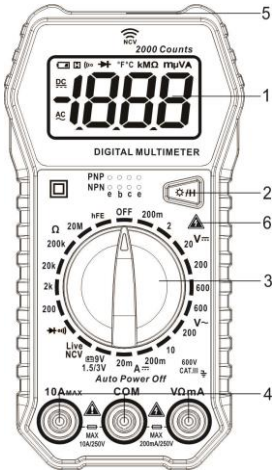
Digital Multimeter User Manual

This product is a small handheld 3½-digit digital multimeter offering stable performance, high reliability, and anti-drop capabilities. The instrument features an LCD screen with 20 mm character height for clear readings. The circuit design centers around a large-scale dual-sloping integrating A/D converter with overload protection, making this a superior and compact measurement tool.

The instrument can measure AC/DC voltage, DC current, resistance, diodes, transistors, and circuit continuity. It also functions as a battery tester, live wire detector, non-contact voltage (NCV) tester. The device is equipped with a backlight for reading measurements in dark environments.

Panel Diagram



1. Display: LCD screen with 20 mm character height

2. ☼/ H Button: Press to freeze the displayed value; press again to unfreeze. Hold down the button to turn on the backlight; hold down the button again to turn off the backlight. Press to switch between Live/NCV functions. (Note: Backlight brightness may decrease when the battery is low.)

3. Function/Range Selector Dial

4. Input Jacks

5. NCV Sensing Area

6. NCV Indicator Light

Safety Information

This series of digital multimeters has been designed in accordance with IEC1010 600V (CAT III) and Pollution Degree 2 standards. Please read this user manual thoroughly to ensure safe instrument use and measurement accuracy.

Safety Symbols

⚠ Important safety symbol; refer to the manual ⏚ Grounding symbol

⚠ High voltage symbol ▣ Double insulation symbol (Class II safety equipment)

Operating Precautions

- To comply with safety standards, the instrument must be used with the provided test leads only. If the test leads are damaged, they must be replaced with the same model or with leads that have the same electrical specifications.
- Do not exceed the input limit specified for each range.
- Avoid touching unused input terminals during measurement.
- When the range of the value to be measured is unknown, set the function/range dial to the highest range.
- Before adjusting the function/range dial, ensure that the test leads are disconnected from the circuit being tested.
- Before measuring resistance in a live circuit, ensure that all power sources are turned off and all capacitors are fully discharged.
- Be cautious when measuring voltages above 60V DC or 30V AC. Do not touch the parts of the test leads beyond the finger guards.
- When measuring televisions or switch-mode power supplies, be aware that pulses in the circuit may damage the instrument.
- Before testing transistors, ensure that the test leads are not connected to any circuit.
- Before using the test leads to measure voltage, ensure that no electronic components are connected to the transistor test socket.

Maintenance

- Disconnect the test leads from the circuit before opening the back cover.
- To protect the instrument's internal circuitry, always replace the fuse with one of the same specifications.
- Do not use the instrument if the back cover is not securely closed or if the screws are not tightened.
- Clean the instrument with a damp cloth and a small amount of detergent only. Do not use chemical solvents on the casing.
- If any abnormalities are observed, immediately discontinue use and send the instrument for repairs.

Technical Specifications

Accuracy: ±(percent of reading + number of counts), valid for 1 year
Environmental temperature: 18°C to 28°C. Environmental humidity: ≤80%

General Specifications:

- Maximum Voltage between Input and Ground: CAT III 600V
- Fuse: F200mA/250V, F10A/250V
- Power Supply: 1.5V AAA ×2

Auto Power Off: The instrument will automatically power off after approximately 15 minutes.

- Maximum Display Value: 1999
- Overload Indicator: "OL"
- Polarity Display: Negative polarity is displayed as "-"
- Working Temperature: 0°C to 40°C
- Storage Temperature: -10°C to 50°C
- Low Battery Indicator: The display shows +−
- Dimensions: 133 mm × 71 mm × 47 mm
- Weight: Approximately 190 g (including batteries)

DC Voltage

Range	Resolution	Accuracy
200mV	100uV	±0.5%±3
2V	1mV	±0.8%±5
20V	10mV	±0.8%±5
200V	100mV	±0.8%±5
600V	1V	±0.8%±5

Input impedance: 10MΩ
Overload protection: 200mV range: 250V DC or AC RMS; all other ranges: 600V DC or AC RMS

DC Current

Range	Resolution	Accuracy
20mA	10uA	±1.0%±5
200mA	100uA	±2.0%±5
10A	10mA	±3.0%±5

Overload protection: F200mA/250V fuse, F10A/250V fuse

AC Voltage

Range	Resolution	Accuracy
200V	100mV	±1.0%±10
600V	1V	±1.0%±10

Input impedance: 10MΩ
Overload protection: 600V DC or AC RMS
Frequency range: 40Hz to 400Hz
Display: Average value (Sine Wave RMS)

Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±1.0%±5
2KΩ	1Ω	±1.0%±5
20KΩ	10Ω	±1.0%±5
200KΩ	100Ω	±1.0%±5
20MΩ	10KΩ	±1.2%±8

Overload protection: 250V DC or AC RMS

Diode and Continuity Test

Range	Description
Buzzer	If resistance is less than 50Ω ± 30Ω, the buzzer will sound.
Diode	The approximate forward voltage drop is displayed.

Overload protection: 250V DC or AC RMS

Battery Test

Range	Display Value	Resolution
1.5V	1.5V	0.01V
3V	3V	0.01V
9V	9V	0.01V

Overload protection: 36V DC or AC RMS

Transistor Test

Range	Description
hFE	Displays the approximate transistor gain as a multiplier between 1 and 1000.

Overload protection: 250V DC or AC RMS

Operating Instructions

Precautions before Operation:

1. Power on the instrument and check if it has sufficient battery. If the battery voltage is low, the +− symbol will appear on the display, indicating that the battery needs to be replaced before use.
2. The ⚠ symbol next to the test lead input jack indicates that the input voltage or current must not exceed the specified value to protect the internal circuitry from damage.
3. Before testing, the function/range dial should be set to the desired range.

Voltage Measurement

1. Insert the red test lead into the **VΩmA** jack. Insert the black test lead into the **COM** jack.
2. Set the function/range dial to the **Voltage** position and use the test leads to measure the voltage of the circuit being tested (connect the test leads in parallel with the circuit).
3. Read the measured voltage value from the LCD.

⚠**Note:**

- If the voltage to be measured is unknown, set the function dial to the highest range and gradually reduce it until satisfactory resolution is achieved.

The maximum input voltage for the voltage range is 600V RMS. To avoid risk of electric shock or instrument damage, do not attempt to measure voltage higher than 600V RMS.

Current Measurement

1. Insert the black test lead into the **COM** jack. If the current to be measured is less than 200mA, insert the red test lead into the **VΩmA** jack; if the current is between 200mA and 10A, insert the red test lead into the **10A** jack.
2. Set the function/range dial to the **Current** position and connect the test leads in series with the load to be tested. The current value and the polarity of the red test lead will be displayed simultaneously.

⚠**Note:**

- If the current range to be measured is unknown, set the dial to the highest range and gradually reduce it until satisfactory resolution is achieved.
- If the display shows only "1" or "OL", it indicates an overload, and the dial must be set to a higher range.
- The ⚠ symbol next to the test lead input jacks indicates a maximum input current of either 200mA or 10A, depending on the jack being used. Excessive current will blow the fuse.

Resistance Measurement

1. Insert the black test lead into the **COM** jack. Insert the red test lead into the **VΩmA** jack.
2. Set the function/range dial to the desired **Ω** range, then connect the test leads in parallel with the resistor being measured. Read the measurement result from the LCD.

⚠**Note:**

- If the display shows only "1" or "OL", it indicates that the measured resistance exceeds the maximum value of the selected range, and the function dial must be set to a higher range. When measuring resistances above 1MΩ, it may take a few seconds for the reading to stabilize. This is normal for high-resistance measurements.
- When there is no input, e.g., when there is an open circuit, the instrument will display "1" or "OL".
- Before measuring resistance in a live circuit, ensure that all power sources are turned off and all capacitors are fully discharged.

Diode Measurement

1. Insert the black test lead into the **COM** jack. Insert the red test lead into the **VΩmA** jack.
2. At this point, the red test lead will have a positive (+) polarity.
3. Set the function/range dial to the position. Connect the red test lead to the anode of the diode and the black test lead to the cathode. The LCD will display the approximate forward voltage drop of the diode.

Continuity Test

1. Insert the black test lead into the **COM** jack. Insert the red test lead into the **VΩmA** jack.
2. Set the function/range dial to the position. Connect the test leads to two points of the circuit being tested. If the resistance between the two points is less than approximately 50Ω ± 30Ω, the built-in buzzer will sound, indicating continuity between those points.

Battery Measurement

1. Insert the black test lead into the **COM** jack. Insert the red test lead into the **VΩmA** jack. At this point, the red test lead will have a positive (+) polarity.
2. Set the function/range dial to the position.
3. Connect the red test lead to the positive terminal of the battery. Connect the black test lead to the negative terminal of the battery.

⚠**Note: The maximum voltage for battery measurement must not exceed 36V. Exceeding this limit could damage the instrument.**

Transistor Measurement

1. Set the function/range dial to the **hFE** position.
2. Insert the E, B, and C terminals of the transistor being tested into the corresponding E, B, and C sockets on the panel.
3. Read the transistor's gain value from the LCD.

⚠**Note: No voltage should be applied when in the hFE range to avoid damaging the instrument.**

Non-Contact Voltage Detection (NCV)

1. Set the function/range dial to the **NCV Live** position, then press the **H** button to select "NCV" measurement mode. The LCD will display "EF".
2. Move the NCV detection area at the top of the instrument close to the live object. If voltage is detected, the NCV indicator light will flash, and at the same time, the buzzer will emit a "beep-beep-beep" alarm sound to warn the user that voltage is present in the area.

⚠**Note:**

- Even if there is no indication, voltage may still be present. Do not rely solely on the NCV detector to determine whether a conductor is live.
- Detection results may be affected by factors such as socket design, insulation thickness, and material type.
- External sources of interference (e.g., flashlights, motors, etc.) may affect the instrument, causing inaccurate detection.

Live Wire Identification (Live)

1. Set the function/range dial to the **NCV Live** position, then press the **H** button to select "Live" measurement mode. The display will show "0".
2. Insert the red test lead into the **VΩ** jack and use the tip of the red test lead to touch the AC voltage. When the instrument emits a "beep-beep-beep" alarm sound, the NCV indicator light flashes, and the display shows "L", the wire being touched is the live wire.

⚠**Note:**

- If the circuit has severe leakage, the meter may also emit a warning sound when the red test lead touches the neutral wire.
- Detection results may be affected by factors such as socket design, insulation thickness, and material type.
- External sources of interference (e.g., flashlights, motors, etc.) may affect the instrument, causing inaccurate detection.

Replacing the Battery and Fuse

1. Under normal circumstances, the fuse does not need to be replaced. Power off the instrument and remove the test leads before proceeding with fuse or battery replacement. Unscrew the screws on the back cover to open the case.
2. The fuse specifications for this instrument are: F200mA/250V and F10A/250V fast-blow type. The replacement fuse must be of the same specification.

3.Use the same type of battery when replacing the battery.

4.After replacing the battery or fuse, the back cover must be securely tightened before using the instrument.

⚠**Warning**

- To avoid electric shock, ensure that the test leads are disconnected from the circuit before opening the back cover.
- Before using the instrument, ensure that the back cover is securely fastened.

Accessories

- User manual: ×1
- Carrying case: ×1
- Battery: 1.5V AAA ×2
- Test leads: ×1 set
- Rubber sleeve: ×1