Inside: Sensors ■ Enclosures ■ Engineered Materials ■ Motion Control

DPN
DESIGN PRODUCT NEWS
Covering the total design engineering function in Canada
May 2011

Linear dc servomotor

MicroMo has extended its offering of linear dc servomotors with the addition of the LM 0830, based on Quickshaft technology from Faulhaber. The 8 x 12 x 30 mm unit weighs 17 g and provides a peak force of up to 2.74 N. The forcer rod, with a diameter of 4 mm, is available in different lengths ranging from 15 to 40 mm.

www.micromo.com

Linear guide braking system

Bishop-Wisecarver Corp. has added carriage brakes to its UtiliTrak linear guide product line. The option offers a two-component assembly for manually securing a carriage to rail in confined spaces. The brake fixture can be retro-fitted to existing applications or factory pre-assembled on new systems, and is available in four sizes.

wwww.bwc.com

Intelligent drive integration

The RP+ drive from Wittenstein is a modular combination of gearbox, pinion and rack. The rack results in a quiet-running product that is weight- and noise-optimized, while the gearbox and pinion components increase allowable torques, the company says.

www.wittenstein-us.com

Volume 39 Number3

PM# 40065710

Designing out installer pain

Team development approach creates loved product

By Mike Edwards

When cable installers enter a high rise residential or office environment, their mission is simple: get in and get out with a minimum of network downtime. In a retrofit scenario, a huge challenge also arises when a single cable requires a branch to be installed that meets both network technical specifications and fire code regulations.

IPEX Management Inc. of Mississauga, ON, wanted to meet this branch installation challenge in order to extend its line of established Kwikpath (http://ow.ly/4CQym) optical fibre and communication cable raceway systems, such as fittings and piping. Cable installers would certainly appreciate a product that could make them more efficient, but what would the product look like?

"The concern we had was with the space in crowded wall and ceiling cavities," explained Rich Schlieker, Innovation Manager at IPEX (www.ipexna.com). Since the cable was fibre optic, the appropriate bend radius in a cavity was also an issue with any new branch product design.

After internal discussions with the product development group at IPEX had commenced, the company then invited the industrial design consultancy Ove Industrial Design Ltd. (www.oveid.com) of Toronto to join the cross-functional design team. "Usability of the product had to be addressed," said Schlieker. "The product needed to create an emotional response, so after meeting with some customers, IPEX then met with Ove."

According to Ove president Tim Poupore, "It was very gratifying as it is still very unusual (for a manufacturer) to connect with a designer before a lot of decisions had been made. IPEX recog-

Continued on page 6

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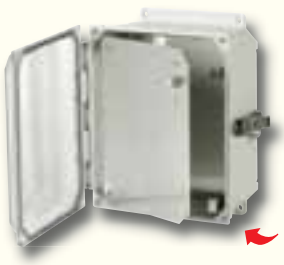
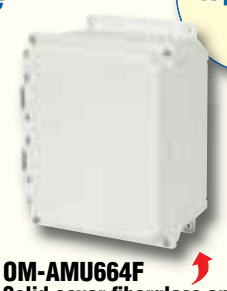


OM-AMU1084TCCF
Fiberglass enclosure with molded-in hinge, clear polycarbonate cover, padlocking twist latch, $105 shown with OM-HFPU108 front dead panel sold separately, $46.50
Boîtier en fibre de verre avec charnières moulées, couvert transparent en polycarbonate, verrou rotatif pour cadenassage, montré avec panneau plein, $105 OM-HFPU108 vendu séparément, $46.50



OM-AMU664F
Solid cover fiberglass enclosures with 4 screw closure and factory installed mounting flange, $60
Boîtiers en fibre de verre avec couvert solide et avec fermeture à 4 vis et bride de montage installée en usine, $60

OM-AMU1206TCCF
Fiberglass enclosure with molded-in hinge, clear polycarbonate cover, padlocking twist latch and mounting flange, $125
Boîtiers en fibre de verre avec charnières moulées, couvert transparent en polycarbonate, verrou rotatif pour cadenassage et bride de montage, $125

OM-AMU1426LWF
Raised front fiberglass enclosure with stainless steel hinge, padlocking snap latch, viewing window and mounting flange, $203
Boîtier en fibre de verre avec panneau avant surélevé avec charnières en acier inoxydable, loquet pour cadenassage, fenêtre et bride de montage, $203

Visit/Visitez omega.ca/om-amu

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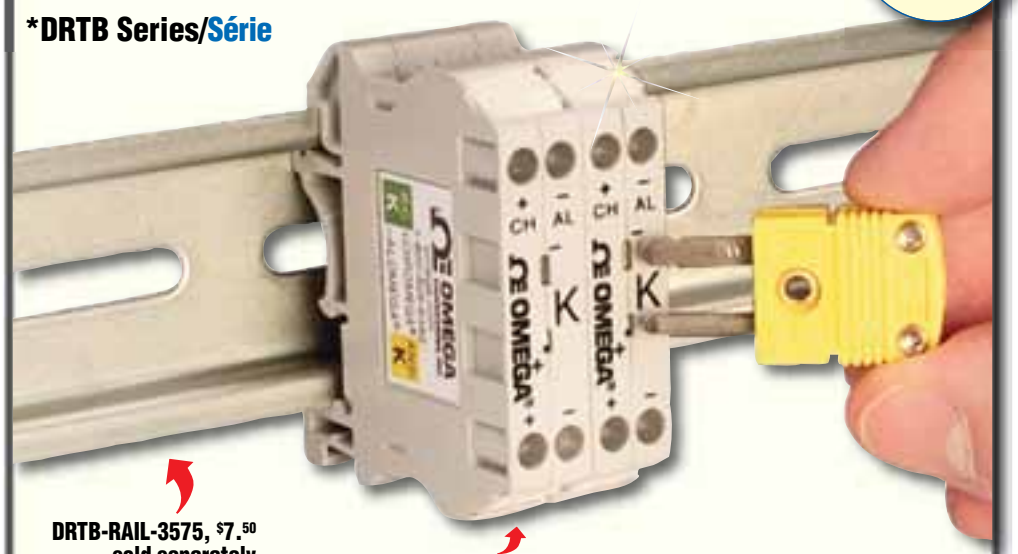

DRTB-RAIL-3575, $7.50
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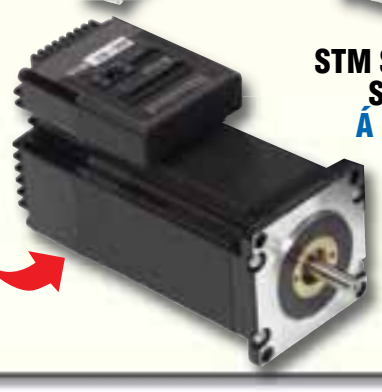

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Visit/Visitez omega.ca/stepmotor

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NEMA 12 wall mount 20 x 16 x 08″	$243.00 N12201608		$489.30 A-201608LP
NEMA 4 wall mount 20 x 20 x 06″	$314.00 N4202006		$634.80 A-20H20ALP
NEMA 4X wall mount 20 x 20 x 06″	$740.00 SSN4202006		$1,558.00 A-20H2006SSLP

*All prices are U.S. published prices. AutomationDirect prices from March 2011 Price List. Hoffman prices are taken from www.hoffmanonline.com Price List 2/14/11. Prices may vary by dealer. Many other part numbers are available from all vendors.

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In this issue

Volvo Group truck tire research contract at UOIT

The University of Ontario Institute of Technology's (www.uoit.ca) Faculty of Engineering and Applied Science has announced a new research contract with Volvo Group North America.

Powering fast action in biotech lab automation

Singer Instruments' innovative biotech laboratory robot for pinning arrays of cells is managed by a Baldor real-time controller, thereby speeding up productivity.

Liquid silicone rubber symposium report

Symposium featured world class line-up of material and equipment suppliers profiled Innovations in LIMS (liquid injection molding system) technology and products.

Fuel economy drives trend to more four cylinders

Government legislation requiring constantly improved fuel economy and lower exhaust emissions continues to drive down engine sizes, according to Bill Vance.

DEPARTMENTS:

THIS MONTH ON dpncanada.com

EXCLUSIVE ONLINE BLOGS

Tax Incentive Blog
Tracey Wills illustrates benefits of collaborating with academia

Editorial Director Blog
Mike Edwards demonstrates how *Electronics for the Evil Genius* is educational

Advertisers Index

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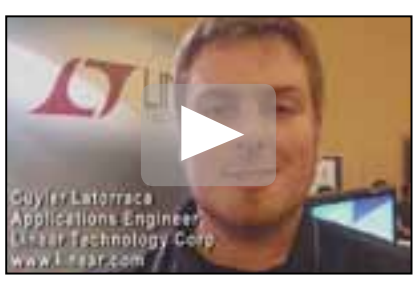
Design Product News magazine stays on top of the latest developments in the fast-moving world of design engineering. Video highlights from trade shows give you access to top executives and product managers and clips from technology demos keep you informed and entertained.

Hybrid vehicle battery stack monitoring



At the SAE 2011 Hybrid Vehicle Technologies Symposium in Anaheim, CA, Cuyler Latorraca, an applications engineer for Linear Technology Corporation demonstrates a multicell battery stack monitoring IC.
http://ow.ly/4DmZr

Intelsat picks MDA for satellite servicing

MDA plans to launch its Space Infrastructure Servicing (SIS) vehicle into near geosynchronous orbit, where it will service commercial and government satellites in need of additional fuel, re-positioning or other maintenance.
http://ow.ly/4Dn6M

Understanding product lifecycle management

Emerging as a strategic driver of business value, PLM (product lifecycle management) helps manufacturers tackle complex processes and synchronize the efforts of distributed teams. Video from PTC explains how.
http://ow.ly/4DndN

DPN DESIGN PRODUCT NEWS DIGITAL EDITION

May 2011

Please go online to dpncanada.com to fully explore and enjoy the Digital Edition of *Design Product News*. This user-friendly new format, with every item linked to other websites, videos and 3D PDFs, will help you get even more invaluable design engineering information from ***DPN***.

DPN editorial director Mike Edwards

dpncanada.com

Interactive stuff

Notice that as you move your mouse over certain parts of the magazine or over the DPN 3D and video player buttons, in some editorial stories and in some advertisements, a grey box appears. That means you are one click away from a new window opening up that takes you to a website or rich media we've linked to.

Renderings

World manufacturing outlook witnessing seismic shifts

By Mike Edwards, Editorial Director

When Statistics Canada reported that manufacturing sales had grown by 4.5% in January, manufacturers here were buoyed by the news.

This happened despite the continued strength of the Canadian dollar, and the automotive sector saw some of the most impressive gains, with sales jumping a full 26% over December numbers.

Automotive sales are unlikely to keep up such a rapid pace, but all experts are pointing to positive times ahead for the industry over the next couple of years. The tragic events in Japan notwithstanding, experts are predicting that the automotive manufacturing industry in Canada will maintain a steady, gradual improvement, according to *DPN* contributing editor Rob Colman.

Vehicle sales take off; Fukushima boosts solar energy

There is still plenty of room to grow, however, notes Conference Board of Canada Economist Michael Burt.

"The situation has improved from the depths of the recession, but there is still a long way to go for us to reach pre-recession sales levels," he explains. "Vehicle sales in the U.S. – the critical factor in the health of our auto industry – in a healthy year will average between 16 and 17 million units. The sales numbers in January annualized for the year set us at around 13.4 million. That is a big improvement from the 10.4 million units sold in 2009 – you have to go back to the 1980s for a comparably low number. In 2010, sales were up to 11.6 million. The most recent numbers show that there is a 25% increase necessary before we hit that healthy, pre-downturn peak."

Shahrzad Fard, Economist with TD Economics, expects that we will see double-digit growth rates in U.S. automotive sales in 2011 and 2012.

"That will correct much of the decline in sales that we've seen in the U.S. since the crisis," she noted. "In Canada, sales are much better. We also expect Mexico to gain much more in sales in 2011-12."

Remarkably, despite constant discussion of movement towards compact vehicles due to fuel costs, the strongest performers recently continued to be trucks (including minivans, sport utility vehicles, light and heavy trucks, vans and buses).

"We do still expect a shift to smaller vehicle purchases in the U.S. in the next year or two," said Fard.

If our automotive manufacturing is in full recovery mode, how is Japanese production faring? By mid-April, Honda, Toyota and Nissan were all reporting the re-opening of plants, with some phasing-in required. Electronics component suppliers, integral to new vehicle systems, report a similar trend.

IC Insights of Scottsdale, AZ, "believes that any negative impact on electronic system (including vehicles, computers, communications and industrial automation) sales from the current situation in Japan will only delay those (earthquake-interrupted) sales, not destroy the demand for the systems. Thus, any shortfall in electronic system sales experienced in 2011 due to the Japan earthquake is likely to be gained back in 2012."

But when it comes to energy sources shifting the purchasing landscape, the nuclear crisis in Japan is also having some unintended consequences.

The earthquake-related nuclear disaster in Japan could prove to be a boon to the photovoltaic (PV) industry in Germany and Italy, the world's two largest solar markets, which have become sensitized to the dangers of a nuclear meltdown, according to new IHS iSuppli research.

"Reaction to the Fukushima nuclear crisis has been swift in Germany and Italy," said Henning Wicht, senior director and principal analyst for photovoltaic systems at IHS. "Germany responded quickly by shutting down seven of its oldest reactors, potentially boosting the prospects for renewable energy in the country. Meanwhile, Italy indicated it might upgrade the role of solar within the country and accept higher volumes of sun-powered energy."

The Design Product News *team would like to express our sincere condolences to all those in Japan who have lost loved ones. To donate to the Red Cross relief effort, visit www.redcross.ca.*

Cover Story

Design team creativity behind Y-Coupler product

From Front Page

nized there was a design issue related to the user."

Poupore noted that IPEX employs a "voice of the customer" process to develop new products and his company was "encouraged to work with contractors to see their pain points."

Product development process includes tremendous risk

Schlieker said that his company "took the time to introduce Ove to IPEX production methods and to meet with the production lead. Tim became part of the extended design team."

The greatest challenge for an installer is the retrofit, Poupore discovered. "We timed how the installer worked in the field, how they operated – climbing up and down a ladder as many as 20 times to cover everything on the job.

"Then we started designing."

One of the initial concepts for the raceway branch product was actually a family of products – possibly a component kit – since the installer wouldn't know what he'd encounter on the job. "The kit idea made sense to us initially," said Poupore, "but installers said they'd have to buy the whole kit and then what would they do with the leftovers?"

Other concept had the branch product with breakaways designed in, but these wall thicknesses weren't flame retardant enough. "The installer could break off the wrong section, rendering the product useless," added Schlieker.

That's when the hack saw became a viable alternative, the design team realized. "Cutting is not a problem with skilled installers where fibre optic cables are constantly being cut," said Poupore.

Team players: Rich Schlieker (left), Innovation Manager at IPEX Management Inc., and Tim Poupore, president of Ove Industrial Design Ltd. Diagram below illustrates the cost-benefit analysis of the Y-Coupler over traditional network deployments.

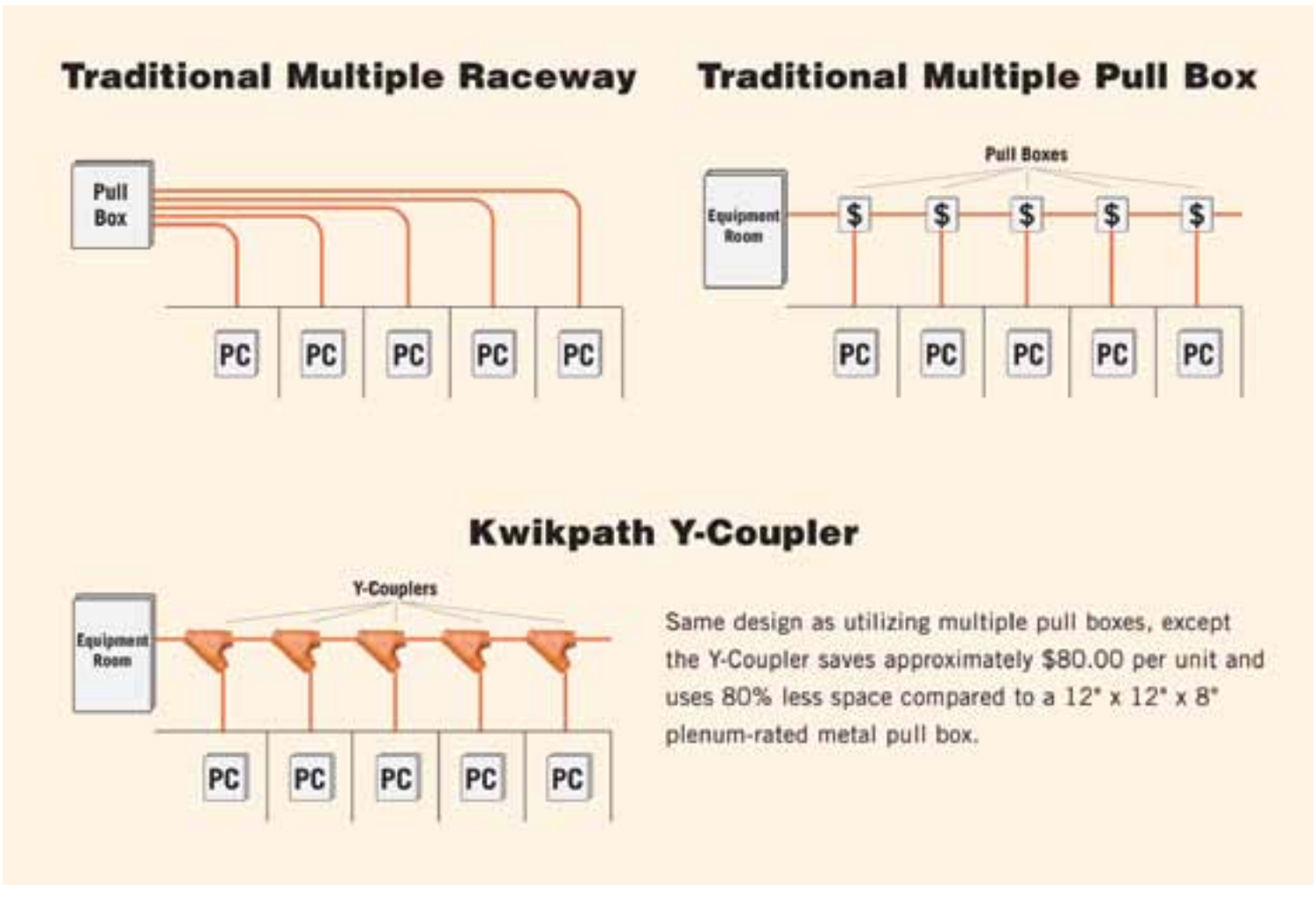
As the design proceeded through various iterations on the drawing board, the angle of the branch had to be determined. Since the bend radius of a fibre optic cable would be directly related to the branch angle, the product development team settled on "splitting the difference" and creating a symmetrical design.

The first major design review "sorted out what wouldn't work," said Schlieker. "We pared down the choices to those that would make the user happy, then considered the implications for manufacturing. Having a symmetrical design also meant the part could be used twice."

A rapid prototype model wasn't created until engineering had defined the branch coupler's mass, diameters and wall thicknesses. Finite element analysis in software ensured the accuracy of the model for downstream tooling and manufacturing.

The finished design was branded the Kwikpath Y-Coupler, accommodating raceway sizes from ¾ to 2 in. Retrofit benefits of the 9 x 7 x 3 in., proprietary CPVC material coupler include no need to remove existing cable, no more duct-taping a raceway branch in place, and reduction or elimination of network downtime (depending on the configuration).

"In any product development process there is tremendous risk as there is a cost to every decision you make," concluded Poupore. "The design process, using a team approach, reduces this risk."



Technical Literature

Hose and couplings. Kurt Hydraulics has published a 180-page catalog featuring its line of standard hose and couplings designed for a broad range of hydraulic applications. Routing tips, SAE specifications and I.D. hose selection information for correct flow and velocity are also included.
www.kurthydraulics.com

Sensors and vision. Banner Engineering has announced its *2011 Product Catalog* is now available in both a print and an interactive online version. The 860-page 2011 catalog covers sensor products together with lighting and indicators, machine vision, wireless and machine safety products.
http://catalog.bannerengineering.com

Cable carriers. A catalog for **igus** lines of Energy Chain cables carriers and Chainflex continuous-flex cables features general information, specific features and options, industries for use, and numerous application examples.
www.igus.com/quickorder

Rodless pneumatic cylinders. The *SC-200.15* catalog from **Bosch Rexroth Canada** is 56 pages of technical and ordering information on the series RTC (rodless thrust cylinder) featuring high load capacity, space-saving design and speeds up to 21 fps.
www.boschrexroth.ca

Pressure sensors. The 12-page *Pressure Sensors Booklet* from **American Sensors Technologies** outlines the advantages of using AST pressure measurement devices for alternative energy industries and cites typical applications for pressure sensor use.
www.astsensors.com/contact.php

Cable systems. The 148-page *Cable Systems* catalog from **Samtec** includes products for high speed cable systems and data links, RF cable systems, high speed panel and I/O systems, sealed panel and I/O systems, IDC cable and flex jumper systems, discrete wire systems and high speed test systems.
http://samtec.com/lrcablecat

Ball screws. Lee Linear, a manufacturer of linear motion components, now provides catalogs for ordering precision ball screws. Its SBC catalog provides metric configuration information, while a separate new catalog gives inch dimensions.
www.leelinear.com.

Electronic components. Distributor **Digi-Key Corp.** has announced the 2011 Digi-Key Catalog has been distributed to customers in the U.S. and Canada and is now available for online viewing. Wireless applications for iPhone, iPad, and iPod touch devices and Android compatible devices are also available.
www.digikey.ca

Drives. A 28-page **Zero-Max** catalog of adjustable speed drives, right angle gear drives, and linear actuators has been published. The brochure contains new product models, new technical application data, drawings and photos for easy ordering.
www.zero-max.com

Fluid power connectors. FasTest has announced its *TwistMate Brochure* is now available for download and in print by request. The publication features TwistMate connectors, plugs and caps. The connectors allow finger-tightened seals up to 10,000 psi.
www.fastestinc.com

Products: Hydraulics & Pneumatics

Ergonomic vacuum lifter

A fully integrated vacuum-hoist lifter that features a new two-button release control to let one person safely handle compact heavy loads such as batteries has been announced by Anver Corp. The VM-Series Lifter is a hoist-based, vacuum powered unit that can be equipped with standard and custom vacuum pads to pick-up compact heavy loads having restricted gripping surfaces. Allowing one person to safely handle these loads, this lifter features a two-button, two-hand release control and a VLS-08 Vacuum Leakage Sensor for positive leak detection. Available with 275 and 550 lb. hoist capacity.
www.anver.com

Pneumatic isolation valves

Bimba has announced the PIV series pneumatic isolation valves. The units are typically the first valve following the FRL components in the line supplying compressed air to pneumatic equipment, the company says, the critical component in any safety lockout, tagout system. Available sizes range from ¼ in. inlet/outlet ports with 3/8 in. exhaust ports up to 1-1/2 in. inlet/outlet ports with 2 in. exhaust ports. Accessories include air mufflers, pressure switches, and air pressure "visual" indicators and connecting hex nipples.
www.bimba.com

Pressure reducing valves

Suitable for the high requirements imposed by mobile and stationary hydraulics, MHDRE pressure reducing valves from Bosch Rexroth Canada provide up to ten million load cycles. The directly controlled hydraulic pressure reducing valves are said to offer not only low leakage but also the exact control of actuator motion through sensitive flow control. The valves, which are available in three different sizes, apply the electric command values steplessly and largely independently of the inlet pressure level. A protection class IP69K is possible. The maximum flow rate of the valves at a pressure difference of seven bar (.p=7 bar) equals between 2.5 and 30 liters per minute, depending on the size.
www.boschrexroth.ca

Fluid power sensors

Novotechnik has introduced the TIM series of non-contact linear position sensors. The series of rod-style sensors is designed for integration in hydraulic and pneumatic cylinders. Screw-plug hole is sized at M18 diameter and plug-in flange is 48 mm. A magnetic pick-up position marker is mounted on the application's piston rod. Sensors are available from stock in stroke lengths from 50 to 2500 mm.
www.novotechnik.com

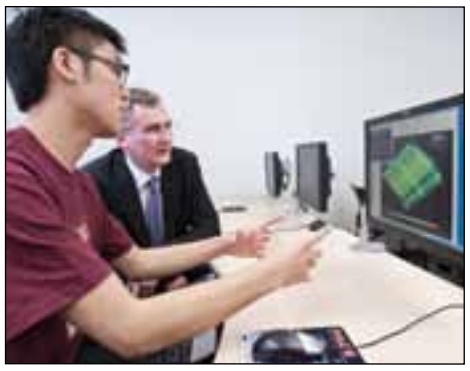
Hydraulically caliper brakes

Nexen Group Inc. has announced spring-engaged, hydraulically disengaged caliper brakes for dynamic braking and static holding applications. Providing operation at as low as -30°F, the brakes are said to out-perform traditional pneumatically actuated brakes and clutches that offer a minimum operating range of 0°F. Various disengagement pressures are available, ranging from 75 to 1500 psi.
www.nexengroup.com

By Design

McMaster lab to give students automotive design edge

Hamilton, ON– The PACE Lab established by **General Motors** (GM) and **PACE Partners Autodesk, HP, Oracle** and **Siemens PLM Software** at **McMaster University** (www.eng.mcmaster.ca) is giving engineering and technology students a global edge as they prepare for careers in the international world of automotive design and engineering.



Joey Chan, a third-year student in the Bachelor of Technology automotive program, describes his design project to Matt Crossley, director of engineering, GM Canada, at the opening of McMaster's PACE Lab on March 17.

Matt Crossley (above right), director of Canadian engineering at GM Canada, and Patrick Deane, president and vice-chancellor at McMaster University, opened the PACE (Partners for the Advancement of Collaborative Engineering Education) Lab at a ribbon-cutting ceremony held at the university in March. Also participating were representatives from Autodesk, HP, Oracle and Siemens PLM Software.

"We want our engineering and technology students equipped to thrive in the automotive industry of the future," said Deane. "That industry is one that is global in scope and collaborative in nature. PACE provides our students with the chance to work with their peers from around the world and gives them exposure to tomorrow's technologies."

PACE has made an in-kind contribution of state-of-the-art computer-based hardware, such as 3D navigation devices and engineering workstations, and engineering software used by automakers around the globe for product planning, engineering, analysis, and data management. The university also receives technical and educational materials for student and instructor training, and academic support.

Volvo Group truck tire research at UOIT

Oshawa, ON – **The University of Ontario Institute of Technology**'s (www.uoit.ca) Faculty of Engineering and Applied Science has announced a new research contract with **Volvo Group North America**. Under the research leadership of Dr. Moustafa El-Gindy (left), associate professor, Faculty of Engineering and Applied Science (FEAS), Volvo is funding a project involving truck tire performance and road interactions for rigid and soft road surfaces. Volvo will invest $150,000 over three years as it collaborates with Dr. El-Gindy to investigate truck tire parameters that will improve fuel economy, without sacrificing safety and cost. Dr. El-Gindy and his team of FEAS graduate and undergraduate students will be analyzing both on-road and off-road tires and their interactions with rigid and soft surfaces through computer simulations.

The Honourable Christy Clark, Premier of British Columbia, joins Marcus Breitschwerdt, President and CEO of Mercedes-Benz Canada, on the BenzPatent-Motorwagen – the world's first motor car. Over 125 years later, Mercedes-Benz continues to reinvent the automobile and revolutionize transportation with the zero local emission B-Class F-CELL.

Mercedes-Benz to build fuel cell stacks in Canada

VANCOUVER, BC and STUTTGART, Germany, – **Mercedes-Benz** has announced that it will set up its own production of fuel cell stacks in Canada. By doing so, the company will bundle the development and production for one of the key components of fuel cell powered electric vehicles in Vancouver.

Günter Walz, vice president Planning International Cooperation Mercedes-Benz Cars (www.mercedes-benz.ca), said "The decision was made to create and build a new production facility under the aegis of Mercedes-Benz Canada as the logical next step of Daimler's successful cooperation with partners in Vancouver." In February 2008, the Automotive Fuel Cell Cooperation (AFCC) in Burnaby, east of Vancouver, was founded as a joint venture between **Daimler** (50.1%), **Ford** (30%) and **Ballard** (19.9%). This is where the fuel cell stack, now used in the current Mercedes-Benz B-Class F-CELL and the Citaro FuelCell Hybrid city bus, was developed.

The aim of this new operation is to cover the entire value chain, from materials research and development of a production technology for a large-scale production.

Construction of a facility designed for the production of stacks for fuel cell vehicles will begin immediately in a 2000 square metre space in a new Burnaby location. Completion of the production facilities is scheduled for early 2012. Following a graduated test and commissioning phase, small-series production of next-generation fuel cell stacks will commence as of 2013. Apart from delivering a higher output and efficiency, these fuel cell stacks excel with their compact construction. This next generation fuel cell stack will also be suitable for use in sedans such as the Mercedes-Benz C-Class or E-Class.

News in Brief

Ontario Rexroth distributor

Vaughan, ON-based hydraulic solutions provider **Hydraflow-Pumptech Fluid Power, Inc.** (www.hydraflow-pumptech.com) has been authorized as a stocking distributor of **Bosch Rexroth Canada**'s Industrial and Mobile Hydraulic products (www.boschrexroth.ca).

Nook linear motion blog

Linear motion specialist **Nook Industries** has launched a blog (http://blog.nookindustries.com) that offers a variety of services at a single location, including 3D solid model downloads, video tutorials, microsites, blog posts, forums, catalog and news on the company's screws and actuators.

OneCAD joins CanSIA

OneCAD Solutions Ltd. (www.onecad.com) of Markham, ON, a mechanical engineering contract design services company, has announced that it is now a member of **CanSIA**, the Canadian Solar Industry Association (www.cansia.ca).

Phoenix Contact opens office in Quebec

Phoenix Contact Canada (www.phoenixcontact.ca) has recently completed the set-up of its Eastern Canadian Regional office located in St-Laurent, QC. The new facility enables Phoenix Contact to provide local support for its broad range of industrial components, electronics and automation solutions. The Quebec office includes an automation lab, new product displays and a training room waiting to provide the market with informative seminars on products, applications and technology.

Schneider Electric appoints Olivier Cousseau as industry marketing director

TORONTO – Energy management specialist **Schneider Electric Canada** (www.schneider-electric.ca) has appointed Olivier Cousseau as director, Industry Marketing (right). Supported by a team of application experts, Cousseau will manage industry offer and segment marketing strategy. Most recently, Cousseau led Schneider Electric's Industrial OEM Segment group in serving machine builders across Canada.

Calendar

June 21-23, 2011. Toronto. **PackEx Toronto** trade show and conference for designers and suppliers to the packaging industry (www.canontradeshows.com/expo/packex11/). Co-located with Automation Technology Expo Canada, Plast-Ex, and Design & Manufacturing Canada shows.

October 17-20, 2011. Toronto. **Canadian Manufacturing Technology Show 2011** includes live automation and machine tool demonstrations (www.sme.org/cmts).

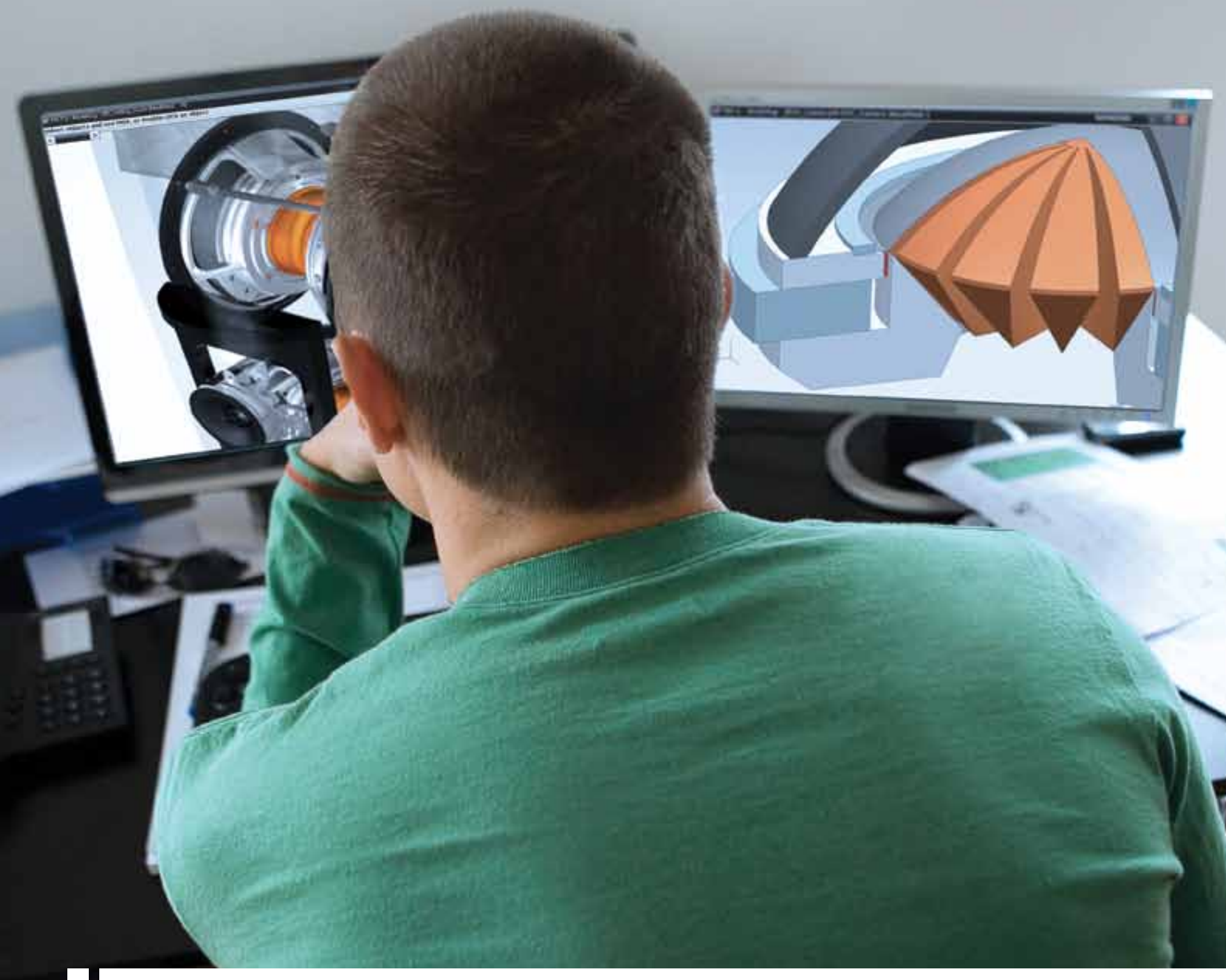
November 29-December 1, 2011. Las Vegas. Autodesk University Conference and Exhibition (http://au.autodesk.com/?nd=e2011) is a chance to hear about the latest advancements in software products such as Inventor and AutoCAD.

Rolls-Royce R&D will target aeroderivative gas turbines.

Rolls-Royce $225 million R&D investment in Canada

MONTREAL – **Rolls-Royce** (www.rolls-royce.com) has announced plans to invest $225 million to develop new technologies for the Group's Energy business in Canada. Funding will be provided over five years and the R&D work will focus primarily on enhancing Rolls-Royce product offerings in the oil & gas and power generation markets. The goal is to provide higher power and lower emissions aeroderivative gas turbines through the use of new combustion technology, fit for purpose industrial materials and alternative fuels. Ultimately this work may provide the technologies for the next generation of Trent and RB211 industrial turbines.

A CAD system that makes innovation easier?



Get inspired. Get NX for design.

Product design organizations face serious challenges: they need to create innovative new products—and get them to market faster than ever before. At the same time, they face constant pressure to take costs out of their development process. NX™ for design from Siemens PLM Software gives your designers everything they need for distinctive styling, design and analysis. The benefits: faster design, greater productivity, and more product innovations. Find out more at **www.siemens.com/nx.**

Answers for industry.

SIEMENS

Spotlight

Sensors

Vortex shedding flow

Parker Fluid Control Division has introduced a line of Vortex Shedding Flow Meters suitable for applications utilizing water, water/glycol coolant and other low-viscosity fluids. Units monitor the flow of cooling fluid for resistance welders, slurry pump seal water, machine coolant, and steam boiler feed water. The meters operate with NPT ports ranging from ¼ to 2 in. sizes and can handle flows from 4 to 200 gpm, with occasional over-ranging up to 125% of capacity without damaging the meter. Units feature 4 ot 20 mA flow rate transmitters and can withstand 10 to 300 PSIG.

www.parkerfluidcontrol.com

Dual axis inclinometer

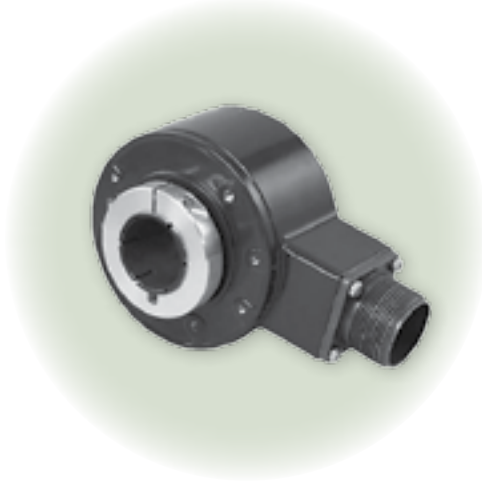
The Fredericks Company has announced release of a dual axis inclinometer (Part #0729-1755-99) with 0 to 5 V analog outputs (x & y axis) for PWM and temperature. Designed for easy use and able to interface with different types of instrumentation and equipment, the inclinometer offers an angle range of ±60° over x and y axis, 0.2 arc minutes resolution (.003°), and ±0.1° repeatability. The inclinometer's operating temperature range is from -40° to 85°C. Custom angle ranges are available. Typical applications include solar tracking, aerial lift platforms and machine tool leveling.

www.frederickscom.com

High-resolution smart camera

Matrox Imaging has announced that the Matrox Iris GT smart camera now offers a model with a 5 MP monochrome CCD sensor. The sensor on the IP67-rated Matrox Iris GT5000 is 2448 x 2050 pixels at 15 fps 2/3 monochrome CCD. Powered by an Intel Atom 1.6 GHz processor, Iris GT runs Windows CE 6.0 or Windows XPe and features an integrated graphics controller with VGA output, 512 MB DDR2 memory, and a 2 GB flash disk. Matrox Iris GT is available with the Matrox Design Assistant development system (bundled) or with the Matrox Imaging Library (sold separately).

www.matrox.com



Programmable IP67 encoder

The **Baumer** HS35 encoder includes the company's dual bearing system, durable shaft seals and IP67 environmental ratings, sealed connector or cable glands, and an optical scanning (LowHarmonics) system. Applications include motor and drive control, oil and gas, cranes, elevators and hoists, and printing machines. Units have better than 60 arcsec accuracy, withstand 200 g shock, operate from -40° to 100°C, are programmable, provide incremental output from 1 to 8192 ppr and offer interpolated resolutions up to 80,000 ppr.

www.baumer.ca

BIMBA GOES ELECTRIC!

bimba.com/ole

After more than 50 years of pneumatic leadership, Bimba introduces its first ever rod-type electric actuator—the Original Line Electric (OLE). Designed, built and tested to provide the greatest durability, highest speed and most thrust per dollar, Bimba's OLE actuators are ideal for applications requiring increased control and flexibility. Just like Bimba's trusted Original Line pneumatic cylinders, OLE actuators deliver the quality, durability, delivery and outstanding customer service you've come to expect.

More motor options

Order a complete OLE system with motor and driver or use your own brand and type of motor. Bimba will even attach the motor of your choice to the actuator and ship fully assembled.

More thrusts per dollar

OLE actuators can handle a wide range of applications with thrusts up to 350 pounds and speeds up to 22 inches per second. Standard, cost-effective cylinders ship in 4 days or less.

Watch the OLE video

Visit **bimba.com/ole** to watch an interactive presentation on the advantages of Bimba's electric actuator, see step-by-step instructions on connecting an OLE system and more.

Contact Bimba today to receive a prototype at a promotional discount. **www.bimba.com** **1-800-44-BIMBA**

Products: Motion Control

Connectivity to Profinet

Danfoss Drives has introduced the VLT Profinet MCA120 Option Card. The option card handles a single connection with an Actual Packet Interval down to 1 ms in both directions. Additionally, the card features a built-in web server for remote diagnostics and visual confirmation of basic drive parameters, as well as an email notifier that can send an email message to one or more recipients should certain warnings or alarms occur, and/or when those warning or alarms are cleared.

www.danfossdrives.com

Explosion-proof actuator

The linear actuator line from Exlar has been expanded to include the EL100 explosion-proof linear actuators, rated for Class I, Div 1, Groups B, C, D and T3 hazardous environments. The linear actuators also meet ATEX requirements for use in potentially explosive atmospheres and are in conformity with the EU ATEX Directive 94/9/EC. The series integrates a planetary roller screw mechanism with a high torque servomotor in a self-contained package. The roller screw consists of multiple threaded rollers assembled in a planetary arrangement around a threaded shaft. The design is engineered to provide reliable and precise operation over thousands of hours, handling heavy loads even under extremely demanding conditions.

www.exlar.com

UL size 34 step motors

Lin Engineering has announced that its 8718 NEMA 34 step motor series has been recognized with a certification of compliance to Underwriters Laboratories Inc.'s (UL) standards. The product line is a series of high torque, 2 phase stepper motors. The motors are available in three body lengths: 2.6, 3.8 and 5.0 in. and are capable of up to 1288 oz in. of holding torque depending on the stack size. These motors can easily be utilized for high torque applications in industries such as packaging and food processing.

www.linengineering.com

Low cost step motor drive

Applied Motion Products has introduced STR step motor drives, available in 4 and 8 A versions. Units are dc input drives requiring a step and direction control signal. They feature anti-resonance, microstep emulation and idle current reduction. Configuration is done entirely with switches on the drive. AMP engineers optimized the performance for a number of motors, storing all the configuration parameters on the drive. The motor is then selected by a 16 position rotary switch. The STR measures 4.64 x 2.97 x 1.29 in.

www.electromate.com

Design/configuration software

Rockwell Automation has added more than 30 new capabilities to its Rockwell Software RSLogix 5000 design and configuration software. Features include integrated motion on EtherNet/IP and high-integrity add-on instructions (AOIs). Other key enhancements of the software include DF1 radio modem protocol broadcast support for reduced power consumption and support for several new Rockwell Automation products.

www.rockwellautomation.com

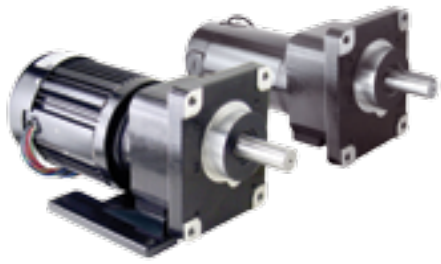
Reciprocating linear drive

The Amacoil-Uhing Kinemax linear drive features rapid pitch adjustment and automatic reversal without requiring clutches, cams or gears. Using the readily accessible dial on the front of the drive unit, a ten-to-one pitch adjustment range is possible. The drive has 7 lb of axial thrust.

www.amacoil.com

High torque gearmotor

Bodine Electric Company has upgraded and expanded its Type CG line of gearmotors. The CG gearhead is paired with Bodine's most powerful variable speed electric motors, the 48R6, ac inverter-duty, and 42A7 permanent magnet DC motors. This integral gearmotor design allows the CG to deliver up to 1000 lb-in. of torque, which is nearly twice the torque of any previous Bodine product.



www.bodine-electric.com

Dual-keyed couplings

A line of large bore couplings that feature axial and annular keyways for use with pumps and mixers driven by unsupported shafts is being introduced by Stafford Manufacturing Corp. The couplings feature axial and annular keyways to transmit torque while restraining lateral motion in pumps and mixers that are driven by unsupported shafts. Offered in 1 to 5 in. ID sizes, the keyways are machined to customer specifications. Available in steel, stainless steel, or aluminum, the couplings come with straight or stepped bores to join dissimilar shafts.

www.staffordmfg.com

Magneto resistive encoder

Portescap, A Danaher Motion Company, has introduced the MR2 magneto resistive encoder. The MR2 incremental encoder is designed for seamless integration with Portescap motor drive systems. The encoders are said to deliver accurate positioning at a controlled speed with factory-programmable resolution from 4 to 512 lines in discrete steps, in a compact package. The encoder is a suitable positioning and speed control solution for medical, security and access, industrial automation, and electronics assembly related applications.

www.portescap.com

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Feature: Motion Control

Powering ultra-fast action of biotech lab automation

Advanced linear motion system is behind the groundbreaking performance of Singer Instruments' innovative biotech laboratory robot for pinning arrays of cells – the RoToR.

This benchtop automation is revolutionizing genetic, genome and cancer research by being able to manipulate over 200,000 yeast or bacteria cell samples per hour. This unprecedented speed – up to an order of magnitude faster than previous lab automation – is changing the way that many biotech labs work. One of Singer's robots often now typically services several laboratories, with users just booking short time slots on it for replicating, mating, re-arraying or backing up yeast or bacteria libraries.

Linear motion ontrol system creates breakthrough

RoToR is managed by a compact real-time controller from Baldor called NextMove ESB-2. This module controls the three axes of motion that perform RoToR's point-to-point pinning action, as well as a sample handling axis, interfacing to the machine's Windows-based graphical user interface, and all the I/O channels required.

Singer Instruments chose NextMove ESB-2 because it incorporated all the real-time stepper and servo motion and machine control facilities they needed, and more – giving it the flexibility to expand and evolve the RoToR design in the future.

Baldor provided Singer Instruments with the complete machine control package, comprising the NextMove controller with its built-in I/O – plus some expansion I/O to handle the large number of sensors and pneumatic actuators on this sophisticated robot – a linear servo motor and drive, and three integrated stepper motor and drive modules. The controller takes care of all the machine and motion control tasks, under the direction of a Windows user interface, which is interfaced via ActiveX commands.

The major movements that the machine makes are point-to-point transfers from source to destination plates along a linear servo motor axis that spans the width of the machine. This axis carries a two-axis stepper motor head that controls the pinning action.

The combined X-Y-Z movement can also stir the samples using a sophisticated helical motion - an action used particularly when manipulating samples to or from liquid wells. There is also another stepper motor axis that controls the loading mechanism for the pin pads.

Other movements, such as the pick up and disposal of pinheads at the start and end of operations, are controlled by simple pneumatic grippers and rotators. A key to the machine's throughput is the use of Singer's unique high-density sample plates and matching plastic pinhead arrays, which allow manipulation of as many as 6144 cell samples in a single stage.

Singer's original intention was to use a closed-loop pneumatic drive for the main transverse axis, but this did not have either the positioning resolution or the speed desired, and was relatively noisy as well – a significant disadvantage in a lab environment. They started looking at linear motors instead.

The RoToR biotech laboratory robot is managed by a compact real-time controller from Baldor called NextMove ESB-2.

Singer Instruments' innovative biotech laboratory robot for pinning arrays of cells is managed by a Baldor real-time controller.

Baldor made this design choice easy by agreeing to produce a special version of a brushless linear servo motor with some mechanical modifications to the linear track that allows it to be supported at the ends alone – rather than along its length. This allows the linear motor's forcer to become an X-axis gantry that carries the additional Y and Z axes. The Y and Z axes are based on Baldor's DSMS family of ultra-compact micro-stepping motors with onboard drive electronics. The linear motor – from Baldor's LMCF series – is another novel product with a special magnet design that minimizes the cogging effect to ensure extremely smooth operation.

After the key hardware decisions had been taken, developing the motion control software was made very easy by Baldor's Mint language and its development environment. This language provided ready-to-use high-level commands for the required movements, making it very simple to get the machine running in the development lab – a task that was achieved in just a few days. Commands that saved valuable time for Singer Instruments ranged from basic movements such as S-ramp profiles – which are used extensively on the linear motion axis to optimize movement speeds between source and destination plates – to one called HELIX which provides the developers with the helical stirring action that is employed when manipulating samples in liquid wells. As the machine has a Windows user interface developed using Visual C# and Windows Presentation Foundation, Singer Instruments also made use of Baldor's ActiveX interface library, which is provided without cost as part of the development tool suite.

"NextMove has given us a platform for controlling our machine that is both economic and easy to apply," said Trevor Clarke, Singer Instruments' technical director. "The simplicity of development is very helpful for us, as RoToR has been the most sophisticated instrument that we have ever produced."

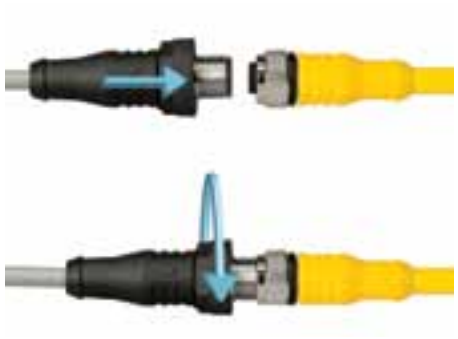
"The NextMove controller provides a very economic control platform for small machines such as these," added Neil Moss of Baldor. "It provides all the control features required for the major motion axes – four in this case – plus the capability of handling several more axes for system expansion, and built-in I/O – keeping the bill-of-material costs very low. NextMove ESB-2 operates standalone, or in conjunction with a PC host, providing great versatility of application for the laboratory and small machines sector."

A video of the RoToR in action can be seen at http://ow.ly/4qm1A.

www.baldor.com

Products: Connectors

Torque connectors



Chartwell Automation has announced TURCK M12 true torque connectors that may be hand-tightened to a predefined torque to avoid over-tightening. The connector is compatible with existing M12 products, and does not require a tool for connection. Because the connector cannot be over-tightened, the integrity of the mechanics and the O-ring connection are said to be maintained. The connectors are available with 3, 4 or 5 poles, both male and female versions in either straight or right-angle configurations.
www.chartwell.ca

Terminal blocks

FCI has announced the expansion of its terminal blocks product portfolio with new plug and socket configurations suitable for industrial and instrumentation applications. The expanded line includes new configurations such as front screw, key backside, contact downside plugs and 2-wall, 45°-angled, feedthrough sockets, and accessories such as polarization keys. All configurations are available with or without the screw-locking-side-flange feature. Green-colored plastic is standard but optional black, blue and grey color plastics are also available.
www.fci.com

PC tail M12x1 panel plugs

The existing M12x1 product line of panel plugs from CONEC has been expanded with 8-pole versions having PC tail contacts or solder contacts for stranded wire up to a maximum cross-section of 0.25 mm2. There are now also PC tail versions of the 4 and 5 pole components available. The sealing to the housing or sensor tube is made by a surrounding radial, formed sealing lip on the contact carrier or alternatively by an O-ring.
www.conec.com

Connecting cables

Weidmuller has introduced fully shielded M12 cables with a braided shield connected to the coupling nut. This design provides 360° protection of the connector and the cable against electromagnetic interference, and gives users fully shielded and secure signal connections. With cULus approval, the new M12

connecting cables are suitable for use on machinery in a broad range of applications in North America. The M12 fully shielded cables includes 3-, 4- and 5-pole versions as single- and double-ended cables.
www.weidmuller.ca

Surface mount connectors

A new line of customized surface mount connectors from Advanced Interconnections reduces board space by utilizing the perimeter of circular and other odd-shaped PC boards. SMT Perimeter Connectors are created from easily customized FR-4 insulators on in-house driller/routing machines and incorporate screw-machined, solder ball terminals (available down to 0.50mm pitch) on both the male header and the mating female connector (socket).
www.advanced.com

Cord retaining system

Schurter has introduced the V-Lock cord retaining system, a product for 10 and 16 A appliance couplers and power entry modules, according to IEC 60320 (15 A and 20 A according to UL). The V-Lock power cord is said to provide a safe and reliable power connection. It latches into the notched inlet or outlet to prevent accidental disconnection of the power from the equipment. The yellow catch mechanism is released by depressing the lever.
www.schurterinc.com/new_pems

Feature: Engineered Materials

Liquid silicone rubber symposium targets emerging advancements

Shin-Etsu Silicones of America, Inc. and Arburg, Inc. recently co-hosted their 5th Annual Liquid Silicone Injection Molding Symposium at Arburg's state-of-the-art Technology Center Midwest in Elgin, IL.

Material and equipment suppliers profiled Innovations in LIMS (Liquid Injection Molding System) technology and products including: molding and process equipment, molds, computer simulation advancements for LIMS part & mold flow, and LSR pumping systems & injection nozzles. Dedicated tracks also addressed multi-component applications for Liquid Silicone Rubber (LSR) – a vital topic in the medical, consumer, and automotive markets.

Over 100 LSR industry professionals attended the symposium and experienced hands-on equipment displays and

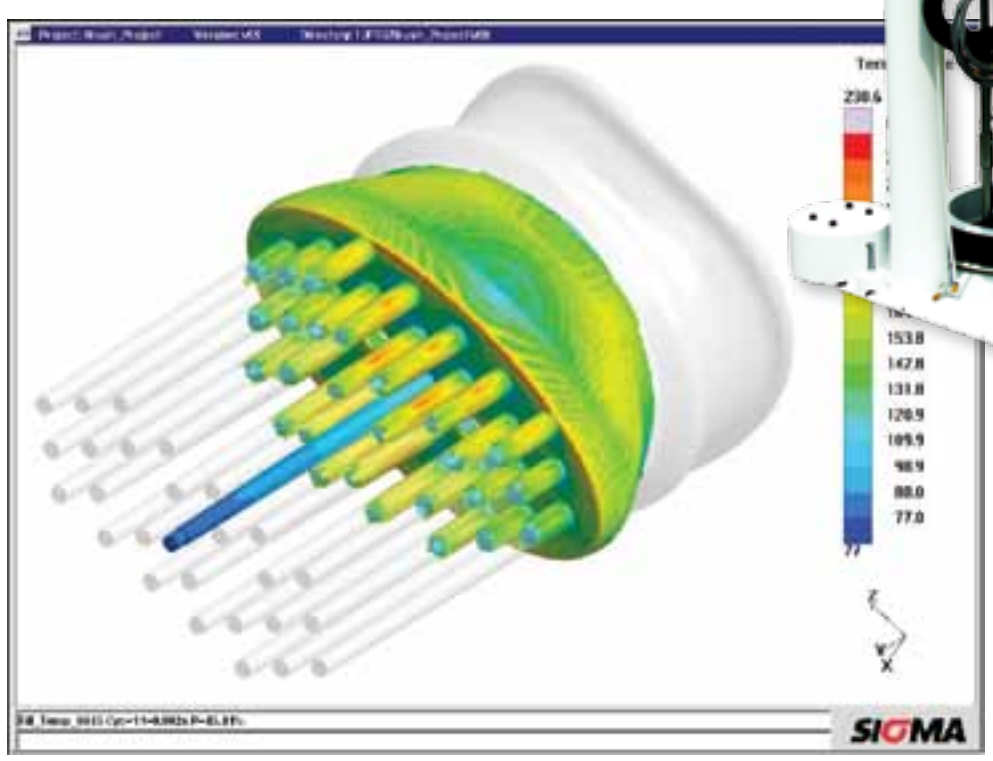
Linear motion ontrol system creates breakthrough

presentations from Shin-Etsu Silicones of America, Arburg, Gayson SDI, Kruse Analysis, Roembke Mfg. and Design, and Fluid Automation.

Eric Bishop, North America marketing manager for Shin-Etsu Silicones of America, Inc. (SESA: A U.S. subsidiary of Shin-Etsu Chemical Co. Ltd., Japan), noted that SESA is broadening the palette of properties of its Select-Hesive LIMS KE2090 Series. The series now provides new hardness ranges from 5- to-70, Shore-A. "The goal is to expand the series' primer-less adhesion benefits to a wider range of applications. We're seeing an increased demand for softer silicones," stated Bishop.

Arburg, a manufacturer of injection molding machines for plastics processing, provided an LSR molding demonstration of its Allrounder 470 A (1000-70) running Shin-Etsu's KEG2000-40 Series material in a 4-cavity baby nipple mold (see video). The 110-ton machine is equipped with an integrated 3-axis Arburg Multilift servo-drive robot and a LSR dosing machine from Fluid Automation. The machine is used in industries that require an optimum level of efficiency, even where a high level of performance is expected, such as the medical technology sector and the food, packaging and automotive industries.

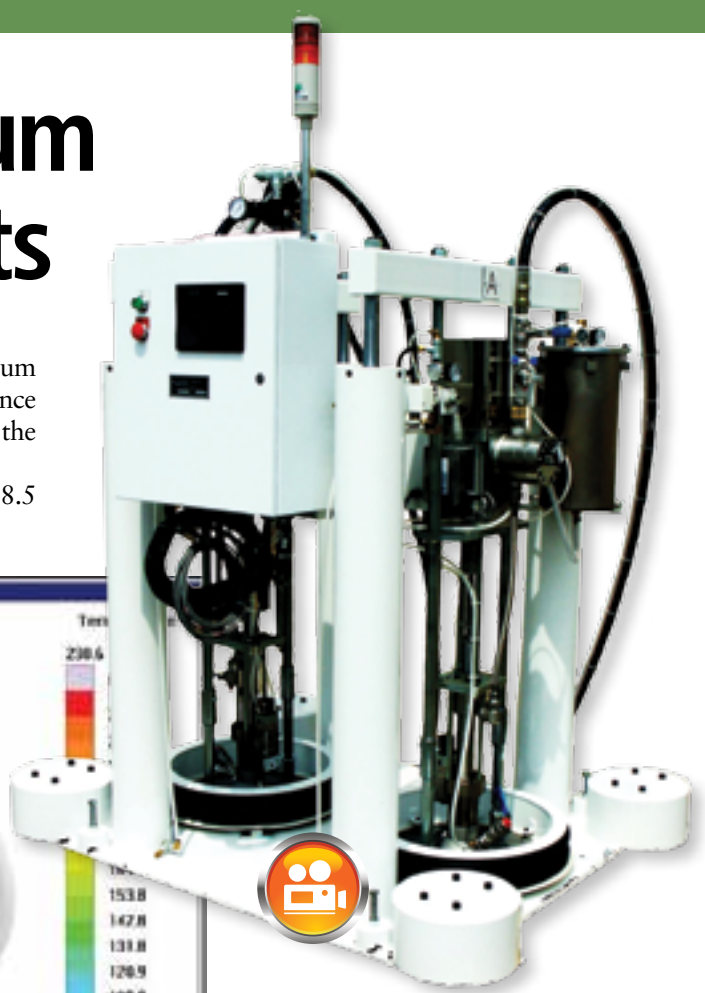
The electric Allrounder 470 A machine features 18.5 in. tie-bar spacing and 3.4 oz maximum injection shot size that offers the flexibility to go as small as 12 mm screw size to optimize efficiency according to shot volume and process requirements. The integrated 3-axis Multilift V robot features an integrated machine control system responsible for controlling the entire robot cell. Features for ensuring LSR shot-to-shot repeatability and accuracy include a special check ring assembly for the screw and regulated back pressure control via servo drive with paraxial measurement at the screw and the point of process.



CAE injection molding simulation adopted in the early phases of LIMS mold-making can determine thermal behaviors in steel molds prior to building.

A designer and builder of inserted flashless rubber molds, Roembke Mfg. & Design president Greg Roembke offered insights into developments in LSR flashless tooling and internal cavity mold pressure sensors which can measure imperfections and correct them during each shot – essentially allowing molders to achieve a window into what's happening inside the mold with each process.

Notably, Roembke focused its attention to a new 2-shot (rubber/plastic) technology system targeting the North American market. The key to the technology vs. the transfer method is that one machine gets the entire product out in molding plastic and LSR together – eliminating an entire step in the molding process. Since it's a 2-shot system, the warm LSR will adhere to warm plastics better. The 2-shot system could use a Shin-Etsu self-bonding material to adhere the silicone to the plastic substrate.



With fluid dispensing equipment, customers should learn the checks and balances for LSR such as pressure fluctuations and how they affect the process, water cooling and the temperature of material and thermal expansion properties.

Gayson Silicone Dispersions, Inc. (GSDI), is a provider of pigment, chemical additive, and catalyst dispersions for HCR/LSR/RTV applications since 1979. Whereas color is a hot trend in multiple market LSR applications for product identification, corporate product branding, and overall aesthetics, it is often considered late in the LIMS production process which can lead to unwanted and costly problems.

At forefront of developing and building state-of-the-art dispensing equipment for RTV and LSR materials since 1974, Fluid Automation, Inc.'s VP of Sales, Bob Pelletier discussed the continuing demand for advanced verifiable ratio control in LSR. According to Pelletier, "It's vital to educate customers on the checks and balances for LSR such as pressure fluctuations and how they affect the process, water cooling and the temperature of material and thermal expansion properties."

With an eye on the present and future of silicone technology, Torsten Kruse, owner of Kruse Analysis, Inc., presented his company's innovative CAE (computer aided engineering) injection molding simulation services which are being adopted in the early phases of LIMS mold-making to determine thermal behaviors in steel molds prior to building. Kruse noted that while the technology has been prevalently used in plastics injection molding, the LSR industry is just beginning to embrace true 3-D LIMS simulations to maximize mold designs.

This article was provided by Shin-Etsu Silicones.
www.shinetsusilicones.com

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Products: Engineered Materials

Heat resistant coatings

A line of high temperature, high gloss, VOC compliant coatings for OEMs that provide a decorative, porcelain-like appearance for metal surfaces is available from Dampney Company. Dampney Thurmalox 8800 series heat resistant high gloss coatings are silicone-based baking enamels that provide a decorative porcelain-like finish on metal surfaces and can withstand heat to 500°F. Developed for single coat application in OEM production lines, the VOC compliant baking enamel is available in a wide range of custom colors with variable gloss levels.
www.dampney.com

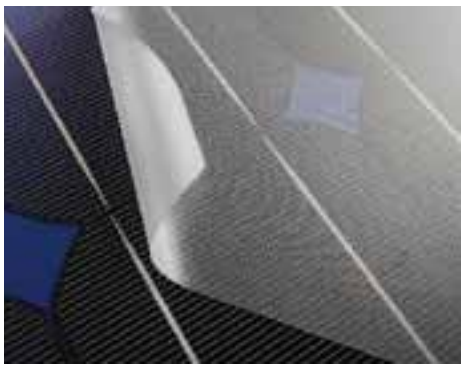
Overmolding TPEs

Elastocon TPE Technologies, Inc. has expanded its STK series of overmolding thermoplastic elastomer (TPE) compounds and concentrates for overmolding onto PC, ABS, PC/ABS and Acrylic. The new STK 50 and STK70 grades have a Shore A hardness range of 45 and 67. Benefits of the new grades, all of which can be injection molded, extruded, blow molded or compounded, are their high flow properties to make them suited for complex parts or components that require protection, good colorability, aesthetically appealing surface finish and high impact resistance, even at low temperatures.
www.elastocontpe.com

TPEs for gaskets and seals

Maxelast thermoplastic elastomers from Alliance Polymers & Services have been expanded to include two formulations targeted for gaskets and seals. They are offered as alternatives to thermoset rubber and TPVs and feature superior sealing performance at high temperatures (up to 100°C). The new lines of Maxelast P3800 series of styrenic TPEs can be injection molded, extruded, co-extruded or co-molded.
www.apstpe.com

Photovoltaic modules



Saint-Gobain Solar has introduced the LightSwitch series, including LightSwitch Frontsheet, LightSwitch Encapsulant, and LightSwitch Frontsheet Complete. LightSwitch Frontsheet is a melt processable fluoropolymer said to provide superior weatherability and UV resistance, suitable for flexible and lightweight solar modules. LightSwitch Encapsulant provides cushioning and structural support to solar cells and circuitry, while maximizing transmission of sunlight for energy conversion. LightSwitch Frontsheet Complete, a pre-laminate combining Frontsheet and Encapsulant, features all the performance benefits of both with improved production efficiencies, including reduced wrinkles and precise alignment.
www.pv.saint-gobain.com

Conductive laminates

Rogers Corp. has introduced RT/duroid 6035HTC, a high-thermal-conductivity (HTC) laminate material engineered for low loss in high-power circuits. The fluoropolymer composite material is suitable for RF and microwave applications in military and high-reliability applications required to handle high power levels, such as power amplifiers. The laminates feature a relative dielectric constant of 3.5 at 10 GHz, making them suitable for a wide range of circuits, including amplifiers, couplers, filters, and power combiners/dividers employed in avionic and other military and hi-rel systems.
www.rogerscorp.com

Electro active polymer

Electroactive Polymer Artificial Muscle (EPAM) actuator technology is available from Artificial Muscle, Inc. (AMI), a Bayer MaterialScience LLC company. AMI's Reflex actuator technology enables high-fidelity touch feedback for touchscreens of mobile phones and other devices. The touch feedback and complex haptic effects made possible for mobile devices and other electronic products are formulated to enhance user experience, whether it's the feel of scrolling a menu or clicking a button provides a superior feel compared with existing technologies.
www.bmsnafta.com

TP carbon fibre composites

Ensinger, Inc. has launched a series of thermoplastic carbon fibre composites suitable for medical components. Stock shapes made using the new TECATEC product series consist of a thermoplastic matrix and a woven fabric of carbon fibre bundles. The combination is said to ensure the achievement of significantly higher tensile and flexural strength compared to fibre reinforced extrudates. The lightweight materials offer good chemical resistance as well, and are also radiolucent, making them ideally suited for external fixation devices and surgical instruments. TECATEC is available in plate thicknesses of 3 to 40 mm, with larger dimensions available on request.
www.shopforplastics.com

Products: Enclosures

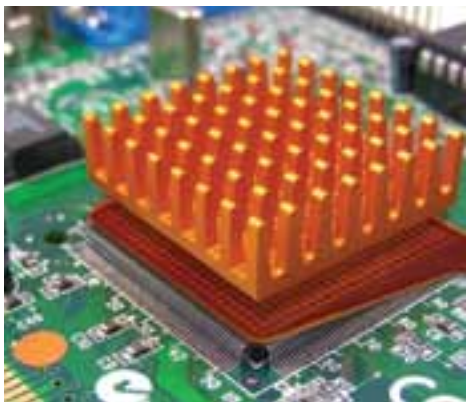
Desktop chassis

The HWCAS is available in two sizes, either 330 x 254 x 76 mm or 432 x 254 x 76 mm. The chassis corners are of dovetailed construction, reinforced with corner posts fitted with brass inserts to take the panel fixings. The 2 mm thick top panel will support heavy components such as transformers without bowing. The 1444 and 1441CWW units come in six sizes ranging from 178 x 127 x 51 mm to 432 x 254 x 102mm.
www.hammondmfg.com

DIN-rail mount outlet boxes

The CPO series DIN-rail mount outlet boxes from WAGO provide control cabinets with power for common tools including laptops and testing equipment. The series utilizes a UL 498 Receptacle that is suitable for UL 508 panels. Addressing requests for compact duplex supplies, the CPO's compact PVC housing measures 60 x 109 mm and features an ABS plastic cover. The series employs a top-mount ground pin, preventing loose metal objects (e.g., conductor strands) from shorting hot and neutral pins together. For varying termination needs, the series offers either color-coded CAGE CLAMP spring pressure termination or MCS pluggable connectors. Depending on CPO variant selected, ratings range from 120 to 250 V and 15 to 20 A.
www.wago.us

Sensor optimizes heatsinks



The Tactilus sensor from Sensor Products is flexible and 0.015-in. thick (0.38 mm), allowing it to be placed between the CPU and heat sink without affecting the assembly. The sensor pad has 625 resistive sensing points arrayed on a 25 × 25 grid. The total sensing area is 2 × 2 in. The scan speed is up to 1000 Hz, and the operating pressure range is 0 to 100 psi (0 to 7 kg/cm2). It is resistant to electromagnetic noise, temperature and humidity fluctuations. Accuracy is ±10%; repeatability is ±2%; hysteresis is ±5%; and non-linearity is ±1.5%.
www.sensorprod.com

Refrigeration motor

The iQ motor from ebm Papst is suitable for commercial refrigeration applications. The EC-motor includes integrated electronics, with efficiency of up

to 65%. Units are frequency independent, provide constant speed within load capacity and offer overload and locked rotor protection.
www.ebmpapst.us

500 know configurations

Elma Electronic offers over 500 configurations of knobs in various styles. The knob types include push-on, set-screw, collet, wing, bell-shaped, aluminum, locking, and specialty knobs. The knob series serves the two-communications, medical, industrial, audio, military, and instrumentation markets. The collet knobs are said to provide a more reliable grip on the switch shaft with metal "fingers" that tighten evenly around the shaft.
www.elma.com

Cold/heat containment

Pentair Technical Products introduces the Hoffman brand PROLINE containment system, designed to segregate cold (intake) and hot (exhaust) air. Consisting of aisle doors, ceiling panels and chimney stacks, the new containment system can be used for hot or cold air containment, preventing the hot and cold air from mixing -- which can lead to poor cooling and wasted energy. The containment system accommodates 36 and 48-in. aisle ways.
www.hoffmanonline.com

Rack mount/desktop chassis

Verotec has introduced a 2U EMC screened, thermally managed and powered IEEE 1101.10/11 desktop or rack mount 19 in. chassis unit that can be supplied with either a horizontally mounted 6U 4 Slot cPCI or a 6U 4 Slot VME64x backplane. The cPCI backplane is available as a 64 bit, PICMG 2.0 R3.0 compliant unit with a right-hand controller slot at the top, rear plug connectors in P3, P4 and P5 and selectable coded I/O in both a standard and CT/H.110 versions, or as a PICMG 2.16 packet switching unit.
www.verotec.us

Automotive Scene

Fuel economy drives trend to more fours

By Bill Vance

The Government legislation requiring constantly improved fuel economy and lower exhaust emissions continues to drive down engine sizes. We have already seen the steady replacement of V8s with sixes, a trend that is continuing on to fours. And even these are coming in smaller displacements.

Ford has been daring in its search for reduced fuel consumption

Who would have imagined a Mercedes-Benz S-class car with a four cylinder engine under the hood? Where we were accustomed to seeing V8s or even V12s, we find a 2.2 litre (2143 cc) diesel four in the 2011 S250CDI, the first four in the S-class's 60-year history.

Buick's highly touted new 2011 Regal sedan based on the European Opel Omega and now built in Oshawa, ON, is powered by either GM's 2.4 litre 182 hp "Ecotec" gasoline four or a smaller 2.0 litre 220 hp turbo four.

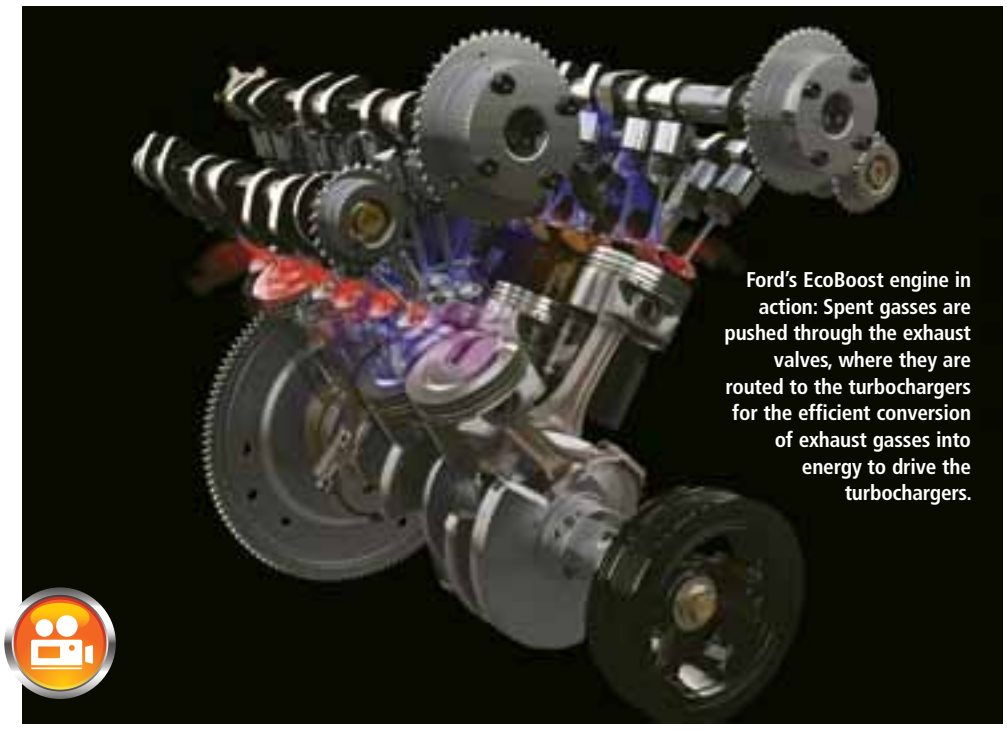
Ford is even more daring. In its search for reduced fuel consumption and emissions its cornerstone power will be its direct injection, turbocharged "EcoBoost" four and six cylinder engines. Within a couple of years it expects almost all of its North American models to be available with EcoBoost (above), with fours taking an increasing share.

The EcoBoost 2.0 litre four, for example (it also comes in other displacements), is available in the 1852 kg 2011 Ford Edge mid-size crossover SUV. It's a big assignment for a 2.0 litre engine, and engineers were concerned over whether a power plant this small could satisfy the performance expectations of drivers accustomed to sixes and eights.

They were pleasantly surprised, and it will now have an even bigger job as optional power in the 1975 kg Explorer SUV. This 2.0 litre produces up to 247 hp and is 25 kg lighter than the EcoBoost V6 one would expect to find in the Explorer.

Ford anticipates 30% fuel economy improvement. It also offers an EcoBoost 3.5 litre V6 in the F150 pickup.

Attaining these prodigious outputs requires the kind of sophisticated engineering and internal pressures that until recently were found in racing engines. The Mercedes-Benz's 2.2 L, 95 hp/L diesel has four-valve cylinders and chain-driven twin overhead camshafts. The common-rail direct fuel injection system operates at up to 2000 bar (29,400 psi), introducing fuel through much faster piezo-electric ceramic injectors activating the injector needles directly, not through the usual electrohydraulic system.



Ford's EcoBoost engine in action: Spent gasses are pushed through the exhaust valves, where they are routed to the turbochargers for the efficient conversion of exhaust gasses into energy to drive the turbochargers.

Air is pumped into the cylinders via two-stage supercharging comprised of twin turbochargers in series. The smaller high pressure turbo provides initial response with virtually no lag, while the larger one takes over at higher engine speeds.

Ford's EcoBoost high output relies on three main factors: high pressure (up to 152 bar) direct fuel injection; light, low-inertia turbochargers; and variable valve timing. But these upgrades can't just be applied to the normally aspirated engine. Coping with combustion pressures some 15% higher requires a stronger cylinder block, crankshaft, pistons and connecting rods, and sodium filled exhaust valves. Boost pressures go up to 1.17 bar, and there is air-to-air intercooling.

Bill Vance is an automotive journalist & author (www.billvanceautohistory.ca).

Medical Engineering

Taking heart from pump assist technology

By Mark Sunderland

While some people are described as "heartless" others are "all heart" and somewhere in the passage of life, people can actually "lose" their heart to a person or cause with the probability of having it broken. The heart is stylized as a wingding and a symbol on bumper stickers.

A heart of stone can now have polymer and microchips

But the bloody thing's just a circulating pump – albeit a vital one. It's the organ that keeps us going and in doing so it beats approximately 100,000 times a day through our lifetime to circulate over 1800 gallons of blood to carry the oxygen and nutrients that enable our bodies to function.

Medical science is now developed to a point at which our organs and body parts can be extirpated, replicated and/or supplemented, and the people who were once described as having a heart of stone can now more likely have a heart of polymer and microchips – battery powered no less and topped up externally by induction.

Every year, more than 50,000 Canadians are diagnosed with heart failure. There are an increasing number of Canadians who are heart attack survivors, and of the 2000 candidates for a heart transplant, only one in ten becomes an actual recipient. Some people don't qualify and others die in the process of waiting.

Fortunately there is a mechanical device that can augment the work of a failing heart – it is known as a ventricular assist device, or VAD. VADs are primarily intended for short term use, typically for patients recovering from heart attacks or heart surgery.

VAD, as the terminology implies, is an assistive device to a natural heart as opposed to an artificial heart that takes over the total pumping job after the natural heart has been removed.

VADs are designed to compensate for the various types of damage to a natural heart whether in the right or left ventrical or both. The left ventrical (LV) is the heart's main pumping chamber and so it's most often the LVAD that is used to keep patients alive with a good quality of life while they wait for a transplant.

The VAD is surgically implanted in the abdomen below the heart and connected by wires to external battery power. The blood circulates in a tube from the left ventrical into the LVAD and back into the heart.

The first pump that could enable a human heart to be bypassed was introduced in the early 1950s, but could serve only for the duration of surgery to a natural heart. The earliest VADs replicated the heart by using a "pulsatile" action by which blood is alternately sucked into the pump from the left ventricle then forced out into the aorta (the big central artery that emanates from the heart).

More recently, work has concentrated on continuous flow pumps, which can be loosely categorized as either centrifugal pumps or axial flow impeller driven pumps. These pumps have the advantage of greater simplicity resulting in the smaller size and greater reliability. A side effect is that they reduce the strength of the pulse and lower its intensity to a point at which the user can be mistaken for dead while merely having a nap unless an explanatory document is carried.

Various clinical trials are underway to simplify and improve the mechanical performance of VADs and also to use transcutaneous (external) induction to provide power and control rather than using cables that penetrate the skin. Aside from the cosmetic advantage, this could significantly reduce the risk of infection.

The LVAD is currently licensed in Canada only as a bridge therapy for people who have qualified but await the opportunity of a transplant. Research is also underway to determine its value as "destination therapy" in other words, a means of sustaining the life of a patient with terminal heart failure but who doesn't qualify for a transplant.

Research at Toronto General Hospital anticipates the day when VADs become sufficiently small and durable as to be totally implantable. But in the prescription for appropriate therapy there are many factors to be considered, and even though we may say that life is priceless, sustaining it comes at a cost.

Mark Sunderland is President of Ottawa-based BioMedical Industry Group (mark.sunderland@biomedgroup.com).

A mechanical device that can augment the work of a failing heart is known as a ventricular assist device, or VAD.

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CAD Industry Watch

AutoCAD 2012: 2D is alive and well!

By Bill Fane

The software companies would have you believe that the only way to design in a 3D world is to use 3D software, preferably theirs.

The fact that they are probably right, at least on the first point, may be irrelevant. The bottom line is that a large chunk of the design world is still using 2D, and Autodesk (www.autodesk.com) continually works to serve those needs as witness the enhanced and new features in AutoCAD 2012. The majority of the "What's New" items in AutoCAD 2012 are 2D enhancements, and many of the 3D additions and enhancements are there to help you produce 2D drawings from 3D models.

AutoCAD 2012 includes a significant improvement to the CHAMFER and FILLET commands. Pick the first object, move your cursor over the intended second object, and AutoCAD 2012 shows a preview of the operation. If things aren't what you want then you can change the specifications before completing the command. This works for two objects, or when applying fillets or chamfers down the length of a polyline.

Multi-function grip capabilities have been extended to many 2D objects. If you hover the cursor over a grip then a selection list of possible actions appears.

Window selection in AutoCAD may be different from that in other programs. Some programs have you pick two points, and others have you pick one point and drag. AutoCAD 2012 has a new default value of 2 for the PICKDRAG system variable. In this mode, a selection window can be defined either by picking two points or by picking one and dragging.

Initiating a selection window in very cramped quarters in a complex drawing can be fun, because AutoCAD will select a single object if it falls within the PickBox. Changing the setting of PICKAUTO from the default of 1 to the new value of 2 means AutoCAD 2012 always starts a selection window, even if the first pick lands on an object.

AutoCAD 2012 has significantly improved the generation of 2D working drawings from 3D models. The new VIEWBASE command creates a layout viewport and then creates a 2D projection of the solid model within it. This effectively combines the existing SOLVIEW and SOLDRAW commands into a single operation. VIEWPROJ creates isometric and orthographic views projected from the base view. The ortho views are linked back to the base view, so that correct orthographic alignments are maintained if you change view locations. The viewport boundaries are invisible and won't plot.

The Autodesk Exchange dialog box appears when you launch AutoCAD 2012, filling the screen.

When VIEWBASE finishes creating the base view it automatically invokes VIEWPROJ. All desired views can quickly and easily be created in one go. The layout views are associative back to the 3D model. If you change it then all of the 2D drawing views can be updated to match.

What if your drawing doesn't contain any 3D models? No problem. VIEWBASE prompts you to browse for an Inventor part, assembly, or presentation file. It then generates views that are still associative back to the original Inventor file and will update if it changes.

AutoCAD 2012 is able to import 13 different file formats, so 2D documentation can be created from other file formats such as SolidWorks, ProE, CATIA, Rhino, ACIS, Parasolids, IGES, STEP, JT, and so on. In this case the drawings are not associative back to the original source.

The most obvious addition to AutoCAD 2012 is the "Autodesk Exchange," which pretty much fills the screen when you launch AutoCAD 2012. The Home tab (above), primarily features "What's New" videos and access to the product support knowledge base and the new WiKiHelp user-contributed information.

Read more online about AutoCAD 2012 at Bill Fane's *DPN* blog where ARRAY, SEEK and User Coordinate System functionality is discussed.

Bill Fane (bill_fane@bcit.ca) is a software reviewer and retired mechanical engineering instructor at BCIT in Burnaby, BC.

Inventor 2012: quality over quantity

The next release of almost any piece of software typically includes about 200 new or enhanced features, and so I was more than a little surprised when the "What's New" list for Inventor 2012 Pro only had 65 entries.

Deducting 20 for Tooling and 9 for Simulation only left 36 entries for basic Inventor, and most of them involved part modeling. There was almost nothing for assemblies, and it seemed that no single item would make a good headline for a product review.

The really good news is that Autodesk's Manufacturing group has gone for quality instead of quantity. There aren't a lot of changes, but they are good ones.

The closest item to an attention-grabber is the new "Marking Menu" functionality. I have never liked ribbon menus. Inventor's is still better than most applications, but the new marking menu has almost eliminated my use of the ribbon. To invoke the marking menu just right-click anywhere in the graphic screen. This brings up a halo and a list of context-sensitive commands. Simply move your cursor to the desired command, click, and it's running.

When working on a complex part or assembly we often need to select a face that is hidden behind another. Worse yet is when it is hidden several levels down, deep within the part or assembly. In previous releases you pause for a second on the outermost face and Inventor brings up the "two green arrows" to let you scroll down through the buried possibilities.

In Inventor 2012, however, just pause for a couple of seconds on the outermost face. Inventor then brings up a drop list of all the faces that are hidden behind the outermost one. Scrolling your cursor down the list highlights each face in turn to allow verification before the final selection.

A hot-button topic in the 3D CAD world these days involves the relative merits of history-based versus history-free modeling. Inventor 2012 can now play either game.

This object was a brick before the author "Fusioned" it.

Fusion, a former Autodesk Labs experimental program, has graduated to a full-fledged application and is included with Inventor 2012.

It can be invoked from within Inventor 2012 or it can run as a stand-alone. A "prismatic" Inventor part can be sculpted it into "organic" flowing shapes. When you return to Inventor the edits have been added as an Alias Freeform object. Unfortunately, it seems to have no connection to the part as it existed before this point, but new Inventor features can be added and constrained to the Alias Freeform object.

Individually, the changes to Inventor 2012 (www.autodesk.com/inventor) may seem minor but they quickly add up to a major improvement in how you use.

There's more online on Inventor 2012 in Bill Fane's *DPN* blog.

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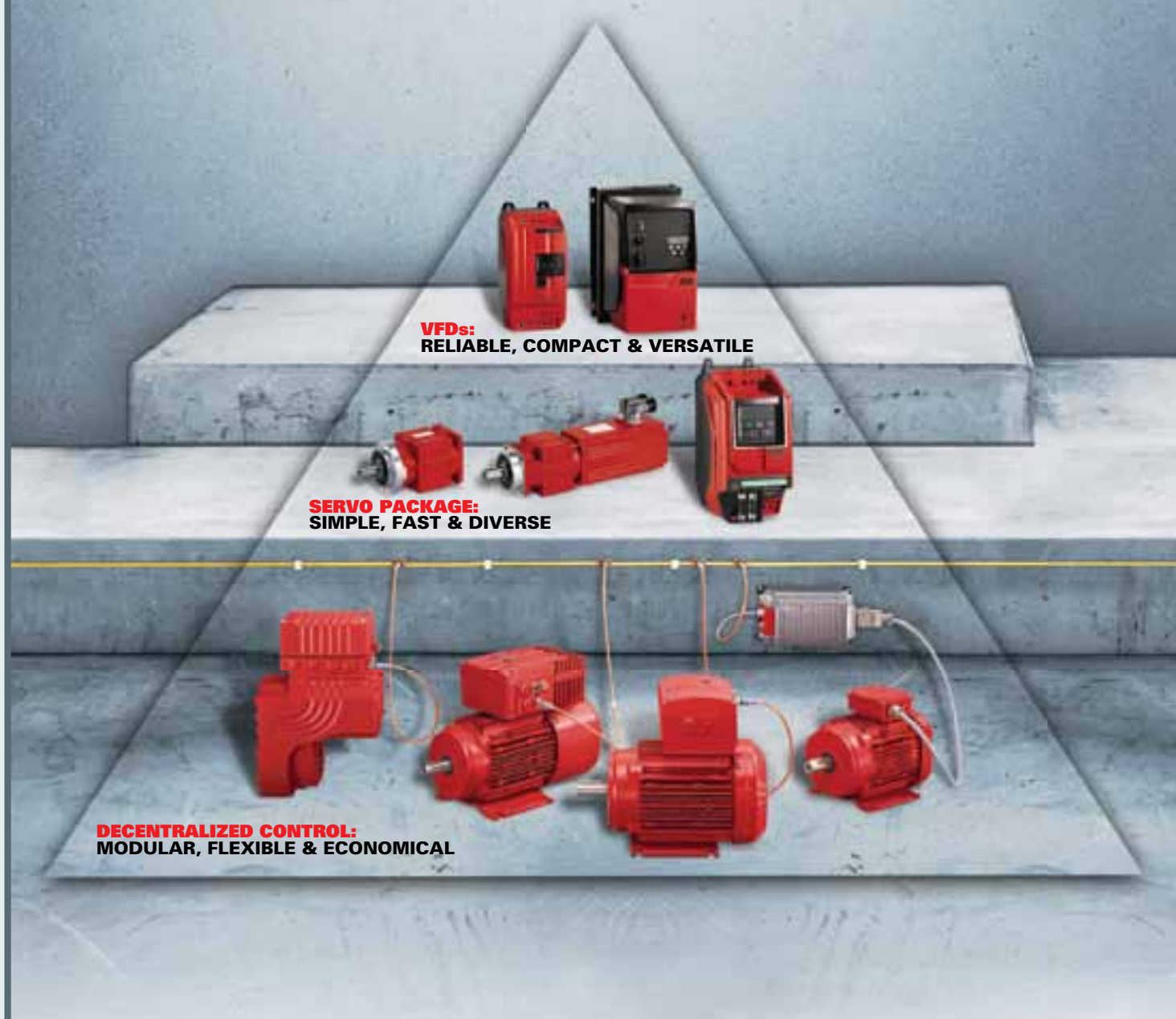

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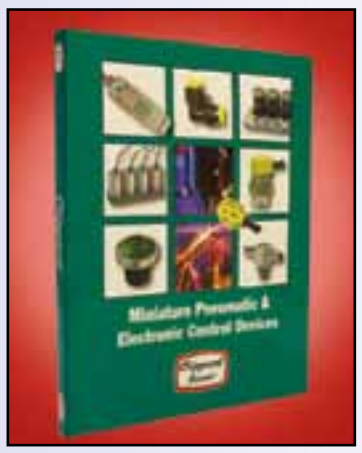

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