

Optimizing Motor Controls for Temporary Surface Pumps

ELECTRIC PUMP PACKAGES & VARIABLE FREQUENCY DRIVES



WHITE PAPER



Pump owners and operators are tasked with finding turnkey, temporary surface pumping solutions that boost efficiency without sacrificing performance, durability, uptime or ease of use. This push for efficient performance is making electric pump packages very popular.

Electric pump packages provide tremendous versatility – offering incredible benefits in terms of variable speed operation and motor control. In surface applications, the speed options offered through a variable frequency drive (VFD) give users more flexibility in what the pump can do, offering a speed range comparable to, or better than, a diesel engine – while eliminating the maintenance and emissions challenges of a Tier 4 engine.

However, VFDs have historically fallen short on portability. They are often used in permanent installations (such as pump stations) where they are installed indoors in a single location. VFDs also include sensitive electrical components that are at risk of failure if exposed to harsh conditions like vibration, debris, temperature and other fluctuations. Moving the VFD might also mean reprogramming it for different applications – requiring skilled labor that's not always readily available.

So: is it possible to optimize motor control, even when the surface pump you're using is being moved and re-staged constantly? The answer comes down to the way the unit is engineered and the features it offers. Consider how these VFD features overcome concerns about portability – and assure the system you choose delivers optimized performance and durability, even in temporary applications.

THE POWER OF EASY-TO-USE CONTROL INTERFACES

In the past, VFDs paired with electric-driven pump packages could only be set up and operated by users with advanced technical training and experience. In contrast, their diesel motor-driven counterparts were easy to setup and use

due to control panels with auto modes and straightforward operation. Now, VFDs feature easy-to-use interfaces, like Pioneer Pump's SmartPrime™, that overcome any knowledge barriers to quickly get pumps operational.

A system like SmartPrime, offered on Pioneer Pump's new portable ElectricPAK™ VFD, adds a control interface that has been built and configured specifically for temporary surface pumping applications. It features color graphics and displays much like an app found on a tablet or phone. SmartPrime allows the VFD to recreate the auto-start mode experience that diesel engine users are used to. The simple-to-operate touchscreen handles all aspects of startup and operation from a streamlined central hub with easy-to-navigate graphics. It also allows for simple monitoring without the need for complex keypad setup and programming.

Another major benefit is that there's no programming learning curve for new VFD users who are used to working with diesel-driven packages. A customized user experience like this also allows users to spend less time commissioning and programming the drive – and more time up and operational.



The SmartPrime™ control interface is exclusive to Pioneer Pump ElectricPAK™ systems and offers a fast startup and simple monitoring experience.

SENSORS & CONTROL MODES

When evaluating the interface of a VFD, consider the options available in terms of sensors and control modes. What types of monitoring features are designed into the system? From a usability standpoint, consider these questions:

- Can operators adjust pump parameters using simple on-screen tools?
- How do operators fine-tune their parameters based on their specific surface dewatering control preference, whether it's level transducers, float switches, or a pressure transducer?
- Is it possible to see real-time pump conditions in a simple, graphic interface?
- Are alternate analog controls available so users can operate the panel with tactile pushbuttons and door-mounted speed potentiometer?
- Does the unit track and log alarms onto a useful database?



SmartPrime control interface features color graphics and displays similar to a mobile app used on a phone or tablet.

These variables can make a big difference in terms of the efficiency the system provides. For example, with an interface like SmartPrime, if a user needs to maintain a depth of eight feet in a wet well, the system can be programmed to automatically adjust speed to achieve this. A transducer will send a signal to the VFD to provide real-time feedback that enables the VFD to alter the motor speed to maintain the desired level. If this unit is later moved to another pumping location, this level can easily be adjusted or reprogrammed as needed.

QUICK-CONNECT POWER CABLES

Quick setup for temporary pumping applications is not only convenient – it can often be essential when pumps are deployed for emergency water removal. An easy-to-use interface will help with this, but the pump itself also needs to offer plug-and-play setup. With ElectricPAK, plug-in locations are housed on the outside of the drive to streamline power, float and transducer installation. The system integration also streamlines motor setup with package identification numbers, so there's no need to search for separate input parameters. Features like these can save countless hours on frontend set up as well as teardown.



Quick-connect power cables featured on the ElectricPAK VFD offer a plug-and-play setup that streamlines the startup process.

UL RATING

Since electricity can be dangerous if not handled correctly, it's important that any VFD used in outdoor and portable situations offer safe operation. When selecting a VFD or a VFD-supported package, look for safety ratings, such as UL Certification 508A. The Underwriters Laboratory (UL) independently tests equipment under various use situations. Products earn the UL Listed seal if they meet nationally recognized safety and sustainability standards. This includes being free from a reasonably foreseeable risk of fire or electric shock, even with equipment that's setup and moved repeatedly.

STANDALONE SKIDS VS. MOUNTING TO PACKAGE

One final consideration is the unit itself and the overall long-term portability needs. Is it better to have the VFD standalone on a skid or mount it to a package? In a standalone situation, the VFD will be less prone to vibration from the pump system. It can also be moved around to various pumps if its primary pump is undergoing maintenance.

An integrated system will be optimized to work together and provide for secure transport within a jobsite or from one jobsite to another. Systems like these will be invaluable in emergency situations – like hurricane recovery zones.

In both a standalone or skid-mounted situation, a total pump package can be engineered and tested to perform across a range of ambient temperatures. It can also be configured to address specific concerns, like high sun exposure or heat. This is especially important given that the cause of nuisance trips in the field are often due to high ambient temperatures. Placement of the system can help in some situations, but the VFD itself can be engineered with a cover on top of the skid to address this directly.

CONCLUSION

New advanced VFD options are becoming more versatile than ever. These VFDs are engineered for portability and life in the field, with enhanced durability features, better interfaces and smarter communication protocols. These advancements in VFD design make a system more portable and easier to setup. For users, this means more streamlined operations, enhanced energy efficiencies and rugged equipment that can deliver time and cost savings as well as long-term performance.



The integrated ElectricPAK from Pioneer Pump is a modular offering of electric-driven pump packages. Each configured assembly includes a high-performance pump, electric motor and variable frequency drive option that provides total systems integration.

THE RUGGED, PACKAGED DRIVE SOLUTION YOU'VE BEEN WAITING FOR IS HERE



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