

FACTORY AUTOMATION

Bertelkamp Automation



Municipal Water Facility Updates Their Lift Station Pump System to Achieve Greater Energy Efficiency and Reduce Maintenance Visits

Implementing a packaged drive solution from Mitsubishi Electric Automation, a municipal water facility, reduced the frequency of clogged pumps from once a week to not yet experiencing a clog since it was implemented.

Key points

- **The Challenge:** Eliminate Maintenance Visits for Clogged Pumps
- **The Solution:** Packaged Drive Solution with Built-In Deragging Function
- **The Result:** No Clogs, Resulting in Cost, Time, and Energy Savings



THE CHALLENGE

Eliminate maintenance visits for clogged pumps

In any mechanical system, the risk of downtime is a serious factor of consideration. For public institutions, downtime has a direct effect on communities. Municipal water systems are at high risk of downtime due to the impact of aging infrastructure and unpredictable failures. They are looking for solutions to make their operations more efficient, reduce spending, and achieve energy efficiency – all while ensuring water is clean for environment renewal and public utilization. With such an important task at hand, it is critical to partner with a trusted, proven solution provider.

Mitsubishi Electric Automation and their distributor, Bertelkamp Automation, were tasked with a project to relieve an ongoing clogging issue for a wastewater plant in Tennessee.

The challenge at hand? Frequently clogging pumps.

According to the NACWAR (National Association of Clean Water Agencies), in 2019, wipes imposed \$30,467 a year in additional operating costs on the average utility nationwide. The cost of clogged pumps adds up both financially and politically. Financial costs accrue due to maintenance visits and part replacements, while community public relations may affect a municipality's reputation. On the operational side, a clogged pump is detected through increased run time, costing energy and money to exert the drives to operate through a blockage.

The customer operates and maintains pumping stations, known as lift stations, that move wastewater from a lower to a higher elevation. Each lift station has at least two induction motors that drive sewage pumps in a wet well. To keep this operation flowing, the customer knew they needed to stop clogs before they occurred, because maintenance was required to visit at least weekly to resolve them. Many of these clogging issues are reported to go undetected until they become so severe that the pump does not meet demand.

An alternative to manually unclogging pumps was needed. To manually resolve the clog, municipalities may disable the problematic pump and open the associated check valve, creating pressure from the alternate pump and resulting in a backflow through the clogged pump to clear. This solution may work, but still requires maintenance intervention, and therefore, downtime.

Mitsubishi Electric iQ-R Series PLC helps to reduce TCO, increase reliability, and reuse existing assets



THE SOLUTION

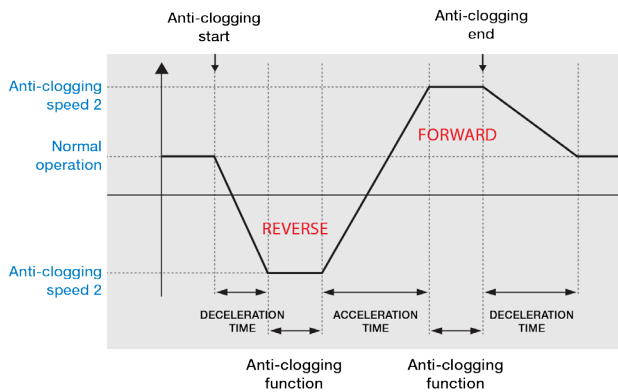
Packaged drive solution with built-in deragging function

Mitsubishi Electric Automation and Bertelkamp Automation stepped in. An FR-F800 Series VFD was installed in one of the customer's lift stations as a test. The FR-F800 VFD has robust hardware and a built-in anti-clogging function, which would meet the customer's need to unclog a pump as it occurs. The VFD detects the clog through the built-in function and performs a forward/reverse rotation sequence on a 12-hour interval to dislodge any material build-up that occurs in a pump.

Pleased with the results of the test, the customer trusted Mitsubishi Electric Automation to provide a solution that would update their existing infrastructure and ensure smooth operations for decades to come. The solution



FR-F800 VFD



consisted of a complete enclosure for the FR-F800 VFDs, with intelligence via the iQ-R Series PLC and user-friendly operation via the GOT2000 Series HMI. To ensure this system was ready to be up and running immediately, the customer utilized Mitsubishi Electric Automation's startup service that extended the warranty on the drives to five years.



GOT2000 Series HMI



Packaged Drive Solution

THE RESULT

No clogs – resulting in cost, time, and energy savings

Since the implementation of the solution, the customer reports that no clogs have been detected. This means reduced maintenance and improved performance.

"We weren't certain that the Mitsubishi Electric VFD's cleaning function would eliminate all the clogging issues at that lift station, but it worked exactly as advertised. The duty cycle was greatly reduced, and the clogs were virtually eliminated."

— Kent Smith
Mitsubishi Electric Product Specialist, Bertelkamp Automation

SUSTAINABILITY BENEFITS

- Through automation technology, the customer can analyze patterns in energy consumption and make more data-driven decisions to strive for reduced CO2 emissions.
- Fewer clogs result in less mechanical wear and tear, which extends pump's useful life and reduces e-waste.
- Preventing clogs leads to substantial energy savings and reduced energy bills for the community – a clogged pump increases energy consumption because it may need to run for longer periods due to restricted fluid flow, and forces the motor to exert more power.

Learn more about: **FR-F800 Series VFD**

iQ-R Series PLC

GOT2000 Series HMI

Bertelkamp Automation, Inc.
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For more information or a free consultation
with an automation engineer, please

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