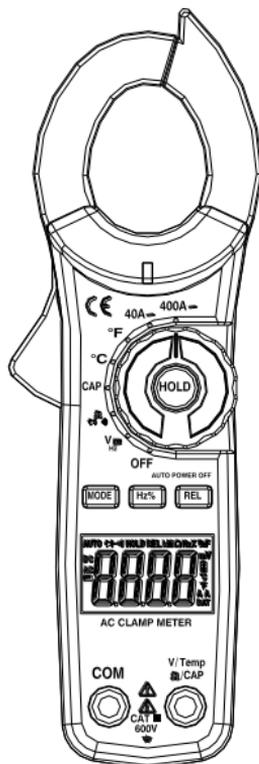


# AC CLAMP METER OPERATIONS MANUAL CM-210



## Safety

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### International Safety Symbols



This symbol, adjacent to another symbol or terminal, indicates the user must refer to the manual for further information.



This symbol, adjacent to a terminal, indicates that, under normal use, hazardous voltages may be present



Double insulation

### SAFETY NOTES

- Do not exceed the maximum allowable input range of any function
- Do not apply voltage to meter when resistance function is selected.
- Set the function switch OFF when the meter is not in use.

### WARNINGS

- Set function switch to the appropriate position before measuring.
- When measuring volts do not switch to current/resistance modes.
- When changing ranges using the selector switch always disconnect the test leads from the circuit under test.
- Do not exceed the maximum rated input limits.

## **CAUTIONS**

This meter is intended for use by trained and qualified industrial professionals. Improper use of this meter can cause damage, shock, injury or death. Read and understand this operations manual before operating the meter.

Always remove the test leads before replacing the battery.

Regularly inspect the condition of the test leads and the meter itself for any damage before operating the meter. Repair or replace any damage before operation.

Use great care when making measurements if the voltages are greater than 25VAC RMS or 35VDC. These voltages are considered a shock hazard.

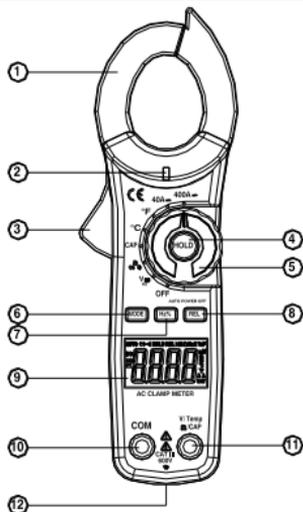
Remove the battery if the meter is to be stored for long periods. Always discharge capacitors and remove power from the device under test before performing Diode, Resistance or Continuity tests.

- Voltage checks on electrical outlets can be difficult and misleading because of the uncertainty of connection to the recessed electrical contacts. Other means should be used to ensure that the terminals are not "live".
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

| Input Limits  |               |
|---|---------------|
| Function  | Maximum Input |
| A AC  | 400A          |
| V DC, V AC  | 600V DC/AC    |
| Frequency, Resistance, Diode, Continuity , Capacitance Test | 600V DC/AC    |
| Temperature ( $^{\circ}\text{C}/^{\circ}\text{F}$ )         | 600V DC/ AC   |

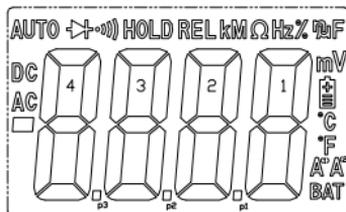
## Meter Description

1. Current clamp
2. Non-contact AC voltage indicator light
3. Clamp trigger
4. Data Hold button
5. Function Dial
6. MODE select button
7. Hz / % button
8. Relative button
9. LCD display
10. COM input jack
11. V / TEMP /  $\Omega$  / CAP jack
12. Battery Cover



## Display Description

|                |  |
|----------------|--|
| <b>AC DC</b>   | AC (alternating current) and DC (direct current) |
| <b>■</b>       | Minus sign                                       |
| <b>8.8.8.8</b> | 4000 count (0 to 3999) measurement reading       |
| <b>AUTO</b>    | Autorange mode                                   |
| <b>REL</b>     | Relative mode                                    |
| <b>→ </b>      | Diode test mode                                  |
| <b>•)))</b>    | Audible Continuity                               |
| <b>HOLD</b>    | Data Hold mode                                   |
| <b>°F, °C</b>  | Units of measure                                 |
| <b>Hz %</b>    | Frequency/duty cycle test mode                   |



## Specifications

| Function                | Range      | Resolution | Accuracy (% of reading) |
|-------------------------|------------|------------|-------------------------|
| AC Current<br>(50/60Hz) | 40.00AAC   | 10mA       | ± (2.5 % + 8 digits)    |
|                         | 400.0 AAC  | 100mA      | ± (2.8 % + 8 digits)    |
| DC Voltage              | 400.0 mVDC | 0.1mV      | ± (0.8% + 2 digits)     |
|                         | 4.000 VDC  | 1mV        | ± (1.5% + 2digits)      |
|                         | 40.00 VDC  | 10mV       |                         |
|                         | 400.0 VDC  | 100mV      |                         |
|                         | 600.0 VDC  | 1V         | ± (2 % + 2 digits)      |

|                          |           |        |                              |
|--------------------------|-----------|--------|------------------------------|
| AC Voltage<br>(50-400Hz) | 4.000 VAC | 1mV    | ± (1.8% + 8 digits)          |
|                          | 40.00 VAC | 10mV   |                              |
|                          | 400.0 VAC | 100mV  |                              |
|                          | 600.0 VAC | 1V     | ± (2.5% + 8 digits)          |
| Resistance               | 400.0 Ω   | 0.1Ω   | ± (1.0% + 4 digits)          |
|                          | 4.000K Ω  | 1Ω     | ± (1.5% + 2 digits)          |
|                          | 40.00K Ω  | 10Ω    |                              |
|                          | 400.0K Ω  | 100Ω   |                              |
|                          | 4.000M Ω  | 1KΩ    | ± (2.5% + 3 digits)          |
|                          | 40.00M Ω  | 10KΩ   | ± (3.5% + 5 digits)          |
| Capacitance              | 4.000nF   | 1PF    | ± (4.0% reading + 20 digits) |
|                          | 40.00nF   | 10PF   |                              |
|                          | 400.0nF   | 100PF  | ± (3% reading + 5 digits)    |
|                          | 4.000 μ F | 1nF    |                              |
|                          | 40.00 μ F | 10nF   |                              |
|                          | 100.0 μ F | 100nF  | ± (4.0% reading + 10 digits) |
| Frequency                | 10-10kHz  | 0.01HZ | ± (1.5% reading + 2 digits)  |
| Sensitivity: 15Vrms      |           |        |                              |

|      |                               |                |               |
|------|-------------------------------|----------------|---------------|
| Temp | -4 to 1400°F<br>-20 to 760°C  | 0.1°F<br>0.1°C | ± (3%rdg+5°C) |
|      | (probe accuracy not included) |                |               |

|                               |  |
|-------------------------------|--|
| <b>Clamp size</b>             | Opening 1.2" (30mm) approximate  |
| <b>Diode Test</b>             | Test current of 0.3mA typical; Open circuit voltage 1.5V DC typical.                               |
| <b>Continuity Check</b>       | Threshold <150Ω; Test current < 0.5mA  |
| <b>Low Battery Indication</b> | "  " is displayed |
| <b>Overrange Indication</b>   | "OL" is displayed  |
| <b>Measurements Rate</b>      | 2 per second, nominal  |
| <b>Input Impedance</b>        | 10MΩ (VDC and VAC)   |
| <b>Display</b>                | 4000 counts LCD  |
| <b>AC Current</b>             | 50-60Hz (AAC)  |
| <b>AC Voltage bandwidth</b>   | 50-400Hz (VAC)   |
| <b>Operating Temperature</b>  | 41 to 104°F (5 to 40°C)  |
| <b>Storage Temperature</b>    | -4 to 140°F (-20 to 60°C)  |
| <b>Operating Humidity</b>     | Max 80% up to 87°F (31°C) decreasing linearly to 50% at 104°F(40°C)                                |
| <b>Storage Humidity</b>       | <80%   |
| <b>Operating Altitude</b>     | 7000ft. (2000meters) maximum.  |
| <b>Over Voltage</b>           | Category III 600V  |
| <b>Battery</b>                | Two "AAA" 1.5V Battery   |
| <b>Auto OFF</b>               | approx. 30 minutes   |
| <b>Dimensions/Weight</b>      | 200x66x37mm/205g   |

## Safety

For indoor use and in accordance with Overvoltage Category II, Pollution Degree 2. Category II includes local level, appliance, portable equipment, etc., with transient overvoltage less than Overvoltage Cat. III  
CE, 

## Approvals

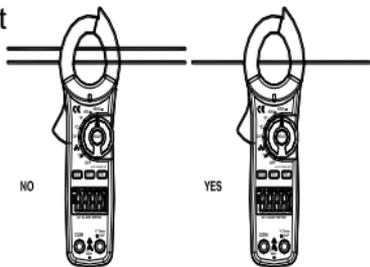
## Operation

**NOTICES:** Read and understand all **warning** and **precaution** statements listed in the safety section of this operation manual prior to using this meter. Set the function select dial to the OFF position when the meter is not in use.

## AC Current Measurements

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

1. Set the function switch to the **400 or 40A** range. \_\_\_\_\_
2. If the range of the measured is not known, select the higher range first then move to the lower range if necessary.
3. Press the trigger to open jaw. Fully enclose one conductor to be measured.
4. Read the current measurement on the LCD display



### **AC/DC Voltage Measurements**

1. Insert the black test lead into the negative/**COM** terminal and the red test lead into the positive/**V** terminal.
2. Set the function switch to the **V** position.
3. Select AC or DC with the **MODE** button.
4. Connect the test leads in parallel to the circuit under test.
5. Read the voltage measurement on the LCD display.

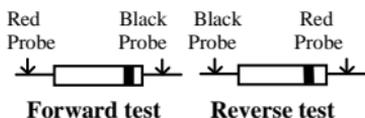
### **Resistance Measurements**

1. Insert the black test lead into the negative (**COM**) terminal and the red test lead into the positive (**V**) terminal.
2. Set the function dial to the  $\Omega$   position.
3. Touch the test probe tips across the circuit or component under test. It is best to disconnect one side of the device under test so the rest of the circuit will not interfere with the resistance reading.
4. Read the resistance measurement on the LCD display.

### **Diode and Continuity Measurements**

1. Insert the black test lead into the negative (**COM**) jack and the red test lead into the positive (**V**) terminal.
2. Set the function dial to the  $\Omega$   position.
3. Press the **MODE** button until “” appears in the display.
4. Touch the test probes to the diode under test. Forward voltage will indicate 0.4V to 0.7V. Reverse voltage will

indicate “**OL**”. Shorted devices will indicate near 0mV and an open device will indicate “**OL**” in both polarities.



For Continuity tests, if the resistance is  $< 150$  a tone will sound.

## Capacitance Measurements

**WARNING:** To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any capacitance measurements. Remove the batteries and unplug the line cords.

1. Set the function dial to the **CAP** position.
2. Insert the black test into the negative (**COM**) terminal. Insert the red test lead into the positive (**V**) terminal.
3. Touch the test leads to the capacitor to be tested.
4. Read the capacitance value in the display

## Frequency or % Duty Cycle Measurements

1. Set the function dial to the **V AC/DC, Hz** position.
2. Insert the black test lead into the negative (**COM**) terminal and the red test lead into the positive (**V**) terminal.
3. Select Hz or % duty with the **Hz/%** button.
4. Touch the test probe tips to the circuit under test.

5. Read the frequency measurement on the LCD display.

## Temperature Measurements

**WARNING:** To avoid electric shock, disconnect both test probes from any source of voltage before making a temperature measurement.

1. Set the function dial to °C or °F.
2. Insert the Temperature Probe into the negative (**COM**) and the positive (**V**) terminals. Be sure to observe the correct polarity. Use K-Type adapter when necessary.
3. Touch the Temperature Probe head to the part whose temperature you wish to measure. Keep the probe touching the part under test until the reading stabilizes (about 30 seconds).
4. Read the temperature in the display. The digital reading will indicate the proper decimal point and value.

**WARNING:** To avoid electric shock, be sure the thermocouple has been removed before changing to another measurement function.

## Non-Contact AC Voltage Measurements

**WARNING:** Risk of Electrocution. Before use, always test the Voltage Detector on a known live circuit to verify proper operation before use.

1. Touch the clamp tip to the hot conductor or insert into the hot side of the electrical outlet.
2. If AC voltage is present, the red detector light will illuminate.

**NOTE:** The conductors in electrical cord sets are often twisted. For best results, drag the clamp tip along a length of the cord to assure placing the tip in close proximity to the live conductor.

**NOTE:** The detector is designed with high sensitivity. Static electricity or other sources of energy may randomly trip the sensor. This is normal operation

### **Mode Button**

Press the **MODE** button to select **DC / ACV / OHM / Diode and Continuity**.

### **Data Hold Button**

To freeze the LCD meter reading, press the data **HOLD** button. The data hold button is located in the center of the rotary Function Dial. While data hold is active, the **HOLD** icon appears on the LCD. Press and release the **HOLD** button again to return to normal operation.

### **REL BUTTON**

For Capacitance Zero & Offset adjustment.

## **Battery Replacement**

1. Remove test leads and turn off meter
2. Remove two Phillips head screws located on battery cover
3. Open the battery compartment
4. Replace the required, Two “AAA” 1.5V Battery
5. Re-assemble the meter

## **Warranty**

This PDI product is warrantied to be free from defects in materials and workmanship for a period of two (2) years from the verified date of purchase. During this warranty period, PDI will either repair or replace the defective unit, at PDI's discretion. A purchase receipt or other acceptable form of proof of original purchase date will be required before any warranty processes begin. PDI warrants all authorized repairs with a six (6) month limited warranty. View full warranty details and register your PDI product at **[www.PDIimeters.com](http://www.PDIimeters.com)**.

**NOTE: Online product registration is required for all warranty claims. All warranty claims must have a Return Goods Authorization assigned from PDI, in order to begin processing. Contact PDI for more details.**



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