

# 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<sub>n</sub>
- 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.

# PSE – The efficient range

## Description

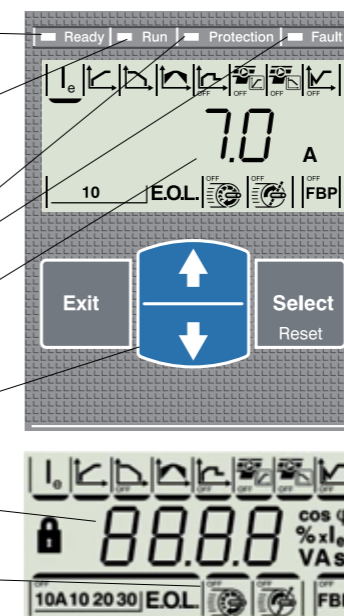
The PSE softstarter can be selected according to the rated motor power in normal duty applications like pumps, compressors, elevators, escalators, short conveyor belts and bow thrusters. See page 30.

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	

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 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](http://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 softstarter selection tool  
available at [www.abb.com/lowvoltage](http://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



# PSE – The efficient range

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



### PSE18 ... PSE370

Rated operational voltage,  $U_o$ , 208-600 V AC

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

#### Motor power

230 V P kW	400 V P kW	500 V P kW	IEC Max rated operational current $I_e$ A	Type	Order code	Weight kg 1 piece
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



PSE18 ... PSE105



PSE142 ... PSE170



PSE210 ... PSE370

### PSE18 ... PSE370

Rated operational voltage,  $U_o$ , 208-600 V AC

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

#### Motor power

230 V P kW	400 V P kW	500 V P kW	IEC Max rated operational current $I_e$ A	Type	Order code	Weight kg 1 piece
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



PSE18 ... PSE105



PSE142 ... PSE170



PSE210 ... PSE370

# PSE – The efficient range Accessories



## Cable connectors for Cu cables

For softstarter type	Wire range mm <sup>2</sup>	Tightening torque max. Nm	Type	Order code	Pack <sup>ing</sup> 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 <sup>2</sup>	Tightening torque max. Nm	Type	Order code	Pack <sup>ing</sup> 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 <sup>2</sup>	bar mm	Type	Order code	Pack <sup>ing</sup> 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 <sup>ing</sup> 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 <sup>ing</sup> 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 <sup>ing</sup> piece	Weight kg 1 piece
PSE18...370	PSEEK	1SFA897100R1001	1	-

## USB-cable for Service Engineer Tool

For softstarter type	Type	Order code	Pack <sup>ing</sup> piece	Weight kg 1 piece
PSE18...370	PSECA	1SFA897201R1001	1	0.130

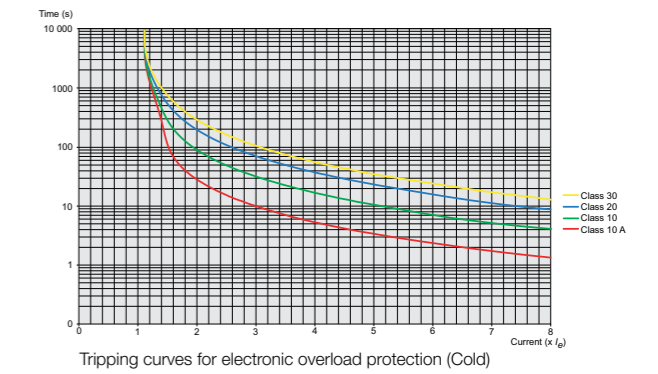
## FieldBusPlug connection accessory

For softstarter type	Type	Order code	Pack <sup>ing</sup> 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				

# PSE – The efficient range Technical data

Rated insulation voltage U <sub>i</sub>	600 V
Rated operational voltage U <sub>n</sub>	208 ... 600 V +10%/-15%
Rated control supply voltage U <sub>c</sub>	100 ... 250 V +10%/-15%, 50/60 Hz ±5 %
Rated control circuit voltage U <sub>c</sub>	Internal 24 V DC
Starting capacity at I <sub>s</sub>	4xI <sub>n</sub> for 10 sec.
Number of starts per hour	10 <sup>1)</sup>
Overload capability, Overload class	10
Ambient temperature	
During operation	-25 ... +60 °C <sup>2)</sup>
During storage	-40 ... +70 °C
Maximum Altitude	4000 m <sup>3)</sup>
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 <sub>n</sub>
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 <sub>c</sub>	250 V AC/24 V DC <sup>4)</sup>
Rated thermal current I <sub>th</sub>	3 A
Rated operational current I <sub>c</sub> at AC-15 (U <sub>n</sub> = 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 <sub>n</sub>
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



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

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

<sup>3)</sup> When used at high altitudes above 1000 meters up to 4000 meters you need to derate the rated current using the following formula.

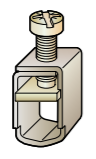
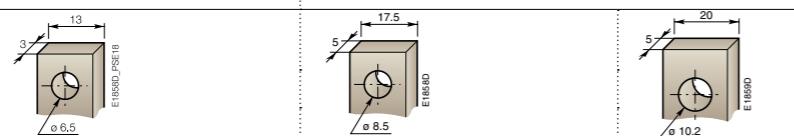
$$[\% \text{ of } I_n = 100 - \frac{x - 1000}{150}] \times x = \text{actual altitude for the softstarter}$$

<sup>4)</sup> 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
<b>Main circuit</b>					
Connection clamp 					
Solid/stranded	1 x mm <sup>2</sup>	2.5–70			See accessories
Solid/stranded	2 x mm <sup>2</sup>	2.5–70			See accessories
Tightening torque (recommended)	Nm	9			See accessories
<b>Connection bar</b>					
					
Width and thickness	mm	13		17.5	20
Hole diameter	mm	ø 6.5		ø 8.5	ø 10.2
Tightening torque (recommended)	Nm	9		18	28
<b>Supply and control circuit</b>					
Connection clamp					
Solid/stranded	1 x mm <sup>2</sup>	2.5		2.5	2.5
Solid/stranded	2 x mm <sup>2</sup>	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 <sub>e</sub> (Internal by-pass)	Max fuse rating - main circuit <sup>1)</sup> Bussmann fuses, DIN43 620 (Knife)			Power requirements supply circuit Holding (VA) / Pull-in (VA)
	Type	Current range A		A	Type	Size	
<b>PSE</b>							
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

<sup>1)</sup>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 <sub>e</sub> 200 V/208 V hp	U <sub>e</sub> 220 V/240 V hp	U <sub>e</sub> 440 V/480 V hp	U <sub>e</sub> 550 V/600 V hp
<b>PSE18</b>	18	5	5	10	15
<b>PSE25</b>	25	7.5	7.5	15	20
<b>PSE30</b>	28	7.5	10	20	25
<b>PSE37</b>	34	10	10	25	30
<b>PSE45</b>	42	10	15	30	40
<b>PSE60</b>	60	20	20	40	50
<b>PSE72</b>	68	20	25	50	60
<b>PSE85</b>	80	25	30	60	75
<b>PSE105</b>	104	30	40	75	100
<b>PSE142</b>	130	40	50	100	125
<b>PSE170</b>	169	60	60	125	150
<b>PSE210</b>	192	60	75	150	200
<b>PSE250</b>	248	75	100	200	250
<b>PSE300</b>	302	100	100	250	300
<b>PSE370</b>	361	125	150	300	350

