

# DPN

# DESIGN PRODUCT NEWS



September 2007

Covering the total design engineering function in Canada



### Aluminum hub couplings

Zero-Max CD Single Flex couplings with aluminum hubs are suitable for servo motor applications. Available in clamp style hubs with or without keyways, torque capacities range from 40 to 1436 Nm, with speed ratings from 4400 to 17,000 rpm.

zero-max.com

Info Card 342

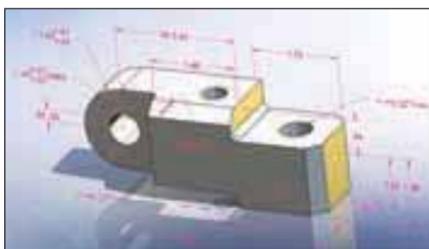


### C1 D2 certified fuse terminal

Emphatec has announced the BC5F is one of the first 5 x 20 mm fuse terminals to be made available with CSA Class 1 Div 2 certification. The 8 mm wide terminal does not require external means to secure the fuse in the terminal or require the complete terminal to be replaced if the fuse blows.

emphatec.com

Info Card 341



### 3D software focuses on UI

SolidWorks Corp. has released SolidWorks 2008, the newest version of its 3D CAD software, with more than 250 user-requested enhancements (see review on page 36). The program provides a time-saving user interface (UI), improved 3D graphics and includes more design analysis capabilities.

solidworks.com

Info Card 340



## Prototype shop masters fast turnarounds

By Mike Edwards

**N**orthwest of Toronto, nestled in the heart of Ontario's vegetable patch, lies a sophisticated prototype fabricating shop that once housed carrots for local farmers.

Formed just over ten years ago by ex-Magna International employees, ProtoTier-1 Inc. of Beeton, ON (prototier.com), can provide production-intent sheet metal parts or one-off, mock-up style parts for fit and function.

"Prototier-1 provides a one-stop shop for prototypes, assemblies and for short run services,"

according to company co-founder and mechanical engineer Wieslaw Koziarowski.

"From CAD data for a stamped part, we can create a prototype tool at a fraction of the cost and time of a production tool," said Koziarowski. "We can also go from CAD drawings to part in one to three weeks, as well as modify existing production parts in as little as two days."

"Runs too small – as little as 100 parts – for the high-volume stampers are perfect for us. We also offer 5-axis laser cutting services, wire EDM for precision cutting, FEA-based flat blank development, CNC machining and large volume CMM layouts." The company also employs statistical

Continued on page 8

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<p><b>Starts at A partir de \$206</b></p> <p>*Iseries Temperature, Process, and Strain Meters and Controllers Indicateurs et Contrôleurs de Température, de Procédé et de Contrainte Iseries</p>	<p><b>Starts at A partir de \$3895</b></p> <p>FMG600 Electromagnetic Flowmeter Débitmètre électromagnétique</p>	<p><b>Starts at A partir de \$430</b></p> <p>LV-1301 Heavy-Duty Side-Mounted Level Switch Contacteur de niveau robuste à montage latéral</p>	<p><b>Starts at A partir de \$500</b></p> <p>DPF11 Series Series Batch Controller For Amplified Frequency Inputs Contrôleur de lots en série</p>	<p><b>Starts at A partir de \$2725</b></p> <p>PSU505 Linear Power Supply Bloc d'alimentation électrique linéaire</p>
<p><b>Starts at A partir de \$1085</b></p> <p>CTXL *Microprocessor-Based Portable Universal Circular Chart SUPERRECORDER<sup>TM</sup> Enregistreur graphique circulaire universel portatif piloté par microprocesseur SUPERRECORDER<sup>TM</sup></p>	<p><b>Starts at A partir de \$1085</b></p> <p>OM-2041 Portable Handheld Data Loggers Enregistreurs de données portables de poche</p>	<p><b>Starts at A partir de \$1865</b></p> <p>FMG-1000 Series Municipal/Industrial Magmeter Débitmètre électro-magnétique municipal/industriel</p>	<p><b>Starts at A partir de \$340</b></p> <p>LVUD-101 Micro-Size Liquid Sensing Switch Interrupteur de détection de liquide</p>	<p><b>Starts at A partir de \$545</b></p> <p>HHF42 Hot-Wire Anemometers Anémomètres à Fil Chauffant</p>

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- DuraPULSE AC drives add sensorless vector control, from 1 to 100 hp
- Marathon inverter-duty motors are available with standard (0.25 to 100 hp) or premium (15 to 100 hp) efficiency ratings; optional encoder mounting available on many models.

GS2 Drives	AutomationDirect GS2 Price/Part Number	VS.	Allen-Bradley Powerflex 40* Price/Part Number
2 hp <i>230V</i>	\$385.00 GS2-22P0		\$685.00 22B-B8P0N104
5 hp <i>460V</i>	\$485.00 GS2-45P0		\$1,030.00 22B-D010N104
5 hp <i>575V</i>	\$460.00 GS2-55P0		\$1,100.00 22B-E6P6N104

All prices are U.S. list prices. AutomationDirect prices are from April 2007 Price List. Allen-Bradley prices taken from Publication 22B-PL001B-EN-P September 2005. Prices and specifications may vary by dealer and configuration. Prices subject to change without notice. \*Includes sensorless vector control; least expensive series with 575V capability.

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## Hydraulics & Pneumatics Lynch increases manifold production capacity

The Lynch Fluid Controls division of the Lynch Group of Companies ([lynch.ca](http://lynch.ca)) has designed and manufactured thousands of standard and custom hydraulic manifolds for clients here and around the world at a time when many local manufacturers have either disappeared or gone offshore. It recently increased capacity to surpass 100,000 units per year.

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#### Industrial design students show promising future

Rocket Show 2007 competition featured Transportation winners Bartek Zalewski and Klaud Wasiak



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Pre-Con (above) and Woodstock Hydro take advantage of IDEC µPLC technology and Glenile expertise



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#### Latest 3D "solid" modelers tackle larger assemblies

Solid Edge V20 (above) faces off against SolidWorks 2008 in CAD Industry Watch software reviews



**RiNano:** slick technology for enclosure air conditioners that leaves competitors in the dust.

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**3D in DPN Online Edition**  
Look for the 'DPN 3D' logo throughout this issue and go to DPN's online PDF edition at [dpncanada.com](http://dpncanada.com) to view images in 3D.



Also look for the play button to view video clips.



# Renderings



## Environmental stewardship makes good business and design sense for manufacturers

By Mike Edwards, Editor

Radical tree huggers no longer have a monopoly on visible concern for the effect that manufacturing has on the environment.

“Earth Day and other environmental awareness events often raise questions about the impact of various manufacturing processes on the environment,” according to North American Die Casting Association (NADCA) president, Daniel Twarog.

Twarog noted that “North American die casters are one industry segment that has been addressing environmental issues in a positive way since the 1970s and continues to implement environmentally friendly production processes.

“Die casting has been at the forefront of efforts to use environmentally friendly production processes because of the high level of recycled metal used for a typical die casting. More than 95% of the aluminum die castings produced in North America are made of post-consumer recycled aluminum. Since the production of recycled aluminum alloy requires less energy than producing alloy directly from ore or other methods, there is a dramatic conservation of non-renewable energy resources.”

In addition to the core benefit of using recycled metal for die casting, there are a number of other environmentally friendly initiatives being implemented by North American die casters, added Twarog.

### Energy conservation on mind of engineers

Die casters are saving energy by reducing melting temperatures and cutting back on the amount of alloy being melted. According to NADCA research, many die casters have cut melting temperatures by 50% per pound of alloy melted, and reduced energy use by another 10% to 30% by preheating charges, using heat mixing pumps and preheating combustion air.

By updating cooling towers and wastewater treatment, die caster have been able to reduce, or in some cases eliminate, chemicals used to treat the water that is used in the die casting process.

A related improvement is limiting the use of die spray, a key element in the production process, to reduce the amount of chemicals that are co-mingled with wastewater. In addition, die casters are working with OEMs to reduce the amount of packaging materials, such as corrugated paper boxes, plastic stretch wrap and pallets, for shipping finished parts.

SKF of Sweden is similarly being creative about its processes and policies. Earlier this year, SKF announced a corporate-wide commitment to reducing its impact on the planet. “The United Nations report ... about the world climate shows that we have a problem,” Tom Johnstone, President and CEO of SKF said.

“There are many views and discussions on the subject. However each of us has to

make their own contribution and this is the start of our contribution.

“We have developed and can offer technical solutions (see Bearings, page 37) that can significantly reduce energy consumption. In addition, we are addressing our own energy consumption to reduce this and to reduce CO<sub>2</sub> emissions.”

Reducing your environmental footprint makes good business sense for smaller organizations, too. Woodstock Hydro (Factory Automation, page 14) wanted to reduce its energy costs that were threatening to spiral out of control at its headquarters

in Woodstock, ON. Since the installation of an IDEC-based automated energy management system, its monthly kWh consumption has been reduced significantly – along with its expenses.

Finally, SEW-Eurodrive Canada (Motion Control, page 30) has demonstrated how gearmotors are becoming an efficient and economical alternative to traditional belt-driven or direct-coupled reducers in Canadian saw mills.

“The advantages are significant,” according to SEW’s Bill Wake, “not only from a capital and operating cost perspec-

tive, but because of the tremendous application flexibility that gearmotors offer.”

So good design can work hand-in-hand with environmental stewardship – tree huggers aren’t the only ones protecting to the planet.

If you found **Renderings** interesting, please fill in Info Card 346 or send a message anytime to [medwards@clbmedia.ca](mailto:medwards@clbmedia.ca).

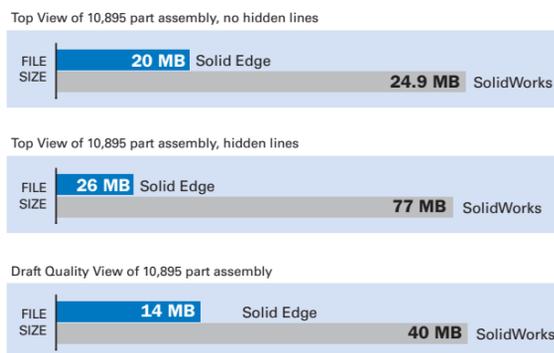
## When making the move to 3D, the choice is clear...



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#### SOLID EDGE vs. SolidWorks



#### SOLID EDGE vs. Inventor

**In comparisons, Inventor simply cannot match the functionality Solid Edge delivers with rapid blue surfacing, 3D wizards, feature recognition, direct editing, data management and large assembly performance.**

“I evaluated eight systems, including Inventor and Solid Works and determined that Solid Edge by far has the best 2D to 3D AutoCAD compatibility out there. My first assignment upon entering Lochinvar was to evaluate the benefits of a 3D CAD system, and if practical, make a recommendation as to which product would best suit our needs. I found that Solid Edge met or exceeded our requirements in almost every aspect.”

*Michael Valcarcel,  
Lochinvar Corp.*



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## By Design

# Website launch raises profile of industrial interface manufacturer

MARKHAM, ON – The name and website is new, but emphatec (emphatec.com) has been serving the industrial interface and power supply business for 15 years. According to emphatic president Don Robinson, the company was the Engineering and Production division of Weidmuller Ltd. (Canada) until October 2003. “Some of emphatec’s products can be purchased through Weidmuller’s distribution network, but we are using Internet as the main sales vehicle.



Naimish Shah of Emphatec contract manufacturer Radiant Technologies Inc (left), Emphatec president Don Robinson, Alphanso Reid and Subhash Shah, co-owners of Radiant Technologies Inc., and Emphatec accountant George Chu.

plers and analog interfaces. The company plans to launch 30 more products in the next six months and as many as 50 over the next year.

While emphatec’s product offering is growing steadily, it currently offers Vanguard modules that provide a front end to a control system – ac power distribution and protection products. SigNext modules include analog signal conditioners, high density discrete interfaces and other unique power distribution products. The InstaLink interface modules are designed for easy installation and include the innovative control loop Continuity Monitoring Module and a dc solid state relay/overcurrent protector.

Emphatec also offers DC Plus power supplies with features said not to be found elsewhere.

“Our focus will continue to be on the design of innovative industrial control products and power supplies.”

Applications for emphatec products include ac and dc power distribution, dc power supply, over voltage protection, over current protection, relays, optocou-



Philip Benson of Carleton, “Best In Show” winner (left) is congratulated by sponsor Spark Innovations’ master designer Jonathan Liberty. Inset: Shinya Kominami (top) of Humber College; Eloise Cataudella of OCAD.

## Industrial design students show “future” products

Graduating industrial design students in Ontario have presented their annual vision of “products of the future.”

The students recently competed in ACIDO Rocket Show 2007, organized by ACIDO (Association of Chartered Industrial Designers of Ontario, acido.info) for 2007 graduates of three industrial design schools – Carleton University, Humber College and Ontario College of Art & Design (OCAD).

This was the 6th year for the show, and the first year as a web-based competition where students submitted their work digitally to a wider scope of peers, professionals and media. At the Rocket Awards Night in Toronto, award recipients showcased their work, including; prototypes, presentation boards and thesis books.

The Rocket “Best Of Show” award

went to Phillip Benson of Carleton for his “Hospital Room Family Zone” presentation (click logo for video). Benson’s visitor space is a socializing area for guests, temporary accommodation for long term visitors and, as a patient becomes increasingly mobile, is an alternative to the hospital bed.

Humber College students Bartek Zalewski and Klaud Wasiak won the top award in the Transportation category for their Lux luxury limousine. To construct their model, the two used SolidWorks 3D software and formed wheel parts using a Z Corp. 3D printer.

Cleaning up in four award categories was Shinya Kominami of Humber for his V-Go construction toy for building ride-on vehicles. Eloise Cataudella of OCAD won a consumer award for her travel headrest (inset above).

## Designfusion, OneCAD make realignment



Greg Marsh of Designfusion (centre), with Kevin Johnstone (left) and OneCAD president Neil Thomas.

TORONTO — Designfusion and OneCAD Solutions have announced that Designfusion (designfusion.ca) has acquired the software sales and support division of OneCAD (onecad.com) solutions, and OneCAD has restructured its business to focus on design services. “We believe the alignment of our organizations in this way will enable us to provide a more focused and highly specialized range of services to the Solid Edge customer community and to the manufacturing marketplace as a whole. With this acquisition Designfusion now has in excess of 1000 customers across Canada,” said Kevin Johnstone, president of Designfusion.

## News in Brief

**Vickers-Warnick adds P+F**  
Distributor Vickers-Warnick (vickers-warnick.com) has announced it will now represent Pepperl+Fuchs. P+F products include inductive, capacitive, photoelectric and ultrasonic sensors.

**Creaform partnership**  
Dassault Systemes has announced a partnership with Creaform Inc. (handyscan3d.com) to integrate CATIA software with the Handyscan 3D laser scanning and 3D modeling system.

**Cognex system integrator**  
Cognex Corp. has selected Oldcastle, ON-based Radix Controls as the exclusive system integrator for its OmniView Cylindrical Product Inspection system under the name, Vision 450 (radixcontrols.com/vision).

**Schneider acquires Elite**  
Schneider Electric Canada (schneider-electric.ca) has announced the acquisition of Victoria-based Elite Engineering Ltd. Elite expertise includes engineering design and field testing.



Bosch Rexroth Canada’s Anthony Morielli.

## Bosch Rexroth signs Atlanta

Bosch Rexroth Canada (boschrexroth.ca) has announced a relationship with Germany-based Atlanta Drive Systems to distribute its products exclusively in Canada. Atlanta makes rack and pinion drives, and servo-worm reducers. “This partnership is consistent with our proven business model of offering a complete, high quality mechatronic solution for one reliable source,” said Anthony Morielli, product manager Electric Drives and Controls division.

## Control Techniques announces Alberta sales manager

Control Techniques (Canada) has announced the addition of John McDougall, CET, to the Emerson Control Techniques Canadian Region sales team (controltechniques.com). McDougall (right) is the new area sales manager for the Alberta marketplace, based out of Calgary. He joins Emerson from Omron Canada where he was an automation specialist for the Alberta division. McDougall has ten years in the automation industry.



Javelin co-founders John Carlan (left) and Ted Lee.

## Javelin Technologies Inc. celebrates 10th anniversary

OAKVILLE, ON – Javelin Technologies Inc., a provider of 3D manufacturing software and services for Ontario and Atlantic Canada, celebrates 10 years of operation this year. Javelin (javelintech.com) has over 45 employees who support over 1300 companies, plus 40 educational institutions. Customers are from all industry segments, ranging in size from single-person operations to large multi-national organizations. According to co-founders John Carlan and Ted Lee, future plans include geographic expansion, diversification of products and services, as well as continue to help Canadian companies become more productive and profitable.

## Calendar

September 30-October 3, 2007. Quebec City. Canadian Wind Energy Association 23rd Annual Conference and Trade Show (canwea.ca).

October 15, 2007. Calgary. Innovation in Automation Tour, an interconnection technology mobile showroom presented by WAGO Corp. (wago.us/innovationtour.htm).

October 15-18, 2007. Toronto. Canadian Manufacturing Technology Show (cmts.ca), featuring Factory Automation and Machine Tools at the Direct Energy Centre.

October 22-23, 2007. Montreal. CYCLE 2007: Towards a Life Cycle Economy is the third annual Canadian Forum on the Life Cycle Management of Products and Services (cycle2007.org).

See more events @ dpncanada.com

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Image courtesy of Alpha Marathon Technologies, Inc.

## Cover Story

# ProtoTier-1 knowledge makes short work of short production runs



A typical stamped vehicle part with spring and hinges from ProtoTier-1. In addition to the traditional automotive markets, the company's expertise is allowing it to pursue business with the medical, furniture, appliance and agricultural industry sectors.

### From Front Page

techniques to prepare PPAP submissions, perform capability studies and generate dimensional inspection reports to ensure that customer specification requirements are always met.

Fellow ProtoTier-1 co-founder Shawn Murray, a tool and die maker, and Kozirowski have a vast amount of experience satisfying the needs of the automotive "tiers,"

as their company name suggests. While Kozirowski observed that China has hurt his manufacturing clients in Canada, Murray noted that Japan-based OEMs have "been loosening up on engineering work and pushing it down into lower-tier subsidiaries."

ProtoTier-1 Inc. places a lot of emphasis on being at the cutting edge of technological innovation. It has an in-house research and development department focused on developing new products in the automotive and

consumer goods sectors. Its R&D efforts are often customer driven and open to economically viable ideas that require technological development.

A number of software tools help speed customer R&D, including KeyCreator for 3D solid modeling and file translation, MasterCAM for CNC machining, FastBlank for FEA-based blank prediction and VISI CAD/CAM for mold and die design.

"Our software can compare the machined

part to the CAD model for design verification," added Kozirowski.

The bulk of prototypes that ProtoTier-1 fabricates are of the sheet metal variety. It stocks a wide range sheet metal grades and thicknesses, which allows the company to maintain very tight delivery schedules. To date it has not declined to fabricate sheet-metal prototypes for any of its customers because of physical limitations.

"ProtoTier can make suggestions about part changes based on manufacturability concerns," explained Kozirowski. "The customer design could be too expensive to tool. For example, a part design may require laser cut trim instead of being blanked."

In addition to creating parts from new designs from customers, the company can produce so-called service parts for old models where dies do not exist any more. "We can do that by employing reverse engineering techniques."

Since part designs are analyzed as a service to its customers, ProtoTier-1 can provide accurate job quotes. "ProtoTier is known for good quality and reliability," said Kozirowski. "We're not necessarily the cheapest up front, but we've never been late."

ProtoTier-1 provides rapid precision laser cutting of metal stampings and machine components from prototype through production. It has a fully equipped and certified quality control department to ensure every component is within exact specifications. Capabilities include the ability to generate tool paths from customer supplied CAD data or digitizing.

ProtoTier-1's CNC machining capacity amounts to several CNC knee mills as well as machining centres capable of machining parts up to 1500 x 900 x 760 mm.

The company has three Mitsubishi laser cutting systems, including a new 5 axis Mitsubishi VZ1 laser, suitable for cutting both flat sheet stock as well as fixture components. "The 5-axis Mitsubishi laser does very accurate 3D trimming and can create blends and features after the forming and 2D cutting processes," said Kozirowski.

Forming equipment at ProtoTier-1 includes hydraulic presses ranging from 40 to 1500 tons, with the bed sizes up to 60 x 192 in. The range ensures that the company can fabricate sheet metal parts varying in physical size and thickness.

ProtoTier-1 also has good experience working with complicated form and deep draw prototypes. However, Murray noted, "in short runs, simplified parts are now appealing to businesses."

If a customer is late with the production tooling, ProtoTier-1 is capable of filling in the gap. Typical stampings include seat components, and lift gate, door and hood hinges. But ProtoTier-1 is about more than automotive parts, Kozirowski emphasized. "We can do work for hospitals, appliance and furniture companies, and are more than capable of providing service for agricultural applications."

Info Card 339

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# Spotlight

## Factory Automation



### Time-to-digital converter

Agilent Technologies has introduced the first time-to-digital converter (TDC) from its Acqiris product line that features six independent stopwatches for precise timing measurements from a common start event to multiple stop events at a high resolution. The TC890 is suitable for time measurement applications, including laser detection and ranging (LIDAR) for 3D mapping and navigation.

agilent.com

Info Card 297



### In-line flow meters

The Omega FV100 series are made up of in-line flow meters that use the vortex shedding measuring principle. As the fluid strikes a bluff body, imparting alternating vortices downstream of the bluff, it creates a vibration on a sensor body containing a piezoelectric crystal. The frequency of the sensor is proportional to the velocity of the fluid and is amplified and converted to a 4 to 20 mA output signal.

omega.com

Info Card 302



### 3-channel color sensor

Festo has announced what it says is the world's smallest color sensor. Using an internal white LED source, and with a 50 x 50 x 17 mm housing, the SOEC-RT-Q50 can locate objects anywhere within its 12 to 32 mm operating range. The IP67 units have a switching frequency of 500 Hz and 3 independent channels with "teach in" capability for recognizing new colors of objects.

festo.com

Info Card 303



### Climate control doors

Rittal Systems has developed a modular system for climate control doors supplied from the warehouse. There are eight different sets of dimensions and six different climate control modules with different output levels and operating voltages. The profile doors, fitted in place of standard doors, for holding the climate control modules are available for enclosures 600, 800 or 1200 mm wide and 1800 or 2000 mm high.

rittal.ca

Info Card 301



### Optical flange sensing

Amacoil has announced an optical flange sensing system said to enhance coil winding accuracy. A light transmitter and a receiver create a steady beam of light. When the spool flange breaks the beam, it signals a switch to turn the reverse lever on the Uhing winding drive. Because the system does not rely on the reflective properties of the take-up spool, it can be used with spools of any color, made of virtually any material including metal, paperboard, wood or plastic.

amacoil.com

Info Card 304



### Photoelectric sensors

Pepperl+Fuchs has introduced ML20 series photoelectric sensors. The 20 x 11 x 31 mm sensors are available in diffused, divergent, polarized retro-reflective and thru-beam models. Diffused and divergent models offer 1 m and 100 mm sensing ranges, and are suitable for reflector-free and clear object detection, respectively.

am.pepperl-fuchs.com

Info Card 298



### Programmable controllers

The Sysmac CP1H programmable controller from Omron has built-in pulse outputs for four axes, analog I/O and serial communications, as well as a USB port. XA CPU units provide 4 input words and 2 output words, and counters provide 4-axis differential phase control. With 4 high-speed encoder inputs up to 1 MHz (single phase) and 4 pulse outputs up to 1 MHz (line driver), CP1H CPUs are suitable for positioning and speed control. Units have UL, CSA and CE approvals.

omron.ca

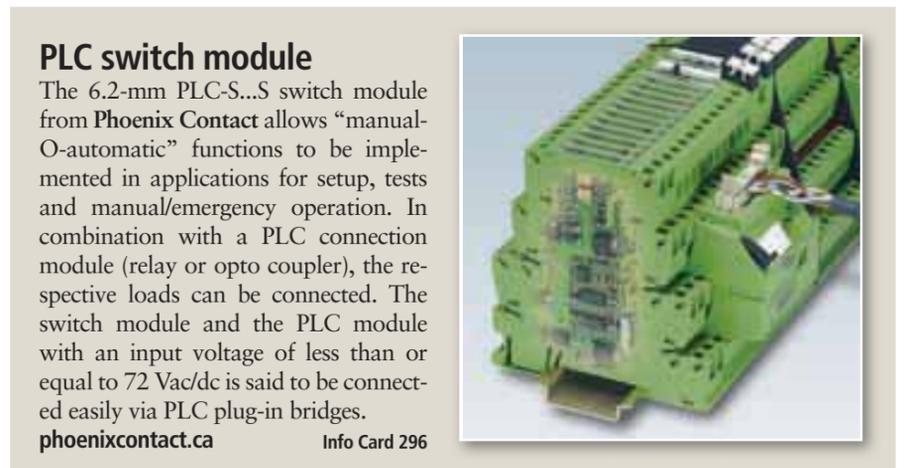
Info Card 294

### 8 channel circuit breaker

The SigNext 8 channel circuit breaker product from emphatec provides eight 24 Vdc rated circuit breakers in a 35 mm wide housing. Less than 4 mm per breaker is said to make the unit even smaller than the most compact DIN rail mounted fuse terminal. A single 24 Vdc input powers all eight supplemental breakers. The manual reset is common to all eight breakers. Modules are available with 0.5, 1.0, 1.5 and 2.0 A breakers. By using the SET and OFF digital inputs, the module can be PLC or DCS controlled. The circuit breaker was designed for use with 24 Vdc power supplies where the available short circuit current does not exceed 800 A.

emphatec.com

Info Card 295

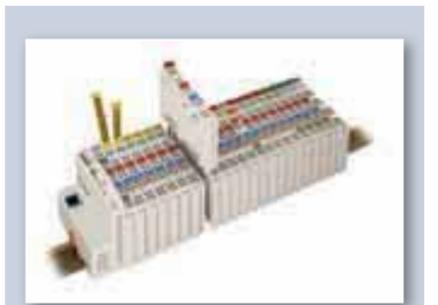


### PLC switch module

The 6.2-mm PLC-S...S switch module from Phoenix Contact allows "manual-O-automatic" functions to be implemented in applications for setup, tests and manual/emergency operation. In combination with a PLC connection module (relay or opto coupler), the respective loads can be connected. The switch module and the PLC module with an input voltage of less than or equal to 72 Vac/dc is said to be connected easily via PLC plug-in bridges.

phoenixcontact.ca

Info Card 296



### 4-channel analog modules

Two 4-channel analog modules for the WAGO-I/O-System have been introduced. Designated the 750-553 (0 to 20 mA) and the 750-555 (4 to 20 mA), both modules are housed in a 12 mm wide, DIN rail mount housing and are compatible with all other 750/753 Series bus-couplers, controllers and I/O modules. Features include: 12 bit resolution; accuracy up to +/-0.1% of FS; LED status indication; one common ground potential for all outputs and electrically isolated outputs to 500 V.

wago.com

Info Card 300



### Fail-safe inductive sensor

ifm efector has introduced a fail-safe inductive sensor that does not require a coded magnet or keyed target for safe operation. The 15 mm range product integrates a patented, non-contact inductive sensing principle that is rated up to Category 4 according to EN954-1 for safety applications.

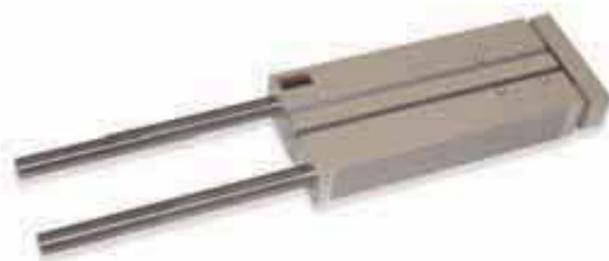
ifmefector.com

Info Card 299

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Visit [bimba.com/solutionsshop](http://bimba.com/solutionsshop) to view more custom solutions like this pneumatic Hand Tool, developed for an automotive manufacturer to automate the grabbing, pulling and trimming of plastic ties.



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The Linear Thruster is a rugged, guided actuator with a cylinder integral to the thruster block. A durable housing with guide shafts along with a sleek body keeps the thruster from rotating and allows it to carry higher loads.

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Info Card 8



## REPAIRABLE STAINLESS STEEL CYLINDERS

The round, smooth bodied design prevents potential sources of bacteria growth and contamination and has proven ideal for washdown environments. Designed specifically for food processing applications, this is the only cylinder that meets USDA regulations.

For more information visit [www.bimba.com](http://www.bimba.com) or call toll-free 800-442-4622

Info Card 9



## TRD ROD LOCK

Bimba introduces the RL Series Rod Lock Cylinder to the TRD product line. With a 100% ball bearing design, the new RL series distributes even locking (clamp-holding) force along the shaft, providing low fatigue on clamping components and no appreciable wear on the piston rod. This unique design extends the life of the Rod Lock and gives superior locking forces that are rated highest in the industry.

For more information visit [www.bimba.com](http://www.bimba.com) or call toll-free 800-442-4622

Info Card 10



## ULTRAN® BAND RODLESS CYLINDER

Designed to address the unique sealing challenge of a mechanical piston/yoke connection, the Bimba Ultraband can be used for door opening, material handling/conveying, packaging and palletizing. See for yourself how the Ultraband out-seals the competition by upwards of 75%.

[bimba.com/bandsvideo](http://bimba.com/bandsvideo)

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Info Card 11



## TRD STAINLESS STEEL TIE ROD

These stainless steel, tie rod cylinders are available in a variety of designs to meet your heavy-duty food processing demands: NFPA interchangeable, non-rotating, force multiplying and air/oil.

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Info Card 12

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# EASY-TO-USE NO-NONSENSE PNEUMATIC SOLUTIONS.



## TWIST CLAMP

Tested to millions of cycles, this long-lasting cylinder outperforms the competition tenfold. Designed to swing up and out of the way after clamping, Bimba's Twist Clamp is an ideal solution for light-duty holding applications where easy work piece removal is necessary.

Info Card 13



## SQUARE ROD

This Original Line cylinder delivers precise, guided motion in one convenient, cost-effective package. By incorporating a stainless steel square rod with rounded corners and a tough aluminum alloy rod guide, the Square Rod ensures non-rotational motion without the need for multiple components.

Info Card 14



## EF2 CYLINDER

This compact, complete and ready-to-use solution is perfect for applications requiring non-rotation. Constructed of durable, hard-anodized aluminum, the EF2 uses two outboard guide shafts, eliminating any twisting or spinning upon actuation to guarantee consistent performance.

Info Card 15

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## Products: Factory Automation

### Operator interface enclosure



Hoffman has released the CC3000 Operator Interface Enclosure System designed to protect operator interface terminals and electronic monitors in UL Type 12 industrial environments. The system is built on a modular platform whereby users can select from four models sized to fit the most common HMI tools, including flat-screen devices, lights, meters and gauges. The company can also custom-size the CC3000 in millimeter increments from 250 x 250 mm to 600 x 600 mm.

[hoffmanonline.com](http://hoffmanonline.com)

Info Card 305

### Safe automation terminals

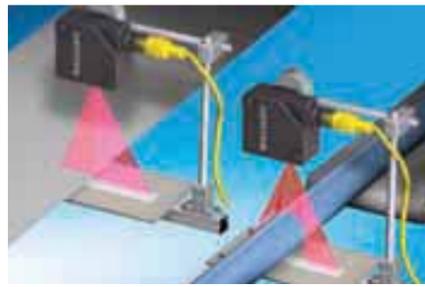


Beckhoff Automation has announced TwinSAFE safety I/O technology for North America. TwinSAFE systems are created by using safety I/O terminals in conjunction with standard Beckhoff I/O terminals and DIN rail mounted controllers. When using TwinCAT PC-based automation and control software, users can create typical safety functions such as emergency stop, safety doors and light curtains. TwinSAFE

I/O terminals interface with common safety sensors and actuators.

[beckhoffautomation.com/twinsafe](http://beckhoffautomation.com/twinsafe) Info Card 306

### Photoelectric line sensor



The BOL 27K measuring line sensor from Balluff provides a way to sense product width, edge detection, hole location and web loop tension. With both discrete and analog outputs, the 0.15 mm resolution retroreflective photoelectric sensor projects a measuring line of light on to a strip of special reflective tape which it uses to measure and locate key attributes of an object. For objects that are more than 150 mm wide, two units can be used in concert to provide the measurement.

[balluff.com/linesensor](http://balluff.com/linesensor)

Info Card 307

### Small ultrasonic sensors



The 10 x 14 x 27 mm SONUS from Baumer Inc. offers a 200 mm sensing range in both digital and analog output types. The 4 g mass makes the sensor suitable for applications with quick movement, such as robot arms and grippers. The IP67-rated unit also features a teach function and an 8 mm connector. Ultrasonic sensors can detect almost any object or liquid without being affected by color or transparency.

[baumer.ca](http://baumer.ca)

Info Card 308

### M12 shielded connectors



Binder-USA has announced a design enhancement for the M12 shielded connectors within its 713, 715 and 825 series. The revised version reduces the amount of loose parts and reduces the number of assembly steps from 8 to 6. The improvements are made possible by preassembling the insulation sleeve inside the metal housing and by securing the O-ring to the shielding ring. Units are available with up to 12 contacts and will accept a cable with an outer diameter of up to 8 mm.

[binder-usa.com](http://binder-usa.com)

Info Card 313

### Ruggedized COTS enclosures



Carlo Gavazzi Computing Solutions has announced rugged electronic packaging services for commercial off-the-shelf (COTS) products. The products are said to offer users the capability to outfit standard commercial products such as computers, servers, data storage units and mobile electronic equipment, with a more protective enclosure. The enclosures are engineered using aluminum with welded seam construction. Meeting MIL specs, units can be configured with a shock and vibration isolated sub-chassis and a temperature control system to fully shield the internal de-

vices from extreme temperatures.

[gavazzi-computing.com/services](http://gavazzi-computing.com/services) Info Card 314

### Stainless steel switches



A range of stainless steel pushbutton switches for use in harsh environments is now available from EAO Switch Corp. Switches and indicators in 22.5 and 30.5 mm size are available. If space is an issue, a stainless steel switch with a low behind-panel depth is offered. EAO can also supply stainless steel switches with LED illumination. Units can also be laser engraved with specific symbols and legends that will not wear off or corrode.

[eaoswitch.com](http://eaoswitch.com)

Info Card 315

### M8/M12 sensor connectors



The M8/M12 connector system from Tyco Electronics includes single end terminated cable assemblies that use an over-molded construction with a choice of PVC or PUR cables in 2 to 10 m lengths. Within the M12 cable assembly range, additional options include screening and LED indication. Panel mount products are offered with a choice of solder cup or PCB termination. A range of field serviceable connectors and Y adaptors are provided. Products offer a minimum of IP67 protection.

[tycoelectronics.com](http://tycoelectronics.com)

Info Card 311





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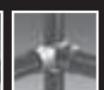
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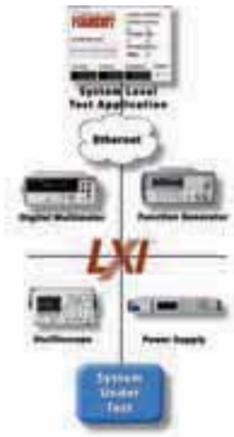
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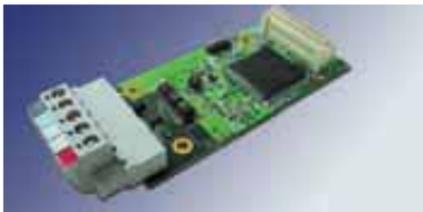
Info Card 16

**LXI measurement software**



Data Translation has announced the Instrument Pak for Measure Foundry software. Instrument Pak is said to provide the first drag and drop graphical software for LXI test and measurement applications. Users can configure applications with newer LXI instrument capabilities using IVI-COM drivers along with existing VISA and SCPI programs. Measure Foundry is an open application builder that now supports standard instruments such as function generators, oscilloscopes, DMMs and programmable power supplies for automated test equipment.  
[datatranslation.com](http://datatranslation.com) Info Card 317

**DeviceNet modules**



Woodhead Industries has introduced the BradCommunications DC100DN OEM module for the DeviceNet fieldbus. The modules are 90 x 40 mm and provide a connection to a choice of fieldbuses (CC-Link, Profibus-DP, DeviceNet). The modules of the line are interchangeable, interfacing with the host system through a 60-point connector. Pinout are identical regardless of the type of module. The data exchanges and the various network services are carried out directly through dual port memory, reachable via a generic library of functions.  
[woodhead.com](http://woodhead.com) Info Card 316

**Cable and hose carriers**



The Gortrac Division of A & A Manufacturing Co., Inc. has introduced the Nylatrac Automation Line of cable and hose carriers. Designed for high speeds and high accelerations, the line includes QT series Quiet Track carriers said to offer significant noise reduction over standard carriers, Gortrac modular guide troughs for long travel support, All-Round multi-axis carrier systems, Bantrac single piece extruded carriers and Nylatube fully enclosed carriers with drop-through options.  
[gortrac.com](http://gortrac.com) Info Card 312

**Electronic vibration switch**



The IMI Sensors Division of PCB Piezotronics has received CSA hazardous area approval for the Model 685B0001C14 electronic vibration switch. The certification includes Class I, Division 1, Groups B,

C & D; and Class II, Division 1, Groups E, F, & G. The switch offers variable time delays, dual 10 A form C relays, and dual NPT openings. The switch also features a 4 to 20 mA output proportional to the measurement range, as well as the raw vibration signal from the integral accelerometer.

[pcb.com](http://pcb.com)

Info Card 310

**Color laser scanner**

The FARO Color Laser Scanner LS is a portable, computerized measurement device that scans, digitally recreates and records all of an area or object's dimensions in full color, creating what looks like a "photograph" on the computer screen – but in 3D. The captured data can be used to create a digital model for factory plan-



ning, building information modeling, as well as inspection, reverse-engineering and CAD-to-part comparison. The scanner captures 50 million pixels in 2.5 min.

[faro.com](http://faro.com)

Info Card 318

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	<b>piconet®</b> <ul style="list-style-type: none"> <li>• Miniature size</li> <li>• Connectorized</li> <li>• High-speed fiber-optic subnet</li> </ul>	
I/O Stations	<b>AIM</b> <ul style="list-style-type: none"> <li>• -40° to 70°C</li> <li>• Rugged 50G shock/vibration</li> <li>• Fully encapsulated</li> </ul>	<b>FD20</b> <ul style="list-style-type: none"> <li>• Highest density, smallest footprint</li> <li>• Drive interface</li> <li>• OEM applications</li> </ul>

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## Feature: Factory Automation

# Automation assists in building energy management, precast concrete quality control

By Mike Edwards

**W**OODSTOCK, ON – Glenile Electric Ltd. has had many years of experience in the traditional electrical industry, servicing the industrial, commercial and residential markets. Lately, however, it has begun applying factory automation technology to win project bids throughout its entire customer base in southwestern Ontario.

Two of its customers couldn't be more different and yet have recently integrated micro PLC technology to maximize quality control and minimize energy consumption.

At the utility Woodstock Hydro Services

Inc. ([woodstockhydro.com](http://woodstockhydro.com)), Glenile's industrial and automation designer Brad Mellick was faced with designing and commissioning an updated energy management system in an office building/truck garage built in 1961. With the help of local IDEC Canada Ltd. ([idec.com/canada](http://idec.com/canada)) technical sales representative Dennette Woodworth, his solution was to specify the IDEC microPLC at the heart of system.

Glenile's natural inclination was to install a new HVAC system. This option was explored, but because it is expensive and there were budgetary concerns, more creative options were also explored. Mellick and Woodworth looked at the system requirements and came up with a

bill of materials that would solve the customer's energy problem and fit into their budget. Using IDEC PLCs, HMI, relays and power supplies, the system could be installed cost effectively to meet the budget and reduce energy cost significantly.

The office building had individual thermostats scattered through four floors to control the heating and cooling. For better control, a master control panel was proposed with an IDEC HG4F screen and a FC5A master PLC installed in the basement of the build-



Brad Mellick of Glenile Electric demonstrates the touchscreen control panel at Woodstock Hydro. Inset: IDEC PLC and power supplies inside the panel.

ing. Three remote PLCs would be installed on each of the floors, connected together on an RS485 Dlink network. The individual room thermostats would be replaced with PT100 zone temperature controls to send temperature information to the PLC. Door interlock switches would shut down the heaters when shipping doors are open to prevent heat loss. Communication would also be required for a variable frequency drive (VFD) motor controller on the main air supply fan.

"By having all the power supplies in one panel, we only had to run 24 Vdc wire to the remote PLCs," said Mellick. "This saved the additional costs of wiring 110 Vac at each remote location, along with the extra circuit breakers and conduit that would have been required, as well as an electrical code safety inspection."

Set point temperatures are programmed into the master HMI control panel to conserve energy when no one is working in the building.

Mellick found IDEC's WindLDR analog and digital device deployment software easy to learn. The system was bench tested at the shop and installation went smoothly with very few issues.

Derek Woodend, Meter/Substation supervisor at Woodstock Hydro, said the Glenile Electric system was "expected to provide significant savings – especially with the building's electric heat – but had already exceeded expectations."

For example, kWh energy consumption for July 2006 was billed at \$4,159.48 compared to \$3,125.84 for July 2007, a reduction of 25% even before cold weather. By contrast, prior to the Glenile system installation in May, the April 2007 Woodstock Hydro facility bill had actually increased 31% over April 2006.

Maintenance supervisor Duncan Hines at Glenile Electric customer Pre-Con Inc. ([pre-con.com](http://pre-con.com)), a subsidiary of Lafarge, has to ensure that its precast/prestressed concrete components for bridges and other structural elements meet stringent quality-controlled, CSA standards.

The controlled environment for producing the concrete is directed by a MicroSmart Pentra-based PLC and 12-in. touchscreen display from IDEC specified by Mellick. As part of a plant expansion at Pre-Con, his design mimics the controls of an older, more expensive Allen-Bradley system still in operation at the Woodstock facility.

Said Mellick: "Glenile Electric has found the IDEC PLC products to be a reliable and cost effective solution for most industrial and commercial applications to compete in today's market."

Info Card 328

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### K-SERIES

SEW-Eurodrive's K-Series right angle helical-bevel gearmotors deliver maximum performance and reliability with 95%+ efficiency and high torque density. Durable gearing designed for long service life makes this drive an ideal choice for around-the-clock applications.

MODEL K-SERIES	
<b>Power ratings</b>	from .07 to 592 HP
<b>Output speeds</b>	from .05 to 317 rpm*
<b>Output torques</b>	to 442,500 lb-in.

\* Based on 4-pole motor **Info Card 19**



### S-SERIES

SEW-Eurodrive's S-Series gearmotors offer helical-before-worm gearing that combines durability with power-packed performance in a compact design requiring no motor belts or couplings.

MODEL S-SERIES	
<b>Power ratings</b>	.07 to 53 HP
<b>Output speeds</b>	from .05 to 250 rpm
<b>Output torques</b>	to 35,400 lb-in.

**Info Card 22**



### R-SERIES

SEW-Eurodrive's R-Series Parallel Gearmotors deliver exceptional performance and reliability combined with low maintenance. Available in many configurations, they distinguish themselves with their efficiency and durable gearing.

MODEL R-SERIES	
<b>Power ratings</b>	from .07 to 433 HP
<b>Output speeds</b>	from .06 to 1340 rpm
<b>Output torques</b>	to 159,300 lb-in.

**Info Card 23**



### F-SERIES

SEW-Eurodrive's F-Series parallel helical gearmotor lives up to its name as the ideal drive for tight space conditions. This compact drive, with its multiple mounting configurations, is a rugged alternative to right angled gearmotors.

MODEL F-SERIES	
<b>Power ratings</b>	from .07 to 330 HP
<b>Output speeds</b>	from .05 to 453 rpm*
<b>Output torques</b>	to 159,300 lb-in.

\* Based on 4-pole motor **Info Card 20**



### W-SERIES

The W20 Series and W30 Series right angle gearmotors are single-stage units with unique Spiroplan gearing. They differ from worm gears in their steel-on-steel material combinations and special tooth meshing design which makes wear-resistance and quiet operation possible.

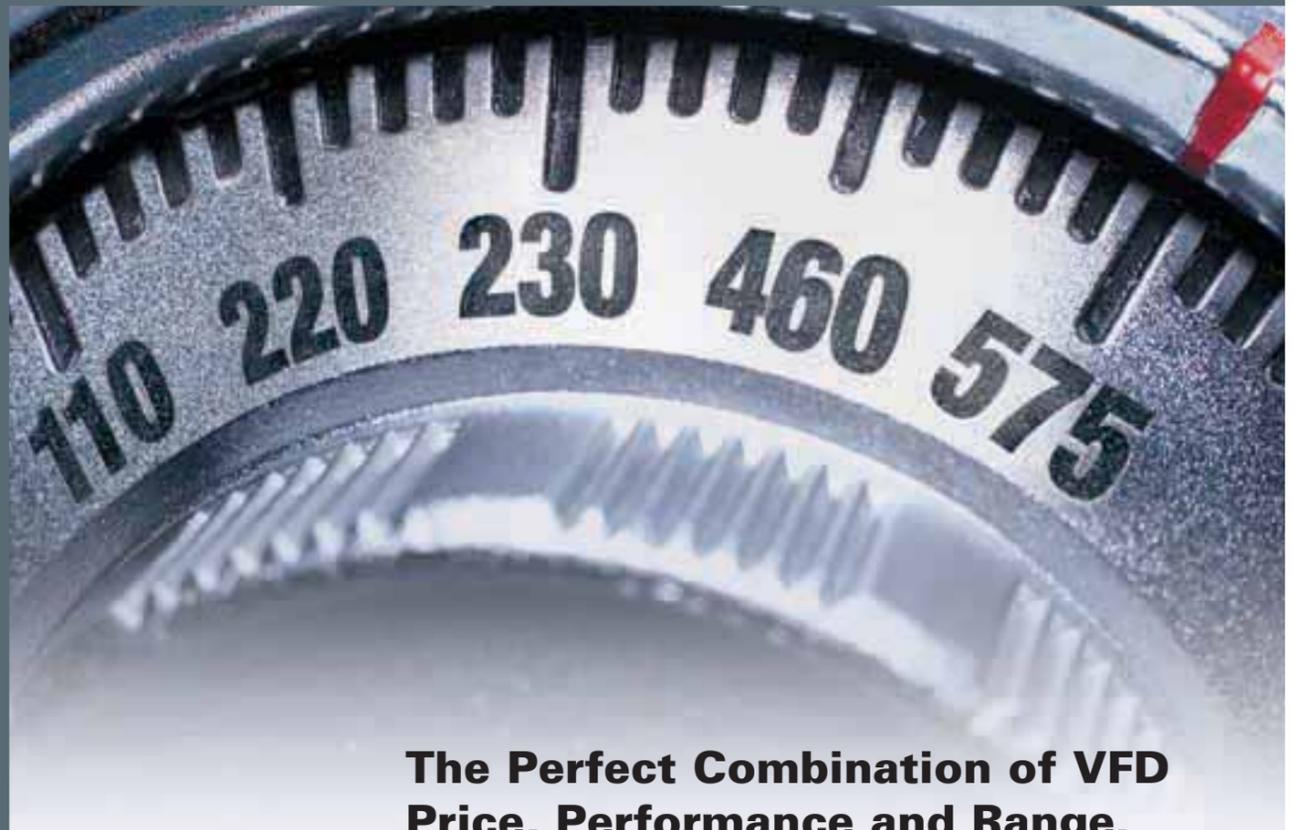
MODEL W-SERIES	
<b>Power ratings</b>	up to 1 HP
<b>Output speeds</b>	from 15 to 207 rpm*
<b>Output torques</b>	to 770 lb-in.

\* Based on 8-, 6-, or 4-pole motor **Info Card 21**

# SEW EURODRIVE

For more information, fill in the Info Card

## Introducing Movitrac® LT



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Info Card 24

**Feature: Factory Automation**

# Bombardier "on board" with measuring arm



Traditional inspection methods slowed the production stream, so Bombardier automated the process with Faro inspection arms (inset). Software collects the measured points and compares them to nominals from the original design.

**B**ombardier's La Pocatiere, QC, facility is a key link in a NAFTA-inspired manufacturing network where assembly of electric commuter trains is shared with a sister facility south of the border in, Auburn, NY.

Parts for carriage bogey trucks and the upper structural parts of the cars are formed and welded as they would be in any sophisticated welding and fabricating shop, but on a scale to accommodate the production of rail cars. For the bodies of the cars, frames,

sides and roof pieces are cut from stainless and carbon steel, then placed in jig fixtures where they are welded by robots. Doors, windows and panels must fit together within accepted body-work standards.

Bombardier engineers used to monitor dimensions of bogey parts for absolute position, for surface flatness, and for surface parallelism. In the past, this was done with conventional mechanical measuring implements such as rules, squares and tapes. For some specific items, technicians would build dedicated go-gages.

However, with over 2000 points to check on each bogey truck – on four units per day – inspection proved to be the beaver that dammed the production stream.

"It was a nightmare," explained Dominique Dumas, final inspection quality specialist. "Also, a go-gage offers no quantitative information. Only a yes or a no as to whether a part is good. You can learn nothing from that."

No two technicians read a rule or caliper the same way; what gets recorded as one number on the first shift can be recorded as something larger or smaller on the second

## 3D system removes data discrepancies of technicians

shift. Also, some critical dimensions such as setting a "zero point" on a truck for finish machining were almost impossible to measure accurately with mechanical tools; they are determined by triangulation from multiple points on the bogey, one of which is in midair. Finally, there was the problem of coordinating the data between the two plants. What the company needed was a way to be able to measure all points in the same manner regardless of who was taking the measurements.

What they found to do these tasks was a FaroArm, a portable 3D measuring system from Faro Technologies, that uses optical encoders in articulating arm joints to pinpoint an exact point, digitize it, then record it in a computer.

At Bombardier, the system reduced bogey measurement time from several hours to less than one. A technician positions the arm on one side of the truck, then touches pertinent locations with the stylus on the end of the arm. When the stylus is in the desired location, the operator presses a button on the handle to record the X-Y-Z location and I-J-K orientation of the point. When one side is measured completely, the technician uses a feature known as "leap frog," to relocate the arm on the other side of the bogey, and the checking continues.

Data from the arm is fed to a computer that operates with one of dozens of compatible software programs compatible with the arm. This software collects the measured points and compares them to nominals from the original design. As soon as a unit is measured, the software can generate SPC reports that show not only how close the truck is on critical tolerances, but also dimensional drift from one unit to another.

*This article was contributed by Faro Technologies Inc. (faro.com).*

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# Automotive Scene

## Gear Wars: carmakers leapfrog up to 8-speed trannies

By Bill Vance

To start this on a personal note, my 1986 Audi had a 3-speed automatic transmission. By the time I moved up to a '94 model it came with a 4-speed. Now my 2002 A6 has a 5-speed, but even that has been superseded by technology; in 2005 the A6 went to a 6-speed. This is not an unusual progression in the industry.

Manuals have seen a similar proliferation in ratios from 3-speeds predominating in the 1950s and 1960s to 4-speeds in the 1960s and '70s to 5-speeds in the '80s. The 1990s saw 6-speed manuals starting to creep in.

What's driving this march to more and more transmission ratios? A variety of goals, including noise reduction and lower engine wear, better driving flexibility and the improved fuel economy and lower emissions that come with selecting the ratio that keeps the engine in its "sweet spot." And all this has to be accomplished while maintaining vehicle performance.

The quest for fuel economy was a big incentive in driving the American industry to more ratios, something that line-haul truckers have known for years. Lowering emissions is also playing an increasingly important role. And from the driver's perspective, the more ratios there are the



The 2007 Lexus LS 460 sedan features an automatic 8-speed transmission, surpassing the 2005 Mercedes-Benz 7-speed automatic in the E-Series. Continuously variable transmission, with its infinite number of ratios, has not yet proved durable enough under high torque applications to find widespread adoption.

more imperceptible the shifts will be.

Another more intangible factor is the drive to one-up the competition. Just as we have a horsepower race going on, we now have a gear ratio race, so it's not surprising that Mercedes-Benz introduced a 7-speed automatic in its 2005 E-Series cars. Not to be outdone in the luxury class, Lexus responded with an 8-speed auto in its 2007 LS 460 sedan.

But the industry never rests in a super competitive marketplace, and now German transmission maker ZF has developed an 8-speed automatic that takes up

the same space as its 6-speed. ZF says it has torque capacity of more than 500 lb ft, better shift quality and more efficiency than their 6-speed. It is adaptable to 2- or 4-wheel drive, and they expect to have it production ready by 2009.

Where it will end is anybody's guess, but can a 9-speed be far away? Inevitably the law of diminishing returns will have to set in, but it appears we are not quite there yet. ZF has calculated that average fuel economy improves 4 to 5 % for each ratio added beyond three speeds, and this seems to hold true even up to the 8-speed level.

Hamid Vahbzadeh, General Motors' director of advanced power transfer and global innovation, presents a more cau-

tionary approach. As he told Automotive Engineering International, while moving up from three to six speeds shows good progressive fuel economy benefits, GM's simulations show these dropping off above six speeds. Adding more and more gears and clutches increases internal friction losses in the transmission, and he thinks the big volume will be in 6-speed automatics.

And as additional gears are added, the transmission's electronic controller must become more and more sophisticated in "talking to" the engine's controller before selecting the optimum gear. Because the car can obtain a wide range of its speed capability in three or even four ratios, the transmission must be able to anticipate the driver's wishes. By monitoring accelerator pedal angle and the speed of its change in position, the controller attempts to select the appropriate ratio for the driver. It also must resist excessive yo-yo-ing among gears.

In spite of differing opinions, there are some gains to be made beyond six speeds, and GM, Ford and other proprietary transmission makers besides ZF are working on more ratios. After all, one must not fall too far behind the competition, even if it's only for bragging rights.

**Lowering emissions playing an important development role**

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**Feature: Hydraulics & Pneumatics**

# Sawmill equipment manufacturer optimizes its cut of the international planer market

Since 1996, Roberval, QC-based Gilbert Products, Inc., a designer and manufacturer of forestry equipment, sawmilling equipment, and surface groomers has only served North American customers. This was mostly the result of the company's limited capacity to provide local support and service to its potential international customers, as well as its inability to convert components back and forth from North America's imperial measurement system to the metric system embraced by Europe and the rest of the world.

While in the process of redesigning its Pull-Through Planers to significantly increase the speed, Gilbert (gilbert-tech.com) received requests from VIDA AB, Sweden's largest privately owned sawmill, and Klausner Nordic Timber GmbH in Germany, both of which were interested adding the planers to their production lines. Naturally, Gilbert wanted to accommodate them, but it still had to resolve the redesign and the imperial/metric conversion issue, as well as determine a way to support its products in both of these countries.

To help address these issues, Bosch Rexroth Canada joined the project during the re-design phase, when Gilbert was asking competing manufacturers to move 5000 lb over 3/8 in. distance in 0.13 s using ballscrews to achieve the speed. Gilbert worked with Bosch Rexroth engineers to refine the calculations, and then Bosch Rexroth came back with a proposition for the components, which included the ballscrew move profile at what was considered a very competitive price. Though the ballscrews were the catalyst that brought Bosch Rexroth into the Gilbert project, in the end they turned out to be just one of many Rexroth components adopted into the new design.

"Gilbert appreciates Bosch Rexroth because they work closely with us through their service and engineering groups," noted Daniel Pare, supervisor of engineering for Gilbert. "Also, all drawing and data sheets are available on the web for our engineers to quickly and easily access. This allows them to design faster and get calculations quickly directly from the web."

Once part of the Gilbert team, Bosch Rexroth Canada engineers were able to introduce several other components as the project progressed – components from not just one, but three Rexroth technology groups.

The Linear Motion and Assembly Technologies group provided ball rails and rolled screws, the Pneumatics group provided cylinders, actuators, FRLs and valves, and the Hydraulics group provided the hydraulic power unit (HPU) for the water glycol cooling system.

All Gilbert Planers use the company's patented Pull-Through Technology, whereby each board is drawn through the planer independently, regardless of the space between each piece. Conversely, in standard planing machines, all pieces of wood are pushed together, such that each piece pushes the next one out. This method, however, increases the potential for defects. The boards are constantly in contact with one another, which can cause cracks and

breaks in each board and can also jam the machine. Alternatively, the Gilbert planer pulls each piece independently, and there is always a gap between each piece.

According to Pare, not only did the Rexroth ballscrews and other components enable Gilbert to achieve the speeds and performance parameters it desired, but they also allowed Gilbert to reduce the amount of manpower required to run the planers and eliminated 60% of the required piping as compared to the previous design that didn't use the ballscrews.

Gilbert now says it offers the fast-

est planer on the European market at a speed of 1200 m/min. The next closest competitor offers 600 m/min.

"We had never delivered outside of North America before, but we agreed to deliver the machines to Sweden and Germany with Rexroth components because it would give the two companies access to spare parts and service (internationally)," explained Pare.

## Redesign of planer significantly increased speed



Gilbert Pull-Through Planers. Insets: Ballscrews (top right) enable Gilbert to achieve the speed specification of moving 5000 lb 3/8 in. distance in 0.13 s. A hydraulic power unit is used in the water glycol cooling system (bottom right).

This article was contributed by Bosch Rexroth Canada (boschrexroth.ca). Info Card 319

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Info Card 29

**Feature: Hydraulics & Pneumatics**

# Electro-pneumatic system saves workers from injury

By Mike Edwards

BRANTFORD, ON – Repetitive strain injuries (RSIs) are a common problem at high-volume parts handling companies, and automotive tailored blank part supplier Noble Metal Processing Canada, Inc. is no exception.

Noble (nobleintl.com) wanted a solution for its operators that daily handle hundreds of 30 to 50 lb laser-welded steel blanks which emerge from inspection laser welding stations at various locations around its plant.

The production of zero-defect laser-welded blanks involves a blanking process followed by a laser welding process. The

blanking process consists of cutting two or more pieces of steel into components that will form a tailored blank when laser welded together. The component blanks (supplied to the Noble plant in Brantford) are of different thicknesses and often of different types of steel, e.g., galvanized or mild. Using different thicknesses and types of steel optimizes the structural and corrosion-resistant properties while minimizing cost and weight.

After blanking, the component blanks are carefully prepared for welding and clamped together. A focused beam of energy, the laser, then welds the components together to create a laser-welded blank.

According to Ralph La Stella, maintenance technician and 10-year veteran

of Noble Canada who has been with the company since day one, “our product has to be 100% defect free for our customers. Each laser-welded blank has to be inspected.” Customers include General Motors, with tailored blanks for the Equinox and Impala models, and Chrysler, with tailored blanks for the 300, Charger and Magnum models. Linear and non-linear laser-welded blanks created at Noble are produced for inner door panels, window frames, whole body sides and floor pans.

La Stella took on the personal challenge of creating a table that would eliminate the RSIs that operators were suffering as result of turning and shifting the blanks to

view them properly. So with the help of La Stella, local automation systems integrator Edwards Pro-Tech Ltd. (edwardsprotech.com) and Festo Inc. (festo.com), Noble

## Noble Metal Processing Canada achieves goal of eliminating RSIs



Noble Metal Processing Canada veteran Ralph La Stella demonstrates laser-welded tailored blank inspection station turntable. The Festo electro-pneumatic controls (inset, bottom) permit operators to flip blanks into a vertical orientation for detailed inspection of weld seams without incurring repetitive strain injuries (RSIs).

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**New Pressure Reducing Valves are Stable in Static Load Applications.**  
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**New Universal User-Programmable Dual-Coil Valve Driver**  
The EVDR is a compact, plug-in-mount, easily programmable controller for use with any single- or dual-coil HydraForce proportional valve having the molded-in Deutsch DT04-2P connectors.  
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**New 6-Way Selector Valve is ideal for Selector or Series/Parallel Circuits.**  
One cartridge can be used to select either of two functions, so the manifold can be smaller with reduced system complexity and lower overall system cost. The SV80-61 was created for low-flow secondary circuits such as side-shift or tilt functions on low-flow reach truck applications.  
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came up with an ingenious vertically-oriented electro-pneumatic inspection turntable platform that has reduced lost man-hours considerably within the plant. “Now operators can stop the turntable in mid-rotation to inspect welds without health and safety concerns.

“The system provides significant improvements” over the labor-intensive methods of the past where staff had to use their hands to pinch-grip the blanks to move them along, explained La Stella. “There’s less fatigue at the end of the day for operators, less strain on the shoulders, elbows and wrists.”

La Stella noted that the turntable system development started about 16 months ago. “I formed a team with Festo sales representative Russ Sobolewski and Edwards mechanical CAD designer Scott Anoil to build a prototype rotary table.”

The turntable platform has five vacuum suction cup-pneumatic cylinder combinations to grip the blanks after they escape from the laser welding station. One cup/cylinder unit in the middle position is also attached to a Festo DGPL rodless cylinder, so that when the other four detach, the blank can be pushed out of the turntable cage without operator intervention. If a defective weld is spotted by an operator, the blank is diverted into a bin past a pair of “whisker” limit switches that automatically send a signal to subtract it from the running total monitored at the inspection workstation.

The turntable itself rotates on a Festo DRQ-100 rack and pinion rotary actuator. System control comes from a Festo CPX which includes an FEC PLC with two 8-point input modules and a 4-point output module, and a VTSA ISO valve terminal with 6 valves that mounts directly to the turntable.

Sobolewski describes the process of Festo providing complete sub assemblies to the system integrators as a service that “provides customer specific engineered solutions with a performance guarantee all under one part number. This separates Festo from the competition – we are not just supplying commodity items.”

A total of ten turntables are now working smoothly at the Noble facility. La Stella concluded: “the team – myself, Festo and Edwards Pro-Tech – has created an awesome relationship and achieved its goal of eliminating RSIs with this turntable design.”

Info Card 320

## Feature: Hydraulics & Pneumatics

# DND finds real-time viscosity sensor for ship engines

HUDSON, NH—The Sensors & Advanced Packaging (SAP) business unit of Vectron International, a designer, manufacturer and marketer of frequency control, sensor, and hybrid products (visensors.com), has announced that its ViSmart viscosity sensor has been successfully evaluated in a simulated ship-board application for a major national maritime application by the Defense Research and Development Canada – Atlantic (DRDC – Atlantic), an agency of the Canadian Department of National Defense (DND).

As a result of the performance testing, DRDC – Atlantic (atlantic.drdc-rddc.gc.ca) has applied to DND to conduct shipboard tests for consideration of installation of the ViSmart into ship-board equipment for continuous real-time lubricant monitoring.

Randy Haggett, the condition based monitoring project scientific authority for DRDC – Atlantic, stated: “The results of the evaluation of the ViSmart sensor are very positive so far. The sensor has been shown to track the change in viscosity as a function of temperature, while also accurately monitoring fuel dilution effects on the condition of oil. Such products will enable the fleet to deploy real-time on-line diagnostic capabilities to optimize engine performance and preventive maintenance procedures.”

### Optimizing engine performance and maintenance

The ViSmart sensor was integrated into a diesel engine and testing was carried out across the entire temperature spectrum ranging from 0° to 120°C for a series of specified commercial oils that are used on-line at the ship as part of the routine operating conditions. After testing for repeatability and reproducibility, the manufacturer’s test data showed that the ViSmart detected oil aging as a function of viscosity to accuracy and repeatability values of  $\pm 1\%$ .

“Vectron’s Sensors & Advanced Packaging business is dedicated to quality, service, flexibility, and innovation,” said Kerem Durdag, director of business development, SAP business, Vectron International.

“The fact that our ViSmart viscosity sensor’s potential for continuous, real-time lubricant monitoring in a ship-board application has been successfully demonstrated is further validation of the technology in a wide array of oil condition monitoring applications.”

Vectron’s ViSmart viscosity sensor is designed to provide instantaneous sample and/or continuous, real-time, in-process viscosity measurements for embedded real-time, in-line environments requiring high resolution and accuracy in low- to mid-range viscosity fluids. The viscosity sensor uses robust and reliable semiconductor technology, has no moving parts, and is sealed for complete immersion. It is unaffected by vibration or flow conditions, does not need field calibration and is packaged in a very portable, lightweight size.

The sensor measures a wide range of viscosity of fluid and is rated for temperatures up to 125°C in a threaded bolt package for quick installation, with custom options and configurations available for

specific industry applications and process requirements.

According to Vectron, the ViSmart model series can be connected to any computer or control platform via the standard USB port and the forthcoming CANBUS and 4 to 20 mA options to provide a continuous audit trail for process monitoring markets to control operating costs and maintain quality standards. Additionally, leveraging Vectron’s Starter Kit bench-top viscometer data station, the customer can acquire multiple channels of continuous viscosity and temperature data, the company says.

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**Feature: Hydraulics & Pneumatics**

# Hydraulic brake system provides ABS and traction control

**H** ydraulic brake systems with ABS and traction control can improve vehicle performance and operator safety. A system of this type provides shorter stopping distances, improved vehicle stability, and enhanced traction for vehicles driven under extreme operating conditions.

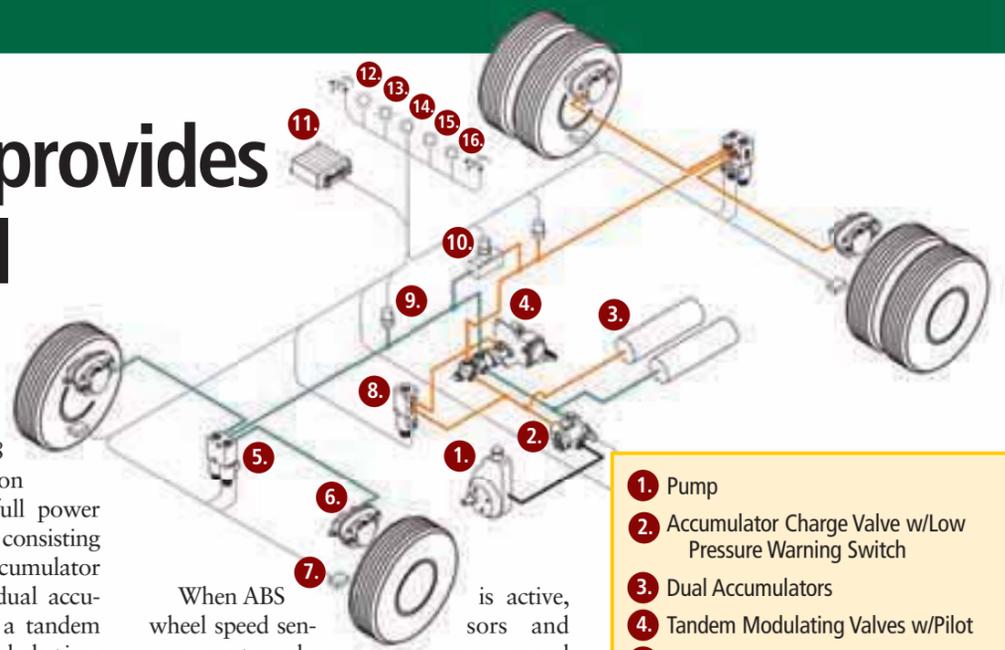
These are important concerns for the drivers and occupants of multi-wheeled vehicles operated on and off the highway, such as heavy construction vehicles, emergency vehicles, recreation vehicles, waste and recycling vehicles, and

**Improves stopping under aggressive braking conditions**

Class 6/7 trucks.

The basis of this system, for vehicles requiring up to 8 channels of ABS and traction

control, is a full power brake system consisting of a pump, accumulator charge valve, dual accumulators, and a tandem pressure-modulating valve. Electrohydraulic brake valves, a pilot section for the tandem pressure modulating valve, speed sensors, pressure transducers and an electronic control unit (ECU) are added to obtain the ABS and traction control features.



When ABS is active, wheel speed sensors are used by the ECU to determine when excessive wheel slip is about to occur. The ECU sends current to the ABS valve to reduce the brake pressure of the wheel with slip. Through the use of this control system, wheel slip is limited to a level that improves

- 1. Pump
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- 3. Dual Accumulators
- 4. Tandem Modulating Valves w/Pilot
- 5. Dual Electrohydraulic Modulating Valves
- 6. Brakes
- 7. Speed Sensors
- 8. Traction Control Electrohydraulic Brake Valve
- 9. Pressure Transducers
- 10. Differential Pressure Switch
- 11. Electronic Control Unit
- 12. ABS Control Lamp and Switch
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- 16. Traction Control Lamp and Switch

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the vehicle's stopping distance and stability under aggressive braking conditions.

When traction control is active, a loss of traction is noted by the ECU through excessive wheel spin at the wheel speed sensors. Under this condition the ECU energizes the traction control valve, which pilot operates the tandem pressure-modulating valve. The ECU also fully energizes the ABS valves of the brakes on wheels that are not spinning – blocking pressure to those brakes. The ABS valve of the spinning wheel is controlled by the ECU. It provides the level of pressure needed to keep the wheel from spinning excessively. This allows torque to be redirected to the wheels with better traction.

Programming and system diagnostics are provided with an RS232 connection between the ECU and a computer running a Windows-based diagnostics interface (DI) program.

System parameters are adjusted by factory trained technicians during commissioning of the system. These values are stored and saved to create a unique control system tuned to provide a given vehicle the desired performance under a variety of traction conditions.

Monitoring inputs and outputs, other than valve currents, are available at the I/O tab of the DI program. Several engine parameters – available from engine controllers using SAE J1939 protocol – can also be displayed.

Monitoring valve currents is available at the Outputs tab screen. In addition, outputs that can be used to activate operator lamps, such as ABS, traction control and brake warnings, can be viewed.

Should system monitoring or system diagnostics be required, the DI provides this information in a visual display for easy monitoring and troubleshooting. In addition, faults are logged to provide diagnostic information to service technicians should a problem ever occur with the system. *This article was provided by MICO, Inc. (mico.com).*

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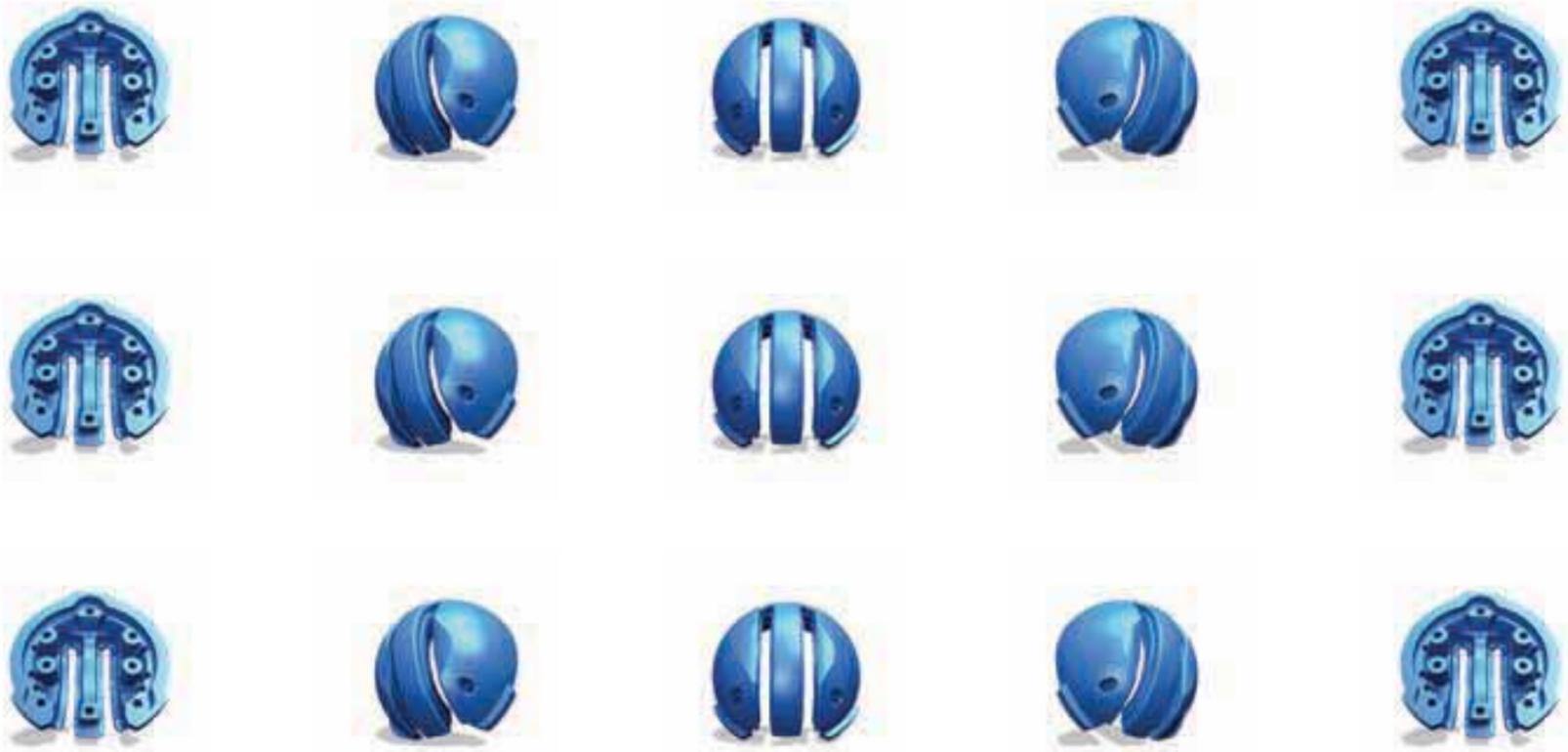
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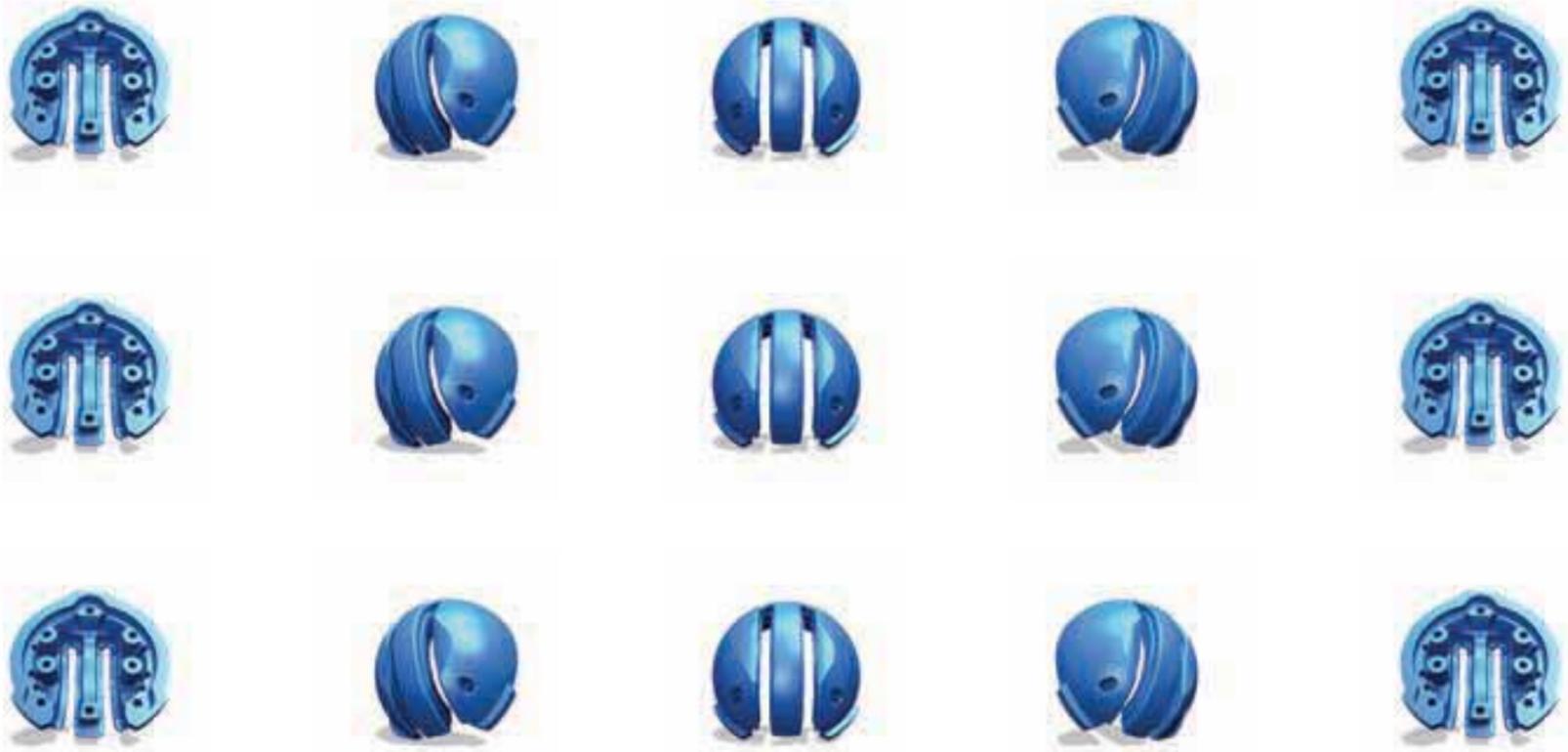
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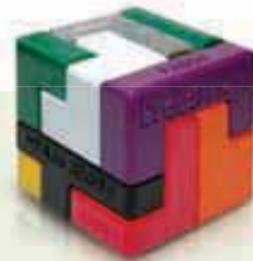


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# Products: Hydraulics & Pneumatics

## Gasketing material



Garlock Sealing Technologies has launched Multi-Swell, a proprietary gasketing material. The material creates its own load when it comes into contact with oil or water, and is said to virtually eliminate the most common cause of gasket failure – in-

sufficient load. The material is said to perform equally well in oil or water, does not degrade in contact with oils and adapts to different types of flange designs.  
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## 2D/3D cylinder configurator



Higginson Equipment Sales, has introduced an ease-to-use Cylinder Configura-

tor and detailed 2D/3D CAD drawing download function. Designers can select desired cylinder features, building a complete Higginson part number, and downloading the respective 2D and/or 3D CAD files in formats such as Parasolid, STEP, DWG, DXF, IGES and Rhino. By downloading CAD files, users are able to insert them directly into their design process.  
[higginson.ca](http://higginson.ca) Info Card 362

## Hydraulic pressure switches



Mechanical hydraulic pressure switches HED8\_2x from Bosch Rexroth cover nominal pressures up to 630 bar and can be installed directly without adapter plate with in-pipe, flange and subplate mounting. Hydraulic ports and electrical plugs K14 and K35, make the units compatible with predecessor models that are no longer available. The switches offer safety according to EN 60529 (IP65) and EN 60947 (Low Voltage Directive).  
[boschrexroth.ca](http://boschrexroth.ca) Info Card 363

## Pneumatic miniature slides



The DGSL series of mini slides from Festo have a guide unit with a repetition accuracy of 0.01 mm, and linearity and parallelism in the 1/100 mm range. DGSL/DGSL units can be combined directly without adapter plates – in pick and place or piggyback configurations. The slides in-

clude interfaces to the Festo modular handling system. The series has 8 sizes from 4 to 25 mm; strokes from 10 to 200 mm.  
[festo.com](http://festo.com) Info Card 364

## Manifold has 6 mm valve



SMC has announced the release of the series VV061 – CUBE manifold which comes with 6 mm wide 3 port valves, which can be used to operate small bore cylinders or as a pilot valve to operate air operated valves. The manifold combines valve, PCB, base and fittings. With 2 voltage options of 24 and 12 Vdc, the 6 mm width valve series V060 consumes 0.55 W in standard configuration and 0.23 W with power saving circuit, and has a response time of 10 ms. The unit comes in 4- and 8-station configurations.  
[smcpneumatics.ca](http://smcpneumatics.ca) Info Card 365

## Stainless steel FRLs



Parker Hannifin offers a line of pneumatic stainless steel filters, regulators and lubricators. The Parker Prep-Air series of air preparation units meet NACE specifications. Made from 316 stainless steel, the FRLs feature fluorocarbon seals and are suitable for systems with pressures to 300 PSIG. Air line filters are available in 1/4 in. port size and 1/2 in. port size models and feature a 2-stage filtration system. Particulate ratings are 5 to 40 microns.  
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**Feature: Hydraulics & Pneumatics**

# Lynch manifolds provide "brains" for diverse hydraulic systems integrators, OEMs

By Mike Edwards

MISSISSAUGA, ON – Not content to be a stay-at-home administrator, Ernie Lynch, president of hydraulic manifold designer and manufacturer Lynch Fluid Controls Inc., travels the world looking for new customers and design ideas. As a result, this division of the Lynch Group of Companies (lynch.ca) has designed and manufactured thousands of standard and custom hydraulic manifolds for clients here and around the world at a time when many local manufacturers have either disappeared or gone offshore.

Since the creation of Lynch Fluid Controls in 1987, the company has designed manifolds from as small as a stainless steel unit with a volume <1 in.<sup>3</sup> for a medical application to a unit that weighs 1200 lb for a pulp and paper application. According to its president, Ernie Lynch, his company has been able to produce as many as 20,000 manifolds per year up to 2007.

"With our expansion this spring we can now produce over 100,000 units – and currently have orders of approximately 75,000 units," said Lynch.

The expansion means that the ISO 9001:2000 certified company now has a new flexible manufacturing system (FMS) with 52 pallets, Mazak FH-5800 and PFH-5800 horizontal machining centres, a Mazak Variaxis 730 vertical machining centre and a central operating station for the system. Other machinery allows Lynch Fluid Controls up to 9 axes of machining.

The FMS is augmented by an ultrasonic wash system to bring parts to a high level of cleanliness, and a customized laser sys-

tem. With the FMS, said Lynch, "we have the capability of manufacturing 24/7 – two shifts per day – including 'lights-out' production."

Lynch stresses the depth of the company's design expertise. "Our hydraulic engineers can take a concept or a problem and find a solution," Lynch said. "Hydraulics companies come to us for manifolds that provide the 'brains' of their systems. Like the 'Intel Inside' campaign, we offer 'Lynch Inside' to these customers.

"Designs come to us in many forms – a discussion, RFQ, concept or CAD drawing – but not the latter very often. So our designers do everything from concept to 3D CAD solid model before the manifold is sent to our production department."

Lynch Fluid Controls also has a solid network of distributors across Canada. "Wainbee and other prominent fluid power distributors use Lynch manifolds," said Lynch.

Units are designed into logging, mining, automotive parts and entertainment applications, Lynch added. "Stage productions such as Miss Saigon, Phantom of the Opera and Cirque du Soleil have used our products, as well as Universal Studios and the Terminator 2 motion picture."

The company can make military, aerospace and medical parts out of a variety of materials, including metals, composites and plastics. The Lynch Group, celebrating its 20th anniversary this year, has also recently added a new member to enhance its offerings for these markets.



Top: Mazak-based flexible manufacturing system (FMS) at Lynch has 52 pallets. Left: Ernie Lynch, president of Lynch Fluid Controls: "Designs come to us in many forms." Below: CAD rendering and animation of typical valve configuration.



actuators, proportional valves, electro-hydraulic valves and other hydraulic components.

Another division, Lynch Electronics, manufactures proportional valve amplifiers and its own "breed" of sensing hydraulic valves, while Lynch Technologies Inc. is an Autodesk Authorized Value Reseller of 3D/2D mechanical design and electrical schematic software, and a training organization. "We are unique as a manufacturer who also provides design software sales and training," said Lynch.

Finally, the Lynch Digital Media division provides web hosting, web development and product development services. Using the Astaro Security Gateways internet security platform, Lynch can also protect customers from outside threats by providing a secure web presence.

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## Feature: Motion Control

# Machine tool OEM reduces start-up time by 75% using automation control system

Based in Windsor, ON, Tri-Way is one of the largest manufacturers of metal-cutting machinery in North America. In the automotive industry, Tri-Way specializes in building machine tools and systems used to produce a wide variety of power train components, such as connecting rods, crankshafts, transmission plates and intake and exhaust manifolds.

When Tri-Way is awarded a job from an automobile manufacturer, the engineers receive a list of approved components and a part print that defines what the automobile part will

look like when it comes off the machine. After reviewing these documents, Tri-Way's application engineering group outlines the best process for machining the part and formulates the manufacturing plans and specifications.

**Platform provided over \$1.5 million in additional production**

In one instance, Tri-Way received an order from an automotive parts supplier to build an eight-station dial table machine used to produce left and right aluminum rocker covers.

The supplier provided Tri-Way with a list of approved components that included the Allen-Bradley ControlLogix control-

ler and Remote I/O communications network from Rockwell Automation. Tri-Way immediately contacted its Allen-Bradley distributor, ElectroZad Supply in Windsor (electrozad.com), to help implement the ControlLogix platform and meet the detailed part specifications outlined by the automotive supplier.

"Although we've been a Rockwell Automation customer for 25 years, we didn't have any design experience using the ControlLogix platform," said Rob Crow, controls engineering manager, Tri-Way. "We were excit-



Using the Rockwell ControlLogix platform, the new Tri-Way machine produces two rocker covers every 9 s, an extremely aggressive cycle time for a machine of its size and twice as fast as the industry standard of 18 s.

ed about the opportunity to implement this advanced control system, but we were also apprehensive about the amount of time it would take us to get the system up and running. It can often take more than a month to implement a new control system, and we weren't thrilled about dedicating that amount of time to implementation."

By running the discrete I/O and HMI on ControlNet, Tri-Way achieved faster data transfer and response than in the customer's original specifications. Tri-Way also used Kinetix motion to control the rate of speed at which the tooling was fed into the machine and rotated when making a cut. Integrated Kinetix motion on the SERCOS interface network allowed Tri-Way to leverage the Control Tags already in the Logic. This reduced engineering and programming demands and increased system throughput, improving overall cycle time, all within the common RSLogix 5000 programming software environment.

At the same time, Tri-Way was also allowed to switch from Allen-Bradley 1336 drives to Allen-Bradley PowerFlex 700 ac drives. The PowerFlex drives provided tight torque control and closed-loop regulation to meet the high-performance demands of this particular application. The drives also feature an innovative bookshelf design that optimizes panel space by allowing side-by-side mounting.

Finally, Tri-Way also changed the original machine specifications by adding a PC user interface running Rockwell Software RSVIEW HMI software. RSVIEW provides an intuitive interface for operators, supports reporting and tracking functions, and allows users to easily make necessary changes. Reusing the tag database from the ControlLogix to program the HMI in RSVIEW represented further engineering savings to Tri-Way.

In less than two weeks, Tri-Way's new control system was fully integrated and operational. According to Crow, "the Rockwell Automation solution was seamless. We couldn't believe the ease with which we were able to start up the system and configure the various components and networks," said Crow. "The ease of integration and flexible connectivity of the ControlLogix platform allowed us to use four different communication networks in one machine."

The new machine produces two rocker covers every 9 s, an extremely aggressive cycle time for a machine of its size and twice as fast as the industry standard of 18 s. For Tri-Way's customer, it represents a 50% savings in machine expenditures and 40% less required floor space, as well as reducing start-up time by 75%.

This article was supplied by Rockwell Automation ([rockwellautomation.ca](http://rockwellautomation.ca)).

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## Feature: Motion Control

# PTDA 2007 Canadian Conference focused on economic drivers

More than 280 attendees, consisting of Canadian power transmission/motion control distributors and their manufacturer suppliers, participated in the recent conference at the Fairmont Le Chateau Frontenac.



### By Mike Edwards

QUEBEC CITY – For the sixth year in a row, the Canadian Conference of the Power Transmission Distributors Association ([ptda.org](http://ptda.org)) provided a unique venue for accessing the latest trends in the Canadian market. More than 280 attendees, consisting of Canadian power transmission/motion control (PT/MC) distributors and their manufacturer suppliers, participated in the recent conference at the Fairmont Le Chateau Frontenac.

## Wind turbines will consume more gearboxes, bearings

According to Mary Sue Lyon, the PTDA executive director, approximately 17% of the overall organization constitutes “Canadian content” between distributor members, manufacturing members and

associate member/educational institutes.

Driving the growth of 20+ percent growth in attendance at the conference, said Lyon, are innovative programs from the PTDA such as the Industrial Careers Pathway curriculum ([industrialcareerspathway.org](http://industrialcareerspathway.org)) developed by industry at community colleges in B.C. (British Columbia Institute of Technology) and Ontario (Mohawk College).

“All industries are facing a recruiting challenge,” Lyon added. “We are a ‘phantom industry’ (power transmission) – no one knows the contribution we make to the economy.”

“We have to overcome the image of manufacturing being a ‘dirty, dark, dying’ industry.”

Opening keynote speaker, Dr. Peter Andersen of Andersen Economic Research,

focused on the ramifications of emerging economies on the global economy, including the price of commodities and market volatility. Andersen expects a global recession in the next five years and that the effect of the U.S. housing market on the Canadian economy will result in a continuing slowdown in lumber and building supplies.

According to Anderson, some Asian countries are facing labor shortages in key areas, such as at call centres in India.

Panelists from key end-user industries paralleled Dr. Andersen’s forecasts:

- Sean Whittaker, director policy & technical affairs for the Canadian Wind Energy Association ([canwea.ca](http://canwea.ca)), presented compelling evidence of the exponential growth rate for wind energy and how the PT/MC industry can supply key components in the manufacturing and maintenance of wind turbines. “Gearboxes and bearings will be in high demand,” Whittaker said. He noted in his presentation that, con-

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PTDA executive director Mary Sue Lyon: the PT/MC industry needs to sell itself to recruit new staffers.



Francois Germain (left), VP eastern Canada, Kinacor, and Patrick Gregoire, GM of Renold Canada Ltd.



Lyon (left), Gregoire, Ann Arnott, PTDA director of programs & services, and David Strutt, PTDA Liaison.

servatively, there should be 10,000 MW of wind-generated energy in Canada by 2015.

• Christian Van Houtte, president of the Aluminum Association of Canada (aac.aluminium.qc.ca), also commented on the effect of emerging economies, noting that the new economies are driving the demand for aluminum which is expected to increase by nearly 80% in the next 15 years. Transportation applications constitute the largest market segment for aluminum finished products, Van Houtte told the conference that “the AAC is looking a niche markets for Canadian production of end-use aluminum products.”

According to Van Houtte, aluminum is a very energy efficient material in the overall scheme of things when related to climate change. He noted that 30% of world demand comes from recycled aluminum, a process that saves 95% of the energy used in the original processing and 100% of the material.

• Catharine Swift, president and CEO of

the Canadian Federation of Independent Business, spoke of the strong entrepreneurial sector of the Canadian economy. “There is reason for optimism,” said Swift. “Technology change is better for smaller businesses.” However, she warned “regulatory overload is having a pernicious effect on the smallest businesses,” and that “we can’t do anything about China, but we can improve our tax structures to arm ourselves better.”

Closing keynote speaker Jean Marc Chaput presented “Put Your Heart Into It,” his message of “stay hungry, stay foolish” and “look for the ‘wow’ factor” in your life, illustrated by many personal stories as well as examples of the corporate use of passion and enthusiasm in their messaging.

Handouts and summaries are available at [ptda.org/canadianconference](http://ptda.org/canadianconference). The PTDA 2008 Canadian Conference will be held May 29-31, 2008 at the Fairmont Whistler, Whistler, BC.

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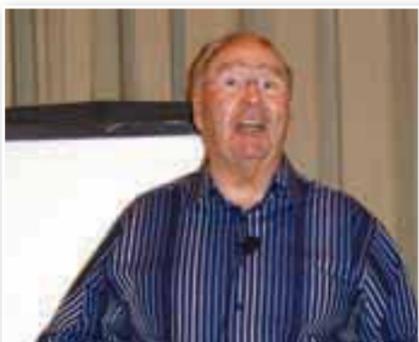
Wind Energy Association director Sean Whittaker.



Dr. Peter Anderson focused on global economy.



Kinacor's Francois Germain (left), Linda Nadon, PIQ magazine publisher and Nigel Bishop, publisher of DPN.



Closing keynote and motivational speaker Jean-Marc Chaput: “Stay hungry, stay foolish.”



Catharine Swift represented the perspective of Canada's independent businesses.

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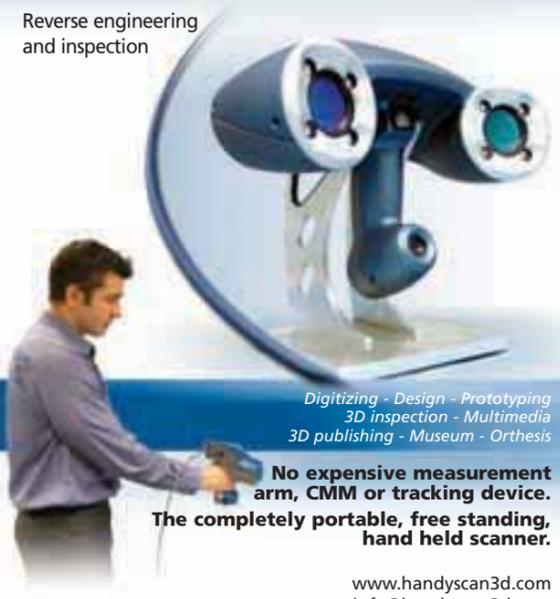
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## Feature: Motion Control

# Gearmotors provide sound alternative in V-belt applications

By Bill Wake

The switch from traditional belt-driven or direct-coupled reducers to state-of-the-art gearmotors is seen as a smart alternative by more and more mill managers. Traditionally, V-belt drives offered limited capabilities that addressed certain requirements within the industry. V-belts were most commonly used for reducing motor input speeds on specific reducer types, to keep them within their optimum operating range. In addition, they offered the flexibility to change or fine-tune speeds in the field after installation. By

## Eliminating V-belts improves safety, maintenance

adjusting the belt drives, the number of gear ratios used throughout the mill could be reduced. And V-belts were sometimes considered an inexpensive method of protecting gear units in overload conditions.

There are some good reasons for eliminating V-belt drives on the input side of reducers. Apart from the loss of horsepower and efficiency through belt slippage, V-belts impose overhung loads which can limit the longevity of motor/reducer bearings. Their limited flexibility cannot accommodate high stop/start cycling applications. And there are safety issues – not only must V-belts be replaced as they wear out, but when belt guards are removed,

exposed V-belts are dangerous to maintenance personnel. Moreover, the relatively large dimensional envelope of the complete drive takes up considerable shop space.

By comparison, ac gearmotors offer numerous practical advantages. First and foremost, with modern helical gearing, gearmotors deliver dramatically better operating efficiency. Because overhung loads on the motor and reducer-shaft bearings are eliminated, service life is longer. The maintenance required to align belts and couplings is also eliminated, as are the safety concerns.

Today's compact ac gearmotor designs



Integrated drive solutions can be optimized plant wide for performance, reliability and cost.

also save plant space, not to mention the capital and installation cost savings that result from smaller, less complicated mounting platforms. Furthermore, with most designs the motor and terminal box can be rotated to accommodate electric cable entry from any angle, an advantage in awkward locations.

For an example of making the shift from traditional drive technology to gearmotors, we turn to the sawmill industry. In the past, primarily due to the absence of any viable alternative, hydraulic and pneumatic drives have been used for cycling and positioning control. With the advent of new gearmotor and variable frequency drive (VFD) technology, improved efficiency for applications requiring high-cycling and positioning control can be achieved electronically. Equally important, initial costs are lower and payback is faster.

The most obvious reduction in operating costs is in energy savings. In order to supply the required pressure on demand, hydraulic systems must run continuously. This means the electric motors driving the hydraulic power units consume considerable energy, while a high percentage of the time they are not in productive use. In addition to the energy cost savings, one has to consider the complexity of the hydraulic circuitry and the regular maintenance required to maintain reliable operation. However, the energy savings alone makes implementing gearmotors with VFD control an extremely attractive option.

To put things in proper perspective, a local sawmill performed a study on converting its SC sorter/trimline from hydraulics to gearmotors and variable frequency drives. When it compared power consumption for both systems, it discovered that the gearmotor/VFD solution would save them approximately \$21,000 per year – and that's just the energy savings. There were also important performance improvements in terms of higher sorter and trimline speeds that translated into higher production output per shift. The projected payback period was less than seven months.

The ability of gearmotor/VFD systems to deliver capabilities such as programmable control for positioning, torque limiting and current limiting, for example, makes for an extremely reliable, low-maintenance alternative that can offer substantially greater uptime and improve the bottom line of any mill. What's more, such features give gearmotor/VFD technology tremendous flexibility for solving existing production bottlenecks in mills, while offering designers a wide range of solutions when implementing new machinery.

Bill Wake is with SEW-Eurodrive Canada ([sew-eurodrive.ca](http://sew-eurodrive.ca)).

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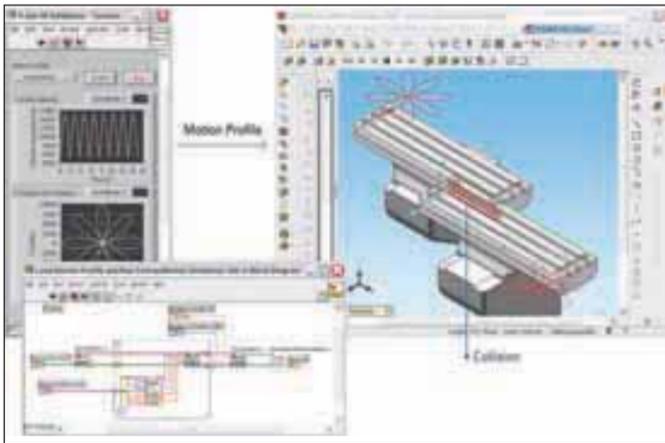
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**Feature: Motion Control**

# Mechatronics: design considerations for machine builders

**By Nipun Mathur**

The term mechatronics is gaining popularity as it represents an industry-wide effort to improve the design process by integrating the best available development practices and technologies to streamline machine design, proto-



typing and deployment. A mechatronics-based approach can lower the risks associated with machine design and meet the following five key challenges that machine designers face today:

**1.** A typical machine design starts with mechanical engineers designing the machine mechanicals using CAD tools. Once they complete the CAD model and create a physical machine, electrical and controls engineers lay out the electrical system and program the machine controller. The design team performs the first test run of the integrated machine on the physical model. Any problems at this stage that require reworking machine parts can lead to long delays and increased expenses and can mean the difference between profit and loss for the machine builder. Getting input from controls and electrical engineers early in the design process can significantly lower this risk. The mechatronics

design approach addresses this challenge by connecting machine design tools and creating a virtual machine prototype before engineers design the physical machine.

Machine builders can use graphical system design tools from NI and 3D CAD tools from vendors including SolidWorks to create a virtual machine prototype. They can test the operation of their machines before creating any physical models by developing their control logic and motion profiles with National Instruments LabVIEW and by creating a 3D CAD model of their machine and simulating it with SolidWorks.

After testing control logic and motion profiles, machine builders can deploy the code to a National Instruments CompactRIO embedded system. The NI LabVIEW FPGA Module and the NI 9505 motion power drive module for NI CompactRIO offer a flexible platform to create precise motion control for machines.

**2.** Understanding customer requirements and developing an appropriate design plan for the machine's mechanical and control systems can be a long and involved process. Miscommunication with the customer in this process can lead to unsuitable machine design and increased cost. By using 3D CAD, machine builders have improved communication with their customers by providing a virtual model of machine mechanicals.

By using virtual machine prototyping and adding logic simulation to the 3D CAD model, machine builders

now can show their customers how a machine will function before investing in the development of the physical mechanical structures. In addition to demonstrating the machine operation for the customer, virtual machine prototyping also can increase interaction among design team members early in the machine design process, resulting in a better final machine.

**3.** Debugging motion profiles on a live machine can be risky. A crash can result in weeks of downtime and added cost for replacement parts. By integrating motion profiles generated in LabVIEW (illustration bottom window) and the NI SoftMotion Development Module (left window) with a 3D CAD model of the machine in SolidWorks (right window), machine builders can detect potential collisions on virtual prototypes, safely verify and fine-tune their motion profiles, and avoid any collisions on the physical machine.

**4.** Because of the complexity of motor drive systems, choosing a motor with the optimal size, cost, weight, and performance for an application can be challenging. If a motor is too small, it can result in overheating, poor control performance, and difficult tuning. If a motor is too large, it can add unnecessary weight and cost to the machine. Machine builders can use virtual machine prototyping to improve the motor sizing process.

With LabVIEW and SolidWorks, machine builders can easily determine the torque required to drive the machine with the desired motion profile. They then can use LabVIEW for motor simulation and determine the best-fit motor for their application to meet the torque and speed requirements.

**5.** Determining the initial PID tuning parameters of a complex machine is difficult, and incorrect settings can produce unexpected machine move-

ments. Using virtual machine prototyping, machine builders can tune PID control algorithms on a 3D CAD model of a machine and gain insight into the PID tuning parameters for the physical machine. These PID tuning settings can then be used on the real machine as a safe starting point.

By integrating machine design tools, the mechatronics approach to machine design streamlines the design process, improves communication both with the customer and within the design team, verifies motion profiles, improves motor sizing and PID tuning, and can give machine builders a clear competitive edge.

*Nipun Mathur is the NI motion control and mechatronics product manager. This article is excerpted from the Q2 2007 issue of Instrumentation Newsletter.*

Info Card 324

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Info Card 51

## Products: Motion Control

### Electric actuator platform



LINAK has introduced a high speed electric actuator. The actuator is built on the model LA36 actuator platform with a speed of up to 6.3 ips without a load and a maximum force of 112 lb. The high force version of the LA36 actuator has a maximum load of 2247 lb.

[linak-us.com](http://linak-us.com)

Info Card 399

### Flexible VFD control in drives



Allen-Bradley PowerFlex 4M ac drives from Rockwell Automation are said to give users economical, easy-to-program variable frequency motor control with feed-through wiring for quick installation. The drives are also said to help users minimize mechanical machine stress and increase application flexibility. Power ratings range from 0.2 to 11 kW, in voltage classes

of 120, 240 and 480 Vac. A, B and C frame sizes are available.

[ab.com/go/powerflex4m](http://ab.com/go/powerflex4m)

Info Card 395

### Adjustable speed ac drives



Baldor Electric Company has announced its Baldor V\*S Drive line includes two models of adjustable speed ac drives (sensorless vector and closed loop vector), said

to have powerful processors and advanced design features. In addition, three micro-drive models are said to offer a cost effective solution for basic adjustable speed applications, as well as a pump/fan drive designed to provide the control needed for maximizing energy savings without sacrificing functionality.

[baldormotion.com](http://baldormotion.com)

Info Card 397

### Belt driven slides



The 120 series belt driven slides from Lin-Tech are designed to handle light loads at very high speeds. The tables use a low friction, preloaded, recirculating linear ball bearing system, which rides on linear rails. The drive system uses two pulleys, along with a steel reinforced polyurethane belt, which provides 90 mm of linear movement/rev of the input shaft. The belt tensioning system is adjustable. NEMA 23 and 34 motor mounts, or gearhead mounts, and planetary gearheads are available.

[electromate.com](http://electromate.com)

Info Card 396

### Soft start/stop controllers



Carlo Gavazzi has introduced a line of RSH Series soft start/stop motor controllers, available in two sizes with basic rotary or advanced push button controls. Motor control capacity ranges from 1.5 hp at 220 Vac to 40 hp at 600 Vac. The controllers enable the starting and stopping of 3-phase asynchronous motors with a three-wire connection to the motor. Units are also said to provide improved starting conditions over conventional star-delta starters by suppressing in-rush currents during motor starting.

[gavazzionline.com](http://gavazzionline.com)

Info Card 398

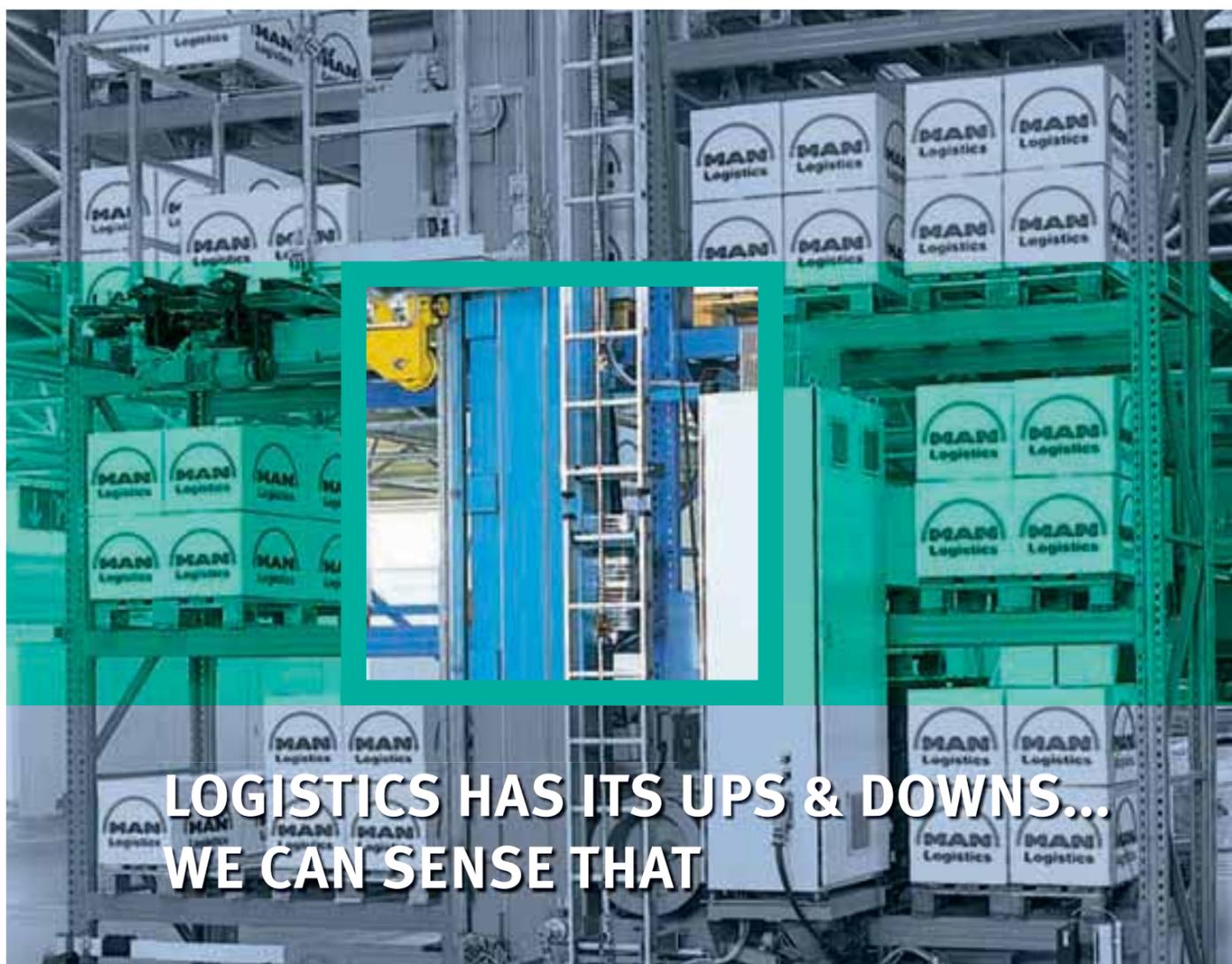
### Hydraulic rotary actuators



Helac Corp. has announced the T20 series of helical, hydraulic rotary actuators. The T20 Series, an improved, high performance replacement for Helac's HS Series rotary actuators, features a splined output shaft that is supported by internal tapered roller bearings. Units are available in three sizes with torque output ranging from 25,000 to 60,000 in. lb at 3000 psi. The T20-25 and T20-45 feature 220° rotation, while the T20-60 offer 200° rotation.

[helac.com](http://helac.com)

Info Card 373



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Info Card 53

### Clutches and couplings



The S90MCC-MTL series of magnetic clutches and couplings from Sterling Instrument features no friction or wearing parts, uses no electricity and no magnetic particles to leak. The units are available in 7 different bore sizes: .250, .375, .500, .625, .750, .875 and 1.000 in. Unit lengths range from 1.65 to 3.11 in., and weigh from .73 to 8.95 lb. Their torque range is from .06 to 25 in. lb.  
sdp-si.com Info Card 387

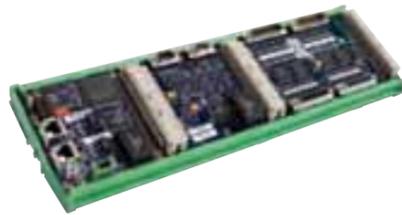
### 2-stage gearmotors



Bison Gear & Engineering has introduced the 650 series of 2-stage, 1/2-hp input direct gearmotors. Mounting is via a face (any angle) or optional footplate, gearing

is AGMA class 9 heat treated steel (1st stage helical metal, balance spur metal) and bearings are needle with thrust ball type. Motor type is permanent split capacitor or 3-phase inverter duty.  
bisongear.com Info Card 388

### Machine design I/O modules



Danaher Motion has introduced SQIO, said to be the only SynqNet I/O interface boards that allow machine builders to integrate their custom analog and/or digital I/O hardware with complex, high performance motion, into a SynqNet network architecture. The state of every SynqNet digital or analog I/O point can be read or modified every sample period. Combined with the SynqNet controller's recorder functionality, it is now possible to achieve I/O sampling rates of 2 to 48 kHz.  
danahermotion.com Info Card 390

### Pulleys for timing belt drives



BRECOflex has announced an assortment of timing pulleys (clamps, tensioners and slider beds) along with timing belts. To assure proper tooth meshing the company recommends the use its pulleys only in conjunction with its high precision timing belts to guarantee longest service life and highest accuracy. Standard and self-track-

ing pulleys in both imperial and metric pitches as well as flat idlers are available.  
brecoflex.com Info Card 391

### BL, e-commutated motors



Commutation electronics are integrated in the brushless Maxon model EC-max 16 two-wire motor. The 16 mm diameter, 33.5 mm long unit has a nominal output of 5 W. The reduction to two connection wires allows brush motors to be directly replaced. The motor generates continuous torque of up to 3.4 mNm. A planetary gearhead can be added to increase inertia up to a maximum of 0.3 Nm.  
maxonmotorusa.com Info Card 392

### Variable speed positioning



Joyce has introduced a programmable controller. The Variable Speed Positioning System (VSPS) is said to allow an operator to easily program up to 10 stopping locations, increasing the capabilities of motorized jacks. The system operates motors between 1/3 and 3 hp, and between 200 and 460 V, 3-phase power.  
trans-quip.com Info Card 394

### Servo gear reducer



The alpha from alpha gear is a gear reducer for simple servo applications. The unit is suitable for a wide range of motor types (including large shafts), operating modes or installation positions. The product offers an efficiency of more than 97% (single-stage at full load) and is said to have high potential speeds.  
alphagear.com Info Card 393

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## Products: Motion Control

### Built-in motor encoders



Bodine Electric Company has announced Incodermotors, a selection of permanent magnet dc and brushless dc motors and gearmotors that are equipped with encoders inside the motor. The units are a pre-wired and tested motor-encoder combination that is ready to drop into an OEM design. The 4.5 to 12 V magnetic encoders are available with one or two hall sensor output signals in resolutions of 2, 4, 8 and

30 ppr. They work with digital tachometers or other electronic devices to measure speed, distance and direction.

[bodine-electric.com](http://bodine-electric.com)

Info Card 437

### NEMA 23 brushless dc motor



The 8-pole NEMA 23 brushless dc motor announced by Magmotor is said to be ca-

pable of 20% more torque than a standard 4-pole servo motor configuration. The design produces a continuous torque up to 230 oz in. and a peak torque of 690 oz in. A variety of electrical and mechanical options are available, including an enclosed encoder, or sealed for IP65 wash down requirements. Custom mounting configurations and winding configurations are also possible.

[magmotor.com](http://magmotor.com)

Info Card 439

### Inverter drive technology

Leeson Electric has introduced the SM2 series Flux Vector drive has a power range of up to 25 hp. Unit features include four modes of operation (V/Hz, Enhanced V/Hz, Vector Speed, and Torque), high start-



ing torque, auto tuning, advanced low-speed control, and dynamic speed regulation. Other specifications include: supply power that is either single phase (120, 208, 220 or 240 Vac) or three phase (208, 240, 400, 480 or 600 Vac, 50/60 Hz). Output frequency is 500 Hz standard or 1000 Hz optional. The enclosure is certified NEMA1, IP21, -10° to 55°C, 2.5% derate per °C above 40°C.

[leeson.com](http://leeson.com)

Info Card 440

### High-torque servo motors



Parker's Electromechanical Automation Division has announced two high-torque motors from its MaxPlusPlus (MPP) servo motor line. The MPP230 and MPP270 frame sizes increase the torque range of the existing MPP product line up to 162 Nm of continuous stall torque, and a peak torque of 513 Nm. A resolver and Stegmann single- and multi-turn absolute encoders is available, along with a 24 V brake option and a shaft seal. The motors are UL and CE certified.

[parkeremotion.com](http://parkeremotion.com)

Info Card 441

### Rodless actuators



The Extrak RM and LM Series rodless actuators from Exlar offer roller screw technology or high speed belt drives. With the roller screw driven versions, higher thrust loads and longer life than ball screw driven rodless actuators are said to be offered. The actuators offer users the choice of motor brand and type – brushless servo, stepper, dc or ac motor. Input transmission options include direct coupling and parallel belt and pulley drive. The rodless actuator's modular body and platen designs offer the user multiple mounting methods from a variety of T slots and threaded holes. The actuators are available in 3 metric frame sizes (65, 80 and 110 mm) with stroke lengths to 7.5 m and speeds to >9 m/s.

[exlar.com](http://exlar.com)

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[www.baldor.com](http://www.baldor.com)



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## Technical Literature

**Fieldbus I/O.** TURCK has announced its first combined fieldbus I/O and media catalog. The 900-plus page catalog contains products for numerous network protocols, including DeviceNet, Ethernet, PROFIBUS, AS-interface, CANopen and Foundation fieldbus.  
chartwell.ca Info Card 420

**EMC filters.** EPCOS has published *EMC Filters Product Profile 2007*, a 62-page selector guide with data regarding filters for power and communication lines.  
epcos.com Info Card 421

**Equipment protection.** The 1200-page Hoffman Specifier's Guide, Volume 21 has information on equipment protection products for the industrial, commercial construction and datacom markets.  
hoffmanonline.com/newbook Info Card 422

**Machine components.** J.W. Winco has released a 764-page updated reprint of its *Standard Machine Components Engineering Manual*. The book features inch and metric size products, including adjustable levers, cabinet U-handles, plastic and steel hinges and locking mechanisms, conveyor components, leveling mounts, hand knobs, fastening components and linear actuators.  
jwwinco.com Info Card 423

**AS-Interface.** The *2007 AS-Interface Reference and Buyer's Guide* is now available from Pepperl+Fuchs. The 200+ page resource includes gateways and scanner cards, power supplies and safety devices.  
am.pepperl-fuchs.com Info Card 424

**Tuning loops.** *Good Tuning: A Pocket Guide, 2nd Edition*, from ISA is a portable summary of the practical considerations for tuning loops. Included is a new section on methods for reducing valve backlash and sticktion, and preventing excessive sensor lag and noise. A fee applies.  
isa.org/tuningpocket Info Card 425

**Linear encoders.** Exposed linear encoders are detailed in a 50-page catalog from Heidenhain provides an overview of encoder technologies, and outlines dimensional and electrical information, mounting tips, and equipment to help obtain the optimal signal quality.  
heidenhain.com Info Card 426

**Connectors.** Samtec has released its *F-207* catalog with 330 pages of applications, specifications and ordering information on board-to-board, cable assembly, and panel and I/O interconnect systems.  
samtec.com Info Card 427

**Linear position transducers.** Novotechnik U.S. has published a 64-page catalog providing details on its line of linear non-contacting sensors, potentiometric position transducers, signal conditioners and monitors.  
novotechnik.com Info Card 428

**Feed and idler rollers.** *Catalog D150* from Stock Drive Products/Sterling Instrument features over 190 feed and idler rollers with multiple applications. The inch and metric products have 60 durometer urethane & neoprene rolling surfaces.  
sdp-si.com Info Card 429

**Boiler, pressure vessels.** The 2007 edition of the *ASME Boiler and Pressure Vessel Code* establishes rules of safety relating to the construction, operation, testing, and maintenance of boilers, transport tanks, nuclear power plant components, and other pressure systems. A fee applies.  
asme.org Info Card 430

## CAD Industry Watch

# SolidWorks simplifies command steps

By Bill Fane

The most obvious change in SolidWorks 2008 is the user interface. Its appearance is reminiscent of the new Microsoft Vista style (can anything be "reminiscent" of something that hardly exists yet?).

Initially, there are no toolbars showing, and only seven drop-down menu items. Instead, all the major commands required to accomplish the current task are displayed in the ribbon bar across the top of the graphic screen area. The content of this bar changes to suit the current activity. In addition, the view manipulation commands such as rotate, zoom, shading style, and so on continuously display at the top of the model view window.

### Assembly models, tolerance stack-ups automated

The primary focus is intended to be "heads-up" and simplified command sequences, so the operator can focus more on the task at hand and less on looking for commands. One of my favorites in this category is the fact that the Sketch command has effectively been eliminated. If you want to add a new extruded feature to an existing part then all you need to do is to select the Extruded Boss function from the panel bar, and then click on the desired face of the part. SolidWorks automatically sets the sketch plane to be on the desired face and then switches the ribbon bar to show the sketching commands.

"Instant 3D" is another interesting new feature. All you need to do is to click on a feature, at which point several things happen. Specifically, a context-sensitive tool

bar pops up near the cursor position, grip handles appear, and all the underlying sketch dimensions that control this feature appear.

There are now several methods that you can use to edit this feature. First, you can click on a dimension number and then type in a new specific value.

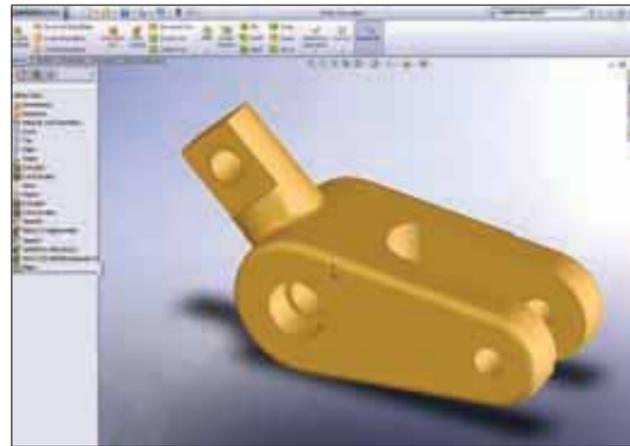
Second, you can drag the grip handle that appears on the selected face. As you do so, a ruler bar appears that shows you the current value of the extrusion dimension that defines the location of this face and the dimension value updates in real time.

Third, you can drag the grip points at the end of any dimension. Once again, the ruler bar appears and everything updates in real time as you drag the grip.

The amazing thing here is that all of this occurs without the software having to do any feature rollback, so you can instantly see the effect of your editing even on features that were created after the one being edited.

Creating a part is one thing, but annotating it is another. This is compounded by the fact that dimensions required to define and constrain a feature are not necessarily the same as those that are required to manufacture and inspect it. Here is where DimXpert comes into play. You set up your datum planes and tolerances, and DimXpert then fully dimensions the 3D model based on your setup.

Ah, but designing and dimensioning a part intended for high-volume mass production is only part of the story. One of the more time-consuming aspects of the design process is analyzing tolerance stack-ups. Will the biggest peg fit into the smallest



SolidWorks 2008 has a totally-new interface, aimed at improving productivity.

hole? Will the smallest peg rattle excessively in the largest hole? SolidWorks 2008 helps solve this with TolAnalyst. Given an assembly model, it will analyze tolerance stack-ups based on the toleranced dimensions created by DimExpert.

A definite trend in the parametric modeling game is that designers are always trying to cram ever-bigger assembly models into the software, with the resultant decline in performance. SolidWorks 2008 helps to overcome this with its new QuickView and Selective Open options.

Initially, SolidWorks will load only the graphics of the selected assembly. It does not load any part or feature information, only the specific part or parts that you want to edit.

All in all, SolidWorks 2008 includes a great many innovative new features.

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

If you found CAD Industry Watch interesting, fill in 347 on the Info Card.

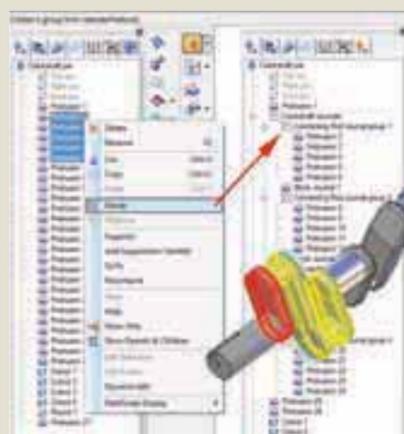
## Putting design on the cutting 'Edge

All indications are that very large assemblies have become the focus of attention for 3D modeling software developers. Solid Edge from UGS PLM Software is no exception, and in fact it is the thrust of most of the significant enhancements in SE version 20.

Solid Edge's approach is twofold; first, it allows designers to establish Zones. These are permanent range boxes that isolate everything within the box from the rest of the assembly. The claim is that this works particularly well for factory floor layouts, wherein the entire production facility may effectively be one "super-machine," consisting of smaller modules and machines linked together by conveyors, transfer stations, and other material-handling equipment. A chemical process plant could be another example.

Individual designers can thus mark their territory for their particular area of responsibility while still remaining connected to the big picture.

Solid Edge's second approach to very large assemblies is called "component grouping." A designer can establish groups of components and sub-assemblies of inter-



In Solid Edge Groups, a designer can establish groups of components and sub-assemblies of interest, and everything else is ignored.

est, and everything else is ignored. These are not sub-assemblies in their own right, in that they have no effect whatsoever on parts lists and bills of material.

A smaller example might be a designer who is focusing on the inlet valve mechanism of a car engine and so would form a group of one valve along with its valve seat, spring, spring seats, stem seal, and

the keepers. These would never be classified as a sub-assembly, because the engine cylinder head cannot be assembled that way, but they allow the designer to isolate them from the rest of the car.

Another interesting new feature is Solid Edge's new auto-constrain feature. Imported components can automatically have assembly constraints intelligently applied. On a larger assembly, this can turn hours of manual constraining into minutes. The doubly-interesting feature is that it works regardless of the source of the component parts. Solid Edge can import files from CATIA, ProE Wildfire, and a number of other applications, and they can then be automatically constrained. In fact, it even works with StereoLithography (STL) files, which greatly simplifies interaction with vendors using different CAD systems.

With version 20, Solid Edge continues to grow as a worthy competitor in the mechanical CAD market.

## Products: Bearings

### Energy efficient bearings



SKF has developed a line of bearings that reduce energy consumption by at least 30% compared with standard ISO products. The line comprises both deep groove ball bearings and tapered roller bearings. The technical improvements combine surface topography, raceway profiles, optimized internal geometry, a special polymer cage, lower-friction grease and, in the case of the tapered roller bearing, also an optimized set of rollers. The energy-efficient tapered roller bearings are aimed at industrial segments where applications exceed 1 MW.

skf.ca Info Card 379

### Grounding system protection



Electro Static Technology has introduced the AEGIS iPRO Shaft Grounding Ring, designed to safely channel harmful shaft currents away from bearings to ground. It is suitable for protecting generators, turbines and medium-voltage motors against electrical bearing damage. It is engineered to divert up to 120 A of continuous shaft current and works even if oil, dirt or grease contaminates the shaft.

est-aegis.com Info Card 381

### Radial relief load platform



To protect the "rolling ring" bearings in Uhing linear drives from undue wear resulting from radial forces, Amacoil has announced a linear bearing slide option on drive assemblies. Supported on its own end supports and guide rails, the linear slide redirects twisting and bending forces – removing them from the Uhing drive and assembly thereby relieving stress and pressure on the bearings and other parts.

amacoil.com Info Card 377

### Ball bushing bearings



Thomson has introduced Bearings Now!, an inventory program that promises same day and next day shipping, from local inventory, on most Thomson Ball Bushing Bearing products. Included in the program are Thomson inch and metric 'A', Super and Super Smart Ball Bushing bearings with matching pillow blocks and seals.

danahermotion.com Info Card 380

### Flywheel couplings



Ringfeder has announced 7 Arcusaflex flywheel coupling sizes for larger engine applications. The additions bring the total available to 21 different sizes, with torque ranges from 1770 to 973,580 lb in. which corresponds to approximately 6500 kW at 1000 rpm. The couplings are now available in rubber as well as a silicone mixture to provide shear resistance in high temperature applications.

ringfeder.com Info Card 376

### High load, low rpm bearing



The DMR Fiber Wound (FW) series bearing from Daemar Inc. is manufactured by a filament winding process that results in a continuous fibreglass filament backing. The filament wound fibreglass structure uses a corrosion resistant epoxy resin as the matrix material. The backing permits the use of a thin wall (1/16 to 1/8 in.) bearing. The FW series will support a bearing load of 30,000 psi, while handling high radial and axial stresses.

daemar.com Info Card 375

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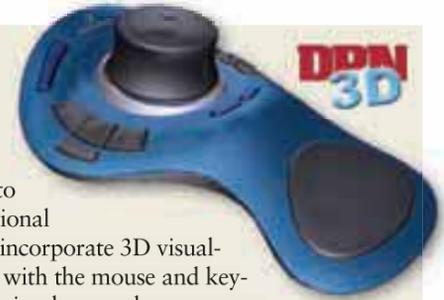
Info Card 60

## CAD Chronicle

### 3D navigation devices

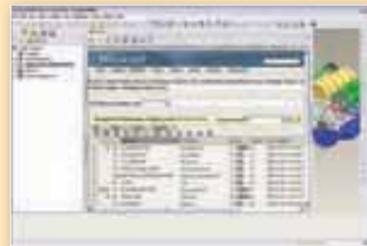
3Dconnexion has announced that its 3D navigation devices are now compatible with Autodesk Inventor 2008 and AutoCAD 2008. The navigation devices are designed to simplify the control of 3D imagery in traditional 3D design software and in applications that incorporate 3D visualization. The devices are used in conjunction with the mouse and keyboard and are held in the alternate hand to simultaneously pan, zoom and rotate 3D objects.

3dconnexion.com



Info Card 334

### Windchill 9.0 optimizes product development

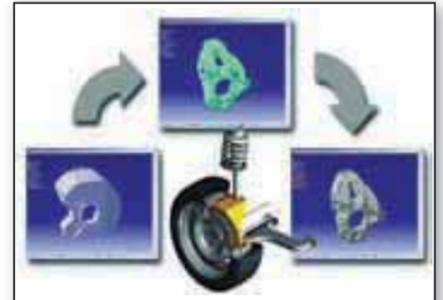


PTC has announced Windchill 9.0, the latest release of the content and process management software. The release is said to enable companies to reuse designs, make modifications, manage work-in-process tasks, and synchronize activities among work-groups and the enterprise. In addition, MPMLink Windchill module enables simultaneous development of product designs and manufacturing process plans to eliminate miscommunication issues and shorten development cycle time.

ptc.com

Info Card 333

### CATIA optimization software



HyperShape/CATIA, an optimization software product, is a direct integration between Dassault Systemes CATIA V5 solution and Altair design optimization technology, Altair OptiStruct. HyperShape/CATIA generates structurally optimal design concepts from supplied packaging information, loads, constraints and required product performance. Typically used ahead of CAD design, HyperShape/CATIA aids designers in developing completely new, mass-efficient, high-performance product design proposals.

altairengineering.ca

Info Card 335

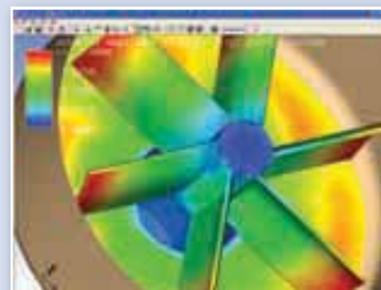
### Free software for non-CAD specialists

Delcam has introduced free software, PowerSHAPE-e, to allow even those that are not CAD specialists, to view, experiment with and comment on CAD data throughout any project. PowerSHAPE is said to incorporate a wide range of easy-to-use surface and solid modeling functionality to modify imported models. The software incorporates all the Delcam Exchange data translation options and so can read in files from all the main CAD systems, as well as neutral formats such as IGES and STEP. For a demonstration, visit the Delcam booth 4138 at CMTS October 15-18 in Toronto.

powershape-e.com

Info Card 336

### Rapid flow software



FloWizard 3.0 software from Fluent is a rapid flow modeling tool that allows design and process engineers to validate their designs much earlier in the product development cycle. Tasks that conventionally require a lot of manual intervention – including meshing, solution steering, and reporting – are performed automatically by the software. The software can also interact with a range of popular 3D solid modelers.

fluent.com

Info Card 337

### Analysis for piping



Algor, Inc., has announced its piping design and analysis software, PipePak V10, features bi-directional associativity between its spreadsheet and graphical display window, including immediate display of pipes entered via the spreadsheet. The features help define complete piping systems and perform structural analysis in compliance with piping codes. The application also includes faster and easier importing of piping models and DXF file geometry from the FEMPRO single user interface.

algor.com

Info Card 338

**Products: Bearings**

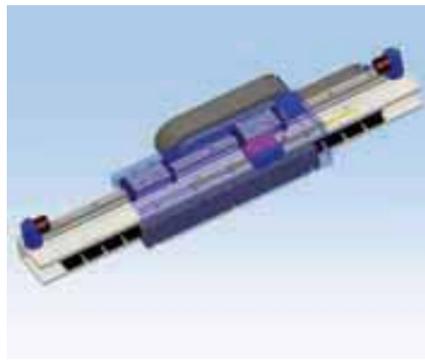
**Tapered shaft adapter**



QM Bearings has expanded its patent pending Blue Brute V-Lock product line, by adding a line of tapered adapter and split-housed equivalent units and expanding its existing straight bore size offerings. The V-lock locking mechanism is designed to maximize shaft holding power and minimize the time needed for installation and removal as compared to conventional bearings. With no need for feeler gauges during installation, the V-Lock locking mechanism is said to offer superior holding power, yet cannot be overtightened.

[qmbearings.com](http://qmbearings.com) Info Card 382

**Positioning stages**



Compact, single rail positioning stages from H2W Technologies are offer a load capacity to 25 kg, high speed 6 m/s, acceleration up to 12 g, zero cogging, resolution to 0.1 um and repeatability to ±1 um. The standard non-contact 3 phase brushless motors have an ironless core winding resulting in a low moving mass stage for higher acceleration. The motor can be commutated either sinusoidally or trapezoidally for optimum performance. Units have continuous forces up to 733 N and peak forces up to 2444 N.

[h2wtech.com](http://h2wtech.com) Info Card 383

**Hydrostatic compact guide**



INA Linear Technology has announced a hydrostatic compact guide for machine tools. The guide is said to achieve excellent hydrostatic damping characteristics and is manufactured to fit in the same installation space as a conventional profiled rail linear guide, as well as KUBE...-B-HS high-speed profiled rail linear guides that reach speeds of up to 10 m/s without losses in load carrying capacity or rigidity.

[ina.com](http://ina.com) Info Card 378

**Couplings solve misalignment**



Ruland Manufacturing has introduced oldham couplings that accomodate large amounts of parallel misalignment. In higher rpm applications, the couplings feature a balanced design for reduced vibration. Torque transmission is accomplished by mating slots in the centre disc with the drive tenons on the hubs. The slots fit with a slight press fit, are on opposite sides of the disc and are oriented 90° apart. Bores range from 1/8 to 2 in.

[ruland.com](http://ruland.com) Info Card 384

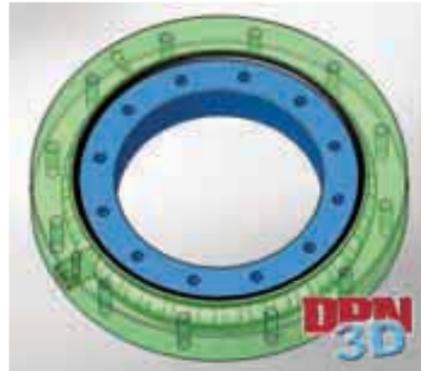
**Sheet metal plastic bearings**



Igus Inc. has announced igubal clip plastic bearings, suitable for a variety of sheet metal applications. Units clip into sheet metal, with no tools or axial retainer required. The clip bearings are said to eliminate the misalignment issues often encountered when using imprecisely formed sheet metal and are suitable for both office equipment and automotive seating applications.

[igus.com](http://igus.com) Info Card 385

**Small bore bearings**



Small bore MT bearings from Kaydon are said to improve the design and lower manufacturing costs of manipulators, articulating arms, lift-assists and balancers. The bolt-up bearing is also said to eliminate the limitations imposed by traditional king post configurations so only one bearing is required in your assembly instead of two. Bearings are available in bore sizes from 50 to 170 mm. The series also incorporates a sealing system designed for minimal friction and contamination exposure.

[kaydonbearings.com](http://kaydonbearings.com) Info Card 386



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Info Card 61

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Info Card 62

**Build Something Brilliant**

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**Engineers' Motion Control TOOLbox**

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Info Card 63

## Feature: Adhesives & Fasteners

# Back to Nuts and Bolts: getting reliability correct on current and future manufactured products

By Ed Palm

The reliability challenge is tougher on OEMs today as advanced products, such as a 70,000-RPM dental drill, require ever lighter, stronger, higher speed, higher RPM, and higher temperature designs to meet market competition and consumer tastes. Much of this reliability challenge stems from screw thread design, which was standardized during WWII to promote compatibility and has remained virtually unchanged since then.

Under ideal conditions, standard male and female threads would fit together perfectly. In the real world, however, under the constraints of mass production and JIT delivery, this seldom happens.

While secondary locking devices have been developed in an attempt to address this shortfall, at best they simply prevent the threads from catastrophically coming apart. Because none actually holds the clamp load in the joint, they are suscep-

tible to vibration, fatigue or temperature-related joint failure.

Though engineers traditionally look to lock washers, prevailing torque fasteners, adhesives or other secondary locking devices, these may be inappropriate or have considerably higher total costs over the product lifecycle. For example, split washers, lock washers, and lock wires add extra weight and complexity to component design. This increases the chance that something may go wrong during assembly or maintenance and complicates inventory control. Other mechanical locking features, such as brackets, can also prove costly and

tedious to use on components with multiple bolts. If not properly fastened during assembly, they can pose a quality assurance risk.

Crimping threads after screwing require extra steps and can prevent reusability. Similarly prevailing torque fasteners can damage threads and often prevent reusability while raising labor, maintenance, and quality inspection costs. Due to high resistance during assembly, they are prone

to galling and require more effort to ratchet down using specialized tools.

Most locking adhesives, in turn, lose effectiveness as temperature rises. In high volume, their use typically requires a large capital expense to purchase and program robot applicators. And when re-application is necessary, cleaning the threads of affected components takes added time and labor before re-application is possible.

Securing bolts with single-use drypatch adhesive, activated when the bolts are tightened, can also add to assembly, maintenance, or warranty costs. This is because, once used, the bolts must be replaced for any necessary rebuilds or maintenance. Affected internal threads must also be cleaned before new bolts with drypatch adhesive can be applied, adding to time and labor costs.

At the heart of the matter is a basic design problem with the standard 60-degree thread form: the gap between the crest of the male and female threads can lead to vibration-induced thread loosening. Stress concentration and fatigue at the first few engaged threads is also a problem, along with an increased probability of shear, especially in soft metals, due to its tendency toward axial loading. Temperature extremes can also expand or contract surfaces and materials, potentially compromising joint integrity.

To address these reliability concerns while reducing component weight and enabling re-usability, engineers have turned to the first thread innovation since World War II, the Spirallock locking fastener. This re-engineered thread form adds a unique 30° wedge ramp (right) at the root of the thread which mates with standard 60° male thread fasteners.

The wedge ramp allows the bolt to spin freely relative to female threads until clamp load is applied. The crests of the standard male thread form are then drawn tightly against the wedge ramp, eliminating radial clearances and creating a continuous spiral line contact along the entire length of the thread engagement. This continuous line contact spreads the clamp force more evenly over all engaged threads, improving resistance to vibrational loosening, axial-torsional loading, joint fatigue, and temperature extremes.

The innovative locking fastener thus compensates for variations in manufacturing tolerance and process due to mass production with its locking thread actually inside the joint. This eliminates the need for secondary locking devices or procedures, and can significantly reduce costly warranty claims and potential liability. The locking fastener has been validated in published test studies at leading institutions including MIT, the Goddard Space Flight Center, Lawrence Livermore



National Laboratory, and British

Aerospace. It has been used in the manufacture of thousands of applications to solve design challenges in a wide range of industries. Production changeovers to this fastener are typically quick and seamless, often requiring just an exchange of traditional nuts, wire inserts or simply drilling out and re-tapping existing parts stock that have unreliable standard tapped holes.

Several online tools can help engineers find the best locking fastener or tooling for the application. Among these are an online Tap Selection Tool; Torque Calculator; Drill and Hole Size Calculator; and Tap Troubleshooting Guide on the Technology page at spirallock.com. The Tap Troubleshooting Guide, for instance, can help walk engineers through an issue such as when a go-gage does not go, which can be a sign that a tap is wearing down or getting poor tool life. It can also help engineers spot when too much tension is being generated in the tapping process.

Though the company is celebrating its 80th anniversary this year, it's still innovating with manufacturers in mind. Of interest to engineers seeking the added strength and reduced weight of softer metals like magnesium or aluminum

is a new type of wire thread insert the company is developing. Besides providing greater component reliability in high vibration, RPM, and temperature environments, the wire thread insert which has no tang yet supplies thread locking in the joint itself, will offer threaded joints additional strength, secure locking, and multiple reusability. This will

be especially helpful for diesel and gas engine manufacturers using softer metals prone to fatigue or stripping.

Now that manufacturers' products have advanced to the point where most consumers and contractors can no longer maintain their own products due to sealed components and electronic complexity, they must get reliability right.

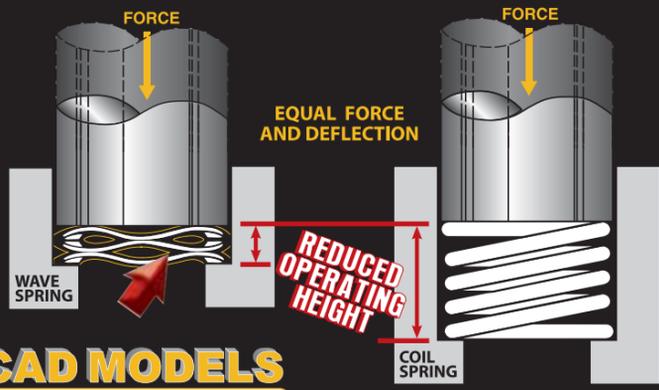
Toward this back to nuts and bolts effort, innovative locking fastener designs such as the first re-engineered thread form since WWII can help engineers limit warranty claims and potential liability while boosting profitability and customer satisfaction.

Ed Palm is President and CEO of Spirallock Corp. For detailed test data, including comparative graphic loading characteristics or photoelastic analysis/load vector comparison animation, visit Spirallock at spirallock.com.

Info Card 332

## The first re-engineered thread form since World War II

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## Products: Adhesives & Fasteners

### Compound transfers heat



Epoxies, Etc... has introduced 50-2366FR, a potting compound designed to quickly transfer heat and not stress sensitive components. The product was formulated for applications requiring low stress, thermal conductivity and flame retardancy. The low viscosity material is suitable for outdoor use and is said to provide excellent electrical insulation properties.

[epoxies.com](http://epoxies.com) Info Card 360

### Metric tapped spacers



Micro Plastics has announced a line of Metric Hex and Hex tapped spacers. Parts are molded in a Nylon 6/6 material making them resistant to vibration, abrasion and corrosion. Units are electrically insulating, non-magnetic and are said to have a high strength to weight ratio. Hex spacers use M4 self-tapping screws, while the Hex tapped spacers use M4 machine screws. Both Hex spacers are available in 8 lengths, ranging from 6 to 25 mm.

[microplastics.com](http://microplastics.com) Info Card 349

### Double-coated foam tape



Pres-On Pres-Mount double-coated foam tape is said to adhere instantly, even when bonding rigid materials to irregular surfaces, providing long-lasting adhesion, gap filling and uniform stress distribution. In addition, the foam cushions joints against shock while dampening sound and vibration, plus acts as an effective thermal seal between cold metals and warmer plastics.

The double-sided tapes are offered to match a broad range of mounting and of thicknesses, densities, colors and widths that can be die-cut to form a gasket.

[pres-on.com](http://pres-on.com) Info Card 358

### Flexured couplings



Helical Products Company offers miniature couplings, U-joints and machined

springs with integrated attachment components. Included are couplings with a wide variety of customized ends. All products use the company's Heli-Cal Flexure technology. The configuration of attachments can be as simple as a plain bore or as complex as a pinion gear. Flexured couplings and U-joints are said to be backlash free and provide constant velocity rotation regardless of misalignment.

[heli-cal.com](http://heli-cal.com) Info Card 359

### Position-control hinge

Southco has expanded its line of CEMA E6 constant torque position control hinges. The 200 Series hinges are available in symmetric torque formats ranging from 0.9 to 1.8 Nm, and in asymmetric torque formats between 0.8 and 2.3 Nm. The 400 Series hinges are available in symmetric torque formats ranging from 1.8 to 3.4 Nm, and in asymmetric torque formats between 1.4 Nm and 4.5 Nm.



Cycle testing has shown these models to perform within +20% of their nominal torque specification for >20,000 cycles. The standard hinges in these two lines are provided with black powder-coated finish, but are also available in other optional finishes. They are rated for an operating temperature range from -20° to 65°C. Both styles incorporate hardened steel shaft and torque elements and are O-ring sealed.

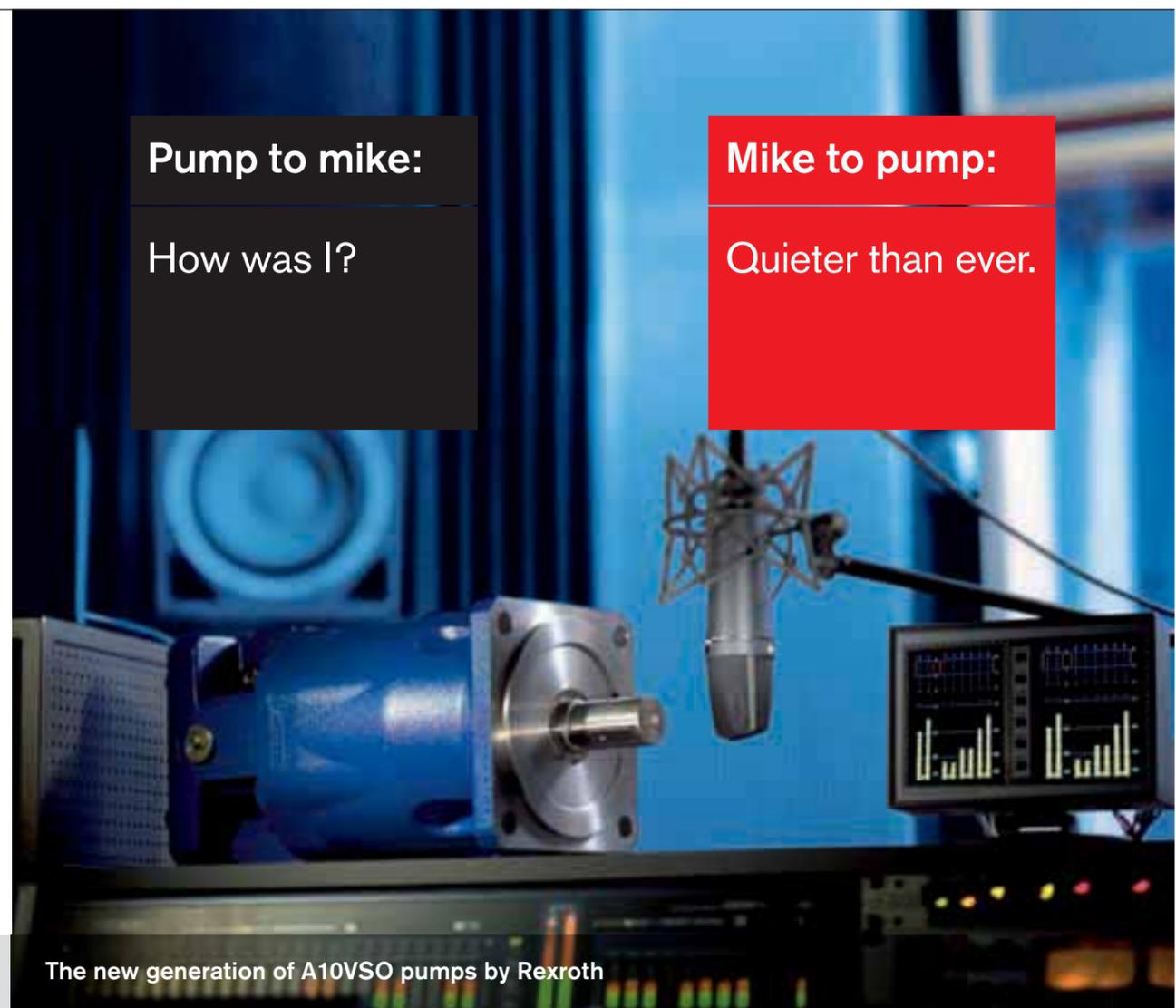
[southco.com](http://southco.com) Info Card 353

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### The new generation of A10VSO pumps by Rexroth

With the newly developed A10VSO series 32, Rexroth presents a variable displacement pump that sets the standards on noise level, for instance. There's virtually no comparable pump you'll hear less from. We've reduced vibration by up to 3 dB(A) and pressure pulsation by up to 50%. At the same time, reliability and economy have been further enhanced by boosting not only hydraulic mechanical efficiency, but service life as well. Yet there are still more reasons to opt for the new A10VSO series 32. Please contact us for more information. Bosch Rexroth. **The Drive & Control Company**

Bosch Rexroth Canada  
(905) 735-0510  
More on A10VSO at [www.boschrexroth.ca](http://www.boschrexroth.ca): Webcode CA0023

Electric Drives and Controls

Hydraulics

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Pneumatics

Service

**Rexroth**  
Bosch Group

## Products: Adhesives & Fasteners

### High temp transfer tapes



Adchem Corp. has announced the 7740 series of high shear, high temperature adhesive transfer tapes with bond strengths sufficient for splicing metal coils and other demanding applications. Testing has demonstrated resistance to thermal cycling, salt solution, acid, brake fluid and UV environments. The 7742-74 and 7745-74 durable transfer tapes, 2 and 5 mils respectively, consist of a pressure sensitive acrylic adhesive system and provide shear strengths at temperatures up to 300°F. The tape can be slit to widths down to 1/8 in.

adchem.com  
Info Card 357

### Press-fit ball plungers



J.W. Winco has introduced metric size stainless steel press-fit ball plungers. The ball plungers are used as detents as well as

for push-on/push-off applications and ejectors. The housing, ball and spring are all made of stainless steel. Diameters from 4 to 12 mm are available.

jwwinco.com  
Info Card 348

### Liquid-tight cord grips



Heyco Products, Inc., has introduced a line of liquid-tight, straight-through cord grips that connect flexible cables and cords of diameters up to 1.350 in. The Heyco-TITE line includes NPT, metric and PG threads in straight-thru configurations. The strain re-

lief products are UL listed, CSA certified, have an IP68 rating per DIN 40050, up to 70 psi water pressure and 94V-2 flammability rating.

cordscanada.com  
Info Card 354

### Rubber/silicone bonding



Hiawatha Rubber has announced capabilities of molding and bonding unique rubber and silicone formulations. The company is said to provide close tolerance, application specific molded rubber/silicone components and bonding to valves, brackets, assemblies, gears, housings, and mechanical assemblies, requiring special formulations and surface finishes.

hiawatharubber.com  
Info Card 355

### Low mass dispensing valve



I&J Fisnar has introduced the 135 g, CV629 cartridge valve, said to be one of the few valves that can be comfortably held in the hand without stress. Suitable for lubricants, silicones and adhesives, it is designed for manual operations where an operator needs to apply frequent dispensing deposits. The valve is also recommended for automated systems, its stroke is adjustable and it is recommended for micro shots or fine-beads. Maximum fluid pressure is 300 psi.

ijfisnar.com  
Info Card 356

### Keylocking thread inserts



Jergens, Inc. has expanded its thread repair insert line with several models to meet military and aerospace specifications. The keylocking inserts are said to be easy to install with standard drills and taps. "Keys" mechanically lock the insert into the base material, holding better than spring or locking patches, which do not mechanically lock the insert, the company says. The inserts are offered in both stainless steel and carbon steel materials.

jergensinc.com  
Info Card 361

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**Feature: Adhesives & Fasteners**

# 'Along For The Ride': fastening hardware using surface mount technology

By **Brian Bentrin**

Traditional hardware options for assembling printed circuit boards (PCBs) have always carried potential baggage. The tedious and exacting process of handling and installing loose hardware often drains productivity. Broaching fasteners, while typically a more efficient alternative, can damage fully populated boards if installed improperly. The resulting scrap

costs can be excessive.

Recent advances in fastening technology have been able to stow this baggage by taking advantage of the infrastructure already operating in the marketplace. A variety of fastener types have been developed specifically for mounting to a PCB using the same soldering processes that mount other electronic components. Surface mount (SM) fasteners effectively become another board component "along for the ride."

Such fasteners when fed on a tape and

reel, assembled with pick-and-place equipment, and reflowed alongside other electronic components can eliminate costs associated with parts handling, contribute to dramatic reductions in quality failures, and accelerate production.

Many methods exist to fasten hardware to PCBs and all will have their advantages and disadvantages. For example, loose spacers (serving as plastic or metal columns used to offset two boards) usually require secondary operations: sometimes they are snapped onto



A step along the bottom allows the solder fillet to be formed; the fastener's rectangular hole promotes quicker heating to minimize heat draw away from surrounding components.

the PCB; in other cases they may be joined with a screw to another component. The secondary operations, performed manually, rob time. Loose nuts and screws must also be removed to prevent rattle or, even worse, shorts and product failures.

Striving to reduce the number of loose parts and simplify the assembly process, broaching spacers or nuts have enjoyed industry popularity by virtually removing handling issues altogether. These fasteners broach by pressing the fastener's knurled section into a slightly smaller hole in the board, forcing the knurls to cut into the board, and installing permanently.

But these types are usually installed after boards have been fully populated with electronic components and the broaching process can subject populated boards to significant amounts of stress and ruin. Micro-cracks may form to sever traces in any of the board's multiple layers and damage can additionally occur if broaching fasteners are misaligned while being pressed into the mounting hole during installation.

Other, less frequently PCB attachment methods include adhesives, buttons, key-holes, and interlocks. All must be placed on the board or assembled and that means time, money, and challenges.

SM fastening eliminates any need to manually place the hardware on a populated PCB. Instead, the hardware (supplied on tape and reel) is positioned while the board is being processed and then installed with the other electronic components using conventional surface mounting equipment.

Other relative advantages include quality issues related to board cracking and misalignment disappear, since the hardware installs automatically with the same pick-and-place robotic equipment used for a board's electronic components. Such a process is non-intrusive to the board and will not expose a board to cracking.

And with fasteners packaged on tape and reel (neither loose nor dumped into bowls), different parts will not get inadvertently mixed as can happen from time to time with disastrous results during production with loose hardware. Several standard types of SM fasteners have been engineered to keep pace with application demands.

While "cost" is one of the most important factors when evaluating fastening methods, a fastener's function is very much part of the equation. In the case of SM fasteners, function is the part's ability to adhere to a PCB, which, in turn, is a function of the part geometry and surface finish, solder paste, and conditions of the surface mounting. All should be taken into account.

*Brian Bentrin, P.E., is Manager of Global New Product Development at PennEngineering (pemnet.com).*

Info Card 456



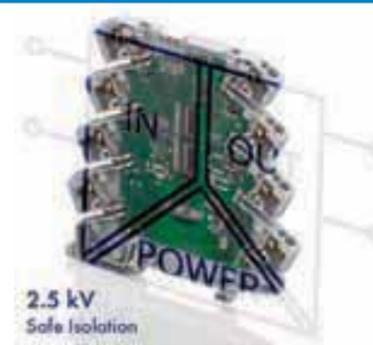
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**Products: Editor's Choice**

**30 mm emergency stops**



The XN4E series of switches from IDEC enable technicians to install up to twenty personal padlocks, preventing unauthorized resetting of the latched emergency stop switch and making service or maintenance safer to perform. Only IDEC switches are said to ensure NC contacts open when the contact block is separated from the operator. NC contacts of conventional E-Stops remain closed if the contact block gets separated from the operator. All XN E-stops are ROHS compliant, UL-listed, c-UL, TUV and CE marked. The XN4E series also complies with OSHA and ISO 12100-2:2003 standards.

idec.com

Info Card 409

**Switch gear protection**



Rittal Systems has introduced Ri4Power, a flexible, integral system said to provide fast and straightforward installation of low-voltage switch gear, as well as provide reliable operation of machinery and systems. The form-separated low-voltage distribution system is for IEC-compliant switch gear with busbar systems up to 1600 A. The height of the individual compartments can be adjusted incrementally, starting at a height of 150 mm. The modular IP54 housings are split up into different sections using functional dividers and side panels. Instead of one door at the front, a number of doors can be installed.

rittal.ca

Info Card 410

**IEC 60320 filtered in/outlets**



Interpower Corp. has introduced a line of IEC 60320 Filtered inlets and outlets. The inlets and outlets are intended for computer, medical, general purpose and/or custom indoor type equipment applications. Units have ratings from 6 to 20 A and either 120 or 250 Vac. Features include: IEC 60320 class I inlet or outlet; screw mount, nickel plated, shielded enclosure; 6.35 mm (0.250 in.) quick disconnect terminals; general purpose filter or medical, low leakage current filter; UL recognition, CSA and VDE approvals; and, RoHS compliant construction.

interpower.com

Info Card 417

**10 A dc/dc voltage regulator**



Linear Technology Corp. has introduced the LTM4600HVMPV, an encapsulated 10 A synchronous switchmode dc/dc step-down regulator system, the first device in a line of uModule dc/dc regulators designed for military and avionics applications. The device operates between -55° to 125°C and is offered in a 15 x 15 x 2.8 mm MIL Plastic LGA (Land Grid Array) package. It can achieve efficiencies as high as 92%.

linear.com/micromodule

Info Card 411

**Navigation switch**



E-Switch has introduced the JS1300 Navigation switch. The switch features multi-position, multi-switch functionality integrated into a single package. The contact rating of the RoHS-compliant switch is 12 Vdc, 50 mA and SPST NO, with an operating life of 100,000 cycles.

e-switch.com

Info Card 412

**LCD color monitors**

AutomationDirect has announced the Atlas line of industrial grade LCD color mon-



itors. Available in 15, 17 and 19 in. sizes, the TFT flat panel monitors offer non-touch and analog resistive touch screen models. Less than 2.75 in. deep, housed in steel chassis and powder-coated machined aluminum bezels, all models are equipped with 100 to 240 Vac input power supplies and NEMA 4/4X/12 panel-mountable front bezels. The line is also equipped with analog video (VGA) connections, and the "T" models provide USB and RS232 connections for the five-wire analog resistive touch screen.

automationdirect.com

Info Card 416

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**Products: Editor's Choice**

**Precision pressure controller**



The CPC6000 pneumatic precision pressure controller from WIKA Instruments Canada has a modular construction, making it possible to operate the instrument with either one or two control channels. Each channel has its own control unit with up to two reference pressure sensors, which can be exchanged without tools. Measuring ranges from -30 in.Hg to 1500 psi are possible, as well as absolute and differential pressure, the latter using two measuring channels.

wika.ca **Info Card 369**

**Quarter-turn actuators**

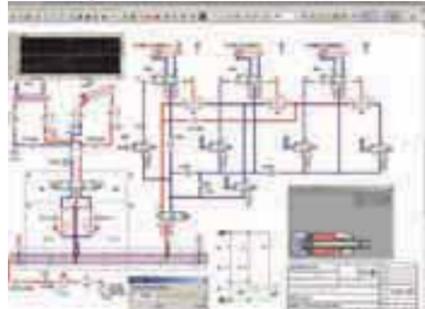


Valvcon brand V-Series actuators from Metso Automation combine a 10-bit mi-

croprocessor with a high-resolution feedback potentiometer to provide 2x better positioning resolution than previous models. The quarter-turn actuators now provide 300 positions from zero to 90°. The series consists of NEMA 4, 4X, 7 and 9 electric actuators designed for service on on-off duty and modulating or proportional control, to digital bus networks. The series is certified for valve and damper service up to 3000 in. lb of torque.

metso.com **Info Card 371**

**Fluid power simulation**



Famic Technologies Inc. has announced Version 5.5 of Automation Studio, software for system design, simulation, engineering, prototyping, diagnostics and training. The library is now has elements from proportional pneumatics. The transducers, instructions generator and controller allow conceiving circuits in open and closed loops. The hydraulic simulator considers the power lines' material to calculate the system losses. The flow line expansion is also considered when calculating hydro-

static lines. Calculations are now also made for the transfer of mechanical power through transmission mechanisms like gear boxes, shafts and clutches.

automationstudio.com **Info Card 368**

**Power brake system**



MICO, Inc. has introduced a full-power brake system with ABS and traction control to provide added control for multi-wheeled vehicles operated both on- and off-highway. The system is said to enhance vehicle stability while decreasing stopping distances and improving acceleration under low traction conditions. As many as eight wheels can be controlled independently of the others. The electronic control unit (ECU) monitors wheel speed and brake line pressures with sensors to added to the machine.

mico.com **Info Card 370**

**Epoxy resin system**

Master Bond Inc. has developed an epoxy resin system called Master Bond EP27. In 6 mil thick films, the product will set in as



little as 2 h at 40°F and will cure in 48 to 72 h. The system has a non-critical mix ratio of 2:1 by weight or volume and a mixed viscosity of 2000 cps. The system is said to offer outstanding physical strength properties and excellent chemical resistance.

masterbond.com **Info Card 352**

**Pump pressure sensor**



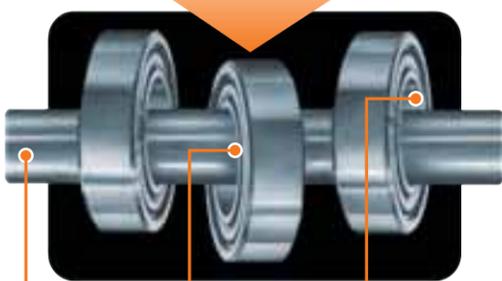
The PIM series pump diagnostic pressure sensor from ifm efector can detect potential pump damage caused by cavitation, trapped air or gas, blockages and deposits. Units can perform both pump monitoring and pressure detection. The sensor continuously monitors a pump to provide numeric indication of the operating system pressure and offers independent continuous diagnosis of the pump's condition.

ifmefector.com **Info Card 404**

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Info Card 71

**Profibus-DP I/O stations**



Turck Inc has expanded its line of Profibus-DP I/O stations with the addition of FDP20 I/O stations. FDP20 stations are available with 16 inputs and 16 input/outputs. In addition to providing IP20 protection, the glass-filled nylon housing and integrated DIN rail connector makes FDP20 stations suitable for integrating I/O in existing panels onto Profibus. A 9-pin female D-connector provides connection to Profibus-DP, and all power is derived from a separate source.

chartwell.ca

Info Card 309

**Vacuum cups, suspensions**



Anver packaged vacuum cups and suspensions let designers create custom lifters and jigs using standard components, including steel tubing and aluminum extrusions. Supplied as integrated packages, advantages to these "packaged" vacuum cup and suspension assemblies include the proper matching of components to application requirements and a single SKU number. Available in flat and single- or multiple-bellows styles, the vacuum cups are offered in a wide range of shapes, sizes and materials. Suspensions can have spring-loaded tops and bottoms to compensate for rigid frames or uneven loads, and can be supplied with many types of fittings and brackets.

anver.com

Info Card 372

**Fast-setting cyanoacrylates**



ITW Devcon has introduced a line of fast-setting Permatex brand ZipGrip cyano-

acrylate adhesives. The adhesives are said to eliminate the need for fixturing and are suitable for bonding or repairing plastics, metals, rubber, and other materials. The product is available in a range of viscosities from liquid formulations for close-fitting parts and porous substrates to gap-filling gels that stay in place even on inverted surfaces.

devcon.com

Info Card 351

**Slip-on pipe fittings**



Kee Industrial Products has introduced the Kee Klamp model 351 Ridge fitting and model 350 Eaves fitting. Available to fit

1.5 in. diameter pipe and galvanized, the fittings both have double set screws on the truss outlet to hold structures together. The Ridge fitting accommodates one vertical upright, one horizontal pipe (perpendicular to the upright), and two slope pipes that form an angle of 125°. The Eaves fitting accommodates one vertical upright, two horizontal pipes (forming an X-Y-Z axis with the upright), and one slope pipe that is angled at 27.5° from the horizontal pipe on the same plane.

keeklamp.com

Info Card 401

**Swivel casters**

The Revvo Caster Company has introduced PlasTech Solus swivel casters. Available in low height and standard height models, the casters are design for medical equipment, home and office furniture, as well as distribution trolleys and other applications. Made from thermoplastics, the units come in wheel diameters of 100 and 125 mm with load capacities of 80 kg and



100 kg, respectively. Low height, 100 mm diameter models are 104 mm high to the base of the stem. There is a choice of roller or ball bearings.

revvocaster.com

Info Card 408

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Schaeffler Canada Inc.

**Feature: CAD**

# Conference unveils tools for both manufacturing and mechanical design

**By Mike Edwards**

TAMPA, FL – Designers had to take a back seat briefly at the recent PTC/user 2007 software conference, while manufacturing engineers were shown tools created to ease the pain of process planning.

MPMLink, designed to work inside Windchill 9.0, PTC's latest release of its PLM (product lifecycle management) platform, assists with manufacturing process planning by providing an environment to create both design process plans and dynamically generate graphical work instructions. In his "Future Directions" presentation, Brian Shepherd, PTC division vice president, Product Management, said "there have been no great tools for manufacturing engineers out there that address the need for manufacturing BOMs and process plans."

PTC also announced the

release of Pro/TOOLMAKER 8.1, machining software with Granite-based Pro/ENGINEER MCAD with associativity, new language support and licensing, and GPOST support. Pro/TOOLMAKER 9.0, due out in 2008, should provide 5-axis capability and 64-bit support, Shepherd said.

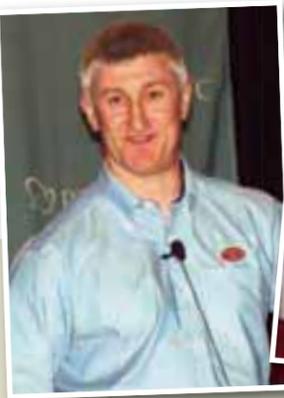
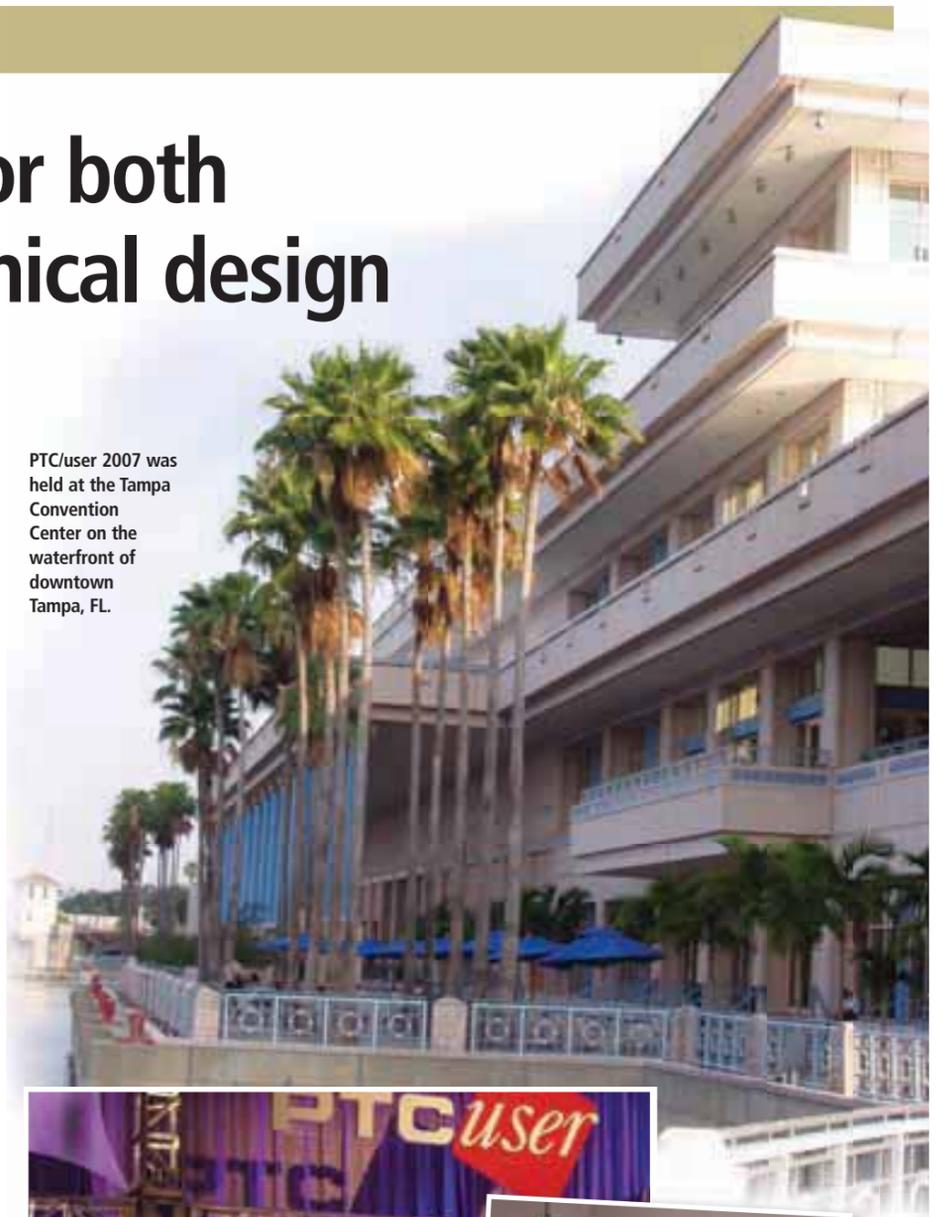
Mechanical design engineers weren't left out at the conference. Two years in the making, Windchill 9.0 offers a multi-CAD data management environment with Windchill Workgroup Manager. The platform can host native data from systems as varied as Pro/E, CATIA V5, UG-NX, SolidWorks, Inventor and AutoCAD. "It's a heterogeneous world," said Shepherd.

Much anticipated is Pro/E Wildfire 4.0, due for release in Q1 2008. Mike Campbell, PTC vice president of Product Management, told DPN that this version will include a digital rights management module solution option for mechanical engineers.

## PTC exec: It's a heterogeneous world out there

Info Card 331

PTC/user 2007 was held at the Tampa Convention Center on the waterfront of downtown Tampa, FL.



Martin Graham (left), director of IT and Logistics at The Wrightbus Group, a manufacturer of public service buses in the UK: "We want to investigate MPMLink for project design management." Dick Harrison (centre), PTC president and CEO: we want customers to have a "single source of truth" in their data. Brian Shepherd (right), PTC division vice president, Product Management addressed the software developer's 2007 roadmap plans and future directions.

Keynote speaker Dean Kamen of Deka Research, inventor of the Segway human transporter and founder of the FIRST Robotics high school competition. Kris Pyle (left in group), VP sales, western Canada at BRT Solutions, and from Ballard Power Systems, Mario Casol, engineering applications specialist and Paul Louw, manager, design services & configuration management, were representative of Canada participation at PTC/user 2007. Ballard of Burnaby, BC, is fuel cell developer and manufacturer that uses a broad range of PTC mechanical CAD and data management software tools.

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Info Card 75

**Feature: CAD**

# UGS reveals thorough integration into Siemens A&D

**By Mike Edwards**

NEW YORK CITY – UGS PLM Software, a division of Siemens Automation & Drives (A&D), recently hosted Innovation 2007, a press conference designed to introduce new software product and management directions, and to showcase customer applications.

From the start of the conference, UGS (ugs.com) wanted to address the FUD (Fear, Uncertainty & Doubt) factor in the wake of the Siemens acquisition earlier this year. Tony Affuso, chairman and CEO of UGS noted that, despite efforts to characterize the deal in a negative light, “the Siemens acquisition doesn’t mean we’ll become just a machine tool company.” He added that with being part of the A&D Group, there is now a 10-year vision where “UGS will be able to “deliver new levels of business value” to customers.

Anton Huber, VP at Siemens A&D, said of the integration of UGS into Siemens that the Germany-based company is basically leaving UGS alone, except for collaboration on the MES (Manufacturing Execution Systems) front. He added that historically, “the business fit for UGS is much better with Siemens that it was with EDS (the IT consulting firm that owned UGS).”

In a sneak preview of Teamcenter 2007, the company’s next release of its PLM software platform, UGS executive Steve Bashada said that the product will have more of a (Microsoft) Outlook user interface alignment: “users can search for data across the enterprise.” The release will also provide more workflow management tools and provide for visual navigation of assembly structures.

A presentation by Matthias Bronowski of the Bosch Siemens Home Appliances Group brought the acquisition into focus.



Anton Huber

With 1200 NX users and 100 Tecnomatix users already in his group, he declared “we know where you are going.” Bronowski is looking forward to further software and hardware integration between solid modeling, factory floor simulation, industrial controllers and process control.

Affuso tagged the integration goal as “Project Archimedes” within the A&D Group, whereby product design and production work together seamlessly. “Siemens intends to offer manufacturers ways to overcome complexity to grow their companies.”

In a Systems Integrator Panel, A.J. Gupta, partner, Accenture, said that PLM adoption means “getting engineers to buy in. Unfortunately, many companies are suffering from ERP fatigue – so they start small

and never reach escape velocity in PLM.”

In his customer presentation, Tom Soderstrom of Jet Propulsion Labs (JPL) noted the value of UGS software for space travel. “Send an avatar, then a robot, then humans to Mars.” He added that implementing Teamcenter 2007 will be an important step at JPL.

Masahide Hamatani, senior general manager at Canon Inc., pointed towards grappling with complexities in his customer presentation. He said that even digital cameras have up to 2000 parts with actual functionality comprised of close to 30% mechanical components – the rest being firmware/software and electronics elements.

It is a challenging simulation and concurrent design environment.” Canon is finding factory worker of 10%/month turnover in Asia becoming an issue, too. “In our Asian plants CAD-generated visualization and animation is being more widely used for training of assembly personnel,” said Hamatani through a translator.

In his presentation, Bruce Boes, VP, Solid Edge Marketing & Business Strategy, advocated for design operations of 5 to 50 engineers. “Teamcenter Express (from the UGS mid-market Velocity Series) can help the little



Masahide Hamatani, senior general manager at Canon Inc., digital cameras present “a challenging simulation and concurrent design environment.”

guy who understands he needs more data management control.”

Info Card 330

## Getting product design and production to work seamlessly



### RSF Mini Brushless Servo Actuators

This new series of high torque brushless servo actuators is designed for exceptional price performance. The actuators range from 30mm to 50mm in diameter and deliver torques 50% higher than comparable brushed actuators (up to 240 in-lb) at 20% faster speeds. A new 30:1 ratio is now available for maximum speeds up to 200 rpm. Positioning accuracy better than 90 arc-sec is achieved and an integral encoder can provide a resolution up to 400,000 ppr at the actuator output. These actuators are designed to be compatible with brushless servo drivers from most manufacturers and are well suited for high volume OEM applications.

Info Card 76



### Hollow Shaft Actuators

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.

Harmonic Drive LLC  
800-921-3332  
www.HarmonicDrive.net

Info Card 77

### RSF-3 Ultra-miniature Actuator

A new ultra-miniature servo actuator is now available from Harmonic Drive! Measuring just 12mm square x 47 mm in length, the RSF-3 brushless actuator delivers maximum torque up to 1.8 in-lb and maximum speeds up to 333 rpm, depending on gear ratio. Zero-backlash harmonic drive gearing provides positional accuracy better than 10 arc minutes and a 200 line, 2 channel incremental encoder (w/ index) gives a minimum resolution of 24,000 ppr at the output shaft. Ideally suited for precision servo applications where available space is at a premium.

Info Card 78



**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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Info Card 80

# Medical Engineering

## The vision of one gives sight to many

*By Mark Sunderland*

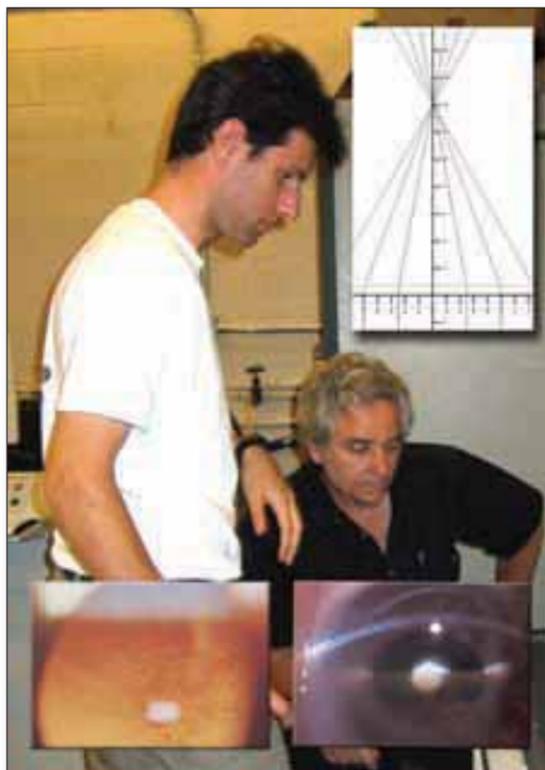
Occasionally, a simple device can have a profound impact. This is especially true in the disabilities market for which modern technology can enable activities that have hitherto not been possible by people with limited dexterity.

Earning potential can also be greatly reduced by a physical disability and blindness, especially in the developing world, is an affliction with devastating consequences. Those too poor to pay for vision care go blind. Those blinded by lack of vision care become poor.

This was the concern of Joel Segre, a graduate of School of Engineering at Stanford University in California. Driven by a passion to apply his skills to the benefit of humankind, his goal was to design medical devices that would be affordable to the over four billion people in the world who earn less than \$2 a day. Blindness, in particular, seemed to him a good place to start because it was both a cause and effect of poverty.

While working at a non-profit organization dedicated to making medical technology and health care services accessible and affordable, Segre found the opportunity to follow up on his goal. Specifically, he worked in the area of cataracts, which account for around 75% of preventable blindness worldwide. A cataract is an opacity that develops in the crystalline lens of the eye or in its envelope. Typically, they progress slowly to cause vision loss and, if they are not treated, they can cause blindness.

As a surgical procedure, cataracts can be relatively easy to treat with intraocular lenses to replace the effected portion of the eye. But although the procedure can be simple, intraocular lenses ñ produced



Joel Segre and Dr. Marvin Weinstein (seated). Insets, clockwise from the top: a ray tracing in Maple math software; a capsular cataract and a cataract in retroillumination.

in the developed countries at about \$100 each – are prohibitively expensive in much of the developing world. For this reason, Segre planned to design an equivalent lens for a fraction of the cost.

Using precision machining equipment, he produced several early prototype lenses. The problem was that many of them produced images with a light haze that was unacceptable for use in humans.

Segre was at a loss as to why this was happening and he couldn't find out where the error occurred. He turned for help to his step-father, Dr. Marvin Weinstein, a well-known theoretical physicist at the Stanford Linear Accelerator Center.

Dr. Weinstein pondered the problem and suggested that in order to understand the cause of the haze they would have to develop a stronger intuition for how sub-

micron variations in the optical surfaces of each lens would affect image quality. To answer the question, Dr. Weinstein decided to construct a computer model of each lens and ray-trace the expected image. In this way they would be able to quickly modify the shape of the lens and find the variations that were causing the problem.

Although there are expensive ray-tracing programs for designing lenses on the software market, Dr. Weinstein decided to implement a simple ray-tracing program in Maple, math software from Waterloo, ON-based Maplesoft ([maplesoft.com](http://maplesoft.com)) Maplesoft specializes in all purpose mathematics software tools with high end mathematical computation power to create models and simulate them for analysis and problem solving.

When the known lens shape was entered into this program, Dr. Weinstein was able to identify the cause of the problem and help Segre correct it.

Dr. Weinstein's computation proved to be a critical turning point in the lens design process. Reflecting on the success of the project, Segre said, "the ray tracing package in Maple allowed Marvin to whip out a solution to a problem that was literally keeping me up at night."

The lenses now produce crystal clear images. And equally clear is that higher visual acuity can now be affordable by a larger sector of the world population.

The Ray Tracing Package program used by Dr. Weinstein is available from the Maplesoft web site, [maplesoft.com/applications](http://maplesoft.com/applications). Keywords: ray tracing.

*Mark Sunderland is president, Biomedical Industry Group, Ottawa ([mark@biomed-group.com](mailto:mark@biomed-group.com)).*

If you found **Medical Engineering** interesting, please fill in Info Card 344.

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**Products: Editor's Choice**

**Conveyor belt splice**



The Unibar Fastener Clipper Splice from Dorner Manufacturing has all its teeth, or hooks, joined together by a single bar stretching the length of the conveyor. This is said to be important because it prevents teeth that may become loose during operation from detaching from the conveyor belt. The splice is also said to be a more low profile clipper splice than other similar devices available. The surface also reduces the chance for teeth to catch and capture fragments of a moving product.

[dorner.com](http://dorner.com)

Info Card 350

**Mini imager reads tiny codes**



Microscan Systems has announced the Quadrus MINI 3 miniature imager. With 3 megapixel imaging, the unit is said to extend the leading edge of bar code imaging technology by providing the highest resolu-

tion available today for data tracking. The product is able to decode high density codes of <3 mil, has a wide field of view and can read up to 100 different codes in a single capture, including both long linear codes and small 2D codes.

[microscan.com](http://microscan.com)

Info Card 448

**Spot cooling vortex tubes**



High temperature vortex tubes from Exair Corp. are suitable for spot cooling applications that are located in environments up to 200°C. Units produce cold air temperatures down to -46°C and have cooling capacities of 135 to 10,200 Btu/h. Tubes convert an ordinary supply of compressed air into two streams; one hot and one cold. Compressed air is the only source of power, eliminating the use of chemicals and refrigerants. The total airflow is 2 to 150 SCFM at 100 PSIG inlet air pressure.

[exair.com/htvortextube.htm](http://exair.com/htvortextube.htm)

Info Card 403

**Plastic chain belt conveyors**

Flextrac plastic chain belt conveyors from QC Industries have load capacities up to 500 lb and speeds up to 375 fpm. The con-



veyors are offered as standard up to 30 ft long, with lengths up to 100 ft available through special order. The features are all contained within a 2.41 in. profile (3.03 in. at the drive end). Widths of 4 to 24 in. are available, with a variety of side profile options for product containment. The conveyors are available with more than 100 styles of 1 in. pitch belting. Available belts include flush grid or flat top styles in a variety of materials, from low cost polypropylene to polyethylene with anti-microbial additive to a super high temperature composite.

[qcindustries.com](http://qcindustries.com)

Info Card 449

**50 mm hollow shaft encoder**



Renco Encoders has announced the RCH50 hollow-shaft encoder. Units include a cus-

tom opto-ASIC that supports incremental encoder line counts up to 4096, as well as outputs for commutation of brushless servomotors. The commutation signals have been implemented with optical logic to provide accurate switch points for smooth and efficient motor operation at any pole count. The internal bearings and flexible stator coupling simplify installation of different motors.

[renco.com](http://renco.com)

Info Card 443

**Inductive rotary encoders**



Heidenhain Corp. has introduced a line of inductive rotary encoders, the RLx 400 series with bearings. The rotary encoders are available in both single-turn and multi-turn versions.

The series now enables users to attain a 16-bit single-turn resolution with a measuring step of 20 angular seconds for speed control, and an accuracy of ±480∞ for positioning. The encoders also reach the vibration load capacity of the company's optical encoders with flange socket (150 m/s<sup>2</sup>).

[heidenhain.com](http://heidenhain.com)

Info Card 444

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Info Card 83

## Products: Editor's Choice

### Integrated data acquisition



MTI has introduced EVE, a system said to enable test operators to integrate virtually any sensor technology – MTI or competition – into a complete, integrated data acquisition, monitoring and reporting system. The system is also said to be a complete data acquisition and analysis package that requires no assembly and no specialized programming with only simple touch screen selections required to setup/run test protocols. The system can accept up to 14 sensor inputs.

[xtronics.ca](http://xtronics.ca)

Info Card 415

### Miniature pushbuttons



NKK Switches has announced it has reduced the cost of its MB2000 and MB2400 series miniature pushbuttons. The MB2000 series of miniature pushbuttons is available in SP, DP and 4P, DT configurations, and offer both momentary and alternate

action circuits. The MB2400 series of momentary action pushbuttons feature a snap-acting mechanism providing a short stroke and audible feedback. The series is available in SP or DP models, with gold, silver, or gold over silver contacts. Both provide 1500 V dielectric strength.

[nkkswitches.com](http://nkkswitches.com)

Info Card 405

### Power supplies expanded

The output voltage of the 48 V power supply units from Phoenix Contact can now be set between 30 and 56 Vdc. The 48 V/5 A, 10 A and 20 A single-phase power supply units and the 48 V/10 A and 20 A three-phase modules are said to ensure low power loss in the case of long routing paths. They can, for example, be used to reliably start motors whose starting



torque has increased due to dirt build-up, the company says.

[phoenixcontact.ca](http://phoenixcontact.ca)

Info Card 406

### Metal electrical raceway



Panduit PMRS and PMR7 metal raceways are said to improve safety and reduce installed costs. The metal raceway system features a patent pending bonding design that provides continuity of the ground path between fittings and channel. System components incorporate a snap mount assembly method for fast installations. The system includes an assortment of fittings, junction boxes, faceplates and accessories for various routing and termination options.

[panduit.com/pmr03](http://panduit.com/pmr03)

Info Card 407

### IP67 Ethernet switches



Weidmuller has introduced a line of IP67 rated 8-port industrial Ethernet switches. The housing has a flammability rating of UL94 V0 with M12 sealed connection ports. The line includes both an unmanaged version and a full-featured managed version. The managed version supports VLAN, QoS, port trunking, port mirroring, SNMP, DHCP, is auto crossing/auto negotiating, and able to perform self-healing connections via the company's Rapid-Ring technology.

[weidmuller.ca](http://weidmuller.ca)

Info Card 413

### Filter technology for uTCA

EMI/RFI filter connector manufacturer CONEC has added PICMG MicroTCA compliant power module input connectors with integrated filters. The integration of filters in the connector allows real estate PCB space savings. Features include screw machined solid contacts for 250 mating cycles (other quality classes upon request), contacts for 24 A (49 A upon request), up to 50 nF integrated filter per power pin and dielectric withstanding voltage 1000 Vdc.

[conec.com](http://conec.com)

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**PLC software**



Schneider Electric has announced Telemecanique TwidoSuite software simplifies developing programs for Twido controllers. Compatible with TwidoSoft, the TwidoSuite software can be used for a variety of commercial and industrial applications including conveying, mining, packaging and palletizing machinery, as well as compressors, HVAC, pumps and water treatment pumping systems. TwidoSuite is said to be the first programming software organized according to the user's development tasks. The user can view high definition, detailed Twido hardware graphics and the related

communication architecture (HMIs, variable speed drives, CANopen, Modbus or Ethernet protocols, field-buses and networks). The user can also select LIST or LADDER programming language.  
**schneider-electric.ca** Info Card 446

**Positioning system**



A positioning system for mounting blowers, heaters, cameras and related devices onto conveyors and packaging equipment is available from Stafford Manufacturing Corp. The Universal Positioning System consists of a base that can attach to any flat surface and a series of stepped and straight-through couplings which accept different sized shafts and can also

mount onto a guide rail. The system features a variety ball-end mounts and V-block clamps for holding blowers, heaters, cameras and related devices. Made of anodized aluminum, couplings are available for 1/2, 3/4 and 1 in. precision shafts and custom end-effectors can be developed to match specific application requirements.  
**staffordmfg.com** Info Card 450

**Motors 3.4 mm high**



Sanyo DC Micro Motor Division has developed a vibrating micro motor featuring a low profile of 3.4 mm, in an SM device package. The BSY series dc motor is available in an 11 mm length. The series is suitable for devices weighing approximately 80 g or less.  
**us.sanyo.com/industrial** Info Card 445

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## Advisory Board Directions



# Do your technology workers understand your business? If not, educate them!

By John Bachmann

Fritz is an engineer's engineer. An undisputed technological expert, he takes great pride in looking into virtually every conceivable option for the design projects he is given by his employer, ABC Integrators. Deadlines sail by, are reset, and sail by again as Fritz's hours allocated to the job pile up. When management puts pressure on him, he retorts that he wants "to get it right" for the customer.

Next door at XYZ Distributors, Joan, a

technical college grad, is a recent addition to the Customer Service Department. She is continually handling "difficult" customers who make repeated calls for delivery updates for items they have ordered. What frustrates her even more is how upset they become when promised dates are missed.

Is there anything that the managers that Fritz and Joan report on can do to turn these two employees around? The answer is "yes" if each manager understands that the common cause of the above problems is a fundamental lack of understanding by their employees of their own business and

that of their customers.

One way of addressing this lack might be to campaign for engineering faculties and technical colleges to include business courses in their programs. But these institutions are trying valiantly to keep up with the break-neck pace of developments in technology and, as a result, their curricula are jammed with technical content. Consequently, it's only logical that employers assume the responsibility for making their technical staff "business literate." But where to start?

What Fritz needs is a crash course in

cost accounting. ABC could enroll him in an evening course at a local community college. There are also probably a number of people at ABC who could explain to Fritz how operating expenses (which include his salary) are deducted from the gross margin to result in an operating profit. Most employees are surprised at how low the operating profit margin typically is at the end of this calculation!

At the end of his training, Fritz should understand that commerce involves one company providing products or services to another company in a way that both make enough profit to stay in business. In many cases this means that the customer can't afford a solution with "all the bells and whistles" and, consequently, Fritz must restrict his proposed solutions to options that fit the customer's budget while providing ABC with a reasonable profit.

Joan's problem in Customer Service is that she can't empathize with the challenges her customers confront every day in order to survive in an increasingly competitive environment. One solution might be to have her tag along with a sales rep on calls to some of the more demanding accounts. Hopefully, when Joan sees a multi-million dollar machine sitting on the customer's floor for which shipment is being delayed due to a missing part she will better understand why the customer gets upset when a part is late. Giving her a quick primer on how cash flow works and contributes to a machine builder's stress will also be helpful.

There is a growing recognition on the part of employers that technology workers, especially those which interact regularly with their companies' customers, need to be more business literate. While in-house solutions may work, today employers can easily out-source this training to local colleges.

That was the thinking behind the Industrial Careers Pathway (ICP) initiative ([industrialcareerspathway.org](http://industrialcareerspathway.org)) started by the Power Transmission Distributors Association ([ptda.org](http://ptda.org)). In Canada, two colleges are leading the ICP effort. Mohawk College in Hamilton and B.C.I.T. in Burnaby, BC, are offering business courses tailored to technology graduates.

The courses are part of certificate programs in Industrial Marketing and Industrial Distribution, but companies can enroll their staff in just a few of the courses to meet particular needs. While the general thrust of these programs leans towards the needs of distribution, most of the courses will still be valuable for employees of manufacturing, service and other technology-focused companies.

Regardless of which route you take, making the effort to make your staff more business literate will pay off in better customer service and less time wasted by your staff chasing or handling business that is probably a lose-lose scenario for you and your customers.



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John Bachmann is the Corporate Sales, Marketing and Quality Manager for Wainbee Limited and the Chairman of the Canadian Fluid Power Association. **Info Card 345.**

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