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Data Sheet

UT5400 Series Electrical Safety Analyzer

V1.0

December 2025

1. 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.

2. Product Overview

UT5400 Series Electrical Safety Analyzer integrate five key test functions: AC Withstand Voltage (ACW), DC Withstand Voltage (DCW), Insulation Resistance (IR), AC Ground Bond (GB), and Ground 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.

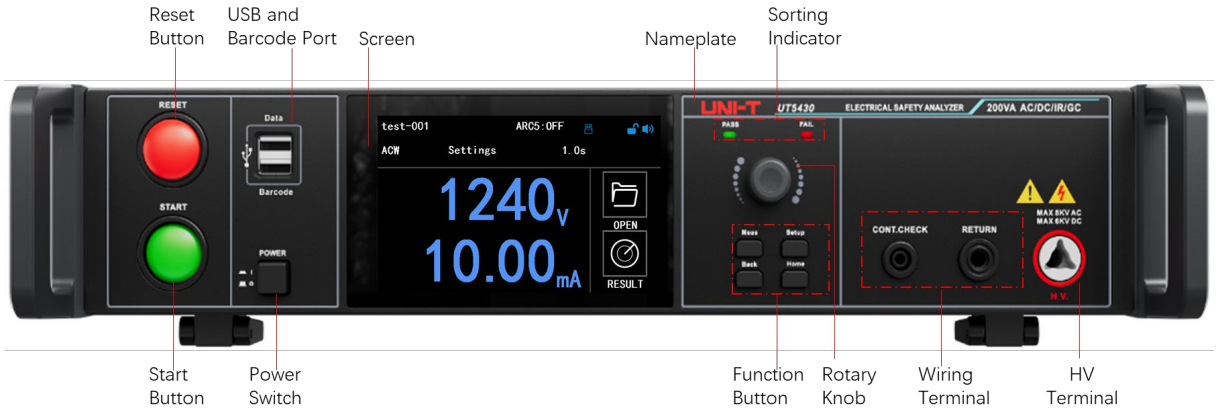
- DC withstand voltage test: Rated output 6 kV / 10 mA, with a minimum leakage current resolution of 0.1 nA.
- Insulation resistance test: Rated output 6 kV / 50 GΩ.
- AC ground bond test: Rated output 40 A / 600 mΩ.
- Continuity impedance test: Measurement range 0.001 Ω to 10 kΩ.

To enhance ease of use, the instrument is equipped with a 5-inch multi-touch display and supports barcode scanner input, enabling more efficient and streamlined operation. It also offers a comprehensive set of interface options, making it suitable for integration into automated test systems that require high safety and high reliability across a wide range of applications.

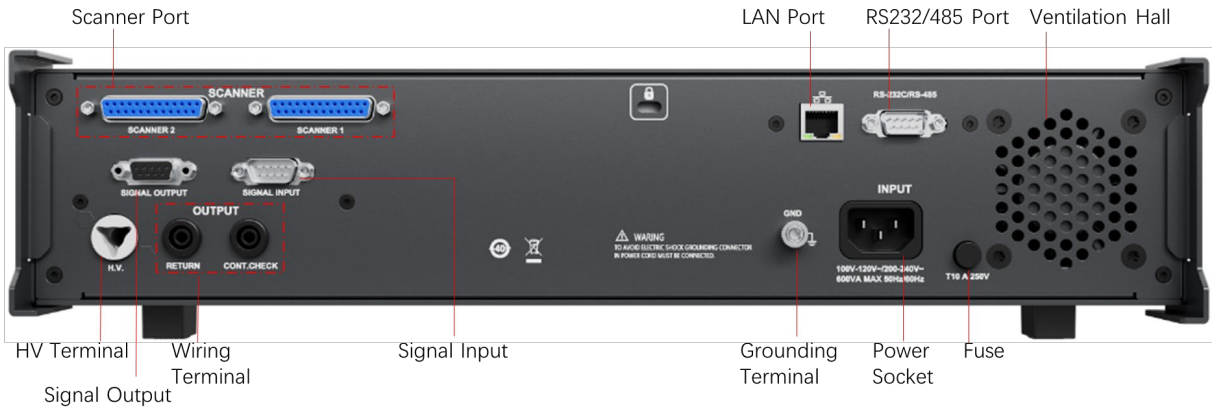
Application Scenarios

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

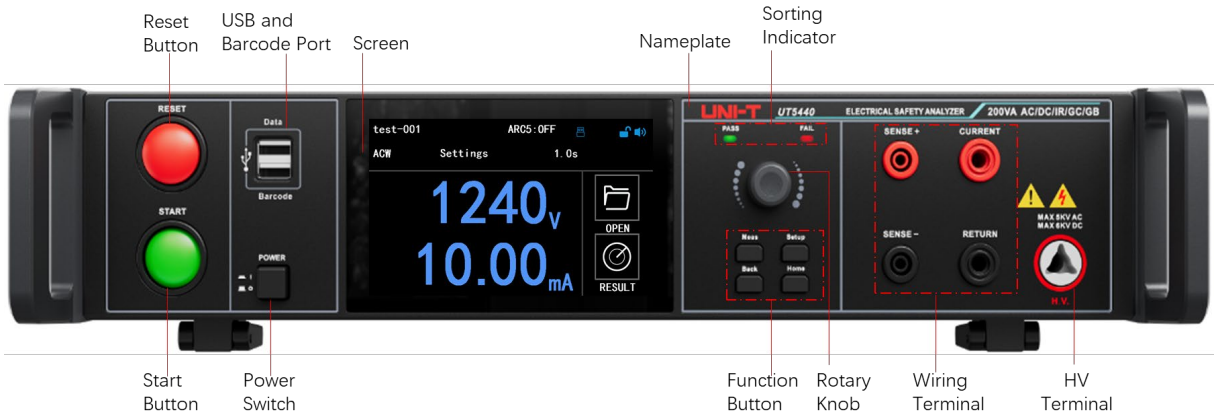
UT5430/UT5451 Front Panel



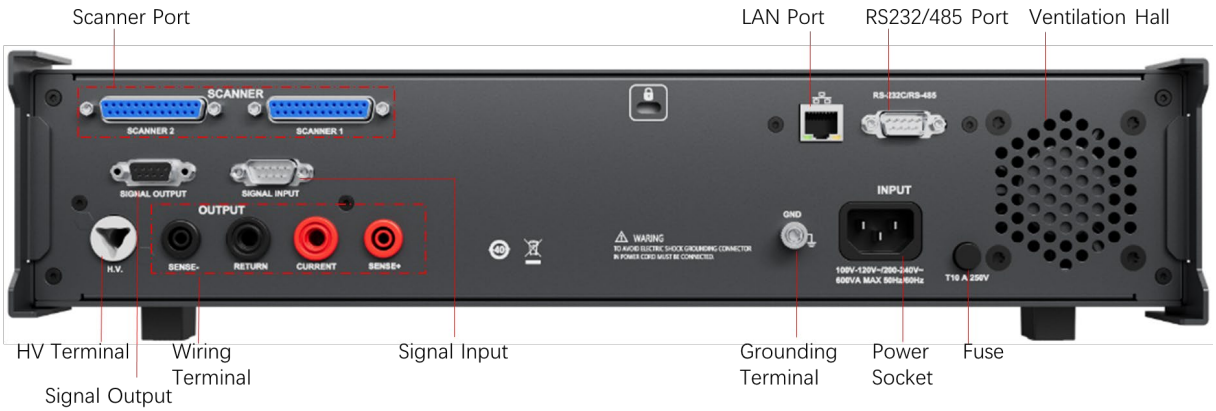
UT5430/UT5451 Rear Panel



UT5440/UT5452 Front Panel



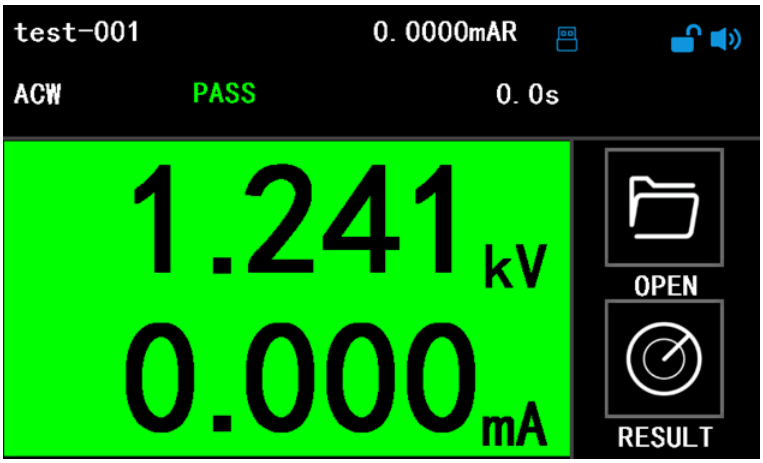
UT5440/UT5452 Rear Panel



3. Design Highlight

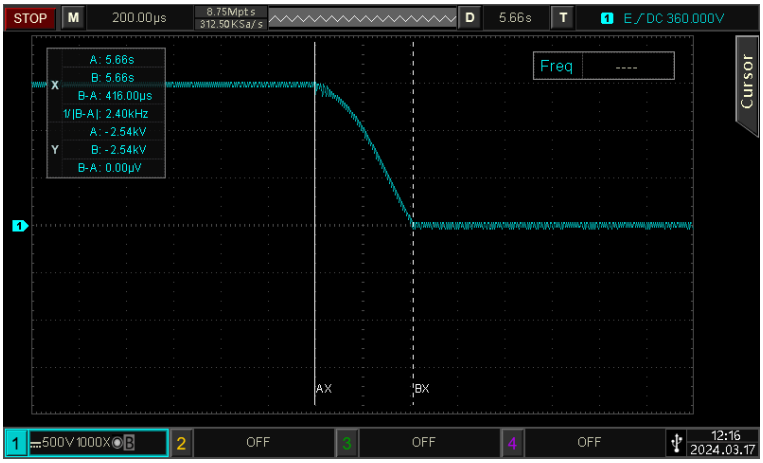
High Precision, High Resolution, Rapid Judgement

Equipped with a high-precision, high-resolution measurement circuit, the instrument achieves voltage and current accuracy of up to 1%, with resolution as fine as 1 V/0.1 nA. It also enables rapid judgement with a test time of just 0.1 seconds. This allows for accurate and fast measurement and analysis of safety parameters, providing reliable protection for users' products.



Rapid Discharge

The instrument is equipped with a DC rapid discharge function, achieving a no-load discharge time of less than 50 ms. This not only enhances operator safety but also improves overall test efficiency.



Multiple Safety Protections

Designed with multiple layers of safety protection, the instrument includes electric shock protection, short-circuit protection, upper/lower limit judgment, and over-temperature protection to safeguard both operators and equipment.

Importantly, the electric shock protection function uses an independent protection circuit. In the event of an unexpected electric shock, the system can immediately cut off the high-voltage output to ensure personal safety.

Wiring Reliability Detection

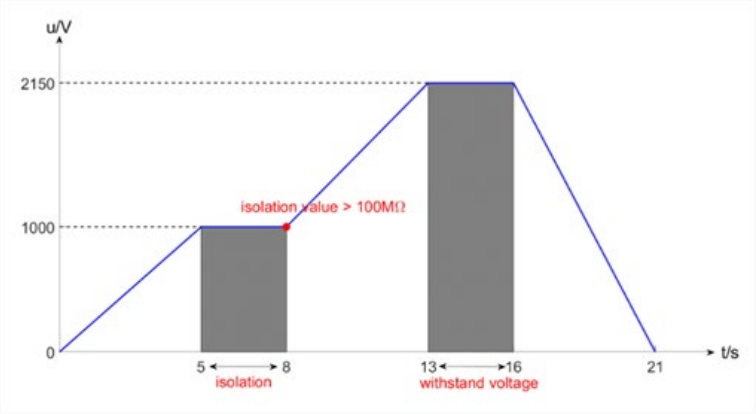
To identify potential wiring issues, the UT5400 series incorporates two key functions.

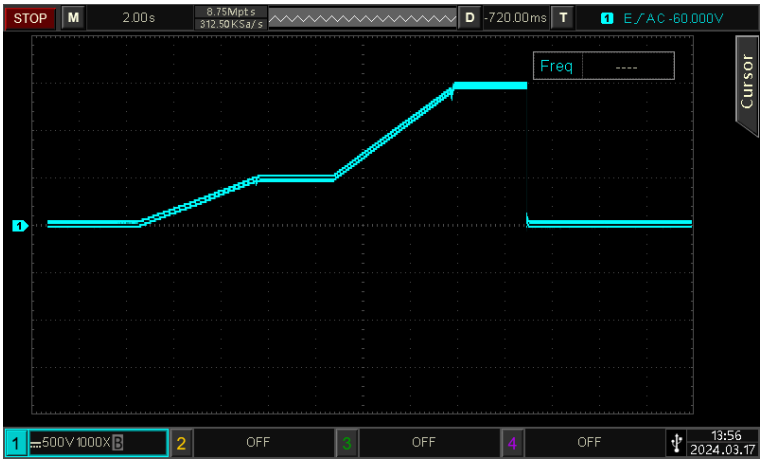
The first is the open/short circuit (OSC) detection function, which independently identifies wiring errors and poor contact in test leads.

The second is the charging lower limit function, which simultaneously verifies proper lead contact during DC withstand voltage and insulation resistance tests, enhancing overall detection efficiency.

Continuous Output

In conventional safety testers, the voltage drops and discharges after each test step. The Continuous Output addresses this limitation by supporting step-by-step voltage boosting as well as cyclic alternating voltage aging tests, meeting more advanced safety test requirements.





4. 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.						

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)		±(2% × the setting value + 6 digits)
		100.0 (UT5451, UT5452)	0.1	

	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)		±(2% × the setting value + 6 digits)
		100.0 (UT5451, UT5452)	0.1	
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)		±(2% × the reading value + 6 digits)
	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 measurement (Unit: mA)	0.000 to 9.999		0.001	±(3% × the reading value + 50 μA); applicable for all ranges when PF > 0.1 and V > 250 VAC
	10.00 to 40.00 (UT5430, UT5440)		0.01	
	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 ±(2% × the setting value + 10 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	±(2% × the setting value + 2 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 ±(2% × the reading value + 10 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	±(2% × the setting value + 2 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	±(2% × the reading value + 10 digits) ; when the reading is < 6% of the range, the error increases by ±(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	±(2% × the reading value + 2 digits)
		0.000 to 3.500 mA	0.001 mA	±(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 10.00 mA	0.01 mA	±(2% × the reading value + 2 digits) ; when the reading is <6% of the range, the error increases by ±(0.2% of the range)

<table>
<tr><td rowspan="2">Slow rise time</td><td>Low range off</td><td>0.4 to 999.9 s</td><td rowspan="5">0.1 s</td><td rowspan="5">±(0.1% × the setting value + 0.05 s)</td></tr>
<tr><td>Low range on</td><td>0.5 to 999.9 s</td></tr>
<tr><td>Slow fall time</td><td colspan="2">0, 1.0 to 999.9 s (0 = off)</td></tr>
<tr><td rowspan="2">Test time</td><td>Low range off</td><td>0, 0.4 to 999.9 s (0 = continuous test)</td></tr>
<tr><td>Low range on</td><td>0, 1.0 to 999.9 s (0 = continuous test)</td></tr>
<tr><td rowspan="6">Slow-rise upper current (Unit: μA)</td><td colspan="2">0.0000 to 0.9999</td><td>0.0001</td><td rowspan="3">Low range enabled when ±(2% × the setting value + 10 digits) applies</td></tr>
<tr><td colspan="2">1.000 to 9.999</td><td>0.001</td></tr>
<tr><td colspan="2">10.00 to 99.99</td><td>0.01</td></tr>
<tr><td colspan="2">100.0 to 999.9, low range on</td><td rowspan="2">0.1</td><td rowspan="3">±(2% × the setting value + 2 digits)</td></tr>
<tr><td colspan="2">0.0 to 999.9, low range off</td></tr>
<tr><td colspan="2">1000 to 10000</td><td>1</td></tr>
<tr><td>Minimum charging current</td><td colspan="4">(0 to 350.0) μA, auto, manual</td></tr>
<tr><td>Discharge time</td><td colspan="4">No-load: < 50 ms, capacitive load: < 100 ms</td></tr>
</table>

Maximum capacitive load	1 μF < 1 kV, 0.75 μF < 2 kV, 0.5 μF < 3 kV, 0.08 μF < 4 kV, 0.04 μF < 5 kV, 0.015 μF < 6 kV			
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	0.0 - 10000 μA, (Total current + Current compensation ≤ 10 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	±(2% × 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 + 6 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 MΩ	1	±(15% × the reading value + 2 digits)
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 10.00A	0 to 600	1	±(2% × the reading value + 6 digits)
	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)
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 Local storage	130000		
Breakdown voltage test	√		
Step connection without power interruption	√		
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℃ Below 28℃, 30 to 70%RH (No condensation) Above 28℃, 30 to 50%RH (No condensation)		
Storage temperature	-20 to 60℃ / < 90%RH (No condensation)		
Dimensions	430 mm (W) x 89 mm (H) x 400 mm (D)		
Weight	UT5430: 12 kg		
	UT5440: 15 kg		
	UT5451: 22 kg		
	UT5452: 25 kg		

5. Accessories

Items	Quantity	Remarks
Electrical Safety Analyzer	1	
Interlock switch	1	Attached to tester
High-voltage test cable (Black)	2	Only for UT5430/UT5451
High-voltage test cable (Red)	1	
Ground Bond output line	1	Only for UT5440/UT5452
Ground Bond loop line	1	Only for UT5440/UT5452
Power cable	1	
RS232C communication line	1	
8G USB Disk	1	
Quick Start Guide	1	

6. 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.

Learn more at: www.uni-trend.com

Register your product to confirm your ownership. You will also get product notifications, update alerts, exclusive offers and all the latest information you need to know.

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