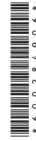


3291-50

CLAMP ON HITESTER

Instruction Manual

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Warranty

Warranty malfunctions occurring under conditions of normal use in conformity with the instruction on Manual and Product Precautionary Markings will be repaired free of charge. This warranty is valid for a period of one (1) year 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 Model 3291-50 CLAMP ON HITESTER. To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

Overview

Because it employs a small, thin-type sensor the 3291-50 Clamp On Hitester can clamp even in narrow places. In addition, the angle of the display panel can be changed to suit the measuring location and the back light makes the instrument easy to use even in dark places.

Inspection

Initial 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.

Maintenance and Service

- To clean the instrument, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as gasoline, as they can deform and discolor the case.
- 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.
- If the instrument seems to be malfunctioning, contact your dealer.

Safety

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.

⚠ DANGER

This instrument is designed to comply with IEC 61010 Safety requirements, and is designed to prevent any electrical shock, injury or death, as well as damage to the instrument. However, using the instrument in a way not described in this manual may negate the provided safety features. Be certain that you understand the safety instructions in this manual, and that you use it. We disclaim any responsibility for accidents or injuries not resulting directly from instrument defects.

Safety Symbol

- ⚠ Indicates conditions and hazards. When the symbol is printed on the instrument, refer to a corresponding type in the instruction Manual.
- ~ Indicates AC (Alternating Current).
- ⎓ Indicates DC (Direct Current).
- ⚡ Indicates that the instrument may be connected to or disconnected from a live circuit.
- ⊞ Indicates a double-insulated device.

Notation of This Manual

- ⊘ Indicates a prohibited action.

Symbols for Various Standards

- CE The instrument complies with the CE marking requirements set out by the EC Directive.
- WEEE Indicates the Waste Electrical and Electronic Equipment Directive (WEEE Directive) in EU member states.

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

Measurement categories

To ensure safe operation of measuring instruments, IEC 61010 establishes measurement categories, categorized as CAT I to CAT IV, and called measurement categories.

⚠ DANGER

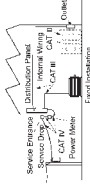
- Using a measuring instrument in an environment designated with a higher-numbered category than that for which the instrument is rated could result in a severe accident, and
- Using a measuring instrument without categories in an environment designated with the CAT II to CAT IV category could result in a severe accident, and must be carefully avoided.

This instrument complies with CAT III 600 V, CAT IV 300 V safety requirements.

CAT II: When directly measuring the electrical outlet receptacles of the primary electrical circuits in equipment connected to an AC power source (e.g., by a power cord (portable tools, household appliances, etc.)).

CAT III: When measuring the primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution network (e.g., power lines, power cables, etc.).

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



Usage Notes

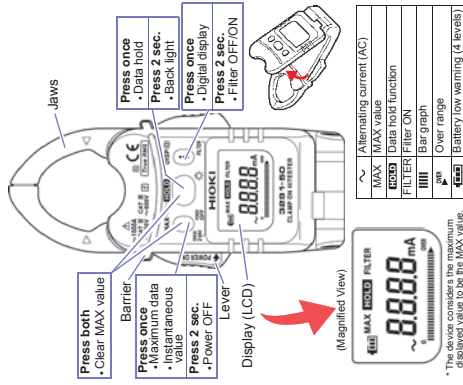
Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

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

⚠ CAUTION

- Do not store or use the instrument where it could be exposed to direct sunlight, high temperature or humidity, or condensation. If the instrument is used in a high humidity environment, clean and inspect it regularly. If the instrument is stored in a humid environment, clean and inspect it regularly.
- This instrument contains a magnetic core. The device should not be used by anyone with a pacemaker or any other electronic medical devices installed in his body.

Names and Functions of Parts



AC current A rms (true rms indication, Auto range)

Range	Guaranteed accuracy	Minimum resolution	Accuracy	
			FILTER OFF	FILTER ON
60 A, 2.00 A to 60.00 A	±0.7% A	0.01 A	±1.5% (9.35 digit)	±1.5% (9.35 digit)
600 A, 54.0 A to 600.0 A	±1.0% A	0.1 A	±3% (9.35 digit)	±3% (9.35 digit)
1000 A, 54.0 A to 1000 A	±1.0% A	1 A	(66 Hz to 400 Hz)	(66 Hz to 400 Hz)

Zero-display range: 0.30 A or less

Within ±0% (in any position based on the center of position)

600 Vrms Measurement category: II (anticipated transient overvoltage 6000 V), 300 Vrms Measurement category IV (anticipated transient overvoltage 6000 V)

Crest factor: 2.8 or less (up to 600 A), 1.68 or less (1000 A range)

Diameter of measurable conductor: 30 mm dia. or less

Temperature range: 0 to 40°C (32 to 104°F), 80%RH or less (at 23°C/73°F) (ATF 25°F)

Response time: 1.1 sec. or less

Maximum input current: 1000 A, continuous

No. of active measurement tolerances in terms of 49: (reading) and 49:1 (digit) values, with the following meanings:
 (A) Being measured and indicated on the measuring instrument.
 (B) The smallest displayable unit on a digital measuring instrument, i.e., the input value that causes the digital display to show a 1 in the least significant digit.
 (C) Total error (A+B) ± 0.05 A
 (D) Minimum resolution of 0.01 A
 (E) Maximum resolution of 0.01 A
 (F) Total error (A+B) ± 0.05 A
 (G) Total error (A+B) ± 0.05 A
 (H) Total error (A+B) ± 0.05 A
 (I) Total error (A+B) ± 0.05 A
 (J) Total error (A+B) ± 0.05 A
 (K) Total error (A+B) ± 0.05 A
 (L) Total error (A+B) ± 0.05 A
 (M) Total error (A+B) ± 0.05 A
 (N) Total error (A+B) ± 0.05 A
 (O) Total error (A+B) ± 0.05 A
 (P) Total error (A+B) ± 0.05 A
 (Q) Total error (A+B) ± 0.05 A
 (R) Total error (A+B) ± 0.05 A
 (S) Total error (A+B) ± 0.05 A
 (T) Total error (A+B) ± 0.05 A
 (U) Total error (A+B) ± 0.05 A
 (V) Total error (A+B) ± 0.05 A
 (W) Total error (A+B) ± 0.05 A
 (X) Total error (A+B) ± 0.05 A
 (Y) Total error (A+B) ± 0.05 A
 (Z) Total error (A+B) ± 0.05 A

General Specifications

Display	LCD: monochrome, 91 segments
Operating temperature and humidity	0 to 40°C (32 to 104°F), 80%RH or less (with no condensation)
Storage temperature and humidity	-10 to 50°C (14.0 to 122.0°F), 80%RH or less (with no condensation)
Location for use	Indoors, Pollution degree 2
Rated supply voltage	Multiple up to 2000 m (6562 feet)
Rated supply current	25 mA
Power supply	CR2032 x 1 Lithium battery
Battery lifetime	Approx. 20 hours (continuous, no load, at 23°C)
Dimensions	Approx. 30 W x 138 H x 26 D mm (1.97 W x 5.35 H x 1.02 D)
Mass	Approx. 115 g (4.1 oz.)
Dielectric strength	7000 Vrms/1 minute, 1 mA sensitivity current
Applicable standards	EN61010-1, EN61010-2, EN61010-3, EN61326-1, EN61326-2, EN61326-3, EN61326-4, EN61326-5, EN61326-6, EN61326-7, EN61326-8, EN61326-9, EN61326-10, EN61326-11, EN61326-12, EN61326-13, EN61326-14, EN61326-15, EN61326-16, EN61326-17, EN61326-18, EN61326-19, EN61326-20, EN61326-21, EN61326-22, EN61326-23, EN61326-24, EN61326-25, EN61326-26, EN61326-27, EN61326-28, EN61326-29, EN61326-30, EN61326-31, EN61326-32, EN61326-33, EN61326-34, EN61326-35, EN61326-36, EN61326-37, EN61326-38, EN61326-39, EN61326-40, EN61326-41, EN61326-42, EN61326-43, EN61326-44, EN61326-45, EN61326-46, EN61326-47, EN61326-48, EN61326-49, EN61326-50, EN61326-51, EN61326-52, EN61326-53, EN61326-54, EN61326-55, EN61326-56, EN61326-57, EN61326-58, EN61326-59, EN61326-60, EN61326-61, EN61326-62, EN61326-63, EN61326-64, EN61326-65, EN61326-66, EN61326-67, EN61326-68, EN61326-69, EN61326-70, EN61326-71, EN61326-72, EN61326-73, EN61326-74, EN61326-75, EN61326-76, EN61326-77, EN61326-78, EN61326-79, EN61326-80, EN61326-81, EN61326-82, EN61326-83, EN61326-84, EN61326-85, EN61326-86, EN61326-87, EN61326-88, EN61326-89, EN61326-90, EN61326-91, EN61326-92, EN61326-93, EN61326-94, EN61326-95, EN61326-96, EN61326-97, EN61326-98, EN61326-99, EN61326-100
Accessories	9757 Carrying case, Strap, Instruction manual, EMAC EN6132_6
Product warranty period	1 year

Functions

Power supply control	ON: Grasping the lever and opening wide the jaws (sawtooth) OFF: Pressing POWER OFF key for 2 seconds or longer.
Filter	ON: Pressing FILTER key for 2 seconds or longer. OFF: Pressing FILTER key for 2 seconds or longer. Initial setting: OFF (Always OFF when the power supply cutoff frequency: 180 Hz to 430 Hz (3-48)) Activate/De-activate: Press FILTER key for 2 seconds or longer. When the power supply is ON, the filter increases noise and other unwanted frequency components. Details of operation: Holds measured values (data update is halted) Deactivate/Press to the OFF key once, Filter ON/OFF (data update is halted) Deactivate/Press to the ON key once, Filter ON/OFF (data update is halted)
Date hold	Details of operation: Displays the maximum measured values reached since the power has been turned on. After the power supply is turned on, press MAX key and HOLD key at the same time. Filter ON/OFF (data update is halted)
MAX value display	Details of operation: Displays the maximum measured values reached since the power has been turned on. After the power supply is turned on, press MAX key and HOLD key at the same time. Filter ON/OFF (data update is halted)

Auto power-off	Details of operation: The power cuts off when "0" is displayed continuously for 1 minute. Operation is not performed for approx. 10 minutes. To deactivate: Power ON while pressing the POW key.
Battery Level Indicator	Details of operation: Displays 4 levels of remaining battery. *Refer to "Replacing Battery".
Back light	Activate/De-activate: Press X key for 2 seconds or longer. (About 15 seconds lighting.) Frequent use of backlight reduces battery life.
Liquid crystal display (LCD) reversal	Details of operation: Automatically reverses when the Manual Reverse key is pressed. Manual Reverse: Pressing the DISP key once. *Refer to "Opening and Closing the Display Panel".
Bar graph	Shows the proportion of the measured value to the range. *OVER, which is a high crest factor current is indicated, which means an out of the accuracy range. *Refer to "Crest factor".
Over Range Display	

Measurement Procedures

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

- Before using the instrument the first time, verify that it operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your dealer.
- The jaws 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 jaws should be free of any scratches or cracks.
- Battery power should be near full capacity when power is turned on. (Refer to "Replacing Battery")
- The reading should be around 0 A when no measurement is being made.

⚠ DANGER

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

⚠ CAUTION

- Be careful to avoid dropping the instrument, or otherwise subjecting them to mechanical shock, the jaws tip will be damaged, negatively influencing measurement.
- Do not input current greater than 1000 A. It will damage the device.

NOTE

- Please note that waveforms that include elements outside the frequency characteristic range may not be measured correctly.
- 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.

AC Current Measurement

⚠ 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 CAT III 600 V, CAT IV 300 V, or over bare conductors.

NOTE

- Correct measurement may be impossible for the case of rush current or significantly fluctuating current.
 - There are cases when an error could be larger depending on positioning of sensors and conductor.
 - When the measuring value exceeds 1000 A the digital display will blink.
 - Waveforms around 20 Hz or below may be displayed as "----".
 - At a low temperature, there are cases when the reading may not be around 0 A without any input signal. But it does not affect measurement.
- Open Jaws to Power On.

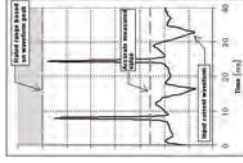
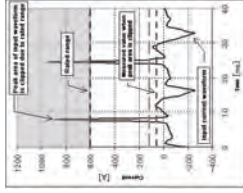
1. Clamp the tester on the conductor, so that the conductor passes through the center of the clamp core.

- Clamp the tester on one wire only.
- Put the conductor perpendicular to the sensor, as shown in the sketch.



Crest factor

"Crest factor = Waveform peak value/intermal rated range" is defined for this instrument. There are cases when the accurate measurement cannot be performed due to the rated range if a high crest factor current (r-RMS is low and a waveform peak is high) is input. This instrument defines the range based on the crest factor. As for a high crest factor current, its measured value becomes small to the range. If a current exceeding a crest factor of 2.8 is inputted, "OVER" is displayed. This measurement is the output of accurate guarantee range and the measured value is for reference purpose only.



Previous models

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Regarding the MAX value display

- (1) Press the MAX key once to confirm the MAX value. When ever a maximum value is updated, the display will be updated.
- (2) A maximum value will be cleared by pressing [MAX] key and [HOLD] key simultaneously whether when a maximum value is displayed or an instantaneous value is displayed.

NOTE

- As far as the Data Hold mode is on, MAX value cannot be updated.
- The MAX value is cleared with FILTER ON/OFF.

Filter function

The default setting of Filter is OFF. Please change the setting according to the use.

Replacing Battery

- To avoid electric shock, when replacing the battery first disconnect the clamp from the object to be measured. After replacing the batteries, replace the cover and screws before using the instrument.
- Use only CR2032 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.
- Handle and dispose of batteries in accordance with local regulations.
- Keep batteries away from children to prevent accident and swallowing.
- To avoid corrosion from battery leakage, remove the batteries from the instrument if it is to be stored for a long time.

NOTE

- The upper left on the display screen indicates the remaining power level. When the battery approaches the exhausting power, "E" is displayed and a few minutes later, power turns off automatically. When "E" is displayed, the accuracy of measurement value is not guaranteed. Replace the new batteries soon.

- At a low or high temperature, the battery life is reduced faster. The batteries included with the device were installed for factory testing purposes. CR2032 lithium batteries can be purchased at electronics and appliance stores where specialized batteries are sold.

- Although the remaining power level indicator may become lower for a moment due to the internal processing, it is not an anomaly.

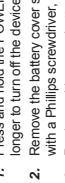
Replacing the Batteries



Tighten



Loosen



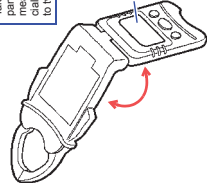
1. Press and hold the POWER OFF key for 2 seconds or longer to turn off the device's power.
2. Remove the battery cover screws on the back of the device with a Phillips screwdriver, then remove the battery cover.
3. Replace with a new battery. When inserting a new battery (CR2032 lithium battery), be sure to position the polarities in their proper orientations.
4. Replace the battery cover and fasten the screws.

CALIFORNIA, USA ONLY
This device contains a CR Coin Lithium Battery which contains Perchlorate Material - special handling may apply.

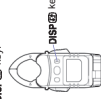
Opening and Closing the Display Panel

Adjust the angle of the display panel for better viewing.

- Take the measurements with the display panel flipped open in order to view the measurement results more clearly, especially in tight locations, without needing to twist the jaw at an awkward angle.



The display can also be reversed by pressing the **DISP** key.



Attaching the strap

Fix the strap for fall prevention.



Make the air gap through the hole just like the figure shown.

Error Display

When an error is displayed on the LCD, the HiTester requires repair. Contact your supplier or Hoki representative.

Error Display	Meaning	Remedial Action
Err0	Internal ROM Error	Repair is necessary. Contact your supplier or Hoki representative.
Err1	Calibration Data Faulty	
Err3		