

9010-50,9018-50

CLAMP ON PROBE

Instruction Manual

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HIOKI

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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 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 9010-50, 9018-50 Clamp on Probe. To obtain maximum performance from the device, please read this manual first, and keep it handy for future reference.

Overview

The 9010-50 and 9018-50 are voltage output type clamp on probes, which are applicable to 500 A AC current measurements. These probes 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.

Inspection and Maintenance

Initial Inspection

When you receive the device, 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.

Maintenance and Service

- To clean the device, 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.
- Measurements are degraded by dirt on the mating surfaces of the jaws, so keep the surfaces clean by gently wiping with a soft cloth.
- If the device seems to be malfunctioning, contacting your dealer or Hioki representative.

NOTE

Pack the device so that it will not sustain damage during shipping, and include a description of existing damage. We do not take any responsibility for damage incurred during shipping.

Safety

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

⚠ DANGER

- **This device 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 device. Using the device in a way not described in this manual may negate the provided safety features.**

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 device defects.



- **To avoid short circuits and potentially life-threatening hazards, never attach the device to a circuit that operates at more than 600 V, or over bare conductors.**

Safety Symbols

	Indicates cautions and hazards. When the symbol is printed on the device, refer to a corresponding topic in the Instruction Manual.
	Indicates that the device may be connected to or disconnected from a live circuit.
	Indicates a double-insulated device.
	Indicates AC (Alternating Current).

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

	Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.
	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 device.
	Indicates advisory items related to performance or correct operation of the device.

Other Symbols



This symbol indicates that the product conforms to regulations set out by the EC Directive.



Indicates a prohibited action.

Measurement categories

To ensure safe operation of measuring instruments, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT II to CAT IV, and called measurement categories.

⚠ DANGER

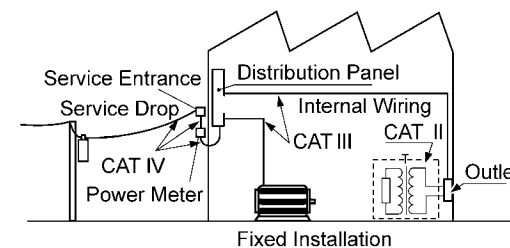
- **Using a measuring device in an environment designated with a higher-numbered category than that for which the device is rated could result in a severe accident, and must be carefully avoided.**
- **Using a measuring device without categories in an environment designated with the CAT II to CAT IV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

This device complies with CAT III safety requirements.

CAT II :When directly measuring the electrical outlet receptacles of the primary electrical circuits in equipment connected to an AC electrical outlet 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 panel, and feeders from the distribution panel to outlets

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)



Instrument Installation

Storage temperature and humidity
 : -10 to 60°C (14 to 140°F), 80%RH or less (no condensation)

Operating temperature and humidity
 : 0 to 50°C (32 to 122°F), 80%RH or less (no condensation)

Avoid the following locations that could cause an accident or damage to the device.	
	Exposed to direct sunlight Exposed to high temperature
	In the presence of corrosive or explosive gases
	Exposed to water, oil, other chemicals, or solvents Exposed to high humidity or condensation
	Exposed to strong electromagnetic fields Near electromagnetic radiators
	Exposed to high levels of particulate dust
	Near induction heating systems (e.g., high-frequency induction heating systems and IH cooking utensils)
	Subject to vibration

Usage Notes



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

⚠ DANGER

- **Clamp-on probe 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.**

⚠ WARNING

- **Do not allow the device 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.**
- **Avoid measuring at frequencies in excess of the derating range, as this will generate heat in the jaws and is dangerous.**

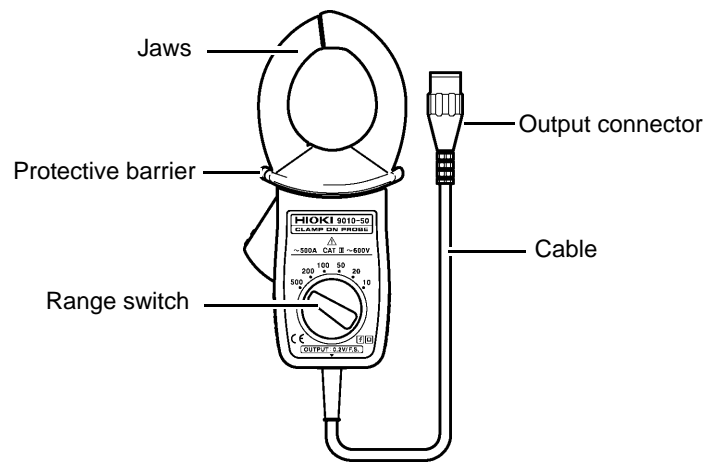
⚠ CAUTION

- Note that the device may be damaged if current exceeding the selected measurement range is applied for a long time.
- Be careful to avoid dropping the device or otherwise subjecting them to mechanical shock, which could damage the mating surfaces of the jaws and adversely affect measurement.
- Do not store or use the device where it could be exposed to direct sunlight, high temperature or humidity, or condensation. Under such conditions, the device may be damaged and insulation may deteriorate so that it no longer meets specifications.
- Keep the jaws tip and core slits free from foreign objects, which could interfere with clamping action.
- Measurements are degraded by dirt on the mating surfaces of the jaws, so keep the surfaces clean by gently wiping with a soft cloth.
- To avoid breaking the cables, do not bend or pull them.
- Avoid stepping on or pinching cables, which could damage the cable insulation.
- Keep the cables well away from heat sources, as bare conductors could be exposed if the insulation melts.

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.

Names of Parts



Measurement Procedure

Preliminary Checks

Before using the device for 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 or Hioki representative.

WARNING

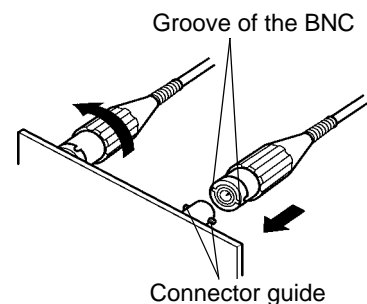
Before using the device, make sure that the insulation on the probes is undamaged and that no bare conductors are improperly exposed. Using the device in such conditions could cause an electric shock, so contact your dealer or Hioki representative for repair.

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.

Set the product being connected to (such as a recorder or tester) to a range which can measure 0.2 V AC.

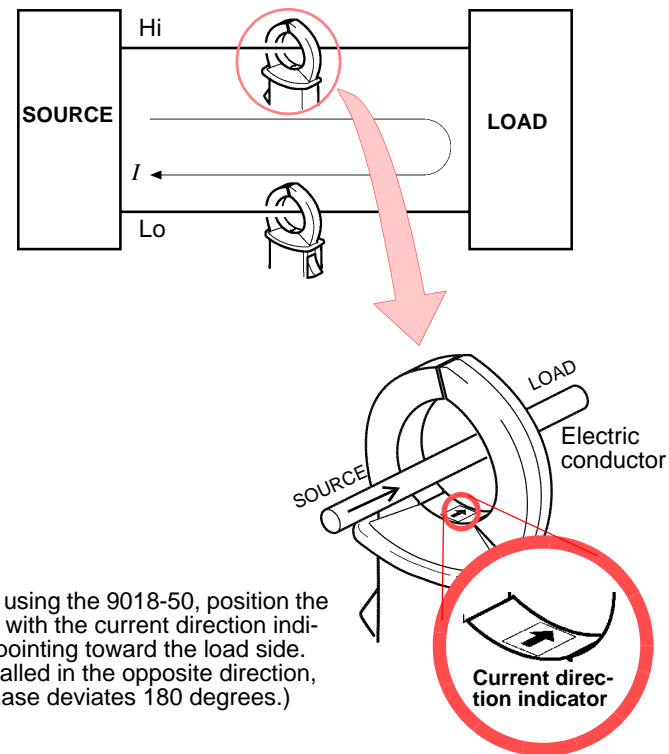
- Align the grooves in the BNC connector with the guide pins on the connection equipment input connector, then turn clockwise while pressing in to lock the connector. To remove from the connection equipment, turn the BNC connector counterclockwise to release the lock, then pull it.



- When input the unknown amount of measuring current, set the range to the largest one (500 A).

- Open the jaws and clamp the conductor so that the conductor is approximately centered between the jaws. When also measuring waveform phase with a recorder or such product, use the 9018-50 and clamp in such a way that the direction of current flow matches the direction of the clamp section's current direction indicator arrow to ensure that the measured current and output voltage are in phase with one another. The 9010-50 is designed for level measurement and does not have a current direction mark.
- Confirm whether the jaws tip connection part is closed certainly.
- Set the proper range of the clamp on probe according to the measurement value.

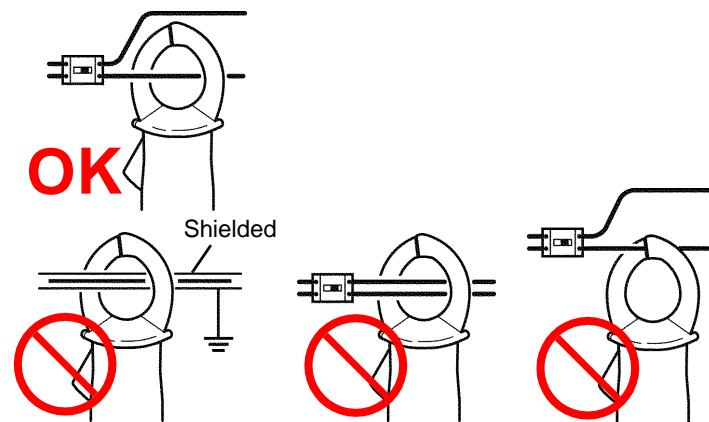
Wiring example



When using the 9018-50, position the clamp with the current direction indicator pointing toward the load side. (If installed in the opposite direction, the phase deviates 180 degrees.)

NOTE

- Attach the clamp around only one conductor. Single-phase (2-wire) or three-phase (3-wire) cables clamped together will not produce any reading.



- Note that a DC component will result in an erroneous reading.
- Ground-shielded conductors cannot be accurately measured.
- Ensure that the input resistance of the measuring instrument being combined with is sufficiently high (1 MΩ or greater is recommended).
- Also read the instruction manual for whichever product you connect to.

Specifications

f.s. : maximum display value or scale length (This is usually the maximum value of the currently selected range.)
rdg. : reading value (The value currently being measured and indicated on the measuring device.)

1. General Specifications

Operating environment	Indoors, Up to 2000 m (6562ft) ASL
Operating temperature and humidity (no condensation)	0 to 50°C (32 to 122°F), 80%RH max.
Storage temperature and humidity (no condensation)	-10 to 60°C (14 to 140°F), 80%RH max.
Maximum rated current	500 A rms
Maximum rated voltage to earth	600 V AC (50 Hz/60 Hz)
Dielectric strength	7060 V rms AC (Sensitive current 1 mA), 50 Hz/60 Hz, 1 minute, between the jaws and the output connector
Applicable Standards	Safety EN61010 Pollution degree 2 Measurement category III (anticipated transient overvoltage 6000 V)
	EMC EN61326

2. Specifications

Measuring range	10/20/50/100/200/500 A AC
Output voltage	0.2 Vf.s.
Maximum input current	(50/60 Hz, continuous, Inside of derating range) 150 Arms (10/20/50 A range) 400 Arms (100/200 A range) 650 Arms (500 A range)
Conditions of guaranteed accuracy	Guaranteed accuracy period: 1 year Guaranteed accuracy period from adjustment made by Hioki: 1 year Opening and Closing of the jaws: Maximum 10000 times Temperature and humidity for guaranteed accuracy : 23°C±5°C (73°F±9°F), 80%RH or less

Model	Basic accuracy (45 Hz ≤ f ≤ 66 Hz)	Frequency characteristics
9010-50	(sine wave current input; jaws center position; common for all ranges; Inside of derating range) ±2% rdg. ±1% f.s.	(at 40 Hz ≤ f ≤ 1000 Hz, adds to the basic accuracy) ±6% rdg. (10/20 A range) ±3% rdg. (50/100/200/500 A range)
9018-50	(sine wave current input; jaws center position; common for all ranges; Inside of derating range) ±1.5% rdg. ±0.1% f.s.	(at 40 Hz ≤ f ≤ 3000 Hz, adds to the basic accuracy) Amplitude ±1% rdg. Phase ±2.5deg.

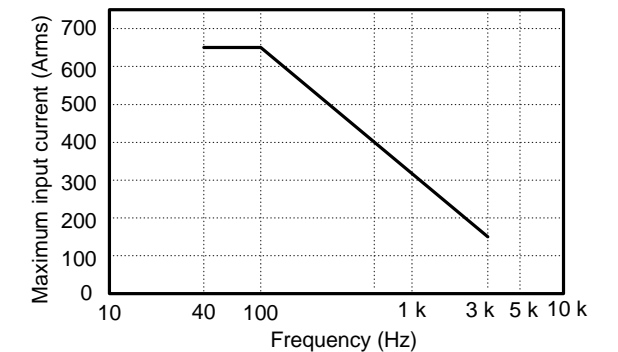
Temperature coef- Within ±0.05% rdg./°C
ficient

Effect of conductor (at 100 A/55 Hz input, using with the conductor 10 position mm diameter)
9010-50 Within ±2%
9018-50 Within ±0.5%

Effect of external magnetic fields (in an AC electromagnetic field of 400 A/m, 60 Hz)
9010-50 1 A equivalent or less
9018-50 100 mA equivalent or less

Output connector	BNC connector
Measurable conductor diameter	Less than 46 mm (1.81")
Dimensions	Approx. 78W×188H×35D mm (3.07"W×7.40"H×1.38"D) (Without protrusions, cord)
Mass	Approx. 420 g (14.8 oz.)
Cable length	Approx. 3 m
Accessories	Instruction manual

3. Derating



Option

9704 Conversion Adapter

This adapter changes the 9010-50 or 9018-50 output connector to a banana plug type. It is needed to connect to products with DMM or banana plug inputs.

NOTE

The banana plug has a safety cover attached and may therefore not be compatible with the shapes of the input connectors on some products.

