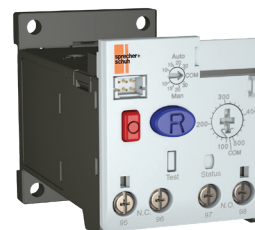


Overload Relays

| | |
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Choices in Overload Relays



CT7N/CT8 Thermal Bimetallic

Key Features:

- Ambient temperature compensation
- Rated for DC and variable frequent drive applications up to 400 Hz
- Optional remote reset solenoid and external reset accessories



CEP7 Solid State

Key Features:

- Current measurement based protection
- Low energy consumption
- Side-mount expansion modules provide adjustable levels of protection and communication



CEP9 Advanced Electronic

Key Features:

- Provides critical motor protection functions
- Communication and diagnostics provide detailed logs and control from relay to motor
- Can simplify control architecture

B
Overload Relays

Product Feature Overview

| Relay Type | CT7N/CT8 | CEP7-1 | CEP9 (Parameter) | CEP9 (Networked) |
|--|----------|--------|------------------|----------------------------|
| Protection Features | | | | |
| Overload | • | • | • | • |
| Phase Loss | | • | • | • |
| Ground Fault | | • | • | • |
| Current Imbalance | • | | • | • |
| Add-on Protection | | • | • | • |
| Over/ Under Voltage | | | • | • |
| Voltage Imbalance | | | • | • |
| Over/ Under Power | | | • | • |
| Diagnostics Features | | | | |
| % Full Load Amperes (FLA) | | • | • | • |
| % Thermal Capacity Utilization (TCU) | | • | • | • |
| Voltage | | | • | • |
| Power | | | • | • |
| Energy | | | • | • |
| Integration Features | | | | |
| DeviceLogix™ | | | • | • |
| Logix Controller | | | | • |
| Connected Components Workbench™ Software | | | • | |
| EtherNet/IP™ | | | | Embedded (dual-port) |
| Local Programming Method | | | USB Type B ❶ | EtherNet/IP or DeviceNet ❶ |

❶ You can also configure CEP9 devices using an optional expansion operator diagnostic station.

Protecting your investment is critical to keeping your operations up and running. Prevent unwanted down time by choosing the right protection for your motor controls. Sprecher + Schuh is proud to offer several options in motor protection. From simple single purpose devices, to varying degrees of selection options and complete factory automation and communication, selecting the right protection is vital to ensuring motor life and longevity. Sprecher + Schuh is here to help protect your investment.

CEP7 Solid State Overload Relays

The Third Generation

3rd Gen CEP7 Overloads

Advanced solid state motor protection

The CEP7-1__ relay provides the following features:

- Electronic overload detection
- Simple configuration
- Selectable trip class
- Adjustable trip current
- Integration with CA7/CAN7 contactors
- Test and reset buttons
- Auto (CEP7-1EF only)/manual reset selection
- RMS current sensing (50/60 Hz)
- External current transformer configurations
- Single- and Three-phase compatibility within the same unit
- Direct and pass-through mounting options

The CEP7-1__ relay lets you connect accessory modules, some of which interface through the front-mounted communication port. Accessories include:

- Ground fault/jam protection module (CEP7-1EF only)
- Remote reset solenoid
- Anti-tamper shield
- Electronic remote indication display CEP7-ERID, with or without reset (CEP7-1EF units only)
- External reset adapter
- DIN rail/Panel adapter



Overload Performance

• Current Measurement-based Protection

Current measurement-based overload protection more accurately models a motor's thermal condition. Ambient temperature over the specified temperature operating range does not impact the performance of current measurement-based designs.

- **Electronic Design** Thermal modeling is performed electronically with precision solid-state components, using a state-of-the-art microprocessor. The microprocessor continually processes motor current data to accurately maintain the time-current status of the motor thermal capacity utilization (%TCU) value.

- **Thermal Memory** A thermal memory design lets the CEP7-1 Overload Relay model the heating and cooling effects of motor on and off periods. This achieves accurate protection for both hot and cold operation.

- **Phase Loss Protection** Phase loss detection is incorporated into the CEP7-1 Overload Relay, allowing it to respond quickly to this type of condition.



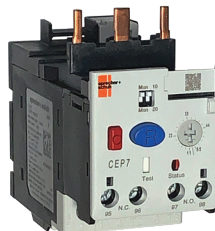
Direct Mount Mechanical attachment



100A



100A



100A



800A

Versatile and Expandable

- **Adjustable Trip Class and Reset Modes** The Basic CEP7-1EE relay offers Trip Class 10 and 20 with manual reset only. The Advanced CEP7-1EF relay offers Trip Class 10, 15, 20, and 30 with a selectable dial, in manual or automatic reset.
- **Pass-through Design** The CEP7-1 relay Pass-through option consumes less panel space than a standard CEP7-1 relay that is configured with a panel-mount adapter. The pass-through design provides integrated DIN Rail mount and panel mounting holes. The CEP7-1 Pass-through Electronic Overload Relay provides the same protection and expandable accessory capabilities as a standard CEP7-1 relay.
- **External CTs** For motor overload protection applications above 100A in current sensing capability, the CEP7-1EF_Z relay offers functionality with external CT configurations up to 800A maximum capacity.

Wide current adjustment range

Thermal or bimetallic overload relays typically have a small current adjustment range of 1.5:1 meaning that the maximum setting is generally 1.5 times the lower setting. Sprecher + Schuh's CEP7-1 overload relay is capable of adjustment to a maximum of five times the minimum set current, which dramatically reduces the number of units required on-hand to cover the full range of current settings up to 100 amperes.

Selectable tripping class

Both the CEP7-1 models have standard Class 10 tripping characteristics. The CEP7-1EE Basic model is equipped with dip switches that allow the selectability between Class 10 and Class 20, while the CEP7-1EF Advanced model possesses a selection dial on the face of the overload for trip classes 10/15/20 and 30. This selection feature allows you to closely match the Trip Class with the start-up time of the motor.

Adaptive Protection

Remote Reset Capability

The CEP7-1EF relay offers optional remote reset capabilities through the use of an electro-mechanical reset solenoid or an electronic remote reset accessory module.

Ground Fault and Jam Protection

The CEP7-1EF relay offers optional ground fault and jam protection through the use of an accessory module. The ground fault current detection level is configurable via a mechanical rotary dial from 0.02...5A. Jam protection is configurable via two mechanical rotary dials, current level from 125...600% FLA, and delay from 0.1...10 seconds.

Robust design

The CEP7 has been designed to physically extend to the back-pan therefore aligning the mounting of the overload with the corresponding contactor. Further, the mechanical attachment and direct electrical connection to the contactor provides a robust mounting, which means less damage from shipping or during field wire installation. The bipolar latching relay which controls the normally closed trip contacts and normally open alarm circuit contacts have been self-enclosed, therefore insulating the electromagnet and shielding against airborne metal particles and other potential environmental debris. The CEP7 has been tested to operate in -20° C. or up to 60° C (140 °F.) and withstand 3G of vibration or 30G of shock on a mountain up to an altitude of 2000m or in a jungle at 95% humidity. Reliability under every conceivable environmental condition is a quality built into the design of the CEP7 electronic overload relay.



CEP7-1EE Switch
Selection for Trip class
(10 or 20)



CEP7-1EF Selectable Dial for
• Manual vs. automatic
• Trip class 10, 15, 20 or 30)


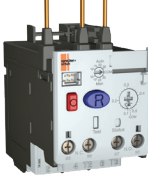
Increased accuracy and improved motor protection

Microelectronics provide flexible and accurate motor overload protection. Unlike traditional overload relays that simulate heat build-up in the motor by passing current through a heater element, CEP7 solid state overload relays measure motor current directly through integrated current transformers. The transformers, in turn, create a magnetic field that induces DC voltage onto the ASIC board. The electronics identify excessive current or loss of phase more accurately, and react to the condition with greater speed and reliability than traditional overload relays. In addition, CEP7 solid state relays offer setting accuracies from 2.5 – 5% and repeat accuracy of 1%.

Dramatically lowered energy requirement saves money, reduces panel space

Because traditional overload relays work on the principle of “modeling” the heat generated in the motor (recreating the heat in the bimetal elements or heaters), a significant amount of energy is wasted. In traditional bimetallic overload relays, as many as six watts of heat are dissipated to perform the protective function. Because the CEP7 uses sampling techniques to actually measure the current flowing in the circuit, very little heat is dissipated in the device...as little as 0.5 watts. This not only reduces the total amount of electrical energy consumed in an application, but it can also have a dramatic impact on the design and layout of control panels. The density of motor starters can be much greater because less heat is generated by each of the individual components. Higher density results in smaller control panels. In addition, special ventilation or air conditioning that might have been required to protect sensitive electronic equipment such as PLC's can now be reduced or eliminated. CEP7 overload relays dramatically reduced energy requirement saves money and reduces panel space.

Direct Mount / Single & Three-phase Applications ①②③

| Overload Relay | Directly Mounts to Contactor... | Adjustment Range (A) | Catalog Number |
|--|-------------------------------------|----------------------|----------------|
| CEP7-1EE Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 20 | | | |
|  <p>shown: CEP7-1EEAB</p> | CA7-9...CA7-23 CAN7-12, CAN7-16 | 0.1...0.5 | CEP7-1EEAB |
| | | 0.2...1.0 | CEP7-1EEBB |
| | | 1.0...5.0 | CEP7-1EECB |
| | | 3.2...16 | CEP7-1EEDB |
| | | 5.4...27 | CEP7-1EEEB |
| | CA7-30...CA7-55 CAN7-37, CAN7-43 | 5.4...27 | CEP7-1EEED |
| | | 11...55 | CEP7-1EEFD |
| CA7-60...CA7-97 CAN7-85 | 20...100 | CEP7-1EEGE | |
| CEP7-1EF Automatic or Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 15, 20, 30 | | | |
|  <p>shown: CEP7-1EFAB</p> | CA7-9...CA7-23 CAN7-12, CAN7-16 | 0.1...0.5 | CEP7-1EFAB |
| | | 0.2...1.0 | CEP7-1EFBB |
| | | 1.0...5.0 | CEP7-1EFCB |
| | | 3.2...16 | CEP7-1EFD B |
| | | 5.4...27 | CEP7-1EFEB |
| | CA7-30...CA7-55 CAN7-37, CAN7-43 | 5.4...27 | CEP7-1EFED |
| | | 11...55 | CEP7-1EFFD |
| CA7-60...CA7-97 CAN7-85 | 20...100 | CEP7-1EFGE | |

TIP!

Most industrial applications usually call for an overload relay that must be manually reset in the event of a trip. This allows the cause of the overload to be identified before the motor is restarted. An overload relay that resets automatically is generally for specialized, or remote applications, such as rooftop AC units where restarting the motor will not harm people or equipment.

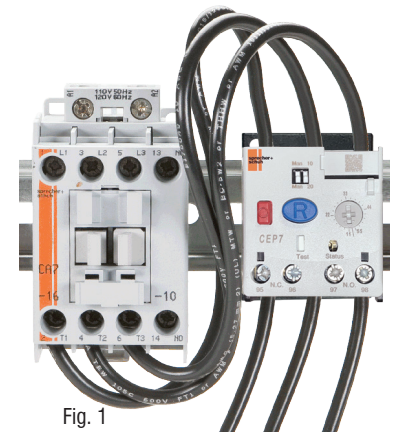





Fig. 1

Pass-Thru Models / Single & Three-phase Applications ②③

| Overload Relay | for use with... ① | Adjustment Range (A) | Catalog Number |
|--|--|----------------------|----------------|
| CEP7-1EE Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 20 | | | |
|  <p>shown: CEP7-1EECP</p> | All contactors | 1.0...5.0 | CEP7-1EECP |
| | | 3.2...16 | CEP7-1EEDP |
| | | 5.4...27 | CEP7-1EEEP |
| | | 11...55 | CEP7-1EEFP |
| | | 20...100 | CEP7-1EEGP |
| CEP7-1EF Automatic or Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 15, 20, 30 | | | |
|  <p>shown: CEP7-1EFGP</p> | All contactors | 1.0...5.0 | CEP7-1EFCP |
| | | 3.2...16 | CEP7-1EFD P |
| | | 5.4...27 | CEP7-1EFEP |
| | | 11...55 | CEP7-1EFFP |
| | | 20...100 | CEP7-1EFGP |
| CEP7-1EF Automatic or Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 15, 20, 30 | | | |
|  <p>shown: CEP7-1EFLZ</p> | All contactors and external current transformers | 30...150 | CEP7-1EFHZ |
| | | 40...200 | CEP7-1EFJZ |
| | | 60...300 | CEP7-1EFKZ |
| | | 80...400 | CEP7-1EFWZ |
| | | 100...500 | CEP7-1EFLZ |
| | | 120...600 | CEP7-1EFMZ |
| 160...800 | CEP7-1EFNZ | | |

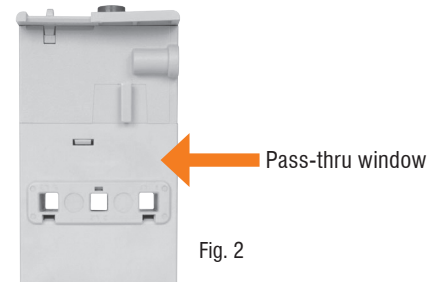


Fig. 2

Description

Fig. 1 - The Pass-Thru version of the CEP7 permits separate mounting of the overload relay.

Fig. 2 - Motor load side cables simply pass-thru a window in the overload relay body. The internal current transformers monitor the current flow.

Benefits

- No need for a panel mount adapter as required with direct-connect versions
- Eliminates 3 to 6 wire terminations
- Designed for use with CA8 or CA7 contactors
- Easily replaces outdated overload relays in existing starter assemblies
- Provides state-of-the-art accuracy and motor protection

① This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.












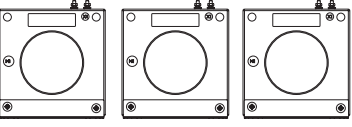
② The reset time of a CEP7 set in the automatic mode is approximately 120 seconds.

③ CEP7 overload relays do not work with Variable Frequency Drives, DC Applications or Softstarters with braking options.

Accessories - CEP7-1

B

3rd Gen CEP7 Overloads

| Accessory | Description | For use with... | Package Quantity | Catalog No. | |
|---|--|-------------------------|------------------|-------------------------|----------------|
|  | Base Unit Anti-Tamper Shield | | 10 | CEP7-1BC8 | |
|  | External Reset Adapter | CEP7-1EE, CEP7-1EF | 1 | CEP7-1ERA | |
|  | Remote Reset Solenoid | | 240V AC | 1 | CEP7-1EMRA |
| | | | 120V AC | 1 | CEP7-1EMRD |
| | | | 24V DC | 1 | CEP7-1EMRZ |
|  | DIN Rail/Panel Adapter | CEP7-1__B | 1 | CEP7-1EPB | |
| | | CEP7-1__D | 1 | CEP7-1EPD | |
| | | CEP7-1__E | 1 | CEP7-1EPE | |
|  | Universal Protection Module ① ② (ground fault/jam) | CEP7-1EF | 1 | CEP7-1EGJ | |
|  | Protection Accessory Anti-Tamper Shield | CEP7-1EGJ | 25 | CEP7-1EMC | |
|  | Reset Adapter (electronic remote reset) | CEP7-1EF | 1 | CEP7-1ERR | |
|  | Electronic Remote Indication Display | with reset | 1 | CEP7-1EGJ, CEP7-1ERR | |
|  | | no reset | | 1 | CEP7-1ERIDN |
|  | Panel/DIN Mounting Kit (includes comm. cable) | CEP7-1EGJ, CEP7-1ERR | 1 | CEP7-1EIKIT1 | |
|  | Accessory Installation Kit and Spare Terminal Blocks (includes comm. cable) | | 1 | CEP7-1EIKIT2 | |
| Current Transformer Kits | | | | | |
| | | For use with... | CT Ratio | | |
|  | CA9-265...305 | | 300:5 | ③ | |
| | | | | | |
| | CA9-370...580 | | 600:5 | ③ | CEP7-CT-UL-300 |
| | | | 400:5 | | CEP7-CT-CE-300 |
| CA9-750...1060 | | ~ | ~ | CEP7-CT-UL-600 | |
| | | | | CEP7-CT-CE-400 | |
| | | | | Refer to Factory | |

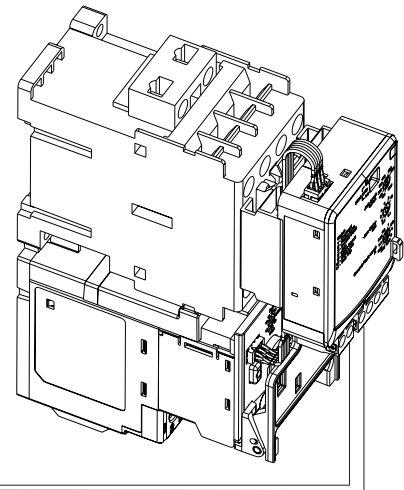
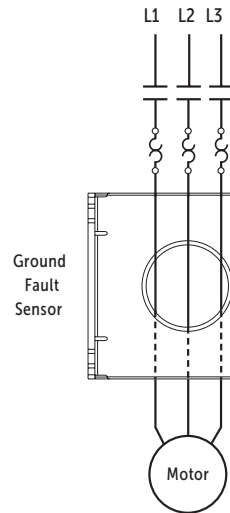
*Includes three Current Transformers
(Overload relay sold separately)*

- ① ATTENTION: The CEP7 Overload relay is not a ground fault circuit interrupter for personnel protection as defined in Article 100 of the NEC.
- ② Dynamic inhibit: Protective function is enabled after the motor current goes above 150% and then falls below 125%
- ③ Utilizes UL or CE approved Current Transformers in conjunction with an overload selection. Refer to catalog page B1.9 for current setting guidance when using CEP7-1E_C_.

CEP7-1 Ground Fault Sensor Installation



Ground Fault Sensor Control Wiring



CEP7-1EF Overload Relay attached to CA7 with CEP7-1EGJ module

CEP7 Ground Fault Sensor Selection

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.

| Sensor Type | Maximum Current | Frequency | Turns Ratio | Sensor Window I.D. | Maximum Recommended Cable Size | For use with CEP7-EGF and CEP7-EGJ and contactor... | Catalog Number |
|-------------|-----------------|-----------|-------------|--------------------|--------------------------------|---|----------------|
| | 45A | 50/60 Hz | 1000:1 | 19.1mm (0.75 in.) | 8 AWG @ 600V ❶ | CA7-9...CA7-37 | CEP7-CBCT1 |
| | 90A | 50/60 Hz | 1000:1 | 39.6mm (1.56 in.) | 2 AWG @ 600V ❶ | CA7-9...CA7-85 | CEP7-CBCT2 |
| | 180A | 50/60 Hz | 1000:1 | 63.5 mm (2.50 in.) | 250MCM (120mm²) @ 600V ❶ | CA7-9...CA9-190 | CEP7-CBCT3 |
| | 420A | 50/60 Hz | 1000:1 | 82.3 mm (3.25 in.) | 350MCM (185mm²) @ 600V ❷ | CA7-9...CA9-400 | CEP7-CBCT4 |

❶ For a three phase system with one cable per phase.
 ❷ For a three phase system with two cables per phase.

Specifications - CEP7 Electronic Overload Relay

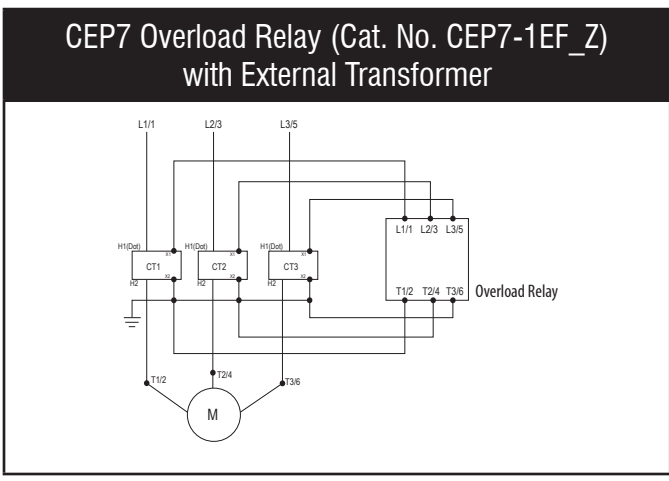
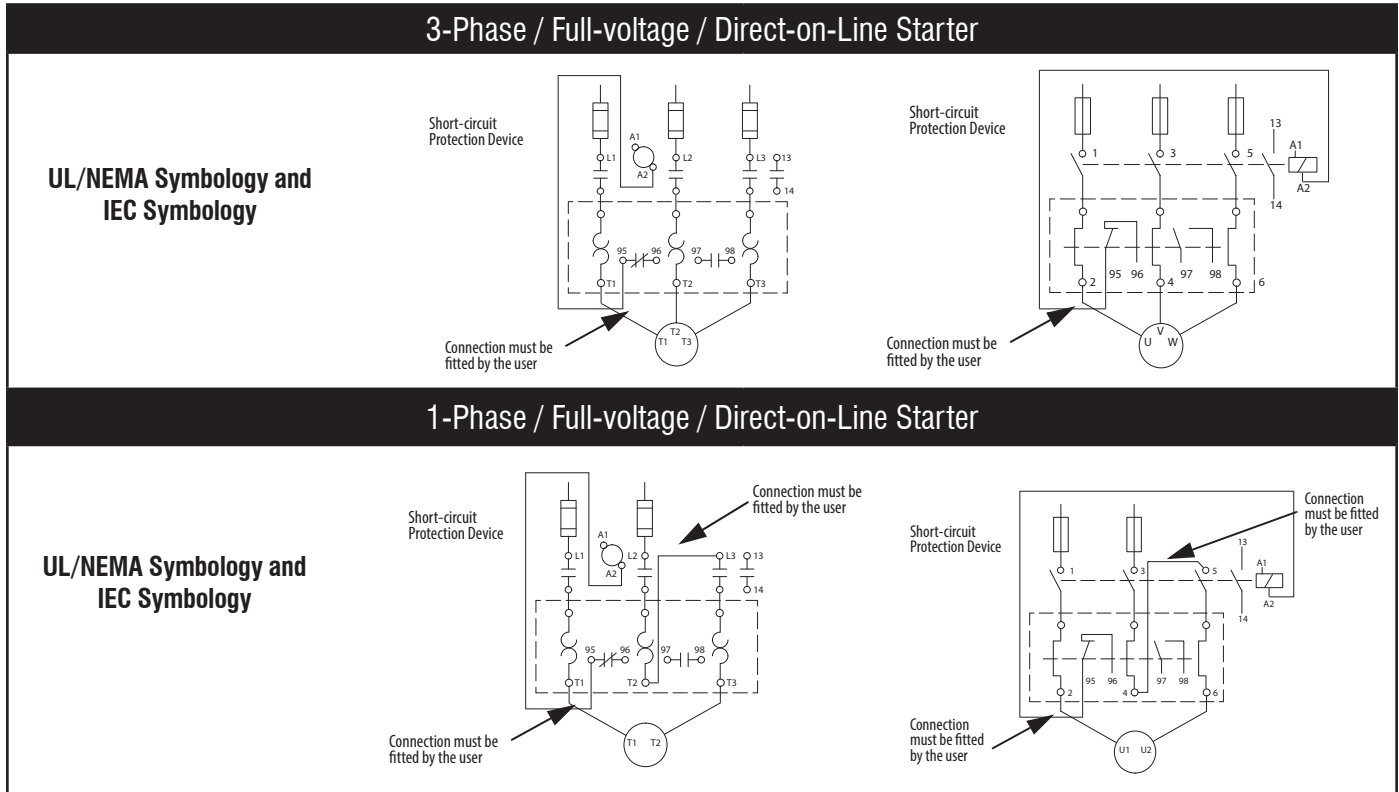
This section contains specifications, wiring diagrams, and certification information for the CEP7 Electronic Overload Relay and its accessories.

Wiring Diagrams

The figures in this section illustrate various wiring configurations for the CEP7 Electronic Overload Relay and accessories.

B

3rd Gen CEP7 Overloads



Standards Compliance and Certifications

This section contains specifications, wiring diagrams, and certification information for the CEP7 Electronic Overload Relay and its accessories.

| Standards Compliance | Certifications |
|------------------------------------|---|
| CSA22.2, No. 60947-4-1 | cULus Listed – File No. E14840 |
| EN 60947-4-1 | CE Marked |
| UL 60947-4-1 | RCM (formerly C-tick) |
| GB/T 14048.4-2010 | CCC |
| SJ/T 11364, GB/T 26572, SJ/Z 11388 | Environmental Protection Use Period 25 (China RoHS) |
| | Morocco Regulatory Certification |

General Protection

| Protection Type | CEP7-1EE | | CEP7-1EF, CEP7-1EF | |
|-----------------|----------|---------|--------------------|-----------|
| | Trip | Warning | Trip ❶ | Warning ❶ |
| Overload | Yes | No | Yes | Yes |
| Phase Loss | Yes | No | Yes | Yes |
| Ground Fault ❷ | No | No | Yes | Yes |
| Jam ❷ | No | No | Yes | Yes |

❶ Trip/Warning indication also available using the CEP7-1ERR/1EGJ and CEP7-ERID / 1ERIDN accessory modules.

❷ Additional ground fault and jam protection accessory CEP7-1EGJ required.

Overload Protection

| Attribute | Rating | |
|----------------------|---|---------------------|
| | CEP7-1EE.. | CEP7-1EF.. |
| Type of Relay | Ambient Compensated Time-Delay Phase Loss Sensitive | |
| Nature of Relay | Solid-state | |
| FLA Setting | Rotary Dial | |
| Trip Rating | 120% FLA | |
| Trip Class | 10, 20 | 10, 15, 20, 30 |
| Reset Mode | Manual | Automatic or Manual |
| Overload Reset Level | Auto Reset occurs at 70% TCU when accessory powered, after 2 minutes when self powered. Manual Reset can occur anytime by pressing the manual reset button. Electronic Reset (ERID input) can only occur below 70% TCU. | |

* Typical reset time for CEP7-1EF devices set to automatic reset mode is dependent upon overload trip class. Typical reset time for Trip Class 10 is 90 seconds, Trip Class 15 is 135 seconds, Trip Class 20 is 180 seconds, and Trip Class 30 is 270 seconds.

Ground Fault Protection

| Attribute | Rating CEP7-1EF |
|------------------------------|---|
| Type | Core Balanced |
| Intended Use | Equipment Protection |
| Classification (Per UL 1053) | Evaluated to UL 1053 but not listed as such |
| Internal Protection Range | 0.02...5.0 A |
| Trip and Warning Time Delay | Fixed at 100 msec ± 20 msec |

Technical Information

Motor/Load Ratings

| Terminals | 1/L1, 3/L2, 5/L3, 2/T1, 4/T2, 6/T3 | |
|---|------------------------------------|----------|
| Terminal Style Devices | | |
| Rated Insulation Voltage - (U_i) | [V] | 690V AC |
| Rated Operating Voltage - (U_o) IEC | [V] | 690V AC |
| Rated Operating Voltage - (U_o) UL | [V] | 600V AC |
| Pass-thru Style Devices | | |
| Rated Insulation Voltage - (U_i) | [V] | 1000V AC |
| Rated Operating Voltage - (U_o) IEC | [V] | 1000V AC |
| Rated Operating Voltage - UL/CSA | [V] | 600V AC |
| Rated Impulse Voltage - (U_{imp}) | [kV] | 6 kV AC |
| Rated Operating Current - (I_o) | See product selection table | |
| Rated Frequency | [Hz] | 45...65 |

Control Relay Ratings

| Relay N.O./N.C. | |
|--------------------------------------|---|
| Type of Contacts | Ag/Ni |
| Rated Thermal Current (I_{the}) | B600: 5.0 A; C600: 2.5 A; R300: 1.0 A |
| Contact Reliability | [V] 17 V, 5 mA |
| Rated Insulation Voltage - (U_i) | [V] 690V AC |
| Rated Operation Voltage - (U_o) | [V] 690 AC (IEC) / 600 AC (UL/CSA) |
| Rated Operating Current (I_o) | [V] B600: 3 A (@120V AC), 1.5 A (@240V AC) |
| | [V] C600: 1.5 A (@120V AC), 0.75 A (@240V AC) |
| | [V] R300: 0.22 A (@125V DC), 0.11 A (@250V DC) |
| Minimum Operating Current | [V] 10 mA @ 5V DC |
| Rating Designation | N.O. C600 / N.C. B600 (AC) N.O. / N.C. R300 (DC) |
| Utilization Category | AC-15/DC-13 |
| B600 VA Rating | 3,600VA make / 360VA break |
| C600 VA Rating | 1,800VA make / 180VA break |
| R300 VA Rating | 28VA make / 28VA break |

Rated Number of Mechanical Operations

| | |
|--------------------|------------|
| Relay N.O./N.C. | 10,000 |
| W/ CA7-9...CA7-37 | 13,000,000 |
| W/ CA7-43...CA7-55 | 12,000,000 |
| W/ CA7-60...CA7-97 | 6,000,000 |

Table for using Current Transformers with CEP7-1E_C_ (range 1.0...5.0 amps) overload relay

| Current Setting | CT Ratio 150:5 Equivalent FLA | CT Ratio 200:5 Equivalent FLA | CT Ratio 300:5 Equivalent FLA | CT Ratio 500:5 Equivalent FLA | CT Ratio 600:5 Equivalent FLA | CT Ratio 800:5 Equivalent FLA | CT Ratio 1000:5 Equivalent FLA | CT Ratio 1500:5 Equivalent FLA |
|-----------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|
| 1.00 | 30 | 40 | 60 | 100 | 120 | 160 | 200 | 300 |
| 1.25 | 38 | 50 | 75 | 125 | 150 | 200 | 250 | 375 |
| 1.50 | 45 | 60 | 90 | 150 | 180 | 240 | 300 | 450 |
| 1.75 | 53 | 70 | 105 | 175 | 210 | 280 | 350 | 525 |
| 2.00 | 60 | 80 | 120 | 200 | 240 | 320 | 400 | 600 |
| 2.25 | 68 | 90 | 135 | 225 | 270 | 360 | 450 | 675 |
| 2.50 | 75 | 100 | 150 | 250 | 300 | 400 | 500 | 750 |
| 2.75 | 83 | 110 | 165 | 275 | 330 | 440 | 550 | 825 |
| 3.00 | 90 | 120 | 180 | 300 | 360 | 480 | 600 | 900 |
| 3.25 | 98 | 130 | 195 | 325 | 390 | 520 | 650 | 975 |
| 3.50 | 105 | 140 | 210 | 350 | 420 | 560 | 700 | 1050 |
| 3.75 | 113 | 150 | 225 | 375 | 450 | 600 | 750 | 1125 |
| 4.00 | 120 | 160 | 240 | 400 | 480 | 640 | 800 | 1200 |

① For multiple conductor applications, the same size and style wire must be used.

Technical Information

| Environmental Ratings | | Overload Rating | Accessory Rating |
|---------------------------------------|---|---|-----------------------------|
| Ambient Temperature | Storage [°C] | -40...+85 (-40...+185 °F) | |
| | Operating (open) [°C] | -20...+65 (-4...+149 °F) | |
| | Operating (enclosed) | -20...+50 °C (-4...+122 °F) | -20...+55 °C (-4...+131 °F) |
| Humidity | Operating [%] | 5...95% Non-condensing; 92% R.H. | |
| | Damp Heat - Steady State (per IEC 60068-2-78) | 93% R.H., 40 °C (104 °F), 56 days | |
| | Damp Heat - Cyclic (per IEC 60068-2-30) | 93% R.H., 25 °C/40 °C (77 °F/104 °F), 21 Cycles | |
| Cooling Method | | Natural convection | |
| Vibration (per IEC 68-2-6), operating | | [G] | 3 |
| Shock (per IEC 68-2-27), operating | | [G] | 30 |
| Maximum Altitude | | [m] | 2000 |
| Pollution Environment | | Pollution Degree 3 | |
| Degree of Protection | | IP20 (front of panel) | IP20 |

B





3rd Gen CEP7 Overloads

Electromagnetic Compatibility

| Immunity and Emissions | | Overload Rating | Accessory Rating |
|---|------|---|---|
| Electrostatic Discharge Immunity | | 6 kV Contact Discharge, 8kV Air Discharge (Performance Criterion "B") | 8 kV Contact Discharge, 8kV Air Discharge (Performance Criterion "B") |
| IEC 61000-4-2, IEC 60533 | | | |
| Radio Frequency Immunity | | | |
| | [Hz] | 10V/m; 80 MHz...1.0 GHz | |
| IEC 61000-4-3 | [Hz] | 3V/m; 1.4 GHz...2.0 GHz | |
| | [Hz] | 1V/m; 2.0 GHz...2.7 GHz | |
| IEC 60533 | [Hz] | 10V/m; 80 MHz...2.0 GHz (Performance Criterion "A") | |
| Electrical Fast Transient / Burst Immunity | | 4kV (3-phase Power); 2kV (Control Power & Communication I/O when CEP7-1ERR or CEP7-1EGJ accessory installed); Performance Criterion "A" | |
| IEC 61000-4-4, IEC 60533 | | [V] | |
| Surge Immunity | | 2kV (L-N); 1kV (L-L); Performance Criterion "B" | |
| IEC 61000-4-4, IEC 60533 | | [V] | |
| Radiated Emissions | | | |
| CISPR11 Environment A | | [Hz] | 30 MHz...1.0 GHz |
| IEC 60533 | | [Hz] | 150KHz...2.0GHz |
| Conducted Emissions | | | |
| CISPR11 Environment A | | [Hz] | 150 KHz...30 MHz |
| IEC 60533 | | [Hz] | 10 KHz...30 MHz (General Power Distribution Only) |
| Conducted Immunity | | | |
| IEC 61000-4-6, IEC 60533 | | [Hz] | Modulation 80% AM at 1 KHz; 10V RMS (150 KHz...80 MHz) |
| Power Frequency Magnetic Field Immunity | | | |
| IEC 60947-1, IEC 61000-4-8 | | [Hz] | 30 A/m; 50 Hz |
| Voltage Variation Immunity | | | |
| IEC 61000-4-11, IEC 60533 | | [V] | Control Power 40...240V (AC/DC) |

Wiring Specifications

Wiring Specifications for CEP7-1E_B, CEP7-1E_D, and CEP7-1E_E

| Wire Type | | Control Wiring | | Power Wiring | | | | | |
|--|---|---|-----------------------|--|-----------------------|--|-----------------------|--|-----------------------|
| | | All | | CEP7-1E B | | CEP7-1E D | | CEP7-1E E | |
| Wires | Range | Torque | Range | Torque | Range | Torque | Range | Torque | |
|  Flexible Stranded w/ Ferrule | 1 Wire | 0.75...2.5 mm ² | 1.4 N•m | 2.5...16 mm ² | 2.5 N•m | 2.5...16 mm ² | 2.5 N•m | 4...35 mm ² | 4.6 N•m |
| | 2 Wires  | | | 2.5...10 mm ² | 3.4 N•m | 2.5...10 mm ² | 3.6 N•m | 4...25 mm ² | |
|  Stranded / Solid | 1 Wire | 0.75...4.0 mm ² (18...12 AWG) | 1.4 N•m (12 lb•in) | 2.5...16 mm ² (14...6 AWG) | 2.5 N•m (22 lb•in) | 2.5...16 mm ² (14...6 AWG) | 2.5 N•m (22 lb•in) | 4...35 mm ² (12...1 AWG) | 4.6 N•m (40 lb•in) |
| | 2 Wires  | | | 25 mm ² (4 AWG) | 3.4 N•m (30 lb•in) | 25 mm ² (4 AWG) | 3.4 N•m (30 lb•in) | 4...35 mm ² (12...2 AWG) | |

Technical Information

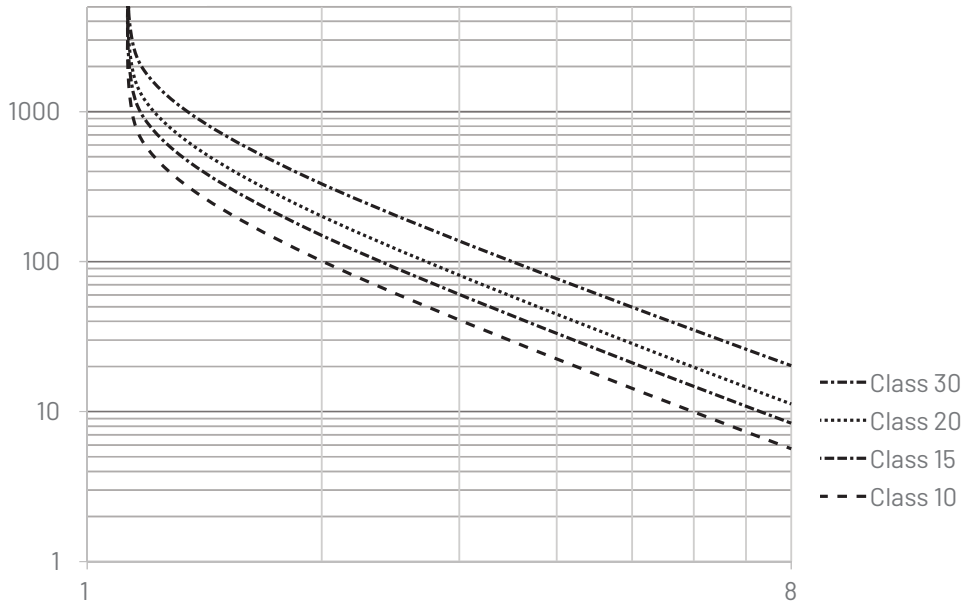
Overload Trip Curves

Typical reset time for CEP7-1EF devices set to automatic reset mode is dependent upon overload trip class. Typical reset time for Trip Class 10 is 90 seconds, Trip Class 15 is 135 seconds, Trip Class 20 is 180 seconds, and Trip Class 30 is 270 seconds.

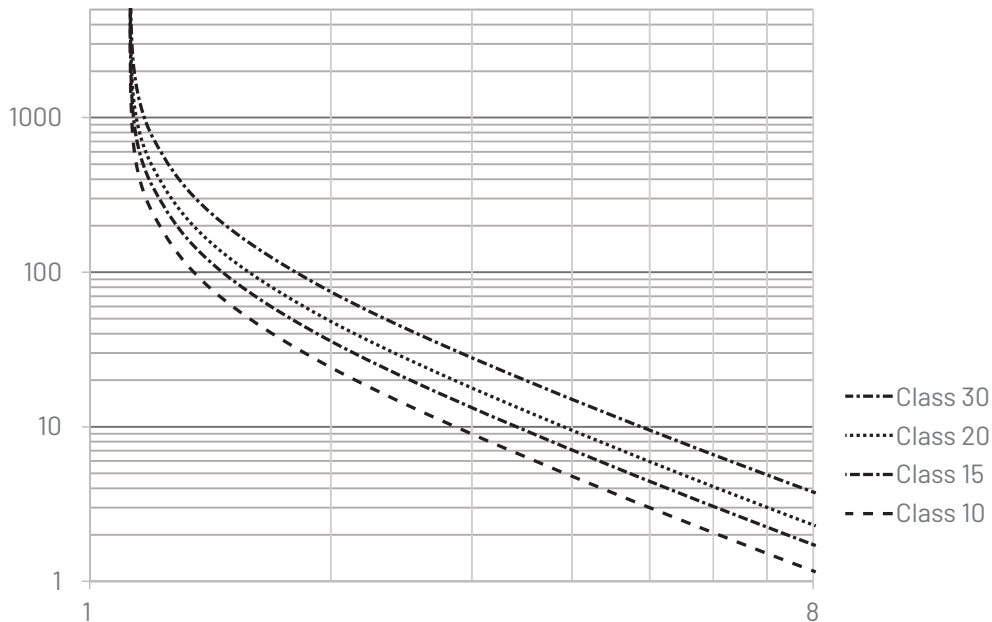
B

3rd Gen CEP7 Overloads

Cold Trip Curves

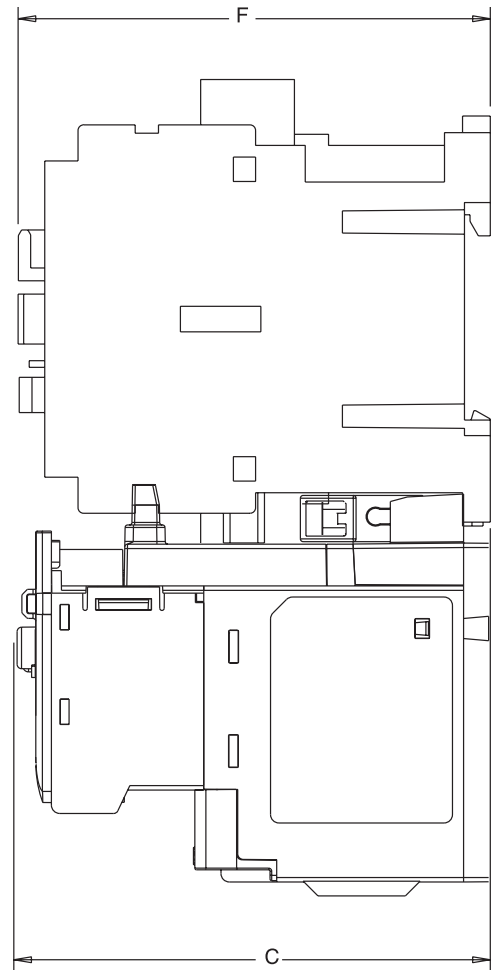
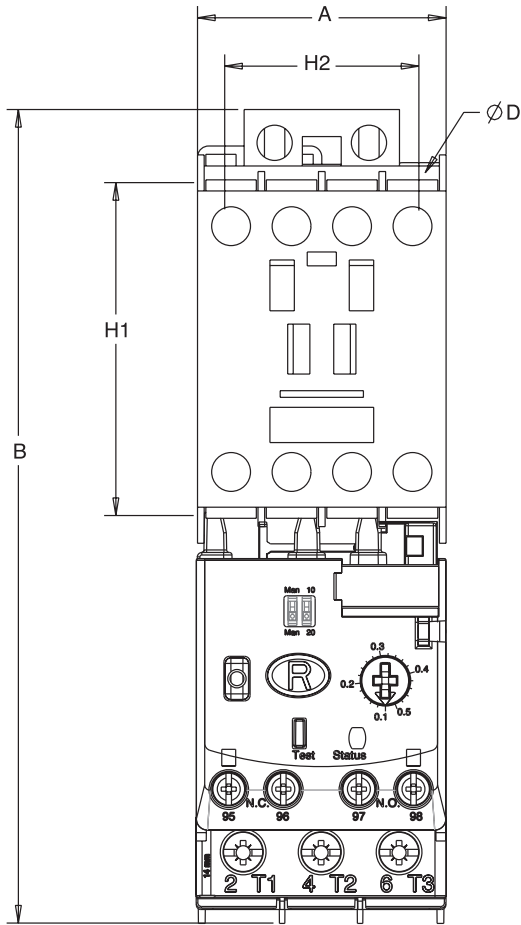


Hot Trip Curves



CEP7-1 Mounted to CA7 Contactor

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



| Overload | Mounted to Contactor | | A Width | B Height | C Depth | D | F | H1 | H2 |
|---------------|----------------------------|------------|-----------------|--------------------|--------------------|---------------|--------------------|------------------|-----------------|
| CEP7-1EE/EF_B | CA7-9...23 CAN7-12...16 | mm (in) | 45 (1-25/32) | 146.6 (5-25/32) | 85.2 (3-23/64) | 4.5 (3/16) | 86.5 (3-13/32) | 60 (2-23/64) | 35 (1-3/8) |
| CEP7-1EE/EF_D | CA7-30...37 CAN7-37 | mm (in) | 45 (1-25/32) | 146.6 (5-25/32) | 101.2 (3-63/64) | 4.5 (3/16) | 104 (4-3/32) | 60 (2-23/64) | 35 (1-3/8) |
| CEP7-1EE/EF_D | CA7-43...55 CAN7-43 | mm (in) | 54 (2-1/8) | 146.6 (5-25/32) | 101.2 (3-63/64) | 4.5 (3/16) | 107 (4-3/32) | 60 (2-23/64) | 45 (1-25/32) |
| CEP7-1EE/EF_E | CA7-60...97 CAN7-85 | mm (in) | 72 (2-53/64) | 192.3 (7-37/64) | 120.4 (4-3/4) | 5.4 (7/32) | 125.5 (4-15/16) | 100 (3-15/16) | 55 (2-11/64) |

B

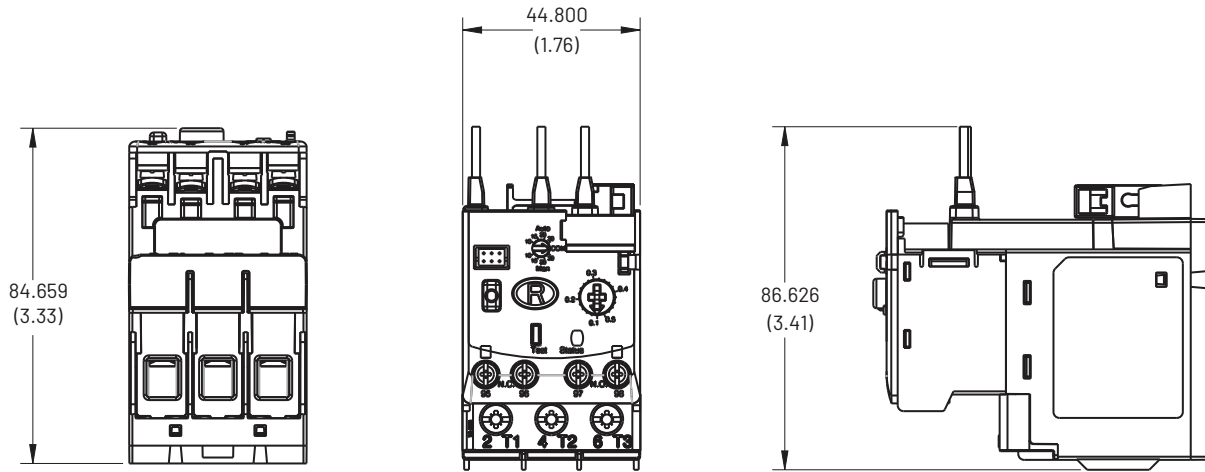
3rd Gen CEP7 Overloads

B

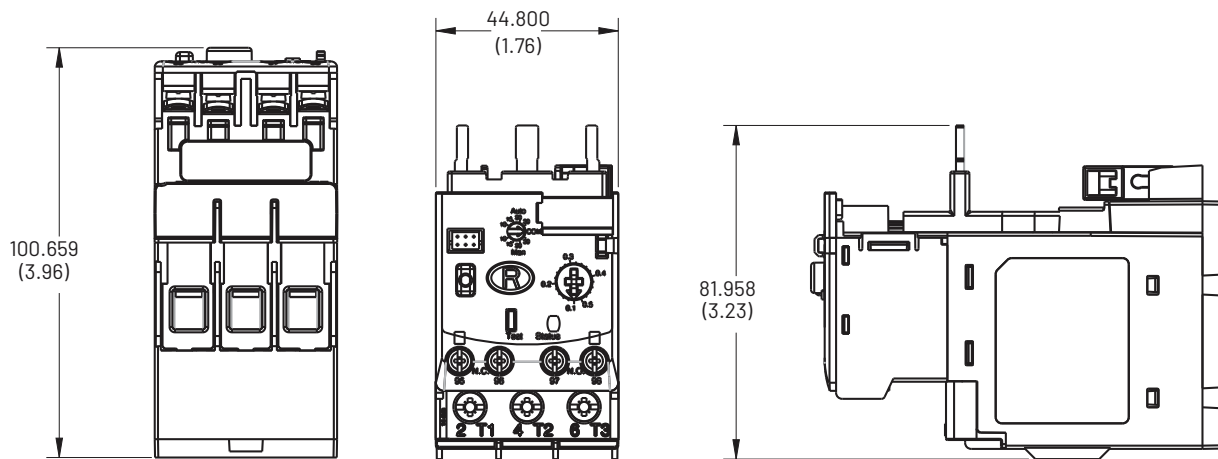
3rd Gen CEP7 Overloads

CEP7-1 Direct-Mount

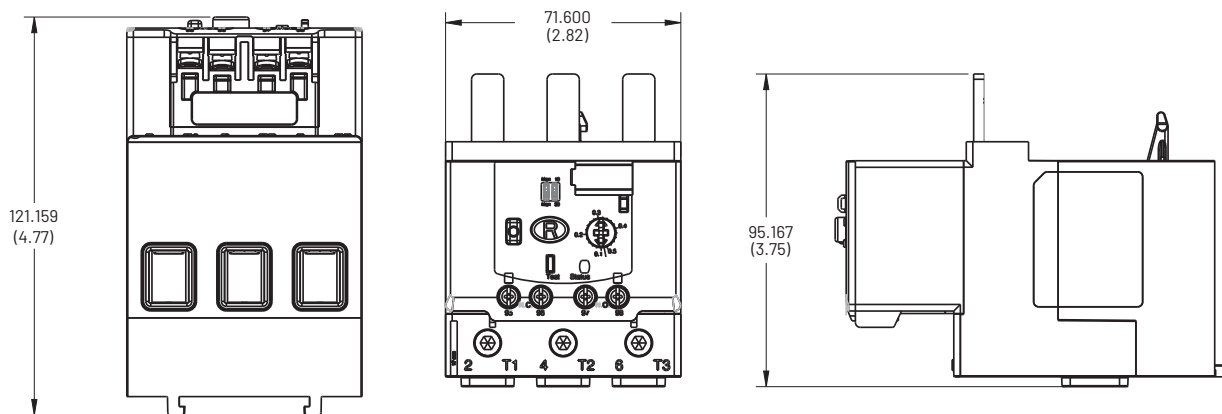
CEP7-1_B



CEP7-1_D

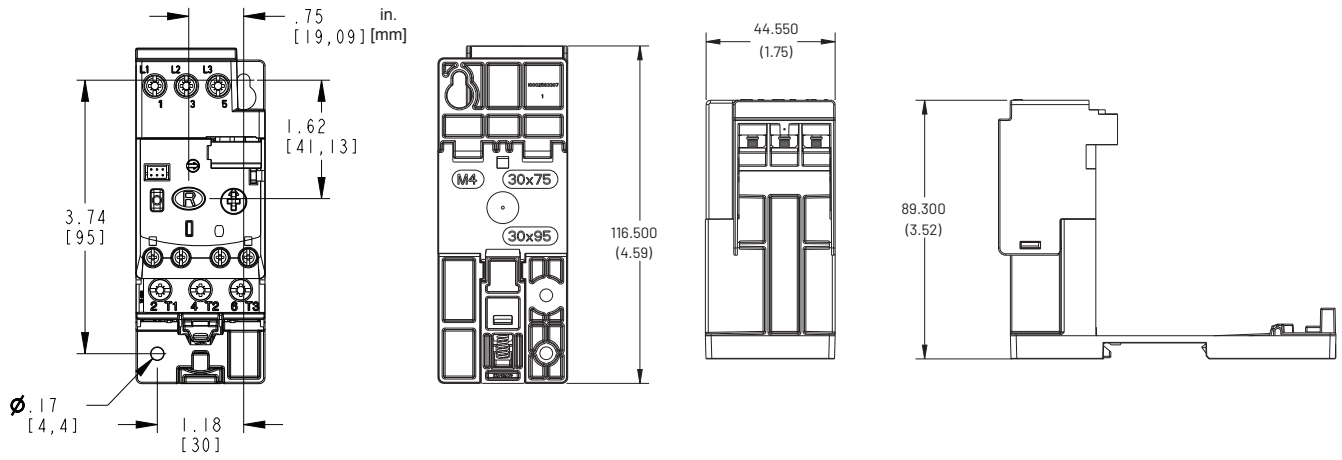


CEP7-1_E

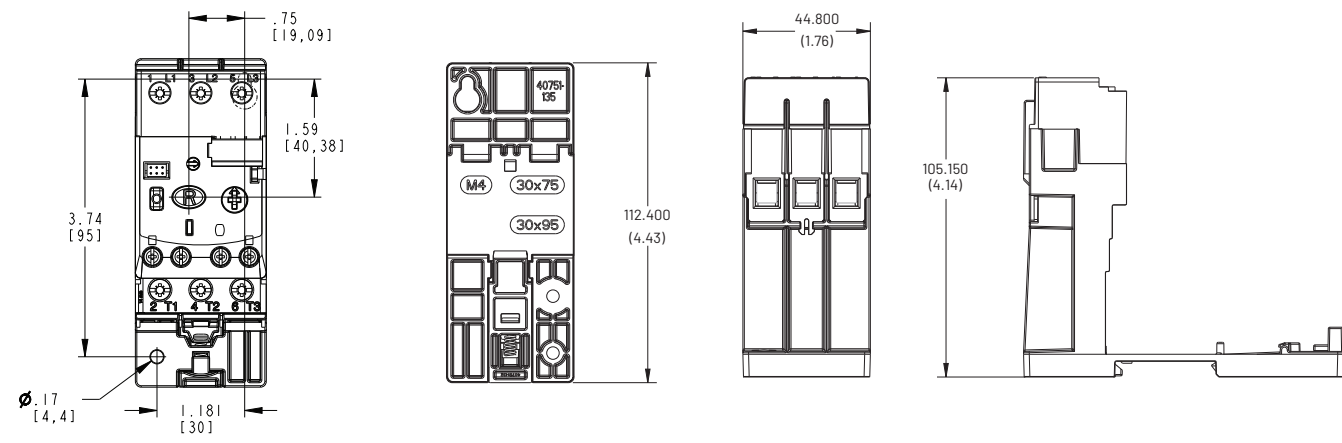


CEP7-1 with CEP7-1EP... Panel Mount Adaptor

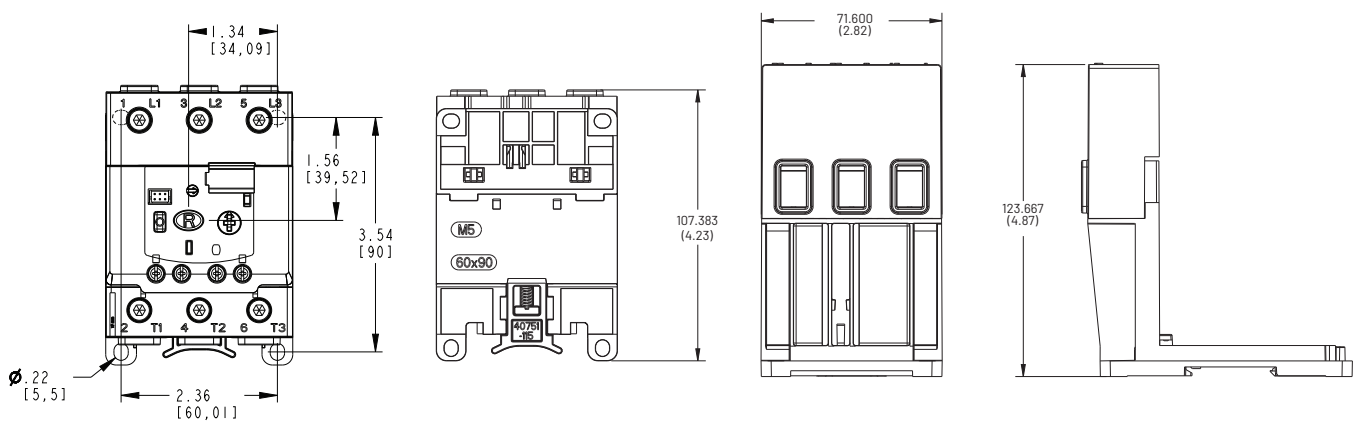
CEP7-1EPB Panel Mount for CEP7-1_B



CEP7-1EPD Panel Mount for CEP7-1_D



CEP7-1EPE Panel Mount for CEP7-1_E

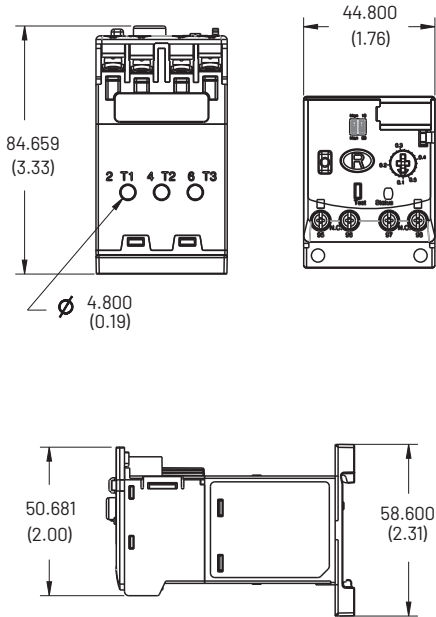


B
3rd Gen CEP7 Overloads

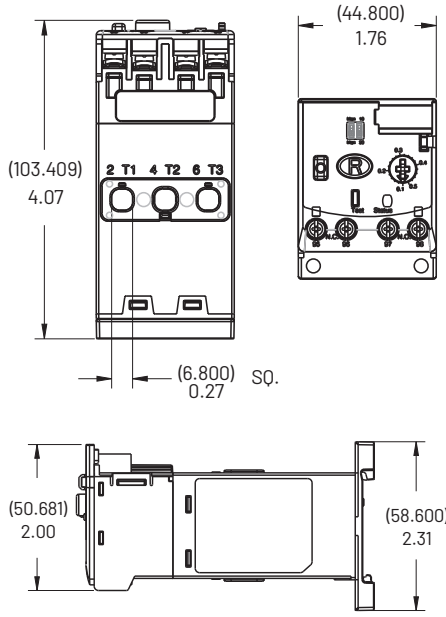
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3rd Gen CEP7 Overloads

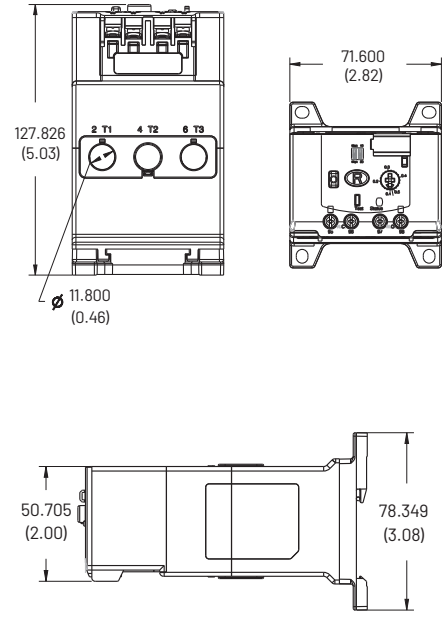
CEP7-1EE & CEP7-1EF Pass-thru Overload / 1.0...27A



CEP7-1EE & CEP7-1EF Pass-thru Overload / 11...55A



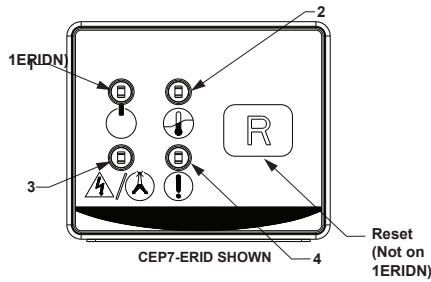
CEP7-1EE & CEP7-1EF Pass-thru Overload / 20...100A



CEP7-ERID and CEP7-1ERIDN Remote Indicator

Indication

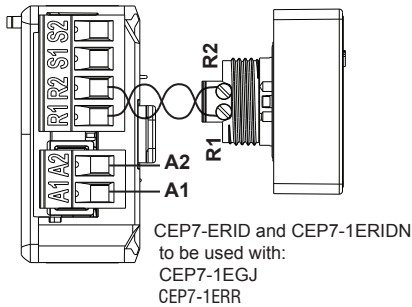
- Starter:
- ① Fault Code:
 - 3-Ground Fault
 - 5-Jam
 - 9-Welded Cont *
 - 10-Comm Loss
 - 11-Test Trip



| LED | Function | Symbol | Fault or Status | Flash Code |
|-----|--------------|--------|------------------------------|-------------------------|
| | | ! | Module Power | Green (Flash) |
| | | | Module Power + Motor Current | Green (Solid) |
| | | | Hardware Fault | Red (Solid) |
| 2 | Overload | ! | Overload Trip / Warning* | Green (Flash) |
| 3 | Phase Loss | ⚡/⚡ | Short Circuit Trip | Red (Solid) |
| | | | Phase Loss Trip / Warning | Red / Yellow (Flash) |
| 4 | Fault Status | ! | Ground Fault Trip / Warning | 3 Red / Yellow (Flash) |
| | | | Jam Trip / Warning | 5 Red / Yellow (Flash) |
| | | | Welded Cont* | 9 Red (Flash) |
| | | | Comm Loss / Warning | 10 Red / Yellow (Flash) |
| | | | Test Trip | 11 Red (Flash) |

* Applies to OLR Module only - KTE9-OLRF

Wiring Diagram



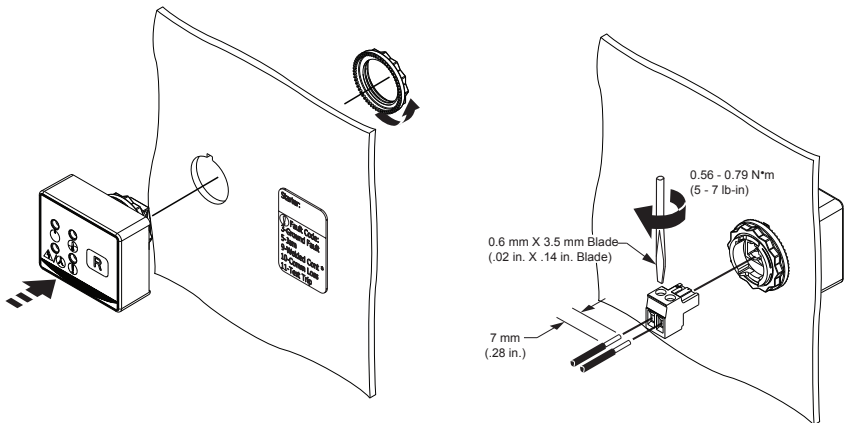
CEP7-ERID and CEP7-1ERIDN to be used with:
CEP7-1EGJ
CEP7-1ERR

Main Connections

Rated Insulation Voltage (Ui): 30V
Rated Operational Voltage (Ue) IEC/UL: 24V DC

| Torque | |
|-----------------|-----------|
| 1m ² | 0.55 N·m |
| VG | (5 lb-in) |

Recommend use of twisted pair for remote reset 24 AWG Minimum



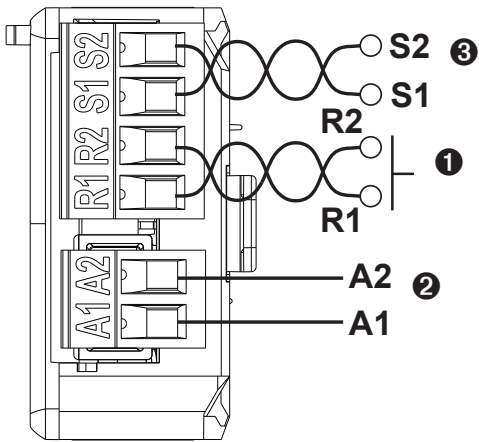
Expansion Accessory Ratings CEP7-1EGJ/1ERR

| Attribute | Rating |
|---------------------------------|---|
| Rated Insulation Voltage Ui | 264V (AC/DC) |
| Rated Operating Voltage Ue, IEC | 24...240V (AC/DC) |
| Rated Frequency | 45...65 Hz |
| Power Consumption | 0.8 Watts at 24V AC; 1.0 Watts at 240V AC |

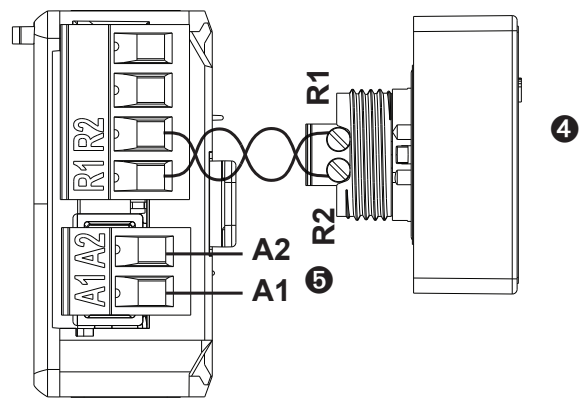
B

3rd Gen CEP7 Overloads

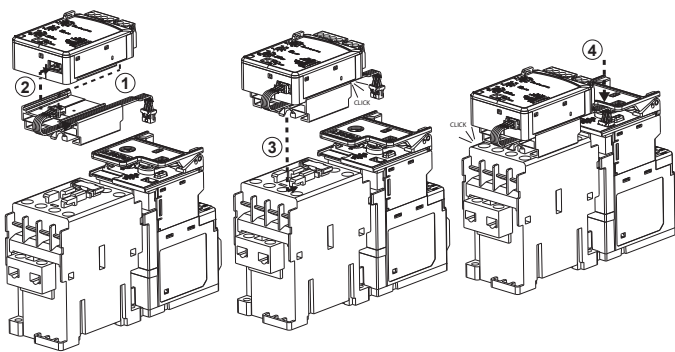
CEP7-1EGJ Universal Protection Expansion Module Wiring



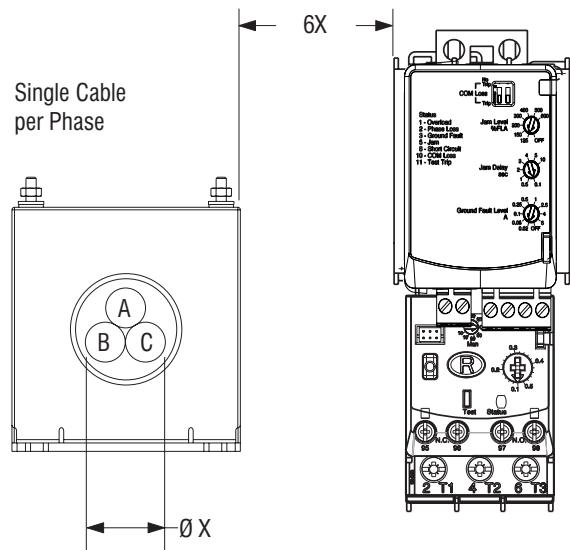
CEP7-1ERR Electronic Reset and Indication Display Module Wiring



Module Installation



Module Installation with CEP7-CBCT



- ❶ Terminals R1 and R2 are used with CEP7-ERID and CEP7-1ERIDN modules.
- ❷ External power must be user supplied. 24...240V, 47...63 Hz or DC.
- ❸ Connect current sensor to Terminal S1 and S2

- ❹ Terminals R1 and R2 are used with CEP7-ERID and CEP7-1ERIDN modules.
- ❺ External power must be user supplied. 24...240V, 47...63 Hz or DC.

CEP7 Solid State Overload Relays

DISCONTINUED

Advanced solid state motor protection

The CEP7 solid state overload relay includes advanced technology with several key features like:

- Selectable trip class and field installable modules
- A wide (5:1) set current adjustment range
- A robust mechanical and electrical mounting
- Self-sealed latching mechanism

The basic concept of utilizing Application Specific Integrated Circuits (ASICs) results in an affordable solid state overload relay. This kind of versatility and accuracy is simply not possible with traditional bimetallic or eutectic alloy electromechanical overload relays.

Fewer units means greater application flexibility

The CEP7 Solid State Overload Relay is available in three basic models:

- CEP7-ED1 is a Class 10, manual reset model available up to 45 amperes which covers the most common horsepower motors and your every day application. This model is economically priced to be competitive with adjustable bimetallic overload relays.
- CEP7-EE is a full featured selectable trip class (10, 15, 20 & 30) 3-phase application overload relay with provision for field mountable modules to handle remote reset, jam protection, and other modules previously available only in higher priced electronic overload relays.

Manual reset or automatic reset can be selected with dip switches on the CEP7-EE models.

- CEP7S-EE is a 1-phase application overload relay packing all features of the 3-phase CEP7-EE model.



Wide current adjustment range

Thermal or bimetallic overload relays typically have a small current adjustment range of 1.5:1 meaning that the maximum setting is generally 1.5 times the lower setting. The CEP7 caused the industry to take note of the flexibility when it first introduced a 3.2:1 adjustment ratio. A wider adjustment range is the primary reason the industry has been turning to more specifications calling for electronic overload relay protection over thermal overload relays. Sprecher + Schuh's CEP7 overload relay is capable of adjustment to a maximum of five times the minimum set current, which dramatically reduces the number of units required on-hand to cover the full range of current settings up to 200 amperes.

5 : 1 Current Range



45A



45A



120A



30A

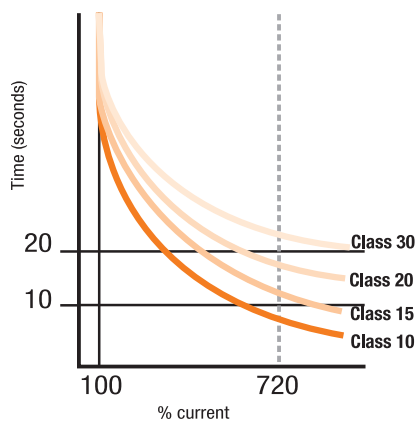
200A



B

CEP7 Overloads

DISCONTINUED



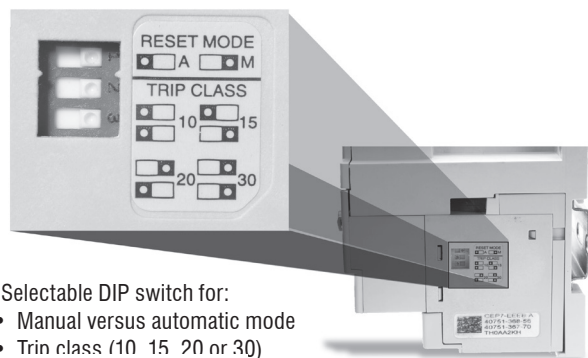
CEP7 overload relays are available with Class 10, 15, 20 or 30 tripping characteristics

Selectable tripping class

Because of today's lighter T-frame motors, Class 10 overload relays (relays that trip within 10 seconds of a locked rotor condition) have become the industry standard. If your application requires a longer motor run-up time, the CEP7-EE Selectable Trip Class has DIP-switches providing Trip Class selection of 10, 15, 20 or 30 seconds. This ability allows you to closely match the Trip Class with the run-up time of the motor.

Choice of reset options

Most industrial applications usually call for an overload relay that must be manually reset in the event of a trip. This allows the cause of the overload to be identified before the motor is restarted. In specialized cases, however, such as rooftop AC units or where restarting the motor will not harm people or equipment, automatic reset may be desired. CEP7-ED1 overload relays are available with Manual Reset exclusively which keeps the cost down. CEP7-EE models have a selectable dip switch for Manual or Automatic Reset modes.



Selectable DIP switch for:
• Manual versus automatic mode
• Trip class (10 15 20 or 30)

The CEP7 has been tested to operate in -20° C. or up to 60° C (140 °F) and withstand 3G of vibration or 30G of shock on a mountain up to an altitude of 2000m or in a jungle at 95% humidity. Reliability under every conceivable environmental condition is a quality built into the design of the CEP7 electronic overload relay.

Self-powered design means convenience

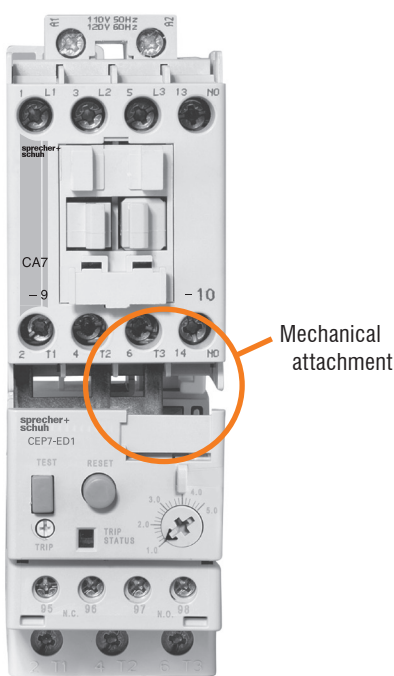
By developing the power it requires from the applied voltage, the CEP7 is "self-powered," eliminating the need for a separate control power source. This is not the case with some other electronic overload relays. Since the CEP7 is self-powered and a traditional auxiliary contact is used to interface with the contactor, the user can apply the CEP7 the same way as an electromechanical overload. No special connections or control schematic diagram provisions are required in 3-phase applications.

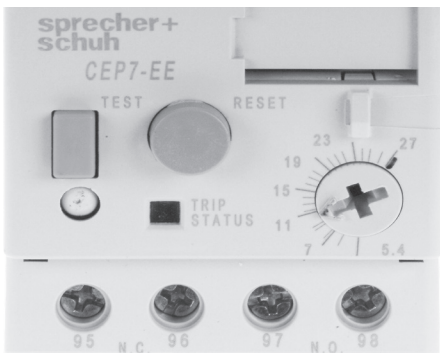
Superior phase failure protection

The CEP7's on-board electronics are constantly monitoring all three phases. If the ASIC board senses that one phase is missing during a steady state running condition on a fully loaded motor, it will trigger in 3 seconds. If a single phase condition is present during starting, the CEP7 will trip within 8 seconds (for a motor >80% loaded). These times are much faster than any thermal bimetallic overload relay. In addition, CEP7 overload relays detect a 50% phase imbalance in the same way as a phase loss.

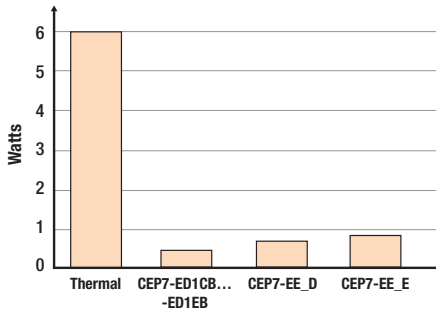
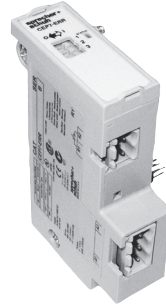
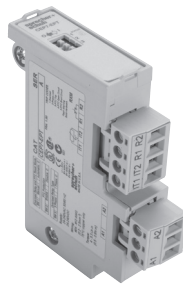
Robust design

The CEP7 has been designed to physically extend to the back-pan therefore aligning the mounting of the overload with the corresponding contactor. Further, the mechanical attachment and direct electrical connection to the contactor provides a robust mounting, which means less damage from shipping or during field wire installation. The bipolar latching relay which controls the normally closed trip contacts and normally open alarm circuit contacts have been self-enclosed, therefore insulating the electromagnet and shielding against airborne metal particles and other potential environmental debris.





DISCONTINUED



Conventional overload relays dissipate as much as six watts of energy compared with as little as 0.5 watts for a comparable size CEP7

Increased accuracy and improved motor protection

Microelectronics provide flexible and accurate motor overload protection. Unlike traditional overload relays that simulate heat build-up in the motor by passing current through a heater element, CEP7 solid state overload relays measure motor current directly through integrated current transformers. The transformers, in turn, create a magnetic field that induces DC voltage onto the ASIC board. The electronics identify excessive current or loss of phase more accurately, and react to the condition with greater speed and reliability than traditional overload relays. In addition, CEP7 solid state relays offer setting accuracies from 2.5 – 5% and repeat accuracy of 1%.

Dramatically lowered energy requirement saves money, reduces panel space


Because traditional overload relays work on the principle of “modeling” the heat generated in the motor (recreating the heat in the bimetal elements or heaters), a significant amount of energy is wasted. In traditional bimetallic overload relays, as many as six watts of heat are dissipated to perform the protective function. Because the CEP7 uses sampling techniques to actually measure the current flowing in the circuit, very little heat is dissipated in the device...as little as 0.5 watts. This not only reduces the total amount of electrical energy consumed in an application, but it can also have a dramatic impact on the design and layout of control panels. The density of motor starters can be much greater because less heat is generated by each of the individual components. Higher density results in smaller control panels. In addition, special ventilation or air conditioning that might have been required to protect sensitive electronic equipment such as PLC's can now be reduced or eliminated. CEP7 overload relays dramatically reduced energy requirement saves money and reduces panel space.

Additional Protection with Side Mount Modules

The CEP7 offers a variety of field installable accessories for side mount on the left side. Side mount modules provide additional motor protection functionality traditionally found only on more expensive models. Modules include the following additional features.

- **Remote Reset** provision for reset after trip from a remote pilot device
- **Jam Protection/Remote Reset** provides adjustable Jam set points and trip delay plus remote reset
- **Ground Fault Protection/Remote Reset** combined with ground fault current transformers provide adjustable set points for ground fault trip protection of equipment plus remote reset
- **Ground Fault/Jam Protection/Remote Reset** combines all three features as described above
- **PTC Thermistor Relay/Remote Reset** manages thermistor sensor signals from the motor
- **Network Communication Modules** provide motor diagnostic information via **Ethernet** communication
 - Two discreet Inputs and one discreet Output
 - Differentiate between various motor protection algorithms
 - Overload and underload warning
 - Jam protection
 - Proactively alert maintenance personnel just before or when a fault occurs
 - Plus remote reset



Directly Mounted CEP7 Solid State Overload Relays, Manual Reset ①②④

| Overload Relay | Directly Mounts to Contactor... ② | Adjustment Range (A) | Trip Class 10 |
|---|-------------------------------------|----------------------|----------------|
| | | | Catalog Number |
| Manual Reset for 3Ø Applications ① | | | |
|  | CA7-9...CA7-23 CAN7-12, CAN7-16 | 0.1...0.5 | CEP7-ED1AB |
| | | 0.2...1.0 | CEP7-ED1BB |
| | | 1.0...5.0 | CEP7-ED1CB |
| | | 3.2...16 | CEP7-ED1DB |
| | | 5.4...27 | CEP7-ED1EB |
| | CA7-30...CA7-55 CAN7-37, CAN7-43 | 1.0...5.0 | CEP7-ED1CD |
| | | 3.2...16 | CEP7-ED1DD |
| | | 5.4...27 | CEP7-ED1ED |
| | | 9...45 | CEP7-ED1FD |

Directly Mounted CEP7 Solid State Overload Relays, Automatic/Manual Reset ①②③④

TIP!

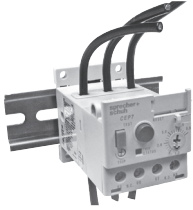
Most industrial applications usually call for an overload relay that must be manually reset in the event of a trip. This allows the cause of the overload to be identified before the motor is restarted. An overload relay that resets automatically is generally for specialized, or remote applications, such as rooftop AC units where restarting the motor will not harm people or equipment.

| Overload Relay | Directly Mounts to Contactor... ② | Adjustment Range (A) | Adjustable Trip Class 10, 15, 20 & 30 |
|---|-------------------------------------|----------------------|---------------------------------------|
| | | | Catalog Number |
| Automatic or Manual Reset for 3Ø Applications ① | | | |
|  | CA7-9...CA7-23 CAN7-12, CAN7-16 | 0.1...0.5 | CEP7-EEAB |
| | | 0.2...1.0 | CEP7-EEBB |
| | | 1.0...5.0 | CEP7-EECB |
| | | 3.2... 16 | CEP7-EEDB |
| | | 5.4...27 | CEP7-EEEB |
| | CA7-30...CA7-55 CAN7-37, CAN7-43 | 1.0...5.0 | CEP7-EECD |
| | | 3.2...16 | CEP7-EEDD |
| | | 5.4...27 | CEP7-EEED |
| | | 9...45 | CEP7-EEFD |
| | | 11...55 | CEP7-EEQD |
| | CA7-60...CA7-97 CAN7-85 | 5.4...27 | CEP7-EEEE |
| | | 9...45 | CEP7-EEFE |
|  | CA7-9...CA7-23 CAN7-12, CAN7-16 | 1.0...5.0 | CEP7S-EEPB |
| | | 3.2...16 | CEP7S-EERB |
| | | 5.4...27 | CEP7S-EESB |
| | CA7-30...CA7-43 CAN7-37, CAN7-43 | 9...45 | CEP7S-EETD |
| | CA7-60...CA7-97 CAN7-85 | 18...90 | CEP7S-EEUE |

- ① 3-phase CEP7 units are only designed for 3Ø applications. Single phase CEP7S units are only designed for single phase applications.
- ② This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.

- ③ The reset time of a CEP7 set in the automatic mode is approximately 120 seconds.
- ④ CEP7 overload relays do not work with Variable Frequency Drives, DC Applications or Softstarters with braking options.

Pass-Thru CEP7 Solid State Overload Relays ⑤

| Overload Relay | Separate Mount for use with... ② | Adjustment Range (A) | Trip Class 10 |
|---|--|----------------------|----------------|
| | | | Catalog Number |
| Manual Reset for 3Ø Applications ①④ | | | |
|  Fig. 1 | CA8-09...12 CA7-9...CA7-23 CAN7-12...CAN7-37 | 1.0...5.0 | CEP7-ED1CP |
| | | 3.2... 16 | CEP7-ED1DP |
| | | 5.4...27 | CEP7-ED1EP |

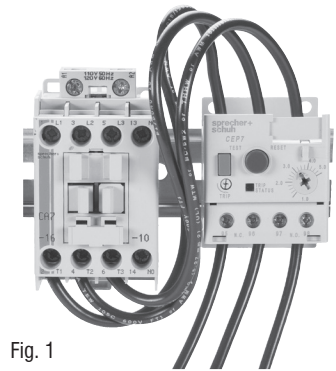
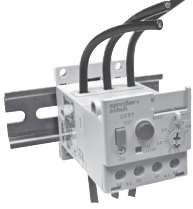
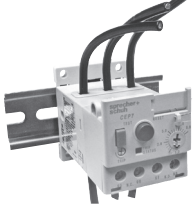


Fig. 1

| Overload Relay | Separate Mount for use with... ② | Adjustment Range (A) | Adjustable Trip Class 10, 15, 20 & 30 |
|---|--|----------------------|---------------------------------------|
| | | | Catalog Number |
| Automatic or Manual Reset for 3Ø Applications ①③④ | | | |
|  Fig. 1 | CA8-09...12 CA7-9...CA7-23 CAN7-12...CAN7-37 | 1.0...5.0 | CEP7-EECP |
| | | 3.2... 16 | CEP7-EEDP |
| | | 5.4...27 | CEP7-EEEP |
| Automatic or Manual Reset for 1Ø Applications ①③④ | | | |
|  Fig. 1 | CA8-09...12 CA7-9...CA7-23 CAN7-12...CAN7-37 | 1.0...5.0 | CEP7S-EEPP |
| | | 3.2...16 | CEP7S-EERP |
| | | 5.4...27 | CEP7S-EESP |



Pass-thru window

Fig. 2

Description

Fig. 1 - The Pass-Thru version of the CEP7 permits separate mounting of the overload relay.


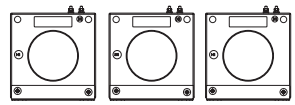
Fig. 2 - Motor load side cables simply pass-thru a window in the overload relay body. The internal current transformers monitor the current flow.

Benefits

- No need for a panel mount adapter as required with direct-connect versions
- Eliminates 3 to 6 wire terminations
- Designed for use with CA8 or CA7 contactors
- Easily replaces outdated overload relays in existing starter assemblies
- Provides state-of-the-art accuracy and motor protection

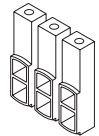
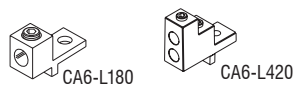



① 3-phase CEP7 units are only designed for 3Ø applications. Single phase CEP7S units are only designed for single phase applications.
 ② This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.
 ③ The reset time of a CEP7 set in the automatic mode is approximately 120 seconds.
 ④ CEP7 overload relays do not work with Variable Frequency Drives, DC Applications or Softstarters with braking options.
 ⑤ Pass-Thru windows will accept one power wire up to #10 AWG wire (6mm²).

Large Amp CEP7 Solid State Overload Relays, Automatic and Manual Reset ①②③④⑥

| Overload Relay | Directly Mounts to Contactor... ② | CT Ratio | Adjustment Range (A) | Selectable Trip Class (10,15,20 & 30) |
|---|--|-----------|----------------------|---------------------------------------|
| | | | | Catalog Number |
| Automatic or Manual Reset for 3Ø Applications ①③ | | | | |
|  CEP7-EEHF | CA6-115...CA6-180 | 150:5 | 30...150 | CEP7-EEHF |
| | CA6-115-EI...CA6-180-EI | 200:5 | 40...200 | CEP7-EEJF |
| | CAN6-180(EI) | | | CEP7-EEJG |
| | CA6-210-EI...CA6-420-EI CAN6-300-EI | 200:5 | 40...200 | CEP7-EEJG |
| | | 300:5 | 60...300 | CEP7-EEKG |
| | CA6-630-EI...CA6-860-EI | 500:5 | 100...500 | CEP7-EELG |
| | | 600:5 | 120...600 | CEP7-EEMH |
| CA9-116...146(-EI) | 800:5 | 160...800 | CEP7-EENH | |
| CA9-116...146(-EI) | 150:5 | 30...150 | CEP7-EEHJ | |
| CA9-190...205(-EI) | 200:5 | 40...200 | CEP7-EEJJ | |
| Current Transformer Kits For use with... CT Ratio | | | | |
|  Includes three Current Transformers (Overload relay sold separately) | CA9-265...305 | 300:5 | ⑦ | CEP7-CT-UL-300 |
| | | | | CEP7-CT-CE-300 |
| | CA9-370...580 | 600:5 | ⑦ | CEP7-CT-UL-600 |
| | | | | CEP7-CT-CE-400 |
| CA9-750...1060 | ~ | ~ | Refer to Factory | |

Items in Gray are marked for discontinuation after 2019



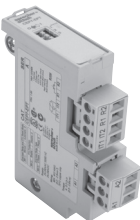

Load Side Lugs & Accessories for use with CA6 Contactors Only

| Lug or Accessory | Description | For Use With... | Catalog Number | |
|--|--|--|-------------------------------------|---------------|
|  CA6-HB | Main Terminal Set, ⑤ Dual Conductor, Touch Safe <ul style="list-style-type: none"> Accommodation for dual connections to each pole Accepts flat or round conductors Touch safe to IP20 according to IEC 60529 Eliminates need for Terminal Shields (price as complete set, containing 2 blocks, 6 lugs) | CEP7-EEHF...CEP7-EEJF, CEP7-EEHJ...CEP7-EEJJ CEP7-EEJG CEP7-EEKG CEP7-EELG | CA6-HB2 CA6-HB3 | See page A129 |
|  CA6-L180 CA6-L420 | Screw Type Lugs - <ul style="list-style-type: none"> Accepts round conductors only Copper construction (set of 3 lugs) | CEP7-EEHF...CEP7-EEJF, CEP7-EEHJ...CEP7-EEJJ CEP7-EEJG, CEP7-EEKG, CEP7-EELG | CA6-L180 CA6-L420 | |
|  CA6-L630 | Screw Type Lugs - <ul style="list-style-type: none"> Accommodation for dual connections to each pole Copper construction accepts round conductors only (set of 3 lugs) | CEP7-EEMH CEP7-EENH | CA6-L630 | |
|  CA6-L860 | Screw Type Lugs - <ul style="list-style-type: none"> Accommodation for dual connections to each pole Copper construction accepts round conductors only (set of 3 lugs) | CEP7-EEMH CEP7-EENH | CA6-L860 | |
|  | Main Terminal Cover - ⑥ <ul style="list-style-type: none"> CA6 touch protection Line or load IP20; IEC60529 & DIN 40 050 protection | CA6-115(-EI) to 180(-EI) CA6-210-EI to 420-EI CA6-630-EI to 860-EI | CA6-TC180 CA6-TC420 CA6-TC860 | |

- ① 3-phase CEP7 units are only designed for 3Ø applications.
- ② This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.
- ③ The reset time of a CEP7 set in the automatic mode is approximately 120 seconds.
- ④ CEP7 Overload relays do not work with Variable Frequency Drives or any Sprecher + Schuh Softstarter with braking options.
- ⑤ Terminal covers not necessary when using CA6-HB_ insulated lugs.
- ⑥ CEP7-EEHF...CEP7-EENH include current transformers used to monitor high amperage.
- ⑦ Utilizes UL or CE approved Current Transformers in conjunction with an overload selection. Refer to page B13 for current setting guidance when CEP7-EECB is used.

Accessories - CEP7 Side Mount Modules ①②

B
CEP7 Overloads

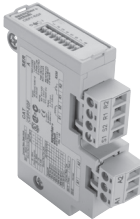

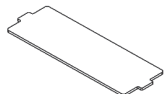
| Accessory | Description | For use with... | Catalog Number |
|---|--|-------------------------------------|----------------|
|  CEP7-ERR | Remote Reset Module (Series B) <ul style="list-style-type: none"> Dip switch adjustable reset mode & type <ul style="list-style-type: none"> - Automatic or Manual reset mode - 1- or 3-Phase relay type operation Provision for reset after trip from remote pilot device | Side-mount to any CEP7-EE CEP7S-EE_ | CEP7-ERR |
|  CEP7-EJM | Jam Protection and Remote Reset Module ③ <ul style="list-style-type: none"> Dip switch adjustable Jam Protection <ul style="list-style-type: none"> - Jam set points -150%, 200%, 300%, or 400% FLA - Trip delay- 0.5, 1, 2, or 4 sec. Provision for reset after trip from remote pilot device | | CEP7-EJM |
|  CEP7-EPT | PTC Thermistor Relay and Remote Reset Module <ul style="list-style-type: none"> PTC Protection and LED Status indication Type of Control Unit Mark A Number of Sensors 6 Maximum Cold Resistance of Sensor Chain 1500 Ω Trip Resistance 3400 Ω ± 150 Ω Reset Resistance 1600 Ω ± 50 Ω Short Circuit Trip Resistance 25 Ω ± 10 Ω Open Circuit Trip Resistance > 20,000 Ω Maximum Voltage at 1T1 / 1T2 (Rptc=4kΩ) < 7.5 Vdc Maximum Voltage at 1T1 / 1T2 (Rptc=open) < 30 Vdc PTC Response Time 500ms... 800ms Provision for reset after trip from remote pilot device | Side-mount to any CEP7-EE CEP7S-EE_ | CEP7-EPT |
|  ETHERNET/IP CEP7-ETN | Network Communication Modules <ul style="list-style-type: none"> Delivers direct access to motor performance and diagnostic data on a field bus based network in addition to seamless control Includes integrated I/O <ul style="list-style-type: none"> 2 inputs 1 output Operational and diagnostic data <ul style="list-style-type: none"> Average motor current Percentage of thermal capacity usage Device status Trip and warning identification Trip history (last five trips) Protective functions <ul style="list-style-type: none"> Overload warning <ul style="list-style-type: none"> - 1...100% TCU Jam protection; <ul style="list-style-type: none"> - Trip setting 150...600% FLA - Trip delay 0.5...25 seconds Warning setting 100...600% FLA Underload warning <ul style="list-style-type: none"> - 20...100% FLA | Side-mount to any CEP7-EE CEP7S-EE_ | CEP7-ETN |

① Side mount modules must have 24 - 240V, 47 - 63Hz or DC applied to terminals A1 and A2 for control power. CEP7-EPRB and CEP7-ETN require 20.4 - 26.4 VDC only. See B18 for more information.

② See Technical Data, Wiring, and DIP Switch set up starting on page B16.

③ Dynamic inhibit: Protective function is enabled after the motor current goes above 150% and then falls below 125%.

Accessories - CEP7 Side Mount Modules ①③

| Accessory | Description | For use with... | Catalog Number |
|---|---|---|----------------|
|  CEP7-EGF | Ground Fault Protection and Remote Reset Module ②⑥• Dip switch adjustable Ground Fault Protection > GF Current range set points - 20...100ma - 100...500mA - 0.2...1.0A - 1.0...5.0A > GF Trip level 20%-100% • LED status indication • Provision for reset after trip from remote pilot device | Side-mount to any CEP7-EE_ CEP7S-EE_ | CEP7-EGF |
|  CEP7-EGJ | Ground Fault/Jam Protection and Remote Reset Module ②⑥ • Dip switch adjustable Ground Fault Protection same as CEP7-EGF shown above. • Jam trip when the motor current exceeds 400% FLA setting when enabled. • LED status indication • Provision for reset after trip from remote pilot device | Must use with CEP7-CBCT_ Current Sensor | CEP7-EGJ |
|  | Adjustment Cover for External Modules | All modules with DIP Switches | CEP7-EMC |

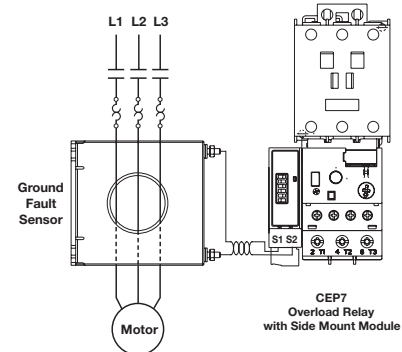
CEP7 Ground Fault Sensor Selection ③





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.



CEP7 Ground Fault Sensor Installation

Ground Fault Sensor Control Wiring



| Sensor Type | Maximum Current | Frequency | Turns Ratio | Sensor Window I.D.  | Maximum Recommended Cable Size | For use with CEP7-EGF and CEP7-EGJ and contactor... | Catalog Number |
|---|-----------------|-----------|-------------|---|---------------------------------------|---|----------------|
|  | 45A | 50/60 Hz | 1000:1 | 19.1mm (0.75 in.) | 8 AWG @ 600V ④ | CA7-9...CA7-37 | CEP7-CBCT1 |
|  | 90A | 50/60 Hz | 1000:1 | 39.6mm (1.56 in.) | 2 AWG @ 600V ④ | CA7-9...CA7-85 | CEP7-CBCT2 |
| | 180A | 50/60 Hz | 1000:1 | 63.5 mm (2.50 in.) | 250MCM (120mm ²) @ 600V ④ | CA7-9...CA9-190 | CEP7-CBCT3 |
|  | 420A | 50/60 Hz | 1000:1 | 82.3 mm (3.25 in.) | 350MCM (185mm ²) @ 600V ⑤ | CA7-9...CA9-400 | CEP7-CBCT4 |

① Side mount modules must have 24 - 240V, 47 - 63Hz or DC applied to terminals A1 and A2 for control power. See B18 for more information.

② ATTENTION: The CEP7 Overload relay is not a ground fault circuit interrupter for personnel protection as defined in Article 100 of the NEC.

③ See Application Details on page B17.

④ For a three phase system with one cable per phase.

⑤ For a three phase system with two cables per phase.

⑥ Dynamic inhibit: Protective function is enabled after the motor current goes above 150% and then falls below 125%.

Accessories

| Accessory | Description | For use with... | Catalog Number |
|-----------|--|---|--------------------------------------|
| | <p>Remote Indication Display "Intellibutton" ③ Connects, communicates, and receives power from CEP7 Side Mount Modules to remotely view status of CEP7-EE Overload Relays</p> | <p>CEP7-EJM CEP7-EGF CEP7-EGJ CEP7-EPT CEP7-ERR</p> | CEP7-ERID |
| | <p>Replacement Parts Kit for CEP7-ERID Includes (1) each Mounting Ring (Plastic), Terminal Block Plug, and LED Fault Code Label</p> | CEP7-ERID | CEP7-NCRID |
| | <p>DIN-rail / Panel Adaptor For separate mounting of overload relay to back pan or top hat DIN-rail</p> | CEP7-ED1...B CEP7(S)-EE...B | CEP7-EPB |
| | | CEP7-ED1..D CEP7(S)-EE...D | CEP7-EPD |
| | | CEP7(S)-EE...E | CEP7-EPE |
| | <p>Current Adjustment Shield Prevents inadvertent adjustment of the current setting</p> | <p>all CEP7-ED1 CEP7-EE</p> | CEP7-BC8 |
| | <p>Solenoid Remote Reset ② - For remote resetting of the solid state overload relay. Replace * in Catalog Number with Coil Code.</p> | CEP7 all | CEP7-EMR* |
| | <p>External Reset Button Used for manually resetting overloads mounted in enclosures</p> | <p>all CEP7</p> | Use D7 Reset - See Section H. |
| | <p>External Reset Button Adaptor Provides a larger "target area" for resetting the overload relay when using an External Reset Button</p> | <p>CEP7-ED1 (all), CEP7-EE_B, CEP7-EE_D, CEP7-EE_E, CEP7-EE_P ①</p> | CEP7-ERA |

Solenoid Remote Reset Coil Codes

(Replace * with coil code below)

| A.C. Coil Code | Voltage Range 50 / 60 Hz ④ |
|----------------|----------------------------|
| J | 24V |
| D | 120V |
| A | 240V |

| D.C. Coil Code | Voltage ⑤ |
|----------------|-----------|
| Z24 | 24VDC |
| Z48 | 48VDC |
| Z01 | 115VDC |

① CEP7-ERA does not fit CEP7-EE_J units without removing the CEP7 cover.




② Solenoid Reset Modules only mount on CEP7 Series C or later.

③ See page B21 for additional details on installation and LED functions.

④ Coil consumption of AC coils is 8VA.







⑤ Coil consumption of DC coils is 12 watts.





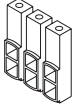


CEP7 Intelli-button Reset Kit with Side Mount Module (For use on CEP7(S)-EE_)

| Accessory | Description | Kit includes... | Catalog Number |
|---|--|--|----------------|
|  | Remote Reset Only | CEP7-ERID CEP7-ERR | CEP7-IB1 |
| | Jam and Remote Reset | CEP7-ERID CEP7-EJM (B) | CEP7-IB2 |
| | Thermistor Relay and Remote Reset | CEP7-ERID CEP7-EPT | CEP7-IB3 |
|  | Ground Fault and Remote Reset | CEP7-ERID CEP7-EGF CEP7-CBCT1 (45A) | CEP7-IB4 |
| | | CEP7-ERID CEP7-EGF CEP7-CBCT2 (90A) | CEP7-IB5 |
| | | CEP7-ERID CEP7-EGF CEP7-CBCT3 (180A) | CEP7-IB6 |
| | | CEP7-ERID CEP7-EGF CEP7-CBCT4 (420A) | CEP7-IB7 |
|  | Ground Fault and Jam and Remote Reset Module | CEP7-ERID CEP7-EGJ CEP7-CBCT1 (45A) | CEP7-IB8 |
| | | CEP7-ERID CEP7-EGJ CEP7-CBCT2 (90A) | CEP7-IB9 |
| | | CEP7-ERID CEP7-EGJ CEP7-CBCT3 (180A) | CEP7-IB10 |
| | | CEP7-ERID CEP7-EGJ CEP7-CBCT4 (420A) | CEP7-IB11 |

Technical Information




B
CEP7 Overloads

| | | CEP7-ED1...B CEP7(S)-EE...B | CEP7-ED1...D CEP7(S)-EE...D | CEP7(S)-EE...E |
|---|----------------|---|---|---|
| Rated Insulation Voltage - U_i | | 690 AC | | |
| Rated Insulation Strength- U_{imp} | | 6 AC | | |
| Rated Operation Voltage - U_e | | 690 AC (IEC) / 600 AC (UL/CSA) | | |
| Rated Operating Frequency | | 50/60 | | |
| Terminal Cross Sections | | | | |
| Terminal Type | |  |  |  |
| Terminal Screw | | M5 | M5 | M8 |
|  | One conductor | 1 x (2.5...16) | 1 x (2.5...16) | 1 x (4...50) |
| | Two conductors | 2 x (2.5...10) ① | 2 x (2.5...10) ① | 2 x (4...25) |
| Torque | | 2.5 | 2.5 | 24 |
| Torque | | 3.4 | 3.4 | 4 |
|  | One conductor | 1 x (2.5...25) | 1 x (2.5...25) | 1 x (4...50) |
| | Two conductors | 2 x (6...16) ① | 2 x (6...16) ① | 2 x (4...35) |
| Torque | | 2.5 | 2.5 | 4 |
| Torque | | 3.4 | 3.4 | 4 |
|  | One conductor | 1 x (14...6) | 1 x (14...6) | 1 x (12...1/0) |
| | Two conductors | 2 x (14...6) ① | 2 x (14...6) ① | 2 x (8...2) |
| Torque | | 22 | 22 | 35 |
| Torque | | 30 | 30 | 35 |
| Poizidrive Screwdriver Size | | 2 | 2 | --- |
| Slotted screwdriver | | 1 x 6 | 1 x 6 | --- |
| Hexagon Socket Size | | --- | --- | 4 |

| | | CEP7-EE_F | CEP7-EE_G | CEP7-EE_H | CEP7-EE_J | |
|--|----------------|---|---|---|---|-------------|
| Rated Insulation Voltage - U_i | | 1000 AC | | | 690 AC | |
| Rated Insulation Strength- U_{imp} | | 6 AC | | | 6 AC | |
| Rated Operation Voltage - U_e | | 1000 AC (IEC) / 600 AC (UL/CSA) | | | 690 AC (IEC)/600AC (UL) | |
| Rated Operating Frequency | | 50/60 | | | 50/60 | |
| Terminal Power | | | | | | |
| Type | |  |  |  |  | |
| Direct Connection | | Hexagonal Bolt | Hexagonal Bolt | Hexagonal Bolt | Hexagonal Bolt | |
| Recommended Torque | | M8 x 25 | M10 x 30 | M12 x 40 | M8 x 25 | |
| Torque | | 11 | 43 | 68 | 11 | |
| Torque | | 100 | 380 | 600 | 100 | |
| With Main Terminal Set (CA6...HB...) | | With CA6-HB2 | With CA6-HB3 | | With CA6-HB2 | |
|  | sm. opening | 16...50 | 25...240 | ~ | 16...50 | |
| | lg. opening | 16...120 | 25...240 | ~ | 16...120 | |
|  | sm. opening | 16...50 | 25...240 | ~ | 16...50 | |
| | lg. opening | 16...120 | 25...240 | ~ | 16...120 | |
| b max. | | 20 | 25 | ~ | 20 | |
| CA6-HB  | s. sm. opening | 3...9 | 6...20 | ~ | 3...9 | |
| | lg. opening | 3...14 | 6...20 | ~ | 3...14 | |
| Recommended Torque | | 10...12 | 20...25 | ~ | 10...12 | |
| Wire size per UL/CSA | | sm. opening | #6...1 / 0 | #4...600MCM | ~ | #6...1 / 0 |
| Wire size per UL/CSA | | lg. opening | #6...250MCM | #4...600MCM | ~ | #6...250MCM |
| Recommended Torque | | [lb-in] | 90...110 | 180...220 | ~ | 90...110 |
| With Screw-type Lugs - Copper Clad (CA6-L...) | | | | W/CEP7-EEMH | W/CEP7-EEHH | |
| CA6-L180 | | [AWG] | #6...250 MCM | ~ | ~ | |
| Recommended Torque | | [lb-in] | 90...110 | ~ | ~ | |
| CA6-L420 | | [AWG] | ~ | #2...350 MCM | ~ | |
| Recommended Torque | | [lb-in] | ~ | 375 | ~ | |
| CA6-L630 | | [AWG] | ~ | ~ | 2/0...500 MCM | |
| Recommended Torque | | [lb-in] | ~ | ~ | 400 | |
| CA6-L860 | | [AWG] | ~ | ~ | ~ | |
| Recommended Torque | | [lb-in] | ~ | ~ | 2/0...500 MCM | |
| | | | | 400 | ~ | |

① For multiple conductor applications the same style and size of wire must be used.

Technical Information

| | | | |
|---|----------------|----------------|--------------------------------|
| Control Circuit | | | |
| Rated Insulation Voltage - U_i | [V] | | 690 AC |
| Rated Insulation Strength - U_{imp} | [kV] | | 6 AC |
| Rated Operation Voltage - U_e | [V] | | 690 AC (IEC) / 600 AC (UL/CSA) |
| Rated Designation | | | B600 |
| Rated Operating Current | | | NO NC |
| AC-15 | 12...120V | [A] | 3 2 |
| | 220...240V | [A] | 1.5 1.5 |
| | 380...480V | [A] | 0.75 0.75 |
| | 500...600V | [A] | 0.6 0.6 |
| DC-13 at L/R 15ms | 24V | [A] | 1.1 1.1 |
| | 110V | [A] | 0.4 0.4 |
| | 220V | [A] | 0.2 0.2 |
| | 440V | [A] | 0.08 0.08 |
| Thermal Current - I_{the} | | | [A] 5 |
| Contact Reliability | | | [kV] 17V, 5mA |
| Screw Terminal Cross Sections | | | |
| Terminal Screw | | | M3 |
|  | One conductor | [mm2] | 1 x (0.5...2.5) |
| | | Torque [Nm] | 0.55 |
| | Two Conductors | [mm2] | 2 x (0.25...1.5) |
| | | Torque [Nm] | 0.55 |
|  | One conductor | [mm2] | 1 x (0.5...4) |
| | | Torque [Nm] | 0.55 |
| | Two conductors | [mm2] | 2 x (0.22...2.5) |
| | | Torque [Nm] | 0.55 |
|  | One conductor | [AWG] | 1 x (24...10) |
| | | Torque [lb-in] | 5 |
| | Two conductors | [AWG] | 2 x (24...12) |
| | | Torque [lb-in] | 5 |
| Pozidrive Screwdriver Size | | | #1 |
| Slotted Screwdriver Size | | | [mm] 0.6 x 3.5 |

| | |
|---|-------------------------------|
| Heat Dissipation | Max. Heat Dissipation [Watts] |
| Catalog Number | |
| CEP7-ED1AB or CEP7-EEAB | 0.03 |
| CEP7-ED1BB or CEP7-EEBB | 0.04 |
| CEP7-ED1_B or CEP7-EE_B (other than A or B) | 0.53 |
| CEP7-EE_D | 0.73 |
| CEP7-EE_E | 0.78 |
| CEP7-EEGF | 0.87 |
| CEP7-EE_F (other than G) | 3.52 |
| CEP7-EE_G | 8.94 |
| CEP7-EE_H | 15.53 |
| CEP7-EE_J | 3.52 |

B
CEP7 Overloads

Table for using Current Transformers with CEP7-EECB (range 1.0...5.0 amps) overload relay

| Current Setting | CT Ratio 150:5 Equivalent FLA | CT Ratio 200:5 Equivalent FLA | CT Ratio 300:5 Equivalent FLA | CT Ratio 500:5 Equivalent FLA | CT Ratio 600:5 Equivalent FLA | CT Ratio 800:5 Equivalent FLA | CT Ratio 1000:5 Equivalent FLA | CT Ratio 1500:5 Equivalent FLA |
|-----------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|
| 1.00 | 30 | 40 | 60 | 100 | 120 | 160 | 200 | 300 |
| 1.25 | 38 | 50 | 75 | 125 | 150 | 200 | 250 | 375 |
| 1.50 | 45 | 60 | 90 | 150 | 180 | 240 | 300 | 450 |
| 1.75 | 53 | 70 | 105 | 175 | 210 | 280 | 350 | 525 |
| 2.00 | 60 | 80 | 120 | 200 | 240 | 320 | 400 | 600 |
| 2.25 | 68 | 90 | 135 | 225 | 270 | 360 | 450 | 675 |
| 2.50 | 75 | 100 | 150 | 250 | 300 | 400 | 500 | 750 |
| 2.75 | 83 | 110 | 165 | 275 | 330 | 440 | 550 | 825 |
| 3.00 | 90 | 120 | 180 | 300 | 360 | 480 | 600 | 900 |
| 3.25 | 98 | 130 | 195 | 325 | 390 | 520 | 650 | 975 |
| 3.50 | 105 | 140 | 210 | 350 | 420 | 560 | 700 | 1050 |
| 3.75 | 113 | 150 | 225 | 375 | 450 | 600 | 750 | 1125 |
| 4.00 | 120 | 160 | 240 | 400 | 480 | 640 | 800 | 1200 |

Technical Information

Environmental Ratings

| | | | |
|----------------------------|-----------|------|---|
| Ambient Temperature | Storage | [°C] | -40...+85 (-40...+185 °F) |
| | Operating | [°C] | -20...+60 (-4...+140 °F) |
| Humidity | Operating | [%] | 5...95, non-condensing |
| | Damp Heat | | per IEC 68-2-3 and IEC 68-2-30 |
| Vibration (per IEC 68-2-6) | | [G] | 3 |
| Shock (per IEC 68-2-27) | | [G] | 30 |
| Maximum Altitude | | [m] | 2000 |
| Pollution Environment | | | Pollution Degree 3 |
| Degree of Protection | | | IP20 |
| Type of Relay | | | Ambient compensated, time delay, phase loss sensitive |
| Nature of Relay | | | Solid-state |
| Trip Rating | | | 120% FLA |
| Trip Class | Type ED | | 10 |
| | Type EE | | 10, 15, 20, 30 |
| Reset Mode | Type ED | | Manual |
| | Type EE | | Manual or Automatic |

Electromagnetic Compatibility

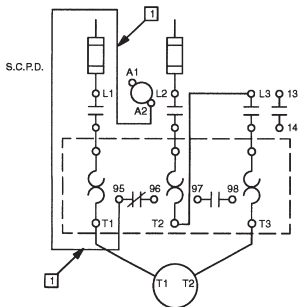
| | | | |
|--|-------------------|-------|--|
| Electrostatic Discharge Immunity | Test Level | [kV] | 8kV air discharge 6kV contact discharge |
| | Performance Level | | 1 ①② |
| RF Immunity | Test Level | [V/m] | 10 V/m |
| | Performance Level | | 1 ①② |
| Electrical Fast Transient Burst Immunity | Test Level | [kV] | 4 kV |
| | Performance Level | | 1 ①② |
| Surge Immunity | Test Level | [V/m] | 2 kV (L-E) 1 kV (L-L) |
| | Performance Level | | 1 ①② |

General

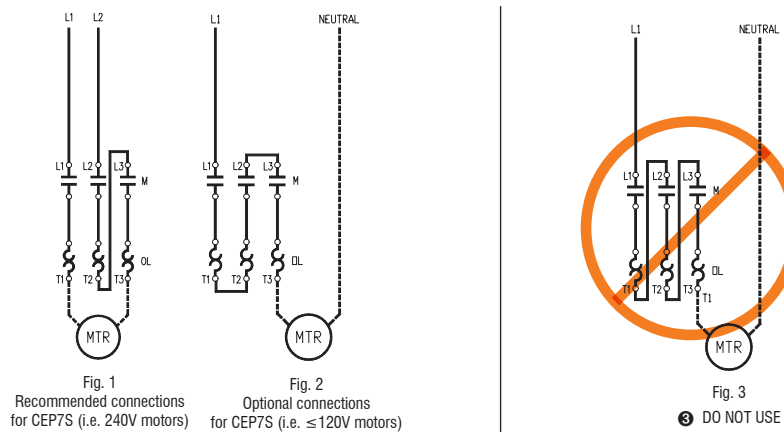
| | | | | |
|--------------------|--|--|--|-----------------------|
| Standards | UL 508, CSA C22.2 No. 14, NEMA (ICS 2-1993 Part 4, EN 60947-4-1, EN 60947-5-1) | | | |
| Approvals | CE, cULus, C-Tick, CCC | | | |
| | | CEP7-ED1...B CEP7(S)-EE...B | CEP7-ED1...D CEP7(S)-EE...D | CEP7(S)-EE...E |
| Weights (unpacked) | [Kg] | 0.25 | 0.25 | 0.52 |
| | [Lb] | 0.55 | 0.55 | 1.06 |

Wiring Diagrams ④

Typical Wiring for Single Phase Applications



CEP7 Single Phase Overload Relay Must be connected as shown in Fig. 1 or 2 only.



- ① Performance Criteria 1 requires the DUT to experience no degradation or loss of performance.
- ② Environment 2.

- ③ If the CEP7S is connected as shown in Fig. 3 the overload will not trip! The CEP7S contains an electronic circuit board that is self powered. If connected as shown in Fig. 3, the CEP7S circuit board will not power up and the CEP7S would not trip.

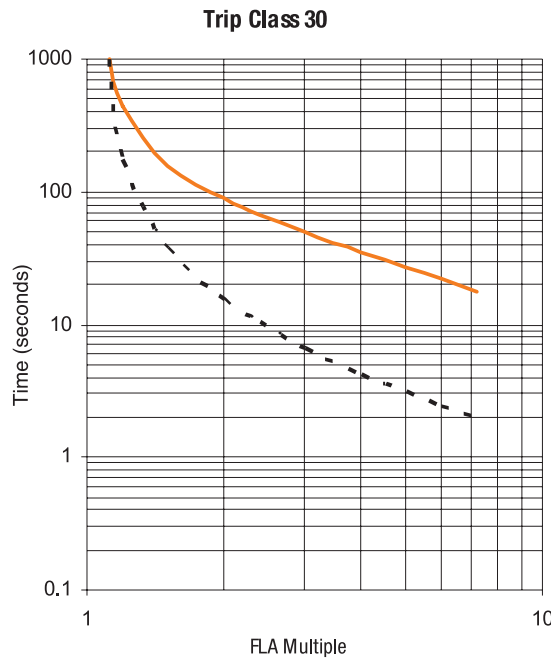
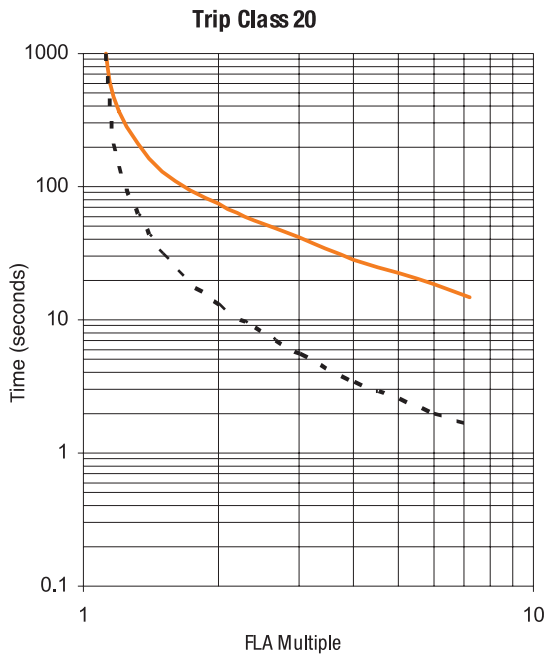
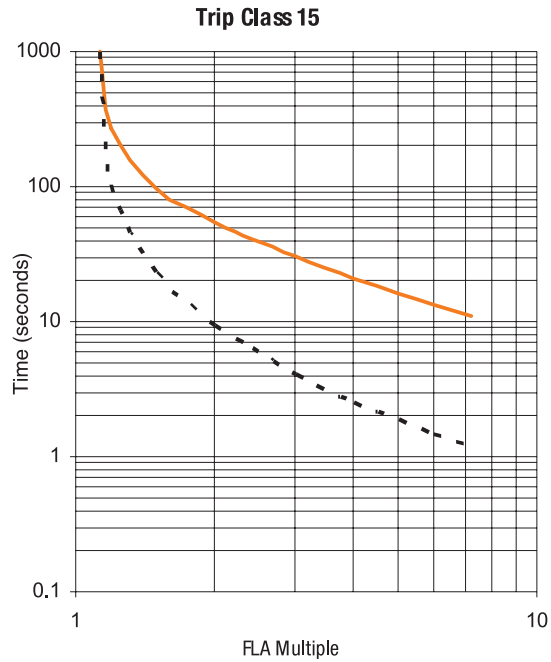
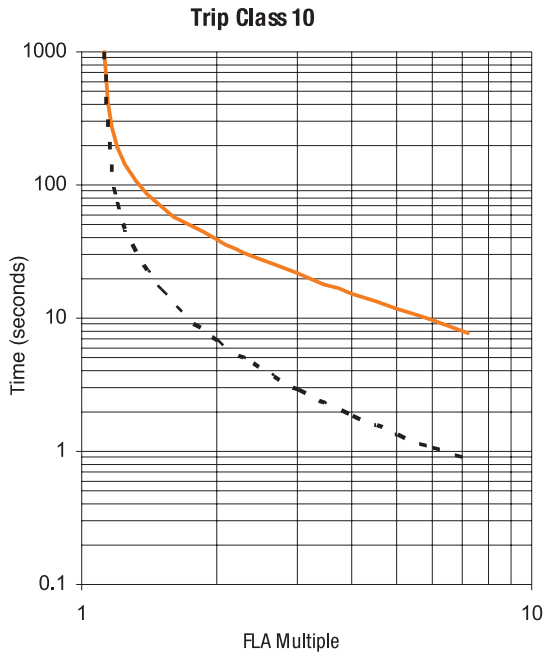
- ④ Connecting a CEP7S in this manner powers the electronic circuit board. Connecting a 3-phase CEP7 in this manner to handle 1-phase will NOT work.

Technical Information

Trip Curves ①

B

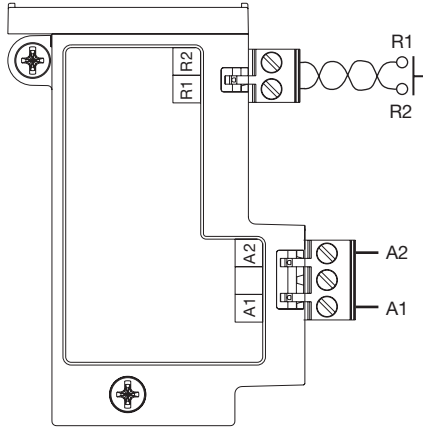
CEP7 Overloads



Trip Curve Legend
Cold Trip ———
Hot Trip - - - - -

① Typical reset time for CEP7 Second Generation devices set to "automatic reset" mode is 120 seconds.

CEP7-ERR & CEP7-EJM Wiring Diagrams



- Apply 24 - 240V, 47 - 63Hz or DC to terminals A1 and A2 for control power.
- Connect remote reset pilot device to Terminals R1 and R2.

CEP7-ERR Operational LED

Status LED:
Steady Green- Module is powered up.

CEP7-ERR Dip Switch

Series B Adjustment Settings

| Overload Relay Remote Reset | | |
|-----------------------------|------------|--------------|
| SW1 | Manual: 1 | Automatic: 0 |
| Overload Relay Type | | |
| SW2 | 3 Phase: 1 | 1 Phase: 0 |
| SW3 | Not Used | |

CEP7-EJM Operational LED

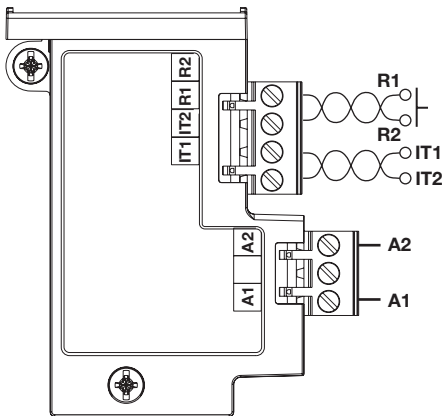
Status LED:
Green flash- module powered
Green solid- module powered plus motor current present
Red flash- warning: Fault detected and CEP7 preparing to trip.
Red solid- hardware fault: Internal hardware fault detected and CEP7 trip attempted. Recover fault by cycling supply voltage.

CEP7-EJM Dip Switch

Adjustment Settings

| Overload Relay Reset Mode | | | |
|-------------------------------|-----------|--------------|------|
| SW1 | Manual: 1 | Automatic: 0 | |
| Jam Trip Delay | | | |
| | SW 2 | SW 3 | SW 4 |
| 0.1 sec | 0 | 0 | 0 |
| 0.5 sec | 0 | 0 | 1 |
| 1 sec | 0 | 1 | 0 |
| 2 sec | 0 | 1 | 1 |
| 3 sec | 1 | 0 | 0 |
| 4 sec | 1 | 0 | 1 |
| 5 sec | 1 | 1 | 0 |
| 10 sec | 1 | 1 | 1 |
| Jam Trip Level | | | |
| | SW 5 | SW 6 | SW 7 |
| Disable / OFF | 0 | 0 | 0 |
| 100% FLA | 0 | 0 | 1 |
| 125% FLA | 0 | 1 | 0 |
| 150% FLA | 0 | 1 | 1 |
| 200% FLA | 1 | 0 | 0 |
| 300% FLA | 1 | 0 | 1 |
| 400% FLA | 1 | 1 | 0 |
| 600% FLA | 1 | 1 | 1 |
| SW8 3 Phase: 1 1 Phase: 0 | | | |

CEP7-EPT Wiring Diagrams



- Apply 24 - 240V, 47 - 63Hz or DC to terminals A1 and A2 for control power.
- Connect remote reset pilot device to Terminals R1 and R2
- Connect Terminal IT1 and IT2 to PTC Chain

CEP7-EPT Operational LED

Status LED:
Steady Green - Module is powered up
Flashing LED - The number of flashes followed by a pause identifies the specific trip code as follows:
(1) Flash - overload trip
(2) Flash - phase loss trip
(3) Flash - PTC trip
(4) Flash - PTC open circuit
(5) Flash - PTC short circuit
Fast Flash - Impending trip. PTC Thermistor fault detected and CEP7 not yet capable of tripping.
Steady Red - Hardware fault. Internal hardware fault detected and CEP7 trip attempted.

CEP7-EPT Dip Switch

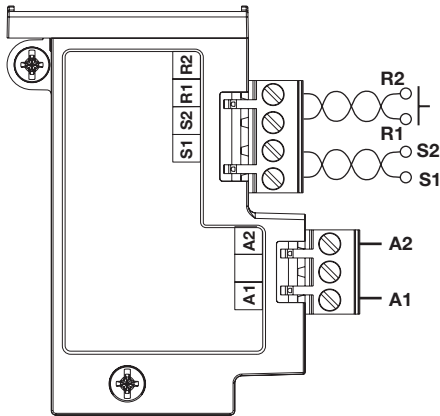
Adjustment Settings

| Overload Relay and PTC Reset Mode | | |
|-----------------------------------|------------|--------------|
| SW1 | Manual: 1 | Automatic: 0 |
| PTC Protection | | |
| SW2 | Enable: 1 | Disable: 0 |
| Overload Relay Type | | |
| SW3 | 3 Phase: 1 | 1 Phase: 0 |

① Dynamic inhibit: Protective function is enabled after the motor current goes above 150% and then falls below 125%.

② The delay between the occurrence of a PTC out-of-range fault and a trip of the CEP7 varies, but is generally described by one of the following: a) 500 ms ± 250 ms, typical; or b) < 6 seconds, for a PTC out-of-range fault present at power-up of the side mount module. Under no conditions should a PTC trip take longer than 6 seconds.

CEP7-EGF & CEP7-EGJ Wiring Diagrams ❶



- Apply 24 - 240V, 47 - 63Hz or DC to terminals A1 and A2 for control power.
- Connect remote reset pilot device to Terminals R1 and R2
- Connect current sensor to Terminal S1 and S2

CEP7-EGF Operational LED

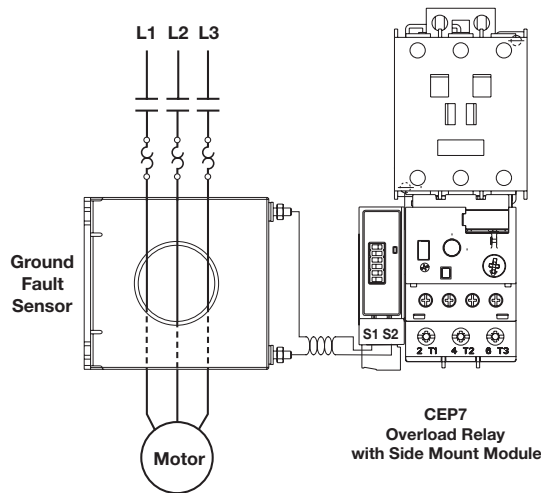
Status LED:
Steady Green - Module is powered up.
Flashing LED - The number of flashes followed by a pause identifies the specific trip code as follows:
(1) Flash - overload trip
(2) Flash - phase loss trip
(3) Flash - ground fault trip
Fast Flash - Impending trip Ground fault detected and CEP7 not yet capable of tripping.
Steady Red - Hardware fault. Internal hardware fault detected and CEP7 trip attempted.

CEP7-EGF Dip Switch

| Adjustment Settings | | | |
|----------------------------|------------|--------------|------|
| Overload Relay Reset Mode | | | |
| SW1 | Manual: 1 | Automatic: 0 | |
| Ground Fault Current Range | | | |
| | SW 2 | SW3 | |
| 20...100mA | 0 | 0 | |
| 100...500mA | 0 | 1 | |
| 0.2...1.0A | 1 | 0 | |
| 1.0...5.0A | 1 | 1 | |
| Ground Fault Trip Level | | | |
| | SW 4 | SW 5 | SW 6 |
| Disable/Off | 0 | 0 | 0 |
| 20% Max GF Current | 0 | 0 | 1 |
| 35% Max GF Current | 0 | 1 | 0 |
| 50% Max GF Current | 0 | 1 | 1 |
| 65% Max GF Current | 1 | 0 | 0 |
| 80% Max GF Current | 1 | 0 | 1 |
| 90% Max GF Current | 1 | 1 | 0 |
| 100% Max GF Current | 1 | 1 | 1 |
| Overload Relay Type | | | |
| SW7 | 3 Phase: 1 | 1Phase: 0 | |
| SW8 | Not Used | | |

CEP7-EGF & CEP7-EGJ Installation ❶

Ground Fault Sensor Control Wiring



CEP7-EGJ Operational LED

Status LED:
Steady Green - Module is powered up.
Flashing LED - The number of flashes followed by a pause identifies the specific trip code as follows:
(1) Flash - overload trip
(2) Flash - phase loss trip
(3) Flash - ground fault trip
(4) Flash - jam trip
Fast Flash - Impending trip Ground fault detected and CEP7 not yet capable of tripping.
Steady Red - Hardware fault. Internal hardware fault detected and CEP7 trip attempted.

CEP7-EGJ Dip Switch

| Adjustment Settings | | | |
|----------------------------|------------|--------------|------|
| Overload Relay Reset Mode | | | |
| SW1 | Manual: 1 | Automatic: 0 | |
| Ground Fault Current Range | | | |
| | SW 2 | SW3 | |
| 20...100mA | 0 | 0 | |
| 100...500mA | 0 | 1 | |
| 0.2...1.0A | 1 | 0 | |
| 1.0...5.0A | 1 | 1 | |
| Ground Fault Trip Level | | | |
| | SW 4 | SW 5 | SW 6 |
| Disable/Off | 0 | 0 | 0 |
| 20% Max GF Current | 0 | 0 | 1 |
| 35% Max GF Current | 0 | 1 | 0 |
| 50% Max GF Current | 0 | 1 | 1 |
| 65% Max GF Current | 1 | 0 | 0 |
| 80% Max GF Current | 1 | 0 | 1 |
| 90% Max GF Current | 1 | 1 | 0 |
| 100% Max GF Current | 1 | 1 | 1 |
| Overload Relay Type | | | |
| SW7 | 3 Phase: 1 | 1Phase: 0 | |
| Jam Protection | | | |
| SW8 | Enable: 1 | Disable: 0 | |

❶ Dynamic inhibit: Protective function is enabled after the motor current goes above 150% and then falls below 125%.

B
CEP7 Overloads

Electrical Data

Power Supply Ratings:

| | | |
|-----------------------------------|-----------|-------------|
| Rated Supply Voltage | <i>Us</i> | 24V DC |
| Rated Operating Range | <i>Ue</i> | 20.4 - 26.4 |
| Rated Supply Current | <i>Ie</i> | 0.1 A |
| Maximum Surge Current at Power-Up | | 2.5 A |
| Maximum Power Consumption | | 2.5...2.7 W |

Output Relay Ratings:

| | | |
|--|------------------------|---|
| Terminals | | |
| OUT A: | | 13/14 |
| Type of Contacts | | Form A SPST - NO |
| Rated Thermal Current | <i>I_{the}</i> | 5 A |
| Rated Insulation Voltage | <i>Ui</i> | 300V AC |
| Rated Operating Voltage | <i>Ue</i> | 240V AC |
| Rated Operating Current | <i>Ie</i> | 3 A (at 120V AC), 1.5 A (at 240V AC) 0.25 A (at 110V DC), 0.1 A (at 220V DC) |
| Minimum Operating Current | | 10 mA at 5V DC |
| Rating Designation | | B300 |
| Utilization Category | | AC-15 |
| Resistive Load Rating (p.f.=1.0) | | 5 A, 250V AC 5 A, 30V DC |
| Inductive Load Rating (p.f.=0.4), (L/R=7 ms) | | 2 A, 250V AC 2 A, 30V DC |
| Short Circuit Current Rating | | 1,000 A |
| Recommended Control Circuit Fuse | | KTK-R-6 (6 A, 600V) |

Input Ratings:

| | | |
|-------------------------------------|--|-----------------|
| Terminals | | |
| IN1: | | 1 |
| IN2: | | 2 |
| SSV (Sensor Supply Voltage) | | 3 |
| Supply Voltage (Provided by module) | | 20.4 - 26.4V DC |
| Type of Inputs | | Current Sinking |

Jam Protection:

| | | |
|------------|--|-----------------|
| Trip Level | | 150...600% FLA |
| Trip Delay | | 0.1...25.0 sec. |
| Inhibit | | 0...250 sec. |

Standards:

UL 508
CSA 22.2, No. 14
EN 60947-

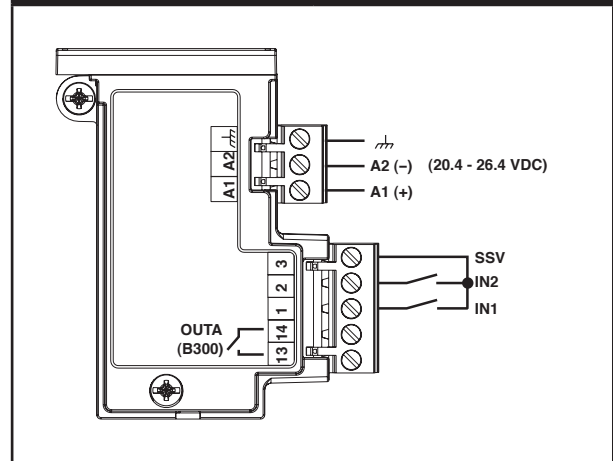
Mechanical Data

| | | |
|--------------------------|------------------------|----------------------------|
| Ambient Temperature | <i>T_{amb}</i> | |
| Storage | | -40...+85°C (-40...+185°F) |
| Operating | | |
| (Open) | | -20...+60°C (-4...+140°F) |
| (Enclosed) | | -20...+40°C (-4...+104°F) |
| Humidity | | |
| Operating | | 5...95% non-condensing |
| Damp Heat - Steady State | | per IEC 68-2-3 |
| Damp Heat - Cyclic | | per IEC 68-2-30 |
| Maximum Altitude | | 2000 m |
| Degree of Protection | | IP20 |

ETHERNET Communication

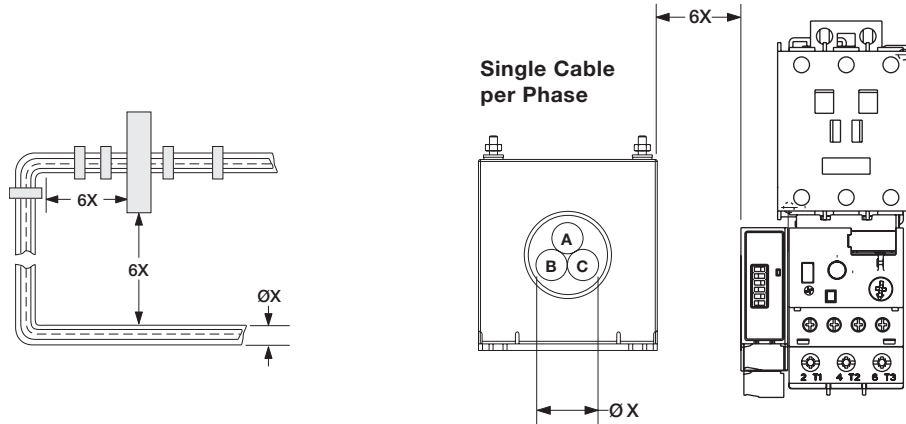
| | |
|--------------------------|--------|
| TCP Connection | 150 |
| CIP Connection | 40 |
| CIP Unconnected Messages | 128 |
| I/O Packet Rates | 500/s |
| Explicit Packet Rates | 500/s |
| Speed Duplex (Half/Full) | 10/100 |
| Duplicate IP Detection | Yes |

CEP7-ETN Wiring Diagram



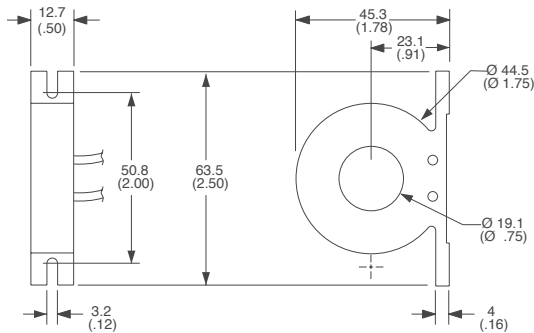
CEP7-CBCT Installation

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.

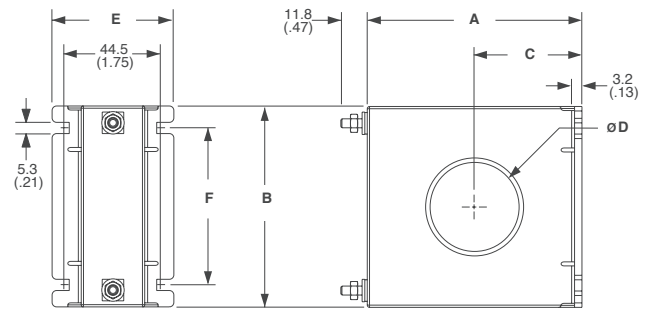


CEP7-CBCT Dimensions

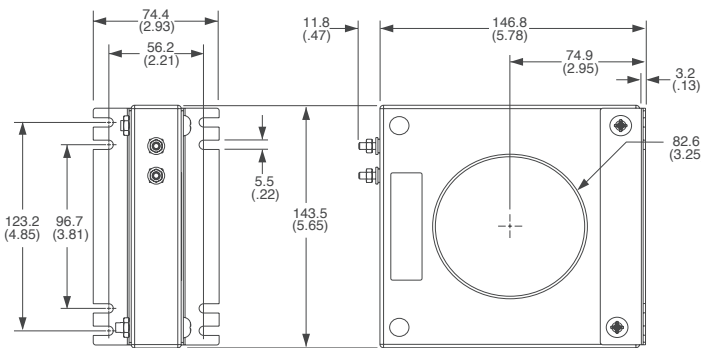
CEP7-CBCT1



CEP7-CBCT2 & 3



CEP7-CBCT4



| Catalog Number | A | B | C | ØD | E | F |
|----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|
| CEP7-CBCT2 | 96 (3.78) | 89 (3.53) | 48.3 (1.90) | 39.6 (1.56) | 54.6 (2.15) | 69.9 (2.75) |
| CEP7-CBCT3 | 122.4 (4.82) | 115.9 (4.56) | 59.7 (2.35) | 63.5 (2.50) | 54.1 (2.13) | 96 (3.78) |

CEP7-CBCT Ground Fault Trip Data

ATTENTION: The CEP7 Overload relay is not a ground fault circuit interrupter for personnel protection as defined in Article 100 of the NEC.

Ground fault trip delay: The delay between the occurrence of a ground fault and a trip of the CEP7 varies, but is generally described by one of the following:

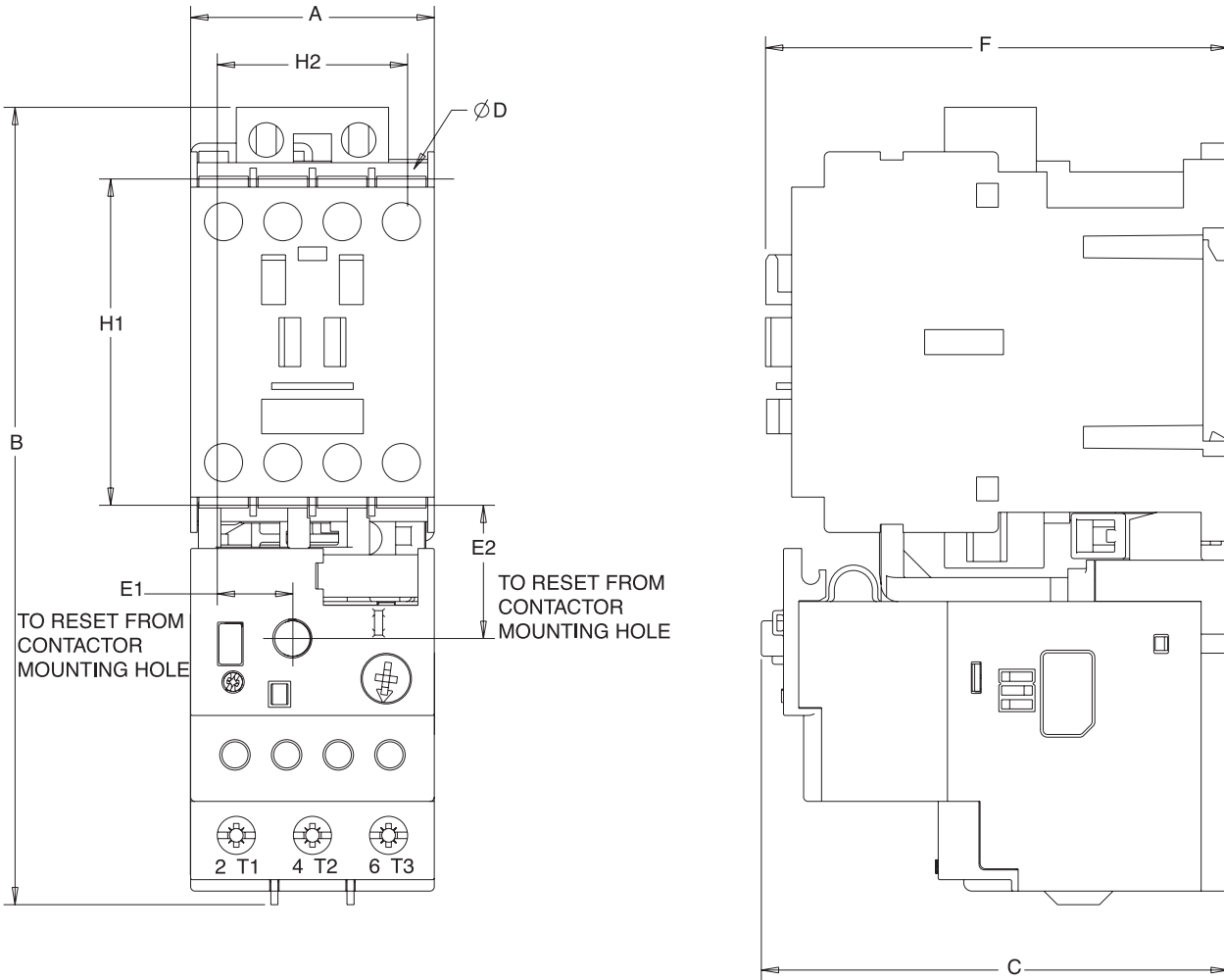
- 50 ms ± 20 ms, typical
- < 6 seconds, for a ground fault present at power-up of the side mount module
- < 30 seconds, if the protection inhibit has not been cleared.

Under no conditions should a ground fault trip take longer than 31 seconds.

Dynamic inhibit: Protective function is enabled after the motor current goes above 150% and then falls below 125%.

CEP7 Mounted to CA7 Contactor

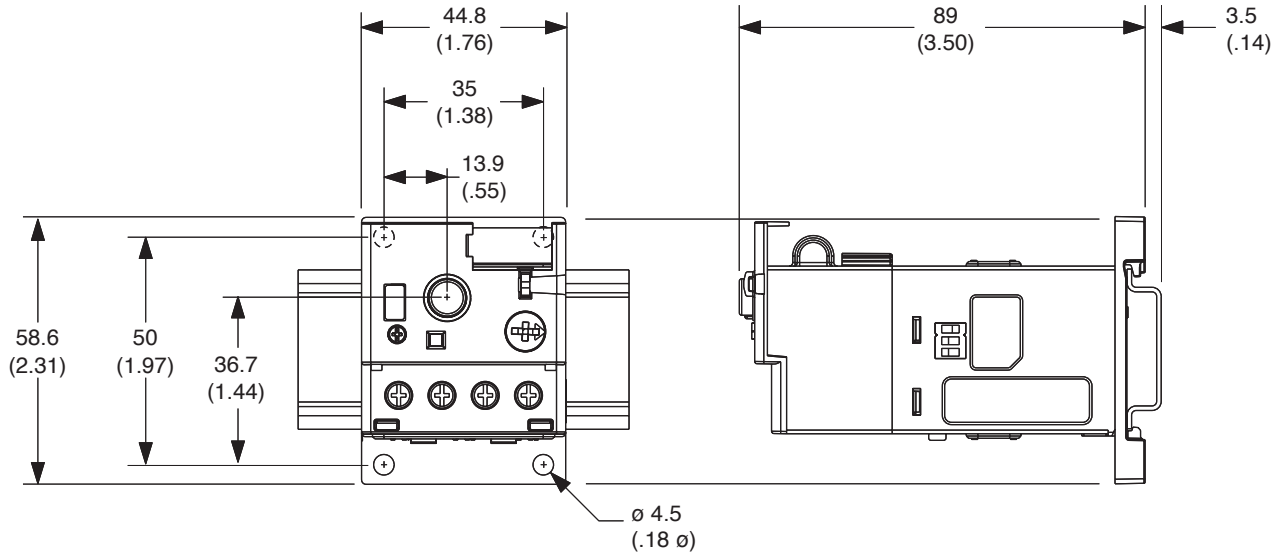
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



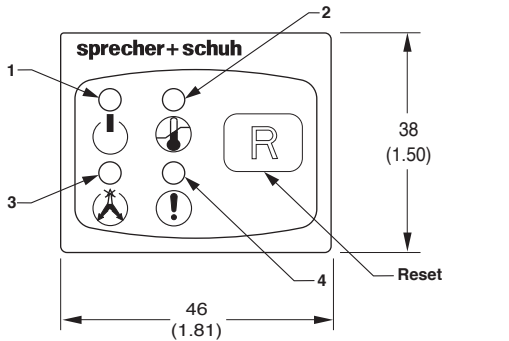
| Overload | Mounted to Contactor | | A Width | B Height | C Depth | D | E1 | E2 | F | H1 | H2 |
|---|----------------------|------------|-----------------|--------------------|--------------------|---------------|-----------------|-----------------|--------------------|------------------|-----------------|
| CEP7-ED1...B CEP7-EE...B CEP7S-EE...B | CA7-9...23 | mm (in) | 45 (1-25/32) | 146.6 (5-25/32) | 85.2 (3-23/64) | 4.5 (3/16) | 13.9 (35/64) | 24.5 (31/32) | 86.5 (3-13/32) | 60 (2-23/64) | 35 (1-3/8) |
| CEP7-ED1...D CEP7-EE...D CEP7S-EE...D | CA7-30...37 | mm (in) | 45 (1-25/32) | 146.6 (5-25/32) | 101.2 (3-63/64) | 4.5 (3/16) | 13.9 (35/64) | 24.5 (31/32) | 104 (4-3/32) | 60 (2-23/64) | 35 (1-3/8) |
| CEP7-ED1...D CEP7-EE...D CEP7S-EE...D | CA7-43...55 | mm (in) | 54 (2-1/8) | 146.6 (5-25/32) | 101.2 (3-63/64) | 4.5 (3/16) | 18.9 (3/4) | 24.5 (31/32) | 107 (4-3/32) | 60 (2-23/64) | 45 (1-25/32) |
| CEP7-EE...E CEP7S-EE...E | CA7-60...97 | mm (in) | 72 (2-53/64) | 192.3 (7-37/64) | 120.4 (4-3/4) | 5.4 (7/32) | 23.8 (15/16) | 29 (1-9/64) | 125.5 (4-15/16) | 100 (3-15/16) | 55 (2-11/64) |

CEP7 Pass-thru Overload

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



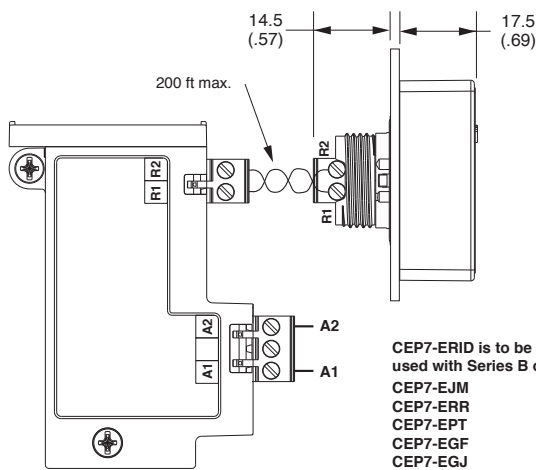
CEP7-ERID Remote Indicator



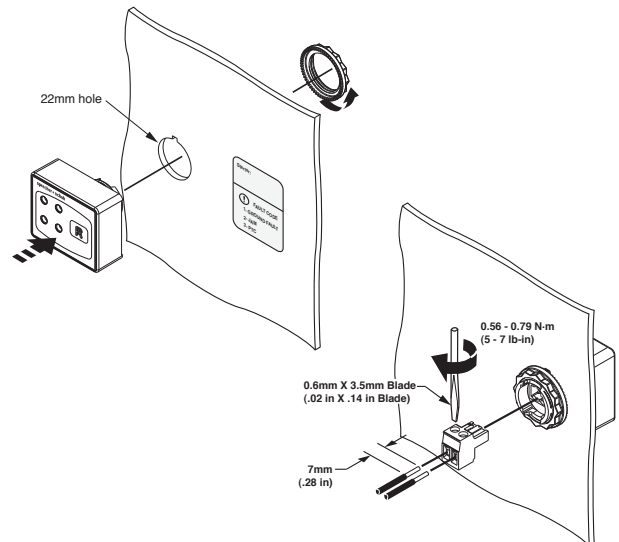
LED Indicators

| L.E.D. | Function | Symbol | Fault or Status | Flash Code |
|--------|-----------------------|--------|------------------------------|----------------|
| 1 | Module Power / Status | | Module Power | Green (Flash) |
| | | | Module Power + Motor Current | Green (Solid) |
| | | | Hardware Fault | Red (Solid) |
| 2 | Overload | | Overload Trip | Red (Solid) |
| | | | Overload Warning (> 110%) | Yellow (Flash) |
| 3 | Phase Loss | | Phase Loss Trip | Red (Solid) |
| 4 | Fault Status | | Ground Fault Trip | 1 Red |
| | | | Jam Trip | 2 Red |
| | | | PTC Trip | 3 Red |
| | | | Fault Detected | Red (Rapid) |

Operating Temperatures -20°C ... 60°C (-4°F ... +140°F)
Storage Temperatures -40°C ... 85°C (-4°F ... +185°F)

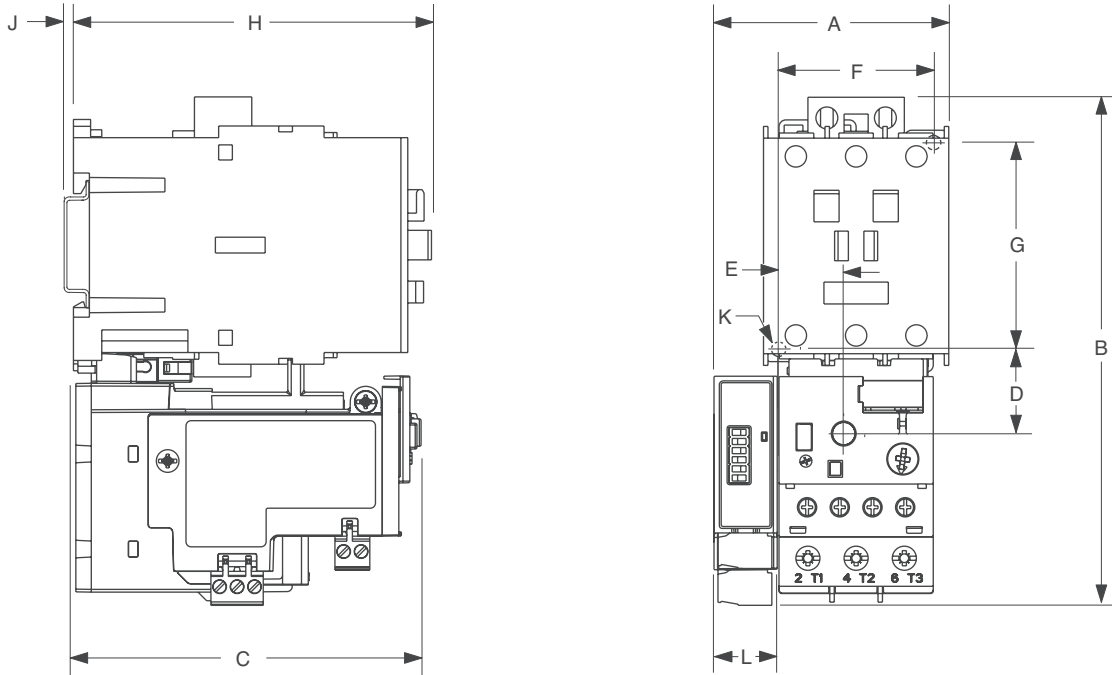


CEP7-ERID is to be used with Series B or later:
CEP7-EJM
CEP7-ERR
CEP7-EPT
CEP7-EGF
CEP7-EGJ



CEP7 Mounted to CA7 Contactor (with side mounted module)

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



| Contactor Cat. No. | Overload Cat. No. | | A ① | B | C | D | E | F | G | H | J | K | L ① |
|--------------------------------|-------------------|---------|-------------|--------------|--------------|------------|------------|-----------|------------|-------------|---------|-----------|----------|
| CA7-9, CA7-12, CA7-16, CA7-23 | CEP7*-EE_B | mm (in) | 63 (2.48) | 148 (5.83) | 85.2 (3.35) | 24.5 (.96) | 13.9 (.55) | 35 (1.38) | 60 (2.38) | 86.5 (3.40) | 2 (0.8) | 4.5 (.17) | 18 (.71) |
| CA7-30, CA7-37 | CEP7*-EE_D | mm (in) | 63 (2.48) | 148 (5.83) | 101.2 (3.98) | 24.5 (.96) | 13.9 (.55) | 35 (1.38) | 60 (2.38) | 104 (4.09) | 2 (0.8) | 4.5 (.17) | 18 (.71) |
| CA7-43...55 | | mm (in) | 67.5 (2.66) | 148 (5.83) | 101.2 (3.98) | 24.5 (.96) | 18.4 (.74) | 45 (1.77) | 60 (2.38) | 107 (4.09) | 2 (0.8) | 4.5 (.17) | 18 (.71) |
| CA7-60, CA7-72, CA7-85, CA7-97 | CEP7*-EE_E | mm (in) | 90 (3.54) | 191.6 (7.54) | 120.4 (4.74) | 29 (1.14) | 23.8 (.94) | 55 (2.16) | 100 (3.94) | 126 (4.94) | 2 (0.8) | 5.4 (.21) | 18 (.71) |

* No letter indicates 3-phase; "S" indicates 1-phase

① Dimension shown covers all side mount modules EXCEPT CEP7-EPRB and CEP7-ETN, where "L" equals 22mm (0.86 in). Add 4mm (0.16 in) to dimension "A".

CEP7-ERR/EJM/EGE/EGJ/EPT Module Technical Information

Wire Size and Torque Specifications

| | | |
|--|----|-----------------------------|
| | 1X | 24.....12 AWG |
| | 2X | 24.....16 AWG |
| | | 5 lb-in |
| | 1X | 0.2.....2.5 mm ² |
| | 2X | 0.25.....1 mm ² |
| | | 0.55 N-m |
| | 1X | 0.2.....2.5 mm ² |
| | 2X | 0.2.....1 mm ² |
| | | 0.55 N-m |

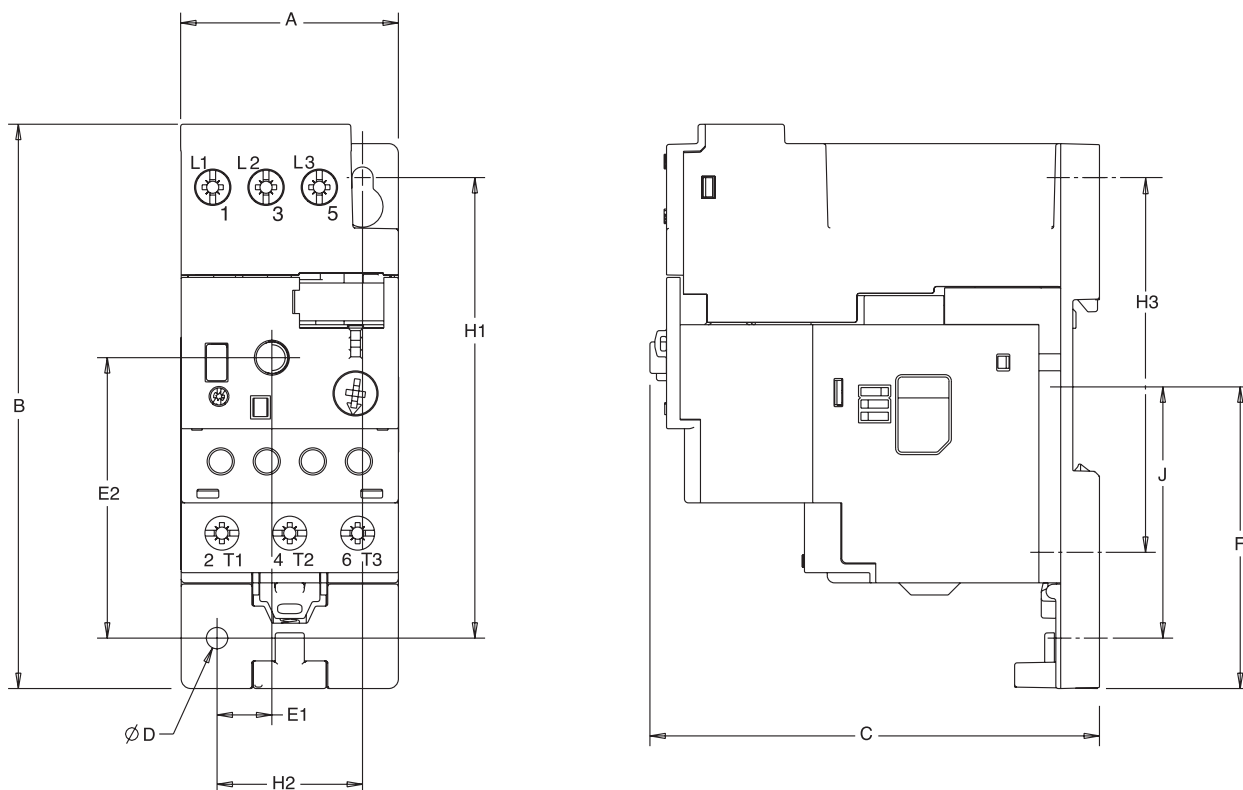
- Connect remote reset pilot device to Terminals R1 and R2.
- Do not apply external voltage to R1 and R2. Equipment damage will occur.
- Recommend use of twisted pair for remote reset, #24 AWG minimum.
- Apply 24 - 240V, 47 - 63Hz or DC to terminals A1 and A2 for control power.
- Rated Insulation Voltage (Ui) 300V
- Rated Operating Voltage (Ue)

| | |
|------------------------|--|
| 24 - 240 VAC, 50/60 Hz | |
| 24 - 240 VDC | |
- Power at Rated Operating Voltage (Typical)

| | |
|---------|-------|
| 24 VAC | 0.8 W |
| 120 VAC | 0.8 W |
| 240 VAC | 1.0 W |
- Rated Impulse Withstand Voltage (U imp) 2.5 kV
- Dynamic inhibit on start. A unique circuit within the CEP7 Protection Modules monitors for motor starting inrush current. The circuit inhibits the protection feature during the motor start period and arms the protection function after the inrush current falls to motor rated current. This allows the motor to start and run, avoiding nuisance tripping during the inrush period.

CEP7 with CEP7-EP... Panel Mount Adaptor

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



B
CEP7 Overloads

| Panel Mount Adaptor | Overload Relay | A Width | B Height | C Depth | D | E1 | E2 | F | H1 | H2 | H3 | J |
|---------------------|----------------|-----------|-----------|-----------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| CEP7-EPB | CEP7-ED1_B | 45 | 116.5 | 92.7 | 4.4 | 11.4 | 57.9 | 62.5 | 95 | 30 | 75 | 52.1 |
| | CEP7-ED_B | (1-25/32) | (4-9/16) | (3-21/32) | (11/64) | (29/64) | (2-9/32) | (2-15/32) | (3-3/4) | (1-3/16) | (2-31/32) | (2-3/64) |
| | CEP7(S)-EE_B | | | | | | | | | | | |
| CEP7-EPD | CEP7-ED1_D | 45 | 112.4 | 108.7 | 4.4 | 11.4 | 57.9 | 62.5 | 95 | 30 | 75 | 52.1 |
| | CEP7(S)-EE_D | (1-25/32) | (4-7/16) | (4-9/32) | (11/64) | (29/64) | (2-9/32) | (2-15/32) | (3-3/4) | (1-3/16) | (2-31/32) | (2-3/64) |
| | CEP7(S)-EE_E | | | | | | | | | | | |
| CEP7-EPE | CEP7(S)-EE_E | 72 | 107.4 | 127 | 5.5 | 26.4 | 54.5 | 48.3 | 90 | 60 | ~ | 43.3 |
| | | (2-53/64) | (4-15/64) | (5-1/64) | (5/32) | (3/4) | (2-9/64) | (1-29/32) | (3-23/64) | (2-23/64) | | (1-45/64) |

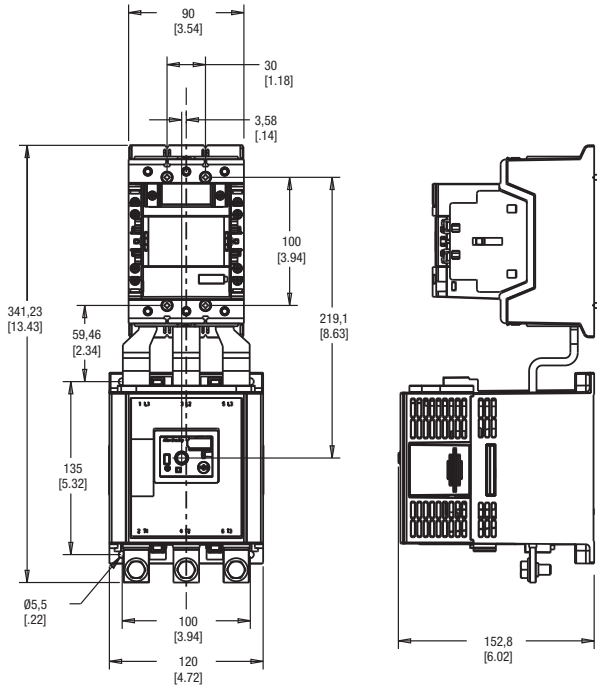
| DIN-rail / Panel Adaptor Terminal Cross Sections | | CEP7-EPB ① | CEP7-EPD ① | CEP7-EPE |
|--|------------------|--------------------------|-------------------------|-------------------------|
| Flexible stranded with ferrule | Single conductor | 1.0...4.0mm ² | 2.5...16mm ² | 4.0...35mm ² |
| | Torque | 1.8 Nm | 2.3 Nm | 4.0 Nm |
| | Two conductor | 1.0...4.0mm ² | 2.5...10mm ² | 4.0...25mm ² |
| | Torque | 1.8 Nm | 2.3 Nm | 4.0 Nm |
| Course stranded / solid | Single conductor | 1.5...6.0mm ² | 2.5...25mm ² | 4.0...50mm ² |
| | Torque | 1.8 Nm | 2.3 Nm | 4.0 Nm |
| | Two conductor | 1.5...6.0mm ² | 2.5...16mm ² | 4.0...35mm ² |
| | Torque | 1.8 Nm | 2.3 Nm | 4.0 Nm |
| Stranded / solid | Single conductor | 14...8 AWG | 16...6 AWG | 12...1 AWG |
| | Torque | 16 lb-in | 20 lb-in | 35 lb-in |
| | Two conductor | 14...10 AWG | 16...6 AWG | 12...2 AWG |
| | Torque | 16 lb-in | 20 lb-in | 35 lb-in |

① For multiple conductor applications, the same size and style of wire must be used.

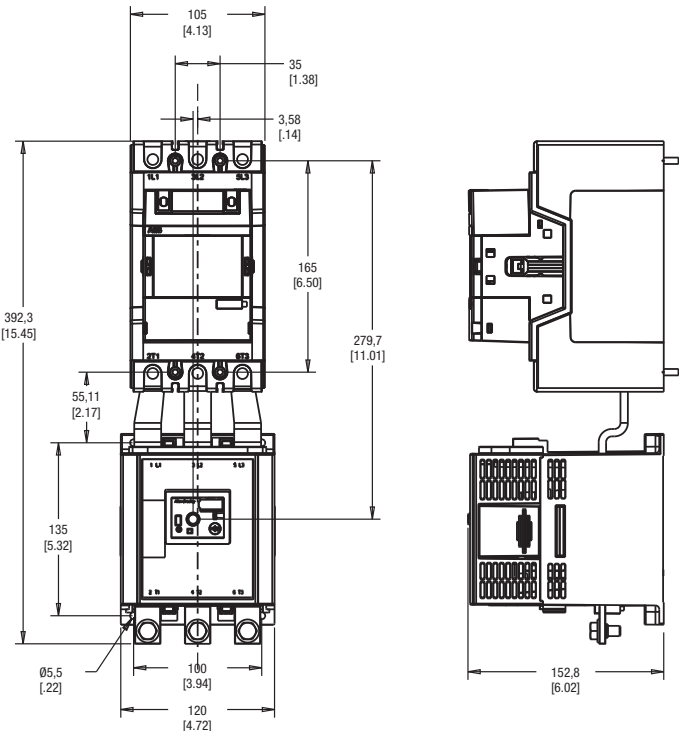
B
CEP7 Overloads

CEP7 Current Transformer Models mounted to CA9 Contactor (116-205A)

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



CA9-116 AND CA9-146 CONTACTORS SHOWN

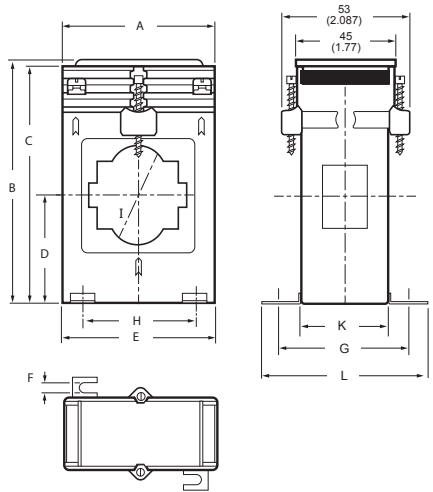
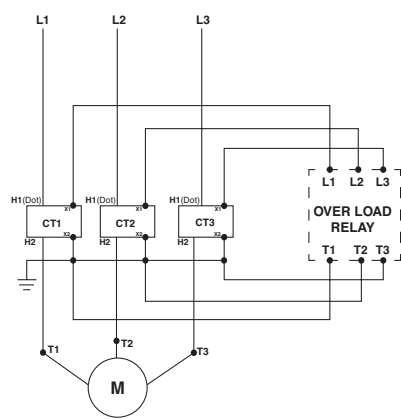
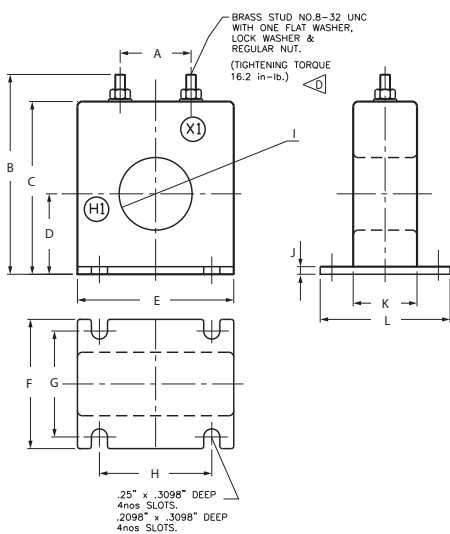


CA9-190 AND CA9-205 CONTACTORS SHOWN

CEP7-CT

CEP7-CT-UL

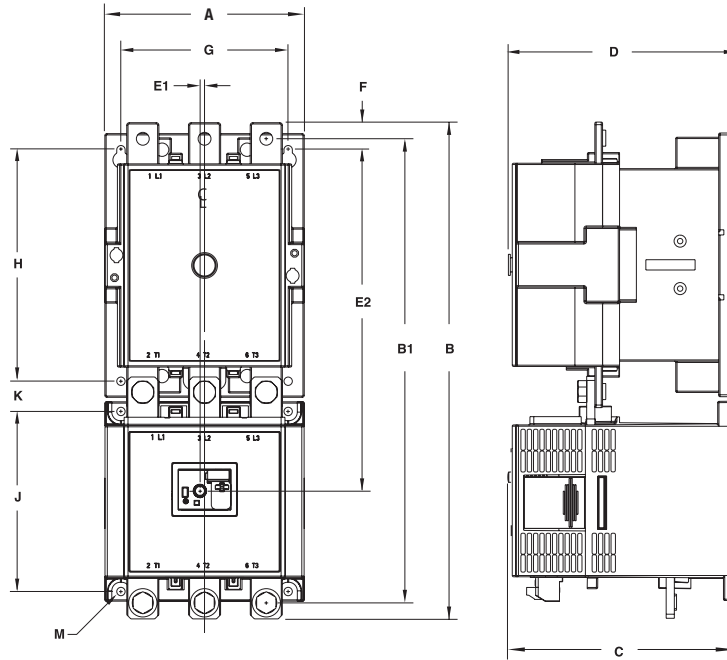
CEP7-CT-CE



| DIMENSIONS mm (inches) | A | B | C | D | E | F | G | H | I | J | K | L |
|---------------------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|-------------|------------|-------------|-------------|
| CEP7-CT-UL-300 | 27.29 (1.09) | 79.5 (3.13) | 68.6 (2.7) | 32.5 (1.27) | 60.96 (2.40) | 50 (1.96) | 40.4 (1.59) | 44.45 (1.75) | 29 (1.14) | 3 (0.118) | 24 (0.94) | 50 (1.96) |
| CEP7-CT-UL-600 | 83.31 (3.28) | 134.4 (5.29) | 123.2 (4.85) | 59.4 (2.34) | 115.8 (4.56) | 54.1 (2.13) | 44.45 (1.75) | 96 (3.78) | 63.5 (2.50) | 4.3 (0.17) | 27.4 (1.08) | 54.1 (2.13) |
| CEP7-CT-CE-300 | 71 (2.80) | 88.5 (3.48) | 85.5 (2.7) | 36.75 (1.27) | 70 (2.75) | 6.5 (0.26) | 57 (2.24) | 50 (1.97) | 32 (1.26) | | 40 (1.58) | 72 (2.83) |
| CEP7-CT-CE-400 | 96 (3.75) | 108.5 (4.27) | 105.5 (4.85) | 48.3 (1.90) | 95 (3.74) | 4.5 (0.177) | 57 (2.24) | 70 (3.75) | 44 (1.73) | ~ | 40 (1.58) | 72 (2.83) |

CEP7 Current Transformer Models mounted to CA6 Contactor (Discontinued)

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.

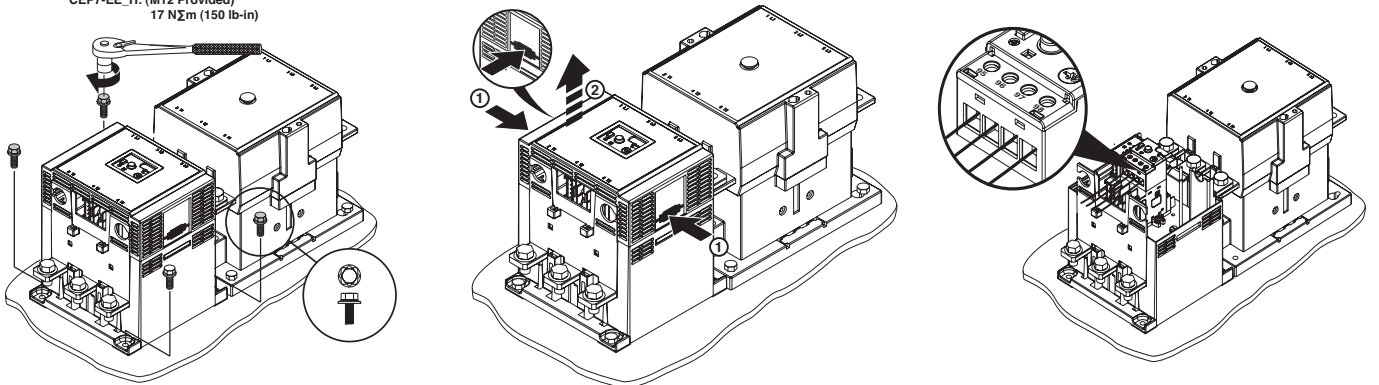


B
CEP7 Overloads

| Overload Relay Cat. | Contactor Cat. | A Width | B Height | | B1 | C Depth | D | E1 | E2 | F | G | H | J | K | M |
|------------------------|----------------|----------------|-------------------------|----------------------|------------------|-----------------|------------------|-------------|------------------|----------------|---------------|---------------|---------------|---------------|-----------------|
| | | | Without Terminal Covers | With Terminal Covers | | | | | | | | | | | |
| CEP7-EEHF CEP7-EEJF | CA6-115 (EI) | 120 (4.72) | 339.8 | 418 | 317.8 (12.51) | 152.7 (6.01) | 156 (6.14) | 36 (.14) | 226.3 (8.91) | 16 (.63) | 100 (3.94) | 145 (5.71) | 135 (5.31) | 22.3 (.88) | ● 5.6 (0.22) |
| | CA6-140 (EI) | | 385.8 | 487.4 | | | | | | | | | | | |
| | CA6-180 (EI) | | 487.4 | 576.5 | | | | | | | | | | | |
| CEP7-EE_G | CA6-210 EI | 155 (6.10) | 385.8 | 487.4 | 360.8 (14.2) | 176.5 (6.95) | 180 (7.09) | 36 (.14) | 265.5 (10.44) | 21 (.83) | 130 (5.12) | 180 (7.09) | 140 (5.51) | 23.5 (.93) | ● 6.5 (0.26) |
| | CA6-300-EI | | 487.4 | 576.5 | | | | | | | | | | | |
| | CA6-420 EI | | 576.5 | 665.6 | | | | | | | | | | | |
| CEP7-EE_H | CA6-630 EI | 255 (10.04) | 552 | 915 | 508 (20) | 269.3 (10.6) | 270.7 (10.66) | 36 (.14) | 384.1 (15.12) | 52.5 (2.07) | 226 (8.90) | 230 (9.06) | 108 (4.25) | 109 (4.29) | ● 13 (0.51) |
| | CA6-860 EI | | 915 | 1004.1 | | | | | | | | | | | |

Assembly Instructions

- CEP7-EE_F: (M5)
3.4 NΣm (30 lb-in)
- CEP7-EE_G: (M6)
5.1 NΣm (45 lb-in)
- CEP7-EE_H: (M12 Provided)
17 NΣm (150 lb-in)



● 8 mounting holes.

Series CEP9 Electronic Overload Relays

Choose Series CEP9 overloads for advanced communication and motor protection



- Intelligent motor protection (EtherNet/IP enabled)
- Scalable solution
- Diagnostic Information
- Integrated I/O
- Adjustable trip class 5...30
- Wide current range
- Test/Reset button
- Programmable trip and warning settings
- True RMS current/voltage sensing (50/60 Hz)
- Protection for single- and three-phase motors

The CEP9 Electronic Overload Relay is an advanced electronic overload from Sprecher + Schuh. Its modular design, communication options, diagnostic information, simplified wiring and integration into Logix make this the ideal overload for motor control applications in an automation system. The CEP9 Overload Relay provides flexibility, reduces engineering time, and maximizes uptime for important motor starter applications.

Intelligent Motor Protection

Easy automation system integration

- Network Connectivity
- Native I/O
- DeviceLogix™ Technology Enabled
- Pre-programmed Operating Modes

Diagnostic Information

Monitor motor performance

- Voltage, Current and Energy
- Trip / Warning Histories
- % Thermal Capacity Utilization
- Time to Trip
- Time to Reset
- Operational Hours
- Number of Starts
- Snapshot Log



Modular Design

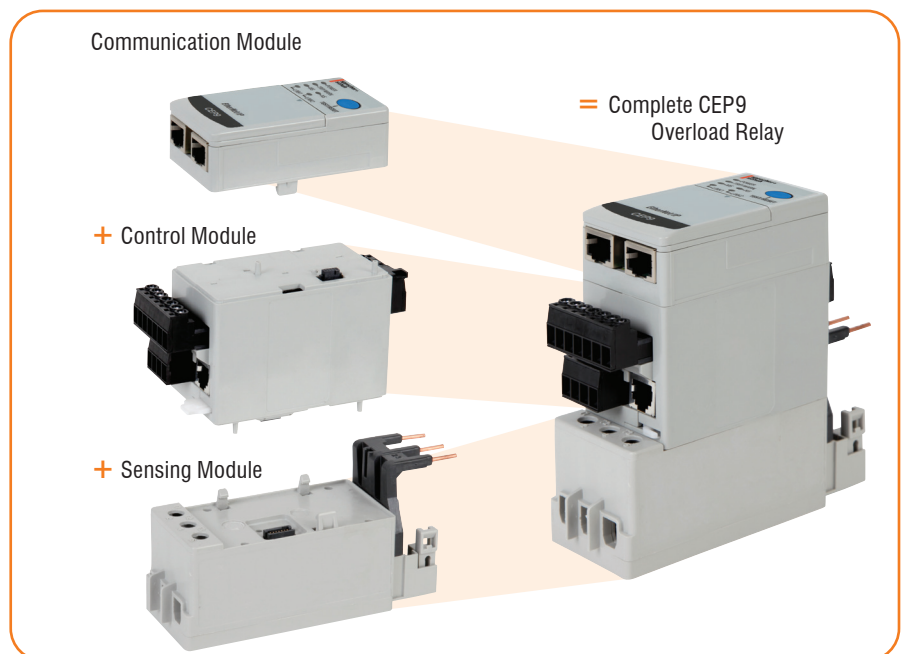
For exact application needs

- Wide Current Range
- Multiple Sensing Capabilities
- Expansion I/O
- Operator Interface

On Board Features

The CEP9 Overload Relay incorporates the newest technologies directly into the device to help simplify installation and configuration. Simplified wiring between the CEP9 overload relay and CA7 or CA9 contactor ensure easy installation.

On-device settings include network address configuration, restore factory default settings, and enable security settings. CEP9 overloads also include removable terminal blocks, I/O and Operator Station Dual Port EtherNet/IP, and it supports device level ring.



Thermal Utilization

The CEP9 Electronic Overload Relay provides overload protection through true RMS current measurement of the individual phase currents of the connected motor. Based on this information, a thermal model that simulates the actual heating of the motor is calculated. Percent of thermal capacity utilization (%TCU) reports this calculated value and can be read via a communications network. An overload trip occurs when the value reaches 100%.

Adjustable Settings

Thermal overload protection setup is accomplished simply by programming the motor's full load current (FLC) rating and the desired trip class (5...30). Programming of the actual values through software programming ensures the accuracy of the protection.

Thermal Memory

The CEP9 Electronic Overload Relay includes a thermal memory circuit designed to approximate the thermal decay for a trip class 20 setting. This means that the thermal model of the connected motor is maintained at all times, even if the supply power is removed.

Reset Modes

This flexibility allows the end-user the ability to select between manual and automatic reset for an overload trip, allowing for broad application. The point of reset is user adjustable from 1...100% TCU.

Time to Trip

During an overload condition, the CEP9 Electronic Overload Relay provides an estimated time to trip that is accessible via a communications network. This allows corrective action to be taken so that production may continue uninterrupted.

Time to Reset

Following an overload trip, the CEP9 Electronic Overload Relay will not reset until the calculated percentage of thermal capacity utilization falls below the reset level. As this value decays, the



time to reset, which is accessible via a communications network, is reported.

Thermal Warning

The CEP9 Electronic Overload Relay provides the capability to alert in the event of an impending overload trip. A thermal warning bit is set in the Warning Status when the calculated percentage of thermal capacity utilization exceeds the programmed thermal warning level, which has a setting range of 0...100% TCU.

Two-Speed Protection

The CEP9 Electronic Overload Relay offers a second FLA setting for 2-speed motor protection. What used to require two separate overload relays - one for each set of motor windings - can now be accomplished with one device. Improved protection is delivered as thermal utilization is maintained in one device during operation in both speeds.

Phase Loss

The CEP9 Electronic Overload Relay offers configurable phase loss protection, allowing the installer to enable or disable the function, plus set a time delay adjustable from 0.1...25.0 seconds. The trip level is factory-set at a current imbalance measurement of 100%.

Ground (Earth) Fault

The CEP9 Electronic Overload Relay incorporates zero sequence (core balance) sensing into its design for low level (arcing) ground fault detection. Trip and warning settings are adjustable from 20 mA...5.0 A. For devices rated greater than 200 A and for ground fault detection less than 1.0 A, the external core balance current transformer accessory is required. Class I protection is provided as defined by UL1053. The CEP9 Electronic Overload Relay provides a max. trip-inhibit setting, offering flexibility to prevent tripping

when the ground fault current magnitude exceeds 6.5 A. This can be useful to guard against the opening of the controller when the fault current could potentially exceed the controller's interrupting capacity rating.

Note: The CEP9 Electronic Overload Relay is not a Ground Fault Circuit Interrupter for personnel protection as defined in article 100 of the U.S. National Electric Code.

Stall

“Stall” is defined as a condition where the motor is not able to reach full-speed operation in the appropriate amount of time required by the application. This can result in motor overheating as current draw is in excess of the motor's full load current rating. The CEP9 Electronic Overload Relay provides user-adjustable stall protection. The trip setting has a range of 100...600% FLA, and the enable time is adjustable up to 250 seconds.

Jam (Overcurrent)

The CEP9 Electronic Overload Relay can respond quickly to take a motor off-line in the event of a mechanical jam, thereby reducing the potential for damage to the motor and the power transmission components.

Trip adjustments include a trip setting adjustable from 50...600% FLA and a trip delay time with a range of 0.1...25.0 seconds. A separate warning setting is adjustable from 50...600% FLA.



Underload (Undercurrent)

A sudden drop in motor current can signal conditions such as:

- Pump cavitation
- Tool breakage
- Belt breakage

For these instances, rapid fault detection can help minimize damage and aid in reducing production downtime.

Additionally, monitoring for an underload event can provide enhanced protection for motors that are coded by the medium handled (e.g., submersible pumps that pump water). Such motors can become overheated despite being underloaded. This can result from an absence or an insufficient amount of the medium (due to clogged filters, closed valves, etc.).

The CEP9 Electronic Overload Relay offers underload trip and warning settings adjustable from 10...100% FLA. The trip function also includes a trip delay time with a range of 0.1...25.0 seconds.

Current Imbalance (Asymmetry)

The CEP9 Electronic Overload Relay offers current imbalance trip and warning settings adjustable from 10...100%. The trip function also includes a trip delay time with a range of 0.1...25.0 seconds.

Remote Trip

The remote trip function allows an external device (e.g., a vibration sensor) to induce the CEP9 Electronic Overload Relay to trip. External device relay contacts are wired to the CEP9 Electronic Overload Relay discrete inputs. These discrete inputs are configurable with an option for assigning the remote trip function.

Current Monitoring Functions

The CEP9 Electronic Overload Relay allows the user to monitor the following operational data over a communications network:

- Individual phase currents — in amperes
- Individual phase currents — as a percentage of motor FLC
- Average current — in amperes
- Average current — as a percentage of motor FLC
- Percentage of thermal capacity utilized
- Current imbalance percentage
- Ground fault current

Diagnostic Functions

The CEP9 Electronic Overload Relay allows the user to monitor the following diagnostic information over the Ethernet/IP network:

- | | |
|-----------------------------------|--------------------------------|
| • Device status | • History of past five trips |
| • Trip status | • History of positive warnings |
| • Warning status | • Hours of operation |
| • Time to an overload trip | • Number of starts |
| • Time to reset after an overload | • Trip snapshot trip |

Status Indicators

The CEP9 Electronic Overload Relay provides the following LED indicators:

- **Power** — This green/red LED indicates the status of the overload relay.
- **TRIP/WARN** — This LED flashes a yellow code under a warning condition and a red code when tripped.

Inputs/Outputs

Inputs allow the connection of such devices as contactor and disconnect auxiliary contacts, pilot devices, limit switches, and float switches. Input status can be monitored via the network and mapped to a controller's input image table. Inputs are rated 24V DC, 120V AC, or 240V AC and are current sinking. Power for the inputs is sourced separately with convenient customer sources at terminal A1. Relay contact outputs can be controlled via the network or DeviceLogix function blocks for performing such tasks as contactor operation.

Test/Reset Button

The Test/Reset button, located on the front of the CEP9 Electronic Overload Relay, allows the user to perform the following:

- **Test** — The trip relay contact will open if the CEP9 Electronic Overload Relay is in an untripped condition and the Test/Reset button is pressed for 2 seconds or longer.
- **Reset** — The trip relay contact will close if the CEP9 Electronic Overload Relay is in a tripped condition, supply voltage is present, and the Test/Reset button is pressed.

Single/Three-Phase Operation

The CEP9 Electronic Overload Relay can be applied to three-phase as well as single-phase applications. A programming parameter is provided for selection between single- and three-phase operation. Straight-through wiring is afforded in both cases.





EtherNet/IP Communications

The CEP9 EtherNet/IP communication module has two RJ45 ports that act as an Ethernet switch to support a star, linear, and ring topology and supports the following:





- 2 concurrent Class 1 connections [1 exclusive owner + (1 input only or 1 listen only)]
- 6 simultaneously Class 3 connections (explicit messaging)
- Embedded web server
- SMPT server for trip and warning events
- Embedded EDS file



Current Sensing Module

| Description | Mounting Options | For Use With | Current Range [A] | Catalog Number |
|---|---|--|-------------------|--------------------|
|  | IEC Contactors | CA7-9...23 | 0.5...30 | CEP9-ESM-I-23-30 |
| | | CA7-30...55 | 0.5...30 | CEP9-ESM-I-55-30 |
| | | | 6...60 | CEP9-ESM-I-55-60 |
| | | CA7-60...97 | 10...100 | CEP9-ESM-I-97-100 |
| | | CA6-115...180 | 20...200 | CEP9-ESM-I-180-200 |
| | | CA9-116...146 | 20...200 | CEP9-ESM-I-146-200 |
| CA9-190...205 | 20...200 | CEP9-ESM-I-205-200 | | |
|  | DIN Rail Mount (to 60A) ① | All contactors and external current transformers | 0.5...30 | CEP9-ESM-I-T-30 |
| | DIN Rail Mount (10 to 200A) ② | All contactors | 6...60 | CEP9-ESM-I-T-60 |
| | | | 10...100 | CEP9-ESM-I-T-100 |
| | | | 20...200 | CEP9-ESM-I-T-200 |
|  | DIN Rail / Panel Mount | All contactors and external current transformers | 0.5...30 | CEP9-ESM-I-7T-30 |
| | | All contactors | 6...60 | CEP9-ESM-I-7T-60 |
| | | | 10...100 | CEP9-ESM-I-7T-100 |
|  | DIN Rail Mount Pass-thru (to 60A) ① | All contactors and external current transformers | 0.5...30 | CEP9-ESM-I-P-30 |
| | DIN Rail Mount Pass-thru (10 to 200A) ② | All contactors | 6...60 | CEP9-ESM-I-P-60 |
| | | | 10...100 | CEP9-ESM-I-P-100 |
| | | | 20...200 | CEP9-ESM-I-P-200 |

Current/Ground Fault Sensing Module

| Description | Mounting Options | For Use With | Current Range[A] | Catalog Number |
|---|---|--|------------------|---------------------|
|  | IEC Contactors | CA7-9...23 | 0.5...30 | CEP9-ESM-IG-23-30 |
| | | CA7-30...55 | 0.5...30 | CEP9-ESM-IG-55-30 |
| | | | 6...60 | CEP9-ESM-IG-55-60 |
| | | CA7-60...97 | 10...100 | CEP9-ESM-IG-97-100 |
| | | CA6-115...180 | 20...200 | CEP9-ESM-IG-180-200 |
| | | CA9-116...146 | 20...200 | CEP9-ESM-IG-146-200 |
| CA9-190...205 | 20...200 | CEP9-ESM-IG-205-200 | | |
|  | DIN Rail Mount (up to 60A) ① | All contactors and external current transformers | 0.5...30 | CEP9-ESM-IG-T-30 |
| | DIN Rail Mount (10 to 200A) ② | All contactors | 6...60 | CEP9-ESM-IG-T-60 |
| | | | 10...100 | CEP9-ESM-IG-T-100 |
| | | | 20...200 | CEP9-ESM-IG-T-200 |
|  | DIN Rail / Panel Mount | All contactors and external current transformers | 0.5...30 | CEP9-ESM-IG-7T-30 |
| | | All contactors | 6...60 | CEP9-ESM-IG-7T-60 |
| | | | 10...100 | CEP9-ESM-IG-7T-100 |
|  | DIN Rail Mount Pass-thru (to 60A) ① | All contactors and external current transformers | 0.5...30 | CEP9-ESM-IG-P-30 |
| | DIN Rail Mount Pass-thru (10 to 200A) ② | All contactors | 6...60 | CEP9-ESM-IG-P-60 |
| | | | 10...100 | CEP9-ESM-IG-P-100 |
| | | | 20...200 | CEP9-ESM-IG-P-200 |

Items in Gray are discontinued

① For Panel Mount option use KT7-45-AS Screw Adaptor. See page F16.

② For Panel Mount option use CEP9-ESM-SA-100 Screw Adaptor. See page B33.

Voltage/Current/Ground Fault Sensing Module

| Description | Mounting Options | For Use With | Current Range[A] | Catalog Number |
|-------------|-------------------------------|--|----------------------------|-----------------------------|
| | IEC Contactors | CA7-9...23 | 0.5...30 | CEP9-ESM-VIG-23-30 |
| | | CA7-30...55 | 0.5...30 | CEP9-ESM-VIG-55-30 |
| | | | 6...60 | CEP9-ESM-VIG-55-60 |
| | | CA7-60...97 | 10...100 | CEP9-ESM-VIG-97-100 |
| | | CA6-115...180 | 20...200 | CEP9-ESM-VIG-180-200 |
| | | CA9-116...146 | 20...200 | CEP9-ESM-VIG-146-200 |
| | DIN Rail Mount (up to 60A) ❶ | All contactors | 0.5...30 | CEP9-ESM-VIG-T-30 |
| | | | 6...60 | CEP9-ESM-VIG-T-60 |
| | DIN Rail Mount (10 to 100A) ❷ | | 10...100 | CEP9-ESM-VIG-T-100 |
| | | | 20...200 | CEP9-ESM-VIG-T-200 |
| | DIN Rail / Panel Mount | | 0.5...30 | CEP9-ESM-VIG-7T-30 |
| | | | 6...60 | CEP9-ESM-VIG-7T-60 |
| | DIN Rail / Panel Mount | 10...100 | CEP9-ESM-VIG-7T-100 | |
| | | | | |
| | DIN Rail Mount Pass-thru ❶ | All contactors and external current transformers | 0.5...30 | CEP9-ESM-VIG-CT-30 |

Items in Gray are discontinued

Control Module




| Description | Rated Control Voltage [V] | No. of Inputs/Outputs | Catalog Number |
|-------------|-------------------------------|-------------------------|--|
| | I/O Module | 110...120V AC, 50/60 Hz | 4 In/3 Out CEP9-EIO-43-120 |
| | | 220...240V AC, 50/60 Hz | 4 In/3 Out CEP9-EIO-43-240 |
| | | 24V DC | 6 In/3 Out CEP9-EIO-63-24D |
| | Ground Fault & PTC I/O Module | 110...120V AC, 50/60 Hz | 2 In / 2 Out CEP9-EIOGP-22-120 |
| | | 220...240V AC, 50/60 Hz | 2 In / 2 Out CEP9-EIOGP-22-240 |
| | | 24V DC | 4 In / 2 Out CEP9-EIOGP-42-24D |

Communication Module



| Description | Catalog Number |
|--|---------------------|
| <p>EtherNet/IP Communication ❸</p> <p>The EtherNet/IP communication module has two RJ45 ports that support a star, linear, and ring topology and supports the following:</p> <ul style="list-style-type: none"> • 2 concurrent Class 1 connections [1 exclusive owner + (1 input only or 1 listen only)] • 6 simultaneous Class 3 connections (explicit messaging) • Embedded web server • SMTP server for trip and warning events (email and text messaging) • Embedded EDS files | CEP9-ECM-ETR |
| <p>Parameter Configuration Module ❸</p> <p>The Parameter Configuration Module (PCM) has one Type B USB interface port and supports the following:</p> <ul style="list-style-type: none"> • Stand-alone non-networked applications • Three rotary dials to set Full Load Amps (FLA) • 8-position DIP switch for trip class and feature selection | CEP9-ECM-PCM |

- ❶ For Panel Mount option use KT7-45-AS Screw Adaptor. See page F16.
- ❷ For Panel Mount option use CEP9-ESM-SA-100 Screw Adaptor. See page B33.
- ❸ CEP9 communication modules require user configuration for full functionality.

Expansion Modules








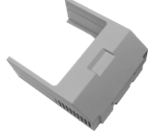
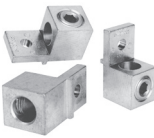
| Description | Rated Control Voltage [V] | No. of Inputs/Outputs | Catalog Number |
|--|---------------------------|------------------------|----------------------------|
|  <p>Analog Expansion Module (mA, V, RTD and Resistance)</p> | ~ | 3 Universal In / 1 Out | CEP9-EXP-AIO-31 ① |
|  <p>Digital Expansion 120V AC</p> <p>Digital Expansion 240V AC</p> <p>Digital Expansion 24V DC</p> | 110...120V AC, 50/60 Hz | 4 In / 2 Out | CEP9-EXP-DIO-42-120 |
| | 220...240V AC, 50/60 Hz | 4 In / 2 Out | CEP9-EXP-DIO-42-240 |
| | 24V DC | 4 In / 2 Out | CEP9-EXP-DIO-42-24D |
|  <p>Expansion Power Supply</p> | 110...240V AC, 50/60 Hz | ~ | CEP9-EXP-PS-AC |
| | 24V DC | ~ | CEP9-EXP-PS-DC |

Accessories

| Description | For Use With | Catalog Number |
|---|--------------|-----------------------|
|  <p>Starter Control Station with 3 meter cable</p> | ~ | CEP9-EOS-SCS |
|  <p>Starter Diagnostic Station with 3 meter cable</p> | ~ | CEP9-EOS-SDS ① |

① Module requires control module firmware v3.000 or higher.

Accessories

| Description | | For Use With | Catalog Number | |
|---|---|--|---------------------------|------------------------|
|  | Contactor Coil Module | CA7-9...23 contactors | CEP9-EIO-CM-23 | |
| | | CA7-30...55 contactors | CEP9-EIO-CM-55 | |
| | | CA7-60...97 contactors | CEP9-EIO-CM-97 | |
|  | Expansion Module Cable | 1 Meter | ~ | CEP9-EXP-CBL-1M |
| | | 3 Meter | ~ | CEP9-EXP-CBL-3M |
|  | Replacement Connectors | CEP9-EIOGP-22- | CEP9-NCIOGP-22-CNT | |
| | | CEP9-EIO-43- | CEP9-NCIO-43-CNT | |
| | | CEP9-EIOGP-42-24D | CEP9-NCIOGP-42-CNT | |
| | | CEP9-EIO-63-24D | CEP9-NCIO-63-CNT | |
| | | CEP9-EXP-DIO-42- | CEP9-NCXP-DIO-CNT | |
| | | CEP9-EXP-AIO-31 | CEP9-NCXP-AIO-CNT | |
| | | CEP9-EXP-PS- | CEP9-NCXP-PS-CNT | |
|  | Panel Mount Screw Adapter | CEP9-ESM-_-T-30 | KT7-45-AS | |
| | | CEP9-ESM-_-T-60 | | |
| | | CEP9-ESM-_-7T-30 | | |
| | | CEP9-ESM-_-7T-60 | | |
| | | CEP9-ESM-_-P-30 | | |
| | | CEP9-ESM-_-P-60 | | |
| | | CEP9-ESM-VIG-CT-30 | | |
|  | Panel Mount Screw Adaptor | CEP9-ESM-_-100 | CEP9-ESM-SA-100 ① | |
|  | Line Side Terminal Cover | CEP9-ESM-_-T-200 | CEP9-ESM-TCT-200 | |
|  | Load Side Terminal Cover | CEP9-ESM-_-180-200 CEP9-ESM-_-205-200 CEP9-ESM-_-T-200 | CEP9-ESM-TCT-200 | |
|  | Contactor Terminal Cover (in between contactor and overload relay) | CEP9-ESM-_-180-200 | CEP9-ESM-TC-180 | |
|  | Screw Type Lugs - <ul style="list-style-type: none"> • Single connections to each pole • Accepts round conductors only • Copper construction • Provided as a set of 3 | CEP9-ESM...-205-200 | CA6-L180 | |

① Sold in multiples of 10. Minimum order is one package of 10. Price is each piece.

Electrical Specifications

Motor/Load Ratings

| | | |
|-------------------------------|------------------------------------|--|
| Terminals | 1/L1, 3/L2, 5/L3, 2/T1, 4/T2, 6/T3 | |
| Rated Insulation Voltage (Ui) | 690V AC | |
| Rated Operating Voltage (Ue) | IEC: 690V AC UL: 600V AC | |
| Rated Impulse Voltage (Uimp) | 6 kV | |
| Rated Operating Current (Ie) | See Catalog Number Explanation | |
| Rated Frequency | 45...65 Hz ❶ | |
| Short Circuit Ratings | See user manual | |
| Number of Poles | 3 | |
| Application | Single-phase or Three-phase | |

Power Supply Ratings

| | | |
|---------------------------------|--------------|---------------|
| Rated Supply Voltage (Us) | 120V AC | 240V AC |
| Operating Range | 85...132V AC | 159...265V AC |
| Maximum Inrush Current | 6 A | |
| Maximum Power Consumption | | |
| CEP9: | 6 W | |
| CEP9 with expansion: | 8 W | |
| Maximum Power Interruption Time | | |
| Vmin: | 10 ms | 10 ms |
| Vmax: | 10 ms | 10 ms |

Output Relay Ratings (Control Module and Expansion Digital Module)

| | | |
|---|---|---------|
| Terminals | Relay 0: | R03/R04 |
| | Relay 1: | R13/R14 |
| | Relay 2: | R23/R24 |
| Type of Contacts | Form A SPST - NO | |
| Rated Thermal Current (Ithe) | 5 A | |
| Rated Insulation Voltage (Ui) | 300V AC | |
| Rated Operating Voltage (Ue) | 250V AC | |
| Rated Operating Current (Ie) | 3 A (@120V AC), 1.5 A (@240V AC) 0.25 A (@110V DC), 0.1 A (@220V DC) | |
| Minimum Operating Current | 10 mA @ 5V DC | |
| Rating Designation | B300 | |
| Utilization Category | AC-15 | |
| Resistive Load Rating (p.f. = 1.0) | 5 A, 250V AC 5 A, 30V DC | |
| Inductive Load Rating (p.f. = 0.4) (L/R = 7 ms) | 2 A, 250V AC 2 A, 30V DC | |
| Short Circuit Current Rating | 1,000 A | |
| Recommended Control Circuit Fuse | KTK-R-6 (6 A, 600 V) | |
| Rated Number of Operations | | |
| Relay 0, Relay 1, and Relay 2: | | |
| with CA7-09...CA7-55 | 5,000,000 | |
| with CA7-60...CA7-97 | 2,500,000 | |

Input Ratings (Control Module and Expansion Digital Module)

| | | | |
|----------------------------|-----------------|-------------|--------------|
| Terminals | Input 0: | INO | |
| | Input 1: | IN1 | |
| | Input 2: | IN2 | |
| | Input 3: | IN3 | |
| | Input 4: | IN4 | |
| | Input 5: | IN5 | |
| Supply Voltage | 24V DC | 120V AC | 240V AC |
| Type of Inputs | Current Sinking | ~ | ~ |
| On-State Voltage | 11V DC | 74V AC | 159V AC |
| On-State Current (turn-on) | 2 mA | 5 mA | 5 mA |
| Off-State Voltage | 5V DC | 20V AC | 40V AC |
| Off-State Current | 1.5 mA | 2.5 mA | 2.5 mA |
| Transition Voltage | 5...11V DC | 20...74V AC | 40...159V AC |
| Transition Current | 1.5...2.0 mA | 2.5...5 mA | 2.5...5 mA |

Low Voltage Directive

The CEP9 Electronic Overload Relay expansion digital modules are tested to comply with EN60947-5-1 Low-voltage switchgear and controlgear Part 5-1: Control circuit devices and switching elements.

Expansion Digital I/O Modules

| | | | |
|--|-------------------|-------------------|-------------------|
| Expansion Digital I/O Modules | CEP9-EXP-DIO-42 | | |
| | -24D | -120 | -240 |
| Digital Output Rated Operational Voltage (Ue): | 250V AC | 250V AC | 250V AC |
| Digital Output Rated Insulation Voltage (Ui): | 2000Vrms for 1s | 2000Vrms for 1s | 2000Vrms for 1s |
| Rated Impulse Withstand Voltage (Uimp): | ~ | ~ | ~ |
| Conditional Short Circuit Current: | 1000 A | 1000 A | 1000 A |
| Recommended Control Circuit Fuse: | KTK-R (6 A, 600V) | KTK-R (6 A, 600V) | KTK-R (6 A, 600V) |
| Utilization Category: | AC15, DC13 | AC15, DC13 | AC15, DC13 |
| Pollution Degree: | 3 | 3 | 3 |

Expansion Power Supply Modules

| | |
|---|-----------------|
| Expansion Power Supply Modules | CEP9-EXP-PS-AC |
| Rated Operational Voltage (Ue): | 100...250V AC |
| Rated Insulation Voltage (Ui): | 2640Vrms for 1s |
| Rated Impulse Withstand Voltage (Uimp): | 4 kV |
| Conditional Short Circuit Current: | ~ |
| Protection Against Short Circuits: | ~ |
| Utilization Category: | ~ |
| Pollution Degree: | 3 |

❶ Exception: Any CEP9 Overload Relay that uses an external ground fault sensor is limited to 50/60 Hz detection.

Environmental Specifications

| | |
|---|---|
| Ambient Temperature ❶ | |
| Storage | -40...+85 °C (-40...+185 °F) |
| Operating (Open) | -20...+55 °C (-4...+131 °F) |
| | (Enclosed) |
| Humidity | |
| Operating | 5...95% Non-condensing |
| Damp Heat – Steady State (per IEC 68-2-3) | 92% r.h., 40 °C (104 °F), 56 days |
| Damp Heat – Cyclic (per IEC 68-2-30) | 93% r.h., 25 °C/40 °C (77 °F/104 °F), 21 Cycles |
| Cooling Method | Natural Convection |
| Vibration (per IEC 68-2-6) | 2.5G operating, 5 G non-operating |
| Shock (per IEC 68-2-27) | 30 G |
| Maximum Altitude | 2000 m ❷ |
| Pollution Environment Pollution Degree | 3 |
| Terminal Marking | EN 50012 |
| Degree of Protection | IP20 |

Electromagnetic Compatibility Specifications

| | |
|--|--|
| Electrostatic Discharge Immunity | |
| Test Level: | 8kV Air Discharge 6kV Contact Discharge |
| Performance Criteria: | 1 ❸❹ |
| RF Immunity | |
| Test Level: | 10V/m |
| Performance Criteria: | 1 ❸❹ |
| Electrical Fast Transient/Burst Immunity | |
| Test Level: | 4kV (Power) 2kV (Control & Comm) |
| Performance Criteria: | 1 ❸❹ |
| Surge Immunity | |
| Test Level: | 2kV (L-E) 1kV (L-L) |
| Performance Criteria: | 1 ❸❹ |
| Radiated Emissions | Class A |
| Conducted Emissions | Class A |

Torque and Wire Size Specifications

| CEP9 Sensing Module | | Torque | | Wire Size | |
|------------------------------|----------|----------|----------|----------------------------|------------------------|
| | | 30A/60A | 100A | 30A/60A | 100A |
| Stranded/Solid [AWG] | Single | 22 lb-in | 35 lb-in | #14...6 AWG | #12...1 AWG |
| | Multiple | 30 lb-in | 30 lb-in | #10...6 AWG | #6...2 AWG |
| Flexible-Stranded w/Ferrule | Single | 2.5 N-m | 4 N-m | 2.5...16mm ² | 4...35 mm ² |
| | Multiple | 3.4 N-m | 4 N-m | 6...10mm ² | 4...25 mm ² |
| Course-Stranded/Solid Metric | Single | 2.5 N-m | 4 N-m | 2.5...25mm ² | 4...50 mm ² |
| | Multiple | 3.4 N-m | 4 N-m | 6...16mm ² | 4...35 mm ² |
| CEP9 Control Module | | Torque | | Wire Size | |
| Stranded/Solid [AWG] | Single | 4 lb-in | | #24...12 AWG | |
| | Multiple | 4 lb-in | | #24...16 AWG | |
| Flexible-Stranded w/Ferrule | Single | 0.45 N-m | | 0.25...2.5 mm ² | |
| | Multiple | 0.45 N-m | | 0.5...0.75 mm ² | |
| Course-Stranded/Solid Metric | Single | 0.45 N-m | | 0.2...2.5 mm ² | |
| | Multiple | 0.45 N-m | | 0.2...1.5 mm ² | |

Protection

| | Trip | Warning |
|-----------------------------|------|---------|
| Overload | Yes | Yes |
| Phase Loss | Yes | No |
| Ground Fault | Yes | Yes |
| Stall | Yes | No |
| Jam | Yes | Yes |
| Underload | Yes | Yes |
| Thermistor (PTC) | Yes | Yes |
| Current Imbalance | Yes | Yes |
| Communication Fault | Yes | Yes |
| Communication Idle | Yes | Yes |
| Remote Trip | Yes | No |
| Blocked Start/Start Inhibit | Yes | No |
| Under Voltage L-L | Yes | Yes |
| Over Voltage L-L | Yes | Yes |
| Voltage Unbalance | Yes | Yes |
| Phase Rotation | Yes | Yes |

Overload Protection

| | |
|----------------------|--|
| Type of Relay | Ambient Compensated Time-Delay Phase Loss Sensitive |
| Nature of Relay | Solid-State |
| FLA Setting | See user manual |
| Trip Rating | 120% FLA |
| Trip Class | 5...30 |
| Reset Mode | Automatic or Manual |
| Overload Reset Level | 1...100% TCU |

Ground Fault Protection (External Ground Fault Module)

| | |
|------------------------------|--|
| Type | Core Balanced |
| Intended Use | Equipment Protection |
| Classification (Per UL 1053) | Class I |
| Protection Range | 20...100 mA 100...500 mA 200 mA...1.0 A 1.0...5.0 A |
| Trip & Warning Time Delay | 0.1...25.0 s |
| Protection Inhibit Time | 0...250 s |

Accuracy

Metering

The CEP9 Electronic Overload Relay metering accuracy is listed below:

| | |
|---------|-------------------------------|
| Current | ±2% of Sensing Module Current |
|---------|-------------------------------|

Range

Protection Timers

All CEP9 Electronic Overload Relay trip timers have a resolution of ±0.1 s or 0.1 s/25 s (whichever is greater).

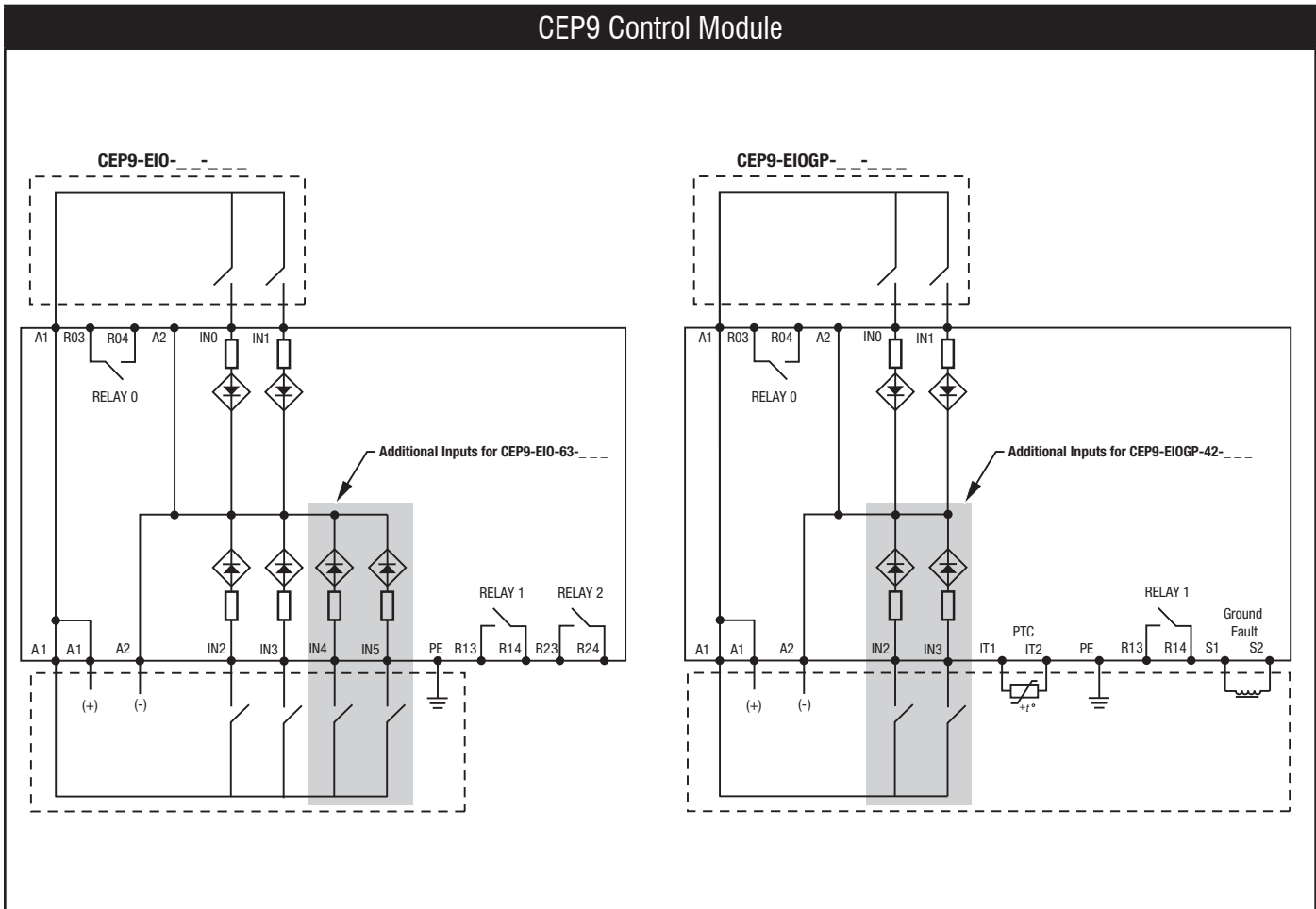
❶ The CEP9 Electronic Overload Relay expansion power supplies (CEP9-EXP-PS-AC and CEP9-EXP-PS-DC) surrounding air temperature must not exceed 55 °C (131 °F).

❷ Any CEP9 Overload Relay that uses an external ground fault sensor is limited to 50/60 Hz detection.

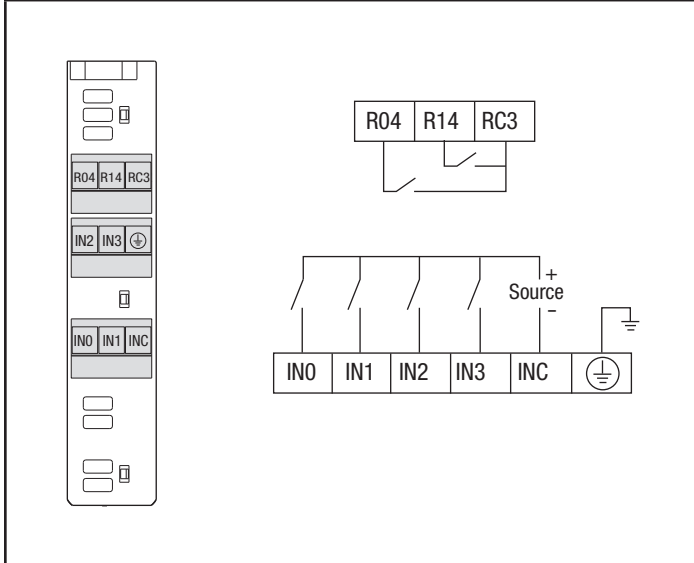
❸ Performance Criteria 1 requires the DUT to experience no degradation or loss of performance.

❹ Environment 2.

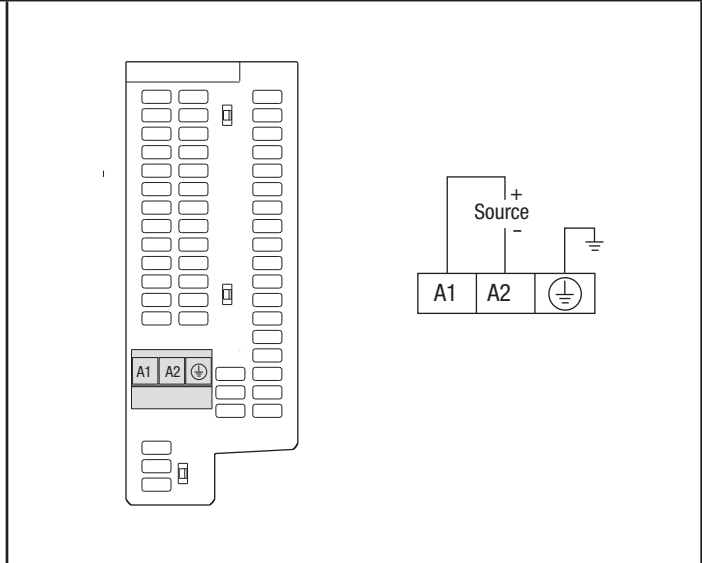
B
CEP9 Overloads



Expansion Digital I/O Modules (CEP9-EXP-DIO-)

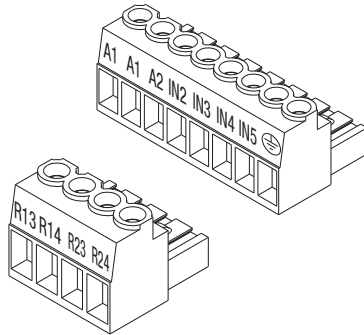


Expansion Power Supplies (CEP9-EXP-PS-)

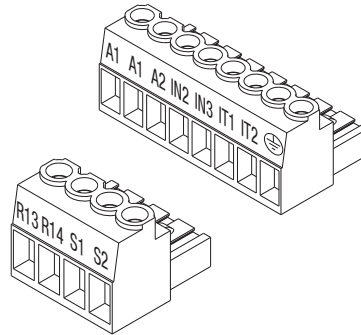


CEP9 Control Module Terminal Designations

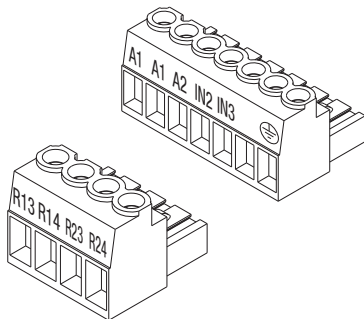
CEP9-EIO-63- ---



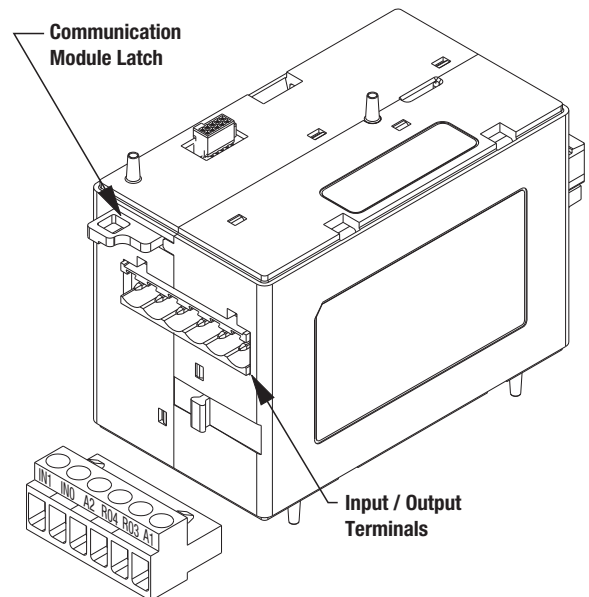
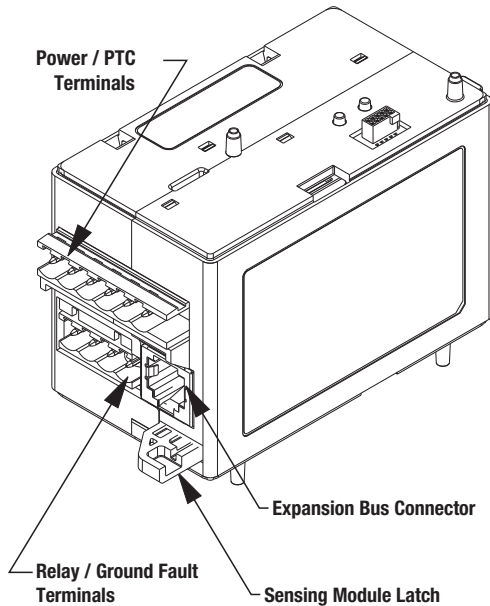
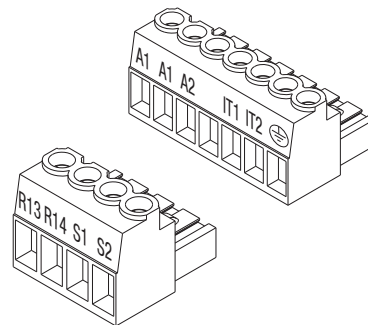
CEP9-EIOGP-42- ---



CEP9-EIO-43- ---



CEP9-EIOGP-22- ---



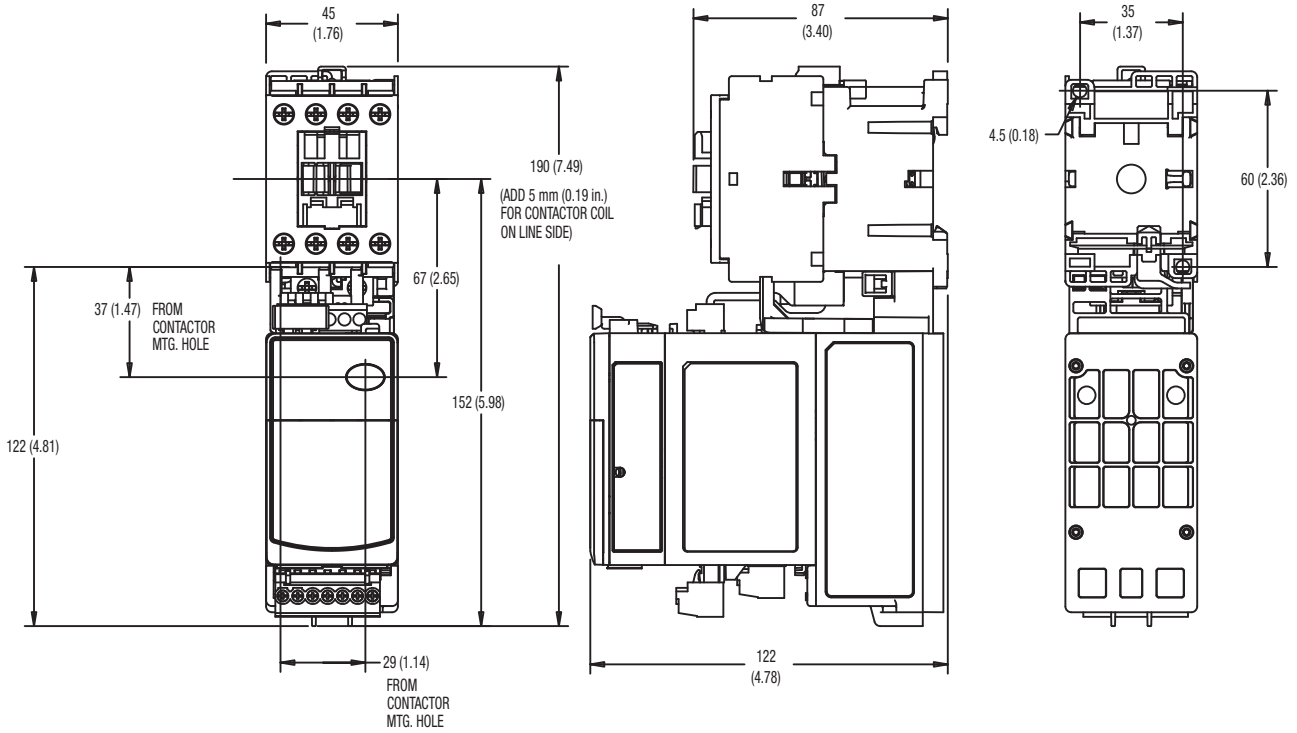
B
CEP9 Overloads

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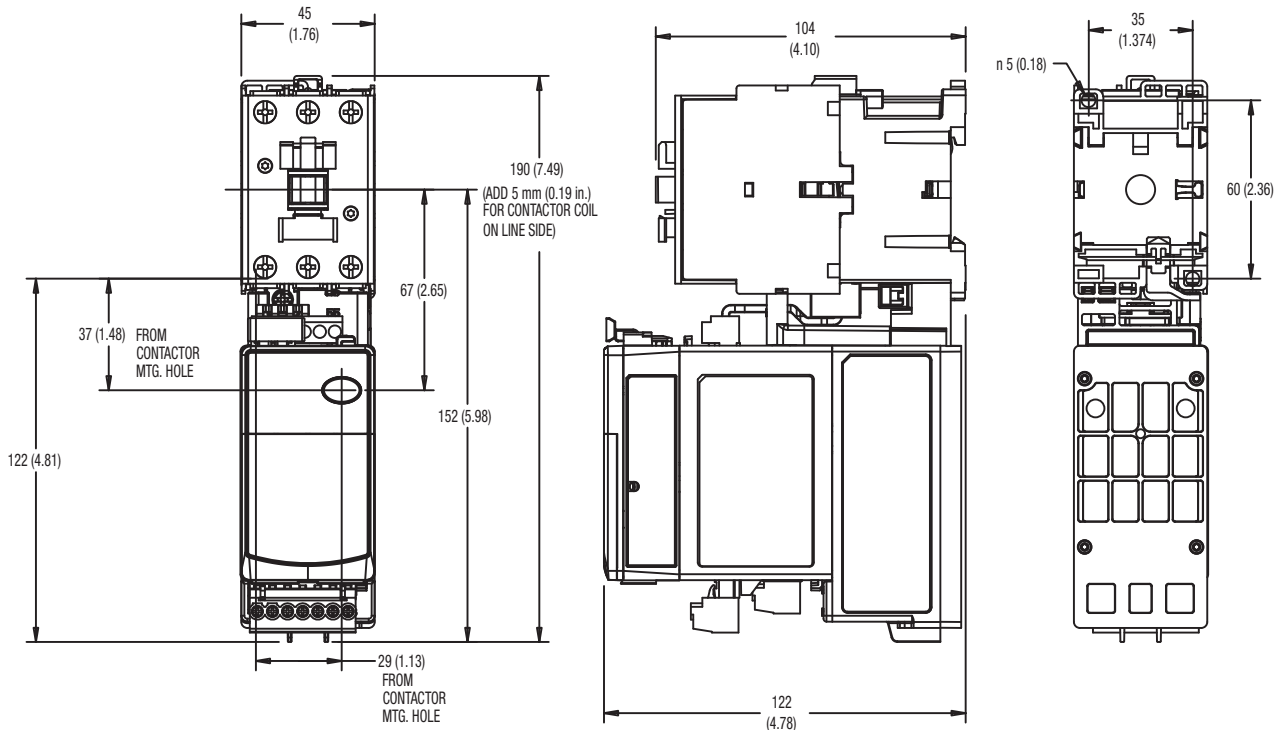
CEP9 Overloads

CEP9 Overload Relay Mounted on CA7-9...23 Contactor

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.

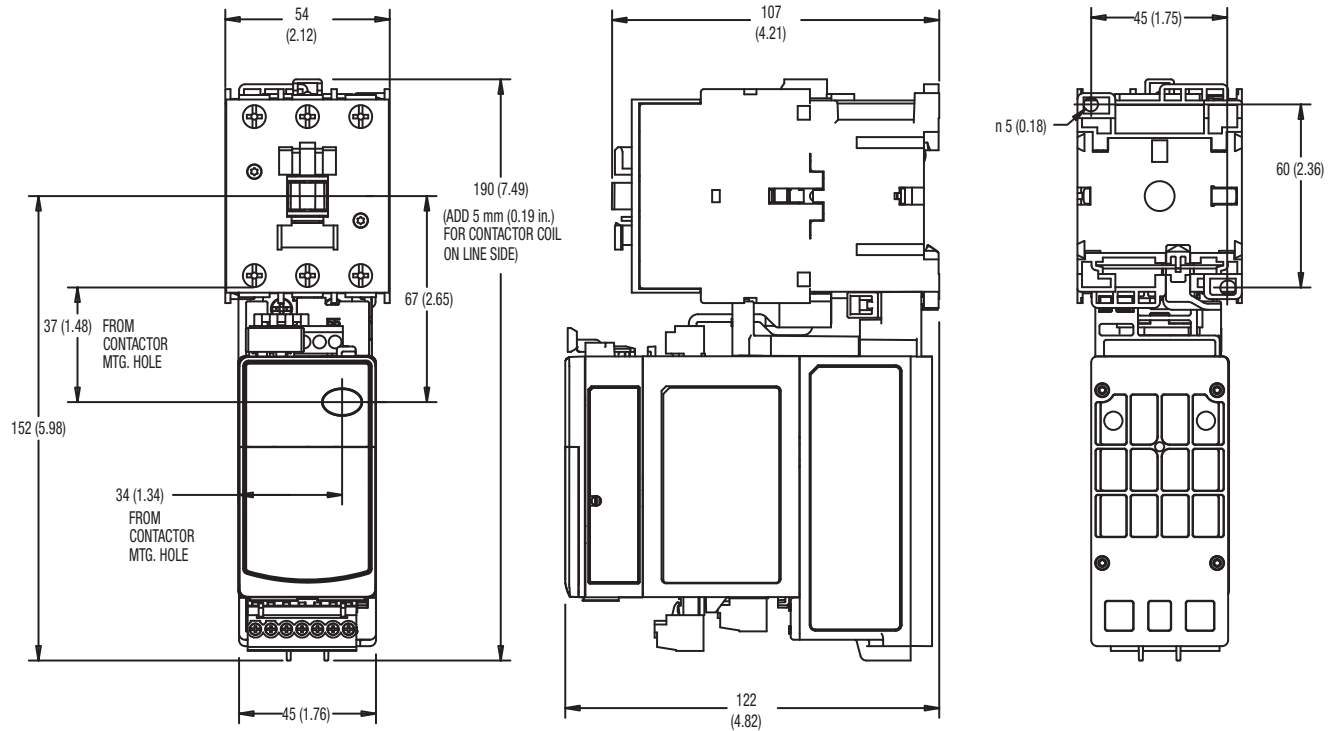


CEP9 Overload Relay Mounted on CA7-30...37 Contactor



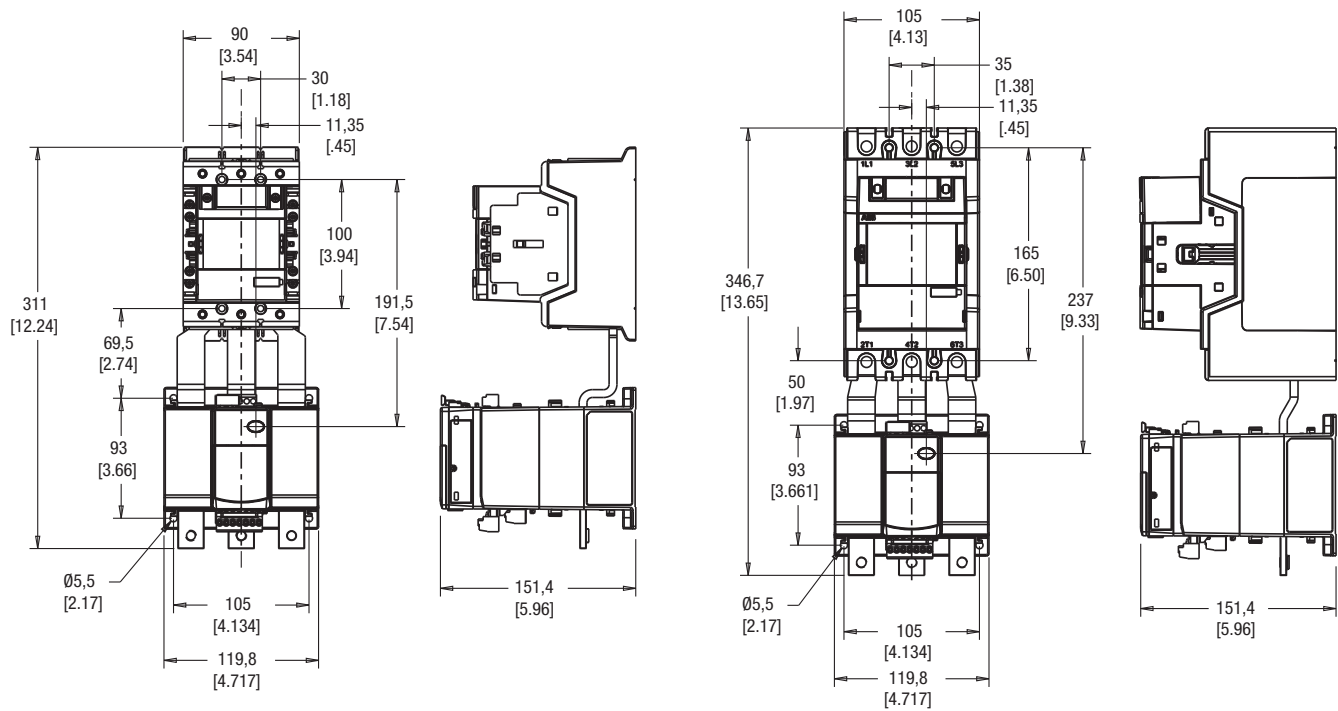
CEP9 Overload Relay Mounted on CA7-43...55 Contactor

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



B
CEP9 Overloads

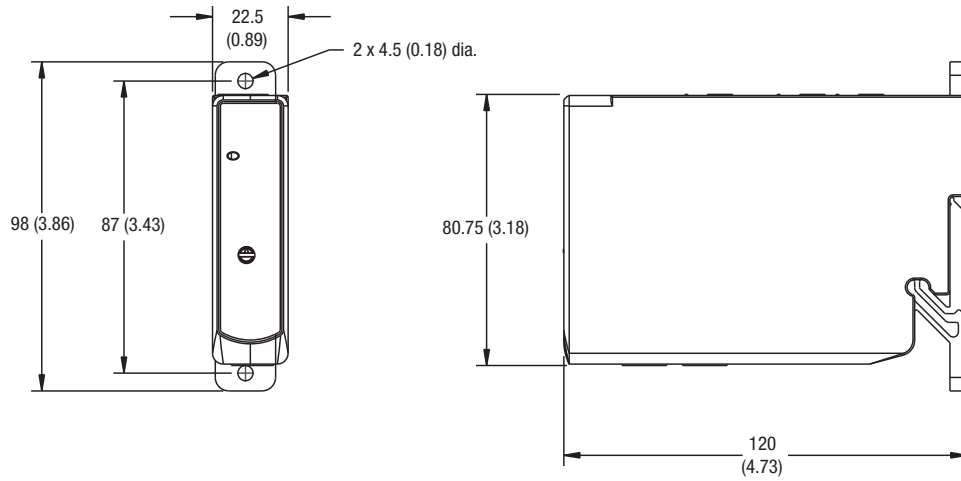
CEP9 Overload Relay Mounted on CA9-116...205 Contactor



CA9-116 AND CA9-146 CONTACTORS SHOWN

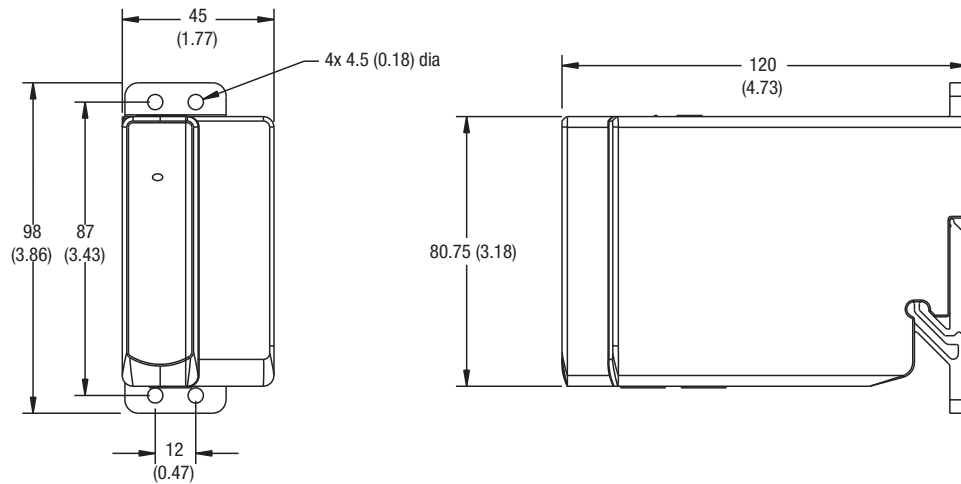
CA9-190 AND CA9-205 CONTACTORS SHOWN

CEP9 Digital Expansion Module (CEP9-EXP-DIO-_)



CEP9 Digital Expansion Power Supply (CEP9-EXP-PS-_)

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



Series CT7N Bimetallic Overload Relays

Choose CT7N overloads in DC applications and when monitoring Variable Frequency Drives



Sprecher + Schuh provides outstanding motor protection with our CT7N Bimetallic Overload Relay

Sprecher + Schuh has always paid particular attention to the subject of motor protection. This concern is reflected in our CT7N line of thermal overload relays which include many standard features not available with the eutectic alloy overload blocks and heater elements of the past.

Consistent and reliable protection

The consistent high quality of Sprecher + Schuh thermal overload relays is ensured by a complex, factory current calibration procedure performed on each unit at full operating temperature. Calibration is performed at the largest and smallest current the overload can handle. The accurate time/current characteristic curve obtained in this manner guarantees reliable motor protection every time.

Superior Class 10 characteristics

Today's T-Frame motors have less copper and iron than the old U-Frame motors that were popular when traditional Class 20 overload relays were designed. For this reason, faster Class 10 overloads like the CT7N Series have been recognized by many motor manufacturers as the ideal type to assure optimum protection of "T" frame motors with applications involving normal start-up conditions.

Protection from single phase conditions

A unique feature not found in traditional thermal overload relays provides accelerated tripping under single phase conditions. This is accomplished with a special "differential tripping" mechanism built into CT7N (see illustration at right).

Ambient temperature compensation

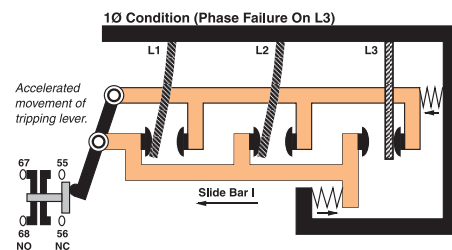
All Sprecher + Schuh thermal overload relays are temperature compensating. An additional bimetallic ambient compensation strip, built into the conductor-bimetal transmission path, ensures that the tripping characteristics of the relay remain constant over an ambient temperature range of -20°C to $+60^{\circ}\text{C}$.

Single phase applications

CT7N Series thermal overload relays can be applied for protection of single phase AC motors. The relays have the same characteristics as shown for three phase operation. To maintain these characteristics, each element of the overload relay must carry the motor current as shown in the connection diagram on page B49.

Other standard features

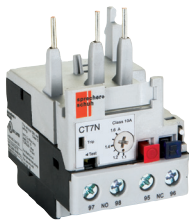

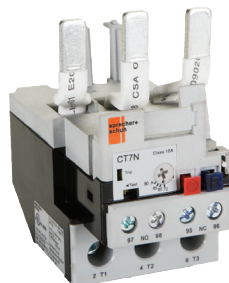


CT7N bimetallic overload relays feature a selectable reset permitting manual or automatic reset modes. A separate NO signal contact is also provided on CT7N overloads, which is isolated from the NC trip contact. This permits the use of a trip signal voltage different than that of the control voltage. The CT7N is also designed to close-couple connect directly to our CA7 contactors, resulting in a compact package.



CT7N Bimetallic Overload Relays offer accelerated tripping under single phase conditions

CT7N Bimetallic Overload Relays, Manual or Automatic Reset ①④

B
CT7N Overloads

| Overload Relay | Directly Mounts to Contactor... | Adjustment Range (A)②③ | Trip Class 10 |
|--|---------------------------------|---|-----------------|
| | | | Catalog Number |
|  <p>CT7N-23-C16</p> | CA7-9...CA7-23 | 0.10...0.16 | CT7N-23-A16 |
| | | 0.16...0.25 | CT7N-23-A25 |
| | | 0.25...0.40 | CT7N-23-A40 |
| | | 0.35...0.50 | CT7N-23-A50 |
| | | 0.45...0.63 | CT7N-23-A63 |
| | | 0.55...0.80 | CT7N-23-A80 |
| | | 0.75...1.0 | CT7N-23-B10 |
| | | 0.90...1.3 | CT7N-23-B13 |
| | | 1.1...1.6 | CT7N-23-B16 |
| | | 1.4...2.0 | CT7N-23-B20 |
| | | 1.8...2.5 | CT7N-23-B25 |
| | | 2.3...3.2 | CT7N-23-B32 |
| | | 2.9...4.0 | CT7N-23-B40 |
| | | 3.5...4.8 | CT7N-23-B48 |
| | | 4.5...6.3 | CT7N-23-B63 |
| | | 5.5...7.5 | CT7N-23-B75 |
| | | 7.2...10 | CT7N-23-C10 |
| | |  <p>CT7N-37-C30</p> | CA7-30...CA7-37 |
| 11.3...16 | CT7N-23-C16 | | |
| 15...20 | CT7N-23-C20 | | |
| 17.5...21.5 | CT7N-23-C21 | | |
| 21...25 | CT7N-23-C25 | | |
| 15...20 | CT7N-37-C20 | | |
|  <p>CT7N-55-C60</p> | CA7-43...CA7-55 | 17.5...21.5 | CT7N-37-C21 |
| | | 21...25 | CT7N-37-C25 |
| | | 24.5...30 | CT7N-37-C30 |
| | | 29...36 | CT7N-37-C36 |
|  <p>CT7N-85-C90</p> | CA7-60...CA7-97 | 33...38 | CT7N-37-C38 |
| | | 17...25 | CT7N-43-C25 |
| | | 24.5...36 | CT7N-43-C36 |
| | | 35...47 | CT7N-43-C47 |
|  <p>Separate mounting required (Panel or DIN-Rail mounted device)</p> | CA7-60...CA7-97 | 45...60 | CT7N-55-C60 |
| | | 35...47 | CT7N-85-C47P |
| | | 45...60 | CT7N-85-C60P |
| | | 58...75 | CT7N-85-C75P |
| | | 72...90 | CT7N-85-C90P |
| 85...97 | CT7N-97-C97P | | |






① CT7N Bimetallic Overload Relays can be used with AC contactors, Electronic DC contactors (CA7-9E...55E) and Two-Winding DC contactors (CA7-60D...97D).

② To select the setting range for use in Wye-Delta Starters, multiply the rated operating current of the motor by a factor of 0.58.

③ For motors with service factor of 1.15 or greater, use motor nameplate full load current. For motors with service factor of 1.0, use 90% of the motor nameplate full load current.

④ Under phase loss condition, this 3-phase two slider bar tripping mechanism will trip in approximately 45 seconds.



Accessories

| Enclosure | Description | For Use With... | Catalog Number |
|--|---|-----------------|---|
|  | DIN-rail / Panel Mount Adapter - For separately mounting thermal overload relays | CT7N-23..37 | CT7N-37-P-A |
|  | Screw Adapter - For screw fixing of the CT7N-37-P-A panel adapter (1 required per adapter) Pkg. of 10. | CT7N-37-P-A | Use KT7-45-AS |
|  | Remote Reset Solenoid - For remote resetting of the overload relay | CT7N ③ CT8 | CMR7N-* <i>Replace * with coil code below</i> |
|  | External Reset Button - Used for manually resetting overloads mounted in enclosures | CT7N all | Use D7 Reset |
|  | Adaptor External Reset - Mounts on relay reset button and provides larger actuation surface. | CT7N ③ CT8 | CT7N-RA3 |

CMR7N Remote Reset Coil Codes

| A.C. Coil Code | Voltage Range ④ | | | D.C. Coil Code | Voltage ⑤ |
|-------------------|-----------------|-------|------------|-------------------|-----------|
| | 50 Hz | 60 Hz | 50 / 60 Hz | | |
| 24Z | ~ | ~ | 24V | 24D | 24VDC |
| 48Z | ~ | ~ | 48V | 48D | 48VDC |
| 120 | 110V | 120V | ~ | 110D | 110VDC |
| 240Z | ~ | ~ | 220...240V | 125D | 125VDC |

Marking Systems ①

| Component | Description | Pkg. Qty. | Catalog Number | See page A54 |
|---|---|-----------|----------------|--------------|
|  | Label Sheet - 1 sheet with 105 self-adhesive paper labels each, 6 x 17mm | 1 | CA7-FMS | |
|  | Marking Tag Sheet - 1 sheet with 160 perforated paper labels each, 6 x 17mm. To be used with transparent cover. | 1 | CA7-FMP | |
| | Transparent Cover - To be used with Marking Tag Sheets. | 100 ② | CA7-FMC | |

① The labeling field of the overload relay may also be written on by hand.

② Minimum order quantity is one package of 100.

③ CMR7N-* and CT7N-RA3 will not mount on separate mount versions of CT7N.

④ Coil consumption of AC coils is 8VA.

⑤ Coil consumption of DC coils is 12 watts.

Electrical Data

B
CT7N Overloads

| Main Circuits | | | CT7N |
|---|------------------------------------|-------------|--|
| Rated Insulation Voltage U_i | [V] | | 690 |
| Rated Impulse Strength U_{imp} | | | |
| Between main poles and between main poles & auxiliaries | | | 6 |
| Between auxiliary circuits | [kV] | | 4 |
| Rated Operating Voltage U_e | | | |
| | IEC | [V AC] | 690 |
| | | [V DC] | 440 |
| | UL, CSA | [V AC] | 600 |
| Rated Frequencies | | [Hz] | 50/60 |
| Power dissipation | | | |
| | up to 0.4 A | [W] | 7 |
| CT7N-23...37 | 0.5...36 A | [W] | 6 |
| | 38 A | [W] | 12 |
| CT7N-43...55 | 25...47 A | [W] | 12 |
| CT7N-85...97 | 47...90 A | [W] | 18 |
| Lifespan | | | |
| Stop function, operates the release contact 95-96 | Mechanical | [Mil. ops.] | 0.25 |
| | Electrical, at max. contact rating | [Mil. ops.] | 0.25 |
| Trip Class | | | |
| | IEC/EN 60947-4-1 | CT7N-23/37 | CT7N-43/55/85/97 |
| | | 10A | 10 |
| | UL | | 10 |
| Trip Rating (ultimate tripping current) | | | 125% FLA |
| Phase Loss Sensitivity: Trip rating at phase loss | | | 115% FLA |
| Reset mode | | | Automatic or Manual |
| Test release | | | Manual release of auxiliary contacts |
| Trip indicator | | | Flag visible through opening on front of relay |
| Approximate weight (unpackaged) | | | |
| | CT7N-23 | | .115 kg |
| | CT7N-37-C20...25 | | .115 kg |
| | CT7N-37-C30...38 | | .155 kg |
| | CT7N-45/55 | | .330 kg |
| | CT7N-85 | | .360 kg |
| | CT7N-85- <u>P</u> | | .415 kg |

| Operating Limits | | CMR7N |
|-------------------------|----------------------|--------------------------------|
| Maximum Command Impulse | | 5s |
| AC 50/60Hz | Pick-up [$x U_s$] | 0.8...1.1 |
| | Drop-out [$x U_s$] | |
| DC | Pick-up [$x U_s$] | 0.7...1.25 |
| | Drop-out [$x U_s$] | |
| Coil Consumption | | |
| AC 50/60Hz | Pick-up [VA-W] | |
| | Hold-in [VA-W] | |
| | Pick-up [$x U_s$] | 17 (24, 110, 125V) 25 (48V) |
| DC | Drop-out [$x U_s$] | 17 (24, 110, 125V) 25 (48V) |

| Control Circuits | | | CT7N |
|---|------------|-----|-----------------------|
| Rated Operating Current I_c | | | |
| | 24V | [A] | 4 |
| AC-15 | 240V | [A] | 2 |
| | 400V | [A] | 1.6 |
| | 690V | [A] | 0.15 |
| | 24V | [A] | 2 |
| DC-13 | 110V | [A] | 0.4 |
| | 220V | [A] | 0.25 |
| | 440V | [A] | 0.08 |
| Thermal Current I_{th} | | | 5 |
| Short Circuit withstand, Fuse | IEC, gL/gG | [A] | 6 |
| Short-circuit withstand, circuit breaker \leq 1kA prospective short-circuit-current | | [A] | 4 |
| Min. contact load for reliable operation | | | 15V, 2 mA |
| Approvals | | | |
| | UL Rating | | A600/Q300 |
| | CSA | | C22.2 No. 14 |
| | cULus | | E33916, NKCR, NKCR7 |
| | IEC/EN | | 6094 S7-1, -4-1, -5-1 |

| Terminations | Main Circuits | | | | | | Control Circuits | Remote Reset |
|----------------------------|---------------------------------|------------------|------------------|-----------------|-----------------|---------------|------------------|--------------|
| | CT7N-23-A16...C25 | CT7N-37-C20...25 | CT7N-37-C30...38 | CT7N-43 CT7N-55 | CT7N-85 CT7N-97 | CT7N-37-P-A | CT7N | CMR7N |
| Terminal Cross-Sections | | | | | | | | |
| Terminal Type | | | | | | | | |
| Terminal Screws | M4 | M4 | M4 | M5 | M6 | M4 | M3.5 | M3.5 |
| Fine stranded with Ferrule | [mm ²] 2x (1.5...4) | 2x (1.5...4) | 1x (2.5...10) | 1x (2.5...16) | 1x (10...35) | 1x (1.5...10) | 2x (1...4) | 2x (1...2.5) |
| Solid or Course Stranded | [mm ²] 2x (1.5...6) | 2x (1.5...6) | 1x (2.5...16) | 1x (2.5...25) | 1x (10...35) | 1x (1.5...16) | 2x (1...4) | 1x (1...2.5) |
| Stranded | [AWG] 2x (16...10) | 2x (14...10) | 1x (10...6) | 1x (10...6) | 1x (8...1) | 1x (16...6) | 2x (18...12) | 1x (16...12) |
| Recommended Torque | [Nm] 1.5...2.2 | 1.5...2.2 | 2.5...3.5 | 2.5...3.5 | 4.5...6 | 1.8...2.8 | 1.2 | 1.2 |
| | [lb-in] 13...20 | 13...20 | 22...31 | 22...31 | 40...53 | 16...25 | 10.6 | 10.6 |
| Pozidrive Screwdriver | Size 2 | 2 | 2 | 2 | ~ | 2 | 2 | 2 |
| Slotted Screwdriver | mm .8 x 5.5 | .8 x 5.5 | .8 x 5.5 | .8 x 5.5 | ~ | .8 x 5.5 | .8 x 5.5 | .8 x 5.5 |
| Hexagon Socket Screw | Size ~ | ~ | ~ | ~ | 4 | ~ | ~ | ~ |

B

CT7N Overloads

General Data

| | CT7N | CT7N |
|---|--|--------------------------------|
| Type of overload relay | Bimetallic, Ambient Compensated, Phase Loss Sensitive | |
| Compensation temperature range | -20...+60°C (-4...+140°F) | |
| Type of Protection in connected state | IP00 IP2X (in a connected state) | |
| Finger Protection | Safe from touch by fingers and back of hand (VDE 0106, Part 100) | |
| Materials | RoHS compliant | |
| Flame Resistivity (Outer housing parts) | UL94: V0 | |
| Environmental | | |
| Climatic Conditions | Storage Temp. Range | -55...+80°C |
| | Operating Temperature Range | -20...+60°C |
| Vibration | Air moisture (Storage/Operating) (per IEC/EN 60068-2-6), service | 5...95% rel. humidity 3g |
| | IEC/EN 61373 (vibration railways) | cat. 1, class B |
| | IEC/EN 60092-504 (vibration ships), service | 0.7g all axes, 2-200 Hz |
| Shock | (per IEC/EN 6800-2-27), transport | 30g |
| | IEC/EN 60068-2-27 (shock half-sinus) service (per IEC/EN 61373 (shock railways)) | 11 ms > 5 g cat. 1, class B |
| Max. Altitude | | 2000 m |
| Pollution Degree | | 3 |

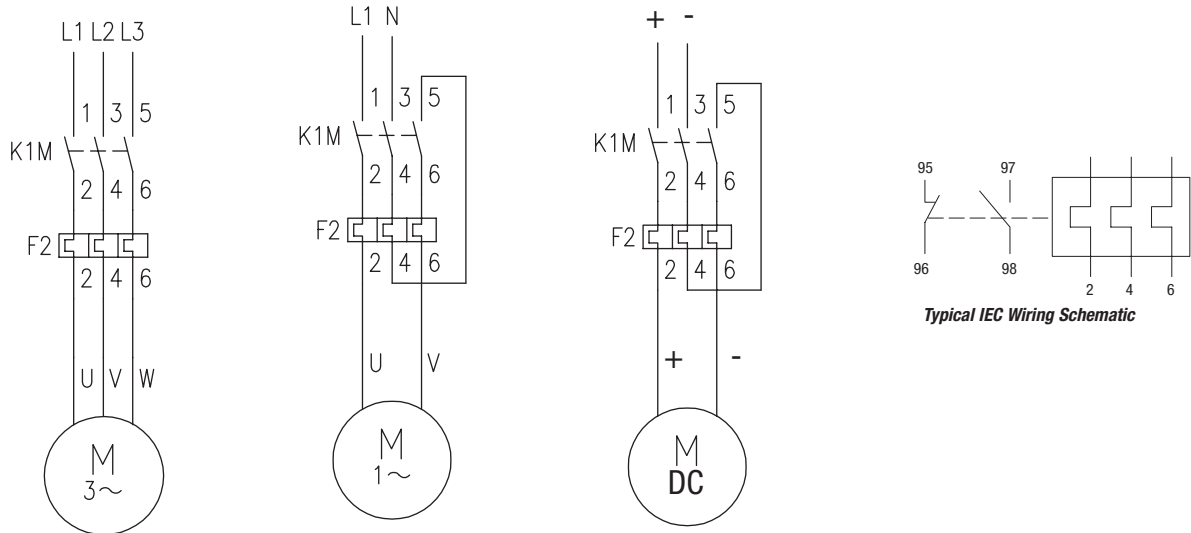
Thermal Overload Relay Maximum Fuse

| For Use With... | Catalog Number | Adjustment Range (A) | Max. Back-up fuse [A] | | |
|---|----------------|----------------------|--|--------|------------------------------|
| | | | gL/gG 50 kA, 690V AC IEC/EN 60947-4-1 Coordination | | UL Class K5 5 kA, 600V AC |
| | | | Type 1 | Type 2 | UL 508 |
| CA7-9...CA7-23 | CT7N-23-A16 | 0.10...0.16 | 50 | ~ | 1 |
| | CT7N-23-A25 | 0.16...0.25 | | ~ | 1 |
| | CT7N-23-A40 | 0.25...0.40 | | 2 | 1 |
| | CT7N-23-A50 | 0.35...0.50 | | 2 | 2 |
| | CT7N-23-A63 | 0.45...0.63 | | 2 | 2 |
| | CT7N-23-A80 | 0.55...0.80 | | 4 | 3 |
| | CT7N-23-B10 | 0.75...1.0 | | 4 | 3 |
| | CT7N-23-B13 | 0.90...1.3 | | 6 | 4 |
| | CT7N-23-B16 | 1.1...1.6 | | 6 | 5 |
| | CT7N-23-B20 | 1.4...2.0 | | 10 | 8 |
| | CT7N-23-B25 | 1.8...2.5 | | 16 | 10 |
| | CT7N-23-B32 | 2.3...3.2 | | 16 | 12 |
| | CT7N-23-B40 | 2.9...4.0 | | 16 | 15 |
| | CT7N-23-B48 | 3.5...4.8 | | 16 | 15 |
| | CT7N-23-B63 | 4.5...6.3 | | 20 | 20 |
| | CT7N-23-B75 | 5.5...7.5 | | 25 | 25 |
| | CT7N-23-C10 | 7.2...10 | | 25 | 35 |
| | CT7N-23-C12 | 9.0...12.5 | | 35 | 50 |
| CT7N-23-C16 | 11.3...16 | 35 | 60 | | |
| CT7N-23-C20 | 15...20 | 80 | 40 | 80 | |
| CT7N-23-C21 | 17.5...21.5 | | 50 | 80 | |
| CT7N-23-C25 | 21...25 | | 50 | 100 | |
| CA7-30...CA7-37 | CT7N-37-C20 | 15...20 | 80 | 40 | 80 |
| | CT7N-37-C21 | 17.5...21.5 | | 50 | 80 |
| | CT7N-37-C25 | 21...25 | | 50 | 100 |
| | CT7N-37-C30 | 24.5...30 | 100 | 63 | 100 |
| | CT7N-37-C36 | 29...36 | 125 | 63 | 125 |
| | CT7N-37-C38 | 33...38 | | 63 | 150 |
| CA7-43...CA7-55 | CT7N-43-C25 | 17...25 | 100 | 50 | 100 |
| | CT7N-43-C36 | 24.5...36 | 125 | 80 | 125 |
| | CT7N-43-C47 | 35...47 | 160 | 100 | 175 |
| | CT7N-55-C60 | 45...60 | 200 | 125 | 150 |
| CA7-60...CA7-97 | CT7N-85-C47 | 35...47 | 160 | 100 | 175 |
| | CT7N-85-C60 | 45...60 | 200 | 125 | 250 ① |
| | CT7N-85-C75 | 58...75 | 200 | 125 | 300 ① |
| | CT7N-85-C90 | 72...90 | 250 | 160 | 350 ① |
| | CT7N-97-C97 | 85...97 | 250 | 160 | 250 ① |
| Separate mounting required (Panel-mounted device) | CT7N-85-C47P | 35...47 | 160 | 100 | 175 ② |
| | CT7N-85-C60P | 45...60 | 200 | 125 | 250 ①② |
| | CT7N-85-C75P | 58...75 | 200 | 125 | 300 ①② |
| | CT7N-85-C90P | 72...90 | 250 | 160 | 350 ①② |
| | CT7N-97-C97P | 85...97 | 250 | 160 | 250 ①② |

① Max. Back-up fuse [A], UL Class K5, 10 kA, 600V AC

② Only in combination with CA7 Contactors.

Connection Diagrams



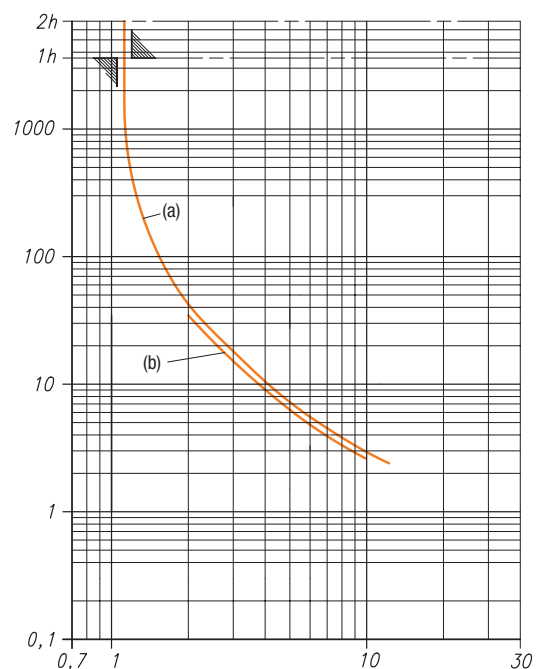
B
CT7N Overloads

Tripping Characteristics

These tripping characteristics refer to IEC/EN 60947-1 and are average values from cold start at an ambient temperature of 20°C. Trip time is pictured as a function of operating current. With the device at max. operating temperature, the trip time decreases to approximately 25% of the shown value.

- (a) Tripping characteristics 3-poles from the cold state
- (b) Tripping characteristics 2-poles from the cold state

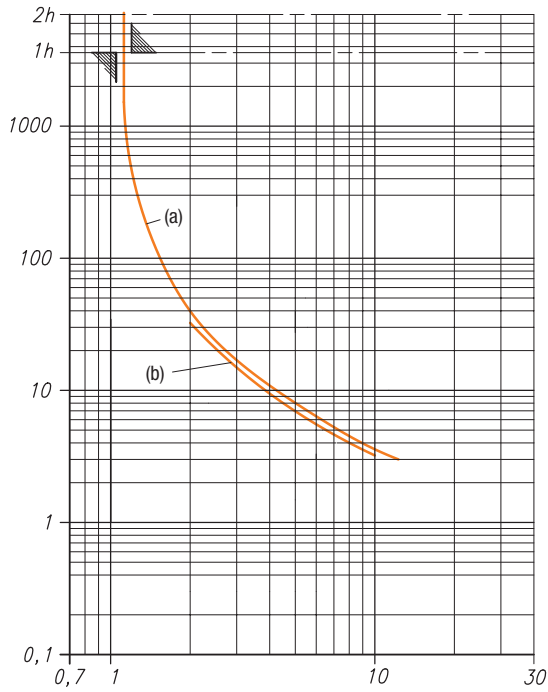
CT7N-23-A16...A40 Overload Relays



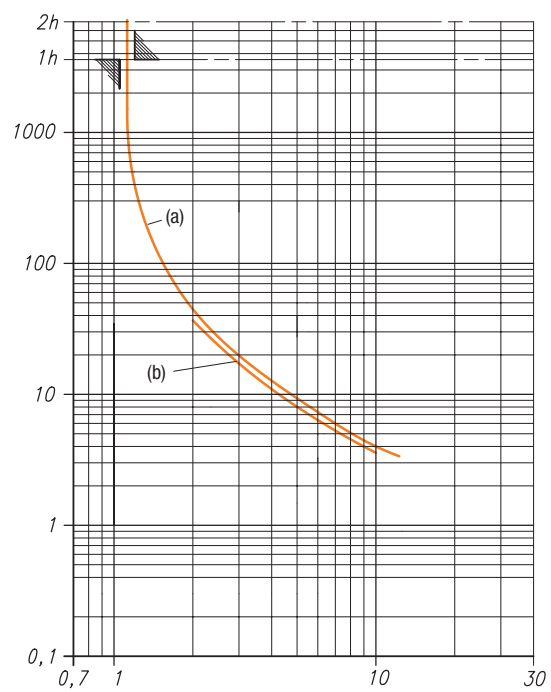
Tripping Characteristics (Continued)

B
CT7N Overloads

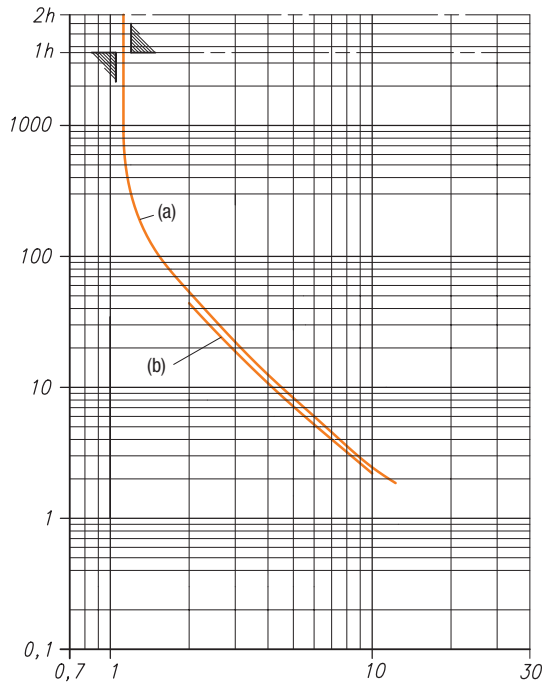
CT7N-23-A50...B40 Overload Relays



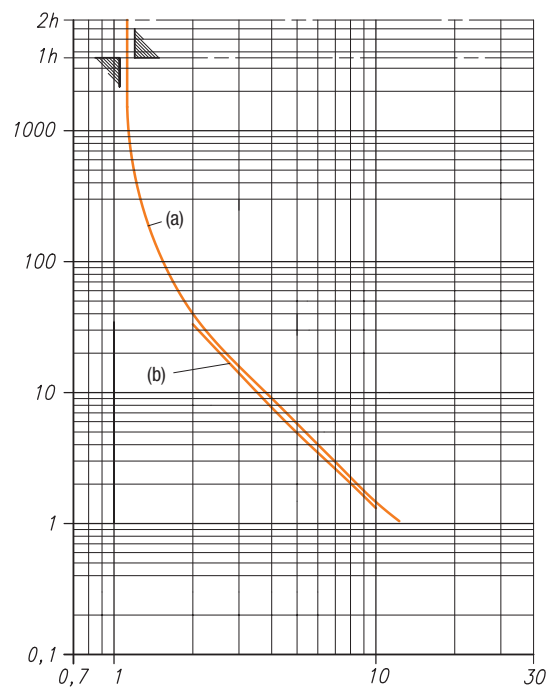
CT7N-23-B48...C25 Overload Relays



CT7N-37-C20...C25 Overload Relays

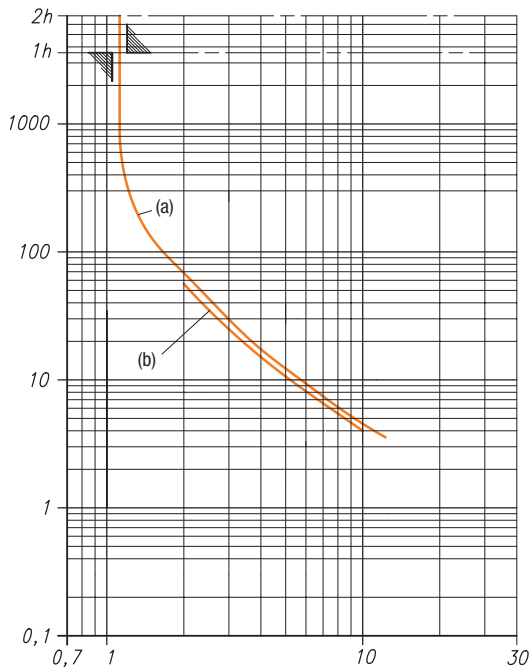


CT7N-37-C30...C38 Overload Relays

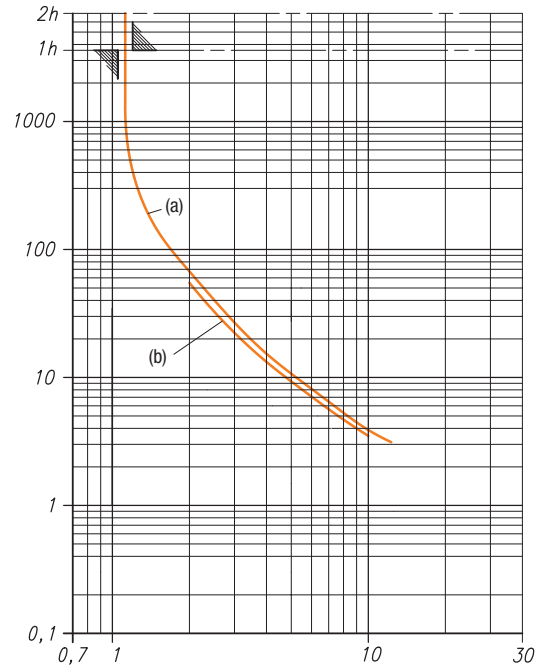


Tripping Characteristics (Continued)

CT7N-43-C25...C47 Overload Relays

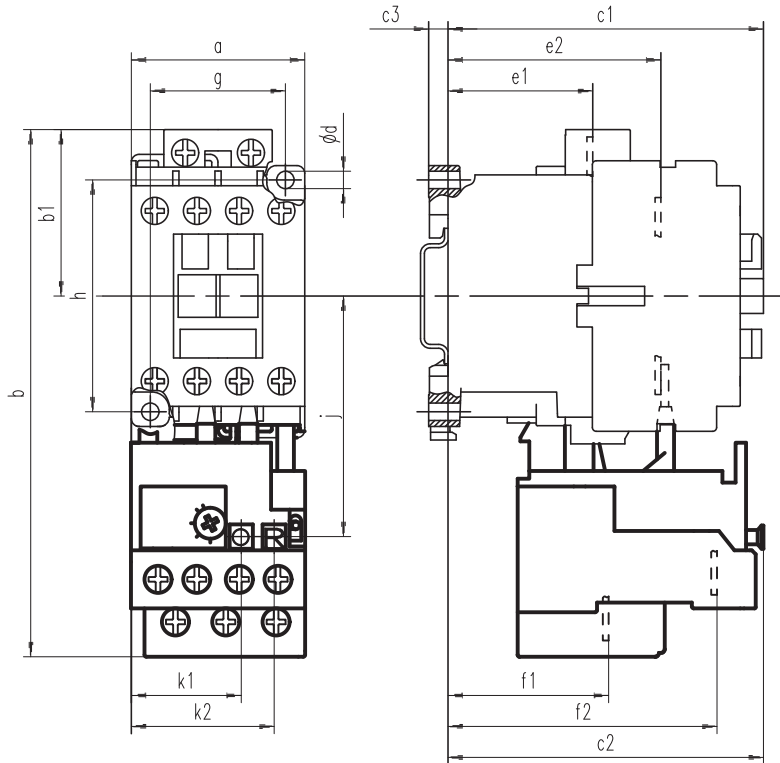


CT7N-85-C47...C90 Overload Relays



Series CT7N (Mounting to CA7 Contactors)

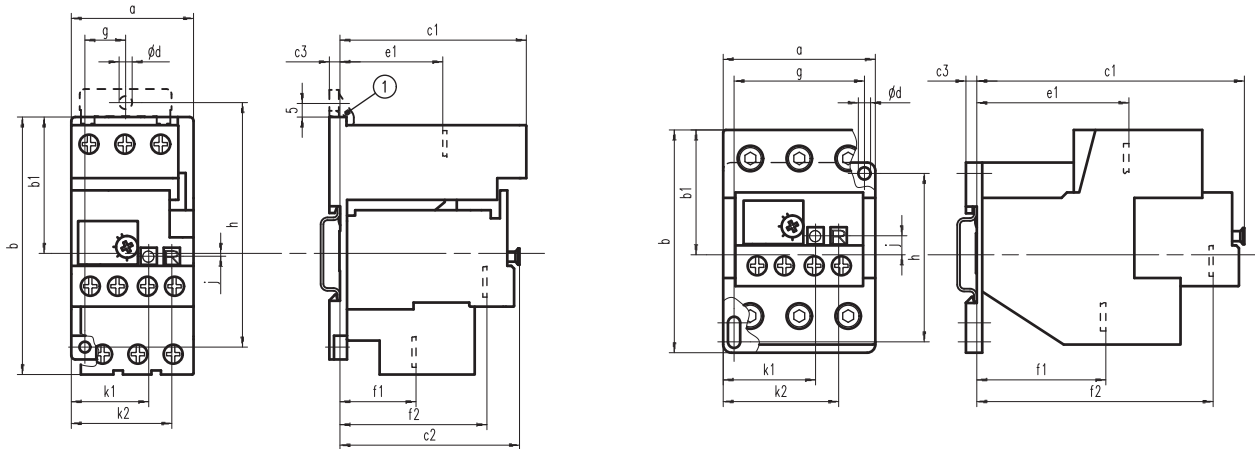
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



| Contactor + Overload | a | b | b1 | c1 | c2 | c3 | ød | e1 | e2 | f1 | f2 | g | h | j | k1 | k2 |
|------------------------------------|-----------------|------------------|-----------------|-------------------|-------------------|---------------|---------------|-------------------|-----------------|-------------------|-------------------|-----------------|------------------|------------------|-------------------|-------------------|
| CA7-9...23 + CT7N-23-A16...C25 | 45 (1-25/32) | 136.5 (5-3/8) | 43 (1-11/16) | 81.5 (3-13/64) | 80.5 (3-11/64) | 5 (13/64) | 4.5 (3/16) | 37.5 (1-15/32) | 55 (2-11/64) | 40.5 (1-19/32) | 68.5 (2-45/64) | 35 (1-3/8) | 60 (2-23/64) | 63.5 (2-1/2) | 29 (1-9/64) | 37.5 (1-15/32) |
| CA7-30...37 + CT7N-37-C20...C25 | 45 (1-25/32) | 136.5 (5-3/8) | 43 (1-11/16) | 99.5 (3-28/32) | 89 (3-1/2) | 5 (13/64) | 4.5 (3/16) | 37.5 (1-15/32) | 60.5 (2-3/8) | 45.5 (1-51/64) | 73 (2-7/8) | 35 (1-3/8) | 60 (2-23/64) | 63.5 (2-1/2) | 29 (1-9/64) | 37.5 (1-15/32) |
| CA7-30...37 + CT7N-37-C30...C38 | 45 (1-25/32) | 149 (5-55/64) | 43 (1-11/16) | 99.5 (3-28/32) | 89 (3-1/2) | 5 (13/64) | 4.5 (3/16) | 37.5 (1-15/32) | 60.5 (2-3/8) | 47 (1-27/32) | 73 (2-7/8) | 35 (1-3/8) | 60 (2-23/64) | 63.5 (2-1/2) | 29 (1-9/64) | 37.5 (1-15/32) |
| CA7-43 + CT7N-43-C25...C47 | 54 (2-1/8) | 149 (5-55/64) | 43 (1-11/16) | 102 (4-1/64) | 100 (3-15/16) | 5 (13/64) | 4.5 (3/16) | 37.5 (1-15/32) | 61 (2-13/32) | 48 (1-57/64) | 88 (3-15/32) | 45 (1-25/32) | 60 (2-23/64) | 66.5 (2-5/8) | 34 (1-11/32) | 42.5 (1-43/64) |
| CA7-55 + CT7N-55-C60 | 54 (2-1/8) | 149 (5-55/64) | 43 (1-11/16) | 102 (4-1/64) | 100 (3-15/16) | 5 (13/64) | 4.5 (3/16) | 37.5 (1-15/32) | 61 (2-13/32) | 48 (1-57/64) | 88 (3-15/32) | 45 (1-25/32) | 60 (2-23/64) | 66.5 (2-5/8) | 34 (1-11/32) | 42.5 (1-43/64) |
| CA7-60...85 + CT7N-85-C47...C90 | 72 (2-53/64) | 191 (7-33/64) | 64 (2-33/64) | 120 (4-23/32) | 108 (4-1/4) | 5.5 (7/32) | 5.4 (7/32) | 45 (1-25/32) | 74 (2-29/32) | 55.5 (2-3/16) | 80 (3-5/32) | 55 (2-11/64) | 100 (3-15/16) | 87.5 (3-7/16) | 41.5 (1-41/64) | 50 (1-31/32) |
| CA7-97 + CT7N-97-C97 | 72 (2-53/64) | 191 (7-33/64) | 64 (2-33/64) | 120 (4-23/32) | 108 (4-1/4) | 5.5 (7/32) | 5.4 (7/32) | 45 (1-25/32) | 74 (2-29/32) | 55.5 (2-3/16) | 80 (3-5/32) | 55 (2-11/64) | 100 (3-15/16) | 87.5 (3-7/16) | 41.5 (1-41/64) | 50 (1-31/32) |

Series CT7N Separate Mount (+ Adaptor)

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.

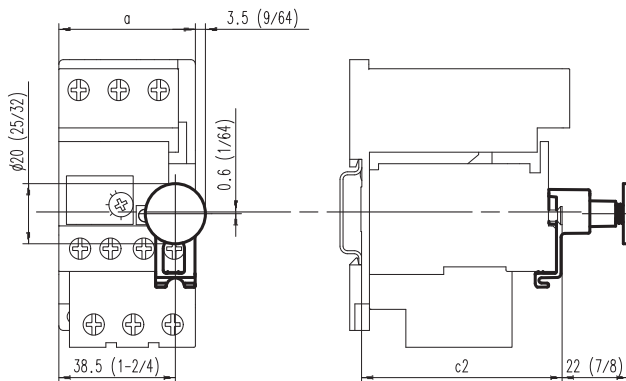


CT7N-23..37 with Panel Mount Adapter

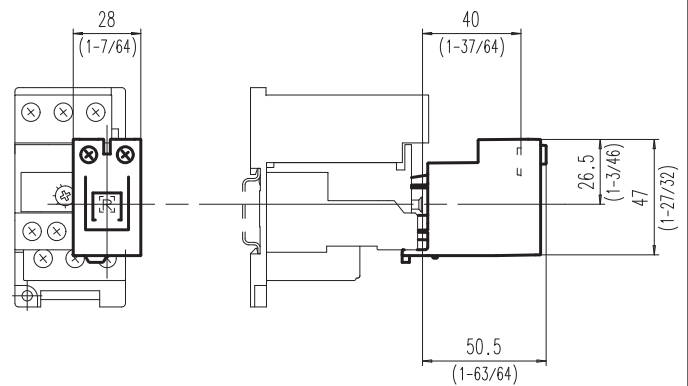
CT7N-85...97 Separate Mount

| Overload + DIN Rail/Panel Mounting Adapter | a | b | b1 | c1 | c2 | c3 | ød | e1 | f1 | f2 | g | h | k1 | k2 |
|--|-----------------|-------------------|-----------------|-------------------|-----------------|-------------|---------------|-----------------|-----------------|-----------------|---------------|-----------------|-------------------|-------------------|
| CT7N-23-A16...C25 + CT7N-37-P-A | 45 (1-25/32) | 89.5 (3-17/32) | 50 (1-31/32) | 69 (2-23/32) | 66 (2-19/32) | 4 (5/32) | 4.5 (3/16) | 38 (1-31/64) | 26 (1-1/32) | 54 (2-1/8) | 15 (19/32) | 90 (3-35/64) | 29 (1-9/64) | 37.5 (1-15/32) |
| CT7N-37-C20...C25 + CT7N-37-P-A | 45 (1-25/32) | 91.5 (3-39/64) | 50 (1-31/32) | 69 (2-23/32) | 66 (2-19/32) | 4 (5/32) | 4.5 (3/16) | 38 (1-31/64) | 28 (1-7/64) | 54 (2-1/8) | 15 (19/32) | 90 (3-35/64) | 29 (1-9/64) | 37.5 (1-15/32) |
| CT7N-85-C47P...CT7N-97-C97P | 56 (2-13/64) | 82 (3-15/64) | 46 (1-13/16) | 99.5 (3-28/32) | ~ | 4 (5/32) | 4.5 (3/16) | 56 (2-13/64) | 47.5 (1-7/8) | 87 (3-27/64) | ~ | 60 (2-23/64) | 41.5 (1-41/64) | 50 (1-31/32) |

CT7N-RA3 External Reset Adaptor



CMR7N Remote Reset Solenoid

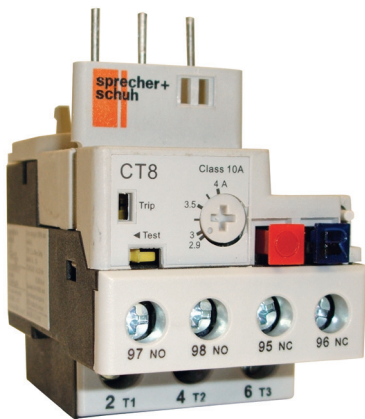


Series CT8 Thermal Overload Relays

B

CT8 Overloads

Simple and effective motor protection for applications to 12 Amps



Sprecher + Schuh provides outstanding motor protection with our CT8 Thermal Overload Relay

Sprecher + Schuh has been a leader in providing superior motor protection. The CT8 is an economical thermal overload relay yet includes proven features like “Differential tripping”, Automatic / Manual reset modes, and isolated alarm circuit contacts as standards.

Consistent and reliable protection

The consistent high quality of Sprecher + Schuh thermal overload relays is ensured by a complex current calibration procedure performed after each unit is at full operating temperature. Calibration is performed at the largest and smallest current the overload can handle. The accurate time/current characteristic curve obtained in this manner guarantees reliable motor protection every time.

Superior Class 10 characteristics

Today’s T-Frame motors have less copper and iron than the old U-Frame motors that were popular when traditional Class 20 overload relays were designed. For this reason, faster Class 10 overloads like the CT8 Series have been recognized by many motor manufacturers as the ideal type to



assure optimum protection of “T” frame motors.



Protection from single phase conditions

A unique feature not found in traditional thermal overload relays provides accelerated tripping under single phase conditions. This is accomplished with a special “differential tripping” mechanism built into CT8 (see illustration at right).

Ambient temperature compensation

All Sprecher + Schuh thermal overload relays are temperature compensated. An additional bimetallic ambient compensation strip, built into the conductor-bimetal transmission path, ensures that the tripping characteristics of the relay remain constant over an ambient temperature range of -20°C to $+60^{\circ}\text{C}$.

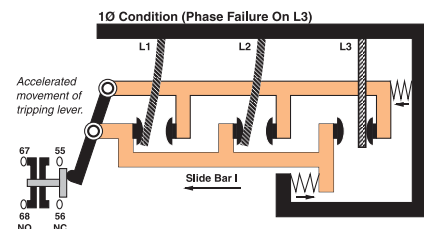
Single phase applications

CT8 Series thermal overload relays can be applied for protection of single phase AC motors. The relays have the same characteristics as shown for three phase operation. To maintain these characteristics, each element of the overload relay must carry the motor current as shown in the connection diagram on page B57.

Other standard features

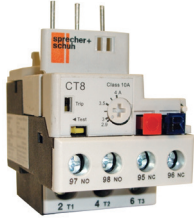
CT8 thermal overload relays feature a fail-safe “trip-free” design that prevents the device from being held closed during an overload. In addition, a selectable lever permits the user the option to choose the manual or automatic reset modes.

A separate NO signal contact is also provided on CT8 overloads which is isolated from the NC trip contact. This permits the use of a trip signal voltage different than that of the control voltage.



CT8 Thermal Overload Relays offer accelerated tripping under single phase conditions

CT8 Thermal Overload Relays - Trip Class 10, Manual or Automatic reset ①

| Overload Relay | Directly Mounts to Contactor... | Adjustment Ranges [A] | Catalog Number |
|--|---------------------------------|-----------------------|----------------|
|  <p>CT8</p> | CA8-09...12 | 0.10...0.16 | CT8-A16 |
| | | 0.16...0.25 | CT8-A25 |
| | | 0.25...0.4 | CT8-A40 |
| | | 0.35...0.5 | CT8-A50 |
| | | 0.45...0.63 | CT8-A63 |
| | | 0.55...0.80 | CT8-A80 |
| | | 0.75...1.0 | CT8-B10 |
| | | 0.90...1.3 | CT8-B13 |
| | | 1.10...1.6 | CT8-B16 |
| | | 1.4...2.0 | CT8-B20 |
| | | 1.8...2.5 | CT8-B25 |
| | | 2.3...3.2 | CT8-B32 |
| | | 2.9...4.0 | CT8-B40 |
| | | 3.5...4.8 | CT8-B48 |
| | | 4.5...6.3 | CT8-B63 |
| | | 5.5...7.5 | CT8-B75 |
| | 7.2...10 | CT8-C10 | |
| CA8-12 | 9.0...12.5 | CT8-C12 | |




Thermal Overload Relay Features:

- Standard motor protection for AC and DC motors
- Overload protection Trip Class 10A
- Auxiliary switch (1 NO and 1 NC)
- Phase loss sensitivity
- Manual/Auto reset button
- Test release
- Stop button
- Trip indicator

B

CT8 Overloads

Accessories

| Enclosure | Description | For Use With... | Catalog Number | |
|---|---|-----------------|---|--------------|
|  | Remote Reset Solenoid - For remote resetting of the solid state overload relay | CT7N CT8 | CMR7N-* <i>Replace * with coil code below</i> | See page B45 |
|  | External Reset Button - Used for manually resetting overloads mounted in enclosures | CT8 all | Use D7 Reset | See page H57 |
|  | Adaptor External Reset - Mounts on relay reset button and provides larger actuation surface. | CT7N CT8 | CT7N-RA3 | See page B45 |

CMR7N Remote Reset Coil Codes

| A.C. Coil Code | Voltage Range | | |
|----------------|---------------|-------|------------|
| | 50 Hz | 60 Hz | 50 / 60 Hz |
| 24Z | ~ | ~ | 24V |
| 120 | 110V | 120V | ~ |
| 240Z | ~ | ~ | 220...240V |

| D.C. Coil Code | Voltage |
|----------------|---------|
| 24D | 24VDC |
| 110D | 110VDC |
| 125D | 125VDC |




① Contactors noted will physically attach to the overload relays listed. This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.

B
CT8 Overloads

Electrical Data

| | | |
|----------------------------------|------------|------------|
| Main Circuits | | |
| Rated Insulation Voltage U^i | [V] | 690 AC |
| Rated Impulse Strength U_{imp} | [kV] | 6 AC |
| Rated Operating Voltage U^e | IEC/UL [V] | 690/600 AC |




Terminations - Power

| | | |
|---|--------------------|---------------|
| Terminal Type  M3.5 | | |
|  Fine stranded w/ ferrule | [mm ²] | 2 x (1.5...4) |
|  Solid or coarse stranded | [mm ²] | 2 x (1.5...4) |
| | [AWG] | 2 x (16...12) |
| Torque Requirement | [Nm] | 1.2 |
| | [Lb-in] | 10.6 |
| Pozidrive screwdriver | Size | 2 |
| Slotted screwdriver | [mm] | 1 x 6 |



Control Circuits

| | | | | |
|--|-----------|-------|------------|------------------------|
| Rated Insulation Voltage U^i | | | [V] | 690 AC |
| Rated Impulse Strength U_{imp} | | | [kV] | 4 AC |
| Rated Operating Voltage U^e | | | IEC/UL [V] | 690/600 AC |
| Rating Designation | | | | A600/Q300 N.O./N.C. |
| Rated Operating Current | | I_e | | |
| AC-15 | 24V | [A] | | 4 |
| | 240V | [A] | | 2 |
| | 400V | [A] | | 1.6 |
| | 600V | [A] | | 0.15 |
| | 24V | [A] | | 2 |
| DC-13 | 110V | [A] | | 0.4 |
| | 220V | [A] | | 0.25 |
| | 440V | [A] | | 0.08 |
| Thermal Current | I_{the} | [A] | | 5 |
| Short Circuit Withstand, fuse gG | | [A] | | 6 |
| Contact Reliability | | | | 15V, 2mA |

Terminations - Control

| | | |
|---|--------------------|---------------|
| Terminal Type  M3.5 | | |
|  Fine stranded w/ ferrule | [mm ²] | 2 x (1...4) |
|  Solid or coarse stranded | [mm ²] | 2 x (1...4) |
| | [AWG] | 2 x (18...12) |
| Torque Requirement | [Nm] | 1.2 |
| | [Lb-in] | 10.6 |
| Pozidrive screwdriver | Size | 2 |
| Slotted screwdriver | [mm] | 1 x 6 |

General Data

| | | |
|--------------------------|-----------------------|---|
| Weight | [kg (lb)] | 0.115 (.25) |
| Standards | | IEC/EN 60947-1, -4-1, -5-1; UL508; CSA C22.2 NO. 14 |
| Approvals | |   |
| Temperature Compensation | | Continuous (Temperature Range -5...+40°C per IEC 60947-4-1, EN60947; PTB: -20...+60°C) |
| Vibration Resistance | (PER IEC 68-2-6) [G] | 3 |
| Shock Resistance | (PER IEC 68-2-27) [G] | 30 |
| Type of Protection | | IP2X |

Environmental

| | | |
|-----------------------|-------------------|--|
| Ambient Temperature | Storage | -55...+80 °C (-67...+176 °F) |
| | Operating | -20...+60 °C (-4...+140 °F) |
| Humidity | Operating | 5...95% Non-condensing |
| | Damp Heat | per IEC 68-2-3 and IEC 68-2-30 |
| Max. Altitude | [m] | 2000 |
| Pollution Environment | | Pollution Degree 3 |
| Protection | Type of Relay | Ambient Compensated, Time Delay, Phase Loss Sensitive |
| | Nature of Relay | Bimetallic Overload Relay |
| | Trip Rating | 125% FLA |
| | Trip Class | IEC: 10A, UL 10 |
| | Reset Mode | Automatic or Manual |
| | Power dissipation | up to 0.4 A 7 W 0.5...12.5 A 6 W |

Operating Limits

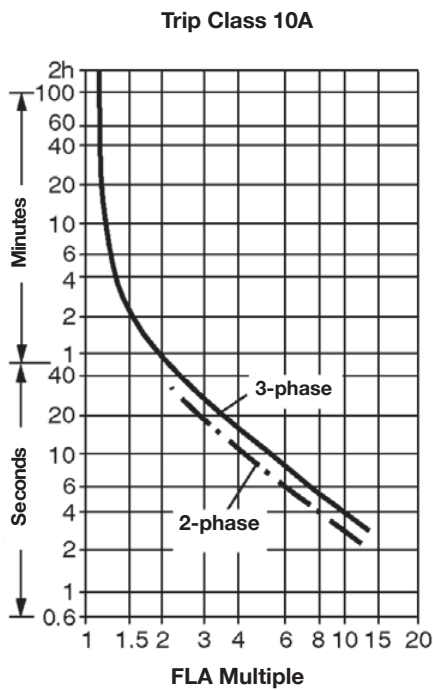
| | | |
|-------------------------|----------------------|--------------------|
| Maximum Command Impulse | | CMR7N 5s |
| AC 50/60Hz | Pick-up [$x U_s$] | 0.8...1.1 |
| | Drop-out [$x U_s$] | |
| DC | Pick-up [$x U_s$] | 0.7...1.25 |
| | Drop-out [$x U_s$] | |

Coil Consumption

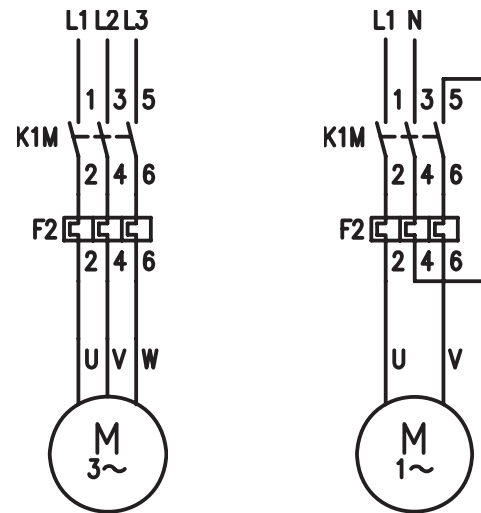
| | | |
|------------|----------------------|--------------------------------|
| AC 50/60Hz | Pick-up [VA-W] | |
| | Hold-in [VA-W] | |
| DC | Pick-up [$x U_s$] | 17 (24, 110, 125V) 25 (48V) |
| | Drop-out [$x U_s$] | 17 (24, 110, 125V) 25 (48V) |

Tripping Characteristics

These trip characteristics refer to IEC 60947 and are average values from cold start at an ambient temperature of 20 °C. Trip time is pictured as a function of operating current. With the device at normal operating temperature, the trip time decreases to approximately 25% of the shown value.

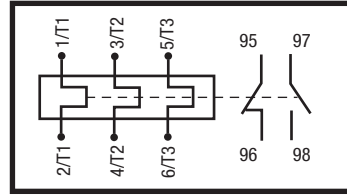
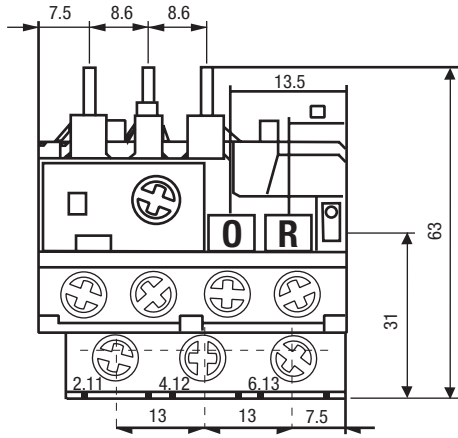


Connection Diagrams

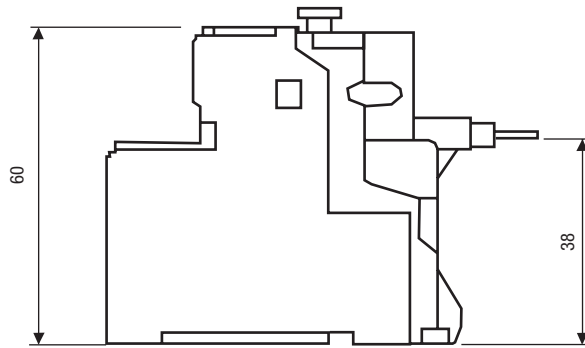
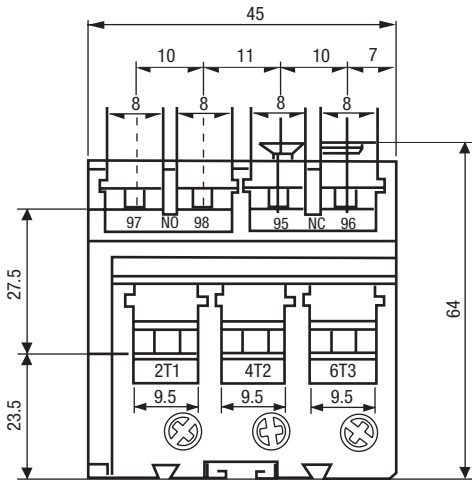


Series CT8

Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



Terminal Marking



Notes

B

Overload Relays

*For Technical Information and Dimensions
please see the online catalog*

Notes

B

Overload Relays

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please see the online catalog*

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