

3287 CLAMP ON 3288 AC/DC HI TESTER 3288-20

Instruction Manual

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Please visit our website at www.hioki.com for the following:

- Regional contact information
- The latest revisions of instruction manuals and manuals in other languages.
- Declarations of Conformity for instruments that comply with CE mark requirements.

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 3287/3288/3288-20 AC Clamp Meter. To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

3288	Average value measurement RMS conversion model
3287	True RMS measurement model
3288-20	

Safety Notes

This instrument is designed to conform to IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, using the instrument in a way not described in this manual may negate the provided safety features. Before using the instrument, be certain to carefully read the following safety notes.

Notation

In this document, the risk seriousness and the hazard levels are classified as follows.

	DANGER Imminent risk of operator death or serious injury
	WARNING Potential for operator death or serious injury
	CAUTION Potential for minor operator injury or device damage or malfunction
	Risk of electric shock
	Prohibited actions
	Actions that must be performed

Symbols affixed to the device

	Precaution or hazard (See corresponding topic.)		
	Risk of electric shock		
	Protected throughout by double insulation or reinforced insulation		
	Device may be connected to or disconnected from a live conductor		
		DC (direct current)	
			AC (alternating current)

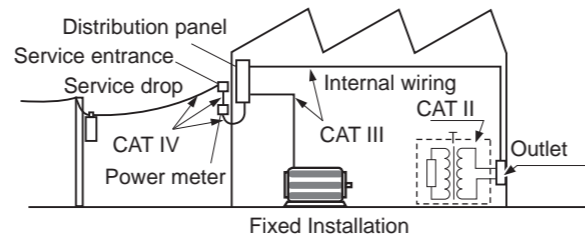
Accuracy

We define measurement tolerances in terms of rdg. (reading) and dgt. (digit) values, with the following meanings:

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.

Measurement categories

This instrument's current measurement part conforms to the safety requirements for CAT III 600 V and the voltage measurement part conforms to the safety requirements for CAT II 600 V, CAT III 300 V measuring instruments.



DANGER

Measuring a location with a higher category number than the measurement category indicated on this device may result in a serious accident such as electric shock.

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

Never apply voltage to the test leads when the resistance and continuity functions are selected.

Doing so may damage the instrument and result in bodily injury. To avoid electrical accidents, remove power from the circuit before measuring.

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 avoid an electric shock, operate the instrument at below a lower rated voltage between that indicated on the instrument and on test leads.

WARNING

- Installing the instrument in inappropriate locations may cause a malfunction of instrument or may give rise to an accident. Avoid the following locations:
 - Exposed to direct sunlight or high temperature
 - Exposed to corrosive or combustible gases
 - Exposed to a strong electromagnetic field or electrostatic charge
- Near induction heating systems (such as high-frequency induction heating systems and IH cooking equipment)
- Susceptible to vibration
- Exposed to water, oil, chemicals, or solvents
- Exposed to high humidity or condensation
- Exposed to high quantities of dust particles

WARNING

- Since there is a risk of electric shock, check that the insulation on the test lead are neither ripped nor torn, and no metal conductor inside the wire are exposed before using the instrument. If damaged, replace them with those specified by our company.
- 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.
- If the sleeves are inadvertently removed during measurement, stop the measurement.
- With regard to the electricity supply, there are risks of electric shock, heat generation, fire, and arc flash due to short circuits. If persons unfamiliar with electricity measuring instrument are to use the instrument, another person familiar with such instruments must supervise operations.
- This instrument is measured on a live line. To prevent electric shock, use appropriate protective insulation and adhere to applicable laws and regulations.
- Handle and dispose of batteries in accordance with local regulations.

CAUTION

- Do not place foreign objects between the jaw tips 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.
- Be careful to avoid dropping the instrument or otherwise subjecting them to mechanical shock, which could damage the jaw and adversely affect measurement.

Poor performance or damage from battery leakage could result. Observe the cautions listed below:

- Do not use batteries after their recommended expiry date.
- Do not allow weak batteries to remain in the instrument.
- Replace batteries only with the specified type.
- Remove the batteries from the instrument if it is to be stored for a long time.

- The indicator lights up when the remaining battery capacity is low. In this case, the instrument's reliability is not guaranteed. Replace the battery immediately.
- To avoid battery depletion, turn the rotary switch OFF after use (the auto power save feature consumes a small amount of current).

Inspection Before Measurement

- Verify that the instrument operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your authorized Hioki distributor or reseller.
- If damage is suspected, check the section below before contacting your authorized Hioki distributor or reseller.
 - (1) Check that the test lead is not broken.**
Replace with the specified L9208 Test Lead.
 - (2) Check that the resistance measurement and continuity test operates normally.**
Have the instrument repaired by 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 testing.
 - (3) Check that the battery voltage is not low.**
Replace the batteries.

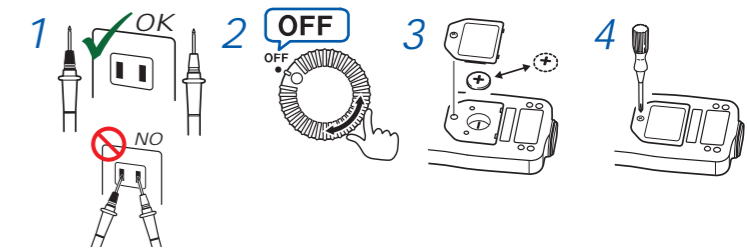
Maintenance/Inspection

Cleaning

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

Insert/Replace Batteries

Necessary tool: Phillips screwdriver and CR2032 Coin-shaped lithium battery



Do not turn the adjustment screw inside the battery case. Doing so will cause the instrument to report abnormal measured values.

CALIFORNIA, USA ONLY

Perchlorate Material - special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate

Functions

Display will automatically turn off if the instrument is not used for 30 min. (Auto power-saving function)

- The auto power save function is activated automatically when the power is turned on. (Not possible to cancel)
- To resume instrument operation in the previous state, select the "OFF" position with the rotary switch and then move the switch to the desired function.

Automatically sets the measurement range to the most appropriate range (Auto-range function)

Displays [AUTO]

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

- Power on the tester while holding down the $\Omega \leftrightarrow \sim V$ or **HOLD** key to select a manual range for measuring AC current [$\sim A$], DC current [$\equiv A$], AC voltage [$\sim V$], DC voltage [$\equiv V$] or resistance [Ω].

- Note that this function is not available for continuity testing. Press the $\Omega \leftrightarrow \sim V$ key to step to the next range.

- To switch between AC voltage [$\sim V$] and DC voltage [$\equiv V$], press and hold the $\sim V \leftrightarrow \equiv V$ key for at least one second.

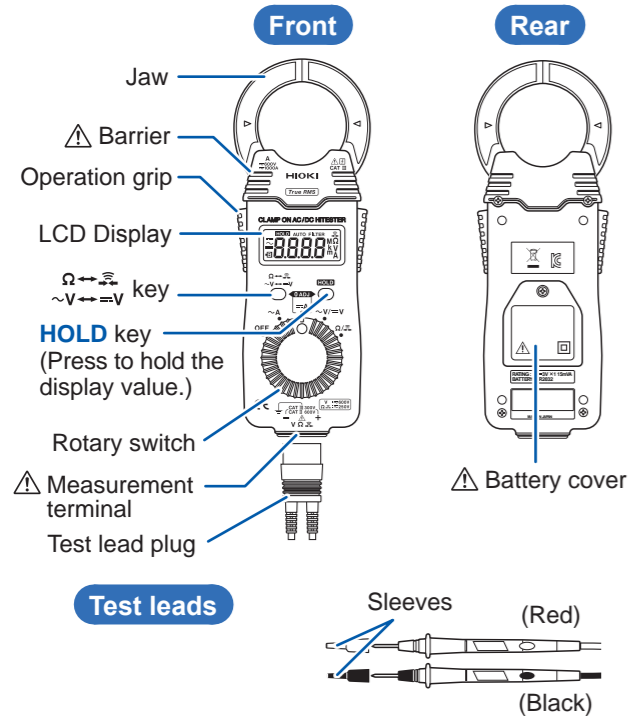
Indication when input exceeds the measurement range (Overflow indication)

Displays [OF] or [-OF]

Zero-adjust Function

- The zero adjustment function compensates for sensor magnetization and changes in current display over time.
- Before measuring DC current [$\equiv A$], you must perform zero adjustment by simultaneously pressing the $\Omega \leftrightarrow \sim V$ and **HOLD** keys while there is no input to the instrument.
- This function is only effective with measurement of DC current [$\equiv A$].

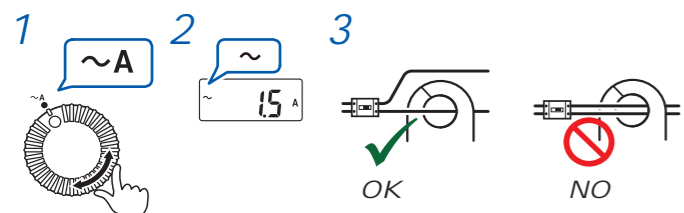
Parts Names



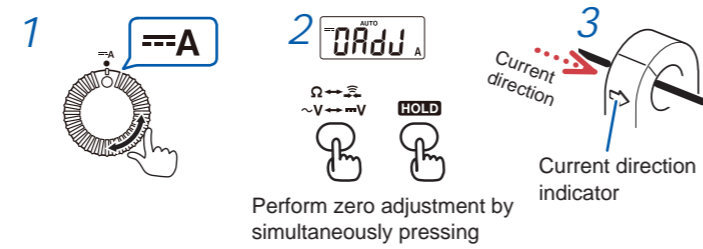
Measurement Methods

Current Measurement

AC Current Measurement [$\sim A$]

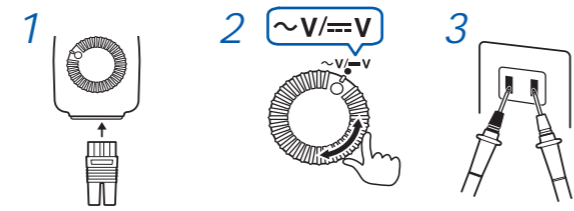


DC Current Measurement [$\equiv A$]

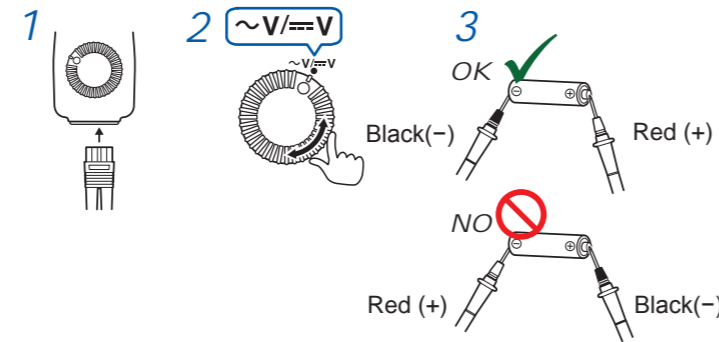


Voltage Measurement

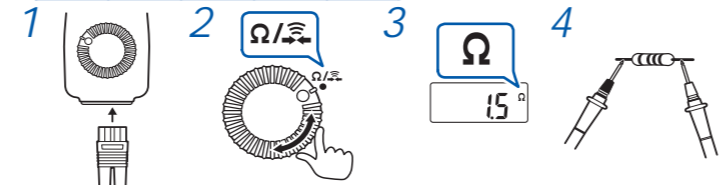
AC Voltage Measurement [$\sim V$]



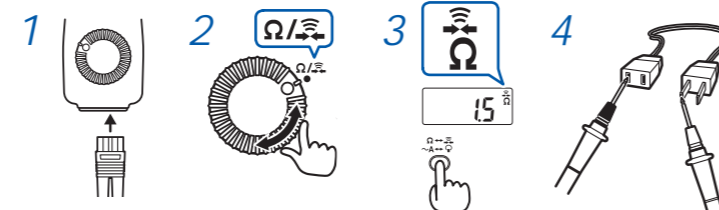
DC Voltage Measurement [$\equiv V$]



Resistance Measurement [Ω]



Continuity check [$\sim \Omega$]



Specifications

General Specifications

Operating environment	Indoors, pollution degree 2, altitude up to 2000 m (6562 ft.)
Operating temperature and humidity	0°C to 40°C (32°F to 104°F) 80% RH or less (no condensation)
Storage temperature and humidity	-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)
Standards	Safety: EN61010 EMC: EN61326

Power supply	CR2032 Coin-shaped lithium battery ×1 (3 V DC) Maximum rated power: 15 mVA
Continuous operating time	3287: Approx. 25 hours, 3288: Approx. 60 hours, 3288-20: Approx. 35 hours (continuous, unloaded)
Dimensions	Approx. 57W×180H×16D mm (2.24"W × 7.09"H × 0.63"D)
Mass	• 3287: Approx. 170 g (6.0 oz.) • 3288, 3288-20: Approx. 150 g (5.3 oz.)
Product warranty period	3 years
Accessories	• CR2032 Coin-shaped lithium battery • 9398 Carrying Case • L9208 Test lead • Instruction Manual
Option	• 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.)

Basic Specifications

Maximum input current	3287: 100 A AC/DC continuous (ACA/DCA) 3288, 3288-20: 1000 A AC/DC continuous (ACA/DCA)
Maximum input voltage	600 V AC/DC (ACV/DCV)
Overload protection	600 V AC/DC (ACV/DCV) 250 V AC/DC (Ω /continuity)
Maximum rated voltage to earth	• Jaw 600 V AC (Measurement category III), (Anticipated transient overvoltage: 6000 V) • Voltage measurement terminal (ACV/DCV) 600 V AC (Measurement category II), 300 V AC (Measurement category III) (Anticipated transient overvoltage: 4000 V)
AC measurement method	3288: Average value measurement RMS method 3287, 3288-20: True RMS measurement method
Display update rate	400 ms±25 ms
Crest factor	• 3287: 2.5 max Current range: 150 A max., Voltage range: 1000 V max. • 3288-20: 3 max. Current range: 1000 A range is 2 max., Voltage range: 1.5 max.
Zero-display range	5 counts or less (current measurement only)
Effects of conductor position	• 3287: within ±1.0% • 3288, 3288-20: within ±2.0% (At all positions around the sensor's centerpoint reference)
Maximum measurable conductor diameter	φ35 mm or less

Accuracy Specifications

- Conditions of guaranteed accuracy**
- Guaranteed accuracy period: 1 year (Number of jaw open/close cycles: 10,000 or less)
 - Guaranteed accuracy period after adjustment made by Hioki: 1 year
 - Battery warning indicator is not lighting
 - Temperature and humidity for guaranteed accuracy: 23°C±5°C (73.0°F±9.0°F), 80% RH or less (no condensation)
 - Temperature characteristic: 0°C to 40°C
Measurement accuracy × 0.1/°C is added

AC current measurement (ACA)

3287			
Range	Accuracy		
	45 Hz≤f≤66 Hz	10 Hz≤f<20 Hz	20 Hz≤f<45 Hz 66 Hz<f≤1 kHz
10.00 A 100.00 A	±1.5%rdg.±5dgt.	±5.0%rdg.±5dgt.	±2.0%rdg.±5dgt.

3288			
Range	Accuracy		
	45 Hz≤f≤66 Hz	10 Hz≤f<45 Hz, 66 Hz<f≤500 Hz	
100.0 A 1000 A	±1.5%rdg.±5dgt.	±2.0%rdg.±5dgt.	

3288-20			
Range	Accuracy		
	45 Hz≤f≤66 Hz	10 Hz≤f<45 Hz, 66 Hz<f≤500 Hz	
100.0 A 1000 A	±1.5%rdg.±5dgt.	±2.0%rdg.±5dgt.	

DC current measurement (DCA)

3287	
Range	Accuracy
10.00 A 100.0 A	±1.5%rdg.±5dgt.

3288/3288-20	
Range	Accuracy
100.0 A 1000 A	±1.5%rdg.±5dgt.

AC voltage measurement (ACV)

Range	Accuracy guarantee range	Accuracy	Input impedance
		30 Hz≤f≤500 Hz	
4.200 V	0.400 V to 4.199 V	±2.3%rdg.±8dgt.	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 measurement (DCV)

Range	Accuracy guarantee range	Accuracy	Input impedance
		±1.3%rdg.±4dgt.	
420.0 mV	40.0 mV to 419.9 mV	±1.3%rdg.±4dgt.	100 MΩ or more
4.200 V	0.400 V to 4.199 V		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 measurement (Ω)

Range	Accuracy guarantee range	Accuracy	Open terminal voltage	
		±2.0%rdg.±4dgt.		
420.0 Ω	40.0 Ω to 419.9 Ω	±2.0%rdg.±4dgt.	3.4 V or less	
4.200 kΩ	0.400 kΩ to 4.199 kΩ		0.7 V (typ.) 3.4 V or less	
42.00 kΩ	4.00 kΩ to 41.99 kΩ		0.47 V (typ.) 3.4 V or less	
420.0 kΩ	40.0 kΩ to 419.9 kΩ		0.47 V (typ.) 3.4 V or less	
4.200 MΩ	0.400 MΩ to 4.199 MΩ		±5.0%rdg.±4dgt.	0.47 V (typ.) 3.4 V or less
42.00 MΩ	4.00 MΩ to 41.99 MΩ		±10.0%rdg.±4dgt.	0.47 V (typ.) 3.4 V or less

Continuity test

Range	Accuracy	Threshold level (beep sound)	Open terminal voltage
420.0 Ω	±2.0%rdg.±6dgt.	50 Ω±40 Ω or less	3.4 V or less