

### Introduction

Thank you for purchasing the HIOKI "Model 3287 CLAMP ON AC/DC HITESTER". To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

### Inspection

When you receive the instrument, inspect it carefully to ensure that no damage occurred during shipping. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

### Safety

#### ⚠ DANGER

This instrument is designed to comply with IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the instrument. Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from instrument defects.

#### ■ Measurement categories (Overvoltage categories)

The current measurement section complies with CAT III 600 V safety requirements, and the voltage measurement section complies with CAT III 300 V, CAT II 600 V safety requirements. To ensure safe operation of measurement instruments, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called measurement categories. These are defined as follows.

CAT I: Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.

CAT II: Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord (portable tools, household appliances, etc.)

CAT III: Primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders from the distribution panel to outlets.

CAT IV: The circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel).

Higher-numbered categories correspond to electrical environments with greater momentary energy. So a measurement device designed for CAT III environments can endure greater momentary energy than a device designed for CAT II. Using a measurement instrument in an environment designated with a higher-numbered category than that for which the instrument is rated could result in a severe accident, and must be carefully avoided. Never use a CAT I measuring instrument in CAT II, III, or IV environments. The measurement categories comply with the Overvoltage Categories of the IEC60664 Standards.

### Safety Symbols

This manual contains information and warnings essential for safe operation of the instrument and for maintaining it in safe operating condition. Before using it, be sure to carefully read the following safety precautions.

In the manual, the ⚠ symbol indicates particularly important information that the user should read before using the instrument. The ⚠ symbol printed on the instrument indicates that the user should refer to a corresponding topic in the manual (marked with the ⚠ symbol) before using the relevant function.

☐ Indicates a double-insulated device.

⎓ Indicates DC (Direct Current).

~ Indicates AC (Alternating Current).

⎓~ Indicates both DC (Direct Current) and AC (Alternating Current).

⏏ Indicates a grounding terminal. Indicates a grounding terminal.

⚡ Indicates that the instrument may be connected to or disconnected from a live circuit.

The following symbols in this manual indicate the relative importance of cautions and warnings.

⚠ **DANGER** Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.

⚠ **WARNING** Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.

⚠ **CAUTION** Indicates that incorrect operation presents a possibility of injury to the user or damage to the instrument.

**NOTE** Indicates advisory items related to performance or correct operation of the instrument.

### Notes on Operation

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

#### ⚠ WARNING

Do not allow the instrument to get wet, and do not take measurements with wet hands. This may cause an electric shock.

To avoid electric shock when measuring live lines, wear appropriate protective gear, such as insulated rubber gloves, boots and a safety helmet.

#### ⚠ CAUTION

Do not store or use the instrument where it could be exposed to direct sunlight, high temperature or humidity, or condensation. Under such conditions, the instrument may be damaged and insulation may deteriorate so that it no longer meets specifications.

**NOTE:** Correct measurement may be impossible in the presence of strong magnetic fields, such as near transformers and high-current conductors, or in the presence of strong electromagnetic fields such as near radio transmitters.

### Accuracy

23°C ± 5°C (73°F ± 9°F), 80%RH or less, no condensation.

AC current measurement: true RMS value, DC current measurement: average value

Function	Range	Accuracy ±(%rdg. +dgt.)		Max. input current
		45 to 66 Hz	10 to 45, 66 to 1 kHz	
ACA (∼A)	10.0 A 100.0 A	±(1.5% +5)	±(2.0% +5)	100 Arms continuous
DCA (−A)	10.0 A 100.0 A	DC	±(1.5% +5)	100 Arms continuous

Effect of conductor position : ±1.0% (Deviation when the sensor center is used as a reference, at 80 A (55 Hz))

Maximum rated voltage to earth : CAT III 600 V

AC voltage measurement: true RMS value, DC voltage measurement: average value

Function	Range (Accuracy range)	Accuracy ±(%rdg. +dgt.)	Input impedance	Max. input voltage
DCV (−V)	420.0 mV (42.0 to 420.0 mV) 4.200 V (0.420 to 4.200 V) 42.00 V (4.20 to 42.00 V) 420.0 V (42.0 to 420.0 V) 600 V (420 to 600 V)	±(1.3% +4)	100 MΩ or more 11 MΩ ±5% 10 MΩ ±5% 10 MΩ ±5% 10 MΩ ±5%	600 V DC

Maximum rated voltage to earth : CAT III 300 V, CAT II 600 V

### Resistance

Function	Range (Accuracy range)	Accuracy ±(%rdg. +dgt.)	Open terminal voltage	Overload protection
Ω	420.0 Ω (42.0 to 420.0 Ω) 4.200 kΩ (0.420 to 4.200 kΩ) 42.00 kΩ (4.20 to 42.00 kΩ) 420.0 kΩ (42.0 to 420.0 kΩ) 4.200 MΩ (0.420 to 4.200 MΩ) 42.00 MΩ (4.20 to 42.00 MΩ)	±(2.0% +4) ±(2.0% +4) ±(2.0% +4) ±(2.0% +4) ±(5.0% +4) ±(10.0% +4)	3.4 V or less 0.7 V (typ.) 3.4 V or less 0.47 V (typ.) 3.4 V or less 0.47 V (typ.) 3.4 V or less 0.47 V (typ.) 3.4 V or less 0.47 V (typ.) 3.4 V or less	250 Vrms

### Continuity

Function	Range	Accuracy ±(%rdg. +dgt.)	Threshold level	Open terminal voltage	Overload protection
Continuity	420.0 Ω	±(2.0% +6)	50 Ω ± 30 Ω	3.4 V or less	250 Vrms

### Specification

Zero-adjust Function	Before measuring DC current (−A), you must perform zero adjustment by simultaneously pressing the Ω ↔ key and HOLD keys.
LCD panel	4199 maximum display value
Out of range indication	OF or -OF
Battery low warning	ⓑ
Data hold indication	HOLD
Zero suppression	5 count or less (current only)
Display update rate	400 ms ± 25 ms
Range switching	Auto range / Manual range
Withstand voltage	3536 V rms sine wave (for 15 seconds) between case and circuit 5312 V rms sine wave (for 15 seconds) between clamp sensor and case 5312 V rms sine wave (for 15 seconds) between clamp sensor and circuit
Crest factor	2.5 (current range: 150A max., voltage range: 1,000 V max.)
Location for use	Altitude up to 2000 m (6562 feet), indoors
Maximum conductor diameter for measurement	35 mm (1.38")
Temperature and humidity for guaranteed accuracy	0 to 40°C (32°F to 104°F), 80%RH max (no condensation)
Guaranteed accuracy period	1 year, or opening and closing of the Clamp Sensor 10,000 times, whichever comes first
Operating temperature and humidity	0 to 40°C (32°F to 104°F), 80%rh or less (no condensation)
Storage temperature	-10 to 50°C (14°F to 122°F) (no condensation)
Temperature characteristics	In 0 to 40°C range: 0.1 x Measurement accuracy / °C (In 32°F to 104°F range: 0.56 x Measurement accuracy / °F)
Power supply	Rated supply voltage 3 V DC x 1 CR2032 x 1 Lithium battery
Maximum rated power	15 mVA
Continuous operating time	Approx. 25 hours (continuous, no load)
Dimensions and mass	Approx. 57W x 180H x 16D mm, approx. 170 g Approx. 2.24"W x 7.09"H x 0.63"D, approx. 6.0 oz.
Accessories	Instruction Manual, 9398 CARRYING CASE, 9208 TEST LEADS
Options	9209 TEST LEADS HOLDER
Applicable standards/Safety:	EN 61010 Current measurement (ACA, DCA) Pollution Degree 2 Measurement Category CATIII 600 V (anticipated transient overvoltage 6000 V) Voltage measurement (ACV, DCV) Pollution Degree 2 Measurement Category CATIII 300 V, CATII 600 V (anticipated transient overvoltage 4000 V) EMC: EN 61326

### Functions and Display

#### ■ Auto Power Save Function

This function automatically switches to the power save state when 10 minutes have elapsed since the last operation.

The auto power save function is activated automatically when the power is turned on. To restore from the auto power save state, turn the function switch to the OFF position once.

**NOTE:** The auto power save function cannot be canceled. A minute amount of power continues to flow while in the power save state. If you will not be using the tester for an extended period of time, set the function switch to OFF or remove the battery.

#### ■ Zero-adjust Function

Before measuring DC current (−A), you must perform zero adjustment by simultaneously pressing the Ω ↔ key and HOLD keys while there is no input to the unit.

The zero adjustment function compensates for sensor magnetization and changes in current display over time. This function is only effective with measurement of DC current (−A).

**NOTE:** Please do not perform zero adjustment while there is any input to the unit. Also note that the zero-adjust function will not function when the display count is greater than 1000.

#### ■ Auto-range Function

When measuring an AC current (∼A), DC current (−A), AC voltage (∼V), DC voltage (−V), or resistance (Ω), the measurement range is automatically set to the most appropriate range.

#### ■ Manual Range Function

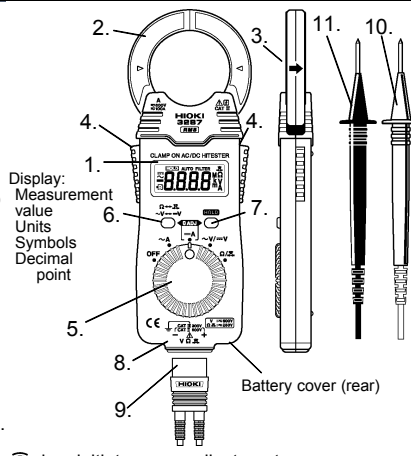
Power on the tester while holding down the Ω ↔ key or HOLD key to select a manual range for measuring AC current (∼A), DC current (−A), AC voltage (∼V), DC voltage (−V) or resistance (Ω). Note that this function is not available for continuity testing. Press the Ω ↔ key to step to the next range. To switch between AC voltage (∼V) and DC voltage (−V), press and hold the ∼ V ↔ − V key for at least one second.

#### ■ Overflow indication

When the input exceeds the measurement range, "OF" or "-OF" is displayed.

### Names and Functions of Parts

- Display
- Clamp sensor
- Current direction indicator
- Operation grip
- Function switch
- OFF / AC current (∼A) / DC current (−A) / Voltage (∼V/−V) / Resistance and Continuity check (Ω/↔)
- Ω ↔ key
- ∼ V ↔ − V key
- Measuring voltage
- Switches between AC voltage (∼V) and DC voltage (−V)
- Measuring resistance or continuity
- Switches between resistance measurement (Ω) and continuity testing (↔)
- Measuring DC current (−A)
- Pressing this key together with HOLD key initiates zero adjustment.
- HOLD key
- Press this to hold the display value (the HOLD indication appears). Press once more to cancel the hold function.
- Measuring DC current (−A)
- Pressing this key together with Ω ↔ key initiates zero adjustment.
- Connector
- Plug
- Connect the test lead plug to the connector for voltage measurement, resistance measurement, or continuity testing. Align the slot on the plug with the key in the connector.
- Red test lead (+)
- Black test lead (-)



### Measurement Procedures

#### Pre-Operation Inspection (Check the following before using the instrument.)

- The cladding of the test lead shall not be torn, and the metal shall not be exposed. (If damage has occurred, replace with the specified test lead [Model 9208]. Failure to do so may result in electric shock.)
- The clamp sensor or the case shall be free of damage. (If damage has occurred, avoid using the instrument. Use of the instrument under these conditions may result in electric shock.)
- The mating portions of the clamp sensor shall mate properly. The mating portions of the clamp sensor should also be free of any scratches or cracks.
- Battery power should be near full capacity when power is turned on. (If the battery is near exhaustion, the indicator "ⓑ" will light up. Using a battery close to exhaustion may result in incorrect measurements.)
- The reading should be around 0 A using the current function when no measurements are being made.
- The reading should be around 0 V using the voltage function while short-circuiting the test lead.
- The reading should be around 0 Ω using the resistance function while short-circuiting the test leads.
- The reading should be around 0 Ω and the buzzer should sound while short-circuiting the test leads in the continuity range.
- Zero adjustment should be performed by pressing both the blue and the yellow buttons using the DC current (−A) function.

#### ⚠ DANGER

Observe the following precautions to avoid electric shock.

- Always verify the appropriate setting of the function selector before connecting the test leads. Disconnect the test leads from the measurement object before switching the function selector.
- Never apply voltage to the test leads when the Resistance, or Continuity Test functions are selected. Doing so may damage the instrument and result in personal injury. To avoid electrical accidents, remove power from the circuit before measuring.
- Clamp sensor and test leads should only be connected to the secondary side of a breaker, so the breaker can prevent an accident if a short circuit occurs. Connections should never be made to the primary side of a breaker, because unrestricted current flow could cause a serious accident if a short circuit occurs.

**NOTE:** The frequency of a distorted waveform, such as on the secondary side of an inverter, may not be indicated correctly.

### Current Measurement

#### ⚠ DANGER

The maximum rated voltage between input terminals and ground is CATIII 600 V. In current measurement mode, attempting to measure voltages exceeding CAT III 600 V with respect to ground could damage the instrument and result in personal injury.

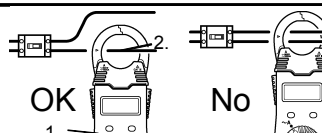
#### ⚠ WARNING

- The maximum permissible input is 100 A. Current measurements exceeding 100 A should be of short duration.
- During current measurement, to avoid an electric shock accident, do not connect the test leads to the unit.

**NOTE:** Clamp the tester on one lead only.

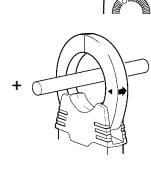
#### ☐ Measuring AC Current (∼A)

- Set the function switch to ∼A.
- Clamp the tester on the conductor, so that the conductor passes through the center of the clamp core.



#### ☐ Measuring DC Current (−A)

- Set the function switch to −A.
- After making sure that there is not input to the unit, perform zero adjustment by simultaneously pressing the Ω ↔ key and HOLD keys.
- Clamp the line to be measured so that the arrow on the side of the clamp sensor points in the direction of current flow and the line is positioned in the center of the sensor jaws. (A negative reading will result if the arrow points in the opposite direction.)



### Voltage Measurement

#### ⚠ DANGER

- The maximum input voltage is 600V DC/AC. Attempting to measure voltage in excess of the maximum input could destroy the instrument and result in personal injury or death.

#### ⚠ DANGER

- To avoid electrical shock, be careful to avoid shorting live lines with the test leads.
- In voltage measurement mode, the maximum rated voltage between input terminals and ground is CATIII 300 V, CAT II 600 V. In current measurement mode, attempting to measure voltages exceeding CATIII 300 V, CAT II 600 V with respect to ground could damage the instrument and result in personal injury.

Check that the test lead plug is firmly connected to the tester before beginning measurement.

#### ☐ Measuring AC Voltage (∼V)

- Set the function switch to ∼V/−V.
- Connect the test leads to the object to be measured. When measuring AC voltage, the polarity of the leads can be ignored.

#### ☐ Measuring DC Voltage (−V)

- Set the function switch to ∼V/−V.
- Press ∼ V ↔ − V key to display −.
- Connect the red (+) lead to the + side of the circuit to be measured and the black (-) lead to the - side. A negative reading will result if the leads are reversed.

### Resistance Measurement (Ω)

Plug the test leads into the connector.

- Set the function switch to Ω/↔.
- Connect the test leads to the object to be measured.

### Continuity Test (↔)

Plug the test leads into the connector.

- Set the function switch to Ω/↔.
- Press the Ω ↔ key, so that the ↔ indication appears.
- Connect the test leads to the object to be measured. Conductivity is good when the buzzer sounds.

### Maintenance

#### ⚠ CAUTION

- If the protective functions of the unit are damaged, either remove the unit from service or post warnings to prevent others from using the unit inadvertently.
- To clean the instrument, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, alcohol, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case.
- To avoid corrosion from battery leakage, remove the battery from the instrument if it is to be stored for a long time.
- If the instrument seems to be malfunctioning, confirm that the battery is not discharged, and that the test leads is not open circuited before contacting your dealer or Hioki representative. Pack the instrument so that it will not sustain damage during shipping, and include a description of existing damage. We cannot accept responsibility for damage incurred during shipping.

### Replacing Battery

#### ⚠ WARNING

- If the unit is connected to a line that is to be measured, dangerous voltage levels may be applied to the terminals, and removing the case may expose live components. To avoid electric shock when replacing the battery, first disconnect the unit and the test leads from the object being measured. Also, after replacing the battery, always replace the cover and tighten the screw before using the unit.
- Use only CR2032 (Panasonic or MAXELL) lithium battery. Use of any other battery may result in explosion.
- Be sure to insert them with the correct polarity. Otherwise, poor performance or damage from battery leakage could result.
- Battery may explode if mistreated. Do not short-circuit, recharge, disassemble or dispose of in fire.
- Keep used battery out of the reach of children. Dispose of used battery according to its type in the prescribed manner and in the proper location.

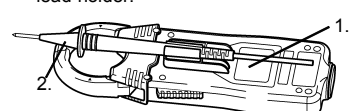
**NOTE:** When the battery is exhausted, the ⓑ indication appears in the display.

- Remove the unit and the test leads from the test item, and power the unit off.
- Remove the unit from the case, and remove the screws on the battery cover.
- Remove the used battery.
- Being careful about the polarity, insert the new battery of the specified type. (CR2032 lithium battery:Panasonic or MAXELL)
- Replace the battery cover and fasten the screws.

**NOTE:** The battery included with this unit was inserted for TESTING PURPOSES ONLY. Battery life will vary. Please replace the original battery with a new battery as soon as it is depleted. CR2032 lithium batteries (Panasonic or MAXELL) can be purchased at electronics and appliance stores where specialized batteries are sold.

### Using the 9209 TEST LEADS HOLDER (Option)

- Remove the battery cover, and in its place fit the test lead holder (option). Fasten the screws securely.
- Insert the test lead probe into the test lead holder.



## HIOKI

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#### DECLARATION OF CONFORMITY

Manufacturer's Name: HIOKI E.E. CORPORATION  
Manufacturer's Address: 81 Koizumi, Ueda, Nagano 386-1192, Japan  
Product Name: CLAMP ON AC/DC HITESTER  
Model Number: 3287, 3288  
Product Option: 9208 TEST LEADS

The above mentioned products conform to the following product specifications:

Safety: EN61010-1:2001  
EN61010-031:2002  
EN61010-2-032:2002

EMC: EN61326-1:1997+A1:1998+A2:2001+A3:2003  
Class B equipment  
Portable test, measuring and monitoring equipment used in low-voltage distribution systems

Supplementary Information:  
The products herewith comply with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

HIOKI E.E. CORPORATION

25 January 2007

T. Yoshida

Tateyoshi Yoshida  
President

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