

UNI-T UT521

UNI-T UT521 Digital Earth Tester User Manual

MODEL: UT521

1. Introduction and Overview

The UNI-T UT520 Series Digital Earth Testers are designed for precise 3-wire and simple 2-wire earth resistance measurements. These instruments are essential for evaluating power and electrical systems, lightning protection equipment, and the ground systems of various electrical installations. The UT521 model offers high economic value and a lightweight design, making it convenient for field work.



Figure 1.1: UNI-T UT521 Digital Earth Tester



UT521

Earth Resistance Tester

Display Count : 2000

Earth Resistance : 0~2000Ω

AC Earth Resistance : 0~200V



Figure 1.2: Key specifications of the UT521 Earth Resistance Tester, including a display count of 2000, earth resistance range of 0-2000Ω, and AC earth resistance range of 0-200V.

2. Product Features

The UT520 series earth resistance testers are equipped with a range of features to ensure accurate and convenient measurements:

- **Manual Range:** Allows for precise selection of measurement ranges.
- **Low Battery Indication:** Alerts the user when battery power is low.
- **Data Hold:** Freezes the displayed measurement for easy reading.
- **LCD Backlight:** Provides illumination for clear readings in low-light conditions.
- **Auto Power Off:** Conserves battery life by automatically shutting down after approximately 10 minutes of inactivity.
- **Full Icon Display:** Intuitive icons on the LCD for easy understanding of modes and status.
- **Double Insulation Protection:** Enhances user safety during operation.
- **Poor Contact Display:** Indicates poor contact with the electrodes using "...Ω".
- **Over-range Display:** Shows "OL" when the measured value exceeds the selected range.

- **Simple 2-wire Testing:** For basic earth resistance measurements.
- **Precise 3-wire Testing:** For more accurate earth resistance measurements.



Product Features



UT520 series earth resistance tester has the functions of backlight display, low battery display, data hold, data storage, auto power off and power saving. It can not only be used for accurate three-wire measurement but also simple two-wire measurement.

Figure 2.1: Overview of UT520 series features, including backlight display, low battery display, data storage, auto power off, and the capability for both accurate three-wire and simple two-wire measurements.

3. Components and Panel Introduction

Familiarize yourself with the main components and controls of the UT521 Digital Earth Tester:



Two-Wire Measurement



Bad Contact Indication



Ac Voltage



Three-Wire Measurement



Double Insulation Protection



Overrange Display

Panel Introduction

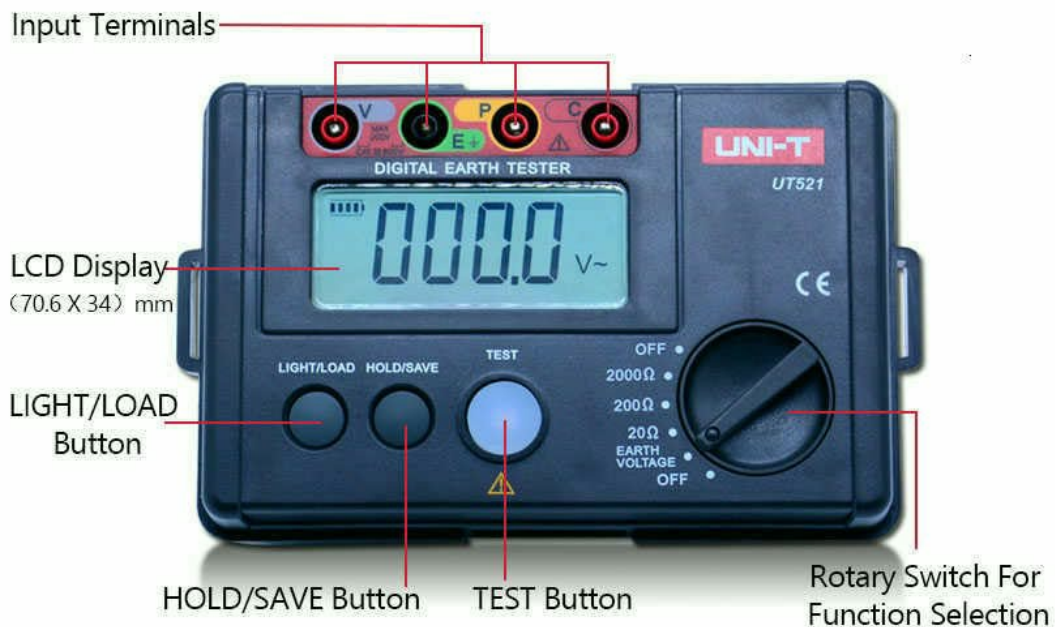


Figure 3.1: Detailed view of the UT521 panel, highlighting the Input Terminals (V, E, P, C), LCD Display (70.6 x 34 mm), LIGHT/LOAD Button, HOLD/SAVE Button, TEST Button, and Rotary Switch for Function Selection.

- **Input Terminals (V, E, P, C):** Connect test leads for various measurements.
- **LCD Display:** Shows measurement readings, battery status, and other indicators.
- **LIGHT/LOAD Button:** Activates the display backlight or initiates a load test.
- **HOLD/SAVE Button:** Freezes the current reading or saves data.
- **TEST Button:** Initiates the measurement process.
- **Rotary Switch:** Selects the desired measurement function (OFF, 2000Ω, 200Ω, 20Ω, EARTH VOLTAGE, OFF).

4. Setup

Before operating the UT521, ensure proper setup:

- Battery Installation:** The UT521 requires 6 x 1.5V LR6 (AA) batteries. Open the battery compartment on the back of the device and insert the batteries, observing correct polarity.
- Accessory Check:** Verify that all standard accessories are present, including batteries, simple test leads with alligator clips, standard test leads with alligator clips, earth spike, and gallus.
- Initial Inspection:** Visually inspect the device and test leads for any signs of damage. Do not use the device if it appears damaged.

UT520 Series Digital Earth Testers



● UT522

UT520 series can perform precise 3-wire and simple 2-wire earth resistance measurement for power and electrical systems, lightning protection equipment, and ground system of all electrical equipment. This series is UNI-T's introductory earth resistance tester with high economic value. Its light weight design is convenient for field work.

SPECIFICATIONS

	Range	UT521	UT522
Earth resistance (Ω)	0~20 Ω	$\pm(2\%+10)$	
	0~200 Ω	$\pm(2\%+3)$	
	0~2000 Ω	$\pm(2\%+3)$	
	0~40 Ω		$\pm(2\%+20)$
	0~400 Ω		$\pm(2\%+3)$
	0~4000 Ω		$\pm(2\%+3)$
AC earth voltage (V)	0~200V	$\pm(1\%+4)$	
	0~400V		$\pm(1\%+6)$
	Frequency: 50Hz/60Hz	✓	✓
Features			
Display count		2000	4000
Manual range		✓	✓
Auto power off	Around 10 minutes	✓	✓
Low battery indication		✓	✓
Data hold		✓	✓
Data storage		20	20
LCD backlight		✓	✓
Full icon display		✓	✓
Double insulation protection		✓	✓
Poor contact display	"... Ω "	✓	✓
Over-range display	Display "OL"	✓	✓
Simple 2-wire testing		✓	✓
Precise 3-wire testing		✓	✓

GENERAL CHARACTERISTICS

Power	1.5V battery (LR6) x 6
Display	70.6mm x 34mm
Product color	Red and grey
Product net weight	560g
Product size	160mm x 100mm x 70.5mm
Standard accessories	Batteries, simple test leads with alligator clips, standard test leads with alligator clips, earth spike, gallus
Standard individual packing	Gift box, carrying bag, English manual
Standard quantity per carton	8pcs
Standard carton measurement	530mm x 300mm x 350mm (0.056 CBM per standard carton)
Standard carton gross weight	19kg

Figure 4.1: Contents of the UNI-T UT521 package, including the main unit, test leads, earth spikes, and carrying bag.

5. Operating Instructions

This section details the procedures for performing earth resistance and AC earth voltage measurements.

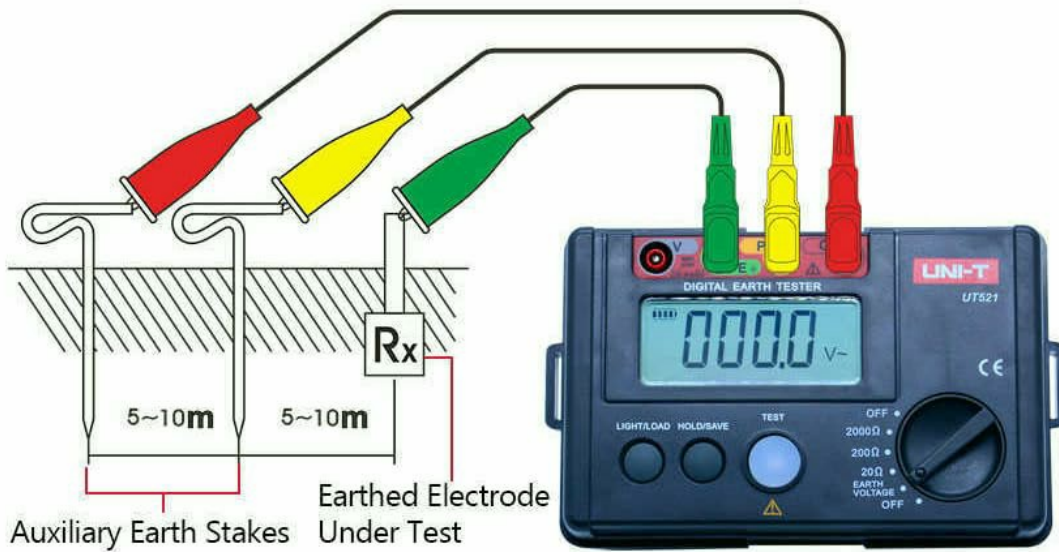
5.1 Earth Resistance Measurement (3-Wire Method)

The 3-wire method provides a more precise measurement of earth resistance. This method requires the use of two auxiliary earth stakes.

1. Insert the two auxiliary earth stakes (P and C) into the ground at appropriate distances (typically 5-10m from the earthing electrode under test).
2. Connect the test leads from the UT521 to the earthing electrode (E), and the auxiliary stakes (P and C) as shown in Figure 5.1.
3. Turn the rotary switch to the desired earth resistance range (20Ω , 200Ω , or 2000Ω).
4. Press the TEST button to initiate the measurement. The reading will be displayed on the LCD.

Precision Measurement

- With use of standard test leads •



Simple Measurement

- With use of simple test leads •

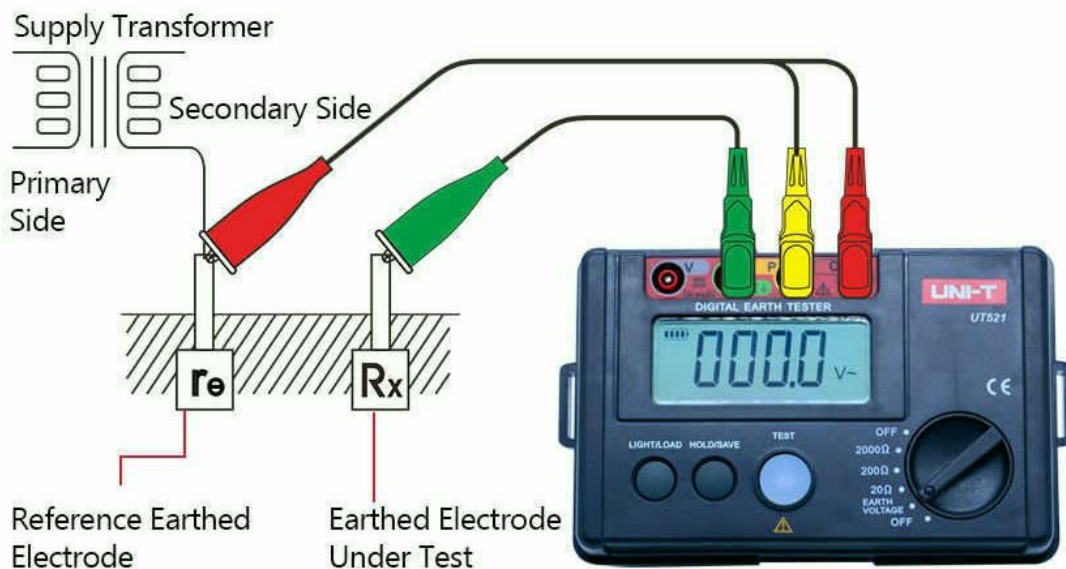


Figure 5.1: Diagram illustrating the precision 3-wire earth resistance measurement setup with auxiliary earth stakes.

Watch the video below for a demonstration of 3-wire earth resistance testing:

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Video 5.1: Demonstration of earth resistance measurement using the UNI-T UT521, including setup and reading results for various resistance values (0:00 - 1:04).

5.2 Earth Resistance Measurement (2-Wire Method)

The 2-wire method is a simpler approach, often used when auxiliary stakes cannot be driven into the ground. It requires a known reference earthing electrode.

1. Connect the test leads from the UT521 to the earthing electrode under test (Rx) and a known reference earthing electrode (re) as shown in Figure 5.2.
2. Turn the rotary switch to the desired earth resistance range (20Ω , 200Ω , or 2000Ω).
3. Press the TEST button to initiate the measurement. The reading will be displayed on the LCD.



Figure 5.2: Diagram illustrating the simple 2-wire earth resistance measurement setup using a reference earthing electrode.

5.3 AC Earth Voltage Measurement

To measure the AC earth voltage, follow these steps:

1. Connect the test leads to the appropriate terminals for voltage measurement (V and E+).
2. Turn the rotary switch to the "EARTH VOLTAGE" position.
3. The AC earth voltage will be displayed on the LCD.

Watch the video below for a demonstration of AC earth voltage testing:

Your browser does not support the video tag.

Video 5.2: Demonstration of AC earth voltage measurement using the UNI-T UT521, showing the device connected to a calibrator and displaying voltage readings (1:04 - 1:33).

6. Specifications

The following table provides detailed specifications for the UT521 and UT522 models:



Figure 6.1: Comparative specifications table for UNI-T UT521 and UT522 Digital Earth Testers.

Category	Specification
Model Number	HY-UT521
Earth Resistance Range	0-20Ω, 0-200Ω, 0-2000Ω
AC Earth Voltage Range	0-200V

Category	Specification
Frequency	50Hz/60Hz
Display Count	2000
Auto Power Off	Around 10 minutes
Data Storage	20 sets
Power Source	6 x 1.5V Battery (LR6)
Display Dimensions	70.6mm x 34mm
Product Color	Red and Grey
Net Weight	0.6 Kilograms (560g)
Product Dimensions	160mm x 100mm x 70.5mm (6.5 x 4.33 x 4.72 inches)
First Available Date	August 6, 2023
Manufacturer	UNI-Trend
Country of Origin	China

7. Maintenance

To ensure the longevity and accuracy of your UNI-T UT521 Digital Earth Tester, follow these maintenance guidelines:

- **Cleaning:** Wipe the device with a soft, dry cloth. Do not use abrasive cleaners or solvents.
- **Battery Replacement:** Replace batteries promptly when the low battery indicator appears. Ensure to use 6 x 1.5V LR6 (AA) batteries. Remove batteries if the device will not be used for an extended period to prevent leakage.
- **Storage:** Store the tester in a cool, dry place, away from direct sunlight and extreme temperatures. Use the provided carrying bag for protection.
- **Test Leads:** Regularly inspect test leads for any cuts, cracks, or damage. Replace damaged leads immediately to ensure safety and accurate measurements.

8. Troubleshooting

If you encounter issues with your UT521, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
Display shows "OL"	Over-range measurement	Select a higher measurement range using the rotary switch.

Problem	Possible Cause	Solution
Display shows "... Ω "	Poor contact with electrodes or test leads	Ensure all connections are secure and the earth stakes are firmly inserted into the ground. Clean the contact points if necessary.
No display or faint display	Low battery or no batteries installed	Replace the batteries with new 1.5V LR6 (AA) batteries. Check battery polarity.
Inaccurate readings	Incorrect measurement method, faulty test leads, or environmental factors	Verify the correct 2-wire or 3-wire setup. Inspect test leads for damage. Ensure proper environmental conditions for testing.

9. What's in the Box

The UNI-T UT521 Digital Earth Tester package typically includes the following items:

- UNI-T UT521 Digital Earth Tester Unit
- Batteries (1.5V LR6 x 6)
- Simple Test Leads with Alligator Clips
- Standard Test Leads with Alligator Clips
- Earth Spikes
- Gallus (Shoulder Strap)
- Carrying Bag
- English User Manual



● UT522

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	0~400V		±(1%+6)
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Data hold		✓	✓
Data storage		20	20
LCD backlight		✓	✓
Full icon display		✓	✓
Double insulation protection		✓	✓
Poor contact display	"...Ω"	✓	✓
Over-range display	Display "OL"	✓	✓
Simple 2-wire testing		✓	✓
Precise 3-wire testing		✓	✓

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Standard quantity per carton	8pcs
Standard carton measurement	530mm x 300mm x 350mm (0.056 CBM per standard carton)
Standard carton gross weight	19kg

Figure 9.1: The complete set of items included with the UNI-T UT521 Digital Earth Tester.

10. Safety Information

Always adhere to safety precautions when operating the UNI-T UT521 Digital Earth Tester to prevent electric shock and damage to the instrument.

- **General Safety:** Read and understand the operating manual before use.
- **Electric Shock Hazard:** To avoid electric shock, remove test leads before opening the case.
- **Measurement Category:** This device is rated for IEC 61010-1 CAT III 600V.
- **Inspection:** Do not use the device if it or its test leads appear damaged.
- **Environment:** Do not operate in wet environments or in the presence of explosive gases or vapors.



Figure 10.1: Back panel of the UT521 showing the warning label: “TO AVOID ELECTRICAL SHOCK, REMOVE TEST LEADS BEFORE OPENING CASE. READ OPERATING MANUAL IEC 61010-1 CAT III 600V.” A QR code with the text “C241076252” is also visible.

11. Warranty and Support

For warranty information, technical support, or service inquiries, please contact UNI-T customer service. Refer to the contact details provided in your product packaging or on the official UNI-T website. You may also find support information via the customer service hotline: 400-876-7822.



Figure 11.1: Product packaging for UNI-T Digital Earth Testers, displaying the customer service hotline: 400-876-7822.