



Figure 1. The Photo of Actual MS2008A



Figure 2. The Photo of Actual MS2008A

FEATURES

- Display: LCD
- Unit indication: function and unit
- Overrange indication: “0L” or “-0L”
- Maximum value display: 1999 digits
- Temperature factor: $<0.1 \times \text{Accuracy}/^{\circ}\text{C}$
- Battery low indication: “” on LCD

➤ Sampling time: Approx. 0.4 second per sample

➤ Operating power: 1.5V×3 AAA batteries

APPLICATIONS

It is widely used to measure AC current, AC/DC voltage, resistance, as well as continuity and diode test. Both auto range and manual range are available. Also it is equipped with reading hold function, maximum value measuring function, auto power off, etc.

DESCRIPTIONS

This meter is a portable professional measuring instrument with LCD and back light easily reading. The ‘single-hand operation’ design for the range switch makes measurement simple and easy. Overload protection and low battery indication are provided. It is an ideal multi-function instrument with scores of practical applications for professional, workshop, school, hobby and home use.

SYMBOLS

Table 1. Symbol

	Caution, risk of danger (Important safety information; refer to the datasheet.)
	Application around and removal from HAZARDOUS LIVE conductors is permitted.
	Double insulation (Protection class II)
CAT III	Overvoltage (Installation) category III, Pollution Degree 2 per IEC1010-1 refers to the level of Impulse Withstand Voltage protection provided.
	Conforms to European Union Directive
	Earth (ground) terminal



GENERAL SPECIFICATIONS

Table 1.

Display	LCD
Maximum indication display	1999digits
Operating altitude	Max. 2000meters
Polarity indication	Automatic, '-' for negative polarity
Overrange indication	'OL' or '-OL'
Sampling rate	Approx. 0.4 second per sample
Unit indication	Function and unit
Auto power off time	15min
Operating power	1.5V×3 AAA batteries
Battery low indication	 on LCD
Temperature factor	<0.1×Accuracy/°C
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-10°C to 50°C (10°F to 122°F)
Maximum voltage between terminals and earth ground	600V DC or rms AC
Dimension	208×78×35mm
Weight	Approx. 340g (including batteries)

ELECTRICAL SPECIFICATIONS

Ambient temperature: 23±5°C Relative humidity: < 75%

Table 1. AC Current

Range	Resolution	Accuracy
2A	0.001A	± (3.5% of rdg +20 digits) ≤0.5A
		± (3.0% of rdg + 10 digits)
20A	0.01A	± (3.0% of rdg + 10 digits)
200A	0.1A	± (2.5% of rdg + 10 digits)
600A	1A	± (1.5% of rdg + 5 digits)
Max. input current: 600A Frequency range: 50 to 60Hz Response: average, calibrated in rms of sine wave		

Table 2. AC Voltage

Range	Resolution	Accuracy
2V	0.001V	± (1.0% of rdg + 5digits)
20V	0.01V	
200V	0.1V	
600V	1V	± (1.2% of rdg + 5digits)



Input impedance: 10M Ω Overload protection: 200mV range: 250V DC or rms AC, 2V-600V ranges: 600V DC or 600V rms AC.
 Max. input voltage: 600V rms AC
 Frequency range: 40 to 200Hz
 Response: average, calibrated in rms of sine wave

Note:

At small voltage range, unsteady readings will appear before the test leads contact the circuit. This is normal because the meter is highly sensitive. When the test leads contact the circuit, the true reading will be shown.

Table 3. DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	$\pm (0.8\% \text{ of rdg} + 2\text{digits})$
2V	0.001V	
20V	0.01V	
200V	0.1V	
600V	1V	$\pm (1.0\% \text{ of rdg} + 2\text{digits})$
Input impedance: 10M Ω Overload protection: 200mV range: 250V DC or rms AC, 2V-600V ranges: 600V DC or 600V rms AC. Max. input voltage: 600V DC		

Note:

At small voltage range, unsteady readings will appear before the test leads contact the circuit. This is normal because the meter is highly sensitive. When the test leads contact the circuit, the true reading will be shown.

Table 4. Resistance

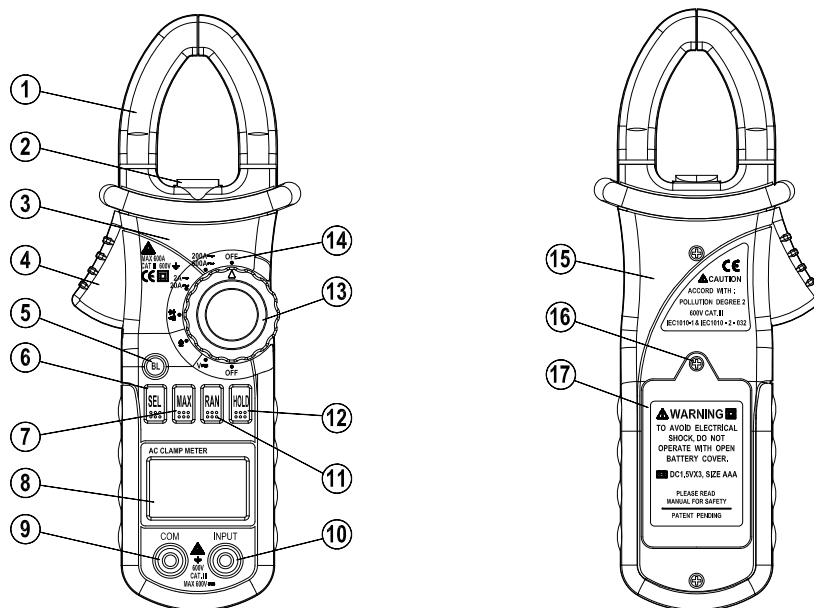
Range	Resolution	Accuracy
200 Ω	0.1 Ω	$\pm (1.2\% \text{ of rdg} + 2\text{digits})$
2k Ω	0.001k Ω	
20k Ω	0.01k Ω	
200k Ω	0.1k Ω	
2M Ω	0.001M Ω	
20M Ω	0.01M Ω	$\pm (2.0\% \text{ of rdg} + 5\text{digits})$
Open circuit voltage: 0.25V Overload protection: 250V DC or rms AC		

Table 5. Diode

Range	Resolution	Function
▶+	0.001V	Displaying approximate forward voltage of diode.
Forward DC current ~ 1mA Reversed DC voltage ~ 1.5V Overload protection: 250V DC or rms AC		

Table 6. Continuity

Range	Resolution	Function
•)	0.1Ω	Built-in buzzer will sound, if resistance is lower than 60Ω.
Open circuit voltage ~ 0.45V		
Overload protection: 250V DC or rms AC		


Table 7. Names of Components

1	Current clamp	10	Input jack
2	Clamp lighting bulb	11	Auto/Manual switch button (RAN)
3	Panel	12	Reading HOLD (HOLD)
4	Trigger	13	Rotary selector
5	Back light switch button (☀)	14	OFF - power switch
6	Function switch button (SEL)	15	Rear case
7	MAX switch button (MAX)	16	Fixing screw of the battery cover
8	Liquid crystal display (LCD)	17	Battery cover
9	COM jack		

Table 8. Switch, Buttons and Input Jacks

☀ Button	Control backlight
SEL Button	Switch among measuring functions
MAX Button	Switch maximum value measurement



RAN Button	Switch between auto and manual ranges
HOLD Button	Holding the reading
INPUT Jack	Measure voltage, resistance, diode and continuity.
COM Jack	Common input connection for current, voltage, resistance, diode and continuity measurement.
OFF Position	Turn off the power.
Rotary Selector	Select functions and ranges.
Clamp	Measure current

Table 9. LCD

AC	Alternating current
DC	Direct current
→ +	Diode test
•)	Continuity buzzer
AUTO	Auto range mode
MANU	Manual range mode
MAX	The maximum value is being measure.
⊞	Battery low
H	This indicates that the display data is being held.
mV, V	Milli-volts, Volts (Voltage)
A	Amperes (Current)
Ω, kΩ, MΩ	Ohms, Kilo-ohms, Mega-ohms (Resistance)



OPERATION INSTRUCTION

Holding Readings

Press the “**HOLD**” button to hold the readings while taking measurement and the value on the display will be held.

Press the “**HOLD**” button again to release the READING HOLD function.

Switching Ranges

When the meter is turned on, it is at the auto range mode for measuring current, voltage, resistance, capacitance and frequency.

Press the “**RAN**” button for manual range mode. The range will go up one level at each press and return to the lowest level, when the highest level is reached.

Press the “**RANGE**” button for two or more seconds to return to the auto range.

When measuring the maximum or minimum value, press the “**RAN**” button, the meter will recover the normal working condition.

Switching Maximum Value

At the voltage and current range, press the “**MAX**” button to switch to maximum value measurement.

Press the “**MAX**” button again, the meter will recover the normal working condition.

SWITCHING FUNCTIONS

Press the “**SEL**” button to switch between AC and DC measurement at the voltage ranges.

Press the “**SEL**” button to switch among diode and continuity ranges.

Back Light and Clamp Lighting Bulb

Press the “” button for two or more seconds to switch on the back light if the light in the environment is too dim for taking reading, which will last for 15 seconds.

In the course of pressing the “” button for two or more seconds again to switch off the back light.

At the current range, when the back light is switch on, the clamp lighting bulb will brighten up.

Note:

LED, which requires a larger working current, is the main source of back light. Although the meter is equipped with a timer set at 15 seconds (i.e. the back light will be off automatically after 15 seconds), frequent use of the back light will shorten the life of the batteries. Therefore, do not use the back light unless necessary.

When the battery voltage is $\leq 3.6V$, the symbol “” (battery low) will appear on the LCD. When the back light is on, even if the battery is $\geq 3.6V$, the “” may appear because of its large working current which will cause the voltage to drop. (The accuracy of the measurement cannot be assured when the “” symbol appears.) In this case, there is no need to replace the batteries yet. Normally, the batteries can last until the “” appears when the back light is not being used.

Auto Power Off

If there is no any operation within any fifteen minutes after power is on, meter will auto power off.

Turn the rotary selector or press any button to resume operation of the meter under auto the power off mode.

At the same time power on, if press the “**HOLD**” button, auto power off disable.

Preparing for Measurement

Switch on the power by turning the rotary selector. If the battery voltage is lower than 3.6V, the “” symbol will appear and the batteries should be replaced.

The “” symbol shows that the input voltage or current should not exceed the specified value in order to protect the internal circuit from damage.

Turn the rotary selector to the required function and range to be measured. Under the manual mode, choose the highest range when the value scale to be measured is unknown.



Connect the common test lead first and then the charged test leads when making connection. Take away the charged test lead first when disconnecting.

Measuring AC Current

⚠ WARNING

Beware of Electrocution.

Ensure that the test leads are disconnected from the meter before making current clamp measurements.

Set the rotary selector to the **A~** range position.

If need be, press the “**RAN**” button to choose the manual range mode.

Press the trigger to open jaw. Fully enclose only one conductor.

Take the reading on the LCD.

Note:

For right results, do not enclose more than one conductor in the jaw.

For optimum results, center the conductor in the jaw.

At the manual range mode, when only ‘OL’ is shown on the LCD, it means the measurement has exceeded the range. A higher range should be selected.

Under the manual range mode, when the scale of the value to be measured is unknown beforehand, set the range to the highest.

“**⚠**” means the maximum input current is 600A rms AC.

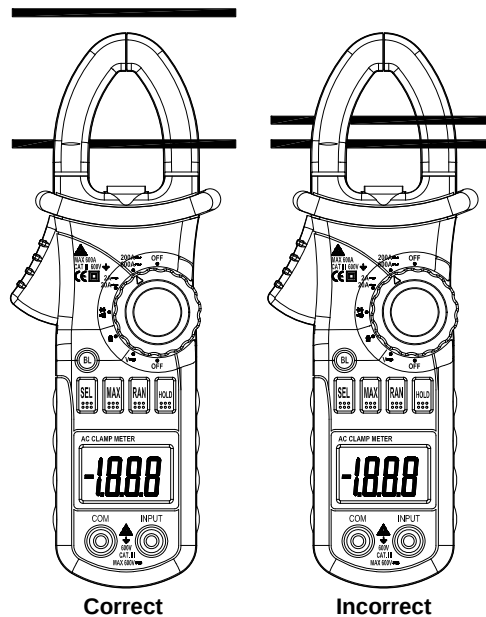


Figure 3. Correct and Incorrect



Measuring AC Voltage

⚠ WARNING

Beware of Electrocutation.

Pay special attention to avoid electric shock when measuring high voltage.

Do not input the voltage which more than 600V rms AC.

Plug the black test lead into the **COM** jack and the red test lead into the **INPUT** jack.

Set the rotary selector to the **V_~** range position, then the meter at the AC V measurement mode.

If need be, press the “**RAN**” button to choose the manual range mode.

Connect the test leads to the voltage source or load terminals for measurement.

Take the reading on the LCD.

Note:

At small voltage range, unsteady readings may appear before the test leads contact the circuit. This is normal because the meter is highly sensitive. When the test leads contact the circuit, the true reading will be shown.

At the manual range mode, when only ‘OL’ is shown on the LCD, it means the measurement has exceeded the range. A higher range should be selected.

At the manual range mode, when the scale of the value to be measured is unknown beforehand, select the highest range first and lower the range gradually.

“⚠” means the maximum input voltage is 600V rms AC.

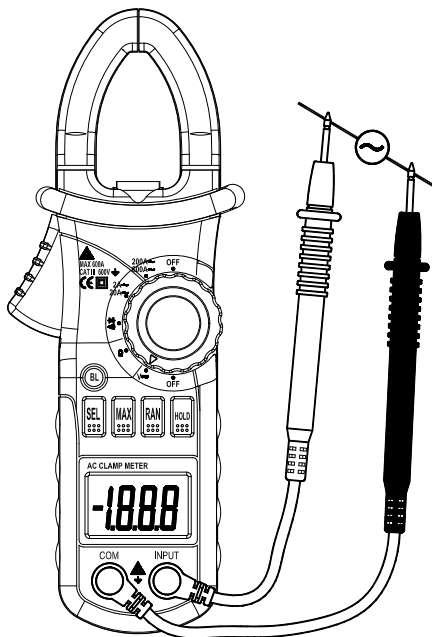


Figure 4. Measuring AC Voltage

Measuring DC Voltage

⚠ WARNING

Beware of Electrocutation.

Pay special attention to avoid electric shock when measuring high voltage.

Do not input the voltage which more than 600V DC.



Plug the black test lead into the **COM** jack and the red test lead into the **INPUT** jack.

Set the rotary selector to at the **V_~** range position.

Press the "**SEL**" to switch to DC V measurement. If need be, press the "**RAN**" button to choose the manual range mode.

Connect the test leads to the voltage source or load terminals for measurement.

Take the reading on the LCD. The polarity symbol denotes the polarity of the end connected by the red test lead.

Note:

At small voltage range, unsteady readings will appear before the test leads contact the circuit. This is normal because the meter is highly sensitive. When the test leads contact the circuit, the true reading will be shown.

Under the manual range mode, when only 'OL' or '-OL' is shown on the LCD, it means the measurement has exceeded the range. A higher range should be selected.

Under the manual range mode, when the scale of the value to be measured is unknown beforehand, select the highest range first and lower the range gradually.

"**Δ**" means the maximum input voltage is 600V DC.

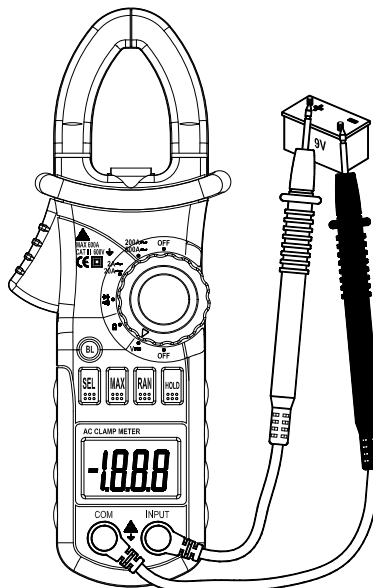


Figure 5. Measuring DC Voltage

Measuring Resistance

Δ WARNING

Beware of Electrocution.

When measuring in-circuit resistance, make sure that the power of the circuit under test has been turned off and that all capacitors have been fully discharged.

Plug the black test lead into the **COM** jack and the red test lead into the **INPUT** jack.

Set the rotary selector to the **Ω** range position.

If necessary, press the "**RAN**" button to choose the manual range mode.

Connect the test leads to the ends of the resistor or circuit for measurement.

Take the reading on the LCD.

Note:

At the manual mode, when only 'OL' is shown on the LCD, it means the measurement has exceeded the range. A higher range



should be selected.

When the input is open, 'OL' will appear on the LCD to indicate that the range has been exceeded.

For measuring resistance above $1\text{M}\Omega$, it may take a few seconds to get a steady reading. This is normal for high resistance reading.

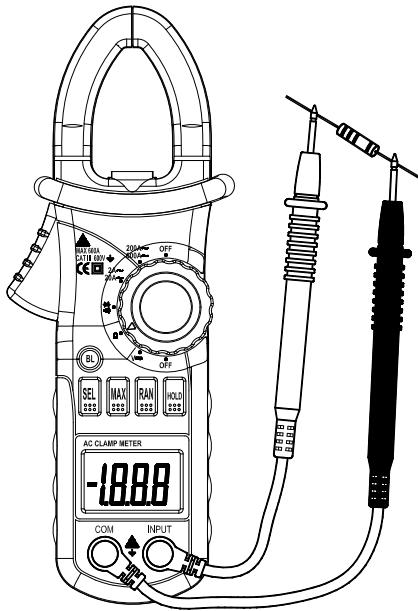


Figure 6. Measuring Resistance

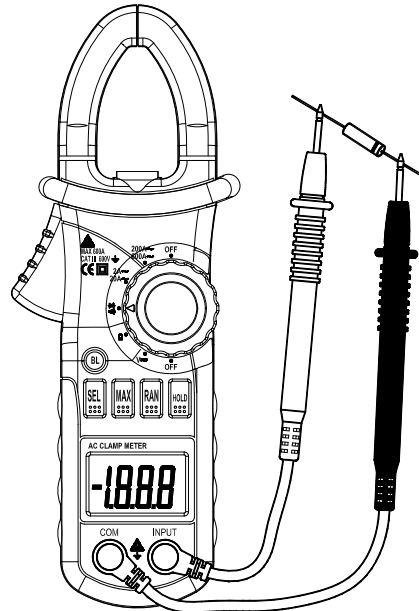


Figure 7. Testing Diode

Testing Diode

Plug the black test lead into the **COM** jack and the red test lead into the **INPUT** jack.

Set the rotary selector to the $\Omega \rightarrow$ range position, then the meter at the $\rightarrow$ test mode.

Connect the red test lead to the anode and the black test lead to the cathode of the diode for testing.

Take the reading on the LCD.

Note:

The meter will show the approximate forward voltage drop of the diode.

When the test leads have been reversed or open, 'OL' will appear on the LCD.

Testing Continuity

⚠ WARNING

Beware of Electrocution.

Make sure that the power of the circuit has been turned off and the capacitors have been fully discharged before testing the continuity of a circuit.

Plug the black test lead into the **COM** jack and the red test lead into the **INPUT** jack.

Set the rotary selector to the $\Omega \rightarrow$ range position.

Press the "SEL" button to switch to Ω continuity test.

Connect the test leads to the two ends of the circuit for measurement.

If the resistance of the circuit being tested is less than 50Ω , the built-in buzzer will sound.

Take the reading on the LCD.



Note:

If the test leads are open or the resistance of the circuit is over 200Ω , “OL” will appear on the LCD.

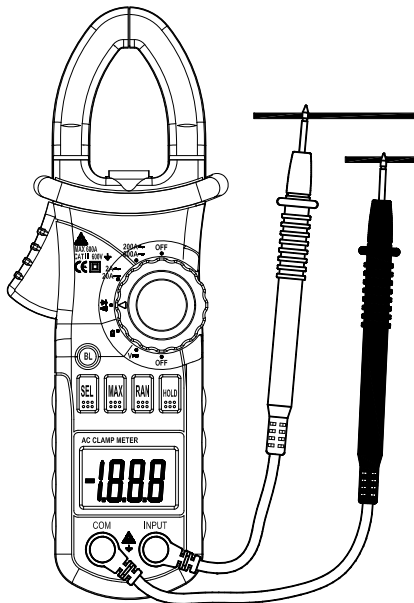


Figure 8. Testing Continuity

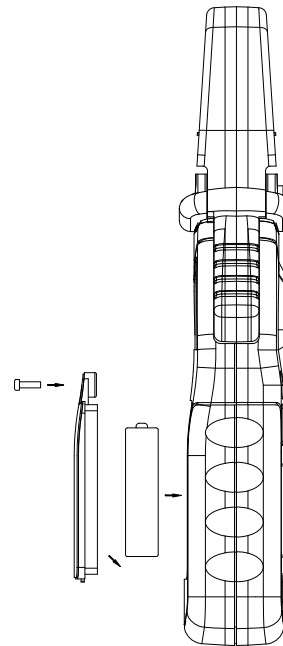


Figure 9. Replacing Test Leads

REPLACING TEST LEADS

⚠ WARNING

The replacement must be test leads in good working condition with the same or equivalent rating: 1000V 10A.

A test lead must be replaced if the insulation layer has been damaged, e.g. the wire inside is exposed.

REPLACING THE BATTERIES

⚠ WARNING

To avoid electric shock, make sure that the test leads have been clearly move away from the circuit under measurement before opening the battery cover of the meter.

If the sign “” appears, it means that the batteries should be replaced.

Loosen the fixing screw of the battery cover and remove it.

Replace the exhausted batteries with new ones.

Put the battery cover back and fix it again to its origin form.

Note:

Do not reverse the poles of the batteries.



ORDERING INFORMATION

Table 10. Unit Price

Quantity	Unit Price
MS2008A	\$25.25

NOTICE

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