

# User manual



## Limited warranty & liability

This product is covered by a one-year warranty from the date of purchase.

This warranty does not cover damage caused by damage to general accessories, accidents, neglect, misuse, modification, contamination, or abnormal operating environments.

Note: if the device freezes or becomes unresponsive during use, please restart it.

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## Overview

This product is a 2-in-1 measuring instrument that combines an LCR digital bridge (hereinafter referred to as LCR) and a high-precision multimeter (hereinafter referred to as DMM).

The instrument features a compact and portable design, a clean appearance, and convenient operation. It is equipped with a 2.4-inch TFT high-definition display and supports one-button switching between LCR mode and DMM mode.

The LCR section adopts both gold-plated clip terminals and spring-loaded probe terminals, enabling professional measurement of various resistors, capacitors, and inductors.

The DMM mode features a high-precision 25,000-count display and can simultaneously display measurement values and waveform trend recording.

This product perfectly combines the functions of an LCR and a DMM, offering excellent performance and powerful functionality to meet a wider range of measurement requirements.

## Safety instructions

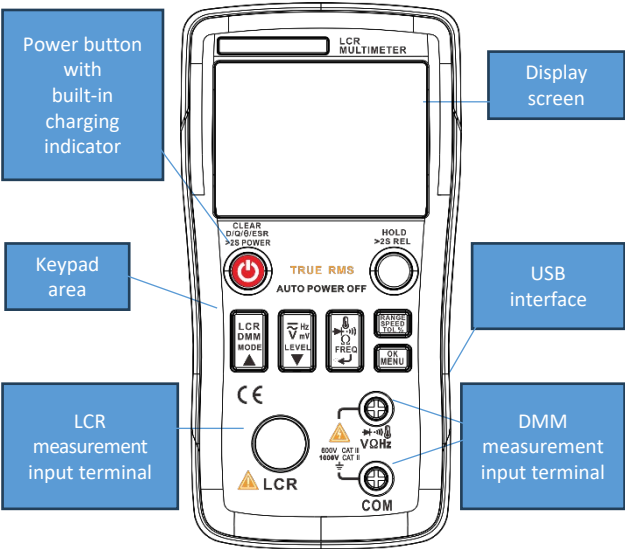
To avoid possible electric shock, fire, or personal injury, please read the safety precautions before use.

Use this product only as specified. Failure to do so may impair the protection provided by the product.

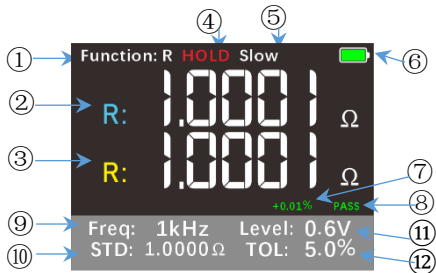
**WARNING! Before using the product, inspect the enclosure for cracks or damaged plastic parts. Carefully check the insulation around the input terminals.**

- Do not use this product in the presence of explosive gases, vapors, or in damp environments.
- Use the correct input terminals and proper range settings according to this user manual, and perform measurements only within the specified measurement ranges.
- Keep your fingers behind the finger guards on the test probes.
- When the product is connected to a circuit under test, do not touch any unused input terminals.
- Disconnect the test leads from the circuit before changing measurement ranges.
- When measuring DC voltages above 36 V or AC voltages above 25 V, serious injury may occur. Users should take appropriate precautions to avoid electric shock.
- Select the correct measurement function and range to prevent damage to the instrument or personal injury.
- Do not operate the product with the front or rear cover removed.
- Low battery power may affect measurement accuracy. Recharge the battery promptly when necessary.
- Keep the device stable during operation and avoid severe vibration or shaking.

# Instrument panel description



## LCR display interface description



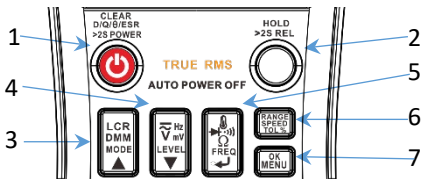
|    |                     |                                                                                          |
|----|---------------------|------------------------------------------------------------------------------------------|
| 1  | Function            | Displays auto, resistance, capacitance or inductance mode.                               |
| 2  | Primary parameter   | Displays the measured value of the primary parameter.                                    |
| 3  | Secondary parameter | Displays the measured value of the secondary parameter.                                  |
| 4  | HOLD                | Indicates data hold mode.                                                                |
| 5  | Measurement speed   | Displays slow, medium, or fast measurement speed.                                        |
| 6  | Battery level       | Displays battery status.                                                                 |
| 7  | Percentage          | Displays the deviation percentage in nominal mode.                                       |
| 8  | Measurement result  | Displays <b>PASS</b> or <b>FAIL</b> according to the preset nominal value and tolerance. |
| 9  | Frequency           | Displays the selected measurement frequency.                                             |
| 10 | Nominal value       | Displays the preset nominal value.                                                       |
| 11 | Test level          | Displays the selected measurement level.                                                 |
| 12 | Tolerance           | Displays the allowable error percentage.                                                 |

## Multimeter display interface description



|   |                       |                                                                                                                                 |
|---|-----------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 1 | Measurement symbols   | Indicates the current measurement type, including AC, DC, resistance, temperature, diode, and continuity symbols.               |
| 2 | Main Display          | Displays the measured value with a maximum display count of 25,000.                                                             |
| 3 | AUTO                  | Indicates auto range mode.                                                                                                      |
| 4 | Max                   | Displays the maximum measured value.                                                                                            |
| 5 | Freq                  | Displays the measured frequency.                                                                                                |
| 6 | Min                   | Displays the minimum measured value.                                                                                            |
| 7 | AVG                   | Displays the average measured value.                                                                                            |
| 8 | Waveform display area | Displays the real-time dynamic waveform of the measured signal, providing a visual record of signal trends and characteristics. |

## Button functions



### 1. POWER button

Press and hold for 2 seconds to power ON/OFF.

In DMM mode, short press to refresh the waveform record.

In LCR mode, short press to switch the secondary parameter.

### 2. HOLD/REL button

Short press to hold the displayed data.

In LCR mode, press and hold to perform zero calibration.

In DMM, press and hold to enter relative measurement mode.

### 3. Up arrow button

Press and hold to switch between LCR mode and DMM mode.

In the settings menu, short press to move upward or adjust values.

In LCR mode, short press to switch measurement functions.

### 4. Down arrow button

In LCR mode, short press to adjust the test level.

In DMM mode, short press to switch measurement functions.

In the settings menu, short press to move downward or adjust values.

### 5. Back button

In LCR mode, short press to adjust the measurement frequency.

In DMM mode, short press to switch measurement functions.

In the settings menu, short press to return to the previous menu.

### 6. RANGE/SPEED button

In LCR mode, press and hold to enter nominal mode.

In LCR mode, short press to adjust measurement speed.

In DMM mode, short press to switch measurement ranges.

### 7. OK/MENU button

Press and hold to enter the system settings menu.

Short press to confirm a selection.

# LCR measurement functions

## Input terminals



Clip input terminal



Spring-loaded probe  
input terminal

## Measurement method

1. Power on the device and enter the LCR measurement interface. Insert the component into the appropriate input terminal according to its package type:
  - Clip terminal for leaded components
  - Spring-loaded probe terminal for SMD components
2. Select the measurement mode according to the component type:
  - Auto
  - Resistance
  - Capacitance
  - Inductance
3. Then select the desired secondary parameter. Auto mode is recommended for general use.
4. Connect the component to the input terminal and set the appropriate test frequency and voltage level. The default setting is typically 1 kHz / 0.6 V.
5. Read the measured value displayed on the screen.

## LCR measurement functions

### Operating precautions

- a. Do not apply any voltage signal to the LCR measurement terminals.
- b. Before measuring large capacitors or capacitors that may contain residual charge, discharge them completely.
- c. Ensure good contact between the component and the measurement terminal. Oxidized or contaminated contact surfaces may introduce contact resistance and affect measurement accuracy.
- d. When measuring low-value resistors, inductors, or capacitors, it is recommended to use the REL (Relative) function to improve measurement accuracy.
- e. This instrument uses the AC impedance measurement principle. The impedance characteristics of components vary with frequency; therefore, appropriate test frequencies should be selected:  
High-capacitance capacitors and high-inductance inductors: use lower frequencies.  
Small-value capacitors and small inductors: use higher frequencies.  
For general-purpose components, 1 kHz is recommended.
- f. Due to frequency limitations, measurements of multilayer chip inductors are for reference only and may not meet high-accuracy requirements.

## Calibration instructions

When calibration is required, follow the procedures below.

Calibration supports the following points:

Short Circuit, 10 m $\Omega$ , 100 m $\Omega$ , 1  $\Omega$ , 10  $\Omega$ , 100  $\Omega$ , 1 k $\Omega$ , 10 k $\Omega$ , 100 k $\Omega$ , 1 M $\Omega$ , 10 M $\Omega$ , and OPEN.

Users may perform full calibration or calibrate individual ranges separately.

### Calibration procedure

Enter the settings menu and select the calibration menu. Press OK to confirm.

Use the up and down buttons to select the range to be calibrated. Connect the corresponding standard resistor and press the OK button to start calibration.

Wait patiently while calibration is in progress.

If calibration is successful:

- The buzzer will emit one beep.
- The screen will display "Success".

If the calibration value is incorrect:

- The buzzer will emit two beeps.
- The screen will display "Fail".

### Notes:

- Standard calibration resistors should preferably be SMD carbon-film resistors. Wire-wound resistors must not be used.*
- During short circuit calibration, ensure all spring contacts are fully shorted together.*
- No resistor should be connected during OPEN calibration.*
- Do not connect the charging cable during calibration.*
- To restore factory calibration data, perform a factory reset.*

## Bridge technical specifications

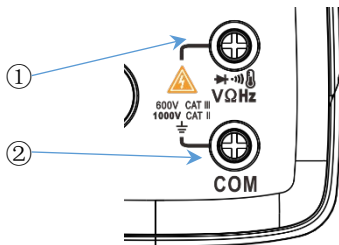
| Function          | Range                                                         | Accuracy @100Hz | Accuracy @1kHz | Accuracy @10kHz | Measurement range                 |
|-------------------|---------------------------------------------------------------|-----------------|----------------|-----------------|-----------------------------------|
| Resistance        | 1 MΩ - 10 MΩ                                                  | ± (5%+5)        | ± (5%+5)       | ---             | Auto mode:<br>10 mΩ - 10 MΩ       |
|                   | 1 kΩ - 1 MΩ                                                   | ± (1%+5)        | ± (0.5%+5)     | ± (1%+5)        | Resistance mode:<br>10 mΩ - 10 MΩ |
|                   | 1 Ω - 1 kΩ                                                    | ± (1%+5)        | ± (0.5%+5)     | ± (0.5%+5)      |                                   |
|                   | 10 mΩ - 1 Ω                                                   | ± (3%+5)        | ± (3%+5)       | ± (3%+5)        |                                   |
| Capacitance       | 1 mF - 20 mF                                                  | ± (5%+5)        | ± (5%+5)       | ---             | Auto mode:<br>50 pF - 5 mF        |
|                   | 1 μF - 1 mF                                                   | ± (2%+5)        | ± (2%+5)       | ± (2%+5)        | Capacitance mode:<br>1 pF - 20 mF |
|                   | 1 nF - 1 μF                                                   | ± (2%+5)        | ± (0.5%+5)     | ± (0.5%+5)      |                                   |
|                   | 1 pF - 1 nF                                                   | ---             | ± (5%+5)       | ± (5%+5)        |                                   |
| Inductance        | 1 H - 60 H                                                    | ± (5%+5)        | ± (5%+5)       | ---             | Auto mode:<br>5 μH - 60 H         |
|                   | 1 mH - 1 H                                                    | ± (2%+5)        | ± (2%+5)       | ± (2%+5)        | Inductance mode:<br>1 μH - 60 H   |
|                   | 10 μH - 1 mH                                                  | ± (2%+5)        | ± (0.5%+5)     | ± (0.5%+5)      |                                   |
|                   | 1 μH - 10 μH                                                  | ---             | ± (5%+5)       | ± (5%+5)        |                                   |
| Parameters        | L, C, R, D, Q, ESR, θ                                         |                 |                |                 |                                   |
| Measurement modes | Auto mode, resistance mode, capacitance mode, inductance mode |                 |                |                 |                                   |
| Test frequencies  | 100 Hz, 1 kHz, 10 kHz                                         |                 |                |                 |                                   |
| Test levels       | 0.3 V, 0.6 V                                                  |                 |                |                 |                                   |

## Parameter description

| Primary parameter |             | Secondary parameter |                              |
|-------------------|-------------|---------------------|------------------------------|
| L                 | Inductance  | ESR                 | Equivalent series resistance |
| C                 | Capacitance | D                   | Dissipation factor           |
| R                 | Resistance  | Q                   | Quality factor               |
|                   |             | θ                   | Phase angle                  |

# Multimeter functions

## Measurement input terminals



|               |                                                                                                      |
|---------------|------------------------------------------------------------------------------------------------------|
| Terminal<br>① | Used for:<br><br>AC/DC voltage<br>Resistance<br>Continuity<br>Diode test<br>Temperature<br>Frequency |
| Terminal<br>② | Common (return) terminal for all measurements.                                                       |

# Measurement methods

## *Measuring AC and DC voltage*

1. Insert the black test lead into the COM terminal and the red test lead into the VΩHz terminal.
2. Select the appropriate voltage measurement mode according to the signal type being measured. Press the voltage function key to select: DC voltage, AC voltage, DC millivoltage, AC millivoltage.
3. Touch the probe tips to the correct test points on the circuit.
4. Read the voltage value displayed on the screen. When measuring AC voltage, the frequency value will also be displayed simultaneously.

### **Warning!**

**The measured voltage must not exceed the maximum rated input value. Otherwise, damage to the instrument and personal injury may occur.**

**When measuring high-voltage circuits, avoid direct contact with any high-voltage conductors.**

## *Measuring resistance*

1. Insert the black test lead into the COM terminal and the red test lead into the VΩHz terminal.
2. Press the function key to select resistance mode.
3. Touch the probe tips to the desired test points of the circuit.
4. Read the resistance value displayed on the screen.

## Continuity test

1. Insert the black test lead into the COM terminal and the red test lead into the V $\Omega$ Hz terminal.
2. Press the function key to select continuity mode.
3. Connect the probe tips to the two points of the circuit under test.

Note: If the built-in buzzer sounds, it indicates that the circuit is shorted or has continuity.

## Diode test

1. Press the function key to select diode mode.
  2. Connect the red probe to the anode of the diode under test and the black probe to the cathode.
  3. Read the forward voltage drop displayed on the screen.
- If the probe polarity is reversed or the diode is damaged, the display will show "OL".

| Buzzer indication for different diode forward voltage drops |                  |
|-------------------------------------------------------------|------------------|
| Diode forward voltage drop                                  | Buzzer indicatio |
| <0.02V                                                      | Continuous beep  |
| 0.02V~0.45V                                                 | Double beep      |
| 0.45~0.75V                                                  | Single beep      |
| 0.75V~1.5V                                                  | Three fast beeps |
| >1.5V                                                       | No beep          |
| Maximum measurable voltage: 3 V                             |                  |

## *Temperature measurement*

1. Insert the black thermocouple plug into the COM terminal and the red thermocouple plug into the V $\Omega$ Hz terminal.
2. Press the function key to select temperature mode.
3. Place the thermocouple probe on the measurement point.
4. After the reading stabilizes, read the temperature value displayed on the screen.

### **Warning!**

**Never apply voltage to the instrument while in continuity or diode test mode.**

**Before testing, disconnect power from the circuit and discharge all high-voltage capacitors.**

## *Firmware upgrade*

1. With the device powered off, press and hold the **HOLD** button, then press the **POWER** button simultaneously.
2. When "USB-Boot" appears on the screen, the device has entered upgrade mode.
3. Connect the device to a computer using a Type-C data cable. The computer will recognize a removable drive named "LCR".
4. Copy the firmware upgrade file to the removable drive. The device will automatically begin the upgrade process.

Do not operate the device or disconnect the cable during the upgrade.

5. After the progress bar completes, the device will automatically finish the upgrade and power off. The device can then be used normally.

## Care and maintenance

In addition to routine maintenance, do not attempt to repair the product or modify its circuitry unless you are properly qualified and have access to the necessary calibration, performance testing, and repair documentation.

### Cleaning the product

Clean the enclosure using a soft damp cloth and a mild detergent. Do not use abrasive cleaners, corrosive chemicals, or solvents. Dust or moisture inside the measurement terminals may affect measurement accuracy. Important: remove all input signals before cleaning the product.

### Battery charging

When the low-battery indicator appears on the screen, recharge the battery promptly.

#### **Charging method 1**

Connect the device to a 5 V power adapter using a Type-C cable.

#### **Charging method 2**

Connect the device to a computer USB port using a Type-C cable.

Charging indicator status

|               |                         |
|---------------|-------------------------|
| Charging      | Red indicator light ON  |
| Fully Charged | Blue indicator light ON |

# Technical specifications

## *General specifications*

|                        |                |
|------------------------|----------------|
| Display (TFT)          | 25,000 Counts  |
| Range selection        | Auto or manual |
| Housing material       | ABS + TPE      |
| Sampling rate          | 3 times/second |
| True RMS               | √              |
| Data hold              | √              |
| Backlight              | √              |
| Low battery indication | √              |
| Auto power off         | √              |

## *Mechanical specifications*

|              |                               |
|--------------|-------------------------------|
| Dimensions   | 149 × 76 × 33.5 mm            |
| Weight       | 191 g (with built-in battery) |
| Battery type | 2000 mAh lithium battery × 1  |
| Warranty     | 1 year warranty               |

## *Environmental specifications*

|                       |             |                |
|-----------------------|-------------|----------------|
| Operating environment | Temperature | 0 °C – 40 °C   |
|                       | Humidity    | < 75% RH       |
| Storage environment   | Temperature | -20 °C – 60 °C |
|                       | Humidity    | < 80 % RH      |

## Multimeter technical specifications

| Function                                                                                              | Range     | Resolution | Accuracy       |
|-------------------------------------------------------------------------------------------------------|-----------|------------|----------------|
| DC Voltage<br>( Precision<br>measurements are<br>conducted at an<br>ambient temperature<br>of 25°C. ) | 2.5000 V  | 0.0001 V   | ± (0.05 % + 3) |
|                                                                                                       | 25.000 V  | 0.001 V    |                |
|                                                                                                       | 250.00 V  | 0.01 V     |                |
|                                                                                                       | 1000.0 V  | 0.1 V      |                |
| DC Millivoltage (mV)                                                                                  | 25.000 mV | 0.001 mV   | ± (0.5 % + 3)  |
|                                                                                                       | 250.00 mV | 0.01 mV    |                |
| AC Voltage (V)                                                                                        | 2.5000 V  | 0.0001 V   | ±(0.5 % + 3)   |
|                                                                                                       | 25.000 V  | 0.001 V    |                |
|                                                                                                       | 250.00 V  | 0.01 V     |                |
|                                                                                                       | 750.0 V   | 0.1 V      |                |
| AC Millivoltage (mV)                                                                                  | 25.000 mV | 0.001 mV   | ±(0.8 % + 3)   |
|                                                                                                       | 250.00 mV | 0.01 mV    |                |
| AC voltage frequency response                                                                         |           |            |                |
| 40 Hz – 1 kHz                                                                                         |           |            |                |

| <i>Function</i> | <i>Range</i>      | <i>Resolution</i> | <i>Accuracy</i>   |
|-----------------|-------------------|-------------------|-------------------|
| Resistance      | 250.00 $\Omega$   | 0.01 $\Omega$     | $\pm(0.5 \% + 3)$ |
|                 | 2.5000 k $\Omega$ | 0.0001 k $\Omega$ | $\pm(0.2 \% + 3)$ |
|                 | 25.000 k $\Omega$ | 0.001 k $\Omega$  |                   |
|                 | 250.00 k $\Omega$ | 0.01 k $\Omega$   |                   |
|                 | 2.5000 M $\Omega$ | 0.0001 M $\Omega$ | $\pm(1.0 \% + 3)$ |
|                 | 25.00 M $\Omega$  | 0.01 M $\Omega$   |                   |
|                 | 250.0 M $\Omega$  | 0.1 M $\Omega$    | $\pm(5.0 \% + 5)$ |

| <i>Function</i> | <i>Range</i> | <i>Resolution</i> | <i>Accuracy</i>   |
|-----------------|--------------|-------------------|-------------------|
| Frequency       | 9.999 Hz     | 0.001 Hz          | $\pm(2.0 \% + 2)$ |
|                 | 99.99 Hz     | 0.01 Hz           | $\pm(0.1 \% + 2)$ |
|                 | 999.9 Hz     | 0.1 Hz            |                   |
|                 | 9.999 kHz    | 0.001 kHz         |                   |
|                 | 99.99 kHz    | 0.01 kHz          |                   |
|                 | 999.9 kHz    | 0.1 kHz           |                   |

| <i>Function</i> | <i>Range</i>     | <i>Resolution</i> | <i>Accuracy</i> |
|-----------------|------------------|-------------------|-----------------|
| Temperature     | -20 °C – 1000 °C | 1 °C              | ±(2.5 % + 5)    |
|                 | -4 °F – 1832 °F  | 1 °F              |                 |
| Diode test      | √                |                   |                 |
| Continuity test | √                |                   |                 |

