



Nursery & Garden Industry
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VFD pump controller and energy use

With the constant increases in electricity costs over the last several years, and current projections that electricity costs in Queensland will continue to increase by a minimum of 3.5 percent per year, nursery managers must consider all areas of the business to reduce energy use and operating costs. This article is the first in a series looking at different methods to reduce irrigation energy use in production nurseries.

One of the highest electricity-using devices in a nursery are water pumps. These are a critical component of any irrigation system, and pump manufacturers are focused on developing more efficient pumps, while irrigation managers are focused on more efficient management practices to reduce energy use. Inefficient or inappropriate pumps will affect the entire irrigation system, reducing the efficiency and uniformity of the whole system. Old pumps can cost more to run, as worn bearings or seals will increase friction and reduce pump efficiency to about 50%..

Variable speed pumps are becoming more affordable and reliable, and are being installed in nurseries as a means of improving energy efficiency. To operate at peak efficiency, pumps should be specifically selected to suit the irrigation system and



the crop irrigation requirements. A single large pump that operates at maximum capacity constantly could be costing more to run than two smaller multi-stage pumps sharing the duty cycle. As a rule of thumb, if there are several separate small pumps used for irrigation, or a booster pump is used to increase pressure and flow half way along a mainline, or the pump is belt-driven from an old motor, then you need to revise your pumping system.

Depending on the type and age of the pump currently being used, installing a Variable Frequency Drive (VFD) pump controller may be a better option, and will provide an immediate reduction in pumping costs. VFD pump controllers are able to adjust flow rates, manage the pump duty cycle and reduce pump run times. They can achieve energy savings of between 20 to 50 percent, with a typical payback period of 6 to 12 months.

An irrigation specialist should be consulted when considering a VFD pump controller to ensure the pump is suitable for a VFD controller, and the right VFD controller is installed for your system. Also, the VFD controller will need to be programmed for your specific irrigation requirements, e.g. operating pressure and ramp times. These soft-start systems provide several benefits, but if the VFD controller is incorrectly programmed it can damage or increase wear to irrigation components.

Energy efficiency can be achieved by investing in new advanced technologies or through simple low cost solutions, regular maintenance, and an understanding of why energy is being used. You may only need to make some simple changes to increase productivity and reduce operating costs.

For example, a production facility with a central VFD controlled irrigation pump supplying two separate irrigation systems with different pressure requirements was causing pipe blowouts in the smaller low pressure system. The installation of a simple pressure/irrigation system selector switch, costing approximately \$300, allowed the VFD to be programmed for two different operating pressures. This allowed the correct operating pressure to be set for each system reducing pipe blowouts, and reducing pumping costs by 40%.

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