FLUID COOLING SYSTEMS, LLC.

SOLUTIONS

COST SAVINGS VARIABLE-SPEED-DRIVES

One of the best ways to save money in cooling applications is by using variable frequency drives, or VFDs on pumps and fans.

In industrial and commercial facilities, most energy is used moving water and air, via pumps and fans respectively. Their motors are oversized to handle worst-case, peak load situations, which occur only about 5% of the year. This means pumps and fans are using excessive energy 95% of the time they're in use. Additionally, systems are typically oversized to account for unexpected loads or future needs. Engineers do this as standard practice but it results in massive inefficiencies and unnecessary costs when combined with all the individual oversized motors throughout a facility.

What is a VFD?

A VFD is an adjustable speed motor controller that matches power to the load requirement. This allows facility managers to combat inefficiencies related to over-engineered systems and components. They modulate motors as needs increase/decrease, thus meeting the varying demands of each system.

VFDs have been used for over 25 years. As technology has improved, they've gotten smaller, more sophisticated and less expensive. In a word: better. They now make sense in a myriad of applications.

How do they work?

A VFD takes the fixed power supplied to it and converts it into a variable frequency and variable voltage source which then feeds a motor. It's like having an infinite number of gears for each motor to accommodate the changing needs of a system. By controlling the speed and torque each motor produces, system optimization is possible.

Additionally, VFDs have soft start ability built in to allow motors to gradually ramp up to the required speed. This is important because a motor draws a much higher current when it is started. This initial surge can be up to ten times the max load for a motor, which causes significant stress to the motor's internal components which can contribute to failure over time. When a VFD is utilized, it applies a very low frequency and low voltage to the motor initially, and then it's brought up at a controlled rate instead of being jolted into action.

LESS WEAR AND TEAR

Reducing the motor's speed and torque for the majority of its life is not only sensible, it also minimizes wear and tear on the motors because they are not being maxed out with every use. Gradually ramping up to speed via soft start technology, allows motors to warm up properly before handling required process loads, which can be significant at peak times. Together, these benefits help reduce maintenance costs and extend the life of both the individual components and the system as a whole.

ENERGY AND COST SAVINGS

VFDs counter the inefficiencies that are inherently built into every system. By matching system capacity to the actual load throughout the entire year, major energy savings are achieved. While speed and flow are more or less proportional, energy consumption and reduction are cubed. Because of this, a motor that is set to 90% of its maximum operating speed actually realizes an energy savings of about 27%. Applying this to a 30hp pump on a normal bell curve, annual savings would be $16,081 based on $.10 per kWh running 24 hours per day. If duty stays within 70%-100% all the time, the savings would be $5,140. This allows VFDs to pay for themselves in a relatively short period of time.

MORE PRECISE LEVELS OF CONTROL

While controls are able to turn on pumps and fans individually, a VFD's ability to control the exact output of each unit provides an infinite combination of speeds to match the exact requirements at any given time. Working together, this means a smarter, more efficient system.

Whether designing into new applications or adding to an existing one, VFDs are not only a smart component, they truly are a necessity.