

# 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

**Product Feature Overview**

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

① 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.

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**Product Feature Overview**

Relay Type	CT7N/CT8	CEP7-1	CEP9 (Parameter)	CEP9 (Networked)
<b>Protection Features</b>				
Overload	•	•	•	•
Phase Loss		•	•	•
Ground Fault		•	•	•
Current Imbalance	•		•	•
Add-on Protection		•	•	•
Over/ Under Voltage			•	•
Voltage Imbalance			•	•
Over/ Under Power			•	•
<b>Diagnostics Features</b>				
% Full Load Amperes (FLA)		•	•	•
% Thermal Capacity Utilization (TCU)		•	•	•
Voltage			•	•
Power			•	•
Energy			•	•
<b>Integration Features</b>				
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.

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# CEP7 Solid State Overload Relays

## The Third Generation

### 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 select ability 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
<b>CEP7-1EE Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 20</b>			
 <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	
<b>CEP7-1EF Automatic or Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 15, 20, 30</b>			
 <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	CEP7-1EFCB
		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	CEP7-1EFG	

### 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.

**B**  
3rd Gen CEP7 Overloads



Fig. 1

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

Overload Relay	for use with... ①	Adjustment Range (A)	Catalog Number
<b>CEP7-1EE Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 20</b>			
 <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
<b>CEP7-1EF Automatic or Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 15, 20, 30</b>			
 <p>shown: CEP7-1EFGP</p>	All contactors	1.0...5.0	CEP7-1EFCP
		3.2...16	CEP7-1EFD
		5.4...27	CEP7-1EFEP
		11...55	CEP7-1EFFP
		20...100	CEP7-1EFGP
<b>CEP7-1EF Automatic or Manual Reset for 1Ø and 3Ø Applications - Trip Class 10, 15, 20, 30</b>			
 <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

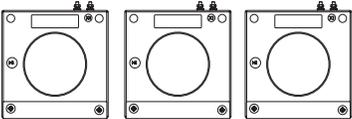
① This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.

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

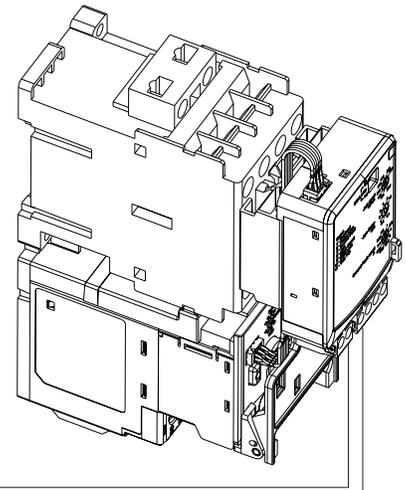
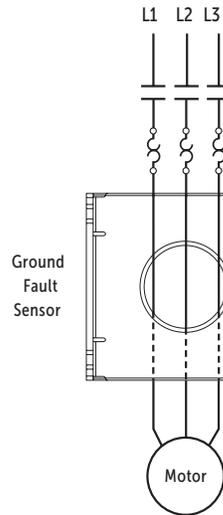
Accessory	Description	For use with...	Package Quantity	Catalog No.	
	Base Unit Anti-Tamper Shield		10	CEP7-1BC8	
	External Reset Adapter	CEP7-1EE, CEP7-1EF	1	CEP7-1ERA	
	Remote Reset Solenoid		240V AC	1	CEP7-1EMRA
			120V AC	1	CEP7-1EMRD
			24V DC	1	CEP7-1EMRZ
 CEP7-1EPB CEP7-1EPD CEP7-1EPE	DIN Rail/Panel 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-ERID	
		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		
 Includes three Current Transformers (Overload relay sold separately)	CA9-265...305	300:5	Ⓢ	CEP7-CT-UL-300	
					CEP7-CT-CE-300
	CA9-370...580	600:5	Ⓢ	CEP7-CT-UL-600	
		400:5		CEP7-CT-CE-400	
CA9-750...1060	~	~	Refer to Factory		

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

**B**  
3rd Gen CEP7 Overloads

**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-EGJ 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 (120mm <sup>2</sup> ) @ 600V ❶	CA7-9...CA9-190	CEP7-CBCT3
	420A	50/60 Hz	1000:1	82.3 mm (3.25 in.)	350MCM (185mm <sup>2</sup> ) @ 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.

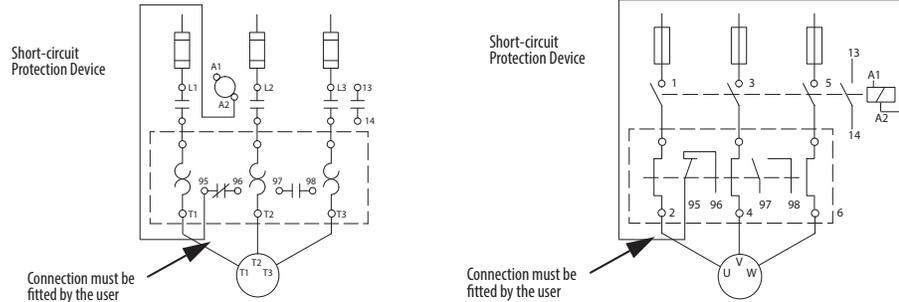
## Wiring Diagrams

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

3rd Gen CEP7 Overloads

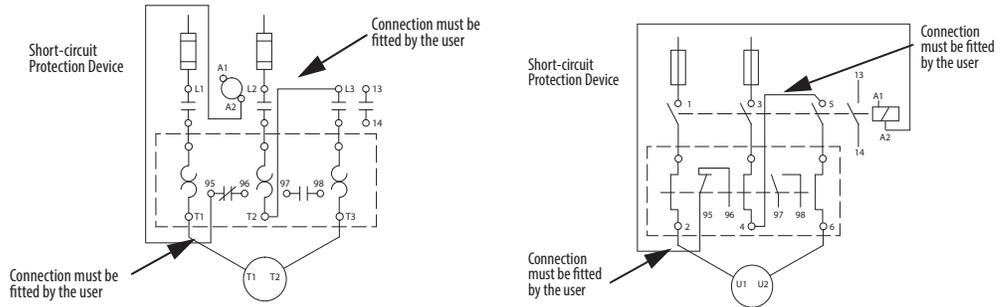
### 3-Phase / Full-voltage / Direct-on-Line Starter

#### UL/NEMA Symbology and IEC Symbology

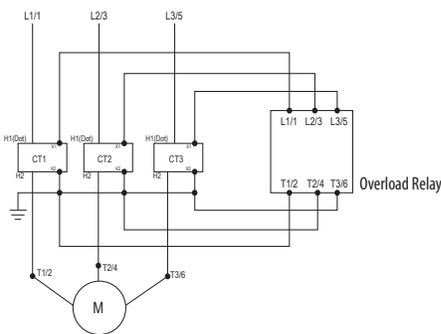


### 1-Phase / Full-voltage / Direct-on-Line Starter

#### UL/NEMA Symbology and IEC Symbology



### CEP7 Overload Relay (Cat. No. CEP7-1EF\_Z) with External Transformer



## 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	
<b>Terminal Style Devices</b>		
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
<b>Pass-thru Style Devices</b>		
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

3rd Gen CEP7 Overloads

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	

#### Electromagnetic Compatibility

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

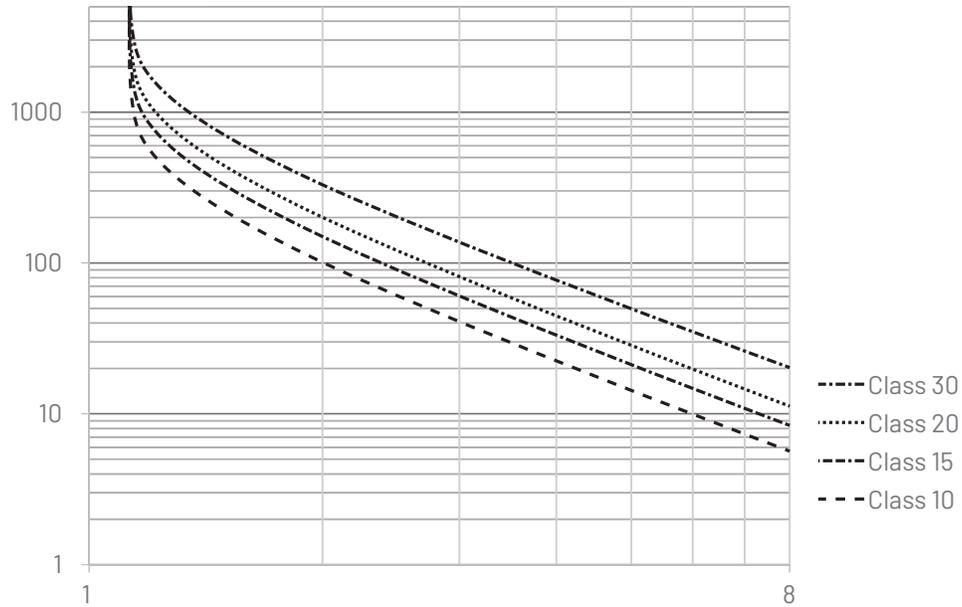
Wire Type		Control Wiring		Power Wiring					
		All		CEP7-1E B		CEP7-1E D		CEP7-1E E	
Wires	Range	Torque	Range	Torque	Range	Torque	Range	Torque	
 Flexible Stranded w/ Ferrule	1 Wire	0.75...2.5 mm <sup>2</sup>	1.4 N•m	2.5...16 mm <sup>2</sup>	2.5 N•m	2.5...16 mm <sup>2</sup>	2.5 N•m	4...35 mm <sup>2</sup>	4.6 N•m
	2 Wires 			2.5...10 mm <sup>2</sup>	3.4 N•m	2.5...10 mm <sup>2</sup>	3.6 N•m	4...25 mm <sup>2</sup>	
 Stranded / Solid	1 Wire	0.75...4.0 mm <sup>2</sup> (18...12 AWG)	1.4 N•m (12 lb•in)	2.5...16 mm <sup>2</sup> (14...6 AWG)	2.5 N•m (22 lb•in)	2.5...16 mm <sup>2</sup> (14...6 AWG)	2.5 N•m (22 lb•in)	4...35 mm <sup>2</sup> (12...1 AWG)	4.6 N•m (40 lb•in)
				25 mm <sup>2</sup> (4 AWG)	3.4 N•m (30 lb•in)	25 mm <sup>2</sup> (4 AWG)	3.4 N•m (30 lb•in)	4...35 mm <sup>2</sup> (12...1 AWG)	
	2 Wires 			2.5...16 mm <sup>2</sup> (14...6 AWG)	3.4 N•m (30 lb•in)	2.5...16 mm <sup>2</sup> (14...6 AWG)	3.6 N•m (32 lb•in)	4...35 mm <sup>2</sup> (12...2 AWG)	

**Technical Information**

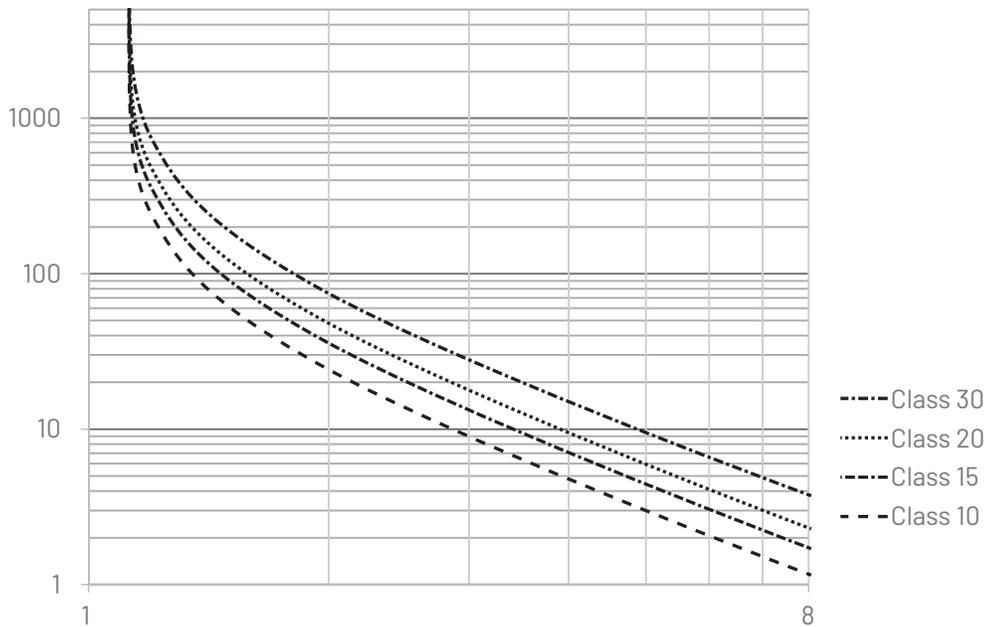
**Overload Trip Curves**

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.

Cold Trip Curves



Hot Trip Curves

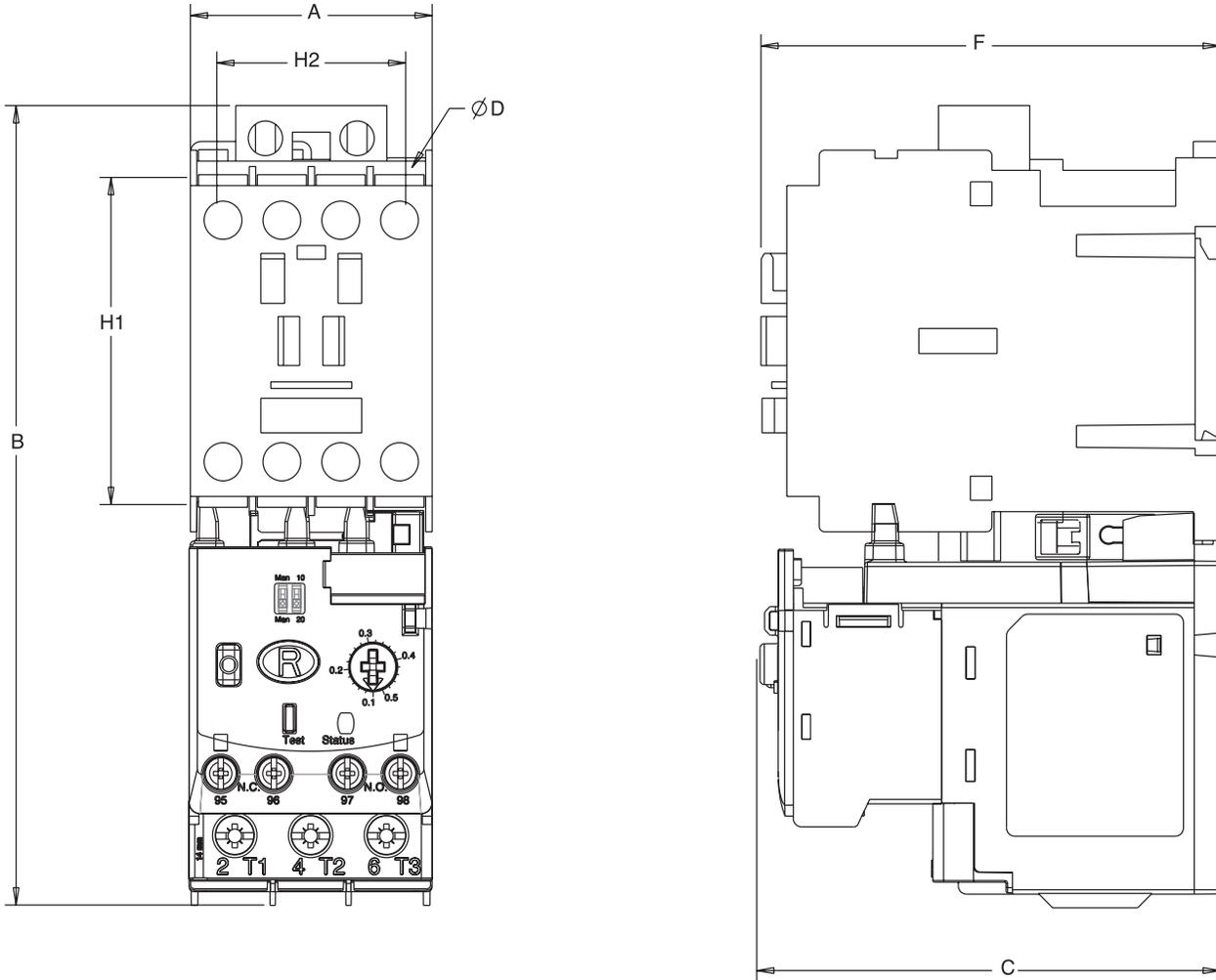


**B**

**3rd Gen CEP7 Overloads**

**CEP7-1 Mounted to CA7 Contactor**

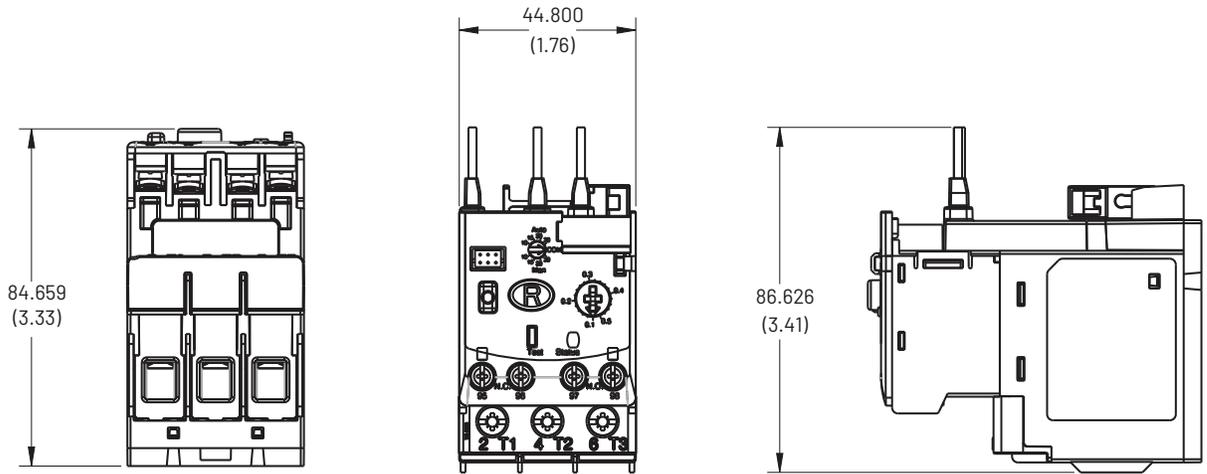
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



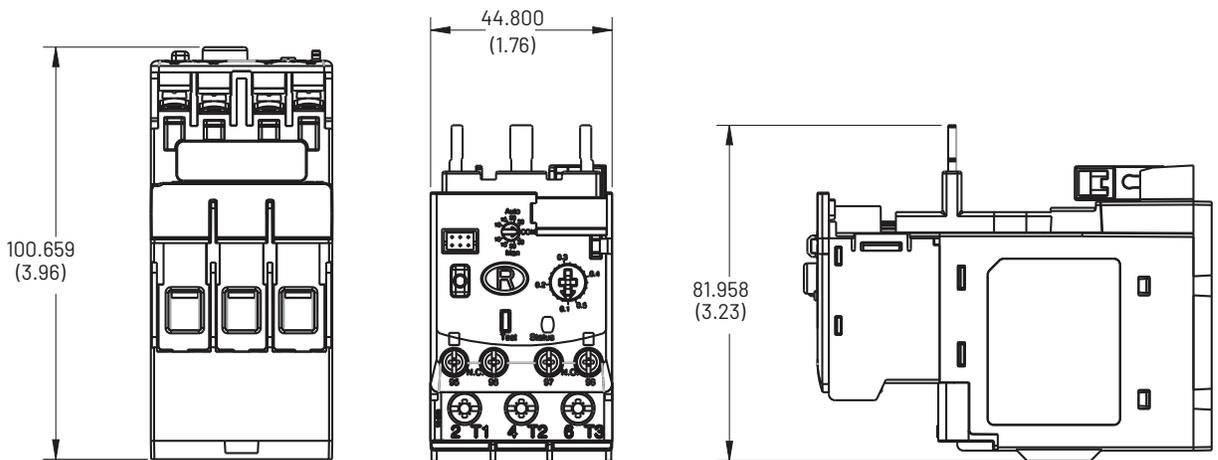
Overload	Mounted to Contactor		A Width	B Height	C Depth	D	F	H1	H2
CEP7-1EE/EF_B	CA7-9...23 CAN7-12...16	mm (in)	45 (1-25/32)	146.6 (5-25/32)	85.2 (3-23/64)	4.5 (3/16)	86.5 (3-13/32)	60 (2-23/64)	35 (1-3/8)
CEP7-1EE/EF_D	CA7-30...37 CAN7-37	mm (in)	45 (1-25/32)	146.6 (5-25/32)	101.2 (3-63/64)	4.5 (3/16)	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)

CEP7-1 Direct-Mount

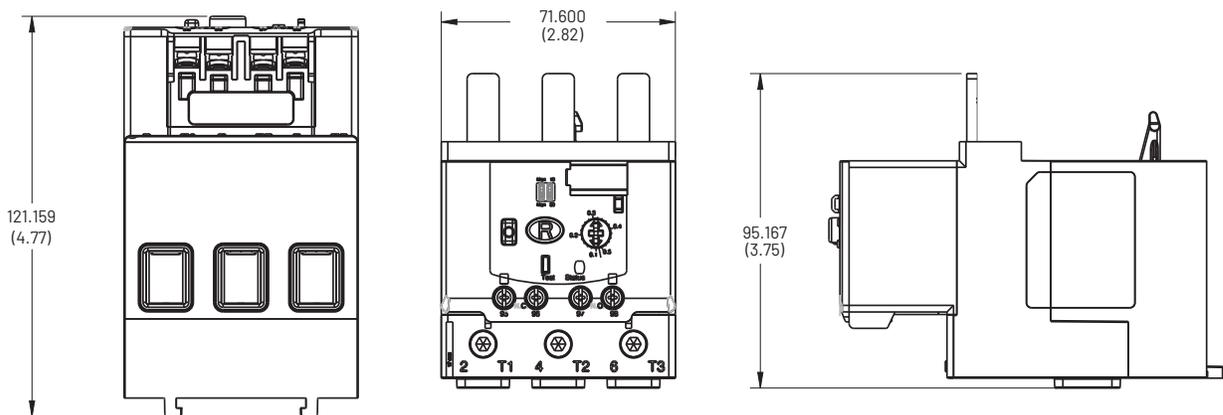
CEP7-1\_B



CEP7-1\_D



CEP7-1\_E



**B**

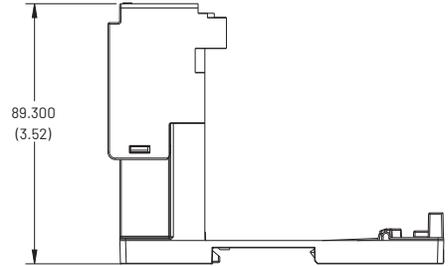
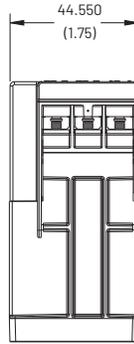
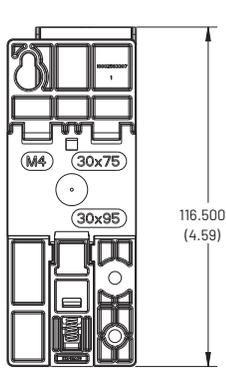
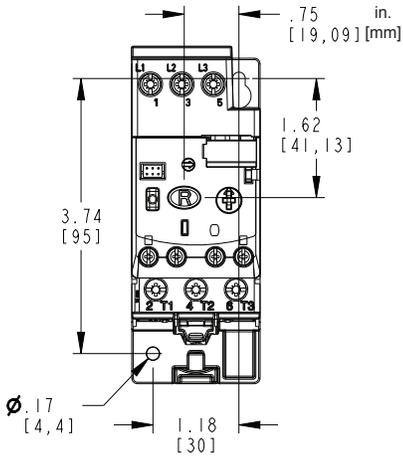
3rd Gen CEP7 Overloads

**B**

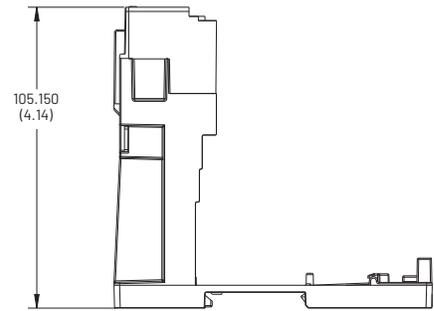
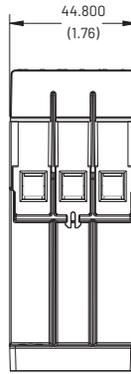
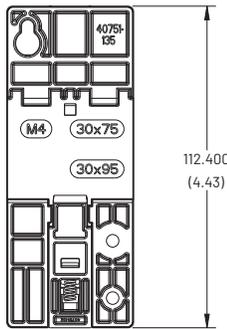
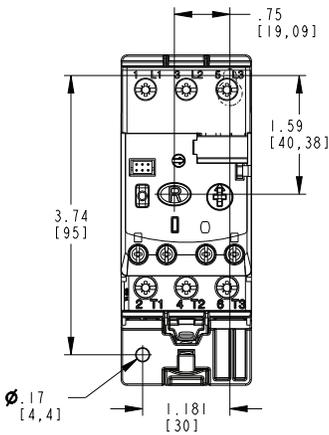
**3rd Gen CEP7 Overloads**

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

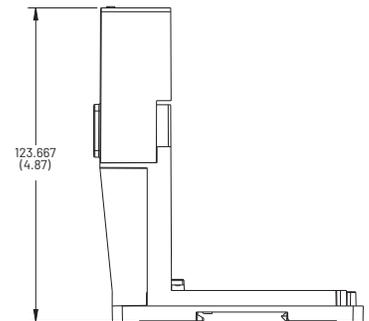
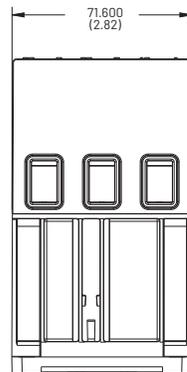
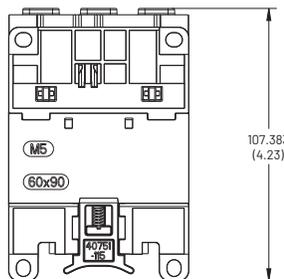
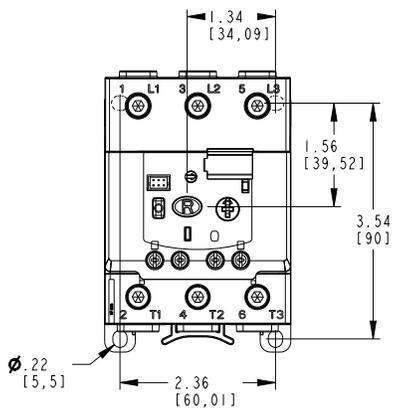
**CEP7-1EPB Panel Mount for CEP7-1\_B**



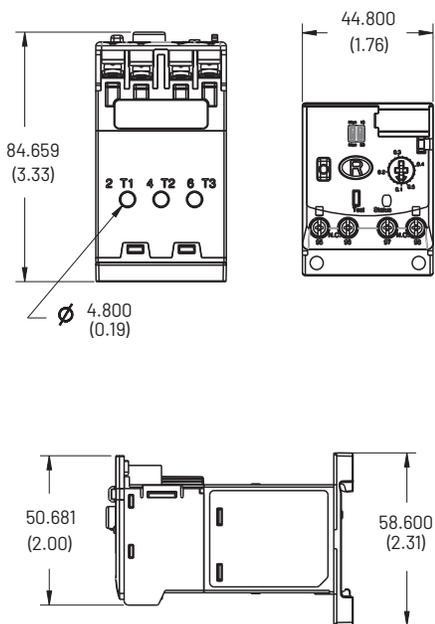
**CEP7-1EPD Panel Mount for CEP7-1\_D**



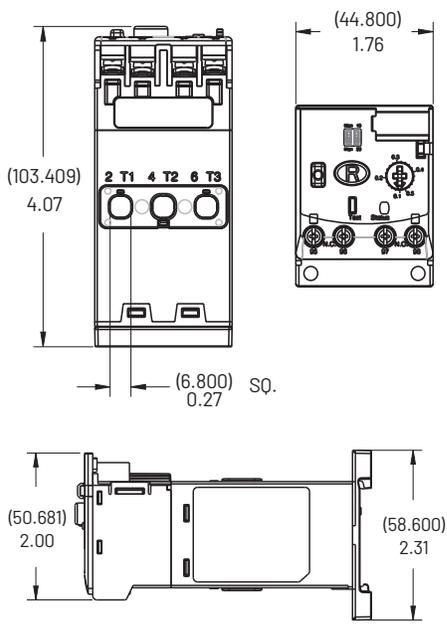
**CEP7-1EPE Panel Mount for CEP7-1\_E**



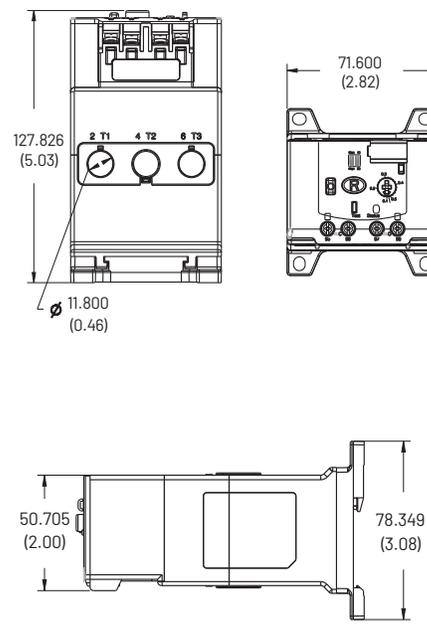
**CEP7-1EE & CEP7-1EF Pass-thru Overload / 1.0...27A**



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



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

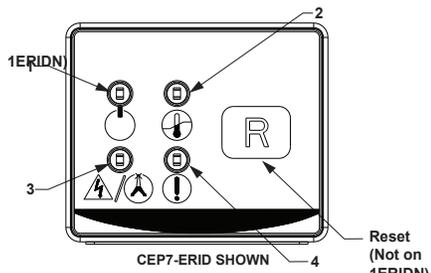


**CEP7-ERID and CEP7-1ERIDN Remote Indicator**

**Indication**

Starter:

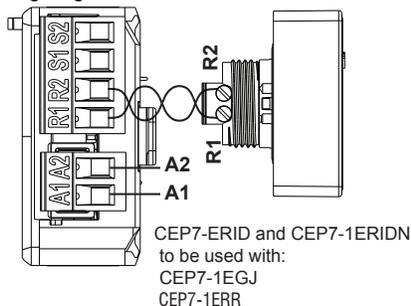
- ① Fault Code:
- 3-Ground Fault
- 5-Jam
- 9-Welded Cont \*
- 10-Comm Loss
- 11-Test Trip



\* Applies to OLRF Module only - KTE9-OLRF

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*	Yellow (Flash)
3	Phase Loss		Short Circuit Trip	Red (Solid)
			Phase Loss Trip / Warning	Red / Yellow (Flash)
			Ground Fault Trip / Warning	3 Red / Yellow (Flash)
4	Fault Status		Jam Trip / Warning	5 Red / Yellow (Flash)
			Welded Cont*	9 Red (Flash)
			Comm Loss / Warning	10 Red / Yellow (Flash)
			Test Trip	11 Red (Flash)

**Wiring Diagram**

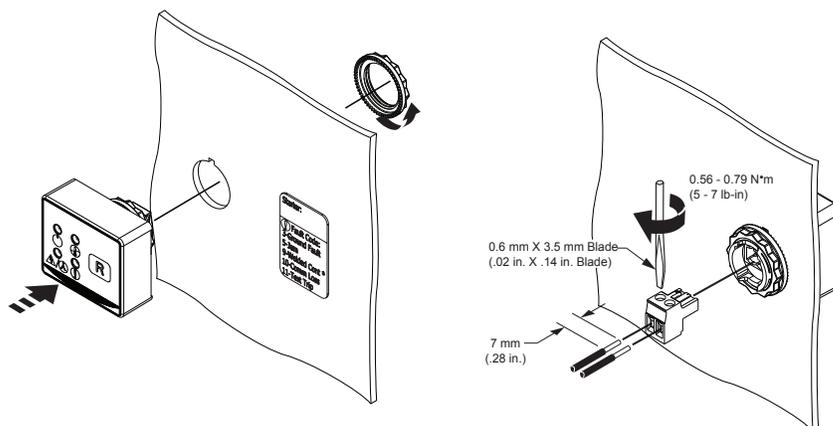


**Main Connections**

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

Torque	
mm <sup>2</sup>	0.55 N·m
VG	(5 lb-in)

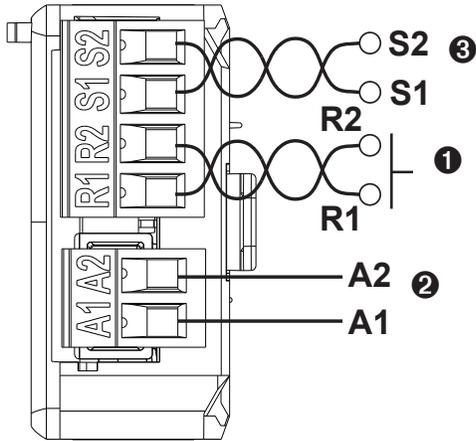
Recommend use of twisted pair for remote reset 24 AWG Minimum



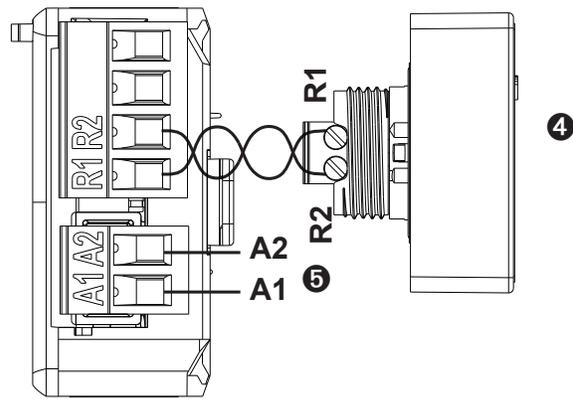
## Expansion Accessory Ratings CEP7-1EGJ/1ERR

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

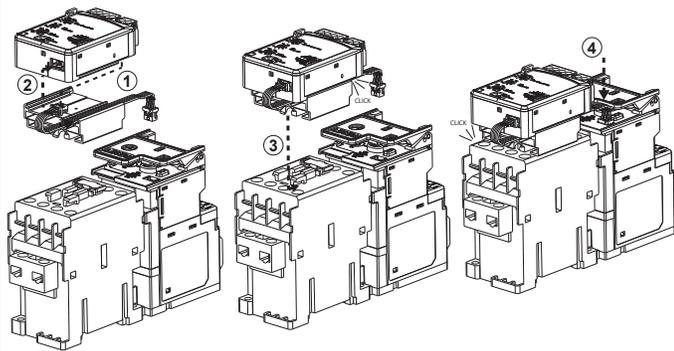
### CEP7-1EGJ Universal Protection Expansion Module Wiring



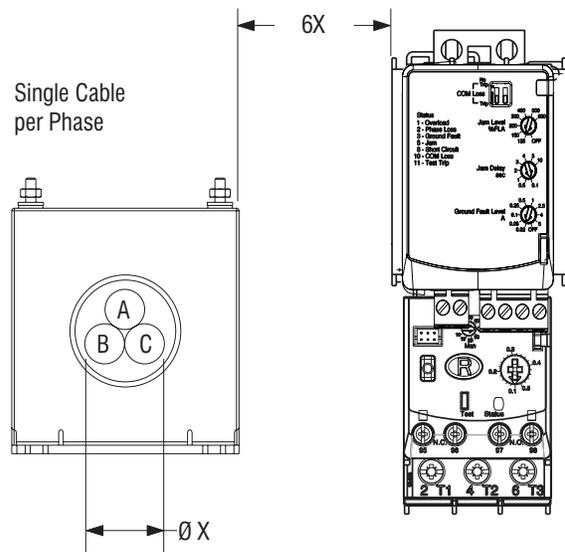
### CEP7-1ERR Electronic Reset and Indication Display Module Wiring



### 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.