HIOKI

9667

FLEXIBLE CLAMP ON SENSOR

Instruction Manual

October 2012 Revised edition 8
Printed in Japan
9667A981-08 12-10H

600113198

HIOKI

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The Declaration of Conformity for instruments that comply to CE mark requirements may be downloaded from the HIOKI website.

Introduction

Thank you for purchasing the HIOKI Model 9667 Flexible Clamp On Sensor.
To obtain maximum performance from the product, please read this manual first, and keep it handy for future reference.

Overview

The 9667 Flexible Clamp On Sensor measures large currents of up to 5000 A AC.
The hollow core coil makes the sensor unit highly flexible, allowing it to be used for clamping in narrow spaces with crowded wiring. This is a feature not seen in sensors that use conventional cores.

Inspection and Maintenance

Initial 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.

Maintenance and Service

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

Specifications

(Accuracy guaranteed for one year at 23±5°C (73±9°F), 80%RH or less)

Rated primary current	5000 to 500 A AC/ 500 to 50 A AC
Output voltage	500 mVAC f.s.
Amplitude accuracy	±2% rdg.±1.5 mV (at 45 Hz to 66 Hz, at sensor center)
Frequency band	10 Hz to 20 kHz (amplitude error: within ±3dB)
Phase accuracy	Within ±1° (at 45 Hz to 66 Hz)
Temperature characteristic	±2% rdg./°C
Effect of conductor position	Within ±3% (deviation from center)
Effect of external electromagnetic field	5 A equivalent,7.5 A max. (in an external electromagnetic field of 400 A/m
Maximum input current	10,000 A continuous (at 45 to 66 Hz)
Dielectric strength	6880 Vrms for 15 seconds (between circuit and sensor, at 50/60 Hz)
Maximum rated voltage to earth	1000 VACrms or less
Operating temperature &humidity	0 to 40°C (32 to 104°F), 80%RH or less (non-condensating)
Temperature of conductor to be measured	50°C or less (122°F or less)
Storage temperature &humidity	-10 to 50°C (14 to 122°F), 80%RH or less (non-condensating)
Operating environment	Indoors, altitude up to 2000 m (6562-ft.)
Applicable Standards	(Safety) EN61010 Measurement Category III, Pollution Degree 2 (Anticipated Transient Overvoltage: 8000 V (EMC) EN61326 EN61000-3-2 EN61000-3-3
Power supply	LR03 alkaline battery x 4 (1.5 VDC x 4) or 9445-02/03 AC ADAPTER (9 VDC) (option) (Voltage fluctuations of ±10% from the rated supply voltage are taken into account.)
Maximum rated power	35 mVA (using batteries), 50 mVA (using AC adapter)
Battery life	Approx. 7.5 days (continuous)
Output impedance	100 Ω or less
Measurable conductor diameter	ϕ254 mm or less
Cable length	Approx. 2 m (78.74") (between sensor and circuit), approx. 1m (39.37") (output cord)
Dimensions	Approx. 910 mm (35.83")(when sensor unit is open) Approx. 57.5W x 86.5H x 30D mm (2.26"W x 3.41"H x 1.18"D) (Circuit box)
Mass	Approx. 450 g (15.9 oz.) (including batteries)
Accessories	Instruction Manual, LR03 alkaline battery x 4
Options	9445-02 AC Adapter 9445-03 AC Adapter

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 product)

Safety

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

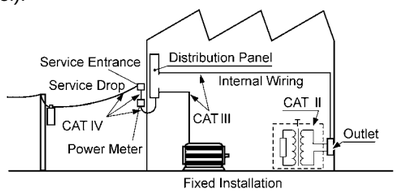
DANGER

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. Using the instrument/ device/ product 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 product defects.

Measurement categories

This product complies with CATIII (1000 V) safety requirements.
To ensure safe operation of measurement products, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT II to CAT IV, and called measurement categories.

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



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.
Use of a measurement instrument that is not CAT-rated in CAT II to CAT IV measurement applications could result in a severe accident, and must be carefully avoided.

Safety Symbol

⚠	In the manual, the ⚠ symbol indicates particularly important information that the user should read before using the product. 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.
⧈	Indicates a double-insulated device.
~	Indicates AC (Alternating Current).
⎓	Indicates DC (Direct Current).
⊗	Wear appropriate protective insulation (insulating rubber gloves and boots, helmet and etc.) when connecting and disconnecting from live electric circuits.

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 product

NOTE Advisory items related to performance or correct operation of the product.

Usage Notes

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.

DANGER

- **To avoid short circuits and potentially life-threatening hazards, never attach the product to a circuit that operates at more than the 1000 V AC, or over bare conductors.**
- **This product 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.**
- **To avoid electric shock, stop using this product if it shows either of the following signs of damage, and do not use the product again until it has been repaired.**
  1. **The blue sensor cover is damaged, and any red part is visible beneath the cover.**
  2. **The yellow connector cover is damaged, and any black part is visible beneath the cover.**

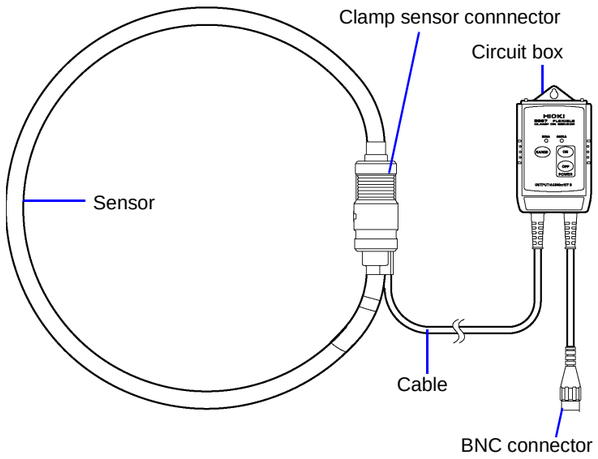
CAUTION

- 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.
- This product is not designed to be entirely water- or dust-proof. To avoid damage, do not use it in a wet or dusty environment.
- Be careful to avoid dropping the product or otherwise subjecting them to mechanical shock, which could damage the mating surfaces of the core and adversely affect measurement.
- Keep the clamp sensor connnector free from foreign objects, which could interfere with clamping action.
- Avoid stepping on or pinching the cable, which could damage the cable insulation.
- To avoid damaging the cables, do not bend or pull the cables.
- Note that the product may be damaged if current exceeding the selected measurement range is applied for a long time.

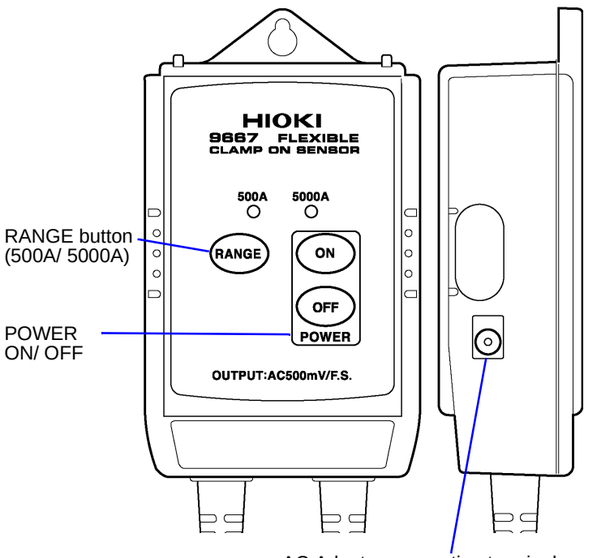
NOTE

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.

Parts Names



Circuit box



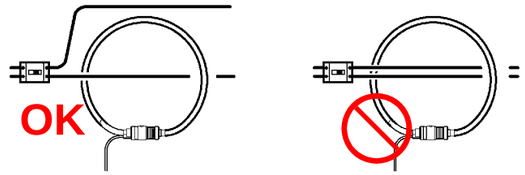
Measurement Procedures

⚠CAUTION

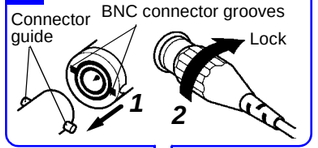
- When disconnecting the BNC connector, be sure to release the lock before pulling off the connector. Forcibly pulling the connector without releasing the lock, or pulling on the cable, can damage the connector.
- To prevent damage to connected instruments, never connect or disconnect the sensor while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

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.



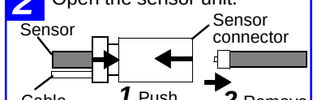
1 Connect the BNC connector.



Engage the BNC connector grooves with the connector-guide projections, and turn the connector clockwise to lock the components.

To remove the BNC connector: Turn the connector counterclockwise and pull it out.

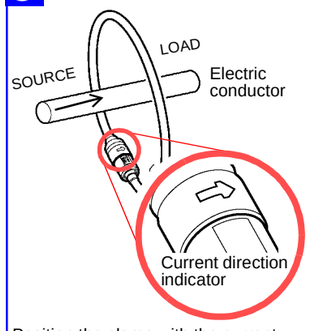
2 Open the sensor unit.



Remove the sensor while pressing both sides of the sensor connector as shown in the illustration.

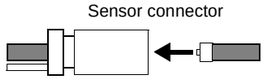
If the sensor connector does not move, check whether the LOCK has been released.

3 Clamp the conductor.

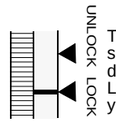


Position the clamp with the current direction indicator pointing toward the load side. (If installed in the opposite direction,the phase deviates 180 degrees.)

Hold only one conductor at the clamp center with the current direction indictor pointing toward the load side.
Securely push the tip of the sensor into the sensor connector.

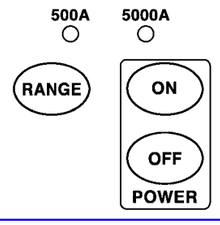


If necessary, lock the sensor connector.



To LOCK, turn the sensor in the direction of the LOCK mark until you hear a click.

4 Turn the power on and select range.



Turn ON the power to the circuit box. (default setting:5000 A)
Select the appropriate range (500/5000 A) using the RANGE button. If the power goes off and then on again, the range will always reset to 5000 A.

NOTE

When using the AC adapter for continuous monitoring, we recommend that you also use batteries to prevent interruptions due to instantaneous power outages.
(If the AC adapter is not used together with batteries, the power goes OFF following an instantaneous power outage.)

Replacing the Batteries

⚠WARNING

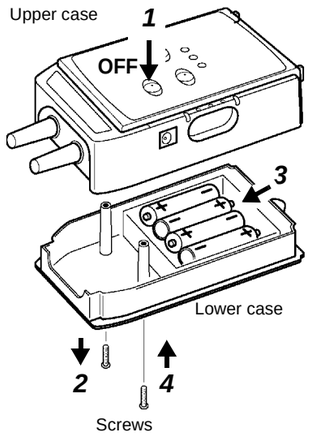
- **To avoid electric shock when replacing the batteries, first disconnect the clamp from the object to be measured.**
- **During battery replacement, use caution not to put any foreign materials such as a metal object into the circuit box to avoid damage to the product.**
- **After replacing the batteries, replace the cover and screws before using the product.**
- **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.**

⚠CAUTION

- Do not mix old and new batteries, or different types of batteries. Also, be careful to observe battery polarity during installation. Otherwise, poor performance or damage from battery leakage could result.
- To avoid corrosion and damage to this product from battery leakage, remove the batteries from the product if it is to be stored for a long time.

NOTE

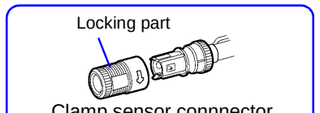
- After use, always turn OFF the power.
- If the power does not go ON after replacing batteries, the fuse may be blown. In this case, do not attempt to replace the fuse or repair the product. Contact your dealer or a HIOKI representative.
- When using an AC adapter, always use the optional 9445-02/03 AC Adapter.



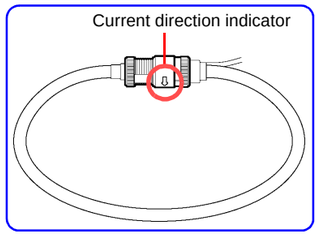
Necessary tool:
Precision Phillips screwdriver

1. Turn OFF the power to the circuit box.
2. Turn the circuit box over and use a Phillips screwdriver to remove the two retaining screws from the lower case.
3. Remove the upper case and mount four new LR03 alkaline batteries. Make sure the polarity is correct.
4. Mount the upper case and tighten the retaining screws.

Clamp Sensor Connector Lock System



Clamp sensor connnector



NOTE

- If you pull out hard the locking part of the Clamp sensor connector, the locking part might be dislodged.
- If this happens, reconnect the connector so that the current direction indicator faces inside as shown in the illustration. If the indicator is faced outside, the current direction indicator will indicate the opposite direction to the actual measuring current.

MEMO