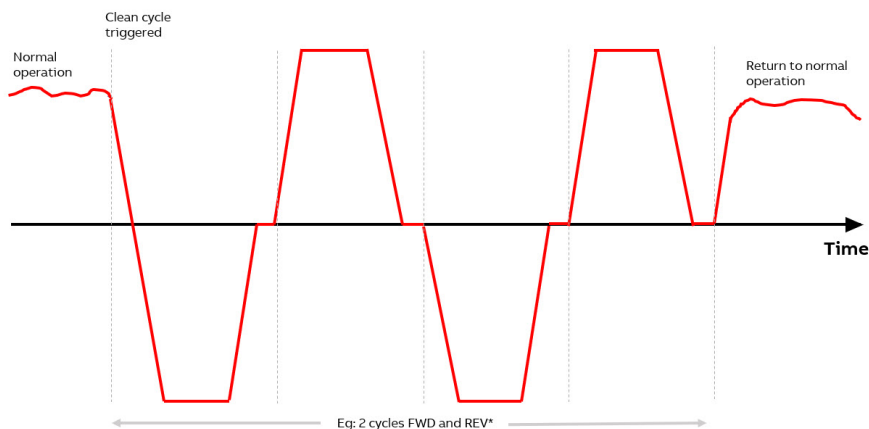


Pump cleaning

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, returning to normal operation at the end.

Pump cleaning is used in wastewater to assist:

- Cleans the pump and reducing blockages
- Improves operational efficiency
- Reduces the cost associated with lifting and cleaning pumps
- Decreases the need for manual cleaning

Pump cleaning sequence

- The drive starts cleaning with a pulse in the opposite direction of the running direction. The speed step size is same for both positive and negative directions.
- The pump cleaning sequence can have several positive and negative direction speed steps in one cleaning sequence.
- The drive automatically determines the fastest ramp during the pump cleaning.

Triggers

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

- On every start and stop

- Based on monitoring the pump load
 - Under-load or Overload curve
- Based on time interval (for example, at every 10 hours)
- On demand (for example, a digital input, to manually force cleaning)
- Through a fieldbus command through SCADA

Cleaning count monitoring

The cleaning count monitoring function calculates the number of cleaning cycles inside a user-defined monitoring window.

Too many frequent cleaning attempts may indicate a pump problem (such as blockage) that the pump cleaning function cannot solve alone and may require manual inspection and cleaning.

When the pump cleaning function is active and maximum number of allowed clean cycles per set time is reached, the drive displays a warning which appears in the event log that can be reviewed as part of the pump's predictive maintenance schedules.

Technical data

Power range	1 to 50 hp, 208-240 V, 1 Phase 1 to 100 hp, 208-240 V 1 to 700 hp, 440-480 V 2 to 250 hp, 525-600 V
Voltage range 50/60 Hz ±5%	1-phase, 208-240 V, +10%/-15% 3-phase, 208-240 V, +10%/-15% 3-phase, 440-480 V, +10%/-15% 3-phase, 525-600 V, +10%/-15%
Control connections	Two analog inputs, two analog outputs, six digital inputs including thermistor input, three relay outputs, EIA-485 Modbus RTU, safe torque off (STO), external 24 V DC supply input, USB via control panel
Optional communication extension modules	EtherNet/IP Modbus TCP Profibus-DP ProfiNet DeviceNet
Degree of protection	UL (NEMA) Type 1 / IP 21, as standard UL (NEMA) Type 12 / IP55, as option

ACQ580 Family



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Configuration example

- After the pump system meets the triggering conditions*
 - At this condition, normal operation stops and the drive uses the target time to reach zero speed.
 - The drive accelerates to the defined cleaning speed.
 - The pump runs at cleaning speed for a programmable time.
 - The pump then decelerates to zero-speed.
 - The pump is stopped until cleaning off time (set as a minimum time between cleaning cycles) has elapsed.
 - The drive accelerates the pump to the predetermined speed in the negative direction.
 - The pump runs at this speed in the negative direction.
 - The pump speed decreases back to zero speed.
 - The pump stops until cleaning off time has elapsed.
 - The drive accelerates the pump in the positive direction.
 - The pump runs at the positive predetermined cleaning speed.
 - The drive decreases the pump speed back to zero.
 - The drive waits until cleaning off time has again elapsed.
 - A new cleaning sequence begins, or normal operation starts depending on how the drive is programmed.
 - The pump returns to normal operation, following the speed/frequency reference of the active control signal.

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.

The functionality can be scheduled during off peak hours so as not to interrupt the normal pumping duty or programmed to activate only when it detects the need for cleaning.

The cleaning cycle counter can provide indication of failing pumps for predictive maintenance.

*See page 1

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