MS8239T/MS8239D+ Digital Multimeter User Manual

Overview of Product Functions

Model / Features	MS8239D+	MS8239T
Maximum Display	4000	4000
DC Voltage	0.01mV–600V	0.01mV–600V
AC Voltage	0.01mV–600V	0.01mV–600V
DC Current	0.1uA–10A	0.1uA–10A
AC Current	0.1uA–10A	0.1uA–10A
Resistance	0.1Ω–40MΩ	0.1Ω–40MΩ
Capacitance	10pF–40mF	10pF–40mF
Frequency	1Hz–10MHz	1Hz–10MHz
℃	—	-20℃ to 750℃
℉	—	-4℉ to 1382℉
⯈|-	✓	✓
🔊	✓	✓
True RMS	✓	✓
Backlight	✓	✓
NCV	✓	✓
Live Wire Identification	✓	✓
Data Hold	✓	✓
MIN/MAX	✓	✓
Relative Value Measurement	✓	✓
Unit Display	✓	✓
Auto Power Off	✓	✓
Range Mode	Automatic Range	Automatic Range
Power Supply	1.5V×2	1.5V×2

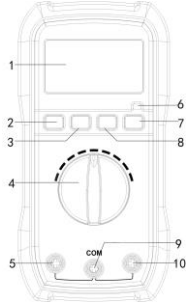
Introduction

This product is a small handheld digital multimeter offering stable performance, high reliability, and anti-drop capabilities. The circuit design centers around a large-scale dual-slope integrating A/D converter with overload protection, making this a superior and compact measurement tool.

The instrument can measure AC/DC voltage, AC/DC current, resistance, diodes, circuit continuity, temperature, frequency, and capacitance. It also functions as a live wire detector, non-contact voltage (NCV) tester, and unit symbol display.

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. SEL Button**:** This button is used to switch between two or more functions within the same range, such as AC/DC voltage, AC/DC current, diode, continuity, and resistance; ℉ and ℃; NCV and live wire identification.
3. MAX/MIN Button
4. Function Selector Dial
5.10A Jack
6.NCV Indicator Light
7.**H** Button (Data Hold)
☀(Backlight Button): Hold down the button to turn on the backlight, down the button again to turn off the backlight.
8.**REL** Button (Relative Value Measurement)
9.COM Jack
10. VΩmA Jack

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)

Operation 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; Environment Humidity: ≤80%

General Specifications:

- Maximum Voltage between Input and Ground: CAT III 600V
- Fuse: F500mA/500V, F10A/500V
- Power Supply: 1.5V AAA ×2
- Maximum Display Value: 4000
- Overload Indicator: "1" or "OL"
- Polarity Display: Negative polarity is displayed as "-"
- Working Temperature: 0°C to 40°C
- Storage Temperature: -10°C to 50°C
- Low Voltage Indicator: The display shows 🪫
- Dimensions: 147 mm × 74 mm × 46 mm
- Weight: Approximately 229 g (including batteries)

DC Voltage

Range	Resolution	Accuracy
40.00mV	0.01mV	±(0.5%+5)
400.0mV	0.1mV	±(0.5%+3)
4.000V	0.001V	±(0.8%+3)
40.00V	0.01V	±(0.8%+3)
400.0V	0.1V	±(0.8%+3)
600V	1V	±(1.0%+5)

Overload protection: mV range: 250V DC or AC RMS; all other ranges: 600V DC or AC RMS

DC Current

Range	Resolution	Accuracy
400.0μA	0.1μA	±(1.0%+5)
4000μA	1μA	±(1.0%+5)
40.00mA	0.01mA	±(1.0%+5)
400.0mA	0.1mA	±(2.0%+5)
4.000A	0.001A	±(2.5%+5)
10.00A	0.01A	±(2.5%+5)

Overload protection: F500mA/500V, F10A/500V fuse

AC Voltage

Range	Resolution	Accuracy
40.00mV	0.01mV	±(1.0%+20)
400.0mV	0.1mV	±(1.0%+10)
4.000V	0.001V	±(0.8%+3)
40.00V	0.01V	±(0.8%+3)
400.0V	0.1V	±(0.8%+3)

600V	1V	±(1.2%+5)

Overload protection: mV range: 250V DC or AC RMS; all other ranges: 600V DC or AC RMS
Frequency range: 40Hz to 1000Hz
Display: True RMS

AC Current

Range	Resolution	Accuracy
400.0μA	0.1μA	±(1.8%+3)
4000μA	1μA	±(1.5%+5)
40.00mA	0.01mA	±(1.5%+5)
400.0mA	0.1mA	±(2.5%+5)
4.000A	0.001A	±(3.0%+10)
10.00A	0.01A	±(3.0%+10)

Overload protection: F500mA/500V, F10A/500V fuse
Frequency range: 40Hz to 1000Hz

Resistance

Range	Resolution	Accuracy
400.0Ω	0.1Ω	±(1.2%+2)
4.000kΩ	0.001kΩ	±(1.0%+2)
40.00KΩ	0.01kΩ	±(1.0%+2)
400.0KΩ	0.1kΩ	±(1.0%+2)
4.000MΩ	0.001MΩ	±(1.0%+2)
40.00MΩ	0.01MΩ	±(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

Capacitance

Range	Resolution	Accuracy
40.00nF	10pF	±(4.0%+25)
400.0nF～400.0uF	100pF～100nF	±(4.0%+15)
4.000mF～40.00mF	1uF～10uF	±(5.0%+25)

Overload protection: 250V DC or AC RMS

Temperature Test

Function	Range	Resolution	Accuracy
℃	-20℃～750℃	1℃	±(2.0%+3℃)
℉	-4℉～1382℉	1℉	±(3.0%+3℉)

Overload protection: 250V DC or AC RMS

Frequency

Range	Resolution	Accuracy
4.000Hz～10.00MHz	0.001Hz～0.01MHz	±(0.1%+2)

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.

Measuring DC Voltage

1. Insert the red test lead into the **VΩmA** jack. Insert the black test lead into the **COM** jack.
2. Turn the function dial to the **V** or **mV** range, press the **SEL** button to switch to DC voltage mode, and connect the test leads to the power source or load to be tested. The polarity of the terminal connected to the red test lead will be displayed on the screen.

Note:

- For manual range instruments, if the voltage to be measured is unknown, set the function dial to the highest range and gradually lower it until satisfactory resolution is obtained.
- If the display shows "1" or "OL", it indicates an overload, and the function dial must be set to a higher range.
- Do not input voltage higher than 600V. Although higher voltages may be displayed, there is a risk of damaging the internal circuitry.
- Be especially careful to avoid electric shock when measuring high voltages.

Measuring DC Current

1. Insert the black test lead into the **COM** jack. If the current to be measured is less than 400mA, insert the red test lead into the **VΩmA** jack. If the current is between 400mA and 10A, insert the red test lead into the **10A** jack.
2. Set the function dial to the desired current range, press the **SEL** button to switch to DC current mode, and connect the test leads in series with the load. The current value will be displayed, along with the polarity of the connection for the red test lead.

Note:

- If the current range to be measured is unknown, set the function 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 function dial must be set to a higher range.
- The ⚠ symbol next to the test lead jacks indicates a maximum input current of either 400mA or 10A, depending on the jack being used. Excessive current will blow the fuse.

Measuring AC Voltage

1. Insert the red test lead into the **VΩmA** jack. Insert the black test lead into the **COM** jack.
2. Turn the function dial to the **V** or **mV** range, press the **SEL** button to switch to AC voltage mode, and connect the test leads to the power source or load being tested.
   Note: Refer to the precautions for DC voltage measurement.

Measuring AC Current

1. Insert the black test lead into the **COM** jack. If the current to be measured is less than 400mA, insert the red test lead into the **VΩmA** jack. If the current is between 400mA and 10A, insert the red test lead into the **10A** jack.
2. Set the function dial to the desired current range, press the **SEL** button to switch to AC current mode, and connect the test leads in series with the load. The current value will be displayed on the screen.
   Note: Refer to the precautions for DC current measurement.

Measuring Resistance

1. Insert the black test lead into the **COM** jack. Insert the red test lead into the **VΩmA** jack.
2. Set the function dial to the desired **Ω** range, press the **SEL** button to switch to Ω (resistance) mode, connect the test leads in parallel with the resistor being measured, and read the measurement result from the display.

Note:

- For manual range meters, if the measured resistance exceeds the maximum value of the selected range, the display will show "1" or "OL". In this case, select 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.

Measuring Diodes

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 dial to the position and press the **SEL** button to select (diode) measurement mode. Connect the red test lead to the anode of the diode and the black test lead to the cathode. The display will show the approximate forward voltage drop of the diode.

Continuity Test

1. Insert the black test lead into the **COM** jack and the red test lead into the **VΩmA** jack.
2. Set the function dial to the continuity position and press the **SEL** button to select (continuity) measurement mode. 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.

Capacitance Measurement

1. Insert the black test lead into the **COM** jack and the red test lead into the **VΩ** jack.
2. Turn the function dial to the **capacitance**

range and discharge the capacitor being tested.

3. Connect the black test lead to the negative terminal of the capacitor and the red test lead to the positive terminal.
4. Read the capacitance value from the LCD.
5. When measuring small capacitors, the meter may show a small non-zero value due to environmental factors and interference from the test leads. Subtract the currently displayed value during testing.

Note:

- **Before measuring resistance in a live circuit, ensure that all power sources are turned off and all capacitors are fully discharged.**
- **Do not input any voltage while in the capacitance range to avoid damaging the meter.**

Frequency Measurement

1. Insert the black test lead into the **COM** jack. Insert the red test lead into the **VΩ** jack.
2. Turn the function dial to the frequency range.
3. Use the test leads to measure the frequency of the circuit being tested (connect the test leads in parallel with the circuit).
4. Read the measured frequency value from the LCD.

Note: When conducting measurements in a live circuit, ensure that the input voltage does not exceed AC 250V.

Temperature Measurement

1. Turn the function selector dial to the **℃/℉** position.
2. Insert the red end of the temperature probe into the **VΩmA** jack and the black end into the **COM** jack.
3. Place the testing end of the temperature probe into the temperature field to be measured.
4. Wait a few minutes for the temperature to stabilize, then read the measured temperature value on the display.
5. Press the **SEL** button to switch between ℃ and ℉.

Non-Contact Voltage Detection (NCV)

1. Turn the function dial to the **NCV** range and press the **SEL** button to switch to the Non-Contact AC Voltage Detection (NCV) mode. The display will show “EF”.
2. Move the NCV detection area at the top of the instrument close to the live object. If the instrument detects a live conductor, the NCV indicator light will flash, and the buzzer will emit a “beep-beep-beep” alarm sound, alerting the user to the presence of voltage and the need to ensure safe operation.

Note:

- Even if there is no indication, voltage may still be present. Do not rely solely on the non-contact voltage 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. Turn the function dial to the **LIVE** range and press the **SEL** button to switch to the Live Wire Identification (LIVE) mode. The display will show “LIVE”.
2. Insert the red test lead into the **VΩmA** jack and use the tip of the test lead to touch the AC voltage. When the instrument emits a “beep-beep-beep” alarm sound and the red LED indicator light turns on, the wire being touched is the live wire.

   Note: If the circuit has severe leakage (approximately ≥15V), the instrument may give both audible and visual warnings when the red test lead touches the neutral wire.

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: 500mA/500V and F10A/500V 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

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

Accessories

- User manual: ×1
- Test leads: ×1 set
- Carrying case: ×1
- Battery: 9V or 1.5V
- Temperature probe: ×1 (MS8239T)