

## Mastech MS8301B

# Mastech MS8301B Digital Multimeter User Manual

Model: MS8301B

## 1. INTRODUCTION

The Mastech MS8301B is a compact, battery-powered digital multimeter designed for measuring AC/DC voltage, AC/DC current, resistance, capacitance, frequency, duty cycle, temperature, diode, and continuity. It features a 4000-count display, backlight, and a non-contact voltage (NCV) detector, making it suitable for various electrical and electronic testing applications.

This manual provides essential information for the safe and effective operation, maintenance, and troubleshooting of your MS8301B digital multimeter. Please read it thoroughly before use.

## 2. SAFETY INFORMATION

**WARNING: To avoid electrical shock, remove test leads before opening the case or battery cover. For your safety, always adhere to the following precautions:**

- Always ensure the multimeter is in good working condition before use.
- Do not apply voltage or current that exceeds the maximum specified limits for each range.
- Use caution when working with voltages above 60V DC or 30V AC RMS, as they pose a shock hazard.
- Never connect the test leads across a voltage source when the rotary switch is set to current, resistance, or continuity mode.
- Ensure the test leads are properly seated in the correct input jacks for the desired measurement.
- Replace batteries promptly when the low battery indicator appears to ensure accurate readings.
- Do not operate the meter in explosive atmospheres or in the presence of flammable gases or dust.
- Always disconnect power to the circuit under test before measuring resistance, capacitance, or continuity.



**Image:** Safety warning label on the back of the Mastech MS8301B multimeter, advising to remove test leads before opening the case or battery cover to avoid electrical shock.

## 3. PRODUCT OVERVIEW

The Mastech MS8301B digital multimeter is designed for ease of use and reliability. Key features include:

- **Display:** 4000 Counts for precise readings.
- **Backlight:** Improves visibility in low-light conditions.
- **Non-contact Voltage Detector (NCV):** For quick and safe detection of AC voltage without direct contact.



**Image:** Front view of the Mastech MS8301B Digital Multimeter, showing the display, rotary switch, function buttons (FUNC, Hz%, NCV), and input jacks (A, COM, mAμA, VΩTEMP).

#### Components:

- **LCD Display:** Shows measurement readings, units, and function indicators.
- **Rotary Switch:** Selects the desired measurement function (e.g., V~, V-, Ω, A~, A-, TEMP, Diode, Continuity, NCV).
- **Function Buttons:**
  - **FUNC:** Toggles between different functions within a single rotary switch position (e.g., AC/DC, Diode/Continuity).
  - **Hz%:** Activates frequency or duty cycle measurement.
  - **NCV:** Activates the Non-Contact Voltage detection mode.
- **Input Jacks:**
  - **COM:** Common terminal for all measurements (connect black test lead).
  - **VΩTEMP:** Input for voltage, resistance, capacitance, frequency, duty cycle, and temperature measurements (connect red test lead).
  - **mAμA:** Input for milliampere and microampere current measurements (connect red test lead).
  - **A:** Input for 10A current measurements (connect red test lead).

## 4. SETUP

Before using your multimeter, ensure the batteries are installed and test leads are correctly connected.

## 4.1. Battery Installation

The MS8301B requires 2 LR44 batteries (included). To install or replace batteries:

1. Ensure the multimeter is turned OFF and disconnect all test leads.
2. Locate the battery compartment on the back of the unit.
3. Use a screwdriver to open the battery cover.
4. Insert the 2 LR44 batteries, observing correct polarity (+/-).
5. Replace the battery cover and secure it with the screw.

## 4.2. Connecting Test Leads

Always connect the black test lead to the **COM** jack. Connect the red test lead to the appropriate input jack based on the measurement type:

- For voltage, resistance, capacitance, frequency, duty cycle, diode, continuity, and temperature measurements, connect the red test lead to the **VΩTEMP** jack.
- For milliampere or microampere current measurements, connect the red test lead to the **mAμA** jack.
- For 10A current measurements, connect the red test lead to the **10A** jack.

## 5. OPERATING INSTRUCTIONS

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This section details how to perform various measurements with your MS8301B multimeter.

### 5.1. DC Voltage Measurement (V<sub>–</sub>)

1. Set the rotary switch to the **V<sub>–</sub>** position.
2. Connect the black test lead to **COM** and the red test lead to **VΩTEMP**.
3. Connect the test leads in parallel to the DC voltage source or component.
4. Read the voltage value on the display.

### 5.2. AC Voltage Measurement (V<sub>~</sub>)

1. Set the rotary switch to the **V<sub>~</sub>** position.
2. Connect the black test lead to **COM** and the red test lead to **VΩTEMP**.
3. Connect the test leads in parallel to the AC voltage source or component.
4. Read the voltage value on the display.

### 5.3. Resistance Measurement (Ω)

1. Set the rotary switch to the **Ω** position.
2. Connect the black test lead to **COM** and the red test lead to **VΩTEMP**.
3. Ensure the circuit or component is de-energized before connecting the test leads.
4. Connect the test leads across the component to be measured.
5. Read the resistance value on the display.

### 5.4. Capacitance Measurement

1. Set the rotary switch to the **Capacitance** position (often shared with Ω or Diode/Continuity, use FUNC button to select).

2. Connect the black test lead to **COM** and the red test lead to **VΩTEMP**.
3. Ensure the capacitor is fully discharged before connecting the test leads.
4. Connect the test leads across the capacitor.
5. Read the capacitance value on the display.

### 5.5. DC Current Measurement (A–, mA–, μA–)

1. Set the rotary switch to the appropriate current range (**A–**, **mA–**, or **μA–**).
2. Connect the black test lead to **COM**.
3. For 10A measurements, connect the red test lead to the **A** jack. For mA/μA measurements, connect the red test lead to the **mAμA** jack.
4. Disconnect power to the circuit. Open the circuit where current is to be measured.
5. Connect the multimeter in series with the circuit.
6. Apply power to the circuit and read the current value on the display.

### 5.6. AC Current Measurement (A~, mA~, μA~)

1. Set the rotary switch to the appropriate current range (**A~**, **mA~**, or **μA~**).
2. Connect the black test lead to **COM**.
3. For 10A measurements, connect the red test lead to the **A** jack. For mA/μA measurements, connect the red test lead to the **mAμA** jack.
4. Disconnect power to the circuit. Open the circuit where current is to be measured.
5. Connect the multimeter in series with the circuit.
6. Apply power to the circuit and read the current value on the display.

### 5.7. Frequency (Hz) and Duty Cycle (%) Measurement

1. Set the rotary switch to a voltage or current range where frequency/duty cycle is applicable (e.g., **V~** or **A~**).
2. Connect the test leads as you would for voltage or current measurement.
3. Press the **HZ%** button to toggle between frequency and duty cycle display.
4. Read the frequency or duty cycle value on the display.

### 5.8. Diode Test (→|►)

1. Set the rotary switch to the **Diode/Continuity** position. Press **FUNC** if necessary to select Diode Test.
2. Connect the black test lead to **COM** and the red test lead to **VΩTEMP**.
3. Ensure the diode is disconnected from the circuit.
4. Connect the red test lead to the anode and the black test lead to the cathode of the diode. The display shows the forward voltage drop.
5. Reverse the test leads. The display should show 'OL' (Open Loop) for a good diode.

### 5.9. Continuity Test (♪)

1. Set the rotary switch to the **Diode/Continuity** position. Press **FUNC** if necessary to select Continuity Test.
2. Connect the black test lead to **COM** and the red test lead to **VΩTEMP**.
3. Ensure the circuit or component is de-energized.
4. Connect the test leads across the circuit path or component.
5. If the resistance is less than approximately 50 Ω, the buzzer will sound, indicating continuity. The display will show

the resistance value.

## 5.10. Temperature Measurement (TEMP °C/°F)

1. Set the rotary switch to the **TEMP** position.
2. Connect the K-type thermocouple (included) to the **VΩTEMP** and **COM** jacks, observing polarity.
3. Place the thermocouple probe on or near the object whose temperature is to be measured.
4. Read the temperature value on the display.

## 5.11. Non-Contact Voltage (NCV) Detection

1. Set the rotary switch to the **NCV** position.
2. Move the top end of the multimeter near a live AC voltage source (e.g., an electrical outlet or wire).
3. The NCV indicator light will illuminate, and the buzzer will sound, with increasing intensity as the meter gets closer to the voltage source.

# 6. MAINTENANCE

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Proper maintenance ensures the longevity and accuracy of your multimeter.

## 6.1. Cleaning

Wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Keep the input jacks free of dust and debris.

## 6.2. Battery Replacement

Refer to Section 4.1 for instructions on battery replacement. Always replace batteries when the low battery indicator appears on the display.

## 6.3. Fuse Replacement

The current input jacks (mAμA and A) are protected by fuses. If the multimeter fails to measure current, the fuse may be blown. To replace a fuse:

1. Ensure the multimeter is turned OFF and disconnect all test leads.
2. Open the multimeter case (refer to the safety warnings regarding opening the case).
3. Locate the blown fuse and carefully remove it.
4. Replace with a fuse of the exact same type and rating (e.g., F1: 400mA/250V, F2: 10A/250V). Using an incorrect fuse can damage the meter or pose a safety hazard.
5. Close the case and secure it.

# 7. TROUBLESHOOTING

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If your multimeter is not functioning as expected, check the following common issues:

- **No display or dim display:** Check battery charge. Replace batteries if necessary.
- **Incorrect readings:**
  - Ensure test leads are correctly connected to the appropriate input jacks.

- Verify the rotary switch is set to the correct measurement function and range.
- Check for damaged test leads.
- **No current measurement:** Check the fuses (refer to Section 6.3).
- **'OL' (Overload) displayed:** The measured value exceeds the selected range. Select a higher range or ensure the circuit is within the meter's capabilities.

## 8. SPECIFICATIONS

The following table outlines the technical specifications for the Mastech MS8301B Digital Multimeter.

### MS8301B Features

- Display 4000 Counts
- Back Light
- Non-contact Voltage Detector

Specifications	Range	Resolution	Accuracy	
DC Voltage	400mV	0.1mV	±(0.5% of reading +3 digits)	
	4V	0.001V		
	40V	0.01V		
	400V	0.1V		
	600V	1V	±(0.8% of reading +3 digits)	
AC Voltage	4V	0.001V	±(0.8% of reading +5 digits)	
	40V	0.01V		
	400V	0.1V		
	600V	1V	±(1.0% of reading +5 digits)	
Resistance	400Ω	0.1Ω	±(0.8% of reading +5 digits)	
	4kΩ	0.001kΩ		
	40kΩ	0.01kΩ		
	400kΩ	0.1kΩ		
	4MΩ	0.001MΩ		
	40MΩ	0.01MΩ		
Capacitance	50nF	0.01nF	±(3.0% of reading +5 digits)	
	500nF	0.1nF		
	5μF	0.001μF		
	50μF	0.01μF		
	100μF	0.1μF		
DC Current	400μA	0.1μA	±(1.0% of reading +5 digits)	
	4000μA	1μA		
	40mA	0.01mA		
	400mA	0.1mA		
	10A	0.01A	±(2.0% of reading +10 digits)	
AC Current	400μA	0.1μA	±(1.2% of reading + 5 digits)	
	4000μA	1μA		
	40mA	0.01μA		
	400mA	0.1μA		
	10A	0.01A	±(2.5% of reading + 10 digits)	
Frequency Through grade HZ/DUTY	5.000Hz	0.001Hz	±(1.0% of reading+ 5 digits)	
	50.00Hz	0.01Hz		
	500.0Hz	0.1Hz		
	5.000KHz	0.001KHz		
	50.00KHz	0.01KHz		
	100.0KHz	0.1KHz		
Through grade V or A	50.00Hz	0.01Hz	± (1.5% of reading + 5 digits)	
	500.0Hz	0.1Hz		
	10.00kHz	0.001KHz		
Duty Ratio	0.1%-99.9%	0.1%	±3%	
Temperature	-4~1832°F	1°F	± (3.0% of reading + 3 digits)	
Diode and Continuity Measurement	Function	Range	Resolution	Accuracy
	Diode Test	1.5V	0.001V	Display approximate diode forwardvoltage drop value.
		When built-in buzzer sounds, the resistanceto be tested is less than 500.		Open circuit voltage: about 0.4V
	Overload protection: 250V DC or AC (RMS)			

**Image:** Detailed specifications table for the Mastech MS8301B Digital Multimeter, showing ranges, resolutions, and accuracies for various measurement functions.

Measurement	Range	Resolution	Accuracy
DC Voltage	400mV	0.1mV	±(0.5% of reading + 3 digits)
	4V	0.001V	
	40V	0.01V	
	600V	1V	
AC Voltage	4V	0.001V	±(0.8% of reading + 5 digits)
	40V	0.01V	
	400V	0.1V	
	600V	1V	
Resistance	400Ω	0.1Ω	±(0.8% of reading + 5 digits)
	4kΩ	0.001kΩ	
	40kΩ	0.01kΩ	
	400kΩ	0.1kΩ	
Capacitance	50nF	0.01nF	±(3.0% of reading + 5 digits)
	500nF	0.1nF	
	5μF	0.001μF	
	50μF	0.01μF	
DC Current	400μA	0.1μA	±(1.0% of reading + 5 digits)
	4000μA	1μA	
	40mA	0.01mA	
	400mA	0.1mA	
AC Current	400μA	0.1μA	±(1.2% of reading + 5 digits)
	4000μA	1μA	
	10A	0.01A	±(2.5% of reading + 10 digits)
Frequency	5.000Hz	0.001Hz	±(1.0% of reading + 5 digits)
	50.00Hz	0.01Hz	
	500.0Hz	0.1Hz	
	5.000kHz	0.001kHz	
Duty Ratio	0.1%~99.9%	0.1%	±3%
Temperature	-4~1832°F	1°F	±(3.0% of reading + 3 digits)

Measurement	Range	Resolution	Accuracy
Diode Test	1.5V	0.001V	Display approximate diode forward voltage drop value.
Continuity Test	When built-in buzzer sounds, the resistance is less than 50Ω.		Open circuit voltage: about 0.4V
Overload Protection	250V DC or AC (RMS)		

General Specifications:

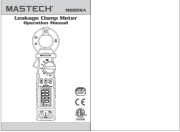
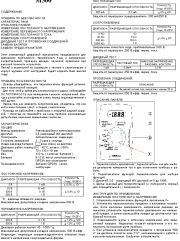
- **Display:** 4000 Counts
- **Power Source:** Battery Powered (2 LR44 batteries, included)
- **Product Dimensions:** 20 x 15 x 25 cm
- **Item Weight:** 1 Kilogram
- **Safety Rating:** CAT II 600V
- **Operating Temperature:** 0°C to 50°C (32°F to 122°F)
- **Storage Temperature:** -10°C to 50°C (14°F to 122°F)
- **Humidity:** <80% RH (non-condensing)
- **Certifications:** CE, RoHS, UL

9. WARRANTY AND SUPPORT





Mastech products are designed for reliability and performance. This product comes with a 1-year EU Spare Part Availability Duration, indicating support for replacement parts within this period.

For technical support, warranty claims, or service inquiries, please contact your retailer or the manufacturer directly. Keep your purchase receipt as proof of purchase.

Related Documents - MS8301B

	<p><a href="#">MASTECH MS2016A Leakage Clamp Meter Operation Manual</a></p> <p>Comprehensive operation manual for the MASTECH MS2016A AC Leakage Clamp Meter, covering safety information, specifications, operating guidance, maintenance, and accessories. Features include AC/DC voltage, resistance, capacitance, continuity, diode, and temperature measurements.</p>
	<p><a href="#">MASTECH M300 Digital Multimeter User Manual</a></p> <p>User manual for the MASTECH M300 digital multimeter, detailing its features, specifications, safety precautions, and operating instructions for measuring DC/AC voltage, DC current, resistance, continuity, and diode testing.</p>



	<p><a href="#">MASTECH MS8223A Pen-Type Digital Multimeter Quick Start Guide</a></p> <p>Quick start guide for the MASTECH MS8223A pen-type digital multimeter, covering safety precautions, specifications, and basic operation for voltage, current, resistance, continuity, logic test, and NCV detection.</p>
	<p><a href="#">Mastech MS8332C Digital Multimeter Quick Start Guide - Features, Specs, and Usage</a></p> <p>Concise guide for the Mastech MS8332C Digital Multimeter. Learn about its specifications, safety precautions, and how to perform common measurements like voltage, current, resistance, and frequency.</p>
	<p><a href="#">MASTECH MY74 Digital Multimeter Quick Start Guide   Accurate Measurements</a></p> <p>Get started quickly with the MASTECH MY74 Digital Multimeter. This guide covers setup, safety, and specifications for accurate voltage, current, resistance, capacitance, frequency, and temperature measurements.</p>
	<p><a href="#">MASTECH MS8250D Digital Multimeter Quick Start Guide</a></p> <p>A concise and SEO-optimized guide for the MASTECH MS8250D Digital Multimeter, providing essential information on safety, specifications, and basic operation.</p>