

New Motor Technology

NovaTorque

INCREASES ECPM LINE

NovaTorque Inc.'s family of Gen2.0 PremiumPlus+ Electronically Commutated Permanent Magnet (ECPM) motors will soon be available in high speed 3 hp and 5 hp 2,400 rpm (maximum speed 3,600 rpm) models. Also available in 3 hp and 5 hp 1,800 rpm models (maximum speed 2700 rpm), NovaTorque motors utilize low-cost ferrite magnets in an innovative flux-focusing design to deliver the efficiency of rare-earth permanent magnet motors at a price that is competitive with induction motors.

"Anyone can build a high efficiency motor using expensive materials and costly manufacturing tolerances and processes. It is also easy to build a low-cost motor with low efficiency. The real challenge is to build a high efficiency motor with a low manufacturing cost, and our Gen2.0 PremiumPlus motors do that," says John Petro, NovaTorque founder and CTO. "Making a significant environmental impact requires that this new motor technology become nearly as ubiquitous as the

AC induction motor is today. That can only be achieved by meeting efficiency goals at a cost and price point that encourages widespread adoption. So our goal has been to create the best efficiency per dollar motor available on the market today."

Driven by variable frequency drives, Gen2.0 PremiumPlus+ ECPM motors boast motor-only rated point efficiencies of 93 and 92 percent for 3 hp and 5 hp versions respectively, far exceeding the levels achieved with induction motors. Additionally, unlike induction motors, NovaTorque's PremiumPlus+ ECPM motors maintain their high efficiency and high torque over a very broad speed and load range.

"Electric motors are everywhere, and nearly half of the electricity produced in the world is used to drive electric motors. The International Energy Agency estimates that the potential exists to cost effectively improve the energy efficiency of electric motor systems by 20 to 30 percent," explains Emily Liggett, NovaTorque CEO. "Adoption of their recommendations, all easily economically justified, would result in a savings of

\$110 billion/year in energy costs and a reduction in 1.3 billion tons of CO₂ emissions each year. These are

significant numbers with enormously positive potential consequences, both economic and environmental. Further, they are based on what was considered the current state of art – premium efficient induction motors driven by variable frequency drives. NovaTorque's innovative technology, with patented flux-focusing stator and rotor hub geometry, produces this performance with an all-ferrite (versus rare earth) magnet design."

NovaTorque PremiumPlus+ motors are packaged in standard NEMA frame sizes and mounting dimensions for easy substitution. Due to their high power density, NovaTorque motors are available both in the mounting frame size typical for induction motors, as well as one frame size smaller. NovaTorque PremiumPlus+ motors are compatible with readily available variable frequency drives (VFDs) from most leading manufacturers, including ABB, Yaskawa, Mitsubishi, Fuji, Hitachi, Toshiba, Danfoss, Siemens and others.

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Portescap

OFFERS SIZE REDUCTION WITHOUT COMPROMISING EFFICIENCY

Portescap introduces 12GS motors to their Athlonix platform of high-power density brush DC motors. New 12GS high endurance motors deliver spectacular speed-to-torque performance in a compact lighter weight package (13.5 g / 0.47 oz) with output power up to 1.2 watts. This enables OEMs to build smaller, lighter and higher performing machines and devices. 12GS motors also feature an energy-efficient coreless design with an optimized self-supporting coil and magnetic circuit to maximize power density, while also providing sustained endurance over the life of the motor. The 12GS brush DC motors are available with three

winding options to suit varied application needs. Customers appreciate the 12GS motor's optimized package size-to-performance ratio, offering 10 percent less volume for the same performance and 50 percent more torque in the same package.

"Our new size 12GS motors provide energy efficiency approaching 80 percent, allowing users to benefit from increased performance over the life of the motor, especially in portable applications," says Lionel Munsch, project manager at Portescap. "Design engineers will realize the benefit of 12GS motors because they will be able to miniaturize their equipment without compromising on power density, efficiency or battery life," he says.

Athlonix 12GS motors provide maximum continuous torque up to 1.5 mN-m to deliver higher endurance and performance while maintaining operational efficiency. This makes 12GS motors ideally suited for use in life science and medical applications including fluid handling machines, insulin pumps, and collimators.

Portescap's new Athlonix 12GS motors are compatible with incremental encoders and gearheads of various sizes and ratios. They are manufactured in an ISO certified facility and are RoHS compliant. Contact Portescap's application and sales support team to obtain additional specifications and rapid prototype samples.

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Pittman

CUSTOMIZED MOTORS MEET SPECIFIC NEEDS

Pittman Motors, a unit of Ametek Precision Motion Control, offers customized motor designs for high-end motion control applications. With Pittman customized motors, design and automation engineers are not limited to an off-the-shelf motor that may not completely meet application requirements, especial-



ly in applications where the motor is expected to operate continuously in a harsh environment. Highly customized DC motors can be designed to meet strict customer specifications for use in harsh environments or demanding applications.

The customer first gained an understanding of the base-model motors that Pittman offers and then worked closely with Pittman design engineers to customize a motor to meet the customer's specific needs. The motor's outside is built using stainless steel for the housing, flanges, and shaft. The motor's inside is protected from debris and moisture using a combination of seals, including a dynamic labyrinth seal on the front mounting surface and o-rings between the flanges and housing.

The customized brushless motor design provides a high level of sealing against particulates and moisture as well as splashes from the corrosive environment. A dynamic labyrinth seal provides protection

from dust contamination, while allowing the motor to operate at high shaft speeds. A stainless steel cable gland and silicon cable sleeve are used for enhanced ingress protection.

The 4-pole brushless motor also was optimized for 24 hour/day operation at speeds ranging from 500 rpm up to 15,000 rpm. It is constructed using high-grade, low-loss lamination steel to increase efficiency at high speeds and skewed rare-earth permanent magnets to minimize cogging at low speeds. The motor is electronically commutated using integrated hall-effect devices. The above example offers just a sampling of the customization capabilities available from Pittman. Thousands of application-specific solutions have been designed

for a broad range of systems such as medical devices, laboratory instrumentation, semiconductor fabrication equipment, robotics, business machines and numerous others.

Pittman also offers a wide range of standard brush and brushless DC motors that are available in a variety of frame sizes, torque and power ratings. Frame sizes range from 0.375-in (9.5 mm) for miniature high-speed brushless DC motors up to 5.25-in (133 mm) for high-torque brushless DC motors with integrated controllers. Output torque ranges from 0.3 oz-in (0.00224-m) to 1,824 oz-in (12.8824-m) without a gearbox. Both planetary and spur gearboxes are available for most brushless DC motors, greatly increasing the available torque output. Gear ratios up to 4732.5:1 are possible. A wide variety of encoder types also are available.

For more information:

Pittman Motors
Phone: (267) 933-2105
www.pittman-motors.com

Kollmorgen

W SERIES PROMOTES RELIABLE OPERATION

Kollmorgen introduces Stainless Steel W Series motors. These IP69K-sealed hygienic servomotors feature an all stainless steel, round housing design that promotes long life and reliable operation in harsh food, beverage and pharmaceutical applications, even subject to frequent high-pressure washdown cleaning. With a robust design that eliminates the need for additional housing, an innovative venting system that eliminates the need for machine builders to supply compressed air to the motor and a 3 and 6 meter standard flying lead option that eliminates the need for intermediate cables, the W series simplifies machine design and component integration.

Precision balanced, low-cogging and high torque density W Series motors use high grade stainless steel for all external and internal metal components, food-grade bearing grease, a food-grade shaft seal and a laser-etched nameplate. They are available in 16 frame/stack combinations, delivering continuous torque to 80 Nm and peak torque to 39024-m at rated speeds to 7,500 rpm. These attributes and performance enable food, beverage and pharmaceutical OEMs to specify exactly the right motor for the application without having to overpay for an over-specified motor, or settle



for a standard motor with a modified housing.

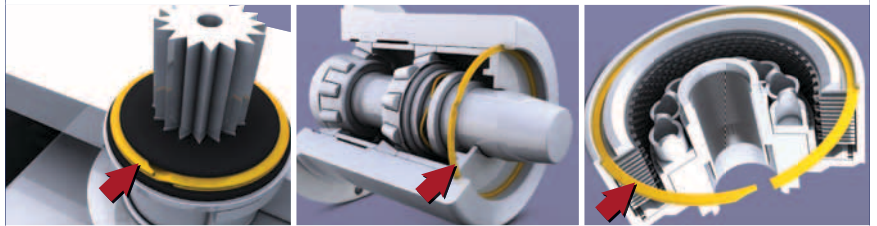
Food, beverage and pharmaceutical equipment machine builders generally use as many stainless steel components as possible, and are increasingly doing so even in areas where non-hygienic motors have historically been used. Non-hygienic motors are difficult to clean and are prone to failure under the harsh operating conditions and rigorous cleaning schedules. Over time the exterior of painted motors can wear and chip, potentially causing paint to get into the end product. Stainless Steel W Series Hygienic motors overcome these concerns and deliver the performance that will keep equipment up and running to maximize productivity.

“Shutdowns by the U.S. Food and Drug Administration can be a public relations and productivity nightmare, and they can be prevented by utilizing hygienic components that are specifically designed for these environments,” says Gene Matthews, product manager, Kollmorgen. “So whether an OEM is designing new equipment, or working a redesign to proactively prevent the possibility of a shutdown or to get an operation back up and running quickly after a shutdown, Kollmorgen’s Stainless Steel W Series motors

are a hygienic, high-performance solution that can help.”

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Crouzet

EXPANDS MOTOR SERIES

Crouzet, a brand of Custom Sensors & Technologies (CST), has introduced the DCmind Brushless direct current motor series, augmenting the recent market debut of the DCmind Brush Series. The latest in the DCmind offering includes the TNi21 and SMi21 brushless motors featuring integrated electronics, power capabilities from 60 to 150 Watts, and high accuracy.

A key benefit to the new series' design is the integrated electronics that save space and provide a smart, compact motor solution. Other important characteristics include an optimized control loop which allows simple and accurate motor management, carefully designed internal thermal protection for improved safety, and intuitive, easy-to-use software. Suitable EMC characteristics assure operational safety and reliability. Available options include mechanical brake and a variety of planetary and worm gearboxes. Either model can be used as a stand-alone motor or in combination with other motors, or controlled by a PLC.

The DCmind SMi21 Series is designed for motion control applications that require precise accuracy. These motors feature a range of 66, 90



and 150 watts nominal usable power at 24VDC and support 9-56 VDC. The SMi21 incorporates a quality 4096 step encoder that controls position, torque, speed, direction, braking and other functions and includes 6 inputs and 4 outputs. Suitable uses include a variety of access control applications such as automatic doors and screen doors used in metro systems, trams, trains, and bank airlocks; as well as turnstiles, barriers and motorized traffic controls.

The DCmind TNi21 Series Motors are rated at 60, 80 and 140 watts nominal usable power at 24VDC and support 10-36 VDC. This series was designed for simple applications dedicated to speed and torque control. Overall, the new brushless motors are excellent for applications found in medical, packaging, robotics, printing/mail sorting and many others.

"The new DCmind Brushless motors add a premium product to our line," says Jerry Brierton, national sales manager. "With the model SMi21's power capabilities to 150 Watts, Crouzet can effectively expand its application reach to the automation positioning market. Additionally, Crouzet's ability to provide adaptations and customization make the product even more attractive to customers looking for a motor that can be modified to meet their exact requirements."

DCmind Brushless motors are manufactured under ISO 9001, ISO 14001, approved in accordance with CE, and are RoHS compliant. Delivery is from stock to 12 weeks.

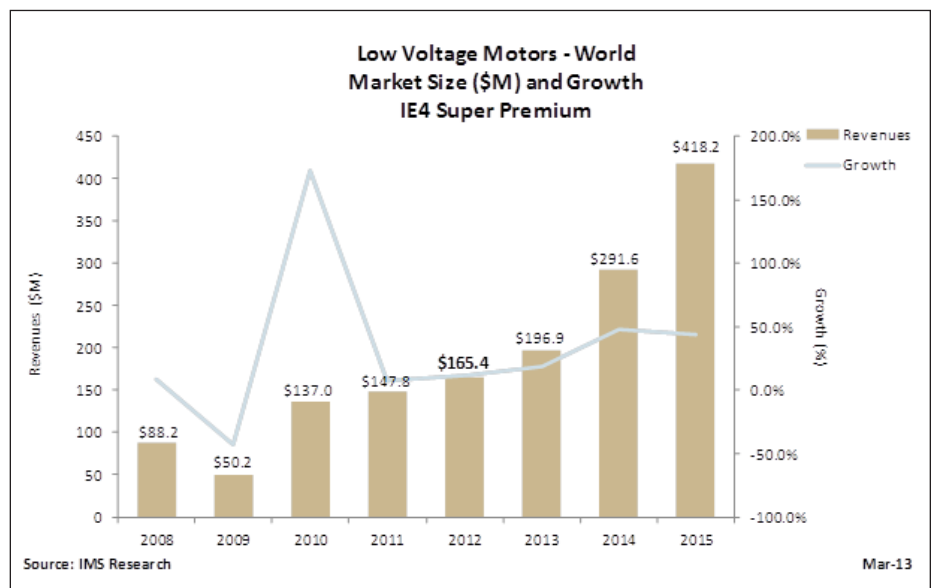
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IHS

REPORTS ON RARE-EARTH MINERAL SUPPLY

China's move to corner the market for rare-earth minerals (REMs) has prompted manufacturers of low voltage industrial motors to adopt alternative technologies that reduce or eliminate the use of these materials, spurring new growth in the motors market. The global market for industrial IE4 Super Premium Efficiency low voltage motors will reach an estimated \$418.2 million by the end of 2015, up 153% percent from \$165.4 million in 2012, according to "The World Market for Low Voltage Motors - 2013 Edition," an upcoming report from IMS Research, recently acquired by IHS Inc. Emerging lower-cost



alternatives to traditional permanent magnet synchronous motors (PMSMs) that achieve IE4 levels of efficiency have added momentum to this niche market.

Rare-earth minerals get rarer

IE4 low-voltage motors based on the traditional AC induction squirrel-cage design—most commonly referred to as PMSMs—have been heavily dependent on REMs like neodymium and dysprosium, which are needed for the high-powered magnets that generate motor efficiencies above IE3 and NEMA Premium. PMSM motor manufacturers experienced a significant setback in prior years due to REM export caps imposed by China, the world's leading producer and processor of these minerals, which caused neodymium prices to skyrocket in 2011. Some degree of stabilization has occurred as of mid-2012, but prices still remain high and represent a cost concern that motor manufacturers must pass on to their customers.

Magnetic repulsion

“Similar to the samarium cobalt (SmCo) magnet sourcing scarcity of the 1980s, which hastened the development and introduction of neodymium magnets to the marketplace, China's tightening of its grip on REM exports has caused manufacturers to seek alternative IE4 technologies,” said Mark Meza, analyst with IHS. “Manufacturers have been very creative in dealing with magnet sourcing issues by producing drive technologies that reduce the number of neodymium magnets needed in a PMSM motor, or by producing IE4 class motors that use no magnets.”

Proprietary solutions

“When discussing the industrial IE4 motor market in the past, the landscape was mostly limited to neo-based PM motors, or motors with copper rotors,” Meza added. “Now, several proprietary designs that use traditional ferrite magnet technology must be included in the discussion as well.”

US-based NovaTorque produces an electrically commutated PM (ECPM) IE4 motor using traditional ferrite magnets (*Ed's note: See NovaTorque news item on page 22*), while Hitachi Metals Ltd. has been at the forefront of developing an axial flux motor technology using amorphous metal ribbons made of iron, silicon and boron (FeSiB), coupled with traditional fer-

rite magnet technology to achieve an IE4 level of efficiency.

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