Mastech MS8232B

Mastech MS8232B Mini Digital Multimeter User Manual

Model: MS8232B

1. Introduction

The Mastech MS8232B is a compact, auto-ranging digital multimeter designed for measuring AC/DC voltage, AC/DC current, resistance, frequency, capacitance, and duty cycle. It features a 3 3/4 digit LCD display with 3999 counts, overload protection, a flashlight function, low voltage display, and automatic power-off for energy conservation. This manual provides essential information for safe and effective operation of the device.

2. Safety Information

To ensure safe operation and avoid damage to the meter, observe the following safety precautions:

- Always ensure the test leads are in good condition and properly connected before making any measurements.
- Do not apply voltage or current that exceeds the maximum specified limits for each range.
- Exercise extreme caution when working with voltages above 60V DC or 30V AC RMS, as these pose a shock hazard.
- Before changing functions, disconnect the test leads from the circuit under test.
- Do not operate the meter if it appears damaged or if the case is open.
- Replace the battery immediately when the low battery indicator appears to ensure accurate readings.
- Adhere to local and national safety codes.

3. Product Overview

The Mastech MS8232B is a compact and versatile digital multimeter. Key features include a 4000-count display, non-contact voltage detection, and an integrated flashlight.

Figure 3.1: Mastech MS8232B Mini Digital Multimeter with test leads.

3.1 Components

- **LCD Display:** Shows measurement readings, units, and function indicators.
- **Rotary Switch:** Used to select the desired measurement function.
- **FUNC Button:** Toggles between different measurement modes within a single rotary switch position (e.g., AC/DC, Resistance/Continuity/Diode).
- **Flashlight Button:** Activates the built-in flashlight.
- **Hz% Button:** Toggles between frequency and duty cycle measurements.
- **Input Jacks:** For connecting test leads.
- **Non-Contact Voltage (NCV) Sensor:** Detects AC voltage without direct contact.

Figure 3.2: Close-up of the rotary switch and function buttons, including FUNC, Flashlight, and Hz%.

Figure 3.3: The multimeter's LCD display showing a measurement.

4. Setup

4.1 Battery Installation

The MS8232B is powered by batteries. To install or replace batteries:

1. Ensure the multimeter is turned OFF.

2. Locate the battery compartment cover on the back of the unit.
3. Use a screwdriver to remove the screw(s) securing the cover.
4. Carefully remove the old batteries (if any) and insert new ones, observing the correct polarity (+ and -).
5. Replace the battery compartment cover and secure it with the screw(s).

4.2 Connecting Test Leads

Connect the red test lead to the 'VΩHz%CAP' input jack and the black test lead to the 'COM' input jack for most voltage, resistance, frequency, and capacitance measurements. For current measurements, refer to the specific current measurement section.

5. Operating Instructions

Always ensure the correct function is selected and test leads are properly connected before making any measurement.

5.1 DC Voltage (DCV) Measurement

1. Set the rotary switch to the 'VΩHz%' position.
2. Press the 'FUNC' button until 'DC' is indicated on the display.
3. Connect the red test lead to the positive side of the circuit and the black test lead to the negative side.
4. Read the voltage value on the LCD display.

5.2 AC Voltage (ACV) Measurement

1. Set the rotary switch to the 'VΩHz%' position.
2. Press the 'FUNC' button until 'AC' is indicated on the display.
3. Connect the test leads across the AC voltage source.
4. Read the voltage value on the LCD display.

5.3 DC Current (DCA) Measurement

1. Set the rotary switch to the 'µA' or 'mA' position, depending on the expected current range.
2. Press the 'FUNC' button until 'DC' is indicated on the display.
3. Disconnect power to the circuit. Break the circuit and connect the multimeter in series. The red lead connects to the higher potential side, and the black lead to the lower potential side.
4. Apply power to the circuit and read the current value.

5.4 AC Current (ACA) Measurement

1. Set the rotary switch to the 'µA' or 'mA' position, depending on the expected current range.
2. Press the 'FUNC' button until 'AC' is indicated on the display.
3. Disconnect power to the circuit. Break the circuit and connect the multimeter in series.
4. Apply power to the circuit and read the current value.

5.5 Resistance Measurement

1. Set the rotary switch to the 'Ω' position.
2. Ensure the circuit under test is de-energized.
3. Connect the test leads across the component to measure its resistance.
4. Read the resistance value on the LCD display.

5.6 Frequency (Hz) and Duty Cycle (%) Measurement

1. Set the rotary switch to the 'VΩHz%' position.
2. Press the 'Hz%' button to cycle between Frequency and Duty Cycle modes.
3. Connect the test leads across the signal source.
4. Read the frequency or duty cycle value on the LCD display.

5.7 Capacitance Measurement

1. Set the rotary switch to the 'CAP' position.
2. Ensure the capacitor is fully discharged before connecting the test leads.
3. Connect the test leads across the capacitor terminals.
4. Read the capacitance value on the LCD display.

5.8 Flashlight Function

The multimeter includes a built-in flashlight for illuminating dark work areas.

1. Press the flashlight button (labeled with a light bulb icon) to turn the flashlight ON.
2. Press the button again to turn the flashlight OFF.

Figure 5.1: The integrated flashlight on the Mastech MS8232B.

5.9 Non-Contact Voltage (NCV) Detection

The NCV function allows for detection of AC voltage without direct contact with conductors.

1. Set the rotary switch to the 'NCV' position (often integrated with other functions or a dedicated position).

2. Bring the top front part of the multimeter (where the NCV sensor is located) close to the conductor.
3. The meter will indicate the presence of AC voltage through an audible beep and/or visual indicator.

5.10 Automatic Power Off

The multimeter features an automatic power-off function to conserve battery life. If no operation is performed for approximately 15 minutes, the meter will automatically shut down. To reactivate, turn the rotary switch to OFF and then back to the desired function, or press any button.

6. Maintenance

6.1 Cleaning

Wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Keep the input terminals free of dirt and moisture.

6.2 Battery Replacement

Refer to Section 4.1 for battery replacement instructions. Always use the specified battery type.

6.3 Storage

If the meter is not to be used for an extended period, remove the batteries to prevent leakage and damage to the unit. Store the meter in a cool, dry place away from direct sunlight.

7. Troubleshooting

Problem	Possible Cause	Solution
Meter does not power on	Dead or incorrectly installed batteries	Check battery polarity or replace batteries.
"OL" (Overload) displayed	Input value exceeds selected range or meter's maximum capacity	Select a higher range (if available) or ensure the input is within the meter's specifications.
Inaccurate readings	Low battery, incorrect function selected, or poor test lead connection	Replace batteries, verify function selection, ensure leads are securely connected.
No NCV detection	No AC voltage present, or sensor not close enough to source	Verify AC voltage presence with direct contact method if safe, move sensor closer.

8. Specifications

The Mastech MS8232B offers the following technical specifications:

	Range	Resolution	Accuracy
DC Voltage	400mV	0.1mV	±(0.5%rdg+3dgt)
	4V	1mV	
	40V	10mV	
	400V	100mV	
	600V	1V	±(0.8%rdg+5dgt)
AC Voltage	4V	1mV	±(0.8%rdg+3dgt)
	40V	10mV	
	400V	100mV	
	600V	1V	±(1.0%rdg+5dgt)
Resistance	400Ω	0.1Ω	±(1.0%rdg+3dgt)
	4KΩ	1Ω	
	40KΩ	10Ω	
	400KΩ	100Ω	
	4MΩ	1kΩ	
	40MΩ	10KΩ	±(1.2%rdg+15dgt)
DC Current	400uA	0.1uA	±(1.8%rdg+5dgt)
	4000uA	1uA	
	40mA	10uA	
	400mA	100uA	
AC Current	400uA	0.1uA	±2.0%rdg+8dgt)
	4000uA	1uA	
	40mA	10uA	
	400mA	100uA	
Capacitance	4nF	0.001nF	±(5.0%rdg+0.6nF)
	40nF	0.01nF	±(5.0%rdg+30dgt)
	400nF	0.1nF	±(3.0%rdg+15dgt)
	4uF	1nF	±(5.0%rdg+25dgt)
	40uF	10nF	
	100uF	100nF	
Frequency	1Hz-5MHz		±(1.5%rdg+15dgt)
Duty Cycle	0.5-99.9%		±(2.0%rdg+5dgt)

Figure 8.1: Detailed technical specifications table.

General Specifications:

- **Display:** 3 3/4 digits LCD, 3999 Counts

- **Overload Protection:** Full range protection
- **Low Voltage Display:** Yes
- **Automatic Power Off:** Yes
- **Flashlight Function:** Yes
- **Power Source:** Battery Powered
- **Safety Standards:** UL 61010-1, IEC 61010-1

Measurement Ranges and Accuracy:

- **DC Voltage (DCV):** 400mV / 4V / 40V / 400V / 600V (±0.5% + 3 digits)
- **AC Voltage (ACV):** 4V / 40V / 400V / 600V (±0.8% + 3 digits)
- **DC Current (DCA):** 400µA / 4000µA / 40mA / 400mA (±1.8% + 5 digits)
- **AC Current (ACA):** 400µA / 4000µA / 40mA / 400mA (±2.0% + 8 digits)
- **Resistance:** 400Ω / 4KΩ / 40KΩ / 400KΩ / 4MΩ / 40MΩ (±1.0% + 3 digits)
- **Frequency:** 1Hz - 5MHz (±1.5% + 15 digits)
- **Capacitance:** 4nF / 40nF / 400nF / 4µF / 40µF / 100µF (±5.0% + 6 digits)
- **Duty Cycle:** 0.5% - 99.9% (±2.0% + 5 digits)

9. Warranty and Support

Specific warranty information for the Mastech MS8232B Mini Digital Multimeter is not provided in the product data. For warranty claims or technical support, please contact your retailer or the manufacturer directly. Retain your proof of purchase for any warranty-related inquiries.