

Blog | By Anthony Lou

# Applying Next-Gen Motor Performance and Efficiency to Pump Applications



As part of our ongoing efforts to raise the bar for sustainability, Infinitum is extending next-generation motor performance and efficiency to pump applications. With built-in Variable Frequency Drives (VFD) and optional IoT monitoring capabilities, you'll find Infinitum motor systems in applications from commercial HVAC, water / wastewater, agriculture, food and beverage, and beyond. Want to know what you can expect from an Infinitum motor system? Read on:

## **Variable Frequency Drives for Better Pump Performance**

When an AC motor is first energized to power a pump, it's susceptible to a large electrical current flow that exceeds the steady-state current value (i.e., in-rush current). Some motor designs address this issue with a soft starter, like a reduced voltage soft starter (RVSS). VFDs control the speed of the motor by producing their own alternating current (AC), ultimately controlling the AC frequency supplied to the motor. With influence over the acceleration and deceleration, a VFD can minimize mechanical stress on the pump system and address common concerns associated with soft starters, such as excessive motor slip, motor heating, and in-rush currents.

At Infinitum, we integrate the motor and the VFD into one modular package. This saves the OEMs, integrators, and end-users who utilize traditional VFDs from having to run wire and install a remote VFD. In addition, our integrated system allows the motor to start with no concerns of current surges when power is applied. Lastly, our VFDs are designed to operate with a maximum THD of 40% on the input side.

## **Less Noise (and Fewer Maintenance Concerns)**

Noise and other mechanical indicators can signal unusual conditions or system inefficiencies that require maintenance. Noise could be caused by any number of factors including abnormal load, incorrect mounting, or brinelling.

From our topology and fundamental technology, Infinitum motors were designed for noise reduction. We designed a synchronous, axial flux, permanent magnet (PM) motor to remove core losses and eddy current loss in the rotor. The absence of magnetic forces between the rotor and the stator means no cogging torque, less vibration, and lower noise.

## **Smaller Size and Footprint**

For small manufacturing or processing facilities, an Infinitum motor system integrated with a pump can free up valuable facilities space by taking a typical packaged pump skid solution and reducing its footprint by 50%. For example, microbreweries are a mainstay in communities across the country—serving as a spot for locals to try new brews and spend time with friends and family. With a VFD mounted directly to the slim profile of our motor, Infinitum offers significant space savings and requires less wiring compared to conventional motor + VFD installations for pump systems. This solution presents cost savings and passes a more manageable system over to integrators and pump OEMs looking for solutions for smaller facilities.



## **Better Performance in Terms of Efficiency and Reliability**

Through a combination of regulation and innovation, motors are continuing to improve in efficiency and energy savings. Some variable speed induction motors are approved for levels exceeding “premium” qualifications (i.e., IE4 and IE5 standards).

Infinitem motors meet IE4 and IE5 efficiency standards, and our VFD delivers up to 98% efficiency. Especially at partial loads, our efficiency curve is flatter for longer compared to AC induction systems. That endurance can help pump OEMs achieve and maintain energy requirements and maximize wire-to-water efficiency. Moreover, Infinitem motor and VFD systems are ETL certified. And as it stands, we are implementing NEMA-standard drive-end bearings and matching that larger specification on our non-drive-end for optimum durability. Pairing this with our PCB stator technology, our solution has proven to be 10x more reliable than iron-core, copper-wound stator machines.

## **Controllability**

Our integrated VFD comes standard with MODBUS control capabilities that can be used to relay information on our motor’s speed and power back to a system controller. This data can be used to determine a pump’s pressure and flow and allow the system to adjust performance as needed. With this capability, mechanical features such as control valves, flow meters, and pressure gauges can be eliminated from the system—saving installation costs and further improving operational efficiencies. Our VFDs can also transmit temperature and vibration readings, so facilities managers and operators have more actionable insights for maintenance.

At Infinitem, we believe in impactful innovation, and we’re tapping into our team’s decades of motor expertise to do just that. Application-focused research and development led us to explore ways to optimize our motor solution to address specific pump OEM concerns such as minimizing shaft end play and mounting compatibility.

[Learn more](#) about Infinitem’s breakthrough technology.

