



3280-20 **CLAMP ON HITESTER**

INSTRUCTION MANUAL

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Introduction

Thank you for purchasing the HIOKI 3280-20 CLAMP ON HITESTER To obtain maximum performance from the instrument, please read this manual first, and

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 pecifications, contact your dealer or Hioki representative.

Safety

⚠ DANGER

This instrument is designed to conform to 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 conforms to CAT III 600 V safety requirements, and the voltage measurement section conforms to CAT III 300 V, CAT II 600 V 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.

Service Entrance Distribution Panel

CAT IV

Power Meter

Internal Wiring

CAT I

[√]CAT III

CAT

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

instrument designed for CAT III environments Service Drop can endure greater momentary energy than one 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 the instrument, be sure to carefully read the following safety notes.

\wedge	The $ riangle$ symbol printed on the instrument indicates that the user should refer to a corresponding topic in the manual (marked with the $ riangle$ symbol) before using the relevant function. In the manual, the $ riangle$ symbol indicates particularly important information that the user should read before using the instrument.
	Indicates a double-insulated device.
	Indicates DC (Direct Current).
\sim	Indicates AC (Alternating Current).
\sim	Indicates both DC (Direct Current) and AC (Alternating Current).
	Indicates a grounding terminal

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

	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.
	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

- During current measurement, to avoid an electric shock accident, do not connect the test leads to the instrument
- To avoid electric shock, do not allow the instrument to get wet, and do not use it when your hands are wet.
- Do not attempt to adjust or repair the instrument with the case open and with voltage being input. Such adjustments or repairs should only be made by a technician who fully understands the dangers involved.
- 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

Accuracy

 23° C $\pm 5^{\circ}$ C (73° F $\pm 9^{\circ}$ F), 80%RH or less, no condensation

1	A to the deduction at the other					
	Function	Range	Accuracy*1			Max. input
	Function	Range	40 to 45 Hz ^{*2}	45 Hz to 66 Hz ^{*2}	66 Hz to 1 kHz ^{*2}	current
	ACA (∼A)	42.00 A 420.0 A 1000 A	±2.0% rdg. ±5 dgt.	±1.5% rdg. ±5 dgt.	±2.0% rdg. ±5 dgt.	2000 A rms continuous
	Effect of conductor position: ±5.0% (in any direction from sensor center) Maximum rated voltage to earth: CAT III 600 V (Current measurement section)					

Function	Range	Accuracy ^{*1}	Input impedance	Max. input voltage
ACV (∼V)	4.200 V 42.00 V 420.0 V 600 V	±2.3% rdg.±8 dgt. (50 - 500 Hz ²)	11 M Ω $\pm 5\%$ 10 M Ω $\pm 5\%$ 10 M Ω $\pm 5\%$ 10 M Ω $\pm 5\%$	600 V rms
DCV (===V)	420.0 mV 4.200 V 42.00 V 420.0 V 600 V	±1.3% rdg. ±4 dgt.	100 M Ω or over 11 M Ω \pm 5% 10 M Ω	600 V DC

Maximum rated voltage to earth: CAT III 300 V, CAT II 600 V (Voltage measurement section)

Function	Range	Accuracy ^{*1}	Open terminal voltage	Overload protection
Resistance $[\Omega]$	420.0Ω $4.200 k\Omega$ $42.00 k\Omega$ $420.0 k\Omega$ $420.0 M\Omega$ $4.200 M\Omega$	±2.0% rdg. ±4 dgt. ±2.0% rdg. ±4 dgt. ±2.0% rdg. ±4 dgt. ±2.0% rdg. ±4 dgt. ±5.0% rdg. ±4 dgt. ±10.0% rdg. ±4 dgt.	3.4 V or less 0.7 V (typ.) 3.4 V or less 0.47 V (typ.) 3.4 V or less	250 V rms
Continuity [🙃]	420.0 Ω	$\pm 2.0\%$ rdg. ± 6 dgt. (Threshold level 50 $\Omega\pm 30~\Omega$)	3.4 V or less	250 V rms

1: rdg. (reading or displayed value), dgt. (resolution) *2: Frequency range

4199 maximum display value

Specification

LCD panel

Out of range indication	OF or -OF
Battery low warning	<u>-8</u>
Data hold indication	HOLD
Zero suppression	5 count or less (current measurement only)
Display update rate	FAST 400 ms±25 ms SLOW 3.2 s±0.2 s
Range switching	Auto range / Manual range
Crest factor	2.5 or less (1.5 or less : maximum display value of range)
Withstand voltage	3.7 kVAC sine wave (for 1 minute) between case and circuit 5.55 kVAC sine wave (for 1 minute) between clamp sensor and case 5.55 kVAC sine wave (for 1 minute) between clamp sensor and circuit
Effect of radiated radio- frequency electromagnetic field (in 3 V/m)	In current measurement mode: ±2.1 A max.
Location for use	Altitude up to 2000 m (6562 feet), indoors
Maximum conductor diameter for measurement	ф33 mm (1.30") or less
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 max (no condensation)
Storage temperature	-10 to 50°C (14°F to 122°F) (no condensation)
	In 0 to 40°C (32°F to 104°F) range: 0.1 x Measurement accuracy fC (°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. 50 hours min. (in AC current measurement mode, continuous, no load)
Dimensions and mass	Approx. 57W x 175H x 16D mm, approx. 100 g Approx. 2.24"W x 6.89"H x 0.63"D, approx. 3.5 oz.
Drop proof	One meter to concrete
Accessories	Instruction Manual, 9398 CARRYING CASE, 9208 TEST LEADS
Options	9209 TEST LEADS HOLDER
	EN61010-1:1993+A2:1995, EN61010-1:2001 Current measurement section: Measurement Category CAT III 600 V
FMO	Pollution Degree 2 (anticipated transient overvoltage 6000 V) Voltage measurement section: Measurement Category CAT III 300 V, CAT II 600 V Pollution Degree 2 (anticipated transient overvoltage 4000 V) EN61010-2-031:1994 (9208), EN61010-2-032:1995 UL61010B-1:2003, UL61010B-2-32:2003, CAN/CSA-C22.2No. 1010.1-92+B-97, CAN/CSA-C22.2No. 1010.2.031-94 (9208), CAN/CSA-C22.2No. 1010.2.032-96 EN61326:1997+A1:1998+A2:2001

Functions and Display

Auto Power Save Function

- This function automatically switches to the power save state when 30 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.

Auto-range Function

When measuring an AC current (\sim A), AC voltage (\sim 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 a key to select a manual range for measuring AC current (\sim A) , AC voltage (\sim V) , DC voltage (=-V) or resistance (Ω). Note that this function is not available for continuity testing. Press the $\Omega \sim 3$ SAMP. F/S key to step to the next range.

to the next range. Powering on with the HOLD key held down: manual ranging, with FAST display update Powering on with the $\Omega \curvearrowright \mathbb{R}$ SAMP. F/S key held down: manual ranging, with SLOW

Overflow indication

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

Names and Functions of Parts

- 1. Display
- Clamp sensor
 - . Operation grip . Function switch OFF / AC current (~A) / AC voltage
- $(\sim V)$ / DC voltage $(\stackrel{---}{\sim}V)$ / Resigned Continuity check $(\Omega/\widehat{s_+})$ 5. $\Omega \sim 3$ SAMP. F/S key
- Measuring AC current or AC or DC voltage Switches display update rate (FAST/SLOW). (FAST/SLOW).
 If the display value is fluctuating and hard to read, switch to the slow Decimal point (COLOW) approximately over the colow.
- update (SLOW: approximately every 3 seconds) to stabilize the display. Measuring resistance or continuity Switches between resistance
- measurement (Ω) and continuity testing (\mathbb{R}) . 6. HOLD key Press this to hold the display value (the [1010] indication appears). Press

once more to cancel the hold

7. Connector 8. 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

Display:

HIOKI 3280-20 RMS

8.8.8

the object

Battery cover (rear)

9. Red test lead (+) 10. 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. (I) 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
- The reading should be around 0 V using the voltage function while short-circuiting the test lead.
- ullet The reading should be around 0 Ω using the resistance function while short-circuiting

⚠ 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 test leads when the Resistance, Continuity Check functions are selected. Doing so may damage the instrument and result in personal injury. Tavoid electrical accidents, remove power from the circuit before measuring.
- Test leads and this instrument 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: Please note that waveforms that include elements outside the frequency
 - characteristic range may not be measured correctly.
 - Accurate 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

AC Current Measurement (~A)

⚠ DANGER

To avoid short circuits and potentially life-threatening hazards, never attach the instrument in current measurement mode to a circuit that operates at more than the maximum rated voltage to earth CAT III 600 V, or over bare conductors

1 Set the function switch to \sim A 2. Clamp the tester on the conductor, so that

the conductor passes through the center of the clamp core. Clamp the tester on one lead only



Noltage Measurement

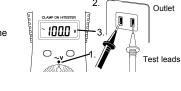
⚠ DANGER

- The maximum input voltage is 600 V AC/DC. Attempting to measure voltage in excess of the maximum input could destroy the instrument and result in personal
- 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 CAT III 300 V, CAT II 600 V. Attempting to measure voltages exceeding 600 V with respect to ground could damage the instrument and result in

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

■ Measuring AC Voltage (~V) Plug the test leads into the connector.

- Set the function switch to \sim V
- 2. Connect the test leads to the object to be measured. When measuring AC voltage, the polarity of the leads can be ignored.
- 3. Read the display.



☐ Measuring DC Voltage (=== V)

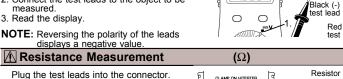
- Plug the test leads into the connector. Set the function switch to ---V.
- 2. Connect the test leads to the object to be measured.

Set the function switch to $\Omega/\overline{\mathbb{R}}$.

3. Read the display

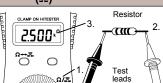
NOTE: Reversing the polarity of the leads displays a negative valu

2. Connect the test leads to the object to be



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3. Read the display

- Plug the test leads into the connector.
- 1. Set the function switch to $\Omega/\overline{\mathbb{A}}$. 2. Press the $\Omega \sim \widehat{\mathbb{A}}$ key, so that the $\widehat{\mathbb{A}}$
- 3. Connect the test leads to the object to be
 - Conductivity is good when the buzzer



Maintenance

⚠ CAUTION

- If the protective functions of the instrument are damaged, either remove it from service or mark it clearly so that others do not use it 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 batteries from the instrument if
- it is to be stored for a long time.
- It is to be stored for a rong time.

 If the instrument seems to be malfunctioning, confirm that the battery is not discharged, and that the test leads are not open circuited before contacting your dealer or Hioki representative. Pack the instrument carefully so that it will not be damaged during shipment, and include a detailed written description of the problem Hioki cannot be responsible for damage that occurs during shipment.

Replacing Battery

⚠ WARNING

- If the instrument 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
- To avoid electric shock when replacing the battery, first disconnect the test leads from the object being measured. Also, after replacing the battery, always replace the cover and tighten the screw before using the instrument.
- · Use only CR2032 lithium battery. Use of any other battery may result in explosion. When replacing the battery, 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. Handle and dispose of batteries in accordance with local
- · Keep batteries away from children to prevent accidental swallowing.

NOTE: When the battery is exhausted, the <a> indication appears in the display . Remove the test leads from the test item, and power the

- instrument off. 2. Remove the instrument 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)
 Replace the battery cover and fasten the screws.

NOTE: The battery included with this instrument was inserted for TESTING PURPOSES ONLY. Battery life will vary. Please replace the original battery with a new CR2032 lithium

battery as soon as it is depleted. CR2032 lithium batteries can be purchased at electronics and appliance stores where specialized batteries are sold.

Using the 9209 TEST LEADS HOLDER (Option)

HIOKI

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

DECLARATION OF CONFORMITY

facturer's Name: HIOKI E.E. CORPORATION

CLAMP ON HITESTER

9208 TEST LEADS

EN61010-1:2001 EN61010-2-031:1994 EN61010-2-032:1995

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

EN61326:1997+A1:1998+A2:2001

HIOKI E.E. CORPORATION

Lungildicki Yuli Hioki

3280E999-0

Manufacturer's Address: 81 Koizumi, Ueda, Nagano 386-1192, Japan

3280-20

Product Name:

Model Number

Safety:

October 17, 2003



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