

Overview

The Carrier Fixed “Status” Current switches are designed for use in any AC current monitoring application in which you are looking for a “Go/No Go” or On/Off status for a particular piece of equipment. The current switches should be installed on the line side of the power to the motor, pump, compressor or other equipment. The current switches 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 may be of concern. The split-core version of the current switches work great in retrofit applications and for use in service vehicles since one part will work in most applications and can be installed without disconnecting any wires. The fixed current status switches can also be used to determine the run time of your equipment and basic load trending applications where you want to know when your piece of equipment runs and for how long it runs for when logging the contact closures on your building management system or PLC.



Applications: Pump Status, Fan Status, Compressors, Motor Status, Ovens, Industrial Equipment, Lighting Status and Usage, Electrical Load Status, Local Alarms (Strobes and Audible Alarms)

NOTE The Fixed Current Switches are not intended to be used in Life / Safety applications or in Hazardous / Classified locations.

Part Numbers

NSA-A/CS2

NSA-A/SCS2

NSA-A/SCS2-L

Specifications

Monitored Current Type:	AC Current
Maximum AC Voltage:	600 VAC
Operating Frequency Range:	40 to 1 kHz
Core Style:	NSA-A/CS2: Solid NSA-A/SCS2: Solid NSA-A/SCS2-L: Split
Sensor Power:	Induced from the Monitored Conductor
Amperage Range:	NSA-A/CS2: 0-250A NSA-A/SCS2: 0-200A NSA-A/SCS2-L: 0-200A
Isolation Voltage:	2200 VAC
Trip Point Style:	Fixed
Trip Point:	NSA-A/CS2: 0.25A or less NSA-A/SCS2: 1.5A or less NSA-A/SCS2-L: 1.5A or less
Contact Type:	Normally open (N/O)
“Status” Contact Rating:	0.2A @ 200 VAC/VDC
“Status” Contact “On” Resistance	< 10 Ohms (tripped)
“Off” Resistance:	> 1 Meg Ohms (Open)
Response Time:	See Response Time table below
Status LED Indication ¹ :	Red LED (Monitored current is above Trip Point)
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 (Not Polarity Sensitive)
Wire Size:	16 to 22 AWG (1.31 mm ² to 0.33 mm ²) Copper Wires only
Terminal Block Torque Rating:	4.43 to 5.31 in-lbs. (0.5 to 0.6 Nm)

Specifications subject to change without notice.



Fixed Status Current Switches

#NSA-A/CS2, NSA-A/SCS2, NSA-A/SCS2-L – 11/14/2019

Installation and Operation

Minimum Mounting Distance:	1" (2.6 cm) between current switch (Relays, Contactors, Transformers)
Agency Approvals:	UL/CUL US Listed (UL 508) Ind. Control Equipment (File # E309723), CE, RoHS2, WEEE
Product Weight:	NSA-A/CS2: 0.216 lbs (0.099kg) NSA-A/SCS2: 0.270 lbs (0.123 kg) NSA-A/SCS2-L: 0.280 lbs. (0.127 kg)
Product Dimensions (L x W x H):	Solid Core: 2.760" (70.11mm) x 3.343" (84.92mm) x 1.050" (26.67mm) Split Core: 2.780" (70.51mm) x 3.238" (82.25mm) x 1.120" (28.45mm)

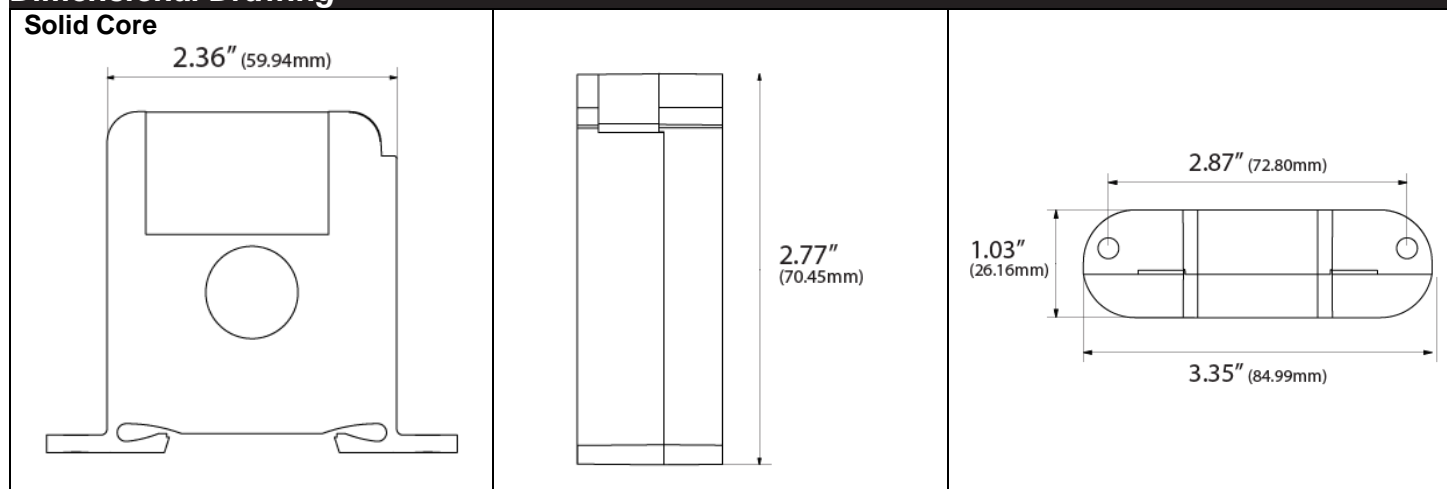
†The LED should not be used to determine if current is present. At low currents the LED may not be visible

Response Time

Model #	0.15 Amps	0.20 Amps	0.25 Amps	0.50 Amps	0.75 Amps	1.0 Amps	1.2 Amps	1.5 Amps	10 Amps	20 Amps
NSA-A/CS2	156mS	100mS	84mS	-	-	32mS	-	-	26mS	24mS
NSA-A/SCS2	-	-	-	484mS	-	72mS	-	45mS	26mS	20mS
NSA-A/SCS2-L	-	224mS	144mS	65mS	47mS	39mS	-	-	25mS	22mS

-: unit was not tested (below minimum trip point or for that range)

Dimensional Drawing



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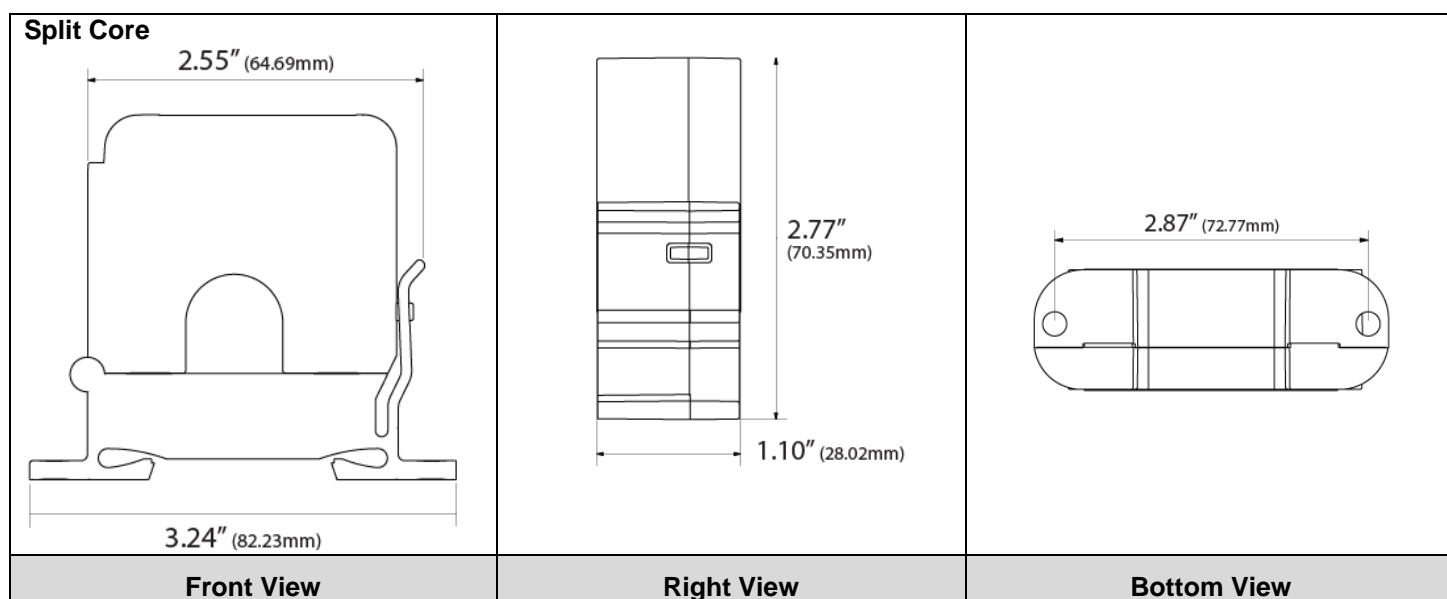


Figure 1

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.
- The NSA-A/CS2 and NSA-A/SCS2 Series Current Switches 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.
 - Never rely on the Red LED to determine whether power is present at the current switch. At very low monitored input currents the Red LED may not light to indicate the current is above the trip point.

Installation

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. The current switches will not require external power because the power for the current switch is induced from the conductor being monitored. The current switch 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 (Figure 3). Leave a minimum distance of 1" (3 cm) between the current switch 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 switch as shown in Figure 2. Press down firmly on the cover to close the current switch. 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.

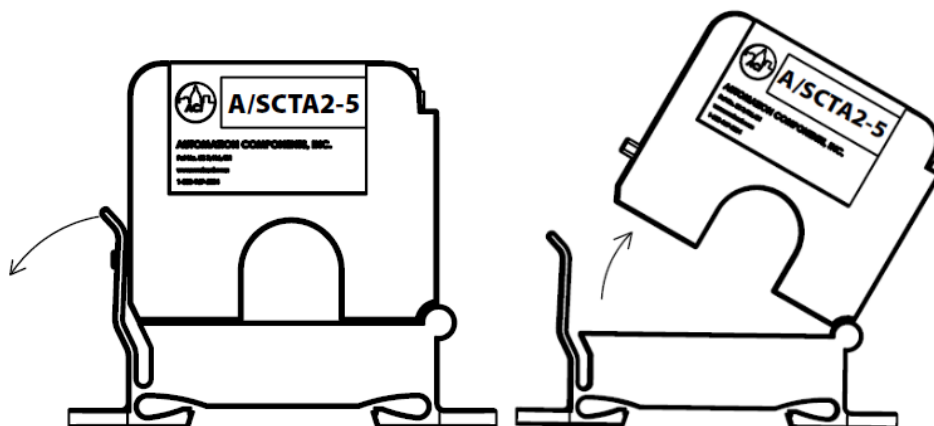


Figure 2

LED

The Red LED will indicate whether the current is above (LED On) or below (LED Off) the fixed trip point. At very low monitored input currents the Red LED may not light to indicate the current is above the trip point.

Din Rail Installation

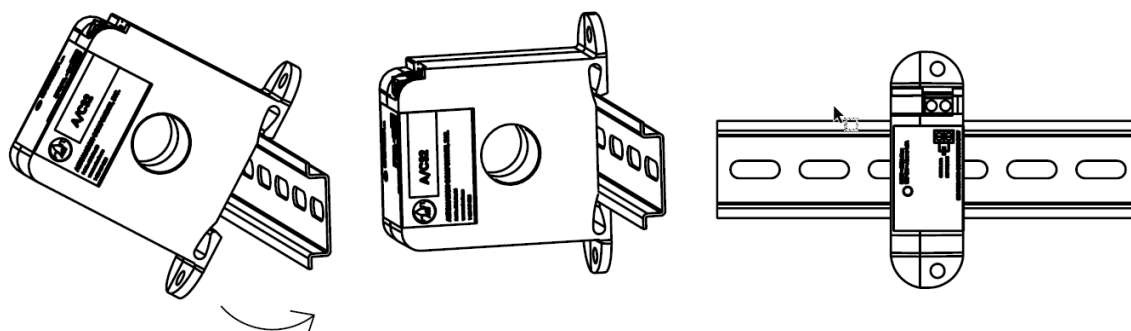


Figure 3

Wires Through Sensors

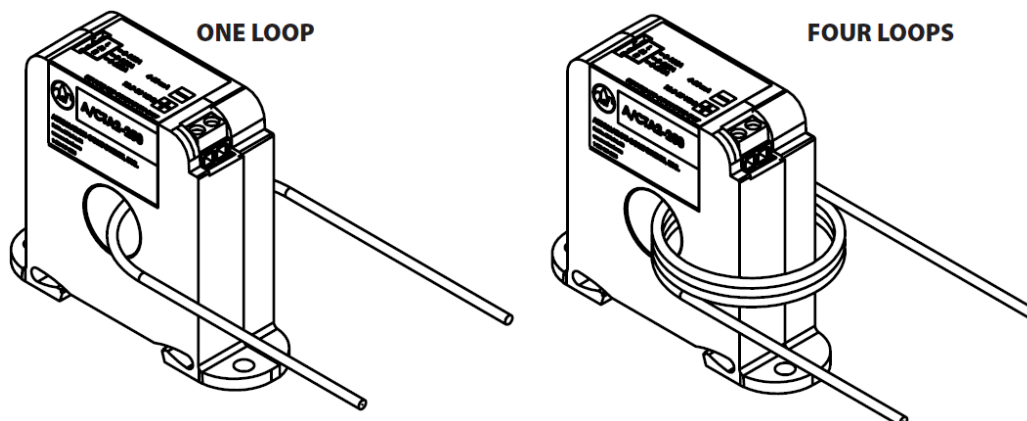


Figure 4

APPLICATION NOTES

The conductor being monitored may be looped through the sensor multiple times. The loops increase the current measured by the current switch. Each time the conductor passes through the current switch window equals one loop (Figure 4). To determine the proper number of loops required, take the rated Fixed Trip Point of the current switch and divide it by the Operating Current of the Monitored Device, add one (1), then round up to the nearest whole number. Example: When using the NSA-A/CS2, a small fan operating at 0.1A should be wrapped through the sensor four times to give you a total operating current of 0.4 Amps flowing through the NSA-A/CS2. Formula Example: $(0.25A/0.1A) = 2.5 + 1 = 3.5$, which rounded up equals 4 loops.

Wiring Instructions

Carrier recommends the use of a two conductor 16 to 22 AWG shielded cable or twisted pair copper wire only, for all current switch applications. A maximum wire length of less than 30 meters (98.4 feet) should be used between the current switch and the Building Management System or controller. 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 switch output terminals represent a solid-state switch for controlling both AC and DC loads and are not polarity sensitive. 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 switch is 0.75" (1.90 cm).

Digital Circuit

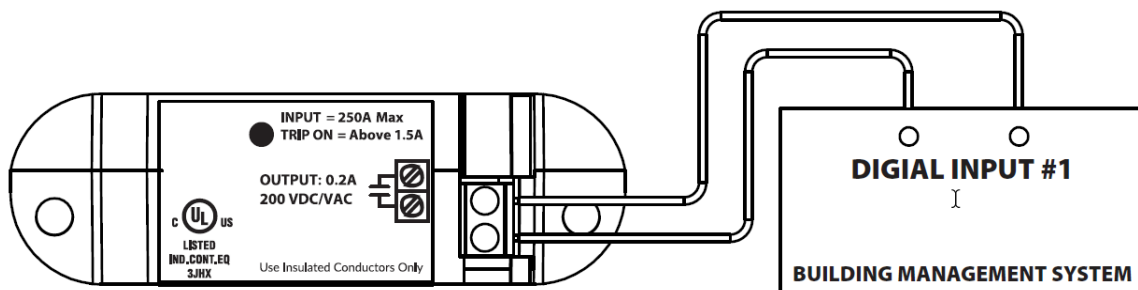


Figure 5

Motor/Fan Control

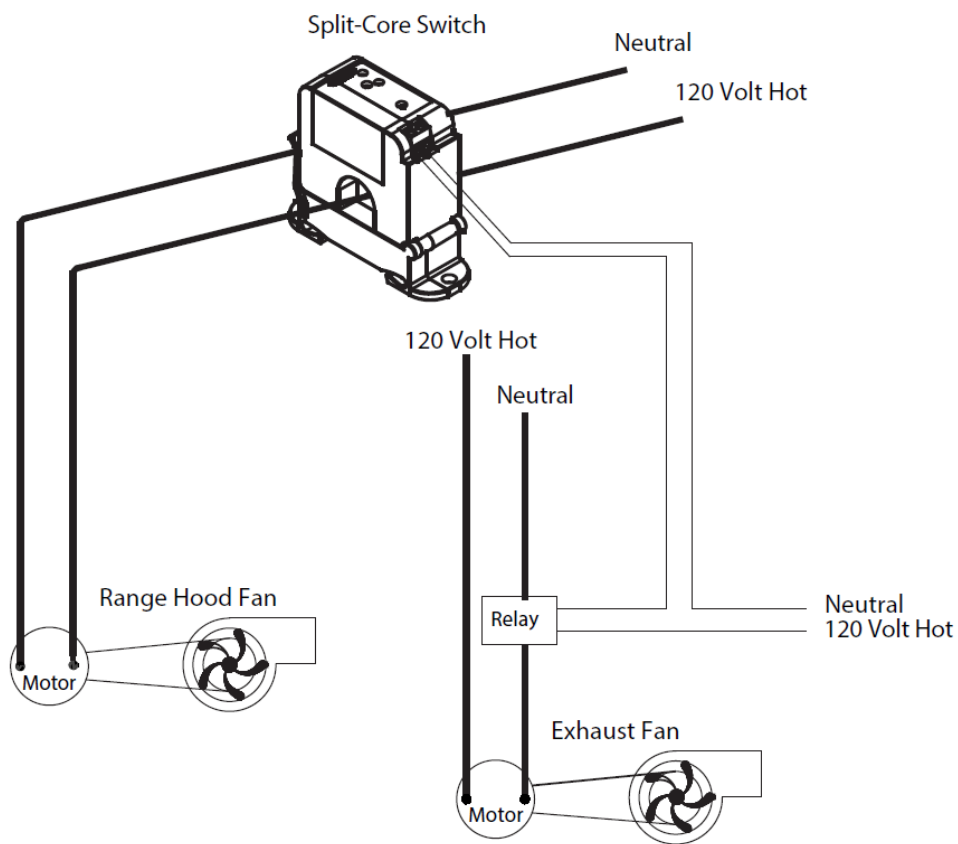


Figure 6



Application Examples

See Figure 5 and Figure 6 for two different current switch applications. Figure 5 shows the use of the Go/No Go Current Switch as a Digital Input to your BAS/PLC Controller. Figure 6 shows a Go/No/Go Current Switch in conjunction with a Contactor to control an exhaust fan.

NOTE The Go/No Go Current switches are only rated at 0.2A @ 200 VAC/VDC and must use an additional Contactor if controlling motor/fans.

Troubleshooting

Problem	Solution
LED is on but the current switch didn't activate	Disconnect the wires from the current switch output. Measure the resistance across the contacts with an Ohmmeter. See Specifications table for the actual resistance readings for an open or closed switch reading.
LED didn't turn on and the current switch didn't activate	Verify that the current flowing in the conductor being monitored is above the fixed trip point as listed in the operating specifications. If the sensor is monitoring less than the fixed trip point, see Figure 3.
LED not on but the Current Switch is Activated	LED not indicating correctly, may have been damaged.
Current Switch is operating at a low-level current or failing to operate within the accuracy specifications	For NSA-A/ASCS2 Series, visually check the mating parts of the core to ensure there is no debris between the split contacts. Remove all debris or dust manually and close the current sensor, see Figure 2. Retest the sensor in your application.

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.