DOE Efficiency Regulations

Steer Motors and Drives Market

Manufacturers work to meet increasingly stringent U.S. Department of Energy regulations

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THE NEWS STAFF

ORLANDO, Fla. — Inside forced-air and hydronics systems alike, motors are hard at work blowing air, circulating water, cooling compressors, and more. And, while there are still a significant number of single-speed motors still in operation, many OEMs are making a concerted move toward variable-speed equipment in order to meet a growing demand for higher efficiency. To help OEMs meet their goals, and to meet increasingly stringent motor efficiency regulations from the U.S. Department of Energy (DOE), motor and drive manufacturers have introduced their smartest, most efficient products yet.

ALL ABOUT EFFICIENCY

For many decades, the single-speed PSC (permanent split capacitor) motor was the industry standard, and it still exists in a great number of installed HVAC systems in the U.S. today. However, as consumers have demanded higher efficiency — and as regulatory bodies, like the DOE, have mandated it — manufacturers have developed new variable speed motors and variable frequency drives to help meet those expectations.

Nidec Motor Corp., recently introduced its U.S. Motors brand 3- to 10-hp electronically commutated motor (ECM) with an IE4 (super premium) efficiency rating for integration with a tuned variable frequency drive (VFD). This motor is a member of the ACCU-SERIES line of variable-speed products and features an integrated user interface that allows for easy setup.

“This motor utilizes ferrite magnets and not rare earth, which allows for more price stability,” said Tim Albers, director of marketing, industrial motors and systems, Nidec Motor Corp. “Integrated motors, drives, and equipment — such as fans, pumps, and compressors — simplify the installation of variable-speed systems. This allows end users to install newer high-technology, ultra-efficient systems with current maintenance staff because the setup, programming, and component matching is all done in advance.”

On the drives side, Danfoss North America recently introduced its VLT® DriveMotor FCM106/FCP106, which received an honorable mention in this year’s AHR Expo Innovation Awards. The FCM106/FCP106 combines a high-efficiency motor with a Danfoss drive, providing a lower-cost, systems smaller, less expensive, and offer lower operating costs to end users,” added Steven Gmeinder, product marketing manager, Danfoss Drives Americas, Danfoss North America. “Production processes can be streamlined with the hardware and software features built into the FCM/FCP106 and its associated MCT21 software.”

Fuji Electric’s FRENCIC HVAC Drive has been designed with features and functions that are targeted to HVAC motor-control applications. David Schrader, business development manager for Fuji Electric Corp. of America, compared the variable-speed control offered by a VFD to the operation of a passenger car. “When you turn on the engine and go to 100 percent speed and then try to control the speed of the car by using your brakes, that’s how a majority of commercial and industrial HVAC applications work today. From that standpoint, this device adds some of the functionality you have with your car — your accelerator pedal and your brake pedal.”

To help the installer, Fuji Electric has simplified the design of its drive, Schrader added. “In a lot of cases, mechanical contractors are being asked to supply the motor control equipment, and mechanical guys aren’t electrical guys, so we’re trying to take some of the work they’re unfamiliar with and coordinate the electrical pieces for the application with the disconnect.”

The S-Flex enclosed drive for commercial fan and pump applications is also designed with the installer in mind, said Judy Matthew, product manager, Schneider Electric.

“If there is an emergency, a fireman can just turn the drive off and it’ll send communication to the BAS [building automation system]. You also have a through-the-door disconnect, which is a safety factor,” she said.

The S-Flex also has an iPad application that aids in programming and troubleshooting the drive. “It’s very popular with maintenance personnel,” Matthew said. “You can see the configuration of the drive, and if there’s a problem, you can email the configuration directly to our support center to help with diagnosing the drive. There’s also a manual on the iPad app, so, if you have a problem, it can tell you what to check for. It’s a time-saving feature.”

By employing VFDs, Taco Inc. has been able to reduce energy use in some of its pumps by 60 percent or more, said Jeff Piceira, eastern commercial regional manager, Taco Inc. Taco’s newest products that utilize VFD technology, the SCI self-sensing installation coupled end suction pumps and SFI frame-mounted end suction pumps, feature reliability and ease in installation for heating, air conditioning, pressure-boosting, cooling, and water-supply applications.

“It’s our most popular pump style,” Piceira said. “The pumps are coming with the drives already mounted on them. They’re all pre-wired, and we’ve already set many of the operating parameters at the factory. It comes out of the crate and they can pipe it right in, put power to it, and turn it on. It really can be that easy.”

IMPROVING ACCESSORIES

In addition to new motor and drive products, manufacturers at the AHR Expo also displayed their newest accessories in this product category.

Baldor, a member of the ABB Group, showcased the Baldor-Dodge Raptor Coupling, which features an easy-to-assemble, patented, split natural rubber element to significantly decrease total costs of ownership and extend equipment life. This wing coupling is designed for drop-in interchangeability and offers easier installation, reduced maintenance, and improved reliability in a wide range of new and existing applications, said Chad Chrudimsky, marketing communications specialist, electrical, Baldor Electric Co.

“Any time you’re mounting a motor to our system, you’re going to put it together with a coupling,” Chrudimsky said. “If the motor shaft in your system isn’t 100 percent aligned, this will give it a little bit of leeway and provide a little bit more tolerance for misalignment.”

Baldor also displayed its proprietary shaft-grounding technology at the AHR Expo. “A lot of people run their motors with a VFD to control its speed and that causes bearing fluting,” Chrudimsky explained. “So, you
Vijay Kambhammettu, marketing leader for Regal Beloit America Inc. “We took the motor and redesigned it. Now, we have this pancake design sitting in the center of the blower assembly, and airflow is not obstructed, which can boost efficiency and reach higher cfm.”

DRIVING THE FUTURE

One of the biggest influencers of motor and drive product innovation has, and will continue to be, energy-efficiency regulations.

“Last year, we had the small motor rule that all open motors had to go to premium efficiency,” Chrudimsky said. “In June of this year, 1- to 500-hp motors need to be covered as premium efficiency. The June 1 rule is one that encompasses a lot more motors. Baldor has been ramping up for the June regulation for about a year and a half. The DOE gives us three to five years to get ready for it, so that’s when you go to your supply chain and let them know it’s inevitable.”

“The cost to comply with the new motor regulations is hefty, he added, though Baldor has stayed a step ahead by providing products that already meet or exceed the DOE’s requirements. “The DOE regulations are causing everyone to go to that now, but we’ve always been on the leading edge of that trend. It was hard in the beginning, but now that we’re at that level, there’s less we have to do to comply.”

“At Danfoss Drives, we’re 100 percent committed to exceeding the local and global expectations of customers in the Americas,” Doring said. “We also have aligned our sales organization to achieve local or regional representation, improving access for our customers across the Americas regardless of their industry or needs. Together, we are stronger than ever and ready to help advance profitable energy-efficient systems.”

Albers said that energy efficiency, whether mandated by the DOE or by the market itself, will continue to influence motor and drive technologies.

“Efficiency is taking over,” he said. “The push for green applications and the ability to lower power bills is driving these trends. Regulation is playing a part, but many of the current high-efficiency systems are exceeding legislated levels. The industry is pushing for efficiency and is willing to pay for it.”

BLOWER MOTOR EFFICIENCY

Blower motors, which have traditionally been single-speed, also got a makeover at this year’s AHR Expo, where Regal Beloit displayed a commercial blower solution as well as a drop-in replacement for residential applications.

The Evergreen EM/CM from Genteq, a Regal Beloit brand, is an aftermarket ECM replacement for indoor blower motors, “Contractors need to become more comfortable with pitching replacement motors to blowers,” said Christopher Mohalley, training manager for Regal Beloit America Inc. “It can save you money over the long haul and increase comfort and IAQ.”

Regal also demonstrated its Genteq DEC Star for commercial air handlers. The DEC Star System combines patented technologies of Genteq HEB (high-efficiency blower) and axial-flow Genteq motors to dramatically improve efficiency and reduce input wattage for HVAC equipment.

“We have a radial motor, but it obstructs the air on one side and decreases efficiency,” said