

Introduction

Thank you for purchasing the HIOKI "9298 CLAMP ON SENSOR". To obtain maximum performance from the product, please read this manual first, and keep it handy for future reference.

Overview

The 9298 is current output type clamp on sensor, which is applicable to 100A AC current measurements. The instrument can be used to measure alternating current on a live power line without the need to cut the wire. Easy operation and connection make them useful for measuring alternating current and power in various fields. (for use with HIOKI 3166 and 3168 CLAMP ON POWER HiTESTER)

Inspection

When you receive the product, 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.

Preliminary Checks

- Before using the product the first time, verify that it operates normally to ensure that the no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.
- Before using the product, make sure that the insulation on the cables is undamaged and that no bare conductors are improperly exposed. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for repair.

Safety

 **DANGER**

This product 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 product. 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 product defects.

Safety symbols

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

|                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"><li>• The  symbol printed on the product indicates that the user should refer to a corresponding topic in the manual (marked with the  symbol) before using the relevant function.</li><li>• In the manual, the  symbol indicates particularly important information that the user should read before using the product.</li></ul> |
|  | Indicates AC (Alternating Current).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|  | Indicates a double-insulated device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | 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.

|                                                                                                  |                                                                                                                            |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|  <b>DANGER</b>  | Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.    |
|  <b>WARNING</b> | Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user. |
|  <b>CAUTION</b> | Indicates that incorrect operation presents a possibility of injury to the user or damage to the product.                  |
| <b>NOTE</b>                                                                                      | Advisory items related to performance or correct operation of the product.                                                 |

**Measurement categories (Overvoltage categories)**  
This product complies with CAT III safety requirements. To ensure safe operation of measurement products, 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 product in an environment designated with a higher-numbered category than that for which the product is rated could result in a severe accident, and must be carefully avoided. Never use a CAT I measuring product in CAT II, III, or IV environments. The measurement categories comply with the Overvoltage Categories of the IEC60664 Standards.

Notes on Use

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

 **DANGER**

- **To avoid short circuits and potentially life-threatening hazards, never attach the clamp to a circuit that operates at more than the 300Vrms.**
- **Clamp sensor 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.**

 **WARNING**

- **To avoid electric shock, do not allow the product to get wet, and do not use it when your hands are wet.**
- **To avoid electric shock when measuring live lines, wear appropriate protective gear, such as insulated rubber gloves, boots and a safety helmet.**
- **Note that the product may be damaged if current exceeding the selected measurement range is applied for a long time.**

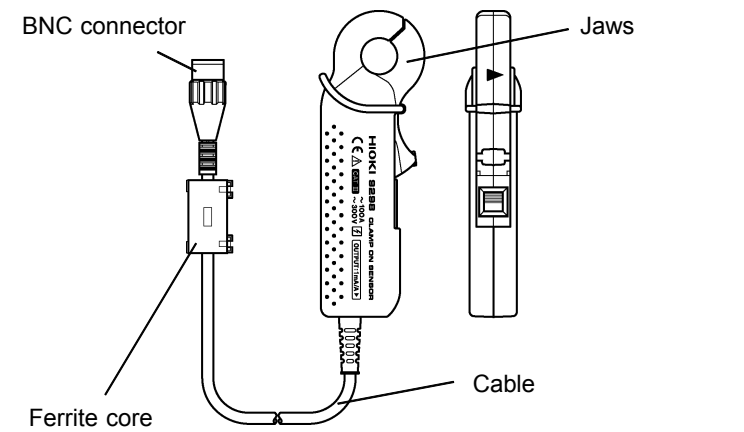
 **CAUTION**

- Keep the clamp jaws and core slits free from foreign objects, which could interfere with clamping action.
- Do not store or use the product where it could be exposed to direct sunlight, high temperature or humidity, or condensation. Under such conditions, the product may be damaged and insulation may deteriorate so that it no longer meets specifications.
- To avoid damage to the product, protect it from vibration or shock during transport and handling, and be especially careful to avoid dropping.
- Keep the clamp closed when not in use, to avoid accumulating dust or dirt on the mating core surfaces, which could interfere with clamp performance.

**NOTE**

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.

Part Names

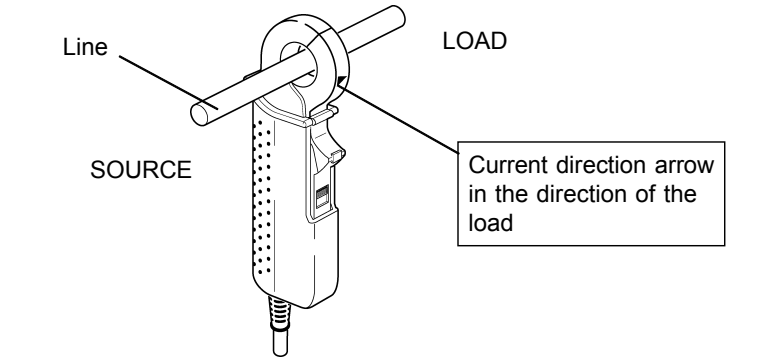


Measurement Procedure

 **CAUTION**

- When disconnecting the BNC connector, be sure to release the lock before pulling off the connector. Forcibly pulling the connector without releasing the lock, or pulling on the cable, can damage the connector.
- To prevent damage to the product and sensor, never connect or disconnect a sensor while the power is on.

In order to make the phases of the measurement and output currents the same, clamp the jaws of the sensor onto the conductor so that the current direction on the clamp points in the direction of the load, and so that the conductor is approximately centered between the jaws. Make sure that the tips of jaws are fully closed.



1. Slide the lock button into the unlocked position when the lever is locked.
2. Align the BNC connector with the connector guide notch on the current input connector. While pushing the connector in, turn it to the right to lock it.
3. Open the jaws, and clamp the sensor onto the conductor.
4. Make sure that only one conductor is in the core.
5. Make sure that the tips of jaws are fully closed.

Specifications

Accuracy is guaranteed for one year at 23±5°C (73±9°F) and Max. 80%RH, and in combination with the 3166 and 3168 CLAMP ON POWER HiTESTER. (Opening and Closing of the Sensor: Maximum 10000 times)

|                                          |                                                                                                       |
|------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Rated primary current                    | 100 AAC                                                                                               |
| Rated secondary current                  | 100 mAAC                                                                                              |
| Secondary current amplitude accuracy     | ±0.5%rdg. ±0.2%f.s.<br>(f.s. : ranges of the 3166 and 3168)<br>(45 to 66Hz, at the clamp core center) |
| Secondary current phase accuracy         | Within ±1° (45 Hz to 5 kHz)                                                                           |
| Amplitude frequency characteristics      | Within ±1% at 40 Hz to 5 kHz<br>(Deviation from accuracy)                                             |
| Effect of external magnetic field        | Approx. 0.1 A<br>(in an AC magnetic field of 400 A/m)                                                 |
| Effect of conductor position             | Within ±0.5%                                                                                          |
| Maximum input current                    | 130 A continuous at 45 to 66 Hz (50°C, 122°F)                                                         |
| Dielectric strength                      | 3536 VrmsAC for 15 seconds (between electric circuit and core, between core and case)                 |
| Maximum rated voltage to earth           | Max. 300 Vrms                                                                                         |
| Operating temperature and humidity range | 0 to 50°C (32 to 122°F), Max. 80%RH<br>(no condensation)                                              |
| Storage temperature and humidity range   | -10 to 60°C (14 to 140°F), Max. 80%RH<br>(no condensation)                                            |
| Location for use                         | Altitude up to 2000 m (6562 feet), Indoors                                                            |

|                                  |                                                                     |                                                                                                                                          |
|----------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Standards applying               | Safety                                                              | EN61010-2-032:2002<br>Type A current sensor<br>Measurement Category III<br>Pollution Degree 2 (anticipated transient overvoltage 4000 V) |
|                                  | EMC                                                                 | EN61326:1997+A1:1998+A2:2001+A3:2003                                                                                                     |
| Diameter of measurable conductor | 15 mm dia. (0.59")                                                  |                                                                                                                                          |
| Cord length                      | Approx. 3 m (9.8 feet)                                              |                                                                                                                                          |
| External dimensions              | Approx. 46W×135H×21D mm (1.8"W×2.3"H×0.7"D) (excluding protrusions) |                                                                                                                                          |
| Mass                             | Approx. 230 g (8.1 oz.)                                             |                                                                                                                                          |
| Accessories                      | Instruction manual, Mark band 6 (3 sets)                            |                                                                                                                                          |

Maintenance and Service

Cleaning the unit

To clean the product, 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.

Service

- If the product seems to be malfunctioning, contact your dealer or Hioki representative.
- Pack the product 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.

**HIOKI**

**DECLARATION OF CONFORMITY**

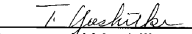
Manufacturer's Name: HIOKI E.E. CORPORATION  
Manufacturer's Address: 81 Koizumi, Ueda, Nagano 386-1192, Japan

Product Name: CLAMP ON SENSOR  
Model Number: 9298

The above mentioned product conforms to the following product specifications:  
Safety: EN61010-2-032:2002  
EMC: EN61326:1997+A1:1998+A2:2001+A3:2003  
ClassB equipment  
Minimum immunity test requirement

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

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HIOKI E.E. CORPORATION  
  
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