

DPN DESIGN PRODUCT NEWS

Covering the total design engineering function in Canada



Thermocouple probes

The TJ-USB series of thermocouple probes from Omega connect directly to a USB port. All models are said to feature a rugged transition joint construction, an integral 2 m shielded output cable and software that converts a Windows PC into a temperature meter, chart recorder and data logger. www.omega.ca



OLED switch and display

NKK Switches has announced OLED SmartSwitch and SmartDisplay high resolution programmable switches. The switches offer 180° viewing angles, 65,536 colors in 16-bit mode, and 256 colors in 8-bit mode. Both devices are capable of displaying full-motion video. www.nkkswitches.com



Planetary gear motor

The SEW-Eurodrive P-Series combination planetary gear motor provides torque capacities to 4 million lb in. and input capacities to 180 hp. Inline co-axial and right angle configurations are available. Products include both helical and bevel-helical, in ratios from 100:1 to 4200:1. www.sew-eurodrive.ca

Volume 36 Number 5

Wheel conveyors made to measure



For conveyor component supplier Interroll Canada Ltd. of Newmarket, ON, automation has become a key to successfully competing in the warehouse optimization business.

Interroll (interroll.com) supplies wheel bearing and roller bearing conveyor system components to rack manufacturers who install their material handling systems at Wal-Mart, Coke, Pepsi, UPS, FedEx, post offices, airports and automotive industry suppliers. According

to Bob Wilkinson, plant manager at Interroll Canada, the 69,000 square foot Newmarket Dynamic Storage Business Unit subdivision of Interroll "has the mandate to supply North and South America with Interroll Logix material handling products."

To assist it in going from an entirely hand-assembled line of wheel bearing conveyors to an automated system is nearby MTP Inc., also of Newmarket. MTP (mtpinc.ca), a manufacturer of custom automated machines, had pre-

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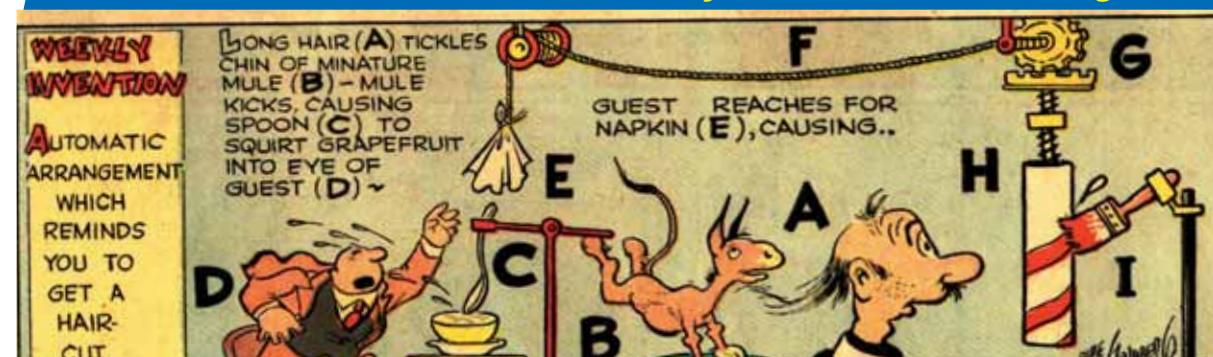
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<p>DCT-12M Angular Pneumatic Grippers 180° Series DirectConnect™ Préhenseurs pneumatiques angulaires DirectConnect™ de série 180°</p> <p>Starts at À partir de \$495</p>	<p>Norgren Excelon® Modular System Accessories Accessoires pour le système modulaire Norgren Excelon™ Quickclamp® and wall bracket Quickclamp® et support mural OM-AIR Series Gage 0...160 psig Jauge 0....160 psig</p> <p>Starts at À partir de \$180</p>	<p>High Performance Stepper Drives with AC Power Supply Entrainements à pas haute performance avec bloc d'alimentation CA STAC6 Series</p> <p>Starts at À partir de \$70</p>		
<p>DMEX-08-18 Modular Mounting Stanchions DirectConnect™ Series Colonne de montage modulaire série DirectConnect™</p> <p>Starts at À partir de \$57</p>	<p>DLM Series Linear Slides—Pneumatic Mini DLM DirectConnect™ Modular Series Tiroirs linéaires pneumatiques – série modulaire mini DLM DirectConnect™</p> <p>Starts at À partir de \$232</p>	<p>OMEGAFLEx® Polyurethane, 95A Shore Durometer, Ether-Based Duromètre Shore 95A OMEGAFLEx™ en polyuréthane, base Ether TYUTH95 Series</p> <p>Starts at À partir de \$21</p>	<p>HUB 444 SiNet™ Multi-Axis Motion Control Concentrateur programmable de réseau SiNet™ avec commande de mouvement sur plusieurs axes</p> <p>Starts at À partir de \$241</p>	
<p>ELC Programmable Logic Controllers and Modules Contrôleurs logiques programmables et modules ELC Series</p> <p>Starts at À partir de \$110</p>	<p>EZ512-AC-RC Intelligent Relay Relais intelligents</p> <p>Starts at À partir de \$125</p>	<p>EZP-S6W-RS PLC Touchpanels Panneaux tactiles de CLP</p> <p>Starts at À partir de \$377</p>	<p>MWTC Series *PATENTED *Breveté *Miniature Wireless Thermocouple Connectors with Rechargeable Batteries The Smart Connector™ *Connecteurs miniatures The Smart Connector™ pour thermocouples sans fil</p> <p>Starts at À partir de \$83</p>	<p>E58 Series Photoelectric Sensors Capteurs photoélectriques</p> <p>Starts at À partir de \$211</p>
<p>LC101 All Stainless Steel "S" Beam Load Cells Cellules de charge genre poutrelle en S tout en acier inoxydable</p> <p>Starts at À partir de \$320</p>	<p>TC-NPT-G-36-DUAL-SMPW-M Cooling Systems Dual Thermocouple Probe with NPT Fitting Systèmes de refroidissement – double sonde à thermocouple avec raccord NPT</p> <p>Starts at À partir de \$63</p>	<p>L73M-3AP-QDN Norgren Excelon® Lubricators Lubrificateur Norgren Excelon™</p> <p>Starts at À partir de \$62</p>	<p>HE-XE102 XL Graphical OCS Compact "All-in-One" Controller Commande compacte OCS graphique XL tout en un</p> <p>Starts at À partir de \$362</p>	<p>O5100 SERIES Infrared Temperature Sensor/Transmitter Détecteur/émetteur thermométrique à infrarouge</p> <p>Starts at À partir de \$205</p>
<p>NFXF50A0-1 Adjustable Frequency AC Drives Entrainements CA de fréquence ajustable</p> <p>Starts at À partir de \$202</p>	<p>iPROX™ Series Proximity Sensors Capteurs de proximité</p> <p>Starts at À partir de \$67</p>	<p>OMPBD7 Series Pushbuttons 22.5 mm Boutons-poussoirs 22,5 mm</p> <p>Starts at À partir de \$14.75</p>	<p>E47BL-E47BM Limit Switches Contacts de fin de course</p> <p>Starts at À partir de \$1024</p>	<p>LCHD Series Low-Profile Tension or Compression Load Cells Pancake Style Extensomètres profilés du genre crêpe pour la tension et la compression</p> <p>Starts at À partir de \$800</p>

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TOTAL

ADD A 3" MONOCHROME TEXT PANEL

C-MORE MICRO TEXT/GRAFICS PANEL
EA1-S3ML-N (non-touch model) \$139

COMMUNICATION CABLE
DV-1000CBL \$19



Example #2
\$316.00 U.S.
TOTAL

ADD A 3" MONOCHROME TEXT PANEL
PLUS AN 8-BUTTON KEYPAD BEZEL

C-MORE MICRO TEXT/GRAFICS PANEL
EA1-S3ML-N (non-touch model) \$139
EA1-MG-BZ1 (8-button keypad bezel) \$59

COMMUNICATION CABLE
DV-1000CBL \$19



Example #3
\$407.00 U.S.
TOTAL

ADD A 3" MONOCHROME TOUCH PANEL

C-MORE MICRO TEXT/GRAFICS PANEL
EA1-S3ML (touch model) \$189

COMMUNICATION CABLE
DV-1000CBL \$19



Example #4
\$814.00 U.S.
TOTAL

ADD A 6" COLOR TOUCH PANEL

C-MORE GRAPHICS PANEL
EA7-S6C-R (touch panel) \$595

COMMUNICATION CABLE
EA-2CBL \$20

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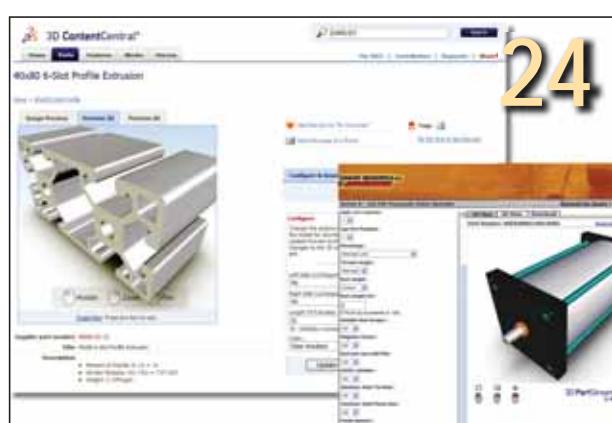
In this issue



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Siemens presents unique traveling technology road show in Canada

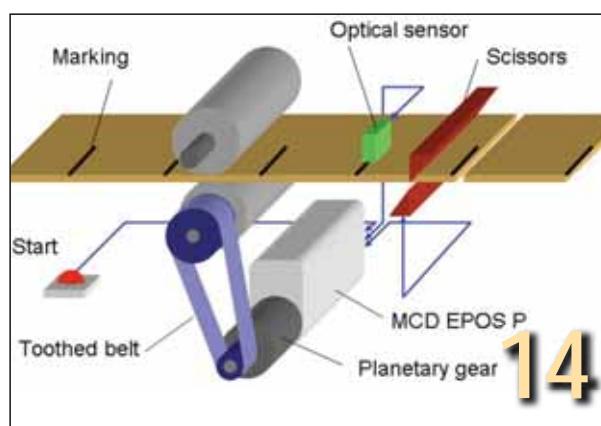
The Siemens exiderome global road show hits five Canadian cities from Alberta to Nova Scotia to demonstrate a breadth of technologies, from automation and drives to power distribution and energy management.



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WeBIT helps Canadian companies to deploy online CAD configurators

Darlex and Cowan Dynamics implement 3D PartStream.NET to make configurable 3D CAD models available to engineers on the web, resulting in more design wins and a marked increase in sales fulfillments.



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Bottleneck of bottle caps solved with compact local drive intelligence

Maxon programmable MCD EPOS-P drives were used in bottle cap assembly process as shown above in schematic representation of wine and liquor bottling machine systems.



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Factory Automation Product Spotlight presents new ways to be productive

Automation components represented include a modular vacuum gripper system, fibre optic IR transmitter, Ethernet/IP I/O, touch panel displays, compact panel PCs and absolute magnetic encoders.

DEPARTMENTS:

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Bosch Rexroth Canada certifies two for its modular conveyor system network

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Gadget designed to prevent toddlers, pets from drowning

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DPN

DESIGN PRODUCT NEWS

DIGITAL EDITION

September 2008



DPN editor
Mike Edwards

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**.



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.

Digital edition sponsored by:

FESTO

Renderings



Results of the DPN Reader Survey:

Online products growing rapidly while print remains strong

By Mike Edwards, Editor

Over the summer, you have spoken and we are listening. In the first *DPN* Reader Survey since 2005, there was much that we wanted to ask you – so thank you for taking the time to respond.

Look what's happened in the three years since the last time you were asked about all things *DPN*:

- *DPN*'s video library was unveiled in January this year
- The interactive *DPN* digital edition was launched in 2007
- 3D PDFs from CAD models became available in 2006

The Flash video presentation on the *DPN* website follows the YouTube model, with categories such as Technology Demos, Training, Trade Shows & Conferences and Products. Naturally, "products" is a broad category, so you are able to drill down into specific disciplines such as Hydraulics, Pneumatics, Power Transmission, Sensors, CAD and Fasteners.

Video website, 3D PDFs, e-newsletters added to the mix

Perhaps you have already been to www.dpncanada.com/video and contributed to the over 32,000 page views that have been recorded since the beginning of 2008.

It was encouraging to see that many of you are clicking through the digital edition. When asked your motivation, most cited "environmental" reasons (saving paper and printing), while just under half responded that embedded links to advertisers and suppliers was the main attraction. About a quarter responded that they were linking to the rich media that *DPN* is hosting, such as video and 3D PDFs.

A nice thing about the Reader Survey was the positive reaction to the question about spending through the end of 2008 compared to last year. While most that responded said they intended to purchase at the same level as 2007, one-third indicated an increase in spending.

So what are your favourite product purchases to complete your design projects? Fasteners led the way, not an entirely surprising answer given the mechanical design engineering focus of *DPN* and its audience. The encroachment of electronics and electrical components on the mechanical world were in evidence, however. The number 2 category on your acquisition wish list was motors and drives, followed closely by sensors.

In terms of the editorial content, the top category response for usefulness to your jobs was New Product Announcements, followed closely by Feature Articles, the Cover Story and By Design. With a name like *Design Product News*, we aim to satisfy on all three counts.

In addition, two-thirds of you responded that you saved articles for future reference and over half contacted a supplier as a result of reading about their product in *DPN*.

In the question about the digital edition, the third highest response was that you want access both to the print and electronic versions of the magazine. It is our intention to do this into the foreseeable future, you can be assured.

However, more and more marketers are looking to reach *DPN* readers via electronic products such as newsletters

and websites (see page 24 for how online CAD configurators are easing the design process for engineers and helping vendors boost sales).

In answer to the question in the survey, "Where does your firm find ideas about adopting products and technologies?" there was a virtual four-way tie: the Internet; directly from vendors/suppliers; trade shows; and, *DPN* magazine. Over half of you said that you ranked *DPN* as one of your best sources of design engineering information, and we will strive to keep it that way.

So watch your email inbox for future opportunities to see the latest products and technologies presented in the time-honoured tradition of *DPN*.

And thanks again for participating in the *DPN* Reader Survey. The complete results will be posted at the *DPN* website.

If you found Renderings interesting, please send a message to medwards@clbmedia.ca.

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By Design

Bosch Rexroth certifies two firms for conveyor system network

Bosch Rexroth Canada (boschrexroth.ca) has announced the addition of **Advanced Motion & Controls Ltd.** (advancedmotion.com) and **General Conveyor Co. Ltd.** (gccl.com) to its VarioFlow PRO System Designer and Builder Network.

The VarioFlow PRO network is an exclusive resource for turnkey VarioFlow modular conveyor systems and solutions for end-users in the packaging, medical, general assembly and material handling industries. The network is made up of qualified integrators that participate at either the Premier, Certified or Associate tier of the program based upon eligibility and certification requirements. Members of the network are equipped to efficiently provide end-users with VarioFlow system solutions.

Advanced Motion & Controls, headquartered in Barrie, ON, has successfully completed factory certification training and participates at the Certified Member level of the VarioFlow network.

Completed factory certification training and participates at the Certified Member level of the VarioFlow network.

Advanced Motion is a Canadian distributor of factory automation products, providing products that employ electronic, pneumatic, robotic and mechanical systems.

General Conveyor, based in Aurora, ON, designs and manufactures a wide range of standard and customized conveyors, accumulators, end-of-line automation and custom machinery. General Conveyor has also completed factory certification training and participates at the Certified Member level of the network.

"Advanced Motion and General Conveyor are valuable new additions to the VarioFlow PRO System Design and Builder Network," said Steve Yardley, sales manager, Assembly Technology at Bosch Rexroth Canada.



Mark Schick, Advanced Motion (left), Ed Cloutier and Steve Yardley, Bosch Rexroth Canada, and Ken Henderson, Advanced Motion.

B.C. student awarded \$5000 scholarship



Sharissa Murphy (left) of White Rock, BC, was one of 21 students seeking a career in manufacturing that earned either \$5000 or \$2500 toward their college or trade school education from the **Fabricators & Manufacturers Association** (FMA) Foundation and **SolidWorks Corp.** (solidworks.com/Education). In addition to the monetary grant, each scholarship winner received a copy of Solidworks' Student Design Kit CAD software package. For information about next year's awards, please visit <http://www.fma-foundation.org/Scholarships.cfm>.

News in Brief

Lynch lab donation

Sun Hydraulics Corp. (sunhydraulics.com) and **Lynch Fluid Controls Inc.** (lynch.ca) are donating Advanced Electro-Proportional Flow Control valves and components to the **University of Waterloo**, Department of Mechanical and Mechatronics Engineering, Fluid Power Control Systems Lab classes.

Magnetek reorganization

Magnetek, Inc. (magnetek.com) has reorganized its radio control sales operations in Canada. Primary distribution and support to Canadian customers of both Magnetek's Telemotive wireless controls product line and its Enrange product line are now consolidated in the company's Mississauga, ON, facility.

Techmire relocates

Techmire (techmire.com), a multi-slide die cast machine supplier, has completed the move of its operations to Pointe Claire, QC, according to parent company, **Dynacast**.



Jergens names director of sales and marketing

Jergens, Inc. (jergensinc.com) has appointed Eric Van Steenlandt (left) as director of Sales and Marketing. In his new capacity, Van Steenlandt will be responsible for all of Jergens' sales and marketing activities in North America. His staff includes 18 direct sales and manufacturers' representatives as well as product managers and support personnel. Van Steenlandt will also communicate with the more than 200 distributors throughout the U.S. and Canada of the company's engineered tooling, fastening hardware and enclosure component products.

Ground breaking, 25th anniversary milestones for Phoenix Contact

It was a double celebration as management, guests and employees of **Phoenix Contact Canada** (phoenixcontact.ca) broke ground on its new Canadian headquarters and observed 25 years in Canada at the new site located in Milton, ON. The grand opening celebration will be next year.



Calendar

September 23-24, 2008. Mississauga, ON. ENEX 08 energy management and efficiency conference and exhibition presented by CLB Media and the Excellence in Manufacturing Consortium (energyexcellence.ca).

September 23-25, 2008. Toronto. Canadian

Manufacturing Week exhibition presented by the Society of Manufacturing Engineers (sme.org/events).

October 8, 2008. Toronto. Vaisala presents its Humidity Measurement Educational Seminar (vaisala.com/seminar).

October 14-16, 2008. Houston. ISA Expo'08 for automation and control (isa.org/events).



Presented by Siemens Canada Ltd., the exiderdome boasts eight showrooms, one multimedia theatre with a 34-metre wide display and meeting rooms. Inset: Joris Myny, vice president of Industry Automation and Drive Technologies, Siemens Canada.

Siemens' exiderdome road show covers Canada

The **Siemens** exiderdome global road show sailed into Toronto on a container ship last month after an earlier stop in Calgary, part of its five-city Canadian tour. Siemens' exiderdome is a two-storey exhibit constructed from 55 containers that transform into an exposition of automation and drive technologies.

Representing more than 130,000 products and combining 220 tons of steel and 20 km of power cables assembled on two floors, the exiderdome boasts eight showrooms, one multimedia theatre with a 34 m wide display and meeting rooms. Once assembled, the exiderdome is entirely self-contained, including air conditioning, heating, wireless internet, power generation and a fully operating kitchen. Due to its flexibility and mobility, the exhibit

can be easily transported by sea, air or road.

In one container dedicated to motion control, Siemens presented its Simotion motion control systems for production machines. Other containers were dedicated to electrical infrastructure, industrial controls, drives, manufacturing automation and process automation.

"We are proud to bring solutions that will increase productivity to our customers," said the newly appointed Joris Myny (inset), vice president of Industry Automation and Drive Technologies, Siemens Canada (siemens.ca).

"Keeping our customers competitive is one of our key objectives."

After a stop in Montreal, exiderdome sails up the St. Lawrence River to Quebec City (September 23-24) and on to Halifax (October 6-7).

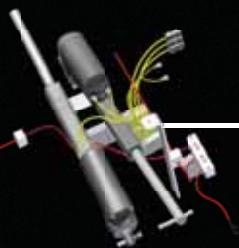


British Columbia Institute of Technology (BCIT) student Susan Boury shows off some of the new equipment in the Endress+Hauser Measurement Lab to E+H Canada president Richard Lewandowski (centre), and Don Wright, president of BCIT.

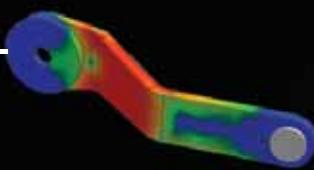
\$269,000 Endress donation helps fund new lab at BCIT

BURLINGTON, ON – Terming it an investment in engineers of the future, **Endress+Hauser Canada** (endress.com) is donating \$269,000 in hardware and software to fund a new measurement laboratory for students in the Automation and Instrumentation program at the **British Columbia Institute of Technology** (bcit.ca) in Burnaby. The contribution by the Burlington, ON-based process measurement engineering services and solutions provider extends over three years. The new, 867 ft² laboratory will consist of six student work stations.

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**HOW DIGITAL PROTOTYPING
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Cover Story

Automated conveyor assembly helps Interroll compete

From Front Page

viously supplied Interroll with an automated roller bearing assembly work cell. MTP machines are CSA approved and P.S.R. is provided where necessary.

Darren Conlan, project manager at MTP (cover photo), said the automated wheel bearing conveyor assembly unit was a "clean sheet" design. "The goal

was to have six wheel assemblies assembled every 15 seconds."

The work cell would have to assemble the wheels simultaneously to the conveyor rails, a tricky task given the varying tolerances of each of the components. The wheel conveyors also are produced in different configurations, said Conlan, including inline, double and triple, as well as with two different wheel configuration

stagers. There are up to 100 different models that can be produced.

"The cell is teachable," explained Conlan. "A pre-assembled template wheel conveyor is passed through the machine and Baumer sensors detect the wheel spacing."

Conlan and his MTP project team faced an immediate challenge once the work cell was prepared for trial runs before delivery to Interroll.



MTP's Declan Conlan at the intake of pre-drilled conveyor rails where their perpendicularity is ensured. Inset: HMI gives operator details of component failure location.

"The rails that came to us were slightly bent from the manufacturer, so to match up the wheel screws through the rail holes, straightening wheel and Misumi cam follower hardware was added to the intake section of the work cell," said Conlan. The rails are pulled with a walking beam setup and a qualifier cylinder to set the start position.

"With a seven thou clearance available for the hole and bolt alignment, the rails have to be perpendicular before wheel assembly can take place."

Bolt torque is set at 15 Nm so that, if necessary, a trip clutch connected to the Fiam pneumatic driver will stop the automated process. "This can be caused by a crossed thread or a bad nut," said Conlan. "A pass or fail signal is sent to the Rockwell PLC where it shows on the Allen-Bradley HMI, telling the operator which nut has failed.

"Sensing on the inserters also prompts the operator. This could detect a bad screw, missing spacer or a misalignment."

The MTP work cell design also addresses operator health and safety issues. "The machine is fully guarded since

Inserter sensors could detect a bad screw or missing spacer

maintenance doors are interlocked on an e-stop circuit. Air pressure is dumped when the circuits are dead," explained Conlan. "No light curtains are necessary because no pinch points are accessible."

Maintenance issues mean that most of the components inside the machine can be sourced easily, no matter where it may be located. Brands such as Festo (pneumatics), Misumi (hardware), Baumer (proximity switches, sensors), Clippard (fittings), Rockwell (PLC/HMI), SMC (escapements), THK (linear guides), Spaenaur (fasteners), Robohand (gripper) and Quicksilver (servo motors) are all represented in the design. "Standard components such as these mean the machine can be shipped anywhere in the world," said Wilkinson.

The MTP automated wheel assembly work cell is now operating on the floor of Interroll, helping to fulfill customer orders, according to Wilkinson. "It requires two operators versus the five required for manual assembly."

During the commissioning stage, "training has been easy and MTP is resolving each of the programming issues as quickly as they come up."

Along with Interroll's lean manufacturing philosophy from the Toyota management school, the machine is also helping to keep the plant from re-locating outside Canada by fending off over-border competition, he added.

"Automation is an investment for the future – we had to change our way of doing things – because industry is change."

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Feature: Motion Control

Achieving more with less: efficiency at all levels

Energy efficiency has many facets. Only a mix of innovative technologies, intelligent control and task-conform deployment will significantly reduce the consumption of energy and resources.

"The improvement of the efficiency of electronic goods is one of the more important undertakings for the future. Not only because less consumption will result in low emissions, but increased energy efficiency will also decrease operating costs," Dr. Karl Tragl, president with Responsibility for Engineering and Manufacturing of Bosch Rexroth AG, explained the new challenge. Calculated over the life cycle, this operation generates more than 90% of the overall costs. The remainder is attributed to acquisition and maintenance. Obviously, investments in energy efficient electronic goods become profitable in the short time, which encouraged companies such as Bosch Rexroth to work in this area for years.

The goal is to increase the degree of efficiency of all components and generally



The Indra Drive line of servo motors from Bosch Rexroth Canada provide for more energy efficient motion control system designs.

the complete system. "An energy-saving motor alone does not effect much, even if it achieves the level EFF1 of the CEMEP three-level scale: an intelligent integrated concept will usually result in higher savings even with a motor of a lower efficiency class. It is intelligent drive control that decisively influences the actual energy consumption," added Tragl. In many applications, drives do not work load-dependant and consume unnecessarily amounts of power. An individual control of every motor improves the overall efficiency but at the same time, also increases the efforts in control technology.

The continuous employment of energy efficient drive controllers provides the maximum potential for reduction in consumption. Currently, a large number of uncontrolled standard motors operating in the supply system are still in use. They may serve, for example, as fan or pump drives. By adding upstream frequency converters, considerable energy savings could be realized. Yet in automation solutions already equipped with variable-speed drives, modern drive technology will also open up considerable saving potentials. In both sectors, Rexroth offers a comprehensive system solution with the IndraDrive family, covering the whole range from a simple frequency converter to a highly functional servo drive.

Two aspects contribute considerably to the energy efficiency of the IndraDrive devices. First, the recovery-capable supply devices in the brake mode can regain the generator power of the connected motors and feed it into the supply system. Secondly, the consequently executed modular design enables the drive controllers to exchange energy load-dependant using a common intermediate circuit. This means that surpluses will not be converted into dissipation heat, but will be used further

wherever they are required.

These energy efficient drives are supplemented by the IndraDyn S motors in synchronous technology available in a large performance range. Compared with the traditional asynchronous standard motors, they provide a considerable higher degree of efficiency, permitting more efficient converter utilization. And Rexroth uses field spool technology in the stator winding of the IndraDyn S motors which permits more compact and shortened overhang winding, compared to the pull-in method, thus

clearly reducing motor performance losses.

An even farther reaching innovation is manifested in the IndraDrive Mi: it combines a modular IndraDrive and IndraDrive-S synchronous motor in an ultra-compact, decentralized servo-motor. Up to 20 units can be linked together using a single cable line. Thus, the IndraDrive Mi not only provides the energy efficiency of the IndraDrive and IndraDyn product families, but also saves up to 85% in wiring costs, 50% in construction volume and up to 70% in switchgear cabinet space, compared to conventional drive solutions.

Despite the large number of components, it is easy to determine the optimum drive package for a specific application. The IndraSize software automatically guides electrical designers to the perfectly matching IndraDrive, requiring only limited data. This supports the load-dependent dimensioning of the drive with simultaneous consideration of all efficiency criteria. *This article was contributed by Bosch Rexroth Canada.*

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Feature: Motion Control

The “science” of motion systems

By Sue DalPonte

The Ontario Science Centre first opened its doors to the public in 1969 when it was heralded for its innovative hands-on approach to science, a model that was soon adopted by other science centres.

Following its zenith in the 1970s, the OSC (ontariosciencecentre.ca/) fell into a period of decline. The 1990s marked the beginning of a new era for significant change and expansion with improvements funded by a \$40 million dollar Agents of Change project. The final phase of this

project was recently completed and last year the unique kinetic installation Cloud, operated by some innovative motion control technology, was opened to the public.

Cloud is an arrangement of 100 identical 14 ft long hanging assemblies suspended at regular intervals from an aluminum grid that measures 42 x 42 ft. The complete installation, including roof support structure, weighs 14,000 lb. Each hanging assembly is comprised of a brushless motor motion control system from which an acrylic shaft is suspended.

Mechanical components for each of

Cloud's 100 motion control systems include an MDrive integrated motor and driver with gearbox, a power supply, and a custom controller the size of a credit card running a simple software interface. Suspended from each mechanical assembly is a long acrylic shaft fitted with 6 pair of evenly spaced acrylic panels. Coordinated rotation, speeds and positions, of the 100 acrylic shafts is controlled through a robust motion control CAN network run on a single remote computer.



The mechanical assembly (inset) behind the kinetic Cloud installation – a fusion of art and technology at the Ontario Science Centre.

MDrivePlus from Intelligent Motion Systems, Inc. (imshome.com) incorporates a high-torque brushless motor and microstepping driver into a single compact package that accepts a broad input voltage range from 12 to 75 Vdc with 20 microstep resolutions up to 51,200 steps per rev for enhanced performance and speed.

When asked about his choice of MDrive for the project, its creator David Rokeby (<http://homepage.mac.com/davidrokeby/home.html>) explained that he spent a lot of time investigating motion control options including servo motor systems, conventional stepper motor systems, and various integrated stepper motor solutions. "But I didn't find any other that delivered what MDrive does."

Rokeby's original concept for controlling the motion of Cloud was to use servo motors. "My original thought was to use servo motors vs. stepper motors. Where steppers are more commonly used for getting to a specific destination in an optimal time frame, Cloud's hanging shafts needed to pass through a specific point in its rotation at a specific time. This model more closely related to servo controls, but servos had a much, much higher cost."

This began a search for a budget solution and lead to Rokeby's discovery of MDrive. "It fit so well because of the driver, indexer and motor combined into a very compact and flexible solution to keep bulk at a minimum." He went on to say that a more conventional solution wouldn't have given as much power. "We needed to minimize the enclosure size and bulk for visual appeal, and a more conventional solution would have required more space, at which point heat would have been a concern. Especially as all 100 assemblies are running continuously and are enclosed in cowlings to make them visually appealing. Reliability was also a huge concern when running more powerful motors located in a tight space."

Potential noise problems could also have existed due to the close proximity of each MDrive to a switching power supply. This was addressed through proper wiring using twisted-shielded cabling.

While Rokeby wanted to keep each motion assembly as compact as possible, sufficient torque was required to move 1,870 lb in² of total inertia per hanging shaft. With an inertia ratio load 3500 times greater than the MDrive's 0.54 lb in², use of a 25:1 ratio gearbox enhanced performance for a realized rotor-to-load inertia ratio of 5.5:1. This enabled the MDrive to control the load and settle out reasonably quickly when stopping, while avoiding oscillation up and down the hanging shafts.

Sue DalPonte is Marketing Communications Manager at IMS. www.imshome.com

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Feature: Motion Control

ATS speeds time to market for packaging system

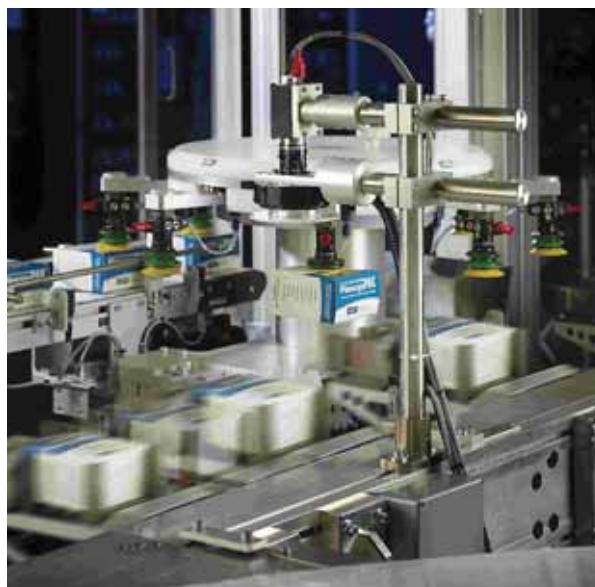
ATS Automation Tooling Systems in Cambridge, ON, recently introduced a reconfigurable, modular solution for packaging called FlexsysPAK. This machine is based on its established Supertrak pallet conveyor system which is also a flexible and configurable packaging alternative.

Engineers have motion control component CAD files at fingertips

The FlexsysPAK system can be applied in packaging operations from blister form, fill and seal to cartoning and case packing. The system is suitable for a wide variety of tasks from assembly and dispense to kitting and packaging. ATS was able to bring this machine to market quickly by using 3D Modeling configurators made available by a number of component manufacturers. Mike Baljak, CAD Support Specialist for the ATS mechanical design group is a user of the 3D Modeling configurators available through many of the component manufacturers' web sites. "Using the configurators has reduced design effort by minimizing the time used to make 3D models of purchased parts," explains Baljak. "Previously, model-

ing a part not available in our library would require finding a catalog – either on-line or hard copy – then modeling the part from the dimensions provided, increasing the possibility of modeling errors and rework as a consequence. Now, it's as simple as logging into either 3D Content Central, where you have direct access to a number of supplier sites, or directly to the supplier site, inputting the parameters and downloading the 3D model. It makes designing more efficient, which saves time and money and allows time to be focused on more important aspects of the design, increasing their quality."

Misumi USA is one of the companies that provides ATS 2D drawings and 3D CAD standard components for assembly automation. Many of the Misumi components specified and purchased for the build of FlexsysPAK were accessed through the Misumi web site, www.misumiusa.com, saving the ATS mechanical designers the time and effort of drawing the components. By accessing the Misumi Configurator, a designer is able to input the part number, reconfigure the part and download the native 3D file. In most cases, this whole process takes considerably less time than what is



FlexsysPAK system from ATS is a highly flexible and configurable carton/case packaging solution for various industries. The manufacturer is able to modify the design and quickly engineer a cost-effective solution for customers, owing to its use of the Misumi CAD Configurator for a wide variety of custom mechanical and automation components.

required to draw the components.

Misumi provides standard components for assembly automation that can be parametrically configured to the precise specifications required for the unique assembly being designed. When the part design is completed, the designer can download the native CAD file of the com-

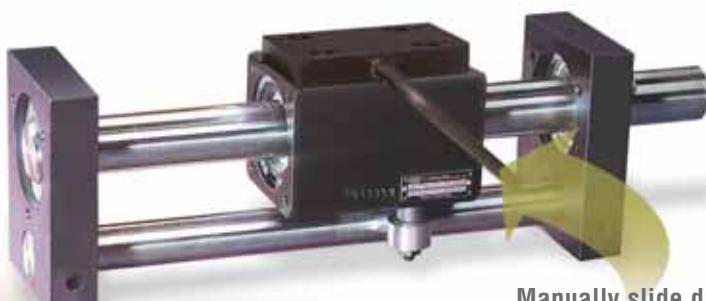
ponent directly into the assembly model. The component becomes a purchased item which is added to the bill of material. This process saves a great deal of time that the engineer can use for the design of components unique to the machine or assembly being designed.

The Misumi components are configurable within the constraints offered by its online configurator. The designer is presented with the available options for each component. Component material and surface finish can be selected through the part number, while each specification can be selected in 1mm increments. Options are numerous, including wrench flats, the location of the wrench flat, set screw flats, key groove and V groove. The designers no longer need to page through volumes of paper catalogs, trying to decide if they can use the components featured. The online configurator features more than 200,000 standard components.

The savings are twofold: first, because part drawings are not required for the purchased components and second, the in-house machine shop at ATS is no longer taxed to machine the simple components. Instead, machinists can concentrate time and effort on the custom components and assemblies that must be machined in-house.

This article was supplied by Misumi USA. www.misumiusa.com

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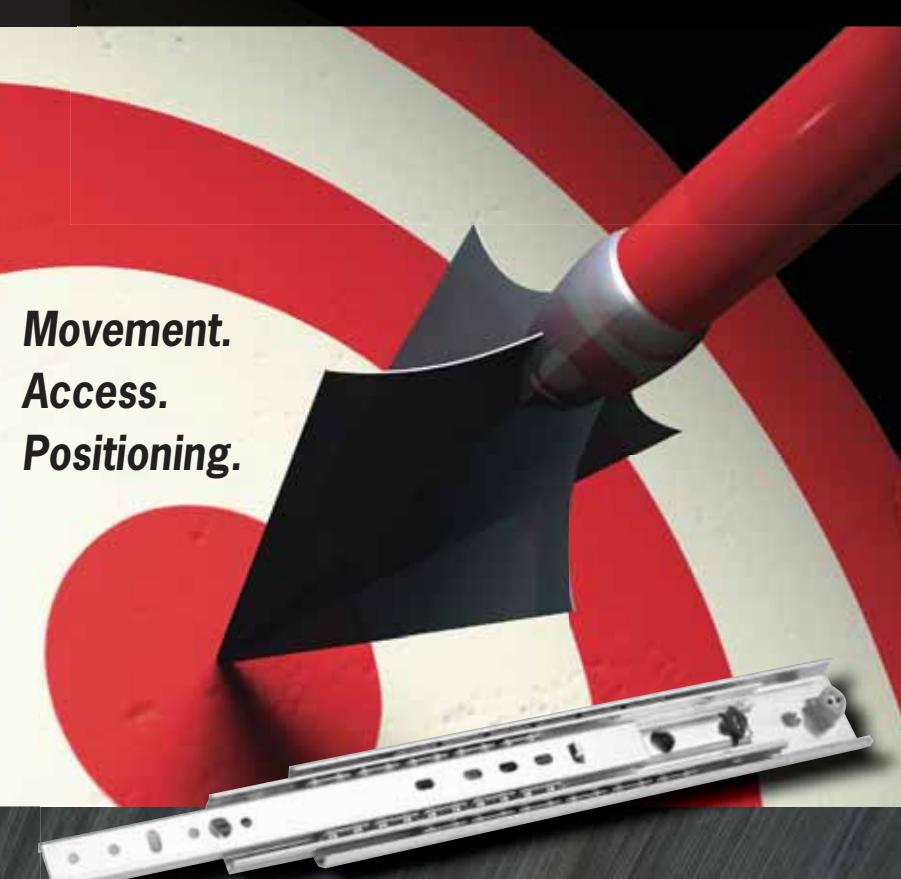
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Feature: Motion Control

Maximizing system uptime with a fault-tolerant network

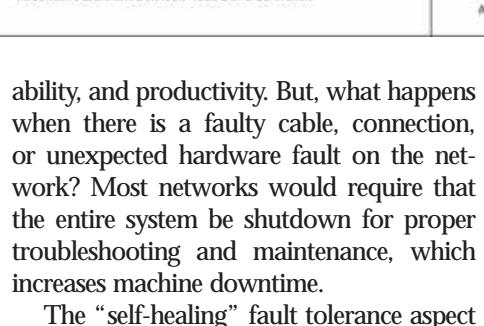
By Robert Pearce

To maintain a competitive edge over competition and outperform next generation machines, OEMs must constantly find better ways to increase system uptime and productivity. It's a constant struggle that all project managers must deal with during the all phases of product development – optimize machine performance to maximize product yields. While these challenges are traditionally fought at the hardware or software application level, one of the best ways to dramatically increase sys-

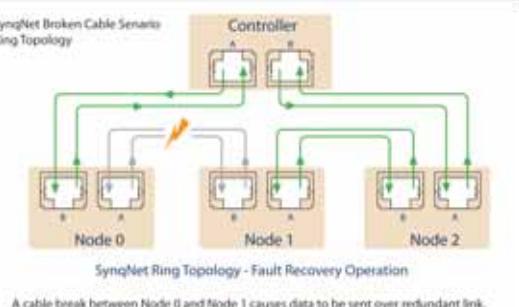
tem uptime is at the network level.

An ideal motion network would help identify potential problems before they occur, as well as provide a way to safely maintain normal operation despite a cable break, loose connection, or node failure to increase system uptime and reliability. Fortunately, this type of network already exists and is being used. Machine builders have chosen SynqNet as their motion network of choice for improving system uptime because of its fault tolerant "self-healing" capabilities and HotReplace functionality.

Optimized machine performance is essential for increasing throughput, reli-



SynqNet Ring Topology - Normal Operation
Redundant cable link between Node 2 and Controller.



ability, and productivity. But, what happens when there is a faulty cable, connection, or unexpected hardware fault on the network? Most networks would require that the entire system be shutdown for proper troubleshooting and maintenance, which increases machine downtime.

The "self-healing" fault tolerance aspect of SynqNet refers to the network's ability to operate a system even after an actual cable break, loose connection, or complete fault of any node on the network. In a SynqNet network ring topology there is

always a redundant data path for ensuring data transmission through the entire ring. SynqNet uses this redundant path as a secondary data channel. In the event that a wiring segment fails, SynqNet hardware re-routes the data path within two servo cycles and the network connection remains available. At the same time, the application will be informed about the event and event location, allowing the machine to respond in a manner appropriate to the specific situation. For example, a machine can be programmed to finish a move sequence that would otherwise cause a dangerous or expensive collision of independent or interlocked machine axes. Bad cables can then be replaced or loose network connections can be fixed at more convenient times to ensure maximum system uptime – a valuable safety and cost savings feature.

For example, a 48-axis machine in the semiconductor industry running on a SynqNet network recently performed a 1000-wafer qualification test for certification and commissioning. During the test, a bad network cable connection was causing insufficient communication to one of the drives, which automatically triggered the "self-healing" fault recovery routine on SynqNet. Data packets were seamlessly rerouted around the bad cable connection without showing any negative affects to machine performance. As a result, the machine passed the qualification test despite having a faulty cable connection.

Engineers were completely unaware of the bad cable connection until they checked the system's log file. After reading the log file, they were able to determine exactly when the fault occurred, as well as the location of the faulty cable because of the synchronized timing clocks on the motion controller and nodes – another unique feature of SynqNet. The synchronized cyclic communication provides complete system visibility and provides a way to time stamp any event on the network for easy identification of system faults, which helps streamline the troubleshooting process.

SynqNet's HotReplace functionality allows one or more consecutive nodes to be shut down, serviced and then reattached to the system without affecting the operation of the other nodes. This feature is particularly useful for modular applications that require regular maintenance or replacement of network nodes. Many high performance systems would require the whole system to be shut down in order to service a module, thus increasing system downtime. But, on a SynqNet network, the HotReplace feature allows modules to be safely taken offline for servicing and then be reattached or replaced while the rest of the system remains fully operational. The implications for cost savings and lower downtime are substantial.

Robert Pearce is senior hardware design engineer, Danaher Motion.

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Feature: Motion Control

Local drive intelligence takes bottle caps out of bottleneck equation

By Urs Kafader

Modern drives in handling systems and industry machines are designed as networks of single modules. Despite the ever increasing complexity and trend towards miniaturization, the complete system should exhibit a high degree of robustness. The application that follows describes a typical example of how these demands may be addressed.

In wine and liquor bottling machines a film is shrunk over the bottleneck and the

cork or cap, a so-called bottle cap. Two different modes of operation are used to cut the film to the desired length. The first method advances the reel-fed band by a fixed distance after a starting signal. Then, a digital signal activates a pair of scissors cutting the band. The second method uses a marking on the band which is detected by an optical reader and initiates a relative position move. Again, the scissors are activated. The selection of the mode of operation is set at the beginning by a digital signal.

The filling machines have an expected life of several decades if properly serviced



and maintained. During the life cycle faulty modules and sub functionalities may be replaced, improved and modernized. This is made easier by a basic modular conception of the machine. Traditionally, a step-

per drive controlled by the main PLC was

used to cut the shrink-film. A redesign of this function uses a programmable maxon compact drive MCD EPOS P. The underlying goal is to put the modularization one step further by transferring intelligence to the local drive.

Another important aspect is to reduce the outer dimensions of the drive and at the same time achieve a higher force. The requirements are at least three working cycles per second. These conditions are optimally fulfilled with the use of a brushless dc motor as found in the MCD EPOS combined with a maxon ceramic gearbox GP 32 C (reduction ratio 18:1), to help provide higher life expectancy. The MCD is smaller than the existing controller and fits perfectly below the feeding roll with the gearbox. A toothed belt transmits the torque from the gearbox to the roll with an additional reduction of 2:1.

The local PLC functionality is built into the programmable MCD EPOS P 60W and controls the complete cutting operation. The drive receives a digital signal from the main PLC defining the mode of operation. Upon the starting signal, the complete process is controlled locally. This means the signals of the optical sensor and the state of the scissors are read, the position moves with the motor executed and the scissors activated. The digital outputs are used as well to provide error signals and to activate the inputs.

In addition, motor, encoder and motion controller are all integrated into an aluminum housing allowing protection up to IP54. All internal connectors are vibration proof and suitable for a harsh industrial environment. The brushless dc servo motor impresses by the high power density and the long life expectancy. Due to the high starting torque, an excellent dynamic behavior is obtained. The slotless winding allows smooth operation without cogging even at the lowest speed. This is further supported by the sinusoidal electronic commutation scheme of the controller. The digital incremental encoder with 1000 counts per turn results in 4000 positions of one motor revolution or a nominal resolution of 0.09°. Combinations with gearheads are foreseen to increase the torque.

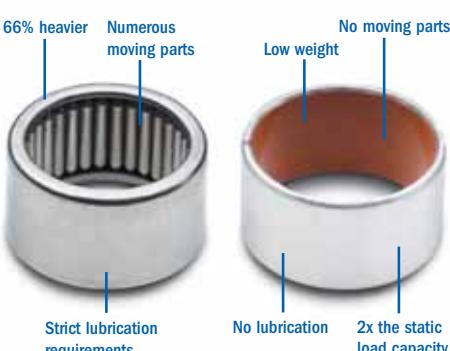
The motion controller used is a member of the maxon EPOS line, a modular positioning system with CANopen field bus interface. It can be used as a speed, torque and position controller. The motion controller is integrated in the slim and compact housing without increasing the outer dimensions of the drive with any protruding parts.

Urs Kafader is a technical trainer at maxon motor, Switzerland.
www.maxonmotorusa.com

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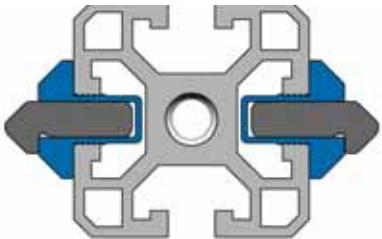
Stopper cylinder



The DFST stopper cylinder from Festo is said to reliably stop work piece carriers with a load range almost three times higher than the previous STAF...-K model. Depending on how the cushioning is set, the unit is said to stop full, half-full and empty work piece carriers gently and vibration free – even for loads of only 1 kg. Humidity and contamination do not cause downtime, the company says, even when the workload is high. When worn out, the cushioning part can be replaced without having to remove the stopper cylinder from the unit. The sensor in the profile slot saves time. Or alternatively, adapt the toggle lever with an inductive sensor by means of an M8 threaded hole.

www.festo.ca

Clamp extrusion series



Bishop-Wisecarver Corp. has announced the QuickTrak series clamp extrusion, said to be a quick and economical way to accurately mount its DualVee. The product is designed to fit the 40 mm series structural aluminum extrusions without requiring track drilling or fasteners. The design is also said to create a solid interface between the beam, clamp and DualVee track, retaining the components in a state of compression, which significantly increases joint rigidity. The initial offering is designed for the company's size 3 DualVee track, but will soon be followed by additional sizes and variations, the company says.

www.bwc.com

Synchronous belts



Fenner Precision has announced the Fenner High Torque (FHT) Class of synchronous belts. Made of polyurethane, the belt construction is said to offer several advantages over traditional materials, including a cleaner tooth profile, different grades for higher COF and temperatures, and tensile strengths exceeding 1000 lb. The belts are available in various sizes and

pitches including 1, 2, 3 and 5 mm. The belts have a curvilinear tooth profile as opposed to the traditional trapezoidal profile to provide more surface contact with the pulley and more uniformly distributed stress concentration.

www.fennerprecision.com

Intelligent positioning



EPOS positioning controllers from Maxon Motor are suitable for applications that

require decentralized drive intelligence. Based on CANopen standard, units cover a performance range from 1 to 700 W. The controllers operate in position, speed and current control mode, and may be configured to operate with both dc brushed and brushless motors. The EPOS2, with 32-bit digital signal processor, is said to offer excellent security and effective protection against electromagnetic interference. With a suitable master, coordinated multi-axis movements and any profile can be carried out in a 1-axis system, says maxon.

www.maxonmotorusa.com

(bipolar) from 71 to 1416 oz-in can be achieved, depending on model. All units are said to incorporate precision-honed



stators and ground rotors for tight air gap and improved performance; high-temperature grade neodymium iron-bore magnets; and single- or double-ended shaft extensions. Motor rotation can run clockwise or counterclockwise. The number of standard leads is 4, 6 or 8, depending on model.

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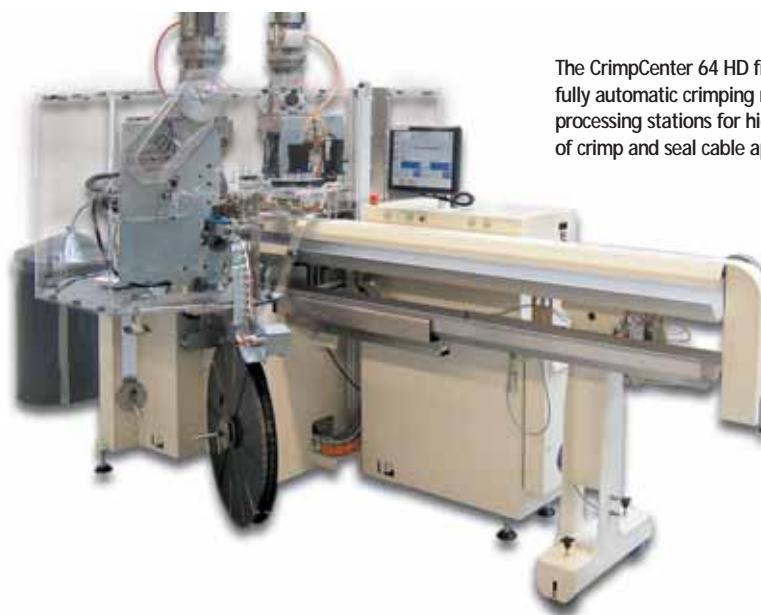
Crimping 101: the art of wire fastening explained

By Pete Doyon
and Peter Schuetz

Crimping, also known as terminating, can be described as the gastight connection of a wire and a terminal. There are an almost infinite number of different crimp terminals available on the market, but they all have one thing in common; they are joined to a

wire through a mechanical deformation process known as "crimping."

Terminals are either sold as "reeled" (i.e.; connected together on a carrier strip) or as loose-piece terminals. Reeled terminals are simpler to handle as they can be easily fed from a reel and processed on semi- or fully automatic crimping machines. With loose-piece terminals, there are no carrier strips. Loose-piece terminals must be brought into position



The CrimpCenter 64 HD from Schleuniger is a fully automatic crimping machine for up to 4 processing stations for high quality processing of crimp and seal cable applications.

for crimping either manually or by a vibratory feeder. Due to the difficulty in handling loose-piece terminals, they are not used as often as reeled terminals.

Both reeled as well as loose-piece terminals can be open- or closed-barrel type terminals. The term "open" or "closed" relates to the design of the terminal. With closed barrel terminals, such as insulated end ferrules or insulated quick-disconnects, the crimp portion of the terminal is shaped like a fully closed cylinder. The stripped wire must be inserted into the circular crimp barrel from the open end of the terminal. Open barrel terminals are shaped like the letter "U", allowing the wire to be moved downwards from the top into the crimp barrel. As open-barrel terminals are easier to automate, they are most often used in mass production. Closed barrel terminals require special "split cycle" applicators that center and hold the terminal and "funnel guides" to center the wire so it enters the crimp barrel without catching wire strands on edge of the terminal.

Reeled terminals can be connected together end-to-end or side-to-side. How they are connected determines how they are fed into the crimping press. Terminals connected end-to-end are fed from the rear and those connected side-to-side are fed from the side. Manufacturers of applicator tooling and crimping presses offer different variants of their equipment, which enables processing of virtually all terminal types.

Reeled terminals can be single-band-

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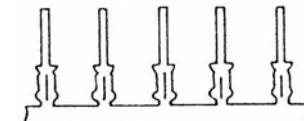


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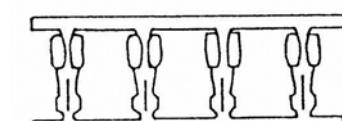
Side-feed terminals



Single-banded,
front carrier strip



Single-banded,
middle carrier strip



Double-banded,
carrier strips
front and back

Reeled terminals can be connected together end-to-end or side-to-side. How they are connected determines how they are fed into the crimping press.

Feature: Adhesives & Fasteners

ed or double-banded, depending on the number of carrier strips between the terminals. Single banded terminals have the band at the front or middle of the carrier strip. Double banded terminals have a band located at both front and rear of the carrier strip. The number of bands and their positions are important since they dictate the design of the crimp tooling.

Most applicators have a mechanical terminal feed which is powered by the press ram. Smaller and more delicate terminals sometimes require a pneumatic feed system which can be set to feed the terminal more gently than a mechanical feed system. Pneumatic feed is also used for larger terminals that sometimes require a longer feed stroke than a mechanical feed system can provide.

During the crimping process, two crimps take place simultaneously – the wire crimp and the insulation crimp. The wire crimp forms the mechanical-electrical connection between the conductor and the terminal. The connection must be gastight, meaning there are no voids (where corrosion can occur) between the wire strands or between the strands and the terminal. The insulation crimp should act as a strain relief against external forces, such as vibration or tension, so that they do not affect the wire crimp. The insulation crimp forms a purely mechanical connection between the terminal and the wire insulation. It is important that the insulation is not damaged during the insulation crimp process.

The shape of the terminal and wire

after the crimping process has led to the relatively common terms "B-crimp" and "O-crimp". Other types of crimps, which are used less frequently, include the 4-point indent crimp and the hex crimp. After the stripped wire is inserted into the terminal, the terminal and wire are compressed (crimped) through terminal-specific parts known as "tooling."

The most common crimp shape for the wire crimp is the B-crimp. When the terminal wings are formed during the crimping process, the individual wire

strands move symmetrically within the terminal space due to the symmetry of the crimped terminal shape.

When a B-crimp shape is used for the insulation crimp, it allows very high connection stability, but it can damage the insulation to a certain degree. For this reason, O-crimps are sometimes specified for the insulation crimp. With an O-crimp, the terminal wings surround, rather than penetrate, the insulation.

Some years ago, it was thought that crimping would be replaced by a newer

connection technology. Although there have been a number of competing technologies, such as ultrasonic welding, resistance welding, insulation displacement technology, etc., no other technology can match the short cycle times, flexibility and low overall cost of crimping, making it a connection technology that is likely to be used for many more years to come.

*Pete Doyon and Peter Schuetz are with Schleuniger, Inc.
www.schleuniger-na.com*

Productivity justifies dispensing robot

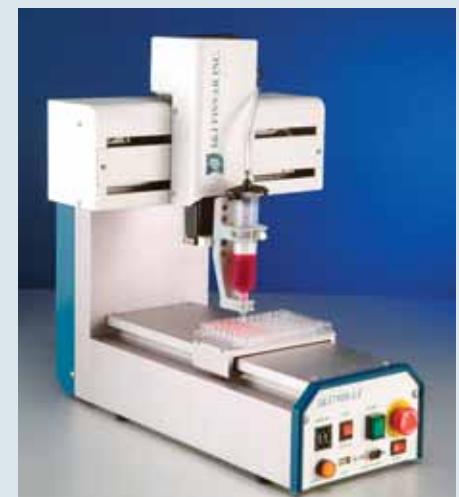
The assembly industry is vast in its scope and incorporates many independent disciplines for device manufacture. A primary segment of the assembly process that is naturally designated for automation is dispensing.

Dispensing beads or dots of any kind of fluid is impossible to control manually and if it isn't automated then the assembly process will invariably be compromised causing rejects, rework and the inevitable product degradation. Previously the justification to automate a dispense application was made difficult by the high capital cost of automation, this is no longer the case and it is more difficult to justify not automating than to automate.

The role of the bench robot has now been realized and any company still using a manually operated dispensing and assembly system will change its procedure if their current process is properly investigated.

Automating the dispensing part of the process ranks highly in eliminating the possible causes of product degradation and failure. Most products have a dispensing element to the process and in all but the most unusual assembly process this part of the manufacture cycle should be automated.

*This article was contributed by I&J Fisnar Inc.
www.ijfisnar.com*



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The FHA Series of actuators features a through-bore up to 45mm in diameter and provides high torque and exceptional positioning accuracy. This performance is achieved in a compact design using a patented "S" tooth harmonic drive gear coupled to a DC brushless pancake motor with integral electronic commutation and a high resolution encoder. Max torque up to 7300 in-lb and positional accuracy better than 1 arc-minute can be achieved. The FHA Series is available in four frame sizes, ranging from 128 to 230mm in diameter, and 78 to 127mm length.

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Hollow Shaft Brushless DC Actuators feature a through-bore up to 14 mm in diameter and provide high torque and exceptional positioning accuracy. This performance is achieved in a compact design using a high performance harmonic drive coupled to a brushless DC motor and a high resolution encoder. Maximum torque up to 250 in-lb and positional accuracy better than 1.5 arc-minute can be achieved. The FHA Mini Series is available in 3 frame sizes, ranging from 50 to 75 mm square, and 48 to 66 mm in length.



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Products: Adhesives & Fasteners

Spiral form fastening



The Orbitform Group has announced a Spiralform cartridge into its standard product line. Spiralform displaces material using an eleven-sided spiral pattern similar to those created by the old Spirograph drawing toy. As the forming tool contacts the surface, material is said to uniformly flow out from the centre, providing superior strength and surfacing. The versatile process can be used on: ferrous and non-ferrous metals; die cast materials; case-hardened fasteners; and, ceramics, glass, and other delicate materials and assemblies.

www.orbitform.com

Flexible magnetic strips



Bunting Magnetics Co. has announced a wide variety of flexible magnetic strips and sheets. Magnetic strips can be used for latches or catches, gaskets, door seals, tool holders, and holding fixtures. The flexible magnets can be bent, twisted, or flexed to conform to any surface without loss of magnetic energy, and can be cut, slit, punched, drilled, or machined to meet many product design specifications, the company says. Features include single, double or multipole magnetization, magnetized single-side or double-side, colored

vinyl, adhesive or non-adhesive back, full rolls or strips and small inkjet printable sheets.

www.buntingmagnetics.com

USP Class VI epoxy adhesive



Master Bond has introduced EP41SMED, a low viscosity epoxy adhesive for fast, room temperature curing, bonding applications. The compound has a 5:1 mix ratio by weight and has a "handling" time of 10 to 15 min at ambient temperatures. Bonds are resistant to water, oil, and many organic solvents, as well as cold sterilants, ETO and gamma radiation. It meets USP Class VI requirements and conforms to Title 21, US Code of Federal Regulations, FDA Chapter 1, Section 175.105 & 175.300 for food applications.

www.masterbond.com

Floating access hardware



PEM floating access hardware from PenEngineering is said to introduce a captive screw assembly for permanent installation into panels of any hardness with the capability to compensate for up to .060 in./1.52 mm mating thread misalignment. The licensed MAThread anti cross-threading screw technology corrects off-angle installations and reliably aligning components. Thread sizes range from #4-40 through

1/4-20 and M3 through M6. Fasteners are supplied with mating washers.

www.pemnet.com

Dual lock reclosables



Fabrico has introduced custom conversion of 3M Dual Lock Reclosable Fasteners. The Dual Lock reclosable fastener from 3M is an industrial-quality fastener that uses small, interlocking mushroom-shaped stems that snap together, and are said to provide 5x more tensile strength than the standard hook-and-loop fastener. Applied with adhesive backing, Dual Lock reclosable fasteners are hidden beneath the surface, eliminating the holes and protrusions often created by standard fasteners, such as clips, snaps, and bolts. The material can be applied to a variety of surfaces, including plastics, bare or painted metal, sealed wood, and glass. The fastener comes in two configurations, regular and low profile, and is available in clear or black.

www.fabrico.com

Hot melt adhesives



Henkel Corp. has announced select Technomelt brand hot melt adhesives in finger-

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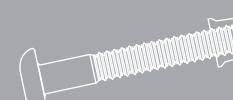
Avdel® Blind Fastening Systems



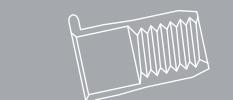
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sized, ready-to-use packets. These packets load directly into the dispensing tank where the packet's dry outer casing melts with the adhesive. Designed to replace sticky cavity packaging and its associated plastic waste, the hot melt packets are available in 28-lb boxes.

www.henkelna.com

Stainless steel wing nuts

J.W. Winco has announced wing nuts in blank, tapped, and tapped through hole versions. Made of stainless steel in a hot stamped, matte shot-blasted finish, the wing nuts have a slight dimple on the ends to permit better grip and provide increased finger contact area. For certain minimum quantities, the blank version can be tapped or reamed in inch or metric sizes to meet customer requirements.

www.jwwinco.com

Hot melt adhesive dot guns



Nordson Corp. has introduced the e.dot+ line of compact electric hot melt adhesive guns. The guns operate in combination with a small diameter hose and an external gun driver, allowing for direct "plug and play" connections between the adhesive melter, gun, driver and hose. The units have on-times as low as 0.4 ms, cycle rates as fast as 1.8 ms, and a service life in excess of 200 million cycles.

www.nordson.com

Cord and cable strain relief



Heyco Products has announced Snap-In Cordgrips for cord and cable strain relief in limited clearance applications inside electrical cabinets and product housings. Fingers on the end of the relief lock into the cabinet or product housing with no tools required. The units are available in a variety of cable diameters and mounting hole sizes, and are constructed from polyamide 6/6 nylon, meet UL 94V-2 flammability requirements and can be specified in black, white or matched to color chips.

www.heyco.com

Acrylic adhesive grabs

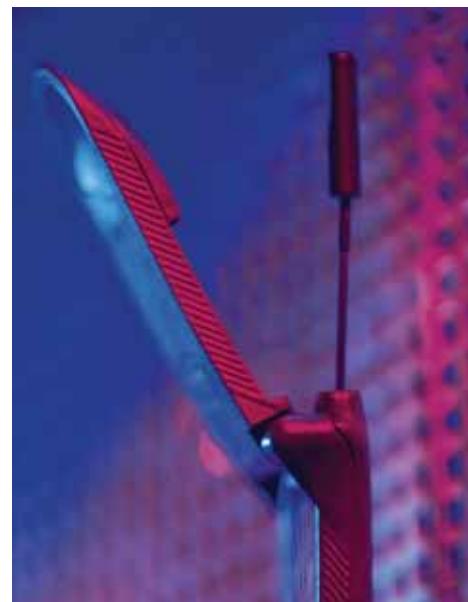


Pres-On has introduced FFVSA acrylic adhesive available on standard rolls of 180 yards in length. The adhesive is .005-in. thick and comes in widths from 3/16 to 54 in. The product is said to exhibit high-initial grab and ultimate holding power when applied to wood, painted surfaces and plastics.

www.pres-on.com

Heat reactive transfer bond

For general purpose bonding and electronic product assembly, Scapa North America has introduced Thermofilm H212U, a heat reactive transfer adhesive that provides structural bond strength on a range of substrates including plastics, metals, ceramics, wood, paper and



woven materials. The adhesive activates and cures on exposure to heat and pressure, and is formulated for splicing fibreglass cloth and other woven fabrics, gasket bonding, laminating to PVC and other plasticized materials, and silicon chip bonding on electronic assemblies. The products is a 2 mil thick nitrile phenolic thermosetting transfer adhesive that is supplied on a 65# temperature resistant kraft release liner.

www.scapano.com

Multi-purpose sealant

Dow Corning 732 multi-purpose sealant is a one-component silicone sealant with non-sagging consistency that cures to form a tough and flexible rubber when exposed to moisture in the air at room temperature. The sealant remains stable and flexible from -60° to 180°C, with short peaks up to 205°C. The sealant complies with military specification MIL-A-46106 and meets FDA CFR 177.2600 standards.

www.dowcorning.com



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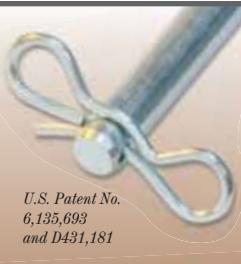


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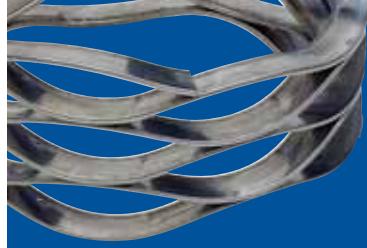
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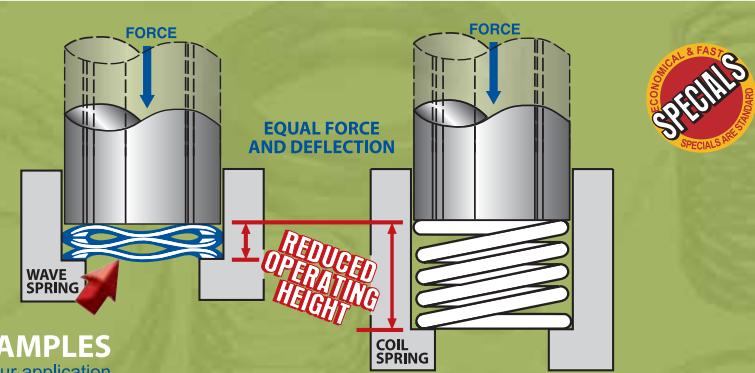
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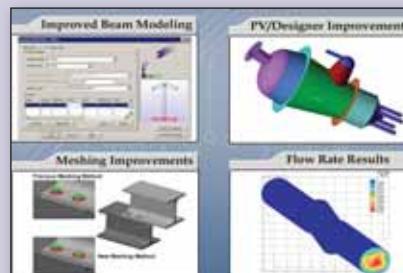
NX 6 includes synchronous technology

Siemens PLM Software has announced Version 6 of NX software incorporates synchronous technology to deliver up to a 100x faster design experience than previously, the company says. Synchronous technology combines with the existing NX capabilities so data does not need to be translated or rebuilt, merging parametric and history-free approaches to speed design. The software also delivers more than 350 user-driven enhancements encompassing 10 different applications, including FE meshing tools.

www.siemens.com/nx



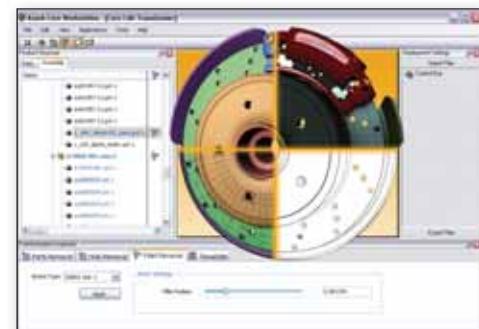
Finite element analysis modeling and simulation



Algor, Inc., has announced that Algor V22 significantly upgrades modeling, simulation and results evaluation and presentation. Features include: expanded support for 64-bit systems, now including pre-processing and post-processing; analysis of open channel flow, involving a free surface between a flowing fluid and a gas above it; a multifrontal massively parallel solver for distributed memory systems; damage analysis for 2D plane stress elements; and a software wizard to automatically calculate and apply remote loads to a stress model.

www.algor.com

3D CAD platform prepares design data for applications

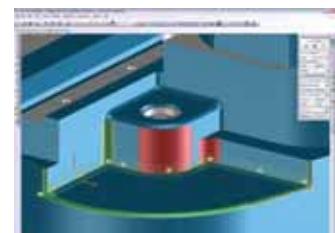


Anark Corp. has announced Anark Core 2.0, its automated 3D CAD transformation platform, adds expanded conversion, transformation, and automation capabilities to cost-effectively prepare 3D product design data for visualization, simulation, CAE, and supply-chain-data-exchange applications. Unlike conventional CAD tools and translators, Anark Core is said to enable users to automate the modification of 3D product structure and geometry, and export revised product data into high-precision B-rep and lightweight mesh formats.

www.anark.com/core/

Explicit 3D CAD system increases productivity

PTC has announced CoCreate 2008 – the latest release of its explicit CAD, PDM and collaboration software. Enhancements include: revised pattern capabilities – creates patterns faster with improved user guidance and new options for irregular patterns and selective suppression of features within a pattern; more flexible work-in-progress capture to allow users to save daily work and “what if” scenarios, even with multiple revisions of locked parts and assemblies loaded into a session; shaded and rendered drawing views; enhanced surface editing capabilities; and, reductions in the number of repetitive steps when modifying components with cylindrical geometry.



Surface and volume mesh



Ansys has released version 5.0 of its TGrid advanced mesh generation software. The technology is a specialized pre-processor for fluid flow analysis. It is used to create large unstructured tetrahedral and hex-core meshes for complex geometry required for the computational analysis of fluid flow. The version introduces new tools and enhanced capabilities to generate high-quality meshes more efficiently.

www.ansys.com

Product documentation from 3D solid models



QuadriSpace has announced Document3D Suite, a software package that does not require multiple programs to publish final 3D documents. The software is a patented integration of 3D tools and document authoring tools that permits import of SolidWorks files directly. Once the SolidWorks 3D model is imported at document, it can then be created and published.

www.quadrисpace.com

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Stop spinning your wheels with CAD.

Xprezo Cycles designs and produces high-end handmade bicycle frames. Frame design involves some assembly modeling but brings aerodynamics and weight vs. rigidity considerations to the fore. Xprezo founder Hugo Bardou uses Solid Edge® software to turn his creative vision into real-world products.

When Bardou started out, his CAD software was AutoCAD and he worked in 2D. It was necessary to create a new set of production drawings for each frame size. A new bill of material had to be generated for each size as well. Also, it was difficult to optimize a design using only 2D since it was difficult to visualize interacting components.

A big advantage of Solid Edge is parametric modeling. "I can parameterize the frame and then change a couple of variables," Bardou explains. "When the design is updated, all the production drawings are updated automatically. All the information needed to build the frame, including angles, cut lengths of raw material, and so on are all changed at this same time. This is very fast and reliable."

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Technical Literature

Enclosures. Rittal Systems has announced Handbook 32, a 1350-page catalog that is said to provide detailed product ordering and specification information to allow users to build customized enclosures solutions with standard parts.

www.rittal.ca

Pneumatic components. Clippard Instrument Laboratory, a manufacturer of miniature fluid power products, has released a 388-page catalog. Products can be found in six main categories, including cylinders, electronic valves, control valves, modular valves, fittings and hose, and air preparation equipment.

www.clippard.com/catalog-b

Bearings. Quality Bearings & Components has published a 384-page "B620" Bearing catalog/handbook that includes over 4978 bearings in 9 product sections. Major product groups include: ball bearings, thrust bearings, sleeve bearings, needle bearings, roller clutches, guide wheels & rail systems, linear ball bearings, lined aluminum linear bearings, and inner and outer ring spacers.

www.qbcbearings.com

Timing belts. BRECOflex Co., has announced its "Arc-Power Technology" catalog B217. Arc-Power polyurethane timing belts come in AT10 and AT15 tooth profile, are steel or stainless steel reinforced and are available in open ended, spliced and welded or truly endless. Belt widths vary from 25 mm to 100 mm.

www.brecoflex.com

Bearings. The Timken Company has released Bearing Selection Guide Version 3.0, an online electronic guide contains engineering calculations and a database of more than 5000 bearings including tapered, spherical, cylindrical and needle roller bearings, as well as ball bearings.

www.timken.com

Fasteners. A series of six two-page spec sheets describes Pemserter presses from PennEngineering for installing self-clinching fasteners.

www.pemnet.com

Fasteners. Jergens, Inc. has issued a 4-page Spinner-Grip Fastening System brochure. The system consists of Jergens' proprietary Spinner-Grip flange lock nuts and Spinner-Grip flange locking bolts.

www.jergensinc.com

Servo motors. A Comprehensive Guide to Servo Motor Sizing book contains all equations and algorithms as used inside the VisualSizer servo motor sizing software, including torque & inertia calculations of mechanisms like leadscrews, gears, rotary tables and actuators. A fee applies.

www.visualsizer.com

I/O systems. WAGO Corp. has issued the WAGO-I/O-SYSTEM Brochure that includes a removable four-panel reference poster that outlines the company's range of bus couplers, PLCs and more than 300 digital I/O, analog I/O and specialty modules.

www.wago.us/products/337.htm

Aluminum extrusions. The 2008-2009 edition of the Buyers' Guide, the directory of Aluminum Extruders Council (AEC) members and their capabilities, covers aluminum's "green" qualities through editorial features and information.

www.aec.org

CAD Industry Watch

Acrobat 9 jumps through all the hoops

By Bill Fane

Any designer who ever has had a need to send data files outside of their office probably needs Acrobat 9 Pro Extended from Adobe Systems Inc.

PDF was developed to be a universal file format that can be read by anyone using pretty much any operating system, if they have the correct reader. Along with their universality, another prime feature is the fact that files can be locked against editing, or even against saving if they are being viewed from a Web site.

Historically we tend to think of PDF files as being fairly simple text documents. This changed with what was nominally Version 7, however, when Adobe (adobe.com) also released Acrobat 3D along with the standard Acrobat product. It now became possible to include 3D solid models within PDF files, and the free Reader could be used to view, manipulate, and analyze the models.

What shook the industry up, however, was the fact that it could also be possible for the recipient to extract the 3D model and save it in a neutral file format such as IGES. A CNC machinist, for example, could be sent a useable model file without the need for the original application that

PDFs: not just for text documents any more

created it, and without the need to send your proprietary underlying design intelligence that you may have built into the model's parametrics.

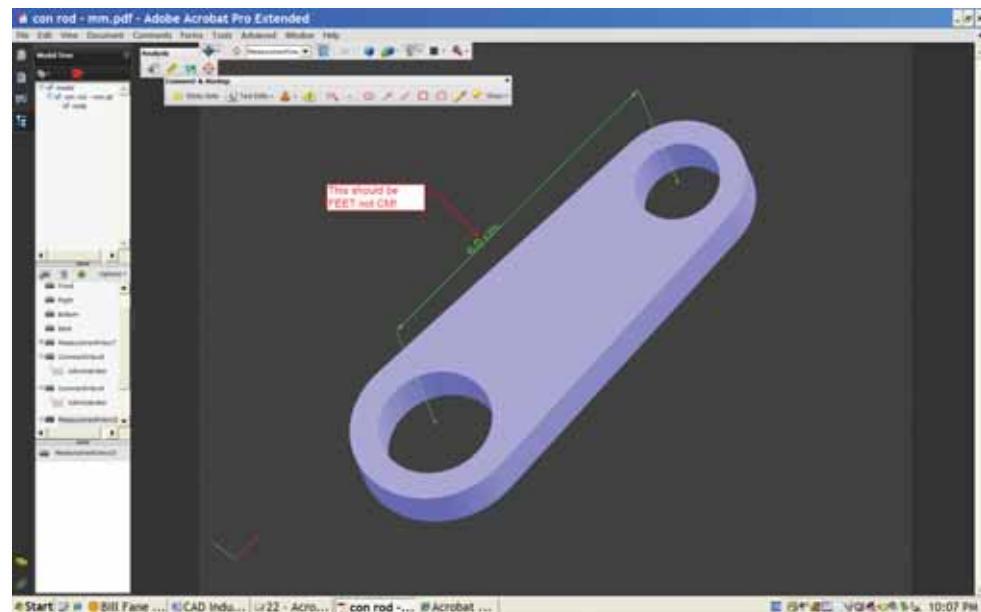
Acrobat 9 Pro Extended pushes the 3D capabilities much further.

First, a bit of explanation of Adobe's product naming system. With Version 9 they have dropped the 3D designation. They now offer three related products for creating PDF files.

The basic Acrobat product is intended for general users who need to create and distribute basic documents and forms.

Acrobat Pro is intended for business professionals. With it, they can create protected documents.

The product of most interest to designers and engineers is Acrobat 9 Pro Extended.



The free Acrobat Reader will let you add dimensions and remarks to an Adobe Acrobat 9 Pro Extended PDF file and then save them back.

Among other features, this product provides the full 3D functionality.

Let's look at the new 3D capabilities for mechanical CAD users. For starters, it now supports a much wider range of native 3D CAD file formats. The full list runs to twenty-one items, with nine new additions or upgrades that include Inventor 2008, SolidWorks 2008, Catia V5, WildFire 4, and Solid Edge 20.

All of this is in addition to new or expanded capabilities in 2D and 3D areas such as architectural, DWG, DXF, DWF, and 3D Studio.

One of the new features that really intrigued me is the ability to combine heterogeneous CAD data. With it, an Acrobat 9 Pro Extended user can import files from several different CAD packages and merge them into one assembly file. For example, you might be using Inventor to design a machine for a client but the gearmotor vendor has supplied you with SolidWorks files, and the conveyor components came from a vendor who uses WildFire.

You can now use Acrobat Pro Extended to send a full 3D approval model of the total assembly to your client, who doesn't use any of these CAD packages. All they need is the free Acrobat Reader. With it they can pan, zoom, and orbit the model. They can make some parts invisible, or isolate single components. They can explode the model, and they can run animations of

it in operation.

Further to this last-mentioned capability, Adobe has acquired Macromedia, and so Acrobat is now able to directly support the Flash animation format. This makes things much faster and simpler because users no longer need to download and install the Flash player separately.

Another significant change in the free Adobe Reader is the fact that it can write markups back to the file. You can send an approval file to a client who can add comments and dimensions, save them, and then return the file to you.

Adobe have even pushed this one step further. You can create your PDF files, and then post them to the free Web hosting service at www.acrobat.com. Your team members, clients, and/or vendors can view the files either at their leisure or in a live, interactive session. In the latter case, any changes that you make to the source document updates their on-screen view live, in almost real time. Similarly, you can see their mark-ups and comments.

In the current global economy, this makes it even easier and faster for designers, clients, and vendors from all over the world to collaborate and confer.

How often have you received an e-mail with a dozen attachments and wondered about the correct sequence for opening them? Conversely, have you ever attached a dozen files to an e-mail and hoped that the recipient opened them in the correct order? Adobe Acrobat 9 Pro Extended solves this problem. With it you can create a portfolio of files in sequence that includes a title page and table of contents. No more guessing as to what comes next in a list of obtuse file names.

Finally, here is a feature of PDF files that is quite unique in the computer industry. Even though the PDF viewer is free, there is no mandatory requirement to update your copy because other people are sending you PDF files created with a later version of Acrobat. That's right; if you still have the version 6 reader, for example, it will open a version 9 file. You won't have access to all of the later features such as portfolios, but you will be able to open the basic files.

As I said at the outset, if you ever need to send data files outside of your office then you probably need Acrobat 9 Pro Extended from Adobe Systems Inc.

AQUO ENERGY DRINK

The advertisement shows a 3D model of a water bottle with various dimensions labeled (e.g., 26, 31.75, 1.1, A, B, C, D, E, F). There are also icons for a video camera and a 3D PDF button.

Acrobat is now able to directly support the Flash animation format, enabling marketers and engineers to create and embed video clips inside PDFs. Click video play button for an example of an animation, and click the 3D DPN button for the 3D PDF of the water bottle assembly.

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

Feature: CAD

Designfusion hosts launch of new Solid Edge software

By Mike Edwards

TORONTO – The first official customer launch of Siemens PLM Software products containing its revolutionary synchronous technology was hosted by Designfusion at the CN Tower earlier this summer. Events were also held in Montreal and Quebec City.

The Toronto-based value-added reseller (designfusion.ca) has now “expanded its offerings the full suite of Siemens PLM Software products,” according to Kevin Johnstone, Designfusion president. “We’re up to 32 employees now and continuing to grow.” In addition to Siemens software from its Velocity Series (including Solid Edge, Teamcenter Express cPDM, CAM Express NC programming, Femap FEA)



Cory Goulden of National Steel Car (left, with colleague Brant McGhee) is enthusiastic about the affect of synchronous technology inside Solid Edge will have on future product development.

and the NX suite of products, the company also represents CNC software specialist alma, 3D printer builder Z Corp., online engineering handbook provider Knovel, and application accelerator software developer certeon.

At the launch, Designfusion customer Cory Goulden, CAD administrator at National Steel Car of Hamilton, ON, addressed an overflow audience of Siemens PLM software users.

“Solid Edge with synchronous technology streamlines communication with our suppliers,” said Goulden. “Its new editing tools allow us to edit a supplier’s 3D data directly, that significantly reduces 2D drawing documentation time. Solid Edge with synchronous technology also makes editing parts easy.”

“This eliminates the time and effort previously spent deciphering the feature tree of traditionally created parts.”



At the launch, former Toronto Maple Leaf captain and motivational speaker Darryl Sittler talked about the benefits of trying to improve, whether personally or in the manufacturing world.

Modifications can be made without having to be concerned over repercussions of pre-existing constraints.”

Another Designfusion customer, Hatch of Oakville, ON, is also bullish on the latest version of Solid Edge. “Solid Edge with synchronous technology will allow us to design special customer requests

faster. Some of the new editing tools will allow us to make changes quicker in order to meet tight deadlines,” said Hatch mechanical designer John Matthews.

As an indicator of Designfusion’s growth, Johnstone pointed out that Saft Power Systems (SPS), a worldwide leading manufacturer of premium power supply solutions, had just selected its design and analysis software to implement a standardized PLM platform. The selection includes 30 seats of Solid Edge software and 15 seats of Femap software from Siemens PLM Software partner Designfusion.

“Solid Edge and Femap will help us

improve communication between our global engineering and manufacturing divisions,” said Vincent Adinkrah, project manager, SPS. “This standard platform will reduce design errors and rework to help us speed time-to-market. In addition, the support of Designfusion will help us develop standards for the use of CAD and CAE technology globally.”

“Saft Power Systems needed superior technology that could handle their global requirements,” said Johnstone. “They also needed software to enable expansion into PLM in the near future. The technology combined with the support we provide

were key factors to this win.”

Solid Edge with synchronous technology includes new key features that speed innovation, including an interactive design paradigm, faster editing tools, native multi-CAD features and 2D/3D workflow integration.

Bruce Boes, global vice president, Velocity Series Marketing, Siemens PLM Software, said that Siemens software products with synchronous technology “will allow designers to not only supply better products but be more creative. It frees engineers to be engineers, not CAD jockeys.”



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Feature: CAD

Turning 3D digital assets into purchase orders

What if you could get design engineers to test the fit and functionality your component or assembly inside a CAD model during a visit to your website or an engineering drawing download portal?

WebIT Inc of London, ON, is in the business of turning hidden engineering drawing assets into design wins – and product purchase orders. The company (webitinc.com) is a business systems consulting firm, with particular expertise in online CAD tools, web development and database design.

According to Dan Caron, WebIT's president, "In this fast-paced manufacturing environment, engineers are continu-

ally looking for more effective ways to incorporate supplier product information into their designs. 3D PartStream.NET enables engineers to interactively configure, view, and download product information directly into their designs – resulting in a distinct sales advantage essential for growing your business and outpacing the competition. In fact, studies show that 80% of the customers who integrate supplier product early on in the design phase, ultimately purchase that product."

3D PartStream.NET is the most cost-effective and efficient way for you to present your products to customers."

WebIT has recently helped two Canadian companies, Darlex and



Cowan Dynamics, make the transition to 3D PartStream.NET and the 3DContentCentral.com portal.

For over 10 years Darlex/Vickers-Warnick Manufacturing (darlex.com) of Stoney Creek, ON, has provided an innovative approach to the traditional challenge of the design and construction of mechanical structures for applications

such as machine guards, machine bases and conveyors.

Always on the look out for new tools to bring to our customers and new ways to generate sales leads, 3D Partstream.NET was quite intriguing, according to Barb Whittaker, marketing manager at Darlex.

"Its comprehensive online catalog provides a complete solution, including configurable model downloads in all leading 2D and 3D CAD formats, easy-to-use sales lead reporting tools as well as administration, hardware and security maintenance. 3D Partstream.NET offered a clear advantage over other methods we had explored in that they not only provided the users an excellent tool but they also capture customer contact information, allowing us to carry out direct follow up with the website's users."

Whittaker continued, "The staff at WebIT Inc ensured that the implementation process was made very simple. They created 3D configurable models of our components and aided in everything from integrating our products into our website and 3DContentCentral (an engineering portal used by hundreds of thousands design engineers world wide)."

She added that Darlex looked at the 3D PartStream.NET strictly from a marketing perspective. "When you look at other alternatives such as GlobalSpec, they don't capture the quality of (sales) leads. Customized online tools are becoming more and more popular and an essential tool for our customers."

A current Darlex customer told Whittaker that "one of the great things about this 3D PartStream.NET is that it eliminates the time-consuming process of searching through a paper catalog for the correct part number and then modeling the identified part from scratch. This tool streamlines a process that used to take one or two hours, down to a few minutes which allows design engineers to complete their designs faster."

Cowan Dynamics (cowandynamics.com) of Montreal has built an international reputation as a supplier of high quality, competitively priced hydraulic and pneumatic cylinders for a broad range of applications and industry sectors.

"We were looking for a new way to attract customers," said Cowan sales engineer Jean Behara. "Manufacturing trade shows were no longer providing productive leads so we decided to invest those dollars into something our current customer base had been asking for a long time – 3D CAD models. 3D PartStream.NET (implemented by WebIT) made the transition painless."

"What appealed to me was (that) our customer can configure and download models of our cylinders and incorporate them into their design. This saves significant time."

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Products: Bearings

Guides reduce vibration



NSK has developed the RA series of roller guides. The guide's design combined with a reduction in roller passage vibration contributes to motion accuracy. Additionally, models in the series are equipped with a retaining piece to achieve smooth motion and stable positioning accuracy. Seals and rail covers are said to reduce the amount of foreign matter to 1/10 that of conventional linear guides. The series is available in custom sizes ranging from RA15 to RA65, and offers interchangeable rails and sliders with Z3. The interchangeable series is available in six sizes, ranging from RA25 to RA65.

www.nskprecision.com

Pump bearings



Graphite Metallizing has developed a special grade of Graphalloy (GMK-GEO) and manufactured geothermal-suitable pump bearings that could handle a high-temperature and corrosive, silt-laden environment from the water being re-injected. There are Graphalloy grades that are able to withstand temperatures ranging from cryogenic to <540°C and that are dimensionally stable even when submerged or under load. Because of their long life and self-lubricating qualities, the grades are suitable for installations that cannot be easily accessed, or where performing regular maintenance is difficult.

www.graphalloy.com

303 stainless steel shafting



Quality Bearings & Components has announced a line of 303 stainless steel solid precision ground shafting. The BBSHAF... Series shafts are stocked in 3 diameters, .1247, .1872 and .2497 in. They are available in lengths ranging from 1 to 36 in. The shafting features 1/64 in. x 45° chamfer at both ends and straightness of .0004 per in.

www.qbcbearings.com

Drive with 800 lb side thrust



Amacoil/Uhing has introduced the model RG80 linear drive which supplies up to 800 lb of side thrust. The drive features "rolling ring" linear motion engineering said to enable mechanical control over reversal, thereby eliminating the need for electronic controls and a reversible motor. Additionally, linear pitch (speed) may be

manually adjusted without gear reduction or adjusting drive motor speed. The drive is a friction drive which must run on a case hardened and ground shaft. The angle of the contoured rolling ring bearings relative to the drive shaft determines the drive's speed and travel direction.

www.amacoil.com



guarantee a significantly longer service life compared to uncoated parts, the company says. The coating of about 8 µm ensures interchangeability of coated and uncoated parts.

www.globalbear.ca

Cr (VI) free protective coating

For bearings and metal parts exposed directly to humid or corrosive environments, NKE Austria GmbH has announced a coating technology that is Cr (VI) free and is therefore compliant with the RoHS Directive. The SQ171 coating can be applied on standard or special bearings to

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Feature: Hydraulics & Pneumatics

Selecting motors for medical pumps

When choosing a motor for medical pumps there are numerous advantages and disadvantages depending on which technology you choose, brush dc, brushless dc, or stepper technologies.

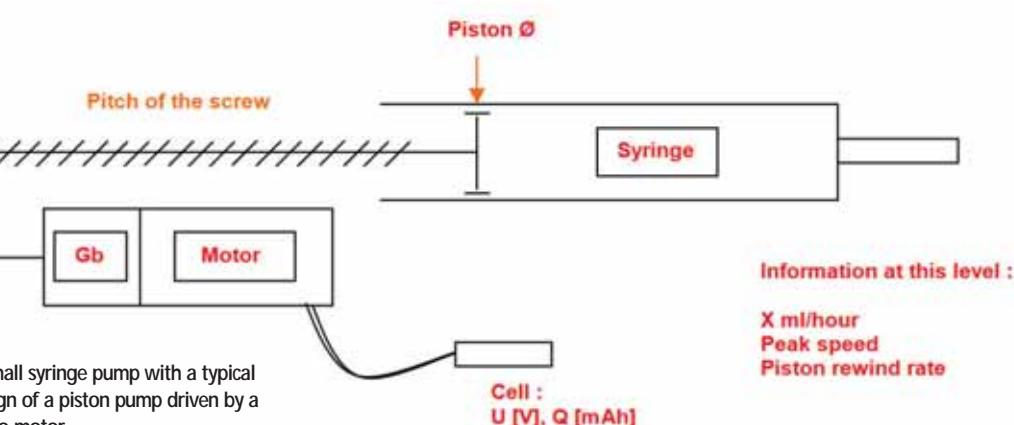
In this article, we will use a small syringe pump as an example, with a typical design of a piston pump driven by a micro-motor.

Brush-type motors have either an iron core or ironless design. The latter is usually selected for battery-operated portable pump applications because it has no iron losses and can use precious metal commutation resulting in mini-

mal mechanical friction and motor efficiencies up to 90%. Usually R/k_2 , which represents the power lost by joule effect in the winding, is an excellent figure of merit to compare a motor versus another. While motor diameter is in principle defined by the customer and the application, the larger the motor is, the smaller the joule losses will be for a given torque.

The way to increase the motor's efficiency is to get the power needed while running the motor at high speed.

In a BLDC motor coils are fixed and



magnet is part of the rotor. Commutation in the coils is done electronically.

The BLDC motor falls into one of two categories, the slotless and the slotted design. Slotless design has the advantage of no cogging or detent torque, and has less iron loss than a slotted design. New high energy magnets are making slotless design the preference in small motors.

BLDC has a lower efficiency than dc, but has the advantage to have electronic commutation.

BLDC's driver and controller are critical to the efficiency of the system. For medical pump a position sensor is used to commutate the phase.

A stepper motor is a BLDC with many poles; thus, the current in each phase will have to be commuted many times per revolution. This design has the strong advantage of having many stable positions (steps) per revolution, providing the highest torque for a given size when compared with regular BLDC or dc motors. The disadvantage is that a stepper is not able to run at high speed.

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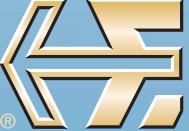
EVDR Series controllers are low-cost, high performance, rugged, compact, and easily programmable to optimize hydraulically-actuated machine and vehicle control functions. The EVDR1-type plug-in controllers are IP67-rated when used with any HydraForce single-coil or dual-coil proportional valve having the molded-in Deutsch® DT04-2P electrical connectors. The plug-in style EFDR1 is designed for controlling and optimizing temperature-activated electro-hydraulic fan drive operation. The ETDR1, also a plug-in style unit, regulates and optimizes clutch engagement in transmission and PTO applications.

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HydraForce is the industry leader in hydraulic and electro-hydraulic control technology for mobile equipment, material handling and heavy duty industrial equipment applications. See our detailed EVDR Series product selection guide at www.hydraforce.com/Electro/EVDR-Guide.htm with links to complete product information.

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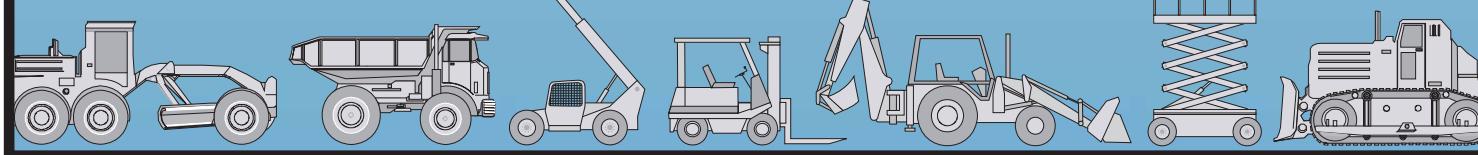


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Different available stepper technologies are: variable reluctance, permanent Magnet, hybrid, disc magnet.

For battery applications, the disc magnet technology is best, as it carries lower inertia and iron losses than other steppers, resulting in higher efficiency.

At low speed they can be used in full step mode, they are driven like a watch motor, the right quantity of energy is delivered to move one step. At high speeds, there are two options: either the motor runs a regular stepper; (poor efficiency) or the motor is driven like a regular servo motor by closing commutation (position sensors needed but efficiency improved).

A motor operating at high speed often requires a gearbox between motor and application. Gearboxes are defined by the output torque needed, the gear ratio and efficiency desired. A spur gearbox has a better efficiency than a planetary gearbox for a given size and gear ratio.

During the optimization phase, it's very important to take into account the system efficiency. The motor itself may present the highest efficiency at high speed, but requires a gearbox with a larger gear ratio. The higher the gear ratio, the lower the gearbox efficiency. The designer will have to select the best compromise between them.

No universal technology solves all applications, but for each situation there are some solutions with various advantages and disadvantages. To optimize a solution during the design phase, project engineers should work closely with motor experts in order to take into account the entire system and not just a part of it.

Dr. Norbert Veignat, MD, is with Portescap Europe, and Claude-Alain Brandt is micro-motor specialist, Portescap, a Danaher Motion Company.
www.portescap.com

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Feature: Hydraulics & Pneumatics

Advanced hydraulic valves bring rock-solid stability to drills

When it comes to drilling attachments, you might say that TEI Rock Drills, Inc. is as solid as a rock. In fact, TEI has grown to become the world's leading manufacturer of drilling attachments for the construction, mining, fencing and geothermal industries, and produces superior, limited access drill rigs.

The company was using a basic valve combination when it started making drilling attachments. Sometimes, when the user touched the handle on the attachments that employed this set-up, all of the flow went to the drill at one time and caused it to move too fast, making it unsafe for the operator.

But that wasn't the only issue that the

old valves presented. "With the old valve sections we were using, no matter what you did when you pushed that handle down, that function was draining 20 gallons per minute," according to Sue Frank, TEI president. "Normally, you only have 40 gallons per minute for any machine, so your first two functions are essentially eating up everything that machine can put out. As a result, that third function might not operate quite as well."

The valves TEI was using – that were at the core of the problem – were of the non-proportional variety. Consequently, when the company began employing 360° positioning capabilities on the attachments,

it needed to find a proportional valve in order to control the flow of oil directed to the positioner. This would allow the operator to ease the attachment into position instead

of slamming it, which is the way the non-proportional valves function.

TEI found Hawe Hydraulik, a Munich-based company could supply the ideal proportional valves for all of its applications.



The size and shape of the Hawe valves are crucial factors in the successful function of the TEI drill attachment. Hawe valves (inset) offer space savings of between 20 and 40% in comparison to standard products.

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WITTENSTEIN – being one with the future

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The company began purchasing Hawe valves from the company's Charlotte, NC, facility in March 2004. The company uses a wide range of Hawe components, from the Size 2 to the Size 5 PSL valves, and purchases between 75 and 100 valves per year.

Most important was the fact that the Hawe valves would provide the stability that TEI's drilling attachments – as well as its limited access drills – required. Concerns about operator safety would become a thing of the past.

"When we started out, we were making solely static mounts," said Frank. "There were no positioning systems, so instability wasn't a problem. When we incorporated positioning capability, we started with a modest 20 degrees side-to-side, which presented no safety issues to speak of.

Still, sometimes a customer would fit a drill on a skid-steer at 20 degrees on the top of the feed mast. With all of the weight distributed at the top like that, the machine was actually prone to lifting to one side. No machine has ever tipped over, but the possibility was always there.

The Hawe valves have solved that problem. With a more controlled flow of oil to the positioner, the attachment doesn't 'jerk' the way it used to, making it far safer for the operator."

Since the company is installing its drilling attachments on another vendor's equipment, there is a limited amount of hydraulic flow at TEI's disposal. This makes it essential that the available flow is used as efficiently as possible.

The size and shape of the Hawe valves are also crucial factors in the successful function of the drill attachment. In fact, ergonomic and contemporary machine design depends on compact hydraulics. Hawe valves offer space savings of between 20 and 40% in comparison to standard products.

Because units can be easily be stacked in different sizes, the valves can be kept compact. Rather than having eight large valve sections, two Size 5 valve sections and six Size 2 sections for positioning functions can be specified. Because valve sizes smaller, the various combinations ultimately mean less oil is consumed.

Hawe components are also capable of abating leakage because of their internal steel construction. So in the unlikely event that a drilling attachment is not properly manufactured, the Hawe valve can compensate minor engineering glitches.

This article was contributed by Hawe North America, Inc.
www.hawehydraulics.com

Feature: Hydraulics & Pneumatics

Design robust cylinders to meet evolving challenges

The main sealing challenges for cylinder makers today are excessive temperature and fluid compatibility (mainly hydrolysis and glycol fluids resistance). Excessive temperature – caused by higher speeds, increased “under hood” temperatures and higher pressures in smaller packages – result in hardening of the material or accelerated compression set which leads to seal failure via cracking at the main lip and/or loss of interference. Damage by hydrolysis and glycol exposure – often due to high humidity, new environmentally friendly bio-oils and/or glycol-based fluids – can result in material crumbling.

According to seal manufacturer Simrit, the following 2010 market needs are anticipated, which exceed the capabilities of most off-the-shelf sealing solutions: high temperature resilience – continuous 120°C oil temperatures; cold temperature resilience – actual application capability of -40°C; high pressure resilience – capable of 42 MPa (6,000 psi) with spikes up to 55 MPa (0.5mm dia. gap); fluid compat-

power engineers design more robust cylinders that meet upcoming market demands.

To test its new material and design innovations, Simrit utilized its best-in-class

Disogrin 9250 (urethane) sealing system (Fig. 1, buffer seal + asymmetrical rod seal + vented rod wiper) as a baseline to assess new urethane and elastomeric blends. This TUDI-based urethane system has decades of field experience and has proven itself to work in the

lab for millions of cycles at above mentioned system running parameters up to temperatures of 100°C, but it is not hydro-

lysis or bio-fluid resistant. A properly designed and maintained system using this best-in-class configuration has proven to provide 8000 to 10,000+ h of running time in the field without failure.

For several years, Simrit has offered a proprietary blend of urethane, NOK U641 (Simrit 94 AU20889), which is capable of handling 110°C system temperatures and low temperature capability of -25°C, as a problem solving solution (Fig. 2). This solution provides customers an exceptional cost/performance benefit. Backed by years of lab and field tests, this solution is extremely hydrolysis and glycol resistant, capable of handling the pressure requirements stated earlier, improves the overall system temperature capability and can be produced in existing tools. Using the baseline sealing system with NOK U641

provides similar hours to our Disogrin 9250 at 100°C, but at an elevated system temperature of 110°C.

In many cases the U641 solution will meet the customers' immediate needs, but it has similar limitations when the temperature is increased to 120°C that the Disogrin 9250 does when the temperature is increased to 110°C (i.e., the material does not immediately fail but the life expectancy is significantly shortened).

To meet the anticipated high and low temperature requirements, NOK UH05 was developed (Fig. 3). The urethane increases the system high temperature capability to an industry leading 120°C.

*This article was excerpted from Simrit insight 02/2008 08 magazine.
www.simritna.com*

Industry challenges include temperature, hydrolysis resistance and bio-friendly fluid compatibility

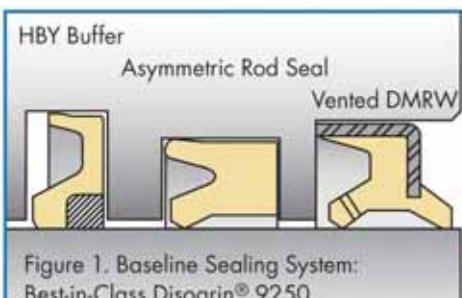


Figure 1. Baseline Sealing System: Best-in-Class Disogrin® 9250

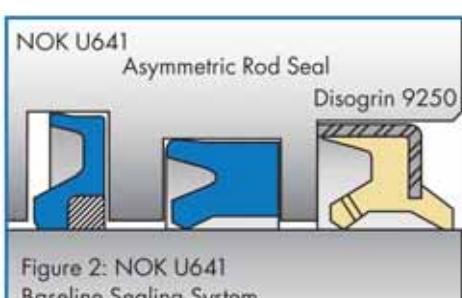


Figure 2: NOK U641 Baseline Sealing System

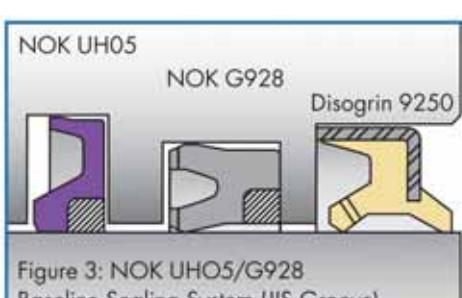
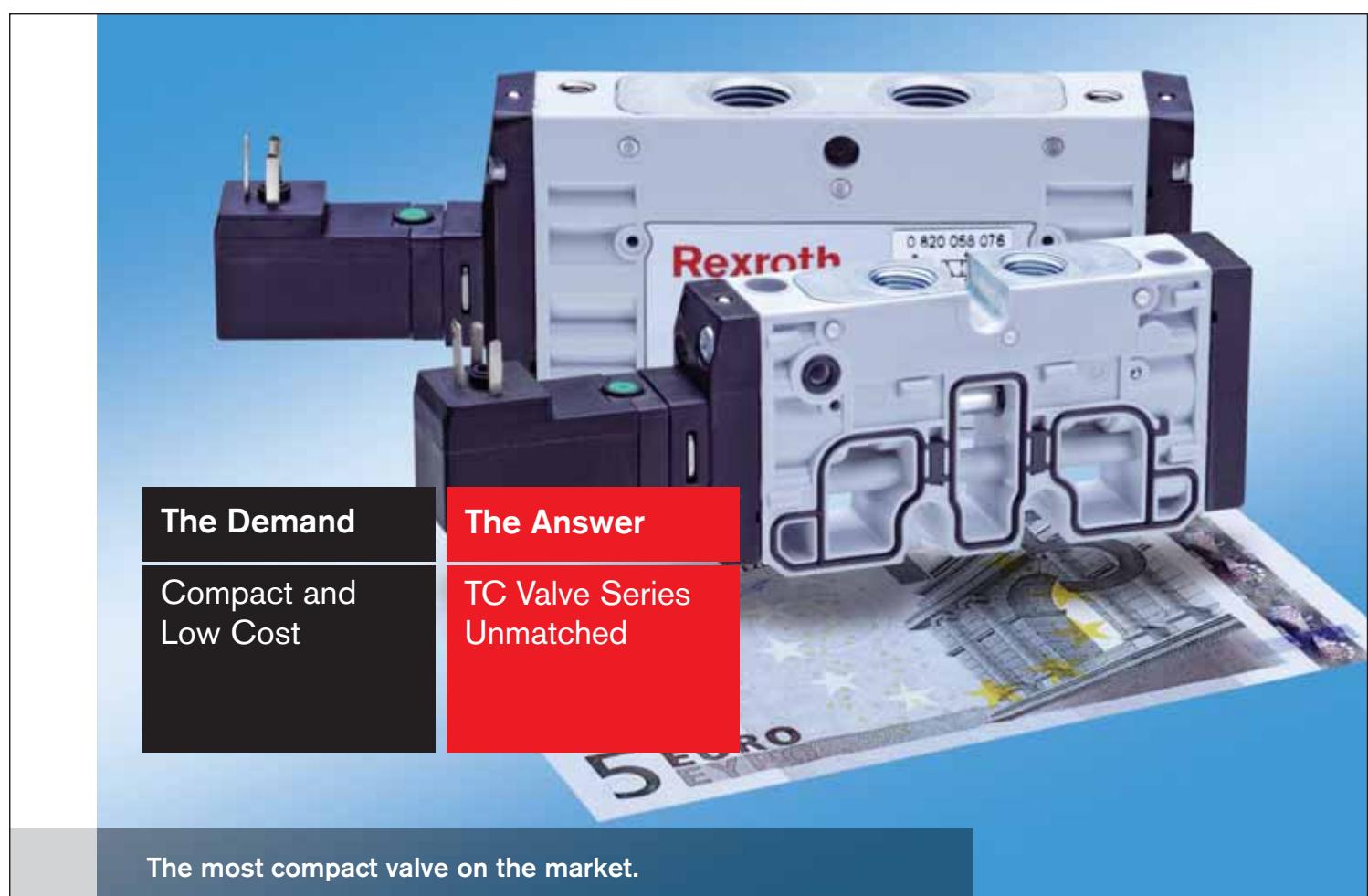


Figure 3: NOK UH05/G928 Baseline Sealing System (JIS Groove)

ability – compatible with all hydraulic and biodegradable fluids; water and chemical resistance – hydrolysis and glycol resistant; and retrofit capable—compatible with standard grooves (North American, DIN [German] and JIS [Japanese]).

The changes to temperature range are especially troublesome as they affect a broad range of applications. Bench testing within the Freudenberg and NOK groups with proven correlation to field results has shown that increasing the system temperature by 10°C over the recommended limit can decrease the seal life by 5x (or greater). To address these concerns, Simrit has established and tested new sealing materials and design advancements that will help fluid



Benefits of TC 08 and TC 15 valve series at a glance:

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High capacity gas boosters



Haskelcan has introduced 50 ratio gas boosters from raise most gases up to 15,000 psi without using electricity or requiring airline lubrication. Higher flow rates are said to mean faster fill times for applications in many industries and institutions. Built-in cooling is also said to ensure trouble-free operation. Units are available for oxygen service.

www.wainbee.com

Clean design cylinder



The clean design compact cylinder model CDC from Festo in accordance with ISO 21287 is said to be easy to clean, almost completely without corners, and recesses

and is without sensor slots so that no dirt can gather. With USDA-H1 lubricating grease and FDA-conforming wiper seals, the cylinder is suitable for contact with food products and for automation tasks in the splash zone within the food processing and packaging industry. Sizes range from 20 to 80 mm, X strokes of 1 to 500 mm and an extensive range of variants are available. Sensing option includes alternatively integrated sensors in the end positions or external switches, which can be freely mounted to the sensor bar.

www.festo.ca

Electronic valve series



At just over an inch tall, and a diameter of less than 3/4 in., the EM valve from Clippard is available in 2- and 3-way configurations, and uses the company's "spider" design. Several voltage options are available, as well as flow rates from 0.55 to 0.75 scfm. The miniature body incorporates wire leads out the top, allowing body rotation for close-centre mounting. In addition, the valve is said to feature higher

flow that combines fast shifting speed and high cycle life with design flexibility for air and/or gas control, pilot control, and any application where space is limited, but desired performance is not.

www.clippard.com/emseries

Pneumatic power clamps

J. W. Winco has announced Misati, S.L. fastening and transfer press clamps and accessories. Having a reduced size, the clamps are said to achieve higher holding forces than other clamping options. The accompanying accessories can adapt the clamps to applications such as molded, cast or machined surfaces, caustic environments, and sensor requirements. The clamps require less air to operate them (resulting in less energy consumption), the company says.

www.jwwinco.com



thermal relief and low flow hydraulic pressure relief applications where zero leakage is needed. Weighing 6 g, typical flow rates range from a few mL/min for thermal relief applications, and up to 250 mL/min for low flow pressure relief applications. Working temperature is -65° to 275°F and the cracking pressure is preset at the factory with capabilities ranging from 1300 psid up to 4700 psid.

www.theleeco.com

Axial piston pump



A10VSO series 32 axial piston pump from Bosch Rexroth Canada is a medium-pressure unit made to help reduce noise in stationary hydraulic systems. The pump was designed with computer-aided analysis to reduce noise and vibration levels while still providing a long service life. In addition to being quieter, the pump decreases pressure pulsation while offering improved cavitation characteristics.

www.boschrexroth.ca

USB hydraulic system



Parker Hannifin has introduced the 836 Push-Lok Plus multipurpose, heat-resistant, high temperature hose with increased working pressures. The hose is versatile enough for use in multiple applications, including diesel fuel. The 836 Plus line is approved with both HY Series crimp fittings and 82 Series field-attachable fittings. The hose line is temperature rated up to 212°F for air and 185°F for water applications, as well as rated for diesel fuel and oil.

www.parkerhose.com

Pressure relief insert



The 281 Zero Leak PRI from The Lee Company is a pressure relief insert for

Flo-tech has introduced the Flo-Check USB hydraulic system analyzer for simultaneously measuring flow, pressure, temperature and power. Data is received from the analyzer through a USB cable and displayed and logged through a custom Windows-based software application (both software and cable are included). The unit is bi-directional and includes a low-resistance load valve and internal pressure relief discs. The analyzer can be used as a stationary or portable tester. It also has the ability to capture pressure spikes up to 10,000 psi combined with a 0.2-ms response time and an accuracy rating of ±1% of reading.

www.flo-tech.com

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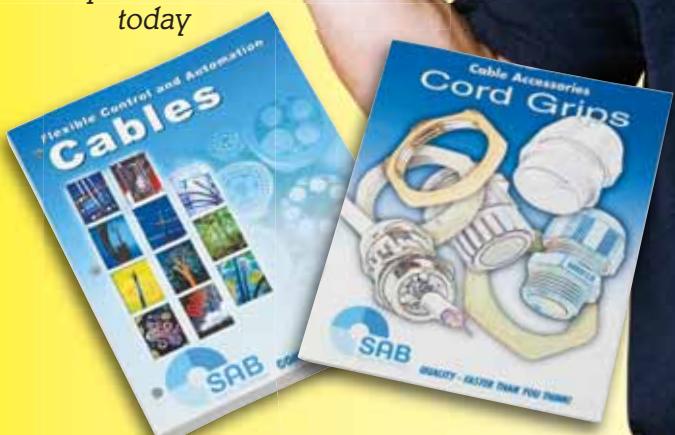


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Automotive Scene

2009 Hyundai Genesis: Luxury at a new price class challenges establishment

By Bill Vance

The arrival of Hyundai's Genesis luxury sedan this fall (a coupe comes later) could be, as that master of mangled prose Yogi Berra used to say, "déjà vu all over again." In 1990, Toyota and Nissan reset the luxury car parameters with their Lexus LS 400 and Infiniti Q-45 respectively. They were direct challengers in technology and features to top level Mercedes-Benz and BMW models at many thousands of dollars less. Some accused the Japanese of sending over loss leaders to establish themselves in the luxury market.

The Lexus LS 400 sold for \$57,000 compared with \$86,000 for the Mercedes 420SEL and \$98,000 for the BMW 750iL, both clearly in the Lexus's sights. Nissan's Infiniti Q-45 was equally competitive at \$54,000.

The Lexus was the German marques' equal in technology. Its silky smooth, all-aluminum, double overhead cam, 32-valve, 4.0 litre V8 produced 250 hp compared with the 420SEL V8's 201. The 750iL's V12 did better at 296 hp, but had that breathtaking \$100,000-nudging sticker. All drove the rear wheels through 4-speed



The 4.6 litre, 32-valve V8, 2009 Hyundai Genesis. Inset: The interior is comparable to the Mercedes S-Class due to a longer wheelbase and overall length than the BMW 5 Series and Mercedes E-Class.

automatic transmissions.

So the question now is: Can Korea's Hyundai, best known as purveyors of economy cars going back to the cheap-but-forlorn early-1980s Pony, do to the Germans and Japanese what Japan did to the Germans 20 years ago?

The Genesis isn't aimed quite as high

as the original Lexus LS 400 and Infiniti Q-45, but its reported benchmarks were the highly regarded BMW 5 Series and Mercedes E-Class. So how does it stack up? It's larger than both with a wheelbase some 50 mm longer and an overall length over 100 mm greater, which translates into interior space equal to the Mercedes S-Class.

The Genesis is luxuriously appointed inside; Hyundai says its Lexicon sound system is available only from Hyundai and Rolls-Royce. In pursuit of quietness Hyundai has included copious sound insulation and double glazed windshield and side windows.

Under the hood BMW has to bypass its naturally aspirated 3.0 litre, 230 hp I-6 528i and go to the twin-turbo, 300 hp 535i version to equal the Genesis V6's 290. This puts the BMW up to \$69,000 compared with the Genesis V6's \$38,000. The BMW's 4.8 litre, 360 hp V8 (still 15 less than the Genesis) comes at \$83,000 while the Genesis V8 is \$49,000.

The magnitude of difference is similar for the Mercedes E-Class. The Lexus ES350 comes closer with its 272 hp 3.5 litre V6, but it's still \$5,000 above and 18 hp below the Genesis V6.

And Hyundai now has nothing to be ashamed of when it comes to quality – it has five models on the 2008 Consumer Reports respected "Recommended" list – Azera, Elantra, Santa Fe, Sonata and Tucson. It had no recommended models in 2002.

Bill Vance is an automotive journalist and author. His books are available at billvanceautohistory.ca.



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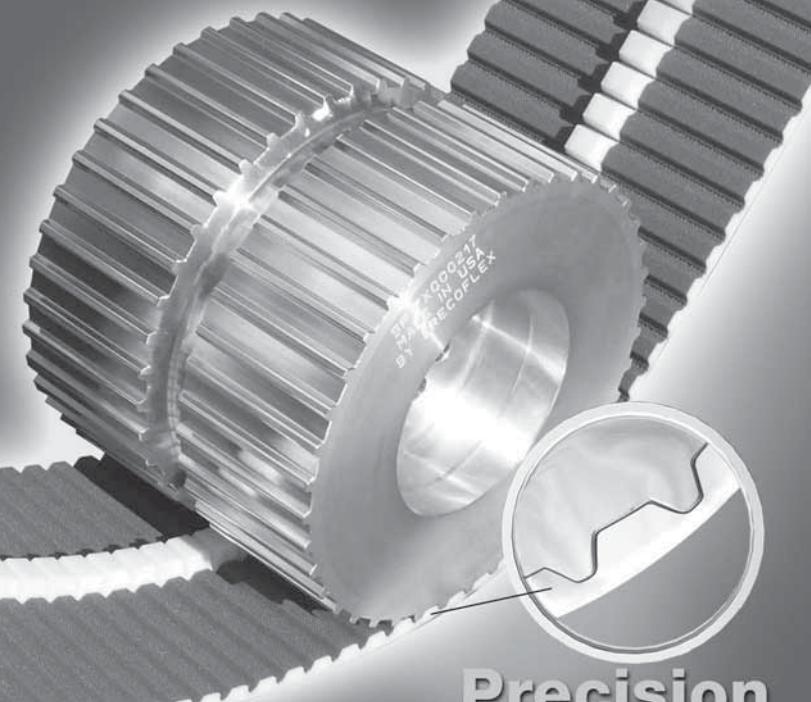


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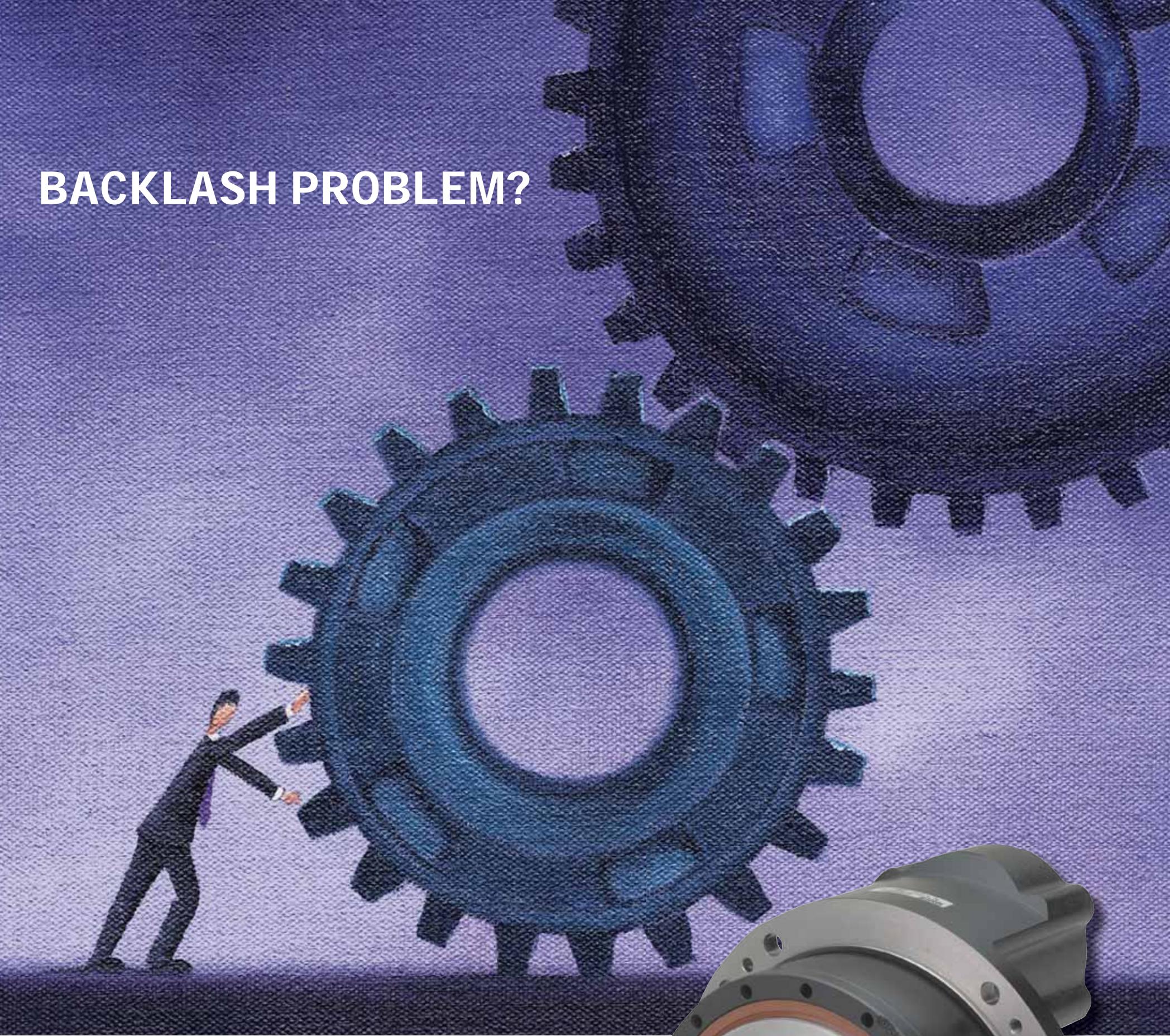


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Spotlight

Factory Automation



Connecting I/O to EtherNet/IP

The IL EIP BK DI8 DO4 2TX-PAC Inline Ethernet bus coupler for EtherNet/IP from **Phoenix Contact** acts as a link between the I/O level and Ethernet. It is designed to connect up to 63 functional units, such as digital and analog I/O, counters, circuit breakers and pneumatics, to the network. The 80-mm bus coupler enables field communication and manages some automation tasks with its 8 digital I/P and 4 O/P. www.phoenixcontact.ca

Connector eliminates step

Molex has announced the addition of its BradConnectivity DIN 43650 connector is designed to reduce the number of components, making them easier to assemble and with fewer parts to stock. The connectors are supplied in single set or bulk components, eliminating the initial effort of disassembly. The design provides IP67 sealing performance (even in humidity) using an external nut over the cable. www.woodhead.com

Reader for data matrix, 1D

The Multi-Code Reader from **ifm efector** is designed to read 2D data matrix codes and 1D bar codes. The reader can identify, verify and qualify most marking methods, including dot-peened, laser-etched and printed DMC codes as well as printed barcodes. The metal housing measures 80 x 42 x 53 mm, incorporating a CMOS images sensor with digital signal processor and an integrated lighting system. www.ifmefector.com

Fibre optic IR transmitter

Omega has introduced the OS4000 series of industrial high speed fibre optic infrared transmitters with the capability to measure temperature from 200° to 1600°C using three standard optical fields of view and three standard fibre optic cable lengths. The CE compliant product has a response time of 1 ms and adjustable emissivity from .05 to .99. Other features include built-in laser sighting for lens probe positioning. www.omega.ca



Configuration tool for Fieldbus cordsets

Pepperl+Fuchs has introduced the FieldConnex Cordset Product Configurator, an online configuration tool allows users to design FieldConnex fieldbus Type A/ER cordset and extension cables in 10 steps – along with a price and availability quote. www.am.pepperl-fuchs.com/fieldconnex/configurator.jsp



IP65 compact panel PC

The CP72xx from **Beckhoff Automation** is panel PC designed for mounting arm installation and is said to integrate the features required for advanced machine control in a 98 mm deep, IP65 housing. The integrated add-on PC comes with a 1.5 GHz Intel Celeron M processor and can optionally be equipped with Intel Pentium M processors up to 1.8 GHz. www.beckhoff.ca/cp72xx

Miniature touch panel displays

The **AutomationDirect** C-more Micro-Graphic panel line now includes 6-in. display models. The touch style graphic/text panels offer a 320x240 pixel graphical display that supports bitmap files. Used in a horizontal orientation, the 6-inch models support 40 lines by 80 characters of static text; 53 lines by 60 characters are supported in vertical orientation. The panels are equipped with drivers to support DirectLOGIC protocols as well as Allen-Bradley DF1 Full duplex, Allen-Bradley DF1 Half duplex, Allen-Bradley PLC5 DF1, AB DH485, Omron Host Link, Omron FINS serial, GE SNPX, Mitsubishi Melsec FX, Siemens PPI, and Entivity Modbus RTU. <http://c-moremicro.automationdirect.com>



Industrial Ethernet switches

WAGO Corp. has announced the 852 Series of Ethernet switches provide a wide range of scalable solutions for network infrastructures. The series ranges from basic Ethernet switches to configurable, multifunction Ethernet communication switches. Housings provide the switches an operating temperature of 0° to 60°C, vibration resistance (acc. to IEC 60068-2-6) and shock resistance (acc. to IEC 60068-2-27). www.wago.com

Analog-controlled SS relay

Carlo Gavazzi has released an addition to the Solitron line of solid-state relays. The RJ1P series includes a microprocessor controlled device with analog input and proportional output capabilities. The series is a single package solution that is capable of switching single phase 230, 480 or 600 Vac, up to 50 A ac loads with 5 different operating modes, when controlled by 0 to 10 Vdc or 4 to 20 mA signals. The units come with an integrated heat sink and are ready for DIN rail mounting. www.gavazzionline.com



Magnetic encoders

Baumer Ltd. has introduced a line of magnetic absolute multi-turn encoders in hermetically-sealed housings. A patented sensor for speed, direction, and position monitoring, the MagRes Hermetic series offers up to 12/18 bit resolution, are zero-point programmable and operate optimally in temperatures from -40° to 85°C. The encoders measure 58 mm in diameter and offer a maximum shock load up to 300 g, 2 ms. Available in shaft and hollow shaft versions. www.baumerelectric.ca



Modular vacuum grippers

The modular vacuum gripper system SSP from **Schmalz** consists of coordinated and compatible gripper elements, large-area connections, sensor units, filters and valves. Large-area gripper modules, individual suction pads, mechanical, electrical, pneumatic grippers, magnetic grippers or even needle grippers can be used individually or in combination with other grippers. www.schmalz.com

Feature: Factory Automation

Ethernet I/O rise leads to the fading away of VME

Launched in 1981, based largely on Motorola's VERSAbus technology, the VME bus has been a mainstay technology in both military and industrial I/O for over 25 years.

But a number of factors, such as ROHS requirements of semiconductor manufacturers and the rise of Ethernet I/O, have driven many vendors to discontinue a variety of their VME I/O board development. This regrettable trend (at least if your system is based on boards about to go "End-Of-Life" or EOL) is not likely to change at any time in the future. This leaves many VME users facing obsolete components and last time buys.

Faced with an EOL issue, more and more engineers are basing their replacement systems on modern Ethernet I/O products, connected to new, off-the-shelf computers.

Ethernet I/O products from United Electronic Industries (UEI) are only a few years old and are based upon up to date modern technology. In addition, UEI has a track record for maintaining production of products and not forcing our customers to upgrade to the latest, greatest technology until they want to, not need to.

Indeed, product obsolescence is often not the primary reason a VME designer switches to an Ethernet solution. Sometimes the designer simply needs a feature or capability not available on a VME platform. UEI Cubes and RACKtangles have a number of advantages relative to VME systems.

The UEI Cube and RACKtangle allow designers to pack more I/O into a smaller space than VME racks. A DNA-PPC8 Cube measures just 4.0 x 4.1 x 5.8 in., and yet allows the installation of up to 150 A/D channels, 192 D/A channels, 288 DIO points, 72 ARINC 429 chan-

nels, 48 serial ports, 48 counter/timer/quadrature channels or 24 CAN-bus ports. The 12-slot RACKtangle I/O chassis provides double these quantities in a standard 3U rack form factor.

Using the UEI high density chassis, designers have found they no longer need to mount their I/O in remote racks and then run long cables between the I/O rack and the main "product" (e.g. a simulator, a dynamometer, a test stand, etc.). Mounting the I/O right on the product decreases noise pick up in the signal wiring and reduces the cost and complexity of running hundreds and sometimes thousands of wires between the sensors and a remote I/O rack. With the I/O mounted locally, installing a product at a customer or final installation site is as simple as connecting power and Ethernet.

Customers who take advantage of the Programmable Automation Controller versions of UEI's I/O also eliminate the space required by an external host computer. The UEIPAC builds a standard Linux based operating system directly into the I/O chassis, allowing the units to run full stand-alone.

Flexibility comes both from the unique Cube/RACKtangle form factor and from the array of different I/O boards that may be installed in a UEI Ethernet Chassis. With I/O Cubes as small as 4 x 4.1 x 4 in., designers can put a UEI chassis in places a VME rack would likely never be considered. The UEI I/O Cube is rated from -40° to 85°C, 50 g shock, 5 g vibration, 0 to 70,000 ft altitude and has been radiation tested for space applications. A fibre optic interface allows the I/O system to be mounted up to 20 km from the host computer.

As for I/O flexibility, UEI offers over 30 different boards. In addition to standard



For applications requiring a small footprint and/or the ability to survive in rugged environments, UEI's Cube (top left) is appropriate. For more traditional, rack-based applications, the RACKtangle (top right) is suitable. Bottom: Typical I/O boards from United Electronic Industries.

analog and digital I/O, there are CAN-bus, RS-232/422/485, ARINC-429, quadrature encoder inputs and soon there will even be a MIL-STD-1553 board.

Like most I/O manufacturers, UEI offers support for popular Windows development languages and applications. Unlike many I/O vendors, UEI also provides factory written drivers for all popular Linux and Real-Time operating systems including QNX, RT Linux, Windows RTX, RTAI Linux and more.

Does Ethernet I/O offer the performance available on the VME platform? The answer is a resounding yes. UEI's patented DMAP Ethernet protocol ensures systems with thousands of I/O points are monitored and updated, all in

less than a millisecond.

If you're building your first system, you don't want to wait 6 to 12 weeks to get a piece of hardware to evaluate. If you're releasing your project to production, you don't want to hear from purchasing that the component you need is 12 to 16 weeks away. Finally, if your up-and-running system takes a lightning hit, you don't want to find out a replacement board is two months away. All of UEI's Cube and RACKtangle I/O products mentioned above are standard, off-the-shelf products.

This article was excerpted from the United Electronic Industries application note #027, Ethernet I/O Chassis – A VME Alternative.

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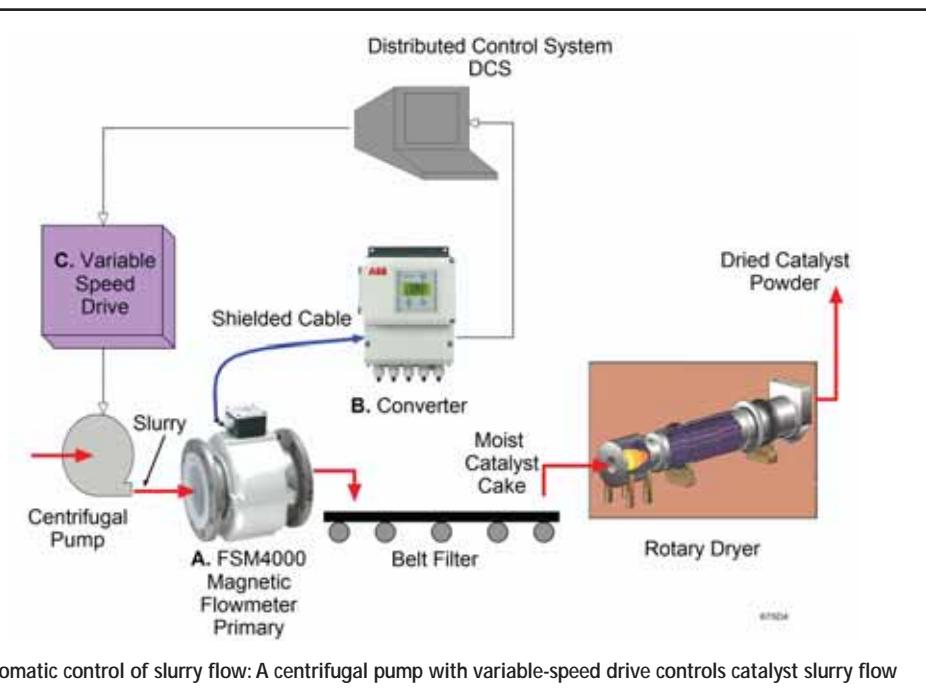
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Automatic control of slurry flow: A centrifugal pump with variable-speed drive controls catalyst slurry flow at a rate set by the distributed control system (DCS). Slurry goes to a belt filter that removes excess liquid and feeds moist catalyst cake into a gas-fired rotary dryer. Dried catalyst powder passes on downstream for further processing.

Upgrading flowmeter stabilizes control of process slurry flow

When an electromagnetic flowmeter on a 3-in. line measuring catalyst slurry containing 30% solids continually produced erratic and erroneous flow readings, one company found the situation was thwarting flow control efforts. The plant maintenance group, responsible for all plant instrumentation, tried various methods to correct magmeter performance with no success. Meanwhile, operation under automatic control was impossible.

The illustration shows intermediate steps in the manufacture of catalyst, indicating the system designed to provide

automatic control of slurry flow. A centrifugal pump with variable-speed drive controls catalyst slurry flow at a rate set by the distributed control system (DCS). Slurry goes to a belt filter that removes excess liquid and feeds moist catalyst cake into a gas-fired rotary dryer. Dried catalyst powder passes on downstream for further processing.

The magmeter installed in the line measures the slurry flow. The magmeter's converter/transmitter sends flow measurement signals to a flow controller in a computer-based DCS located in the plant's central control room. The control room operator sets the desired flow rate. The rate of flow is set to keep the filtration/drying operations running smoothly and continuously at an optimum production rate.

The original meter's flow signals were

Reliable ac magnetic technology eliminates erratic flow signals

erratic and completely unpredictable. The signals could call for excessive rates of slurry flow that caused the dryer to flame out and shut down the line. The control room operator could not depend on the measured flow readings, forcing reliance on manual control.

The solution came when plant maintenance decided to substitute the new FSM4000 magmeter from ABB Instrumentation for the original magmeter. Upon installation, the new meter performed exceptionally well, producing reliable, consistent flow signals that meant permitted operation via automatic control.

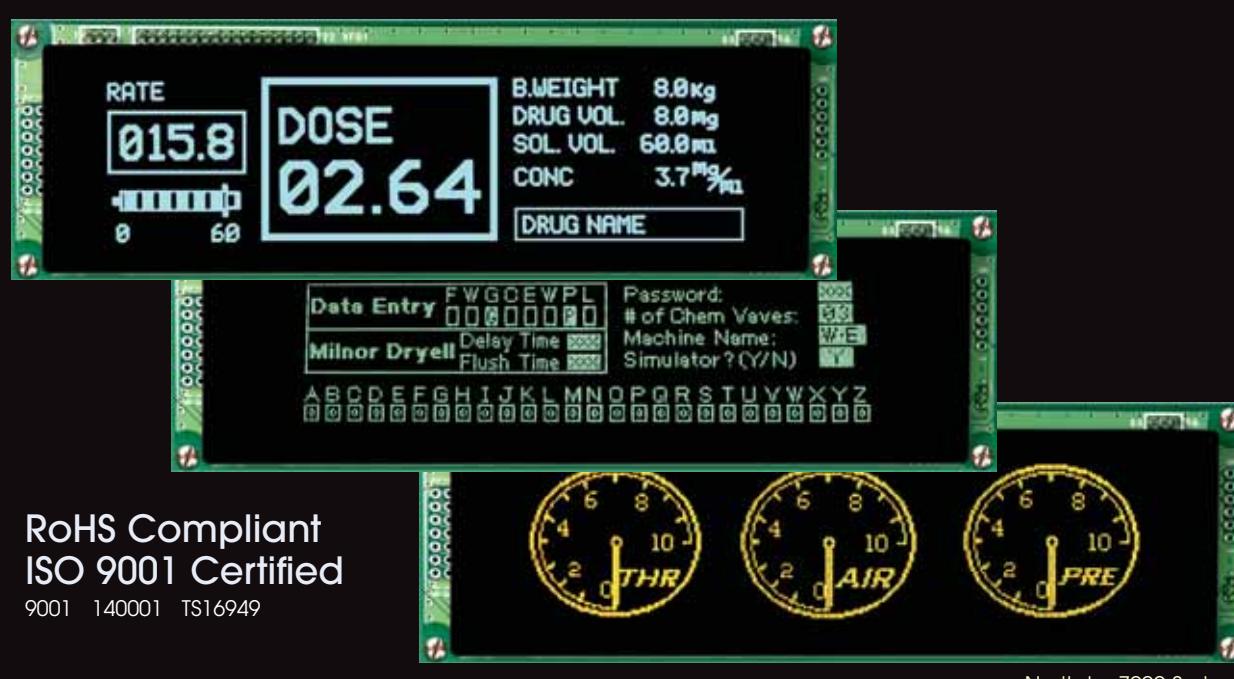
The FSM4000's success in dealing with noisy applications originates with its use of 70 Hz ac excitation of the primary's magnetic field combined with advanced digital signal processing. The measurement signal has an accuracy of $\pm 0.5\%$ of rate, and offers a high speed of response.

The result is that with dependable flow control readings, the process is now on automatic control, improving production and eliminating troublesome shutdowns.

The success with the FSM4000 on its first catalyst slurry application in the plant has led additional installations on similar slurry flow control systems. In one case, a higher temperature slurry required a double thickness of the PTFE liner in the magmeter primary, capable of withstanding fluid temperatures as high as 180°C. The standard PTFE and alternate liners of PTA and hard rubber are suitable for fluid temperatures from -40° to 130°C.

These two FSM4000 installations were followed in rapid succession by four more on other plant slurry applications. This article was provided by ABB Instrumentation. Contact: Robert Mapleston, 215-674-6580 or robert.mapleston@us.abb.com. www.abb.ca

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Medical Engineering

For the silent horror of drowning comes a poolside audible alarm of warning

By Mark Sunderland

It's the eerie silence of suffocating that defines the horror of drowning. No screams – no cries for help – no breath – only a momentary ripple of water, and for a child – death within five minutes.

So it's about time we reached a consensus on adult supervision. A toddler with access to water is only safe during actual moments of eye contact with a caregiver.

That's why the US Consumer Products Safety Association says: "Supervision can and does fail." and "Layers of protection work."

At the end of this summer season there will, again, be a tragic statistic for "death by drowning." Drowning is of course not limited to summer but its tragedy is especially poignant in contrast to the joys of pool and beach. Each year, according to the Red Cross, an average of 600 Canadians drown. More than half the number of drownings occur during the months of June, July and August.

The accidental death toll for children by drowning is capped only by car accidents.

The easy-to-assemble backyard pool has done nothing to lower the statistics of drowning. For a child, the entry can be easy but the escape can be impossible – even the wading pool is a danger because toddlers can fall face first over the edge.

Pool covers/blankets can also represent a source of danger – especially so for pets that can sink between the blanket and the perimeter of the pool, and then surface below the cover. The family cat for example sees a bird on the cover and then

leaps in and sinks.

Bob Lyons, an electrical engineer and President of Terrapin Communications has been studying water safety for about 10 years. He concedes that constant supervision of children in the presence of water is vitally important, but repetition of the message has had little impact on drowning



The Safety Turtle alarm kit from Terrapin Communications.

related deaths and injuries. Constant eye tracking of the child would be more to the point – but that's not realistic.

Officially, there are five "layers of protection" strategy. Supervision, CPR training, first aid, water rescue and pool fencing but for all this, tragedies continue to occur and people continue to drown.

Lyons and Terrapin have developed and brought a product to market that counters the risk of a drowning accident in a novel way. The "Safety Turtle" (safetyturtle.com) is a simple wristband device that incorporates a water sensing element and a small transmitter. It is fastened to a child's wrist in a manner that prevents it from being easily removed. The significance is that when contact is made with water it wirelessly transmits a signal to a monitor that then produces

an audible alarm.

The patented electronic water sensor requires very low battery power to operate and is designed to only actuate the signal when more than a half of it is immersed in water. This means that a child can play in the rain or lawn sprinklers without sounding the alarm.

Beyond the Turtle's important contribution to safety, its success is enhanced by its appearance.

Scott Gibson of Gibson Product Design (gibsonproduct.com), the Ottawa industrial design and product development company that was responsible for its design, recognizes that the physical appearance is an important component to the drowning prevention equation. Not only does it sound the alarm but it is attractive for children to wear and the act of wearing it is a tangible reminder to be cautious. It's colorful and children like turtles.

The Safety Turtle has won numerous awards for the inventor and the company. Success has generated the development of other devices that incorporate the same technology – a sensor, for example, that's incorporated in a sun visor for senior citizens who participate in aquatic therapy. A Turtle for pets too – up to 50,000 domestic pets drown in backyard pools every year. There is also, in the Turtle family of devices, a pool gate alarm.

So, let this column join with Safety Turtle in reminding its readers that although backyard pools can be lots of fun, they also pose a horrible danger. In response, Safety Turtle can greatly enhance your effective supervision.

Mark Sunderland is President, BioMedical Industry Group, Ottawa (mark@biomed-group.com).

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Editor's Choice

Reducer gearbox line



The Baldor reducer gearbox line for heavy-duty material handling applications, the Dodge MagnaGear XTR, is available in either parallel shaft or right angle drive configurations. All of the larger sizes of the gearbox employ a planetary output stage. This is said to reduce size substantially compared with all helical or bevel gearing systems, often by as much as 25% or more. The line offers a choice of eight sizes, rated for output torques from 11,300 to 103,950 Nm. Speed reduction ratios from 8.5:1 to 63:1. Units are designed to meet or exceed international and AGMA standards.

www.dodgept.com/pdf/brochures/gearing/BR1610.pdf

Direct-acting solenoid



The 70 series valve from Midland-ACS is a direct-acting 3/2 hazardous area solenoid valve for the oil, gas and petrochemical industries. Designed for

actuator control, the series is available with connections from 1/4 to 1/2 in. NPT and is EExd IIC T6 with IP67 Ingress Protection classified, for use in hazardous environments. Compliant with the ATEX directive and entitled to bear the CE mark, the valve is also IECEx certified. Power consumption is 3.5 W at an ambient temperature of -50° to 60°C.

www.midland-ac.com

Automated controls



Omega is to provide an independent shutdown for thermal processes. Dual 4-digit displays allow viewing of the process temperature and limit setpoint simultaneously. The unit is constructed of a plastic case with a tinted front panel that meets NEMA 4X (IP65) specifications when properly installed. The series accepts signals from a variety of temperature sensors (thermocouple or RTD elements), its programming allows it to meet a wide variety of application requirements, and its immunity to noise interference makes the product CE compliant.

Linear measurement



Pepperl+Fuchs has introduced PMI14V-F112-U-V3 inductive linear measurement sensors. The flush mountable sensors are 35 mm wide x 41 mm deep, and provide a 14 mm sensing range with resolutions up to 0.033 mm. PMI14V sensors feature a voltage output with zero position adjust, giving users the flexibility to scale the unit to shorter usable lengths.

www.am.pepperl-fuchs.com

AutomationDirect has released Think & Do version 8.0, a PC control product version that supports development, deployment and operation of automated control systems for material handling and manufacturing. The intuitive and open-architecture environment readily is said to integrate with hardware and software components from most major suppliers. Major components of Think & Do 8.0 include ProjectCenter to create various projects, FlowView for creating control logic in easy-to-use and read control flowcharts, ScreenView for creating and editing HMI screens, I/OView for configuring project I/O, and the AppTracker feature provides a fast, graphical debugging tool.

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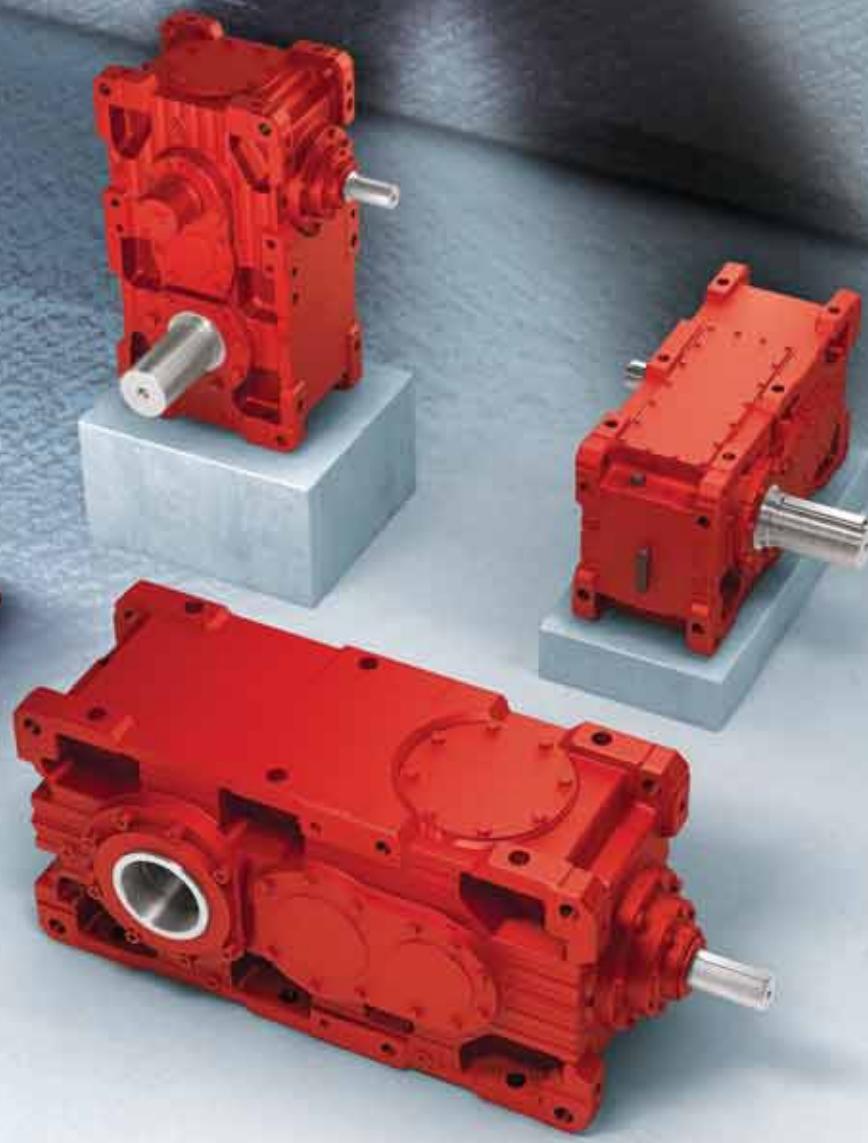
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Editor's Choice

Internal locking device



The Ecloc series from Ringfeder is an internal locking device that is said to provide for higher torques, self-centering and axial capacities in rotating machinery for a variety of heavy-duty applications. The devices are directly interchangeable with other commercially available locking devices. The series uses a slit ring design for greater shaft tolerance variation. All devices provide a backlash-free connection and eliminate keys, keyways, splines, press fits and shrink fits. Units are available with or without flanges.

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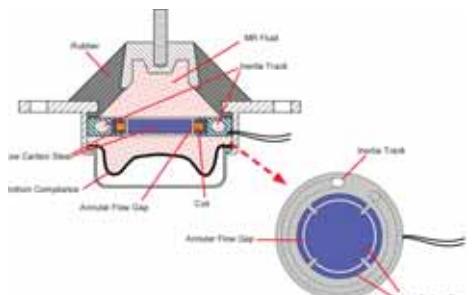
Flexible gasket formulations



Permatex brand Gasket Makers from Devcon are available in a variety of formulations to replace conventional gaskets. The non-corrosive, form-in-place compounds require no mixing and cure at room temperature. Gaskets not only form to any size and shape, but are also said to offer better performance. They are available in three technologies – elastomeric rubber, silicone rubber, and anaerobic – that resist weathering and thermal cycling, and will not shrink or crack.

www.devcon.com

Glycol-based magnetic fluids



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Lord Corp. has announced that its proprietary Magnetorheological (MR) glycol-based fluids are now available for general evaluation. When exposed to a magnetic field, MR fluids change state from a liquid to a semi-solid nearly instantaneously and with complete reversibility. As a result, MR dampers provide fast and infinitely-variable control of energy dissipation, the company says. The response time is less than 10 ms and can respond to transients, resulting in improved torque control, it adds. MR technology also allows for mechanical simplicity that does not require moving parts and magnetic activation is essentially temperature independent.

www.lord.com/mr

Miniature inductive proxs



ics products, as well as the keypads/keyboards used in mobile phones and laptop and desktop PCs. A patented MicroLens light extraction technology and improved manufacturing processes are said to make light guide packages that are thinner than ever with no sacrifice in performance.

www.calbrooke.com

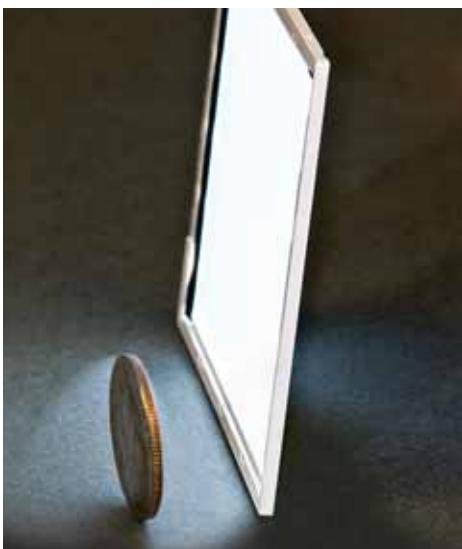
Slim interlock switches



Balluff has developed a line of miniature inductive proximity sensors that open up new frontiers for machine designers. Balluff SuperShorty sensors have stainless steel bodies and a protection rating of IP67, and are available in 6.5 mm smooth and M08 threaded housings. Pre-wired cable models are available in two lengths: 10 and 6 mm versions, while connectorized models are only 18 mm long. All have a nominal 1.5 mm sensing range.

www.balluff.com/supershortsy

Thin led-based backlights



Global Lighting Technologies has introduced LED-based backlights that offer 0.4 mm thickness or less – to provide molded light guide BLUs available for backlighting LCDs in a wide array of consumer electron-

HVAC system programming



The Building Automation Control Library (BACL) from Phoenix Contact permits building automation applications for heating, ventilation, and air-conditioning to now be programmed and configured to IEC 61131-3 standards with PC Worx.

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The library offers the user a wide variety of functions for simple configuration work: setup, diagnosis, and capture of EnOcean sensors for individual room and lighting control and all basic functions involved in regulating primary systems. Additional function modules enable communication with frequency converters from Danfoss and VDI 3814-compliant emergency operations from Romutec Steuer und Regelsysteme GmbH.

www.phoenixcontact.ca

Rugged pressure switch

Alpha Controls & Instrumentation has announced a pressure switch that uses a double-contact, double-diaphragm design to combat against false actuations triggered by shock or vibration.

The Design-FLEX PSF100A by World Magnetics can survive shocks up to 50 g or vibrations to 10 g at frequencies from 50 to 2000 Hz.

www.alphacontrols.com

Multi-axis controller/servo



The Technosoft TMC-3D combines a multi-axis motion controller and a digital servo drive in one unit. Based on the MotionChip technology, the TMC-3D controls (via CAN-bus) up to 8 Technosoft intelligent drives (including itself). Its embedded servo drive is suitable for dc, brushless and step motors up to 640 W (80 V, 8 A). 3-D and 2 1/2-D coordinated motion paths are executed through TMC-3D and other two Technosoft drives, using PVT commands. The motion programming can be done using PC or PLC motion libraries, or directly at controller level with the EasyMotion Studio software.

www.technosoftmotion.com

Hydraulic actuator alternative

Ontor Ltd. has announced the E-Drive Eliminator HD Heavy Duty ball screw linear actuator series. As an alternative to hydraulic actuators, it is said to eliminate many of the associated concerns, such as noise, heat, leakage, controllability, and low stiffness, while handling high loads at high speeds and maintaining the rugged and durable steel construction typical of hydraulics. The unit is able to provide thrust from 2000 to 25000 lb and repeatable to .0005 in. A bronze nose bearing provides support for the extended piston. A dual nonferrous dovetail switch tracks are said to provide a simple method of placing and adjusting switches for over travel protection as well as home detection.

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Editor's Choice

Lightweight linear actuator



igus Inc. has introduced a linear actuator featuring a smaller mounting height and lower weight than its predecessor. The model DryLin ZLW-0630 has an installation height of 1.22 in. The unit, made up of a toothed-belt linear drive equipped with a hard-anodized aluminum profile, a DryLin W compact linear guide, iglide J plastic sliding elements and plastic end blocks,

weighs 1.76 lb for a system with a 2-foot stroke. DryLin ZLW-0630 is also suitable for speeds reaching up to 6.5 fps. www.igus.com

Linear gantry modules



Bosch Rexroth Canada has expanded its range of linear modules with BKK and BKR Bridge Modules designed to span lon-

ger lengths without intermediate support. The modules consist of an extruded aluminum profile whose geometry has been optimized for high torsional stiffness, reducing deflection in applications where the module is not fully supported, such as Y axes for gantry systems, the company says. Two internal ball rail systems with four steel runner blocks are mounted inside the extrusion, at a 90° angle to each other. The units also have an angled carriage with T-slots for flexible and secure mounting of the user's load. The BKR belt-driven Bridge Module is available in lengths up to 8000 mm and provides faster speeds, the company adds, while the BKK ball screw driven version is suitable for higher thrust forces and lengths up to 5500 mm. www.boschrexroth.ca

Magnetic display



The SIKO magnetic display MA564 is powered by a 24V voltage supply. Sensor movements are detected even without operating voltage due to an integrated buffer battery, enabling the current position to be captured at all times. A compact size is said to allow it to be used in close-space situations such as on the moving supports of boring aggregates used in wood and metal processing. System accuracy is 0.01 mm. www.mittmann.com

Brushless servo motor



Baldor Electric Company has announced BSM132 brushless servo motor has the capability to reach 20 hp and can be expanded to 34 hp with optional blower cooling. The servo motors provide continuous stall torque from 620 to 1060 lb in. and speed capability to 5000 rpm. Design features include: IP65 protection; feedback including resolver or absolute encoder; and, servo rated ball bearings. www.baldor.com

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34B frame BLDC motor



Bodine Electric Company has introduced a 34B-frame, 24 V brushless dc motor to its INTEGRAMotor product line. The product combines a PWM speed control, a brushless dc motor and an optical encoder. The 34B/FV provides 1/4 hp and up to 100 oz in. continuous torque, making the motor more than twice as powerful as any model previously available from Bodine. Speed is controlled with a digital pulse width modulation interface and integrated control accepts inputs from an external motion controller or PLC. An enclosed 1024 PPR, 2 channel, optical encoder provides closed loop feedback to the external controller. Units are rated IP44. www.bodine-electric.com

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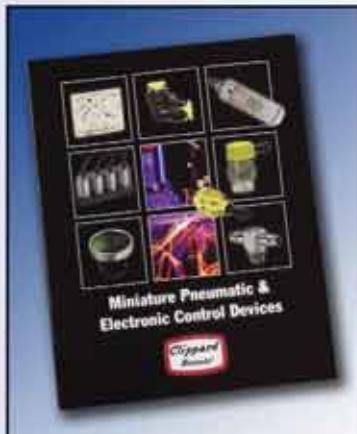
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