CATALOG

Softstarters

PSR, PSRC, PSE and PSTX

Motors use almost one third of the world’s generated electricity. So it is safe to say that reliable motor operation is crucial to our modern way of life.

Contents

ABB softstarters
How we are helping the industry

A softstarter from ABB offers you several values and benefits. Whether you are a consultant, OEM, panel builder or end-user, A softstarter will add to your business value by securing motor reliability, improving installation efficiency and increasing application productivity.

SECURE MOTOR RELIABILITY

ABB softstarters help increase your motors lifetime by protecting it from electrical stress. Starting currents are easily optimized to your load, application and motor size. Over ten motor protection features are included to keep your motor safe from different load and network irregularities.

IMPROVE INSTALLATION EFFICIENCY

Reduce your installation time and panel size by having all features you need built into your softstarter. Our softstarters are easy to install thanks to their compact design and many built-in features. The built-in bypass saves energy and space while reducing heat generation. A complete motor starting solution in one unit.

INCREASE APPLICATION PRODUCTIVITY

Reduce the number of stops in your production by allowing your softstarter to do more than just starting. Our softstarters reduce the mechanical stress on your motor application, which will increase your uptime. Torque control, pump cleaning, motor brake and many other features enable you to operate your process at its full potential.

Xylem - South Africa

ABB softstarters providing efficiency to the mining industry

One of Xylems water solutions helps to prevent flooding in mines. Previous softstarters needed a lot of extra protection equipment. Xylem was looking for a simpler solution that would ensure reliability even at 3,500 meters depth. Reducing the number of components by 80 percent, shortened installation time by 60 percent. Costs cut to half has helped Xylem sell twice as many panels with softstarters as before.

Installation time reduced by 60%

Total panel cost reduced by 50%

Common applications for softstarters Pumps, fans, compressors and conveyors

A softstarter can do wonders with your operations. Packed with useful features, it reduces the wear of your equipment, improve the reliability of your processes and increase overall productivity.

01 Softstarters controlling pumps

02 Softstarters controlling fans

Pump

Eliminating water hammering with torque control

Water hammering is a common problem with pumps and typically results in wear in pipes and valves when starting and stopping the pump. The ABB softstarter feature torque control provides a soft pipe fill during start and eliminates water hammering during stop. The benefits are prolonged lifetime of the system and increased uptime.

Keep pipes and pumps clean

Many pumps risk getting clogged over time. This will cause reduced flow and increased risk of pump damage. Thanks to the feature to reverse the direction of the flow and start again with kick-start, ABB softstarters can help prevent and solve pump clogging and associated downtime.

Avoid running dry with underload protection

Damages due to pumps running dry can be avoided with the softstarter feature dry pump protection, called underload protection. It stops the motor which saves the pump from additional wear and contributes to prolonging its lifetime.

Fans

Soft starting adjusted to application

Fans normally have a high moment of inertia, which makes starting tough and current high. Using an ABB softstarter, the voltage is increased gradually during start, which reduces the current and removes the inrush peak. It is possible to adjust the settings to fit almost any starting condition, from unloaded to fully loaded.

Fast stops with motor braking

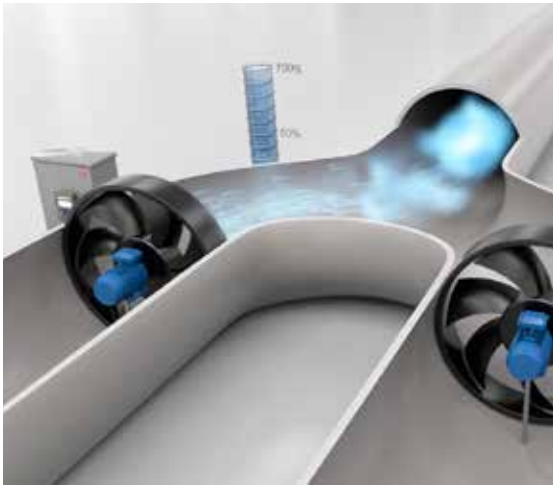
It can also take a long time to stop a fan. With the dynamic brake feature, also called flux braking, the stopping time can be reduced. This improves process safety when the load has a high moment of inertia and makes fan operation easier for the operator.

Avoid unwanted movements with stand still brake

An idle fan that is rotating backwards, due to wind or airflow from another fan, can be kept still using the stand still brake. It prevents unwanted airflow and improves the control of the system without the need for an external mechanical brake.

01

02



03 Softstarters controlling compressors

04 Softstarters controlling conveyor belts

Compressors

Full control of current with current limit
Many applications are sensitive to high or variable starting currents. The feature current limit makes it possible to start the motor securely even in a weaker network, improving the availability of the equipment and system. Reducing the current means reducing the stress on cables, network and motor.

Full voltage start for scroll compressors
For scroll compressors it is often necessary to start the motor in a very short time while still maintaining a low starting current. Full voltage start is a start mode that gives you almost a direct start but without the current peak.

Phase reversal protection for problem-free commissioning
A motor rotating in the wrong direction, which may occur due to connecting the phases wrongly, may cause severe damage to a compressor. Using phase reversal protection, the motor won't start in the wrong direction, avoiding costly compressor downtime and repairs.

Conveyors

Avoid overheating with overload protection
Too much material on a conveyor belt may cause overload and overheating, reducing the reliability and longevity of the motor. ABB's overload protection feature shuts down the motor in case of overload, avoiding overheating.

Increased flexibility with jog with slow speed
After stopping the belt, it may be necessary to run the motor at low speed to correctly position the belt before resuming operation. The jog with slow speed feature makes it possible to position the belt manually, in both forward and reverse direction, before re-starting the belt. This improves process efficiency and eliminates the need for a variable speed drive, a considerably more expensive solution for solving the problem.

Continuous operation with limp mode
Shorted thyristor is a possible problem for a softstarter, putting it out of operation until the component has been replaced. Using limp mode, the softstarter will continue to work with one thyristor shorted, avoiding costly unplanned stoppages.

03

04

Motor starting

Why motor starting and stopping matters

There are some common issues associated with starting and stopping electrical motors. Depending on requirement, different starting and stopping methods can be used.

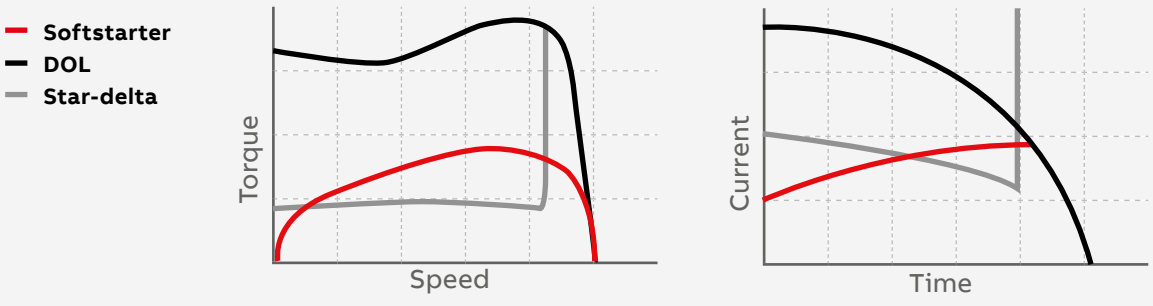
Direct-on-line

Direct-on-line starting (DOL) is the easiest and most commonly used starting method. It is suitable for stable networks and mechanically stiff and well-dimensioned shaft systems due to the high current and torque generated during start. DOL starting is uncontrolled, which means that the motor will start with maximum current and torque regardless of load type.

Star-delta

A star-delta starter reduces current and torque during start. The starting current is about one third compared to direct-on-line starting, although it also reduces the starting torque to about 25 percent. Star-delta is not adjustable, so if the torque is reduced too much, the motor will not start. Current peaks will happen when switching from star to delta connection.

Typical torque and current curves from starting a motor



Softstarter

Like direct-on-line and star delta starters, softstarters are used to start and stop motors in full-speed applications. It eliminates common problems associated with motor starting and stopping, including electrical surges, spikes and high inrush currents. Because it offers soft starting and stopping, a softstarter is the optimal compromise between a direct-on-line or star-delta starter and a variable speed drive in many full-speed motor applications.

Variable speed drive

Like a softstarter, a variable speed drive (VSD) can perform soft motor starting and stopping. However, the VSD was designed primarily to control motor speed, resulting in energy efficient motor operation in variable speed applications. Using a VSD with the sole purpose of ensuring soft starting and stopping of full-speed motors can therefore be considered an unnecessarily advanced solution.

Comparison between different starting methods

The table below describes which problems are prevented, using the most common starting methods.

	Direct on line DOL	Star-delta start Y/D	Softstarter	Drive
Reduce high inrush current	–	●	●	●
Reduce heavy wear on bearings, shafts, gear boxes, etc	–	○	●	●
Prevent slipping belts	–	○	●	●
Remove torque/current peaks	–	–	●	●
Prevent water hammering in piping system	–	–	●	●
Need of variable speed control	–	–	–	●

● = standard, ○ = reduced, – = not available

ABB softstarters
A part of your motor starting solution

Motor starting requires several components to work perfectly together. ABB is a one-stop shop for motor starting, offering all the necessary components and complete motor starting solutions, proven together in numerous installations worldwide.

Can I use a softstarter on a ship?

ABB softstarters PSE and PSTX have marine approvals and are certified for marine environment.

Ships uses IT-networks which means that there is a floating electrical ground. It is possible to use an ABB softstarter in such a network but it is recommended to not connect the functional ground on the softstarter to the ship to avoid disturbances from the network to effect the electronics inside the softstarter.

Can I use a softstarter for an ATEX motor?

ABB softstarter PSTX can be used to start ATEX classified motors in EX environments. However, always consult with your local ATEX certified expert for component selection and system design. Listed below are some points for consideration (but not limited to):

- Locate the softstarter outside the EX area, or in an ATEX approved panel
- The PSTX Softstarter has not a specific ATEX approved motor overload protection. The standard (global or local) may require this depending on the type of installation. If the standard requires it an external ATEX approved EOL/TOL should be considered
- Select softstarter according to normal or heavy-duty start depending on your application.
- A line/fault contactor can be used in case of failure
- Determine the short circuit coordination rating and type that is needed for the application. Typically, there should be a coordination for a device, for example a fault contactor, that won't get welded shut in case of short circuit.

Always consult with certified ATEX expert and follow local laws and regulations that applies.

Typical motor control cabinet
Overview

Safety relay
The Sentry safety relay series are powerful and easy to use. They can monitor E-stops or other type of safety devices up to PLe/SIL3.

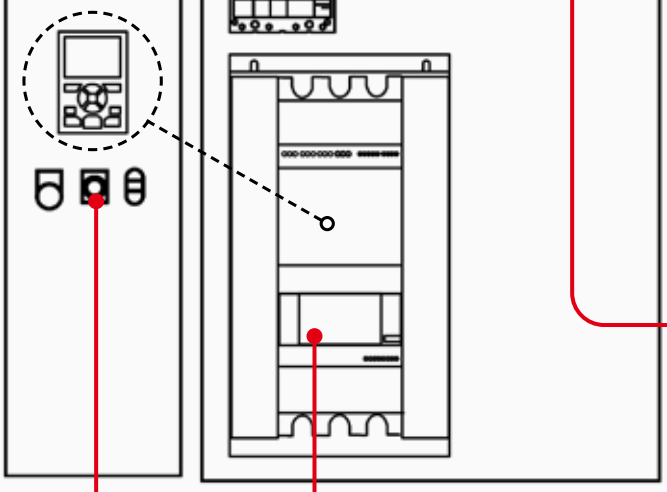
Power supply CP-C.1
Power reserve and switching of high peak currents help maximize system availability. Rated output voltage 24 V DC

Liquid level monitoring relays CM-ENS
- Monitoring and signalling the water level

Short circuit breaker MCCB
Short circuit protection of motor
Possibility for electrical isolation

PLC AC500
- Automatic control
- Remote communication

Switch fuse
- Short circuit protection of downstream devices
- Type 2 coordination when using rapid fuses
- Making and breaking of motor loads (AC-23A)
- Safe isolation



Line contactor AF
- Isolation at stop
- Isolation at faults
- Emergency stop
- Back-up DOL starter

Pilot devices
- Remote control of motor
- Indication of Softstarter and motor status with light and sound
- Emergency stop of motor

Softstarter
- Soft start and stop with reduced current
- Features to improve process productivity
- Detachable keypad for front door mounting on a panel

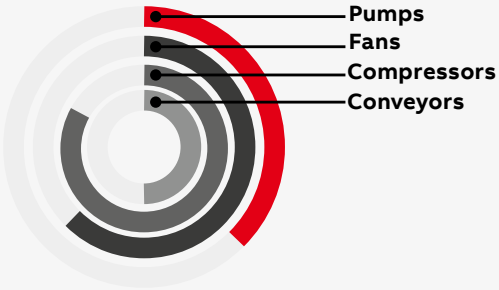
Softstarters portfolio
Overview

PSR - The compact range
PSR is our most compact softstarter with basic benefits and values. PSR can handle up to 100 starts per hour. Suitable for small motors.

Current: 3 A... 105 A

Main voltage: 208 V... 600 V

Application features

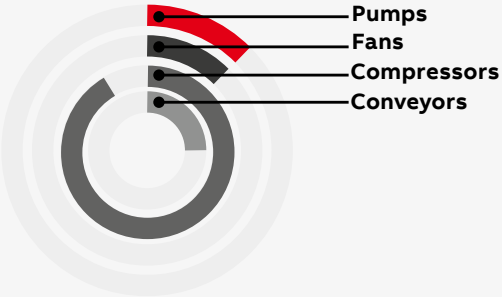


PSRC - For scroll compressor
PSRC is fast and easy to install with fixed settings. Designed for scroll compressors results in less stress on the compressor reducing the maintenance cost to a minimum.

Current: 3 A... 105 A

Main voltage: 208 V... 600 V

Application features

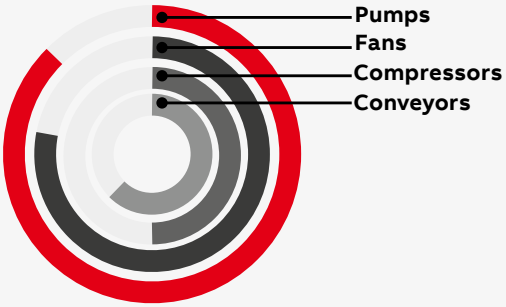


PSE - The efficient range
The new generation PSE is a true general purpose softstarter. It's a perfect balance between high starting capacity and cost efficiency. Now featuring built-in fieldbus communication.

Current: 18 A... 370 A

Main voltage: 208 V... 600 V

Application features

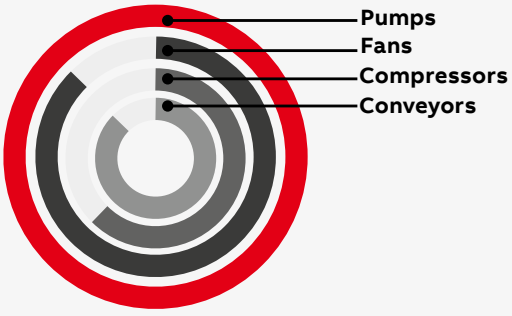


PSTX - The advanced range
PSTX is the most complete alternative for any motor starting application. Featuring built-in modbus and anybus modules that support all major communication protocols.

Current: 30 A... 1250 A

Main voltage: 208 V... 690 V

Application features



Softstarters selection

ABB softstarters offering consists of four ranges, covering every need. The products help you secure motor reliability, improve installation efficiency and increase application productivity.




Product range overview	PSR	PSRC	PSE	PSTX
Technology	Basic	Basic	General	Advanced
Motor size	Small – up to 105 A	Small – up to 105 A	Medium – up to 370 A	Large – up to 1250 A
Installation efficiency	Basic	Basic	Medium	High
Motor protection	-	-	Medium	High
Application	All	Scroll compressor	All	All
Application enhancement	Basic	Basic	Medium	High
Fieldbus Communication	Yes	Yes	Yes	Yes
Anybus Communication	-	-	-	Yes
Torque control	-	-	Yes	Yes
Heavy duty starts	-	-	Yes	Yes
Frame sizes	A, B, C, D	A, B, C, D	A, B, C	A, B, C, D, E, F

Selection process

1 Determine softstarter series

First, determine the softstarter series that fulfill the needs of the application and motor. Use the guide on the left to explore the three series and the power range each one covers.

2 Match the softstarter size with the motor current

When the softstarter series is selected, the correct size should now be determined. The selection of a softstarter is based on the current. Find the softstarter that corresponds to the motor current.

3 Fine tune and select the correct size

The last step is to fine tune the selection, and there are three different factors to consider:

- Normal or a heavy load: If the load is characterized as a heavy load, select the next size softstarter in the series.
- High ambient temperature
- High altitude

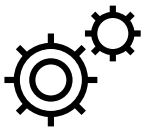
Use the equations and the table on the right to find the correct de-rating equation.

Altitude formula
De-rate for altitudes between 1000-4000 m or 3280-13123 ft with the following equations for all softstarters:
In meters: % of Ie = 100 – (x-1000)/150
In feet: % of FLA = 100 – (y-3280)/480
Where x/y is the actual altitude in m/ft

Temperature equations	
PSTX and PSR In Celsius:	40...60 °C: Reduce Ie with 0.8%/°C
PSTX and PSR In Fahrenheit:	104...140 °F: Reduce FLA with 0.44%/°F
PSE In Celsius:	40...60 °C: Reduce Ie with 0.6%/°C
PSE In Fahrenheit:	104...140 °F: Reduce FLA with 0.33%/°F

Typical applications	
Normal duty start	**Heavy duty**
Bow thrusters	Centrifugal fan
Centrifugal pump	Conveyor belt (long)
Compressors	Crusher
Conveyor belt (short)	Stirrer
Elevator	Sawmill

Softstarters benefits and features



SECURE MOTOR RELIABILITY

Increase your motors lifetime...
With ABB softstarters, starting currents are easily optimized to your load, application and motor size.

...by protecting it from electrical stresses.
Over ten motor protection features are included to keep your motor safe from overloads and network irregularities.

Softstarter features	PSR	PSE	PSTX
Current limit	–	●	●
Current limit ramp and dual current limit	–	–	●
Electronic motor overload protection	–	●	●
Dual overload protection	–	–	●
Underload protection	–	●	●
Power factor underload protection	–	–	●
Locked rotor protection	–	●	●
Current/Voltage imbalance protection	–	–	●
Phase reversal protection	–	–	●
Customer defined protection	–	–	●
Motor heating	–	–	●
PTC/PT100 input for motor protection	–	–	●
Overvoltage/undervoltage protection	–	–	●
Earth-fault protection	–	–	●

● = standard, O = option, – = not available

IMPROVE INSTALLATION EFFICIENCY

Reduce your installation time and panel size...
ABB softstarterss are easy to install thanks to their compact design and many built-in features.

...by having everything that you need built in.
Built-in bypass saves energy and space while reducing heat generation: a complete motor starting solution in one unit designed and verified by ABB.

Softstarter features	PSR	PSE	PSTX
Built-in bypass	●	●	●
Inside-delta connection possible	–	–	●
Graphical display and keypad	–	●	●
Detachable keypad	–	–	●
Motor runtime and start count	–	–	●
Programmable warning functions	–	–	●
Diagnostics	–	–	●
Overload time-to-trip	–	–	●
Overload time-to-cool	–	–	●
Analog output	–	●	●
Fieldbus communication	O	●	●
Event log	–	O	●
Multiple languages	–	–	17
Electricity metering	–	–	●

● = standard, O = option, – = not available

INCREASE APPLICATION PRODUCTIVITY

Reduce the number of production stops...
ABB softstarters reduce mechanical stress on your application which increases uptime.

...by letting the softstarter do more than just starting.
Torque control, pump cleaning, motor break and many more features enables you to use your process to its full potential.

Softstarter features	PSR	PSE	PSTX
Torque control	–	●	●
Torque limit	–	–	●
Coated PCBA	–	●	●
Limp mode	–	–	●
Jog with slow speed forward/ reverse	–	–	●
Dynamic brake	–	–	●
Stand still brake	–	–	●
Sequence start	–	–	●
Full voltage start	–	–	●
Kick start	–	●	●
Automatic pump cleaning	–	–	●

● = standard, O = option, – = not available

Case studies

Tasmanian salmon operation keeps its fish cool with ABB softstarters
Tassal upgrades the motor control center in Australia's biggest land-based salmon hatchery with ABB Softstarters, ensuring the continuous operation of its water chillers.
For more information visit: Link

Lower the inrush current by 50%

Xylem - South Africa
ABB softstarters providing efficiency to the mining industry
Xylem reducing the number of components by 80%, shortened installation time by 60%. Costs cut to half has helped Xylem sell twice as many panels with softstarters as before. For more information visit: Link

Total panel costs reduced by 50%

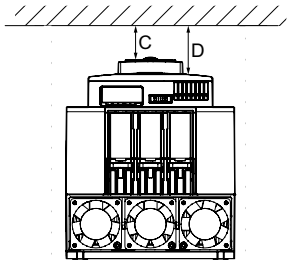
Indian tourist town is pumped up over ABB Softstarters that help uninterrupted water supply
Shimla has cut pipeline damage 50% using Softstarters to help lift water thousands of feet from a dam to quench the thirst of millions. For more information visit: Link

Pipeline damage reduced by 50%

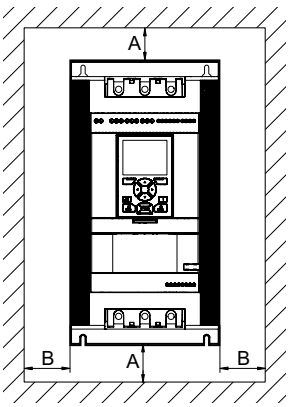
Wall mounting
Instructions

Product	Minimum distance to wall mm (in)			
	A	B	C	D
PSR				
PSR3 ... PSR16	0	0	25 (0.98)	N/A
PSR25 ... PSR30	0	0	25 (0.98)	N/A
PSR37 ... PSR45	0	0	25 (0.98)	N/A
PSR60 ... PSR105	0	0	25 (0.98)	N/A
PSRC				
PSR3 ... PSR16	0	0	25 (0.98)	N/A
PSR25 ... PSR30	0	0	25 (0.98)	N/A
PSR37 ... PSR45	0	0	25 (0.98)	N/A
PSR60 ... PSR105	0	0	25 (0.98)	N/A
PSE				
PSE18 ... PSE105	100 (3.94)	10 (0.39)	20 (0.79)	N/A
PSE142 ... PSE170	100 (3.94)	10 (0.39)	20 (0.79)	N/A
PSE210 ... PSE370	100 (3.94)	10 (0.39)	20 (0.79)	N/A
PSTX				
PSTX30 ... PSTX105	100 (3.94)	10 (0.39)	20 (0.79)	35 (1.38)
PSTX142 ... PSTX170	100 (3.94)	10 (0.39)	20 (0.79)	35 (1.38)
PSTX210 ... PSTX370	100 (3.94)	10 (0.39)	20 (0.79)	35 (1.38)
PSTX470 ...PSTX570	150 (5.91)	15 (0.59)	20 (0.79)	35 (1.38)
PSTX720 ... PSTX840	150 (5.91)	15 (0.59)	20 (0.79)	35 (1.38)
PSTX1050 ... PSTX1250	150 (5.91)	15 (0.59)	20 (0.79)	35 (1.38)

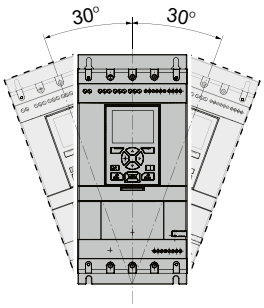
Minimum distance to front

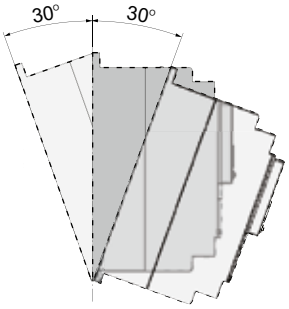


Minimum distance to wall



Maximum mounting angle





Certifications and approvals

The table below shows the certifications and approvals for ABB softstarters. For other certifications and/or approvals, please contact ABB.

Certifications and approvals

	Certifications							Approvals: ship classification societies					
Abbreviation approved in	CE EU	cULus Canada USA	CCC China	EAC Russia	ANCE Mexico	C-tick Australia	KC Korea	ABS	DNV	Lloyd's Register	CCS	PRS	Class NK
PSR3 ... PSR105	●	●	●	●	●	●	●	—	—	—	—	—	—
PSRC3 ... PSRC105	●	●	●	●	●	●	●	—	—	—	—	—	—
PSE18 ... PSE370	●	●	●	●	●	●	●	●	●	●	●	●	●
PSTX30 ... PSTX1250	●	●	●	●	●	●	●	●	●	●	●	●	●

Note: • Standard design approved, the products wear the certification mark when it is required.

Directives and standards	
No. 2006/95/EC	Low voltage equipment
No. 2004/108/EC	Electromagnetic compatibility
EN 60947-1	Low-voltage switchgear and controlgear - Part 1: General rules
EN 60947-4-2	AC semiconductor motor controllers and starters
UL 508	Industrial Control Equipment
CSA C22.2 No 14	Industrial Control Equipment

Items included in the box with the softstarter

	Multi-language manual	Terminal kit	Cable and mounting kit for detachable keypad
PSR3 ... PSR105	●	O	—
PSRC3 ... PSRC105	●	O	—
PSE18 ... PSE105	●	O	—
PSE142...PSE370	●	—	—
PSTX30 ... PSTX105	●	O	●
PSTX142...PSTX1250	●	—	●

● = included, O = built-in, – = not included

PSE - The efficient range
Introduction

Technical specifications
- Rated operational current: 18...370 A
- Operational voltage: 208...600 V AC
- Wide rated control supply voltage: 100...250 V AC, 50/60 Hz

Features
- Voltage ramp and torque control for both start and stop
- Two-phase controlled
- Current limit
- Kick-start
- Built-in bypass for energy saving and easy installation
- Illuminated display that uses symbols to become language neutral
- External keypad rated IP66 (Type 1, 4X,12) as an option
- Analog output for display of motor current

Protections
- Electronic overload protection
- Underload protection
- Locked rotor protection

Communication
- Built-in Modbus RTU
- Fieldbus communication with fieldbus plug adapter and fieldbus plug

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SECURE MOTOR RELIABILITY

Basic motor protection and current limit
The PSE includes the most important protections for handling different load situations that can happen to pumps e.g. overload and underload. The current limit gives you more control of the motor during start and allows you to start your motor in weaker networks.

IMPROVE INSTALLATION EFFICIENCY

Saving time and money with built-in bypass and compact design
On the PSE, the bypass is built in and verified by ABB, saving you time during installation and space in your panel. The keypad is language neutral and illuminated for easy set-up and operation in field. The compact design makes installation fast and easy.

INCREASE APPLICATION PRODUCTIVITY

Torque control for elimination of water hammering in pumps
Torque control is the most efficient way to stop a full speed pump. The PSE has a special torque stop ramp that is designed together with a pump manufacturer to eliminate water hammering in an optimal way.

Screw mounting PSE is fast easy to install by using screw mounting.

Digital input for start, stop and reset PSE is controlled through digital inputs using the internal 24 V DC source. This allows easy control with e.g. push buttons or relays.

Output signal relays for run, top of ramp and event Three output signal relays for indicating that the motor is running, that the softstarter is in top of ramp and if any event has happened. The relays can be used e.g. with pilot lights or to control a line contactor.

Coated circuit boards protecting from dust, moist and corrosive atmosphere.

Modbus- RTU fieldbus communication for monitoring and control. Support for all major communication protocols.

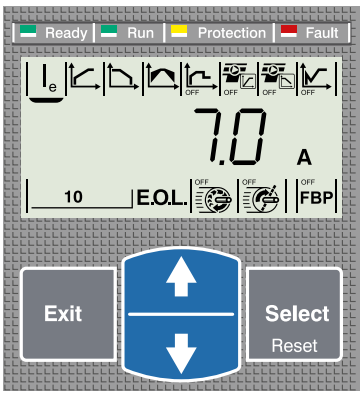
Torque control function the absolutely best possible stop of pumps without water hammering and pressure surges.

PSE display

Illuminated and language-neutral display with icons The display on PSE uses icons for fast and easy set-up of parameters. Each icon indicates a different parameter to set and makes navigation and setting of parameters easy.

LED indicators

- Green ready LED
  Flashing - Control supply
  Steady - Main power available
- Green run LED
  Flashing - Ramping up/down
  Steady - TOR
- Yellow protection LED
- Red fault LED



PSE - The efficient range

Coordination examples

PSE18 ... PSE105

PSE142 ... PSE170

PSE210 ... PSE370

Normal start In-line connected

	Technical data				Using MCCB only, type 1 coordination will be achieved [1] MCCB (400 V, 40 ºC)		To achieve type 2 coordination, semi-conductor fuses must be used [1]	Suitable switch fuse for recommended semi-conductor fuses [1]	The line contactor is not required for the softstarter itself but often used to open if OL trips [1]
Softstarter	IEC kW (400V)	IEC max A	UL HP (440-480 V)	UL max FLA	MCCB (35 kA)	MCCB (50 kA)	Fuse protection (85 kA), Semiconductor fuses, Bussmann	Switch fuse	Line contactor
PSE18	7.5	18	10	18	XT2N160	XT2S160	170M1563	OS32GD	AF26
PSE25	11	25	15	25	XT2N160	XT2S160	170M1564	OS32GD	AF26
PSE30	15	30	20	28	XT2N160	XT2S160	170M1566	OS32GD	AF30
PSE37	18.5	37	25	34	XT2N160	XT2S160	170M1567	OS63GD	AF38
PSE45	22	45	30	42	XT2N160	XT2S160	170M1568	OS63GD	AF52
PSE60	30	60	40	60	XT2N160	XT2S160	170M1569	OS63GD	AF65
PSE72	37	72	50	68	XT2N160	XT2S160	170M1571	OS125GD	AF80
PSE85	45	85	60	80	XT2N160	XT2S160	170M1572	OS125GD	AF96
PSE105	55	106	75	104	XT3N250	XT3S250	170M3819	OS250D	AF116
PSE142	75	143	100	130	XT3N250	XT3S250	170M5809	OS400D	AF146
PSE170	90	171	125	169	XT3N250	XT3S250	170M5810	OS400D	AF190
PSE210	110	210	150	192	XT4N320	XT4S320	170M5812	OS400D	AF265
PSE250	132	250	200	248	XT5N400	XT5S400	170M5813	OS400D	AF265
PSE300	160	300	250	302	XT5N400	XT5S400	170M6812	OS630D	AF305
PSE370	200	370	300	361	XT5N630	XT5S630	170M6813	OS630D	AF370

[1] These are an example of coordination. For more examples see: https://applications.it.abb.com/SOC/Page/Selection.aspx

Coordination tables (SOC) >

For more examples of coordination visit the online tool for coordination with short circuit protection, overload protection and line contactor.

PSE - The efficient range

Ordering details

NOTE

PSE range updates (2018)
- Built in Modbus-RTU communication protocol added
- Increased firmware & hardware stability and reliability
- Improved package and inlay

PSE frame C updates (2018)
PSE210..PSE370 redesigned with more compact size and have new order codes replacing existing PSE Frame C that will be phased out. Terminal extension kit available as accessory for retro-fit.

PSE18 ... PSE105

PSE142 ... PSE170

PSE210 ... PSE370

Normal starts, class 10, in-line Rated operational voltage U_e, 208-600 V, Rated control supply voltage U_s, 100-250 V AC, 50/60 Hz

IEC rated operational power			current	UL/CSA rated operational power								
230V Pe kW	400V Pe kW	500V Pe kW	Ie A	200/208V Pe hp	220/240V Pe hp	440/480V Pe hp	550/600V Pe hp	FLA	Type	Order code	Net Weight (kg)	Net Weight (lb)
4	7.5	11	18	5	5	10	15	18	PSE18-600-70	1SFA897101R7000	2.5	5.5
5.5	11	15	25	7.5	7.5	15	20	25	PSE25-600-70	1SFA897102R7000	2.5	5.5
7.5	15	18.5	30	7.5	10	20	25	28	PSE30-600-70	1SFA897103R7000	2.5	5.5
9	18.5	22	37	10	10	25	30	34	PSE37-600-70	1SFA897104R7000	2.5	5.5
11	22	30	45	10	15	30	40	42	PSE45-600-70	1SFA897105R7000	2.5	5.5
15	30	37	60	20	20	40	50	60	PSE60-600-70	1SFA897106R7000	2.5	5.5
18.5	37	45	72	20	25	50	60	68	PSE72-600-70	1SFA897107R7000	2.5	5.5
22	45	55	85	25	30	60	75	80	PSE85-600-70	1SFA897108R7000	2.6	5.7
30	55	75	106	30	40	75	100	104	PSE105-600-70	1SFA897109R7000	2.9	6.3
40	75	90	143	40	50	100	125	130	PSE142-600-70	1SFA897110R7000	4.4	9.7
45	90	110	171	60	60	125	150	169	PSE170-600-70	1SFA897111R7000	4.4	9.7
59	110	132	210	60	75	150	200	192	PSE210-600-70-1	1SFA897112R7001	8.5	18.7
75	132	160	250	75	100	200	250	248	PSE250-600-70-1	1SFA897113R7001	10.6	23.3
90	160	200	300	100	100	250	300	302	PSE300-600-70-1	1SFA897114R7001	10.6	23.3
110	200	250	370	125	150	300	350	361	PSE370-600-70-1	1SFA897115R7001	10.6	23.3

Heavy-duty starts, class 30, in-line Rated operational voltage U_e, 208...600 V, Rated control supply voltage U_s, 100...250 V AC, 50/60 Hz

IEC rated operational power			current	UL/CSA rated operational power								
230V Pe kW	400V Pe kW	500V Pe kW	Ie A	200/208V Pe hp	220/240V Pe hp	440/480V Pe hp	550/600V Pe hp	FLA	Type	Order code	Net Weight (kg)	Net Weight (lb)
3	5.5	7.5	12	3	3	7.5	10	11	PSE18-600-70	1SFA897101R7000	2.5	5.5
4	7.5	11	18	5	5	10	15	18	PSE25-600-70	1SFA897102R7000	2.5	5.5
5.5	11	15	25	7.5	7.5	15	20	25	PSE30-600-70	1SFA897103R7000	2.5	5.5
7.5	15	18.5	30	7.5	10	20	25	28	PSE37-600-70	1SFA897104R7000	2.5	5.5
9	18.5	22	37	10	10	25	30	34	PSE45-600-70	1SFA897105R7000	2.5	5.5
11	22	30	45	10	15	30	40	42	PSE60-600-70	1SFA897106R7000	2.5	5.5
15	30	37	60	20	20	40	50	60	PSE72-600-70	1SFA897107R7000	2.5	5.5
18.5	37	45	72	20	25	50	60	68	PSE85-600-70	1SFA897108R7000	2.6	5.7
22	45	55	85	25	30	60	75	80	PSE105-600-70	1SFA897109R7000	2.9	6.3
30	55	75	106	30	40	75	100	104	PSE142-600-70	1SFA897110R7000	4.4	9.7
40	75	90	143	40	50	100	125	130	PSE170-600-70	1SFA897111R7000	4.4	9.7
45	90	110	171	60	60	125	150	169	PSE210-600-70-1	1SFA897112R7001	8.5	18.7
59	110	132	210	60	75	150	200	192	PSE250-600-70-1	1SFA897113R7001	10.6	23.3
75	132	160	250	75	100	200	250	248	PSE300-600-70-1	1SFA897114R7001	10.6	23.3
90	160	200	300	100	100	250	300	302	PSE370-600-70-1	1SFA897115R7001	10.6	23.3

PSE - The efficient range

Accessories

Cable connectors for CU cables

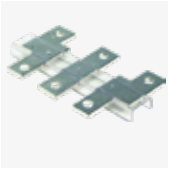
Cable connectors for Cu cables

Article	Wire range mm²	Tightening torque max Nm	Type	Order code	Pkg qty	Net kg	lb
PSE142 ... PSE170	6...120	14	KIT FC Cu XT4 3pcs	1SDA066917R1	3	0.18	0.40
PSE142 ... PSE170	2 x (50...120)	16	LZ185-2C/120	1SFN074709R1000	3	0.10	0.22
PSE210 ... PSE370	16...300	25	T5 400 3pcs	1SDA055016R1	3	0.39	0.45

Cable connectors for CU & AL cables

Cable connectors for Al and Cu cables

Article	Wire range mm²	Tightening torque max Nm	Type	Order code	Pkg qty	Net kg	lb
PSE142 ... PSE170	95...185	31	KIT FC CuAl T4 3pcs	1SDA054988R1	3	0.14	0.31
PSE210 ... PSE370	185...240	43	KIT FC CuAl T5 400 3pcs	1SDA055020R1	3	0.24	0.54



Terminal enlargements

Terminal enlargements

Article	Dimensions hole ø mm²	bar mm²	Type	Order code	Pkg qty	Net kg	lb
PSE18 ... PSE105	6.5	15 x 3	LW110	1SFN074307R1000	1	0.07	0.14
PSE142 ... PSE170	10.5	17.5 x 5	LW185	1SFN074707R1000	1	0.29	0.64
PSE210 ... PSE370	10.5	20 x 5	LW300	1SFN075107R1000	1	0.49	1.08

Terminal kit

Terminal kit

Article	Type	Order code	Pkg qty	Net kg	lb
PSE142...PSE170	PSLE-185	1SFA899221R1002	1	0.34	0.75
PSE210...370	PSLE-300	1SFA899221R1003	1	0.30	0.66

Terminal extension

Terminal extension

Article	Type	Order code	Pkg qty	Net kg	lb
PSE142 ... PSE170 8.5 17.5 x 5	LX205	1SFN074810R1000	1	0.25	0.55
PSE210 ... PSE370 10.5 20 x 5	LX370	1SFN075410R1000	1	0.35	0.77

PSE - The efficient range
Accessories

Terminal shrouds

Terminal shrouds

Article	Type	Order code	Pkg qty	Net kg	lb
PSE18... PSE105, Screw terminals	LT140-30L	1SFN124203R1000	2	0.07	0.15
PSE142... PSE170, short for use with cable clamps	LT185-AC	1SFN124701R1000	2	0.05	0.11
PSE142... PSE170,long for use with compression lugs	LT185-AL	1SFN124703R1000	2	0.22	0.49
PSE210... PSE370, short for use with cable clamps	LT300-AC	1SFN125101R1000	2	0.09	0.19
PSE210... PSE370, long for use with compression lugs	LT300-AL	1SFN125103R1000	2	0.28	0.62

External keypad

External keypad including a 3m cable

Article	Type	Order code	Pkg qty	Net kg	lb
PSE18 ... PSE370	PSEEK	1SFA897100R1001	1	0.13	0.29

USB cable

USB cable for Service Engineer Tool

Article	Type	Order code	Pkg qty	Net kg	lb
PSE18 ... PSE370	PSECA	1SFA897201R1001	1	0.10	0.22

Fieldbus plug adaptor

Fieldbus plug connection, cable included

Article	Type	Order code	Pkg qty	Net kg	lb
Fieldbus plug adaptor	PS-FBPA	1SFA896312R1002	1	0.15	0.33

Terminal extensions retrofit kit

Terminal extensions retrofit kit

Article	Type	Order code	Pkg qty	Net kg	lb
Terminal extensions retrofit kit	LXR370	1SFA899222R1003	1	0.45	0.99

Modbus adapter

Modbus adapter

Article	Type	Order code	Pkg qty	Net kg	lb
Modbus adapter	PS-MBIA	1SFA899300R1020	1	0.01	0.02

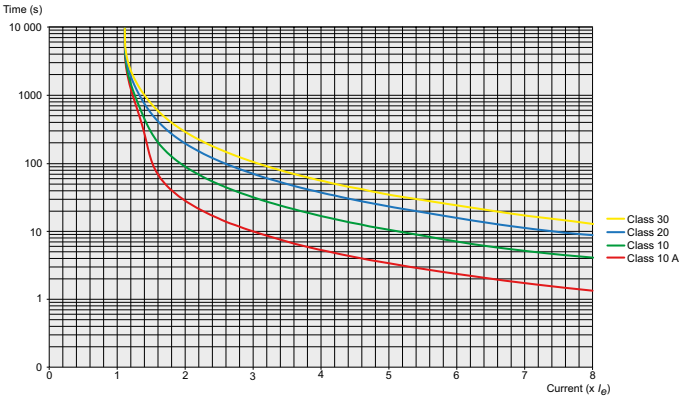
PSE - The efficient range

Technical data

Technical data	PSE18 ... PSE370
Rated insulation voltage U_i	600 V
Rated operational voltage U_e	208...600 V +10%/-15%
Rated control supply voltage U_s	100...250 V +10%/-15%, 50/60 Hz ±10 %
Rated control circuit voltage U_c	Internal 24 V DC
Starting capacity at I_e	4 x I_e for 10 sec.
Number of starts per hour	10 [1]
Maximum Altitude	4000 m (13123 ft) [3]
Overload capability	
Overload class	10
Ambient temperature	
During operation	-25...+60 °C (-13...+140 F) [2]
During storage	-40...+70 °C (-40...+158 F)
Degree of protection	
Main circuit	IP00
Supply and control circuit	IP20
Main circuit	
Built-in bypass	Yes
Cooling system	fan cooled (thermostat controlled)
HMI for settings	
Display	4 7-segments and icons. Illuminated
Keypad	2 selection keys and 2 navigation keys
Main settings	
Setting current	Size dependent
Ramp time during start	1...30 sec
Ramp time during stop	0...30 sec
Initial/end voltage	30...70%
Current limit	1.5...7 x I_e
Torque control for start	Yes / No
Torque control for stop	Yes / No
Kick start	Off, 30...100%
Signal relays	
Number of signal relays	3
K2	Run signal
K3	TOR (bypass) signal
K1	Event signal
Rated operational voltage U_e	100-250 V AC/24 V DC [4]
Rated thermal current I_{th}	3 A
Rated operational current I_e at AC-15 (U_e = 250 V)	1.5 A
Vibration test	
According to IEC 60068-2-6:2007	

Technical data	PSE18 ... PSE370
Analog output	
Output signal reference	4...20 mA
Type of output signal	I Amp
Scaling	Fixed at 1.2 x I_e
Control circuit	
Number of inputs	3 (start, stop, reset of faults)
Signal indication LED	
On / Ready	Green flashing / steady
Run / TOR	Green flashing / steady
Protection	Yellow
Fault	Red
Protections	
Electronic overload	Yes (Class 10A, 10, 20, 30)
Locked rotor protection	Yes
Underload protection	Yes
Fieldbus connection	
ABB Fieldbus plug	Yes (option)
Built-in modbus	Yes
External keypad	
Display	LCD type
Ambient temperature	
During operation	-25...+60 ºC (-13...+140 F)
During storage	-40...+70 ºC (-40...+158 F)
Degree of protection	IP66

[1] Valid for 50% on time and 50% off time. If other data is required, contact your local ABB office.
[2] Above 40 ºC (104 F) up to max. 60 ºC (140 F) reduce the rated current with 0.6% per ºC (0,33% per F).
[3] When used at high altitudes, above 1000 meters (3281 ft) up to 4000 meters (13123 ft), de-rate the rated current using the following formula. [% of Ie = 100 - $\frac{x - 1000}{150}$] x = actual altitude of the softstarter in meters.
[4] A common voltage needs to be used for all 3 signal relays.

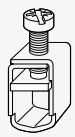


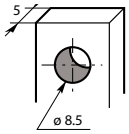
Tripping curves for the integrated electronic overload protection
PSE has an integrated electronic overload protection that can be set to four different tripping classes. Below you find a curve for each tripping class in cold state.
See page 66 for bigger picture.

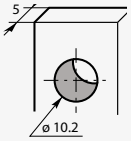
PSE - The efficient range

Technical data

Main terminals







Article	PSE18… 105	PSE142… 170	PSE210… 370
Cu cable - Flexible 1 x mm²	2.5…70 mm²	6…120 mm²	16…300 mm²
Clamp type	Included	1SDA066917R1	1SDA055016R1
Tightening torque	8 Nm	14 Nm	25 Nm
Cu cable - Flexible 2 x mm²	2.5…70 mm²	50…120 mm²	-
Clamp type	Included	1SFN074709R1000	-
Tightening torque	8 Nm	16 NM	-
Cu cable - Stranded 1 x mm²	2.5…70 mm²	6…120 mm²	16…300 mm²
Clamp type	Included	1SDA066917R1	1SDA055016R1
Tightening torque	8 Nm	14 Nm	25 Nm
Cu cable - Stranded 2 x mm²	2.5…70 mm²	50…120 mm²	-
Clamp type	Included	1SFN074709R1000	-
Tightening torque	8 Nm	16 NM	-
Al cable - Stranded 1 x mm²	-	95…185 mm²	185…240
Clamp type	-	1SDA054988R1	1SDA055020R1
Tightening torque	-	31 Nm	43 Nm
Lugs			
Width	22 mm (0.866 in)	24 mm (0.945 in)	30 mm (1.181 in)
Diameter>=	6.5 mm (0.256 in)	8.5 mm (0.335 in)	10.2 mm (0.402 in)
Tightening torque	9 Nm (80 in lb)	18 Nm (159 in lb)	28 Nm (248 in lb)
Connection capacity acc to UL/CSA 1 x AWG/kcmil	6…2/0	6…300 kcmil	4…400 kcmil
Clamp type	Included	ATK185	ATK300
Tightening torque	71 in lb	300 in lb	375 in lb
Connection capacity acc to UL/CSA 2 x AWG/kcmil	-	-	4…500 kcmil
Clamp type	-	-	ATK300/2
Tightening torque	-	-	375 in lb
Supply and control circuit			
Cu cable - Stranded 1 x mm²	0.75…2.5 mm² (19…14 AWG)		
Cu cable - Stranded 2 x mm²	0.75…1.5 mm² (19…16 AWG)		
Tightening torque	0.5 Nm (4.4 in lb)		

Fuse ratings and power losses

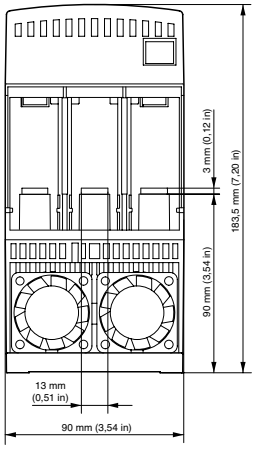
	Current range	Max power loss at rated I_e	Max fuse raiting - main circuit [1] Bussmann fuses, DIN43 620 (Knife)			Power requirements supply circuit Holding (VA) / Pull-in (VA)
Softstarter	**A**	**W**	**A**	**Type**	**Size**	
PSE18	5.4…18.0	0.2	40	170M1563	000	16/19.9
PSE25	7.5…25.0	0.4	50	170M1564	000	16/19.9
PSE30	9.0…30.0	0.5	80	170M1566	000	16/19.9
PSE37	11.1…37.0	0.8	100	170M1567	000	16/19.9
PSE45	13.5…45.0	1.2	125	170M1568	000	16/19.9
PSE60	18.0…60.0	2.2	160	170M1569	000	16/19.9
PSE72	21.6…72.0	3.1	250	170M1571	000	16/19.9
PSE85	25.5…85.0	4.3	315	170M1572	000	16/19.9
PSE105	31.8…106.0	6.6	400	170M3819	1*	16/19.9
PSE142	42.9…143.0	12.1	450	170M5809	2	16/31
PSE170	51.3…171.0	17.6	500	170M5810	2	16/31
PSE210	63.0…210.0	8.8	630	170M5812	2	21/244
PSE250	75.0…250.0	12.5	700	170M5813	2	21/244
PSE300	90.6…302.0	18.0	800	170M6812	3	21/244
PSE370	111.0…370.0	27.4	900	170M6813	3	21/244

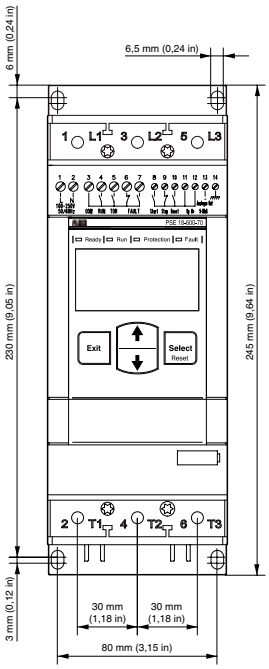
[1] For the supply circuit 6 A delayed, for MCB use C characteristics.

PSE - The efficient range

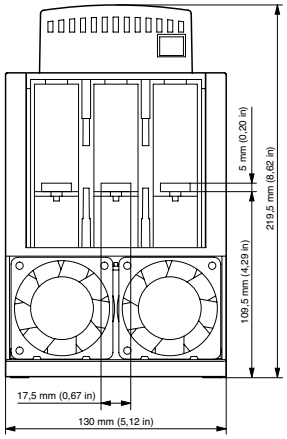
Dimensions

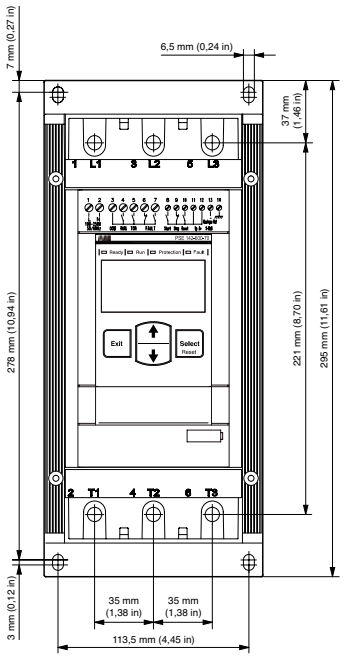
PSE18... 105



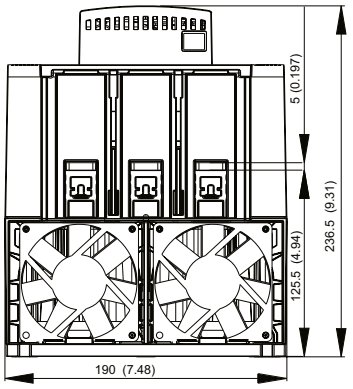


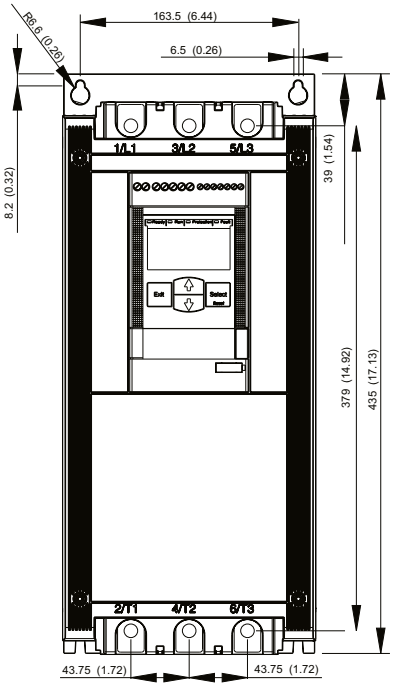
PSE142... 170



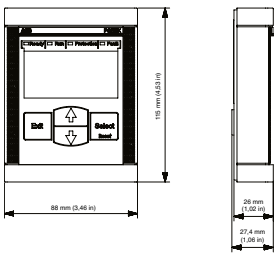


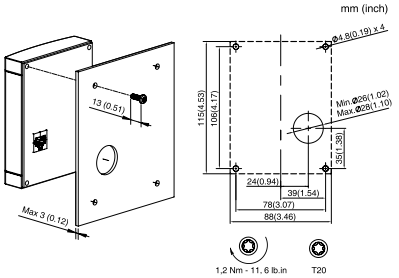
PSE210... 370





External keypad (PSEEK)

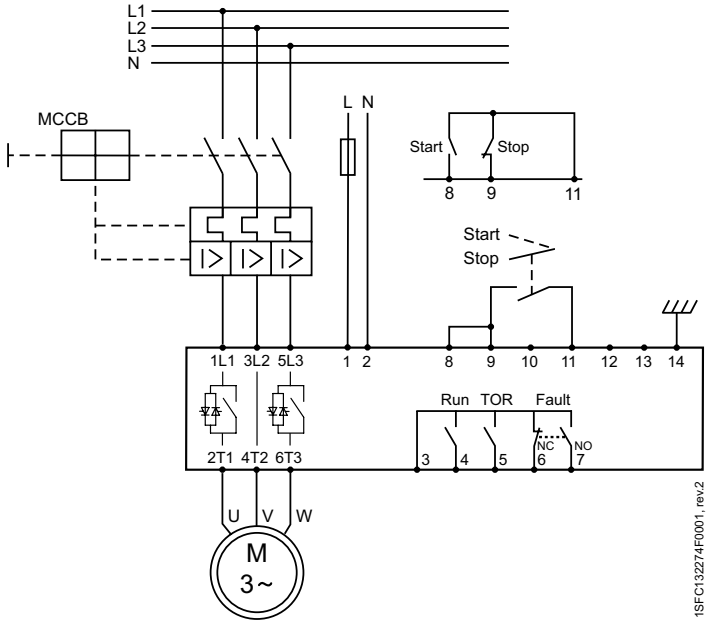




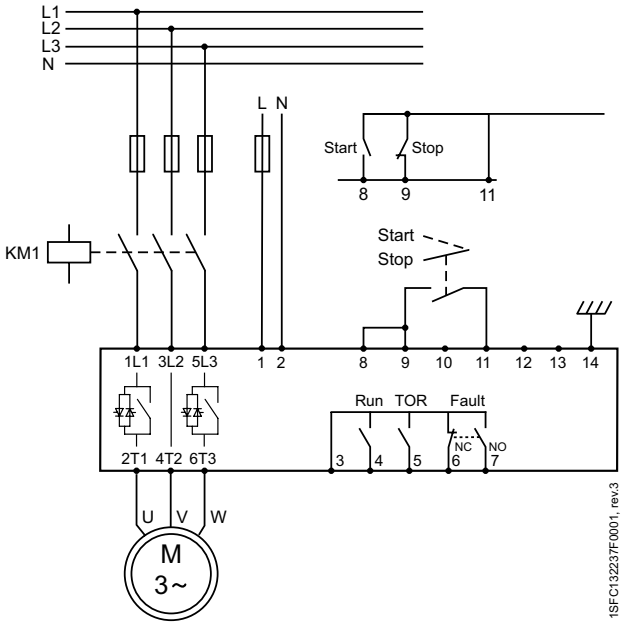
PSE - The efficient range

Circuit diagrams

PSE18... 370
With MCCB and line contactor



With fuses and line contactor



For more circuit diagrams see **solutions.abb/softstarters**