

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

CTS-20; CTP-20

PRODUCT DATA



FEATURES

- Solid or split core loop-powered current transmitters
- Fast response time
- Integral DIN rail mounting flange
- Easy wiring, polarity sensitive output
- Accepts up to a 350 MCM (17.3 mm) cable
- Operates up to 250 continuous amps
- True RMS versions are available
- Limited five year warranty
- RoHS and WEEE compliant

DESCRIPTION

The CTS-20 and CTP-20 series current sensors monitor the current flowing to electrical equipment or buildings. The magnitude of this current is then converted into a linear and proportional 4 to 20 mA output signal, which can be monitored by your Building Management, DDC or PLC controller. The current sensors are available in either an average or true RMS output version. All of these sensors have jumper selectable input ranges except for the 0 to 5 Amp input range. These current sensors should be used in load trending (current monitoring) type applications. The CTS-20 series current sensors are an excellent choice for new installations. The CTP-20 series current sensors are ideal for retrofit or existing installations, since it is not necessary to power down the unit and disconnect any wires during the installation process. All of the current sensors are fast acting, reliable and extremely easy to install. No additional din rail mounting clips are necessary, due to the unique design of the integral din rail mounting flange.

The CTS-20 and CTP-20 series current sensors are extremely accurate from 1 to 100% of the FSO (Full Scale Output). All of the current sensors are factory calibrated using a NIST Traceable standard and shipped with the jumper placed in the largest jumper selectable range. In applications where the maximum current is larger than 250 Amps, Honeywell recommends the use of a traditional ratio:5 (5A) current transformer and the CTS-20-005 or CTP-20-005 for best results. The CTS-20 and CTP-20 must be externally powered using a +12 to 30 Vdc power supply.

All of the CTS-20 and CTP-20 series current sensors come with a limited five year factory warranty.

Contents

| | |
|----------------------------------|---|
| Description | 1 |
| Features | 1 |
| Specifications | 2 |
| Ordering Information | 2 |
| Safety | 4 |
| Installation | 4 |
| Troubleshooting | 6 |
| Current Conversion Formula | 6 |



SPECIFICATIONS

Sensor Supply Voltage (Vs): +12 to 30 Vdc

Supply Current: 36 mA max

Amperage Ranges: See Table 1

Output: 4 to 20 mA, 2-Wire loop powered

Accuracy (from 1-100% of FSO):

CTS-20-AVG, CTP-20-AVG: $\pm 0.5\%$

CTS-20-VFD, CTP-20-VFD: $\pm 0.5\%$

Maximum Load Resistance:

CTS-20-AVG, CTP-20-AVG: 700 ohms @ 24 Vdc (Vs-9)/
0.02-40.2

CTS-20-VFD, CTP-20-VFD: 650 ohms @ 24 Vdc (Vs-10)/
0.02-40.2

Response Time:

CTS-20-AVG, CTP-20-AVG: <75 mS

CTS-20-VFD, CTP-20-VFD: <200 mS

Operating Frequency Range: 30 Hz to 1 kHz

Isolation Voltage: 2220 Vac

Max Sensing Current Voltage: 600 Vac

Aperture (Hole) Size: 3/4 in. (19 mm), Accepts up to 350 MCM (17.3 mm) cables

Dimensions: See Figures 1 and 2

DIN Rail Size: 1-3/8 in. (35 mm)

Unit Weight:

CTS: 0.22 lbs (0.1 kg)

CTP: 0.24 lbs (0.1 kg)

Enclosure Rating/Color: UL94-5VB/Burgundy

Operating Temperature Range:

CTS-20-AVG, CTP-20-AVG: 5° to 104° F (-15° to 40° C)

CTS-20-VFD, CTP-20-VFD: 32° to 104° F (0° to 40° C)

Operating RH Range: 0 to 95% RH, non-condensing

Agency Approvals:

CE, UL

Environmental Compliance:

RoHS-Directive 2002/95/EC

WEEE-Directive 2002/96/EC

Table 1. Operating Specifications

| Product Number | Core Type | Output | Range | Jumper ^a | 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 ^b | Solid | 4-20 mA True RMS | 0-5 Amps Fixed | None | 60 Amps | 100 Amps |
| CTS-20-050-VFD-001 ^b | 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 |

^a All current sensors are shipped from the factory with the jumper set in the high range.

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

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE[®] wholesaler or distributor, refer to the TRADELINE[®] Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Automation and Control Products Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care
1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Toronto, Ontario M1V 4Z9.

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

Table 1. Operating Specifications (Continued)

| Product Number | Core Type | Output | Range | Jumper ^a | Max. Current Continuous | Max. Current for 6 secs. |
|---------------------------------|-----------|------------------|--|-----------------------|----------------------------------|----------------------------------|
| CTS-20-250-VFD-001 | 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 ^b | Split | 4-20 mA True RMS | 0-5 Amps Fixed | None | 60 Amps | 100 Amps |
| CTP-20-050-VFD-001 ^b | 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 ^b | 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 |

^a All current sensors are shipped from the factory with the jumper set in the high range.

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

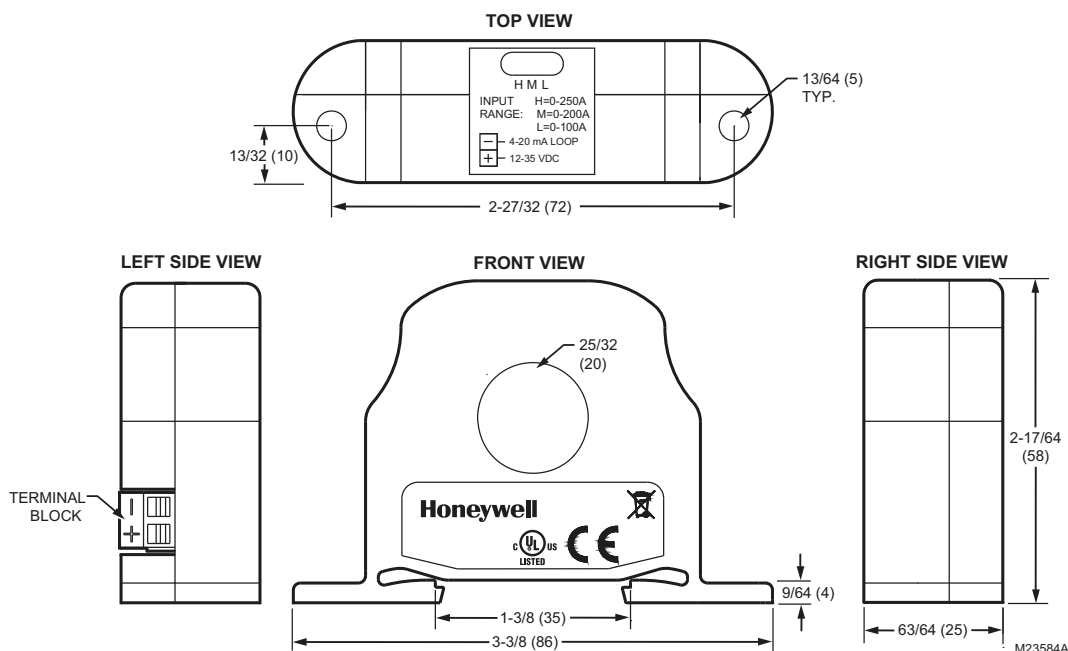


Fig. 1. CTS-20 current sensor dimensions in inches (mm)

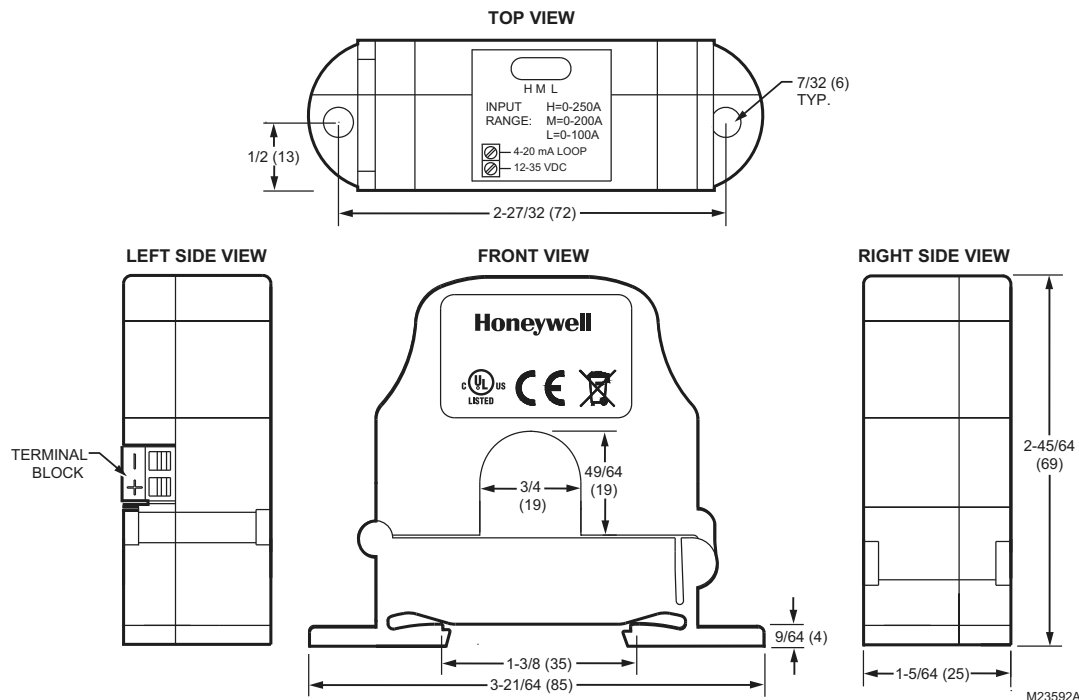


Fig. 2. CTP-20 current sensor dimensions in inches (mm)

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.

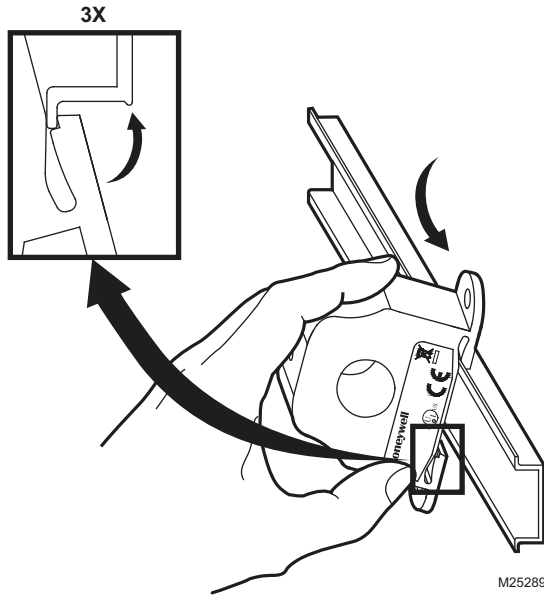


Fig. 3. Sensor placed on DIN rail

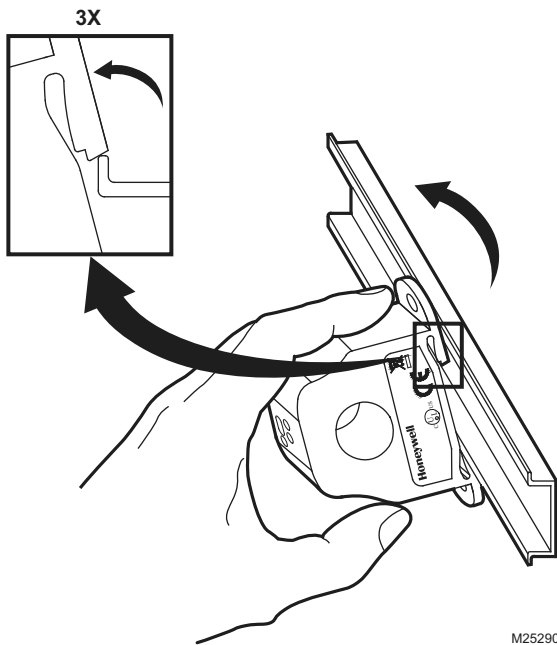
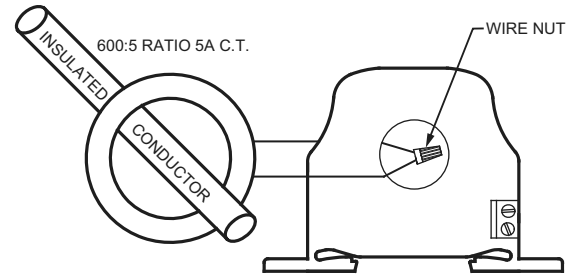


Fig. 4. Sensor removed from DIN rail

⚠ 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 CTS-20-005-AVG-001 or CTS-20-005-VFD-001 as shown in Fig. 5.



EXAMPLE: FOR CURRENTS UP TO 600 AMPS, USE A 600:5 RATIO C.T. AS SHOWN.

M25295A

Fig. 5. 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.

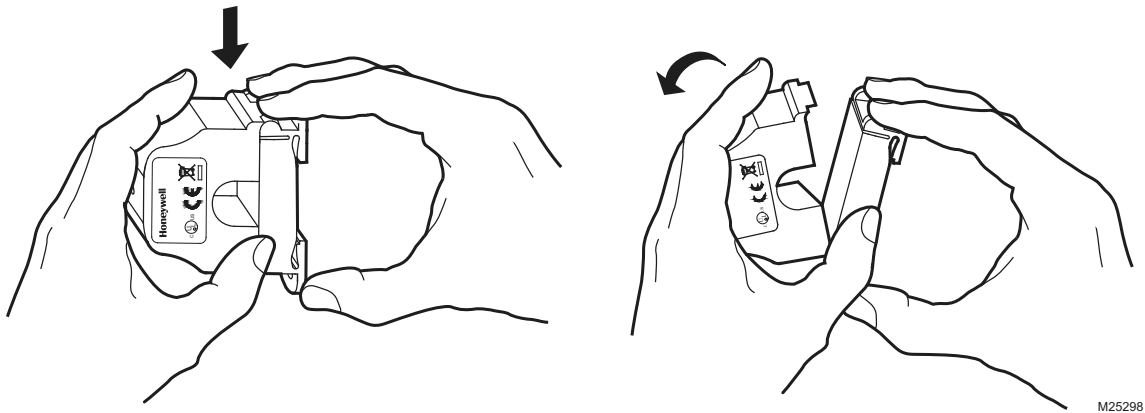


Fig. 6. Opening sensor by hand

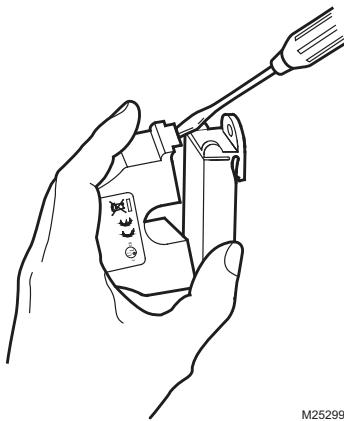


Fig. 7. Opening with a screwdriver

Wiring

Honeywell recommends the use of 16 to 22 AWG (1.3 to 0.3 mm²) 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 switches 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).

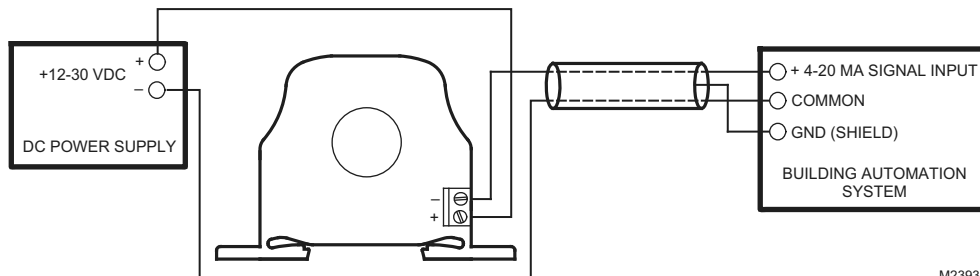


Fig. 8. Wiring example

TROUBLESHOOTING

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

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

Automation and Control Solutions

Honeywell International Inc.
1985 Douglas Drive North
Golden Valley, MN 55422
customer.honeywell.com

Honeywell Limited-Honeywell Limitée
35 Dynamic Drive
Toronto, Ontario M1V 4Z9

® U.S. Registered Trademark
© 2007 Honeywell International Inc.
63-2654—1 C.H. Rev. 05-07



Printed in U.S.A. on recycled
paper containing at least 10%
post-consumer paper fibers.

Honeywell