

CT7731
CT7736
CT7742

AC/DC AUTO-ZERO
CURRENT SENSOR

Instruction Manual

EN

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HIOKI

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All regional contact information

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•EU declaration of conformity can be downloaded from our website.

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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 three (3) years 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 CT7731, CT7736, CT7742 AC/DC Auto-Zero Current Sensor. To obtain maximum performance from the device, please read this manual first, and keep it handy for future reference. Be sure to also read the separate “Current Sensor Operating Precautions” before use.

The latest edition of the instruction manual

The contents of this manual are subject to change, for example as a result of product improvements or changes to specifications. The latest edition can be downloaded from Hioki’s website.
<https://www.hioki.com/global/support/download/>

Product registration

Register your product in order to receive important product information.
<https://www.hioki.com/global/support/myhioki/registration/>

Troubleshooting

If the device seems to be malfunctioning, contact your authorized Hioki distributor or reseller.

Overview

This current sensor has a Hioki PL14 output connector, enabling it to be automatically recognized when connected to a compatible instrument for simple setup. Furthermore, its features include reduced zero-point variability caused by temperature, making it well suited to applications characterized by temperature variations, for example continuous measurement during daytime and nighttime hours.

Parts Names

Example: CT7736

Jaw

Protective barrier

Lever

Cable

Output connector

Serial number (label on rear of device)

The serial number consists of nine digits. The first two digits indicate the year of manufacture, while the second two digits indicate the month of manufacture. Do not remove this sticker as the number is important.

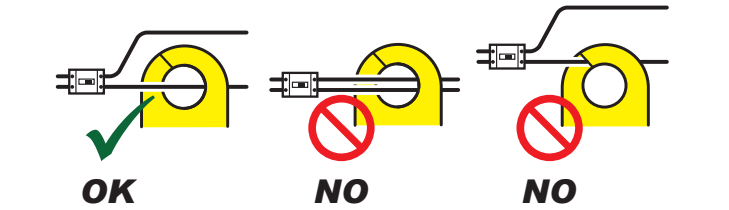
Measurement Methods

Inspection Before Use

Verify that the device operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your authorized Hioki distributor or reseller.

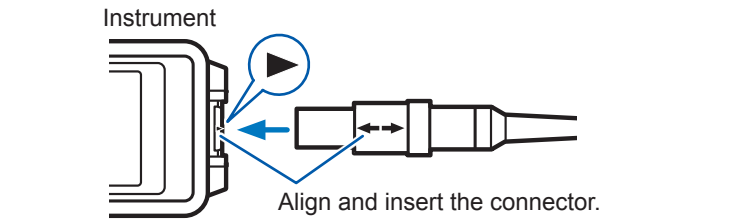
Check Items	Remedy
Is the jaw cracked or damaged?	If there is any damage, electric shock may result. Discontinue use and contact your authorized Hioki distributor or reseller.
Is the cable insulation torn?	Broken connections will make proper measurement impossible. Discontinue use and contact your authorized Hioki distributor or reseller.
Is the cable broken at the base (of the connector or grip)?	Broken connections will make proper measurement impossible. Discontinue use and contact your authorized Hioki distributor or reseller.

- Attach the clamp around only one conductor. If you clamp single-phase (2-wire) or three-phase (3-wire) conductors together, the device will not be able to make a measurement.



- When a conductor to be measured is clamped in the center of the jaw, measurement is performed the most accurately, with no effect of the conductor position.
- To measure low current levels, multiple windings may be used to increase relative sensitivity (10 windings multiplies the measured current by a factor of 10). However, in this case, the windings should be made radially, with a diameter of at least 20 cm.
- The reading may show a measurement greater than the actual value due to magnetic-field interference. The amount of interference varies depending on the sensor. For details, see “Magnetic-field interference” in Specifications.
- For more information about instrument operation and settings, see the instrument’s instruction manual.

1 Connect the device to the instrument.



Align the arrow on the device’s output connector with the ► on the compatible instrument’s sensor input connector and insert the connector.

2 Perform zero-adjustment. (DC measurement)

Perform zero-adjustment under no-input conditions.

Once zero-adjustment has been performed, movement of the device’s zero-point will be within the guaranteed range. Consequently, you must perform initial zero-adjustment before use.

3 Clamp the conductor

Source

Load

Conductor

Current direction

Current direction indicator

Gripping the lever to open the jaw, align the current direction indicator with the direction of the current in the conductor, and close the jaw with the conductor roughly centered in the jaw. If the phase is not an issue during AC measurement, the direction of current flow in the wire relative to the current direction indicator may be ignored.

Close the tips of the jaw completely before performing measurement. If the output cable is caught on the jaw or the jaw is forced into the measurement location, it may not close completely. If this occurs, it will not be possible to obtain an accurate measurement.

4 Once measurement is complete, remove the device from the conductor and disconnect it from the instrument.

When disconnecting the device from the instrument, grip the tip of the output connector (the part with the arrow) and pull the connector straight out.

Pulling forcibly on the base of the connector may damage the device.

Specifications

	CT7731		CT7736		CT7742	
Operating environment	Indoors, pollution degree 2, altitude up to 2000 m (6562 ft.)					
Operating temperature and humidity	-25°C to 65°C (-13.0°F to 149.0°F), 80% RH or less (no condensation)					
Storage temperature and humidity	-25°C to 65°C (-13.0°F to 149.0°F), 80% RH or less (no condensation)					
Dustproof and waterproof (EN60529)	Jaw, barrier, grip: IP40 (when the jaws closed)		Jaw, barrier: IP50 (when the jaws closed) Grip: IP54 (when measuring an insulated conductor only) Risk of electric shock from the conductor being measured increases when wet.			
Standards	Safety: EN61010 EMC: EN61326					
Dielectric strength	7.4 kV AC for 1 minute (between jaw and grip, between jaw and output connector)					
Power consumption category	Sensor power consumption category: 2 (See the continuous operating time for the instrument to which the device is to be connected.)					
Dimensions	(Not including dimensions of protruding parts, lever, or jaw)					
	Approx. 58W × 132H × 18D mm (2.28"W × 5.20"H × 0.71"D)		Approx. 64W × 160H × 34D mm (2.52"W × 6.30"H × 1.34"D)		Approx. 64W × 195H × 34D mm (2.52"W × 7.68"H × 1.34"D)	

	CT7731	CT7736	CT7742
Jaw dimensions	Approx. 66W × 13D mm (2.60"W × 0.51"D)	Approx. 69W × 14D mm (2.72"W × 0.55"D)	Approx. 92W × 18D mm (3.62"W × 0.71"D)
Mass	Approx. 250 g (8.8 oz.)	Approx. 320 g (11.3 oz.)	Approx. 510 g (18.0 oz.)
Cable length	Approx. 2.5 m (98.43")		
Product warranty period	3 years		
Accessories	Instruction Manual, Current Sensor Operating Precautions		

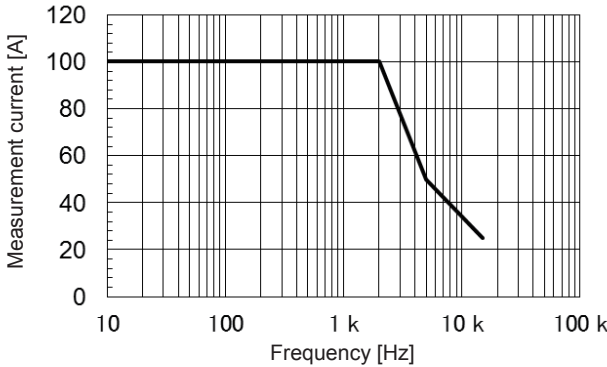
Output Specifications and Measurement Specifications

(1) Basic specifications

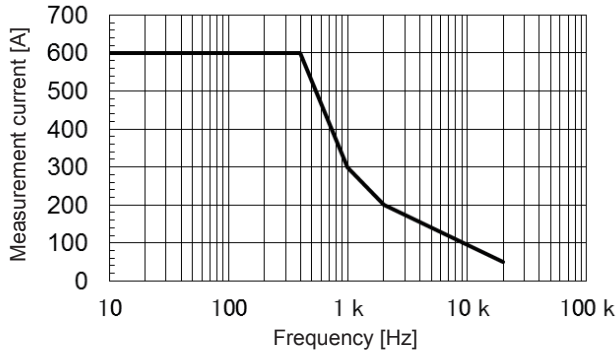
	CT7731	CT7736	CT7742
Output connector	Hioki PL14		
Rated measurement current	100 A AC/DC	600 A AC/DC	2000 A AC/DC
Output rate	1 mV/ A	1 mV/ A	0.1 mV/ A
Maximum measurement current	RMS value, continuous: see "Frequency deratings" below.		
	Peak value (under the RMS value conditions described above.):		
	150 A peak	900 A peak	2840 A peak
Frequency band	DC to 5 kHz (−3 dB)		
Measurable conductor diameter	φ33 mm (φ1.30") or less	φ33 mm (φ1.30") or less	φ55 mm (φ2.17") or less
Sampling frequency*1	36.5 kHz ±0.2 kHz		
Maximum rated voltage to earth	600 V AC/DC (Measurement category IV)	1000 V AC/DC (Measurement category III) 600 V AC/DC (Measurement category IV)	
	Anticipated transient overvoltage: 8000 V		

*1. When used in combination with a high-precision power meter, sampling frequency noise may appear as a harmonic component in measured values.

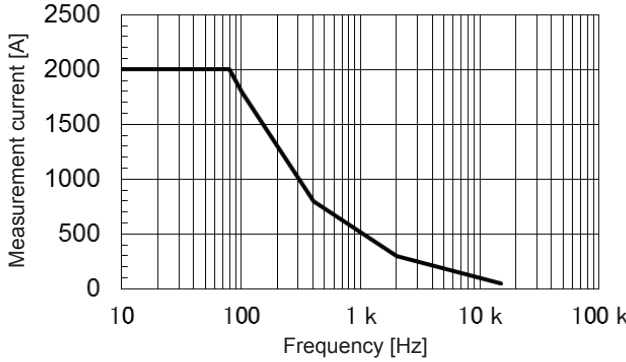
CT7731 Frequency derating



CT7736 Frequency derating



CT7742 Frequency derating



(2) Accuracy specifications

f.s.: The rated measurement current.

rdg.: The value currently being measured and indicated on the measuring instrument.

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Conditions of guaranteed accuracy	Guaranteed accuracy period: 3 years		
	Opening and closing of the jaw: 30000 times or less		
	Accuracy guarantee for temperature and humidity: 23°C ±5°C (73°F ±9°F), 80% RH or less		
	After performing zero-adjustment with the instrument to which the device is connected		
	Accuracy of AC measurement guaranteed for sine wave inputs		
	See separate table.		
Measurement accuracy	See separate table.		
Temperature coefficient	In the operating temperature range, add 0.1 × specified accuracy/°C (at temperatures other than 23°C±5°C).		
Offset drift (Between −25°C and 65°C, Reference value: at 23°C)	Within ±0.5% f.s.	Within ±0.1% f.s.	Within ±0.1% f.s.
Effect of radiated radio-frequency electromagnetic field			
15% f.s. at 10 V/m			
Effect of conducted radio-frequency electromagnetic field			
10% f.s. at 3 V			
Effect of conductor position (deviation from center)			
Within ±1.5% Within ±2.0% Within ±1.0%			
Effect of external magnetic field (400 A/m, DC)			
Within ±1.5% f.s. Within ±0.5% f.s. Within ±0.2% f.s.			
Maximum cord extension length	100 m (Depends on the instrument to which the device is to be connected.)		

CT7731 Measurement accuracy

Frequency		DC	45 ≤ f ≤ 66 (Hz)	DC < f < 45, 66 < f ≤ 500 (Hz)
Amplitude (A)	I ≤ 80	±1.0% rdg. ±0.5% f.s.	±1.0% rdg. ±0.5% f.s.	±2.0% rdg. ±0.5% f.s.
	80 < I ≤ 100			±2.5% rdg. ±0.5% f.s.
Peak (A peak)	I peak ≤ 110	±1.0% rdg. ±2% f.s.	±1.0% rdg. ±2% f.s.	±2.0% rdg. ±2% f.s.
	110 < I peak ≤ 150			±2.5% rdg. ±2% f.s.
Phase		–	±1.8 deg.	DC < f < 45 (Hz): ±1.8 deg. 66 < f ≤ 500 (Hz): Not defined.

CT7736 Measurement accuracy

Frequency		DC	45 ≤ f ≤ 66 (Hz)	DC < f < 45, 66 < f ≤ 1 k (Hz)
Amplitude (A)		±2.0% rdg. ±0.5% f.s.	±2.0% rdg. ±0.5% f.s.	±3.0% rdg. ±0.5% f.s.
Peak (A peak)	I peak ≤ 600	±2.0% rdg. ±0.7% f.s.	±2.0% rdg. ±0.7% f.s.	±3.0% rdg. ±0.7% f.s.
	600 < I peak ≤ 900	±4.0% rdg. ±0.7% f.s.	±4.0% rdg. ±0.7% f.s.	±5.0% rdg. ±0.7% f.s.
Phase		–	±1.8 deg.	DC < f < 45 (Hz): ±1.8 deg. 66 < f ≤ 1 k (Hz): Not defined.

CT7742 Measurement accuracy

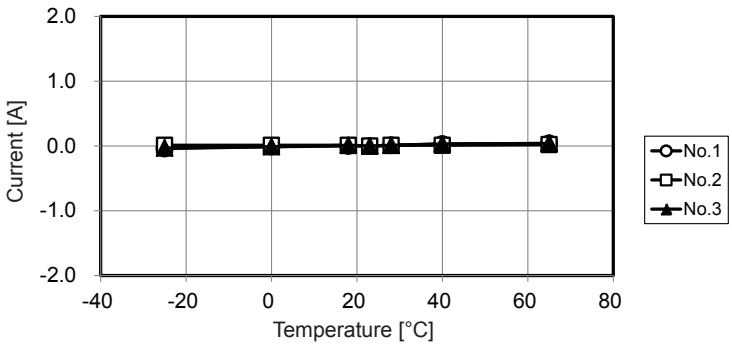
Frequency		DC	45 ≤ f ≤ 66 (Hz)	DC < f < 45, 66 < f ≤ 1 k (Hz)
Amplitude (A)	I ≤ 1800	±1.5% rdg. ±0.5% f.s.	±1.5% rdg. ±0.5% f.s.	±2.5% rdg. ±1.0% f.s.
	1800 < I ≤ 2000		±2.0% rdg. ±0.5% f.s.	
Peak (A peak)	I peak ≤ 2300	±1.5% rdg. ±1.0% f.s.	±1.5% rdg. ±1.0% f.s.	±2.5% rdg. ±1.0% f.s.
	2300 < I peak ≤ 2840	±6.0% rdg. ±1.5% f.s.	±6.0% rdg. ±1.5% f.s.	±7.0% rdg. ±1.5% f.s.
Phase		–	±2.3 deg.	DC < f < 45 (Hz): ±2.3 deg. 66 < f ≤ 1 k (Hz): Not defined.

“Peak input” is only available in conjunction with CM7290 Display Unit. For more information about the combination accuracy with the instrument, see the instrument’s instruction manual.
Amplitude accuracy design value is DC < f < 5 Hz. Phase accuracy design value is DC < f < 10 Hz.

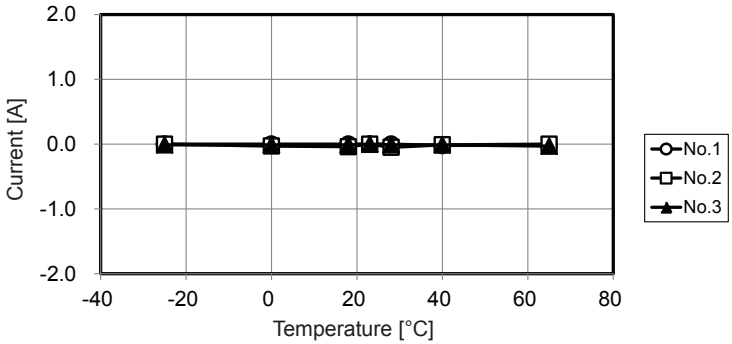
Zero-point Temperature Characteristics

Hall elements are subject to individual variation. Reference examples are provided below to illustrate zero-point variation (23°C reference) relative to temperature variations for each sensor. (There is also a variation in characteristics among individual products.) The operating temperature range is −25°C to 65°C (−13°F to 149°F). (See below for example characteristics.)

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CT7742

