

# Softstarters – overview

## Type PSR - the compact range



Softstarter, Type	PSR3 ... PSR16					PSR25 ... PSR30		PSR37 ... PSR45	
	PSR 3	PSR 6	PSR 9	PSR 12	PSR 16	PSR 25	PSR 30	PSR 37	PSR 45
Normal start, In Line connected :									
(480 V), hp	2	3	5	7.5	10	15	20	25	30
UL, Max. A	3.4	6.1	9	11	15.2	24.2	28	34	46.2
(400 V), kW	1.5	3	4	5.5	7.5	11	15	18.5	22
IEC, Max. A	3.9	6.8	9	12	16	25	30	37	45

### 480V, 104 °F

Manual Motor Starter, Type	MS116		MS325		MS450	
MS116	MS116	MS116	MS116	MS116	MS325	MS450

If using manual motor starter or an MCCB Type 1 coordination will be achieved.

### Fuse protection 480 V, J Fuse based on UL, max A x 1.75

10 A	10 A	20 A	20 A	30 A	40 A	50 A	60 A	80 A
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### Fused disconnect

OS30	OS30	OS30	OS30	OS30	OS60	OS60	OS60	OS100
10 A	10 A	20 A	20 A	30 A	40 A	50 A	60 A	80 A
5kA	5kA	5kA	5kA	5kA	5kA	5kA	5kA	5kA

Suitable fused disconnect for the recommended J fuses.

Short circuit current rating

### AC3 rated By-pass contactor, Type

A9	A9	A9	A12	A16	A26	A30	A40	A40
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The line contactor is not required for the softstarter itself but often used to open if OL trips.

### Thermal overload relay, Type

TA25DU	TA25DU	TA25DU	TA25DU	TA25DU	TA25DU	TA25DU	TA42DU	TA75DU
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The overload relay is always required to protect the motor.

### AC1 rated By-pass contactor, Type

Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in
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The by-pass contactor can be used to reduce the power loss of the softstarter but also to increase the number of starts/h.

### Current transformers

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The current transformer is required if the current limit function of the PSS is used.

## Type PSS - the flexible range



PSS18/30 ... 44/76				PSS50/85 ... 72/124			PSS85/147 ... 142/245			PSS175/3000/515		
PSS 18/30	PSS 30/52	PSS 37/64	PSS 44/76	PSS 50/85	PSS 60/105	PSS 72/124	PSS 85/147	PSS 105/181	PSS 142/245	PSS 175/300	PSS 250/430	PSS 300/515
10	20	25	30	30	40	50	60	75	100	125	150	200
18	28	34	40	47	56	67	85	105	125	156	225	248
7.5	15	18.5	22	25	30	37	45	55	75	90	132	160
18	30	37	44	50	60	72	85	105	142	175	250	300

### 480V, 104 °F

MCCB Branch protection, Type	T2			T3			T4		
T2	T2	T2	T2	T3	T3	T3	T4	T4	T5

### Fuse protection 65 kA (Max. fuse size), Semiconductor fuses, Bussman with fuse holder, Type

170M1364	170M1366	170M1368	170M1369	170M1369	170M1370	170M1371	170M1372	170M3019	170M3020	170M3021	170M5013	170M5015
170H1007	170H1007	170H1007	170H1007	170H1007	170H1007	170H1007	170H1007	170H3004	170H3004	170H3004	170H3004	170H3004

### Fused disconnect

OS60	OS60	OS60	OS100	OS100	OS100	OS200	OS200	OS400	OS400	OS400	OES600
35A	45A	60A	80A	100A	100A	200A	250A	300A	400A	500A	500A
5kA	5kA	5kA	5kA	5kA	5kA	10kA	10kA	10kA	10kA	10kA	18kA

### AC3 rated By-Pass, Type

A16	A26	A30	A40	A40	A50	A63	A95	A110	A145	A185	A210	A260
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### Thermal overload relay, Type

TA25DU	TA25DU	TA42DU	TA75DU	TA75DU	TA75DU	TA75DU	TA110DU	TA110DU	TA200DU	TA200DU	TA450DU	TA450DU
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### AC1 rated By-Pass, Type

A9	A16	A26	A26	A30	A40	A50	A50	A75	A110	A145	A145	A185
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### Current transformers, Type

PSCT-60	PSCT-40	PSCT-50	PSCT-60	PSCT-75	PSCT-75	PSCT-100	PSCT-125	PSCT-150	PSCT-200	PSCT-250	PSCT-400	PSCT-400
2 turns	1 turn	1 turn	1 turn	1 turn	1 turn	1 turn	1 turn	1 turn	1 turn	1 turn	1 turn	1 turn

## Type PST/PSTB - the advanced range



PST30 ... 72					PST85 ... 142			PST175 ... 300				PSTB370 ... 470		PSTB570 ... 1050			
PST 30	PST 37	PST 44	PST 50	PST 72	PST 85	PST 105	PST 142	PST 175	PST 210	PST 250	PST 300	PSTB 370	PSTB 470	PSTB 570	PSTB 720	PSTB 840	PSTB 1050
20	25	30	40	50	60	75	100	125	150	200	250	300	400	500	600	700	900
28	34	42	54	68	80	104	130	156	192	248	302	361	480	590	720	840	1062
15	18.5	22	25	37	45	55	75	90	110	132	160	200	250	315	400	450	560
30	37	44	50	72	85	105	142	175	210	250	300	370	470	570	720	840	1050

### 480V, 104 °F

MCCB Branch Protection, Type	T2				T3			T4			T5		S6		S7		
T2	T2	T2	T2	T2	T3	T3	T3	T4	T4	T5	T5	T5	T5	S6	S6	S7	S7

### Fuse protection 65 kA (Max. fuse size), Semiconductor fuses, Bussman with fuse holder, Type

170M1366	170M1368	170M1369	170M1369	170M1371	170M1372	170M3019	170M3020	170M3021	170M5012	170M5013	170M5015	170M5013	170M5015	170M5015	170M5018	170M6018	170M6020
170H1007	170H1007	170H1007	170H1007	170H1007	170H1007	170H3004	170H3004	170H3004	170H3004	170H3004	170H3004	170H3004	170H3004	170H3004	170H3004	170H3004	170H3004

### Fused disconnect

OS60	OS60	OS100	OS100	OS200	OS200	OS400	OS400	OS400	OES600	OES600	OES600	OES600	OES800	OES800	L900A	L1200A	Ø	Ø
45A	60A	80A	100A	100A	200A	250A	300A	400A	500A	500A	500A	600A	800A	800A	30kA	42kA	42kA	85kA
5kA	5kA	5kA	5kA	5kA	10kA	10kA	10kA	10kA	10kA	10kA	18kA	18kA	18kA	30kA	30kA	42kA	42kA	85kA

### AC3 rated By-pass contactor, Type

A26	A30	A40	A50	A63	A75	A110	A145	A185	A210	A260	A300	AF400	AF460	AF580	AF750	AF1350	AF1650
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### Electronic overload relay

Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in
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### AC1 rated By-pass contactor, Type

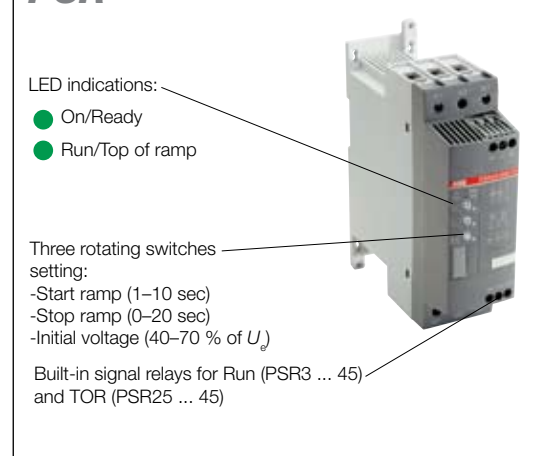
A16	A26	A30	A40	A50	A50	A75	A110	A145	A145	A185	A260	Built-in AF260	Built-in AF300	Built-in AF400	Built-in AF580	Built-in AF750	Built-in AF750
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### Current transformers

Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated
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Ⓞ PSTB840 and PSTB1050: Fused disconnect not available, use fuse holder, Bussman type, 170H3004.

## PSR



- LED indications:
- On/Ready
  - Run/Top of ramp

- Three rotating switches setting:
- Start ramp (1–10 sec)
  - Stop ramp (0–20 sec)
  - Initial voltage (40–70 % of U<sub>N</sub>)

Built-in signal relays for Run (PSR3 ... 45) and TOR (PSR25 ... 45)

## PSS



- LED indications:
- Power supply ON
  - Completed start ramp TOP OF RAMP
  - EXTERNAL FAULT
  - GENERAL FAULT (motor side or unit)

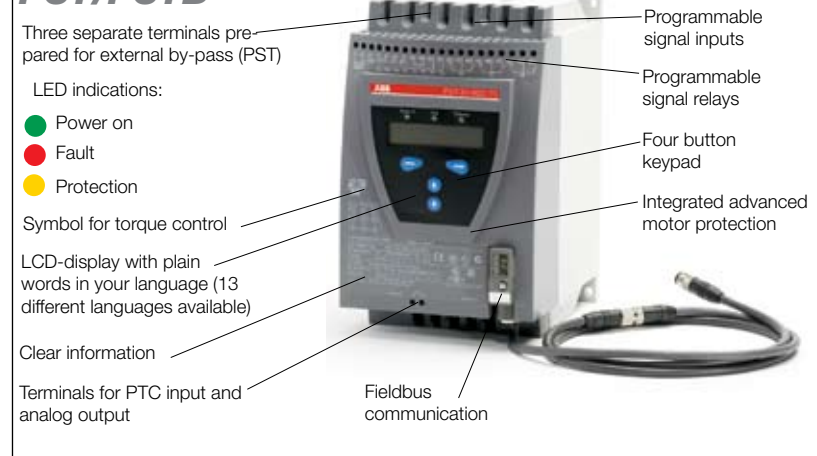
- Three rotating switches setting:
- Start ramp (1–30 sec)
  - Stop ramp (0–30 sec)
  - Initial voltage (30–70 % of U<sub>N</sub>)
  - Current limit 1.5–4 x I<sub>N</sub> (If used: Initial voltage fixed at 40 % of U<sub>N</sub>)

Built-in signal relays for fault and by-pass

Transparent lid to protect the settings

Dip-switch for In Line/ Inside Delta connection

## PST/PSTB



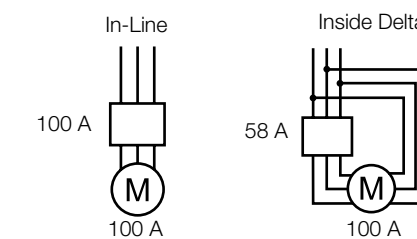
- LED indications:
- Power on
  - Fault
  - Protection

- Symbol for torque control
- LCD-display with plain words in your language (13 different languages available)
- Clear information
- Terminals for PTC input and analog output

- Three separate terminals prepared for external by-pass (PST)
- Programmable signal inputs
- Programmable signal relays
- Four button keypad
- Integrated advanced motor protection
- Fieldbus communication

### In-Line or Inside Delta for PSS and PST(B)

Softstarters type **PSS18/30...300/515** and **PST30 ... 300, PSTB370...1050** can be connected inside the motor delta (compare the connection for standard Wye-Delta starters). In this case the current through the softstarter is reduced by 42 %. It will then be possible, for example, to run a 100 A motor using a 58 A PSS/PST Softstarter.



### Integrated advanced motor protection

Inside the PST Softstarter, you will find useful features for advanced motor and softstarter protection, including: programmable overload protection, high current, underload, phase imbalance, phase reversal, thyristor overload protection, and bypass monitoring to ensure proper by-pass operation.

### Programmable signal relays

All PST units have three programmable signal relays where each relay can signal Run, Top of Ramp or Event. The Event setting can be used to signal protections, faults and warnings. The supervisory functions monitor not only software and critical softstarter functionality but also phase loss and out of frequency range.

### Integrated By-pass contactor

On the larger sizes (PSTB 370 ... PSTB1050), there is an ABB AF contactor integrated. This gives you advantages in terms of cost saving, space saving and last but not least energy saving. With a by-pass contactor you can reduce the power losses during normal run by 90 % or more. The smaller units, PST30 up to PST300, which are not equipped with a built-in by-pass contactor, have an extra set of three terminals on the line side. The terminals are marked B1, B2 and B3 and shall be used when connecting an external by-pass contactor. This will enable the integrated protection functions also when the softstarter is by-passed.

### External keypad (option)

An external keypad is available as an option. The keypad can be mounted on a panel door for example

to view/control the softstarter without opening the door. The keypad can also be used to copy parameters between different softstarters.

### Fieldbus communication

The PST Softstarter has a built-in interface on the front for connection of the ABB FieldBusPlug used for fieldbus communication. Through this interface it is possible to control the softstarter, achieve status information, up- and down load of parameters. The interface between the softstarter and the FieldBusPlug is always the same. Independently of PST Softstarter size or delivery date it is possible to connect to any fieldbus protocol later on since this is defined in the FieldBusPlug itself. Available protocols are AS-Interface, DeviceNet, Profibus DP and Modbus-RTU. To connect the PST Softstarter to a fieldbus system you need

the appropriate accessories as well as specific software for PLC set-up, which is available at [www.abb-control.com](http://www.abb-control.com) on the Softstarter pages.

### Torque control

The default setting is a normal voltage ramp but it is possible to select torque ramp. With the torque control function it is possible to start and stop motors with a more linear acceleration than when using the normal voltage ramps. During start this can be used to reduce the wear on the equipment driven by the motor.

During stop, controlling the torque is especially useful for pump applications where voltage ramps can lead to a sudden torque drop which may result in water hammering and pressure

surges. Torque control will keep these problems to an absolute minimum.

### Torque limit

With the torque limit function enabled, the torque can never exceed a set value during start. This will minimize stress and wear on the equipment driven by the motor.

### Analog output

With the PST(B) softstarter it is possible to have analog output signals to be used as input to a PLC or an analog meter. The output signals can be selected to be for instance the current of the motor, main voltage, active power or the temperature of the motor. The terminals used for analog output are also used for PTC protection, so only one of these functions can be used.





## The complete range

### ABB offers three softstarter ranges

**The compact range, PSR3...45** covers motor currents from 3 to 45 A.

- The compact design makes it possible to fit more products on a given mounting surface.
- Easy to install.** Can either be snapped onto a DIN rail or screw mounted.
- Clear setting instructions are provided on the front.

**The flexible range, PSS18...300** which is intended for motor currents from 18 A - 250 A "Inline" and up to 515 A "Inside Delta" configuration, offers a solution possible to adapt to almost any application:

- With two connection possibilities, either in line with the motor or inside the motor delta.
- Can be equipped with **current limit**. (possibility to limit the current during start)
- Easy to set up.** With just three clearly labeled rotary switches on the front of the unit it is possible to adjust the softstarter for a wide range of applications.

**Solid state electrical circuit** ensures the highest reliability and reduces the need for maintenance to a minimum, even in applications with frequent starts and stops.

### The advanced range, PST(B)30...1050

Besides many functions this range also speaks your language. The range covers motor currents from 30 A to 1062 A "Inline" and up to 1810 A "Inside Delta" configuration.

- Advanced integrated protection
- Flexible bus communication system.
- LCD display.** With 13 languages, a menu system similar to your mobile phone, preprogrammed application settings and automatic status and event logging, it couldn't be easier to set up and operate!
- Programmable signal relays.
- Integrated by-pass contactor on PSTB.
- Torque control.
- Analog output.

	The compact range, PSR3 ... 45	The flexible range, PSS18/30 ... 300/515	The advanced range, PST30 ... PSTB1050
Field bus communication enabled	-	-	•
Real time clock	-	-	•
Programmable fault supervision functions	-	-	•
Programmable warning functions	-	-	•
PTC input for motor protection	-	-	•
High current protection	-	-	•
Phase imbalance /phase reversal protection	-	-	•
Locked rotor protection	-	-	•
Thyristor overtemperature protection	-	-	•
Motor overload protection	-	-	•
Four button keypad (external keypad available)	-	-	•
External keypad	-	-	○
Current limit control	-	○	•
In Line and Inside Delta connection	-	•	•
LED indications	-	•	•
Built-in by-pass contactor (On PSTB)	-	•	•
Ramp Start/Stop	-	•	•
Torque control	-	•	•
Analog output	-	•	•

- Standard
- Optional
- Not available

**Benefits with ABB's Softstarters**

- + Soft start/Soft stop
- + Torque control
- + Current limit/Torque limit
- + No current peaks
- + No torque peaks
- + Less mechanical wear
- + Less maintenance
- + No production breaks

Result = **PROFIT**



# ABB

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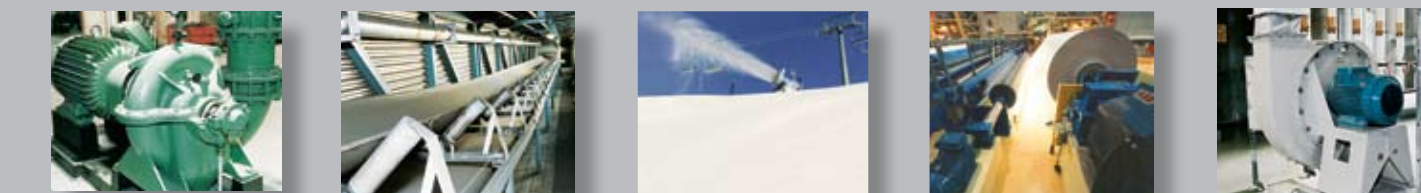
Panorama

## Softstarters

The Complete Range



# ABB



## Softstarters for every customer need...

### Why soft start?

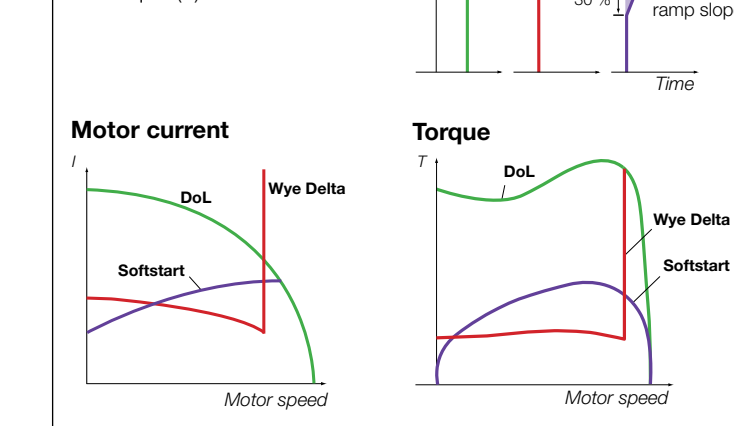
Do you have rough and jerky motor starts? High starting currents and torques? Or high current and torque peaks?

When it is important to have smooth start-up you can use a softstarter. Instead of switching directly to full voltage the softstarter ensures gradual voltage increase during start-up which naturally limits the current.

ABB offers the most complete range of softstarters on the market. You can find all product-related documentation such as brochures, catalogs, certificates and drawings at: [www.abb.com/lowvoltage](http://www.abb.com/lowvoltage)

### Differences between different starting methods

Graphs showing the basic differences between direct-on-line starting (DoL), wye starting and soft starting in terms of the motor voltage (U), motor current (I) and motor torque (T).



**Take the stress out of starting – use a Softstarter from ABB**

### Quick guide for selection

#### Normal start Class 10

Select size according to the motor HP ratings

#### Typical applications

- Bow thruster
- Compressor
- Elevator
- Centrifugal pump
- Conveyor belt (short)
- Escalator

#### Heavy duty start Class 30

Select one size larger than the motor HP ratings

#### Typical applications

- Centrifugal fan
- Crusher
- Mixer
- Conveyor belt (long)
- Mill
- Stirrer

**! If more than 10 starts /h**  
Select one size larger than the standard selection.

