

CM-2000C Digital clamp meter Manual

1.SUMMARY

This is a 3 1/2digit digital AC/DC clamp meter with good stability and reliability. It has a LCD with 20mm digit display, which provides clear readings.






It can be used into the measurements for DCV, ACV, True RMS of ACA, resistance, Non-contact voltage detecting, Temperature, diode and continuity; It has been designed with more functions in clamp lighting, unit symbol display, MAX/MIN, data hold, auto/manual range switching, auto power off and the alarm system. It adopts a 8 digits of micro-processor which can drive LCD directly and an integrated circuit which converting by a dual integral A/D, It can provides high resolution, high precise driving with digital display. This meter has completed functions, high accuracy measurement, which is easy to use, it is an ideal tool for Labs, Factories, Radio Fans and Household.

2.SAFETY NOTICE

The meter has been designed to be in compliance with the terms of IEC1010 (The safety standard which issued by International Electro Technical Committee), Please read this manual carefully before operation.


- 1.Please check whether Test Leads is a reliable contact, right connect, whether it is in a good insulation condition before having a measurement, in order to avoid electric shock.
- 2.Don't input a value which is over than the one of specified limit value, in order to avoid electric shock and the damage of the meter.
3. Please be careful when you have a measurement for higher than 60V of DC and 40V of ACV, in order to avoid electric shock
- 4.Please choose correct functions in order to avoid any possible issues with wrong operation.
- 5.Test Leads should be put away from the test end or target when you're changing functions.
6. Please be especially careful on the Nipping, when it has No insulated conductor and Generatrix it will be caused Electric shock by accident contacting with the Conductor.
7. Please do not change the Circuit of meter randomly in order to avoid damage of meter, it also will be incurred potential safety concerns.

8. Safety symbols specification

“” High voltage, “” GND, “” Dual insulation, “” Refer to manual, “” Low battery indication

3.Characterers

3-1. General Characters

- 3-1-1. Display way: LCD
- 3-1-2. Max display:2000(3 1/2 digits, automatic polarity and unit symbol display);
- 3-1-3. Measurement method: Analog to digital converter (with micro processor ADC+MCU);
- 3-1-4. Sampling rate: approx 3 times/second.
- 3-1-5. Over Load of range display: “OL” will be displayed.
- 3-1-6. Low Battery Indication: “”
- 3-1-7. Working environment: (0~40)℃, relative humidity: <80%;
- 3-1-8. Store condition: (-10~50)℃, relative humidity: <80%
- 3-1-9. Battery: 2 pieces x 1.5V battery (“AAA” 7# battery);
- 3-1-10. Dimension: 110×240×45mm (width x length x height);
- 3-1-11. Max Expansion of the Clamp: 28mm
- 3-1-12. Weight: approx 200g(including battery)
- 3-1-13. Accessories: Manual, Test Leads, Carrying bag, gift box.

3-2. Technical Specification

3-2-1.Accuracy: ±(a% of reading + digits), in order to ensure the accuracy, surrounding temperature should be at (23±5)℃ and relative humidity should be less than 70%. The accuracy is guaranteed for one year since from the date of manufacture.

3-2-2. DC voltage (DCV)

Range	Accuracy	Resolution
200mV	±(0.5%+5)	0.1mV
2V		1mV
20V		10mV
200V		100mV
600V	±(1.0%+5)	1V

Input impedance: 200mV Range>40MΩ, others is 10MΩ

Overload protection:1000V of DC or 750V of AC peak value

3-2-3. AC voltage (ACV)

Range	Accuracy	Resolution
200mV	±(1.5%+10)	0.1mV
2V		1mV
20V		10mV
200V	±(1.2%+5)	100mV
600V		1V

Input impedance: 10MΩ

Overload protection: 600V of DC or Rms of AC

Frequency response: 600V at 40Hz~1000Hz, other ranges 40Hz~2000Hz.

Display: True Rms Response(calibration base on Sine Wave RMS)

3-2-4. AC current (ACA)

Range	Accuracy	Resolution
2A	±(3.0%+5)	1mA
20A		10mA
200A		100mA
600A	±(2.0%+5)	1A

Frequency response: Since Wave and Triangular Wave are 40Hz-1kHz, Others is 40Hz-200Hz.

Overload protection: 600A(Do not input more than 60 seconds)

Attention: The target Current Conductor should be placed in the middle of Clamps

3-2-5. Resistance (Ω)


Range	Accuracy	Resolution
200Ω	±(0.8%+5)	0.1Ω
2kΩ		1Ω
20kΩ		10Ω
200kΩ		100Ω
2MΩ	±(1.2%+5)	1kΩ
20MΩ		10kΩ

Open-circuit Voltage: 500mV

Overload protection: 250V of DC or Peak value of AC.

Attention: Test Leads should be short circuit at first when using a range at 200Ω, got the Resistance of Wire lead and then deduct it from actual measurement.

3-2-6. Diode and Continuity Measurement

Range	Display Value	Test Conditions
	Diode towards to forward direction and voltage drop	Forward DC Current is approx 0.8mA, Reverse Voltage is approx 2.2V
	Buzzer will makes a continuous alarm when the Resistance for the both ends of target measurement is less than 50Ω	Open-circuit Voltage: approx 2V

Overload protection: 250V of DC or Peak value of AC.

Warning: Input Voltage value at this range is Prohibited

3-2-7. Temperature (℃/F)

Range	Display Value	Resolution
-40℃~1000℃	<400℃ ±(1.0%+5) ≥400℃ ±(1.5%+15)	1℃
0F~1832F	<750F ±(1.0%+5) ≥750F ±(1.5%+15)	1F

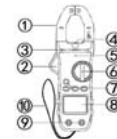
Thermocouple: K type(Nickel-chromium, Nickel-silicon)

Warning: Input Voltage value at this range is Prohibited.

4.Operation Instructions







4-1. Panel Instructions

- 1) Clamp: Measuring Area is from 0A to 600A of Current and Non-Contact Voltage detecting.
- 2) Clamp Trigger: Can open the Clamp or Close the Clamp.
- 3) Hand Protection: It is a safety design for keeping Users' hands away from dangerous area.
- 4) Clamp Light: Turn on Clamp Light to illuminate the area of target measurement when under a dark environment in order to keep your safety.








5) NCV detecting indicator: Can detect high voltage nearby and prevent electric shock.

6) Switch Button: Use for changing measurement's functions, Range and Turn on or Turn off the meter.

Function	Description
	ACA measurement
	ACV,DCV measurement
	Non-Contact Voltage detecting
	Resistance Measurement
	Diode/Continuity measurement, press “SELECT” to choose Diode or Continuity measurement as a circle switching.
	Temperature measurement. Press “SELECT” button to switch to ℃ or ℉.

7) Function Keys

SELECT KEY

- 1) This is a key for Selecting function, base on a working principle of Trigger action. Short press this key to choose measurement modes: Choose DC or AC at “”, choose “” at “” or “” at “” choose “C” or “F” when at Temperature range.
- 2) The Meter will be Auto-power off when it is not being using within 15 minutes, then it will be entering into sleeping mode, the Buzzer will makes 5 times of alarm reminder within 1 minute before Auto-power off; Please press this “SELECT” function or Power on/off button to turn on the Power if you want to restart it.
- 3) Press this key and put it on Hold and then turn on the Power to awake it from sleeping mode, and then Auto-power off function will be canceled.
- 4) Illuminating lamp control key, press it for more than 2 minutes to turn on Illuminating lamp, and then press it for more than 2 minutes again to make it off.


MAX/MIN KEY:

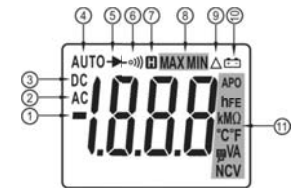
- 1) is a key for Data hold. Press this key it'll be entering into Manual Range Mode automatically, and shows MAX value, press it again to show MIN value.
- 2) Press MAX/MIN key for more than 2 minutes to exit Data Hold mode. Auto-power off will be canceled when it's been entered into MAX/MIN mode, also HOLD and SELECT function will Not be available at this moment. Data Hold Key: Press HOLD key, the Meter will keeps the Data of measurement on LCD, press it again to exit Data Hold; Any new measurements CAN'T be started when using this Data Hold function.

RANGE KEY:

- 1) It is a key for Auto/ Manual Range selecting, it set up as Auto Range when Power-on or Switching. Single click it to change to Manual range. When it is under Manual Range, press this key for each one time it will be rose up for each one grade, press this key again when it arrived the Highest grade then it will be drop to the LOWEST grade.
- 2) If press RANGE key for more than 2 minutes or making a Switching it will be exit Manual Range.

HOLD/☼ KEY:

- 1) It is a key for Data Hold, base on a working principle of Trigger action, short press this key to keep the current Data of measurement on LCD, LCD will show symbol “”, press this key again to exit Data Hold.
- 2) Backlight control key, press it for more than 2 minutes to turn on Backlight(it will be shown on LCD) then press it for more than 2 minutes again to make it off. Backlight function will be off automatically when you release backlight control key after 30 minutes.
- 8) LCD Display: Shows the Value and Unit of measurement



Sequence	Functions	Description
1	-	The symbol of a Negative measurement.
2	AC	AC Voltage or AC Current Range
3	DC	DC Voltage or DC Current Range
4	AUTO	Auto Range

5		Diode measurement
6		Continuity alarm to be activated.
7		Data Hold function to be activated.
8	MAX MIN	MAX/MIN function to be activated.
9		Invalid.
10		Lower Battery. Warning: In order to avoid Electric Shock or Personal Injury by wrong Reading values, the Battery must be changed ASAP when it appears this symbol.
11	APO hFE MΩ, kΩ, Ω °C/°F mV, V A NCV	Auto power off function has been activated. Transistor measurement (to measure the magnification times of transistor). MegaOhm, Killohm, Ohm Centigrade degree, Fahrenheit degree MilliVolt, Volt Amperes(A) Non-contact voltage detecting.

9) V/Ω Input Terminal: Positive Input Terminal for Measurements (The end of RED Test Leads); COM terminal is for GND input: Negative Input Terminal for Measurements(The end of BLACK Test Leads);

10) Carrying belt.

4-2. DC Voltage measurement

- Put BLACK Test Leads into “COM” terminal, and RED Test Leads into “VΩ” terminal
- Turn Switch button to “V $\overline{\text{---}}$ ”
- Auto Range is set up as default, it will shows “AUTO”, press “RANGE” key to change it to Manual Range, the ranges of 200mV、2V、20V、200V、600V are available.
- Connecting Test Lead and the end of target measurement, the end’s Voltage and Polarity of RED Test Lead will be shown on LCD.



Attention :

- If LCD shows “OL” at Manual Range, means it has been exceeded measurement Range, you should switch the Range to a higher level.
- Do not input Measurement Voltage more than 600V, if exceeded Meter Circuit will be facing a damage problem, Beeper alarm will be activated if more than 1000V.
- When you having a measurement for High Voltage Circuit, please pay much more attention to NOT to touch the High Voltage Circuit.

4-3. AC Voltage measurement

- Put BLACK Test Leads into “COM” terminal, and RED Test Leads into “VΩ” terminal
- Turn Switch button to “V \sim ”
- Auto Range is set up as default, it will shows “AUTO”, press “RANGE” key to change it to Manual Range, the ranges of 2V、20V、200V、600V are available.
- Connecting Test Lead and the end of target measurement, the Both end’s Voltage of Test Lead will be shown on LCD.



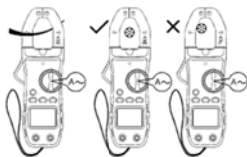
Attention :

- If LCD shows “OL” at Manual Range, means it has been exceeded measurement Range, you should switch the Range to a higher level.
- Do not input Measurement Voltage more than 600V, if exceeded Meter Circuit will be facing a damage problem, Beeper alarm will be activated if more than 750V.
- When you having a measurement for High Voltage Circuit, please pay much more attention to NOT to touch the High Voltage Circuit.

4-4. AC Current measurement

(1) Turn the Switch button to the Ranges of “2A/20A or 200A/600A”

(2) Open the Clamp and clamp one Wire Lead, you can capture Reading Value directly. Please put Wire Lead in the middle of both Clamps to capture the most precise reading value.



Attention :

- If you have no idea for the range of target Current, you should put the Range to the Highest Level, and then turn it to related level according to display value.
- If LCD shows “OL”, means it has been exceeded measurement Range, you should switch the Range to a higher level.
- Max Measurement Current is 600A, Meter would be faced to be damage if input Current is more

than 600A for a long time.

4-5. Resistance measurement

- Put BLACK Test Leads into “COM” terminal, and RED Test Leads into “VΩ” terminal
- Turn Switch button to “Ω”
- Auto Range is set up as default, it will shows “AUTO”, press “RANGE” key to change it to Manual Range mode.

Attention :

- If you have no idea for the range of target Resistance when you having a measurement at Manual Range mode, you should put the Switch button to the Highest Level.
- If LCD shows “OL”, means it has been exceeded normal Range, you should turn it to a higher level. When measuring a Resistance which is on or above 1MΩ, Reading value needs few seconds to be stable, it is normal when having measurement for High Resistance.
- If the Input is Open Circuit, “OL” will be shown on LCD.
- Make sure all of power for target Circuit has been shut down and All of Capacitance has been discharged completely before having an On-line Resistor’s measurement.
- If a bit error has been incurred at measurement, it is possible caused by other on-line Components or electric potential on the two ends of target Resistor.
- Please don’t input Voltage at Resistance Range.

4-6. Diode ,Continuity Measurement.

- Put BLACK Test Lead into “COM”, put RED Test Lead into “VΩ”(Attention: The Polarity of RED Test Lead is “+”)
- Turn Switch to “”, it set up as Default for Diode measurement mode; Press SELECT to choose or measurement mode.
- Forward direction measurement: Connect RED Test Lead and the Positive electrode of Target Diode, and Connect Black Test Lead and the Negative electrode of Target Diode, LCD will shows similar value of forward Voltage drop for Diode.
- Reverse direction measurement: Connect RED Test Lead and the Negative electrode of Target Diode, and connect BLACK Test Lead and the Positive electrode of Target Diode, LCD will shows “OL”.
- A complete Diode measurement should includes Forward and Reverse direction measurement, if test result can not be in compliance with this, it means the Diode is broken.
- Press “SELECT” key to change to Continuity measurement mode.
- Connect Test Leads and both Ends of Target Circuit, if Resistance is lower than 50Ω the Buzzer will makes alarm reminder.

Attention:

- Please DON’T input Voltage at this range “”
- Please Make sure all of Power has been shut down and All of Capacitance has been discharged completely when having an On-line measurement, Any Negative Electric potential or any AC signals will makes Alarm reminder to be activated.

4-7. Non-Contact Voltage Detecting

WARNING

This Function might be disturbing by different external Sources, then might be incurred a wrong alarm reminder, test result is just for reference when using this function.

Turn Switch button to “NCV” position, the Target Circuit to be placed on the top of Meter, Meter will shows strong and weak signals, meanwhile, Beeper will makes “tick-tick-tick” of alarm reminder.

Attention :

- Even if there is no any indication, the voltage might still be there. Do not rely on NCV detector as the only way to judge whether a Voltage is still existed on the Wire lead or not.
- Voltage detecting may be affected by power socket design, type of insulation and its thickness and other factors.
- Interference sources at the external environment such as flashing light, motor might cause a wrong signal for a wrong judgement.

4-8. Temperature Measurement

- Turn Switch button to “°C/°F”, press “SELECT/ED \rightarrow ” key to choose °C or °F measurement mode.



2. Put the cold ends(Free ends) of thermocouple/Sensor respectively into “VΩmA(+) and COM(-)” terminal, put

the working end(Temperature measuring end) of thermocouple/Sensor in the field of target temperature, then

LCD shows the Temperature value of target temperature field, reading value is Centigrade degree.(Please pay attention to the polarity, if it is opposite, display value will be drop when the target temperature is rising)

Attention :

- When Input end is Open-circuit it will displays normal temperature.
- Please DO NOT change Temperature sensors randomly, otherwise the accuracy can not be guaranteed.
- Input Voltage at Temperature range is PROHIBITED.

4-9. Auto Power Off

If there is no any actions on the Function Keys and Switch Button within 15 minutes when having a measurement,

the meter will be entering into sleeping mode, press Function Keys to restart working mode. Press SELECT key and put it on Hold under power off and then put the power on to start, Auto Power Off will be canceled. Shut down the meter and restart it ,Auto-power off function will be resumed.

5.Meter Maintenance

The meter is a precise instrument, please DON’T change the Circuit randomly.

Attention:

- Don’t input a DC voltage more than 600V or an AC Voltage more than 600V rms
- Don’t measure a Voltage when the meter is at the range of Current, Resistance, Diode and Continuity.
- Don’t make any measurements if the battery isn’t well installed or the back cover isn’t fixed.
- Before replacing Battery, please remove the test leads from the measuring ends and turn off the power.
- Keep the meter away from water, dust and slipping.
- Don’t expose or store the meter under high temperature, high humidity, combustible, explosive and strong magnetic place
- Wipe the case with a wet cloth and a soft detergent. Do not use abrasives and alcohol to clean the meter.
- If the meter is not being used for a long time, you should take out the battery in order to avoid leakage corrosion.
- Attention to battery of 1.5V status, when symbol“” is appeared, you should replace the battery according to the following steps:
 - Unscrew the screws on the battery door and remove the cover;
 - Take out the old battery and replace with a new one. Although any battery of 1.5V can be used, in order to extend the circle life, it’s better to use alkaline battery;
 - Put on battery door and fix the screws.

6.Trouble Shooting

If the meter does not work properly, following steps might help you to solve general issues. If trouble is still be there please contact Repairing centre or Distributor.

Fault	Solution
No reading on LCD	<ul style="list-style-type: none"> ■ Turn on the power; ■ Release the HOLD key; ■ Replace battery
signal appears	■ Replace battery
No current to be input	■ Replace fuse
Big error Value	■ Replace battery

- The specifications are subject to changes without prior notice;
- The content of this manual is regarded as correct. If users find out any mistakes or omissions, please kindly contact with the manufacturer;
- The manufacturer will not be responsible for the accidents and harm caused by improper operations;
- The functions described in this User Manual shall not be considered as the reason for any special usages;