase public power unit and outdoor power supply line equipment. Equipment designed to "initial connection," such as power distribution system of power station, power instrument, front-end overload protection, and any outdoor transmission line.
	Certification	CE indicates a registered trademark of the EU.
	Certification	UKCA indicates a registered trademark of United Kingdom.
	Certification	Conforms to UL STD 61010-1 and 61010-2-030. Certified to CSA STD C22.2 No.61010-1 and 61010-2-030.

	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.

1. UT5140 Overview

The UT5140 is a next-generation AC/DC ground bond tester featuring a 4.3-inch TFT-LCD display in a compact and lightweight design. With a maximum test current of 40 A, it delivers stable current output for both AC and DC ground testing and adopts a four-terminal configuration to ensure accurate and efficient measurements. Its adjustable open-circuit voltage enhances safety for both operators and the device under test. Equipped with versatile communication interfaces, the UT5140 is an ideal solution for automated systems and production line testing.

1.1 Application Fields

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

1.2 Technical Specification

Output voltage (open-circuit)	Range	3.00 - 8.00 V AC/DC
	Resolution	0.01 V
	Accuracy	$\pm(3\% \text{ of setting} + 3 \text{ counts})$
Output frequency		50Hz/60Hz, or users could change to DC mode
Output current	Range	0-150 m Ω : 30.01-40.00 A
		0-200 m Ω : 10.01-30.00 A
		0-600 m Ω : 1.00-10.00 A
	Resolution	0.01 A
	Accuracy	$\pm(3\% \text{ of setting} + 3 \text{ counts})$
Maximum Loading	Range	1.00-10.00A : 0-600m Ω
		10.01-30.00A : 0-200m Ω
		30.01-40.00A : 0-150m Ω
	Resolution	1m Ω
	Accuracy	$\pm(2\% \text{ of setting} + 2 \text{ counts})$
Max and Min-Limit Resistance	Range	0 - 150 m Ω (30.01 to 40.00 A)
		0 - 200 m Ω (10.01 to 30.00 A)
		0 - 600 m Ω (1.00 to 10.00 A)
	Resolution	1 m Ω
	Accuracy	$\pm(2\% \times \text{setting} + 2 \text{ counts})$
HI/LO-Limit Voltage	Range	0-6V
	Resolution	0.01
	Accuracy	$\pm(2\% \times \text{setting} + 2 \text{ counts})$
Dwell Time	Range	0, (0.5 to 999.9) s, (0 = continuous)
	Resolution	0.1s
	Accuracy	$\pm 0.1\% \times \text{setting}$
Resistance Offset	Range	0-100m Ω

	Resolution	1mΩ
	Accuracy	$\pm(2\% \times \text{setting} + 2 \text{ counts})$
Voltage offset	Range	0-4.00V
	Resolution	0.01V
	Accuracy	$\pm(2\% \times \text{setting} + 2 \text{ counts})$
Measurement Current	Range	0.00-40.00A AC/DC
	Resolution	0.01 AC/DC
	Accuracy	$\pm(2\% \times \text{setting} + 2 \text{ counts})$
Measurement Voltage	Range	0-8.00V AC/DC
	Resolution	0.01 AC/DC
	Accuracy	$\pm(2\% \times \text{setting} + 2 \text{ counts})$
Resistance	Range	0-600mΩ : 1.00-5.99A
	Resolution	1mΩ
	Accuracy	$\pm(3\% \times \text{setting} + 3 \text{ counts})$
	Range	0-600mΩ : 6-40A
	Resolution	1mΩ
	Accuracy	$\pm(2\% \times \text{setting} + 2 \text{ counts})$
General Characteristics		
Interface	USB Host, HANDLER, RS232C/RS485, LAN	
Memory	100 test files and each for 100 steps	
Power	100 to 120 VAC / 200 to 240 VAC 50 / 60 Hz $\pm 5\%$	
Display mode	4.3-inch LCD screen	
Product size (W×H×D)	214 mm×88 mm×349 mm	
Product net weight	5.3 kg	

Temperature range for accuracy guarantee: $25 \pm 5^{\circ}\text{C}$

Calibration interval: Once per year

1.3 Main Features

- Compliant with major safety standards, including CCC, IEC, EN, VDE, BS, UL, and JIS.
- 4.3-inch TFT-LCD display with an intuitive panel layout; test results and parameters are clearly visible.
- Supports a maximum test current of up to 40 A, suitable for most application scenarios.
- Adopts four-wire (Kelvin) measurement to eliminate lead resistance and enhance measurement accuracy.
- Preset upper/lower limit with automatic pass/fail judgment and audible/visual alarms.
- Built-in memory for storing up to 100 test files, each containing up to 100 test steps.
- Easy file and data import/export via USB interface.
- Multiple communication interfaces supporting SCPI and MODBUS protocols for seamless integration into automated test systems.

2. Front/Rear Panel

2.1 Front Panel

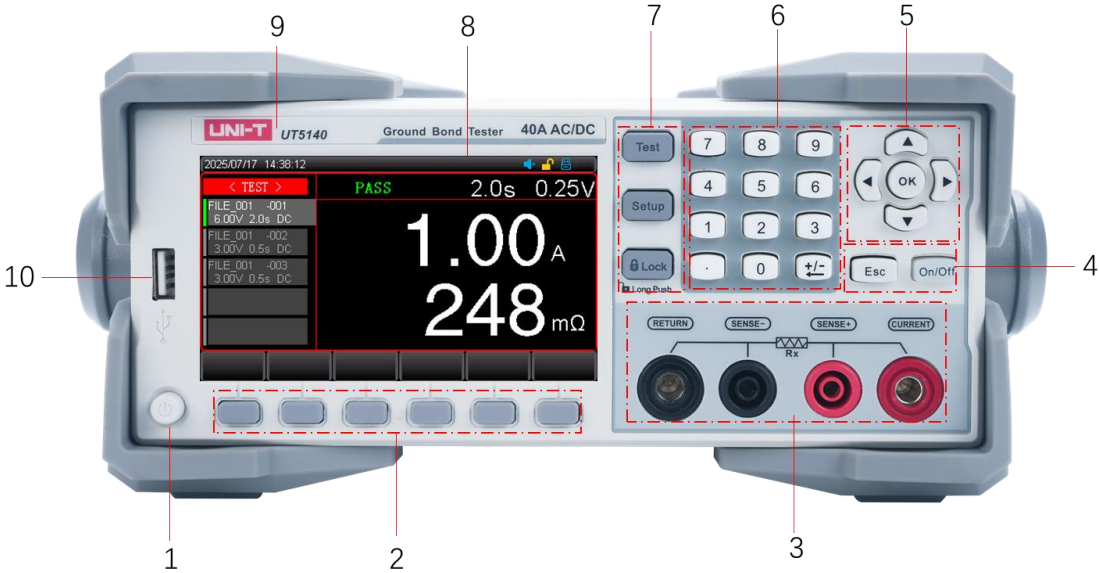


Figure 2-1 UT5140 Front Panel

No.	Button/Terminal	Description
1	Power Switch	Turn the instrument on or off.
2	Function Button	Performs different functions based on the on-screen menu directly above the button.
3	RETURN Terminal	Provides a return path for high current passing through the device under test (DUT).
	SENSE- Terminal	Used in four-wire resistance measurements; measures the negative voltage across the DUT to obtain accurate milliohm impedance values.
	SENSE+ Terminal	Used in four-wire resistance measurements; measures the positive voltage across the DUT to obtain accurate milliohm impedance values.
	CURRENT Terminal	Provides high current output for impedance testing.
4	Esc Button	Cancels the current operation or returns to the previous interface.
	On/Off Button	Start/Stop the test.
5	Arrow Keys	Navigate the cursor to select or modify parameters.
	OK Button	Confirms the value entered via the numeric keypad; long press captures the screen.
6	Numeric Keypad	Used for entering numeric values.
7	Test Button	Accesses the main test interface.
	Setup Button	Opens the parameter settings interface.
	Lock Button	Press and hold for 1 second to lock or unlock the keypad.
8	Scree	4.3-inch TFT-LCD
9	Nameplate	UNI-T logo and model
10	USB Port	Interface for external USB flash drives.

2.2 Rear Panel

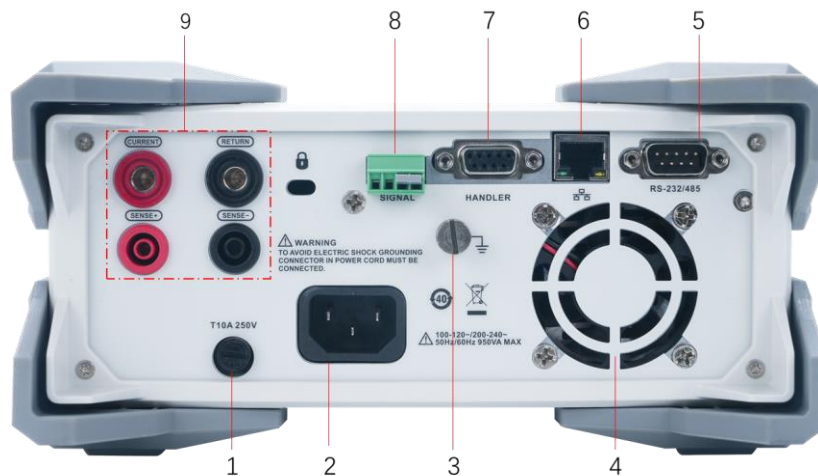


Figure 2-2 UT5140 Rear Panel

No.	Terminal	Description
1	Fuse Holder	Contains the input power fuse. If replacement is needed, use a fuse with the correct rating and specification.
2	Power Input Socket	AC power inlet; use only a standard-compliant power cord.
3	Protective Ground Terminal	Ensure the instrument is properly grounded before operation.
4	Cooling Fan	Ensure sufficient space at the rear panel for proper ventilation and heat dissipation.
5	RS-232C /RS-485 Interface	Serial communication ports for connecting the instrument to a computer or external controller.
6	LAN Interface	Connect to a network when using LAN communication or control functions.
7	HANDLER Interface	Remote I/O control port. Supports input of RESET and START signals, and relay output of PASS, FAIL, and TEST status signals.
8	SIGNAL Interface	Used for interlock protection and 24 V internal power output. The Interlock terminal must be shorted to DGND; otherwise, the instrument will block test initiation.
9	SENSE+ Terminal	Used in four-wire resistance measurements; measures the positive voltage across the DUT to obtain accurate milliohm impedance values.
	CURRENT Terminal	Provides high current output for impedance testing.
	RETURN Terminal	Provides a return path for high current passing through the device under test (DUT).
	SENSE- Terminal	Used in four-wire resistance measurements; measures the negative voltage across the DUT to obtain accurate milliohm impedance values.

3. Inspection and Installation

3.1 Packaging List

Before using the instrument, please:

1. Inspect the instrument for any physical damage or surface scratches.
2. Check the contents on the packaging list to ensure all items are present.

If the instrument is damaged or any accessories are missing, please contact the UNI-T sales department or your authorized distributor.

3.2 Power Requirements

This instrument is designed for use under CAT II conditions only. Do not use it in CAT III or CAT IV environments. Before powering on, ensure that the supply voltage and fuse rating match the voltage setting selected by the AC selector switch on the back panel of the instrument.

Parameter	Requirement
Voltage	100-120 V/200-240 V
Frequency	50/60 Hz
Power Consumption	950VA Max.
Fuse	T10A 250V

- The power cable provided with the instrument is a three-core power cord. Before use, ensure that the socket's ground terminal is properly and securely grounded.
- This device uses a 250 V / 10 A fuse, size 5 × 20 mm, which is pre-installed at the factory. A spare fuse is also included.
- When replacing the fuse, disconnect the external power cord first. Open the fuse holder, remove the blown fuse, and replace it with a new one of the same specification. After proper installation, the instrument can be powered on again.



Warning: Do not use the instrument with a damaged power cord, as this may result in electric shock.

3.3 Environmental Requirements

UT5140 is recommended for use under the following environmental conditions.

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

3.4 Cleaning

1. To prevent electric shock, always unplug the power cord before cleaning.
2. Use a clean, soft cloth slightly dampened with water to wipe the outer casing and front panel. Ensure the instrument remains dry, and do not allow moisture to enter the interior.
3. Do not attempt to clean the internal components of the instrument.



Caution: Do not use solvents such as alcohol, gasoline, or other chemical cleaners to clean the instrument, as they may damage the surface or internal components.

3.5 Handle Adjustment

The handle is adjustable and can be set to four different positions. To adjust, hold both sides of the handle and pull or rotate it as shown in the figure below.

Figure 3-1 Original Position

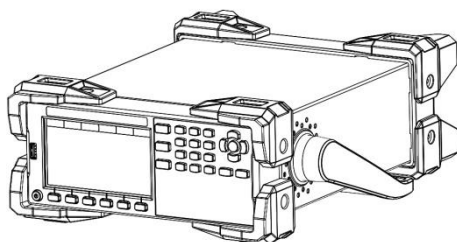


Figure 3-2 Test Position

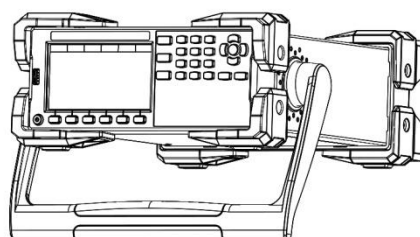


Figure 3-3 Removal Position

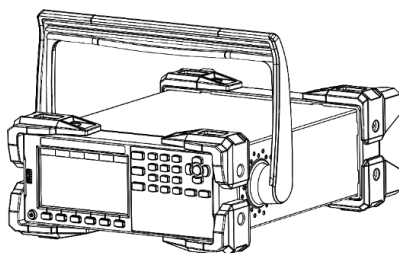
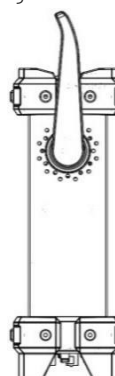


Figure 3-4 Lift Position



3.6 Daily Checking

To prevent accidents and ensure safe operation, inspect the instrument before each use:

1. Inspect that the input power supply meets the specified requirements and that the power configuration is correct.
2. Ensure the instrument is properly grounded.
3. Check that all test leads are intact and free from cracks, breaks, or other damage.

4. Test Setting

4.1 Power-ON Procedure

Follow the steps below to correctly power on the ground bond tester:

1. Connect the power cord securely to the instrument and verify that the supply voltage matches the specifications marked near the power input socket.
2. Press the power switch on the front panel to turn on the instrument.
3. During the power-on self-test, a progress bar will appear on the display, and indicator lights will flash simultaneously.
4. Once initialization is complete, the instrument will enter the measurement standby state and display the current status on the screen.
5. A successful power-on self-test confirms that the instrument meets factory calibration and is ready for operation.



Note: Before operating the ground bond tester, carefully read the *Safety Instructions* section to ensure safe usage.

Warning:

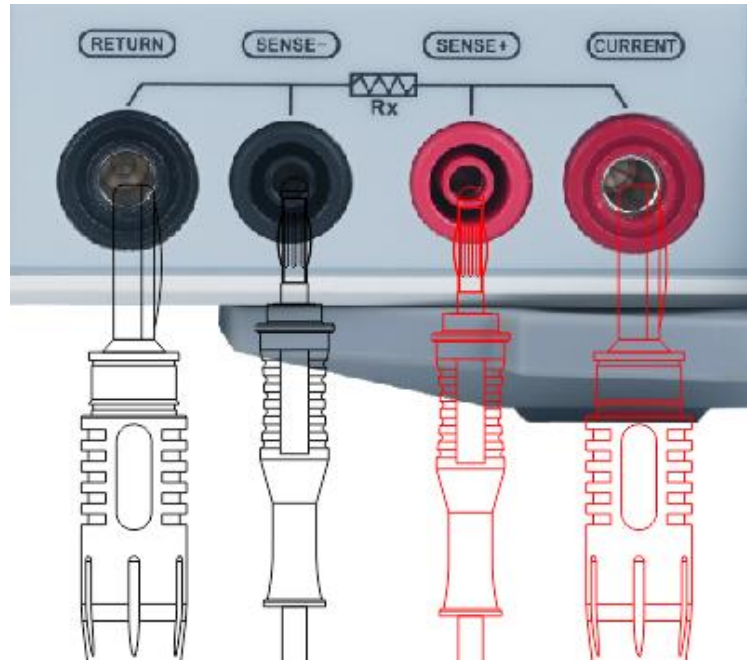
- Confirm that the supply voltage is consistent with the mains voltage. Incorrect voltage may result in equipment damage.
- Always connect the power cord to a properly grounded outlet. Do not use power strips or sockets without protective grounding, as this may pose a serious electrical hazard.

4.2 Connection Diagram

Connect the test leads to the instrument as shown in the diagram below.

And connect test leads with the device under test (DUT).

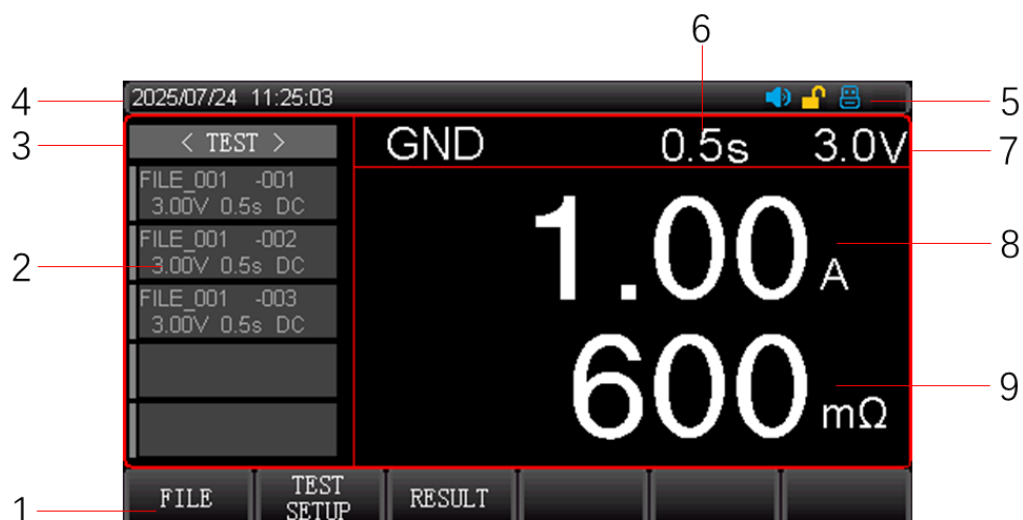
Ensure that all connections are made according to the correct terminal polarities.



Note: Before beginning any test, confirm that all input terminals are connected with the correct polarity. Incorrect wiring may result in instrument damage.

4.3 Interface Introduction

After entering test mode, the LCD screen is divided into multiple functional areas to display relevant information for operation and testing. The interface layout of the UT5140 is as follows.



4.3.1 Test Interface

No.	Display	Description
1	Function Button Area	Located at the bottom of the screen, these buttons allow quick access to various functions based on the current interface context.
2	Test File Area	Displays the active test file. This section allows users to configure and manage test parameters and conditions.
3	Measurement Area	When the cursor is positioned here, users can navigate between file selection, measurement settings, and view real-time measurement results.
4	Time Display	Displays the current system date and time.
5	System Icon Area	Displays status icons such as USB connection, remote sensing (compensation), short-circuit test, sound status, keypad lock, and remote control activation.
6	Test Time	Displays the parameters configured in the test file.
7	Open-circuit Voltage	
8	Test Current	
9	Upper Limit Setting	

4.3.2 Status Information

1

2025/05/07 16:58:38

2

3

4

5

Status	Status Icon	Description
System Time	2025/05/06 16:58:38	Displays the current system time in the format: Year/Month/Day Hour/Minute/Second
Alarm		Indicates that key press sounds are enabled.
Key Lock		Indicates that the keypad is unlocked.
USB		Indicates that a USB flash drive is connected.
LAN		Indicates that the LAN connection is active.

4.3.3 ON /OFF Indicator

The ON/OFF button on the front panel of the UT5140 is equipped with a status indicator to reflect the instrument’s operational state.

Testing State: When the instrument is actively running a test, the indicator light beneath the ON/OFF button illuminates, indicating that the tester is in operation.

Standby State: Press the ON/OFF button again will stop the test, and the indicator light will turn off accordingly. This visual indication helps users quickly confirm whether the instrument is currently active or in standby mode.

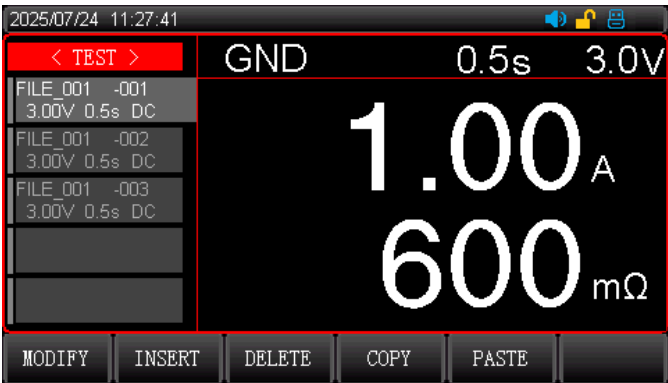
4.4 Screenshot Function

The instrument supports a screenshot feature. To use it, insert a USB flash drive into the USB port located on the front panel. Once the USB drive icon appears on the screen, press and hold the **OK** button to capture the current screen. The captured image will be saved directly to the USB flash drive for future reference.

Note: For best performance, it is recommended to use a reliable branded USB flash drive with a FAT32 file system and a maximum capacity of 128 GB.

5. System Setting

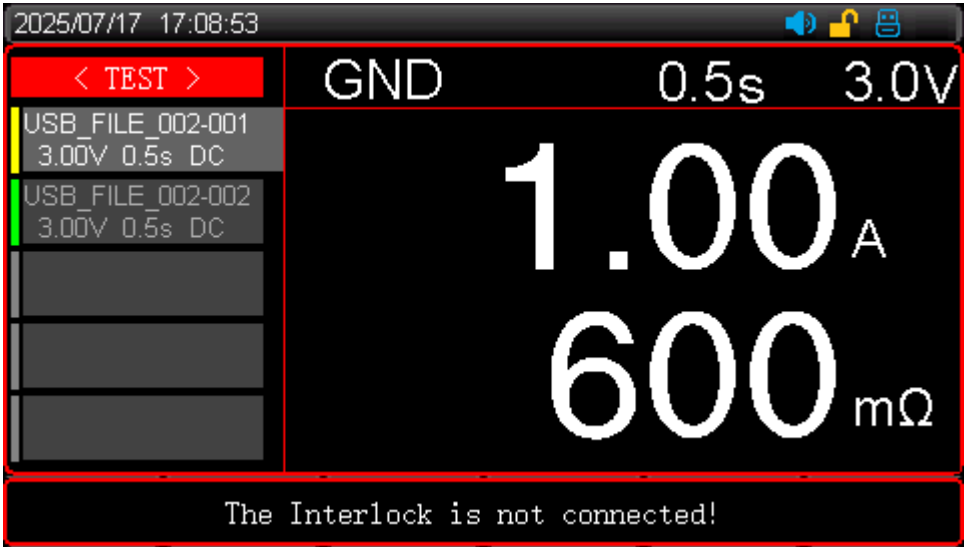
After the ground bond tester is powered on, the screen will remain on the test interface. Once a test step is selected using the cursor, press the corresponding function keys at the bottom of the screen to perform the displayed operations.



Screen Function Key	Description
Modify	Edit the selected test conditions.
Insert	Create and add a new test file.
Delete	Remove the selected test file.
Copy	Copy the parameter settings from the selected test file.
Paste	Apply the copied parameter settings to the target test file.

UT5140 ground bond tester includes an interlock feature. Before configuring parameters, ensure that the interlock is not engaged—that is, confirm that the **Signal terminal** on the rear panel is properly connected.

If the **ON/OFF** button is pressed while the instrument is locked and the alarm volume is enabled, the instrument will emit a short "beep-beep" warning sound. Additionally, a corresponding status indicator will appear at the bottom of the screen, as shown in the figure below.



5.1 System Configuration (System Config)

Press the **Setup** key to enter the **<System Config>** menu, as shown in the figure below.



System Settings	Options	Default	Description
Language	English, 中文	English	Select the interface language for the instrument.
Date Setting	0000-00-00	N/A	Set the current system date.

Time Setting	00:00:00	N/A	Set the current time (24-hour format).
COM Bus	RS232, RS485, LAN	RS232	Supports three types of remote communication interfaces: RS232, RS485, and LAN.
COM Mode	SCPI, MODBUS	SCPI	Supports two communication protocols: SCPI and Modbus (RTU). SCPI: Suitable for communication with computers. Modbus (RTU): Convenient for industrial devices such as PLCs.
BPS	4800, 9600, 19200, 38400, 57600, 115200	9600	Set the communication baud rate.
Key Volume	OFF, Low, Middle, High	Middle	Set the key volume.
Warning Volume	OFF, Low, Middle, High	Middle	Set the warning volume.
ADDR	0 to 255	1	When using the Modbus RTU protocol, set the device address: 00: Used for broadcast communication. 1 to 255: Station address when connected to a bus network.
IP	xxx.xxx.xxx.xxx	192.168.030.036	Editable using the numeric keypad; applicable when TCP is selected as the communication method.
Port	N/A	502	A fixed value used when TCP is selected; not editable.
Outage Record	OFF, ON	ON	ON: Automatically saves the test step parameters set in the measurement interface. OFF: Does not auto-save test step parameters; settings are reloaded from the enabled test file each time the instrument powers on.
Factory Set	RESET	RESET	Restore all settings to factory defaults.

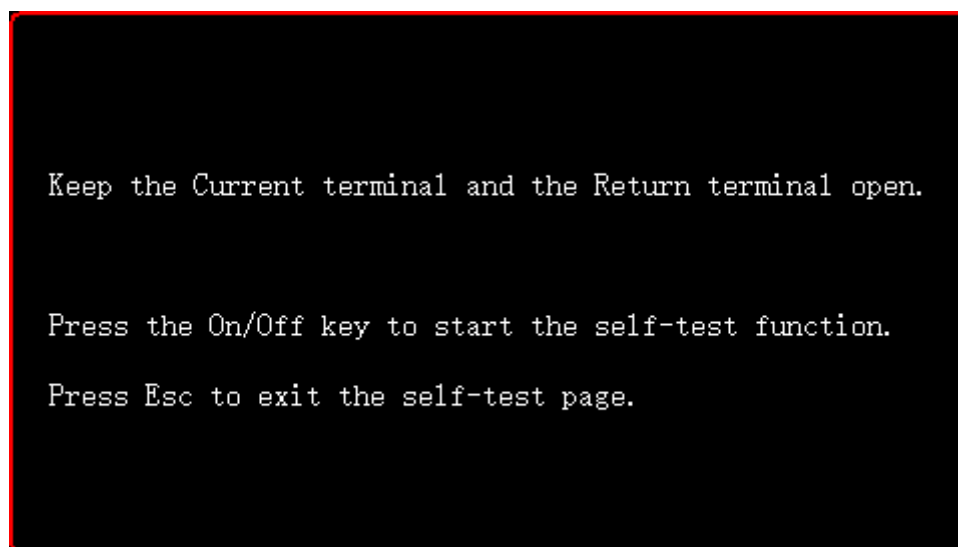
5.1.1 Device Information

On the system setting menu, press the Device Info function button at the bottom of the screen to enter **<Device Info>** menu. This menu displays details such as the model, serial number, software version, and hardware version.



5.1.2 Self-Test

On the system setting menu, press the Self-Check function button at the bottom of the screen to enter the **<Self-Test>** menu, as shown in the figure below.



Remove **Current**, **Return** connection wires; press the ON/OFF button to start the self-test; press the Esc button to exit the self-test menu.

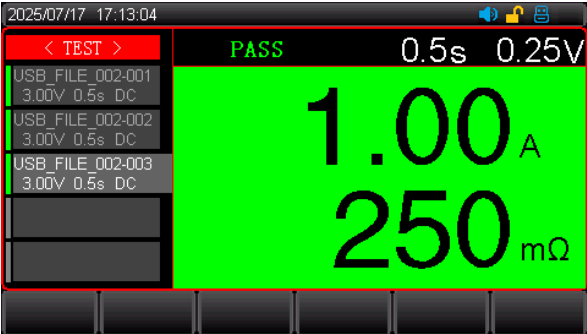
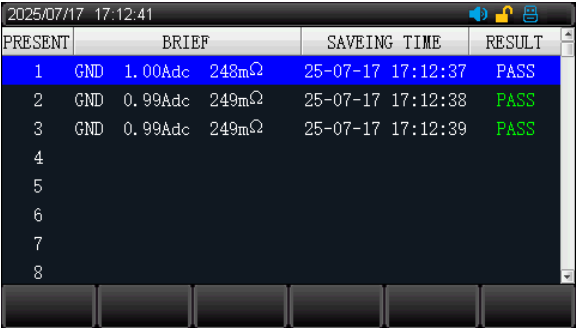
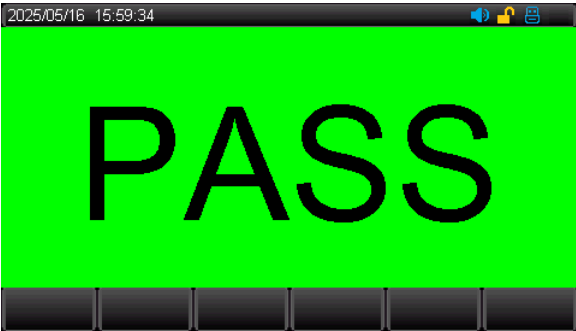
Test Result: Pass	Test Result: Failed
Self-check completed. Press Esc to exit the self-test page.	Self-check function error! Please confirm your contact information or call your UNI-T Technology dealer. Press Esc to exit the self-test page.

5.1.3 Test Setting

On the test menu, move the cursor to **<Test>**, press the **<Test Setup>** function button at the bottom of the screen to enter the test setup menu.



Test Settings	Options	Default	Description
Single Step	ON, OFF	ON	ON: During a multi-step (linked) test, press the ON/OFF button again after the first test group completes to continue to the next group. OFF: The instrument will automatically proceed to the next test group after completing the first group.
Fail Stop	ON, OFF	ON	ON: The test process stops immediately after a failure. OFF: The test process continues regardless of failure, until all test steps are completed.

Test Result	LAST, ALL, PASS/FAIL	LAST	Last: When performing a single test or a multi-step test, only the result of the last test step is displayed after the test is completed, as shown in the figure below. 
		ALL	All: When performing a multi-step test, all executed test results are displayed after the test is completed. Switch the display view using the Up and Down cursor keys, as shown in the figure below. 
		PASS/FAIL	Pass/Fail: When performing a single test or a multi-step test, the overall test result is shown simply as "PASS" or "FAIL" after completion, as shown in the figure below. 
Color States	DULL, VIVID	DULL	Dull: The test result screen appears in a muted color style after the test is completed, as shown in the figure below.

			
		VIVID	Vivid: The test result screen appears in a vivid color style after the test is completed, as shown in the figure below. 
Location	IN. MEMORY, NONE	IN. MOMORY	Test results are saved to the instrument's internal memory after the test is completed.
		NONE	Test results are not saved after the test is completed.
Remote Control	OFF, ON	OFF	Used to enable or disable the control of the handler interface.

Startup Method

1. Local startup: Initiate the startup using the power switch button on the front panel.
2. PLC startup: Initiate the startup using the START control signal input through the HANDLER interface.
3. Communication startup: Always enabled. Refer to the communication protocol for implementation details.

5.2 File Management

On the test setup menu, move the cursor to **<Test>**, press the file function button at the bottom of the screen to enter the **<File Management>** menu, as shown in the figure below.

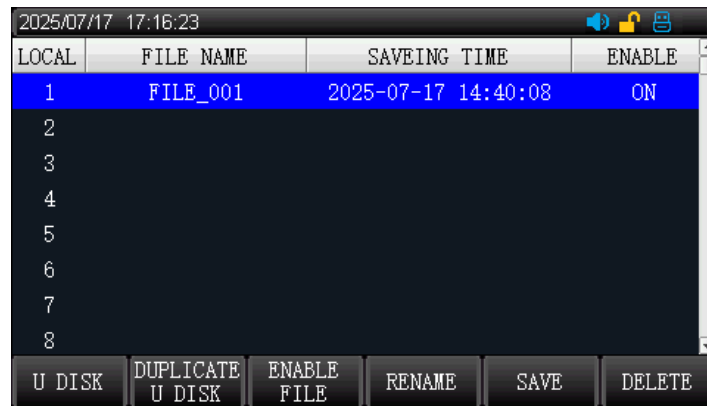


Figure 5-1 File Management

5.2.1 Memory

The memory function allows users to select and manage test files stored either in the instrument's internal memory or on an external USB flash drive.

The internal memory supports access to up to 100 files.

The USB flash drive also supports access to up to 100 files.

5.2.2 File Activation

UT5140 instrument supports storage of up to 100 test step memory groups. Users can configure test files (File) and steps (STEP) as needed. Each folder can contain up to 100 individual test steps, and the system will automatically proceed to the next step during testing. Each test step can be assigned only one test function. Activating a file loads the parameter settings saved in the selected memory group, switches the instrument to testing mode, and prepares it to execute the test according to the reloaded parameters.

Activation Steps

1. Navigate to the **<File>** menu.
2. Use the cursor keys to select the desired file.
3. Press the activate file function button at the bottom of the screen or the OK button to activate the file.

5.2.3 File 1 to File 100

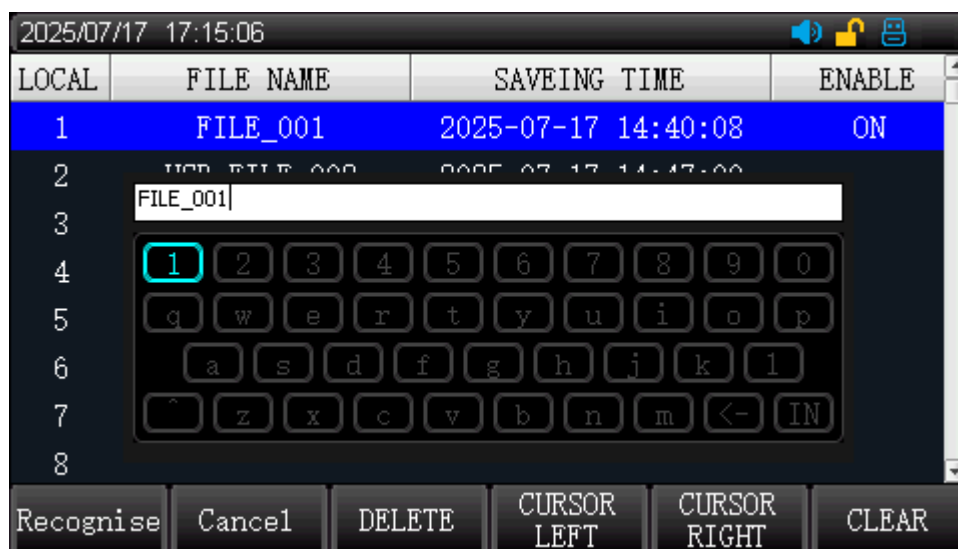
Users can manage 1 to 100 files for saving, reading, and deletion. The available functions are listed in the table below.

Function Key	Description
Local/U Disk	Save all current settings to the instrument's internal memory or an external USB flash drive.
Duplicate U Disk	Copy all settings from internal memory to the USB flash drive.
Enable File	Load the selected file's parameters into the system.
Rename	Modify the file name; custom filenames are supported.
Save	Save all current settings to the selected file.
Delete	Delete the selected file.

Setting Steps

1. Enter the <File> menu.
2. Use the cursor keys to select any file slot from File 1 to File 100.
3. According to your operation requirements, use the function buttons at the bottom of the screen to perform the desired action (as shown in the table above).

5.2.4 Rename File



Setting Steps

1. Press the left/right arrow keys to move the cursor.
2. Use the function buttons at the bottom of the screen to select the character range and perform operations based on the cursor position.
3. Press the up/down arrow keys to select the desired character, then press the OK button to confirm.

4. Finally, move the cursor to IN on the screen and press OK button to confirm the new filename. Press Esc to cancel the modification.

Note: The first file and the currently activated file cannot be deleted.

5.2.5 Copy File

To help users efficiently perform batch configuration of the instrument, the instrument supports saving setting information to an external USB flash drive.

Other instruments can read the required configuration parameters directly from the USB flash drive. The USB flash drive supports up to 100 external files. The file storage format is shown in Figure 5-1.

	FILE_001.STA	2025/7/17 17:15	STA 文件	1 KB
---	--------------	-----------------	--------	------

Figure 5-2 USB File Storage

File path: UT5140\STATE\ FILE_001.STA

When a file from the USB flash drive is saved to the instrument's internal memory, its name will automatically be prefixed with **USB_** for easy identification.

2025/07/17 17:14:52						
LOCAL	FILE NAME	SAVEING TIME	ENABLE			
1	FILE_001	2025-07-17 14:40:08				
2	USB_FILE_002	2025-07-17 14:47:00	ON			
3						
4						
5						
6						
7						
8						
U DISK		DUPLICATE U DISK	ENABLE FILE	RENAME	SAVE	DELETE

5.3 Data Record

On the test menu, move the cursor to <Measurement>, then press the <Measurement Results> function button at the bottom of the screen to access the measurement results menu.

Note: This function is available only when the measurement result storage is set to Internal Disk in the <Measurement Settings> menu.

The data record function allows real-time storage of measurement data to a USB flash drive. These files can be accessed and viewed on a computer, as shown in Figure 5-2.

Insert the USB flash drive into the USB port on the front panel of the instrument before starting the test.

After the test is completed, measurement data will be automatically saved in the USB flash drive in tabular format.

The number of records that can be stored depends on the capacity of the USB flash drive.

Current Test Result

2025/07/17 17:18:22					
PRESENT	BRIEF			SAVEING TIME	RESULT
1	GND	1.00A	251mΩ	25-07-17 17:17:56	PASS
2	GND	1.00A	250mΩ	25-07-17 17:17:57	PASS
3	GND	1.00A	251mΩ	25-07-17 17:17:58	PASS
4	GND	1.00A	251mΩ	25-07-17 17:17:59	PASS
5					
6					
7					
8					
PRESENT/ HISTORY	DUPLICATE U DISK				

Historical Test Results

2025/07/17 17:18:31					
HISTORY	BRIEF			SAVEING TIME	RESULT
1	GND	0.99A	69mΩ	25-07-17 15:11:51	PASS
2	GND	0.99A	247mΩ	25-07-17 15:11:52	PASS
3	GND	1.00A	247mΩ	25-07-17 15:11:53	PASS
4	GND	0.98A	72mΩ	25-07-17 15:12:01	PASS
5	GND	1.00A	247mΩ	25-07-17 15:12:02	PASS
6	GND	1.00A	247mΩ	25-07-17 15:12:03	PASS
7	GND	0.98A	72mΩ	25-07-17 15:12:16	PASS
8	GND	1.00A	246mΩ	25-07-17 15:12:17	PASS
PRESENT/ HISTORY	DUPLICATE U DISK	CLEAR	PAGE UP	PAGE DOWN	JUMP

 data_2025-07-19 17_01_28.csv	2025/7/19 17:01	Microsoft Excel ...	3 KB
 data_2025-07-19 17_01_34.csv	2025/7/19 17:01	Microsoft Excel ...	3 KB

Figure 5-3 Data File in USB Flash Drive

Test data is automatically saved in the DATA folder under the corresponding instrument model directory on the USB flash drive. Files are named based on the current date and time in .csv format.

For example, file path: UT5140\DATA\data_2025-07-19 17_01_28.csv

Table 5-1 Data Record

Time	Test Type	Test Current	Test Voltage	Test Time	Resistance	Judgement
2025/7/17 15:11	AC50Hz	0.99A	0.07V	2.0s	69mΩ	PASS
2025/7/17 15:11	DC	0.99A	0.25V	0.5s	247mΩ	PASS
2025/7/17 15:11	DC	1.00A	0.25V	0.5s	247mΩ	PASS
2025/7/17 15:12	AC50Hz	0.98A	0.07V	2.0s	72mΩ	PASS
2025/7/17 15:12	DC	1.00A	0.25V	0.5s	247mΩ	PASS
2025/7/17 15:12	DC	1.00A	0.25V	0.5s	247mΩ	PASS
2025/7/17 15:12	AC50Hz	0.98A	0.07V	2.0s	72mΩ	PASS
2025/7/17 15:12	DC	1.00A	0.25V	0.5s	246mΩ	PASS
2025/7/17 15:12	DC	0.99A	0.25V	0.5s	247mΩ	PASS
2025/7/17 15:13	AC50Hz	0.98A	0.07V	2.0s	72mΩ	PASS
2025/7/17 15:13	DC	1.00A	0.25V	0.5s	247mΩ	PASS
2025/7/17 15:14	DC	1.00A	0.25V	0.5s	247mΩ	PASS
2025/7/17 17:08	AC50Hz	1.00A	0.25V	0.5s	247mΩ	ABORT
2025/7/17 17:08	AC50Hz	1.00A	0.25V	0.5s	247mΩ	ABORT

No.	Settings	Description
1	Time	The moment the test is performed.
2	Test Type	The selected test mode (AC 50 Hz, AC 60 Hz, or DC).
3	Test Current	The current used during the test.
3	Test Voltage	The voltage used during the test.
4	Test Time	The duration of each test step.
5	Resistance	The measured impedance value.
6	Judgement	The test result (Pass/Fail).

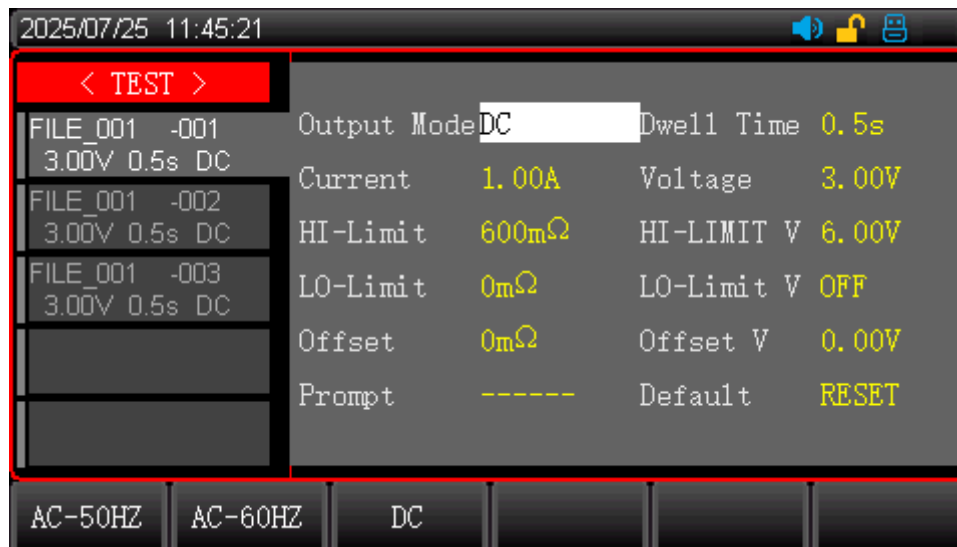
Note: Each test data file is identified by the test timestamp, which is generated by the instrument's internal clock. If the internal clock fails, the timestamp may be inaccurate, making it difficult to distinguish between files. In such cases, the internal battery should be replaced. For best results, it is recommended to return the instrument to the factory for battery replacement.

6. Operation

In non-operating state, press the Setup button to enter the test setup menu.

6.1 Test Step

The instrument supports up to 100 test items in total. The menu for configuring execution parameters is shown in the figure below.



Settings	Options	Default	Description
Output Mode	AC 50/60 Hz, DC	DC	Set the output current mode for ground impedance testing.
Dwell Time	(0.5 to 999.9)s, C-test	0.5 s	Set the test duration for the current test item.
Current	1 to 40 A	1 A	The output current value used in ground impedance testing.
Voltage	3 to 8 V	3 V	Set the open-circuit voltage.
HI-Limit	0 to 600 mΩ	600 mΩ	Set the upper limit for ground impedance.
LO-Limit	0 to 600 mΩ	0 mΩ	Set the lower limit for ground impedance.
HI-Limit V	0 to 6 V	6 V	Set the upper voltage limit for the ground impedance test; measures the voltage across the DUT.
LOW-Limit V	0 to 6 V	0 V	Set the lower voltage limit for the ground impedance test; measure the voltage across the DUT.
Offset	0 to 100 mΩ	0 mΩ	Set the impedance offset value. The offset can be set automatically or manually after short-circuiting the test leads.
Offset V	0 to 4 V	0 V	Set the voltage offset value. The offset can be set automatically or manually after short-circuiting the test leads.
Prompt	N/A	-----	Set a prompt message or note as a reminder or instruction for this step.
Default	N/A	RESET	Restore all settings to their default values.

6.2 Prompt Message

The instrument displays various messages on the LCD screen to indicate test status and results during operation.

Prompt Message	Description
Test Time	While the test is running and before the first result is acquired, the display continuously updates with elapsed time.
Test Pass	If the DUT remains within all defined test limits throughout the test, the result is considered valid. The LCD will display "Pass".
Test Stop	If the test is manually interrupted by pressing the ON/OFF button or using a remote control, the test is aborted, and the LCD will display "Abort".
Upper Limit Impedance Test Failure	If the measured ground impedance exceeds the configured HI-Limit, the test fails due to high impedance. The LCD will display the set upper limit value.
Lower Limit Impedance Test Failure	If the measured ground impedance is below the configured LO-Limit, the test fails due to low impedance. The LCD will display the set lower limit value.
Upper Limit Voltage Test Failure	If the voltage measured across the DUT exceeds the configured HI-Limit V, the test fails due to excessive voltage. The LCD will display the voltage upper limit value.
Lower Limit Voltage Test Failure	If the voltage across the DUT is below the configured LOW-Limit V, the test fails due to insufficient voltage. The LCD will display the voltage lower limit value.

6.3 Operation Procedure

UT5140 is primarily designed for production line automation, quality analysis, and inspection. Its operation and settings are straightforward. If an invalid setting or operation is attempted, the tester will emit two short beeps (provided the alarm volume is enabled) and return to the original settings. Please follow the steps below to operate the tester correctly.

The tester automatically detects the input power voltage—no manual voltage selection is required. Before connecting the power cord to the mains, verify that the fuse specifications are correct. Then, connect the ground wire to the ground terminal on the rear panel of the tester.

Connect the power cord to both the tester and the power socket, but do not connect the test leads to the output terminals of the tester yet.

First, securely connect all test leads of the DUT or its test fixture. Then:

- Connect the return line to the Return terminal of the tester.
- Connect the ground test lead to the corresponding terminal.
- Finally, connect the current output lead to the current terminal of the tester. Ensure that all test leads are properly connected.

Next, turn on the tester using the input power switch. Upon startup, the tester will automatically display the memory group and test parameter data from the last test and enter standby and parameter setting mode.

Before testing, refer to the instructions for setting test parameters to complete the general test and system settings. These system settings are independent of the test functional parameters and are stored in a separate memory space.

To reset test parameters:

1. Move the cursor to select and configure the test step.
2. Press the Setup button to enter the parameter setting menu.
3. Modify the parameters as needed.

For detailed instructions, refer to *Section 6.1*.

To select a different test file, go to the file menu and press the enable file button to choose the desired file.

To start a test, press the ON/OFF button. The green output indicator inside the button will illuminate.

Warning: Do not touch the DUT during testing for safety.

To stop the test at any time, press the ON/OFF button again. The tester will immediately stop, the indicator light will turn off, and the display will retain the current test values.

To resume the test, press the ON/OFF button again—the program will continue from the unfinished step.

To restart the test from the beginning, move the cursor to the first step and press the ON/OFF button. The program will start from the first step.

If the DUT fails the test, the tester will:

- Immediately stop
- Display the failure status and measurement values
- Illuminate the red FAIL indicator
- Emit a warning beep

To continue with the remaining test steps, press the ON/OFF button again.

For detailed information on failure messages, refer to *Section 6.2*.

To operate the tester using an external remote control:

Connect the remote control to the Remote Input terminal on the rear panel.

The remote-control switches function identically to those on the tester's front panel.

The tester also provides remote monitoring output signals (for Test Pass, Test Fail, and Test in Progress). For details on using these functions, refer to the *Section 7.3 Handler Interface*.

7. Communication Interface

7.1 Remote Communication Interface

7.1.1 RS-232C 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. The RS-232 signal definitions for UT5140 are shown in Table 7-1.

Table 7-1 Communication Interface Signal

Signal	Signal	Pin Numbers of 9-Pin Connector
Transmit data	TXD	3
Receive data	RXD	2
Ground	GND	5
RS485 interface	485A	8
RS485 interface	485B	9

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

The default communication settings are as follows:

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

Baud Rate: Configurable via the Baud Rate option on the <System Config> menu

Data Bits: 8 bits

Stop Bits: 1 bit

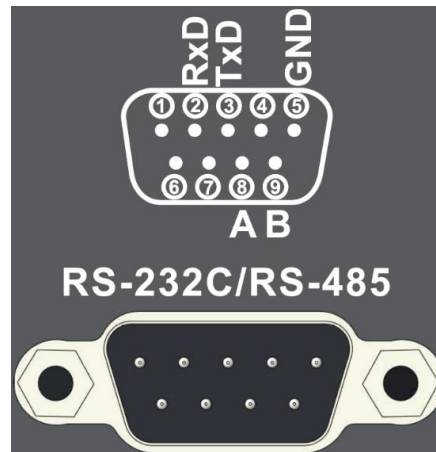
Parity: None

7.1.2 RS-232C Connection



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

Figure 7-2 RS-232C Connector, 9-pin D-sub Male Connector



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

The default communication settings are as follows:

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

Baud Rate: Configurable via the Baud Rate option on the <System Config> menu

Data Bits: 8 bits

Stop Bits: 1 bit

Parity: None

7.1.3 RS-485 Interface

The instrument supports the RS485 interface and is compatible with the ModBus RTU protocol.

It is equipped with a standard RS-232C interface (Pin 8 as A, Pin 9 as B).

The station number of the instrument can be set from 1 to 255 on the <System Config> menu. When multiple slave devices are connected, **ensure each device is assigned a different station number.**

RS485 is a communication interface designed for multi-device communication, allowing one master to connect in parallel with multiple slave devices.

7.2 Communication Setting

Communication settings are primarily used to configure the parameters required for communication between the electronic load and the host computer. Communication is established via the RS232 interface. Users must obtain the appropriate connection cables to enable remote control of the electronic load.

Before connecting to the host computer, please ensure that the correct cables have been acquired and that the communication parameters have been properly configured in the <System Config> menu.



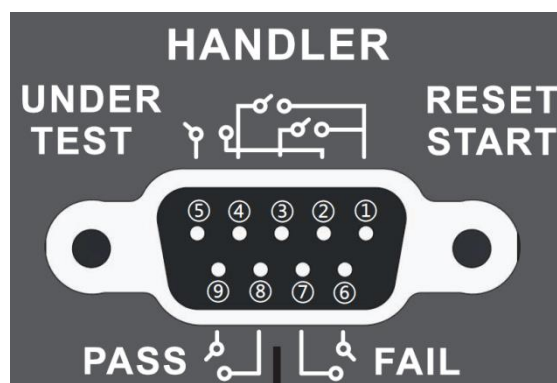
Communication Setting Steps

1. Press the Setup button on the front panel to enter <System Config> menu.
2. Set COM MODE, COM BUS, and BPS in <System Config> menu, ensure that these parameters match the upper computer settings.

7.3 Handler Interface

This series of testers is equipped with a 9-pin D-sub connector that provides remote control input and output signals. For optimal performance and signal integrity, it is recommended to use shielded cables for both input control and output signal connections.

Figure 7-3 HANDLER Interface



Note: To enable the HANDLER function, the remote-control setting in the instrument's test configuration must be set to **ON**. When remote control is enabled, the front panel ON/OFF switch is disabled to prevent maloperations or safety hazards caused by simultaneous local and remote control.

Table 7-2 HANDLER Pin Definition

Input/Output	Pin	Name	Description
Signal Input	1	COM	COM (Common low-end): Provides the 0 V reference for the start and stop control signals.
	3	START	Start signal: The instrument begins testing when the START terminal is shorted to COM.
	4	RESET	Stop signal: The instrument stops testing when the RESET terminal is shorted to COM.
Signal Output	2	TEST1	These two terminals are shorted during the measurement process and become open-circuited after the test is completed.
	5	TEST2	
	8	PASS1	These terminals remain open during the test. They are shorted when the test result is PASS.
	9	PASS2	
	6	FAIL1	These terminals remain open during the test. They are shorted when the test result is FAIL.
	7	FAIL2	

Figure 7-3 HANDLER Sequence Diagram

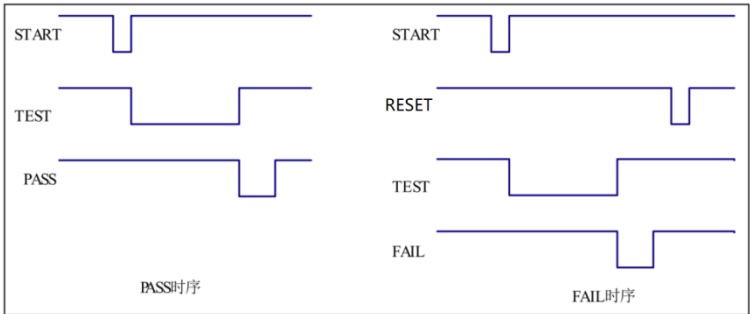
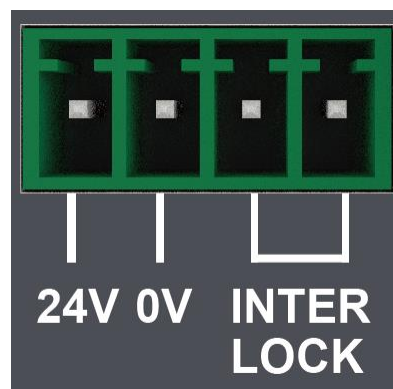


Table 7-3 HANDLER Sequence Diagram Description

Signal	Description
Starting a test via the HANDLER	1. Verify that the TEST (in-test) signal is inactive. The START signal can only be received when the TEST (in-test) signal is inactive. 2. Once confirmed, send a START signal (40 ms to 200 ms pulse width) to initiate the test.
Stopping a test via the HANDLER	Send a RESET signal at any time (40 ms to 200 ms pulse width) to abort the ongoing test.
Signal output-In test	During testing, the relay shorts PIN 2 and PIN 5. Once the test ends, the relay returns these pins to an open state.
Signal output-Test passed	If the test passes, the relay shorts PIN 8 and PIN 9, and maintains this state until a new test program starts or the stop switch is pressed. Once a new test begins or the stop switch is activated, the relay returns PIN 8 and PIN 9 to an open-circuit state.
Signal output-Test failed	If the test fails, the relay shorts PIN 6 and PIN 7, and maintains this state until a new test program starts or the stop switch is pressed. Once a new test begins or the stop switch is activated, the relay returns PIN 6 and PIN 7 to an open-circuit state.

7.4 Signal Interface

Figure 7-4 Signal Interface



1. The SIGNAL interface provides a power supply with an approximate output voltage of +24 V (Pin 1: +24 V; Pin 2: Ground), and a maximum output current of less than 0.5 A. This output can be used to drive indicator lights, photoelectric switches, low-power solenoid valves, and other devices in coordination with the HANDLER interface control signals.

**Note:**

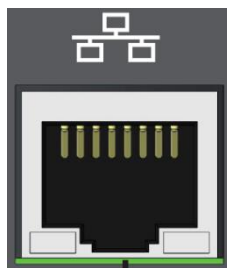
- This power supply is an open-loop output from the instrument's internal power source and is not voltage-regulated. The actual output is approximately 29 V. Please verify compatibility before use.
- The instantaneous maximum current must not exceed 0.5 A, and the long-term operating current must be kept below 0.2 A. If higher current is required, an external power supply should be used.

2. Pins 3 and 4 of the SIGNAL interfaces are designated for the interlock signal. A pluggable terminal block is provided to facilitate user wiring. If the interlock signal is open, the instrument will be locked, preventing the initiation of a test or immediately halting any ongoing test. Additionally, a warning message will appear at the bottom of the measurement screen: "Interlock not connected! Please check the Interlock connection status."

For more details, refer to the setup instructions in *Section 4.2*.

7.5 LAN Interface

Figure 7-5 LAN Interface



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

Enter the <System Config> interface shown in the figure below and select the LAN communication mode.

Move the cursor to the **COM BUS** field, then use the function button to select LAN.

8. Appendix

8.1 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.

9. 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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