



EM200 SERIES

— DIGITAL CLAMP METER —

OWNER'S MANUAL

- Read this owner's manual thoroughly before use






WARRANTY

Warrants this instrument to be free from defects in material and workmanship for a period of one year. Any instrument found defective within one year from the delivery date and returned to the factory with transportation charges prepaid will be repaired, adjusted or replaced at no charge to the original purchaser. This warranty does not cover expendable items such as batteries or fuses. If the defect has been caused by a misuse or abnormal operating conditions, the repair will be billed at a nominal cost.

SAFETY INFORMATION

This digital clamp meter has been designed according to IEC-1010 concerning electronic measuring instruments with an overvoltage category (CAT II 600V) and pollution degree 2.

ELECTRICAL SYMBOLS

-  Important safety information. Refer to the manual.
-  Dangerous voltage may be present.
-  Earth ground
-  Conforms to European Union directives
-  Double insulated (Protection class II)

SAFETY WARNING

1. Read the operating instructions before using the instrument and pay particular attention to all WARNINGS and CAUTIONS in this instruction manual.
2. Be sure that the cover and the test leads of the meter are in good conditions.
3. Set the range /function switch at the correct position when measuring.
4. Make sure to insert the red and the black test leads to their appropriate jacks. The black test lead should be connected first when measuring while the red test lead should be disconnected first after measuring.
5. When the range and function changes, both test leads should be disconnected.
6. To avoid damage to the instrument, never exceed the allowable maximum input of each range.
7. Be care of electric shock hazard when the voltage to be tested is above DC 60V or AC 30V.
8. To avoid electric shock, do not open the battery compartment cover when making measurement.
9. Remove the test leads from the circuit being measured before replacing the battery.
10. Do not change the built-in circuit to avoid damage to the meter.
11. Do not use or store the instrument in an explosive atmosphere (i.e. the presence of flammable gas or fume, vapor or dust).

12. CAT II- Measurement Category II is for measurements performed on circuits directly connected to low voltage installation.(Examples are measurements on household appliances, portable tools and similar equipments.) Do not use the meter for measurements within Measurement Categories III and IV.

	DCV	ACV	DCA	ACA	Ω	$\rightarrow+$	$\bullet))$	TEMP	FREQ	HOLD	LIGHT
201	*	*		*	*	*	*			*	*
202	*	*		*	*	*	*	*		*	*
203	*	*		*	*	*	*		*	*	*
204	*	*	*	*	*		*		*	*	

CHARACTERISTICS

200 series clamp meters are 3 1/2-digit LCD multimeters powered by 9V standard battery. They can be used in the measurements of AC/DC voltage, AC current, DC current (only for 204), resistance, frequency, temperature, continuity and diode. They also has data-held and back-light function. They are ideal instruments for use in fields, factory, college and laboratory. They has the following characteristics:

- 1) Meet the safety standard in IEC1010-1, IEC1010-2-032.
- 2) 3 1/2-digit LCD (16mm).
- 3) Data-hold.
- 4) Back-light(not for 204), easy reading.
- 5) Overload protection to all range.
- 6) High resistance for min. measurement error.
- 7) Safe, individual battery box design, easy for battery replacement.

FRONT PANEL

1. Transformer jaws

Pick up the AC current flowing through the conductor.

2. Trigger

Press the level to open the transformer jaws.

When the finger pressing on the level is released the jaws will close again.

3. Button

- **Hold Button**

Press the HOLD button, the reading will be locked and symbol "H" will be displayed on the LCD. When the button is released, the reading will disappear.

- **LIGHT button**

The back-light button is unlocked. Press the button and the display will auto power off in 5 seconds. Press it again, the display will be lighted again.

- **POWER button**

Press POWER button, the meters go on. Press again, the meters will go off.

- **Zero button(only for 204)**

Press this button for several seconds, the display will appear "00.0"

4. LCD

3 1/2-digit, 7 segments



5. " Ω Hz °C "input connector

For the red test lead.

6. Rotary switch

A rotary switch is used to select the measurement function and range.

7. "COM" input connector

For the black test lead.

8. "V" input connector

For the red test lead.

GENERAL SPECIFICATIONS

Max. display: LCD 3 1/2-digit (1999 count)

Measuring method: Dual slope integration A/D converter

Sampling speed: 2-3 times/sec.

Unit display: Function and unit symbols displayed

Polarity: Automatic negative polarity display

Overload indication: Symbol "1" appears on the LCD

Low battery indication: Symbol "  " appears on the LCD

Data hold: symbol "1" appears on the LCD

Back-light: LCD back-light auto go off in 5 seconds

Environment: 0~40°C, ≤75%RH

Storage temperature: -10~50°C, ≤75%RH

Power: 9V laminated battery, IEC6F22 NEDA1604 JIS006P

Conductor size: Approx. 42mm diameter (max.)

Dimensions: 250mm x 99mm x 46mm

Weight: Approx. 400g (battery & test leads included)

Accessories: A pair of test leads, one piece of 9V battery, one piece of K type thermocouple (202 only) and one copy of operation manual.

TECHNICAL SPECIFICATIONS

Accuracy: $\pm(\% \text{reading} + \text{digits})$, guaranteed for 1 year.

Environment: temperature 23°C, $\leq 75\% \text{RH}$

DC VOLTAGE

RANGE	RESOLUTION	ACCURACY
1000V	1V	$\pm(0.5\% + 2)$

Overload protection: 1000V DC or AC rms.

Input impedance: 9M Ω

AC VOLTAGE

RANGE	RESOLUTION	ACCURACY
750V	1V	$\pm(1\% + 5)$

Overload protection: 1000V DC or AC rms.

Input impedance: 9M Ω

Frequency range: 40~400Hz

AC CURRENT

RANGE	RESOLUTION	ACCURACY
20A	0.01A	$\pm(2.5\% + 5)$
200A	0.1A	
1000A	1A	

Overload protection: 120% of full range, 30 seconds

Frequency range: 40~400Hz

AC , DC CURRENT (Only for 204)

RANGE	RESOLUTION	ACCURACY
200A	0.1A	±(2% + 3)
1000A	1A	

Temperature coefficient : -0.2% / °C

RESISTANCE

RANGE	RESOLUTION	ACCURACY
200kΩ	0.1kΩ	±(1.0% + 3)
2kΩ	1Ω	
200Ω	0.1Ω	

Overload protection: 250V DC or AC rms

AUDIBLE CONTINUITY

RANGE	DESCRIPTION	TEST CONDITION
•)))	The built-in buzzer will sound if the resistance of the circuit unnder test is less then 30Ω.	Open circuit voltage about 3 V
➔+	The approximate forward voltage of the diode under test will be displayed on the LCD.	Testing current 1mA

FREQUENCY(ONLY FOR 203 & 204)

RANGE	RESOLUTION	ACCURACY
2kHz	1Hz	±(2% + 5)

Overload protection: 250V DC or AC rms

Input voltage range: 500mV~10V rms

TEMPERATURE

RANGE	RESOLUTION	ACCURACY
-40°C ~ 400°C	1°C	-40~0°C±(1.5% + 4) 0~400°C±(1% + 3)

MEASURING AC CURRENT

Caution: The max. AC current range is 1000A. TO avoid damage to the instrument, do not use the meter to measure the current that might exceed the max. input value.

1. Set the rotary switch to the desired range.

Caution:

- a. If the current to be measured is not known beforehand, set the range switch to the highest range and turn it down range by range till the satisfactory resolution is obtained.
 - b. If the figure "1" is displayed on the LCD, it indicates that the range has been exceeded and the range switch should be set to higher range.
 - c. Remove the test leads from the instrument after measuring to avoid electric shock.
2. Press the trigger to open the transformer jaws and clamp onto a conductor.
- a. If the conductor to be clamped is more than two pieces, accurate measurements can not be taken.
 - b. The most accurate reading will be obtained by keeping the conductor at the center of the transformer jaws.
3. Read the value displayed on the LCD.
4. Press the Data Hold button, and the last reading will be held with the symbol "H" shown on the LCD.

5. If it is too dark to read the value on the LCD, press the LIGHT button, and the back-light will be lightened and turned off automatically in 5 seconds. Press it again, the back-light will be turned on again.

Caution: Do not turn on the back-light if it is not necessary because the power consumption is too much.

MEASURING DC CURRENT (Only 204)

Caution: The max. DC current range is 1000A. TO avoid damage to the instrument, do not use the meter to measure the current that might exceed the max. input value.

1. Set the rotary switch to 200A range.

Press the ZERO button for several seconds until the display appears "00.0"

2. Set the rotary switch to the desired range.

Caution:

- a. If the current to be measured is not known beforehand, set the range switch to the highest range and turn it down range by range till the satisfactory resolution is obtained.
 - b. If the figure "1" is displayed on the LCD, it indicates that the range has been exceeded and the range switch should be set to higher range.
 - c. Remove the test leads from the instrument after measuring to avoid electric shock.
3. Press the trigger to open the transformer jaws and clamp onto a conductor.

Caution:

- a. If the conductor to be clamped is more than two pieces, accurate measurements can not be taken.
 - b. The most accurate reading will be obtained by keeping the conductor at the center of the transformer jaws.
4. Read the value displayed on the LCD.

MEASURING AC VOLTAGE**Caution:**

The max. AC voltage range is 750V. To avoid electric shock or damage to the instrument, do not use the meter to measure voltage that might exceed the max. input value.

1. Connect the black test lead to the "COM" jack and the red test lead to the "V" jack.
2. Set the rotary switch to 750V range.
3. Connect the test leads across the source or load to be measured.
4. Read the voltage value displayed on the LCD.
5. Press the HOLD button for data-hold and LIGHT button for back-light.

MEASURING DC VOLTAGE

Caution: The max. DC voltage is 1000V. To avoid electric shock or damage to the instrument, do not use the meter to measure voltage that might exceed the max. input value.

1. Connect the black test lead to the "COM" jack and the red test lead to the "V" jack.
2. Set the rotary switch to the desired range.
3. Read the voltage value displayed on the LCD along with the polarity of the red test lead.
4. Press the HOLD button for data-hold and the LIGHT button for back-light.

MEASURING RESISTANCE

Caution: a. The overload protection to the resistance is 300V DC or AC rms. If the resistance to be measured is connected to a circuit, turn off the power to the circuit and discharge all capacitors before measuring.

b. Do not use the instrument to measure voltage when the rotary switch is set to the resistance range, otherwise, the built-in circuit will be damaged.

1. Connect the black test lead to "COM" jack and the red test lead to the " $\rightarrow \Omega$ Hz °C " jack.
2. Set the rotary switch to the " Ω " range.
3. Connect the test leads to two terminals of the circuit to be tested.
4. Read the value displayed on the LCD.

Caution: If the circuit has been opened or the resistance value is over range, the figure "1" will be displayed on the LCD.

If the resistance value is less than $30\Omega \pm 10\Omega$, the built-in buzzer will sound.

6. Press the HOLD button for data-hold and the LIGHT button for back-light.

MEASURING FREQUENCY

Caution: The max. input is 1000V rms. If the voltage is over 100V, the value displayed on the LCD will not be accurate. The accuracy is 0.5V rms.

1. Connect the black test lead to the "COM" jack and the red test lead to the " $\rightarrow + \Omega \text{ Hz } ^\circ\text{C}$ " jack.
2. Set the rotary switch to the "Hz" range.
3. Connect the red and the black test leads to the circuit to be tested.
4. Read the value displayed on the LCD.
5. Press the HOLD button for data-hold and the LIGHT button for back-light.

MEASURING TEMPERATURE

1. Set the range switch to the TEMP range and the current room temperature will be displayed on the LCD with the character .
 2. Connect the K type thermocouple to the " $\rightarrow + \Omega \text{ Hz } ^\circ\text{C}$ " and "COM" jack.
 3. Contact the object to be measured with the thermocouple carefully.
 4. Read the value displayed on the LCD.
 5. Press the HOLD button for data-hold and the LIGHT for back-light.
- Caution: When the thermocouple is not inserted or disconnected, the temperature is the current room temperature.

TESTING DIODE

1. Connect the black test lead to the "COM" jack and the red test lead to " $\rightarrow + \Omega \text{ Hz } ^\circ\text{C}$ " jack.
2. Set the rotary switch to the " $\rightarrow +$ " range.
3. Connect the red test lead to the anode of the diode to be tested and the black test lead to the cathode of the diode.
4. The approx. forward voltage drop of the diode will be displayed on the LCD.
5. Press the HOLD button for data-hold and the LIGHT button for back-light.

BATTERY REPLACEMENT

Caution: a. If the symbol " $\rightarrow +$ " appears on the LCD, it indicates that the battery should be replaced.

b. Before opening the case, always be sure that the test leads have been disconnected from the measurement circuits.

1. TO replace the battery, remove the two screws in the bottom of the case. Simply remove the old one, and replace with a new one of the same ratings (9V IEC6F22 NEDA 1604 JIS006P).
2. Close the case and tighten the screws completely before using the meter to avoid electrical shock.