Motor Protection

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 bimetallic 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 bimetallic 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

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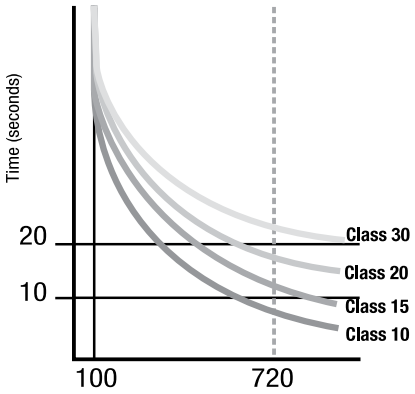


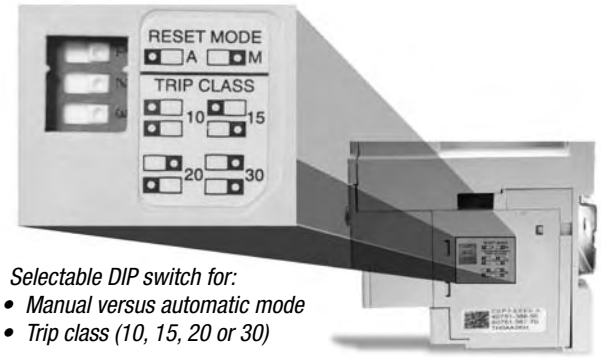
CEP7 overload relays are available with Class 10, 15, 20 or 30 tripping characteristics

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.

Choice of reset options

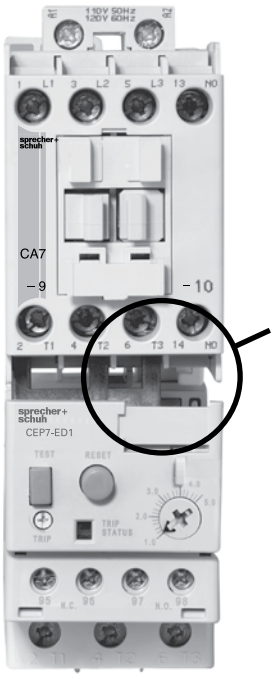
Most industrial applications usually calls for an overload relay that must be manually reset in the event of a trip. This allows the cause of the overload to be identified before the motor is restarted. In specialized cases, however, such as rooftop AC units or where restarting the motor will not harm 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 selectable dip switch in Manual and Automatic Reset modes.



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

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 insolating the electromagnet 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.



Mechanical attachment

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.

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.

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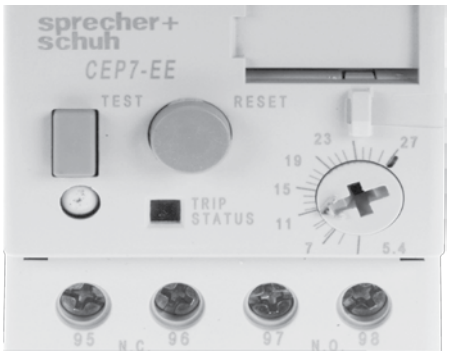

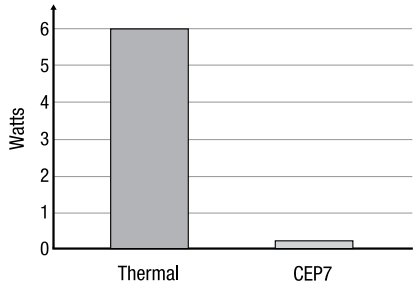

Conventional overload relays dissipate as much as six watts of energy compared with as little as 150 milliwatts for the CEP7

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%.

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 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.

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 **Profibus** or **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

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Directly Mounted CEP7 Solid State Overload Relays, Manual Reset ❶❷❹

Overload Relay	Directly Mounts to Contactor… ❷	Adjustment Range (A)	Trip Class 10	
			Catalog Number	Price
Manual Reset for 3Ø Applications ❶				
	CA7-9…CA7-23 CAN7-12, CAN7-16	0.1…0.5	**CEP7-ED1AB**	**77**
		0.2…1.0	**CEP7-ED1BB**	**77**
		1.0…5.0	**CEP7-ED1CB**	**77**
		3.2… 16	**CEP7-ED1DB**	**77**
		5.4…27	**CEP7-ED1EB**	**77**
	CA7-30…CA7-43 CAN7-37, CAN7-43	5.4…27	**CEP7-ED1ED**	**123**
		9…45	**CEP7-ED1FD**	**123**

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

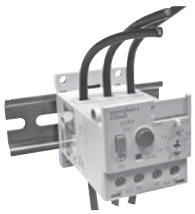
Overload Relay	Directly Mounts to Contactor… ❷	Adjustment Range (A)	Adjustable Trip Class 10, 15, 20 & 30	
			Catalog Number	Price
Automatic or Manual Reset for 3Ø Applications ❶				
	CA7-9…CA7-23 CAN7-12, CAN7-16	0.1…0.5	**CEP7-EEAB**	**88**
		0.2…1.0	**CEP7-EEBB**	**88**
		1.0…5.0	**CEP7-EECB**	**88**
		3.2… 16	**CEP7-EEDB**	**88**
		5.4…27	**CEP7-EEEB**	**88**
	CA7-30…CA7-43 CAN7-37, CAN7-43	1.0…5.0	**CEP7-EECD**	**138**
		3.2…16	**CEP7-EEDD**	**138**
		5.4…27	**CEP7-EEED**	**138**
		9…45	**CEP7-EEFD**	**138**
	CA7-60…CA7-97 CAN7-85	5.4…27	**CEP7-EEEE**	**158**
		9…45	**CEP7-EEFE**	**158**
		18…90	**CEP7-EEGE**	**164**
		60…120	**CEP7-EEVE**	**164**
Automatic or Manual Reset for 1Ø Applications ❶				
	CA7-9…CA7-23 CAN7-12, CAN7-16	1.0…5.0	**CEP7S-EEPB**	**88**
		3.2…16	**CEP7S-EERB**	**88**
		5.2…27	**CEP7S-EESB**	**88**
	CA7-30…CA7-43 CAN7-37, CAN7-43	9…45	**CEP7S-EETD**	**138**
	CA7-60…CA7-85 CAN7-85	18…90	**CEP7S-EEUE**	**164**

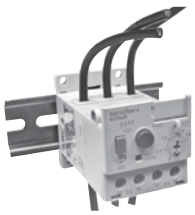
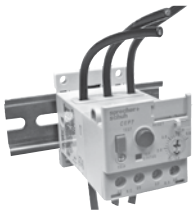
TIP!

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.

❶ 3-phase CEP7 units are only designed for 3Ø applications. Single phase CEP7S units are only designed for single phase applications.
❷ This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.
❸ The reset time of a CEP7 set in the automatic mode is approximately 180 seconds.
❹ CEP7 overload relays do not work with Variable Frequency Drives, DC Applications or Softstarters with braking options.

Pass-Thru CEP7 Solid State Overload Relays ❺

Overload Relay	Separate Mount for use with… ❷	Adjustment Range (A)	Trip Class 10	
			Catalog Number	Price
Manual Reset for 3Ø Applications ❶❹				
 Fig. 1	CA8-09…12 CA7-9…CA7-23 CAN7-12…CAN7-37	1.0…5.0	**CEP7-ED1CP**	**77**
		3.2… 16	**CEP7-ED1DP**	
		5.4…27	**CEP7-ED1EP**	

Overload Relay	Separate Mount for use with… ❷	Adjustment Range (A)	Adjustable Trip Class 10, 15, 20 & 30	
			Catalog Number	Price
Automatic or Manual Reset for 3Ø Applications ❶❸❹				
 Fig. 1	CA8-09…12 CA7-9…CA7-23 CAN7-12…CAN7-37	1.0…5.0	**CEP7-EECP**	**88**
		3.2… 16	**CEP7-EEDP**	
		5.4…27	**CEP7-EEEP**	
Automatic or Manual Reset for 1Ø Applications ❶❸❹				
 Fig. 1	CA8-09…12 CA7-9…CA7-23 CAN7-12…CAN7-37	1.0…5.0	**CEP7S-EEPP**	**88**
		3.2…16	**CEP7S-EERP**	
		5.2…27	**CEP7S-EESP**	

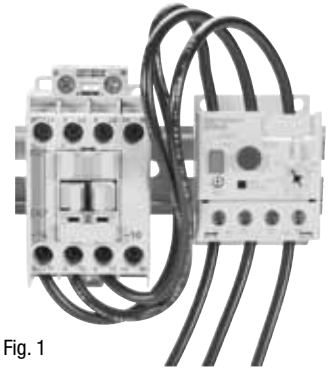


Fig. 1

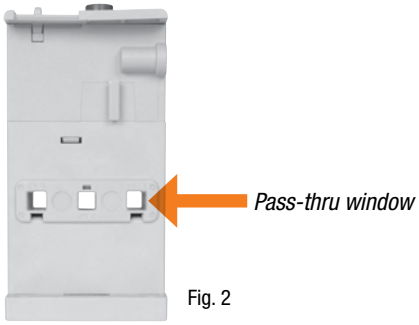


Fig. 2

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

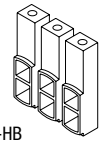
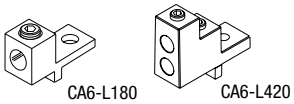
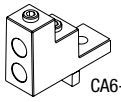
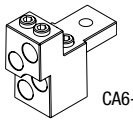
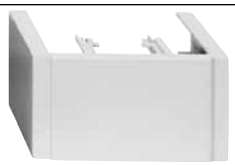
- No need for a panel mount adapter as required with direct-connect versions
- Eliminates 3 to 6 wire terminations
- Designed for use with CA8 or CA7 Contactors
- Easily replaces outdated overload relays in existing starter assemblies
- Provides state-of-the-art accuracy and motor protection

❶ 3-phase CEP7 units are only designed for 3Ø applications. Single phase CEP7S units are only designed for single phase applications.
❷ This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.
❸ The reset time of a CEP7 set in the automatic mode is approximately 180 seconds.
❹ CEP7 overload relays do not work with Variable Frequency Drives, DC Applications or Softstarters with braking options.
❺ 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 ❶❷❸❹❼

Overload Relay	Directly Mounts to Contactor… ❷	CT Ratio	Adjustment Range (A)	Selectable Trip Class (10,15,20 & 30)	
				Catalog Number	Price
Automatic or Manual Reset for 3Ø Applications ❶❸					
 CEP7-EEHF	CA6-95…CA6-110	No CT	60…120	**CEP7-EEVF ❽**	**285**
	CA6-95…CA6-180 CA6-95-EI…CA6-180-EI CAN6-180(EI)	150:5	30…150	**CEP7-EEHF**	**508**
		200:5	40...200	**CEP7-EEJF**	**508**
	CA6-210-EI…CA6-420-EI CAN6-300-EI	200:5	40...200	**CEP7-EEJG**	**888**
		300:5	60...300	**CEP7-EEKG**	**888**
		500:5	100...500	**CEP7-EELG**	**888**
	CA6-630-EI…CA6-860-EI	600:5	120...600	**CEP7-EEMH**	**1397**
		800:5	160...800	**CEP7-EENH**	**1397**

Load Side Lugs & Accessories

Lug or Accessory	Description	For Use With...	Catalog Number	Price
 CA6-HB	**Main Terminal Set, ❺** **Dual Conductor, Touch Safe** • 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**	**See page A101**
		CEP7-EEJG CEP7-EEKG CEP7-EELG	**CA6-HB3**	
 CA6-L180 CA6-L420	**Screw Type Lugs -** • Accepts round conductors only • Copper construction (set of 3 lugs)	CEP7-EEHF CEP7-EEJF	**CA6-L180**	
		CEP7-EEJG CEP7-EEKG CEP7-EELG	**CA6-L420**	
 CA6-L630	**Screw Type Lugs -** • 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 -** • 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 - ❾** • CA6 touch protection • Line **or** load **(price each)** • IP20; IEC60529 & DIN 40 050 protection	CA6-95(-EI) to 180(-EI) CA6-210-EI to 420-EI CA6-630-EI to 860-EI	**CA6-TC180** **CA6-TC420** **CA6-TC860**	**See page A103**

❶ 3-phase CEP7 units are only designed for 3∅ applications.
❷ This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.
❸ The reset time of a CEP7 set in the automatic mode is approximately 180 seconds.
❹ CEP7 Overload relays do not work with Variable Frequency Drives or any Sprecher + Schuh Softstarter with braking options.
❺ CA6-HB1 is not applicable with CEP7.
❻ Terminal covers not necessary when using CA6-HB-_ insulated lugs.
❼ CEP7-EEHF…CEP7-EENH include current transformers used to monitor high amperage. CEP7-EEVF directly monitors amperage. No current transformer is necessary.
❽ CEP7-EEVF is supplied with load side lugs internally mounted (see pg. B12) CEP7-EEVF not for use with CA6-95-EI or CA6-110-EI. Series B Range was 55…110 and Series C expanded to 60…120 starting Nov. 2009.
❾ Terminal Covers not necessary when using Main Terminal Sets (CA6-HB…) which are insulated.

Accessories - CEP7 Side Mount Modules ❶❷

Accessory	Description	For use with…	Catalog Number	Price
 CEP7-ERR	**Remote Reset Module (Series B)** • Dip switch adjustable reset mode & type - 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**	**100**
 CEP7-EJM	**Jam Protection and Remote Reset Module ❸** • Dip switch adjustable Jam Protection - 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**	**110**
 CEP7-EPT	**PTC Thermistor Relay and Remote Reset Module** • 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**	**125**
 PROFIBUS CEP7-EPRB	**Network Communication Modules** • Delivers direct access to motor performance and diagnostic data on a field bus based network in addition to seamless control • **Includes integrated I/O** 2 inputs 1 output • **Operational and diagnostic data** Average motor current Percentage of thermal capacity usage Device status Trip and warning identification Trip history (last five trips) • **Protective functions** Overload warning - 1…100% TCU Jam protection; - Trip setting 150…600% FLA - Trip delay 0.5…25 seconds - Warning setting 100…600% FLA Underload warning - 20…100% FLA	Side-mount to any CEP7-EE_ CEP7S-EE_	**CEP7-EPRB**	**415**
NEW  ETHERNET CEP7-ETN			**CEP7-ETN**	**422**

❶ 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 B17 for more information.

❷ See page B16 for Technical Data, Wiring, and DIP Switch set up.

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

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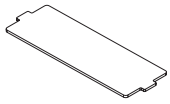
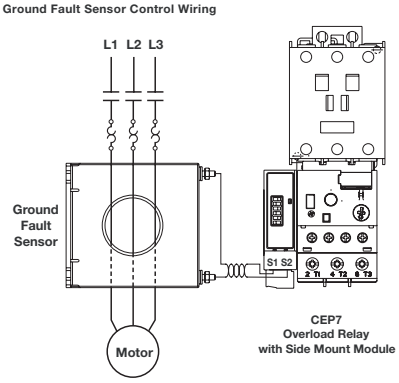
Accessories - CEP7 Side Mount Modules ❶❸

Accessory	Description	For use with…	Catalog Number	Price
 CEP7-EGF	**Ground Fault Protection and Remote Reset Module ❷❻•** 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_ Must use with CEP7-CBCT_ Current Sensor	**CEP7-EGF**	**110**
 CEP7-EGJ	**Ground Fault/Jam Protection and Remote Reset Module ❷❻** • 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		**CEP7-EGJ**	**145**
	**Adjustment Cover for External Modules**	All modules with DIP Switches	**CEP7-EMC**	**6.50**

CEP7 Ground Fault Sensor Installation



CEP7 Ground Fault Sensor Selection ❸

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 ❹	CA7-9...CA7-37	**CEP7-CBCT1**	**50**
	**90A**	**50/60 Hz**	1000:1	39.6mm (1.56 in.)	2 AWG @ 600V ❹	CA7-9...CA7-85	**CEP7-CBCT2**	**175**
	180A	**50/60 Hz**	1000:1	63.5 mm (2.50 in.)	250MCM (120mm²) @ 600V ❹	CA7-09…CA6-180	**CEP7-CBCT3**	**226**
	**420A**	**50/60 Hz**	1000:1	82.3 mm (3.25 in.)	350MCM (185mm²) @ 600V ❺	CA7-09…CA6-420	**CEP7-CBCT4**	**287**

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

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

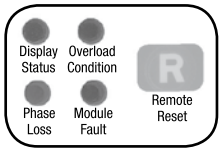
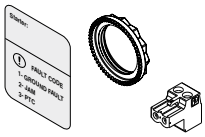
❸ See page B16 for Application Details.

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

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

❻ 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	Price
	**Remote Indication Display "Intellibutton" ❸** Connects, communicates, and receives power from CEP7 Side Mount Modules to remotely view status of CEP7-EE Overload Relays 	CEP7-EJM CEP7-EGF CEP7-EGJ CEP7-EPT CEP7-ERR	NEW **CEP7-ERID**	**100**
	**Replacement Parts Kit for CEP7-ERID** Includes (1) each Mounting Ring (Plastic), Terminal Block Plug, and L.E.D. Fault Code Label	CEP7-ERID	**CEP7-NCRID**	**27**
	**DIN-rail / Panel Adaptor** For separate mounting of overload relay to back pan or top hat DIN-rail	CEP7-ED1…B CEP7-EE…B	**CEP7-EPB**	**29**
		CEP7-EE…D	**CEP7-EPD**	**29**
		CEP7-EE…E	**CEP7-EPE**	**35**
	**Current Adjustment Shield** Prevents inadvertent adjustment of the current setting	all CEP7-ED CEP7-EE	**CEP7-BC8**	**13**
	**Solenoid Remote Reset ❷ -** For remote resetting of the solid state overload relay. Replace ✱ in Catalog Number with Coil Code.	CEP7 all	**CEP7-EMR✱**	**81**
	**External Reset Button** Used for manually resetting overloads mounted in enclosures	all CEP7	**Use D7 Reset - See Section H.**	**~**
	**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**	**14**

Solenoid Remote Reset Coil Codes

(Replace ✱ with coil code below)

A.C. Coil Code	Voltage Range 50 / 60 Hz ❹
J	**24V**
D	**120V**
A	240V

D.C. Coil Code	Voltage ❺
Z24	**24VDC**
Z48	48VDC
Z01	115VDC

❶ At the time of this printing CEP7-ERA does not fit CEP7-EE(HF...HH) without removing the CEP7 cover.
❷ Solenoid Reset Modules only mount on CEP7 Series C, available in 2010.
❸ See page B21 for additional details on installation and LED functions.
❹ Coil consumption of AC coils is 8VA.
❺ Coil consumption of DC coils is 12 watts.

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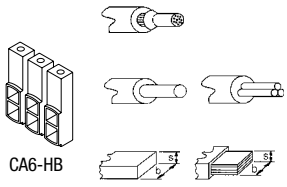
Technical Information

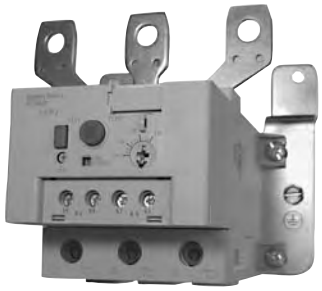
			CEP7-ED1...B CEP7-EE...B	CEP7-ED1ED..FD CEP7-EE...D	CEP7-EE...E
Rated Insulation Voltage - U_i		[V]	690 AC		
Rated Insulation Strength- U_{imp}		[kV]	6 AC		
Rated Operation Voltage - U_e		[V]	690 AC (IEC) / 600 AC (UL/CSA)		
Terminal Cross Sections					
Terminal Type					
Terminal Screw			M5	M5	M8
Flexible with wire end ferrule	One conductor	[mm²]	1 x (2.5...16)	1 x (2.5...16)	1 x (4...35)
	Torque	[Nm]	2.5	2.5	2.4
	Two conductors	[mm²]	2 x (2.4...10) ❶	2 x (2.4...10) ❶	2 x (4...25)
	Torque	[Nm]	3.4	3.4	4
 Course stranded / solid	One conductor	[mm²]	1 x (2.5...25)	1 x (2.5...25)	1 x (4...50)
	Torque	[Nm]	2.5	2.5	4
	Two conductors	[mm²]	2 x (6...16) ❶	2 x (6...16) ❶	2 x (4...35)
	Torque	[Nm]	3.4	3.4	4
 Stranded / Solid	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	1 x 6	---
Hexagon Socket Size		[mm]	---	---	4

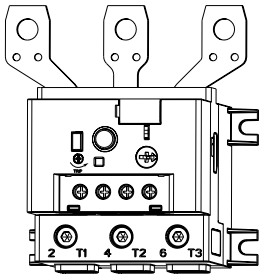
			CEP7-EE_F	CEP7-EE_G	CEP7-EE_H	
Rated Insulation Voltage - U_i		[V]	1000 AC			
Rated Insulation Strength- U_{imp}		[kV]	6 AC			
Rated Operation Voltage - U_e		[V]	1000 AC (IEC) / 600 AC (UL/CSA)			
Terminal Power						
						
Type			Hexagonal Bolt	Hexagonal Bolt	Hexagonal Bolt	
Direct Connection 			M8 x 25	M10 x 30	M12 x 40	
Recommended Torque		[Nm]	11	16	68	
		[lb-in]	100	140	600	
With Main Terminal Set (CA6...HB...)			**With CA6-HB2**	**With CA6-HB3**		
 CA6-HB	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	~
Recommended Torque		[lb-in]	~	~	MCM 600	~
CA6-L860		[AWG]	~	~	~	4 x 2 / 0...500
Recommended Torque		[lb-in]	~	~	~	MCM 600

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_e		[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			
Terminal Screw			M8
 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

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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 - U_e			
AC-15	12...120V	[A]	3 / 2 ❶
	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
Flexible with wire end ferrule	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
Course stranded / solid	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
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	[˚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 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

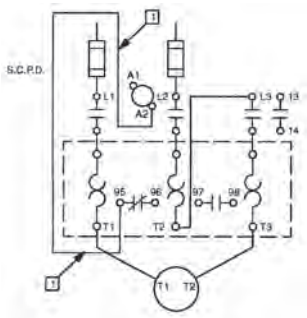
Electrostatic Discharge Immunity	Test Level	[kV]	8kV air discharge 6kV contact discharge
	Performance Level		1 ❶❷
RF Immunity	Test Level	[V/m]	10 V/m
	Performance Level		1 ❶❷
Electrical Fast Transient Burst Immunity	Test Level	[kV]	4 kV
	Performance Level		1 ❶❷
Surge Immunity	Test Level	[V/m]	2 kV (L-E)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

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	0.52
		[Lb]	0.55	0.55	1.06

Wiring Diagrams ❹

Typical Wiring
for Single Phase Applications



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

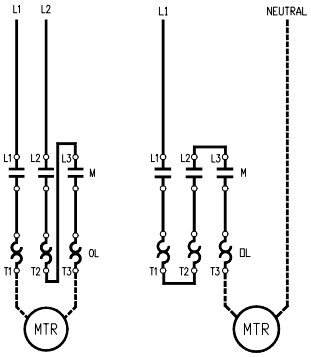


Fig. 1
Recommended connections
for CEP7S (i.e. 240V motors)

Fig. 2
Optional connections
for CEP7S (i.e. ≤120V motors)

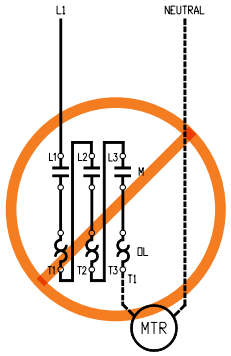


Fig. 3
❸ DO NOT USE

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

❷ Environment 2.

❸ 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.

❹ 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.

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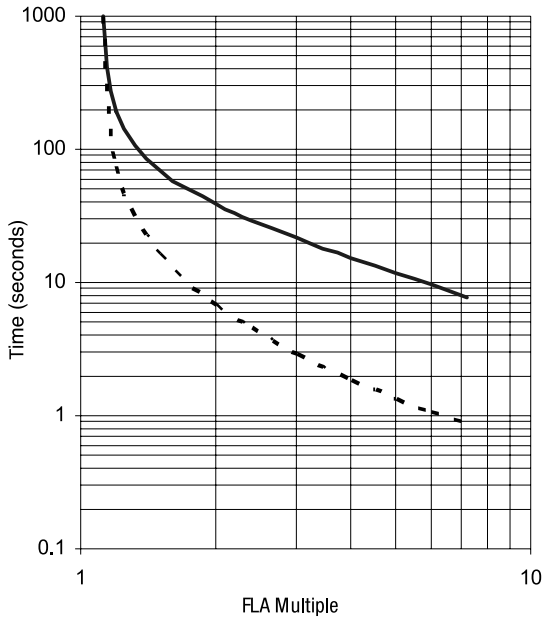
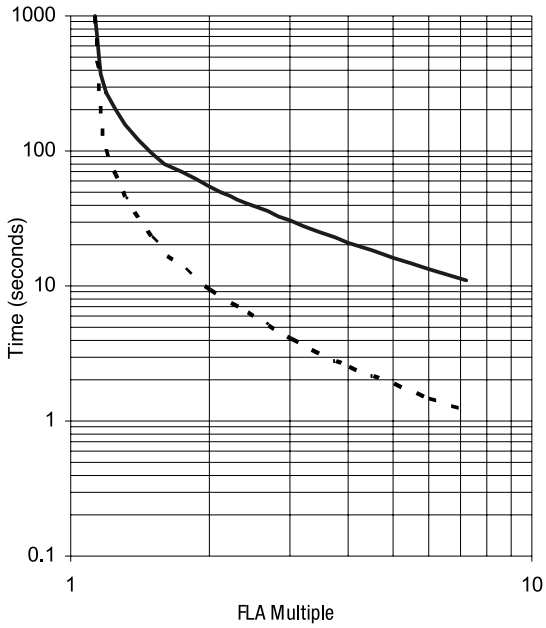
Technical Information

Trip Curves ❶

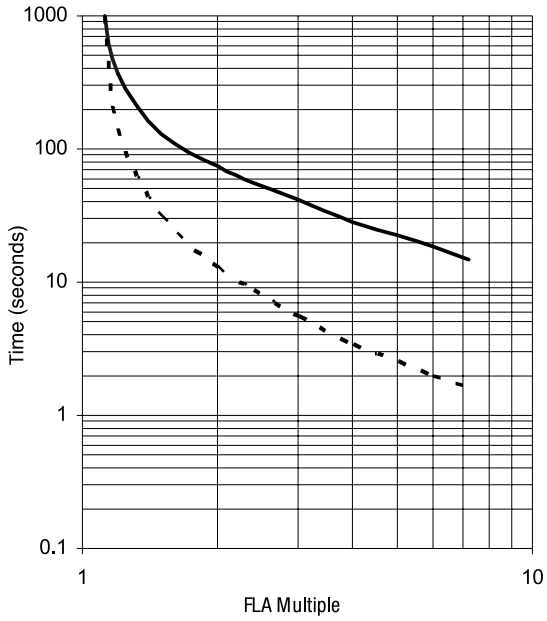
Trip Class 10



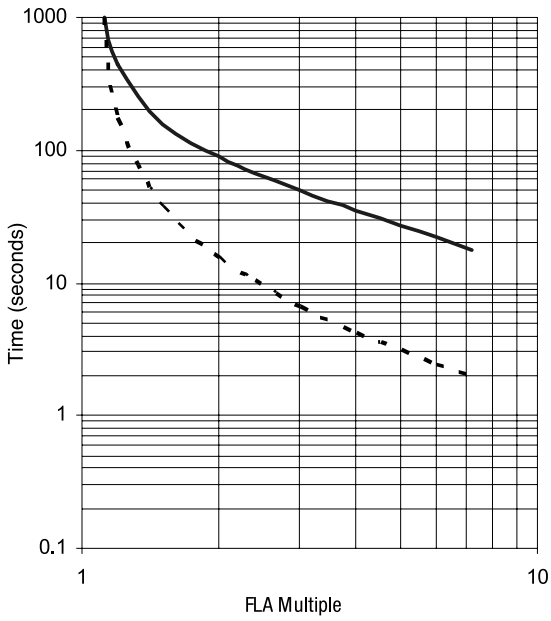
Trip Class 15



Trip Class 20



Trip Class 30



Trip Curve Legend

Cold Trip ——————

Hot Trip – – – – –

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

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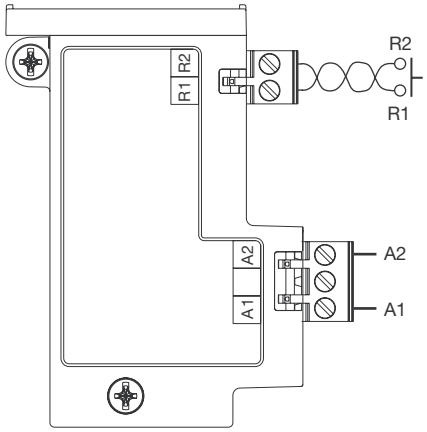
CEP7-ERR & CEP7-EJM Wiring Diagrams



- 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

Remote Reset		
SW1	Enable: 1	Disable: 0

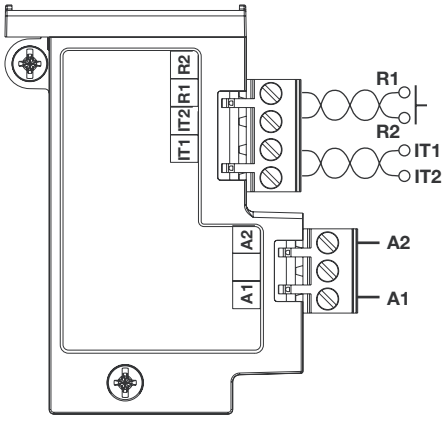
Jam Protection		
SW2	Enable: 1	Disable: 0

Jam Trip Level	SW3	SW4
150%	0	0
200%	0	1
300%	1	0
400%	1	0

Jam Trip Delay	SW5	SW6
0.5 sec	1	1
1 sec	1	0
2 sec	0	1
4 sec	0	0

❶

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

❷

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

SSNA9000

Electrical Data

Power Supply Ratings:		
Rated Supply Voltage	*Us*	24V DC
Rated Operating Range	*Ue*	20.4 - 26.4
Rated Supply Current	*Ie*	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_{the}	5 A
Rated Insulation Voltage	*Ui*	300V AC
Rated Operating Voltage	*Ue*	240V AC
Rated Operating Current	*Ie*	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 DC 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 my 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-

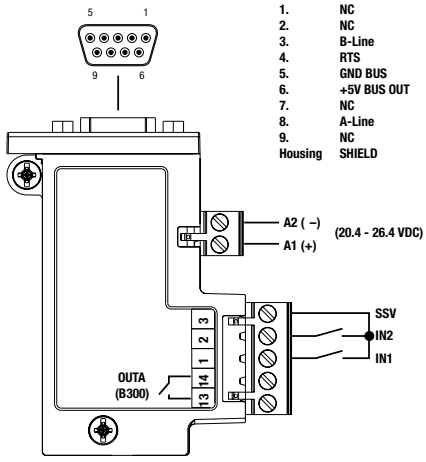
Mechanical Data

Ambient Temperature	T_{amb}	
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

PROFIBUS Communication

Baud Rate	9.6 k, 19.2 k, 45.45 k, 93.75 k, 187.5 k, 500 k, 1.5 M, 3 M, 6 M,12 M
Auto-Baud Rate identification	Yes
DP-V0 (Cyclic data exchange)	Yes
DP-V1 (Acyclic services)	Yes
DP-V2 (Acyclic services)	No
Set Slave Address (SSA) support	Yes

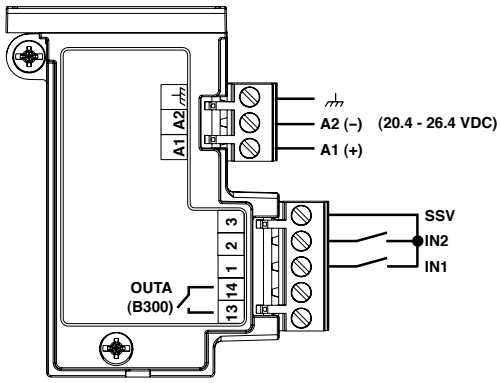
CEP7-EPRB Wiring Diagram



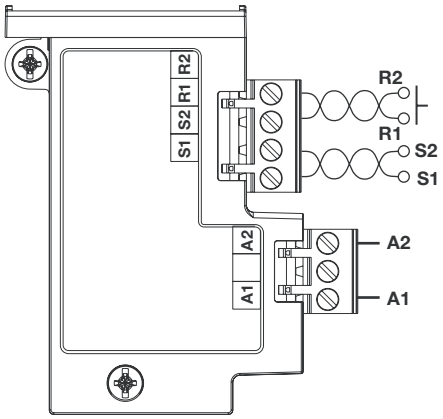
ETHERNET Communication

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-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: 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

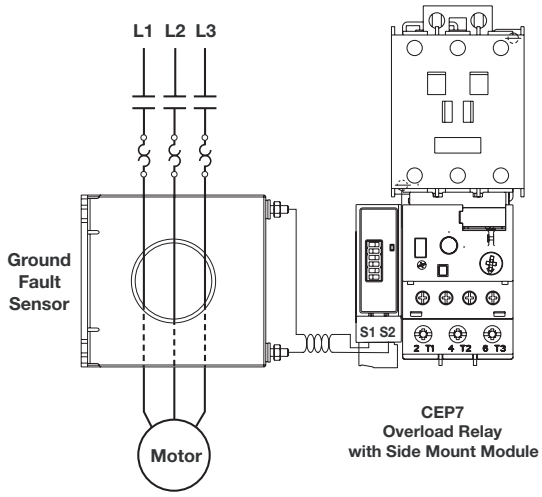
Ground Fault Trip Level	SW 4	SW 5	SW 6
Disable/Off	0	0	0
20% Max GF Current	0	0	I
35% Max GF Current	0	I	0
50% Max GF Current	0	I	I
65% Max GF Current	I	0	0
80% Max GF Current	I	0	I
90% Max GF Current	I	I	0
100% Max GF Current	I	I	I

Overload Relay Type		
SW7	3 Phase: I	1Phase: 0

SW8	Not Used

CEP7-EGF & CEP7-EGJ Installation ❶

Ground Fault Sensor Control Wiring



CEP7 Overload Relay with Side Mount Module

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

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

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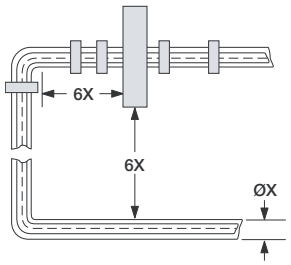
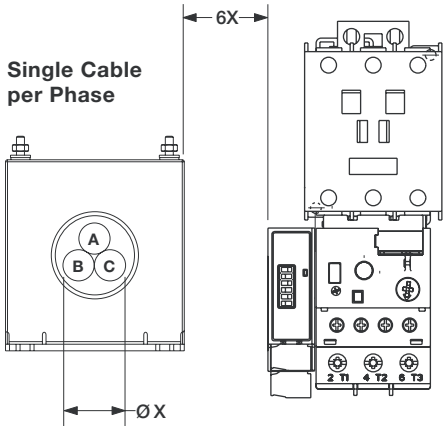
CEP7-CBCT Installation

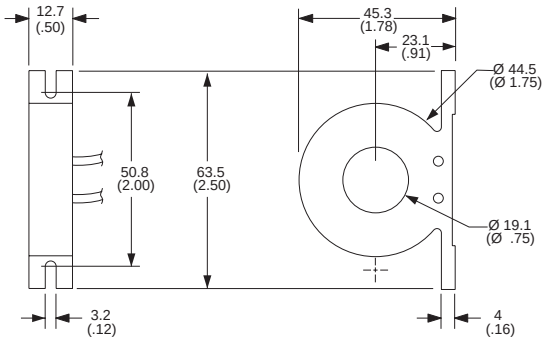
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



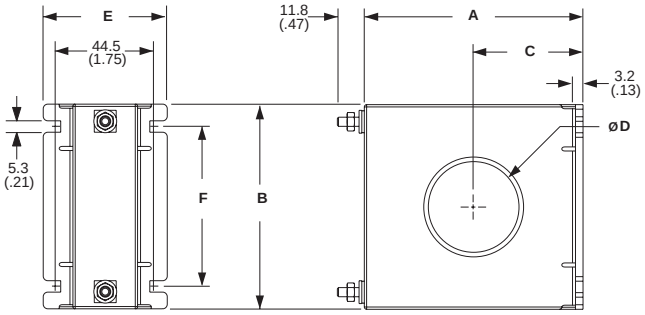


CEP7-CBCT Dimensions

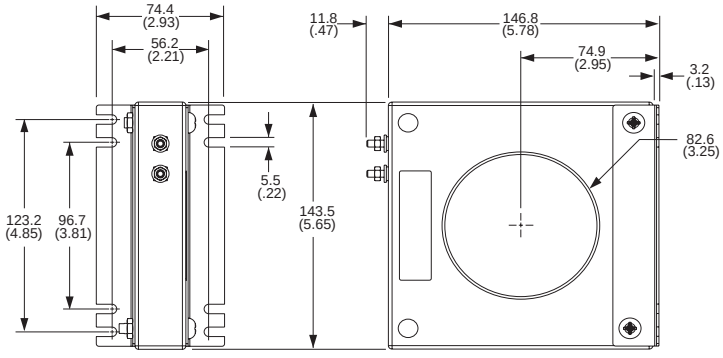
CEP7-CBCT1



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

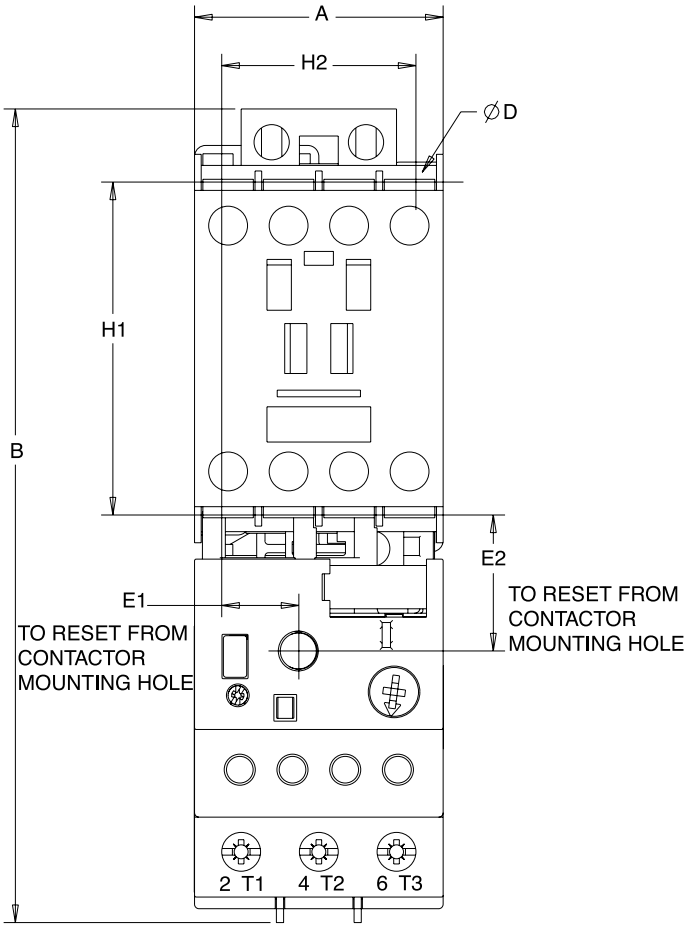
ATTENTION: The CEP7 Overload relay is not a ground fault circuit interrupter for personnel protection as defined in Article 100 of the NEC.

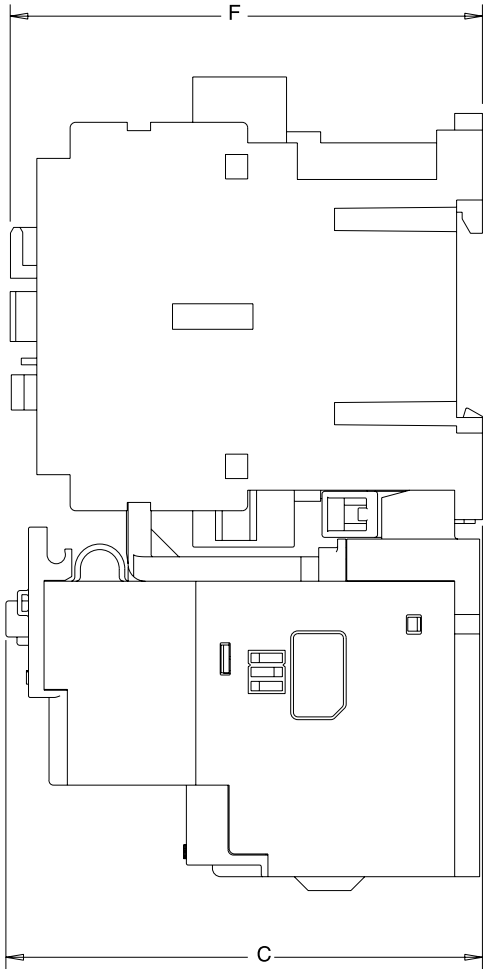
Ground fault trip delay: The delay between the occurrence of a ground fault and a trip of the CEP7 varies, but is generally described by one of the following:
50 ms ± 20 ms, typical
< 6 seconds, for a ground fault present at power-up of the side mount module
< 30 seconds, if the protection inhibit has 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-ED1ED..FD 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)

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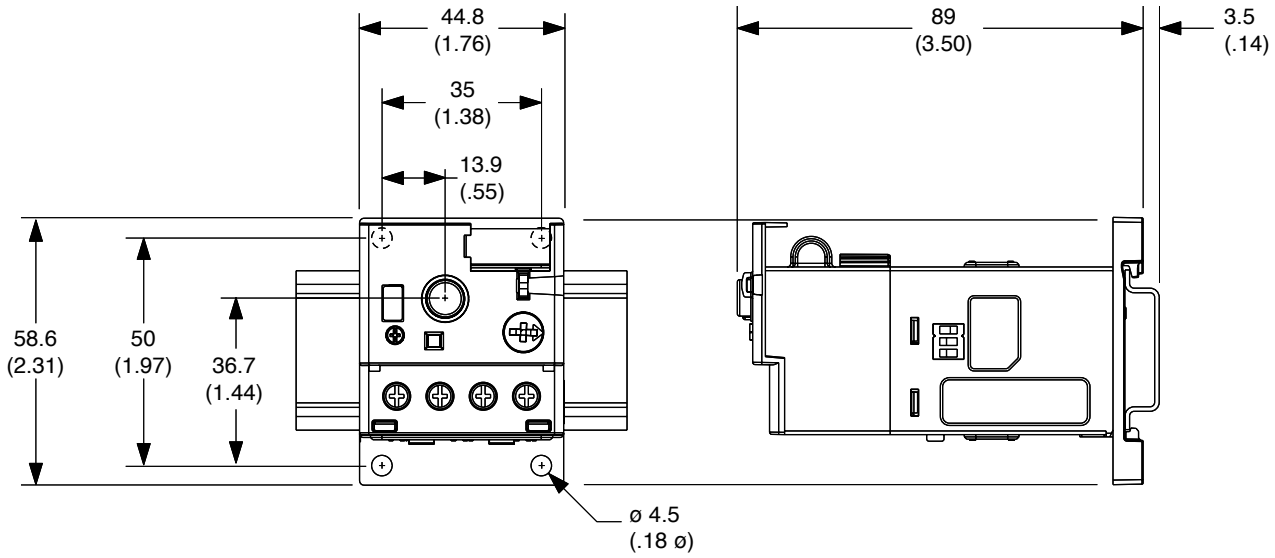
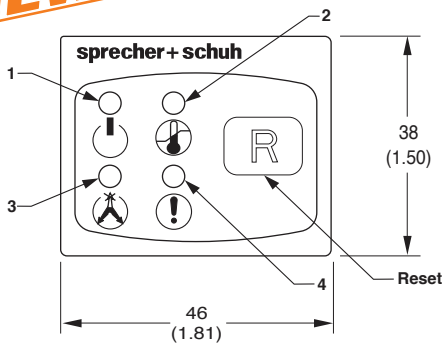
CEP7 Pass-thru Overload

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



CEP7-ERID Remote Indicator

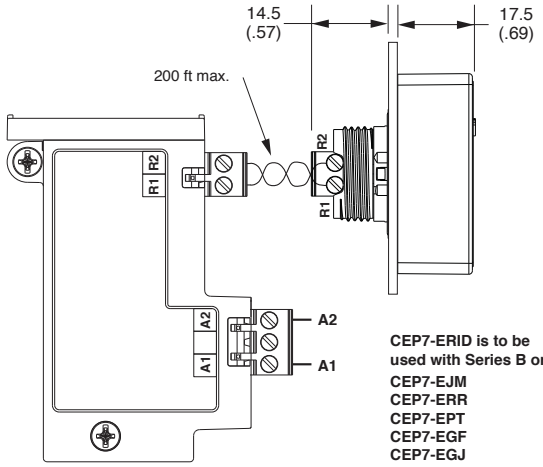
NEW



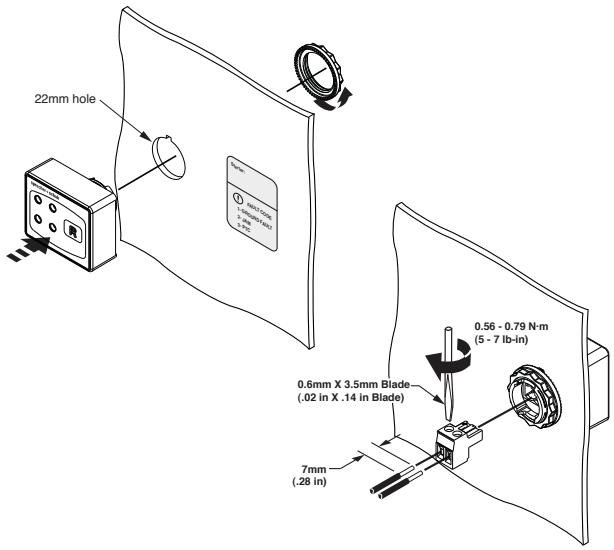
LED Indicators

L.E.D.	Function		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



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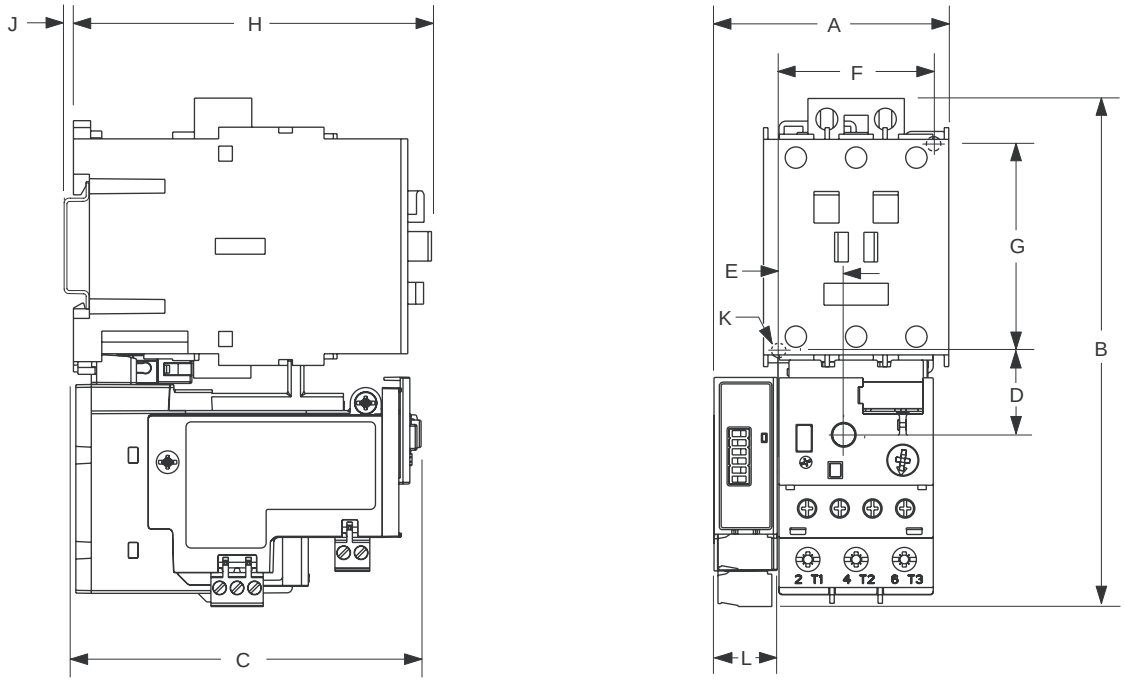
CEP7 Mounted to CA7 Contactor *(with side mounted module)*

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



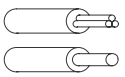
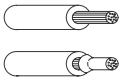
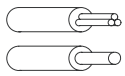
Contactor Cat. No.	Overload Cat. No.		A ❶	B	C	D	E	F	G	H	J	K	L ❶
CA7-9, CA7-12, CA7-16, CA7-23	CEP7*-EE_B	mm (in)	63 (2.48)	148 (5.83)	85.2 (3.35)	24.5 (.96)	13.9 (.55)	35 (1.38)	60 (2.38)	86.5 (3.40)	2 (0.8)	4.5 (.17)	18 (.71)
CA7-30, CA7-37	CEP7*-EE_D	mm (in)	63 (2.48)	148 (5.83)	101.2 (3.98)	24.5 (.96)	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

❶ 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 Module Technical Information

Wire Size and Torque Specifications

	1X 2X	24.....12 AWG 24.....16 AWG 5 lb-in
	1X 2X	0.2.....2.5 mm² 0.25.....1 mm² 0.55 N·m
	1X 2X	0.2.....2.5 mm² 0.2.....1 mm² 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.

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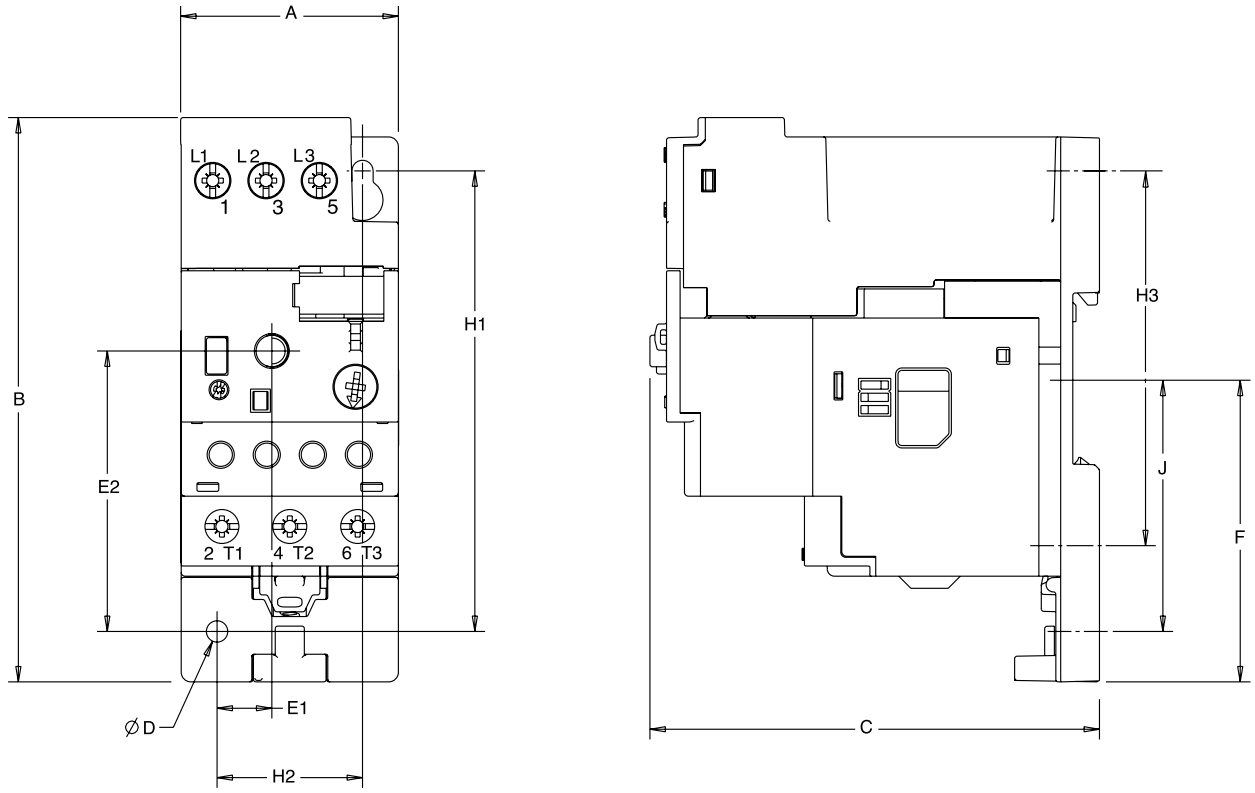
CEP7 with CEP7-EP… Panel Mount Adaptor

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



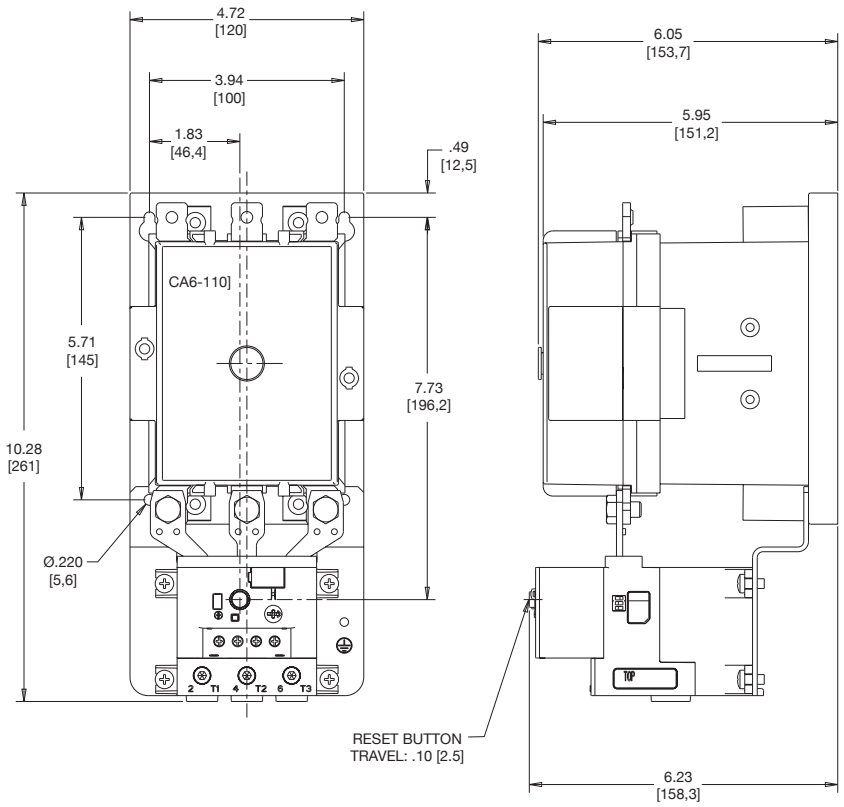
Panel Mount Adaptor	Overload Relay	A Width	B Height	C Depth	D	E1	E2	F	H1	H2	H3	J
CEP7-EPB	CEP7-ED1ED..FD CEP7-ED…B CEP7-EE…B CEP7S-EE…B	45 (1-25/32)	116.5 (4-9/16)	92.7 (3-21/32)	4.4 (11/64)	11.4 (29/64)	57.9 (2-9/32)	62.5 (2-15/32)	95 (3-3/4)	30 (1-3/16)	75 (2-31/32)	52.1 (2-3/64)
CEP7-EPD	CEP7-EE…D CEP7S-EE…D	45 (1-25/32)	112.4 (4-7/16)	108.7 (4-9/32)	4.4 (11/64)	11.4 (29/64)	57.9 (2-9/32)	62.5 (2-15/32)	95 (3-3/4)	30 (1-3/16)	75 (2-31/32)	52.1 (2-3/64)
CEP7-EPE	CEP7-EE…E CEP7S-EE…E	72 (2-53/64)	107.4 (4-15/64)	127 (5-1/64)	5.5 (5/32)	26.4 (3/4)	54.5 (2-9/64)	48.3 (1-29/32)	90 (3-23/64)	60 (2-23/64)	~	43.3 (1-45/64)

DIN-rail / Panel Adapter Terminal Cross Sections		CEP7-EPB ❶	CEP7-EPD ❶	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

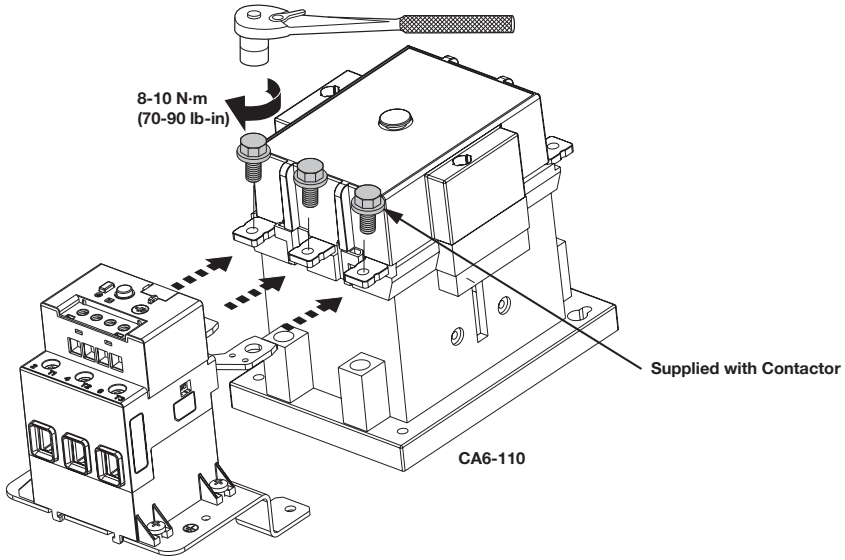
❶ For multiple conductor applications, the same size and style of wire must be used.

CEP7-EEVF mounted to CA6 Contactor

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



Assembly Instructions



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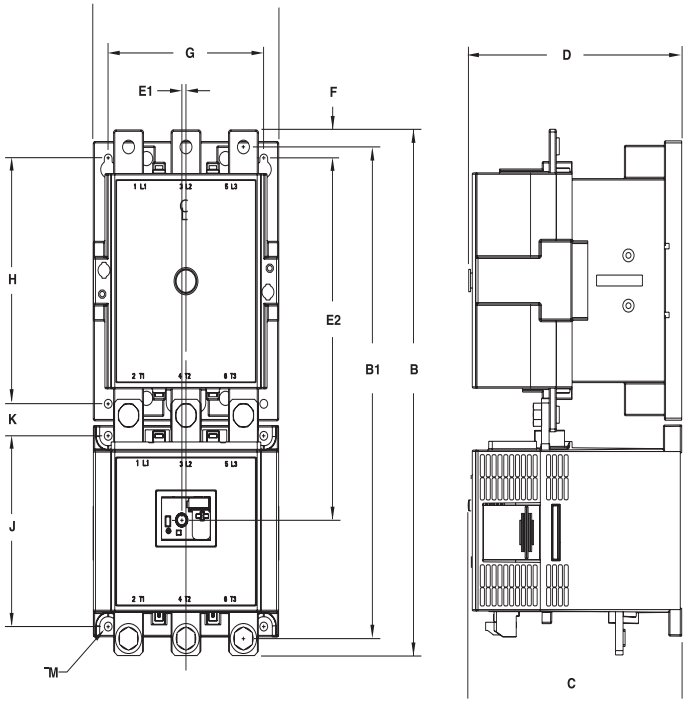
CEP7 Current Transformer Models mounted to CA6 Contactor

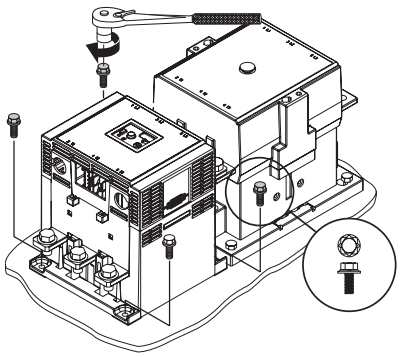
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.

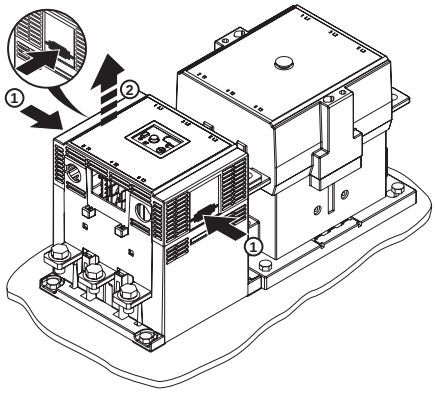


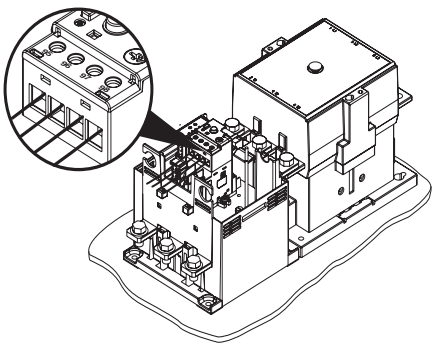
Overload Relay Cat.	Contactor Cat.	A Width	B Height		B1	C Depth	D	E1	E2	F	G	H	J	K	M
			Without Terminal Covers	With Terminal Covers		Reset									
CEP7-EEHF CEP7-EEJF	CA6-95 (EI) CA6-110 (EI)	120 (4.72)	336.3 (13.24)	418 (16.46)	311.8 (12.27)	152.7 (6.01)	156 (6.14)	36 (.14)	226.3 (8.91)	12.5 (.49)	100 (3.94)	145 (5.71)	135 (5.31)	22.3 (.88)	8 – 5.6 (8 – .22)
	CA6-140 (EI) CA6-180 (EI)	120 (4.72)	339.8 (13.38)	418 (16.46)	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)	8 – 5.6 (8 – .22)
CEP7-EE_G	CA6-210 EI CA6-420 EI	155 (6.10)	385.8 (15.19)	487.4 (19.19)	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)	8 – 6.5 (8 – .26)
CEP7-EE_H	CA6-630 EI CA6-860 EI	255 (10.04)	552 (21.73)	915 (36.02)	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)	8 – 13 (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)







SSNA9000

Series CT7N Bimetallic Overload Relays

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

In Stock Now

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 that 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°C.

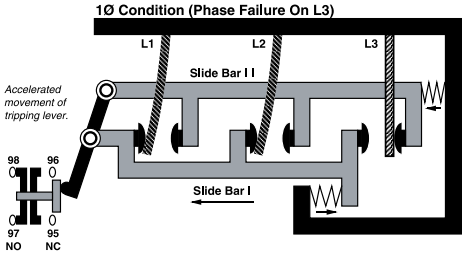
Single phase applications

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 schematic on page B31.

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.

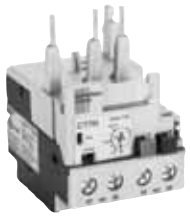
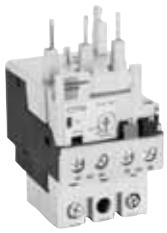
Sprecher + Schuh provides outstanding motor protection with our CT7N Bimetallic Overload Relay



CT7N Bimetallic Overload Relays offer accelerated tripping under single phase conditions

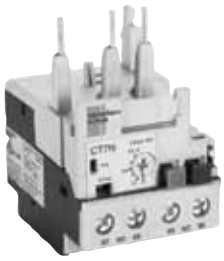
SSNA9000

CT7N Bimetallic Overload Relays, Manual or Automatic Reset ❶

Overload Relay	Directly Mounts to Contactor...	Adjustment Range (A)❷❸	Trip Class 10 Catalog Number	Price
 *CT7N-23-C16*	CA7-9…CA7-23	0.10…0.16	**CT7N-23-A16**	**82**
		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**	
 *CT7N-37-C30*		5.5…7.5	**CT7N-23-B75**	
		7.2…10	**CT7N-23-C10**	
		9.0…12.5	**CT7N-23-C12**	
		11.3…16	**CT7N-23-C16**	
		15…20	**CT7N-23-C20**	
		17.5…21.5	**CT7N-23-C21**	
		21…25	**CT7N-23-C25**	
	CA7-30…CA7-37	15…20	**CT7N-37-C20**	**124**
		17.5…21.5	**CT7N-37-C21**	
		21…25	**CT7N-37-C25**	
 *CT7N-85-C90*		24.5…30	**CT7N-37-C30**	
		29…36	**CT7N-37-C36**	
		33…38	**CT7N-37-C38**	
	CA7-43	17…25	**CT7N-43-C25**	**131**
		24.5…36	**CT7N-43-C36**	
		35…47	**CT7N-43-C47**	
	CA7-60…CA7-85	35…47	**CT7N-85-C47**	**149**
		45…60	**CT7N-85-C60**	
		58…75	**CT7N-85-C75**	
		72…90	**CT7N-85-C90**	**177**

Overload Relay	Separate Mount...	Adjustment Range (A)❷❸	Trip Class 10 Catalog Number	Price
	Separate mounting required (Panel or DIN-Rail mounted device)	35…47	**CT7N-85-C47P**	**168**
		45…60	**CT7N-85-C60P**	**172**
		58…75	**CT7N-85-C75P**	**172**
		72…90	**CT7N-85-C90P**	**257**

❶ CT7N Bimetallic Overload Relays should not be used with conventional DC contactors. Use electronic DC version (CA7-9E...43E).
❷ 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.
❸ 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.



Directly Mounts to Contactor...	CT7N			CT7			CT7K		
	Adjustment Range (A)	Catalog Number	Code	Adjustment Range (A)	Catalog Number	Code	Adjustment Range (A)	Catalog Number	Code
CA7-9…CA7-23	0.10…0.16	**CT7N-23-A16**	AA16	0.1…0.16	CT7-24-0.16	TA	0.10…0.15	CT7K-17-0.15	TKA
	0.16…0.25	**CT7N-23-A25**	AA25	0.16…0.24	CT7-24-0.24	TB	0.15…0.23	CT7K-17-0.23	TKB
	0.25…0.40	**CT7N-23-A40**	AA40	0.24…0.4	CT7-24-0.4	TC	0.23…0.35	CT7K-17-0.35	TKC
	0.35…0.50	**CT7N-23-A50**	AA50	0.4… 0.6	CT7-24-0.6	TD	0.35… 0.55	CT7K-17-0.55	TKD
	0.45…0.63	**CT7N-23-A63**	AA63				0.55…0.8	CT7K-17-0.80	TKE
	0.55…0.80	**CT7N-23-A80**	AA80	0.6…1.0	CT7-24-1.0	TE			
	0.75…1.0	**CT7N-23-B10**	AB10				0.8…1.2	CT7K-17-1.2	TKF
	0.90…1.3	**CT7N-23-B13**	AB13	1.0…1.6	CT7-24-1.6	TF			
	1.1…1.6	**CT7N-23-B16**	AB16				1.2…1.8	CT7K-17-2.7	TKG
	1.4…2.0	**CT7N-23-B20**	AB20	1.6…2.4	CT7-24-2.4	TG			
	1.8…2.5	**CT7N-23-B25**	AB25				1.8…2.7	CT7K-17-2.7	TKH
	2.3…3.2	**CT7N-23-B32**	AB32	2.4…4	CT7-24-4	TH			
	2.9…4.0	**CT7N-23-B40**	AB40				2.7…4	CT7K-17-4.0	TKJ
	3.5…4.8	**CT7N-23-B48**	AB48	4…6	CT7-24-6	TJ	4…6	CT7K-17-6.0	TKK
	4.5…6.3	**CT7N-23-B63**	AB63						
	5.5…7.5	**CT7N-23-B75**	AB75	6…10	CT7-24-10	TK	6…9	CT7K-17-9.0	TKL
	7.2…10	**CT7N-23-C10**	AC10						
CA7-12...CA7-23	9.0…12.5	**CT7N-23-C12**	AC12	10…16	CT7-24-16	TL	9…12.5	CT7K-17-12.5	TKM
CA7-16...CA7-23	11.3…16	**CT7N-23-C16**	AC16				12.5…17.5	CT7K-17-17.5	TKN
	15…20	**CT7N-23-C20**	AC20	16…24	CT7-24-24	TM			
	17.5…21.5	**CT7N-23-C21**	AC21						
	21…25	**CT7N-23-C25**	AC25						
CA7-30…CA7-37	15…20	**CT7N-37-C20**	BC20	18…30	CT7-45-30	TN			
	17.5…21.5	**CT7N-37-C21**	BC21						
	21…25	**CT7N-37-C25**	BC25						
	24.5…30	**CT7N-37-C30**	BC30						
CA7-37	29…36	**CT7N-37-C36**	BC36	30…45	CT7-45-45	TP			
	33…38	**CT7N-37-C38**	BC38						
CA7-43	17…25	**CT7N-43-C25**	CC25	18…30	CT7-75-30	TQ			
	24.5…36	**CT7N-43-C36**	CC36						
	35…47	**CT7N-43-C47**	CC47						
CA7-60…CA7-85	35…47	**CT7N-85-C47**	DC47	30…45	CT7-75-45	TR			
	45…60	**CT7N-85-C60**	DC60	45…60	CT7-75-60	TS			
CA7-85	58…75	**CT7N-85-C75**	DC75	60…75	CT7-75-75	TT			
	72…90	**CT7N-85-C90**	DC90	70…90	CT7-100-90 ❶	TU			

❶ CT7N can be directly mounted to CA7-85. CT7 required separate mount.

Accessories

Enclosure	Description	For Use With...	Catalog Number	Price
	**DIN-rail / Panel Mount Adapter -** For separately mounting thermal overload relays	CT7N-23..37	**CT7N-37-P-A**	**16**
	**Screw Adapter -** For screw fixing of the CT7N-37-P-A panel adapter (2 required per adapter) Pkg. of 10.	CT7N-37-P-A	**Use KT7-45-AS See page F16**	**~**
	**Remote Reset Solenoid -** For remote resetting of the overload relay	CT7N ❸ CT8	**CMR7N-✱** *Replace ✱ with coil code below*	**81**
	**External Reset Button -** Used for manually resetting overloads mounted in enclosures	CT7N all	**Use D7 Reset See Section H**	**~**
	**Adaptor External Reset -** Mounts on relay reset button and provides larger actuation surface.	CT7N CT8	**CT7N-RA3**	**6**

CMR7N Remote Reset Coil Codes

A.C. Coil Code	Voltage Range ❹		
	50 Hz	60 Hz	50 / 60 Hz
24Z	**~**	**~**	**24V**
48Z	~	~	48V
120	**110V**	**120V**	**~**
240Z	~	~	220…240V

D.C. Coil Code	Voltage ❺
24D	**24VDC**
48D	48VDC
110D	110VDC
125D	125VDC

Marking Systems ❶

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**	**See page A58**
	**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 ❷	**CA7-FMC**	

❶ The labeling field of the overload relay may also be written on by hand.
❷ Minimum order quantity is one package of 100. Price each x 100 = total price.
❸ Remote Reset Solenoid for use with direct mount version of CT7N. CMR7N-* will not mount on separate mount versions of CT7N.
❹ Coil consumption of AC coils is 8VA.
❺ Coil consumption of DC coils is 12 watts.

SSNA9000

Electrical Data

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
Power dissipation			
CT7N-A...B	up to 0.4 A	[W]	7
	0.5…36 A	[W]	6
	38 A	[W]	12
CT7N-C	25…47 A	[W]	12
CT7N-D	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

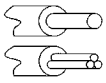
Trip Class	CT7N..A/B	CT7N..C
IEC/EN 60947-4-1	10A	10
UL	10	

Trip Rating (ultimate tripping current)	120% FLA
Phase Loss Sensitivity: Trip rating at phase loss	115% FLA

Control Circuits			CT7N
Rated Operating Current I_e			
AC-15	24V	[A]	4
	240V	[A]	2
	400V	[A]	1.6
	690V	[A]	0.15
DC-13	24V	[A]	2
	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 ≤ 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	60497-1, -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-85	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	[mm²]	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…4)
	Solid or Course Stranded	[mm²]	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…4)
		[AWG]	2x (16…10)	2x (14…10)	1x (10…6)	1x (10…6)	1x (8…1)	1x (16…6)	2x (18…12)	1x (18…12)
Recommended Torque		[Nm]	1.5…2.2	1.5…2.2	2.2…3.5	2.5…3.5	4…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

General Data

	CT7N
Type of overload relay	Bimetallic, Ambient Compensated, Phase Loss Sensitive
Compensation temperature range	–20…+60°C (–4…+140°F)
Type of Protection	IP00
in connected state	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		CT7N
Climatic Conditions	Storage Temp. Range	-55…+80ºC
	Operating Temperature Range	-20…+60ºC5…
	Air moisture (Storage/Operating)	95% rel. humidity
Vibration	(per IEC/EN 60068-2-6), service	3g
	ICE/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	11 ms > 5 g
	(per IEC/EN 61373 (shock railways)	cat. 1, class B
Max. Altitude	2000 m	
Pollution Degree	3	

Short Circuit Coordination

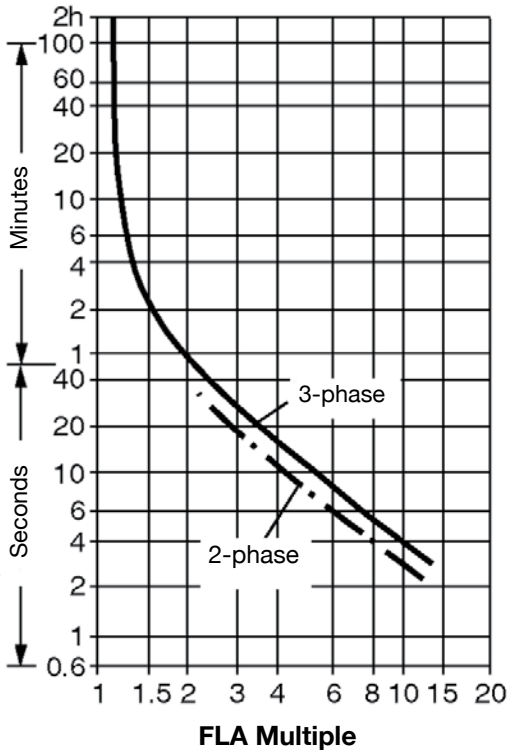
For Use With...	Catalog Number	Adjustment Range (A)	Max. Back-up fuse [A]		
			gL/gG 50 kA, 690V AC IEC/EN 60947-4-1 Coordination		UL Class K5 5 kA, 600V AC
			Type 1	**Type 2**	**UL 508**
CA7-9…CA7-23	CT7N-23-A16	0.10…0.16	50	~	1
	CT7N-23-A25	0.16…0.25		~	1
	CT7N-23-A40	0.25…0.40		2	1
	CT7N-23-A50	0.35…0.50		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		1	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	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
CA7-60…CA7-85	CT7N-85-C47	35…47	160	100	175
	CT7N-85-C60	45…60	200	125	250 ❶
	CT7N-85-C75	58…75	200	125	300 ❶
	CT7N-85-C90	72…90	250	160	350 ❶
Separate mounting required (Panel-mounted device)	CT7N-85-C47P	35…47	160	100	175 ❷
	CT7N-85-C60P	45…60	200	125	250 ❶❷
	CT7N-85-C75P	58…75	200	125	300 ❶❷
	CT7N-85-C90P	72…90	250	160	350 ❶❷

❶ Max. Back-up fuse [A], UL Class K5, 10 kA, 600V AC
❷ Only in combination with CA7 Contactors.

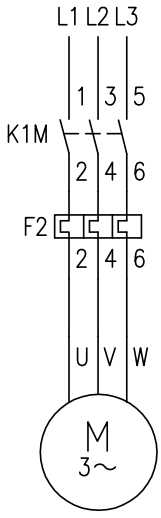
Tripping Characteristics

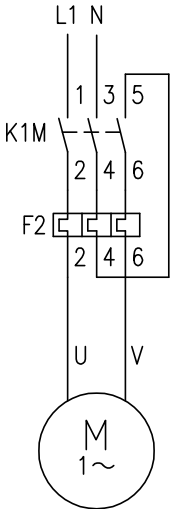
These tripping characteristics comply with IEC 947 and are the mean values of the scatter bands at 20°C ambient temperature starting from the cold state. Tripping time is a function of operating current. In equipment at operating temperature, the tripping time of the overload relay falls to approximately 1/4 of the read value.

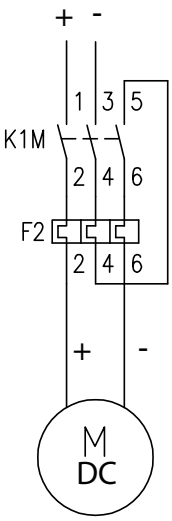
Trip Class 10A



Connection Diagrams



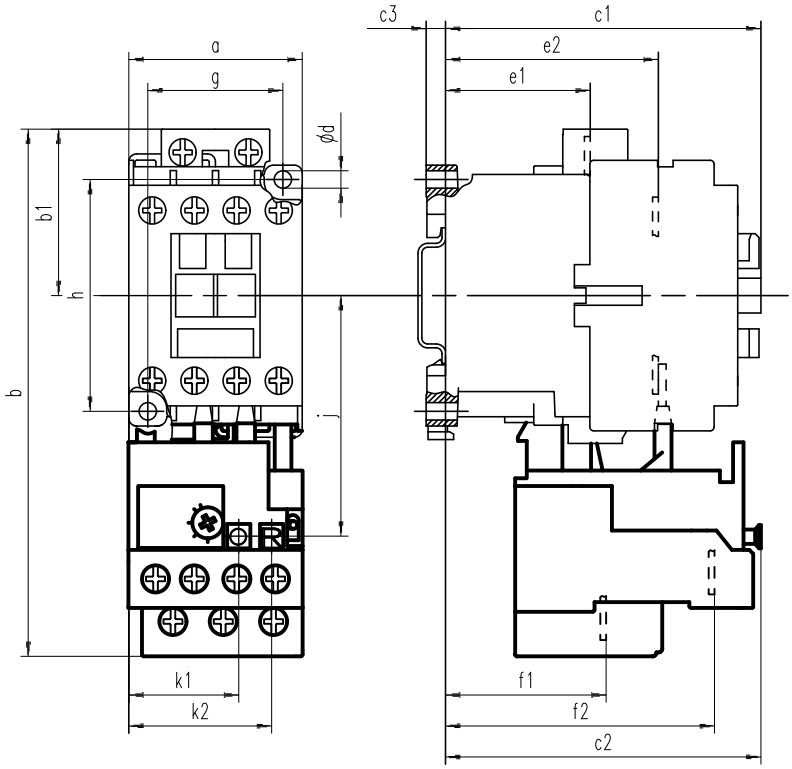




SSNA9000

Series CT7N (Mounting to CA7 Contactors)

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

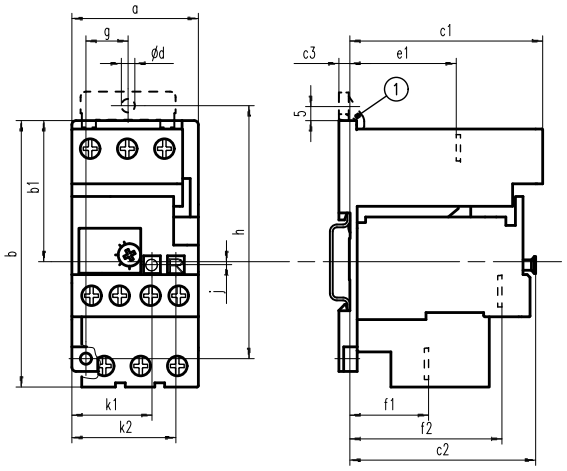


Contactor + Overload	a	b	b1	c1	c2	c3	ød	e1	e2	f1	f2	g	h	j	k1	k2
CA7-9…23 + CT7N-23-A16…C25	45 (1-25/32)	136.5 (5-3/8)	43 (1-11/16)	81.5 (3-13/64)	80.5 (3-11/64)	5 (13/64)	4.5 (3/16)	37.5 (1-15/32)	55 (2-11/64)	40.5 (1-19/32)	68.5 (2-45/64)	35 (1-3/8)	60 (2-23/64)	63.5 (2-1/2)	29 (1-9/64)	37.5 (1-15/32)
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)
CA7-60…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)

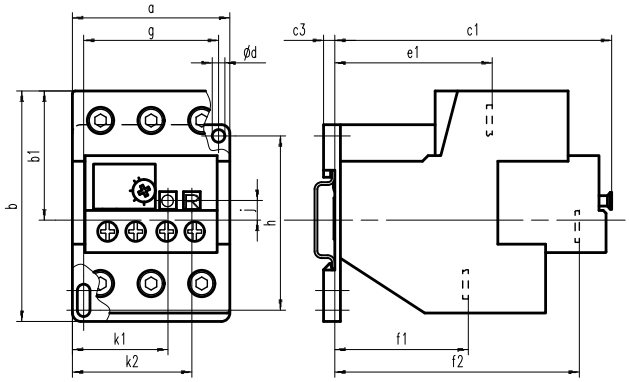
SSNA9000

Series CT7N Separate Mount + Adaptor

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



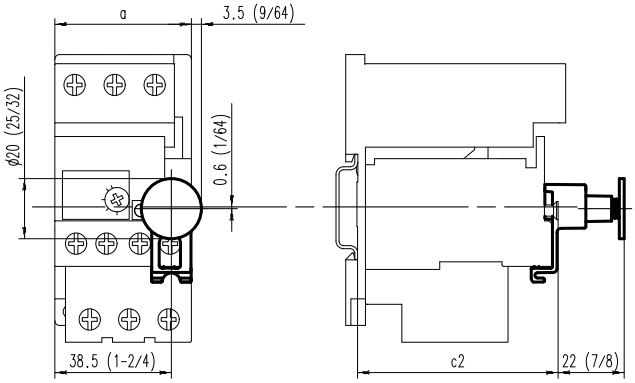
CT7N-23..37 with Panel Mount Adapter



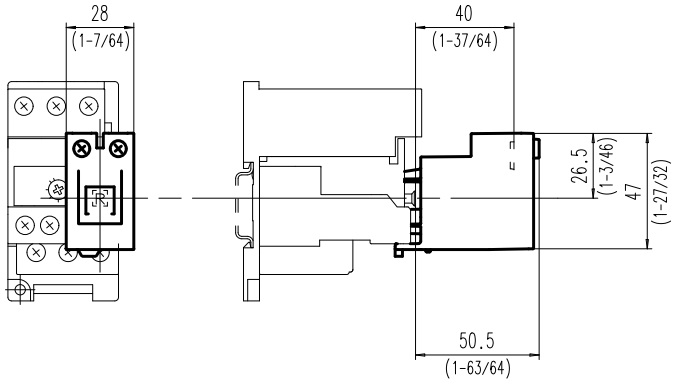
CT7N-85 Separate Mount

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 CT7N-37-C20…C25 + CT7N-37-P-A	45 (1-25/32)	89.5 (3-17/32)	50 (1-31/32)	68.5 (2-45/64)	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-C30…C38 + CT7N-37-P-A	45 (1-25/32)	91.5 (3-39/64)	50 (1-31/32)	68.5 (2-45/64)	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…C90P +	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)

CEP7-RA3 External Reset Adaptor



CMR7N Remote Reset Solenoid



Series CT8 Thermal Overload Relays

Simple and effective motor protection for applications to 12 Amps

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 that 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 –25°C to +50°C.

Single phase applications

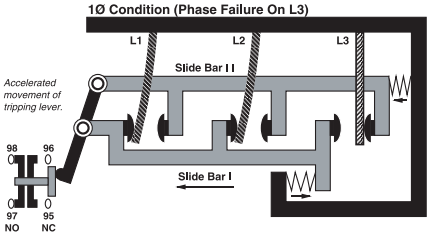
CT8 Series thermal overload relays can be applied for protection of single phase AC motors. The relays have the same characteristics as shown for three phase operation. To maintain these characteristics, each element of the overload relay must carry the motor current as shown in the schematic on page C88.

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.

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



CT8 Thermal Overload Relays offer accelerated tripping under single phase conditions

SSNA9000

CT8 Thermal Overload Relays - manual or automatic reset ❶

Overload Relay	Directly Mounts to Contactor...	Adjustment Ranges [A]	Trip Class 10	
			Catalog Number	Price
 CT8	CA8-9	0.10…0.16	**CT8-A16**	**69**
		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**	
	CA8-9 or 12	5.5…7.5	**CT8-B75**	**69**
		7.2...10	**CT8-C10**	**75**
	CA8-12	9.0...12.5	**CT8-C12**	**75**

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

Accessories

Enclosure	Description	For Use With...	Catalog Number	Price
	**Remote Reset Solenoid -** For remote resetting of the solid state overload relay	CT7N CT8	**CMR7N-✱** *Replace ✱ with coil code below*	**See page B28**
	**External Reset Button -** Used for manually resetting overloads mounted in enclosures	CT8 all	**Use D7 Reset See Section H**	**~**
	**Adaptor External Reset -** Mounts on relay reset button and provides larger actuation surface.	CT7N CT8	**CT7N-RA3**	**See page B28**

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

❶ 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.

Electrical Data

Main Circuits

Rated Insulation Voltage *U*		[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		[mm²]	2 x (1.5…4)
Solid or coarse stranded		[mm²]	2 x (1.5…4)
		[AWG]	2 x (16…10)
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*		[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
Rated Operating Current		I_e	N.O./N.C.
AC-15	24V	[A]	4
	240V	[A]	2
	400V	[A]	1.6
	600V	[A]	0.15
DC-13	24V	[A]	2
	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		[mm²]	2 x (1…4)
Solid or coarse stranded		[mm²]	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 (oz)]	0.155 (.25)
Standards		IEC/EN 60947-1, -4-1, -5-1; UL508; CSA C22.2 NO. 14
Approvals		CE cULus

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

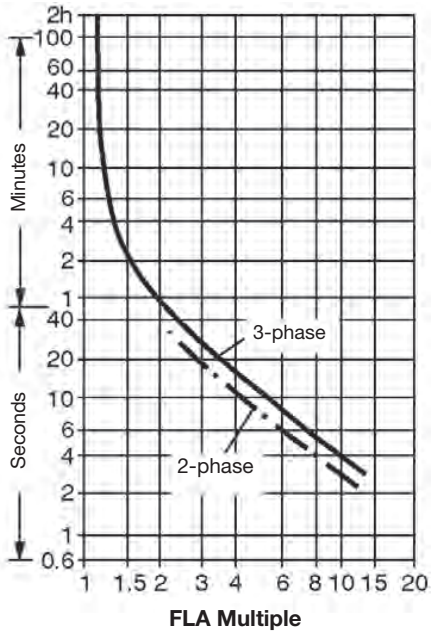
Ambient Temperature	Storage	-55…+80 ºC (-67…+176 ºF)
	Operating	-20…+60 ºC (-4…+140 ºF)
Humidity	Operating	5…95% Non-condensing
	Damp Heat	per IEC 68-2-3 and IEC 68-2-30
Max. Altitude	[m]	2000
Pollution Environment		Pollution Degree 3
Protection		
Type of Relay		Ambient Compensated, Time Delay, Phase Loss Sensitive
Nature of Relay		Bimetallic Overload Relay
Trip Rating		120% 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

SSNA9000

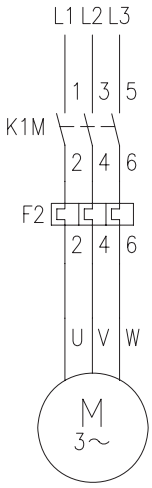
Tripping Characteristics

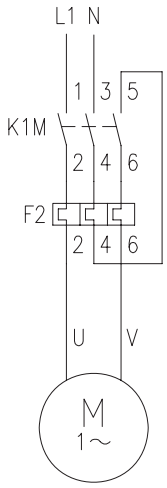
These trip characteristics refer to IEC 60947 and are average values from cold start at an ambient temperature of 20 °C. Trip time is pictured as a function of operating current. With the device at normal operating temperature, the trip time decreases to approximately 25% of the shown value.

Trip Class 10A



Connection Diagrams

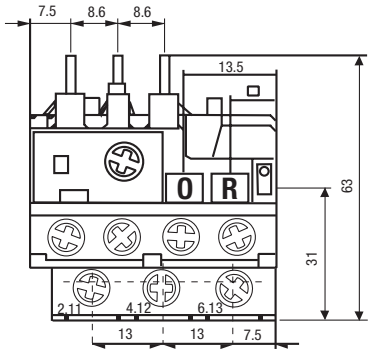


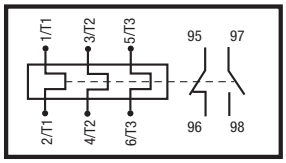


SSNA9000

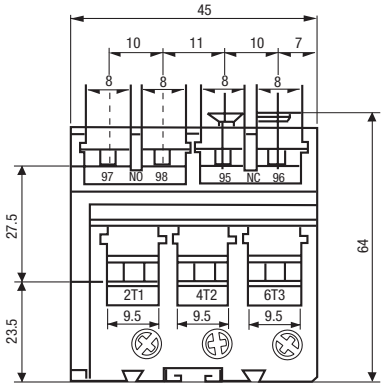
Series CT8

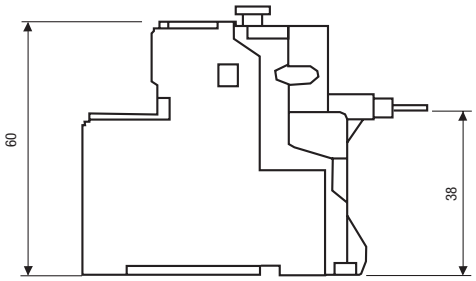
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.





Terminal Marking





SSNA9000

RT7 Thermistor Protection Relays

When exact motor temperature sensing is critical

Investment Protection

Electric motors are significant investments, and losing them to overheating just is not an option. Sprecher + Schuh's RT7-E1 and RT7-E2 Thermistor Protection Relays are designed to keep that from happening. The RT7 is not a replacement for an overload relay. Instead, it is additional protection from damaging heat build-up in the motor.

If you have thermistors…

Installed in many of today's electric motors are thermistors, which sense heat levels produced in the stator windings. If thermal levels exceed safe standards, thermistors send that information to the relay, which trips and switches off the motor. The RT7-E1 and RT7-E2 display a red LED to indicate a fault.
The RT7-E1 and RT7-E2 also trip because of a short or open in the sensor measuring circuit. Each relay displays an open circuit alert with a 2 Hz red LED and a short circuit warning with a blinking red LED. The RT7-E2 stores a motor's switching status in memory during power failures – a critical safeguard.

Compatibility and Convenience

These relays and their microprocessor technology provide very accurate and repeated protection. Neither requires adjustment, and their broad supply voltage rating (24…240V AC/DC) makes them ideal for a wide variety of applications. Up to six PTC thermistors can be connected in series.

Automatic Reset

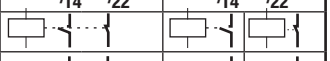
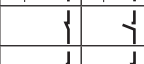
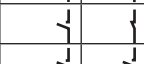
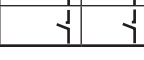
The RT7-E1 and RT7-E2 automatically reset if the sensor measuring circuit's resistance drops below the reset value. To keep a motor from restarting after automatic reset, provide three-wire momentary control. The RT7-E2 also has a manual reset button, as well as a terminals for remote reset.

Feature comparison

Model	RT7-E1	RT7-E2
Thermal overload protection	●	●
Short-circuit/open-circuit protection in the sensor measuring circuit	●	●
Power-on indication (green LED)	●	●
Trip indication (red LED)	●	●
Automatic reset	●	●
Manual reset & Test Button		●
Remote reset (external button)		●
Storage of switching status in memory		●

SSNA9000

Relay Configuration

	RT7-E1	RT7-E2
	13/14 21/22	13/14 21/22
		
Normal		
Tripped		
Power off		

RT7 Pricing

RT7 Series	Price
RT7-E1	176
RT7-E2	247

Power/Trip Identification

Indication	LED	Resistance
Power On	Green	
Trip Overtemp	Red	3600 ohms
Trip Open Sensor Circuit	Red 2 Hz	>18000 ohms
Trip Shorted Sensor Circuit	Red Flashing	<20 ohms

Technical Information (Electrical)

Supply	
Rated Supply Voltage (Us)	24…240V AC/DC
Operating Range	AC: 0.8…1.1 Us DC: 0.9…1.1 Us
Maximum Power Consumption	1.5 VA
Output Relay	
Type of Contacts	Type E1: (2) Form A, one relay Type E2: (2) Form A, independent relays
Rated Thermal Current	5 A @ 250V AC 4 A @ 24V DC
Rated Insulation Voltage	250V AC
Rated Operating Voltage	250V AC
Utilization Category	AC15/DC13

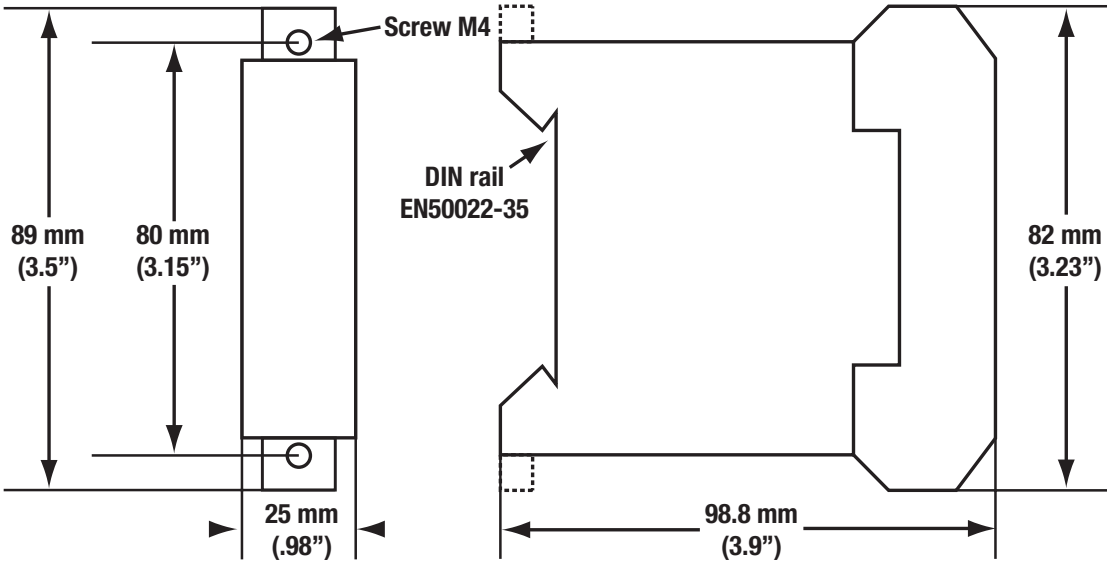
Technical Information (Mechanical)

Environmental	
Ambient Temperature	-40˚C…+80˚C; (storage) -25˚C…+60˚C; (operating)
Humidity	5…95% noncondensing
Maximum Altitude	2000 m
Pollution Environment	Pollution Degree 2
Degree of Protection	IP 20
PTC Sensor Circuit	
Type of Control Unit	Mark A
PTC Sensor Characteristic	IEC 34-11-2
Max. Number of Sensors	6
Max. Cold Resistance of Sensor Chain	1500 ohm
Trip Resistance	3600 ohm (± 300 ohm):
Reset Resistance	1580 ohm (± 60 ohm):
Short Circuit Trip Resistance	<20 ohm (-5 ohm, +0 ohm):
Short Circuit Reset Resistance	24 ohm (-0 ohm, +6 ohm)
Open Circuit Trip Resistance	>18000 ohm:
Terminal Cross-Sections	
Terminal Screwdriver Blade	M3
Conductor Size	0.5…2.5 mm2 20…12 AWG
Measuring Line	
Minimum Cross Section (mm^2)	0.5 0.75 1 1.5
Maximum Length (m)	200 300 400 600 200…600m: twisted pair, shielded shield connection at T1
Remote Reset	
Maximum Line Length	200…600m: twisted pair, shielded shield connection at r1

SSNA9000

RT7

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



SSNA9000

Obsolete in 2009

CT7
CT7K

sprecher+schuh

SSNA9000

Series CT7 Thermal Overload Relays

Choose CT7 overloads in DC applications and when monitoring Variable Frequency Drives

Obsolete in 2009

Sprecher + Schuh provides outstanding motor protection with our CT7 Thermal Overload Relay

Sprecher + Schuh has always paid particular attention to the subject of motor protection. This concern is reflected in our CT line of thermal overload relays that include many standard features not available with traditional overload protection devices.

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 that 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 CT 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 CT7 (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 –25°C to +50°C.

Single phase applications

CT 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 schematic on page B48.

Other standard features

CT 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 reset button permits any one of three reset options to be chosen: test, manual or automatic modes.

A separate NO signal contact is also provided on CT7 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.

CT7 Thermal Overload Relays, Manual or Automatic Reset ❶❷

Overload Relay	Directly Mounts to Contactor...	Adjustment Range (A)	Trip Class 10 Catalog Number	Price
 CT7-24-10	CA7-9…CA7-37	0.1…0.16	**CT7-24-0.16**	**90**
		0.16…0.24	**CT7-24-0.24**	**90**
		0.24…0.4	**CT7-24-0.4**	**90**
		0.4… 0.6	**CT7-24-0.6**	**90**
		0.6…1.0	**CT7-24-1.0**	**90**
		1.0…1.6	**CT7-24-1.6**	**90**
		1.6…2.4	**CT7-24-2.4**	**90**
		2.4…4	**CT7-24-4**	**90**
		4…6	**CT7-24-6**	**90**
		6…10	**CT7-24-10**	**90**
 CT7-75-75	CA7-12…CA7-37	10…16	**CT7-24-16**	**90**
	CA7-23…CA7-37	16…24	**CT7-24-24**	**90**
	CA7-30…CA7-43	18…30	**CT7-45-30**	**127**
	CA7-37…CA7-43	30…45	**CT7-45-45**	**149**
	CA7-60...CA7-85	18…30	**CT7-75-30**	**168**
		30…45	**CT7-75-45**	**168**
		45…60	**CT7-75-60**	**185**
	CA7-72…CA7-85	60…75	**CT7-75-75**	**185**
	Separate Mounting	70…90	**CT7-100-90**	**272**

Note: CT7 Thermal Overload Relays do not fit into standard "A" and "B" enclosures with standard reset assemblies. They can only be used on "Open Style" starters or custom quoted enclosures. Contact your Sprecher+ Schuh representative for more information.

Special Note:

Wye-Delta Starters - First multiply motor full load current by 58%. Then, using this figure, select appropriate Overload Relay Code from tables above.

Part Winding Starters - First multiply motor full load current by 50%. Then, using this figure, select appropriate Overload Relay Code from tables above.

❶ 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.

❷ For separately mounted overload, purchase DIN-Rail/Panel Mount Adaptor in Accessory section (Cat.# CT7-…-P-A).

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Accessories

Enclosure	Description	For Use With...	Catalog Number	Price
	**DIN-rail / Panel Mount Adaptor -** ❶ For separately mounting thermal overload relays	CT7-24-0.16…24	**CT7-24-P-A**	**15**
		CT7-75-30…75 ❶	**CT7-75-P-A**	**27**
	**Anti-Tamper Shield -** Provides protection against inadvertent adjustment of mode selector and full load current setting	CT7 all	**CMS7-BC1**	**7**
	**Remote Reset -** For remote resetting of the solid state overload relay	CT7 all	**CMR7-✱** *Replace ✱ with coil code below*	**78**
	**External Reset Button -** Used for manually resetting overloads mounted in enclosures	CT7 all	**Use D7 Reset See Section H**	**~**

CMR7 Remote Reset Coil Codes

AC Coil Code	Voltage Range		
	50 Hz	60 Hz	50 / 60 Hz
24Z	~	~	24V
120	110V	120V	
240	220V	230V	
240Z	~	~	240V

DC Coil Code	Voltage
24D	24VDC
48D	48VDC
115D	115VDC

Marking Systems ❷

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**	**See page A58**
	**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 ❸	**CA7-FMC**	
	Tag Carrier - For marking with Clip-on Tags. See Terminals Section for complete listing of Clip-on Tags.	100 ❸	**CA7-FMA2**	

❶ Panel mount adaptors are not available for CT7-45-30...45. If panel mount required, order CT7-75-30...45 Overload Relay and use CT7-75-P-A Panel Mount Adaptor.
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.

Electrical Data

		CT7-24…	CT7-45…	CT7-75…	CT7- 100-90
Main Circuits					
Rated Insulation Voltage U_i					
UL	[V]	600	600	600	600
CSA	[V]	690	690	690	690
Rated Impulse Strength U_{imp}	[kV]	6	6	6	6
Rated Operating Voltage U_e	[V]	690	690	690	1000
Overvoltage Category/Degree of Contamination		III/3	III/3	III/3	III/3
Protective Separation					
Between main circuits and aux. contacts					
Per DIN, VDE 106, Part 101 and Part 101 A1		440	440	440	440
Terminal Cross-Sections					
Terminal Type					
Terminal Screws		M4	M6	M6	M8
 Flexible with Wire End Ferrule	[mm²]	2 x (1…4)) 2 x (1…6)	1 x 25 2 x (1…10)	1 x 25 2 x (2.5...10)	50
 Solid Conductor	[mm²]	1 x (2.5...6)	2 x (1…16)	2 x (1…10)	16
Stranded	[mm²]	~	~	2 x (1…16)	50
Max. Wire Size per UL/CSA	[AWG]	14...8	14…2	14…2	2
Recommended Torque	[Nm]	1.8	3.5	3.5	6
	[lb-in]	16	31	31	54
Pozidrive Screwdriver	Size	2	2	2	~
Slotted Screwdriver	mm	1 x 6	1 x 6	1 x 6	~
Hexagon Socket Size	SW [mm]	~	~	~	4

Control Circuit

			CT7-24…	CT7-45…	CT7-75…	CT7- 100-90
Rated Insulation Voltage U_i		[V]	500	500	500	500
Rated Impulse Strength U_{imp}		[kV]	6	6	6	6
Rated Operating Voltage U_e		[V]	500	500	500	500
Rated Operating Current U_e				Normally Open	Normally Closed	
AC-15	220...240V	[A]		1.5	1.5	
	380...480V	[A]		0.5	0.9	
	500...600V	[A]		0.5	0.8	
	24V	[A]		0.9	0.9	
	60V	[A]		0.75	0.75	
	110V	[A]		0.4	0.4	
	220V	[A]		0.2	0.2	
Conventional Thermal Current		[A]		6	6	6
Terminations						
Terminal Type						
			M 3.5	M 3.5	M 3.5	M 3.5
 Flexible with Wire End Ferrule		[mm²]	2 x (0.75...2.5)	2 x (0.75...2.5)	2 x (0.75...2.5)	2 x (0.75...2.5)
 Solid Conductor		[mm²]				
Stranded		[mm²]	2 x (0.75...4)	2 x (0.75...4)	2 x (0.75...4)	2 x (0.75...4)
Max. Wire Size per UL/CSA		[AWG]	18...14	18...14	18...14	18...14
Recommended Torque		[Nm]	1.2	1.2	1.2	1.2
		[lb-in]	11	11	11	11
Pozidrive Screwdriver		Size	2	2	2	2
Slotted Screwdriver		mm	1 x 6	1 x 6	1 x 6	1 x 6

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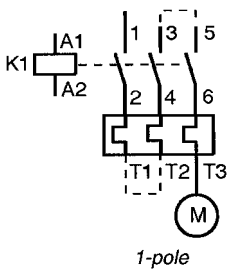
General Data

		CT7-24…	CT7-45…	CT7-75…	CT7-100-90
Weight	[kg (lb)]	0.13 (0.29)	0.21 (0.46)	0.21 (0.46)	1.3 (2.86)
Standards			IEC 947, EN 60 947, DIN VDE 0660		
Approvals			CE, UL, CSA, PTB		
Corrosion Resistance			Humid/Warm, Constant, per DIN, IEC 68, Part 2-3		
Ambient Temperature			Humid/Warm, Cyclic, per DIN, IEC 68, Part 2-30		
Open			–25…+50°C (–13…122°F		
Enclosed			–25…+40°C (–13…104°F)		
Temperature Compensation	Continuous (Temperature Range		–5…+40°C per IEC 947, EN60947; PTB: –5…+50°C)		
Shock Resistance					
10ms sinusoidal shock	[G]		10		
Type of Protection			IP00		
in connected state			IP2LX (in a connected state)		
Finger Protection			Safe from touch by fingers and back of hand (VDE 0106, Part 100)		

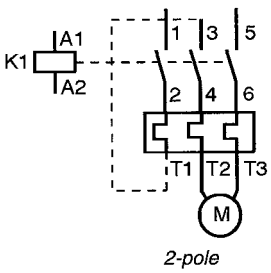
Short Circuit Coordination

Mounting on Contactor	Catalog Number	Adjustment Ranges [A]	gL Back-Up Fuses max. I_e[A]	
			Type 1 Coordination	Type 2 Coordination
CA7-9…CA7-37	CT7-24-0.16	0.1…0.16	25	0.5
	CT7-24-0.24	0.16…0.24	25	1
	CT7-24-0.4	0.24…0.4	25	2
	CT7-24-0.6	0.4… 0.6	25	4
	CT7-24-1.0	0.6…1.0	25	4
	CT7-24-1.6	1.0…1.6	25	6
	CT7-24-2.4	1.6…2.4	25	10
	CT7-24-4	2.4…4	25	16
	CT7-24-6	4…6	25	20
	CT7-24-10	6…10	50	25
CA7-12…CA7-37	CT7-24-16	10…16	63	35
CA7-23…CA7-37	CT7-24-24	16…24	63	50
CA7-30…CA7-43	CT7-45-30	18…30	80	63
CA7-37…CA7-43	CT7-45-45	30…45	125	80
CA7-60...CA7-85	CT7-75-30	18…30	80	63
	CT7-75-45	30…45	125	80
	CT7-75-60	45…60	160	100
CA7-72…CA7-85	CT7-75-75	60…75	250	160
Separate Mounting	CT7-100-90	70…90	315	200

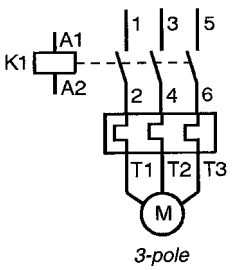
Connection Diagrams



1-pole



2-pole



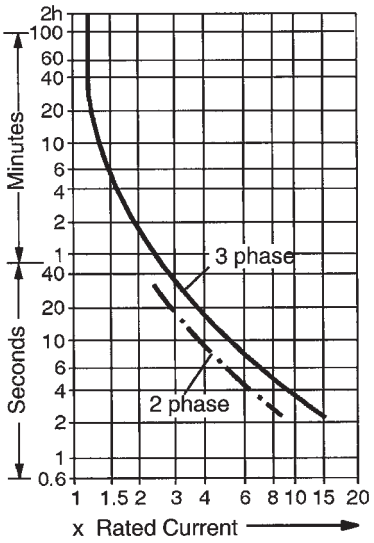
3-pole

SSNA9000

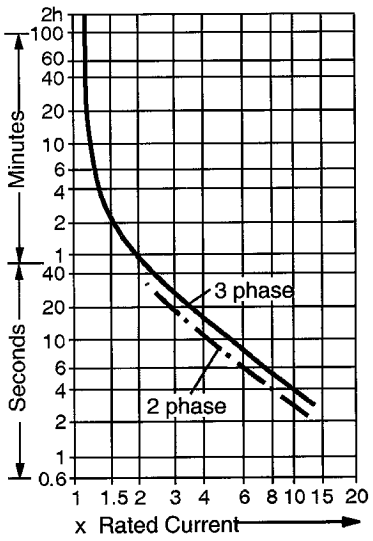
Tripping Characteristics

These tripping characteristics comply with IEC 947 and are the mean values of the scatter bands at 20°C ambient temperature starting from the cold state. Tripping time is a function of operating current. In equipment at operating temperature, the tripping time of the overload relay falls to approximately 1/4 of the read value.

CT7-24, 45 & 75



CT7-100-90



CT7 Thermal Overload Relay
(thermally delayed over-current relay) with differential tripping for motor protection in the event of a phase failure.

Mean value of tolerance bands, heated in three phases.

Curves: from cold state

Curves: trip time for single phase condition.

Function Limits: -25°C…+50°C

Temperature Compensation: continuous from -5°C…+40°C.

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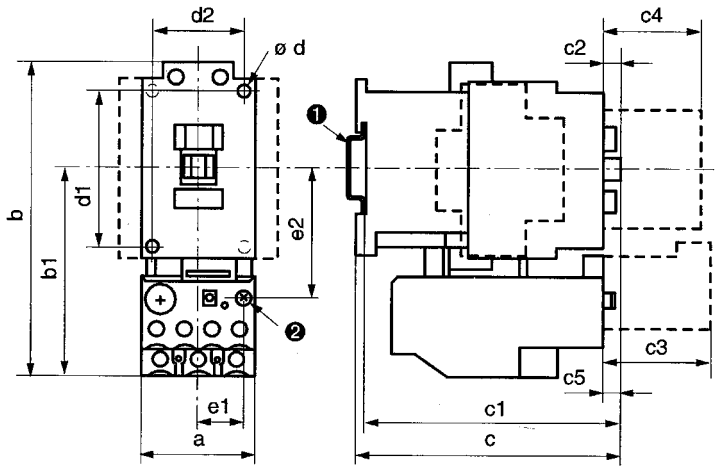
Series CT7 (Mounting to CA7 Contactors)

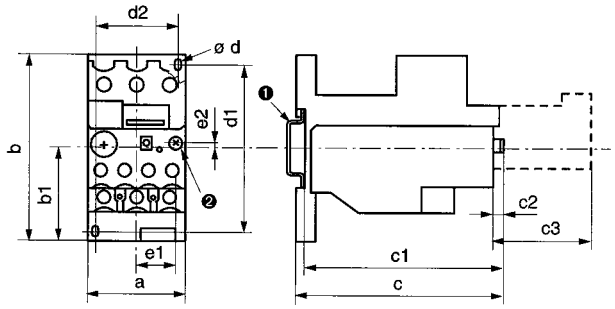
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



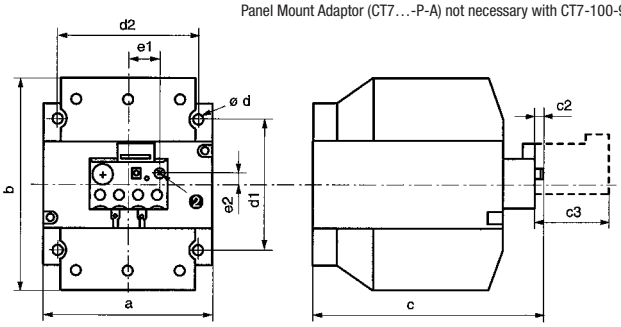
O/L Relay	Fits Contactor...	a	b	b1	c	c1	c2	c3	c4	c5	∅d	d1	d2	e1	e2
CT7-24	CA7-9...23	45 (1-25/32)	127 (5)	83 (3-17/64)	96 (3-25/32)	91 (3-37/64)	15 (19/32)	51 (2)	39 (1-17/32)	5 (13/64)	Two ∅ 4.2 Two 3/16 ∅	60 (2-23/64)	35 (1-25/64)	16.5 (21/32)	51 (2)
	CA7-30...37	45 (1-25/32)	127 (5)	83 (3-17/64)	105 (4-9/64)	99 (3-37/64)	6.5 (17/64)	51 (2)	39 (1-17/32)	9.5 (3/8)	Two ∅ 4.2 Two 3/16 ∅	60 (2-23/64)	35 (1-25/32)	16.5 (21/32)	51 (2)
CT7-45	CA7-30...37	60 (2-23/64)	140 (5-33/64)	97 (3-13/16)	105 (4-9/64)	99 (3-37/64)	6.5 (17/64)	51 (2)	39 (1-17/32)	6.5 (17/64)	Two ∅ 4.2 Two 3/16 ∅	60 (2-23/64)	35 (1-25/32)	16.5 (21/32)	57 (2-1/4)
	CA7-43	60 (2-23/64)	140 (5-33/64)	97 (3-13/16)	107 (4-7/32)	103 (4-3/32)	6.5 (17/64)	51 (2)	39 (1-17/32)	8.5 (21/64)	Two ∅ 4.2 Two 3/16 ∅	60 (2-23/64)	45 (1-25/32)	16.5 (21/32)	57 (2-1/4)
CT7-75	CA7-60...85	72 (2-53/64)	185 (7-9/32)	120 (4-23/32)	125 (4-15/16)	120 (4-23/32)	8.5 (21/64)	51 (2)	39 (1-17/32)	28.5 (2-1/8)	Two ∅ 4.2 Four 7/32 ∅	100 (3-15/16)	55 (2-11/64)	16.5 (21/32)	82 (3-15/64)

Series CT7 (Separate Mounting Using Adaptor CT7-…-P-A)

Panel Mount Adaptor (CT7…-P-A) not necessary with CT7-100-90



Catalog #: CT7-24…CT7-75



Catalog #: CT7-100-90

Catalog Number	a	b	b1	c	c1	c2	c3	∅d	d1	d2	e1	e2
CT7-24	45 (1-25/32)	85 (3-11/32)	44 (1-47/64)	95 (3-47/64)	90 (3-35/64)	5 (13/64)	51 (2)	Two ∅ 4.5 Two 3/16 ∅	60...74 (2-23/64...2-29/32)	35 (1-25/64)	16 (5/8)	3 (1/8)
CT7-45	60 (2-23/64)	90 (3-35/64)	44 (1-47/64)	117 (4-49/64)	112 (4-13/32)	15 (19/32)	51 (2)	Two ∅ 5.4 Two 7/32 ∅	74 (19/32)	50 (1-31/32)	16 (5/8)	0 (0)
CT7-75	100 (3-15/16)	120 (4-23/32)	~	135 (5-15/16)	~	5 (13/64)	51 (2)	Four ∅ 6.2 Four 1/4 ∅	74 (2-29/32)	80 (3-5/32)	16 (5/8)	7 (9/32)

❶ May be mounted on 35mm EN 50 022-35 DIN-rail.
❷ With reset rod, maintain 9mm maximum operating radius from center of reset button.
c3 Remote reset
c4 Auxiliary contact block

SSNA9000

Series CT7K Thermal Overload Relays

Simple and effective motor protection for applications to 10HP @ 460V (15HP @ 575V)

Obsolete in 2009

Sprecher + Schuh's economical CT7K Thermal Overload Relays share the same excellent protection characteristics as our full featured thermal overload relays, with the exception of differential tripping and selectable reset, yet still trip under single phase conditions at 1.25 x set current.

Consistent and reliable protection

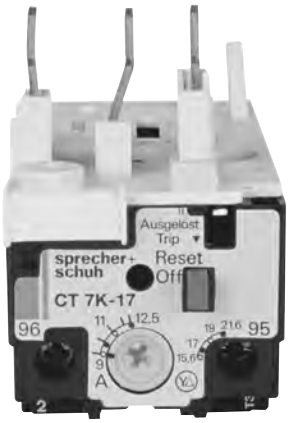
The consistent high quality of Sprecher + Schuh thermal overload relays is ensured by a complex current limiting calibration procedure performed after each unit is at full operating temperature. Calibration is performed at the largest and smallest current the overload can handle. The accurate time/current 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 that 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 CT Series have been recognized by many motor manufacturers as the ideal type to assure optimum motor protection.

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 –25°C to +60°C.



Single phase applications

CT 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 schematic on page B54.

Convenient dial adjustment of motor FLA

Rather than changing "heaters" to set the overload to the motor's FLA, CT relays have a dial adjustment on the faceplate. This convenience offers a wide range of FLA settings and allows you to accurately set or reset the overload in seconds.

Other standard features

CT thermal overload relays feature a fail-safe "trip-free" design that prevents the device from being held closed during an overload. CT7K overload relays feature a manual reset.

An optional NO signal contact can be added to the CT7K in the field for use as an alarm circuit.

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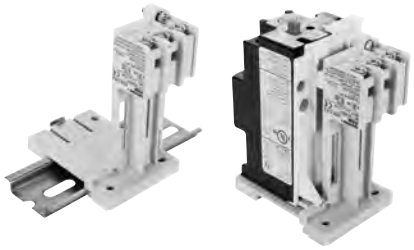
CT7K Thermal Overload Relays, Manual Reset

Overload Relay	Directly Mounts to Contactor...	Adjustment Ranges [A]	Trip Class 10	
			Catalog Number	Price
 CT7K-17	CA7-9...23	0.10…0.15	**CT7K-17-0.15**	**72**
		0.15…0.23	**CT7K-17-0.23**	
		0.23…0.35	**CT7K-17-0.35**	
		0.35… 0.55	**CT7K-17-0.55**	
		0.55…0.8	**CT7K-17-0.80**	
		0.8…1.2	**CT7K-17-1.2**	
		1.2…1.8	**CT7K-17-1.8**	
		1.8…2.7	**CT7K-17-2.7**	
		2.7…4	**CT7K-17-4.0**	
		4…6	**CT7K-17-6.0**	
		6…9	**CT7K-17-9.0**	
	CA7-12...23	9…12.5	**CT7K-17-12.5**	
	CA7-16...23	12.5…17.5	**CT7K-17-17.5**	**76**

CT7K Thermal Overload Relay Accessories

Accessory	Description	For Use with...	Catalog Number	Price Each
	**Auxiliary Contact Block -** 1 N.O. alarm contact	All CT7K	**CT3K-P-10**	**17**
	DIN-Rail/Panel Mount Adaptor for separate mounting CT7K Thermal Overload.	All CT7K	**CT7K-17-P-A**	**15**

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❶ Separately mounted overload not available.

Electrical Data

			CT7K
Main Circuits			
Rated Insulation Voltage U_i			
	UL	[V]	~
	CSA	[V]	~
	CULus	[V]	600
Rated Impulse Strength U_{imp}		[kV]	6
Rated Operating Voltage U_e		[V]	600
Overvoltage Category/Degree of Contamination			III/3
Terminal Cross-Sections			
Terminal Type			
			M3.5
Terminal Screws			
	Flexible with Wire End Ferrule	[mm²]	2 x (1…2.5))
	Solid Conductor	[mm²]	1 x (1.5...4)
	Stranded	[mm²]	2 x (1...2.5)
Max. Wire Size per UL/CSA		[AWG]	2 x (14...10)
Recommended Torque		[Nm]	1.4...2.0
		[lb-in]	12...20
Pozidrive Screwdriver		Size	2
Slotted Screwdriver		mm	1 x 6

Control Circuit

			CT7K
Rated Insulation Voltage U_i		[V]	690
Rated Operating Voltage U_e		[V]	690
Rated Operating Current U_e			
AC-15	220...240V	[A]	3
	380...480V	[A]	1.6
Conventional Thermal Current		[A]	4
Terminations			
Terminal Type			
			M 3.5
	Flexible with Wire End Ferrule	[mm²]	2 x (0.75...2.5)
	Solid Conductor	[mm²]	2 x (0.75...2.5)
	Stranded	[mm²]	2 x (0.75...4)
Max. Wire Size per UL/CSA		[AWG]	2 x (18...14)
Recommended Torque		[Nm]	1.2
		[lb-in]	11
Pozidrive Screwdriver		Size	2
Slotted Screwdriver		mm	1 x 6

General Data

Weight	[kg (oz)]	0.15 (4.8)
Standards		IEC 947, EN 60 947, DIN VDE 0660
Approvals		CE, UL, CSA, PTB
Corrosion Resistance		Humid/Warm, Constant, per DIN, IEC 68, Part 2-3
		Humid/Warm, Cyclic, per DIN, IEC 68, Part 2-30
Ambient Temperature		
Open		–25…+60°C (–13…140°F)
Enclosed		–25…+40°C (–13…104°F)
Temperature Compensation		Continuous (Temperature Range –5…+40°C per IEC 947, EN60947; PTB: –5…+50°C)
Shock Resistance		
10ms sinusoidal shock	[G]	10
Type of Protection		IP00
in connected state		IP2X (in a connected state)
Finger Protection		Finger and back of hand safe (VDE 0106, Part 100)

SSNA9000

Short Circuit Coordination - CT7K ❶

Mounting on Contactor	Catalog Number	Adjustment Ranges [A]	gL Back-Up Fuses max. I_e[A]	
			Type 1 Coordination	Type 2 Coordination
CA7-9...CA7-23	CT7K-17-0.15	0.1…0.15	50	~
	CT7K-17-0.23	0.15…0.23	50	~
	CT7K-17-0.35	0.23…0.35	50	2
	CT7K-17-0.55	0.35… 0.55	50	2
	CT7K-17-0.8	0.55…0.8	50	2
	CT7K-17-1.2	0.8…1.2	50	4
	CT7K-17-1.8	1.2…1.8	50	4
	CT7K-17-2.7	1.8…2.7	50	6
	CT7K-17-4	2.7…4	50	10
	CT7K-17-6	4…6	50	16
CA7-12...CA7-16	CT7K-17-9	6…9	50	20
	CT7K-17-12.5	9...12.5	50	25
CA7-23	CT7K-17-17.5	12.5...17.5	50	25
	CT7K-17-12.5	9...12.5	50	25
	CT7K-17-17.5	12.5...17.5	50	35

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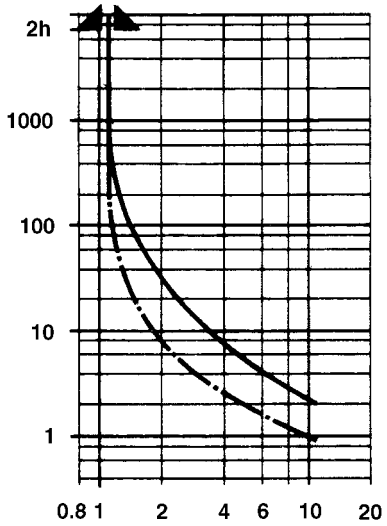
❶ I_q = 50kA, except as indicated.
❷ I_q = 25kA for this test.

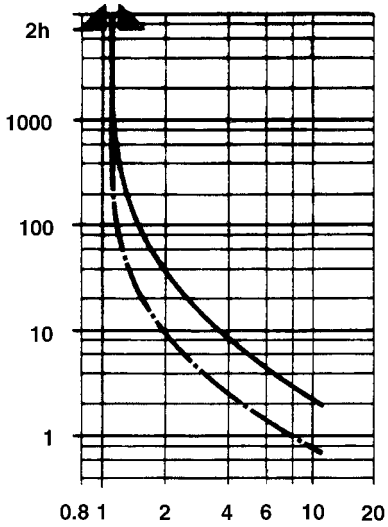
Tripping Characteristics

These tripping characteristics comply with IEC 947 and are the mean values of the scatter bands at 20°C ambient temperature starting from the cold state. Tripping time is a function of operating current. In equipment at operating temperature, the tripping time of the overload relay falls to approximately 1/4 of the read value.

0.1…2.7A



2.7…17.5A



Time/Current Characteristics of CT7K Thermal Overload Relays

Mean value of tolerance bands, heated in three phases. **Solid curves** indicate performance of cold relay. **Dashed curves** indicate performance in operationally warm state (loaded with the set current).

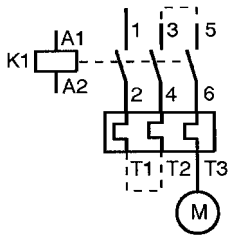
Tolerance: trip time ±20% (±10 for current).

Function Limits and Temperature Compensation: from -25°C…+70°C.

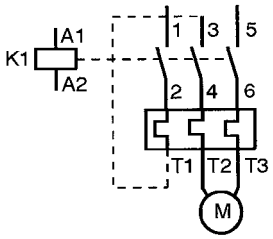
Tripping Limits: specified in IEC60947-4 for -5°C…+40°C are satisfied in range -20°C…+60°C.

Two Phase Loading (phase failure): Trip limits 1.05…1.25 of set current I_{eF} (1.05…1.32 I_{eF} is permissible according to IEC 60947-4). For motors up to 10kW, the two-phase trip at max. 1.25 I_{eF} guarantees heat build-up limitation to the value which occurs in the event of a 3-phase trip at 1.2 I_{eF}.

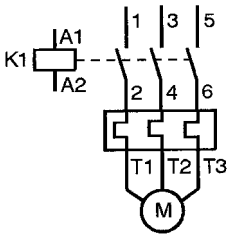
Connection Diagrams



1-pole



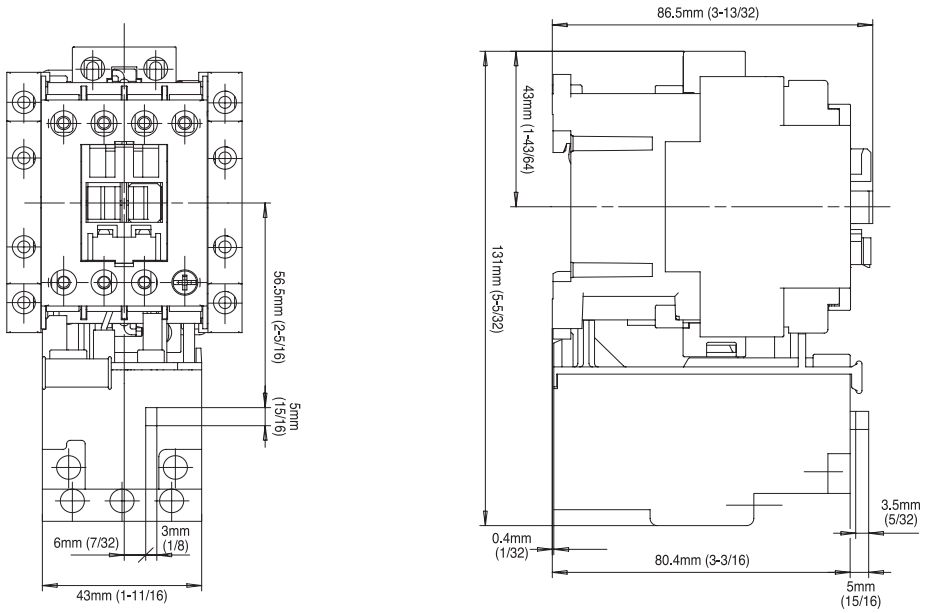
2-pole



3-pole

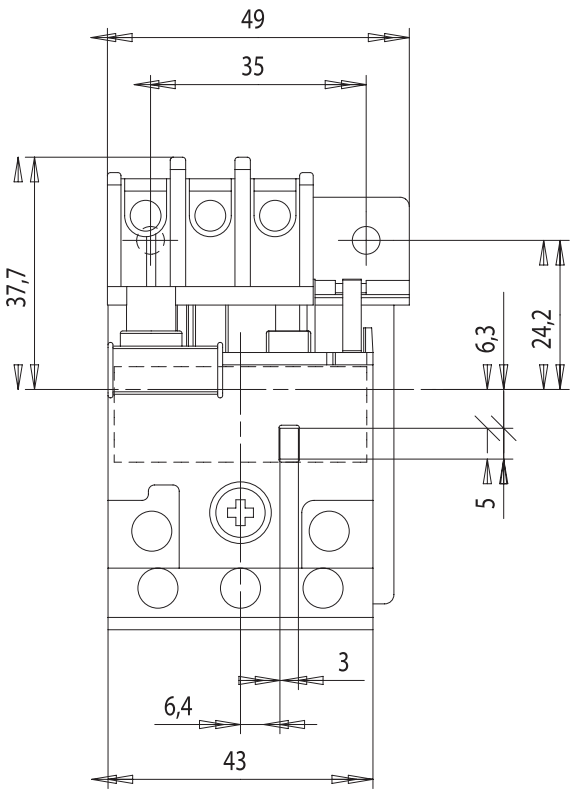
Series CT7K *(Mounting to CA7 Contactor)*

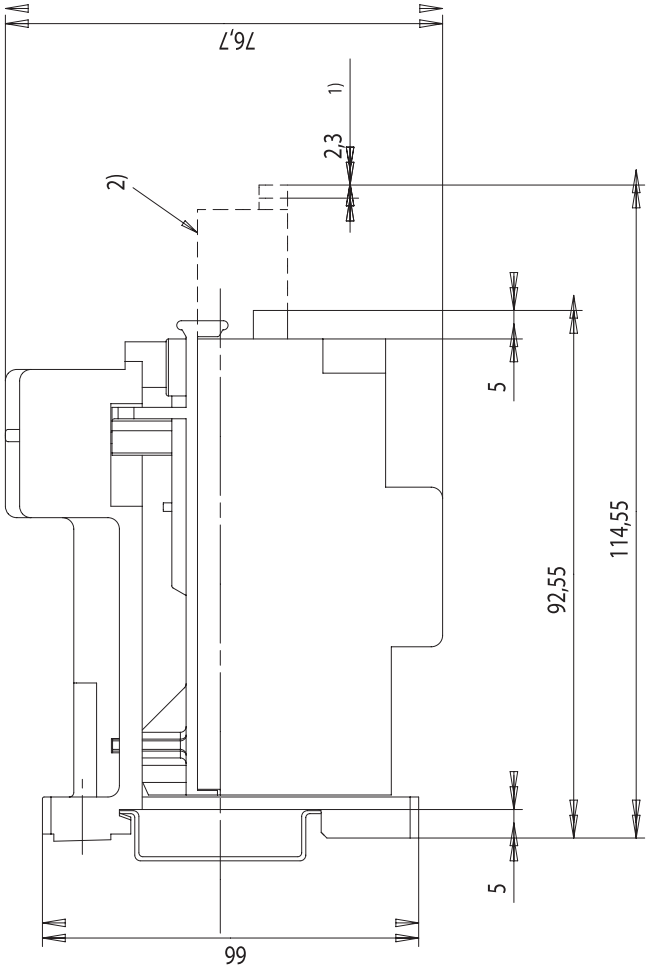
Dimensions are in millimeters (inches). Dimensions not intended for manufacturing purposes.



Series CT7K *(Separate mounting using adapter CT7K-17-P-A)*

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





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