Automation Components
a DwyerOmega brand

USER'S MANUAL

4 mA to 20 mA Output Current Sensor Series

Installation & Operation Instructions

workaci.com

For latest product manuals:
workaci.com/resources/resource-library

CONTACT

Automation Components, Inc.
workaci.com/contact-us
Telephone:
1-(888) 967-5224
Fax:
(608) 831-7407

Table of Contents

1. Precautions

- This product is not intended to be used for Life or Safety applications.
- This product is not intended for use in any hazardous or classified locations.

1.1. High Voltage

Disconnect and lock out all power sources before installation as severe injury or death may result from electrical shock due to contact with high voltage wires.

2. General Information

The 4 mA to 20 mA Output Analog Current Sensors are designed for use in any AC current monitoring application in which you are looking to monitor a particular piece of equipment. Applications may include monitoring a resistive type load such as an incandescent light bulb, heating element as well as any single speed linear load. The current sensors are available in both solid and split-core versions which also includes a 72.77 mm (2.87 in) Patented (Pat. No. US 7,416,421) 35 mm DIN Rail mounting foot for easy installation in panel mount applications. The solid-core versions are a great choice for new installations or OEM applications in which cost sensitivity, lower trip points and environmental issues like dust and moisture may be of concern. The split-core version of the current sensors work great in retrofit applications and for use on service technicians vehicles since one or two parts will work in most applications and can be easily installed without disconnecting any wires.

3. Installation

Make sure that all installations are in compliance with all national and local electrical codes. Only qualified individuals that are familiar with codes, standards, and proper safety procedures for high-voltage installations should attempt installation. The current sensor is a 2-wire, 4 mA to 20 mA Loop Powered device that requires a regulated +13.5 V dc to 30 V dc external power source.

The current sensor may be mounted in any position using the two #8 x ¾ in Tek screws and the mounting holes in the base, or snapped directly on to the 35 mm DIN rail (See Figure 2). Leave a minimum distance of 3 cm (1 in) between the current sensor and any other magnetic devices such as contactors and transformers.

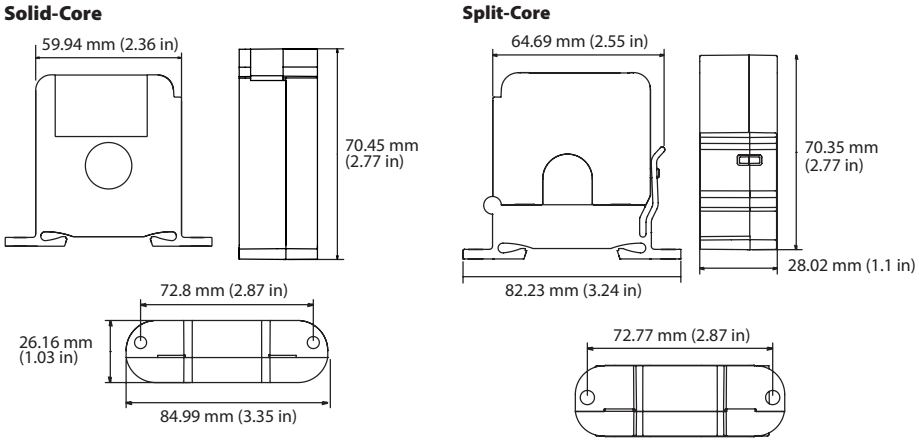

Figure 1: Dimensions

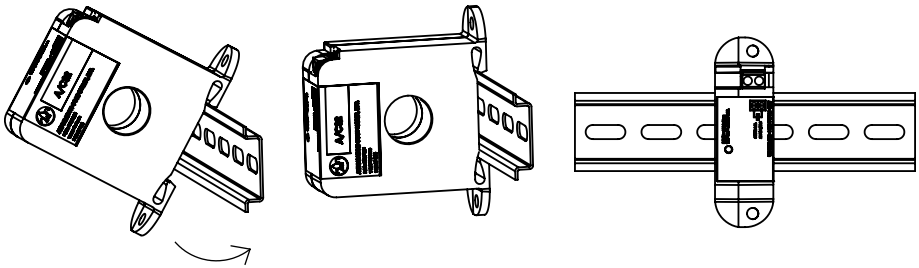

Figure 2: DIN Rail Installation

3.1. Latch Operation for A/SCTA2 Series

Press down on the side tab and swing the top of the unit up to open the split core current sensor as shown in Figure 3. Press down firmly on the cover to close the current sensor. An audible "click" will be heard as the tab slides over the tongue on the base.

Caution

Mating surfaces of the magnetic core are exposed when the sensor is open. Electrical contact grease, present on the cores to prevent corrosion, can capture grit and dirt if care is not exercised. Operation can be impaired if anything prevents good contact between pole pieces. Visually check the mating parts of the core before closing the current sensor.

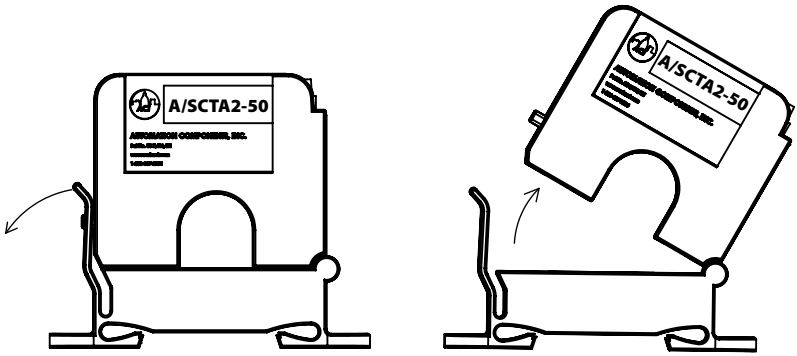

Figure 3: Opening A/SCS2 Series

3.2. Current Sensor Setup

The amperage range selected represents the maximum current that can be applied to the conductor being monitored, Do not exceed! All current sensors with selectable ranges will have the range selection jumper factory set on the high range. For models with field selectable amperage ranges, select the correct amperage range using the range selection jumper. Note that all -RMS models have True RMS outputs and should be used with Variable Frequency Drives.

Note
An extra jumper shunt is included. It can be discarded if not needed.

In applications where high vibrations are encountered, ACI recommends to use the jumper shunt without tab. A pliers can help with jumper shunt installation onto the pins.

---

4. Wiring Instructions

ACI recommends the use of a two conductor 1.5 mm^2 to 0.34 mm^2 (16 AWG to 22 AWG) shielded cable, copper wire only, for all 4 mA to 20 mA current sensor installations. A maximum wire length of less than 30 m (98.4 ft) should be used between the current sensors and the Building Management System or controller. All wiring must comply with all local and National Electric Codes.

Note
When using a shielded cable, be sure to connect only (1) end of the shield to ground at the controller. Connecting both ends of the shield to ground may cause a ground loop.

When removing the shield from the sensor end, make sure to properly trim the shield to prevent any chance of shorting. The current sensor terminals are polarity sensitive and represent a linear and proportional 4 mA to 20mA output signal. Tighten the screws at the terminal block connections to the recommended torque of 0.5 Nm to 0.6 Nm (4.43 in-lbs to 5.31 in-lbs). The aperture (hole) size of the current sensor is 1.90 cm (0.75 in).

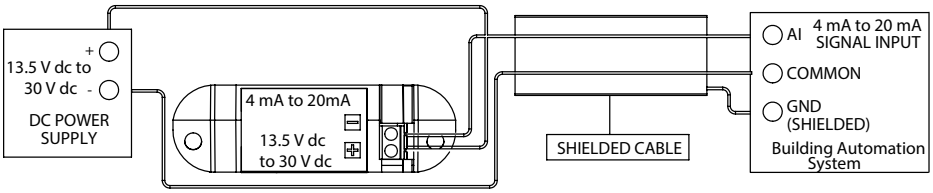

Figure 4: Wiring

5. Troubleshooting

Problem	Solutions
No reading	• Confirm that you have +13.5 V dc to 30 V dc in series with the current sensor output terminals and the analog input of the control panel. • Check the polarity of the circuit. • Verify that the terminals are screwed down, wires are firmly in place. • Disconnect the input to the control panel and then insert a current meter (mA range) in series with the current sensor output to verify that the circuit is working properly.
Erratic readings	• Verify that the wires are terminated properly. • Check that the +13.5 V dc to 30 V dc input is clean. In areas of high RF interference, shielded cable may be necessary to stabilize signal.
Inaccurate readings	If you suspect that the current sensor is not reading within the accuracy specifications, please contact the factory for assistance.
Current Sensor is operating at a low-level current or failing to operate within the accuracy specifications.	• Visually check the mating parts of the core to ensure there is no debris between the split contacts. See Figure 3. • Remove all debris or dust manually and close the current sensor. • Continue to retest the sensor in your application.

6. Standard Ordering

Model #	Item #	Selectable Ranges	Measurement	AC Waveform	Solid-Core	Split-Core	Output Signal
A/SCTA2-50	142375	0 to 10/20/50 A	Average	Pure Sinusoidal		•	4 mA to 20 mA
A/SCTA2-200	142374	0 to 100/150/ 200 A	Average	Pure Sinusoidal		•	4 mA to 20 mA
A/CTA2-50-RMS	142373	0 to 10/20/ 50 A	True RMS	Distorted & Pure Sinusoidal	•		4 mA to 20 mA
A/CTA2-250-RMS	142372	0 to 100*/200/ 250 A	True RMS	Distorted & Pure Sinusoidal	•		4 mA to 20 mA
A/SCTA2-50-RMS	142371	0 to 10/20/50A	True RMS	Distorted & Pure Sinusoidal		•	4 mA to 20 mA

Note*
Only the 100 amp range will meet the accuracies over the operating frequency range of 15 Hz to 100 Hz (See Specification Table).

7. Product Specifications

Sensor Non-Specific Information	
Monitored Current Type:	AC Current
Maximum AC Voltage:	600 V ac
Isolation Voltage:	2200 V ac
Operating Frequency Range[2]:	A/CTA2 & A/SCTA2 Series: 40 Hz to 1000 Hz A/CTA2-50-RMS & A/SCTA2-50 RMS: 15 Hz to 100 Hz A/CTA2-250-RMS (0-100 A Range): 15 Hz to 100 Hz A/CTA2-250-RMS (0-200/250 A Ranges): 30 Hz to 100 Hz
Core Style:	Solid-Core and Split-Core Versions available (See Ordering Grid pg. 8)
Supply Voltage:	+8.5 V dc to 30 V dc (Reverse Polarity Protected) 250 Ohm Load (1 V dc to 5 V dc): +13.5 V dc to 30 V dc l 500 Ohm Load (2 V dc to 10 V dc): +18.5 V dc to 30 V dc
Maximum Load Resistance @ 24 V dc:	775 Ohms (Formula: (24 V dc to 8.5 V dc) / 0.020 A)
Supply Current:	25 mA minimum
Sensor Amperage Range:	See Ordering Grid pg. 8 (Field Selectable)
Output Signal l Maximum Output Signal:	4 mA to 20 mA (2-Wire, Loop Powered) l Limited to 25 mA
Accuracy[1]:	All Models: ± 1 % of Selected Range except A/SCTA2-50-RMS: ± 2% from 15 Hz to 20 Hz ± 1 % from 20 Hz to 100 Hz
Response Time:	A/CTA2-xxx and A/SCTA2-XXX: < 600 mS (Rise and Fall Time) A/CTA2-xxx-RMS & A/SCTA2-50-RMS: 600 mS (Rise Time) and 2800 mS (Fall Time)
Aperture Size:	19.05 mm (0.75 in)
DIN Rail Size:	35 mm (U.S. Patent No. 7,416,421)
Operating Temperature Range:	-15 °C to 40 °C (5 °F to 104 °F)
Operating Humidity Range:	0 % to 95 %, non-condensing
Storage Temperature l RH Range:	5 °C to 35 °C (41 °F to 95 °F) l 40 % to 85 % RH, non-condensing
Enclosure Material l Flammability Rating:	PC/ABS (Polycarbonate/ABS Blend) l UL94-V0
Wiring Connections:	2 Position, Screw Terminal Block (Polarity Sensitive)
Wire Recommendations:	2 Conductor (Shielded Cable)
Wire Size:	0.823 mm^2 to 0.205 mm^2 (18 AWG to 24 AWG) Copper Wires only
Terminal Block Torque Rating:	0.5 Nm to 0.6 Nm (4.43 in-lbs to 5.31 in-lbs)
Minimum Mounting Distance:	2.6 cm (1 in) between current sensor & other magnetic devices (Relays, Contactors, Transformers)

Note[1]: All current output sensors are calibrated at an ambient room temperature of 21.5 °C (71 °F).
Note[2]: Only the 0 amp to 100 amp range in the A/CTA2-250-RMS will meet

accuracy specifications from 15 Hz to 100 Hz.

WARRANTY
The ACI Current Switch Series are covered by ACI's Five (5) Year Limited Warranty, which is located in the front of ACI'S SENSORS & TRANSMITTERS CATALOG or can be found on ACI's website: www.workaci.com.

W.E.E.E. DIRECTIVE
At the end of their useful life the packaging and product should be disposed of via a suitable recycling centre. Do not dispose of with household waste. Do not burn.

Automation Components
a DwyerOmega brand

workaci.com

I0000789
Version 10.0

DWYEROMEGA™
Improving the world, one measurement at a time.™