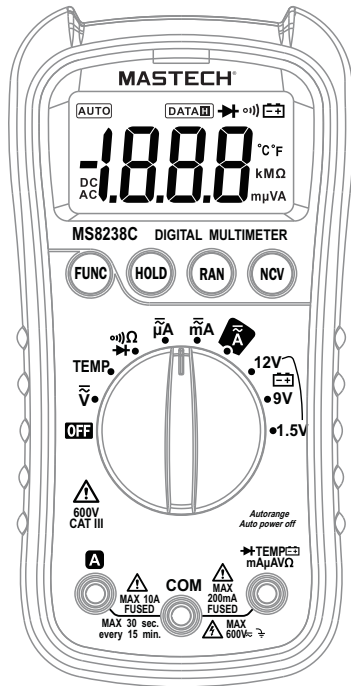


MASTECH®

MS8238C

Digital Multimeter User's Manual



CAT III
600V

CE

ETL
LISTED
US
Intertek

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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 MS8238C is a small, safe and reliable 3 ½ digit handheld auto ranging multimeter. This meter can measure AC/DC voltage, AC/DC current, resistance, diode, continuity, battery test, temperature and non-contact voltage tests. This tool is ideal for professionals and hobbyists alike.

2. Safety Information

2.1 Safety Standards

The MS8238C meets 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.

WARNING











The special attention should be paid when using the meter because the improper usage may cause electric shock and damage the meter. The safety measures in common safety regulations and operating instruction should be complied with when using. In order to make fully use of its functions and ensure safe operations please comply with the usage in this section carefully.

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.
- Measure known voltage with the meter to verify that the meter is working properly. If the meter is working abnormally, stop using it immediately. A protective device may be damaged. If there is any doubt, please have the meter inspected by a qualified technician.

2.3 Electrical Symbols

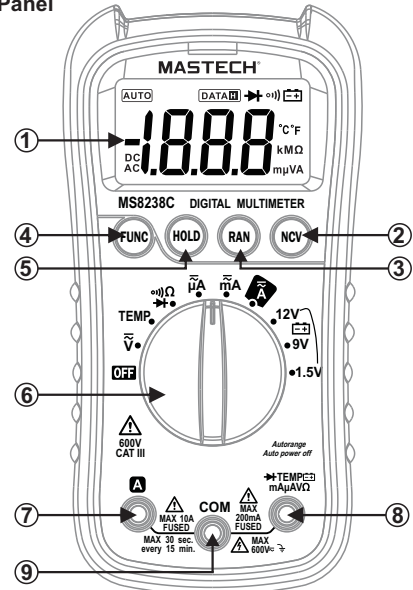
	Important safety information.
	High voltage with danger.
	Ground.
	Double Insulation (Class II safety equipment).
	Fuse must be replaced as per the specification herein.
	Accord with the related EU laws and regulations
	AC (Alternating Current)
	DC (Alternating Current)
	AC & DC (Both direct and Alternating Current)
	Conforms to UL STD. 61010-1, 61010-2-030 and 61010-2-033; Certified to CSA STD. C22.2 NO. 61010-1, 61010-2-030 and IEC STD. 61010-2-033

CAT III : MEASUREMENT CATEGORY III

is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.

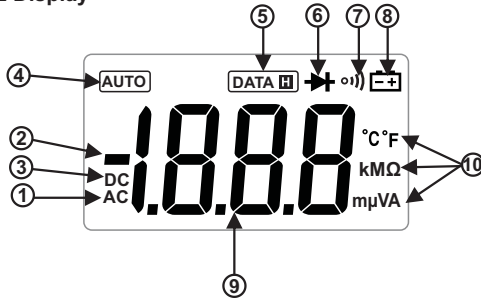
3 Description and Usage

3.1 Front Panel



- | | |
|-------------------------------------|---|
| 1. LCD display | 6. Rotary switch |
| 2. Non-contact voltage (NCV) button | 7. A input jack |
| 3. Range button | 8. Common jack |
| 4. Function button | 9. Input jack (all functions except current greater than 200mA) |
| 5. Data hold button | |

3.2 Display



- 1.AC (alternating current)
- 2.Polarity indicator
- 3.DC (direct current)
- 4.Auto range
- 5.Data hold
- 6.Diode measurement
- 7.Continuity measurement
- 8.Low battery indicator
- 9.Reading display
- 10.Measurement units

3.3 Button Functions

FUNC button:

- Press "**FUNC**" to switch between AC/DC or between functions.

HOLD button:

- Press "**HOLD**" to keep the current reading on screen. "**DATA H**" symbol will appear on the display.
- Press "**HOLD**" again to release the hold.

RAN button:

- Press "**RAN**" to switch to manual range. Each press of the button will switch to the next highest range, until reaching the highest range where it will switch to the lowest range.
- Hold "**RAN**" to return to auto range.

NCV button:

- 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.

3.4 Auto Power Off Function

- After 15 minutes of non-use the meter will automatically turn itself off.
- To turn the meter back on, press any button or turn the rotary switch to any position.
- To deactivate the auto power off function, hold down "**HOLD**" when turning on the meter.

4. Operating Instructions

4.1 AC/DC voltage measurement

- Set the rotary switch to the AC/DC voltage position.
- Press “FUNC” to switch between AC and DC voltage.
- 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 ACrms to prevent damage to the meter or personal injury

4.2 AC/DC current measurement

- AC/DC current measurement
- Turn off power to the circuit. Allow all capacitors to discharge.
- Set the rotary switch to the appropriate AC/DC current range.
- Press “FUNC” to switch between AC and DC current.
- 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 600V between the input terminals and ground to prevent injury or damage to the meter

WARNING

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

4.3 Resistance measurement

- Turn off power to the circuit. Allow all capacitors to discharge.
- Set the rotary switch to the multi-function position. The default function is resistance.
- 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.

4.4 Continuity measurement

- Turn off power to the circuit. Allow all capacitors to discharge.
- Set the rotary switch to the multi-function position. Press "**FUNC**" twice to enter continuity mode.
- 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 30Ω , 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 continuity measurements.

4.5 Diode test

- Turn off power to the circuit. Allow all capacitors to discharge.
- Set the rotary switch to the multi-function position. Press "**FUNC**" once to enter diode mode.
- 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 diode measurements.

4.6 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

4.7 Temperature measurement


- Set the rotary switch to the temperature position. Press "**FUNC**" to switch between Celsius and Fahrenheit.
- Connect the positive end of the K-type thermocouple to the input jack and the negative end to the COM jack.
- Place the tip of the thermocouple to the surface of the object to be tested and read the measurement on the display.

WARNING

To avoid injury or damage to the meter, do not move the rotary switch to the temperature position while measuring voltages exceeding 30V

5. Specifications

5.1 General Specifications

Function	Range
Safety Rating	CAT III 600V, pollution degree: II
Operating Altitude	<2000m
Operating Temperature/ Humidity	0~40°C, <80% RH
Storage Temperature/ Humidity	-10~60°C, <70% RH, remove battery
Temperature coefficient	0.1xaccuracy/°C (>18°C or <28°C)
Max. Input between terminals and earth ground	600V DC or AC rms
Fuse Protection	µA/mA ranges: FF 400mA H 600V 10A range: FF 10A 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 normal operating voltage, "  " is shown on the display
Polarity Indication	Display automatically displays "-"
Power Supply	DC 9V, NEDA 1604 or 6F22
Size(LxWxH)	148x73.5x50mm
weight	about 232g

5.2 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.

5.2.1 DC Voltage

Measuring range	Resolution	Accuracy
200mV	0.1mV	\pm (0.5% of reading +3 digits)
2V	0.001V	
20V	0.01V	
200V	0.1V	
600V	1V	\pm (0.8% of reading +3 digits)

Input impedance: 10MΩ

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

5.2.2 AC Voltage

Measuring range	Resolution	Accuracy
2V	0.001V	\pm (0.5% of reading +5 digits)
20V	0.01V	
200V	0.1V	
600V	1V	\pm (1.0% of reading +5 digits)

Input impedance: 10MΩ

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

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

5.2.3 Resistance

Measuring range	Resolution	Accuracy
200Ω	0.1Ω	±(0.8% of reading +4 digits)
2kΩ	0.001kΩ	
20kΩ	0.01kΩ	
200kΩ	0.1kΩ	
2MΩ	0.001MΩ	
20MΩ	0.01MΩ	±(1.0% of reading +4 digits)

Overload protection: 600V DC or AC rms

5.2.4 Diode Test

Function	Rang	Resolution	Description
Diode Test ▶	1.5V	1mV	Display shows forward voltage drop

Overload protection: 600V DC or AC rms

5.2.5 Continuity

Function	Description	Description
o)	If measured resistance is less than 30Ω, buzzer will sound	Open circuit voltage:~0.5V

Overload protection: 600V DC or AC rms

5.2.6 DC Current

Measuring range	Resolution	Accuracy
200μA	0.1μA	±(0.8% of reading +3 digits)
2000μA	1μA	
20mA	0.01mA	
200mA	0.1mA	
10A	10mA	±(1.0% of reading +10digits)

Overload protection: mA jack: FF 400mA H 600V fuse

10A jack: FF 10A 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.

5.2.7 AC Current

Measuring range	Resolution	Accuracy
200μA	0.1μA	±(1.0% of reading +3 digits)
2000μA	1μA	
20mA	0.01mA	
200mA	0.1mA	±(1.2% of reading +3digits)
10A	10mA	±(1.5% of reading +10digits)

Overload protection: mA jack: FF 400mA H 600V fuse

10A jack: FF 10A H 600V fuse

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

Max input current: mA jack: 200mA AC rms

10A jack: 10A AC rms

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

5.2.8 Temperature

Position	Resolution	Accuracy
-20~750°C	1°C	±(2.0% of reading +2 digits)
-4~1382°F	1°F	±(2.0% of reading +4 digits)

Overload protection: FF 400mA H 600V fuse

5.2.9 Battery Test

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

Overload protection: FF 400mA H 600V fuse

6. Maintenance

6.1 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.

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- 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.

6.2 Replacing the Battery and Fuses

1. Under normal conditions, it is unnecessary to replace the fuse. Don't replace it until the probes are unplugged and the power is shut down. Take out the two screws of the rear cover to remove the housing.
2. The specification of the fuse is:
F1 F 10A H 600V, F2 F 400mA H 600V
The replacement should be of the same specification.
3. The battery for this multimeter is 9V NEDA 1604 or 6F22.
The replacement should be of the same specification.
4. Don't put the instrument into use until the rear cover is screwed after replacing battery or fuse.

Warning

To avoid electric shock, make sure the probes are disconnected from the measured circuit before removing the rear cover. Make sure the rear cover is tightly screwed before using the instrument.

6.3 Replacing the Probe

If insulation on probe is damaged, replace it.

WARNING

Use meet EN 61010-031 standard, rated CAT III 600V, 10A or better probe.

