



# Voltage Output Analog Current Sensors

#NSA-A/SCTE2-50, NSA-A/SCTE2-150, NSA-A/SCTE2-250, NSA-A/SCTV2-50, NSA-A/SCTV2-150, NSA-A/SCTV2-250  
11/14/2019

## Installation and Operation

### Overview

The Voltage 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 for proper operation. All voltage output current sensors use an “Average” current measuring method and should be used in applications where a pure Sinusoidal AC waveform that has very little or no distortion/noise on the conductor being monitored. Applications may include monitoring a resistive type load such as an incandescent light bulb or heating element as well as any single speed linear load. Voltage Output current sensors are available in both solid and split-core versions which also includes a Patented 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 retro-fit 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. For best results, the voltage output current sensors should not be used in applications with switching power supplies or variable speed drives due to the limited operating frequency range. In applications where variable speed drives or waveforms include distortion/noise, Carrier recommends the use of the NSA-A/CTA2-RMS or NSA-A/SCTA2-RMS Series sensors where you need to supply 24 VDC power to the current sensors with a 4-20 mA signal. A 249 Ohm or 499 Ohm 1 Watt resistor can be used to convert the 4-20 mA signal into a useable 1-5 or 2-10 VDC output signal at your building management system or PLC.



**Applications:** Load Trending, Single Speed Loads, Pumps, Compressors, Fans, Preventative Maintenance, LEED, Project Justification (Calculating ROI), Process Control

### Part Numbers

NSA-A/SCTE2-50	NSA-A/SCTE2-150	NSA-A/SCTE2-250	NSA-A/SCTV2-50
NSA-A/SCTV2-150	NSA-A/SCTV2-250		

### Specifications

Monitored Current Type:	AC Current
Maximum AC Voltage:	600 VAC
Isolation Voltage:	2200 VAC
Operating Frequency Range:	50 to 600 Hz
Core Style:	NSA-A/SCTE2 Series: Split   NSA-A/SCTV2 Series: Solid
Supply Voltage:	Induced from the Monitored Conductor (Insulated Conductors only)
Sensor Amperage Range:	NSA-A/SCTx2-50: 50   NSA-A/SCTx2-150: 150   NSA-A/SCTx2-250: 250
Output Signal   Number of Wires:	NSA-A/SCTE2 Series: 0 to 5 VDC   NSA-A/SCTV2 Series: 0 to 10 VDC   2-Wires
Accuracy <sup>1</sup> :	NSA-A/SCTE2 Series (0-10A Range Only): +/- 1% from 5-100% of Selected Range NSA-A/SCTE2 Series (All Other Ranges): +/- 1% from 2-100% of Selected Range NSA-A/SCTV2 Series: +/- 1% from 5-100% of Selected Range
Response Time:	< 300 mS (Rise and Fall Times)
Aperture Size:	0.75" (19.05 mm)
Din Rail Size:	35 mm (U.S. Patent No. 7,416,421)
Operating Temperature Range:	5 to 104°F (-15 to 40°C)
Operating Humidity Range:	0 to 95%, non-condensing
Recommended Storage Temp   RH Range:	41 to 95°F (5 to 35°C)   40% to 85% RH, non-condensing
Enclosure Material   Flammability Rating:	PC/ABS (Polycarbonate/ABS Blend)   UL94-V0
Wiring Connections:	2 Position, Screw Terminal Block (Polarity Sensitive)
Wire Recommendations:	2 Conductor (Shielded Cable)

Specifications subject to change without notice.



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<b>Wire Size:</b>	18 to 24 AWG (0.823 mm <sup>2</sup> to 0.205 mm <sup>2</sup> ) Copper Wires only
<b>Terminal Block Torque Rating:</b>	4.43 to 5.31 in-lbs. (0.5 to 0.6 Nm)
<b>Minimum Mounting Distance:</b>	1" (2.6 cm) between current sensor & other magnetic devices (Relays, Contactors, Transformers)
<b>Agency Approvals:</b>	UL/CUL US Listed (UL 508) Ind. Control Equipment (File # E309723), CE, RoHS2, WEEE
<b>Product Weight:</b>	0.274 lbs. (0.125 kg)
<b>Product Dimensions (L x W x H):</b>	<b>Solid Core Versions:</b> 2.760" (70.11 mm) x 3.343" (84.92 mm) x 1.050" (26.67 mm) <b>Split Core Versions:</b> 2.780" (70.51 mm) x 3.238" (82.25 mm) x 1.120" (28.45 mm)

<sup>1</sup>All current output sensors are calibrated at an ambient room temperature of 71°F (21.5°C)

### Dimensional Drawing

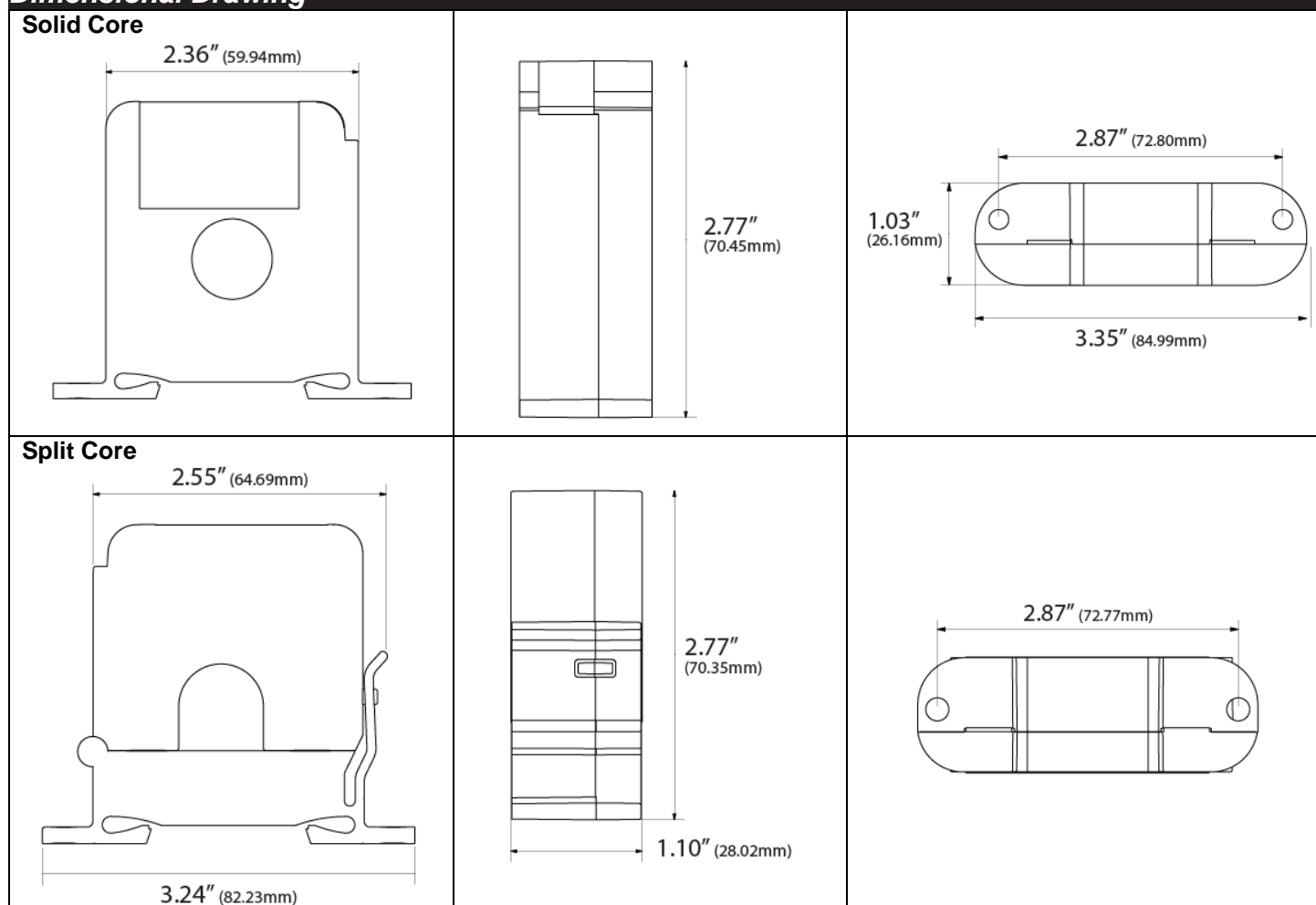


Figure 1

## Installation

### 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.
- Current Sensors must be used on Insulated Conductors Only.
- **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.
- Ensure 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.

### General

The current sensor will not require external power, since the power for the current sensor is induced from the conductor being monitored. The current sensor may be mounted in any position using the two #8 x 3/4" Tek screws and the mounting holes in the base, or snapped directly on to the 35mm DIN rail (See Figure 3). Leave a minimum distance of 1" (3 cm) between the current sensor and any other magnetic devices such as contactors and transformers.

### Latch Operation

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 2. 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.

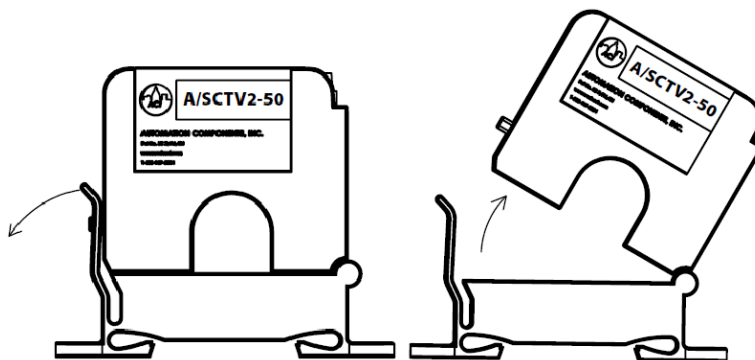


Figure 2

**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.

### 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.

### NOTES

- An extra jumper shunt is included. It can be discarded if not needed.
- In applications where high vibrations are encountered, Carrier recommends to use the jumper shunt without tab. Pliers can help with jumper shunt installation onto the pins.

### DIN Rail Installation

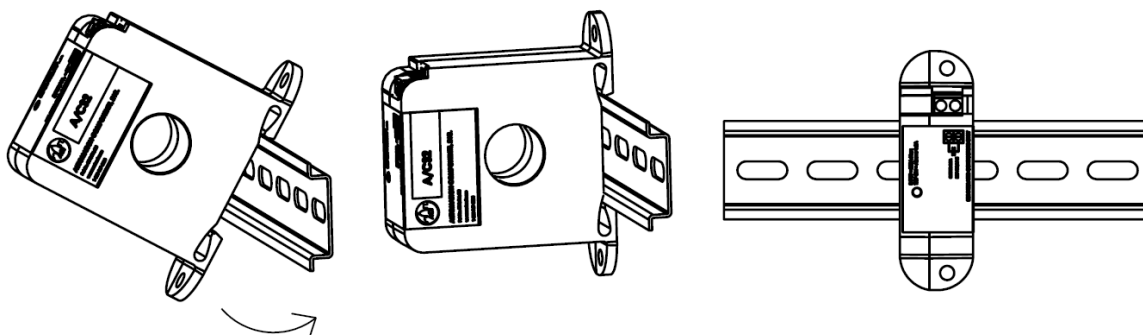


Figure 3

### Wiring Instructions

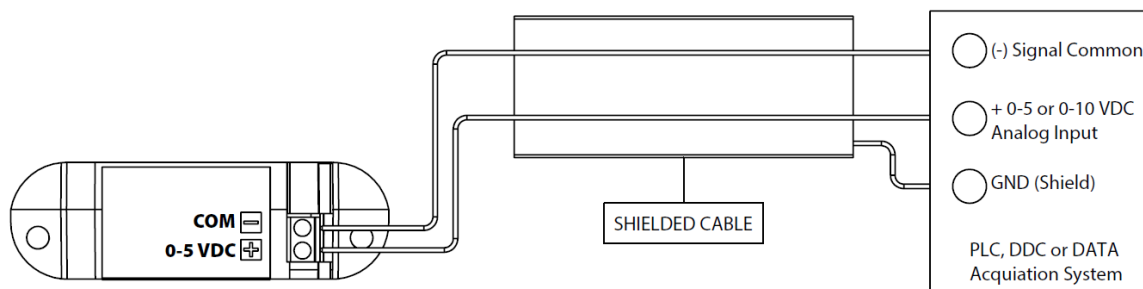


Figure 4

Carrier recommends the use of a two conductor 16 to 22 AWG shielded cable, copper wire only, for all Analog current sensor installations. A maximum wire length of less than 30 meters (98.4 feet) 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 0 to 5 or 0 to 10 VDC output signal. Tighten the screws at the terminal block connections to the recommended torque of 0.5 to 0.6 Nm (4.43 to 5.31 in-lbs.). The aperture (hole) size of the current sensor is 0.75" (1.90 cm).



### Troubleshooting

Problem	Solution
No reading	<ul style="list-style-type: none"><li>• Verify that there is current -owing through the conductor being monitored with a clamp-on current probe. The power for the current sensor is induced from the conductor being monitored.</li><li>• Check the polarity of the circuit.</li><li>• Verify that the terminals are screwed down, wires are firmly in place.</li><li>• Disconnect the wires from the current sensor output. Measure the voltage across the current sensor output with a Voltmeter to verify that the sensor is working properly.</li></ul>
Erratic readings	<ul style="list-style-type: none"><li>• Verify that the wires are terminated properly.</li><li>• In areas of high RF interference, shielded cable may be necessary to stabilize signal.</li></ul>
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.	<ul style="list-style-type: none"><li>• Visually check the mating parts of the core to ensure there is no debris between the split contacts. See Figure 2.</li><li>• Remove all debris or dust manually and close the current sensor.</li><li>• Continue to retest the sensor in your application.</li></ul>

### W.E.E.E. Directive

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