

Soft Starters Types Range Guide

ABB PSR, PSS, PSE, PST and PSTB – what each range is, where it fits and the key specifications

What a soft starter does

A soft starter ramps the voltage to a three-phase motor up (and down) smoothly, instead of hitting it with full voltage as a direct-on-line (DOL) starter does. This reduces starting current, mechanical shock on belts, gears and couplings, and water hammer when stopping pumps. ABB groups its soft starters into four families that together cover motors up to about 1800 A: the compact **PSR**, the flexible **PSS**, the efficient **PSE** and the advanced **PST(B)**.

Range comparison at a glance

	PSR	PSS	PSE	PST / PSTB
Positioning	Compact	Flexible	Efficient	Advanced
Rated current	3 – 105 A	18 – 300 A in-line (up to 515 A inside delta)	18 – 370 A	30 – 1050 A (up to 1810 A inside delta)
Operational voltage	208 – 600 V AC	208 – 690 V AC	208 – 600 V AC	208 – 690 V AC
Control supply	100 – 240 V AC or 24 V AC/DC	110 – 120 V AC or 220 – 240 V AC	100 – 250 V AC	100 – 250 V AC, 50/60 Hz
Control method	Two-phase control, voltage ramp	Voltage ramp; optional current limit via external CT	Torque control	Torque control, full feature set
Built-in bypass	Yes, all sizes	No (relay for external bypass)	Yes	PSTB 370 – 1050 A (PST 30 – 300 A prepared for external bypass)
Inside-delta connection	No	Yes	No	Yes
Interface	3 potentiometers	Rotating switches	Display for setup and monitoring	Full-text LCD, 14 languages
Ambient temperature	-25 to +60 °C	-25 to +60 °C	-25 to +50 °C	Wide range; see datasheet

PSR – The compact range (3 to 105 A)

The most compact of the families. It uses a simple soft start and soft stop with a voltage ramp, which makes it a good fit for small motors where space is tight and basic functionality is enough.

- Sizes: PSR3, 6, 9, 12, 16, 25, 30, 37, 45, 60, 72, 85 and 105 (13 electrical sizes).
- Operational voltage 208 – 600 V AC; control supply 100 – 240 V AC or 24 V AC/DC.
- Built-in bypass on all sizes, which saves energy and installation time.
- Run signal relay on all devices; ramp-up and ramp-down are set with potentiometers on the front.
- Units up to 45 A can be DIN-rail mounted, and all sizes can be screw mounted.
- Connection kits allow direct mounting to ABB manual motor starters (for example MS116, MS132 and MS450) for a very compact starter assembly.
- Reduces water hammer when stopping pumps, compared with the abrupt stop of a star-delta or DOL starter.
- Example: PSR45-600-70 is rated 45 A, with motor ratings of 11 / 22 / 30 kW at 230 / 400 / 500 V.

PSS – The flexible range (18 to 300 A)

The PSS can be connected either in-line with the motor or inside the motor delta, selected with a dip switch. It is a common replacement for star-delta starters.

- Model names show both current ratings, for example PSS18/30 (18 A in-line, 30 A inside delta) up to PSS300/515.
- Operational voltage 208 – 690 V AC; control supply 110 – 120 V AC or 220 – 240 V AC.
- Inside-delta connection: the soft starter carries only about 58% of the motor current, so a smaller unit can drive a larger motor.
- Settings are made with rotating switches, so few settings are needed to get running.
- Designed for continuous operation without bypass; a bypass signal relay controls an external bypass contactor.
- Fault signal relay (NO or NC) and an input for an optional external current transformer to set a maximum starting current.
- Ambient temperature -25 to +60 °C. Available in normal-start (class 10) and heavy-duty (class 30) ratings.

PSE – The efficient range (18 to 370 A)

Described by ABB as the first compact soft starter with torque control. It combines a built-in bypass with a back-lit display for easier setup and monitoring.

- Sizes: PSE18, 25, 30, 37, 45, 60, 72, 85, 105, 142, 170, 210, 250, 300 and 370.
- Operational voltage 208 – 600 V AC (some ABB literature lists up to 690 V); control supply 100 – 250 V AC.
- Torque control for smoother pump and fan operation and less water hammer.
- Built-in bypass reduces energy losses and wiring.
- Ambient temperature -25 to +50 °C.

PST(B) – The advanced range (30 to 1050 A)

The top-of-range family, with almost all the functionality an application might need. PST is the standard unit and PSTB is the version with a built-in bypass contactor in the larger sizes.

- Sizes: PST30 to PST300, and PSTB370 to PSTB1050.
- Rated current 30 – 1050 A (up to 1810 A inside delta); both in-line and inside-delta connection.
- Operational voltage 208 – 690 V AC; control supply 100 – 250 V AC, 50/60 Hz.
- Full-text LCD display in 14 languages, built-in motor protection and torque control.
- Built-in bypass on PSTB (370 – 1050 A); PST 30 – 300 A is prepared for an external bypass.
- Fieldbus communication is supported through the FieldBusPlug accessory.

Note: newer PSTX series

ABB has since introduced the **PSTX** as the successor to PST. PSTX covers 30 – 1250 A (up to 2160 A inside delta) at 208 – 690 V AC, with built-in, ABB-verified bypass and a graphical display. PSTX30 to PSTX370 are followed by PSTB470 to PSTB1050 in the same catalogue. If you are quoting current stock, check whether PSTX is the model on offer.

Which range for which job

Application	Suggested range	Why
Small pumps, fans, compressors up to about 105 A where space is limited	PSR	Compact, built-in bypass, DIN-rail mount to 45 A
Replacing a star-delta starter; need to run a larger motor on a smaller unit	PSS	Inside-delta connection, about 58% of motor current through the unit
Pumps and general machinery that need torque control and low energy loss	PSE	Torque control with built-in bypass
Large motors, demanding duty, protection and communication needs	PST(B) / PSTX	Highest current range, full protection set, fieldbus, up to 1050 A (1250 A on PSTX)

Model code example

PSR18-600-70 – PSR range, 18 A current rating, 600 V operational voltage, control supply code 70 = 100 – 250 V AC (code 11 = 24 V AC/DC).

Sources and caveats

Compiled from ABB's catalogue *Softstarters Type PSR, PSS, PSE, PST and PSTB* (document 1SFC132005C0201), ABB product pages for PSR, PSS and PSTX, and reseller datasheets. Some ratings differ slightly between document revisions and resellers (for example the PSE voltage ceiling and PSR starts per hour), so confirm exact figures for the unit you are quoting against the current ABB datasheet.