

Aquavar IPC with NEMA 3R enclosure helps make farming operations more efficient and profitable

CALIFORNIA GROWER USES VFD TECHNOLOGY TO OPTIMIZE PUMP OPERATION, REDUCE ENERGY COSTS

Pumps are everywhere in agriculture, essential both for irrigation and for heating, ventilation and cooling (HVAC). But water needs change, and irrigation systems don't always require a constant flow rate or constant pressure. Variable frequency drives (VFDs) are electric controllers that vary the speed of the pump, allowing the pump to respond smoothly and efficiently to fluctuations in demand.

Challenge

Eat Sweet Farms, an agricultural operation in Santa Maria, California, has long focused on growing different varieties of berries like strawberries, blueberries and blackberries. In 2019, the local grower, which is part of Central West Produce, decided to expand its crops to include avocados in an effort to capitalize on 20 previously unused acres of barren hillside.

The multi-level terrain, though ideal for avocado farming, posed a challenge for effectively irrigating the crops. At the steepest elevation, water had to travel 500 feet uphill, but only 100 feet at its lowest elevation. The outdoor location also dictated the need for a weatherproof NEMA 3R enclosure.

Seeking to boost energy efficiency without increasing costs, Eat Sweet Farms consulted with Coast Water Solutions, a local irrigation equipment supplier in Oxnard, California, to design and install a new VFD solution that could easily handle the field elevation changes.

Solution

Adding a VFD to an irrigation pump is ideal when running irrigation systems that require different pressures and/or flow rates. Because a VFD maintains a constant discharge pressure regardless of the irrigation demand, a VFD enables the operation of one, some or all irrigation systems depending on irrigation needs and pump capacity.



Installing the IPC in the NEMA 3R enclosure helped protect Eat Sweet Farm's irrigation system in its remote location.

CHALLENGE :

- Design and install a new VFD solution that could handle field elevation changes up to 500 feet, while boosting energy efficiency without increasing costs.

PROJECT HIGHLIGHTS:

- Installing a VFD on a single pump serving multiple irrigation lines provides flexibility to change pressures for different pumping requirements.
- The NEMA 3R enclosure protects the VFD system from environmental factors, especially in remote locations
- Optimize pump operations while reducing energy costs.

SOLUTIONS:

- Xylem Aquavar IPC with NEMA 3R enclosure
- 75 HP Goulds Water Technology e-SV multistage pump

The Coast Water Solutions team selected and installed a Xylem brand Aquavar Intelligent Pump Controller (IPC) variable speed drive in a NEMA 3R enclosure with a hand-off-auto switch and potentiometer, as well as a built-in fused disconnect. It's optimized for pumps in submersible and above ground applications, and adds capabilities including multi-pump configuration and remote monitoring. The Aquavar IPC, which can be configured for up to four pumps, controls a 75 HP, 3-phase, 480V Goulds Water Technology e-SV multistage pump doing 200 GPM at 220 PSI for the first setpoint and 200 GPM at 150 PSI for the second setpoint.

According to Jeffrey Hirashima, a design and sales representative with Coast Water Solutions, installing a VFD on a single pump serving multiple irrigation lines provides the flexibility to change pressures for different pumping requirements. Eat Sweet Farm's irrigation system uses flooded suction to draw water from a reservoir on the property and installing the IPC in the NEMA 3R enclosure helped protect the system in the remote location. The VFD enables the pump to vary the flow of water while maintaining different operating pressure set points depending on the topographical needs, resulting in energy savings.

“It’s a pressure-on-demand system in order to irrigate the avocado crops at high elevation,” explained Scott McDonnell, technical sales manager, Xylem, Inc.

In other words, when cutting back on the flow, the pump will reduce in speed and the flow will reduce, but still keep as close as possible to the best efficiency point on the pump curve. As the system calls for a larger volume of water, the pump will supply more but still keep constant pressure. This eliminates the need for throttling devices such as pressure-reducing valves or flow-control valves.

Additionally, the Aquavar IPC variable speed controller brings the latest in pump drive technology and programming. The drive and interface are designed to give advanced capabilities that help effectively and efficiently operate your system. The Aquavar IPC also is equipped with the Start-Up Genie to ensure easy start-up and programming.

“The Aquavar IPC is the easiest VFD to navigate,” said Hirashima.



For outdoor applications, it's important that the VFD system is protected from exposure to weather, dust, heat or other environmental factors.

Protection from the elements

In agricultural settings, dust, rodent damage and heat are the leading causes of VFD failure. VFDs themselves generate significant heat that must be dissipated. An increase in temperature will see a dramatic drop in VFD efficiency and typically requires a cooling mechanism. Cool, clean electrical components last longer and perform better.

“Irrigation systems are typically located outside so they are close to the water pumps and wells they receive their water supply from,” said McDonnell. “For outdoor applications like that, it is important that the VFD system is protected from exposure to weather, dust, heat or other environmental factors.”

The Aquavar IPC is housed in an optional NEMA 3R steel enclosure featuring thermostatically controlled ventilation fans. The air intake of the fans are equipped with filters. As the fans pull in outside air and exhaust internal air, the internal enclosure temperature is kept reasonably close to ambient. The enclosed cabinet also keeps components out of direct contact with the elements, allowing the Aquavar IPC to be used in a broader range of geographical regions and applications. The lockable cabinet protects the equipment inside from being easily exposed to damage for security and peace of mind.

For added protection, Coast Water Solutions also installed a stand-alone shade structure over the Aquavar IPC at Eat Sweet Farms.

Results

With the installation of the Aquavar IPC, Eat Sweet Farms has successfully optimized its pump operations and reduced energy costs by 43%.



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