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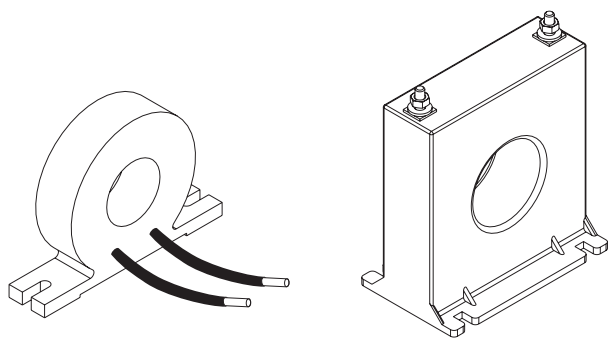
# CEP7 Core Balanced Ground Fault Sensor Application and Installation

(Cat CEP7-CBCT1; -CBCT2)

**ATTENTION:** To prevent electrical shock, disconnect from power source before installing or servicing. Install in suitable enclosure. Keep free from contaminants. (Follow NFPA70E requirements).

**ATTENTION:** The purpose of this document is to serve as a guide for typical installation. The National Electrical Code and any other governing regional or local code will take precedence. Rockwell Automation cannot assume responsibility for the compliance or proper installation of the ground fault sensor or associated equipment. A hazard of personal injury and/or equipment damage exists if codes are ignored during installation.

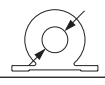
**ATTENTION:** This ground fault protection system is intended for equipment protection only. This system is not a ground fault circuit interrupter, for personnel protection, as defined in Article 100 of the National Electrical Code.



## Core-Balanced Ground Fault Sensor Operation

Ground fault current is sensed by passing all lines carrying current to and from a motor through the window of a special current transformer called a ground fault sensor. If all the current to the motor returns through the lines in the sensor window, no significant current will be induced in the sensor secondary. If, however, ground fault current returns via a path external to the sensor, such as via the conduit walls, a current will be induced in the sensor secondary. This current will be sensed and amplified by solid state circuits. If the ground fault current is larger than the selected ground fault trip level of the overload relay, the overload relay will trip.

## Ground Fault Sensor Selection

| Catalog Number | Maximum Current | Frequency | Turns Ratio | Sensor Window I.D.  | Sensor Type | Maximum Recommended Cable Size | Ref: IEC Contactor Catalog Number |
|---|---|---|---|---|---|---|---|
| CEP7-CBCT1 | 45A | 50/60 Hz | 1000:1 | 19.1 mm (.75 in.) |  | 8 AWG @ 600V ① | CA7-09.....CA7-37 |
| CEP7-CBCT2 | 90A | 50/60 Hz | 1000:1 | 39.6 mm (1.56 in.) |  | 2 AWG @ 600V ① | CA7-09.....CA7-85 |

① For a three phase system with one cable per phase

| | | | |
|---|---|---|---|
| REFERENCE | | CEP7 CORE BALANCED GROUND FAULT SENSOR INSTALLATION INSTRUCTION SHEET | E - DOC |
| REVISION AUTHORIZATION: 1 1024888; 2 1026549 | DIMENSIONS APPLY BEFORE SURFACE TREATMENT (DIMENSIONS IN INCHES) TOLERANCES UNLESS OTHERWISE SPECIFIED .XX: N/A .XXX: N/A ANGLES: N/A | Rockwell Automation | THIS DRAWING IS THE PROPERTY OF ROCKWELL AUTOMATION, INC. OR ITS SUBSIDIARIES AND MAY NOT BE COPIED, USED OR DISCLOSED FOR ANY PURPOSE EXCEPT AS AUTHORIZED IN WRITING BY ROCKWELL AUTOMATION, INC. |
| 42053 | DR. M. Guelmi DATE 1-16-07; CHKD. M. Jutz DATE 1-16-07; APPD. G. Lehman DATE 1-16-07 | | LOCATION: MILWAUKEE, WISCONSIN U.S.A. |
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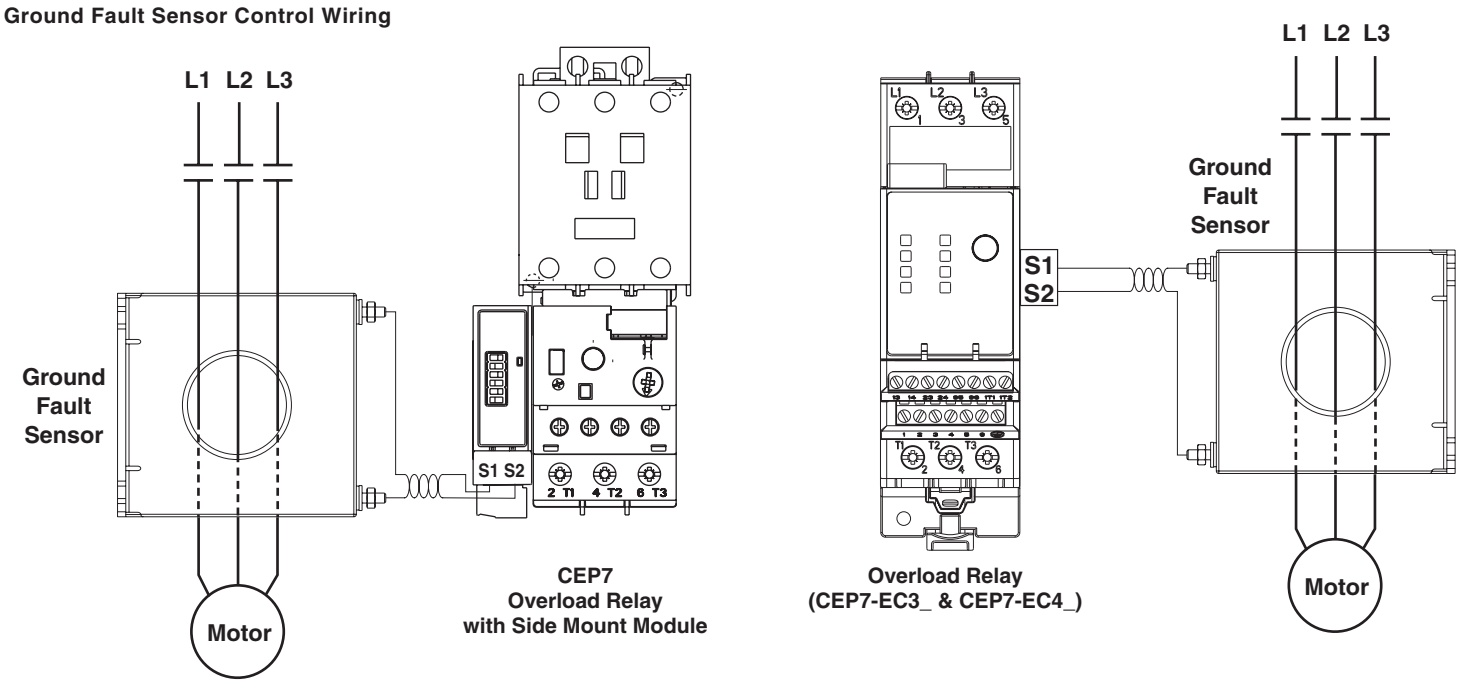
## Control Wire Installation Instructions

The control wiring between the ground fault side mount module or to the overload relay (CEP7-EC3_) and the ground fault sensor must be a twisted pair. Lines in excess of three feet long must be a shielded pair with the shield connected to ground at only one point. Maximum length is one-hundred feet for the shielded cable. All overload relay and ground fault sensor terminals are for copper wire only in sizes #12 AWG through #24 AWG. Ring lug termination is required for the ground fault sensor terminals of CEP7_CBCT2 and larger.

**Ground Fault Sensor Control Wiring**




## Power Cable Installation Instructions

**ATTENTION:** Do not apply power to a system with power cables going through the sensor unless the sensor is connected to the overload relay. Operation without a low impedance connection to the secondary windings may result in damage to the sensor.

1) All power cables, including the neutral when used, must pass through the sensor window. The equipment ground conductor (the conductor used to carry the non-current carrying metal parts of equipment, as defined by Article 100 of the National Electrical Code) must not pass through the sensor window.

2) The power cables, going through the sensor window, must be straight, tightly bundled, centered in the window, and perpendicular to the sensor for a length equal to or greater than six times the wire bundle diameter (including insulation) from the sensor (see Figure 1).

3) All other conductors with available fault currents in excess of 1000 amps should be placed a distance equal to or greater then six times the cable bundle diameter (including insulation) from the sensor (see Figure 2).

4) The power cables of the branch circuit to be protected by the overload relay must not be grounded on the load side of the ground fault sensor.

5) If the power cables are enclosed in a conducting jacket, the jacket must be grounded on the line side of the sensor. (The jacket must not pass through the sensor window, but must be cut at the window and joined with a conductor that passes outside the sensor window).

6. The power system must be solidly grounded or grounded through an impedance at the source, as long as the impedance allows for a magnitude of current to flow that is within the operational range of the overload relay.

**Ground Fault Sensor Mounting**

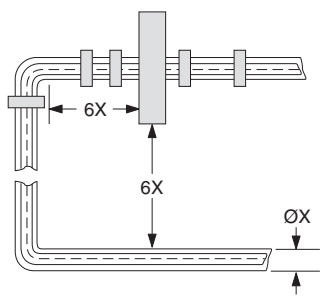
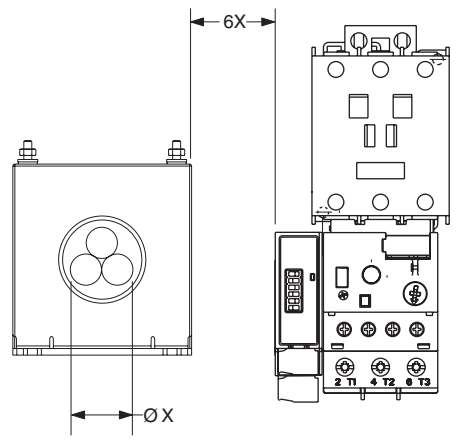



Figure 1



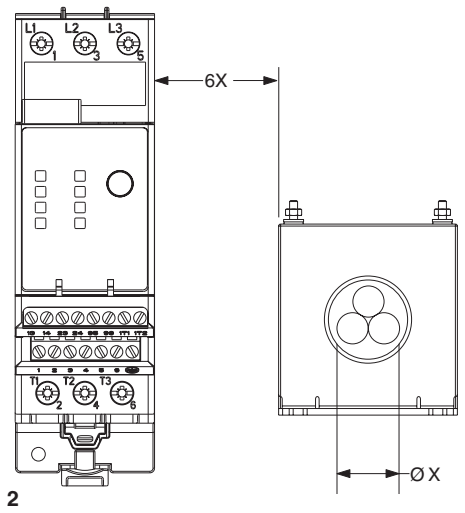




Figure 2



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| REVISION AUTHORIZATION | |
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DIMENSIONS APPLY BEFORE SURFACE TREATMENT

(DIMENSIONS IN INCHES) TOLERANCES UNLESS OTHERWISE SPECIFIED

.XX: N/A

.XXX: N/A

ANGLES: N/A

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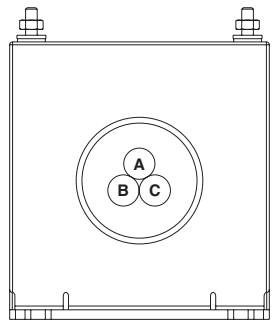
## Locating Phase Conductors in a Core-Balanced Ground Fault Sensor Window

An ideal core-balanced ground fault sensor responds only to the sum of the currents flowing through the sensor window; however an actual core-balanced ground fault sensor may saturate if the phase currents are too large. This results in ground fault sensor output even if the sum of the phase currents is zero. Saturation can be minimized by choosing a ground fault sensor with adequate core size and symmetrically locating the phase conductors in the center of the sensor window as shown in the following figure.

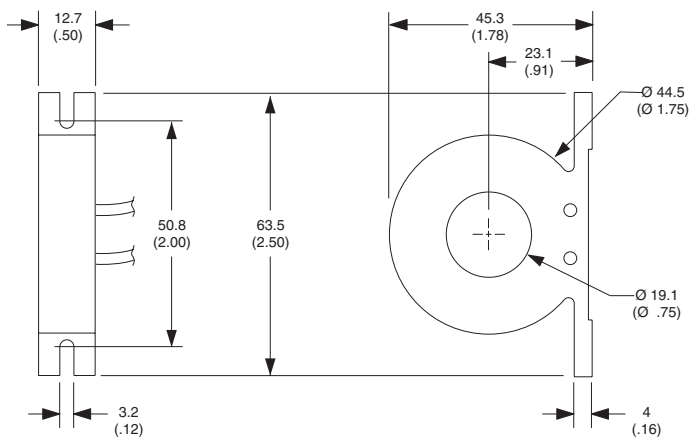
- If shields, drain, ground, or ground-check wires pass through the sensor window, return them through the sensor window before termination.
- Firmly secure the conductors in the center of the sensor window so that they cannot be moved accidentally or under fault conditions.
- The gap between the conductors and the sensor window should be at least 12.7mm (0.5inches). It is preferable to have a gap of 25.4mm (1 inch) or more.

**Single Cable per Phase**

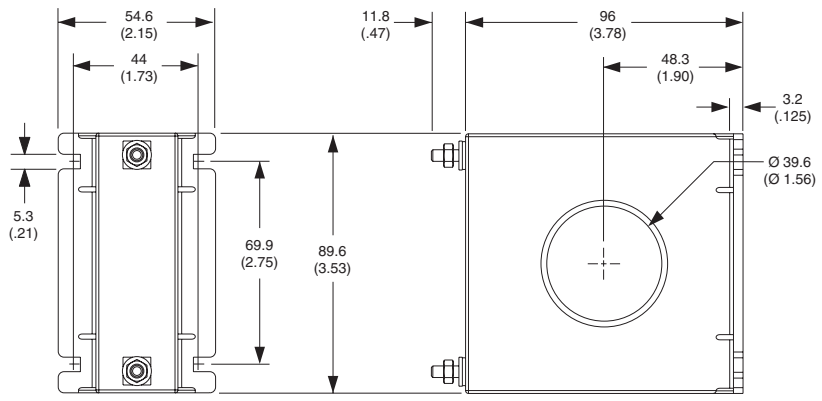



## Ground Fault Sensor Dimensions

**CEP7-CBCT1**




**CEP7-CBCT2**



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| PART NO. | CHG. CHAR. | MATERIAL | FLAT SIZE | FOLD SIZE |
|---|---|---|---|---|
| -01 | 2 | TWO SIDES PRINTED BODY STOCK WHITE BODY INK BLACK | 17" W x 11" H | 4-1/4" W x 2-3/4" H |

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