

Instruction Manual for MAS830LH MAS830H MAS830BH MAS838H Series Digital Multimeter



DIGITAL MULTIMETER

Introduction

The instrument of this series is a small hand-held 3 1/2 digital multimeter featuring stable, highly reliable and anti-drop performance. It is provided with a LCD display of 15 mm height for clear reading. The circuit design takes LSI double integral A/D converter as its core under the protection of an overload protection circuit, making it a superior and handy instrument.

It can be used to measure DC and AC voltage, DC current, resistance, diodes, transistors, temperature and for in-circuit continuity test.

Measurement features of the types of this series:

Features	MAS830LH	MAS830H	MAS830BH	MAS838H
Alternating Voltage measurement V_{\sim}	◆	◆	◆	◆
Direct Voltage measurement V_{\rightleftharpoons}	◆	◆	◆	◆
Direct current measurement A_{\rightleftharpoons}	◆	◆	◆	◆
Resistance measurement Ω	◆	◆	◆	◆
Diode measurement $\rightarrow $	◆	◆	◆	◆
Temperature measurement $^{\circ}\text{C}$				◆
On-off measurement $\bullet)$	◆	◆		◆
Data hold	◆	◆	◆	◆
Backlight	◆			

1. Display

3 1/2 digital, 15 mm height, 7 sections LCD display

2. BACKLIGHT

Press the BACKLIGHT button to turn on the backlights which will last 5 seconds, to turn it on again, hit the button as needed.

3. Function and range switch


Select different functions and range

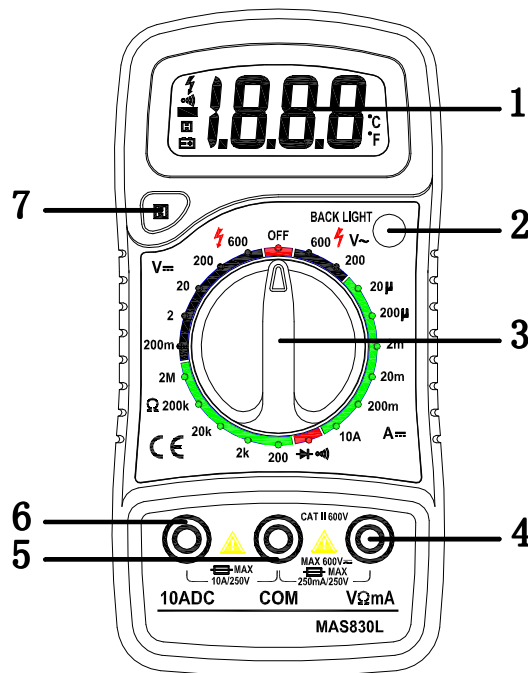
4. V Ω mA Jack

5. COM jack

6. 10A Jack

7. Data hold button






Press the HOLD button. The LCD will hold the last reading measured and display the  symbol. When the button is released, the instrument will return to normal.



Safety Information

MAS830L, MAS830, MAS830B and MAS838 Digital Multimeters are designed based on IEC61010 600V (CAT II) and pollution degree 2. To ensure the safe and accurate use, please read the instruction manual carefully.

Safety Signs

	Important safety information. Read the manual
	High voltage with danger
	Ground
	Double Insulation (Class II safety equipment).
	Fuse must be replaced as per the specification herein.

- The instrument can only be used in conjunction with the probe for the compliance with safety standards. If the probe needs replacing due to damage, the replacement must be of the same type or the same electrical specifications.
- Do not exceed the input limits specified for each range.
- When the instrument is measuring, do not touch the input terminal not in use.
- When a measurement range is uncertain, turn the function/range switch to the maximum range position.
- Before turning the function/range switch, make sure the probe is open with the circuit being measured.
- Before on-line resistance measurement, turn off all power and discharge all capacitors.

- Be careful when taking measurement of voltage higher than 60V DC/30V AC. Remember to keep your fingers behind the hand shield of the probe.
- When measuring a TV set or switch power supply, watch for pulse in the circuit that may damage the multimeter
- Before measuring any transistor, make sure the probe is not connected to any circuit being measured.
- Before taking the measurement of voltage with the probe, make sure there is no electronic element connected to the test socket of the transistor.

Maintenance

- Before removing the rear cover, disconnect the probe from the circuit to be measured
- To protect the internal circuit, replace the fuse with one of the same specification:

F1 250mA/250V

F2 10A/250V

- Don't use the instrument until the rear cover is placed back and the screws are tightened.
- Clean the housing of instrument only with a wet rag dripped with little detergent but never chemical solution. In case of any abnormality, stop using it and sent it for maintenance.

Technical data

Accuracy: $\pm\%$ of reading ± 5 digits, one year warranty. Ambient temperature: 18°C to 28°C, Ambient humidity: 80%.

General features:

Maximum voltage
between input and the
ground : CAT II 600V

Fuse : F1 250mA/250V F2 10A/250V

Power : 9V battery, NEDA 1604 or 6F22

Maximum display value : 1999

Over-range indication : "1"

Polarity display : "-" for negative polarity.

Operating temperature : 0°C to 40°C

Storage temperature : -10°C to 50°C.

Low voltage indication : "  " on the display

Appearance dimension : 138mm×69mm×31mm

Weight : 170g.

Direct current voltage measurement

Range	Resolution	Accuracy
200mV	100μV	$\pm 0.5\%$ of reading, ± 3 digits
2V	1mV	$\pm 0.5\%$ of reading, ± 3 digits
20V	10mV	$\pm 0.5\%$ of reading, ± 3 digits
200V	100mV	$\pm 0.5\%$ of reading, ± 3 digits
600V	1V	$\pm 0.8\%$ of reading, ± 5 digits

Overload protection: 200mV range: 250V dc or rms; the rest ranges: 600V dc or rms.

Direct current measurement

Range	Resolution	Accuracy
20μA	0.01μA	$\pm 1\%$ of reading, ± 3 digits
200μA	0.1μA	$\pm 1\%$ of reading, ± 3 digits
2mA	1μA	$\pm 1\%$ of reading, ± 3 digits
20mA	10μA	$\pm 1\%$ of reading, ± 5 digits
200mA	100μA	$\pm 1.5\%$ of reading, ± 5 digits
10A	10mA	$\pm 3\%$ of reading, ± 10 digits

Overload protection: F1 200mA/250V Fuse F2 10A/250V

* MAS838H, no 20μA position

Alternating voltage measurement

Range	Resolution	Accuracy
200V	100mV	$\pm 1.2\%$ of reading, ± 10 digits
600V	1V	$\pm 1.2\%$ of reading, ± 10 digits

Overload protection: 600V dc or rms.

Frequency range: 40Hz to 400Hz.

Display: Average (effective value of sinusoid).



Resistor

Range	Resolution	Accuracy
200 Ω	0.1 Ω	$\pm 0.8\%$ of reading, ± 5 digits
2k Ω	1 Ω	$\pm 0.8\%$ of reading, ± 2 digits
20k Ω	10 Ω	$\pm 0.8\%$ of reading, ± 2 digits
200k Ω	100 Ω	$\pm 0.8\%$ of reading, ± 2 digits
2M Ω	1k Ω	$\pm 1.0\%$ of reading, ± 5 digits

Maximum open circuit voltage: 3.2V

Overload protection: 250V DC or RMS.

Diode and circuit on-off measurement

Range	Description
	When the on-resistance is smaller than (70 \pm 30) Ω , the built-in buzzer will beep.
	Displays the approximate diode positive voltage.



Overload protection: 250V DC or RMS. AC.

Temperature measurement


Range	Resolution	Measurement	Accuracy
$^{\circ}\text{C}$	1 $^{\circ}\text{C}$	-20 $^{\circ}\text{C}$ to 0 $^{\circ}\text{C}$	$\pm 10\%$ Range, ± 2 digits
		-0 $^{\circ}\text{C}$ to 400 $^{\circ}\text{C}$	$\pm 1.0\%$ Range, ± 3 digits
		400 $^{\circ}\text{C}$ to 1000 $^{\circ}\text{C}$	$\pm 2.0\%$ Range

Instructions

Notices before operation:

1. Plug the instrument in, check the 9V battery, if it is low, the symbol  will display, requiring battery replacement; otherwise follow the steps below.
2. The  besides the probe jack indicates that the input voltage or current should not exceed the specified limits to protect the internal circuit.
3. Before measurement, turn the function/range switch to the desired range.

Direct voltage measurement

1. Insert the red probe into the "V Ω mA" jack and the black one into the COM jack.
2. Turn the function/range switch to the range of **V**  and connect the probe to the power supply or load to be measured. The polarity touched by the red probe will be on the display


Notice

1. If you do not know the measured voltage range in advance, set the function/range switch to the maximum range, and then gradually turn to smaller ranges until satisfactory resolution.
2. If the display shows "1", this indicates an overrange measurement, and the switch should be set to a higher range.
3. Do not input a voltage of more than 600V, it is capable of indicating a higher voltage, but with the risk of damaging the inside circuit.
4. When taking the measurement of high voltage, pay special attention to avoid an electric shock.

Direct current measurement

1. Place the black probe into the COM jack. for current to be measured not exceeding 200mA, put the red one into the "V.Ω.mA" jack. For current to be measured between 200mA and 10A, insert the red probe into the 10A jack
2. Set the function/range switch to the desired A $\overline{\text{---}}$ range, and connect the probe in series with the load to be measured. The current value and the polarity connected to the red probe will be shown on the display.

Notice

1. If you do not know the measured voltage range in advance, set the function/range switch to the maximum range, and then gradually turn to smaller ranges until satisfactory resolution.
2. If the display shows "1", this indicates an overrange measurement, and the switch should be set to a higher range.
3. The symbol  beside the probe indicates the maximum input current is 200mA or 10A, depending on the inserted jack. Overcurrent will blow the fuse.

Alternating voltage measurement

1. Place the red probe into the "VΩmA" jack and the black one into the "COM" jack.
2. Turn the switch to **V~**, and connect the probe to the power supply or load to be measured.

Note : Refer to point 1, 2, 3, and 4 for direct current voltage measurement.

Resistance measurement

1. Place the black probe into the COM jack and the red one into the V/ Ω /Hz jack.
2. Turn the switch to the COM jack, and connect the probe to the resistor being measured and read the results on the display

Notice

1. If the resistor being measured is greater than the maximum value of the selected range, the display will show "1", requiring the selection of a higher range. It normally takes a few seconds for the reading to get stable when measuring a resistor larger than 1 M Ω .
2. In default of input, for instance, open circuit, the display shows "1".
3. When measuring an online resistor, de-energized the circuit being measured and discharge all capacitors.

Diode measurement

1. Insert the black probe into the COM socket and the red one into the V.Ω.mA, then the red probe will be of positive polarity.
2. Turn the switch to the range, and connect the red probe to the positive pole of the diode being measured and the black one to the negative pole, read the approximate forward voltage drop of the diode on the display.

Circuit On-Off measurement

Insert the black probe into the COM jack and the red one into the V. Ω .mA jack. Turn the switch to the $\bullet||$ position and connect the probes in parallel with two points of the circuit being measured. If the resistance between the two points is less than 100 Ω , the built-in buzzer will beep to indicate the continuity between the two points.

Temperature measurement

Turn the switch to the °C position and insert the black probe of the thermocouple sensor into COM jack and the red one into the V.Ω.mA jack. Place the operating terminals (temperature measurement terminals) onto or inside the object being measured and directly read the temperature value in °C on the display.

When the switch is turned to the °C position and the sensor is in an open circuit, the display shows room temperature.

Replacement of battery and fuse

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 250mA/250V, F210A/250V. 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.