# VFD Innovation As A Key To Success

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Summer is upon us, and although orders may be slightly down compared to this time last year, your customers are no less demanding and your production schedules are no less critical in maintaining and growing your business. Capital projects have come under scrutiny and the maintenance budget has probably been reviewed and reduced as well. So when you need to select a Variable Frequency Drive (VFD) for either your capital project or MRO requirements, you want to select a brand with the highest level of value and reliability.

Which of the self-correlating magnetic motor control digital feedback parameters do you really need to change before your conveyor application will run its best? Do you actually need triple-buffered photo optic couplers in your analog input speed circuit? If you've had similar inquiries, you might find this VFD selection process very confusing.

**Feel The Power**
A VFD that is truly technically innovative will utilize all its processing power, diagnostics, I/O, and computing speed to make your life easier and improve your operational efficiency, consistency, and, ultimately, your profitability.

But before we go further, let's start with a basic description to make sure we're all talking about the same thing. A modern, general-purpose VFD connects to an AC power source and converts that AC power into DC energy, which is stored via internal capacitors. This DC energy is then made into an equivalent variable voltage and frequency, which is most often delivered to a three-phase induction motor. The motor draws current (amps) which allows the rotor to develop torque, resulting in the shaft spinning at a desired RPM and direction.

Given this knowledge base, I feel there are five essential areas to consider when selecting the proper VFD: power (voltage, amps, input and output requirements), control (keypad, digital or analog I/O, network communication), environment, application, and life cycle costs.

**Step One**
This first area, power, deals with:

- The available AC input power (either single or three-phase).
- The phase-to-phase voltage (typically 220-230, 380-415, 460-480, or 575).
- The frequency (50 or 60 Hz).
- The connected motor will determine the output voltage and amp rating of the VFD. Since a modern VFD delivers current and synthesized voltage at a desired frequency to the connected motor, it should always be sized according to the FLA value, and not the horsepower stamped on the

connected motor nameplate.

The second area—control—deals with how to tell the VFD what to do, and how to do it. You may wish to use the full function keypad mounted on the front cover, or remote terminal signals, called I/O. These are either digital signal connections that can be programmed to tell the VFD what to accomplish, such as status information on VFD operation, or analog (variable voltage or milli-amp) signals that are typically used for speed or torque reference. Several popular communication networks, such as EtherNet/IP, DeviceNet, PROFIBUS, Modbus, and others can also be utilized for high-speed control of all operations, as well as programming. Insisting on an open network could help ensure that you don't get handcuffed into one manufacturer's hardware, software, or standards.

**Environmental Know-How**

In terms of operational environment, you need to be concerned with where you plan on installing the VFD. There are numerous NEMA and IP enclosure ratings to consider, such as indoor, dust-tight, outdoor, water-tight, etc. Ambient temperature also needs to be verified. A consideration which is often overlooked is the potential vibration that the VFD may be subjected to under normal operating conditions. A high shock and vibration installation may cause the unit to fail sooner than expected, so check the specifications if there is any question.

Additionally, what process are you intending the VFD to run? Here is where a professional, well-trained local distributor, backed up by a strong application/tech support group at the manufacturer level, can take the stress out of your selection process.

Finally, life cycle costs should be at the heart of your VFD selection criteria. Don't go through this entire process and end up simply selecting the lowest price VFD you can find on the internet. Saving a few dollars on the initial purchase price can end up costing your company thousands in lost production, unscheduled maintenance, missed deliveries, or worse.

In today's business environment, plant engineers and maintenance managers need a manufacturer and distribution channel that can supply a technically innovative VFD. This means quality, application flexibility, and operational simplicity levels that will result in process improvement and increased profitability.

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