HIOKI

CM3289

AC CLAMP METER

Instruction Manual

EN

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CM3289A961-00 18-03H

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HIOKI

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Warranty

Warranty malfunctions occurring under conditions of normal use in conformity with the Instruction Manual and Product Precautionary Markings will be repaired free of charge. This warranty is valid for a period of three (3) years from the date of purchase. Please contact the distributor from which you purchased the product for further information on warranty provisions.

Introduction

Thank you for purchasing the Hioki CM3289 AC Clamp Meter. This instrument is a clamp meter that can be perform true RMS measurement of current simply by clamping it around a circuit. To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

Target audience

This manual has been written for use by individuals who use the product in question or who teach others to do so. It is assumed that the reader possesses basic electrical knowledge (equivalent to that of someone who graduated from the electrical program at a technical high school).

Be sure to also read the separate document “Operating Precautions” before use.

Safety Notes

Symbols affixed to the device

	The instrument can be connected to or disconnected from a live conductor
	The flexible sensor can be connected to or disconnected from live conductors when appropriate protective insulation is used. The clamp meter and test leads can only be connected to or disconnected from insulated conductors suited to the voltage of the conductor under measurement.

⚠ DANGER

To avoid electric shock, do not touch the portion beyond the protective barrier during use.

Do not subject the instrument to any voltages when the resistance measurement or continuity check function is selected. Doing so may damage the instrument and result in bodily injury. To avoid electrical accidents, turn off the circuit before measuring it.

⚠ WARNING

- To avoid electric shock, short circuits and damage to the instrument, disconnect the test leads from the measurement object before switching the rotary switch.
- To prevent electric shock, when measuring the voltage of a power line use a test lead that satisfies the following criteria:
  - Conforms to safety standards IEC61010 or EN61010
  - Of measurement category III or IV
  - Its rated voltage is higher than the voltage to be measured
- The optional test leads for this instrument conform to the safety standard EN61010. Use a test lead in accordance with its defined measurement category and rated voltage.
- To prevent a short circuit accident, be sure to use the test leads with the sleeves attached when performing measurements in the CAT III measurement category. (For the measurement categories, see “Measurement categories” (Operating Precautions).)
- If the sleeves are removed during measurement, stop the measurement.
- Handle and dispose of batteries in accordance with local regulations.

⚠ CAUTION

Do not place foreign objects between the jaw tips (or flexible loop couplings) or insert foreign objects into the gaps of the jaws (or flexible loop couplings). Doing so may worsen the performances of the sensor or interfere with clamping action.

- The B indicator is displayed when the remaining battery capacity is low. In this case, the accuracy of the instrument is not guaranteed. Replace the battery immediately.
- To avoid battery depletion, set the rotary switch in the **[OFF]** position after use. (Even when the automatic power-saving function is enabled, the instrument consumes a small amount of the battery power.)

Inspection Before Measurement

- Before using the instrument, check it and verify that it operates properly to make sure that it suffered no damage during storage or transportation.
- If damage is suspected, check the section below before contacting your authorized Hioki distributor or reseller.

(1) Check the test lead for breaks.
If any, replace it with the new L9208 Test Lead.

(2) Check that the resistance measurement and continuity check operates normally.
If any one of them does not operate normally, send the instrument for repair to the your authorized Hioki distributor or reseller. The instrument may have been subject to a voltage of greater than 600 V during resistance measurement or continuity check.

(3) Check that the battery weakens.
If it weakens, replace the battery.

Functions

Automatic power-saving function

The instrument automatically turns off the LCD display after it is not operated for 30 minutes.

To restore the instrument from a non-displaying state

Set the rotary switch in the **[OFF]** position and then another one.

To cancel automatic power-saving function

- Set the rotary switch in a position other than **[OFF]** while holding down the **HOLD** key.
- The text **[APS]** and **[OFF]** are displayed in turn on the LCD display, and the automatic power-saving function is disabled.

To enable the automatic power-saving function, set the rotary switch in the **[OFF]** position, and then another one.

Auto-range function

The instrument automatically selects the most appropriate measurement range.

The text **[AUTO]** is displayed on the LCD display.

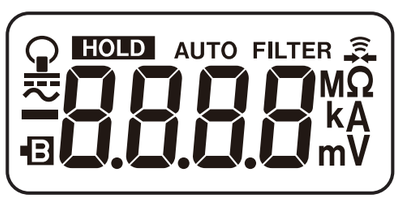
To set the measurement range manually (Manual-range function)

1. Set the rotary switch in the **[OFF]** position and then set the rotary switch in a position other than **[OFF]** while holding down the Ω↔⏚ / ~A↔Ω key.
2. Press the Ω↔⏚ / ~A↔Ω key to switch the measurement range. (Any ranges can be set except for the continuity check.)

Overflow indication

If an input exceeds the measurement range, the text **[OF]** or **[-OF]** is displayed on the LCD display.

LCD Display With All Segments Turned On

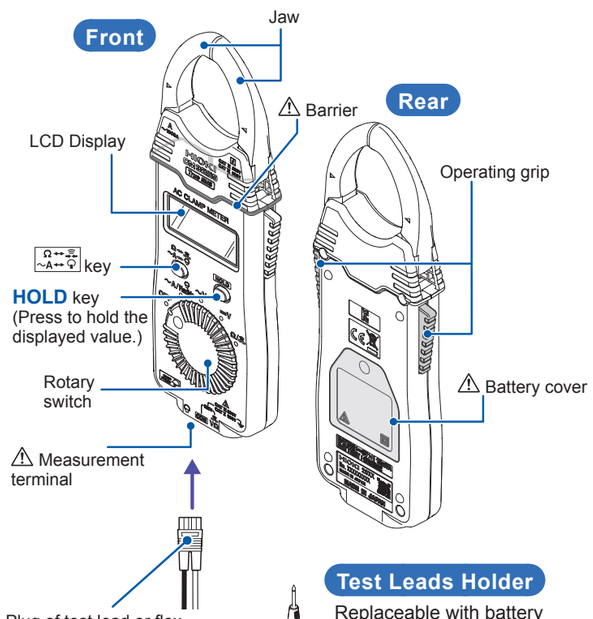


The segment **[FILTER]** is not used.

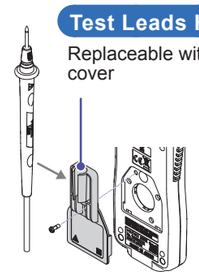
The instrument screen displays the alphanumeric characters as follows.

Parts Names

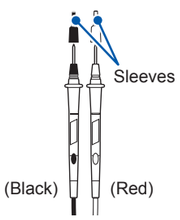
AC Clamp Meter



Test Leads Holder

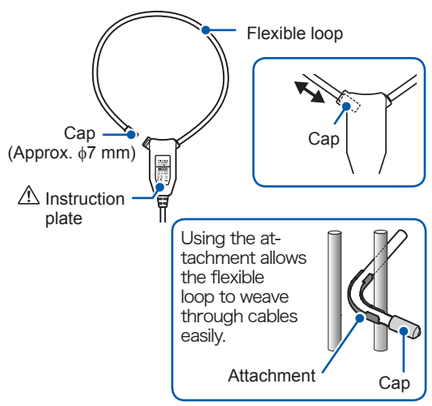


Test Lead



AC Flexible Current Sensor*

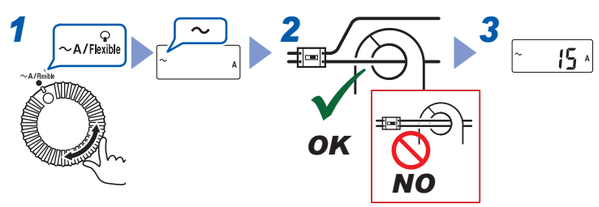
*Optional



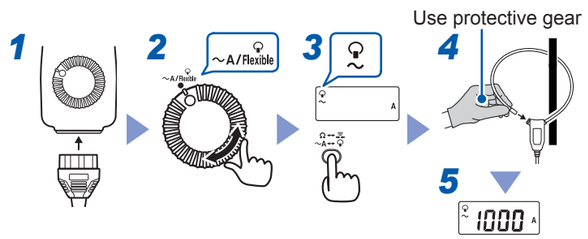
Measuring Methods

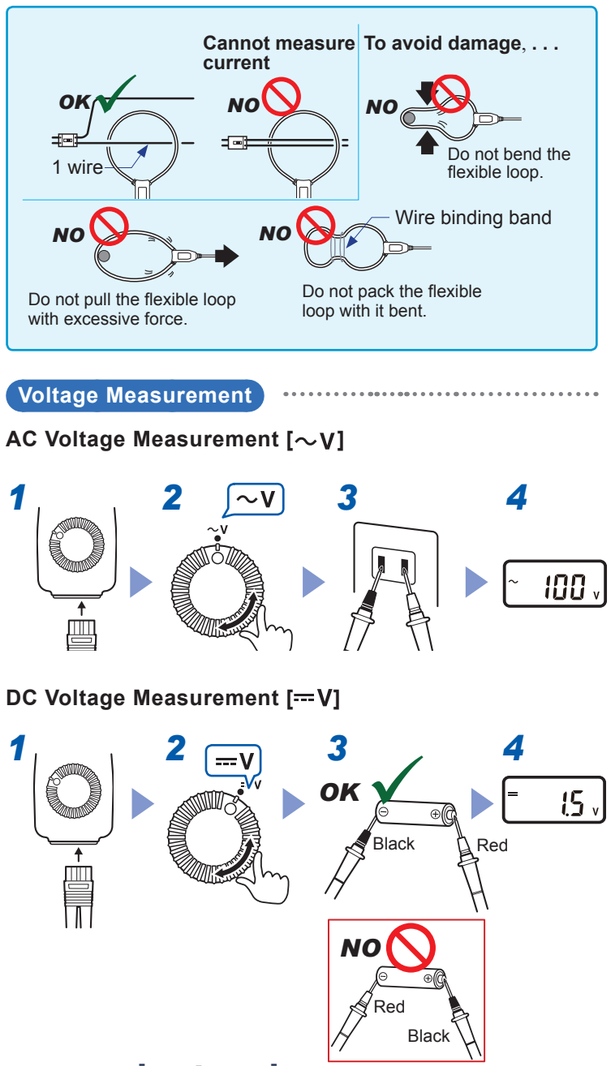
AC Current Measurement [~A/Flexible]

Measuring current with the instrument



Measuring current with Model CT6280 AC Flexible Current Sensor (optional)



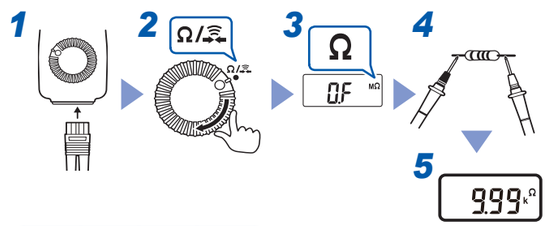


Voltage Measurement

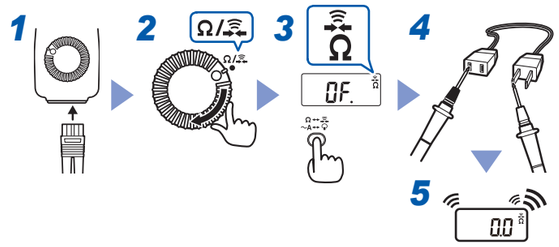
AC Voltage Measurement [~V]

DC Voltage Measurement [⎓V]

Resistance Measurement [Ω]



Continuity Check [•))]



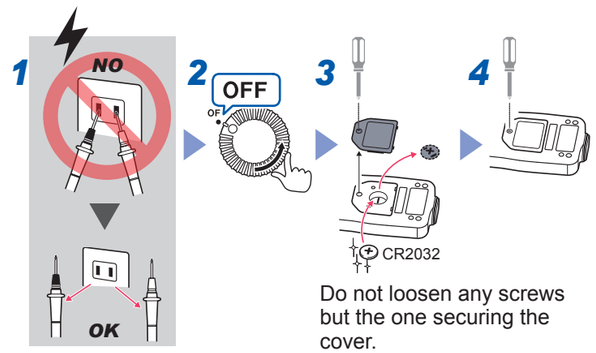
Cleaning / Replacing Battery

Cleaning

- Measurements are degraded by dirt on the mating surfaces of the jaw (or flexible loop coupling), so keep the surfaces clean by gently wiping with a soft, dry cloth.
- To clean the instrument, wipe it gently with a soft cloth moistened with water or mild detergent.
- Wipe the LCD display gently with a soft, dry cloth.

Replacing Battery

Necessary items: Phillips screwdriver (No.1) and Coin cell lithium battery (CR2032)



Do not loosen any screws but the one securing the cover.

Do not turn any one of the three screws inside the battery case. Doing so will cause the instrument to report abnormal measured values.

CALIFORNIA, USA ONLY
This product contains a CR Coin Lithium Battery which contains Perchlorate Material - special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate

Specifications

General Specifications

Operating environment	Indoors, pollution degree 2, altitude up to 2000 m (6562 ft.)
Operating temperature and humidity	
Temperature	−25°C to 65°C (−13.0°F to 149.0°F) (For the 40 MΩ range: up to 40°C)
Humidity (no condensation)	Less than 40°C (104.0°F): 80% RH or less At least 40°C (104.0°F) but less than 45°C (113.0°F): 60% RH or less At least 45°C (113.0°F) but less than 50°C (122.0°F): 50% RH or less At least 50°C (122.0°F) but less than 55°C (131.0°F): 40% RH or less At least 55°C (131.0°F) but less than 60°C (140.0°F): 30% RH or less At least 60°C (140.0°F) but less than 65°C (149.0°F): 25% RH or less
Storage temperature and humidity	−25°C to 65°C (−13°F to 149°F), 80% RH or less (no condensation)
Drop-proof	Operate after a drop from1 m on concrete
Standards	Safety: EN61010 EMC: EN61326
Power supply	Coin cell lithium battery CR2032 ×1 (3 V DC) Rated power voltage: 3 V DC Maximum rated power: 15 mVA
Continuous operating time	Approx. 70 hours (AC current measurement mode, continuous, unloaded)
Dimensions	• CM3289: Approx. 57W×181H×16D mm (2.24″W × 7.13″H × 0.63″D) • CT6280: Approx. 42W×65H×18D mm (1.65″W × 2.56″H × 0.71″D) (excluding the flexible loop and output cable)
Dimensions (Jaw)	Approx. 50W×11D mm (1.97″W × 0.43″D)
Mass	• CM3289: Approx. 100 g (3.5 oz.) (including battery) • CT6280: Approx. 71 g (2.5 oz.)
Product warranty period	CM3289, CT6280: 3 years
Accessories	• 9398 Carrying Case • L9208 Test lead • Coin cell lithium battery CR2032 (Installed in Model CM3289, for LCD display) • Instruction Manual • Operating Precautions (0990A909)
Options	• CT6280 AC Flexible Current Sensor (Attachment and C0205 are included) • 9209 Test Leads Holder • L4933 Contact Pin Set (Can be connected to the tip of the L9208, which comes with the instrument.) • L4934 Small Alligator Clip Set (Can be connected to the tip of the L9208, which comes with the instrument.) • C0205 Carrying Case (Models CT6280, L9208, and CM3289 can be stored.)

Basic Specifications

Maximum input current	• Jaw (CM3289):2000 A AC, continuous (45 Hz to 66 Hz) • Flexible loop (CM3289+CT6280): 4200 A AC, continuous (50 Hz to 60 Hz)
Maximum input voltage	600 V AC/DC and 3×10^6 V·Hz or less (ACV, DCV)
Overload protection	600 V AC/DC (ACV, DCV, Ω, continuity)
Maximum rated voltage to earth	
Jaw, CT6280	600 V AC (Measurement category III), 300 V AC (Measurement category IV) (Anticipated transient overvoltage: 6000 V)
Voltage measurement terminal	600 V AC (Measurement category II), 300 V AC (Measurement category III) (Anticipated transient overvoltage: 4000 V)
AC measurement method	True RMS measurement method
Display update rate	400 ms±25 ms
Noise rejection characteristics	NMRR DCV −40 dB or more (50 Hz/60 Hz) CMRR DCV −100 dB or more (50 Hz/60 Hz, 1 kΩ unbalance) ACV −60 dB or more (50 Hz/60 Hz, 1 kΩ unbalance) But, −45 dB or more for 600 V range.
Crest factor	For 2500 counts or less, 2.5 Reduces linearly to 1.5 or less at 4200 counts
Zero-display range	5 counts (AC current measured with jaw or flexible loop)
Effects of conductor position	• CM3289: within ±5.0% (Specified with a 11-mm-diameter cable) • CT6280: within ±5.0% (At any positions, based on the center of sensor)
Maximum measurable conductor diameter	• CM3289: ϕ33 mm or less • CT6280: ϕ130 mm or less
Model CT6280	Cross-section diameter of sensor cable: Approx. ϕ5.0 mm Sensor-tip cap diameter: Approx. ϕ7.0 mm Output cable length: Approx. 800 mm

Accuracy Specifications

rdg. (reading or displayed value):The value currently being measured and indicated on the measuring instrument.

dgt. (resolution):The smallest displayable unit on a digital measuring instrument, i.e., the input value that causes the digital display to show a “1” as the least-significant digit.

Conditions of guaranteed accuracy

- Guaranteed accuracy period: 1 year (Number of jaw and flexible loop open/close cycles: 10,000 or less)
- Guaranteed accuracy period after adjustment made by Hioki: 1 year
- Temperature and humidity for guaranteed accuracy: 23°C±5°C (73.0°F±9.0°F), 80% RH or less
- Temperature characteristic: Measurement accuracy × 0.1/°C is added (excluding 23°C±5°C)

AC Current Measured With Jaw

Range	Accuracy range	Accuracy		
		40 Hz ≤ f < 45 Hz	45 Hz ≤ f ≤ 66 Hz	66 Hz < f ≤ 1 kHz
42.00 A	4.00 A to 41.99 A	±2.0% rdg. ±5 dgt.	±1.5% rdg. ±5 dgt.	±2.0% rdg. ±5 dgt.
420.0 A	40.0 A to 419.9 A			
1000 A	100 A to 1000 A			

Accuracy is not defined for currents of 3×10^5 A·Hz or more.

AC Current Measured With Flexible loop

Range	Accuracy range	Accuracy		
		40 Hz ≤ f < 50 Hz	50 Hz ≤ f ≤ 60 Hz	60 Hz < f ≤ 1 kHz
420.0 A	40.0 A to 419.9 A	±3.5% rdg. ±5 dgt.*1, *2	±3.0% rdg. ±5 dgt.*1	±3.5% rdg. ±5 dgt.*1, *2
4200 A	400 A to 4199 A			

*1: Includes accuracy of CT6280 AC Flexible Current Sensor, ±1.0% rdg.
*2: Accuracy is not defined for a current of 1000 A or more or that of 3×10^5 A·Hz or more.

AC Voltage

Range	Accuracy range	Accuracy		Input impedance
		45 Hz ≤ f ≤ 66 Hz	66 Hz < f ≤ 500 Hz	
4.200 V	0.400 V to 4.199 V	±1.8% rdg. ±7 dgt.	±2.3% rdg. ±8 dgt.	11 MΩ±5%
42.00 V	4.00 V to 41.99 V			10 MΩ±5%
420.0 V	40.0 V to 419.9 V			10 MΩ±5%
600 V	400 V to 600 V			10 MΩ±5%

DC Voltage

Range	Accuracy range	Accuracy	Input impedance
420.0 mV	40.0 mV to 419.9 mV	±2.5% rdg. ±5 dgt.	100 MΩ or more
4.200 V	0.400 V to 4.199 V	±1.0% rdg. ±3 dgt.	11 MΩ±5%
42.00 V	4.00 V to 41.99 V		10 MΩ±5%
420.0 V	40.0 V to 419.9 V		10 MΩ±5%
600 V	400 V to 600 V		10 MΩ±5%

Resistance

Range	Accuracy range	Accuracy	Open-circuit voltage
420.0 Ω	40.0 Ω to 419.9 Ω	±2.0% rdg.±4 dgt.	3.4 V or less
4.200 kΩ	0.400 kΩ to 4.199 kΩ		
42.00 kΩ	4.00 kΩ to 41.99 kΩ		
420.0 kΩ	40.0 kΩ to 419.9 kΩ		
4.200 MΩ	0.400 MΩ to 4.199 MΩ	±5.0% rdg.±4 dgt.	
42.00 MΩ	4.00 MΩ to 41.99 MΩ	±10.0% rdg.±4 dgt.	

Continuity Check

Range	Accuracy	Threshold for buzzer sound	Open-circuit voltage
420.0 Ω	±2.0% rdg.±4 dgt.	50 Ω±40 Ω or less	3.4 V or less

Function Specifications

Display	Maximum count: 4199 counts
Battery indicator warning voltage	The mark is displayed at a battery voltage of 2.3 V±0.15 V or less.