

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 softstarter range with torque control. This makes the PSE range an ideal choice for pumping applications where water hammering normally is a big problem. The compactness and advanced functionality of the PSE means that it is also a very efficient solution for other 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, preventing 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. This eliminates the need of an additional current transformer. The analog output signal can also be used as an analog input to a PLC.

Display and keypad

The setup of the PSE softstarter is done using the four button keypad and the illuminated display, providing a quick and easy setup. 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 setup 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 - Supply 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 showing functions.
Language neutral



External keypad with same design as the fixed HMI

PSE – The efficient range

Overview



PSE18 ... PSE105

Normal start In-line connected (400 V) kW IEC, max. A (440-480 V) hp UL, max FLA	Softstarter, type								
	PSE18	PSE25	PSE30	PSE37	PSE45	PSE60	PSE72	PSE85	PSE105
	7.5	11	15	18.5	22	30	37	45	55
	18	25	30	37	45	60	72	85	106
	10	15	20	25	30	40	50	60	75
	18	25	28	34	42	60	68	80	104
Using MCCB only, type 1 coordination will be achieved	400 V, 40 °C								
	MCCB (35 kA), type								
	T2N160								T3N250
	MCCB (50 kA), type								
	T2S160								T3S250
To achieve type 2 coordina- tion, 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 re- commended 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	AF52	AF65	AF80	AF96	AF116
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								

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

Normal start In-line connected (400 V) kW IEC, max. A (440-480 V) hp UL, max FLA	Softstarter, type					
	PSE142	PSE170	PSE210	PSE250	PSE300	PSE370
	75	90	110	132	160	200
	143	171	210	250	300	370
	100	125	150	200	250	300
	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 coordina- tion, semi-conductor fuses must be used	Fuse protection (85kA), Semiconductor fuses, Bussmann, type					
	170M5809	170M5810	170M5812	170M5813	170M6812	170M6813
Suitable switch fuse for re- commended 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					
	AF140	AF190	AF205	AF265	AF305	AF370
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 the 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 the softstarer selection tool 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 <u>one</u> 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_c , 100-250 V AC, 50/60 Hz

Motor power			IEC Max rated operational current I_e A	Type	Order code	Weight kg 1 piece
230 V P kW	400 V P kW	500 V P kW				
4	7.5	11	18	PSE18-600-70	1SFA897101R7000	2.4
5.5	11	15	25	PSE25-600-70	1SFA897102R7000	2.4
7.5	15	18.5	30	PSE30-600-70	1SFA897103R7000	2.4
9	18.5	22	37	PSE37-600-70	1SFA897104R7000	2.4
11	22	30	45	PSE45-600-70	1SFA897105R7000	2.4
15	30	37	60	PSE60-600-70	1SFA897106R7000	2.4
18.5	37	45	72	PSE72-600-70	1SFA897107R7000	2.5
22	45	55	85	PSE85-600-70	1SFA897108R7000	2.5
30	55	75	106	PSE105-600-70	1SFA897109R7000	2.5
40	75	90	143	PSE142-600-70	1SFA897110R7000	4.2
45	90	110	171	PSE170-600-70	1SFA897111R7000	4.2
59	110	132	210	PSE210-600-70	1SFA897112R7000	12.4
75	132	160	250	PSE250-600-70	1SFA897113R7000	13.9
90	160	200	300	PSE300-600-70	1SFA897114R7000	13.9
110	200	250	370	PSE370-600-70	1SFA897115R7000	13.9

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Heavy-duty starts, class 30, in-line, ordering details



PSE18 ... PSE105



PSE142 ... PSE170



PSE210 ... PSE370

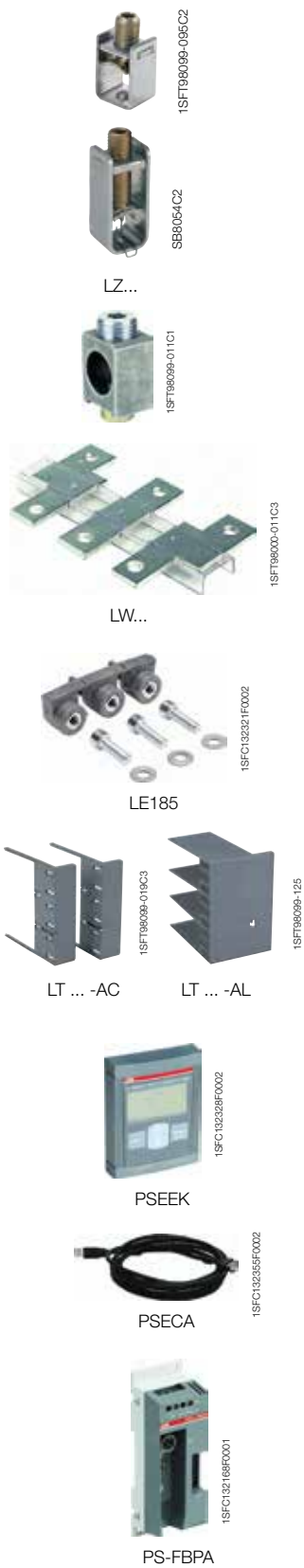
PSE18 ... PSE370

Rated operational voltage, U_e , 208-600 V AC
Rated control supply voltage, U_c , 100 - 250 V AC, 50/60 Hz

Motor power			IEC Max rated operational current I_e A	Type	Order code	Weight kg 1 piece
230 V P kW	400 V P kW	500 V P kW				
3	5.5	7.5	12	PSE18-600-70	1SFA897101R7000	2.4
4	7.5	11	18	PSE25-600-70	1SFA897102R7000	2.4
5.5	11	15	25	PSE30-600-70	1SFA897103R7000	2.4
7.5	15	18.5	30	PSE37-600-70	1SFA897104R7000	2.4
9	18.5	22	37	PSE45-600-70	1SFA897105R7000	2.4
11	22	30	45	PSE60-600-70	1SFA897106R7000	2.4
15	30	37	60	PSE72-600-70	1SFA897107R7000	2.5
18.5	37	45	72	PSE85-600-70	1SFA897108R7000	2.5
22	45	55	85	PSE105-600-70	1SFA897109R7000	2.5
30	55	75	106	PSE142-600-70	1SFA897110R7000	4.2
40	75	90	143	PSE170-600-70	1SFA897111R7000	4.2
45	90	110	171	PSE210-600-70	1SFA897112R7000	12.4
59	110	132	210	PSE250-600-70	1SFA897113R7000	13.9
75	132	160	250	PSE300-600-70	1SFA897114R7000	13.9
90	160	200	300	PSE370-600-70	1SFA897115R7000	13.9

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Accessories



Cable connectors for Cu cables

For softstarter type	Wire range mm ²	Tightening torque max. Nm	Type	Order code	Pack ^{ing} piece	Weight kg 1 piece
PSE142 ...170	6-120	14	–	1SDA06691R1	3	0.200
PSE142 ...170	2 x (50-120)	16	LZ185-2C/120	1SFN074709R1000	3	0.100
PSE210 ... 370	16-300	25	–	1SDA055016R1	3	0.133

Cable connectors for Al and Cu cables

For softstarter type	Wire range mm ²	Tightening torque max. Nm	Type	Order code	Pack ^{ing} piece	Weight kg 1 piece
PSE142 ...170	95-185	31	–	1SDA054988R1	3	0.078
PSE210 ... 370	185-240	43	–	1SDA055020R1	3	0.133

Terminal enlargements

For softstarter type	Dimensions hole ø mm ²	bar mm	Type	Order code	Pack ^{ing} piece	Weight kg 1 piece
PSE18...105	6.5	15 x 3	LW110	1SFN074307R1000	1	0.100
PSE142...170	10.5	17.5 x 5	LW185	1SFN074707R1000	1	0.450
PSE210...370	10.5	20 x 5	LW300	1SFN075107R1000	1	1.230

Terminal nut washer

For softstarter type	Req. qty	Type	Order code	Pack ^{ing} piece	Weight kg 1 piece
PSE142...170	2	LE185	1SFN074716R1000	2	0.200
PSE210...370	2	LE300	1SFN075116R1000	2	0.300

Terminal shrouds

For softstarter type	Suitable for	Req. qty	Type	Order code	Pack ^{ing} piece	Weight kg 1 piece
PSE142...170	Cable connectors	2	LT185-AC	1SFN124701R1000	2	0.050
PSE142...170	Compression lugs	2	LT185-AL	1SFN124703R1000	2	0.220
PSE210...370	Cable connectors	2	LT300-AC	1SFN125101R1000	2	0.070
PSE210...370	Compression lugs	2	LT300-AL	1SFN125103R1000	2	0.280

External keypad including a 3m cable

For softstarter type	Type	Order code	Pack ^{ing} piece	Weight kg 1 piece
PSE18...370	PSEEK	1SFA897100R1001	1	–

USB-cable for Service Engineer Tool

For softstarter type	Type	Order code	Pack ^{ing} piece	Weight kg 1 piece
PSE18...370	PSECA	1SFA897201R1001	1	0.130

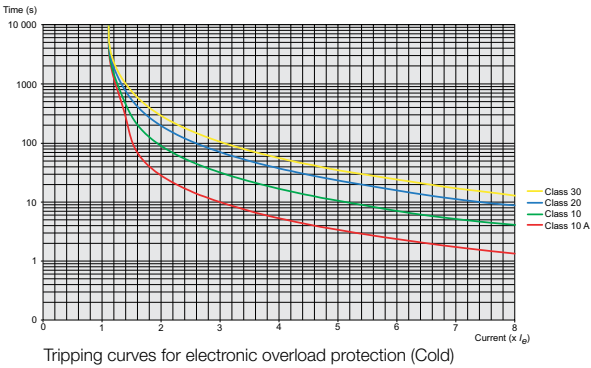
FieldBusPlug connection accessory

For softstarter type	Type	Order code	Pack ^{ing} piece	Weight kg 1 piece
The same accessory for all sizes	PS-FBPA	1SFA896312R1002	1	0.060
ABB's FieldBusPlug suitable for all sizes. See page 50-53				

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Technical data

Rated insulation voltage U _i	600 V	Analog output	
Rated operational voltage U _e	208 ... 600 V +10%/-15%	Output signal reference	4 ... 20 mA
Rated control supply voltage U _s	100 ... 250 V +10%/-15%, 50/60 Hz ±5 %	Type of output signal	I Amp
Rated control circuit voltage U _c	Internal 24 V DC	Scaling	Fixed at 1.2 x I _e
Starting capacity at I _e	4xI _e for 10 sec.	Control circuit	
Number of starts per hour	10 ¹⁾	Number of inputs	3 (start, stop, reset of faults)
Overload capability, Overload class	10	Signal indication LED's	
Ambient temperature		On / Ready	green flashing / steady
During operation	-25 ... +60 °C ²⁾	Run / TOR	green flashing / steady
During storage	-40 ... +70 °C	Protection	yellow
Maximum Altitude	4000 m ³⁾	Fault	red
Degree of protection		Protections	
Main circuit	IP00	Electronic overload	Yes (Class 10A, 10, 20, 30)
Supply and control circuit	IP20	Locked rotor protection	Yes
Main circuit		Underload protection	Yes
Built-in by-pass	Yes	Field bus connection	
Cooling system - fan cooled (thermostat controlled)	Yes	Connection for ABB FieldBusPlug	Yes (option)
HMI for settings		External keypad	
Display	4 7-segments and icons. Illuminated	Display LCD type	
Keypad	2 selection keys and 2 navigation keys	Ambient temperature	
Main settings		during operation	-25 ... +60 °C
Setting current	Size dependent	during storage	-40 ... +70 °C
Ramp time during start	1-30 sec	Degree of protection	IP66
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		



¹⁾ Valid for 50% on time and 50% off time. If other data is required, please contact your sales office

²⁾ Above 40 °C up to max. 60 °C reduce the rated current with 0.6% per °C.

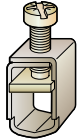
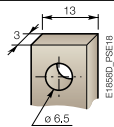
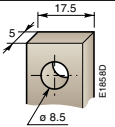
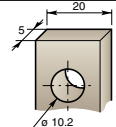
³⁾ When used at high altitudes above 1000 meters up to 4000 meters you need to derate the rated current using the following formula.
[% of I_e = 100 - $\frac{x - 1000}{150}$] x = actual altitude for the softstarter

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	6.5	8.5	10.2
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's overload protection		Max power loss at rated I _e (Internal by-pass)				Power requirements supply circuit Holding (VA) / Pull-in (VA)
		Current range		Max fuse rating - main circuit ¹⁾			
				Bussmann fuses, DIN43 620 (Knife)			
Type	Type	A	W	A	Type	Size	
PSE							
PSE18	Integrated	5.4-18	0.2	40	170M1563	000	16/19.9
PSE25	Integrated	7.5-25	0.4	50	170M1564	000	16/19.9
PSE30	Integrated	9-30	0.5	80	170M1566	000	16/19.9
PSE37	Integrated	11.1-37	0.8	100	170M1567	000	16/19.9
PSE45	Integrated	13.5-45	1.2	125	170M1568	000	16/19.9
PSE60	Integrated	18-60	2.2	160	170M1569	000	16/19.9
PSE72	Integrated	21.6-72	3.1	250	170M1571	000	16/19.9
PSE85	Integrated	25.5-85	4.3	315	170M1572	000	16/19.9
PSE105	Integrated	31.8-106	6.6	400	170M3819	1*	16/19.9
PSE142	Integrated	42.9-143	12.1	450	170M5809	2	16/31
PSE170	Integrated	51.3-171	17.6	500	170M5810	2	16/31
PSE210	Integrated	63-210	8.8	630	170M5812	2	30/700
PSE250	Integrated	75-250	12.5	700	170M5813	2	30/700
PSE300	Integrated	90.6-302	18	800	170M6812	3	30/700
PSE370	Integrated	111-370	27.4	900	170M6813	3	30/700

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 FLA A	U _e 200 V/208 V hp	U _e 220 V/240 V hp	U _e 440 V/480 V hp	U _e 550 V/600 V hp
Type					
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

