

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 (-13 to 140 °F)
- 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 $1.5 - 7 \times I_n$
- 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 the built-in 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 by 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.

PSE – The efficient range

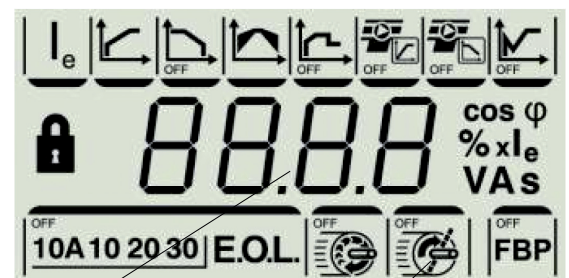
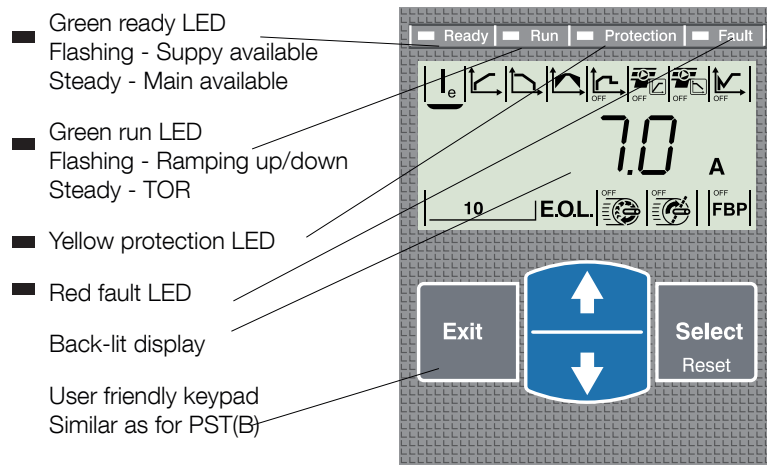
Description

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 18.

For heavy duty applications like centrifugal fans, crushers, mixers, mills, stirrers and long conveyor belts, select a softstarter from page 19. The softstarter selection tool ProSoft can also be used for a more optimized selection.



Settings



Four digits showing values and messages

Icon's for showing functions. Language neutral

PSE – The efficient range

Overview



PSE18 ... PSE105

Normal start
In-line connected

(480 V) hp
(600 V) hp
UL/CSA, Max FLA

Softstarter									
PSE18	PSE25	PSE30	PSE37	PSE45	PSE60	PSE72	PSE85	PSE105	
10	15	20	25	30	40	50	60	75	
15	20	25	30	40	50	60	75	100	
18	25	28	34	42	60	68	80	104	

Using MCCB only, type 1
coordination will be achieved

MCCB (10 kA, 600 V, 40 °C)						MCCB (25 kA, 600 V, 40 °C)		
T3S070TW	T3S100TW	T3S125TW	T3S150TW	T3S225TW		T4S250TW	T5S300TW	

Using J fuses, type 1
coordination will be
achieved

175 % rating
Max rating

J type fuse protection (85 kA)									
30 A	40 A	45 A	50 A	70 A	100 A	110 A	125 A	175 A	
40 A	50 A	60 A	80 A	100 A	125 A	150 A	175 A	225 A	

Minimum enclosure size ¹⁾

600 x 500 x 300 mm / 24 x 20 x 12 in

Fusible disconnect switch
for the above J fuses

Fusible disconnect switch									
OS30	OS60	OS100	OS200						

The line contactor is not
required for the softstarter
itself but often used to open
if OL trips

Line contactor									
AF26	AF30	AF50	AF63	AF75	AF95	AF110			

Overload protection is used
to protect the motor from
over heating

Electronic overload relay									
Built-in									

The by-pass will reduce the
power loss of the softstarter

By-pass									
Built-in									

¹⁾ Enclosure that has two latching points minimum. For use in pollution degree 2 environment.

PSE – The efficient range

Overview



PSE142 ... PSE170



PSE210 ... PSE370

Normal start
In-line connected

(480 V) hp
(600 V) hp
UL/CSA, Max FLA

Softstarter					
PSE142	PSE170	PSE210	PSE250	PSE300	PSE370
100	125	150	200	250	300
125	150	200	250	300	350
130	169	192	248	302	361

Using MCCB only, type 1
coordination will be achieved

MCCB (25 kA), 600 V, 40 °C					
T5S400BW	T6S600BW			T6S800BW	

Using J fuses, type 1
coordination will be
achieved

175 % rating

Max rating

J type fuse protection (85 kA)					
225 A	250 A	300 A	400 A	500 A	600 A
300 A	350 A	450 A	500 A	600 A	700 A

Minimum enclosure size ¹⁾

900 x 760 x 300 mm /
36 x 30 x 12 in

1200 x 900 x 300 mm / 48 x 36 x 12 in

Fusible disconnect switch
for the above J fuses

Fusible disconnect switch					
	OS400			OS600	

The line contactor is not
required for the softstarter
itself but often used to open
if OL trips

Line contactor					
AF145	AF185	AF210	AF260	AF300	AF400

Overload protection is used
to protect the motor from
over heating

Electronic overload relay					
			Built-in		

The by-pass will reduce the
power loss of the softstarter

By-pass					
			Built-in		

¹⁾ Enclosure that has two latching points minimum. For use in pollution degree 2 environment.

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 18	Ordering - see page 19
Typical applications	
• Bow thruster • Compressor • Elevator	• Centrifugal pump • Conveyor belt (short) • Escalator • Centrifugal fan • Crusher • Mixer • Conveyor belt (long) • Mill • 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

230 V kW	400 V kW	500 V kW	208 V hp	230 V hp	480 V hp	600 V hp	UL/CSA Max rated operational current I_e A	Part number	Weight kg (lb)
4	7.5	11	5	5	10	15	18	PSE18-600-70	2.4 (5.29)
5.5	11	15	7.5	7.5	15	20	25	PSE25-600-70	2.4 (5.29)
7.5	15	18.5	7.5	10	20	25	28	PSE30-600-70	2.4 (5.29)
9	18.5	22	10	10	25	30	34	PSE37-600-70	2.4 (5.29)
11	22	30	10	15	30	40	42	PSE45-600-70	2.4 (5.29)
15	30	37	20	20	40	50	60	PSE60-600-70	2.4 (5.29)
18.5	37	45	20	25	50	60	68	PSE72-600-70	2.5 (5.51)
22	45	55	25	30	60	75	80	PSE85-600-70	2.5 (5.51)
30	55	75	30	40	75	100	104	PSE105-600-70	2.5 (5.51)
40	75	90	40	50	100	125	130	PSE142-600-70	4.2 (9.26)
45	90	110	60	60	125	150	169	PSE170-600-70	4.2 (9.26)
59	110	132	60	75	150	200	192	PSE210-600-70	12.4 (27.34)
75	132	160	75	100	200	250	248	PSE250-600-70	13.9 (30.64)
90	160	200	100	100	250	300	302	PSE300-600-70	13.9 (30.64)
110	200	250	125	150	300	350	361	PSE370-600-70	13.9 (30.64)

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_c , 100 - 250 V AC, 50/60 Hz

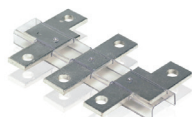
230 V kW	400 V kW	500 V kW	208 V hp	230 V hp	480 V hp	600 V hp	UL/CSA Max rated operational current I_e A	Part number	Weight kg (lb)
3	5.5	7.5	3	3	7.5	10	11	PSE18-600-70	2.4 (5.29)
4	7.5	11	5	5	10	15	18	PSE25-600-70	2.4 (5.29)
5.5	11	15	7.5	7.5	15	20	25	PSE30-600-70	2.4 (5.29)
7.5	15	18.5	7.5	7.5	20	25	28	PSE37-600-70	2.4 (5.29)
9	18.5	22	10	10	25	30	34	PSE45-600-70	2.4 (5.29)
11	22	30	15	15	30	40	42	PSE60-600-70	2.4 (5.29)
15	30	37	20	20	40	50	60	PSE72-600-70	2.5 (5.51)
18.5	37	45	25	25	50	60	68	PSE85-600-70	2.5 (5.51)
22	45	55	30	30	60	75	80	PSE105-600-70	2.5 (5.51)
30	55	75	40	40	75	100	104	PSE142-600-70	4.2 (9.26)
40	75	90	50	50	100	125	130	PSE170-600-70	4.2 (9.26)
45	90	110	60	60	125	150	169	PSE210-600-70	12.4 (27.34)
59	110	132	75	75	150	200	192	PSE250-600-70	13.9 (30.64)
75	132	160	75	75	200	250	248	PSE300-600-70	13.9 (30.64)
90	160	200	125	125	250	300	302	PSE370-600-70	13.9 (30.64)

PSE – The efficient range

Accessories



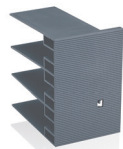
ATK...



LW...



LE185



LT ... -AL



PSEEK



PS-FBPA

Cable connectors for Al and Cu cables

For softstarter type	Wire range mm ² (AWG)	Tightening torque max. Nm (lb-in)	Part number	Pack ^{ing} piece	Weight kg (lb) 1 piece
PSE142 ... 170	25-150 (4 AWG - 300 MCM)	13.5 (275 lb-in)	ATK185	3	0.100 (0.220)
PSE210 ... 370	25-185 (4 AWG - 400 MCM)	43 (375 lb-in)	ATK300	3	0.168 (0.370)
PSE210 ... 370	2 x 25-240 (2 x 4 AWG - 500 MCM)	43 (375 lb-in)	ATK300/2	3	0.434 (0.957)

Terminal enlargements

For softstarter type	Dimensions hole ø mm (in)	bar mm (in)	Part number	Pack ^{ing} piece	Weight kg (lb) 1 piece
PSE142...170	10.5 (0.413)	20 x 5 (0.787 x 0.197)	LW185	1	0.450 (0.992)
PSE210...370	13 (0.512)	40 x 6 (1.575 x 0.236)	LW300	1	1.230 (2.712)

Terminal nut washer kits ¹⁾

For softstarter type	Req. qty	Part number	Pack ^{ing} piece	Weight kg (lb) 1 piece
PSE142...170	2	LE185	2	0.200 (0.441)
PSE210...370	2	LE300	2	0.300 (0.661)

Terminal shrouds

For softstarter type	Suitable for	Req. qty	Part number	Pack ^{ing} piece	Weight kg (lb) 1 piece
PSE142...170	Compression lugs	2	LT185-AL	2	0.220 (0.485)
PSE210...370	Compression lugs	2	LT300-AL ²⁾	2	0.280 (0.617)

External keypad including a 3m cable

For softstarter type	Part number	Pack ^{ing} piece	Weight kg (lb) 1 piece
PSE18...370	PSEEK	1	–

Fieldbus plug connection accessory

For softstarter type	Part number	Pack ^{ing} piece	Weight kg (lb) 1 piece
The same accessory for all sizes	PS-FBPA	1	0.060 (0.132)

¹⁾ The terminal nut washer kits come standard with the PSE unit.
²⁾ The LT300-AL is not compatible with ATK300/2 cable connector.

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	$4xI_n$ for 10 sec.
Number of starts per hour	10 ¹⁾
Overload capability, Overload Class	10
Ambient temperature	
During operation	-25 ... +60 °C (-13 to 140 °F) ²⁾
During storage	-40 ... +70 °C (-40 to 158 °F)
Maximum Altitude	4000 m (13123 ft) 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	1,5-7 xI_n
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, with $3.5 \times I_n$ for 7 seconds. If other data is required, please contact your sales office

²⁾ Above 40 °C (104 °F) up to max. 60 °C (140 °F) reduce the rated current with 0.6 % per °C (0.33 % per °F).

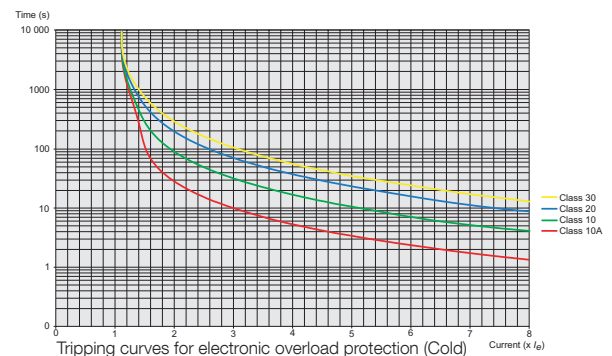
³⁾ When used at high altitudes above 1000 meters (3281 ft) up to 4000 meters (13123 ft) you need to derate the rated current using the following formula.

$$\left[\% \text{ of } I_e = 100 - \frac{x - 1000}{150} \right] \quad x = \text{actual altitude for the softstarter in meter}$$

$$\left[\% \text{ of } I_e = 100 - \frac{x - 3280}{497} \right] \quad x = \text{actual altitude for the softstarter in feet}$$

⁴⁾ A common voltage needs to be used for all 3 signal relays.

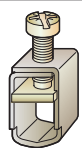
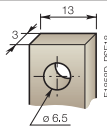
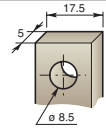
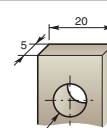
Analog output	
Output signal reference	4 ... 20 mA
Type of output signal	I Amp
Scaling	Fixed at $1.2 \times I_e$
Control circuit	
Number of inputs	3 (start, stop, reset of faults)
Signal indication LED's	
On / Ready	Green flashing / steady
Run / TOR	Green flashing / steady
Protection	Yellow
Fault	Red
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 (-13 to 140 °F)
during storage	-40 ... +70 °C (-40 to 158 °F)
Degree of protection	IP66



PSE – The efficient range

Technical data

Cross section of connection cables

		Softstarter PSE18 ... PSE105		PSE142 ... PSE170	PSE210 ... PSE370
Main circuit					
Connection clamp					
Solid/stranded	1 x mm² (AWG)	2.5 – 70 (14-1/0)		See accessories	
Solid/stranded	2 x mm² (AWG)	2.5 – 70 (14-1/0)		See accessories	
Tightening torque (recommended)	Nm (lb-in)	9 (79.66)		See accessories	
Connection bar					
					
Width and thickness	mm (in)	13 (0.512) x 3 (0.118)		17.5 (0.689) x 5 (0.197)	20 (0.787) x 5 (0.197)
Hole diameter	mm (in)	6.5 (0.256)		8.5 (0.335)	10.2 (0.402)
Tightening torque (recommended)	Nm (lb-in)	9 (79.66)		18 (159.31)	28 (247.82)
Supply and control circuit					
Connection clamp					
Solid/stranded	1 x mm² (AWG)	2.5 (14)		2.5 (14)	2.5 (14)
Solid/stranded	2 x mm² (AWG)	1.5 (16)		1.5 (16)	1.5 (16)
Tightening torque (recommended)	Nm (lb-in)	0.5 (4.43)		0.5 (4.43)	0.5 (4.43)

Semi-conductor fuse ratings and power losses

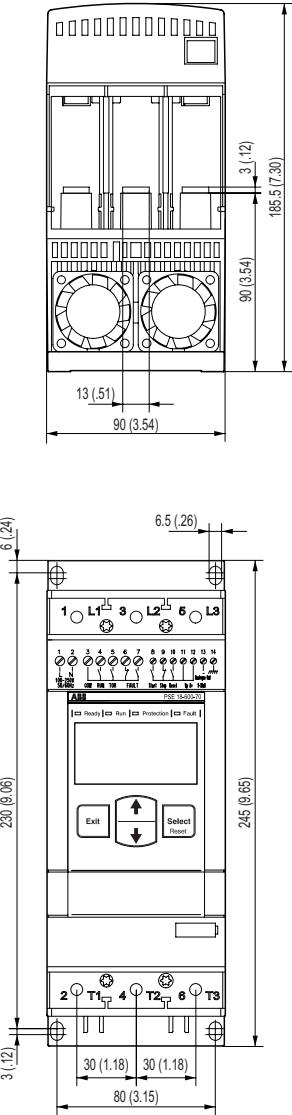
For Softstarter	Overload protection		Max power loss at rated I _n (Internal by-pass)	Max semi-conductor fuse rating - main circuit Coordination type 2 (85 kA)			Supply circuit power requirements ¹⁾
	Type	Current range		Bussman Fuses, DIN43 620			
				A	Type	Size	
Type	Type	A	W	A	Type	Size	VA/VA pull 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 use a maximum 6 A time-delay fuse or an MCB with type C characteristics.

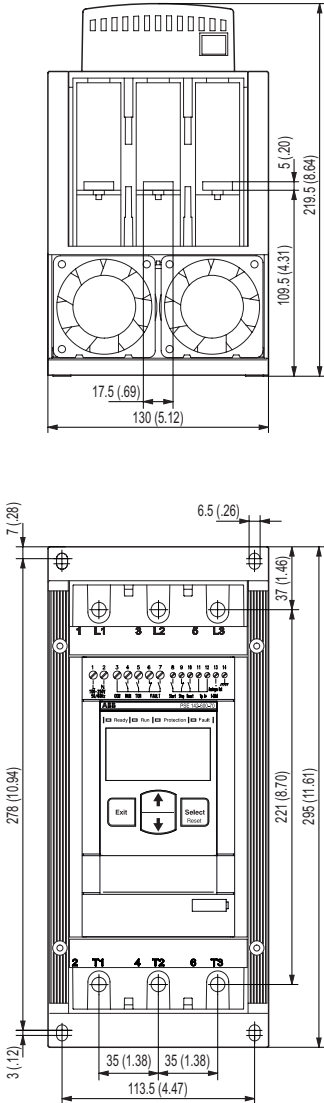
Dimensions

PSE softstarters

PSE18 ... 105



PSE142 ...170



PSE210 ... 370

