

V2

SOFT STARTER STARTUP MANUAL
SPRECHER + SCHUH
HYDRAULIC INSTALLATION

VERSION 2.0



Document History

Date	Version	Summary of Changes
May 1, 2018	1.0	Initial Submittal
October 26, 2020	2.0	Changed cover page New document format Deleted Din Rail termination Replaced Construction section to include wiring to the CXN board

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Sprecher + Schuh Soft Starter

The Sprecher + Schuh soft starter is used on hydraulic controllers.

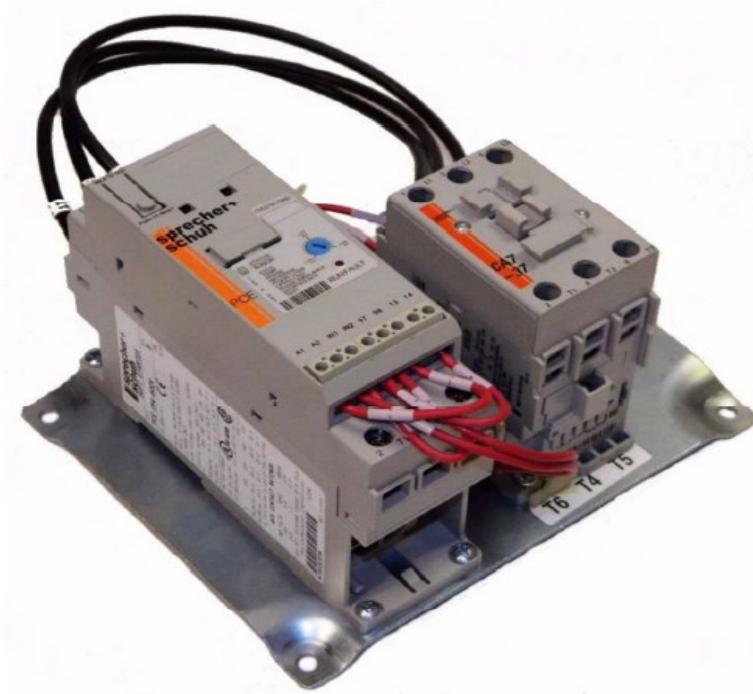


Figure 1: Sprecher + Schuh Soft Starter

Equipment/Settings Verification

Set and verify the equipment matches the job specific parameters for proper operation. See V2 Controller sheet 01 Getting Started Parameter Table for more information.

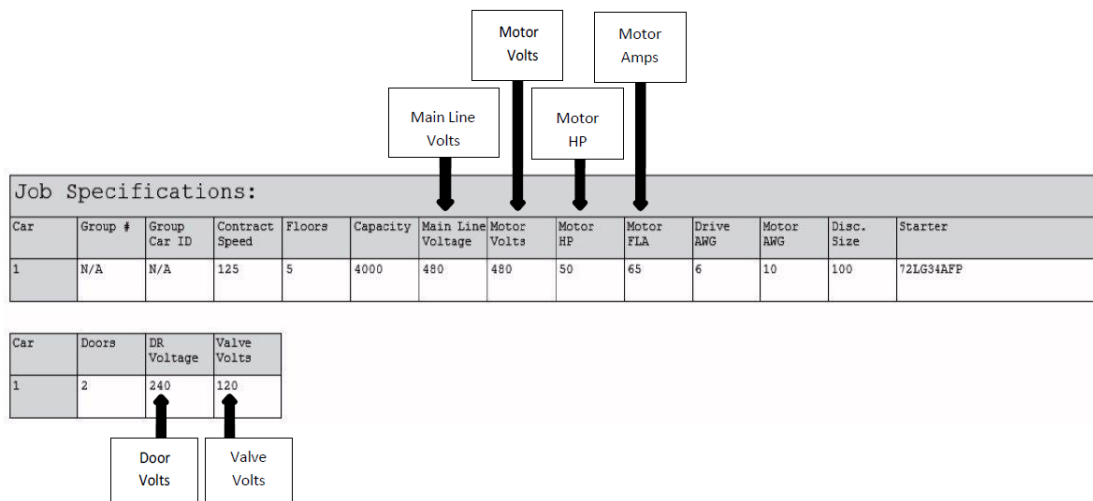


Figure 2: Example of Parameter Table

Grounding Requirements

NOTE: A proper and effective building ground connection is required for the safe and successful operation of the controller.

Examples of a proper building-to-controller ground are as follows:

1. Attach the ground wire to the street side of a water main.
2. Attach the ground wire to a grounding rod in the pit.

The controller has a common ground bus terminal connection.



Figure 3: Ground Bus Terminal

- The building, motor, transformer, and filter(s) must all share a common ground. This removes ground loops, limits impedance, and routes noise into the ground.

Wiring

A checklist must be completed during the soft starter wiring process. See Appendix 3 for terminal location.

Power

Perform the following to connect power. See *V2 Controller sheet 03 Machine Room* for job specific information.

- Connect main line power L1/L2/L3 to soft starter.
- Connect the ground wire to the green terminal screw on the soft starter mounting plate or ground bus terminal.

Valves

Perform the following to connect the valve solenoids. See *V2 Controller sheet 04 Motor and Drive Connections* for job specific information.

1. Wire the following valve solenoids to the machine room CXN board.
 - Up High Speed Valve (UPH)
 - Up Leveling Speed Valve (UPL)
 - Down High Speed Valve (DNH)
 - Down Leveling Speed Valve (DNL)

Motor/Soft Starter

Perform the following to connect the soft starter to the motor. See *V2 Controller sheet 04 Motor and Drive Connections* for job specific information. See Appendix 2 for additional DIP switch settings.

Perform the following for a 6-Lead Delta Wiring.

1. Connect the 6/12 -Lead motor lead to terminals T1/T2/T3 on the soft starter and T6/T4/T5 on the fault connector.
2. Open cover on top of soft starter and turn DIP 15 OFF.

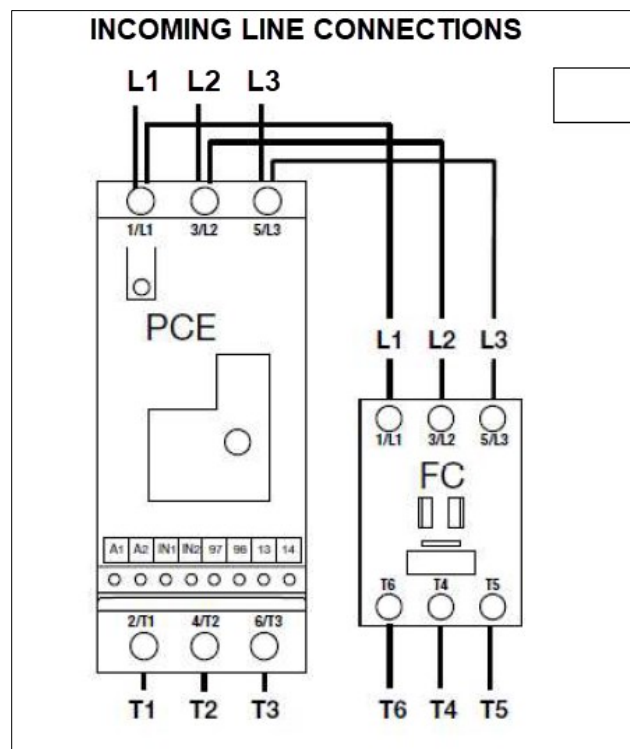


Figure 4: 6-Lead Delta Wiring Configuration

The table below lists the 6/12-Lead Delta Wiring.

Table 1: 6/12-Lead Delta Wiring

Terminals		T1	T2	T3	T4	T5	T6	Jump
Single Voltage	(208-575 VAC)	1	2	3	4	5	6	N/A
Dual Voltage	Low (220-240 VAC)	1,7	2,8	3,9	10,4	11,5	12,6	N/A
	High (460-480 VAC)	1	2	3	10	11	12	4 and 7 5 and 8 6 and 9

Perform the following for a 3-Lead Delta Wiring.

1. Connect the 3/9 -Lead motor lead to terminals T1/T2/T3 on the fault contactor.
2. Open cover on top of soft starter and turn DIP 15 ON.

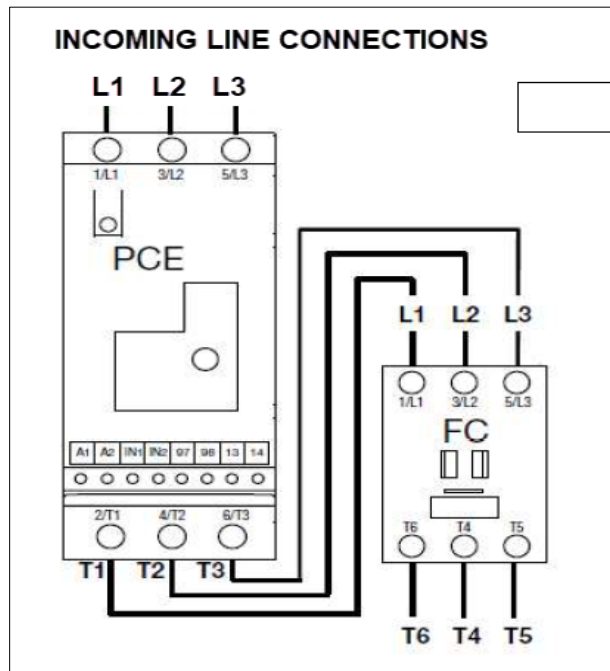


Figure 5: 3-Lead Line Wiring Configuration

The table below lists the 3/9-Lead Line Wiring.

Table 2: 3/9-Lead Line Wiring

Terminals		T6	T4	T5	Jump
3-Lead Motor	(208-575 VAC)	1	2	3	N/A
9-Lead Motor	Low (220-240 VAC)	1,6,7	2,4,8	3,5,9	N/A
	High (460-480 VAC)	1	2	3	4 and 7 5 and 8 6 and 9

Construction

Perform the following to wire the Construction box. See *V2 Controller sheet 01 Getting Started* for job specific information.

1. Install jumpers between M24 and inputs per print.
2. Install jumpers between M24 and any additional inputs if required. For example, Pre-Transfer and Emergency Power.
3. Remove factory wires on inputs 521 and 522.
4. Install the Run Box UP/DOWN switch to IOs 521 and 522.
5. Install the Run Box UP/DOWN Enable switch to M24.
6. Install the Temporary Run switch between 120 and SFIN on the CXN board.
7. Jumper 120 to THL, MHL, and BHL on the CXN board.

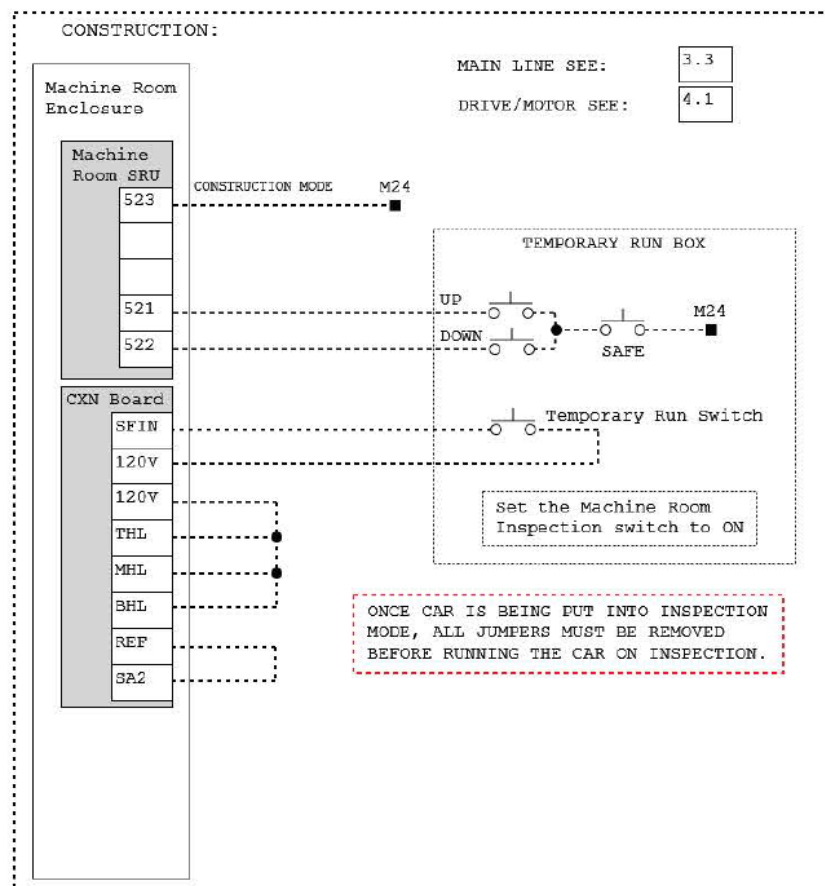


Figure 6: Example of Construction Wiring

Powering Up

Perform the following to power up the soft starter. Complete the checklist during the verification process.

1. Apply external power by closing the main disconnect.
2. Close the two-pole breaker and all pushbutton breakers.

3. Verify the LCD on the Smartrise board and the soft starter power up.

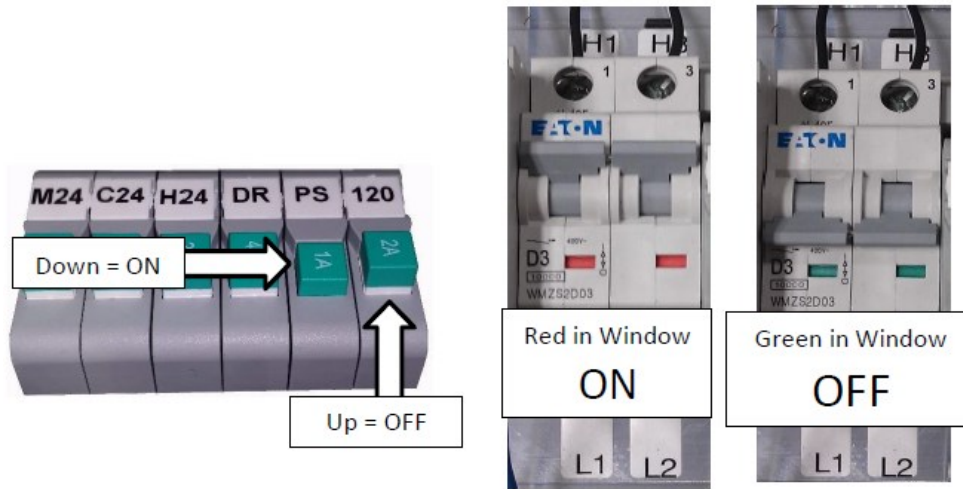


Figure 7: Breakers

Final Setup

Perform the following to set the Bypass Term Limit. Complete the checklist during the verification process.

NOTE: The selected menu within the menu options is shown with a *.

1. Toggle the Inspection/Normal switch to INSP position.
2. On the Smartrise Machine Room board, press the left arrow (ESC) button several times to get to the MAIN SCREEN.
3. Press the right button to access the Main Menu.
4. From the MAIN MENU, scroll and select Setup.



Figure 8: MAIN MENU – Setup

5. From the SETUP menu, scroll and select Misc.



Figure 9: SETUP Menu – Misc

- From the MISC menu, scroll and select Bypass Term Limits.

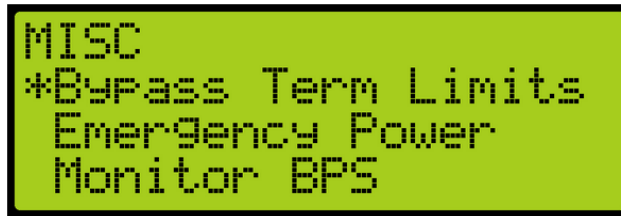


Figure 10: MISC Menu – Bypass Term Limits

- From the BYPASS TERM LIMITS menu, set the bypass term limits from NO to YES.



Figure 11: Bypass Term Limits Menu – NO

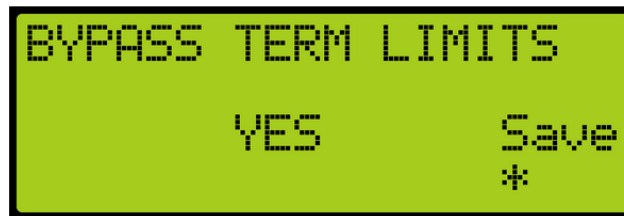


Figure 12: Bypass Term Limits Menu – YES

- Scroll right and press Enter to save.
- Press the left button several times to get to the MAIN SCREEN.
- Verify the LCD displays Construction Mode on the MAIN SCREEN.

Operation

Run the car and complete the checklist during the verification process.

No Faults

Make sure the car is moving without triggering a fault either on the Smartrise SRU board or the soft starter. If the SRU board displays a soft starter fault, look at the soft starter to see what the fault is. See Soft Starter Fault for troubleshooting faults.

Proper Direction

Make sure the car is moving in the same direction as the control switch on the Run Box. See Wrong Direction for troubleshooting proper direction faults.

At Speed

Make sure the car is moving in both directions and at the proper inspection speed. See If the motor is running in the wrong direction, swap any two motor leads.

Car Not Moving or Too Slow for troubleshooting at speed faults.

Under Control

Make sure that the car is moving under full control. The car should stop when commanded from the Run Box. Verify that the car runs with no faults for 10 seconds or more. See No Control for troubleshooting under control faults.

Troubleshooting

The following sections list troubleshooting procedures.

Soft Starter Fault

If the Smartrise controller indicates a soft starter fault and the soft starter has the fault LED flashing, see Appendix 1 Sprecher + Schuh Troubleshooting Chart.

Wrong Direction

If the motor is running in the wrong direction, swap any two motor leads.

Car Not Moving or Too Slow

If the car is not moving or too slow perform the following:

- If the car does not move, verify that the valve relays are turning on when a direction is given (for example, UPL and SM for the Up direction and DNL for the Down direction).
- Measure the outputs to verify that the Valve board is working properly. If the proper voltages are present, check the wiring and to the valves.
- Adjust the valves as required to get proper starts, stops, and run speeds.

No Control

If there is no control perform the following:

- Verify the SF1 relay comes on when commanding the car to move. It is controlled by output 601 on the SRU board.
- Verify the fault contactor is engaging when the car is commanded in either direction but the pump motor only comes on in the Up direction.

- Verify 120 VAC is present when the car is being commanded to run on the CXN board for:
 - UPH
 - UPL
 - DNH
 - DNL

Appendix 1 Sprecher + Schuh Troubleshooting Chart

The table below lists troubleshooting solutions.

Table 3: Troubleshooting Solutions

Flashes	Fault Type	Possible Fault Explanations	Possible Solutions
1	Overload	<ul style="list-style-type: none"> Motor overload condition present. FLA dial adjustment not matched to motor. 	<ul style="list-style-type: none"> Check for motor overload condition. Verify actual motor current does not exceed FLA. Verify/Reset FLA dial adjustment. Program/modify Overload setting for load or duty cycle required.
2	Over Temperature	<ul style="list-style-type: none"> Controller ventilation blocked. Controller duty cycle exceeded. Colling fan not working. Ambient temperature exceeded. Failed Control module. Over-current condition with Overload disabled. 	<ul style="list-style-type: none"> Check for proper ventilation. Verify duty cycle. Connect or replace cooling fan Wait for controller to cool or provide external cooling. Replace control module.
3	Phase Reversal	<ul style="list-style-type: none"> Incoming supply voltage is not the expected sequence of either ABC or CBA 	<ul style="list-style-type: none"> Check power wiring, Change two of the incoming phases and verify that the motor is spinning in the correct direction. If the motor does not turn in the correct direction, change the incoming phases back to their original connections and change DIP switch #9 to the desired Line Rotation sequence setting.
4	Phase Loss/ Open Load	<ul style="list-style-type: none"> Missing Supply Phase Missing or unable to detect motor connection 	<ul style="list-style-type: none"> Check that the fault contactor is closing. If not, verify that the safety string is closed or jumped out. Check for open line (for example, open fuse), Check for incorrect wiring to load, Verify proper operation of the fault Contactor, Verify connection type to motor (LINE or DELTA), Ensure product is sized correctly for motor.

Flashes	Fault Type	Possible Fault Explanations	Possible Solutions
5	Phase Imbalance	<ul style="list-style-type: none"> Unbalanced Phase Currents (> 65% differential) Incoming line voltage problem 	<ul style="list-style-type: none"> Check motor current in each phase to verify imbalance. Motor current imbalance can indicate potential motor problems
6	Shorted SCR	<ul style="list-style-type: none"> Shorted SCR Welded or latched Bypass contactor 	<ul style="list-style-type: none"> Verify connection type (LINE or DELTA) and verify setting. Perform continuity check across power poles (L1-T1, L2 -T2, L3 -T3) Measurements should exceed 10 kOhms. For best results, remove line and load motor connections. Cycle power to device and attempt to restart. If fault persists replace device.
7	Test	<ul style="list-style-type: none"> Intended operation 	<ul style="list-style-type: none"> Reset Fault.
12	Checksum	<ul style="list-style-type: none"> Internal Software computation 	<ul style="list-style-type: none"> Replace Device.

Appendix 2 Sprecher + Schuh PCE Soft Start DIP Switch Settings

The PCE elevator controller is programmed through DIP switches located on the front of the controller. **Default settings are indicated by shaded areas.**

Start Time

The start time defines the time the controller will ramp or limit current to the motor. The controller can determine when the motor is up to speed. Therefore, it may transition to bypass before this time expires. If the motor does not reach speed before the time expires, the controller will continue under SCR control and not close the bypass contactor.

The table below lists the start time.

Table 4: Start Time

Setting (Seconds)	DIP Switch 1	DIP Switch 2	DIP Switch 8
2	OFF	OFF	OFF
5	ON	OFF	OFF
10	OFF	ON	OFF
15	ON	ON	OFF

Start Mode

In Current Limit mode, a set level of current is applied to the motor over the start time. In Soft Start mode, the device will ramp the torque from the initial level to 100% over the start time.

The table below lists the start mode.

Table 5: Start Mode

Mode Setting	DIP Switch 3
CURRENT LIMIT	OFF
SOFT START	ON

Current Limit/Initial Torque Level

The current limit/initial torque level defines the time the controller will ramp or limit current to the motor. The controller can determine when to bypass before this time expires. If the motor does not reach speed before the time expires, the controller will continue under SCR control and not close the bypass contactor.

The table below lists the current limit/initial torque level.

Table 6: Current Limit/Initial Torque Level

%FLA / %Torque	DIP Switch 4	DIP Switch 5
150% / 15%	OFF	OFF
250% / 25%	ON	OFF
350% / 35%	OFF	ON
450% / 65%	ON	ON

Soft Start Time

Soft Stop reduces the voltage applied to the motor over the programmed period of time. The soft stop is complete when the soft stop timer has expired or the current measured drops below 50% of the FLA setting.

The table below lists the Soft Start time.

Table 7: Soft Start Time

Setting (Seconds)	DIP Switch 6	DIP Switch 7
OFF	OFF	OFF
1 X START TIME	ON	OFF
2 X START TIME	OFF	ON
3 X START TIME	ON	ON

Phase Rotation

The phase rotation is the allowable phase rotation of the motor defined by this switch.

The table below lists the phase rotation.

Table 8: Phase Rotation

Setting	DIP Switch 9
ABC ROTATION	OFF
CBA ROTATION	ON

Phase Imbalance

The controller has the ability to monitor for imbalance between phase currents. This protection feature can be user disabled.

The table below lists the phase imbalance.

Table 9: Phase Imbalance

Setting	DIP Switch 10
ENABLED	OFF
DISABLED	ON

Overload Trip Class

The controller incorporates, as standard, electronic overload protection. This motor overload protection is accomplished electronically with the use of internal current transformers on each of the three phases. The controllers overload protection is programmable providing the user with flexibility.

The table below lists the overload trip class.

Table 10: Overload Trip Class

Setting	DIP Switch 11	DIP Switch 12
OFF	OFF	OFF
10	ON	OFF
15	OFF	ON
20	ON	ON

Overload Reset

In manual reset mode, the fault can only be reset by pushing the 'push to reset' button on the front of the controller. In auto reset mode, the unit will automatically reset when the unit determines the motor has cooled to 75% of its thermal capacity.

The table below lists the overload reset.

Table 11: Overload Reset

Setting	DIP Switch 13
MANUAL	OFF
AUTO	ON

AUX#1 Setting

The operation defines the operation of the auxiliary contacts. Normal mode means that the contact will change state immediately when a start/run command is given. Up-to-Speed mode means that the contact will change state only when the controller is in bypass. Aux#2, when added, will operate opposite of this programming.

The table below lists the Aux#1 setting.

Table 12: Aux#1 Setting

Setting	DIP Switch 14
NORMAL	OFF
UP TO SPEED	ON

Motor Connection Type

In DELTA connection mode, the device is designed to control a 6 or 12 lead motor. In LINE connection mode, the device is designed to control a 3 or 9 lead motor.

The table below lists the motor connection type.

Table 13: Motor Connection Type

Setting	DIP Switch 15
DELTA	OFF
LINE	ON

Stop Delay

When the delay is programmed, the motor will continue to run for the programmed period of time after the run command is removed from the controller.

The table below lists the stop delay.

Table 14: Stop Delay

Setting (Seconds)	DIP Switch 15
0.0	OFF
0.75	ON

Appendix 3 Terminal Locations

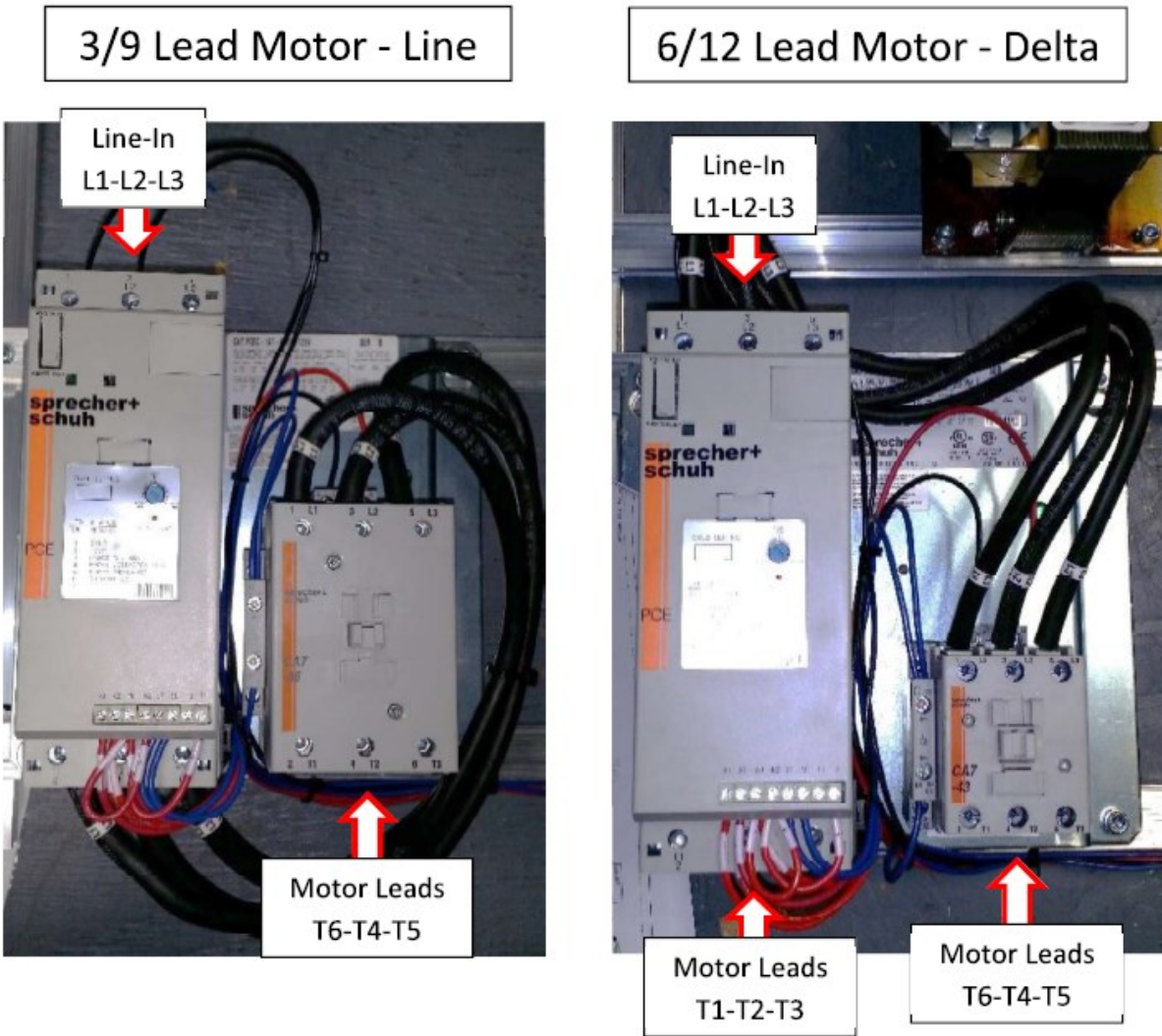


Figure 13: Terminal Locations