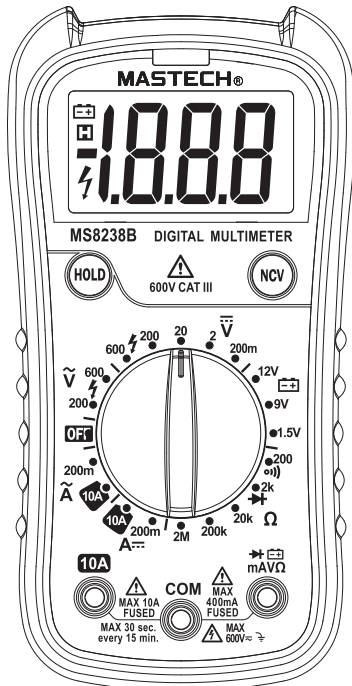


# MASTECH® MS8238B

## Digital Multimeter User's Manual



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## 1. Overview

### Warning

**TO avoid electrical shock or personal injury, please read all safety information, warnings and precautions before using the meter.**

The MS8238B is a small, safe and reliable 3 1/2 digit handheld multimeter. This meter can measure AC/DC voltage, AC/DC current, resistance, diode, continuity, battery test and non-contact voltage tests. This tool is ideal for professionals and hobbyists alike.

## 2. Safety Information


### 2.1 Safety Standards

The MS8238B meets the following safety standards: EN61010-1 for electronic testing instruments. This meter meets EN61010-1 standards for CAT III 600V installations and a pollution degree of 2.





- The protection provided by the meter can only be ensured if all safety procedures are strictly followed.
- The safety symbols on the meter are to advise of potential dangerous situations. Caution is required when measuring close to the meter's safety limits.
- Never exceed the protection limit values indicated in the specifications for each range of measurement.

## 2.2 Precautions

- To avoid electrical shock or personal injury, observe and follow all safety precautions
- Check the meter for damage before use. Do not use if any damage is observed.
- Check the test leads for cracks or exposed wires before using the meter. Replace if necessary.
- Ensure the meter works properly by testing a known voltage source first. If not working properly, the protective equipment may be damaged; have the meter serviced before using.
- Never measure voltages that may exceed the protection limit indicated on the meter.
- Always be careful when working with voltages above 60V dc or 30V ac rms. Keep fingers behind the probe barriers when making voltage measurements.
- Make sure the test leads are in the correct input jacks before measurement.
- Do not expose the meter to explosive gas, dust or vapor.
- When connecting the test leads to a measurement circuit, connect the common lead first, then the live lead. Reverse when disconnecting.
- Turn off power to circuit and discharge all capacitors before making resistance, continuity or diode measurements.
- In order to avoid incorrect DC voltage readings, check the circuit for AC voltage first, then put the meter in the appropriate DC voltage range.
- Turn off circuit power and check fuses before connect the leads when measuring current. Turn circuit power on after making connection.
- Never use the meter unless the back cover is in place and fastened securely.

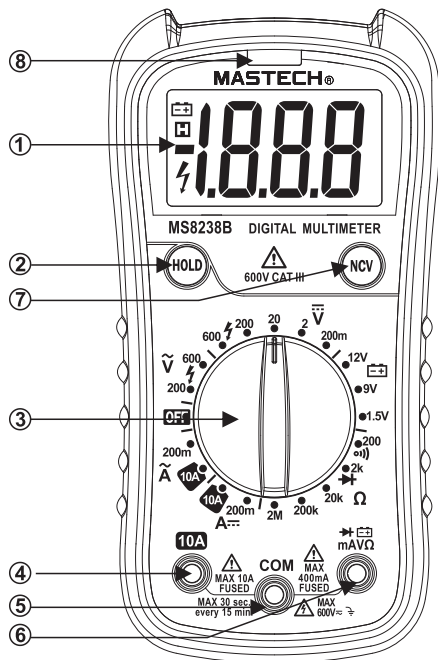
- When the low battery indicator “” is displayed, replace the battery. The accuracy of the meter cannot be guaranteed while the low battery indicator is on.
- Before opening the case, always disconnect test leads from all energized circuits.
- For continued protection against fire, replace fuse only with the specified voltage and current ratings listed in the manual.

## 2.3 Electrical Symbols

|   |                              |
|---|------------------------------|
|  | Important safety information |
|  | AC (Alternating Current)     |
|  | DC (Direct Current)          |
|  | High risk                    |

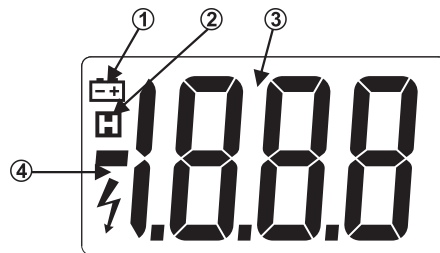
## 3 Description and Usage

### 3.1 Front Panel



1. LCD display
2. Data hold button
3. Rotary switch
4. 10A input jack
5. Common jack
6. Input jack (all functions except current greater than 200mA)
7. Non-contact voltage (NCV) button
8. Non-contact voltage (NCV) indicator

### 3.2 Display



1. Low battery indicator
2. Data hold
3. Measurement display
4. Polarity indicator

## 3.3 Using the Meter

### 3.3.1 Data Hold

The data hold function will hold the current reading on the display.

- Press the “**HOLD**” button to hold the current reading. “**H**” symbol will appear on the display.
- Press the “**HOLD**” button to release the hold.

### 3.3.2 Non-Contact Voltage Detection (NCV)

Hold the “**NCV**” button down in any mode and the meter will activate the non-contact voltage detection.

- Hold the meter up to a voltage source and the buzzer will sound and the NCV indicator will light up if voltage is detected.
- Release the “**NCV**” button to stop NCV detection.

### 3.3.3 AC/DC voltage measurement

- Set the rotary switch to the appropriate AC or DC voltage range.
- Connect the red test lead to the input jack and the black lead to the COM jack.
- Connect the leads to the circuit under test and read the measurement on the display. Observe polarity for DC measurements. If “**OL**” is display, it means the measurement has exceeded the current range. Move the rotary switch to a higher range.

#### **Warning**

**Do not measure voltages higher than 600V DC or AC rms to prevent damage to the meter or personal injury.**

### 3.3.4 AC/DC current measurement

- Turn off power to the circuit. Allow all capacitors to discharge.
- Set the rotary switch to the appropriate AC or DC current range.
- Depending on the current to be measured, connect the red test lead to either the input or 10A jack and the black lead to the COM jack.
- Break the circuit and connect the leads in series with the circuit (black lead on the lower voltage side).
- Turn circuit power on and read the measurement on the display. If “**OL**” is display, it means the measurement has exceeded the current range. Move the rotary switch to a higher range.

#### **Warning**

**Never measure open-circuit voltages exceeding 250V between the input terminals and ground to prevent injury or damage to the meter.**

#### **NOTE**

**Check fuses before making current measurements, Make sure to use correct input jacks to prevent damage to the meter.**

## 3.3.5 Resistance measurement

- Turn off power to the circuit. Allow all capacitors to discharge.
- Set the rotary switch to the appropriate resistance range.
- Connect the red test lead to the input jack and the black lead to the COM jack.
- Connect the leads to the circuit under test and read the measurement on the display.

### Tips for measuring resistance:

- In-circuit resistance is usually different from a resistors rating due to the fact that the meter's test current flows in parallel with the circuit.
- For increased accuracy when measuring low resistances, short the test leads, record the value displayed, then connect the leads to the circuit and subtract the shorted value from the circuit measurement.
- When the leads are disconnected from the circuit under test, "OL" will be displayed on the screen.

### Warning

**To prevent injury or damage to the meter, turn off power to circuit and discharge all capacitors fully before making resistance measurements.**

## 3.3.6 Continuity measurement

- Turn off power to the circuit. Allow all capacitors to discharge.
- Set the rotary switch to the continuity position.
- Connect the red test lead to the input jack and the black lead to the COM jack.
- Connect the leads to the circuit under test. If the measured resistance is less than  $50\Omega$ , the buzzer will sound.

### Warning

**To prevent injury or damage to the meter, turn off power to circuit and discharge all capacitors fully before making resistance measurements.**

## 3.3.7 Diode test

Turn off power to the circuit. Allow all capacitors to discharge.

- Set the rotary switch to the diode position.
- Connect the red test lead to the input jack and the black lead to the COM jack.
- Connect the red test lead to the anode (+) and the black lead to the cathode (-) of the diode and read the measurement on the display. The meter will display "OL" if the connection is reversed.

### Warning

**To prevent injury or damage to the meter, turn off power to circuit and discharge all capacitors fully before making resistance measurements.**

## 3.3.8 Battery test

- Set the rotary switch to the appropriate battery test range.
- Connect the red test lead to the input jack and the black lead to the COM jack.
- Connect the red test lead to the positive (+) end and the black lead to the negative (-) end of the battery and read the measurement on the display.

### Warning

**To prevent injury or damage to the meter, do not connect the meter to a battery with a voltage rating exceeding 60V AC or 30V DC**

## 4. Specifications

### 4.1 General Specifications

| Function  | Range  |
|---|--|
| Safety Rating                                       | CAT III 600V; pollution degree: II   |
| Operating Altitude                                  | <2000m   |
| Operating Temperature/<br>Humidity                  | 0~40°C, <80% RH  |
| Storage Temperature/<br>Humidity                    | -10~60°C, <70% RH, remove battery  |
| Max. Input between<br>terminals and earth<br>ground | 600V DC or AC rms  |
| Fuse Protection                                     | 10A range: F1:FF 10A H 600V<br>mA range: F2:FF 400mA H 600V                                  |
| Sample Rate   | Approx. 3 times/sec.   |
| Display   | 3 ½ digit LCD display  |
| Overload Indication                                 | Display shows "OL"   |
| Low Battery Indication                              | When battery voltage drops below<br>normal operating voltage, "⊕" is<br>shown on the display |
| Polarity Indication                                 | Display automatically displays "-"   |
| Power Source  | 1x 9V battery  |

### 4.2 Technical Specifications

Accuracy:  $\pm$ (% of reading + digits) at 18°C~28°C with a relative humidity of <80%; guaranteed for a period of one year.

#### 4.2.1 DC Voltage

| Measuring range | Resolution | Accuracy                           |
|-----------------|------------|------------------------------------|
| 200mV           | 0.1mV      | $\pm$ (0.5% of reading + 2 digits) |
| 2V              | 0.001V     |                                    |
| 20V             | 0.01V      |                                    |
| 200V            | 0.1V       |                                    |
| 600V            | 1V         | $\pm$ (0.8% of reading + 5 digits) |

Max. input voltage: 600V DC or AC rms.

#### 4.2.2 AC Voltage

| Measuring range | Resolution | Accuracy                           |
|-----------------|------------|------------------------------------|
| 200V            | 0.1V       | $\pm$ (1.0% of reading + 5 digits) |
| 600V            | 1V         |                                    |

Max. input voltage: 600V DC or AC rms.


Frequency Response: 40~400Hz, sine wave rms  
(avg. response)

#### 4.2.3 Resistance

| Measuring range | Resolution | Accuracy                           |
|-----------------|------------|------------------------------------|
| 200Ω            | 0.1Ω       | $\pm$ (0.8% of reading + 4 digits) |
| 2kΩ             | 0.001kΩ    |                                    |
| 20kΩ            | 0.01kΩ     |                                    |
| 200kΩ           | 0.1kΩ      |                                    |
| 2MΩ             | 0.001MΩ    |                                    |


Overload protection: 250V DC or AC (RMS)

## 4.2.4 Diode Test

| Function   | Resolution | Description   |
|--|------------|---|
| Diode Test  | 0.001V     | Forward DC current: 1mA<br>Reverse DC voltage: 2.9V<br>Display shows forward voltage drop |

Overload protection: 250V DC or AC (RMS)

## 4.2.5 Continuity

| Function  | Description  | Description                |
|---|--|----------------------------|
|  | If measured resistance is less than 50Ω, buzzer will sound | Open circuit voltage: 2.9V |

Overload protection: 250V DC or AC (RMS)

## 4.2.6 DC Current

| Measuring range | Resolution | Accuracy                     |
|-----------------|------------|------------------------------|
| 200mA           | 0.1mA      | ±(0.8% of reading +3 digits) |
| 10A             | 10mA       | ±(1.2% of reading +3digits)  |

Overload protection: mA jack: FF400mA H 600V fuse

10A jack: FF10A H 600V fuse

Max input current: mA jack: 200mA DC

10A jack: 10A DC

When measuring current exceeding 2A, do not measure for longer than 2 minutes continuously. Wait 10 minutes to continue measurement.

## 4.2.7 AC Current

| Measuring range | Resolution | Accuracy                     |
|-----------------|------------|------------------------------|
| 200mA           | 0.1mA      | ±(1.0% of reading +3 digits) |
| 10A             | 10mA       | ±(1.5% of reading +3digits)  |

Overload protection: mA jack: FF400mA H 600V fuse

10A jack: FF10A H 600V fuse

Max input current: mA jack: 200mA AC rms

10A jack: 10A AC rms

When measuring current exceeding 2A, do not measure for longer than 2 minutes continuously. Wait 10 minutes to continue measurement.

## 4.2.8 Battery Test

| Position | Resolution | Accuracy                     |
|----------|------------|------------------------------|
| 12V      | 0.01V      | ±(0.8% of reading +7 digits) |
| 9V       | 0.01V      | ±(0.8% of reading +7digits)  |
| 1.5V     | 0.001V     | ±(3.0% of reading +5digits)  |

Overload protection: F400mA H 600V fuse

## 4.2.9 NCV Test

- Hold down the NCV button and move the NCV sensor at the top of the unit next to the object being tested.
- When voltage is detected (>110V AC rms) the buzzer will sound and the NCV indicator will flash.



## Note:

- Even if the indicator doesn't go off, voltage may still exist. Do not use NCV detection as the sole determination of a lack of voltage present in a conductor. Detection could be impaired by socket design, insulation, etc.
- When measuring voltage through input jacks, NCV indicator may light up due to induced voltage.
- External environmental interference could cause false NCV indications.

## 5. Maintenance

### 5.1 General Maintenance

This section provides basic information on maintaining the meter, such as replacing fuses and the battery. Only experienced and authorized personnel should make repairs to the meter.


#### Warning

**To avoid injury or damage to the meter, do not allow moisture inside the case and remove test leads before opening battery cover.**

- Use a damp cloth to regularly clean the outside of the meter. Do not use abrasives or chemical solvents. Dirty or damp input jack can adversely affect readings.
- To clean input jacks, follow the following steps:
  1. Turn off the instrument and remove the test leads.
  2. Clear any dirt or other particles on the input jacks.
  3. Use a cotton ball/swab with a lubricant (i.e. WD-40) to clean off the contacts of the input jacks.
  4. Use a separate cotton ball/swab for each jack to prevent cross-contamination.

## 5.2 Replacing the Battery

#### Warning

**To avoid false readings and potential dangerous situations, replace the battery immediately when the “” symbol appears**  
**Turn off the meter and disconnect the test leads before opening the battery cover to prevent electrical shock and personal injury.**

**Use the following steps to replace the battery:**

1. Turn off the meter.
2. Remove test leads.
3. Unscrew and remove battery cover from back of meter.
4. Replace used battery with a new 9V battery.
5. Replace battery cover and fasten securely.

## 5.3 Replacing the Fuse

#### Warning

**Turn off the meter and disconnect test leads before opening back cover to avoid electrical shock and personal injury.**

**Use the following steps to replace the fuses:**

1. Turn off the meter
  2. Remove test leads
  3. Remove outer holster
  4. Unscrew and remove back cover from the meter
  5. Replace blown fuse(s) with same amp/voltage ratings.
  6. Replace back cover and fasten securely.
- Replace outer holster

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