

## Three Major VFD Trends

The Shift Away from General Purpose Controls Toward Reduced Installation Costs



## Introduction

Forty-plus years ago transistor-based Variable Frequency Drives (VFDs) quickly demonstrated their ability to save energy and improve process control. Successive VFD generations improved their motor control performance, reduced their size, and minimized installation time. VFD development is shifting focus away from general purpose motor controls that are already meeting market demands toward one market driver that is remaining constant: reduce installation costs.

## Saving Time

To minimize commissioning time, VFDs are being designed and built for individual industries. Out-of-the-box VFDs are programmed with industry-specific terminology, parameter defaults are customized, new functions created, and unneeded features are cut away.

VFDs are also being programmed with industry specific setup wizards which guide the installer through the typical steps needed to run a drive. These software features are all designed to minimize the installers time in front of a drive at the job site to reduce commissioning costs.

A second benefit of creating industry-specific drive features is to minimize the amount of time required to train drive installers, making drive setup natural and intuitive.



Industry-specific setup wizards simply installation and reduce setup time

## Saving Space



Example of a NEMA-4X (IP66) drive enclosure

Open Type and NEMA 1 VFD enclosures are still the staple VFD manufactured in the Americas. They are commonly mounted to a machine, facility wall, or added to another enclosure with a higher environmental protection rating.

However, NEMA 12 (IP54) and NEMA 4/4X (IP66) VFDs are rapidly gaining popularity, particularly in fan and pump applications where the application controls now reside in the VFD's software rather than external logic. They are smaller and weigh less than VFDs put in another enclosure. They also minimize overall component count by minimizing wire, terminal blocks, and additional cooling.

Engineered drive packages with branch circuit protection, power conditioning devices, and control IO still have a firm place in the industry, but enclosures will continue to become more specialized and cost effective.

## Mitigating Harmonics

Meeting IEEE 519-2014: IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems current harmonic requirements has become a focus in Pacific coast states and has been slowly moving eastward. Mitigating current harmonics increases installation costs from the equipment owner's perspective; the cost savings comes from the power utility's side.

Reducing current harmonics has become so important to utilities that many offer rebates to help offset higher VFD costs. This is perhaps the area of greatest change in the VFD marketplace over the past five years. Conventional low-harmonic topologies, such as 18-pulse rectifiers and harmonic filters, are being displaced by a wide array of active switching topologies that are more efficient, consume less space, and easier to install.

## Conclusion

VFD manufacturers are continuously evolving their products and adding a multitude of features, but the primary purpose of a VFD is to save the owner money. VFDs that continue to reduce cost of ownership will continue to dominate the markets.



The Yaskawa U1000's unique AC-to-AC power conversion architecture is the latest advancement in IEEE 519 low-harmonic variable frequency drives. By eliminating the DC bus the U1000 is smaller and more efficient than earlier products.