PSE – The efficient range
Description

Product description

- Wide rated operational voltage 208 – 600 V AC
- Wide rated control supply voltage 100 – 250 V, 50/60 Hz
- Rated operational current 18 to 370 A
- Wide ambient temperature range, -25 to +60 °C
- Coated circuit boards for reliable operation in harsh environment
- Built-in by-pass on all sizes, saving energy and reducing installation time
- User friendly HMI with illuminated language neutral display and four button keypad
- Optional external keypad, IP66
- Torque control for excellent control of pumps
- Current limit, adjustable between 1.5 – 7 x I_e
- Motor overload protection with classes 10A, 10, 20 and 30
- Motor underload protection to detect pumps running dry
- Locked rotor protection, detecting jammed pumps
- Kick start to start jammed pumps or conveyor belts
- Analog output showing operational current, 4 – 20 mA
- Optional fieldbus communication using Profibus, Modbus, Devicenet or CANopen
- Sophisticated algorithm eliminating the DC-component and thereby providing excellent starting performance.

The PSE softstarter range is the world's first compact softstarters with Torque Control. This makes the PSE range an excellent choice for pumping application where water hammering normally is a big problem. With its compact design and advanced functionality, the PSE is also a very efficient solution for other common applications such as compressors and fans.

Torque control

The most important function when stopping pumps is torque control. Since the PSE softstarter is optimized for controlling pumps, this feature is a must.

Built-in by-pass for energy saving

Using by-pass after reaching full voltage will greatly reduce the power loss and thereby save energy. In the PSE softstarter range, the by-pass is built-in on all sizes, which will give the most compact starting solution and reduce the need for wiring during installation.

Coated circuit boards

All circuit boards in the new PSE softstarter have a protective coating to ensure a reliable operation even in tough environments like wastewater plants, where corrosive gases and acids may exist.

Motor protection

The PSE softstarter is equipped with built-in electronic overload protection, protecting the motor from overheating. Since no additional overload device is needed, our efficient design saves both space, installation time, and ultimately money.

Analog output

The analog output terminals can be connected to an analog current meter to show the current during operation and thereby eliminating the need for an additional current transformer. The analog output signal can also be used as an analog input to a PLC.

Display and keypad

The set-up of the PSE softstarter is done using the four button keypad and the illuminated display, providing a quick and easy set-up. While operating, the display will also provide important status information such as current and voltage.

External keypad

As an option the PSE softstarter can be equipped with an external keypad for easy set-up and monitoring of the unit without opening the enclosure door. The keypad can also be used to copy parameters between different softstarters.

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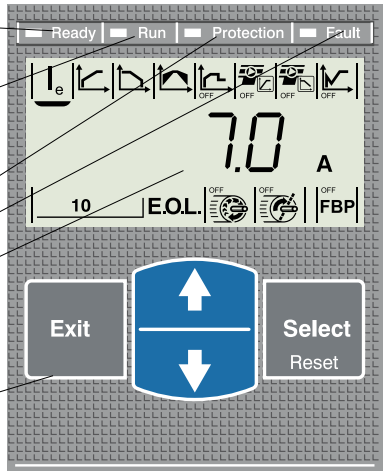
The PSE Softstarter can be selected according to the rated motor power in normal duty applications like pumps, compressors, elevators, escalators, short conveyor belts and bow thrusters. See page 30.
For heavy duty applications like centrifugal fans, crushers, mixers, mills, stirrers and long conveyor belts, select a softstarter from page 31.

Settings

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

Back-lit display

User friendly keypad
Similar as for PST(B)



Four digits showing values and messages

Icon's for showing functions. Language neutral

PSE – The efficient range
Overview

PSE18 ... PSE105

	Softstarter. Type								
Normal start In-line connected	PSE18	PSE25	PSE30	PSE37	PSE45	PSE60	PSE72	PSE85	PSE105
(400 V) kW	7.5	11	15	18.5	22	30	37	45	55
IEC, Max. A	18	25	30	37	45	60	72	85	106
(440-480 V) hp	10	15	20	25	30	40	50	60	75
UL, Max FLA	18	25	28	34	42	60	68	80	104
	400 V, 40 °C								
Using MCCB only, type 1 coordination will be achieved	**MCCB (35 kA), type**								
	T2N160								T3N250
	MCCB (50 kA), type								
	T2S160								T3S250
To achieve type 2 coordination, semi-conductor fuses must be used	**Fuse protection (85 kA), Semiconductor fuses, Bussmann, type**								
	170M1563	170M1564	170M1566	170M1567	170M1568	170M1569	170M1571	170M1572	170M3819
Suitable switch fuse for recommended semi-conductor fuses	**Switch fuse, type**								
	OS32GD03P			OS63GD03P			OS125GD03P		OS250D03P
The line contactor is not required for the softstarter itself but often used to open if OL trips	**Line contactor, type**								
	AF26		AF30	AF38	A50	A63	A75	A95	A110
Overload protection is used to protect the motor from over heating	**Electronic overload relay, type**								
	Built-in								
The by-pass will reduce the power loss of the softstarter.	**By-pass, type**								
	Built-in								

A50 ... A300 might be replaced by AF50 ... AF300
The table above is an overview of possible combinations of devices.
Complete coordination tables are available at www.abb.com/lowvoltage

PSE – The efficient range
Overview

	PSE142 ... PSE170		PSE210 ... PSE370			
	Softstarter. Type					
Normal start In-line connected	PSE142	PSE170	PSE210	PSE250	PSE300	PSE370
(400 V) kW	75	90	110	132	160	200
IEC, Max. A	143	171	210	250	300	370
(440-480 V) hp	100	125	150	200	250	300
UL, Max FLA	130	169	192	248	302	361
	400 V, 40 °C					
Using MCCB only, type 1 coordination will be achieved	**MCCB (35 kA), type**					
	T3N250		T4N320	T5N400		T5N630
	MCCB (50 kA), type					
	T3S250		T4S320	T5S400		T5S630
To achieve type 2 coordination, semi-conductor fuses must be used	**Fuse protection (85kA), Semiconductor fuses, Bussmann, type**					
	170M5809	170M5810	170M5812	170M5813	170M6812	170M6813
Suitable switch fuse for recommended semi-conductor fuses	**Switch fuse, type**					
	OS400D03P				OS630D03P	
The line contactor is not required for the softstarter itself but often used to open if OL trips	**Line contactor, type**					
	A145	A185	A210	A260	A300	AF400
Overload protection is used to protect the motor from over heating	**Electronic overload relay, type**					
	Built-in					
The by-pass will reduce the power loss of the softstarter.	**By-pass, type**					
	Built-in					

How to select correct size

By using the guide here, you can quickly select a suitable softstarter for the most common applications.

If a more precise selection is required, you can use Prosoft, a selection software available at www.abb.com/lowvoltage

Quick guide for selection

Normal start Class 10	**Heavy duty start class 30**
Ordering - see page 30	Ordering - see page 31

Typical applications

• Bow thruster	• Centrifugal pump	• Centrifugal fan	• Conveyor belt (long)
• Compressor	• Conveyor belt (short)	• Crusher	• Mill
• Elevator	• Escalator	• Mixer	• Stirrer

If more than 10 starts/h

Select one size larger than the standard selection

PSE – The efficient range
Normal starts, class 10, In-Line, ordering details

PSE18 ... PSE105

PSE142 ... PSE170

PSE210 ... PSE370

PSE18 ... PSE370

Rated operational voltage, U_e, 208 - 600 V AC

Rated control supply voltage, U_s, 100 - 250 V AC, 50/60 Hz

Motor power

230 V P_e kW	400 V P_e kW	500 V P_e kW	IEC Max rated operational curent I_e A	Type	Order code	Weight kg 1 piece
4	7.5	11	18	**PSE18-600-70**	**1SFA897 101 R7000**	2.4
5.5	11	15	25	**PSE25-600-70**	**1SFA897 102 R7000**	2.4
7.5	15	18.5	30	**PSE30-600-70**	**1SFA897 103 R7000**	2.4
9	18.5	22	37	**PSE37-600-70**	**1SFA897 104 R7000**	2.4
11	22	30	45	**PSE45-600-70**	**1SFA897 105 R7000**	2.4
15	30	37	60	**PSE60-600-70**	**1SFA897 106 R7000**	2.4
18.5	37	45	72	**PSE72-600-70**	**1SFA897 107 R7000**	2.5
22	45	55	85	**PSE85-600-70**	**1SFA897 108 R7000**	2.5
30	55	75	106	**PSE105-600-70**	**1SFA897 109 R7000**	2.5
40	75	90	143	**PSE142-600-70**	**1SFA897 110 R7000**	4.2
45	90	110	171	**PSE170-600-70**	**1SFA897 111 R7000**	4.2
59	110	132	210	**PSE210-600-70**	**1SFA897 112 R7000**	12.4
75	132	160	250	**PSE250-600-70**	**1SFA897 113 R7000**	13.9
90	160	200	300	**PSE300-600-70**	**1SFA897 114 R7000**	13.9
110	200	250	370	**PSE370-600-70**	**1SFA897 115 R7000**	13.9

PSE – The efficient range
Heavy duty starts, class 30, In-Line, ordering details

PSE18 ... PSE105

PSE142 ... PSE170

PSE210 ... PSE370

PSE18 ... PSE370

Rated operational voltage, U_e, 208 - 600 V AC

Rated control supply voltage, U_s, 100 - 250 V AC, 50/60 Hz

Motor power

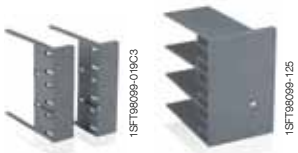
230 V P_e kW	400 V P_e kW	500 V P_e kW	IEC Max rated operational curent I_e A	Type	Order code	Weight kg 1 piece
3	5.5	7.5	12	**PSE18-600-70**	**1SFA897 101 R7000**	2.4
4	7.5	11	18	**PSE25-600-70**	**1SFA897 102 R7000**	2.4
5.5	11	15	25	**PSE30-600-70**	**1SFA897 103 R7000**	2.4
7.5	15	18.5	30	**PSE37-600-70**	**1SFA897 104 R7000**	2.4
9	18.5	22	37	**PSE45-600-70**	**1SFA897 105 R7000**	2.4
11	22	30	45	**PSE60-600-70**	**1SFA897 106 R7000**	2.4
15	30	37	60	**PSE72-600-70**	**1SFA897 107 R7000**	2.5
18.5	37	45	72	**PSE85-600-70**	**1SFA897 108 R7000**	2.5
22	45	55	85	**PSE105-600-70**	**1SFA897 109 R7000**	2.5
30	55	75	106	**PSE142-600-70**	**1SFA897 110 R7000**	4.2
40	75	90	143	**PSE170-600-70**	**1SFA897 111 R7000**	4.2
45	90	110	171	**PSE210-600-70**	**1SFA897 112 R7000**	12.4
59	110	132	210	**PSE250-600-70**	**1SFA897 113 R7000**	13.9
75	132	160	250	**PSE300-600-70**	**1SFA897 114 R7000**	13.9
90	160	200	300	**PSE370-600-70**	**1SFA897 115 R7000**	13.9

PSE – The efficient range
Accessories

LZ...

LW...

LE185



LT ... -AC LT ... -AL

PSEEK

PS-FBPA

Cable connectors for Cu cables

For softstarter type	Wire range mm²	Tightening torque max. Nm	Type	Order code	Packing piece	Weight kg 1 piece
PSE142 …170	6-185	16	–	1SDA 023 354 R0001	3	0.200
PSE142 …170	2 x (50-120)	16	LZ185-2C/120	1SFN 074 709 R1000	3	0.300
PSE210 … 370	16-240	25	–	1SDA 023 368 R0001	3	0.400

Cable connectors for Al and Cu cables

For softstarter type	Wire range mm²	Tightening torque max. Nm	Type	Order code	Packing piece	Weight kg 1 piece
PSE142 …170	35-95	13.5	–	1SDA 023 356 R0001	3	0.100
PSE142 …170	25-150	31	–	1SDA 023 357 R0001	3	0.100
PSE210 … 370	120-240	43	–	1SDA 023 370 R0001	3	0.100

Terminal enlargements

For softstarter type	Dimensions hole ø mm²	bar mm	Type	Order code	Packing piece	Weight kg 1 piece
PSE18...105	10.5	17.5 x 5	LW110	1SFN 074 307 R1000	1	0.100
PSE142...170	10.5	20 x 5	LW185	1SFN 074 707 R1000	1	0.450
PSE210...370	13	40 x 6	LW300	1SFN 075 107 R1000	1	1.230

Terminal nut washer

For softstarter type	Req. qty	Type	Order code	Packing piece	Weight kg 1 piece
PSE142...170	2	LE185	1SFN 074 716 R1000	2	0.200
PSE210...370	2	LE300	1SFN 075 116 R1000	2	0.300

Terminal shrouds

For softstarter type	Suitable for	Req. qty	Type	Order code	Packing piece	Weight kg 1 piece
PSE142...170	Cable connectors	2	LT185-AC	1SFN 124 701 R1000	2	0.050
PSE142...170	Compression lugs	2	LT185-AL	1SFN 124 703 R1000	2	0.220
PSE210...370	Cable connectors	2	LT300-AC	1SFN 125 101 R1000	2	0.070
PSE210...370	Compression lugs	2	LT300-AL	1SFN 125 103 R1000	2	0.280

External keypad including a 3m cable

For softstarter type	Type	Order code	Packing piece	Weight kg 1 piece
PSE18...370	PSEEK	1SFA 897 100 R1001	1	–

Fieldbus plug connection accessory

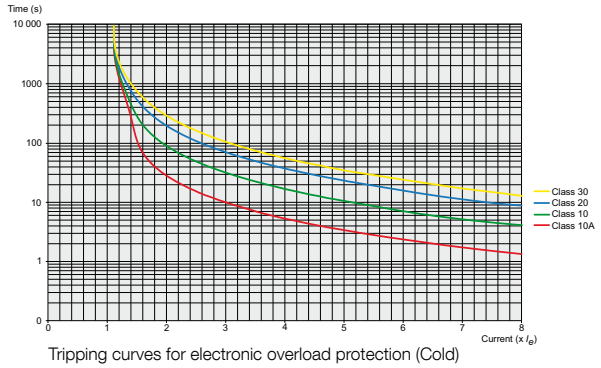
For softstarter type	Type	Order code	Packing piece	Weight kg 1 piece
The same accessory for all sizes	PS-FBPA	1SFA 896 312 R1002	1	0.060

ABB Field Bus Plug suitable for all sizes. See page 50-53

PSE – The efficient range
Technical data

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 ±5 %
Rated control circuit voltage U_c	Internal 24 V DC
Starting capacity at I_e	4xI_e for 10 sec.
Number of starts per hour	10 [1]
Overload capability,	
Overload Class	10
Ambient temperature	
During operation	-25 … +60 °C [2]
During storage	-40 … +70 °C
Maximum Altitude	4000 m [3]
Degree of protection	
Main circuit	IP00
Supply and Control circuit	IP20
Main circuit	
Built-in By-pass	Yes
Cooling system - Fan cooled (thermostat controlled)	Yes
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	1.5-7xI_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 (By-pass) signal
K1	Event signal
Rated operational voltage U_e	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

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's	
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
Field bus connection	
Connection for ABB FieldBusPlug	Yes (option)
External keypad	
Display LCD type	
Ambient temperature	
during operation	-25 … +60 °C
during storage	-40 … +70 °C
Degree of protection	IP66

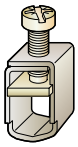
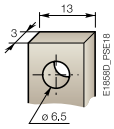
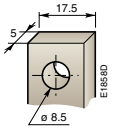
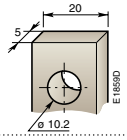


Tripping curves for electronic overload protection (Cold)

[1] Valid for 50 % on time and 50 % off time, with 3.5 x I_e for 7 seconds. If other data is required, please contact your sales office
[2] Above 40 ºC up to max. 60 ºC reduce the rated current with 0.6 % per ºC.
[3] When used at high altitudes above 1000 meters up to 4000 meters you need to derate the rated current using the following formula.
[% of I_e = 100 - $\frac{x - 1000}{150}$] x = actual altitude for the softstarter
[4] A common voltage needs to be used for all 3 signal relays

PSE – The efficient range
Technical data

Cross section of connection cables

		Type of softstarter PSE18 ... PSE105	PSE142 ... PSE170	PSE210 ... PSE370
Main circuit Connection clamp				
Solid/stranded	1 x mm²	2.5 – 70	See accessories	
Solid/stranded	2 x mm²	2.5 – 70	See accessories	
Tightening torque (recommended)	Nm	9	See accessories	
Connection bar				
Width and thickness	mm			
Hole diameter	mm			
Tightening torque (recommended)	Nm	9	18	28
Supply and control circuit Connection clamp				
Solid/stranded	1 x mm²	2.5	2.5	2.5
Solid/stranded	2 x mm²	1.5	1.5	1.5
Tightening torque (recommended)	Nm	0.5	0.5	0.5

Fuse ratings and power losses

For Softstarter	Recommended ABB Overload protection		Max power loss at rated I_e (Internal by-pass)	Max fuse raiting - main circuit [1] Bussman Fuses, DIN43 620			Power requirements supply circuit
Type	Type	Current range A	W	A	Type	Size	VA/VA pull in
PSE							
PSE18	Integrated	5.4-18	0.2	40	170M1563	000	16
PSE25	Integrated	7.5-25	0.4	50	170M1564	000	16
PSE30	Integrated	9-30	0.5	80	170M1566	000	16
PSE37	Integrated	11.1-37	0.8	100	170M1567	000	16
PSE45	Integrated	13.5-45	1.2	125	170M1568	000	16
PSE60	Integrated	18-60	2.2	160	170M1569	000	16
PSE72	Integrated	21.6-72	3.1	250	170M1571	000	16
PSE85	Integrated	25.5-85	4.3	315	170M1572	000	16
PSE105	Integrated	31.8-106	6.6	400	170M3819	1*	16
PSE142	Integrated	42.9-143	12.1	450	170M5809	2	16
PSE170	Integrated	51.3-171	17.6	500	170M5810	2	16
PSE210	Integrated	63-210	8.8	630	170M5812	2	23/350
PSE250	Integrated	75-250	12.5	700	170M5813	2	23/350
PSE300	Integrated	90.6-302	18	800	170M6812	3	23/350
PSE370	Integrated	111-370	27.4	900	170M6813	3	23/350

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

PSE – The efficient range
UL ratings

3-phase motor rating – In-Line

Softstarters	Motor power P (hp) and full load current FLA, (A)				
	Max	U_e	U_e	U_e	U_e
	FLA	200V / 208V	220V / 240V	440V / 480V	550V / 600V
Type	A	hp	hp	hp	hp
PSE18	18	5	5	10	15
PSE25	25	7.5	7.5	15	20
PSE30	28	7.5	10	20	25
PSE37	34	10	10	25	30
PSE45	42	10	15	30	40
PSE60	60	20	20	40	50
PSE72	68	20	25	50	60
PSE85	80	25	30	60	75
PSE105	104	30	40	75	100
PSE142	130	40	50	100	125
PSE170	169	60	60	125	150
PSE210	192	60	75	150	200
PSE250	248	75	100	200	250
PSE300	302	100	100	250	300
PSE370	361	125	150	300	350