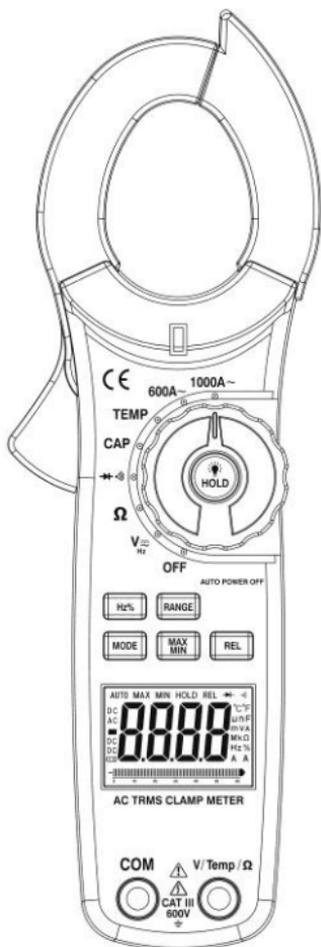


CM-220

True RMS AC CLAMP METER

INSTRUCTION MANUAL



Safety

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 to 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

Improper use of this meter can result in damage, shock, injury or death. Read and understand this instruction manual before operating the meter.

Always remove the test leads before replacing the battery. Inspect the condition of the test leads and the meter itself for any damage before operating the meter. Repair or replace any damage before use.

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.

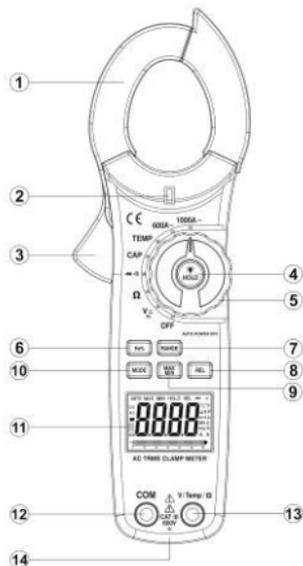
Always discharge capacitors and remove power from the device under test before performing Diode, Resistance or Continuity tests.

- Voltage checks on electrical outlets can be difficult and misleading because of the difficulty of connecting 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.

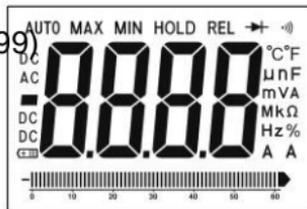
Input Limits	
Function	Maximum Input
A AC	1000A
V DC, V AC	1000V DC/AC
Frequency, Resistance, Diode, Continuity, Capacitance Test	1000V DC/AC
Temperature (°C/°F)	-4° ~ 1400°F / -20° ~ 760°C

Meter Description

1. Current clamp
2. Non-contact AC voltage indicator light
3. Clamp trigger
4. Data HOLD / BACKLIGHT button
5. Rotary function dial
6. Hz / Hz% function button
7. RANGE select button
8. RELATIVE button
9. MIN/MAX button
10. MODE select button
11. LCD display
12. COM input jack
13. V/ Ω /CAP/TEMP/Hz input jack
14. Battery Cover



1. **AC DC** AC(alternating current) and DC (direct current)
2. **—** Minus sign
3. **8.8.8.8** 6000 count (0 to 5999) measurement reading with 61 segments
Analog Bargraph
4. **AUTO** AutoRange mode
5. **REL** Relative mode
6. **→|** Diode test mode
7. **•)))** Audible Continuity
8. **HOLD** Data Hold mode
9. **°C,°F, μ ,m,V,A,K,M, Ω** Units of measure list
10. **MAX MIN** MAX/MIN mode
11. **Hz %** Frequency/duty cycle mode



Specifications

Function	Range & Resolution	Accuracy (% of reading)
AC Current (50/60Hz)	600.0 AAC	± (2.8 % + 8 digits)
	1000 AAC	± (3.0 % + 8 digits)
AC Current (400Hz)	600.0 AAC	± (5.0 % + 10 digits)
	1000 AAC	± (5.0 % + 10 digits)
DC Voltage	600.0 mVDC	± (0.8% + 2 digits)
	6.000 VDC	± (1.5% + 2 digits)
	60.00 VDC	
	600.0 VDC	
AC Voltage (50-400Hz)	6.000 VAC	± (1.8% + 8 digits)
	60.00 VAC	
	600.0 VAC	
Resistance	600.0 Ω	± (1.0% + 4 digits)
	6.000KΩ	± (1.5% + 2 digits)
	60.00KΩ	
	600.0KΩ	
	6.000MΩ	± (2.5% + 3 digits)
60.00MΩ	± (3.5% + 5 digits)	
Capacitance	40.00nF	±(4.0% reading + 20 digits)
	400.0nF	±(3% reading + 5 digits)
	4.000μF	
	40.00μF	±(4.0% reading + 10 digits)
	400.0μF	
4000μF	±(5.0% reading + 10 digits)	
Frequency Sensitivity:15Vrms	10-10kHz	±(1.5% reading + 2 digits)
Temp (type-K) (probe accuracy not included)	-20.0 to 760.0°C	±(3%rdg+5°C)
	-4.0 to 1400.0°F	±(3%rdg+9°F)

Clamp size	Opening 1.5" (40mm) approx.
Diode Test	Test current of 0.3mA typical; Open circuit voltage 1.5V DC typical.
Continuity Check	Threshold <40Ω; Test current < 0.5mA
Low Battery Indication	"  " "OL" is displayed
Over Range Indication	"OL" is displayed
Measurements Rate	2 per second, nominal
Input Impedance	10MΩ (VDC and VAC)
Display	6000 counts LCD
AC Current	50-400Hz (AAC)
AC Voltage Bandwidth	50-400Hz (VAC)
Operating Temperature	41 to 104°F (5 to 40°C)
Storage Temperature	-4 to 140°F (-20 to 60°C)
Operating Humidity	Max 80% up to 87°F (31°C) decreasing linearly to 50% at 104°F(40°C)
Storage Humidity	<80%
Operating Altitude	7000ft. (2000meters) max.
Over voltage	Category III 600V
Battery	One 9V Battery
Auto OFF	approx. 15 minutes
Dimensions/Weight	232x77x39mm/271g
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

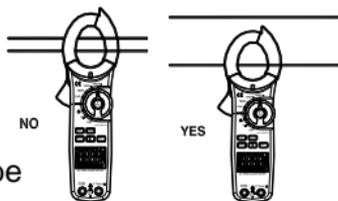
Operation

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 Rotary function 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 dial to the **1000A** or **600A** 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.

DC/AC Voltage Measurements

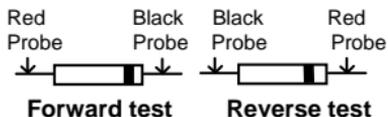
1. Insert the black test lead into the negative **COM** terminal and the red test lead into the positive **V** terminal.
2. Set the function dial to the **V** position.
3. Select AC or DC with the **MODE** button.
4. Connect the test leads in parallel to the circuit under test.
5. Read the voltage measurement 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 terminal.
2. Set the function dial to the Ω 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 banana plug into the negative **COM** jack and the red test lead banana plug into the positive diode jack.
2. Turn the rotary dial to the  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.



5. For Continuity tests, if the resistance is $< 40\Omega$, 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 rotary function dial to the “**CAP**” position.
2. Insert the black test lead banana plug into the negative (**COM**) jack. Insert the red test lead banana plug into the positive (**V**) jack.
3. Touch the test leads to the capacitor to be tested.
4. Read the capacitance value in the display

Frequency/Duty Cycle Measurements (electronic)

1. Set the rotary function switch to “**V**” position.
2. Select ACV with the **MODE** button
3. Press the **Hz%** button to indicate “**Hz**” in the display.
4. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **Hz** jack.
5. Touch the test probe tips to the circuit under test.
6. Read the frequency on the display.
7. Press the **Hz%** button again to indicate “**%**” on the display. Read the % of duty cycle on the 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 rotary function dial to **TEMP**.
2. Insert the K-Type adapter into the negative **COM** and the **V** jacks, making sure to observe the correct polarity.
3. Select °C or °F with the **MODE** button.
4. 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).
5. 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

1. Turn meter on and touch the clamp tip to the suspected hot conductor or insert into the hot side of the electrical outlet.
2. If AC voltage is present, the detector light will illuminate.

NOTE: The conductors in electrical cord sets are often twisted. For best results, rub the probe 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

To select between **DC/ACV,Ω,Diode,Continuity,CAP,°C,°F**

MIN & MAX Recording Button

Press **MIN/MAX** to enter MIN, MAX Recording mode (manual range only). Select the proper range before selecting MIN MAX to ensure that the MIN/MAX reading will not exceed the testing range. Press once to select **MIN**. Press again to select **MAX**. and press again release **MIN/MAX** recording function.

REL BUTTON

For Offset adjustment.

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** display icon appears on the LCD. Press the data hold button again to return to normal operation.

Note: The HOLD feature may activate when the **Backlight** is turned on. Press the HOLD key again to exit Hold.

RANGE BUTTON

When the meter is first turned on, it automatically goes into Autoranging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, perform the following:

1. Press the **RANGE** button. The “Auto Range” display indicator will turn off, The “Manual Range” display indicator will turn on
2. Press the **RANGE** button to step through the available ranges until you select the range you want.
3. Press and hold the **RANGE** button for 2 seconds to exit the Manual Ranging mode and return to Autoranging.

Backlight Button

The backlight function illuminates the display and is used when the ambient light is too low to permit viewing of the displayed readings. Press the  button for two seconds to turn the backlight on and press the button a second time to turn the backlight off.

Battery Replacement

1. Remove the one rear Phillips head screw
2. Open the battery compartment
3. Replace the Requires One 9V battery
4. Reassemble the meter.

Warranty

This PDI product is warranted 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.

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.



Precision Diagnostic Instruments

7581 W. 103rd Ave.

Westminster, CO 80021

Tel: 1-800-453-7892

Fax: 303-650-1238