

## 102L Digital Multimeter User Manual

### A. Overview

The 102L is a battery-powered digital multimeter with true RMS and auto-ranging capabilities. In addition to the standard multimeter functions, it also features inductance measurement. The instrument has a 6000-count display, an LCD screen with backlight for clear readings..

### B. Safety Information

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

(1) During measurement, do not exceed the "Technical Specifications" maximum measurement value.

(2) Voltages below 36V are considered safe. When measuring DC voltage above 36V or AC voltage above 25V, ensure that the test leads have reliable contact, correct connections, and good insulation to avoid electric shock.

(3) When changing functions or ranges, the test leads should be removed from the test points.

(4) Select the correct function and range; an over-range measurement will display "OL."

(5) Safety symbol explanation:

|                                                                                   |                                        |                                                                                     |             |
|-----------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|-------------|
|  | Hazardous Voltage                      |  | Earth       |
|  | Double Insulated                       |  | Low Battery |
|  | Risk of Danger. Check the User Manual. |                                                                                     |             |

### C. Specifications

| Electrical Specifications |         |            |           |           |                                                                                   |
|---------------------------|---------|------------|-----------|-----------|-----------------------------------------------------------------------------------|
| Function                  | Range   | Resolution | Accuracy  | MAX.Value | Other                                                                             |
| DC Voltage<br>(V)         | 6.000V  | 0.001V     | ±(0.5%+3) | 1000V     | Input Resistance:10MΩ                                                             |
|                           | 60.00V  | 0.01V      |           |           |                                                                                   |
|                           | 600.0V  | 0.1V       |           |           |                                                                                   |
|                           | 1000V   | 1V         |           |           |                                                                                   |
| DC Voltage<br>(mV)        | 60.00mV | 0.01mV     | ±(1.0%+3) | 600mV     | Input Resistance:10MΩ<br>(600mV range, >60MΩ)<br>Frequency Response:<br>40Hz-1kHz |
|                           | 600.0mV | 0.1mV      |           |           |                                                                                   |
|                           | 6.000V  | 0.001V     |           |           |                                                                                   |
|                           | 60.00V  | 0.01V      |           |           |                                                                                   |
| AC Voltage<br>(V)         | 600.0V  | 0.1V       | ±(1.0%+3) | 750V      | Input Resistance:10MΩ<br>(600mV range, >60MΩ)<br>Frequency Response:<br>40Hz-1kHz |
|                           | 750V    | 1V         |           |           |                                                                                   |
|                           | 60.00mV | 0.01mV     |           |           |                                                                                   |
|                           | 600.0mV | 0.1mV      |           |           |                                                                                   |
| DC Current<br>(A)         | 6.000A  | 0.001A     | ±(1.2%+3) | 10A       | MAX.Current: 10A (no more than 15 seconds)<br>No Voltage input at this mode       |
|                           | 10.00A  | 0.01A      |           |           |                                                                                   |
|                           | 60.00mA | 0.01mA     |           |           |                                                                                   |
|                           | 600.0mA | 0.1mA      |           |           |                                                                                   |
| DC Current<br>(mA)        | 6.000A  | 0.001A     | ±(1.5%+3) | 10A       | Frequency Response(AC):<br>40Hz-1kHz                                              |
|                           | 10.00A  | 0.01A      |           |           |                                                                                   |
|                           | 60.00mA | 0.01mA     |           |           |                                                                                   |
|                           | 600.0mA | 0.1mA      |           |           |                                                                                   |

| Function                                                                                                                     | Range                                         | Resolution | Accuracy                     | MAX.Value              | Other                               |
|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------|------------------------------|------------------------|-------------------------------------|
| Resistance                                                                                                                   | 600.0Ω                                        | 0.1Ω       | ±(0.5%+3)                    | 60MΩ                   | Disables input voltage in this mode |
|                                                                                                                              | 6.000kΩ                                       | 0.001kΩ    |                              |                        |                                     |
|                                                                                                                              | 60.00kΩ                                       | 0.01kΩ     |                              |                        |                                     |
|                                                                                                                              | 600.0kΩ                                       | 0.1kΩ      |                              |                        |                                     |
|                                                                                                                              | 6.000MΩ                                       | 0.001MΩ    |                              |                        |                                     |
|                                                                                                                              | 60.00MΩ                                       | 0.01MΩ     |                              |                        |                                     |
| Capacitance                                                                                                                  | 6.000nF                                       | 0.001nF    | ±(5.0%+20)                   | 60.00mF                | Disables input voltage in this mode |
|                                                                                                                              | 60.00nF                                       | 0.01nF     |                              |                        |                                     |
|                                                                                                                              | 600.0nF                                       | 0.1nF      |                              |                        |                                     |
|                                                                                                                              | 6.000μF                                       | 0.001μF    | ±(2.0%+5)                    |                        |                                     |
|                                                                                                                              | 60.00μF                                       | 0.01μF     |                              |                        |                                     |
|                                                                                                                              | 600.0μF                                       | 0.1μF      |                              |                        |                                     |
|                                                                                                                              | 6.000mF                                       | 0.001mF    | ±(5.0%+5)                    |                        |                                     |
|                                                                                                                              | 60.00mF                                       | 0.01mF     |                              |                        |                                     |
|                                                                                                                              | Frequency                                     | 99.99Hz    |                              |                        |                                     |
| 999.9Hz                                                                                                                      |                                               | 0.1Hz      |                              |                        |                                     |
| 9.999kHz                                                                                                                     |                                               | 0.001kHz   |                              |                        |                                     |
| 99.99kHz                                                                                                                     |                                               | 0.01kHz    |                              |                        |                                     |
| 999.9kHz                                                                                                                     |                                               | 0.1kHz     |                              |                        |                                     |
| 9.999MHz                                                                                                                     |                                               | 0.001MHz   |                              |                        |                                     |
| Inductance                                                                                                                   |                                               | 6.000mH    | 0.001mH                      | ±(5%+50)               | 60.00H                              |
|                                                                                                                              | 60.00mH                                       | 0.01mH     |                              |                        |                                     |
|                                                                                                                              | 600.0mH                                       | 0.1mH      | ±(3%+10)                     |                        |                                     |
|                                                                                                                              | 6.000H                                        | 0.001H     |                              |                        |                                     |
|                                                                                                                              | 60.00H                                        | 0.01H      | ±(5%+50)                     |                        |                                     |
| Duty Cycle                                                                                                                   | 1%~99%                                        | 0.1%       | ±(0.1%+2)                    |                        |                                     |
| Diode                                                                                                                        | V(DC forward current is 5mA, voltage is 3.9V) |            |                              |                        | Disables input voltage in this mode |
| Continuity                                                                                                                   | V(no more than 50Ω)                           |            |                              |                        |                                     |
| Temperature                                                                                                                  | (-20~1000)°C                                  |            | 1°C                          | 1000°C                 |                                     |
|                                                                                                                              | (-4~-1832)°F                                  |            | 1°F                          | 1832°F                 |                                     |
| General Specifications                                                                                                       |                                               |            | Mechanical Specifications    |                        |                                     |
| LCD Display                                                                                                                  | 6000 counts                                   |            | Dimension                    | 130*65*32mm            |                                     |
| Measurement Range                                                                                                            | Auto                                          |            | Weight                       | 130g(battery included) |                                     |
| Material                                                                                                                     | ABS                                           |            | Battery Type                 | 1.5V AAA Battery * 2   |                                     |
| Sampling Rate                                                                                                                | 3 times/second                                |            | Warranty                     | One years              |                                     |
| Ture RMS                                                                                                                     | √                                             |            | Environmental Specifications |                        |                                     |
| Data Hold                                                                                                                    | √                                             |            | Operating Temperature        | 0~40°C                 |                                     |
| Screen Backlight                                                                                                             | √                                             |            | Environment Humidity         | <75%                   |                                     |
| Low Battery Indication                                                                                                       | √                                             |            | Storage Temperature          | -20~60°C               |                                     |
| Auto Power Off                                                                                                               | √                                             |            | Environment Humidity         | <80%                   |                                     |
| Safety Specifications                                                                                                        |                                               |            |                              |                        |                                     |
| EN 61010-1: 2010; EN 61326-1: 2013; FCC Part 15 Subpart B: 2016                                                              |                                               |            |                              |                        |                                     |
| Standard Accessories                                                                                                         |                                               |            |                              |                        |                                     |
| Battery * 2pcs; Test Lead * 1 pair; Drawstring Pouch * 1pc<br>TP01K thermocouple probe * 1pc ; English User Manual; Gift Box |                                               |            |                              |                        |                                     |

### D. Instruction

(1) Panel Description (refer to the image on the right)

1. LCD Display: Displays the measured values and units.

2. Function Keys

2a. "HOLD" Key: Press this key to freeze the current reading, and the screen will display the "HOLD" symbol. Press again to exit the hold state. To activate the backlight, press and hold this key for more than 2 seconds, and press again to turn off the backlight.

2b. "SELECT" Key: Press this key to toggle between AC/DC voltage, diode/resistance/continuity, or °C/°F ranges.

3. Rotary Switch: Used to change the measurement function and range.

(Starting from OFF and rotating clockwise)

3a. OFF Position: Power-off mode.

3b. AC/DC Voltage(V)/Frequency/Duty Cycle Range (referred to as voltage range).

3c. AC/DC Millivolt Voltage(mV)/Frequency/Duty Cycle Range (referred to as small voltage range).

3d. Resistance/Continuity/Diode/Capacitance Range (referred to as resistance range).

3e. Non-Contact Voltage Detection Range (NCV).

3f. Inductance Range (L).

3g. AC/DC Current (A) Range (referred to as current range).

3h. AC/DC Current (mA) Range (referred to as small current range).

4. VΩHz: Input terminal for voltage, resistance, capacitance, inductance, frequency, temperature, current (mA), continuity, diode, and duty cycle measurements.

5. COM: Common terminal for all measurements.

6. 10A: Input terminal for current (A) measurements.

### (2) Voltage Measurement

1. Insert the black test lead into the "COM" jack and the red test lead into the "VΩHz" jack.

2. Turn the knob switch to the voltage range or millivolt voltage range.

3. Press the SELECT key to toggle between AC and DC voltage measurement.

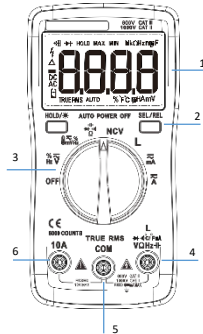
4. Touch the test leads to the correct test points on the circuit.

5. Read the displayed voltage value on the screen.

\*Attention:

a. The measured voltage must not exceed the rated maximum test value, as it may damage the instrument and pose a risk to personal safety.

b. When measuring high-voltage circuits, avoid touching the high-voltage components.



(3) Current Measurement

1. Insert the black test lead into the "COM" jack, and the red test lead into the "VΩHz" jack (for maximum test value of 600mA) or the "10A" jack (for maximum test value of 10A).
2. Turn the knob switch to the current range or small current range.
3. Press the SELECT key to toggle between AC and DC current measurement.
4. Disconnect the circuit path to be tested, connect the test leads in series with the circuit, and apply power to the circuit.
5. Read the displayed current value on the screen.

\* Attention:

- a. The measured current must not exceed the rated maximum test value, as it may damage the instrument and pose a risk to personal safety.
- b. If the magnitude of the current to be measured is unknown, perform a preliminary test using the 10A jack and then select the appropriate range based on the displayed value.

**Under the current measurement mode, it is strictly prohibited to input voltages higher than 36V DC or 25V AC peak.**

(4) Resistance Measurement

1. Insert the black test lead into the "COM" jack and the red test lead into the "VΩHz" jack.
  2. Turn the knob switch to the resistance range, and the screen will display "OL" by default.
  3. Touch the test leads to the desired circuit test points.;
  4. Read the displayed resistance value on the screen.
- \* Attention:
- a. Before measuring live resistance, ensure that all power sources in the tested circuit are turned off, and all capacitors are completely discharged.
  - b. Inputting voltage in the resistance range is strictly prohibited.

(5) Continuity Measurement

1. Insert the black test lead into the "COM" jack and the red test lead into the "VΩHz" jack.
  2. Turn the knob switch to the resistance range, and press the SELECT key once to switch to the continuity range.
  3. Touch the test leads to the two points of the circuit to be tested.
  4. If the resistance value is less than 50Ω, the buzzer will sound, indicating a short circuit.
- \*Attention:
- a. Inputting voltage in the continuity range is strictly prohibited.

(6) Diode Measurement

1. Insert the black test lead into the "COM" jack and the red test lead into the "VΩHz" jack.
2. Turn the knob switch to the resistance range, and press the SELECT key twice to switch to the diode range.
3. Connect the red test lead to the positive terminal of the diode to be tested, and the black test lead to the negative terminal.

4. Read the forward voltage displayed on the screen.;
  5. If the test lead polarity is reversed or the diode is faulty, the screen will display "OL."
- \*Attention:

- a. Inputting voltage in the diode range is strictly prohibited.
- b. Before testing, disconnect the circuit's power supply and discharge all high-voltage capacitors.

(7) Capacitance Measurement

1. Insert the black test lead into the "COM" jack and the red test lead into the "VΩHz" jack.
  2. Turn the knob switch to the resistance range, and press the SELECT key three times to switch to the capacitance range.
  3. Connect the red test lead to the positive terminal of the capacitor to be tested, and the black test lead to the negative terminal.
  4. . After the reading stabilizes, read the displayed capacitance value on the screen..
- \* Attention :
- Before testing, disconnect the circuit's power supply and discharge all high-voltage capacitors.

(8) Frequency and Duty Cycle Measurement

1. Insert the black test lead into the "COM" jack and the red test lead into the "VΩHz" jack.
  2. Turn the knob switch to the frequency range, and press the SELECT key again to measure the duty cycle if needed.
  3. Touch the test leads to the desired circuit test points.;
  4. Read the displayed frequency/duty cycle value on the screen.
- \* Attention :
- a. The frequency range is suitable for measuring high frequencies and low voltages.

(9) Temperature Measurement

1. Insert the black plug of the thermocouple into the "COM" jack and the red plug into the "VΩHz" jack.
  2. Turn the knob switch to the temperature range, and the screen will display the room temperature by default. Press the SELECT key to switch between °C/°F.
  3. Place the temperature sensor of the thermocouple in the temperature field to be measured.
  4. Read the displayed temperature value on the screen.
- \* Attention :
- a. Inputting voltage in the temperature range is strictly prohibited.

(10) Inductance Measuring

1. Insert the black test lead into the "COM" terminal and the red test lead into the "VΩHz" terminal.
2. Turn the knob switch to the "L" (inductance) position.
3. Use the red and black test leads to probe the two terminals of the inductor to be measured. The instrument will automatically select the appropriate range based on the inductance value.
4. After the reading stabilizes, read the inductance value displayed on the screen.

(11) Auto Power Off

1. If the instrument is not used for 15 minutes, it will automatically power off.
  2. One minute before powering off, the built-in buzzer will emit five beeps as a reminder.
  3. To restart the instrument after auto power off, simply press the SELECT key to turn on the power.
  4. If you wish to disable the auto power off function, hold down the SELECT key while turning on the instrument. The buzzer will emit four beeps, indicating that the auto power off has been canceled.
- E. Maintenance and Care

Except for battery and fuse replacement, please do not attempt to repair this product or modify the circuit unless you have the required qualifications and possess the appropriate calibration, performance testing, and maintenance operation instructions.

- (1) This product should not be stored or used in high-temperature, high-humidity, flammable, explosive, or strong magnetic field environments.
- (2) Use a damp cloth and mild cleaning agent to clean the casing; do not use corrosive agents or solvents.
- (3) Before cleaning the product, ensure to clear the input signal first.
- (4) If not in use for an extended period, remove the battery to prevent battery leakage and corrosion of the instrument.
- (5) Pay attention to battery usage; when the display shows the "  " symbol, replace the battery following these steps:
  - 1Unscrew the screw holding the battery in place on the back cover, and open the battery compartment door;
  - 2Remove the old battery and replace it with two new batteries of the same type.;
  3. Close the battery compartment door and tighten the screw.
- (6) When replacing the fuse, use a fuse of the same specification and model. Follow the same steps as in (5).

**Warning:**

- 1. Do NOT exceed the "maximum value" indicated in the Specification;**
- 2. Do not measure voltage in current、resistance、diode、continuity、temperature or inductance mode.**
- 3. Do not use this instrument when the battery is not installed or the back cover is not securely closed.**
- 4. Before replacing the battery or fuse, remove the test leads from the test points and turn off the instrument.**

F. Troubleshooting

If your instrument is not functioning properly, the following methods can help you quickly resolve common issues. If the problem persists and cannot be resolved, please contact the maintenance center or the distributor for assistance.

| Fault Phenomenon                                                                                     | Inspection Area and Method           |
|------------------------------------------------------------------------------------------------------|--------------------------------------|
| Display screen not showing                                                                           | Power not connected; Replace battery |
|  Symbol appearing | Replace battery                      |
| No current input                                                                                     | Replace fuse                         |

**Limited Warranty and Scope of Responsibilities**

From the date of purchase, this product is eligible for a one-year warranty service. However, this warranty does not cover fuses (blown), disposable batteries (used up), or damages resulting from accidents, negligence, misuse, modification, contamination, or abnormal operating environments.

Any changes to this user manual will not be separately notified; The contents of this user manual are believed to be accurate. If users find any errors, omissions, etc., please contact the manufacturer; The company is not liable for accidents and hazards caused by user errors in operation; The functions described in this user manual should not be considered as reasons to use the product for special purposes.