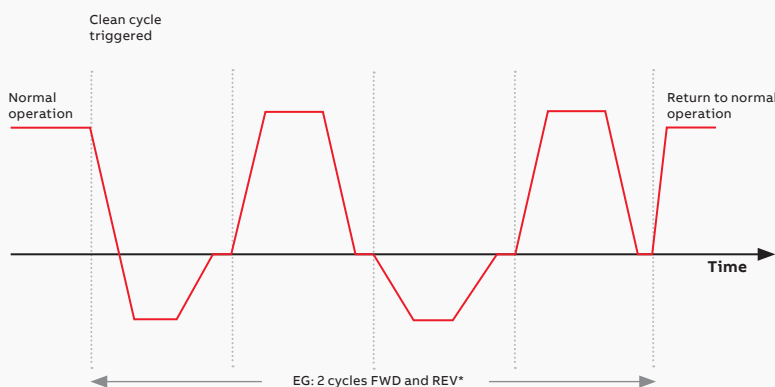


Pump cleaning

Preventing unplanned downtime caused by impeller obstructions



* Clean can be FWD only for screw-on impellers

The pump cleaning (anti-jam or anti-ragging) function uses a programmable sequence of forward and reverse rotations of the pump to shake off and remove any build-up of rags on the impeller.

01 Pump cleaning cycle showing typical 2 cycle forward and reverse cleaning.

02 Pump cleaning cycle showing 1 cycle forward and reverse cleaning, with different ramps

Pump cleaning is used in wastewater to assist:

- Cleaning the pump and reducing blockages
- Improving operational efficiency
- Reducing the cost associated with lifting and cleaning pumps
- Decreasing the need for manual cleaning

Pump cleaning sequence

- The softstarter starts cleaning with a rotation in the opposite direction of the running direction. The speed is different for forward and reversing directions.
- Slow speed reversing and full speed forward.
- The pump cleaning sequence can have several different start and stop ramps in the forward direction, however for the reversing direction, only slow speed.

Triggers

The cleaning sequence starts based on the selected triggering conditions. The cleaning sequence can start on these conditions:

- On demand (for example, a digital input, to manually force cleaning)
- Through a fieldbus command through SCADA
- Manually control through HMI

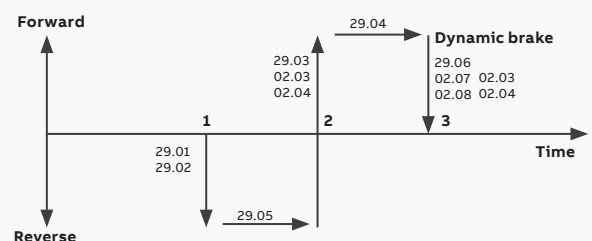
Cleaning with three different sequences

A pump cleaning period consists of three sequences:

1. Reverse jog – strength, speed and time, the maximum speed in reverse is 33% of nominal speed.
2. Forward – type (FV, TR, VR)* and time
3. Reverse brake – type (TR+BR, VR+BR, DB)*

More strength, FV and DB = better cleaning – but more harsh to the system, Start via keypad or D/I.

* FV=Full voltage ramp, TR= Torque control ramp, VR= Voltage ramp, BR=Brake and DB= Dynamic brake



Technical Details	
Power range	PSTX: 7.5 to 1 800 hp (frame sizes A-F)
Voltage range	208...600/690 V +1 0%/-1 5% Control supply: 1 00...250 V +1 0%/-1 5% Control circuit: Internal or external 24 V DC
Frequency	50/60 Hz ±1 0%
Max operating current (I_e)	4 x I _e for 1 0 secondes
Number of starts per hour	10 for PSTX30...PSTX370, 6 for PSTX470...PSTX1 250 Valid for normal start (class 10) for 50% on time and 50% off time.
Ambient temperature	PSTX 30-1 250: -1 3 to 1 04°F (-25 to 40 °C) From 1 04 to 1 40°F (+40°C to +60°C with derating 0.8% of current per 1 .8°F (1°C))
Degree of protection	Main circuit IP00 Supply and control circuit IP20 External keypad (detachable) IP66 and UL Type 4X outdoor
Main circuit	Built-in bypass contactor Cooling system - Fan cooled (thermostat controlled)
HMI and Keypad	Display LCD type, graphical 17 L languages
Compliance	CE, UL, cUL, CCC, EAC, ANCE, C-tick, KC
Control connections	Three digital inputs, three digital outputs, one analog output, PT1 00/ PTC input, Modbus RTU, USB via control panel
Optional I/O extension modules	PS-FBPA Fieldbus plug adaptor DX1 1 1 -FBP.0 Extension module for I/O DX1 22-FBP.0 Extension module for I/O 24 VDC
Optional communication extension modules	Profibus-DP, DeviceNet, Modbus-RTU, EtherNet-IP, Modbus-TCP, Profinet, EtherCat
PC tools	SoftstarterCare - for easy set-up and commissioning proSoft selection tool - for easy selection PSTX simulator - to test and practice different set-ups

Configuration example

1. Slow speed jog reverse. Parameter 29.01 (Pump clean reverse speed) decides which slow speed should be used. The parameter 29.02 (Pump clean reverse strength) decides how fast the motor accelerates to the slow speed in the reverse direction. It is recommended to set it to a high value (60 – 100%) to achieve an aggressive acceleration for clogging or enough torque for jamming. Default settings 29.01 jog reverse 20% - 29.02 strength 45% - 29.05 time to run reverse 5 second.

2. Forward direction. Parameter 29.03 (Pump clean forward start mode) decides which start method should be used to accelerate the motor in the forward direction. Default is full voltage start which very quickly accelerated the motor up to full speed in the forward direction. If a softer start is needed parameter 29.03 (Pump clean forward start mode) can be set to Torque ramp or Voltage ramp, then the parameter 02.03 (Start ramp initial level) and 02.04 (Start ramp time) are used in the pump cleaning forward start. 29.04 (Pump clean auto forward time) decides how long time the motor should be run in the forward direction. Default settings 29.03 full voltage start - 29.04 time to run forward 5 second.

3. When it is time to switch direction from forward to reverse the parameter 29.08 (Pump clean stop mode) decides if a stop ramp should be run to avoid any water hammering that might otherwise occur. Immediately after the stop ramp a dynamic brake quickly bring the motor to stand still. Parameter 29.08 (Pump clean stop mode) is set default to Torque ramp and brake. The Torque ramp or Voltage ramp in the Pump clean stop mode can be adjusted by parameter 02.05 (Stop ramp end level) and parameter 02.06 (Stop ramp time).

The Dynamic brake in the Pump clean stop mode can be adjusted by the parameter 29.06 (Pump clean brake strength) and parameter 29.07 Pump clean brake timeout). The parameter 29.06 (Pump clean brake strength) decides how fast the motor will decelerate from full speed. It is recommended to set a high value (50– 60%) to achieve an aggressive deceleration. If the brake takes longer time than 10s, increase the parameter 29.07 (Pump clean brake timeout). Default settings 29.08 Torque ramp with brake - 29.06 brake strength 45% - 29.07 Brake timeout 10 seconds.

4. The whole sequence is repeated and start from 1 again until the Auto button on the HMI is released or signal from I/O or fieldbus is removed.

Note: The clean cycle can set to FWD only or FWD/REV (based on impeller type) The pump clean function reduces downtime and minimizes the labor required to manually clean your pumps. It also reduces operating costs by enabling the pump to operate at a higher efficiency.

For more information please see installation commissioning manual for PSTX section automatic pump cleaning

