

# Solid Core and Split Core 4-20 mA Output Current Sensors

CTS-20; CTP-20

INSTALLATION INSTRUCTIONS

**SAFETY**

**⚠ WARNING**

For CTS-20 Series current sensors, ensure that all power sources are disconnected and locked out before installation as severe injury or death may result from electrical shock due to contact with high voltage wires.

**⚠ CAUTION**

This product is not intended to be used for life or safety applications.

**⚠ CAUTION**

This product is not intended for use in any hazardous or classified locations.

**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 to 20 mA Loop Powered device that requires a regulated +12 to 30 Vdc external power source.

**IMPORTANT**

*The current switch should be used on insulated conductors only!*

The current sensors may be mounted in any position using the two (2) #8 x 3/4 in (19 mm) Tek screws and the mounting holes in the base or snapped directly on to the 1-3/8 in. (35 mm) DIN rail (See Figures 3 and 4). Leave a minimum distance of 1 in. (25 mm) between the current sensor and any other magnetic devices such as contactors and transformers.

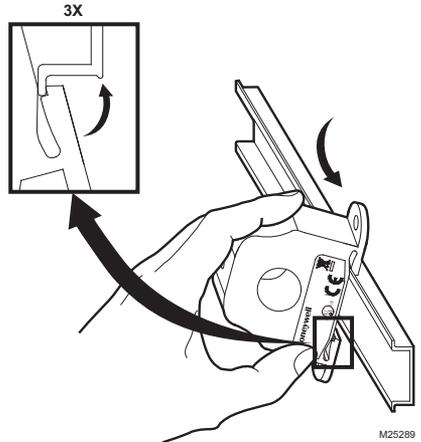


Fig. 1. Sensor placed on DIN rail

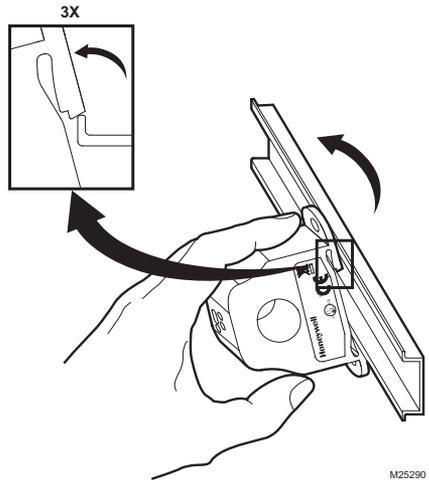


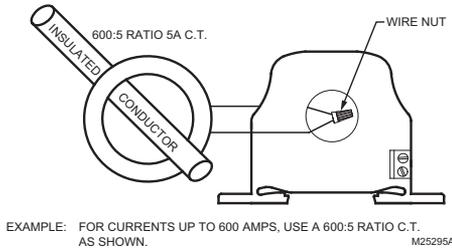
Fig. 2. Sensor removed from DIN rail



## **⚠ WARNING**

The secondary of the 5A Current Transformer (C.T.) must be shorted together before the power may be turned on from the device.

For applications in which the normal operating current is greater than 200 or 250 Amps, depending on the model, or for conductor diameters larger than 0.75 in. (19 mm) in diameter, an external 5 Amp Current Transformer (C.T.) must be used in conjunction with a CTS20-005 or CTS20-005VFD as shown in Fig. 5.



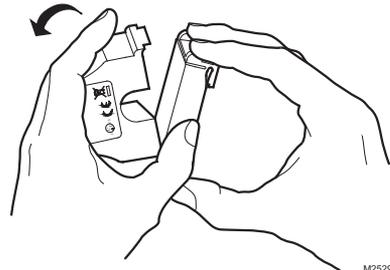
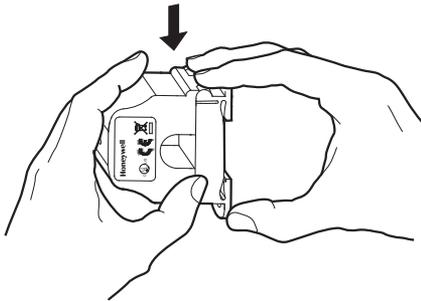
**Fig. 3. Current transformer**

## **Latch Operation (Split Core Models)**

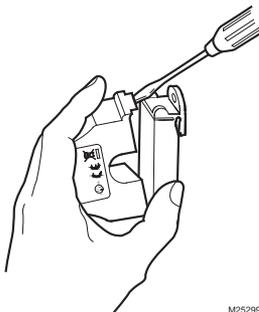
Pressing down on the two (2) side tabs and swinging the cover open, opens the split core current switch as shown in Fig. 6. Lifting up the latch with a flat-tip screwdriver as shown in Fig. 7 can also open the unit. Press down firmly on the cover to close the current switch. An audible “click” will be 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. Silicone grease, present on the cores to prevent rust, 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.



**Fig. 4. Opening sensor by hand**



**Fig. 5. Opening with a screwdriver**

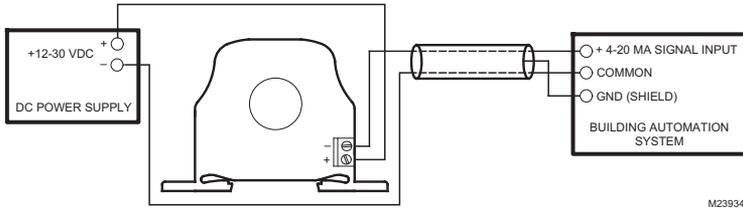
## **Wiring**

Honeywell recommends the use of 16 to 22 AWG (1.3 to 0.3 mm<sup>2</sup>) shielded cable, copper wire only for all current sensor applications. A maximum wire length of less than 98.4 feet (30 meters) should be used between the current sensors 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 so as to prevent any chance of shorting. The current sensor terminals are polarity sensitive and represent a linear and proportional 4 to 20 mA output signal. The current sensors are available in either an Average or True RMS output version. The recommended torque to be used on the terminal block connections is 5.93 in-lbs (0.67 Nm). The

aperture (hole) size of the current sensor is 3/4 in. (19 mm) and will accept a maximum cable diameter of 350 MCM (17.3 mm).



M23934

Fig. 6. Wiring example

## OPERATING SPECIFICATIONS

Max Sensing Current Voltage: 600 Vac

Table 1. Specifications by Product Number

Product Number	Core Type	Output	Range	Jumper <sup>a</sup>	Max. Current Continuous	Max. Current for 6 secs.
CTS-20-005-AVG-001	Solid	4-20 mA Average	0-5 Amps Fixed	None	100 Amps	125 Amps
CTS-20-050-AVG-001	Solid	4-20 mA Average	0-10 Amps 0-20 Amps 0-50 Amps	Low Middle High	100 Amps 150 Amps 200 Amps	125 Amps 225 Amps 300 Amps
CTS-20-250-AVG-001	Solid	4-20 mA Average	0-100 Amps 0-200 Amps 0-250 Amps	Low Middle High	200 Amps 360 Amps 400 Amps	250 Amps 450 Amps 500 Amps
CTS-20-005-VFD-001 <sup>b</sup>	Solid	4-20 mA True RMS	0-5 Amps Fixed	None	60 Amps	100 Amps
CTS-20-050-VFD-001 <sup>b</sup>	Solid	4-20 mA True RMS	0-10 Amps 0-20 Amps 0-50 Amps	Low Middle High	60 Amps 100 Amps 160 Amps	80 Amps 200 Amps 300 Amps
CTS-20-250-VFD-001 <sup>b</sup>	Solid	4-20 mA True RMS	0-100 Amps 0-200 Amps 0-250 Amps	Low Middle High	160 Amps 320 Amps 400 Amps	200 Amps 400 Amps 500 Amps
CTP-20-005-AVG-001	Split	4-20 mA Average	0-5 Amps Fixed	None	100 Amps	125 Amps
CTP-20-050-AVG-001	Split	4-20 mA Average	0-10 Amps 0-20 Amps 0-50 Amps	Low Middle High	100 Amps 150 Amps 200 Amps	125 Amps 225 Amps 300 Amps
CTP-20-200-AVG-001	Split	4-20 mA Average	0-100 Amps 0-150 Amps 0-200 Amps	Low Middle High	135 Amps 180 Amps 250 Amps	200 Amps 300 Amps 400 Amps
CTP-20-005-VFD-001 <sup>b</sup>	Split	4-20 mA True RMS	0-5 Amps Fixed	None	60 Amps	100 Amps
CTP-20-050-VFD-001 <sup>b</sup>	Split	4-20 mA True RMS	0-10 Amps 0-20 Amps 0-50 Amps	Low Middle High	60 Amps 100 Amps 160 Amps	80 Amps 200 Amps 300 Amps
CTP-20-200-VFD-001 <sup>b</sup>	Split	4-20 mA True RMS	0-100 Amps 0-150 Amps 0-200 Amps	Low Middle High	135 Amps 180 Amps 250 Amps	200 Amps 300 Amps 400 Amps

<sup>a</sup> All current sensors are shipped from the factory with the jumper set in the high range.

<sup>b</sup> All VFD models have True RMS outputs and should be used with Variable Frequency Drives. Not CE compliant at this time.

## TROUBLESHOOTING

Problem	Solution
No reading	<ul style="list-style-type: none"> <li>• Confirm that you have +12 to 30 Vdc in series with the current sensor output terminals and the analog input of the control panel.</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 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.</li> </ul>
Erratic readings	<ul style="list-style-type: none"> <li>• Verify that the wires are terminated properly.</li> <li>• Check that the +12 to 30 Vdc input is clean. In areas of high RF interference, shielded cable may be necessary to stabilize signal.</li> </ul>
Inaccurate readings	<ul style="list-style-type: none"> <li>• If you suspect that the current sensor is not reading within the accuracy specifications, please contact the factory for assistance.</li> </ul>

## CURRENT CONVERSION FORMULA

To convert the current sensor output signal to a current reading.

Current reading = mA output/20 mA x Amp Span.

For example:

For a reading of 4 mA with a 0-250 Amp span:

Current reading =  $(4 \text{ mA}/20 \text{ mA}) \times 250 \text{ A} = 0 \text{ Amp.}$   
 $(0/16) \times 250 = 0$

NOTE: 4 mA = 0 Amps  
 20 mA = 250 Amps

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