



AC/DC True-RMScLamp Meter

Products Code: MCA-207

Instruction Manual



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1. Measuring Limits

DC Amperes:	0.01A to 1000A
AC Amperes:	0.01A to 1000A
DC Voltage:	0.1mV to 600V
AC Voltage:	0.1mV to 600V

Resistance:	0.1 Ω to 40M Ω
Capacitance:	0.001 nF to 40mF
Frequency:	0.001 kHz to 4kHz
Temperature:	-40°C to 1000°C -40°F to 1832°F

2. Safety Information

This manual contains information that must be followed for operating the meter safely and maintaining the meter in a safe operating condition. If the meter is not used in a manner specified in this manual, the protection provided by the meter may be impaired.

The Model has been designed and complies with IEC 61010-1 and EN 61010-1 safety requirements for Electronic Measuring Apparatus.



WARNING

- Read through the operating instructions thoroughly and understand the instructions before operating the meter.
- Keep the manual at hand so as to enable quick reference when necessary.
- Ensure that the use of the meter is in its intended applications and follow measuring procedures described in this manual.

- Follow all safety and operating instructions to ensure maximum personal safety during the use and operation of the meter.
- Failure to follow the above instructions may cause injury. Instrument damage and/or damage to equipment under test.
- The symbol indicated on the meter means that the user must refer to related parts in the manual for safe operation of the meter. Be sure to carefully read the instructions following each symbol in this manual.



DANGER is reserved for conditions and actions that are likely to cause serious or fatal injury



WARNING is reserved for conditions and actions that are likely to cause serious or fatal injury.



CAUTION is reserved for conditions and actions that are likely to cause minor injury

DANGER



- Never use the meter to measure voltages on a circuit above the maximum allowable input value on any function.

- Do not exceed the maximum allowable input of any measurement range.
- Never touched exposed wiring, connections or any live circuit when attempting to take measurement.
- Do not attempt to make measurements in flammable gaseous areas, fumes, vapor or dust. The use of the instrument in these areas may cause sparking, which can lead to an explosion.
- Do not attempt to use the instrument if its surface or your hand is wet.
- Never open the battery compartment cover when making measurements.

WARNING



- Always inspect the meter and test leads for any signs of damage or abnormality before use. If the meter or its accessories have any structural defects such as broken test leads, cracked cases, exposed metal parts or the display is not reading, do not attempt to make measurements.
- Do not turn the function switch whilst test leads are connected to the meter.
- Do not install substitute parts or make modifications to the meter. Return the meter to your distributor for repair or re-calibration.

- Ensure the meter is switch off before opening the battery cover when replacing the battery.
- Never replace a battery if the surface of the meter is wet or moist.

CAUTION



- Before making measurements ensure that the function selector switch is set on the appropriate range position.
- Always make sure that the plug of each test lead is inserted fully into the appropriate terminal of the meter.
- Ensure that the function selector switch is set to the “OFF” position after use. When the meter will not be in use for a long period of time, place it in storage after removing the battery.
- Do not expose the meter to direct sunlight, extreme temperatures or moisture.
- Do not abrasives or solvents on the meter. To clean it, use a damp cloth and mild detergent only.

Qualified and trained service technicians should only perform calibration and repair for the meter.

3.FEATURES

- True RMS measurement of AC Current and AC Voltage
- Large 4000 count LCD display with a bargraph and a bright white LED backlight.
- Wide measurement range from 0.01A AC/DC up to 1000A AC/DC
- Measures AC and DC Voltage up to 600 volts
- Measures resistance from 0.01Ω up to $40M\Omega$.
- Capacitance measurements up to 40mF
- Temperature measurements from -40°C to $+1000^{\circ}\text{C}$ and -40°F to $+1832^{\circ}\text{F}$.
- Designed to the international safety standard IEC61010 CAT III 600V/ CAT II 1000V, Pollution degree 2.
- Auto power off after approximately 20 minutes to conserve battery life.
- Continuity Buzzer and Diode Test
- Frequency measurement up to 4kHz.
- Peak Hold to record the minimum and maximum readings for current and voltage.
- Data Hold switch used to freeze readings on display.

5.SPECIFICATIONS

Clamp Size	30mm Opening Approx
Diode Test typical; Open circuit voltage	Test Current of 0.3mA 1.5V DC
Continuity check current<1mA	Threshold<35Ω; Test current<1mA
Low battery indication	“  ” is displayed
Overrange Indication	“OL” is displayed
Measurements Rate	2 per second, nominal
Input Impedance	10MΩ (VDC and VAC)
Display	4000 count LCD
AC Current	50/60Hz (AAC)
AC Voltage Bandwidth	50/60 (VAC)
Operating Temperature 122°F)	-10°C to 50°C (14°F to 122°F)
Storage Temperature 140°F)	-30°C to 60°C (-22°F to 140°F)
Relative Humidity	UP to 85%
Over Voltage	Category III 600V
Battery	One DC 9V IEC6F22 1604
Battery	
Auto Power Off	Approx 20 minutes
Dimensions	229 x 80 x 49mm
Weight	303g

5.SPECIFICATIONS

DC Current

Range	Measuring Range	Resolution	Accuracy(% of Readings)
40A	0~40.00A	0.01A	$\pm(2.8\%+10\text{digits})$
400A	0~400.0A	0.1A	$\pm(2.8\%+8\text{digits})$
1000A	0~1000A	1A	$\pm(3.0\%+8\text{digits})$

AC Current

Range	Measuring Range	Resolution	Accuracy(% of Readings)
40A	0~40.00A	0.01A	$\pm(2.8\%+10\text{digits})$
400A	0~400.0A	0.1A	$\pm(2.8\%+8\text{digits})$
1000A	0~1000A	1A	$\pm(3.0\%+8\text{digits})$

DC Voltage

Range	Measuring Range	Resolution	Accuracy(% of Readings)
400mV	0~400.0mV	0.1mV	$\pm(0.8\% + 2\text{digits})$
4V	0~4.00V	0.001V	$\pm(1.5\% + 2\text{digits})$
40V	0~40.00V	0.01V	
400V	0~400V	0.1V	
600V	0~600V	1V	$\pm(2.0\% + 2\text{digits})$

AC Voltage

Range	Measuring Range	Resolution	Accuracy(% of Readings)
400mV	0~400.0mV	0.1mV	$\pm(0.8\% + 2\text{digits})$
4V	0~4.00V	0.001V	$\pm(1.5\% + 2\text{digits})$
40V	0~40.00V	0.01V	
400V	0~400V	0.1V	
600V	0~600V	1V	$\pm(2.0\% + 2\text{digits})$

Note: No Autoranging on 400mV AC Range

Resistance

Range	Measuring Range	Resolution	Accuracy(% of Readings)
400 Ω	0~400.0 Ω	0.1 Ω	$\pm(1.0\% + 4 \text{ digits})$
4k Ω	0~4.000k Ω	1 Ω	$\pm(1.5\% + 2 \text{ digits})$
40k Ω	0~40.00k Ω	10 Ω	
400k Ω	0~400.0k Ω	100 Ω	
4M Ω	0~4.000M Ω	1k Ω	$\pm(2.5\% + 5 \text{ digits})$
40M Ω	0~40.00M Ω	10k Ω	$\pm(3.5\% + 10 \text{ digits})$

Capacitance

Range	Measuring Range	Resolution	Accuracy(% of Readings)
4nF	0~4.000nF	0.001nF	$\pm(5.0\% + 30 \text{ digits})$
40nF	0~40.00nF	0.01nF	$\pm(5.0\% + 20 \text{ digits})$
400nF	0~400.0nF	0.1nF	$\pm(3.0\% + 5 \text{ digits})$
4 μ F	0~4.000 μ F	0.001 μ F	
40 μ F	0~40.00 μ F	0.01 μ F	
400 μ F	0~400.0 μ F	0.1 μ F	$\pm(4.0\% + 10 \text{ digits})$
4mF	0~4.000mF	0.001mF	$\pm(4.5\% + 10 \text{ digits})$
40mF	0~40.00mF	0.01mF	$\pm(5.0\% + 10 \text{ digits})$

Frequency

Range	Measuring Range	Resolution	Accuracy(% of Readings)
4kHz	0~4.000kHz	0.00kHz	$\pm(1.5\% + 2 \text{ digits})$ Sensitivity: 5Vrms min

Temperature

Range	Measuring Range	Resolution	Accuracy(% of Reading)
°C	-40°C~1000°C	1°C	±(2.5% + 3°C)
°F	-40.0°F~1832°F	1°F	±(2.5% + 5°F)

6. DC Current Measurement

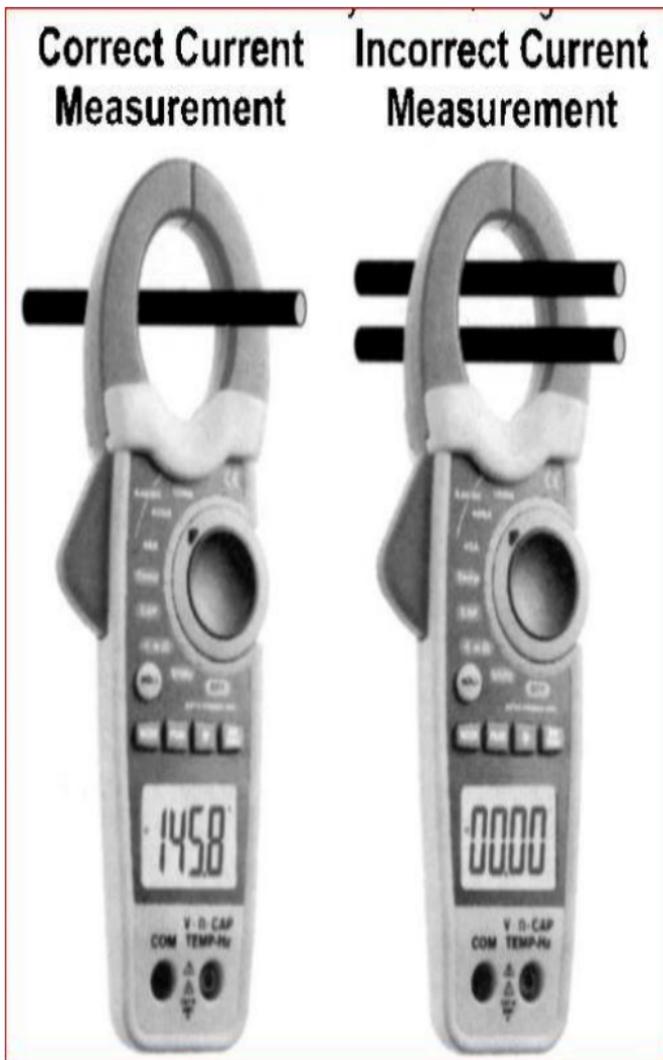
 **WARNING:** Ensure that the test leads are disconnected from the meter before making current measurements.

1. Set the function switch to 1000A or 400A or 40A range position, and make sure that the current under test does not exceed the upper limit of the measuring range you have selected. The meter automatically defaults to DC Current.
2. Press the DC ZERO button once, the Δ sign will appear on the LCD indicating Range is zero.
3. Press the trigger to open up the transformer jaws and clamp around the single conductor under test.
4. Read the display.

Note:

- During current measurements keep the transformer jaws fully closed, otherwise this will affect the accuracy of the measurement.

- When large currents the transformers jaws may buzz. This is not a fault and does not affect the accuracy of the reading.



7. AC True RMS Current Measurement



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

1. Set the function switch to 1000A~ or 400A~ or 40A~range position, and make sure that the current under test does not exceed the upper limit of the measuring range you have selected.
2. Press the MODE button to select the AC Current range. The meter automatically defaults to Dc Current.
3. Press the trigger to open up the transformer jaws and clamp around the single conductor under test.
4. Read the display.

Note:

- During current measurements keep the transformer jaws fully closed, otherwise this will affect the accuracy of the measurement.
- When large currents the transformer jaws may buzz. This is not a fault and does not affect the accuracy of the reading.
- The meter is set to default to “Auto Range” mode.
- Pressing the PEAK hold button will allow the user to record the peak maximum and minimum readings on the AC volt range. See page 17 for further instructions for “PEAK” Hold function.

**Correct Current
Measurement**

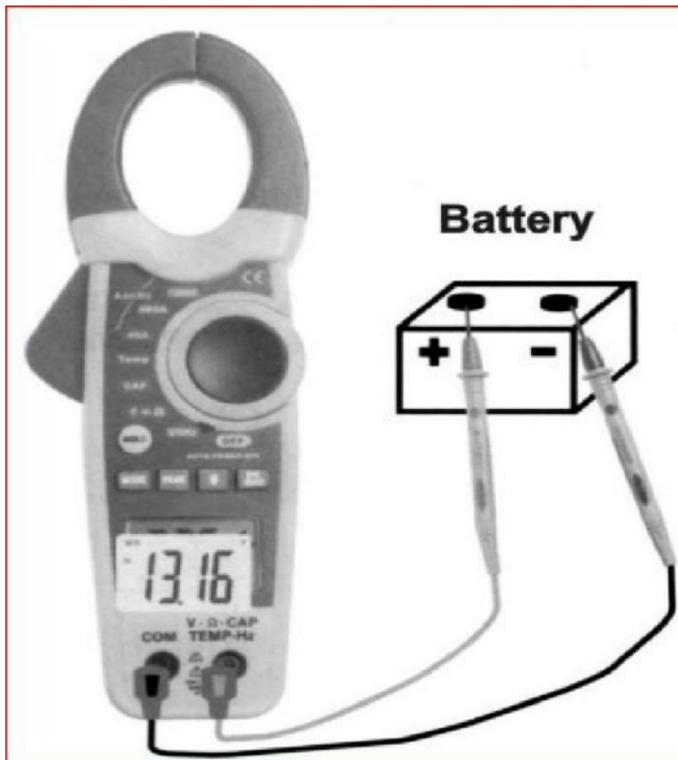


**Incorrect Current
Measurement**



8.DC Voltage Measurement

- 1.Set the function switch to  range position. The meter automatically defaults to DC Volts.
- 2.Insert the test lead into the “**V Ω TEMP HZ**” input terminal and the black lead to the “**COM**” terminal.
- 3.Connect the other end of the test leads to the circuit under test.
- 4.Read the display. If a “-” sign is displayed, the red leads is the negative potential.



9.AC true RMS voltage measurement

- 1.Set the function switch  range position.
- 2.Press the MODE button to select the AC Volt range. The meter automatically defaults to DC Volts.
- 3.Insert the red test lead into the “V Ω TEMP HZ” input terminal and the black lead to the “COM” terminal.
- 4.Connect the other end of the test leads to the circuit under test. Take the reading on the display.

Note:

- The meter is set to default to “Auto Range” mode.
- Pressing the PEAK hold button will allow the user to record the peak maximum and minimum readings on the AC volt range. See page 7 for further instructions for “PEAK” Hold function.

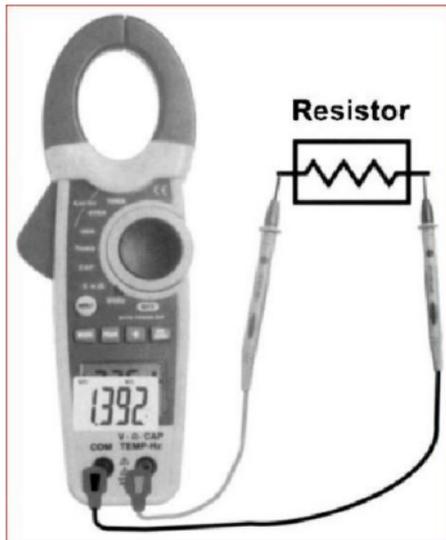


10. Resistance Measurement

1. Set the function switch to  range position. The meter automatically defaults to resistance range.
2. Insert the test lead into the “V Ω TEMP HZ” input terminal and the black lead to the “COM” terminal.
3. Connect the other end of the test leads to the circuit or component under test. Take the reading on the display.

Note:

- The meter is set to default to “Auto Range” mode.
-  **WARNING** before attempting to make a resistance measurement, ensure there is no voltage present on the circuit under test.



11. Capacitance Measurement

1. Set the function switch to CAP range position.
2. Insert the test lead into the “V Ω TEMP HZ” input terminal and the black lead to the “COM” terminal.
3. Connect the other end of the test leads to the circuit or component under test. Take the readings on the display.

Note:

- In capacitance range the meter is Auto Ranging only.
- CAUTION to avoid damage to the meter or the equipment under test, remove all power from the circuit and discharge all capacitors before measuring capacitance.
- Large value capacitors should be discharged through an appropriate resistance load. Use the DC Voltage function to confirm that the capacitors are discharged.

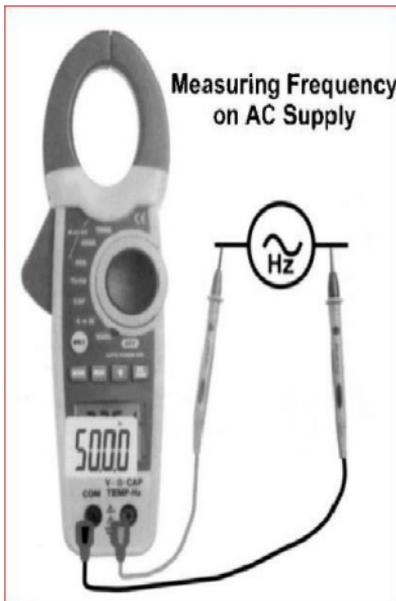


12. Frequency Measurement

1. Set the function switch to  range position. The meter automatically defaults to Frequency range.
2. Press the MODE button for 3 seconds to select the Frequency range. The meter automatically defaults to DC Voltage.
3. Insert the test lead into the “V Ω TEMP HZ” input terminal and the black lead to the “COM” terminal.
4. Connect the other end of the test leads to the circuit or component under test. Take the readings on the display.

Note:

- In the Frequency Range the meter is Auto Ranging only.

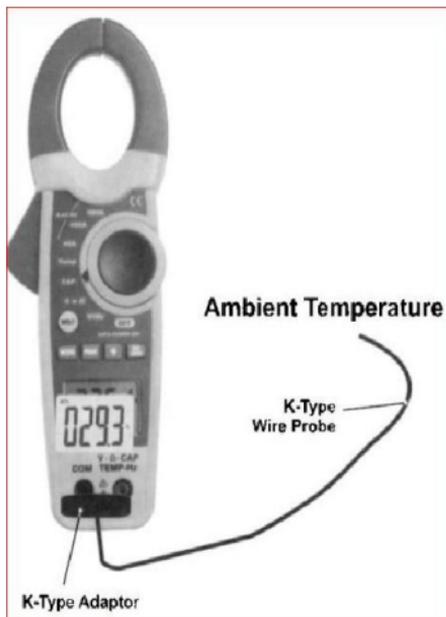


13. Temperature Measurement

1. Set the functions switch to TEMP range position. The meter automatically defaults to °C range.
2. Insert the meter white temperature adaptor into the “**V Ω TEMP HZ**” input terminal and the “COM” terminal. Ensure that the “-” marking on the adaptor is inserted into the “COM” terminal and the “+” marking on the adaptor is inserted into the “**V Ω TEMP HZ**” input terminal.
3. Connect any K-Type probe into the meter adaptor and measure the temperature of the apparatus or area required.
4. Read the temperature directly on the display.
5. To change the measuring unit from °C to °F, press the MODE button to select the °F unit.

Note:

- The meter is set to default to “Auto Range” mode.



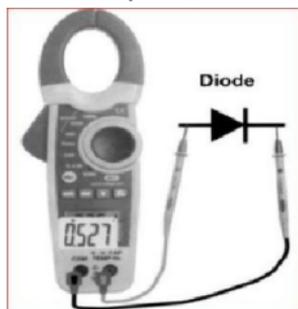
14. Diode Test

1. Set the function switch to  range position.
2. Press the MODE button to select the Diode Test range. The meter automatically defaults to resistance.
3. Insert the red test lead into the “V Ω TEMP HZ” input terminal and the black lead to the “COM” terminal.
4. Connect the other end of the test leads to the components under test. Read the display.

Note:

- Use the diode test to check diodes, Transistors, silicon controlled rectifiers (SCR's) and other semiconductor devices.
- The test sends a current through a semiconductor junction, then measures the junction's voltage drop.
- Normal forward voltage drop (forward bias) for a good silicon diode is between 0.4V to 0.9V. a reading higher than that indicates a leaky (defective) diode. A zero reading indicates a shorted diode.

Reverse the test leads connection (reverse bias) across the diode. The display shows “OL” if the diode is good. Any other readings indicate the diode is shorted or resistive (defective).



15. Continuity Testing

1. Set the function switch to  range position.
2. Press the MODE button to select the Continuity Test range. The meter automatically defaults to Resistance.
3. Insert the red test lead into the “V Ω TEMP HZ” input terminal and the black lead to the “COM” terminal.
4. Short the tip of the test leads and make sure the display reads “0” and the buzzer beeps.
5. Connect the tip of the test leads to the circuit or component under test. The display reads the resistance and the buzzer beeps when the reading is not more than about 35Ω .

Note:

- Using resistance and continuity function in a live circuit will produce false results and may damage the instrument.
- In many cases the suspicious components must be disconnected from the circuit under test to obtain accurate results.
- **WARNING** before attempting to make a test, ensure there is no voltage present on the circuit.



16. DATAHOLD

This is a function used to freeze the reading on the display, ideal for later viewing.

1. Press the HOLD button once. When the HOLD is activated, the meter beeps, freezes the reading, and displays the “HOLD” indicator on the LCD.
2. To deactivate the “HOLD” function, press HOLD button once, the meter will beep and the meter will start reading new measurements.

17. PEAK HOLD

This is a function used to record the maximum and minimum readings on the display for the voltage and current ranges.

1. Press the PEAK button once. This will record the PEAK maximum, the meter beeps, and displays the “P MAX” indicator on the LCD.
2. Press the PEEK button again. This will record the “PEAK” minimum, the meter beeps, and displays the “P MIN” indicator on the LCD.
3. To deactivate the “PEEK” function, press button for 3 seconds, the meter will beep and the meter will start reading new measurements.

18. LCD Backlight

The backlight is ideally used in dark or dimly lit areas.

1. Press the  button for 3 seconds, and the bright white light will come on.

2. To turn off the backlight press the  button for 3 seconds.

Note: the use of the backlight will reduce the battery life considerably.

19. Auto Power Off

This feature automatically turns off the meter after approximately 20 minutes from the last measurement taken. To turn on the meter, press any button or move the rotary switch to any position. Ensure the test leads are disconnected from any circuit to avoid injury or meter damage.

20. Battery Replacement

When the  sign appears on the LCD, this indicates the battery should be replaced. Use the following procedure to replace the standard 9V battery (IEC 6F 22) battery.

1. Disconnect the test leads from any live source and remove the leads from the input terminals.
2. Rotate the function switch to the OFF position.
3. The battery cover is secured to the bottom of the case by a screw. Using a screwdriver remove the screw from the battery cover and remove the battery cover from the meter.
4. Remove the old battery and replace it with a new IEC 6F 22 9V battery.

5. Replace the battery cover and reinstall the screw.

