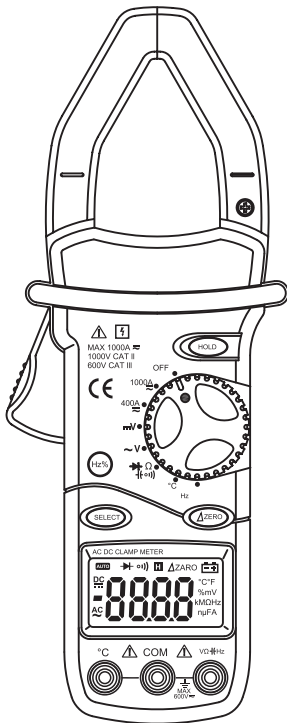


AC / DC CLAMP METER

OPERATOR'S MANUAL



CAT II
1000V

CAT III
600V

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Safety information

This AC/DC clamp meter has been designed according to IEC1010-1 and IEC1010-2-032 concerning safety requirements for electrical measuring instruments and hand - held current clamps with an overvoltage category CAT II 1000V and CAT III 600V pollution degree of 2.

However, electrical noise or intense electromagnetic fields in the vicinity of the equipment may disturb the measurement circuit. Measuring instruments will also respond to unwanted signals that may be present within the measurement circuit.

Users should exercise care and take appropriate precautions to avoid errors in measurement.

Symbol Explanation

	Note-Important safety information, refer to the instruction manual.
	Application around and removal from UNINSULATED HAZARDOUS LIVE conductors is permitted.
	Caution, possibility of electric shock
	Equipment protected throughout by double insulation or reinforced insulation.
	Earth (ground) TERMINAL
	Direct current
	Alternating current

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CAT II	This unit is capable of safely measuring circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation.
CAT III	This unit is capable of safely measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.

Safety Precautions

Follow all safety and operating instructions to ensure maximum personal safety during operation and to ensure the meter is kept in good operating condition.

- Read these operating instructions thoroughly and completely before operating your meter. Pay particular attention to WARNINGS, which will inform you of potentially dangerous procedures. The instructions in these warnings must be followed.
- Always inspect your meter and test leads for any sign of damage or abnormality before every use. If any abnormal conditions exist (i.e. broken test leads, cracked cases, display not reading, etc.), do not attempt to take any measurements.
- Do not expose the instrument to direct sunlight, extreme temperature or moisture.
- Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mat, or any approved insulating material.
- Always take precautions when working with voltages above

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60V DC or 30 AC RMS.

- Never use the meter to measure voltages that might exceed the maximum allowable input value of any function.

Maintenance

- Never touch exposed wiring, connections or any live circuit when attempting to take measurements.
- Before opening the case, always disconnect test leads from all energized circuits.
- Never use the meter unless the back cover is in place and fastened completely.
- Do not use abrasives or solvents on the meter. To clean, use a damp cloth and mild detergent only.
- Qualified and trained service technicians should only perform calibration and repair of the meter.
- Do not attempt calibration or service unless trained and another person capable of rendering first aid and resuscitation is present.

Cleaning





To keep the instrument clean, wipe the case with a damp cloth and detergent; do not use abrasives or solvents.

General Description

This meter is an auto-ranging professional AC/DC clamp meter with a 3999 count display. This meter can measure DC and AC voltage, DC and AC current, resistance, capacitance, temperature, frequency, duty cycle, diode and continuity tests.

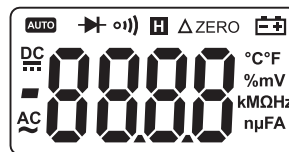
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







Panel Description

1. Transformer jaws
Pick up the AC or DC current flowing through the conductor.
2.  DC current direction sign.
3. HOLD button
When this button is pushed, the display will keep the last reading and "  " symbol will appear on the LCD. Pushing it again returns the meter to normal mode.
4. Rotary switch
The rotary switch is used to select functions and turn the meter on/off.
5.  ZERO button
Push this button to enter relative mode and "  ZERO " will appear on the display and the meter will store the displayed reading as the reference value. In relative mode, the display will show the difference between the reference value and the currently measured value.

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6. LCD Display



	Auto range indication
	Diode test indication
	Continuity indication
	Hold data indication
	Relative measurement indication
	Low battery indication
	DC input indication
	AC input indication
	Polarity indication
	Duty cycle measurement indication
	Temperature (centigrade) measurement
	Temperature (fahrenheit) measurement
	Voltage measurement unit
	Ohm measurement unit
	Frequency measurement unit
	Capacitance measurement unit
	Current measurement unit

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7. “VΩ Hz” jack

This is the positive input terminal for voltage, diode, capacitance, frequency, duty cycle and continuity measurement. Use the red test lead for this input jack.

8. “COM” jack

This is the common input terminal for all measurement except current. Use the black test lead or the negative lead of the type-k thermocouple for this input jack.

9. “°C” jack

This is the positive input terminal for the type-k thermocouple. Use the positive lead of the thermocouple for this input jack.

10. SELECT button

In the “Ω → ∩) |{” position, press SELECT to switch between “Ω or → ∩) or ∩) |{” functions. The corresponding symbol and units will appear on the display. In current measurement, press SELECT to switch between AC and DC current.

11. Hz% button

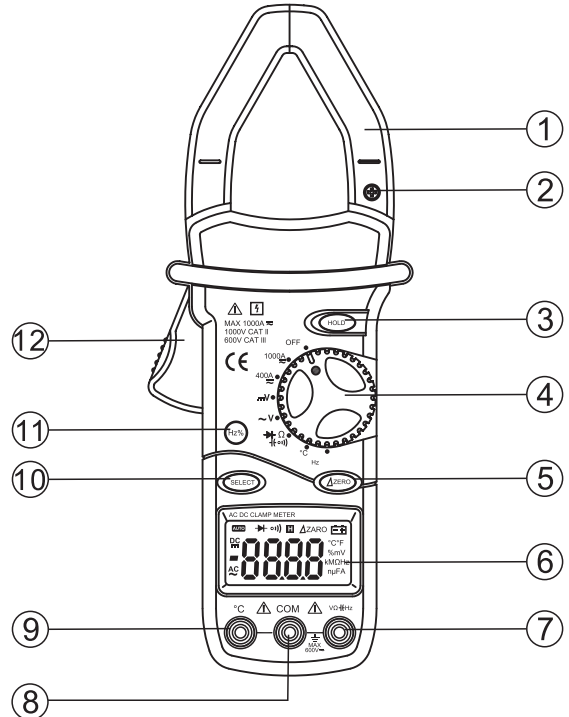
Press Hz% to switch between frequency and duty cycle while in the Hz position.

12. Trigger

Press the lever to open the transformer. When the lever is released, the jaws will close again.

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LAYOUT (FORWARD)



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Operating Instructions

DC Voltage Measurement

1. Insert the black and red test leads into the **COM** and **VΩ Hz** input terminals respectively.
2. Set rotary switch to the **V** position.
3. Connect the test leads in parallel with the circuit to be measured. Be careful not to touch any electrical conductors.
4. The polarity of the red lead connection will be indicated along with the voltage value.
5. Read the measurement on the display.

AC Voltage Measurement

1. Insert the black and red test leads into the **COM** and **VΩ Hz** input terminals respectively.
2. Set rotary switch to the **V~** position.
3. Connect the test leads in parallel with the circuit to be measured. Be careful not to touch any electrical conductors.
4. Read the measurement on the display.
5. In AC voltage mode, pressing **Hz%** will display the frequency of the signal being measured.

DC Current Measurement

1. Set the rotary switch to the 400A or 1000A position.
2. Push the SELECT button to select DC current.
3. Push "**Δ**ZERO" for relative measurement if necessary and to zero the display.
4. Press the trigger to open transformer jaw and to clamp one conductor only, making sure that the jaw is firmly closed around the conductor.
5. Read the measurement on the display.

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Note:

Sometimes the clamp can retain some of the electromagnetic signal after measurement. If the display does not return to "0", try opening the jaws several times before measuring again.

AC Current Measurement

1. Set the rotary switch to the 400A or 1000A position.
2. Push the SELECT button to select AC current.
3. Press the trigger to open transformer jaw and clamp one conductor only, making sure that the jaw is firmly closed around the conductor.
4. Read the measurement on the display.

Resistance Measurement

1. Insert the black and red test leads into the **COM** and **VΩ Hz** input terminals respectively.
2. Set rotary switch to the **Ω** position.
3. Push the SELECT button to select **Ω**.
4. If the resistance being measured exceeds the maximum value of the range or the input is not connected, an overrange indication "OL" will be displayed.
5. Read the measurement on the display.

Note:

1. When checking in-circuit resistance, be sure the circuit under test has all power removed and that all capacitors have been discharged fully.
2. For measuring resistance above 1MΩ, the meter may take a few seconds to get a stable reading. This is normal for high resistance measurements.

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3. When the input is not connected, i.e. at open circuit, the figure "OL" will be displayed for the overrange condition.

Diode Measurement

1. Insert the black and red test leads into the **COM** and **V Ω \leftarrow Hz** input terminals respectively.
2. Set rotary switch to the **$\Omega \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow$** position. Push the SELECT button to select **\rightarrow** .
3. The red lead should be connected to the anode and the black lead to the cathode of the diode.
4. The typical voltage drop should be about 0.6V for silicon diode or 0.3V for germanium diode.
5. If the diode is reverse biased or there is an open circuit the reading displayed will be "OL".

Continuity Testing

1. Insert the black and red test leads into the **COM** and **V Ω \leftarrow Hz** input terminals respectively.
2. Set rotary switch to the **$\rightarrow \rightarrow \rightarrow \rightarrow \rightarrow$** position.
3. Push the SELECT button to select **\rightarrow** .
4. If continuity exists (i.e. the resistance is less than 40 Ω), the built-in buzzer will sound.

Capacitance Measurement

1. Insert the black and red test leads into the **COM** and **V Ω \leftarrow Hz** input terminals respectively.
2. Set the rotary switch to the **$\Omega \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow$** position.
3. Connect test leads across the capacitor under measurement and be sure that the polarity of connection is observed (Note: The polarity of the red lead connection is positive "+").
4. Read the measurement on the display.

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Frequency Measurement

1. Insert the black and red test leads into the **COM** and **V Ω \leftarrow Hz** input terminals respectively.
2. Set rotary switch to the Hz position.
3. Frequency should be the default setting. Connect the test leads in parallel with the circuit to be measured. Be careful not to touch any electrical conductors.
4. The signal amplitude must also be greater than the sensitivity level.
5. Determine that the amplitude level of the signal to be measured is not greater than the input voltage limit (250V DC/AC rms.).
6. Read the measurement on the display.

Note:

The input voltage should be between 1V and 10V rms. ac. If the voltage is more than 10V rms, the reading may be out of the meter's accuracy range.

Temperature Measurement

WARNING

Before inserting type-k thermocouple, make sure all leads are disconnected from the meter and from measurement circuits. Do not connect the thermocouple to any voltage source while connected to the meter.

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1. Set the rotary switch to the °C Position. The LCD display will show "OL".
2. Connect the red lead of "K" type thermocouple into the "°C" jack and the black lead of "K" type thermocouple into the "COM" jack. The LCD display will show the current environment temperature.
3. Touch the tip of the thermocouple to the test object.
4. Read the measurement on the display.

Duty Cycle Test

1. Insert the black and red test leads into the **COM** and **V Ω Hz** input terminals respectively.
2. Set rotary switch to the **Hz** position.
3. Push the Hz% button to select duty cycle mode and connect the test leads in parallel with the circuit to be measured. Be careful not to touch any electrical conductors.
4. Read the measurement on the display.



Specifications

Accuracy is given as \pm (% of reading + number of least significant digits) at 18°C to 28°C, with relative humidity up to 80%. All specifications assume less than 1 year since calibration.

General

Maximum voltage CAT II 1000V and CAT III 600V.
Display LCD 3999 counts. Updates 2-3/sec.
Ranging method Auto range mode
Polarity indication " - " display for negative polarity.

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Overrange indication Only figure "OL" on the display.
Jaw capability 42mm (Max conductor size)
Power Battery 9V  IEC 6F22
JIS 006P NEDA 1604 type.
Low battery "" appears on the display
Operating 5°C to 35°C
Storage temperature -10°C to 50°C
Temperature coefficient 0.1 × specified accuracy) / °C
(<18°C or >28°C)
Altitude 2000m
Size 250mm×99mm×43mm
Weight Approx. 416g.

DC Voltage

Range	Resolution	Accuracy
0.4V	0.1mV	±0.7% of rdg 1 ±digit
4V	1mV	
40V	10mV	
400V	0.1V	
1000V	1V	±0.8% of rdg 3 ±digits

Input Impedance: 10MΩ
Overload Protection: 1000V DC or 750V AC RMS

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AC Voltage

Range	Resolution	Accuracy
4V	1mV	±0.8% of rdg 5 \pm digits
40V	10mV	
400V	0.1V	
750V	1V	±1.0% of rdg 10 \pm digits

Input Impedance: 10M Ω

Frequency range: 40Hz to 400Hz.

Overload Protection: 1000V DC or 750V AC RMS

DC Current

Range	Resolution	Accuracy
400A	0.1A	±3.0% of rdg 3 \pm digits
1000A	1A	

Overload Protection 120% ranges for 60 seconds max.

AC Current

Range	Resolution	Accuracy
400A	0.1A	±3.0% of rdg 3 \pm digits
1000A	1A	

Overload Protection:

120% ranges for 60 seconds max.

Frequency range: 50Hz to 60Hz.

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Resistance

Range	Resolution	Accuracy
400 Ω	0.1 Ω	±1.2% of rdg 1 \pm digit
4K Ω	1 Ω	
40K Ω	10 Ω	
400K Ω	0.1K Ω	
4M Ω	1K Ω	
40M Ω	10K Ω	±2.0% of rdg 3 \pm digits

Overload Protection: 250V dc or rms. ac for all ranges.

Capacitance Measurement

Range	Resolution	Accuracy
4nF	1pF	±4.0% of rdg 10 \pm digits
40nF	10pF	
400nF	0.1nF	
4 μ F	1nF	
40 μ F	10nF	

Overload Protection: 250V dc or rms. ac for all ranges.

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Frequency Measurement

Range	Resolution	Accuracy
40Hz	0.01Hz	±2.0% of rdg 1 ±digit
400Hz	0.1Hz	
4kHz	1Hz	
40kHz	10Hz	
100kHz	0.1kHz	

Measurement range: 1V to 10V rms. 10Hz to 100kHz.

Duty Cycle

Range	Resolution	Accuracy
0.1%~99.9%	0.1%	±2.0% of rdg 2 ±digit

Temperature

Range	Resolution	Accuracy
400°C~750°C	1°C	±1.0% of rdg ± 5°C
0°C~400°C	1°C	±1.0% of rdg ± 3°C
-40°C~0°C	1°C	±1.0% of rdg ± 6°C

Audible Continuity And Diode

Range	Description
o)	If continuity exists (about less than 40Ω), built-in buzzer will sound.
→	Shows the approx. forward voltage of the diode.

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Auto Power Off

To extend the life of the battery, the meter has an Auto Power Off function. If no buttons are pressed or the rotary switch is not moved for about 15 minutes, the meter will automatically turn itself off. To turn the meter back on, move the rotary switch or press any button.

Replacing The Battery

WARNING

To avoid electrical shock or personal injury, remove the test leads and any input signals before replacing the battery. Replace only with same type of battery.

When the display shows the "" symbol or the backlight is not very bright, the battery should be replaced to assure proper operation. Use the following procedure to replace the battery:

1. Turn the rotary switch to the OFF position. Disconnect test leads from any live source and remove the test leads from the input terminals.
2. Remove screws on the battery cover and open the cover.
3. Remove the used battery and replace with a new 9V battery (IEC 6F22 JIS 006P NEDA 1604 type).
4. Never use the multimeter unless the battery cover is in place and fastened securely.

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Replacing Test Leads

Replace test leads if the insulation appears worn or tips are damaged.

 **WARNING:**

Replacement leads must meet EN 61010-031 standards, rated CAT III 600V, 10A or greater.

Accessories

- Operator's instruction manual
- Set of test leads
- "K" type thermocouple
- Storage Case
- 9 volt battery
(IEC 6F22 JIS 006P NEDA 1604 type).

 **WARNING**

Using this appliance in an environment with a strong radiated radio frequency electromagnetic field (approximately 3V/m) may influence its measuring accuracy.

