



PROSTAR SOFTSTARTER

PRR-L SERIES

7.5~530KW

INSTRUCTION MANUAL

Contents

Section 1

Preface and Limited Warranty	2
Preface.....	2
Limited Warranty.....	2

Section 2

Installation	3
Safety Notice.....	3
Receiving, Inspection and Storage.....	3
Physical Location.....	4
Installation.....	5
Frame Size and Mounting Instruction	5

Section 3

Wiring	6
Main Circuit.....	6
Control Circuit.....	6
Terminal Explanation	7
Instruction for Accessory Choose.....	8

Section 4

Set	9
Start and Stop Features.....	9
Keyboard description.....	11
Displaying State.....	11
Operation explanation.....	12

Section 5

Maintenance	13
--------------------------	----

Section 6

Troubleshooting	14
------------------------------	----

Section 7

Technical data	15
General Technical Data.....	15
Schematic Diagram.....	16
Settings for different applications (for reference).....	17

Section 1

Preface and Limited Warranty

Preface

Thanks for choosing PRR-L for your application. For proper operation and good performance of the starter & the security of the operator read this instruction manual carefully. Connect us or our distributor in your district if you have any problem that is not mentioned in this manual during the operation of PRR-L. We will by all means to solve your problem.

Limited Warranty

Prostar International Electric Co., Ltd. hereafter refer to as Company, assumes no responsibility for improper installation of a PRR-L by untrained personnel. A PRR-L should only be installed by a trained technician who has read and understand the contents of this manual. Improper programming of a PRR-L can lead to unexpected, undesirable, or unsafe operation or performance of the PRR-L. This may result in damage to equipment or personal injury. Company shall not be liable for economic loss, property damage, or other consequential damages or physical injury sustained by the purchaser or by any third party as a result of such programming. Claims for purchase price refunds, repairs, or replacements must be referred to WEST SPREAD with all pertinent data as to the defect, the date purchased, the task performed by the control, and the problem encountered

For a period of two years from the date of original purchase, we will repair or replace controls and accessories without charge that our examination proves to be defective in material or workmanship.

Goods may be returned only with written notification including a WEST SPREAD Return Authorization Number.

Section 2

Installation

Safety Notice

- IMPORTANT:** Read this manual carefully and follows its instructions before operating equipment.
- IMPORTANT:** Installation, operation, and maintenance should be in strict accordance with this manual, national codes and good practice. Installation or operation not performed in strict accordance with these instructions will void manufacturer's warranty.
- IMPORTANT:** After installation, verify that no hardware (bolts, washer, etc.) have fallen into the power section.
- WARNING:** When the PRR-L is connected to main power, even if control power is not connected and the motor is stopped, full voltage may appear on the PRR-L's output terminals. This voltage is extremely dangerous, and may cause death or severe injury if contacted.
- WARNING:** PRR-L must be grounded to ensure correct operation, safety, and to prevent damage.
- WARNING:** Disconnect all power inputs before wiring or servicing the equipment.
- WARNING:** The temperature of the heat sink may be high enough to hurt.
- WARNING:** Don't attempt to repair the damaged component.

Receiving, Inspection and Storage

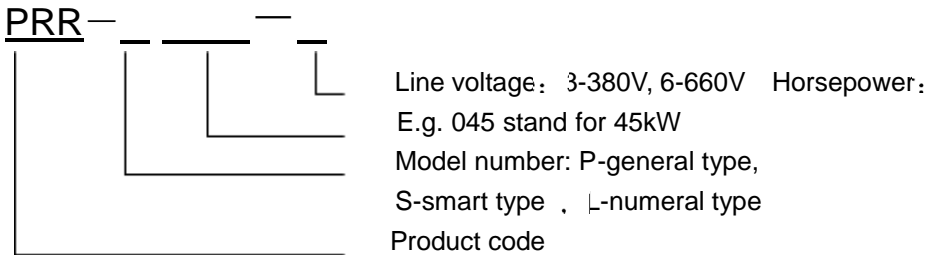
When you receive your control, there are several things you should do immediately.

1. Remove the control from the carton. Inspect for shipping damage and report any damage immediately to your supplier.

PRR-L motor soft starter

Cat. No.:	PRR -XXXX-X
Power supply:	3 XXX V AC
Horsepower:	XXX kW
Manufactory No.:	XXXXXX
Manufactory date:	

- Verify that the part number of the control you received is the same as the part number listed on your purchase order. Check the nameplate of the PRR-L and be certain that the product you received correspond to your order. Connect the supplier promptly if something is wrong.



- If the control is to be stored for several weeks before use, be sure that it is stored in a location that is clean, dry and free from corrosives and contaminants. Storage temperatures must not exceed 140°F (60°C).
- Verify each starter is packed with a Certificate of Quality, Instruction Manual and a WEST SPREAD Return Authorization Number.

Physical location

Location of the PRR-L is important to achieve proper performance and normal operating life. The unit should be installed in an area where:

There is no direct sunlight, rain or moisture

It is ventilated well

There are no flammable, explosive, corrosive gases and **conductive** dusts

Vibration is less than 0.5G

Ambient temperature is : $-25 \sim +45$

Humidity is less than 95 percent (20 ± 5)

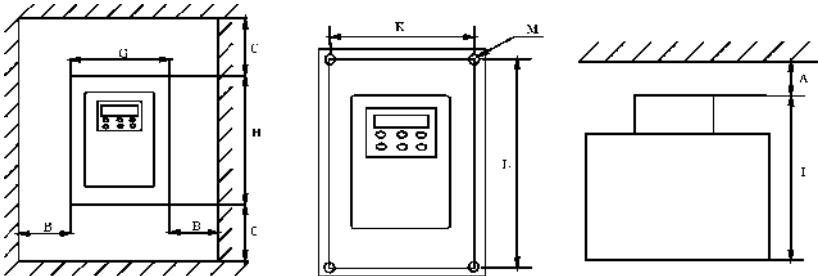
Altitude is under 2000 meters (derate Amp rating 1 percent per 100 meter when above 2000 meters)

Installation

When preparing to mount the PRR-L, lift it by its base, never by the front cover. For effective cooling as well as proper maintenance, the PRR-L must be installed on a flat, non-flammable vertical surface (wall or panel) using four mounting screws. There must be enough clearance on each side of the PRR-L for sufficient air flow. Consult the chart below.

Frame size and the mounting instruction (mm)

Cat. No.	G	H	I	K	L	M	A	B	C
PRR-L008~075	170	286	200	133	250	7	5	10	20
PRR-L090~185	286	439	220	240	357	9	5	10	20
PRR-L220~315	325	480	220	279	386	9	5	10	20
PRR-L400~530	407	620	220	351	481	9	5	10	20

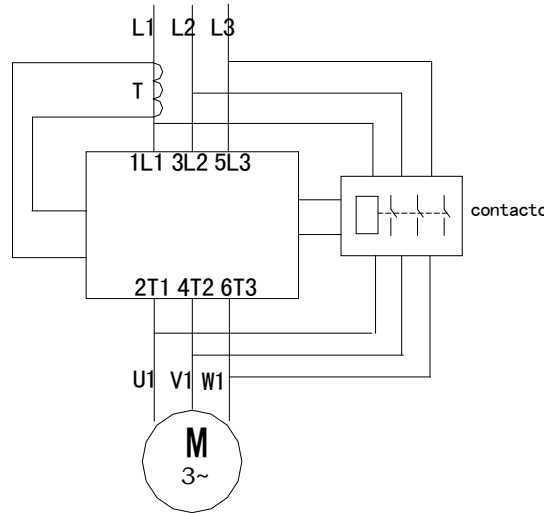


Section 3

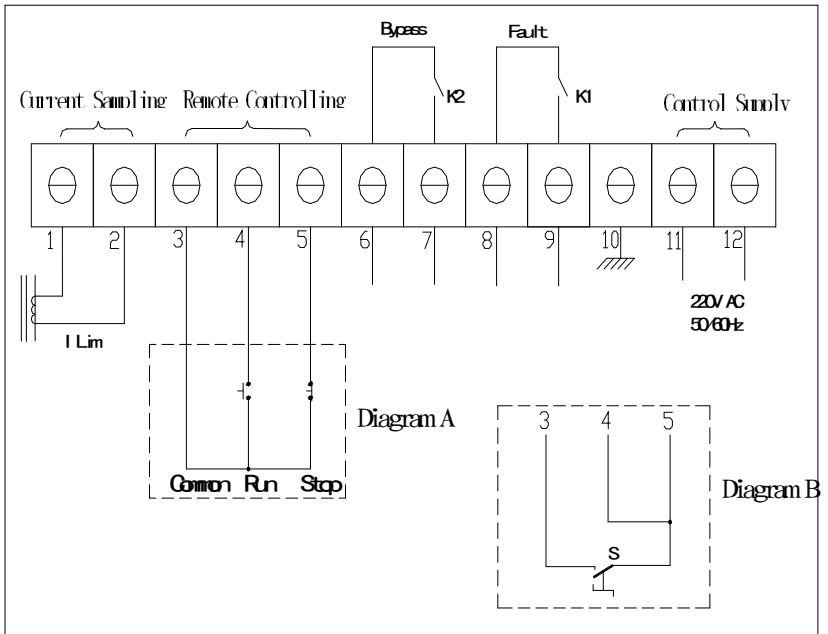
Wiring

Main Circuit

Terminals 1L1, 3L2, 5L3 are for power supply, and 2T1, 4T2, 6T3 to motor. Terminal mark is printed on front of the starter. The line sequence has no effect on starters. Installation of the contactor sees the diagram at right



Control Circuit



Terminal Explanation

	Terminal No.	Function	Description	Specification
Input	1	Current sampling	To current transformer (no sequence)	
	2			
	3	Common	Jumper RUN and COM or STOP and COM for remote control	
	4	Remote running input	There are two kinds of circuit for run/stop control, see diagram (A) and (B)	
	5	Remote stopping input		
	11	Control supply	Terminal 11 for power cord, terminal 12 for null line	AC 220 Volts ±15% 50Hz
	12			
Output	6	Start up relay contact	The inner contact closes when the motor starts up and the motor is bypassed	Contact capacity: 250 Volts/5 Amps
	7			
	8	Fault relay contact	The inner contact closes when starter trips the motor.	Contact capacity: 250 Volts/5 Amps
	9			
	10	Grounding	To grounding cord. Note1	1.5-2.5mm ²

Notes to Control Circuit.

Note1: The grounding cord should be as short as possible and should be connected to the nearest grounding point of the starter. The appropriate place is on the mounting board next to the starter. The mounting board should be grounded too. This is the functional grounding not the protectoral ground.

Note2: The bypass after acceleration option allows the PRR-L is bypassed automatically when the motors normal speed. Customer reaches it need a bypass contactor (should be purchased separately) when chooses this option.

Note3: When customer chooses the bypass after acceleration an external current transformer is needed for the over current protection in the bypass, otherwise the over current protection is not available during the operation. (Current transformer should be wired out of the bypass circuit.)

Introduction for Accessory Chose:

House Power (KW)	Model No.	Rate Current (A)	Model No. of Contactor	Current Transformer (accessory)
			(accessory)	
7.5	PRR-L08-3	18	CJX4-25	50/5
11	PRR-L011-3	24	CJX4-32	50/5
15	PRR-L015-3	30	CJX4-32	100/5
18.5	PRR-L018-3	39	CJX4-40	100/5
22	PRR-L022-3	45	CJX4-50	100/5
30	PRR-L030-3	60	CJX4-63	100/5
37	PRR-L037-3	76	CJX4-80	200/5
45	PRR-L045-3	90	CJX4-95	200/5
55	PRR-L055-3	110	CJX4-115F	300/5
75	PRR-L075-3	150	CJX4-150F	300/5
90	PRR-L090-3	180	CJX4-185F	400/5
110	PRR-L110-3	218	CJX4-225F	500/5
132	PRR-L132-3	260	CJX4-265F	500/5
160	PRR-L160-3	320	CJX4-330F	600/5
185	PRR-L185-3	370	CJX4-400F	600/5
220	PRR-L220-3	440	CJX4-500F	800/5
250	PRR-L250-3	500	CJX4-500F	1000/5
280	PRR-L280-3	560	CJX4-630F	1000/5
315	PRR-L315-3	630	CJX4-630F	1500/5
400	PRR-L400-3	780	JWCJ20-800A	1500/5
470	PRR-L470-3	920	JWCJ20-1000A	1500/5
530	PRR-L530-3	1000	JWCJ20-1000A	1500/5

Section 4

Set

&4.1 Start and Stop Features

PRR-L has three modes to start motors and two modes to stop them. Customers may choose different modes according to the application and motor load. Three start modes are: Voltage Ramp Start, Current Limit Start, and Voltage Ramp Start with Current Limit and. Two stop modes

are:

Voltage Ramp Stop and Free Stop.

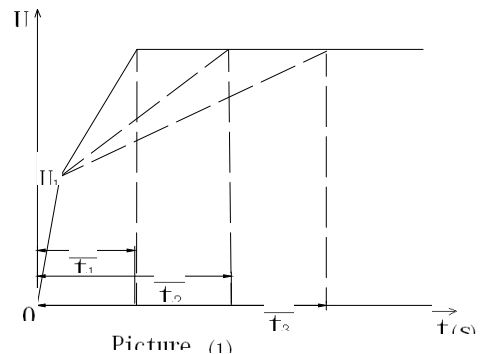
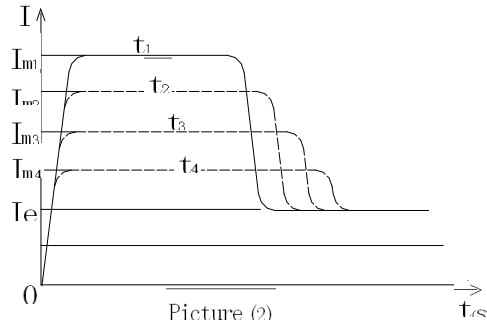
Voltage Ramp Start

During start the initial voltage is set to a level where the motor will begin to turn when power is applied. The ramp time is adjustable to provide a smooth start.

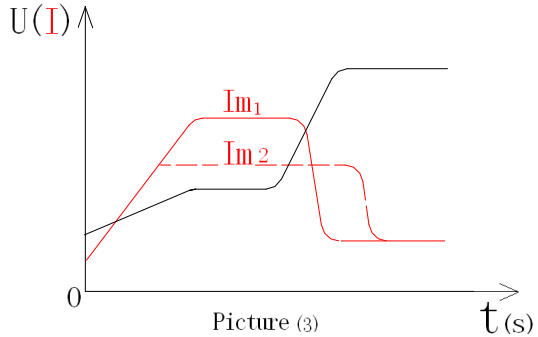
Current Limit Start

If current limit start is selected the starter will operate similar to voltage starting. On high inertia loads such as chippers and grinders the Current Limit is what determines the starting time. The starter will provide that current regardless of the ramp time setting.

Voltage Ramp Start with Current Limit



During start the motor voltage ramp up gradually from initial voltage to full in the preset time while the start current is keep under the current limit. This start mode avoid the inrush current appeared during the voltage ramp start and the mechanical shocks in the current limit start as well.



Voltage Ramp Stop

If a ramp down function is needed, the initial voltage is used to lower voltage to a level where the motor will begin to slow down when the stop button is pushed. Ramp down can extend motor stopping time preventing sudden stopping problems such as water hammer.

$I(N)$

N (Speed)

I (Current)

0

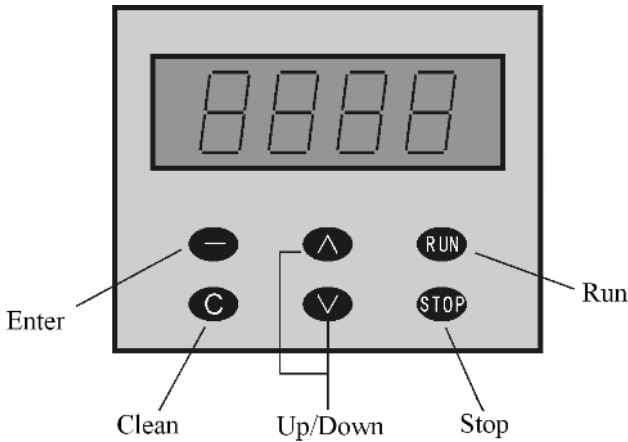
Picture(4)

$t(s)$

Free Stop

When the stop button is pushed the motor is shut down by the soft starter then the motor turns at the inertia and slows down gradually till it stops.

&4.2 Keyboard description



Confirming keyboard: 1、 Entering parameter menu
2、 confirming parameter

Up and down keyboard: 1、 Choosing parameter
2、 Modifying parameter

Exiting keyboard: 1、 Exiting parameter menu
2、 Exiting parameter

Stopping keyboard: 1、 Stop soft starter
2、 Reset malfunction


Running keyboard: Running soft starter







&4.3: Displaying State

Sequence No.	Displaying	State	Remark
1	5000	Stopping	Equipment is stop
2	0000	Editing	Read or modify parameter
3	0000	Running 1	Soft starter is during start
4	0000	Running 2	Running in full voltage
5	0000	Running 3	Voltage Ramp Stopping
6	0000	Malfunction	Soft starter is faulting

&4.4 Operation explanation







&4.4.1 Operation



When a soft starter is turned on, it is preparing for operating. the keyboard will display **STOP**. And then if you press the keyboard  you will enter the parameter state, then you can operate the parameter with one of two modes which are read parameter or modify parameter. When the two NO. in front of the LEDs are glimpsing, you can only read the parameter. When the two NO. in end of the LEDs are glimpsing you can modify the parameter.

When you are reading the parameter, you can press the keyboard  and  to browse. Press the keyboard  preparing for modifying the parameter. press  and  enter to choose and modify the parameter. At last press  to exit.

&4.4.2 Modify the parameter

The parameter have four LEDs in all, two LEDs in front denote which style the parameter is. The others denote the numerical value.


Sequence No.	Displaying	Parameter	operating	Initial value
1		Initial voltage(UINI) The UINI should set high enough for the motor to turn. The start (stop) UINI may be set from 10 percent to 70percent, 16 classes. Choose 100 percent for full voltage start.	In the situation of operating parameter, pressing  or  to modify the numerical value.	20%
2		Start time The start time determines motor's voltage ramp up time from initial to full voltage. The start time may range from 0 to 60 seconds.16 classes. Actual acceleration time to full speed depends upon the motor load. Chose "0" for current limit	In the situation of operating parameter, pressing  or  to modify the numerical value.	10%

		mode.		
3		<p>Stop Ramp(Soft Stop) Time The soft stop is used for high friction loads. When the soft stop is initiated the motor's voltage ramp down gradually from initial to zero. Stop ramp time is 0 ~ 60 Seconds adjustable. Chose "0" for free stop.</p>	<p>In the situation of operating parameter, pressing <input type="checkbox"/> or <input type="checkbox"/> to modify the numerical value.</p>	0
4		<p>Current Limit (Ilim) The current limit may be from 2 to 5 times motor FLA. When the current limit is set the max starting current will be keep under the setting. The CL setting must be high enough to provide enough starting current in all starting conditions.</p>	<p>In the situation of operating parameter, pressing <input type="checkbox"/> or <input type="checkbox"/> to modify the numerical value.</p>	3%


NOTICE:

1. All these parameters must NOT be set in the starter's operating. The setting in the starter's starting, stopping, running is invalid.
2. All the parameters of the starter is effective at the temperature range of -25 to 45 . Derate the Amp rating 1.5 percent per over 45 to 60 max.

Section 5 Maintaining


 Maintenance only can be preceded after the PRR-L is DISCONNECTED with ALL power parts!






Please check the cooling channel of the starter routinely. Make sure it is not choked by refuses and dusts. Verify that the ventilating fan works properly. The vane should turn without hindrance.


 Don't attempt to replace the defective or fused SCRs. The SCR must be replaced by the professional engineer

Section 6

Troubleshooting

When the LEDS display , denotes the soft starter has faulted,, the detail as follows:

State of LEDS	State of starter	Corrective action
	Starter standby	<ol style="list-style-type: none"> 1、 Bypass contactor always closed 2、 Check if the SCRS are defective
	Starter does nothing when start command is given	<ol style="list-style-type: none"> 1、 Wire terminal 3, 4 and 5. 2、 Check if control wire and switch are defective. 3、 Check if line voltage is out of rang.
No display		<ol style="list-style-type: none"> 1、 Check terminal wire 11,12 2、 Check if control supply is out of range
	One or more phases are missing	Check wiring for phase lose
	Ambient temperature is too high	<ol style="list-style-type: none"> 1、 Check whether the Ventilation for starter is not effective 2、 Check if starter is keeping direct sunlight 3、 Check if radiator's temperature is too high and temperature switch off. 4、 Check if control wire voltage is out of rang when the starter is operating
	Operating is faulted	<ol style="list-style-type: none"> 1、 Check if each parameter numerical value as the motor's scutcheon. 2 Check if the current limit set too low and Ratio of the current transformer is no appropriate or does not rate the motor
	Starter's input wires or out wires are short	<ol style="list-style-type: none"> 1 Check if output wires of the PRR-L are short 2 Check if the SCRS are defective
	Motor is open set (p7=0)	<ol style="list-style-type: none"> 1、 Check motor for opens 2. Check wiring for phase lose.

	Current limit is invalidate	<ol style="list-style-type: none"> 1、 Check if the current transformer is not wired or wired properly to terminal 1 and 2. 2、 Check if the ratio of the current transformer is not appropriate or does not rate the motor. 3、 Check if the Current limit parameter is appropriate.
	Over current	<ol style="list-style-type: none"> 1、 Check if output wires of the PRR-L are short. 2、 Motor overload. 3、 Ratio of the current transformer is not appropriate or does not rate the motor

★ Upon fault PRR-L trips and the motor stops. Diagnostic is displayed on the LED. Press “stop” for four seconds

Section 7

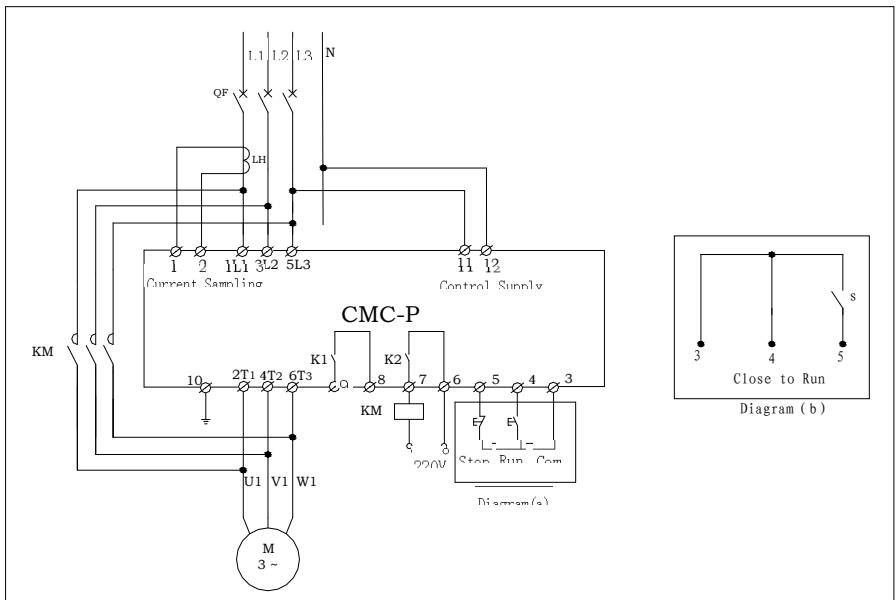
Technical Data

General Technical Data

Control supply	AC 220 Volts $\pm 15\%$ 50Hz
Power supply	AC 380 Volts $\pm 30\%$ 50Hz
Rating current	15~1000 Amps, altogether 22 ratings
House power	7.5~530 kW (at 380 Volts)
Adaptable motor	Standard three phase AC squirrel cage motors
Start modes	Current limit start, voltage ramp start (ramp time 0.5~60S adjustable), voltage ramp start with current limit
Stop modes	Free stop, soft stop (ramp down time 0.5~60 S adjustable)
Logic control (two)	Power supply
Output relay	K1: fault; K2: full voltage (bypass), N.O. contact: 5 Amps, AC 250 Volts
Maximum Starts	May start frequently or infrequently, we

per hour	recommend less than 25 starts per hour for better performance
Protections	Open gate protection; overload protection, short circuit protection, and over temperature protection, etc.
Cooling mode	Cool naturally or fan cooling
Protection degree	IP20
Environmental	Operating temperature: -25~+45
	Humidity: 5 percent~95 percent(20 ±5)
	Non-condensing, no flammable, explosive, corrosive gases and no conductive dust
	Install condition: indoors with good ventilation
	Resistance to vibration: (operational) less than 0.5G
	Altitude: 2000 meters (derate Amp rating 1% per 100 meters above 2000 meters)

Schematic Diagram



NOTICE. when you need junction control and keyboard control all can

been used ,you must choose ‘diagram(a)’ to wire the control wires. But if you choose ‘diagram (b)’, the keyboard couldn’t start (stop) the soft starter.

Settings for different applications (for reference)

Application	Initial Voltage (percent)	Ramp Up Time (Sec)	Ramp Down Time (Sec)	Current Limit
Ship Screw Propellers	20	10	0	2.5
Radial Fans	15	20	0	3.5
Radial Pumps	20	6	6	3
Piston Compressors	20	15	0	3
Crane and Hoists	30	15	6	3.5
Mixers	40	15	0	3.5
Crushers	30	15	6	3.5
Screw Compressors	20	15	0	3.5
Screw Conveyors	15	10	6	3.5
No-Load Motors	20	10	0	2.5
Belt Conveyors	20	15	10	3.5
Heat Pumps	20	15	6	3
Escalators	20	10	0	3
Air Pumps	20	10	0	2.5