

Second Generation CEP7 Solid State Overload Relays

Advanced solid state motor protection

The introduction of the second generation of CEP7 solid state overload relays advances Sprecher + Schuh's leading edge technology with several improved features. This second generation of CEP7 overload relay includes features like:

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

The basic concept of utilizing Application Specific Integrated Circuits (ASICs) resulting in an affordable solid state overload relays remains unchanged. This kind of versatility and accuracy was simply not possible with traditional bi-metallic or eutectic alloy electromechanical overload relays.

Fewer units means greater application flexibility

The new CEP7 is available in three basic models:

- CEP7-ED1 is a Class 10, manual reset model available up to 27 amperes which covers the most common horsepower motors and your every day application. This model is economically priced to be competitive with adjustable bi-metallic overload relays.
- CEP7-EE is full featured selectable trip class (10, 15, 20 & 30) 3-phase application overload relay with provision for field mountable modules to handle remote reset, stall 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 new 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



first generation of CEP7 caused the industry to take note of the flexibility when it 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 building on field experience now introduces a CEP7 overload 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 90 amperes.

5 : 1 Current Range



27A



45A

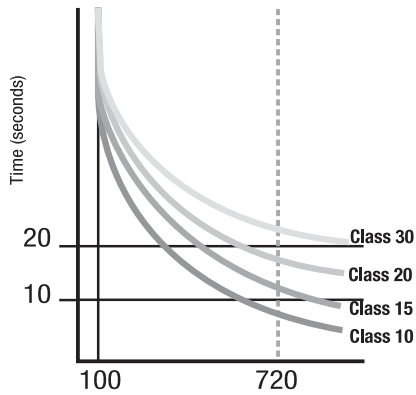


90A



30A

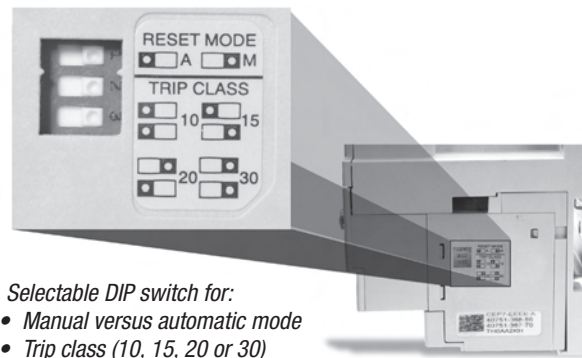
800A



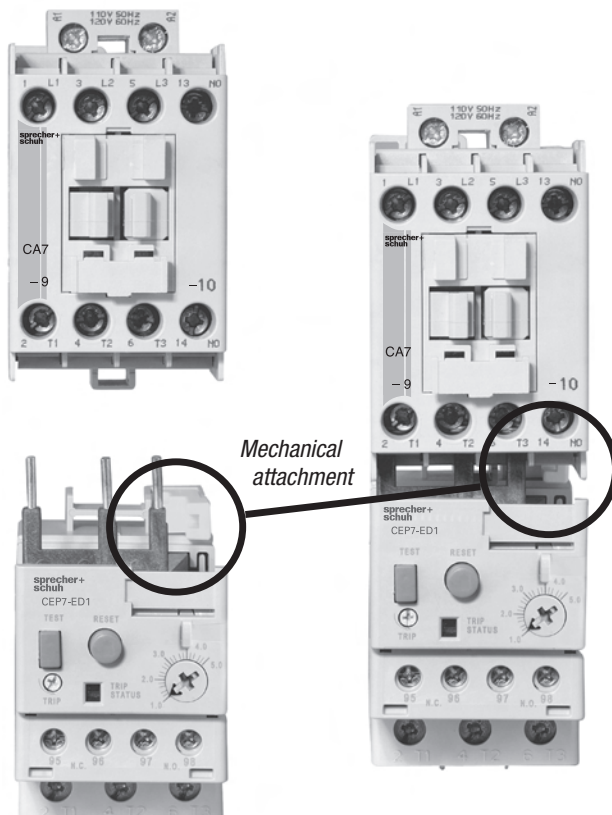
CEP7 overload relays are available with Class 10, 15, 20 or 30 tripping characteristics

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 new 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.



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



Mechanical attachment

Choice of reset options

Most industrial applications usually calls 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 dip switch selectability in Manual and Automatic Reset modes.

More robust design

The CEP7 has been re-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 has been "beefed-up." This provides for a more 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 electro-magnet and shielding against airborne metal particles and other potential environmental debris. The new 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 this second generation of CEP7 electronic overload relay.



Increased accuracy and improved motor protection

Microelectronics provides 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%.

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 competitive 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.

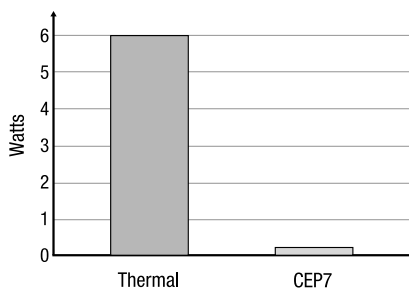
Dramatically lowered energy requirement saves money, reduces panel space

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 bi-metallic 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 150 milliwatts. 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.

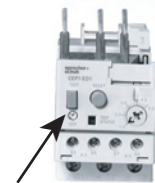
Superior phase failure protection

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 bi-metallic overload relay. In addition, CEP7 overload relays detect a 50% phase imbalance in the same way as a phase loss.





Conventional overload relays dissipate as much as six watts of energy compared with as little as 150 milliwatts for the CEP7

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	Price
Manual Reset for 30 Applications ①				
	CA7-9...CA7-23	0.1...0.5	CEP7-ED1AB	46
		0.2...1.0	CEP7-ED1BB	46
		1.0...5.0	CEP7-ED1CB	46
		3.2... 16	CEP7-ED1DB	46
		5.4...27	CEP7-ED1EB	46

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


Overload Relay	Directly Mounts to Contactor... ❷	Adjustment Range (A)	Adjustable Trip Class 10, 15, 20 & 30	
			Catalog Number	Price
Automatic or Manual Reset for 30 Applications ❶				
	CA7-9...CA7-23	0.1...0.5	CEP7-EEAB	52
		0.2...1.0	CEP7-EEBB	52
		1.0...5.0	CEP7-EECB	52
		3.2... 16	CEP7-EEDB	52
		5.4...27	CEP7-EEEB	52
	CA7-30...CA7-43	1.0...5.0	CEP7-EECD	82
		3.2...16	CEP7-EEDD	82
		5.4...27	CEP7-EEED	82
		9...45	CEP7-EEFD	82
	CA7-60...CA7-85	5.4...27	CEP7-EEEE	95
		9...45	CEP7-EEFE	95
		18...90	CEP7-EEGE	100
Automatic or Manual Reset for 10 Applications ❶				
	CA7-9...CA7-23	1.0...5.0	CEP7S-EEPBB	52
		3.2...16	CEP7S-EERBB	52
		5.2...27	CEP7S-EESBB	52
	CA7-30...CA7-43	9...45	CEP7S-EETD	95
	CA7-60...CA7-85	18...90	CEP7S-EEUE	100

TIP!

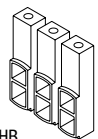
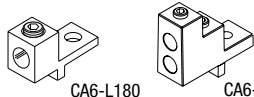
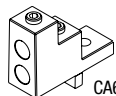
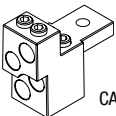

Most industrial applications usually call for an overload relay that must be manually reset in the event of a trip. This allows the cause of the overload to be identified before the motor is restarted. An overload relay that resets automatically is generally for specialized, or remote applications, such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

- ① 3-phase CEP7 units are only designed for 30 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 180 seconds.
- ④ CEP7 overload relays do not work with Variable Frequency Drives, DC Applications or Softstarters with braking options.
- ⑤ The mechanical trip actuator will become functional on shipments of CEP7 second generation starting April 2006. The exact date of Field availability may depend on levels of stock on-hand.

Large Amp CEP7 Solid State Overload Relays, Automatic and Manual Reset ①②③④⑤

Overload Relay	Directly Mounts to Contactor... ②	CT Ratio	Adjustment Range (A)	Selectable Trip Class (10,15,20 & 30)	
				Catalog Number	Price
Automatic or Manual Reset for 3Ø Applications ①③					
 CEP7-EEHF	CA6-95...110 ④	No CT	55...110	CEP7-EEVF	170
	CA6-95...-180 CA6-95-EI...-180-EI	150:5	30...150	CEP7-EEHF	302
		200:5	40...200	CEP7-EEJF	302
	CA6-210-EI...-420-EI	200:5	40...200	CEP7-EEJG	528
		300:5	60...300	CEP7-EEKG	528
		500:5	100...500	CEP7-EELG	528
	CA6-630-EI...-860-EI	600:5	120...600	CEP7-EEMH	830
		800:5	160...800	CEP7-EENH	830






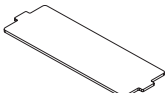
Load Side Lugs & Accessories

Lug or Accessory	Description	For Use With...	Catalog Number	Price
 CA6-HB	Main Terminal Set, ⑥ 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	CA6-HB2	120
		CEP7-EEJG CEP7-EEKG CEP7-EELG	CA6-HB3	175
 CA6-L180 CA6-L420	Screw Type Lugs - <ul style="list-style-type: none"> Accepts round conductors only Copper construction (set of 3-two sets required to wire line and load sides) 	CEP7-EEHF CEP7-EEJF	CA6-L180	100
		CEP7-EEJG CEP7-EEKG CEP7-EELG	CA6-L420	150
 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-two sets required to wire line and load sides) 	CEP7-EEMH CEP7-EENH	CA6-L630	200
 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-two sets required to wire line and load sides) 	CEP7-EEMH CEP7-EENH	CA6-L860	300
	Main Terminal Cover - ⑦ <ul style="list-style-type: none"> CA6 touch protection Line & Load (two pieces per set) IP10; IEC60529 & DIN 40 050 protection 	CEP7-EE_F CEP7-EE_G CEP7-EE_H	CA6-TC180 CA6-TC420 CA6-TC860	28 47 60

- 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 180 seconds.
- ④ CEP7 Overload relays do not work with Variable Frequency Drives or any Sprecher + Schuh Softstarter with braking options.
- ⑤ The mechanical trip actuator will become functional shipments of CEP7 second generation after April 2006. Field availability may depend on levels of stock on-hand.

- ⑥ CA6-HB1 is not applicable with CEP7.
- ⑦ Terminal covers not necessary when using CA6-HB-....
- ⑧ CEP7-EEHF...CEP7-EENH include current transformers used to monitor high amperage. CEP7-EEVF directly monitors amperage. No current transformer is necessary.
- ⑨ CEP7-EEVF not for use with CA6-95-EI or CA6-110-EI.

Accessories - CEP7 Side Mount Modules ①②

Accessory	Description	For use with...	Catalog Number	Price																				
 CEP7-ERR	Remote Reset Module <ul style="list-style-type: none">Provision for reset after trip from remote pilot device	Side-mount to any CEP7-EE_ CEP7S-EE_	CEP7-ERR	60																				
 CEP7-EJM	Jam Protection and Remote Reset Module <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% FLATrip delay- 0.5, 1, 2, or 4 sec.Provision for reset after trip from remote pilot device		CEP7-EJM	70																				
 CEP7-EGF	Ground Fault Protection and Remote Reset Module ② <ul style="list-style-type: none">Dip switch adjustable Ground Fault Protection<ul style="list-style-type: none">GF Current range set points<ul style="list-style-type: none">20...100ma100...500mA0.2...1.0A1.0...5.0AGF Trip level 20%-100%LED status indicationProvision for reset after trip from remote pilot device	Side-mount to any CEP7-EE_ CEP7S-EE_ Must use with CEP7-CBCT_ Current Sensor	CEP7-EGF	70																				
 CEP7-EGJ	Ground Fault/Jam Protection and Remote Reset Module ② <ul style="list-style-type: none">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 indicationProvision for reset after trip from remote pilot device		CEP7-EGJ	90																				
 CEP7-EPT	PTC Thermistor Relay and Remote Reset Module <ul style="list-style-type: none">PTC Protection and LED Status indication<table><tr><td>Type of Control Unit</td><td>Mark A</td></tr><tr><td>Number of Sensors</td><td>6</td></tr><tr><td>Maximum Cold Resistance of Sensor Chain</td><td>1500</td></tr><tr><td>Trip Resistance</td><td>3400 ± 150</td></tr><tr><td>Reset Resistance</td><td>1600 ± 50</td></tr><tr><td>Short Circuit Trip Resistance</td><td>25 ± 10</td></tr><tr><td>Open Circuit Trip Resistance</td><td>> 20,000</td></tr><tr><td>Maximum Voltage at 1T1 / 1T2 (Rptc=4k)</td><td>< 7.5 Vdc</td></tr><tr><td>Maximum Voltage at 1T1 / 1T2 (Rptc=open)</td><td>< 30 Vdc</td></tr><tr><td>PTC Response Time</td><td>500ms...800ms</td></tr></table>Provision for reset after trip from remote pilot device	Type of Control Unit	Mark A	Number of Sensors	6	Maximum Cold Resistance of Sensor Chain	1500	Trip Resistance	3400 ± 150	Reset Resistance	1600 ± 50	Short Circuit Trip Resistance	25 ± 10	Open Circuit Trip Resistance	> 20,000	Maximum Voltage at 1T1 / 1T2 (Rptc=4k)	< 7.5 Vdc	Maximum Voltage at 1T1 / 1T2 (Rptc=open)	< 30 Vdc	PTC Response Time	500ms...800ms	Side-mount to any CEP7-EE_ CEP7S-EE_	CEP7-EPT	75
Type of Control Unit	Mark A																							
Number of Sensors	6																							
Maximum Cold Resistance of Sensor Chain	1500																							
Trip Resistance	3400 ± 150																							
Reset Resistance	1600 ± 50																							
Short Circuit Trip Resistance	25 ± 10																							
Open Circuit Trip Resistance	> 20,000																							
Maximum Voltage at 1T1 / 1T2 (Rptc=4k)	< 7.5 Vdc																							
Maximum Voltage at 1T1 / 1T2 (Rptc=open)	< 30 Vdc																							
PTC Response Time	500ms...800ms																							
	Adjustment Cover for External Modules	All modules with DIP Switches	CEP7-EMC	4																				





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

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




③ See page B13-B13.3 for Technical Data, Wiring, and DIP Switch set up.

Accessories




Accessory	Description	For use with...	Catalog Number	Price
	DIN-rail / Panel Adaptor For separate mounting of overload relay to backpan or top hat DIN-rail	CEP7-ED1...B CEP7-EE...B	CEP7-EPB	18
		CEP7-EE...D	CEP7-EPD	18
		CEP7-EE...E	CEP7-EPE	21
	Current Adjustment Shield Prevents inadvertent adjustment of the current setting	all CEP7-ED CEP7-EE	CEP7-BC8	8
	External Reset Button Adaptor Provides a larger "target area" for resetting the overload relay when using an External Reset Button	CEP7-EE (AB...GE) CEP7-EE (PB...GE) ❶	CEP7-ERA	8
	External Reset Button Used for manually resetting overloads mounted in enclosures	all CEP7	Use D7 Reset - See Section H.	~

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	Price
	45A	50/60 Hz	1000:1	19.1mm (0.75 in.)	8 AWG @ 600V ⑤	CA7-9...CA7-37	CEP7-CBCT1	30
	90A	50/60 Hz	1000:1	39.6mm (1.56 in.)	2 AWG @ 600V ⑤	CA7-9...CA7-85	CEP7-CBCT2	105

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Marking Systems ②

Component	Description	Pkg. Qty.	Catalog Number	Price Each
	Label Sheet – 1 sheet with 105 self-adhesive paper labels each, 6 x 17mm	1	CA7-FMS	1
	Marking Tag Sheet - 1 sheet with 160 perforated paper labels each, 6 x 17mm. To be used with transparent cover.	1	CA7-FMP	1
	Transparent Cover - To be used with Marking Tag Sheets.	100 ⑤	CA7-FMC	.10
	Tag Carrier - For marking with Series V7 Clip-on Tags.	100 ⑤	CA7-FMA2	.10

❶ At the time of this printing CEP7-ERA does not fit CEP7-EE(HF...HH) without removing the CEP7 cover.







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




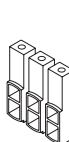



❸ Minimum order quantity is one package of 100. Price each x 100 = total price.

④ See pg. B13 for Application Details.

⑤ For a three phase system with one cable per phase

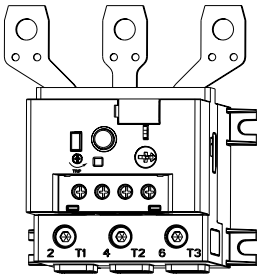






Technical Information

			CEP7-ED1...B CEP7-EE...B	CEP7-EE...D	CEP7-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)		
Terminal Cross Sections					
Terminal Type			M5	M5	M8
Terminal Screw			M5	M5	M8
	One conductor	[mm ²]	1 x (2.5...16)	1 x (2.5...16)	1 x (4...35)
	Torque	[Nm]	2.5	2.5	2.4
	Two conductors	[mm ²]	2 x (2.4...10) ❶	2 x (2.4...10) ❶	2 x (4...25)
	Torque	[Nm]	3.4	3.4	4
	One conductor	[mm ²]	1 x (2.5...25)	1 x (2.5...25)	1 x (4...50)
	Torque	[Nm]	2.5	2.5	4
	Two conductors	[mm ²]	2 x (6...16) ❶	2 x (6...16) ❶	2 x (4...35)
	Torque	[Nm]	3.4	3.4	4
	One conductor	[AWG]	1 x (14...6)	1 x (14...6)	1 x (12...1)
	Torque	[lb-in]	22	22	35
	Two conductors	[AWG]	2 x (14...6) ❶	2 x (14...6) ❶	2 x (6...2)
	Torque	[lb-in]	30	30	35
Pozidrive Screwdriver Size			2	2	----
Slotted screwdriver			[mm]	1 x 6	---
Hexagon Socket Size			[mm]	---	4

			CEP7-EE_F	CEP7-EE_G	CEP7-EE_H
Rated Insulation Voltage - U_i			[V]	1000 AC	
Rated Insulation Strength- U_{imp}			[kV]	6 AC	
Rated Operation Voltage - U_e			[V]	690 AC (IEC) / 600 AC (UL/CSA)	
Terminal Power					
Type					
Direct Connection			Hexagonal Bolt	Hexagonal Bolt	Hexagonal Bolt
Recommended Torque			M8 x 25	M10 x 30	M12 x 40
			11	16	68
			[lb-in]	140	600
With Main Terminal Set (CA6...HB...)			With CA6-HB2	With CA6-HB3	
	sm. opening	[mm²]	16...35 ❷	25...240	~
	lg. opening	[mm²]	16...95 ❷	25...240	~
	sm. opening	[mm²]	16...50 ❷	25...240	~
	lg. opening	[mm²]	16...120 ❷	25...240	~
	b max.	[mm]	20	25	~
	s. sm. opening	[mm]	3...9	6...20	~
	lg. opening	[mm]	3...14	6...20	~
	Recommended Torque		[Nm]	10...12	20...25
Wire size per UL/CSA	sm. opening	[AWG]	#6...1 / 0	#4...600MCM	~
	lg. opening	[AWG]	#6...250MCM	#4...600MCM	~
Recommended Torque		[lb-in]	90...110	180...220	~
With Screw-type Lugs - Copper Clad (CA6-L...)					W/CEP7-EEMH W/CEP7-EEHH
CA6-L180		[AWG]	#6...300 MCM	~	~
Recommended Torque		[lb-in]	90...110	~	~
CA6-L420		[AWG]	~	2x#4...350 MCM	~
Recommended Torque		[lb-in]	~	130-150	~
CA6-L630		[AWG]	~	~	2 x 2 / 0...500 MCM 600
Recommended Torque		[lb-in]	~	~	~
CA6-L860		[AWG]	~	~	4 x 2 / 0...500 MCM 600
Recommended Torque		[lb-in]	~	~	~

❶ For multiple conductor applications the same style and size of wire must be used. ❷ Minimum 25mm² (#4 AWG) -95mm² with sleeve per DIN 46228.

Technical Information

					
				CEP7-EEVF	
Rated Insulation Voltage - U_i		[V]	690 AC		
Rated Insulation Strength- U_{imp}		[kV]	6 AC		
Rated Operation Voltage - U_o		[V]	690 AC (IEC) / 600 AC (UL/CSA)		
Line Terminal Power					
Type		Hexagonal Bolt			
Direct Connection				M8 x 25	
Recommended Torque		[Nm]	8...10		
(Bolt supplied with contactor)		[lb-in]	70...90		
Load Terminal Cross Sections					
Terminal Type		M8			
Terminal Screw					
	Flexible with wire end ferrule	One conductor	[mm²]	1 x (4...50)	
		Torque	[Nm]	4.6	
		Two conductors	[mm²]	2 x (4...25)	
		Torque	[Nm]	4.6	
	Course stranded / solid	One conductor	[mm²]	1 x (4...50)	
		Torque	[Nm]	4.6	
		Two conductors	[mm²]	2 x (4...35)	
		Torque	[Nm]	4.6	
	Stranded / Solid	One conductor	[AWG]	1 x (12...1/0)	
		Torque	[lb-in]	40	
		Two conductors	[AWG]	2 x (8...2)	
		Torque	[lb-in]	40	
Pozidrive Screwdriver Size		---			
Slotted screwdriver		[mm]	---		
Hexagon Socket Size		[mm]	4		

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) / 690 AC (UL/CSA)
Rated Operation Current - I_e	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
	AC-15		
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
 Flexible with wire end ferrule	One conductor	[mm ²]	1 x (0.5...2.5)
	Torque	[Nm]	0.55
	Two Conductors	[mm ²]	2 x (0.25...1.5)
	Torque	[Nm]	0.55
 Course stranded / solid	One conductor	[mm ²]	1 x (0.5...4)
	Torque	[Nm]	0.55
	Two conductors	[mm ²]	2 x (0.22...2.5)
	Torque	[Nm]	0.55
 Stranded / Solid	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

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

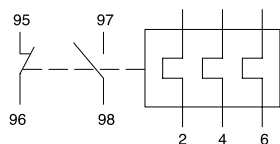
Technical Information

Environmental Ratings		
Ambient Temperature	Storage	[-40...+85 (-40...+185 °F)]
	Operating	[-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 standard
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

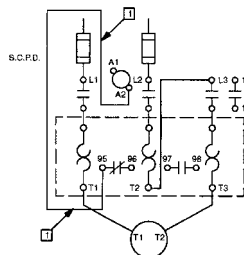
Electromagnetic Compatibility		
Electrostatic Discharge Immunity	Test Level	[kV]
		8kV air discharge 6kV contact discharge
RF Immunity	Performance Level	1 ①②
	Test Level	[V/m]
Electrical Fast Transient Burst Immunity	Performance Level	1 ①②
	Test Level	[kV]
Surge Immunity	Performance Level	1 ①②
	Test 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 (CD2-1993 Part 4, EN 60947-4-1, EN 60947-5-1)		
Approvals	CSA, UL, ATEX (pending)		
	CEP7-ED1...B CEP7-EE...B	CEP7-EE...D	CEP7-EE...E
Weights (unpackaged)	[Kg]	0.25	0.25
	[Lb]	0.55	0.55
		0.52	1.06

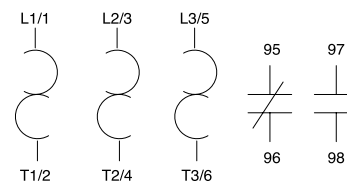
Wire Schematics



Typical IEC Wiring Schematic



Typical Wiring for Single Phase Applications

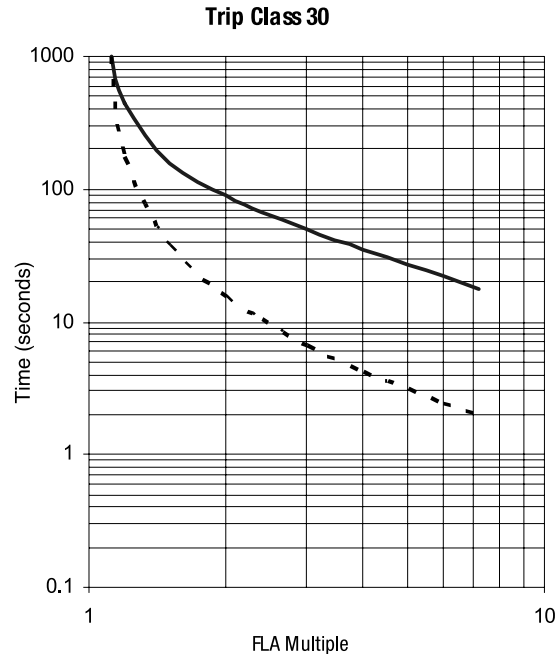
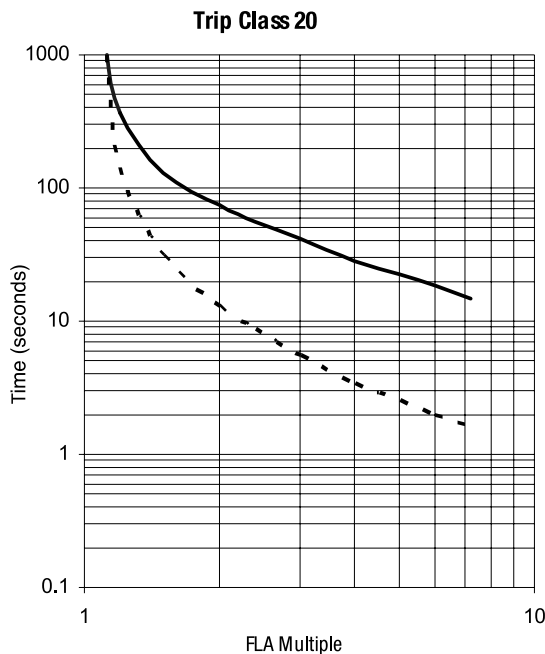
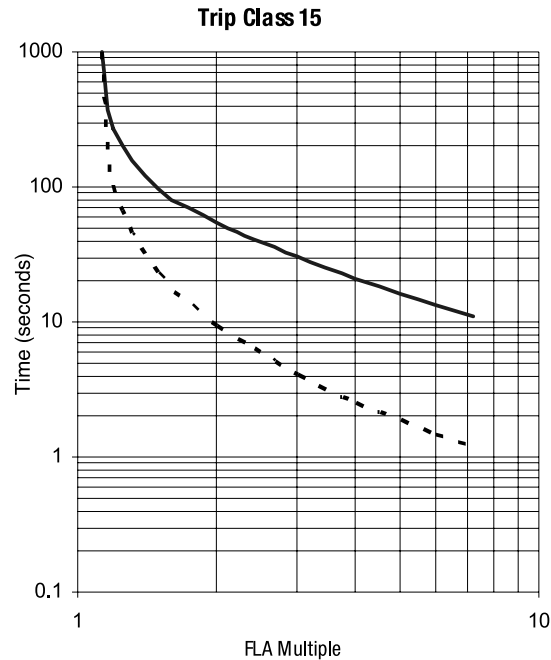
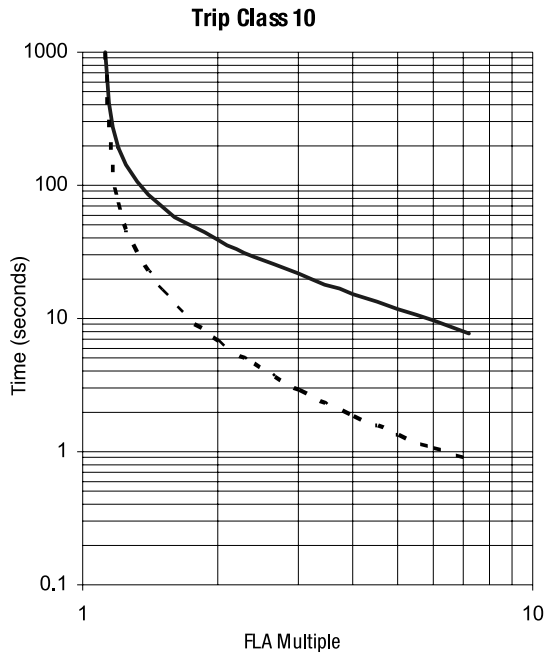


Typical NEMA Wiring Schematic

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

Technical Information

Trip Curves ①



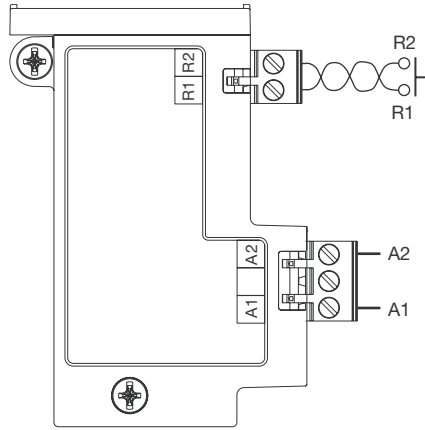
Trip Curve Legend

Cold Trip ———
Hot Trip - - - - -

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

Dimensions

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/EJM Operational LED

Status LED:
Steady Green - Module is powered up.

CEP7-EJM Dip Switch

Adjustment Settings

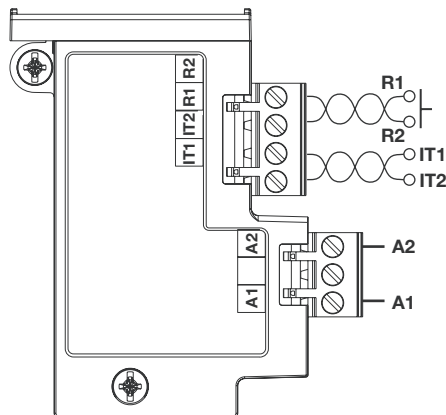
Remote Reset		
SW1	Enable: I	Disable: 0

Jam Protection		
SW2	Enable: 0	Disable: I

Jam Trip Level		
	SW 3	SW 4
150%	0	0
200%	0	I
300%	I	0
400%	I	I

Jam Trip Delay		
	SW 5	SW 6
0.5 sec	I	I
1 sec	I	0
2 sec	0	I
4 sec	0	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: I	Automatic: 0
-----	-----------	--------------

PTC Protection

SW2	Enable: I	Disable: 0
-----	-----------	------------

Overload Relay Type

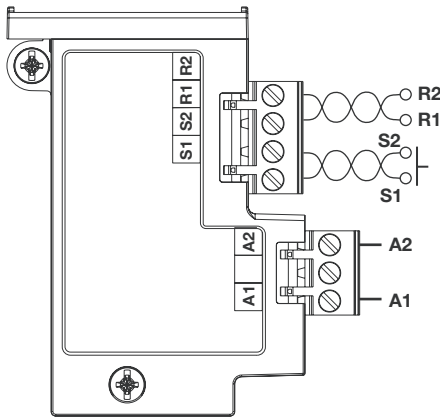
SW3	3 Phase: I	1 Phase: 0
-----	------------	------------

❶

❶ 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:
500 ms ± 250 ms, typical;
< 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.

Dimensions

CEP7-EGF & CEP7-EGJ 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 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.

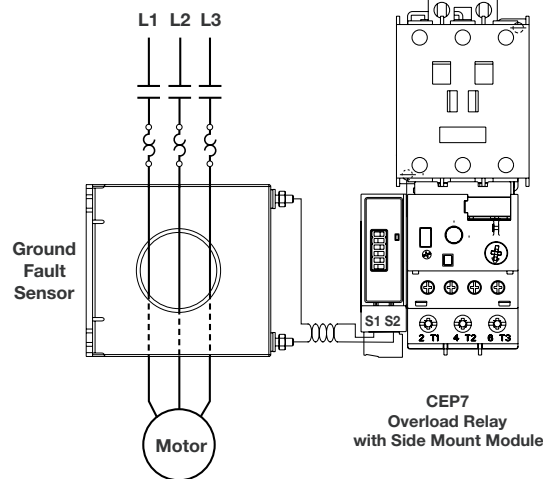
CEP7-EGF Dip Switch

Adjustment Settings

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

CEP7-EGF & CEP7-EGJ Installation

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.

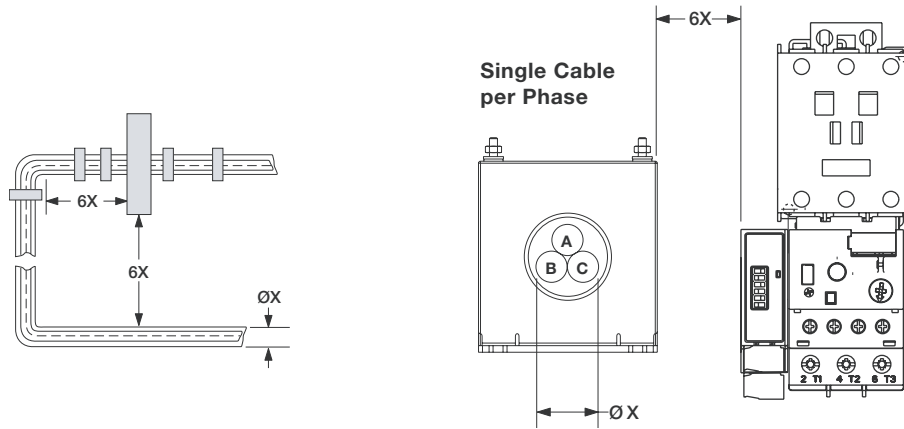
CEP7-EGJ Dip Switch

Adjustment Settings

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

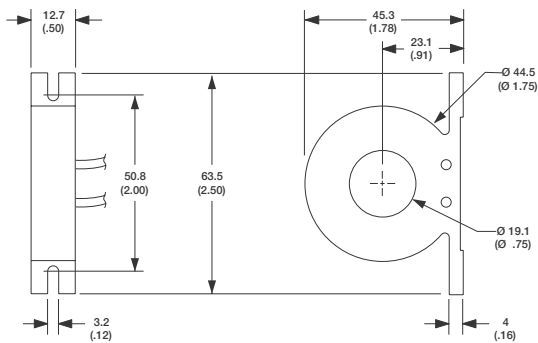
Dimensions

CEP7-CBCT Installation

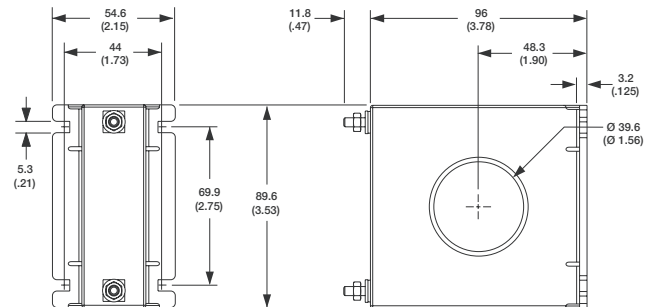


CEP7-CBCT Dimensions

CEP7-CBCT1



CEP7-CBCT2



CEP7-CBCT Ground Fault Trip Data

ATTENTION: The CEP7 Overload relay is not a ground fault circuit interruptor 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 \pm 20 ms, typical

< 6 seconds, for a ground fault present at power-up of the side mount module

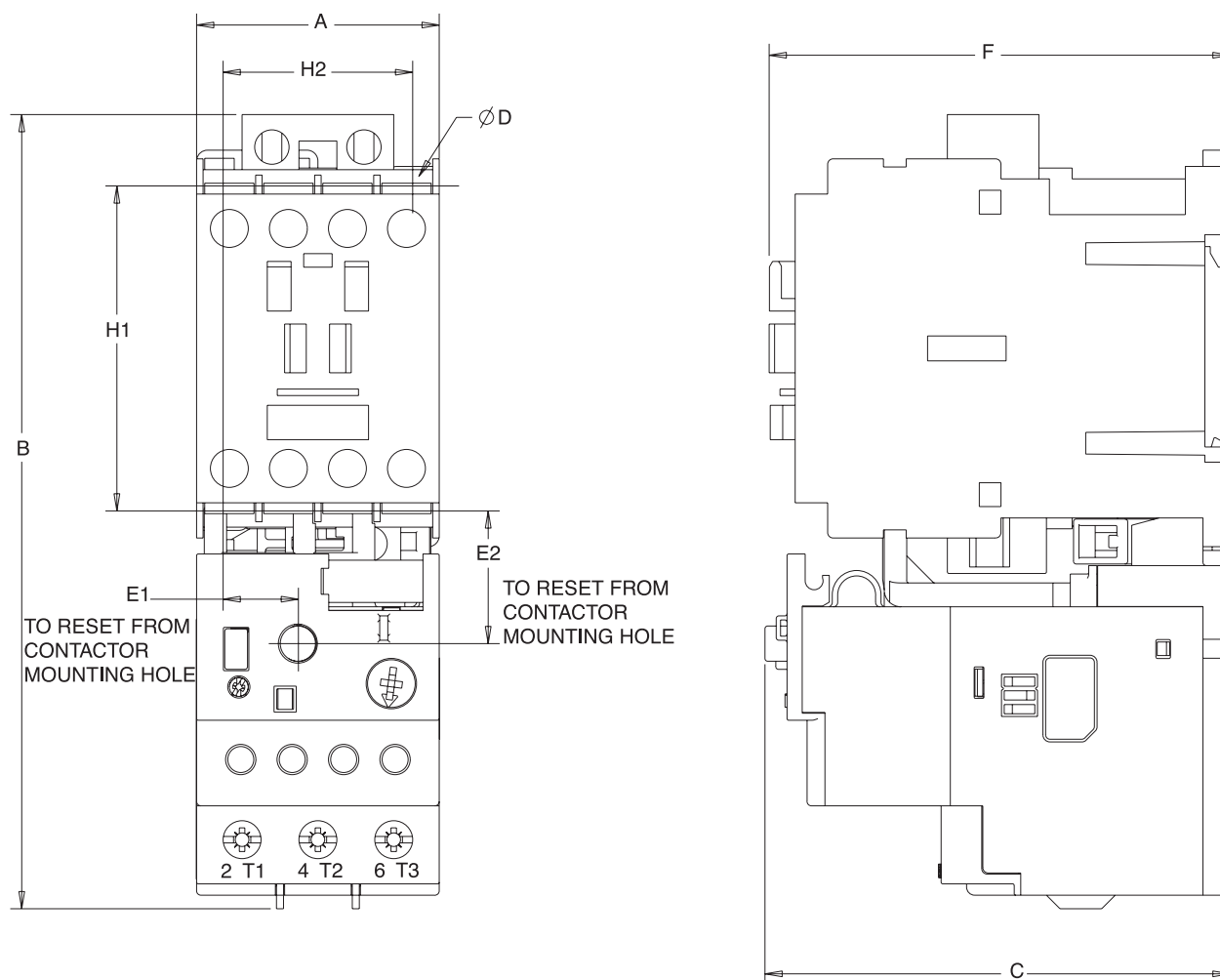
< 30 seconds, if the protection inhibit has not been cleared.

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

Dimensions

CEP7 Mounted to CA7 Contactor

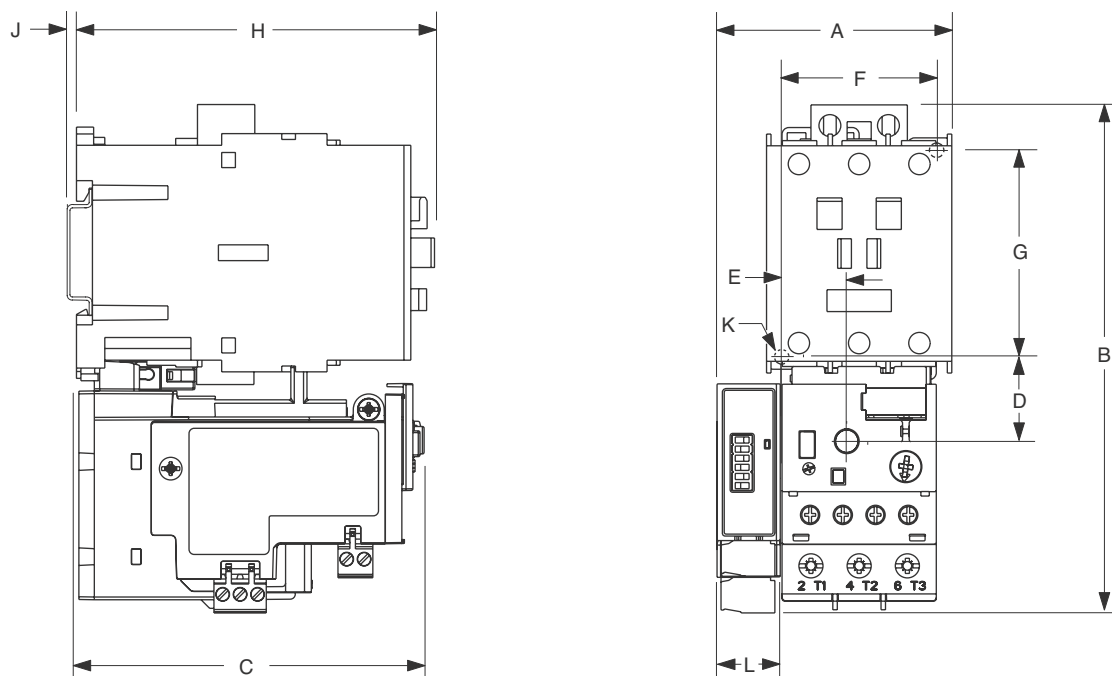
- Dimensions are in millimeters (inches)
- Dimensions not intended for manufacturing purposes



Overload	Mounted to Contactor	A Width	B Height	C Depth	D	E1	E2	F	H1	H2
CEP7-ED...B CEP7-EE...B CEP7S-EE...B	CA7-9...23	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-EE...D CEP7S-EE...D	CA7-30...37	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-EE...D CEP7S-EE...D	CA7-43	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...85	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)

Dimensions

CEP7 Mounted to CA7 Contactor (with side mounted module)



Contactor Cat. No.	Overload Cat. No.		A	B	C	D	E	F	G	H	J	K	L
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		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	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

CEP7 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

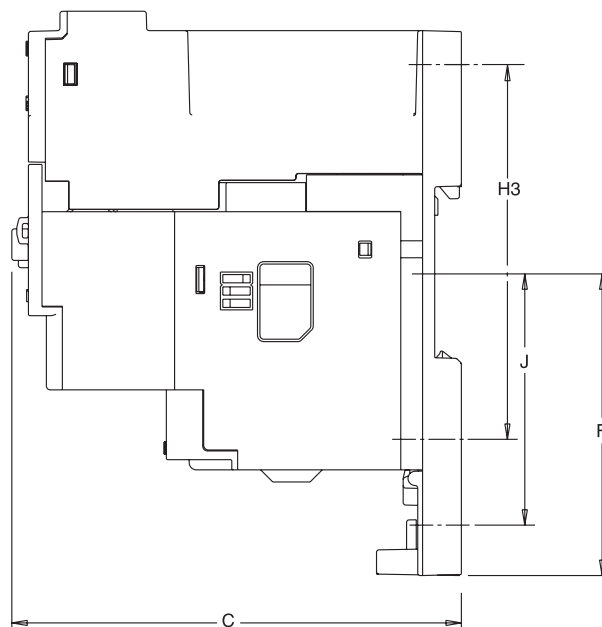
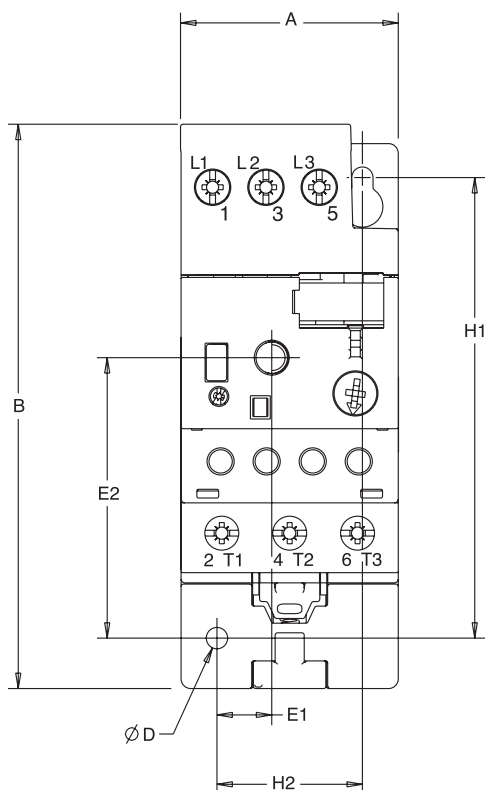
- Connect remote reset pilot device to Terminals R1 and R2.
- Do not apply external voltage to R1 and R2. Equipment damage will occur.
- Recommend use of twisted pair for remote reset, #24 AWG minimum.
- Apply 24 - 240V, 47 - 63HZ or DC to terminals A1 and A2 for control power.
- Rated Insulation Voltage (Ui) 300V
- Rated Operating Voltage (Ue) 24 - 240 VAC, 50/60 Hz
24 - 240 VDC
- Power at Rated Operating Voltage (Typical)

24 VAC	0.3 W
120 VAC	0.3 W
240 VAC	0.5 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.

Dimensions

CEP7 with CEP7-EP... Panel Mount Adaptor

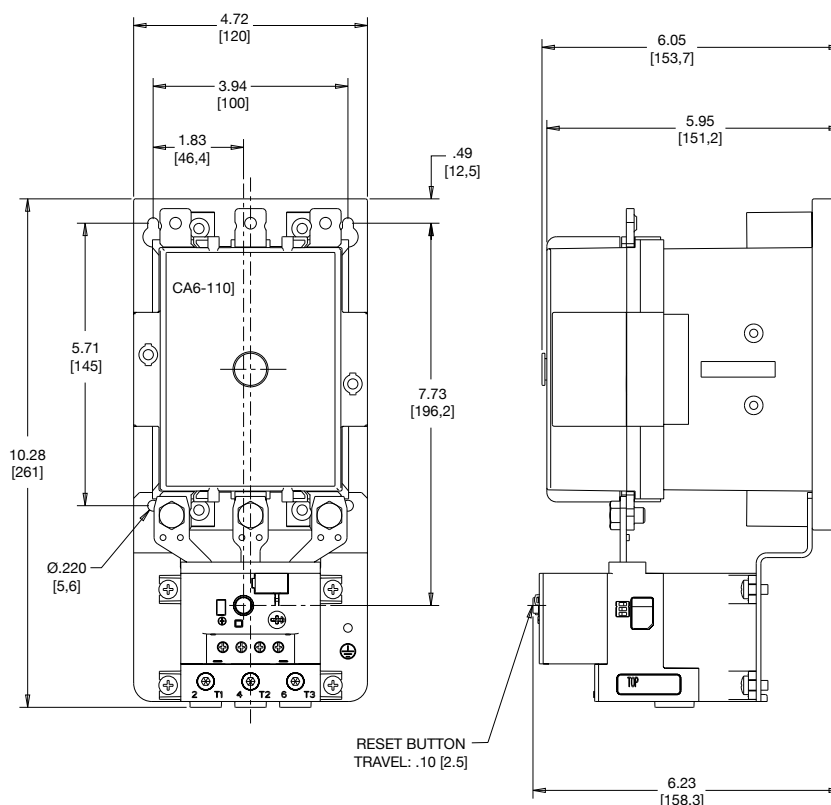
- Dimensions are in millimeters (inches)
- Dimensions not intended for manufacturing purposes



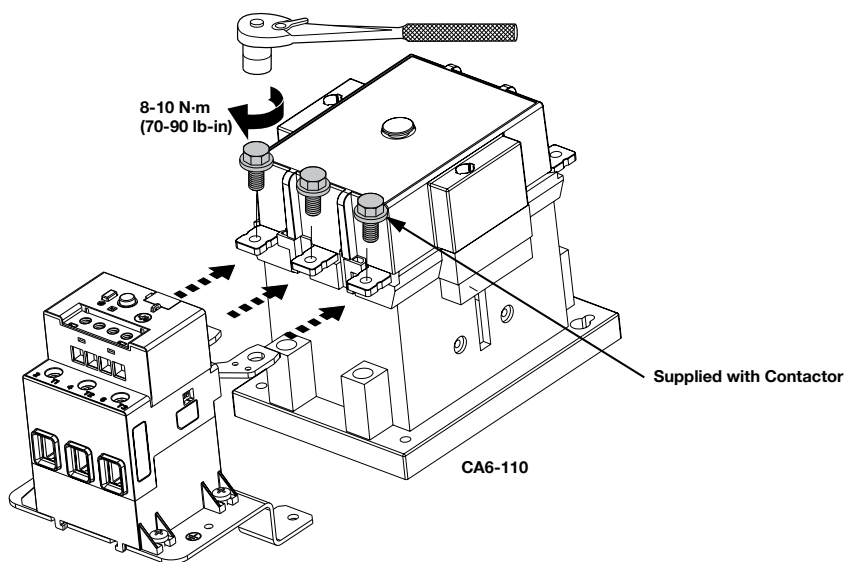
Panel Mount Adaptor	Overload Relay	A Width	B Height	C Depth	D	E1	E2	F	H1	H2	H3	J
CEP7-EPB	CEP7-ED...B	45	116.5	92.7	4.4	11.4	57.9	62.5	95	30	75	52.1
	CEP7-EE...B	(1-25/32)	(4-9/16)	(3-21/32)	(11/64)	(29/64)	(2-9/32)	(2-15/32)	(3-3/4)	(1-3/16)	(2-31/32)	(2-3/64)
	CEP7S-EE...B											
CEP7-EPD	CEP7-EE...D	45	112.4	108.7	4.4	11.4	57.9	62.5	95	30	75	52.1
	CEP7S-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)
	CEP7S-EE...D											
CEP7-EPE	CEP7-EE...E	72	107.4	127	5.5	26.4	54.5	48.3	90	60	~	43.3
	CEP7S-EE...E	(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)
	CEP7S-EE...E											

DIN-rail / Panel Adapter Terminal Cross Sections		CEP7-EPB ①	CEP7-EPD ①	CEP7-EPE
Flexible stranded with ferrule	Single conductor	1.0...4.0mm²	2.5...16mm²	4.0...35mm²
	Torque	1.8 Nm	2.3 Nm	4.0 Nm
	Two conductor	1.0...4.0mm²	2.5...10mm²	4.0...25mm²
	Torque	1.8 Nm	2.3 Nm	4.0 Nm
Course stranded / solid	Single conductor	1.5...6.0mm²	2.5...25mm²	4.0...50mm²
	Torque	1.8 Nm	2.3 Nm	4.0 Nm
	Two conductor	1.5...6.0mm²	2.5...16mm²	4.0...35mm²
	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

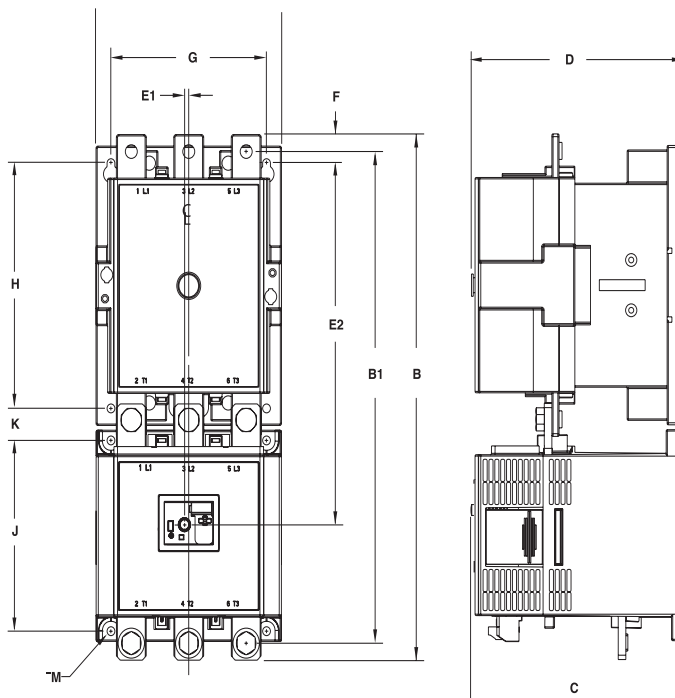
① For multiple conductor applications, the same size and style of wire must be used.

CEP7-EEVF

Assembly Instructions



CEP7-EE_F... EE_H mounted to CA6 Contactor



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-EE_F	CA6-95 (EI)	120	336.3	418	311.8	152.7	156	36	226.3	12.5	100	145	135	22.3	8 - 5.6
	CA6-110 (EI)	(4.72)	(13.24)	(16.46)	(12.27)	(6.01)	(6.14)	(.14)	(8.91)	(.49)	(3.94)	(5.71)	(5.31)	(.88)	(8 - .22)
	CA6-140 (EI)	120	339.8	418	317.8	152.7	156	36	226.3	16	100	145	135	22.3	8 - 5.6
CEP7-EE_G	CA6-180 (EI)	(4.72)	(13.38)	(16.46)	(12.51)	(6.01)	(6.14)	(.14)	(8.91)	(.63)	(3.94)	(5.71)	(5.31)	(.88)	(8 - .22)
	CA6-210 EI	155	385.8	487.4	360.8	176.5	180	36	265.5	21	130	180	140	23.5	8 - 6.5
	CA6-420 EI	(6.10)	(15.19)	(19.19)	(14.2)	(6.95)	(7.09)	(.14)	(10.44)	(.83)	(5.12)	(7.09)	(5.51)	(.93)	(8 - .26)
CEP7-EE_H	CA6-630 EI	255	552	915	508	269.3	270.7	36	384.1	52.5	226	230	108	109	8 - 13
	CA6-860 EI	(10.04)	(21.73)	(36.02)	(20)	(10.6)	(10.66)	(.14)	(15.12)	(2.07)	(8.90)	(9.06)	(4.25)	(4.29)	(8 - .51)

Assembly Instructions

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

