PCEC Hydraulic Elevator Softstarters up to 150 HP @ 480 VAC

Unique advantages not found in electromechanical or other solid state starters

The PCEC Hydraulic Elevator Softstarter is a current-limiting solid state starter. It consists of four basic components: the control module, power module, fault contactor, and a selectable Class 10, 15 or 20 solid state overload relay for motor protection.

What makes it better?

Current-limiting increases motor life by reducing or eliminating high current surges caused by traditional wye-delta starters. Also reduces or eliminates voltage drop in weak electrical systems.

Reduces mechanical stress on entire hydraulic system. This results in less maintenance to the pump and related hydraulic components, and ultimately, less downtime.

Solid state
The softstarter itself contains no moving parts that can wear out. This reduces or eliminates regular maintenance. Electrical noise and heat generation is also reduced. The PCE provides a smooth, stepless ramp of the hydraulic pump motor from 0 to full speed.

Wired inside the delta

The PCEC Hydraulic Elevator Softstarters are wired "inside the delta". Lower current is passed through the softstarter, resulting in less heat generation, smaller devices, smaller panel space, and lower cost. The PCEC fits new and existing installations, providing an exact replacement for many wye-delta starters. The PCEC can also be configured for Line connected 3-wire motor applications.

Microprocessor control provides precision operation

PCEC softstarters are under full microprocessor control, which limits starting current to the preset adjustable value. Current never exceeds the preset limit. Microprocessor control also provides finer increments of adjustment, facilitating smooth, repeatable, and accurate starting characteristics,

independent of component aging and varying environmental conditions.

LED diagnostic display

An LED display indicates operating status and fault condition (overload, over temperature, phase reversal/ phase loss, phase imbalance, shorted SCR, start fault). This enables speedy diagnosis and quick resolution of problems.

Flexible design

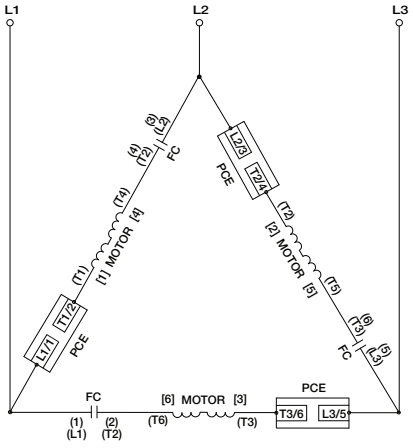
The PCEC softstarter matches the mounting hole configuration of many wye-delta solid state starters, allowing easy replacement. The unit features a 2-wire control interface to accommodate new and existing installations. It also includes “up to speed” contact for easy integration. Additional auxiliary contacts can be mounted on the side of the PCEC unit. Field-replaceable components means easy maintenance.

Standard fault contactor

A standard fault contactor isolates one side of the motor windings from the line power in case of softstarter fault or motor overload. Current flow is prevented by mechanical isolation in addition to the solid state SCRs.

UL/CSA Elevator Ratings

The PCEC Softstarters are UL Listed and cUL Listed (Canadian Standards per UL 508 and CS C22.2 No. 14-95) as solid state motor controllers in File E96956. They are also UL Listed and cUL Listed per UL 508 and CAN/ CSA B44.1-96 as elevator controllers in File E3125.



PCEC Hydraulic Elevator Softstarters are wired "inside the delta" for more efficient operation and retrofit

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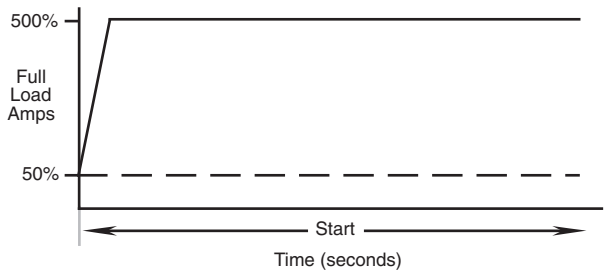
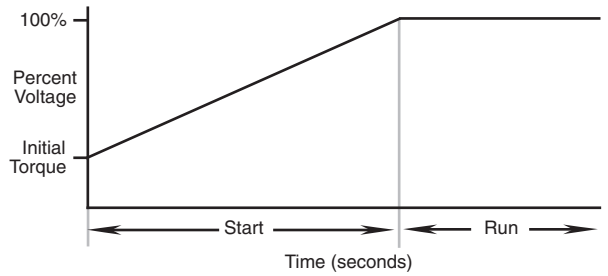
Modes of Operation (Standard)

Current Limit Starting



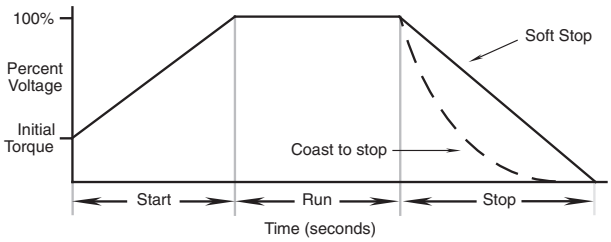
Through the use of internal current sensors, the PCEC will regulate the current level applied to the motor over the programmed period of time. This type of motor control produces a slow start and insures that the current does not exceed the programmed level. This is standard configuration of the device and aligns well with traditional applications.

Soft Start



During Soft start, the voltage is ramped from an initial set point to full voltage over the programmed period of time. This type of motor control produces a smooth start in less time than the current limit setting, however the current is not restricted.

Soft Stop



Soft stop provides the ability to ramp down the voltage applied to the motor over a programmed period of time. The result is a smooth stop.

Diagnostics

Overload	The built in motor overload provides protection of the motor for over current conditions. This protection feature offers a user selectable setting called the trip class, which can be used to accommodate different applications and motor types. When the motor draws more than the nominal value of current for a period of time, the device will fault on a motor overload fault.
Over Temperature	The product includes a built in self monitoring method for detecting a SCR over-temperature condition. If the internal temperature exceeds a design threshold the device will fault on a SCR Overtemp fault.
Phase Reversal	The user can select the phase relationship of the incoming power. If this phase relationship changes, the device will fault indicating a problem.
Phase Loss/Open Load	When any one of the incoming 3 phases are lost, the controller will fault indicating a phase loss condition has occurred.
Phase Imbalance	When enabled, this motor protection feature will detect if a phase imbalance condition exists and fault the unit. A phase imbalance is defined as a 65% differential between the highest and lowest phase for more than 3 seconds.
Shorted SCR	Each time the PCEC initiates a start, it checks to see if the SCR's are operating correctly. If the controller is unable to properly turn on and off any one of the SCR's, the device will fault on a Shorted SCR fault.

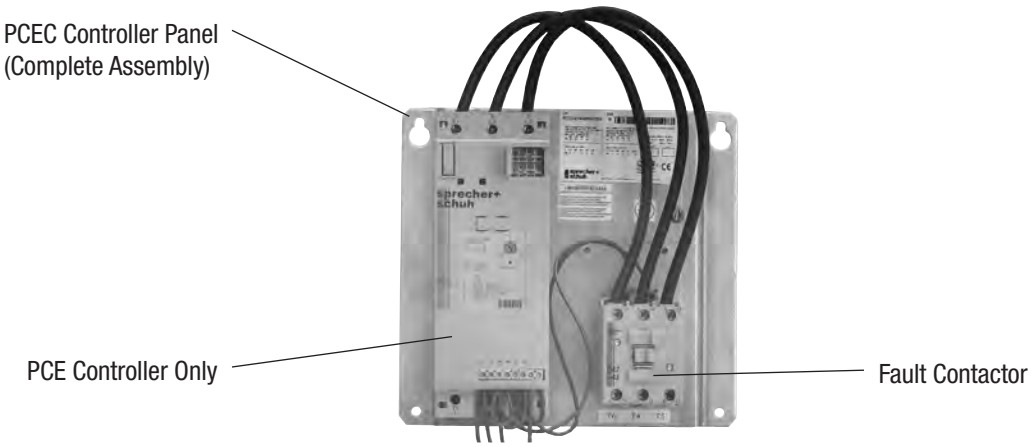
PCEC Controller Panel - 120V Control Voltage ❹❻

DELTA Connected - 6 Wire					Line Connected - 3 Wire ❷					With 120VAC 50/60 Hz ❸ Control Voltage	
Maximum Horsepower				Overload Range ❶	Maximum Horsepower				Overload Range ❶		
208V	240V	480V	575V		208V	240V	480V	575V		Catalog Number	Price
10	10	15	30	10.9…32.9	5	5	10	15	6.3…19	PCEC-032-600V-120V	1078
10	15	30	50	17.3…51.9	7.5	10	20	25	10…30	PCEC-051-600V-120V	1299
20	20	30	60	21…64	10	10	25	30	12.3…37	PCEC-064-600V-120V	1564
20	25	40	60	25…74	10	15	30	40	14.3…43	PCEC-074-600V-120V	2213
30	40	60	100	35…104	15	20	40	50	20…60	PCEC-104-600V-120V	2877
40	50	75	150	50…147	25	30	60	75	28.3…85	PCEC-147-600V-120V	3807
75	75	150	200	59…234	40	50	100	125	34…135	PCEC-234-600V-120V ❺	7405

PCEC Controller Panel - 230V Control Voltage ❹❻

DELTA Connected - 6 Wire					Line Connected - 3 Wire ❷					With 230VAC 50/60 Hz ❸ Control Voltage	
Maximum Horsepower				Overload Range ❶	Maximum Horsepower				Overload Range ❶		
208V	240V	480V	575V		208V	240V	480V	575V		Catalog Number	Price
10	10	15	30	10.9…32.9	5	5	10	15	6.3…19	PCEC-032-600V-230V	1078
10	15	30	50	17.3…51.9	7.5	10	20	25	10…30	PCEC-051-600V-230V	1299
20	20	30	60	21…64	10	10	25	30	12.3…37	PCEC-064-600V-230V	1564
20	25	40	60	25…74	10	15	30	40	14.3…43	PCEC-074-600V-230V	2213
30	40	60	100	35…104	15	20	40	50	20…60	PCEC-104-600V-230V	2877
40	50	75	150	50…147	25	30	60	75	28.3…85	PCEC-147-600V-230V	3807
75	75	150	200	59…234	40	50	100	125	34…135	PCEC-234-600V-230V ❺	7405

❶ Motor FLA must fall within the specified range to operate correctly.
❷ The PCEC Controller panels are shipped in the DELTA connection mode by default. LINE connection requires the power wires to be reconfigured and DIP Switch #15 to be programmed for LINE connection mode by the customer.
❸ Internal fan is optional for PCEC-032…064. See page D61 to purchase separately. All other PCEC units have internal fan as standard.
❹ Purchase additional PCE Auxiliary Contact Blocks separately. See page D7. One Auxiliary Contact Block (one or two pole) may be mounted on the right side of the PCE controller.
❺ Separate 120V or 240V single phase is required for PCEC fan operation.
❻ The PCEC Hydraulic Elevator duty rating is 80 starts per hour at 50% duty cycle (160 calls per hour). Starts per hour are based on when the motor starts, the motor only runs on "up" calls.



Replacement Parts

Complete Assembly (For Reference Only)	PCE Controller Only	Price	PCE Fans	Price	Fault Contactor	Price	Fault Contactor Coil	Price
PCEC-032-600V-120V	**PCE-032-600V**	**892**	**PCV-064 (optional)**	**53**	**CA7-37-00-120**	**See Section A**	**TC473**	**See Section A**
PCEC-051-600V-120V	**PCE-051-600V**	**1120**			**CA7-37-00-120**			
PCEC-064-600V-120V	**PCE-064-600V**	**1392**			**CA7-37-00-120**			
PCEC-074-600V-120V	**PCE-074-600V**	**1844**	**PCV-147**	**134**	**CA7-43-00-120**		**TD473**	
PCEC-104-600V-120V	**PCE-104-600V**	**2449**			**CA7-60-00-120**		**TE473**	
PCEC-147-600V-120V	**PCE-147-600V**	**3275**			**CA7-85-00-120**		**TE473**	
PCEC-234-600V-120V	**PCE-234-600V**	**6698**	**PCV-234**	**365**	**CA6-180-EI-11-120**		**CA6-TGE865**	

PCEC-032-600V-230V	**PCE-032-600V**	**892**	**PCV-064 (optional)**	**53**	**CA7-37-00-240**	**See Section A**	**TC858**	**See Section A**
PCEC-051-600V-230V	**PCE-051-600V**	**1120**			**CA7-37-00-240**			
PCEC-064-600V-230V	**PCE-064-600V**	**1392**			**CA7-37-00-240**			
PCEC-074-600V-230V	**PCE-074-600V**	**1844**	**PCV-147**	**134**	**CA7-43-00-240**		**TD858**	
PCEC-104-600V-230V	**PCE-104-600V**	**2449**			**CA7-60-00-240**		**TE858**	
PCEC-147-600V-230V	**PCE-147-600V**	**3275**			**CA7-85-00-240**		**TE858**	
PCEC-234-600V-230V	**PCE-234-600V**	**6698**	**PCV-234**	**365**	**CA6-180-EI-11-220W**		**CA6-TGE866**	

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Electrical

Power Circuit		UL/cUL/CSA	IEC
Rated Operational Voltage		200…600V AC	200…500V~
Rated Insulation Voltage		600V AC	500V~
Dielectric Withstand		2200V AC	2500V~
Repetitive Peak		200…600V AC: 1600	500V~: 1600
Rated Impulse Voltage		6 kV	
Over-voltage Category		III	
Number of Poles		Equipment designed for 3 phase only	
Operating Frequency		50/60 Hz	
Controller Utilization Category		32/51/64	AC-53b: 3.5-15:3585
		74/104/147	AC-53b: 4.5-30:1770
		234	AC-53b: 3.5-30:1770
Overload Current Range (Amps)		LINE	DELTA
	32	6.3...19	10.9...32.8
	51	10...30	17.3...51.9
	64	12.3...37	21...64
	74	14.3...43	25...74
	104	20...60	35...104
	147	28.3...85	50...147
	234	34...135	59...234

Control Circuit	UL/cUL/CSA	IEC
Rated Operational Voltage	100…120 V AC, 200…240V AC	120~, 240~
Rated Insulation Voltage	NA	300V~
Dielectric Withstand	NA	3000V
Rated Impulse Voltage	3kV	
Operating Frequency	50/60 Hz	
Control Power Requirements	32/52/64	215 mA @ 120 V AC , 180 mA @ 240 V AC
	74/104/147	200 mA @ 120 V AC , 100 mA @ 240 V AC
	234	200 mA @ 120 V AC , 120 mA @ 240 V AC
Fan Power Requirements	32/52/64	NA
	74/104/147	NA
	234	20 VA

Electrical (continued)

Short Circuit Performance	Type 1	
Device Current Rating	Max Fuse Size and Type	Max Available Fault Rating
32	70 A - RK5	5 kA
	125 A - K5	5 kA
51	125 A - RK5	5 kA
	200 A - K5	10 kA
64	125 A - RK5	5 kA
	200 A - K5	10 kA
74	150 A - RK5	5 kA
	250 A - J	10 kA
104	200 A - RK5	5 kA
	400 A - J	10 kA
147	250 A - RK5	10 kA
	400 A - J	10 kA
234	400 A - RK5	10 kA
	450 A - K5	10 kA

Auxiliary Contacts (Fault and Aux#1)	UL/cUL/CSA	IEC
Rated Operational Voltage	250V AC / 30V DC	250V~ / 30V DC
Rated Insulation Voltage	250V	250V~
Rated Impulse Voltage	NA	4kV
Dielectric Withstand	1500V AC	2000V~
Operating Frequency	50/60 Hz	
Utilization Category	D300	AC-15 / DC
Type of Control Circuit	Electromagnetic Relay	
Number of Contacts	1	
Type of contacts	Normally Open (N.O.)	
Type of current	AC/DC	
Rated Operational Current (Max.)	0.6 A @ 120 V~ and 0.3 A @ 240V~	
Conventional Thermal Current (Ith)	1 Amp	
Make/Break VA	432/72	

Mechanical

Resistance to Vibration	Operational	1.0 G Peak, 0.15 mm (0.006 in) displacement
	Non-operational	2.5 G Peak, 0.38 mm (0.015 in) displacement
Resistance to Shock	Operational	15 G
	Non-operational	5.5 G

Environmental

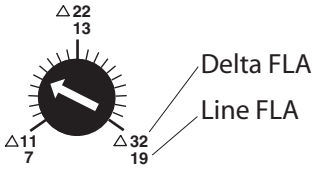
Operating Temperature	0…50 C (32…122 F) Open
	0…40 C (32…104 F) Enclosed
Altitude	2000 m (6560 ft)
Humidity	5…95% (non-condensing)
Pollution Degree	2

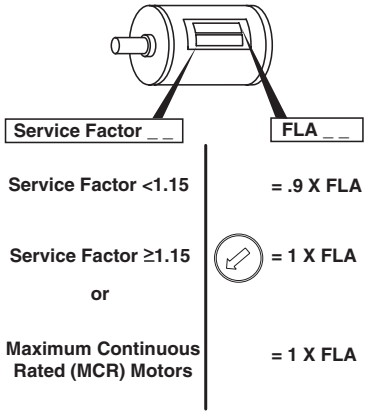
UL/CSA Elevator Ratings

The PCEC Softstarters are UL Listed and cUL Listed (Canadian Standards per UL 508 and CS C22.2 No. 14-95) as solid state motor controllers in File E96956. They are also UL Listed and cUL Listed per UL 508 and CAN/CSA B44.1-96 as elevator controllers in File E3125.

Motor FLA Adjustments

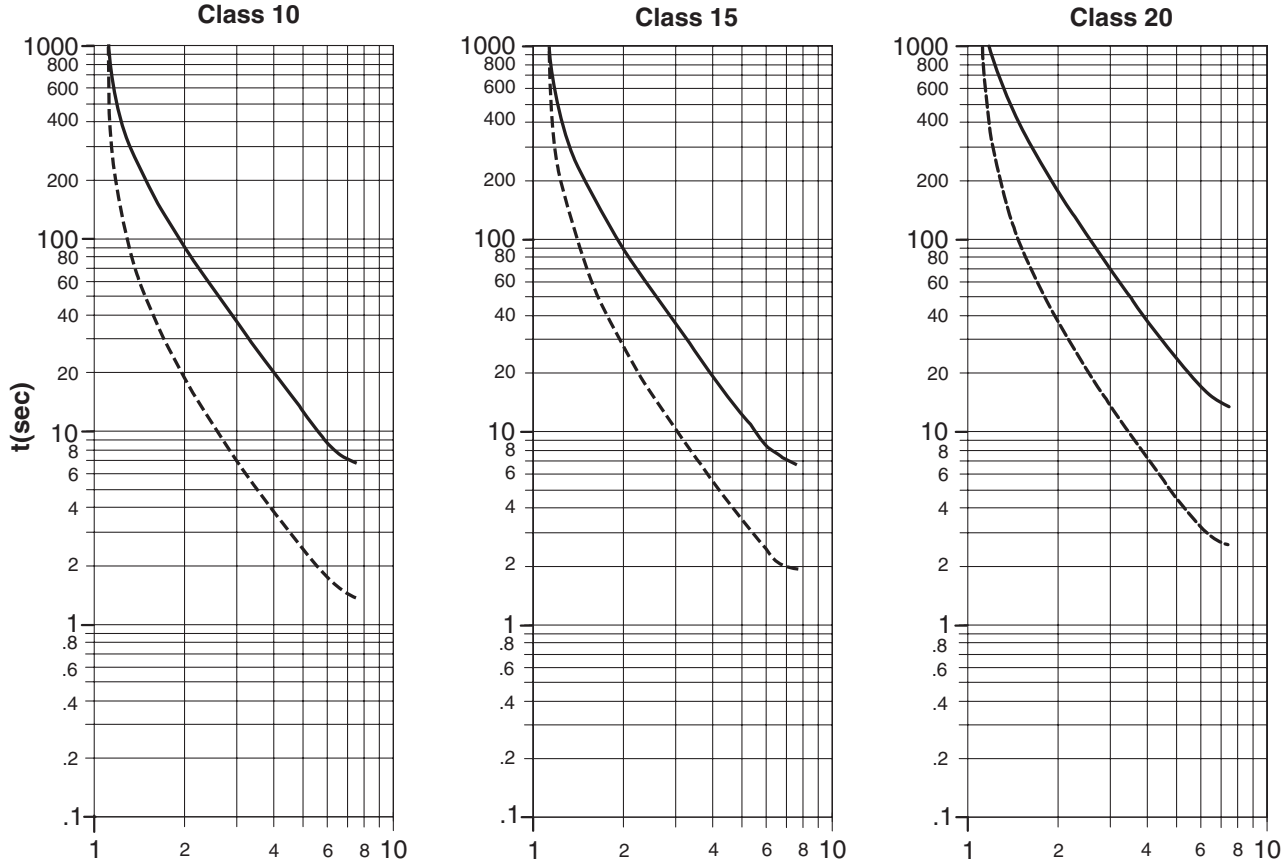
The front of the PCE controller contains a dial which is used for setting the actual FLA of the motor. The label is designed to accommodate motors connected in the LINE or DELTA mode. To determine the proper setting, look at the motors nameplate and set the dial accordingly. The dial setting can be modified depending on the service factor of the motor as shown:





Motor Overload Trip Curves

The trip class should be set according to the motors maximum permissible locked rotor time or the general thermal capabilities. Consult the motor manufacturer for recommendations on setting the trip class.



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Terminal Torque Specifications

PCE Controller Information

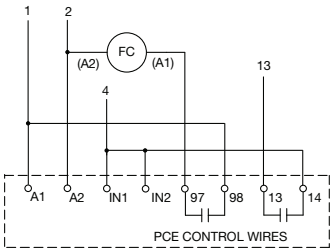
Controller Size	Units	Line Power Terminals	Load Power Terminals	Control Power Terminals
32/51/64	Wire Size	14 - 4 AWG (2.5 - 25 mm^2)	14 - 6 AWG (2.5 - 16 mm^2)	24 - 14 AWG (0.2 - 2.5 mm^2)
	Torque	20 - 25 lb-in. (2.3 - 2.8 Nm)	20 - 22.5 lb-in. (2.3 - 2.6 Nm)	4.4 - 8 lb-in. (0.5 - 0.9 Nm)
74/104/147	Wire Size	14 - 3/0 AWG (2.5 - 95 mm^2)	14 - 1 AWG (2.5 - 50 mm^2)	24 - 14 AWG (0.2 - 2.5 mm^2)
	Torque	100 - 110 lb-in. (11.3 - 12.4 Nm)	100 - 110 lb-in. (11.3 - 12.4 Nm)	4.4 - 8 lb-in. (0.5 - 0.9 Nm)
234	Wire Size	6 - 250 AWG (16 - 120 mm^2)	6 - 250 AWG (16 - 120 mm^2)	24 - 14 AWG (0.2 - 2.5 mm^2)
	Torque	275 lb-in (31 Nm)	275 lb-in (31 Nm)	4.4 - 8 lb-in. (0.5 - 0.9 Nm)

Fault Contactor Information

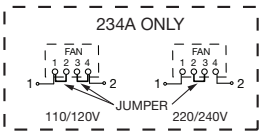
Controller Size	Units	Line Power Terminals	Load Power Terminals	Control Power Terminals
32/51/64/74	Wire Size	14 - 6 AWG (2.5 - 16 mm^2)	14 - 6 AWG (2.5 - 16 mm^2)	16 - 12 AWG (1 - 4 mm^2)
	Torque	13 - 31 in. lbs. (2.3 - 3.5 Nm)	13 - 31 in. lbs. (2.3 - 3.5 Nm)	8.9 - 13 in. lbs. (1 - 1.5 Nm)
104/147	Wire Size	14 - 2 AWG (2.5 - 35 mm^2)	14 - 2 AWG (2.5 - 35 mm^2)	16 - 12 AWG (1 - 4 mm^2)
	Torque	31 - 52 in. lbs. (3.5 - 6 Nm)	31 - 52 in. lbs. (3.5 - 6 Nm)	8.9 - 13 in. lbs. (1 - 1.5 Nm)
234	Wire Size	6 - 300 AWG (16 - 150 mm^2)	6 - 300 AWG (16 - 150 mm^2)	2x 16…12 AWG (2x 1…4 mm^2)
	Torque	250 lb-in (28 Nm)	250 lb-in (28 Nm)	12 - 20 lb-in. (1.4 - 2.3 Nm)

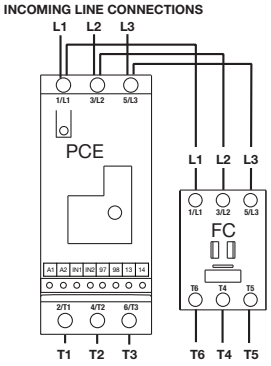
SSNA9000

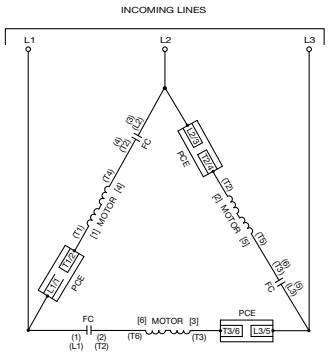
DELTA Connection Diagrams, Power, and Motor Wiring

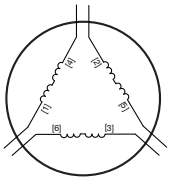


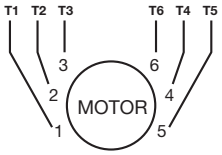
1- CONTROL POWER (L)
2- CONTROL COMMON (N)
4- START ENABLE
13- UP TO SPEED INDICATION



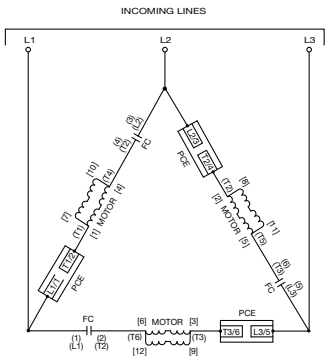


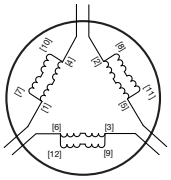


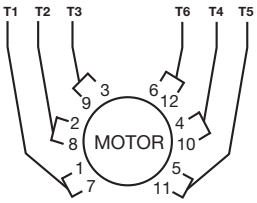




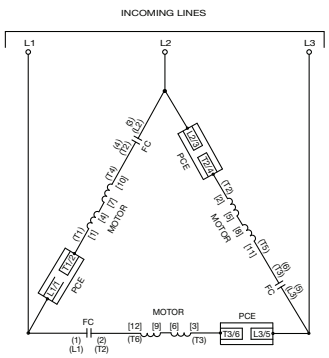
6 LEAD MOTOR CONNECTIONS							
STARTER TERMINALS	T1	T2	T3	T6	T4	T5	JUMPER
MOTOR TERMINALS	1&7	2&8	3&9	6&12	4&10	5&11	N/A

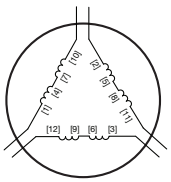


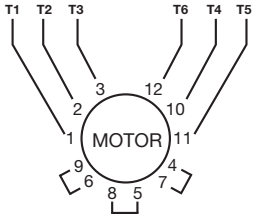




12 LEAD 230V LOW VOLTAGE MOTOR CONNECTIONS							
STARTER TERMINALS	T1	T2	T3	T6	T4	T5	JUMPER
MOTOR TERMINALS	1&7	2&8	3&9	6&12	4&10	5&11	N/A





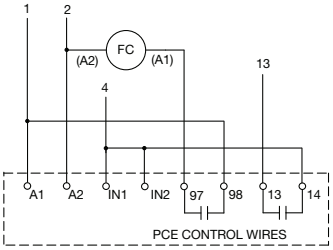


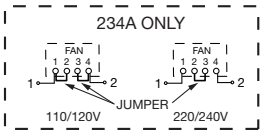
12 LEAD 460V HIGH VOLTAGE MOTOR CONNECTIONS							
STARTER TERMINALS	T1	T2	T3	T6	T4	T5	JUMPER
MOTOR TERMINALS	1	2	3	12	10	11	4&7 5&8 6&9

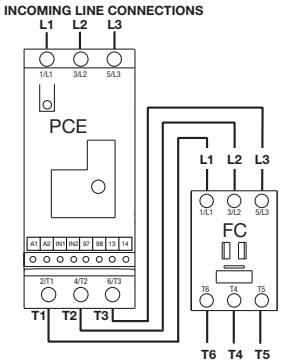
LINE Connection Diagrams, Power, and Motor Wiring

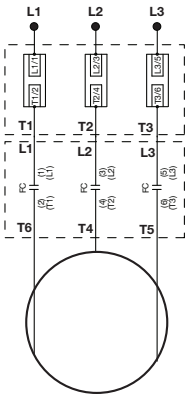
Note: The power wire configuration and dip switch settings must be changed for the line connection method

1- CONTROL POWER (L)
2- CONTROL COMMON (N)
4- START ENABLE
13- UP TO SPEED INDICATION

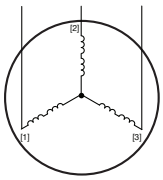




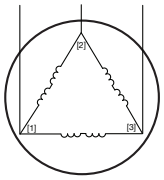


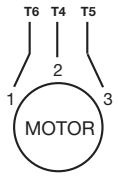


WYE

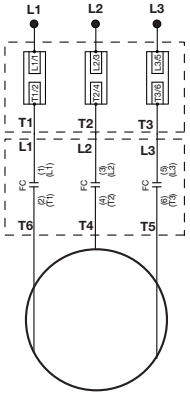


DELTA





3 LEAD MOTOR CONNECTIONS				
STARTER TERMINALS	T6	T4	T5	JUMPER
WYE & DELTA MOTOR TERMINALS	1	2	3	N/A



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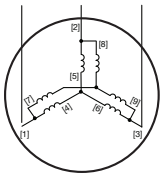
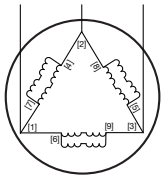
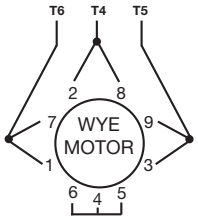
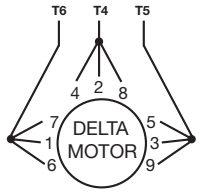


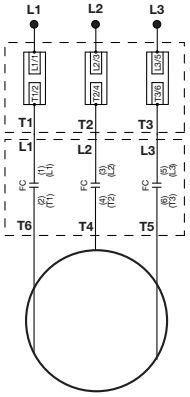
DELTA



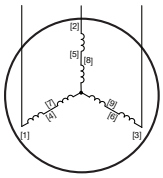




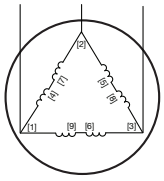
9 LEAD, 230V LOW VOLTAGE, MOTOR CONNECTIONS				
STARTER TERMINALS	T6	T4	T5	JUMPER
WYE MOTOR TERMINALS	1 & 7	2 & 8	3 & 9	4, 5, 6
DELTA MOTOR TERMINALS	1,6,7	2,4,8	3,5,9	N/A

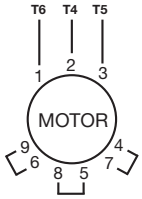


WYE



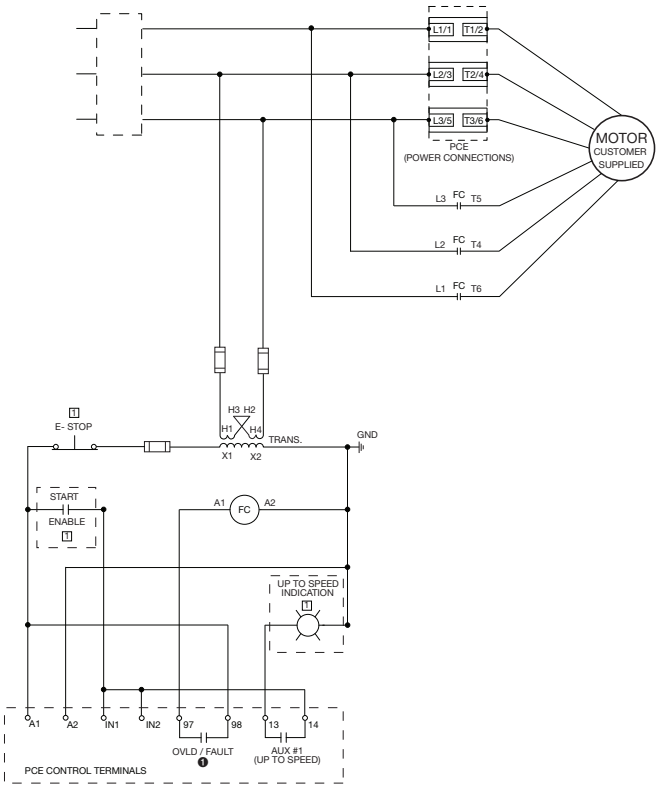
DELTA



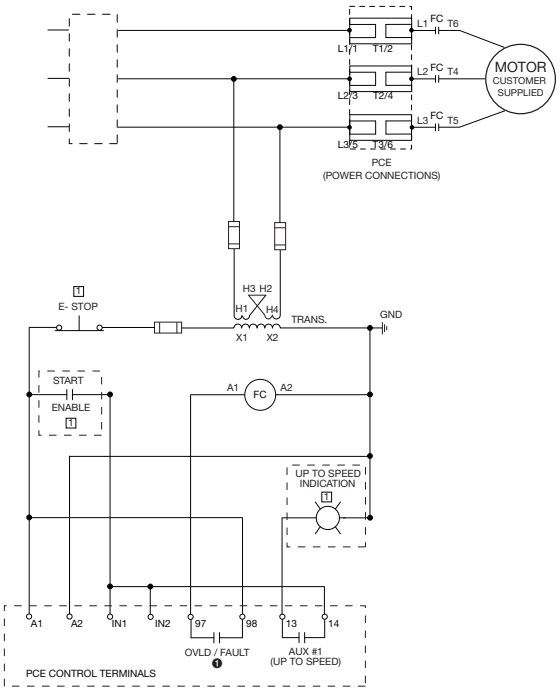


9 LEAD, 460V HIGH VOLTAGE, MOTOR CONNECTIONS				
STARTER TERMINALS	T6	T4	T5	JUMPER
WYE & DELTA MOTOR TERMINALS	1	2	3	4 & 7 5 & 8 6 & 9

DELTA Connected Controller - Typical Control Wiring



LINE Connected Controller - Typical Control Wiring

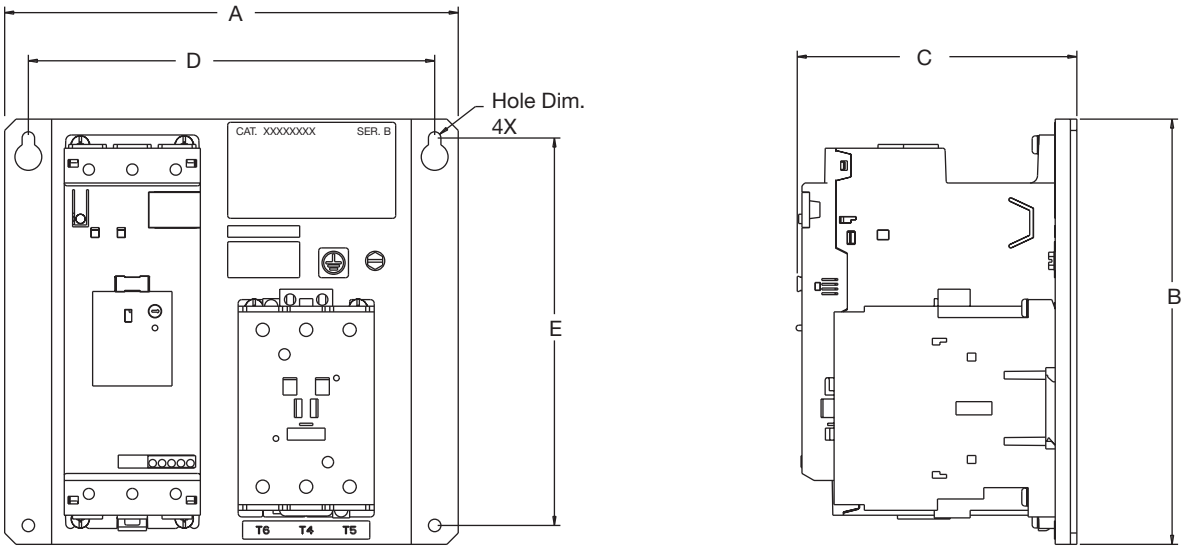


SSNA90000

❶ When (A1)(A2) control power is applied, (97)(98) contact closes instantaneously and opens when the PCE detects an overload or fault condition, or when control power is removed.

PCEC Hydraulic Elevator Softstarter

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



Controller Size	Units	A (Width)	B (Height)	C (Depth)	D	E	Hole Dim - 4x	Approx. Weight
32/51/64	mm	178	144	115.7	165.1	127.0	5.6	4 lbs (2 Kg)
	in	7.01	5.67	4.56	6.50	5.00	0.22	
74/104/147	mm	240	225	147.9	215	205	6.6	14 lbs (6 Kg)
	in	9.45	8.86	5.82	8.46	8.07	0.260	
234	mm	362	515	216.4	330.2	489.5	8.7	51 lbs (23 Kg)
	in	14.25	20.28	8.52	13.00	19.27	0.343	

SSNA9000