What is a variable frequency drive or adjustable speed drive?

Variable frequency drives (VFDs), also called adjustable speed drives (ASDs), allow induction-motor-driven loads such as fans and pumps to operate at increased efficiency. By controlling motor speed so that it finely corresponds to varying load requirements, VFD installations can increase energy efficiency and process precision, and afford other performance benefits such as over speed capability. They can also eliminate the need for expensive and energy-wasting throttling mechanisms such as control valves and outlet dampers.¹

Fundamentals of VFDs

• A VFD changes the frequency and voltage supplied to the motor
• A reduction in frequency results in the shaft of the motor spinning at speeds lower than the standard 1200, 1800, and 3600 RPMs (depending on the motor)

Benefits of VFDs

• Added control—smoother acceleration and deceleration, automated response to system conditions (e.g. pressure, flow, etc.)
• VFDs operate on an as-needed basis, saving energy, money and maintenance costs
• Energy savings—especially on variable-torque centrifugal fan and pump applications
• Improved process control, such as speeding up or slowing down a machine or process
• Bypass capability in the event of an emergency
• Protection from overload currents
• Extending the life of your motor equipment
• Reduce noise

Energy savings potential

• Centrifugal fans and pumps offer the highest potential for savings
• Example:
  – Flow increase 10%
  – Power increase 33%
  – Small decrease in flow = bigger decrease in power

Market segments

• Industrial processes, such as glass manufacturing, mining, refining
• Commercial real estate
• Churches
• Food processing
• Grocery stores
• Commercial space (retail and real estate)
• Hotels/motels
• Schools and universities
• Cold storage
• Hospitals

¹www.asource.com
²Extruders and conveyors are Custom VFD applications
VFD Case Study: Greater Twin Cities United Way

VFD UPGRADES YIELD BIG RETURN ON A SMALL INVESTMENT

The situation:

• A resourceful nonprofit with a 68,000 sq. ft. facility in the heart of downtown Minneapolis was looking for ways to maximize their operating budget.

• In need of energy efficiency upgrades, they started with the low-hanging fruit—projects such as lighting.

• In order to maximize the energy savings potential, they also replaced their air conditioner and air handler (both of which were installed in the 1960s).

Their engineers suggested installing variable frequency drives (VFDs) on the wall fans of the newly installed air handler to maximize their energy savings. VFDs are used in commercial and industrial settings where the climate of a large space needs to be controlled. And with 68,000 sq. ft. of space, you could say the Greater Twin Cities United Way qualified.

As you can see from the project snapshot above, a not-so-obvious, small, energy efficiency upgrade can be a big bonus. And you don’t have to be a nonprofit to get on board with that. To see the full case study on the Greater Twin Cities United Way or other similar customer case studies visit ResponsibleByNature.com/Case-Studies.

Be aware that VFDs are not beneficial for every application and some are not eligible for a rebate.

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We are here to help.

For assistance in determining if VFDs would benefit your facility, or to find out more about rebates, contact one of our dedicated energy efficiency specialists in our Business Solutions Center at 1-855-839-8862 or energyefficiency@xcelenergy.com. Or visit our website at: xcelenergy.com/MotorEfficiency.