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Pick-and-Place Robot

Efficiencies Found in Proper Component Application



Crowning: A Cheap Fix for Noise Reduction and Misalignment Problems and Applications On Gears

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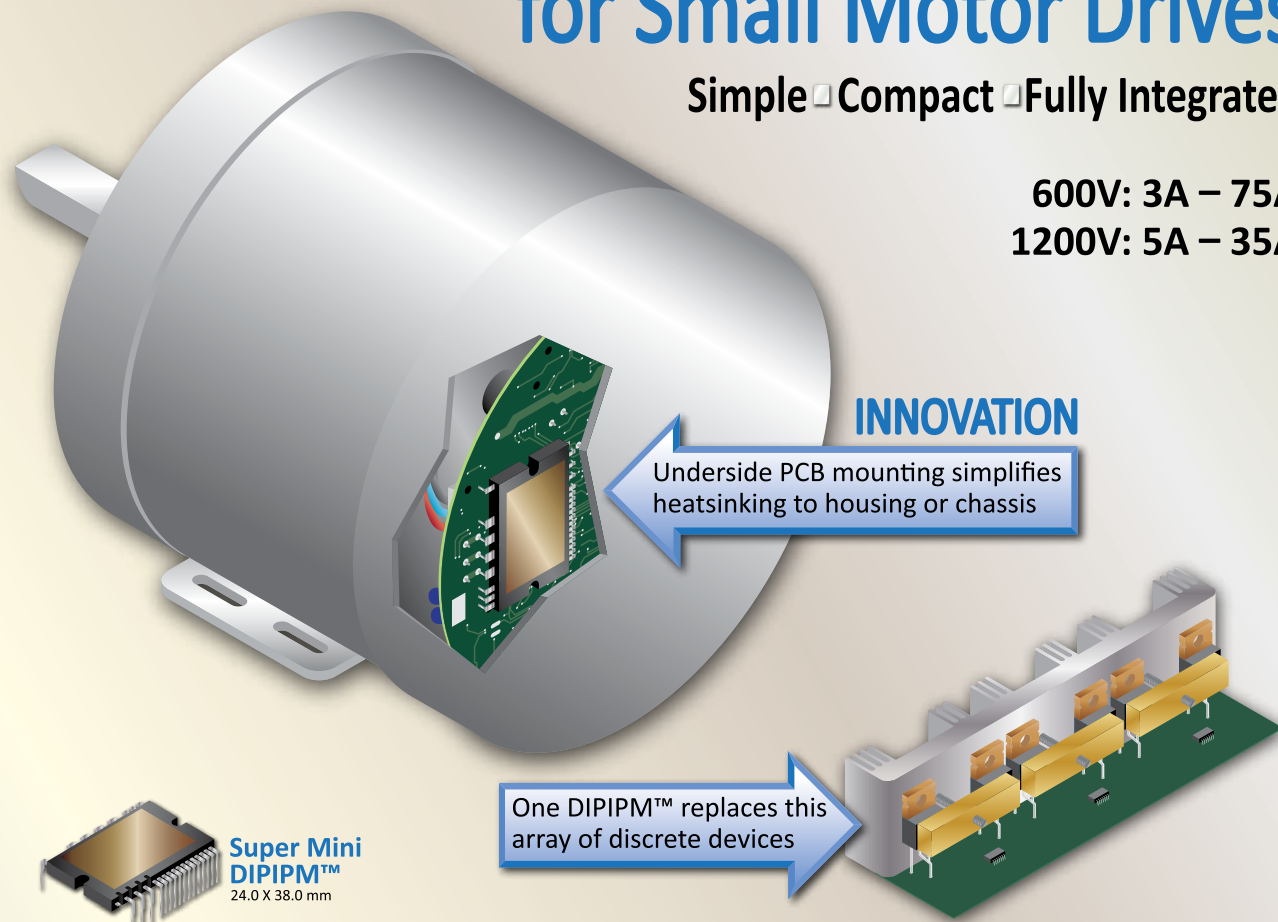
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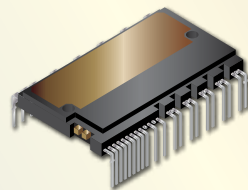
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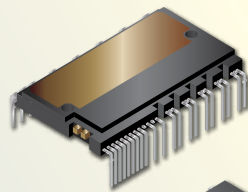
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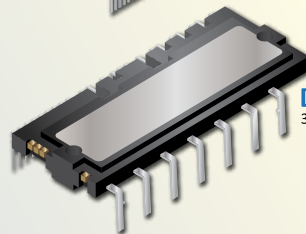
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New Scale Awarded US Patent for UTAF Piezoelectric Motor for Next-Generation Smart Phone Cameras

New Scale Technologies, Inc. has received its fifth US patent for miniature piezoelectric motor technology. Trade-named the UTAF motor (Ultra-Thin Auto Focus), the device integrates all ultrasonic motor functions into a single piezoelectric ceramic beam measuring 4.5 mm by 0.82 mm by 0.7 mm.

Piezoelectric ceramics vibrate in response to electrical signals; ultrasonic motors translate those micrometer-scale vibrations into larger motion through friction contact. The UTAF motor uses an innovative co-fired, multi-layer ceramic process to create a single beam composed of many thin layers of piezo ceramic. Sub-segments of the monolithic beam are energized independently, causing the beam to vibrate simultaneously in two orthogonal directions as its motion mechanism.

Frequency, phase and amplitude of the ultrasonic vibrations are controlled by a two-phase drive circuit. Because the layers are very thin, they respond to signals of 3 volts or less. This is a significant advantage in smart phone camera applications, as it allows the UTAF motor to operate directly from the phone battery.

The UTAF motor is combined with several other patent-pending innovations to deliver a complete ultra-thin auto focus actuator module for next-generation, ultra-thin mobile phones with image sensors better than 8 MP. These innovations include advanced drive electronics incorporated into New Scale's NSD-2101 driver IC, a compact lens module design with a high-efficiency pin-bushing guide, and "Smart Step" control software that optimizes speed and accuracy while minimizing acoustic noise. The UTAF Ultra-Thin Auto Focus module enables continuous auto focus for video capture, as well as faster focus more rapid picture taking.

Enhanced Software Solution from GE Simplifies Programming and Speeds Time To Solution

GE Intelligent Platforms has released Proficy Machine Edition 6.5, a universal development environment for HMI, motion and control applications that all share a single workspace and tool set. Coupled with an efficient, user-friendly structure and standardized user interface, Proficy Machine Edition is designed for ease-of-use and quick time-to-solution for the entire project lifecycle. From configuring and developing to commissioning and maintaining, it improves the overall engineering efficiency of application development and provides users with a sustainable advantage for their business.

Included in the new release is the ability to import and export control logic in XML. This allows users to maintain control strategies in standardized XML format and selectively import

logic blocks to create a complete automation project. In addition, this capability allows Machine Edition to interface with external programming and design tools that are capable of generating control codes in XML. Users can choose to design their system using a third-party development tool and import the generated XML logic into Machine Edition.

MDrive Integrated Motion Systems With Ethernet

Ethernet is used in more than 90 percent of networks today, and now MDrive integrated motor and drive systems are available for Ethernet networks with simplified connectivity, ease of use and reliability with minimal signal degradation over long distance.

MDrive Ethernet systems feature integrated motor, drive and fully programmable controller, with standardized IP addressing system that allows up to 255 devices on a network while eliminating the complicated wiring and software configuring of traditional multi-drop systems using RS-422/485 communications. MDrive Ethernet systems use standard RJ45 connectors and CAT5/6 cabling, which are widely available.

MDrive Ethernet systems support the industrial standard MODBUS/TCP as well as MCode/TCP. MCode/TCP is a modification to proprietary programming language used by all fully programmable MDrive products, making existing MDrive programs portable to the new Ethernet-based products.

An additional enhancement for MDrive Ethernet products is Hybrid Motion Technology, which delivers the benefits of servo and stepper motors, with unique capabilities and enhancements over both. Hybrid Motion Technology is a hardware-based system for real-time response that delivers smooth movement while eliminating unintentional stalling, saves energy and lowers heat with variable current setting, enables operation at 100 percent of motor torque and operates in Torque Mode, which is a unique feature for stepper motors.

GE Commercial Refrigeration Motors Product Line Acquired by Kinetek

Kinetek, a US-based designer and manufacturer of motor, control and system solutions for commercial and industrial markets, has acquired the commercial refrigeration motors product line of GE Energy's Industrial Solutions Division. The GE motors product line will be manufactured and marketed by Merkle-Korff Industries, an operating unit of Kinetek. Merkle-Korff is a manufacturer of advanced solutions for commercial food and refrigeration equipment, pellet stove, door opener and custom applications.

The GE motors product line acquired by Kinetek is specifi-



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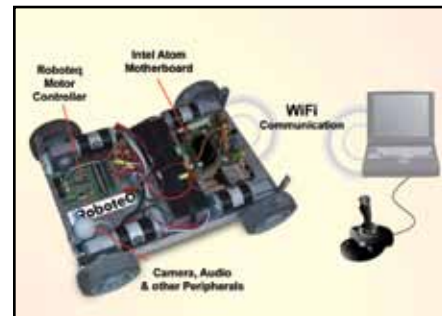
cally designed for refrigeration, coolers, display cases, blowers and fans, and similar applications, according to Norman Bates, Merkle-Korff president. "Energy efficiency is a major concern for these refrigeration units as many of them operate 24-hours a day, seven days a week. We believe that our experience in this segment, including our R&D capability and resources, can build on the GE motor technology to provide a tremendous value for current and future customers," said Bates.

Roboteq Publishes WiFi Robot Platform Design Based on Motor Controller and Intel Atom Mainboard

Roboteq, Inc., a developer of motor controllers for the mobile robotics industry, has designed WiFi Robot platform featuring the Roboteq's AX3500 DC Motor Controller and an Intel Atom Processor-based Mini-ITX mainboard.

The robot is a battery-operated, four wheel-drive unit, built around a 1.5 by 2 feet (46 cm by 61 cm) aluminum frame, with WiFi connectivity and video camera. The robot can feed live video and can be remotely operated via the Internet. The robot is a technology platform that users interested in robotics can easily replicate and to which they can add functionality and intelligence.

The Roboteq's AX3500 motor controller has two channel outputs that are used to power and steer the robot by varying the speed and direction of the motors at each side of the chassis. The controller also has outputs for up to eight RC servos, allowing the control of simple robotic arms and other accessories. The Roboteq motor controller is connected to the Intel Atom mainboard via its RS232 port.



The Intel D510M mainboard was selected because of its 100 percent passive cooling, low power consumption, balanced features set, performance and low cost. The mainboard consumes 800 mA from the robot's 24 V batteries, ensuring several hours of continuous operation depending on motor usage. A power converter ensures proper operation whether the batteries are fully charged or partially depleted.

New Soft Start/Sort Stop Motor Controller

Schneider Electric has introduced a new Enclosed Altistart 22 soft start/soft stop motor controller. The new product includes an integrated circuit breaker disconnect and soft starter in a stand-alone enclosure. These new solid-state combination motor controllers provide a pre-engineered, integrated solution that helps to reduce voltage starting and soft stopping of standard three-phase asynchronous induction (squirrel cage) motors.

The Enclosed Altistart 22 soft start/soft stop motor controller, with integrated bypass functions, allows customers to extend

the service life of their machines through reducing wiring costs, simplifying installation and ultimately achieving greater energy efficiency. The integrated bypass reduces the number of external components, such as power wiring, contactor and control wiring for coil, while also decreasing heat dissipation and allowing for a smaller enclosure.

The Enclosed Altistart 22 unit provides a cost-effective solution featuring a complete low voltage offering of horsepower ratings up to 125 hp at 480 V. In addition, the unit is fitted with an over-current protection device, shorting (bypass) and isolation, which eliminates the need for any additional components. The conformal-coated, printed circuit boards provide enhanced resistance to harsh environments, increasing the service life of installations and lowering maintenance costs. With its energy efficient features, such as reduced current inrush, reduced voltage drop and mechanical shocks, the Enclosed Altistart 22 controller offers a solution for customers' basic motor control needs.

Energy Savings Calculator App Released From WEG

WEG Electric Corp., a provider of industrial electrical technologies, has released an energy savings calculator application for BlackBerry smartphone devices. In a few steps, the app calculates savings gained from utilizing WEG variable frequency drives (VFDs) and/or electric motors.

The WEG Energy Savings Calculator can calculate potential energy savings, return on investment, reduction of CO2 emissions and create reports and calculations for all the motors in a facility.

For those without a BlackBerry device, the calculator can still be accessed for general use from the WEG Green Web site.

In addition to the energy savings calculator, the WEG Green Web site offers other resources including energy efficient product information and guidelines for federal energy regulations. Installing a VFD can help save money by controlling the process speed and adjusting it to the specific load at any time. This is particularly true for variable torque applications like pumps and fans. For motors, money can be saved by replacing one, a few, or all of the motors in a facility with higher efficiency products. Any gain in efficiency by replacing motors with higher efficiency versions can translate into considerable savings, which could pay for the investment in a few years or even months.



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Optimizing Delta Pick-and-Place Robot

Efficiencies Found in Proper Component Application

The annual North American consumption of candy per person is nearly 25 lbs. Therefore, chances are you have eaten tiny sweets out of fancy boxes that were placed there by the packaging's industry most successful rapid transfer robot: the Delta Robot. Developed in the 1980s, the Delta Robot design is the most pervasive rapid transfer robot design on the market with applications in the packaging, medical and pharmaceutical industries. With pick and place systems consisting of up to 20 such Delta robots handling 100 to 2,500 products per minute, there are a lot of sweets to go around.

The continual need for rise in productivity with robotics is met with various challenges. High reliability, low maintenance, redundancy and equable robot utilization are some of the key performance aspects which manufacturers face. These challenges cause OEMs of the Delta robot to continually look for ways to improve their design, seeking optimization of components to provide the best solution. A prime example of such redesign can be seen with the Bosch Sigpack Systems Delta robot. Alpha Gear Drives and Wittenstein Motion Control, both members of Wittenstein, supported the Delta robot's new design with advanced components and utilization of Cymex, Wittenstein's proprietary servo sizing software. Wittenstein and Alpha were able to reduce the robot's space envelope and increase throughput.

The Delta Design

The basic idea behind the Delta parallel robot design is the use of parallelograms. A parallelogram allows an output link to remain at a fixed orientation with respect to an input

link. The use of three such parallelograms completely restrained the orientation of the mobile platform that remains with only three translational degrees of freedom. The input links of the three parallelograms are mounted on rotating levers via revolute joints.

Wittenstein Continued on Page 8

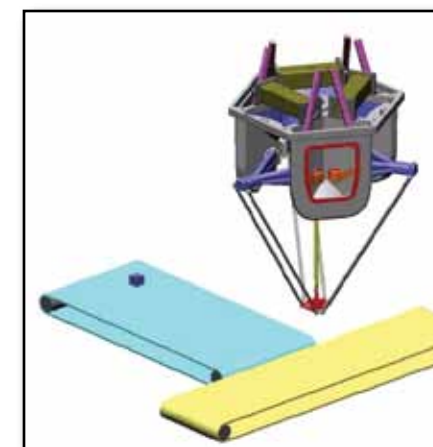


Figure 1. Classic Delta robot designed using rack and pinion as a linear actuator

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The revolute joints of the rotating levers are actuated in two different ways: with rotational (DC or AC servo) motors or with linear actuators. Making the Delta robot well suited for pick and place applications, the fourth leg is used to transmit rotary motion from the base to an end-effector mounted on the mobile platform.

The Delta robot of Sigpack Systems was originally designed using linear rack and pinion actuators. This design proved to be less than optimal. Key improvements that needed to be addressed included:

- High maintenance due to the openness of the rack and pinion/linear actuator design
- Performance of less than optimal
- High assembly times
- Heavy weight of the robot
- Less than optimal control and accuracy

The new design was developed for maximum functionality and a 75 percent reduction of components. This design called for a motor-gearbox combination with an integrated lever arm, providing the optimal solution of having all the drive components enclosed and protected against water and dust, reduction in space envelope and weight and improved performance.



Figure 2. New design using Alpha's TPM motor-gearbox combination

The Delta Re-Design

The Delta robot redesign was to replace the existing linear rack and pinion with a compact motor-gearbox system with an integrated lever arm. Well suited for Sigpack, the TPM servo actuator is comprised of a high precision gearhead, a high-pole motor and feedback all integrated into a single package. Because the actuator concept eliminates any extra components, the space and weight envelope reduced by 50 percent. By design, this new solution eliminated the additional rotating parts that are used in a conventional solution, i.e. additional bearings, couplings and larger shafts, which lead to decreased inertia of the actuator. The source of power in an electromechanical solution, the magnets, is moved closer to the load which improves stiffness and results in higher dynamics. Assembly time was reduced and controllability improved.



Figure 3. Motor-gearbox drive with carbon lever



Figure 4. Sigpack Systems Delta Robot in action

With reduction in components and optimized factory design, the mechanical design now consisted of:

- The robot frame
- Four motor/gearbox units
- A few carbon beams

Comparison of both solution specifications points to the new Delta design (XR31) as vastly improved:

Delta Roboter	XR33	XR31
Pads -No. Cycles (min)	150	185
Max. Acceleration (g)	0.315	0.455
Cycle Time (s)	0.4	0.32
Working Area (mm)	48 x 8.5	48 x 9.2
Total Weight (lbs.)	242	165
Maintenance Rate	Annually	None
Assembly Time (h)	6.5	2.5
Parts (piece)	572	158

With productivity and efficiency becoming increasingly important, the redesign concept of the Delta robot utilizing alpha and Wittenstein components as integral system improvements created the optimal robot for your sweet desires. So, the next time you have some tasty chocolate treats out of a fancy box, think of the Delta robot and the compact servos that placed them nicely in the box, at about 150 pieces a minute for each robot in the system.

Contact Wittenstein at www.wittenstein-us.com.

Crowning: A Cheap Fix for Noise Reduction and Misalignment Problems and Applications on Gears

Fred Young, CEO
Forest City Gear

Noisy gear trains have been a common problem for gear designers for a long time. With the demands for smaller gearboxes transmitting more power at higher rpm and incumbent demands for greater efficiency, gear engineers are always searching for new ways to reduce vibration and limit noise, without increasing costs.

Some popular solutions to the noisy gear problem include enlarging the pinion to reduce undercut, using Phenolic, Delrin or other noise-absorbing products, where possible, or changing to a helical gear train. Other methods include tightening specifications to insure greater gear quality or redesigning the acoustical absorption characteristics of the gearbox. Occasionally, experimentation with gear ratios can limit harmonic frequency amplification, which otherwise can cause a gearbox to amplify noise like a finely tuned stereo system. The engineer can also study material and hardness requirements, so that modifications may be made to minimize heat treatment distortion or possibly eliminate the need for heat treatment entirely. Particular attention must also be paid to gear geometry to insure maximum contact.



Another approach to the gear noise problem that yields good results is crowning or barreling of the teeth. This technique involves changing the chordal thickness of the tooth along its axis. This modification eliminates end bearing by offering a contact bearing in the center of the gear. A second benefit of the crowning approach

to gear cutting is the minimization of misalignment problems, caused by inaccurate machining of the casting, housing, shafting, gearboxes or bearing journals. Crowning can also reduce lead problems in the gears themselves, which causes the gears

Forest City Gear Continued on Page 10

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to wear unevenly and bind because of eccentricities and position errors. Obviously, a gear with a center contact is less affected by discrepant manufacturing or design; furthermore, one can reduce the backlash requirements and allow the gears to wear in rather than wear out.

Shaving is a secondary gear finishing operation done after rough hobbing or shaping to create the desired crown. Crown shaving has long been a popular method, especially in manufacturing coarse pitch gears. With the recent evolution of gear equipment capable of crowning while cutting, the need for shaving just to achieve a crown has been eliminated.

Two variations of the crown shaving method will produce a gear to compensate for off-lead or misalignment conditions. One approach produces a crown by rocking the table during the reciprocation of work and cutter. The degree of crown is readily changed by this method. The other approach is plunge feeding, which requires dressing the shaving cutter to the desired crown. Generally, it is faster to plunge feed, but the technique can subject the cutter to greater wear. Of course, it is more difficult to change the crown, provided one starts with good quality gears. Shaving improves the quality of profile and



reduces error in the gear tooth, through the cutting and burnishing action of the cutters. The crown form can be produced on gear teeth in several other ways. One method is to shape the gear by use of a crown cam in the shaper back-off mechanism. The proper radius of the gear is calculated by using the amount of crown on the flank and the pressure angle of the gear. Unfortunately, the blocks, while not complex, tend to be expensive.

Users of heavily loaded gears have been using crowning for quite some time. Another area ripe for the use of crowning is in the manufacturer of hydraulic wobble motors. Here, the application is strictly for misalignment problems rather than for noise reduction. An allied area involves heavily loaded pinions used in actuators for aircraft control surfaces. Generally speaking, it is more advantageous to crown the pinion because it makes more revolutions per minute and may generate more noise. In this case, it is of paramount importance to compensate for load deflection. Unfortunately, few companies in the United States have been applying this technology to commercial fine pitch gearing. However, the few manufacturers who have tried it are most pleased with the results. Some users have reported a 5-time to 10-time reduction in noise, accompanied by less vibration, wear and power draw.

Prime candidates for use of the crowning technique are the small fractional horsepower motor manufacturers or anyone dealing with spur or helical pinions that are susceptible to noise or misalignment. Because crowning on foreign gear hobbing equipment has been available for a greater length of time, this method has been developed to a greater extent in Europe.

Fred Young is the owner and CEO of Forest City Gear Co. in Roscoe, Illinois. He has worked for the company since the mid-1950s and assumed its management in 1968.

“Prime candidates for use of the crowning technique are the small fractional horsepower motor manufacturers or anyone dealing with spur or helical pinions that are susceptible to noise or misalignment.”

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For more information, visit www.forestcitygear.com.

e-Drive 2011 Industry Outlook

Industry Leaders Share Their Insight on Growth Areas, Driving Factors and What to Watch for in 2011

Unprotected VFD-Driven Motors: A Ticking Time Bomb

Adam Willwerth, Sales & Marketing Manager
Electro Static Technology

As part of the ongoing dialogue about how to make office buildings and manufacturing operations greener (more energy-efficient), there has been a lot of talk about how variable frequency drives (VFDs) can save energy in HVAC systems and automated assembly lines. And with good reason. VFDs can reduce energy usage and costs by 30 percent or more.

This is why more companies have been installing VFDs, and I expect this trend to continue. Regrettably, there has been relatively little talk about the downside of VFDs, and how they induce motor shaft currents that damage bearings. Unless a motor's bearings are properly protected against the pitting that takes place when these ground-seeking currents zap through them, they and perhaps the whole motor will have to be replaced prematurely.

According to a recent survey of 1,323 construction projects valued at \$5 million to \$50 million each, the number of such

projects specifying VFD-driven motors rose by 21 percent between June 2009 and



November 2010. But only a fraction, about one-sixth, of those sites installing new VFDs will also be protecting their motors' bearings through shaft grounding.

Consequently, there is a ticking time bomb out there, many of the motors recently fitted with VFDs are headed for trouble. Readers should keep an eye on the bearing-failure rates for motors in systems where VFDs have been recently added.

To be truly green, a system must not only save energy, it must also be sustainable. In other words, the savings derived from added efficiency must be ongoing, not just temporary. When the time bomb goes off and motor bearings fail, many companies will experience downtime and repair/replacement costs that will more than eat up their new savings.

Industry Outlook Continued on Page 12

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Some people have already learned how to protect motor bearings with shaft grounding rings that safely channel damaging currents to ground, bypassing the bearings entirely. Retrofitting a previously installed motor has been the usual way, preventive maintenance. But two major motor manufacturers have recently realized the benefits of offering their customers certain models with our AEGIS Shaft Grounding Ring already installed at the factory.

As the word spreads that VFDs can cause bearing damage, our company expects demand for these maintenance-free shaft grounding rings, from motor manufacturers and end users alike, to grow significantly in 2011.

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The Future of Electric Motors: What Today's Engineers Need to Know

Kitt Butler, Director, Motors and Drives
Advanced Energy

As electric motors use 53 percent of all electric energy produced in the US, operation of existing electric motors have a significant impact on power consumption. As more and more companies focus on energy efficiency, there is going to be more demand placed on engineering departments to not only improve reliability and increase productivity of electric motors, but reduce energy consumption as well.

With the regulations from the Energy Independence Security Act (EISA) now in effect, both motor manufacturers and original equipment manufacturers (OEMs) are responsible for meeting the EISA minimum



motor regulations. As many OEMs purchase motors from manufacturers, OEMs should be conducting testing in accordance with the regulations and keeping careful records of the results. If changes need to be made to meet the requirements, OEMs should be working to validate motors to find the best fit for their equipment needs based on performance and price.

OEMs manufacturing their own motors covered by EISA for their own equipment have more to consider, as they will be required to submit a Compliance Certificate (CC#) Application to the Department of Energy (DOE) to verify their motors are compliant. In this situation, the law views the OEM as the manufacturer and requires the same compliance as a motor manufacturer. Evidence must be presented, including test results from accredited labs or programs demonstrating motor designs meet the requirements. The DOE will then issue a CC# that must be displayed on all covered motor nameplates. The OEM may choose to review motor suppliers selling covered products approved by DOE, or continue building motors. In either case, careful review is required by engineers and equipment designers.

Efficiency is critical. The efficiency stated on a manufacturer's nameplate must be verified from testing a sample of motors. Motors can be validated for a CC# through direct testing or through the use of an Alternative Efficiency Determination Method (AEDM). AEDMs are statistical or computer models that can be validated through testing and applied to larger ranges of motor ratings covered by EISA. In either case, paperwork is required to be submitted to the DOE verifying the test work and validating the motors to receive a CC#.

The new EISA regulation covers many new types of motors than previous laws and also raise the minimum efficiency required on motors previously covered. Because of this manufacturers are forced to design products to meet these required efficiency levels. At Advanced Energy we are seeing more and more OEMs and motor manufacturers in our lab as a result.

To meet motor testing demands and to better service our customers, Advanced Energy recently made capital investments into new equipment and software, such as:

- Flux 2D motor design software;
- Yokogawa DL850 Scoperecorder; and
- Yokogawa WT3000 three-phase precision power analyzer for motor and drives testing purposes.

Flux 2D is a finite element software that is used in motor design and analysis. This software enables Advanced Energy to help its customers with custom motor designs and improvements and also directly contribute to cutting edge research into new motor prototypes in various

applications including traction.

The Yokogawa DL850 Scoperecorder provides the ability to capture eight channels of high-speed, high resolution waveforms. This will be helpful when evaluating new technologies, drive or controller outputs, switching effects and any other type of transient states. While the DL850 allows Advanced Energy to see the events in real-time, it does have a large memory storage capacity for long-term monitoring.

The Yokogawa WT3000 provides Advanced Energy with the flexibility to bring testing and validation services directly to its

Industry Outlook Continued on Page 14



James Seiler, Encoder Product Manager
CUI, Inc.

Q: What do you see as being the largest growth area in the Motor, Drive or Automation market in 2011?

A: Forecasts for 2011 are fairly flat, with rotary position devices overall growth in the range of 4 percent. I believe the following markets will experience the largest growth: food and beverage, water and wastewater processing & delivery and renewable energy.

Q: What factors are driving this growth?

A: All three represent focus points for infrastructure growth in developing countries like China, Pakistan, India and others.

Q: What important changes, trends or advancements do you foresee in 2011?

A: Pretty much what has been the trend in the past two or three years: smaller package size, self-diagnostics (smart encoders), higher resolution and lower power consumption.

Q: What's new for your company in 2011?

A: We recently released the AMT203 absolute and AMT303 commutation encoders and expect sales of those units to anchor growth for CUI motion control products in 2011. The AMT203 is a 12 bit absolute encoder that can be programmed to output up to 2,048 quadrature cycles per

revolution. The AMT303 provides U/V/W commutation signals for brushless DC motors with 1~10 pole pairs along with quadrature position outputs to 1,024 per revolution. Both products feature CUI's proprietary, patented capacitive code-generation technology, measure 28.6 by 37.4 by 11 mm, and consume <10 mA of current at 5 V. Both models accommodate nine popular shaft diameters from 0.2 mm to 0.8 mm. Both models have numerous programmable features that save time and address multiple application conditions.

Q: What should our readers keep an eye on for 2011?

A: I believe we will begin see the emergence of wireless encoders based on a technology similar to cell phone technology. A number of recent developments make now the right time to pursue this:

- Availability of frequencies previously reserved for analog television transmission
- Maturity of limited transmission RF technologies
- Well-established encoding/decoding protocols
- Availability of low-cost, miniaturized RF transmission modules.

Though not all applications are prime for this type of change, the prospect of eliminating the cost and maintenance of cabling along with enhanced integration of automated processes make it desirable.

CUI, Inc. designs, manufactures, and markets electro-mechanical components for the OEM manufacturer. CUI's Motion Control line offers one of the industry's widest ranges of rotary encoders for motion control applications.

For more information, visit www.cui.com.

Revolutionizing Encoder Technology



The Benefits of Capacitive Technology

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AMT100

Incremental Encoder Series

AMT203

Absolute Encoder Series

AMT303

Commutation Encoder Series

www.amtencoder.com



clients. A very versatile and powerful instrument, the WT300 allows us to test and measure DC and high AC frequency ranges, as well as measure input and output simultaneously. Most important, this device is completely portable. Advanced Energy can go on-site and provide precision analysis of existing systems, measuring the performance of large motors without our customer having to take the motor out of service. The WT3000 will also assist Advanced Energy in responding to customers who need information beyond just efficiency, especially for those in research and development who want to see voltage and current waveforms, harmonics and validation of total harmonic distortion (THD).

Going forward, we know motors convert a tremendous amount of electrical energy into mechanical energy and drive our lives every day. The electric motor is a critical component in many plant applications and are used in a wide range of equipment in almost every sector of the economy, from pumps, compressors and fans to power tools, hoists and vacuum cleaners to automotive and aerospace applications. The recent energy efficiency regulations impact all of us and hold the potential for dramatic energy savings, and more regulations are on the way. In order to meet these higher efficiency levels, motor manufacturers, OEMs and motor users will need to work together in order to achieve results.

Advanced Energy is a nonprofit committed to a future in which energy needs are met at reasonable costs, helping industrial customers improve the return on their energy investment. With expertise in motors and drives and industrial process technologies, Advanced Energy provides solutions through consulting, testing and training. At its motors and drives lab, Advanced Energy provides access to cutting edge state-of-the-art testing of motors, drives and industrial process technologies.

For more information, visit www.advancedenergy.org.

David Levett, Power Electronics Design and Applications Engineer
Infiniteon Technologies Industrial Power, Inc.

Q: What do you see as being the largest growth area in the Motor, Drive or Automation market in 2011? What factors are driving this growth?

A: Recent years have seen an added focus on devices for inverters associated with renewable energies such as photovoltaic and wind power. In addition, applications in construction and commercial hybrid vehicles have been gaining momentum. Energy efficiency, government support and pricing on competitive technologies are currently the most important factors for growth.

Q: What important changes, trends or advancements do you foresee in 2011?

A: For IGBTs, innovative manufacturing techniques will allow significant improvement in reliability. Power cycling and thermal cycling improvements will be accomplished while allowing higher maximum temperature operation.

LS Power Semitech
A joint venture with infineon

Piotr Luniewski
LS Power Semitech Co. Ltd

Q: What important changes, trends or advancements do you foresee in 2011?

A: More consolidations in the industry, a bigger move towards using intelligent power modules for consumer motor control, right-sizing the overall design (as opposed to making a product design physically smaller) and industrial applications using new tools designed mainly for the consumer market applications.

Q: What's new for your company in 2011?

A: LS Power Semitech is introducing CIPOS-mini intelligent power modules into many home appliances such as washing machines and refrigerators. This fully-molded IPM has the smallest form-factor from 4 A up to 30 A in the same package for scalability of design.

LS Power Semitech Co. Ltd, a Joint Venture of LS Industrial Systems & Infineon Technologies, is the new source for the production and distribution of the Infineon Molded Module (CIPOS) family of products.

For more information, visit www.lspst.com.

Additionally, new devices and module topologies and packages will be introduced or expanded, such as Prime PACK, SmartPACK, and .XT technology.

Q: What's new for your company in 2011?

A: Faster switching devices such as the SiC JFET have been in the works aiming to attain the high frequency and high efficiency needed for growing applications such as photovoltaic. Gate drivers for these devices are also being investigated.

Infiniteon offers a full range of high power switching devices such as IGBTs, SCRs and diodes for use in inverters for motor drive, traction, UPS, welding as well as renewable energy applications.

For more information, visit www.infineon.com.



Multi-Turn Absolute Encoder and Commutation Encoders En Route

Josh Barton, Account Manager
Jim Stevens, VP of Sales & Marketing
US Digital

We are excited about the opportunities emerging for 2011. We continuously hear the need from our customers for a competitive commutation and low cost multi-turn absolute encoder solution and are currently developing both of these solutions, with the goal of releasing into production by third quarter 2011.

The commutation encoder will provide the opportunity to meet specific customer needs where the competition is struggling. The solution will mount to a NEMA size 17 and larger motor frame. The encoder will provide traditional A, B with Index incremental outputs in a differential RS422 format. Resolutions will range up to 5,000 CPR or 20,000 positions per revolution using interpolation. We will use our patented



collet style push-on hub design with a thru-hole shaft option; multiple pole counts will be available on this new encoder.

The low cost, Multi-Turn Absolute Encoder is being designed specifically with the medical industry in mind, where our customers use a stepper motor for movement. Medical applications utilizing stepper positioning systems currently use a relative or incremental style encoder. Presently in the event of a power cycle, the motion control system loses any data on a current sample in process and must perform a home cycle to accurately know the position of the stepper motors. This causes the customers serious problems that could be avoided with our new low cost Multi-Turn Absolute Encoder. We are designing this to be a kit style encoder that mounts directly to the tail shaft of a NEMA size 11 or larger stepper motor. Shaft diameters from 4 mm to 10 mm will be accommodated. We plan on using our absolute quadrature and SPI communication on this encoder along with our patented, collet style, push-on hub design with a thru-hole shaft option. The maximum installed height is planned at 20 mm. The minimum positional accuracy target is 0.1 degrees.

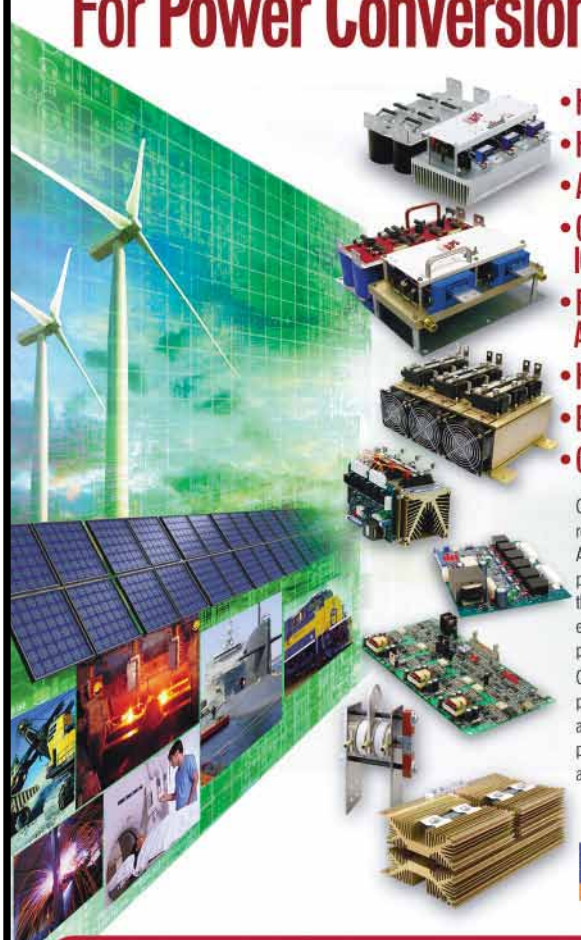
These brand new developments will open many doors in 2011 and beyond. We are excited to bring new technology solutions into our customers hands based on their specific needs. We will continue to provide our current and

new encoder technology quickly to our customers with laser focused quality.

US Digital's innovative building blocks include absolute and incremental optical encoders, inclinometers, drives, PC interfaces, digital displays and more. Celebrating 30 years within the motion control industry, our mission is to continue to make our customers successful by inventing, manufacturing, and quickly delivering the most practical motion control components world-wide.


For more information, visit <http://usdigital.com>.

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Motor, Drive & Automation Systems 2011

Advancements in Motion Control and Power Electronic Technology
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Motor, Drive & Automation Systems 2011 is an international, industry-leading conference focused on the latest economic trends and technical advancements impacting motor, drive and automation systems. Join hundreds of peers and potential business partners and discover how new technologies are improving performance, energy efficiency and providing cost savings in a variety of applications.

The event serves technical and management professionals involved in all sectors of motor, drive and automation technologies including end users, integrators, manufacturers and dealers.

If you are involved in the motor, drive or automation industries or if your products and systems use these technologies, this is a must attend event.

Make plans today to attend the leading Motor, Drive and Automation Systems conference.

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www.e-driveonline.com/Conf-11/motors_conf11_index.php
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Keynote and Featured Presentations

Motors, Drives and Motion Control - Global Market Update

Hear the latest data on the low voltage AC induction motors and large motors markets and discover market updates on motion control, as well as low voltage and medium voltage motor drives. The market updates will include an estimate of the worldwide market sizes, as well as a discussion of growth and a forecast for the next three years. This session will provide industry sector and geographic region breakdowns.

*Alex Chausovsky, Research Manager, Motion & Drives Group
IMS Research*

Investing in Energy Efficiency Panel

Discover how both motor and drive manufacturers and end-users are improving and integrating energy efficiency technologies.

*Kirk Barker, Electronics Product Manager, Maxon Motor
Ken Berringer, Engineer • Silicon Labs
Speaker TBA, National Instruments
Additional Panelists to be Announced*

Motor and Drive Market Outlook and Success Strategies

The market for motors and drives is recovering with the global economy, but what is the right course for manufacturers? Learn strategies for success in this challenging environment. This session will provide economic data, market forecasts and recommendations for small and large manufacturers of motors and drives, as well as valuable strategic insight for subsystem suppliers, dealers and end-users of motor and drive systems.

Erik Halbert, Manager • Boston Strategies International

What in the World of Motors is Going On: A Review of World-Wide Activity of Motor Efficiency Policies, Programs, Legislation and New Technologies

This presentation will review world-wide motor policies, programs and new technologies relative to efficiencies, testing standardization and implications for the US. Recently enacted US congressional legislation will be discussed, pending efforts to regulate new motor categories and surrounding legal challenges.

*Richard E. deFay, Project Manager, Sustainable
Electric Energy • Copper Development Association, Inc.*

Monday, February 28th - Pre-Conference Workshops

Advanced Motor Drives Simulation Techniques Incorporating Statistics and Manufacturing Data

Presented by Rakesh Dhawan with Strategic Technology Group, this workshop will cover fundamental simulation techniques for simulating brushless DC motor drives, brushless AC Motor drives, induction motor drives, space vector modulation and field oriented control using Spice based tools.

Electric Motor Power Measurement and Analysis

Presented by Bill Gatheridge with Yokogawa Corp. of America and Ian Walker with GMW Associates, this four hour workshop will provide the attendees with a three-step process for making precision electrical and mechanical power measurements on various motors and variable speed drive systems. A special section will be devoted to the current sensors required for use on variable frequency drives and inverter systems.

Update on Wind Generator Technologies: Yesterday, Today and Tomorrow

Presented by Dr. Keith W. Klontz and Dr. Haodong Li with Advanced MotorTech LLC, this workshop focuses on the electric machine technologies and the many competing options available today for wind energy systems. The workshop begins with a review of wind energy systems built and operated used up about 2000.

Motor Control Fundamentals and Brushless Drives

Presented by Dr. Dal Y. Ohm with Drivetech, Inc., this workshop will provide fundamental concepts on motor control including commutation methods and power semiconductor circuits. The content will cover most of the basic knowledge in designing DC and brushless DC motor drives, including sensorless control techniques.

Designing Your BLDC Motor

Presented by Jim Hendershot and Tanvir Rahman with Infolytica, this full day event will cover a broad range of topics and cover useful techniques and tips on how to approach your next motor project. The workshop will focus on practical problems faced by real designers in their work environment.

Field Oriented Control and Advanced AC Motor Control Algorithms

Presented by Dr. Dal Y. Ohm with Drivetech, Inc., this workshop will provide in-depth knowledge and skills in designing high performance AC motor drives. The course starts with the principles of FOC (Field Oriented Control, aka Vector Control) and applies FOC in PM synchronous (both IPM and SPM) and induction motors.

A Review of Design Elements of the Brushless PM Motor and Drive and of PM Generators

Presented by Dan Jones with Incremotion Associates, USA, this workshop brings together the technical attributes and design tradeoffs of the 9 specific types of brushless PM motors and their associated drives, along with representative applications. SPEED motor design software will be used to display the principles of motor design with representative examples. An overview of recent PM generator design processes will be covered.



Photo courtesy of Leeth/SACVB

Motor, Drive and Automation Systems will be held at the Grand Hyatt San Antonio. A special room rate of \$199 is available for attendees. Be sure to reserve your room by February 7th, 2011, to receive this special rate. Be sure to mention Webcom Communications when reserving.

<http://grandsanantonio.hyatt.com>

Reliability of IGBTs in Industrial Drives

Presented by John Donlon and Eric Motto with Powerex, Inc., this four hour workshop will address the reliability of the IGBT power module which is the heart of modern industrial drives. This workshop will discuss the proper selection of the IGBT, its limitations and failure modes, the precautions that must be taken to ensure long life, and the design and application considerations that affect reliability.

High Performance Motor & Drive System Design

Presented by George Holling with Rocky Mountain Technology, the workshop will focus on the design of motors and drive for high performance drive systems such as drive system with > 97 percent overall efficiency and > 98.5 percent motor efficiencies and systems with very high power densities of greater than 1 KW/lb.

A Comprehensive Review of the Basic Design Elements of the Brushless PM Motor and Drive and an Overview of PM Generators

Presented by Dan Jones with Incremotion Associates, USA, this seminar brings together the technical attributes and design tradeoffs of the 9 specific types of brushless PM motors and their associated drives, along with representative applications. An overview of recent PM generator design processes will be covered. Today's application success stories are discussed along with projections on future brushless PM applications.

Complete Workshop descriptions and registration information can be found online at www.e-driveonline.com.

Tuesday, March 1st - Wednesday, March 2nd - Conference Sessions

Market Trends and Analysis

Motors, Drives and Motion Control - Global Market Update
*Alex Chausovsky, Research Manager, Motion & Drives Group
IMS Research*

A Review of World-Wide Activity of Motor Efficiency Policies, Programs, Legislation and New Technologies
Richard E. deFay, Project Manager, Sustainable Electric Energy • Copper Development Association, Inc.

Motor and Drive Market Outlook and Success Strategies
Erik Halbert, Manager • Boston Strategies International

Motor and Drive Industry Insights
Michael Rashe, Global Program Manager for Power Transmissions • Frost & Sullivan

Maximizing Efficiency and Performance

Active Front End Drives for Optimizing Power
Craig Nelson, Product Marketing Manager • Siemens Industry, Inc.

Meeting New Safety and Energy Efficiency Standards for Explosion-Proof Motors
*Joel F. Nashett, Market Development Engineer
Henkel Loctite Corp.*

Evaluation of the Thermal Image of a Motor and Its Effect on Performances
Philippe Wendling, Vice President • Magsoft

Investing in Energy Efficiency Panel
*Kirk Barker, Electronics Product Manager, Maxon Motor
Ken Berringer, Engineer • Silicon Labs
Speaker TBA, National Instruments
Additional Panelists to be Announced*

Efficiency Optimization for Standard Planetary Gears
Joe Sitta, President • IMS Gear Planetary Gears, Inc.

Motor Design and Testing

Rapid 3D Motor Design using Finite Element Simulators
*Hussam Maleh, Application Specialist
ElectroMagneticWorks, Inc.*

Electrified Vehicle Electric Motor Development Combining Test and Simulation
*Michael Ryder • University of Michigan
Ray Skinner • A&D Technology*

Efficiency Testing of Switched Reluctance and AC Permanent Magnet Motors
*Pierre Angers, Researcher - End Use Technologies
Hydro-Québec Research Institute*

Technical Considerations for the Testing of Small Motors
*Emmanuel Agamloh, Motors and Drives Consultant
Advanced Energy*

Magnetization and Measurement of PM Motors
*Hartmut Pagel, International Sales Director
MAGSYS Magnet Systeme*

Technology Advancements

FPGA Technology as a Platform for Innovation Integration in Motor Drives Applications
Marc Perron, President • Alizem

Magnetic Bearing Technology for Electric Motors and Other Rotating Machinery – Ready for Prime Time
John Rama, P.E., Vice President – Sales • Synchrony, Inc.

Advances in Control

Techniques for Improved Stepper Motor Control
Patrick Heath, Strategic Marketing Manager • Microchip Technology, Inc.

Increasing Productivity Through Customized Gearbox and Motion Control Design
Paul Anderson, Mechanical Engineer • Wittenstein, Inc.

Advances in Digital Control of Single Phase AC Motor Control
*Jim Walls, Director of R&D • AirCare Automation, Inc.
Howard Abramowitz, President • AirCare Automation, Inc.*

FPU – An Advantage Over Fixed Point for Three-Phase Motor Control
Yashvant Jani • Renesas Electronics America, Inc.

Various Sensorless Control Methods for AC Motor Drives
Dr. Jae H. Park, Vice President of R&D • Drivetech, Inc.

Power Management

Meeting Reliability and Lifetime Goals in IGBT Based Converter Designs
*David Levett, Power Electronics Design and Applications Engineer
Infineon Technologies Industrial Power, Inc.
Piotr Luniewski • Infineon Technologies Industrial Power, Inc.*

Sixth Generation IGBT Modules with Innovative Packaging
Eric R. Motto, Principal Engineer • Powerex, Inc.

A Robust Intelligent Power Module Family for Low Cost Drive Applications
*Wolfgang Frank • Infineon Technologies AG, Germany
Peter Stipan • Infineon Technologies Industrial Power, USA*

Coordinated Circuit Protection Solutions for Power Supplies, Relays, Solenoids and Controllers
Matthew Williams, Global Applications Engineering Manager Tyco Electronics

Co-Located Conference

Motor, Drive & Automation Systems 2011 will be co-located with the MAGNETICS 2011 conference.



MAGNETICS 2011 is focused on the latest economic developments and technical advancements in magnetics markets and technologies bringing together worldwide magnetics experts.

Attendees will have access to the combined exhibit hall and networking breaks, reception and luncheons. For a nominal "conference upgrade" fee of \$300, attendees will have access to both conference programs and proceedings.



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New VLT Automation VT Drive is Cost Reducing Powerhouse for Industrial Variable Torque Applications

Danfoss has introduced the VLT Automation VT Drive. These drives are specifically engineered to save energy, reduce up front and operating costs, and maximize uptime in industrial variable torque fan, pump, blower and compressor applications. They are available for 240 VAC and 480 VAC single and three phase, or 575 and 690 VAC three phase operation with 1/2 up to 1,400 HP, along with a wide range of industrial enclosure options, to support varied performance needs.



A Smart Logic Controller eliminates ancillary equipment to reduce installed costs, and main disconnects and integral fusing further reduces installation cost by reducing panel space requirements. Dedicated pump functions simplify programming and commissioning. An optional one-wire Safe Stop can reduce installed costs for applications with safe operation requirements.

All VLT Automation VT Drives feature an integrated DC link to eliminate the need for external

filters, along with Intelligent Heat Management to remove excessive heat and promote maximum drive operating life. An ambient temperature rating of 50°C without derating eliminates the need for expensive cooling add-ons.

VLT Automation VT Drives provide autotuning of PI-controllers to eliminate the potential for tuning, and password protection reduces the potential for unauthorized changes to the drive settings. They are available in a variety of industrial enclosures, from protected chassis to IP66 (NEMA 4X indoor), suitable for harsh washdown environments, without the need for customized panels. These drives provide multiple language support to display all information in a user-selected language.

Unique Two Speed Drive Delivers Full Torque at Low Speed Yet Still Runs Cool

Force Control Industries has released their Two Speed Drive for applications up to 30 HP that require a high turndown ratio while maintaining high torque. Unlike variable speed motors that lose torque or develop heat problems at very low speed, the Force Control Two Speed Drive eliminates those problems with secondary speeds as low as 60:1 while still maintaining full torque continuously. This unique drive includes a brake motor with a low speed drive built in. This provides precise low speed control with continuous high torque as well as high speed capability in one compact package.

Additional benefits include the simplicity of a mechanical drive which is maintained by local mechanical maintenance

staff, and not affected by electrical line spikes, lightning or other electrical issues. Totally enclosed units are well suited for dusty, dirty or wet environments, even outdoors. Force Control Two Speed Drives are designed for transfer or lift systems, rotary components, car spotters, cranes, winches and more.

The Posidyne Two Speed Drive consists of a high speed motor connected through a spring set friction stack operating as a clutch and a brake (primary brake clutch) to a 4 lug shaft mounted to a worm gear. The worm gear connects to a worm, which has a secondary drive consisting of a small low speed motor connected to one end and a spring set brake (low speed brake) to the other end.

The MagnaShear Two Speed Drive is the same concept as the air actuated units except that the brakes are actuated by an electrical coil instead of an air piston. High speed and low speed modes are selected by energizing the appropriate electrically controlled coils. The spring-set braking mode is selected when both coils are de-energized, allowing the springs to engage both disc stacks to stop the drive system. Low speed is selected by releasing both brakes and energizing the secondary low speed feed motor.

This design provides internal surge suppression, standard electrical connections and modular assembly designs. They are suitable for standard NEMA motor mounting and are available for a wide range of gear ratios. Each Force Control Two Speed drive is totally enclosed and impervious to dirt, dust and harsh environments.



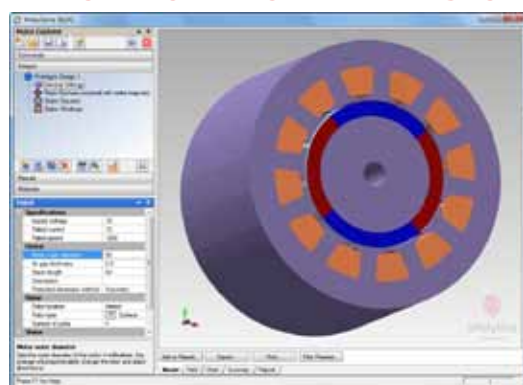
Modular Brushless Permanent Magnet Motors

Dunkermotoren USA has developed a family of high performance modular brushless permanent magnet motors driven by an integrated servo motor drive. The family is composed of 2.95 inch (75 mm) squared high power density motors in three stack lengths. The family motor

peak torque varies from 22.1 in-lb to 44.2 in-lb, and up to 55.7 in-lb. Axial lengths are respectively 4.53 inches, 5.51 inches and 6.50 inches.

The modular construction of the BG75 series is available with integral electronic drive and precision position encoder with 4,096 ppr. The power electronics provides a range of input voltages from 10 VDC to 50 VDC, and delivers up to 50 A peak for this motor series.

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RoHS

Send New Product Announcements to Shannon Given at shannong@infowebcom.com.

Allegro MicroSystems, Inc.'s New Hall-Effect Linear Current Sensor IC

Allegro MicroSystems, Inc. introduces a new Hall-effect linear current sensor IC that provides economical and precise solutions for AC or DC current sensing in low-voltage audio, communications systems, white goods and automotive applications. Typical applications include circuit protection, current monitoring and motor and inverter control.



The ACS711 is optimized for low-side current sensing applications, although the terminals of the conductive path are electrically isolated from the sensor leads (pins 5 through 8), providing sufficient internal creepage and clearance dimensions for a low AC or DC working voltage applications.

The ACS711 is provided in a small, surface mount SOIC8 package. The leadframe is plated with 100 percent matte tin, which is compatible with standard lead (Pb) free printed circuit board assembly processes. Internally, the device is Pb-free, except for flip-chip high-temperature Pb-based solder balls, currently exempt from RoHS. The device is fully calibrated prior to shipment from the factory.

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Self-Protected MOSFETs Raise Protection Levels for Inductive Loads

Diodes, Inc. has announced additions to its IntelliFET range of self-protected MOSFETs. The 60 V, 75 mΩ (typical) rated single N-channel ZXMS6006DG/SG and dual N-channel ZXMS6006DT8 provide thermal shutdown, short circuit, over voltage, over current and input ESD protection facilities enabling circuit designers to increase circuit reliability. Designed for automotive and industrial applications, these self protected MOSFETs are well suited for switching inductive loads, such as motors, relays and lamps at low frequencies.

The dual channel ZXMS6006DT8 integrates over-temperature, over-current, over-voltage and input ESD protection on each of their two independent and isolated switching channels. Packaged in the thermally efficient SM8, the ZXMS6006DT8 delivers a thermal efficiency 30 percent better than comparable competing SO8 devices, ensuring cooler running, more reliable end applications.

The single channel ZXMS6006DG (drain connected to tab) and ZXMS6006SG (drain connected to source) are offered in the compact high power dissipation SOT223 package and provide a cost effective alternative to competing solutions. Both the ZXMS6006DG and ZXMS6006SG have nominal load current ratings of 2.8 A, at an input voltage of 5 V, and have an avalanche clamping rating of 490 mJ.

Discovery Technology International

Benefits

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Brushless DC Speed Controller

Lin Engineering has released the new Brushless DC Speed Controller, the BL100. Combining simplicity with high performance, the BL100 can be utilized with a large majority of BLDC motors.

The BL100 has an input operating voltage of up to 48 VDC and up to 10 amps of continuous current, 20 amps peak. It also features closed loop control with adjustable P and I values for finer tuning when the application demands it.

The BL100 can be used in either analog or digital modes. The analog mode allows users to adjust speed and direction via the on-board potentiometer or and external potentiometer for higher resolution. The digital mode allows for communication via RS485 (RS232 and USB converter cards are available) and comes with a complimentary Graphical User Interface (GUI). The GUI enables users to configure acceleration and deceleration profiles along with controlling multiple speed controllers through assigned character addresses.

Heidenhain's Portable Interface Box Eliminates Need for PC Cards

The new EIB 741 available from Heidenhain Corp. is an external interface box for precise position measurement. It is a network-capable measuring solution that removes the requirement of a PC interface card that is usually necessary when connecting measurement apparatus to an industrial PC or laptop.



The EIB 741 is well suited for inspection stations and multipoint inspection apparatuses as well as for mobile data acquisition, such as in machine inspection and calibration.

A maximum of four Heidenhain encoders, either with sinusoidal incremental signals (1 Vpp) or with EnDat interfaces (EnDat 2.1 and EnDat 2.1), can be connected to the EIB 741.

This external interface box subdivides the periods of the incremental signals up to 4,096-fold for measured-value generation. The integrated measured-value memory enables the EIB 741 to save up to 250,000 measured values per axis. Internal or external triggers can be used for axis-specific storage of the measured values.

A standard Ethernet interface using TCP/IP or UDP communication is standard for data output. This permits the direct connection to the PC or laptop. The type of measured-value transfer can be selected through the operating mode (transfer of individual values, block transfer or transfer upon software request).

Driver software for Windows, Linux and LabVIEW is included in the items supplied in order to process the measured values on the PC. The driver software facilitates programming as well as includes programming examples demonstrating the performance range of the EIB 741.

Two EIB 741 interface boxes fit next to each other within a standard 19-inch housing, occupying one height unit. Multiple boxes can also be daisy-chained in other configurations.

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MOTION CONTROL



Haydon Kerk Motion Solutions Offers Extended Stroke Linear Actuators

Haydon Kerk Motion Solutions, Inc. now offers the 19000 series, 20 mm captive linear actuator in a variety of stroke lengths. The 19000 captive is designed for applications such as micro-fluidic dispensing, electronic throttle control, fine adjustment control for optics, antenna movement, scanning devices and other applications requiring linear motion in tight spaces. Stroke lengths now available are 0.551 inches, 0.708 inches, 0.984 inches and 1.22 inches.



The 19000 series captive linear actuator is a compact rotary-to-linear motion device with a built in anti-rotation mechanism. This allows the engineer the flexibility to design a precision linear motion system with the fewest components possible.

Compact Drive with an Integrated Motion Controller

MicroMo has announced a new 22 mm innovation that extends the portfolio of the BX4 range of four pole brushless DC servomotors from Faulhaber. The series 2232 / 2250 BX4 CSD/CCD is a compact drive with an integrated motion controller. This new series combines all the advantages of the BX4 four pole brushless technology with a single axis motion controller. High reliability, high torque, compact slotless design with no cogging torque, and robust construction without the use of adhesives make this new series well suited for complex applications such as robotics, automation, medical and laboratory technology, specialty machinery and aerospace.

The flexible drives are available with a RS-232 serial or CAN interface. Configuring the drives is simple using the complimentary Faulhaber Motion Manager 4.4 software. The drives are based on the Faulhaber motion control platform. The compact motion controller, which fits within the diameter of the motor, combined with the motor and a full range of gearhead combinations provides a versatile modular platform for a variety of applications. The drives have a wide operational temperature range from -25°C to 85°C and provide a continuous current up to 0.69 A with a peak of up to 3 A. The speed can be precisely controlled from down to 5 rpm and up to 8,000 rpm. Custom firmware and software are available on request. All of

the drives have factory preset current limits to protect the motor and electronics during normal operation. Upon request, the drives can be supplied with separate motor and electronics voltage supply connections.

New Thomson 400 Series Profile Rail Solution Delivers Optimized Performance in Automation Applications

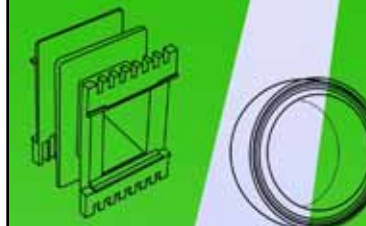
Thomson has introduced 400 series Profile Rail Linear Guides, a solution engineered to deliver accurate, reliable and compliant linear motion in automation applications. The 400 Series is available in 4 meter lengths, in sizes from 15 to 45 mm in 5 mm increments, for extended joint-free rail transfer, even in smaller-sized applications. Double-faced ball track bearing arrangements allow for compliance to simplify installation, and enable equal load carrying capacity in all directions. The 400 series is available with standard or ball cage carriages that use the same rail design.

The 400 series Profile Rail Linear Guides are rated to handle loads ranging from 9800 N up to 129,500 N. They feature a polymer ball-return tube that reduces noise while retaining lubrication. The ball cage option includes individual ball lubricant reservoirs to increase running smoothness and operating life, while reducing noise by up to 30 percent when compared with standard carriages, even at high speeds.

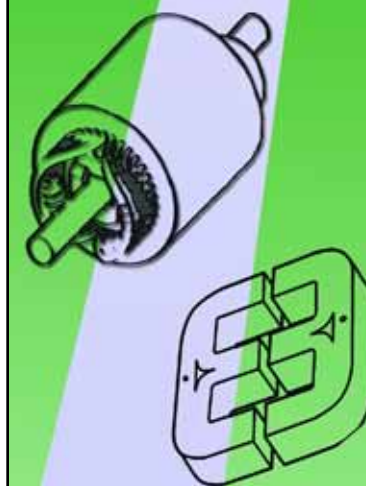
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Beckhoff Automation and Fertig Motors Enter Product Development Partnership

Beckhoff Automation has made a significant investment in the future development and production of its drive technology. Fertig Motors GmbH, in a joint venture with the Beckhoff Group, will co-develop and produce highly dynamic Beckhoff servomotors.

In cooperation with Fertig Motors GmbH, which has its headquarters located in Marktheidenfeld, Germany, Beckhoff is developing new product series of servomotors that are specially designed for PC- and EtherCAT-based control technology.

Fertig Motors was established in March 2010 as a joint venture between Beckhoff Automation and Erwin Fertig, the former CEO and founder of Elau. Fertig currently has a team of 15 experienced motor and drive technology developers. The production facility is currently under construction and will begin series production at the end of 2011.

With the new standard product lines as a basis, the intent is to also develop and manufacture application-specific motors in the future. In this way, Beckhoff and Fertig Motors strive to provide their customers and their customers' applications with ideally suited motion products. The existing standard servomotor series from Beckhoff, the AM2000, AM3000 and AM3500, will, of course, continue to be expanded even further, so that the widest possible range of motion solutions will be available.

A. O. Smith to Sell Electric Motor Division to Regal Beloit Corp for \$875 Million

A. O. Smith Corp. has entered into a definitive agreement to sell its Electrical Products Company, an operating segment that is one of the largest manufacturers of electric motors for residential and commercial applications in North America, to Regal Beloit Corp. for approximately \$875 million, comprised of \$700 million in cash and approximately 2.83 million shares of Regal Beloit common stock. The transaction, which has been approved by both companies' boards of directors, is expected to close in the first half of 2011.

Commenting on the timing and the merits of the transaction, A. O. Smith chairman and CEO Paul W. Jones said, "The electric motor industry has been undergoing a significant transformation over the last several years due to global consolidation and the emergence of a number of international competitors. The consolidation in the marketplace, which has accelerated this year, prompted us to evaluate the potential sale of our motor business, with the expectation that we would reinvest the proceeds into high growth opportunities."

"We are very excited about the prospects of Electrical Products combining with Regal Beloit. We have tremendous respect for their organization and feel they are a world class company. While we received strong interest from a number of companies, Regal Beloit's proposal provided the best value for our shareholders, customers, and employees. Regal Beloit has a

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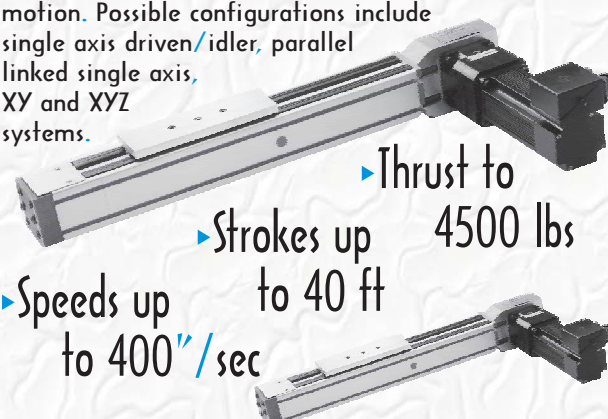
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long-standing track record for excellence in the manufacturing of mechanical and electric motion control and power generation products. Aligning our Electrical Products division with Regal Beloit will afford our customers and employees a platform with the size, scope and global presence needed to be competitive in this dynamic market," said Jones.

Regal Beloit Corp., headquartered in Beloit, Wis., is a manufacturer of mechanical and electrical motion control and power generation products serving markets throughout the world. Regal Beloit has manufacturing, sales, and service facilities throughout the US, Canada, Mexico, Europe and Asia.

Honeybee Licenses High Temperature Motor Technology to CDA InterCorp, LLC

Honeybee Robotics, a developer of advanced technology for robotic and spacecraft systems, has licensed its High Temperature Motor to CDA InterCorp, LLC. The motor can tolerate temperatures of 460°C and above, the highest ever recorded for an electric motor, making it well suited for applications in extreme heat environments, such as aviation and drilling.

Under the agreement, CDA InterCorp will manufacture and market high temperature motors for space and commercial applications. Honeybee Robotics will continue developing support systems for the motor through Phase II SBIR funds recently awarded by NASA.

Honeybee created the High Temperature Motor for future missions to the surface of Venus, where it would encounter in-

tense heat and pressure. Materials and design allow it to operate in extreme heat without the need for a bulky, expensive thermal control system. Its high efficiency and temperature tolerances make it well suited to severe environments, such as in deep drilling applications, geothermal systems or aircraft engines.

"The licensing agreement for the High Temperature Motor fits our strategy of providing highly engineered, highly reliable controllable drive actuators for use in extreme environments and applications," said Joe Grote, president of CDA InterCorp, LLC. "This is a logical expansion of our standard product line and we are looking forward to incorporating this technology with our current design standards and introducing it to customers in the space, aerospace, defense and oil and gas industries."

Clean Tech Startup Secures \$5 Million in Funding for Development of Extended-Range Hybrid-Electric Digital DriveSystem

Wrightspeed, Inc., has secured \$5 million in a Series A financing from a private investor. The funding will be used to support the development of Wrightspeed's Digital DriveSystem, an extended-range hybrid electric drive system targeted at high fuel consumption and high-performance vehicles.

"Our technology will displace at least 3,000 gallons of fuel per year per high-usage vehicle," said founder and CEO, Ian Wright. The system takes a unique approach to on-board power generation and uses motors modularly, making it easy to tailor to a vehicle's specific use.

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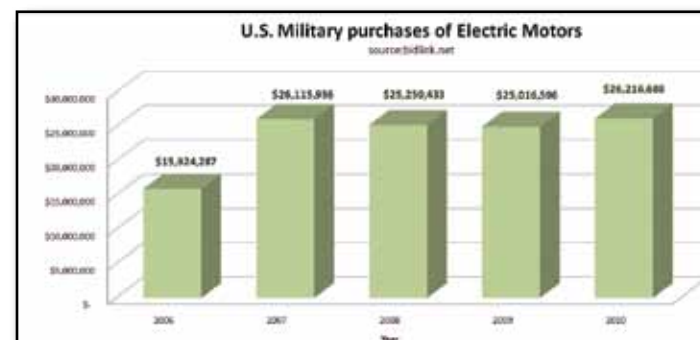


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Defense Department Demand Stable for Electric Motors

Pentagon demand for electric motors has been stable over the last five years, with Defense Logistics Agency (DLA) annual purchasing at around \$26 Million. Many industries studied by BidLink have shown the same pattern of a significant increase in sales from 2006 to 2007, then stabilization. In September 2010, defense secretary Robert Gates called for \$100 Billion in cuts to the Defense Department budget over the next five years. Fortunately for companies that make replacement parts, this means more business as many of these cuts could affect large projects like the F35 aircraft, while not affecting the process of repairing and restocking, and technologically upgrading the military. The Defense department has expressed their commitment to cut waste without reducing capabilities.

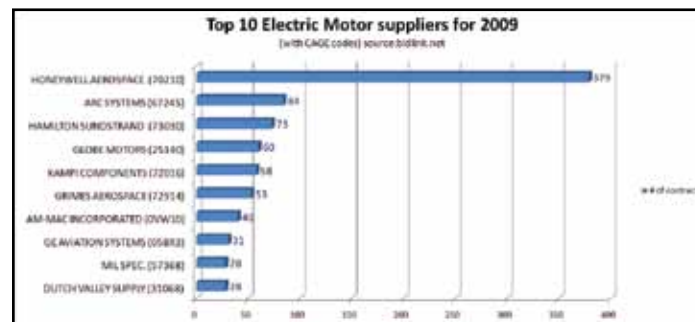


DLA Motor Purchases - Source bidlink.net

We examined the competition in this industry for FY 2009, since at the time of this article, 2010 had not yet ended. Honeywell International (CAGE code 70210) is the clear leader by number of contracts, winning 450 percent more than the second place holder, Arc Systems (67245).

This follows a similar pattern that we have seen in other industries analyzed by BidLink. It seems that each industry has a clear leader, winning significantly more contracts than the other competitors. Much of this business comes from long term contracts, which are periodically re-awarded. Opportunity exists for savvy competitors.

By sales volume, Honeywell (70210) almost tripled the sales of GE Avation Systems (81039) in 2009. The other eight com-



Top 10 electric motor suppliers to Defense Department DLA - Source Bidlink.net



Top 10 electric motor suppliers by sales to DLA - Source Bidlink.net

petitors were almost evenly matched. The largest contract for 2009 was 296 AC Control Motors, NSN: 6105-00-938-8503 at \$6,102.17 each for a total contract value of \$1,806,242.32.

BidLink.net is a provider of defense industry information for contractors worldwide. This data includes millions of defense contracts, procurement history, part numbers and vendor details. This unique combination of resources allows BidLink to monitor and extract important information for the defense contracting industry. BidLink.net, based in Washington, D.C., provides bid consolidation, searching and notification services, as well as part number (NSN) lookup to many military activities and thousands of private companies around the world.

Calendar of Events

March

1-2 - Motor, Drive and Automation Systems 2011, San Antonio, Texas

21-24 - Automate 2011, Chicago, Ill.

April

3-8 - MDA - Motion, Drive and Automation, Hannover, Germany

12-14 - SAE 2011 World Congress, Detroit, Mich.

19-21 - ABB Automation and Power World, Orlando, Fla.

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