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# **PSE**

## The efficient range

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# 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



SECURE  
MOTOR  
RELIABILITY

### Basic motor protection and current limit

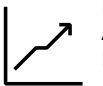
The PSE includes the most important protections for handling different load situations that can happen to pumps e.g. overload and underload. The current limit gives you more control of the motor during start and allows you to start your motor in weaker networks.



IMPROVE  
INSTALLATION  
EFFICIENCY

### Saving time and money with built-in bypass and compact design

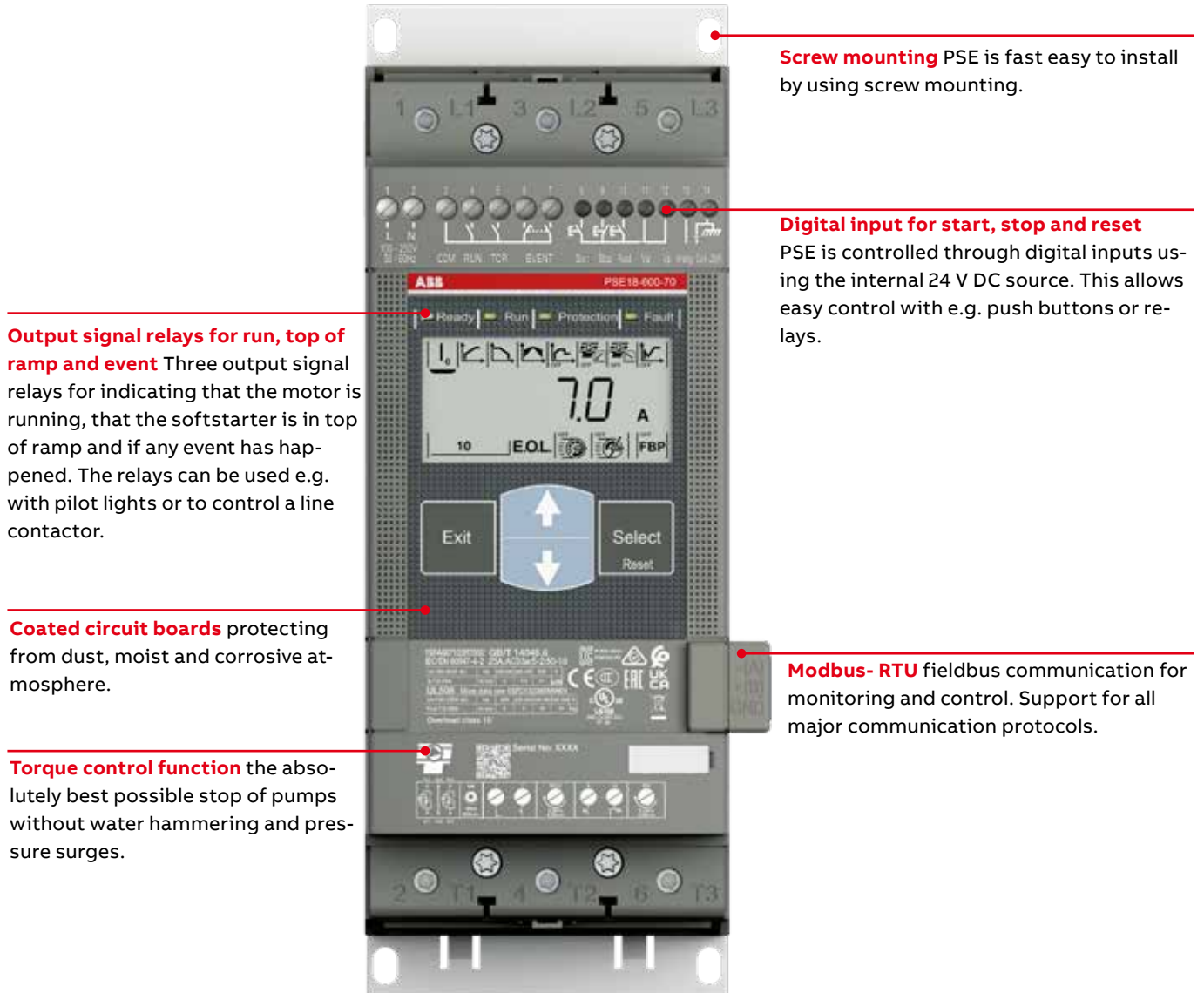
On the PSE, the bypass is built in and verified by ABB, saving you time during installation and space in your panel. The keypad is language neutral and illuminated for easy set-up and operation in field. The compact design makes installation fast and easy.



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.

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

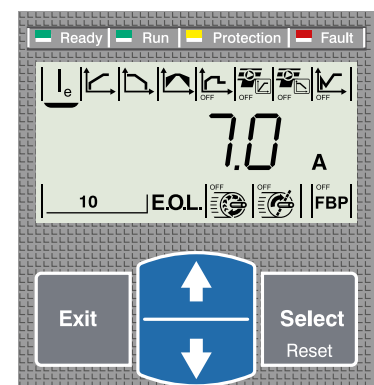
**Modbus-RTU** fieldbus communication for monitoring and control. Support for all major communication protocols.

## 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

Softstarter	Technical data				Using MCCB only, type 1 coordination will be achieved <sup>1)</sup> MCCB (400 V, 40 °C)		To achieve type 2 coordination, semi-conductor fuses must be used <sup>1)</sup>	Suitable switch fuse for recommended semi-conductor fuses <sup>1)</sup>	The line contactor is not required for the softstarter itself but often used to open if OL trips <sup>1)</sup>
	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

<sup>1)</sup> 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



PSE18 ... PSE105

PSE142 ... PSE170

PSE210 ... PSE370

#### 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.

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 $I_e$ A	UL/CSA rated operational power				FLA	Type	Order code	Net Weight (kg)	Net Weight (lb)
230V $P_e$ kW	400V $P_e$ kW	500V $P_e$ kW		200/208V $P_e$ hp	220/240V $P_e$ hp	440/480V $P_e$ hp	550/600V $P_e$ hp					
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 $I_e$ A	UL/CSA rated operational power				FLA	Type	Order code	Net Weight (kg)	Net Weight (lb)
230V $P_e$ kW	400V $P_e$ kW	500V $P_e$ kW		200/208V $P_e$ hp	220/240V $P_e$ hp	440/480V $P_e$ hp	550/600V $P_e$ hp					
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

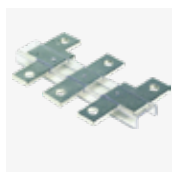
Article	Wire range mm <sup>2</sup>	Tightening torque max Nm	Type	Order code	Pkg qty	Net kg	lb
PSE142 ... PSE170	6...120	14	KIT FC Cu XT4 3pcs	1SDA066917R1	3	0.18	0.40
PSE142 ... PSE170	2 x (50...120)	16	LZ185-2C/120	1SFN074709R1000	3	0.10	0.22
PSE210 ... PSE370	16...300	25	T5 400 3pcs	1SDA055016R1	3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



Cable connectors for CU & AL cables

#### Cable connectors for Al and Cu cables

Article	Wire range mm <sup>2</sup>	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 mm <sup>2</sup>	bar mm <sup>2</sup>	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

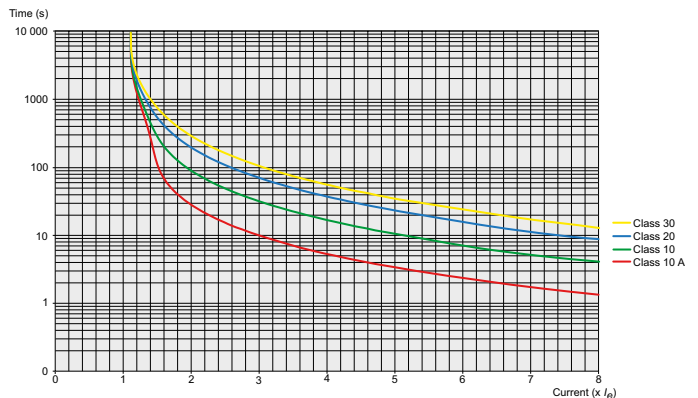
# PSE - The efficient range

## 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 $\pm$ 10 %
Rated control circuit voltage $U_c$	Internal 24 V DC
Starting capacity at $I_e$	$4 \times I_e$ for 10 sec.
Number of starts per hour	10 <sup>1)</sup>
Maximum Altitude	4000 m (13123 ft) <sup>3)</sup>
<b>Overload capability</b>	
Overload class	10
<b>Ambient temperature</b>	
During operation	-25...+60 °C (-13...+140 F) <sup>2)</sup>
During storage	-40...+70 °C (-40...+158 F)
<b>Degree of protection</b>	
Main circuit	IP00
Supply and control circuit	IP20
<b>Main circuit</b>	
Built-in bypass	Yes
Cooling system	fan cooled (thermostat controlled)
<b>HMI for settings</b>	
Display	4 7-segments and icons. Illuminated
Keypad	2 selection keys and 2 navigation keys
<b>Main settings</b>	
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	$1.5...7 \times I_e$
Torque control for start	Yes / No
Torque control for stop	Yes / No
Kick start	Off, 30...100%
<b>Signal relays</b>	
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 <sup>4)</sup>
Rated thermal current $I_{th}$	3 A
Rated operational current $I_e$ at AC-15 ( $U_e = 250$ V)	1.5 A
<b>Vibration test</b>	
According to IEC 60068-2-6:2007	

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

<sup>1)</sup> Valid for 50% on time and 50% off time. If other data is required, contact your local ABB office.  
<sup>2)</sup> 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).  
<sup>3)</sup> 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  $I_e = 100 - \frac{x - 1000}{150}$ ] x = actual altitude of the softstarter in meters.  
<sup>4)</sup> A common voltage needs to be used for all 3 signal relays.

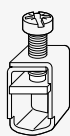
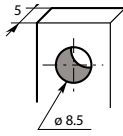
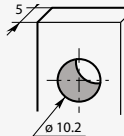






















Tripping curves for the integrated electronic overload protection  
 PSE has an integrated electronic overload protection that can be set to four different tripping classes. Below you find a curve for each tripping class in cold state. See page 66 for bigger picture.



## PSE - The efficient range

### Technical data

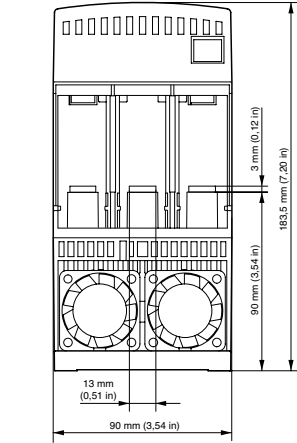
						
<b>Main terminals</b>						
<b>Article</b>		<b>PSE18... 105</b>	<b>PSE142... 170</b>	<b>PSE210... 370</b>		
<b>Cu cable - Flexible 1 x mm<sup>2</sup></b>		2.5...70 mm <sup>2</sup>	6...120 mm <sup>2</sup>	16...300 mm <sup>2</sup>		
 Clamp type		Included	1SDA066917R1	1SDA055016R1		
 Tightening torque		8 Nm	14 Nm	25 Nm		
<b>Cu cable - Flexible 2 x mm<sup>2</sup></b>		2.5...70 mm <sup>2</sup>	50...120 mm <sup>2</sup>	-		
 Clamp type		Included	1SFN074709R1000	-		
 Tightening torque		8 Nm	16 NM	-		
<b>Cu cable - Stranded 1 x mm<sup>2</sup></b>		2.5...70 mm <sup>2</sup>	6...120 mm <sup>2</sup>	16...300 mm <sup>2</sup>		
 Clamp type		Included	1SDA066917R1	1SDA055016R1		
 Tightening torque		8 Nm	14 Nm	25 Nm		
<b>Cu cable - Stranded 2 x mm<sup>2</sup></b>		2.5...70 mm <sup>2</sup>	50...120 mm <sup>2</sup>	-		
 Clamp type		Included	1SFN074709R1000	-		
 Tightening torque		8 Nm	16 NM	-		
<b>Al cable - Stranded 1 x mm<sup>2</sup></b>		-	95...185 mm <sup>2</sup>	185...240		
 Clamp type		-	1SDA054988R1	1SDA055020R1		
 Tightening torque		-	31 Nm	43 Nm		
<b>Lugs</b>						
 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)		
<b>Connection capacity acc to UL/CSA 1 x AWG/kcmil</b>		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		
<b>Connection capacity acc to UL/CSA 2 x AWG/kcmil</b>		-	-	4...500 kcmil		
 Clamp type		-	-	ATK300/2		
 Tightening torque		-	-	375 in lb		
<b>Supply and control circuit</b>						
 Cu cable - Stranded 1 x mm <sup>2</sup>		0.75...2.5 mm <sup>2</sup> (19...14 AWG)				
 Cu cable - Stranded 2 x mm <sup>2</sup>		0.75...1.5 mm <sup>2</sup> (19...16 AWG)				
 Tightening torque		0.5 Nm (4.4 in lb)				
<b>Fuse ratings and power losses</b>						
Softstarter	Current range	Max power loss at rated I <sub>n</sub>	Max fuse rating - main circuit <sup>1)</sup>			Power requirements supply circuit Holding (VA) / Pull-in (VA)
	A		Bussmann fuses, DIN43 620 (Knife)			
	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

<sup>1)</sup> For the supply circuit 6 A delayed, for MCB use C characteristics.

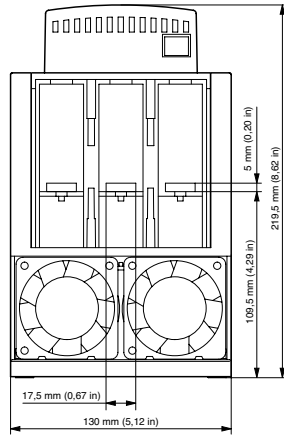
# PSE - The efficient range

## Dimensions

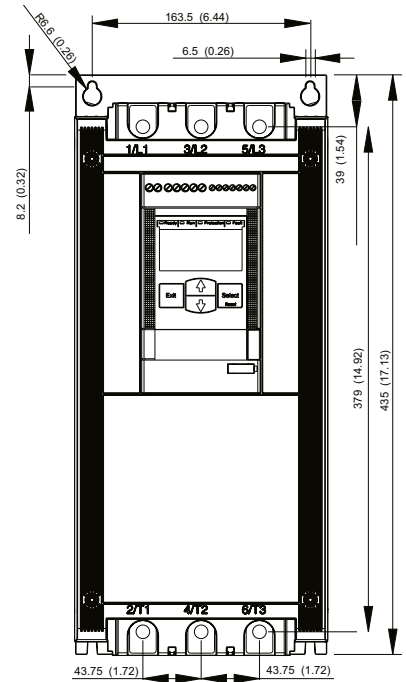
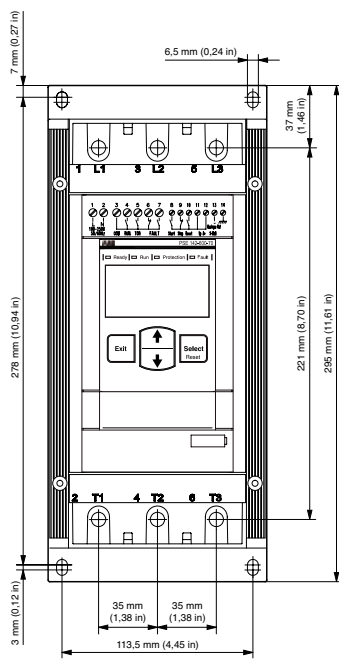
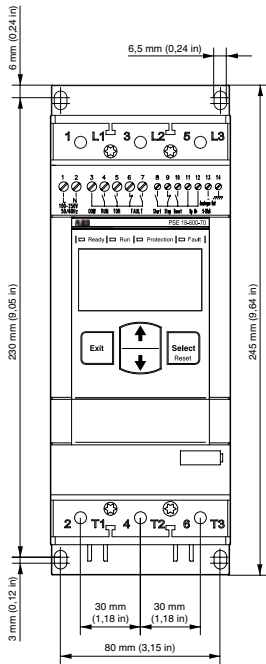
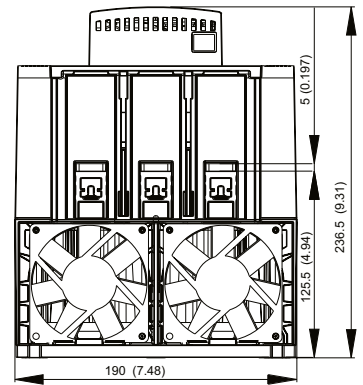
PSE18... 105



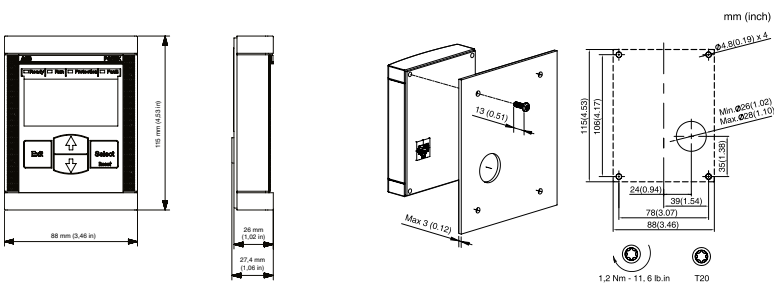
PSE142... 170



PSE210... 370



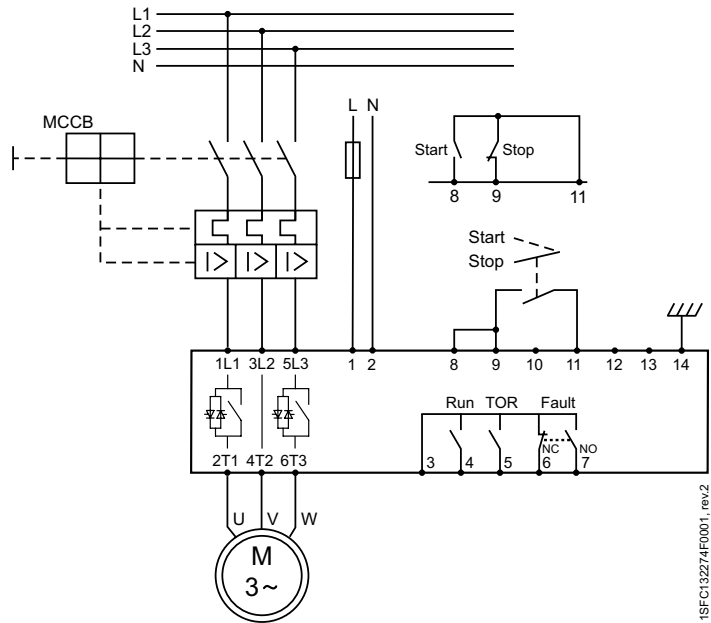
### External keypad (PSEEK)



# PSE - The efficient range

## Circuit diagrams

**PSE18... 370**  
**With MCCB and line contactor**



**With fuses and line contactor**

