

Introduction

Thank you for purchasing this Hioki "9270 • 9271 CLAMP ON SENSOR". To get the maximum performance from the unit, please read this manual first, and keep this at hand.

Safety

△ DANGER

During high voltage measurement, incorrect measurement procedures could result in injury or death, as well as damage to the equipment.

Please read this manual carefully and be sure that you understand its contents before using the equipment. The manufacturer disclaims all responsibility for any accident or injury except that resulting due to defect in its product.

This Instruction Manual provides information and warnings essential for operating this equipment in a safe manner and for maintaining it in safe operating condition. Before using this equipment, be sure to carefully read the following safety notes.

△ DANGER



- To avoid short circuits and accidents that could result in injury or death, use clamp testers only with power lines carrying 600 V AC or less.
- To avoid short circuits and accidents that could result in injury or death, when the tips of jaws are open, do not use on bare conductors.

The following symbols are used in this instruction Manual to indicate the relative importance of cautions and warnings.

△ DANGER	Indicates that incorrect operation presents extreme danger of accident resulting in death or serious injury to the user.
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△ WARNING	Indicates that incorrect operation presents significant danger of accident resulting in death or serious injury to the user.
△ CAUTION	Indicates that incorrect operation presents possibility of injury to the user or damage to the equipment.
NOTE	Denotes items of advice related to performance of the equipment or to its correct operation.

Safety symbols

△	In the manual, this mark indicates explanations which it is particularly important that the user read before using the equipment.
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Inspection

When the unit is delivered, check and make sure that it has not been damaged in transit. If the unit is damaged, or fails to operate according to the specifications, contact your dealer or Hioki representative.

Precaution

△ DANGER

Always connect the clamp on sensor to the secondary side of a breaker. On the secondary side of a breaker, even if the lines are shorted the breaker can trip and prevent an accident. On the primary side, however, the current capacity may be large, and in the event of a short-circuit there may be a serious accident.

△ WARNING

- To prevent electric shock, do not allow the unit to become wet and do not use the unit when your hands are wet.
- When working with live circuits, take all suitable precautions against accidents, including the use of electrical safety gear such as rubber gloves, rubber boots, and safety helmets.
- Be careful to avoid application of power levels exceeding the unit's rated measurement range. The unit may be damaged if current at levels in excess of the measurement limit is applied for a long time.
- Be gentle when plugging in or unplugging the connector. When the connector is plugged in, never pull on the cable.
- Never plug in or unplug the connector when digital power meter or the clamp unit's power is turned on.
- When the digital power meter or the clamp unit's power is turned off, do not apply current to the clamp sensor.
- Before using the unit, make sure that the sheathing on the cable is not damaged and that no bare wire is exposed. If there is damage, using the unit could cause electric shock. Contact your dealer or Hioki representative.

△ CAUTION

- Do not store or use the unit where it will be exposed to direct sunlight, high temperature, high humidity, or con-

densation. If exposed to such conditions, the unit may be damaged, the insulation may deteriorate, and the unit may no longer satisfy its specifications.

- To avoid damage to the unit, do not subject the equipment to vibrations or shocks during transport or handling. Be especially careful to avoid dropping the equipment.
- If the split face of the jaws becomes dirty, clean it by wiping lightly with a soft cloth.
- To avoid damaging the sensor cables. Do not bend or pull the sensor cables.
- Avoid treading on or pinching the cable so as not to damage the cable sheaths.
- Keep the cables well away from heat, to prevent the possibility of melting the insulation.

NOTE Accurate measurement may be impossible in locations subject to strong external magnetic fields, such as transformers and high-current conductors, or in locations subject to strong external electric fields, such as radio transmission equipment.

Overview

The 9270, 9271 was developed for to provide a 20A (9270), 200A (9271) clamp sensor for use with the 9486 clamp unit of the 3191 digital power meter. Together with the 3191, the 9270, 9271 makes it possible to measure alternating current in live power lines without cutting into the lines.

The sensor features good frequency response (amplitude and phase), and is easy to connect and use. Its versatility will find application in a wide variety of fields dealing with current and power measurement.

Specifications

(1) 9270 Specifications

Rated current : 20 A AC f.s.
 Output Voltage : 2 V AC / 20 A (Output impedance Approx. 50Ω)
 Input impedance : Less than 0.2mΩ
 Effect of external magnetic fields : 20 mA equiv. Typ (in an AC field of 400 A/m)
 Operating input range : 50 A
 Maximum rated input : 100 A
 Power consumption : Approx. 960 mW (at rated input level)

(2) 9271 Specifications

Rated current : 200 A AC f.s.
 Output Voltage : 2 V AC / 200 A (Output impedance Approx. 10Ω)
 Input impedance : Less than 0.02mΩ
 Effect of external magnetic fields : 200 mA equiv. Typ (in an AC field of 400 A/m)
 Operating input range : 300 A
 Maximum rated input : 500 A
 Power consumption : Approx. 2.8 W (at rated input level)

(3) 9270, 9271 Specifications

Precision (23°C ± 3°C, 45 to 66Hz) :
 Better than ±0.5% rdg. ±0.05% f.s.
 ±0.2°
 Frequency response (deviation from precision) :
 Less than ±1.0% between 10Hz to 30KHz
 Less than ±2.5% between 5Hz to 50KHz
 Phase Characteristic :
 Less than ±0.5° between 10Hz to 20KHz
 Less than ±1.0° between 5Hz to 50KHz
 Thermal coefficient : Within ±0.05% f.s./°C (0°C to 40°C)

Operating environment : 0°C to 40°C, less than 80% RH (no condensation)

Storage environment : -10°C to 50°C, less than 80% RH (no condensation)

Effect of conductor position : Less than ±0.3%

Dielectric strength : 2,200 V AC for 1 minute between (electrical circuit and case, and case and core)

Maximum circuit voltage : 600 V AC

Measurable conductor diameter : Up to φ20mm

Cord length : Approx. 3m

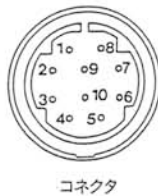
External dimensions : Approx. 145(W)×60(H)×33(D) mm

Mass : Approx. 230g

Accessories : 9355 CARRYING CASE, 1
 Instruction Manual, 1
 Mark bands, 6 (3 sets)

(4) Connector pin assignments

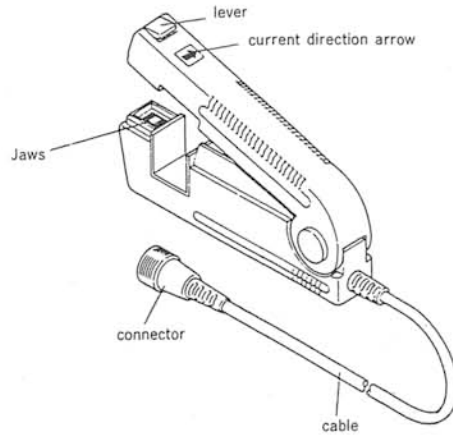
①	Power supply	GND
②	//	(+)
③	//	(-)
④	//	GND
⑤	Output	(+)
⑥	//	(-)
⑦	ID signal (connected to power supply GND)	
⑧	//	{ connected to power supply GND (9270) N. C (9271)
⑨	//	(N. C)
⑩	Shield (cable)	



(6) **Mating receptacle**
 RM515ERB-10SD (Hirose)

(7) **Measurement ranges**
 As the 9270, 9271 is rated for 20A and the is rated for 200A, best results can be obtained by selecting the sensor as follows.
 For currents from 20 mA to 20A: Use the 9270
 For currents from 20A to 200A: Use the 9271

Nemes of parts



Measurement Procedure

○ Lightly press the lever and spread the tips of the clamp with both hands, then position the clamp so that the conductor is approximately centered in the jaws with the current direction arrow facing in the direction of the load. Next, grip the clamp lightly so that the lever snaps securely shut.



NOTE

- Do not clamp the sensor onto more than one conductor at a time.
- Note that a DC component of more than a few amperes will result in an erroneous reading.
- Also note that operation will not be correct if the power frequency is very low (less than about 1.5Hz).
- The circuit is such that a DC voltage is output briefly after the power is turned on. Stabilization of the output takes about 20 seconds.
- With the 9270, do not apply more than 100 A at frequencies greater than 10kHz. This is to prevent the sensor from becoming too hot.
- With the 9271, the clamp sensor will become quite hot when measuring current that exceeds the rated level. Therefore, the duration of such measurements should be kept as short as possible.

Measurement of 2-conductor electrical appliance cords

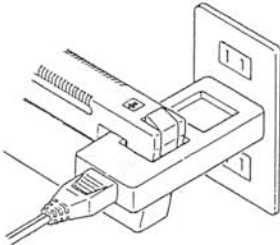
△ WARNING

- The maximum permissible input is 100 V AC or 15 A AC. Do not measure voltage in excess these limitations, as doing so heat build-up may damage the unit or cause a short circuit.
- In order to prevent electric shock and short circuits, never insert foreign objects into the voltage measurement holes.

Measurement of current used by electrical appliances with 2-conductor cords that are designed to plug into conventional AC outlets can be easily accomplished using the optional CT-101A line splitter.

As shown in the figure, plug the CT-101A into the AC outlet, then plug the appliance being checked into the CT-101A. Measurement can then be accomplished by clamping through the window in the CT-101A.

If the current flow is very low, clamp the sensor through the X 10 window in the line splitter. This will multiply the output of the clamp sensor by a factor of ten, then the actual value can be obtained by dividing the measured value by 10.



Maintenance

Gently wipe dirt from the surface of the unit with a soft cloth moistened with a small amount of water or neutral cleanser. Do not under any circumstances use benzine, alcohol, acetone, ether, paint thinner, lacquer, or ketone solvents on the unit, as these may cause deformation or discoloration.

Service

- If the unit is not functioning properly, check the cable. If a problem is found, contact your dealer or Hioki representative.
- Pack the unit carefully so that it will not be damaged during transport, and write a detailed description of the problem. Hioki cannot bear any responsibility for damage that occurs during shipment.



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