Power Connections
Spring 2013
Shakopee Public Utilities

Variable Frequency Drives

A VFD is a device that controls the voltage and frequency that is being supplied to a motor; therefore, it controls the speed of the motor and the system it is driving.

AC induction motors are essentially constant speed machines. A VFD converts incoming AC power to DC, which is inverted back into three-phase output power. Based on speed setpoints, the VFD directly varies the voltage and frequency of the inverted output power to control motor speed.

Substantial energy savings can be achieved in many applications by varying the speed of motors and the driven load using a commercially available VFD. Savings include energy costs, capital costs and maintenance associated with these controls.

If properly installed and set-up, VFDs can save 30% to 80% of energy use.

The following table provides typical examples of loads and their energy savings potential:

Type of Load	Applications	Energy Savings Potential
Variable Torque Load	- Centrifugal Fans - Centrifugal Pumps - Blowers - HVAC systems	Lower speed operation results in significant energy savings as power to the motor drops with the cube of the speed
Constant Torque Load	- Mixers - Conveyers - Compressors - Printing Presses	Lower speed operation saves energy in direct proportion to the speed reduction
Constant Horsepower Load	- Machine Tools - Lathes - Milling Machines - Punch Presses	No energy savings at reduced speed; however, energy savings can be realized by attaining the optimized cutting and machining speeds for the part being produced

Contact Julie Ambach, your SPU account representative, for specific rebate information for your business

Maximizing Savings

» **Select the proper VFD for the application**

When using an AC drive and motor combination there are many different applications and methods where the energy savings and the energy recovery can be significant. Each application should be reviewed to get the maximum amount of energy savings. In many cases, the energy savings and operating costs which are saved are much larger than the cost of the installation.

» **Do not run motors at a constant, full speed**

VFDs can use up to 4% of the power that would be directly supplied to a motor if a VFD were not used. For this reason, VFDs may not be cost-effective for motors that are run at constant, full speed.

» **Ensure the VFD sequence is set-up properly**

The best sequencing for VFD systems depends on the application. Consult with your supplier to ensure the VFD is running at optimum efficiency.

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In This Issue

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