



USER'S GUIDE

MSCTA-40 & MSCTE-40 Series Analog Output Current Sensor



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Automation Components, Inc.
a DwyerOmega brand

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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 MSCTA and MSCTE Series 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.

2. General Information

The MSCTA and MSCTE 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 MSCTA-40 is a 2 wire 4-20mA loop current sensor which requires a +13.5 to 30VDC power supply. The MSCTE-40 has a 0-5VDC output, and does not require external power, since the power for the current sensor is induced from the conductor being monitored.

The split-core 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.

The MSCTA/E series sensors can be secured to the monitored cable using a cable tie and the integrated cable tie anchor feature of the housing. The sensors also come with an attachable mounting foot that allows the unit to be mounted in any position using one Tek screw or snapped directly on a 35mm DIN rail.

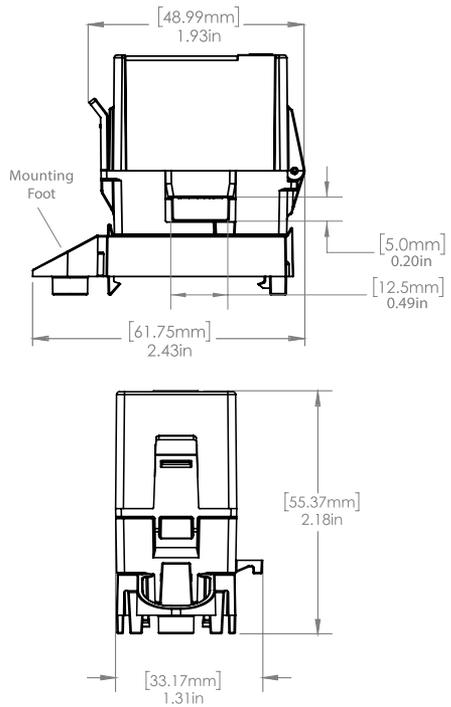


Figure 1: Enclosure Dimensions

3. Installation Instructions

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 MSCTA-40 is a 2 wire 4-20mA loop current sensor which requires a +13.5 to 30 VDC power supply. The MSCTE-40 has a 0-5VDC output, and does not require external power, since the power for the current sensor is induced from the conductor being monitored. The MSCT sensor has multiple mounting options. The MSCT sensor enclosure has a plastic feature that allows for the monitored current wire to be cable tied to the enclosure for free hanging installation applications - See **Figure 4** (pg. 6). This will be the preferred method for most installations.

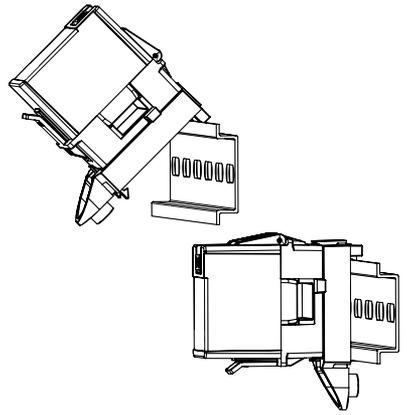


Figure 2: DIN Rail Installation

Alternatively, the current sensor product comes with a detached mounting foot. With the mounting foot attached to the sensor main body, the enclosure may be mounted in any position using the one #8 x 3/4" Tek screw through the hole in the mounting foot. The mounting clip must be snapped into position- See **Figure 3**. Align the front of the MSCT Sensor (latch) with the front of the mounting clip (screw mount). Insert the MSCT Sensor unit at a slight angle, with the back of the unit leading down, and push down to snap into place. Additionally, the enclosure may be snapped directly on a 35mm DIN rail - See **Figure 2**. Leave a minimum distance of 1" (3 cm) between the current switch and any other magnetic devices such as contactors and transformers.

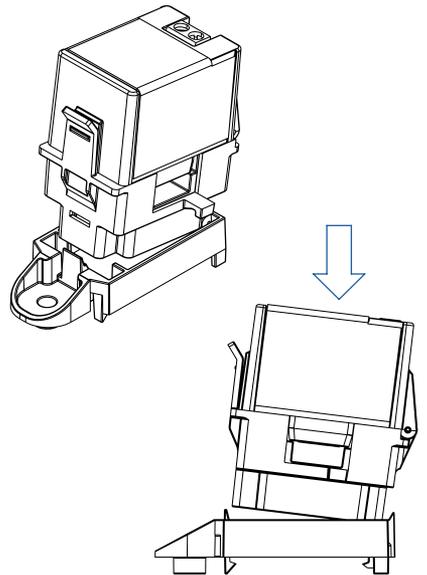


Figure 3: Mounting Foot Attachment

LATCH OPERATION

Press down on the side tab and swing the top of the unit up to open the split core current switch. 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. 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.

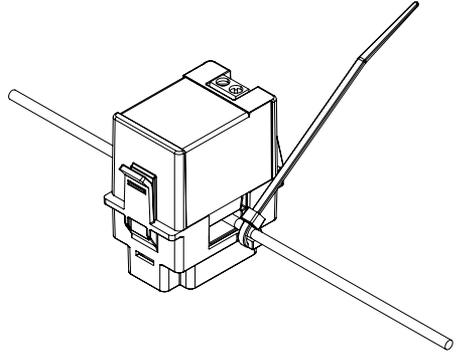
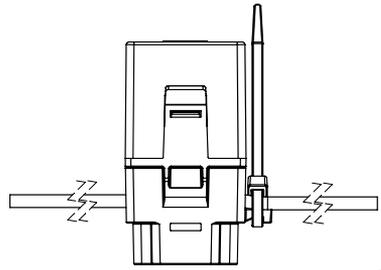


Figure 4: Wire Mounting

4. Wiring Instructions

ACI recommends the use of a two conductor 16 to 22 AWG shielded cable or twisted pair copper wire only for all analog current sensor applications. 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 4 to 20 mA (MSCTA-40) or 0 to 5 VDC (MSCTE-40) output signal. See diagrams below for proper wiring. 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 0.20" (5.0 mm) x 0.49" (15.5 mm). It fits 10AWG to 14 AWG THHN Insulated Wire.

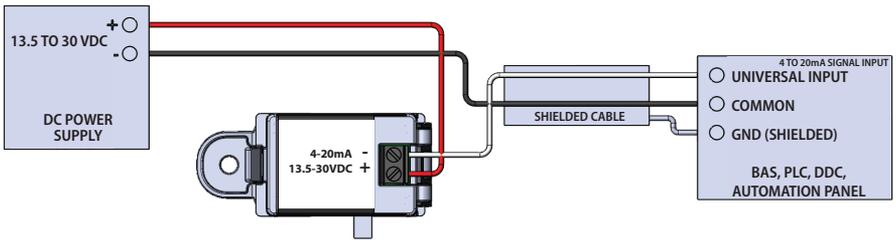


Figure 5: MSCTA-40 Wiring Diagram

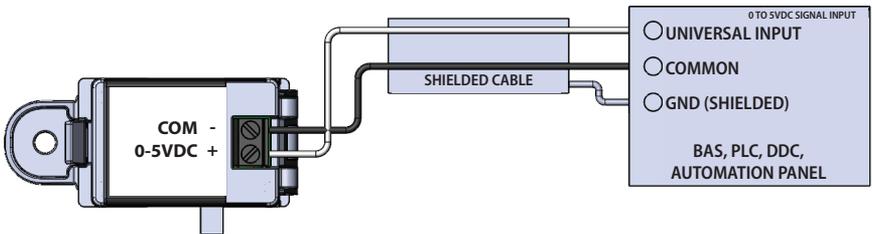


Figure 6: MSCTE-40 Wiring Diagram

5. Troubleshooting

Problem	Solutions
<p style="text-align: center;">No Reading</p>	<ul style="list-style-type: none"> • Verify that there is current flowing through the conductor being monitored with a clamp-on current probe. • Check the polarity of the circuit. • Verify that the terminals are screwed down, wires are firmly in place.
	<p>MSCTA-40</p> <ul style="list-style-type: none"> • Confirm that you have +13.5 to 30VDC in series with the current sensor output terminals and the analog input of the control panel. • 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.
	<p>MSCTE-40</p> <ul style="list-style-type: none"> • No power supply needed. The power for the current sensor is induced from the conductor being monitored. • Disconnect the wires from the current sensor output and tighten down the screws. Measure the voltage across the current sensor output with a Voltmeter to verify that the sensor is working properly.
<p style="text-align: center;">Erratic Readings</p>	<ul style="list-style-type: none"> • Verify that the wires are terminated properly. • In areas of high RF interference, shielded cable may be necessary to stabilize signal.
<p style="text-align: center;">Inaccurate Readings</p>	<p>If you suspect that the current sensor is not reading within the accuracy specifications, please contact the factory for assistance.</p>
<p style="text-align: center;">Current Sensor is operating at a low-level current or failing to operate within the accuracy specifications:</p>	<ul style="list-style-type: none"> • 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. • Continue to retest the sensor in your application.

6. Specifications

Monitored Current Type: AC Current

Maximum AC Voltage: 600 VAC

Isolation Voltage: 2200 VAC

Operating Frequency Range: 50/60 Hz

Core Style: Split-Core

Supply Voltage (MSCTA-40): +8.5 to 30 VDC (Reverse Polarity Protected)

250 Ohm Load (1-5 VDC): +13.5 to 30 VDC

500 Ohm Load (2-10 VDC): +18.5 to 30 VDC

Supply Current (MSCTA-40): 25 mA minimum

Supply Voltage (MSCTE-40): Induced from the Monitored Conductor (Insulated Conductors only)

Maximum Load Resistance at 24 VDC (MSCTA-40): 775 Ohms
(Formula : $[24 \text{ VDC} - 8.5 \text{ VDC}] / 0.020 \text{ A}$)

Sensor Amperage Range: 40 A

Output Signal: MSCTA-40: 4 to 20 mA (2-Wire, Loop Powered)
MSCTE-40: 0-5 VDC

Response Time: MSCTA-40: < 600 mS (Rise and Fall Times)

MSCTE-40: < 300 mS (Rise and Fall Times)

Aperture Size (Diameter) | Wire Size: 0.20" (5.0 mm) x 0.49" (12.5 mm)

| Fits 10 AWG to 14 AWG THHN Insulated Wire

DIN Rail Size: 35 mm

Operating Temperature Range¹: MSCTA: -22 to 140 °F (-30 to 60 °C)

MSCTE: -22 to 122 °F (-30 to 50 °C)

Operating Humidity Range: 10 to 95 %, non-condensing

Storage Temperature | RH Range: -40 to 158 °F (-40 to 70 °C) | 10 % to 95 % RH, non-condensing

Enclosure Material | Flammability Rating: PC/ABS (Polycarbonate/ABS Blend) | UL94-V0

Wiring Connections: 2 Position Screw Terminal Block (Polarity Sensitive)

Wire Size: 16 to 22 AWG (1.31 mm² to 0.33 mm²) Copper Wires Only

Terminal Block Torque Rating: 4.43 to 5.31 in-lbs. (0.5 to 0.6 Nm)

Minimum Mounting Distance: 1" (2.6 cm) between current switch & other magnetic devices (Relays, Contactors, Transformers)

Agency Approvals: UL/CUL US Listed (UL 508) Ind. Control Equipment (File # E309723), CE, RoHS, UKCA, FCC, CAN ICES-3 / NMB-3

Product Weight: 0.165 lbs. (0.075 Kg)

Product Dimensions (L x W x H): 1.93" (48.99 mm) x 1.31" (33.17 mm) x 2.18" (55.37 mm)

Note¹: Maximum 40 °C for 50 Hz operation of MSCTE

	Accuracy	Current	Application Range Temperature	Frequency
MSCTA-40	±0.75 % FS (±0.3 A)	Greater than 2 A	5 to 140 °F (-15 to 60 °C)	60 Hz
	±0.75 % FS (±0.3 A)	Greater than 2 A	32 to 140 °F (0 to 60 °C)	50 Hz
MSCTE-40	±0.4 % FS (±0.16 A)	Full Range	5 to 95 °F (-15 to 35 °C)	60 Hz
	±0.75 % FS (±0.3 A)	Full Range	-22 to 122 °F (-30 to 50 °C)	60 Hz
	±0.75 % FS (±0.3 A)	Full Range	-22 to 86 °F (-30 to 30 °C)	50 Hz

WARRANTY

The ACI MSCTA and MSCTE Current Sensor 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.

FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



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