DPN DESIGN PRODUCT NEWS

May 2008

Covering the total design engineering function in Canada

Compression limiters

Spirol International has introduced the series CL500 and CL550 roll formed, insert moldable compression limiters designed to replace expensive machined limiters. The series CL500 is designed around clearances for 6 and 8 mm bolts. The series CL550 is designed with additional clearance around the bolts to accommodate greater positional tolerances.

www.spirol.com

Oscilloscope breaks barrier

Agilent Technologies Inc. has announced that it broke the one-billion acquisition samples (1 Gpt) barrier for the first time with its Infiniium 90000A Series. The InfiniiScan Plus enables 150 ps hardware-event identification and 75 ps software-event identification.

www.agilent.com

Variable speed ac motors

WEG Electric Motors Corp. has developed a control technology – OptimalFlux – that enables a standard TEFC motor, powered by a WEG variable frequency drive, to operate at a much cooler temperature across its entire speed range, particularly at low speeds.

www.pamensky.com

Lennox air conditioners have Canadian foundation

By Mike Edwards

Commercial air conditioners are everywhere: on the top of schools, hospitals, office buildings and factories. Lennox Industries, a name synonymous with this market, turned to a pair of Canadian companies to help it mass process the foundation that anchors each of these units.

That foundation is a full perimeter base rail, providing holes to attach the air conditioner's side panels, openings for conduit and slots for forklift truck access. The Lennox packaged rooftop units (lennoxcommercial.com) can be gas/electric or electric/electric and range in capacity from 2 to 50 tons. The base rail also "provides greater structural integrity so the unit is easier to handle when rigging and transporting," according to Lennox.

To manufacture the base rails at its Stuttgart, Arkansas, rooftop unit production facility, Lennox approached metal rollforming specialist Samco Machinery (samco-machinery.com) of Toronto to produce the precision, fully customized equipment required. Samco in turn recruited Almac Conveyor Co. Ltd. (almac.com) of Aurora, ON, to produce the sophisticated material handling systems that transfer the rails between the process stages.

The rollforming equipment in the Arkansas plant transforms coils of galvanized steel into a wide variety of Lennox base rail profiles in precise steps, according to project leader Calin Fudulu of

Continued on page 8

Volume 36 Number 3

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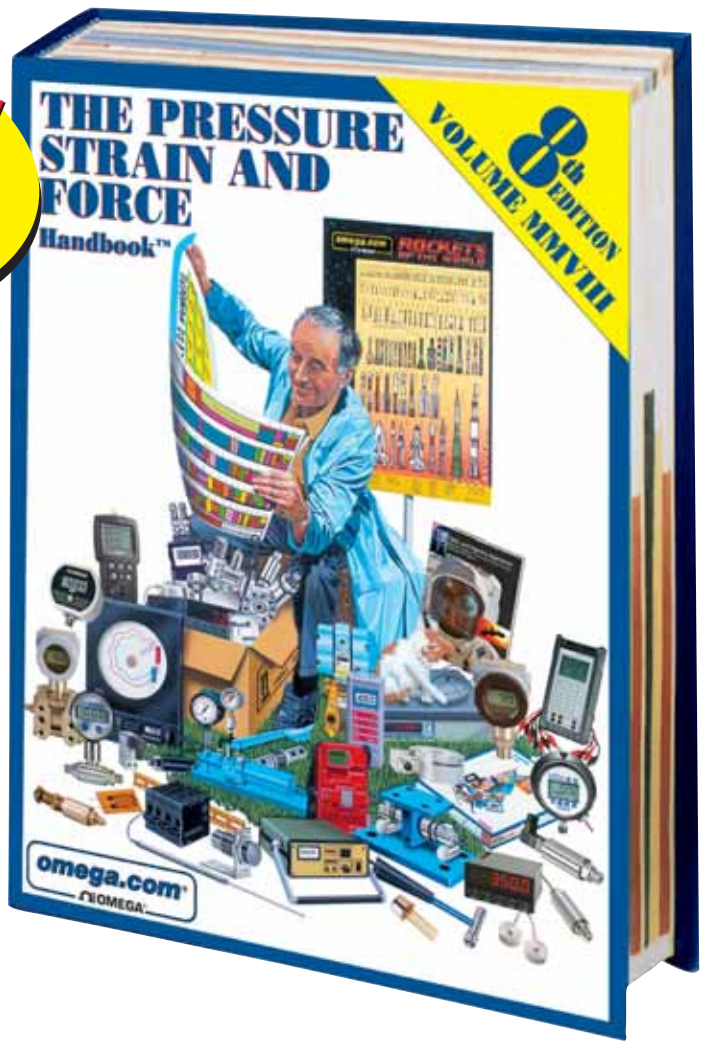

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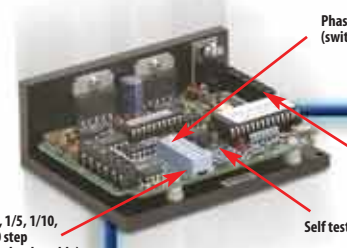

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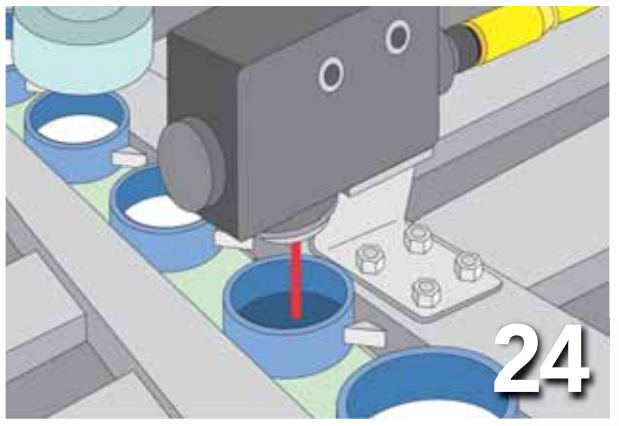
In this issue

Davis Controls celebrates 75 years in the industrial distribution business

Distributor pioneers customer service in the process instrumentation and industrial controls market with a nationwide network of offices and computerized management system.



Sensors play critical role in dynamic materials handling applications

Deciding what is required and what is "nice to have" challenges designers everywhere. This article provides valuable tips for engineers making tough sensor decisions.

Training and certification initiatives working in fluid power industry

"Electronics has become the preeminent control medium for fluid power": Donna Pollander, executive director, International Fluid Power Society. Eaton Hydraulics demonstrates its high tech training.

Tesla electric sports car driven by standard Lithium ion batteries

A proprietary 248 hp ac electric motor spins up to 13,000 rpm and weights less than 52 kg. The battery pack is guaranteed for 160,000 km, says Bill Vance.

DEPARTMENTS:

Advertisers Index

DPN DESIGN PRODUCT NEWS

DIGITAL EDITION May 2008

DPN editor
Mike Edwards

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

Interactive stuff

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

Renderings

Tool and machining industry presents ways to keep our manufacturing alive and kicking

By Mike Edwards, Editor

Would you say that the Canadian economy is in good shape or bad? Certainly the buoyant resource sector has created a boom in Western Canada, resulting in a strong dollar with better purchasing power on the world stage.

Unfortunately, our manufacturing sector in the old industrial heartland of Ontario has seen many job losses and plant closures, especially in the automotive arena. The resurgent dollar has been blamed as the biggest culprit in making our manufactured goods increasingly pricey and uncompetitive.

The members of the Canadian Tooling & Machining Association (cmta.com) have been hit particularly hard, but are not taking things lying down. Horst Schmidt, president of the Cambridge, ON-based association, has been particularly vocal about how Canada can defend its position amongst global manufacturers.

Become a "process solution" for your customers

In his presentation to the CMTA Western Ontario Chapter meeting this winter, Schmidt noted that the machinery, tool, die and mold (MTDM) sector in Germany "is successfully competing world wide with costs well above our Canadian costs.

"Germany, with the highest shop rate is fully booked out well into 2008 and they are shipping tools into China. They are competing against the Chinese MTDM sector in their own back yard."

The Germans are competing successfully, according to Schmidt, despite operating under a number of impediments:

- More stringent work place safety regulations
- Enforced 35 hour work week with no overtime permitted
- Highest labor rates for the least hours worked by any worker in the world
- High tax structures
- Little or no government assistance
- Tooling cost well above comparable Canadian costs

The differences?

"They are managing their customers rather than letting their customers manage them," said Schmidt. "They complete 100% of the engineering and part analysis before they start the build – minimizing the costly and disruptive changes during the build.

"They know their true detailed costs when they quote, they plan the build to maximize their available resources, and they do it once and do it right."

Recommendations for Canadian manufacturers from Schmidt have a common sense approach. For example, he said, "If the customer requires 50,000 cycles do not build a tool that is good for a million cycles. Do all the engineering required … for most of us that would increase the engineering content.

"Complete engineering first, then build. Understand the customer's requirements, then engineer to that."

Lean techniques necessary throughout the process start with raw materials. "Most blocks of steel spend 80% of the time on the floor doing nothing," said Schmidt. "Ideally the block should be worked on continuously from when it comes in until the finished product leaves our doors."

The business approach to a tooling inquiry also differs between Canadians and Germans. A Canadian tooling supplier "wants to acquire the basic information necessary so that he can get on with designing and building the tool," noted Schmidt, while a German tooling supplier "objective is to understand the complete system for which he is designing and building the tool so that the tool is properly thought out for the overall process rather than the production of the part."

The Canadian supplier "then moves forward and builds the tool to produce the part," while the German supplier "then becomes part of the production team working with the customer to provide the best tool/part solution for the process."

In Canada, the supplier philosophy seems to be "build to print" while it should be to become a "process solution" for the customer, concluded Schmidt.

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

By Design

Davis Controls 75th anniversary a milestone for national distributor

By Mike Edwards

OAKVILLE, ON – **Davis Controls Ltd.**, a distributor of process instrumentation and industrial controls (daviscontrols.com), is celebrating its 75th anniversary this year. With head offices in Oakville, Ontario and regional offices across Canada, Davis Controls is now a member of the small and select community of Canadian companies to reach this 75th anniversary distinction.

This year, distributor Davis Controls celebrates 75 years of serving the process instrumentation and industrial controls market in Canada.

The company has humble beginnings. According to Neil Montgomery, president and CEO of Davis Controls, the mechanical engineer founder Cecil R. Davis "road his bicycle through downtown Toronto fixing boilers," and later began to sell level switches to his customers, a product category that the company still carries today.

The strength of Davis Controls is in "surrounding yourself with good people," he added. "Many industrial products are very much alike – with only subtle differences." So customer service has to provide the attraction, explained Montgomery.

"Customers expect bullet-proof products and service, so what do you have to add after that?"

In the 1996 time period, after experiencing many of flat revenues, Davis Controls decided to implement an enterprise resource planning system. With the system, Montgomery noted, now Davis Controls employees can have instant access to information from manufacturing, distribution and financials such as order entry, inventory and accounts receivable.

Montgomery said that this avoids the scenario where a customer question takes hours or even an entire day to receive an answer that's potentially buried in a private email or paper filing cabinet.

Schmalz launches Canadian branch office

CAMBRIDGE, ON – **J. Schmalz GmbH** of Glatten, Germany, has announced the opening of its Canadian branch office here (schmalz.com/ca). The company says it is poised to provide Canada with full support in sales and service, consulting, engineering, inventory and emergency services. "Our innovative products will help Canadian companies to streamline their processes and improve productivity at competitive prices for a faster ROI," said Ludwig Seegraeber, general export manager, Schmalz Gmbh. Its main products are vacuum components, and gripper, handling, and clamping vacuum systems.

The 2008-2009 CFPA Board of Directors: George Connell (left), Doug Newton, Richard Leece, Bob Balon, Alan Wheatley, Don Trenn, Mark Hoyland, Richard Docherty, John Bachmann and Chris Ballard.

Technology education tops bill at association meeting

TORONTO – Issues of education, certification and the future of fluid power technology dominated the annual winter meeting of the **Canadian Fluid Power Association** (cfpa.ca) held here recently.

Executives of the **International Fluid Power Society** (ifps.org) and **National Fluid Power Association** (nfpa.com), along with educators from Ontario-based **Mohawk College** and **Centennial College**, provided their perspective on how the fluid power industry can keep members current on training credentials and how students are being trained for the future.

Part of the education process for businesses is recruiting young people into careers in an industry that is perceived to "dirty." CFPA chairman John Bachmann of **Wainbee** pointed to the Toronto-area middle school Canadian Fluid Power Challenge, currently in its eighth year. "We have 17 schools involved now and want 20," said Bachmann. He added that industry sponsors are always needed to step up to support the event.

Western Canada Chapter CFPA president Don Trenn of **Gil Del Hydraulics** Services told the meeting that the association is working with the **Northern Alberta Institute of Technology** in Edmonton to incorporate a hydraulics curriculum. Trenn added that the annual Strathcona Tech Challenge in Edmonton now has five middle schools and 19 high schools represented. "Our goal is have 250 students involved in the skills competition."

Ted Chisholm of distributor **BDI Canada** reported that the first course at Mohawk College part of the Industrial Careers Pathway (industrialcareerspathway.org) initiative to make tech grads more business savvy, has been completed.

News in Brief

Creaform Montreal office

Creaform (creaform3d.com) has opened an office in the Montreal metropolitan area. The company provides scanning, metrology and inspection, CAD and reverse engineering services.

E.M. Precise 20 years

E.M. Precise Tool Ltd. (emprecise.com) of Stoney Creek and St. Catharines, ON, celebrates its 20th anniversary this year. A distributor of cutting tools and coolants to the metalworking industry, it also provide manufacturing consulting services, custom cutting tool design, tool repair and CNC programming.

Kee changes name

Kee Industrial Products, Ltd., of Concord, ON, has announced that the company will now operate as **Kee Safety, Ltd.** (keesafety.com). The Kee Safety Group is segmented into four business units: Safety Components, Safety Systems, Safe Access Solutions and Safe Steelwork Connections.

Orbitform names sales representative

Orbitform Group (orbitform.com) of Jackson, MI, has announced that Richmond Hill, ON-based **Tool & Assembly Systems, Inc.** (toolassembly.com) has joined the company as sales representatives for Ontario. Besides representing Orbitform's line of forming, fastening, joining, and assembly systems, Tool & Assembly Systems brings over 15 years of related automotive, OEM, and commercial industries experience to the Orbitform sales team.

Applied Precision appoints director of sales

MISSISSAUGA, ON – **Applied Precision Inc.** (appliedprecision.ca) has announced David Delves as sales director (right). The addition of Delves, as well as application specialist Otto Akeson, is part of what the company says is its commitment to put the right team in place to expand its 3D technology offerings and grow in new markets. Applied Precision is a provider of 3D digitizing systems and services for new product development, quality inspection and CAD updating solutions to numerous manufacturing industries across North America.

Calendar

May 29-31, 2008. Whistler, BC. PTDA Canadian Conference presented by the Power Transmission Distributors Association (ptda.org).

June 5, 19, 24, 28, 2008. Montreal, Vancouver, Calgary, Edmonton. The Autodesk Experience Tour with sessions including What's New With AutoCAD 2009 Tips & Tricks with Lynn Allen (http://experience.autodesk.com).

June 10, 2008. Milton, ON. CFPA annual golf tournament for fluid power education (cfpa.ca/events).

June 17-18, 2008. Web Handling 1: Understanding Web Handling Systems presented by Seminars for Engineers, USA (seminarsforengineers.com/converting).

See more events @ dpncanada.com

Almac Industrial Systems staff: ready to serve the material handling industry.

Almac Conveyor creates new identity to reflect capabilities

AURORA, ON – **Almac Conveyor Co. Ltd.** has added a new identity to reflect its expanding business operations in the material handling industry. As the company has evolved from a supplier of belt, chain and roller conveyors to a custom equipment-manufacturer, its business has grown so substantially the company has created a new division, **Almac Industrial Systems** (AIS) to better reflect its current product offerings. AIS will build on its reputation for customer return on investment, ease of process, integration to master schedule, solid engineering experience and dedication to customer specification. One of Almac's newest product lines is an ever-expanding roll forming process system (see cover story).

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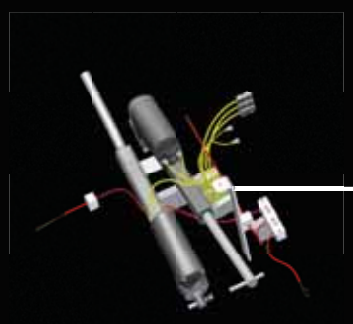

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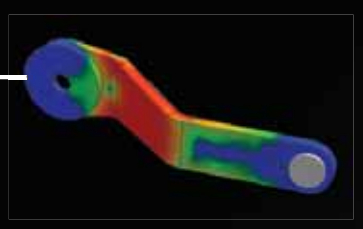

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HOW DIGITAL PROTOTYPING GOT THE HTC FLOOR GRINDER ON THE GROUND FASTER.

autodesk.com/htc

Image courtesy of HTC Sweden AB.

Cover Story

Samco Machinery, Almac Conveyor team up for custom production line

From Front Page

Samco Machinery. “Each frame is a specifically designed unit,” said Fudulu. The Samco system has to be flexible to accommodate all the different models Lennox produces, “along with future projects,” he added.

The PLC-controlled continuous feed system starts with several punch presses creating notches, holes and corner mitres for downstream assembly. “The roll former then gives the rail its profile, strength and channels, with up to 24 forming passes, before it is cut by a hydraulic press into a specific length,” said Fudulu.

Once a base rail is punched, formed and cut, it has to make its way to the hydraulically-driven Samco bender where the four-sided frame is formed – and that is where Almac Conveyor came into the picture.

“It was a complicated engineering project,” said Boris Gartsbein, project leader at Almac Industrial Systems (a division of Almac Conveyor Co. Ltd.). The complication was to develop a system that could handle the range of rail lengths that Lennox required, varying from 172 to 424 in., and then handle them again as rectangular frames to be stored in stacks on a receiving table.

This meant that Almac had to design both a bender-infeed and bender-outfeed system. Almac designed an infeed system with eight PHD pneumatic grippers on a rack and pinion drive for the vertical movement of the gantry. Two variable frequency drive motors from SEW-Eurodrive control the timing belt and sprocket-driven X-Y gantry system.

To receive a cut rail from the Samco rollformer station, Almac pushers move the product from the roller conveyor into a pocket, then tilts the rail for better pneumatic gripper access. Once a rail is gripped, it can be transported and deposited in the Samco bending station.

The heart of the base rail production line is the electrical controls driven by Rockwell Automation’s ControlLogix PLC system from sensors via DeviceNet to HMIs (bender operator interface shown).

“The bender is a single unit that does all four corners,” said Fudulu. “The rail goes from being straight to a closed-in frame. Three bends are created, followed by an operation to ‘close’ the last corner.” Lennox personnel later install a fastener to complete the frame.

The Almac outfeed pick and place gantry system consists of four hooks to lift the frame from the bender and travels 396 in. in 20 s to the receiving table.

Each hook extends by a Parker cylinder, is adjustable by an Allen-Bradley servomotor and a Numatics screw drive unit. Each pair of hooks is mounted on two bridges, perpendicular to each other. The bridges are adjustable by Duff-Norton actuators. The bridges are mounted on a side-shift carriage, driven back and forth by a 4 in.-bore Parker cylinder.

A side-shift carriage is also mounted on a gantry platform lifted by an 8 in.-bore Parker cylinder. The platform is mounted on the transfer carriage and is driven back and forth by a timing belt and an SEW gearmotor. “This is a special piece of machinery, not just an off-the-shelf set of conveyors,” said Gartsbein.

Not just standard off-the-shelf equipment

Both Samco and Almac equipment is controlled by one electrical platform, the Allen-Bradley ControlLogix PLC system over a DeviceNet I/O network, according to Gus Theoulis, electrical engineering manager at Samco. “One central processor” was necessary for such a complex project, said Theoulis.

Rockwell PanelView HMIs and remote I/O drops throughout the base rail manufacturing system monitor a variety of motor encoders, proximity switches, photoelectric sensors, fibre optic sensors and limit switches. Theoulis said that one of the biggest challenges for Samco was designing a rotary embossing unit in the base rail rollforming line.

The unit creates notches, permitting the finished frames to be stackable. “The pattern had to be precise and flexible, allowing for slippage in the rollforming process,” explained Theoulis. An Allen-Bradley servodrive and some creative programming kept the embosser from slowing down the continuous feed system.

Almac is involved with the designing, engineering, manufacturing, installing and commissioning of complete material handling systems. Samco Machinery produces rollforming equipment for applications such as the garage door, automotive, building construction, shelving and racking industries.

Feature: Hydraulics & Pneumatics

Fluid power and electronics are not mutually exclusive career choices

By Tom Blansett

The fluid power industry has a perception problem, and if we don't start addressing it soon, the problem may well turn into the kind of positive feedback loop we all try to avoid building into our systems.

In a nutshell, the action today among young engineers is heavily focused on electronics, and those same young engineers tend to see fluid power as a dirty, archaic, boring technology with no room for innovation or people who like to think outside the box.

Promising students aren't offered nearly enough scholarships, fellowships or internships to study fluid power related technologies. And to the extent those students choose to pursue careers in electronics where those incentives are available, the fluid power industry is increasingly starved for new talent to drive the innovation we need to create the future we're all working toward. That's the bad news.

Electronics training at Eaton's Hydraulics Operations in Eden Prairie, MN. Near to far: Terry Gomez and Lee Jepsen of Eaton (Canada) sales, Devin Klotz of HyPower Systems (Winnipeg), Pat Kinnison of Hydraquip (Oklahoma) and Curtis Steele of HyPower Systems.

The good news is that none of these things are inevitable. We, as an industry, can address and change all of them for the better, and it is very much in our own best interest to do so. In fact, we don't really have a choice, because as Donna Pollander, executive director of the International Fluid Power Society (IFPS) said recently, "electronics has become the preeminent control medium for fluid power."

The irony of the situation in which we find ourselves is that fluid power and electronics are complementary technologies. Fluid power supplies the "muscle" and electronics provide the "brains" of modern systems in both mobile and industrial applications. And "intelligent" systems are the future for many applications. The fact is that we need each other, and we need to find new ways to get that message out.

The IFPS has launched an initiative to create an Electronics (Electronic Controls) Certification program. "Our plan is to first develop a specialist certification, Certified Fluid Power Electronics Specialist, immediately followed by Industrial Technician and Mobile Technician certifications."

Eaton is a major sponsor of this initiative – the company has contributed funding to support the program – and will be an active participant in the development process. We are confident that it will make a significant difference over the long run by providing both incentives and rewards to talented individuals who choose careers in fluid power control systems. That's one form of positive feedback that will help increase the number of qualified people available to the industry.

Another is the ongoing training program Eaton has developed in association with Alexandria Technical College (Alex-Tech) in Alexandria, MN. Here we are taking the approach of improving the skills of individuals who already are pursuing careers in fluid power by training them to use the advanced electronic tools that exist today. Program graduates receive CONTROL F(x) Certification from Eaton's Training Services Department.

Eaton's product manager for Electronics, A.J. Smith, says that Alex-Tech's association with Eaton and IFPS will lead to fellowships for the colleges students, and fuel the growth of their program. "It's a win-win situation with academia and industry working together to address the industry's needs while improving the skills and earning potential of the students."

Students from Eaton distributors in the U.S. and Canada recently spent a week in Eden Prairie earning their CONTROL F(x) certification, a standardized approach to control software development based on the IEC 61131-3 programming standard.

Garett Aubin of HyPower Systems in Winnipeg, attended a recent Alex-Tech class. "The training was a great experience."

Tom Blansett is Manager of Training Services for Eaton's Hydraulics Operations
www.eaton.com/hydraulics.com

Feature: Hydraulics & Pneumatics

Seals a critical choice when designing a pneumatic cylinder

Some examples of cylinder design methods to employ include: 3D assembly (illustration), process mapping, finite element analysis, surface finish analysis, materials testing, product validation, failure mode effects analysis.

Pneumatic cylinders continue to provide a valuable and preferred option for linear actuation in many applications. The sealing system is a critical element of cylinder design when striving to achieve optimum performance.

A number of environmental factors can compromise the seals in a pneumatic cylinder. These include: fluid flow and pressure profiles; thermal changes; media changes; hardware motions; assembly processes; and, time.

Good sealing system engineers work towards understanding the impact of each environmental factor to maximize any benefits and minimize any negative impact as they seek to achieve the necessary balance between the four main measures of sealing system performance: leakage, friction, life and system cost.

Find a balance between leakage, friction, life, system cost

Today's sealing system engineers have three main areas to adjust when effectively working with other engineering disciplines to optimize sealing system products: materials, shapes and processes.

As an example of the design process in action for a range of pneumatic cylinders requiring cost effective, high performance sealing systems, Trelleborg Sealing Solutions has been working with many customers to develop a new line of pneumatic sealing systems. Demands in the market indicated that we need a more robust, longer life, more cost effective sealing system for pneumatic cylinders requiring a good balance of low cost and long life. After gathering the market input, the best value for cylinder performance is a sealing system that would work well in the following environment:

- in oil-free compressed air with minimal lubrication at startup
- compressed air conditions of 100 psi, with 230 psi maximum pressure
- a working speed range of 100 fpm, with maximum short term excursions to 400 fpm
- low friction and no stick slip during operation
- lifetime travel of 4000 miles

To achieve this balance, a Trelleborg design team addressed materials, designs and process improvements concurrently. The result was a focus on three areas:

- Developing suitable Zurcon polyurethane materials to achieve the desired level of performance through balancing the excellent wear and abrasion resistance of polyurethane with the right strength, chemical compatibility, and friction characteristics required to achieve long life, excellent sealing performance, low friction, and appropriate total system cost
- Designing appropriate geometries with rounded contact area at the seal lip to maintain grease film, small lip thickness gives low radial force for low friction, air channels to allow proper pressure activation, and other features that optimize using a low hardness Zurcon polyurethane material. As an example of using available tools, FEA and product testing validated and confirmed performance of these new design features.
- Development and validation of the use of an injection molding process that limits cost and provide superior material properties

To insure the proper balance was achieved, a final battery of product testing was conducted to insure the leakage, friction, system cost, and lifetime measurables were achieved. As an example of robust validation process, an endurance test was conducted to determine the rod seal leakage during the course of an endurance test to see trends related to leakage at 29 psi and 145 psi. Other validation tests included breakout friction, low temperature performance, high pressure tests, and bursting pressure tests, all of which are designed to provide validation of a critical measurable of performance.

Effective pneumatic cylinder performance requires effective sealing system performance. As shown in our example with our pneumatic Zurcon sealing system, you can achieve successful performance. It requires close examination of the basic sealing function so one can examine successfully all of the environmental factors in conjunction with other pneumatic cylinder engineering functions. In doing so, we can optimize successfully materials, designs, and processes to provide world class cylinder performance.

This article was excerpted from the White Paper supplied by Trelleborg Sealing Solutions, "Making Today's Pneumatic Cylinders Work Effectively." For further information, contact larry.castleman@trelleborg.com.

www.tss.trelleborg.com/us

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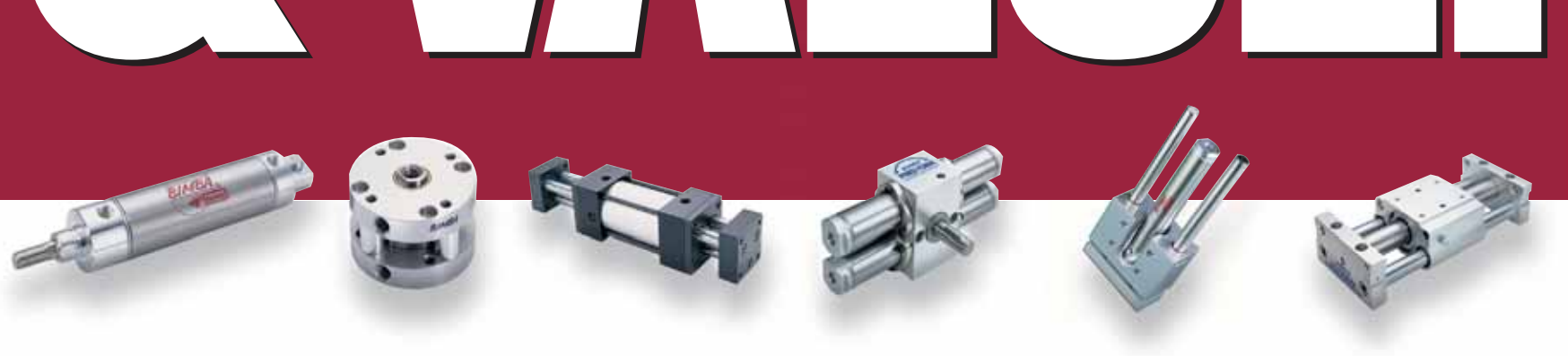

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Spotlight

Hydraulics & Pneumatics

Pneumatic rotary actuators

Schunk Inc. has added sizes 8 to 14 to its range of pneumatic SRU rotary actuators. The four sizes are equipped with a pneumatic drive based on the rack/pinion principle and with double compressed air actuation. Supplied torque is 0.14 to 1.15 Nm. For deceleration, either elastomer dampers or hydraulic shock absorbers may be used. The 45° end position adjustability feature is already integrated in the basic module.
www.schunk.com

Multiple position cylinders

Bimba Manufacturing has announced the EFP MultiPosition and EFQ MultiForce cylinders. The MultiPosition cylinder is a double-acting, single rod end cylinder that provides three positions. The two-piston unit is said to save space and eliminate the need for an additional cylinder. The MultiForce cylinder is a double-acting, single end rod cylinder that doubles the resultant force on extension.
www.bimba.com

Scalable motion control

The HNC100-3x scalable controller from **Bosch Rexroth** expands the range of application of the HNC100 electro-hydraulic control line. It can communicate with higher-level controls via Profibus-DP, INTERBUS-S, INTERBUS-S with fiber optic cable, and CANopen fieldbuses. The HNC100 is also available with SERCOS interface.
www.boschrexroth.ca

Versatile rotary indexing

Festo has announced pneumatic rotary indexing tables. The products can be converted to clockwise or counter-clockwise rotation, and adjusted to alternative indexing setting. A stationary centre section with a through-hole for cables and tubing permits connections and settings to be made from one side, including compressed air and sensors. Inductive sensors are integrated into housing and end-position cushioning can be adjusted.
www.festo.ca

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TESTING
INTEGRATION

If you think we just offer the largest selection of standard enclosures, you haven't looked beneath the surface.

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In addition to having your enclosure built the way you want it, you will also benefit from the industry's first UL-certified in-house test lab, and thermal management expertise through our partnership with McLean Thermal.

Having shipped over 10 million enclosures and accessories last year, it's a safe bet we can handle your project and help you manage your program too. Whether it's an order of one, one hundred or one thousand, even Hoffman's massive product selection is far larger than it appears.

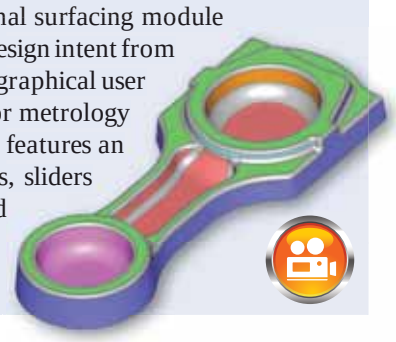
Contact your local Hoffman distributor, or locate your sales office at **hoffmanonline.com**

CAD Chronicle

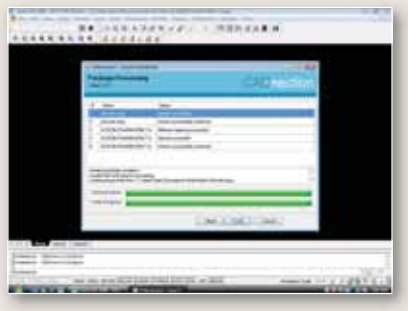
Software extracts design intent from 3D scan data

Geomagic has introduced Geomagic Studio 10, the latest version of its digital reconstruction software. Studio 10 features an optional surfacing module called Geomagic Fashion that automatically extracts design intent from scanned physical objects. It also includes an enhanced graphical user interface, streamlined feature framework, multi-sensor metrology support, and a customizable architecture. The version features an enhanced GUI with user-configurable display themes, sliders and collapsible menus for a cleaner, less-cluttered workspace.

www.geomagic.com



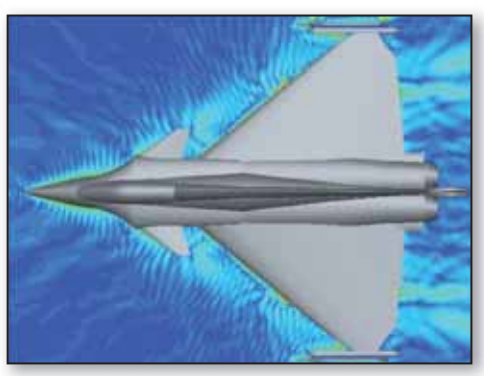
AutoCAD and SharePoint co-operation



CADnection, developers of distributed file-sharing and AutoCAD integration technology, has announced the availability of extended reference file management capabilities in its namesake product. The product is said to form a seamless integration between Autodesk's AutoCAD and Microsoft SharePoint – a suite of server-based capabilities for data sharing and content management. The added integration enables users to ensure the data integrity of AutoCAD drawings and reference file relationships.

www.cadnection.com

Electromagnetic phenomena



ESI Group has announced the latest version of its PAM-CEM Solutions software package. The product is aimed at performing realistic and predictive electromagnetic compatibility (EMC) simulations. The software package is able to mix both with 3D time domain simulations suited to reflected or diffracted phenomena and CRIPTE, and a dedicated Transmission Lines tool for cable networks. The version also addresses the management of large-scale models including several-dozen million elements (STL or NASTRAN files) and hundreds of wires.

www.esi-group.com

Notebook workstation graphics

NVIDIA Corp. has introduced the NVIDIA Quadro FX 3600M professional GPU for notebook and laptop workstations. The platforms are said to deliver a uniform feature set, which include Shader Model 4.0, CUDA technology and GPU computing for visualization. Engineered to deliver high performance and visualization of extensive datasets with high image quality in an ISV-certified, notebook platform, the Quadro FX 3600M is available as a fully qualified MXM v2.1A type-III form factor mobile workstation graphics board.

www.nvidia.com/quadro

Portable 3D mouse

3Dconnexion has announced the SpaceNavigator for Notebooks. The unit is half the weight of its desktop counterpart – the SpaceNavigator – but also includes a new cap design for more immersive and natural interactions within 3D applications. Designed to withstand the wear and tear of travel, the portable 3D mouse comes with a travel case. 3Dconnexion 3D mice allow users to lift, press and turn the control cap to fly through 3D space while simultaneously zooming and rotating the view with fluid and highly intuitive control.

www.3Dconnexion.com

Electronics simulation

Ansoft Corp. has released new versions of Nexxim, its circuit simulation software, and Ansoft Designer, its integrated schematic and design management software. The products include new statistical analysis and transient simulation capabilities said to allow engineers to rapidly simulate high-speed serial channel behavior. Nexxim v4 features VerifEye for eye analysis of serial links using statistical methods. Ansoft Designer v4 features a "push excitation" feature and enhanced dynamic links.

www.ansoft.com

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L.S. Starrett Company's reputation is so rich and solid that the words "quality" and "Starrett" are virtually synonymous. The company makes precision tools, gauges, measuring instruments and saw blades for industrial, professional and consumer markets worldwide.

When it came time to upgrade its previous 2D CAD system, the ability to maintain the investment in legacy CAD drawings was critical. The company planned to continue using its 2D process to some extent, so good 2D functionality was a key requirement. But the company also wanted to move into full 3D capabilities for manufacturing of parts and assemblies.

Starrett installed Solid Edge® software from Siemens PLM Software. Starrett implemented the Solid Edge system at its Massachusetts facility and three other divisions that had been using SolidWorks® software. Starrett's Jim Woessner notes, "Solid Edge was perfect for us because it can do 2D and 3D equally well."

Solid Edge is a powerful hybrid 2D/3D design system and a core component of the Velocity Series™ portfolio. Solid Edge provides superior part and assembly modeling, drafting, transparent data management, and built-in finite element analysis. The Velocity Series portfolio allows companies to implement PLM using software designed specifically for rapid, easy deployment on Windows®, at a low total cost of ownership.

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June 10, CN Tower, Toronto.
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www.siemens.com/plm/toronto

SIEMENS

Feature: Enclosures

Fire protection technology for valve actuators helps refinery

Intertec is supplying over 100 glass fibre reinforced polyester (GRP) cabinets to protect valve actuators against fire at a Russian oil refinery near St. Petersburg.

Field-based cabinet manufacturer Intertec of Sarnia, ON, is supplying over 100 fire protection cabinets to support Emerson Process Management's instrumentation solution for the new hydrocracker complex at the Kirishi oil refinery near St. Petersburg, Russia. The cabinets will provide the valve actuators with a minimum of 30 minutes of protection against fire, so that the plant's emergency shut down systems and services can quickly isolate and minimize damage, to protect employees, assets and environment.

The cabinets are made from high-quality glass fibre reinforced polyester (GRP). This material is very stable and highly resistant to corrosion from the petrochemical media at the plant. A proprietary construction process developed by Intertec allows the company to fabricate the material into complex enclosure shapes, and the new cabinets are variations of a field-proven product known as the Intertec Fire Shelter.

Emerson Process Management is engaged as field instrumentation vendor for the new hydrocracking complex at Kirishi refinery, a subsidiary of Surgutneftegas. Emerson chose Intertec because no off-the-shelf solution existed for this application, and because of previous experience with the vendor.

The cabinets will house valve actuators that are critical to plant operation and fail-safe shutdown. They have been fabricated using a sandwich construction of non-combustible insulation and long fibre reinforced GRP sheeting. This provides the required fire protection time, but with the added advantages of high strength, very high resistance to weather and the possible corrosive effects of the chemicals produced at the plant. Intertec's technology is said to offer a more efficient alternative to traditional metal fire protection cabinets because of its much lower thermal conductivity.

To validate performance before installation, the independent Russian institution, Pozhaudit, tested an example cabinet. The test demonstrated that the internal temperature did not rise above 60ºC for at least 30 min when subjected to an oil based fire with a temperature of around 1000ºC.

Glass fibre reinforced polyester molds to cabinet

In addition to protecting against fire, the cabinets protect the actuators from weather extremes at this northern latitude. The cabinets have been designed to suit the application, and include a panel opening to facilitate field inspection and maintenance.

"These cabinets have been custom-made for the application, to suit the chosen valve actuators, the fire protection specifications, and the weather conditions," said Intertec's project manager, Klaus-Dieter Meyer. "Our flexible GRP manufacturing processes allow us to cost-effectively fabricate these custom designs, even for the relatively small volumes required."

"This protection is required quite commonly, yet there are no Russian or German norms for the exact application," added Meyer. "So, to help plant engineers specify with confidence, we have subjected our enclosures to detailed fire tests, with an array of sensors that show temperatures at various internal points."

Intertec can supply a wide range of cabinets, shelters and accessories for field-based industrial equipment.

This article was supplied by Intertec Instrumentation Ltd. A datasheet on Intertec's Fire Shelter technology is available at intertec.info/common/pdf/en/SD331e.pdf.

www.intertec.info

Technical Literature

Certification. TÜVRheinland has announced a *Global Market Access Solutions* catalog outlining its testing, inspection and certification services for international companies.
www.us.tuv.com/ad

Control valves. The **ISA** reference book, *Control Valves*, is said to provide solutions to problems involving the body assemblies, actuators and accessories of control valves, as well as an overview of valve design and construction. A fee applies.
www.isa.org/controlvalvehandbook

Motion control. The motion control catalog from **alpha & Wittenstein** includes the latest technical data and application examples.
www.alphagear.com

Control & automation. 936-page **IDEC** *Industrial Control & Automation* catalog (*U909*) features over 42,000 products including power supplies, PCB relays, touchscreens, PLCs, sensors and switches.
www.idec.com/literature

Power transmission. The 2008 **Misumi** catalogs feature more than 200,000 products including shaft collars, supports, bushings, bearings, guides, ball screws, pins, couplings, pulleys, belts, washers, shims, retaining rings, angle plates, rollers, handles, casters, springs, clamps, manifolds, extrusions and accessories.
www.misumiusa.com/newcatalogorder.aspx

Sensing components. Gems Sensors & Controls has released a 12-page P*roduct Overview Brochure* showcasing level, flow and pressure sensors, and valves and relay controls.
www.gemssensors.com

Touch screen technology. White Electronic Designs Corp. has released a *Touch Technology* whitepaper that focuses on helping engineering and industrial designers make better decisions regarding the integration of touch technology in outdoor applications.
www.whiteedc.com/whitepapers.html

Timing belts. *PowerGrip TruMotion Timing Belt Catalog D155* from **Stock Drive Components** features polymer-free nylon tooth facing inch and metric timing belts that feature MXL, XL, L, GT2, profiles.
www.sdp-si.com/catalogs.htm

Testing. Endevco has announced publication of its *2008 Dynamic Test Handbook*. Sections include conversion factors, mathematical constants and relationships, dynamic measurements, electric circuit formulas, signal conditioning and environment factors.
www.endevco.com/contactus/litrequest.aspx

Aluminum anodizing. The **Aluminum Anodizers Council** has released a technical bulletin *Guide to Selecting the Proper Adhesive for Anodizing Applications*. The document explains which adhesives are better to use when bonding anodized aluminum to various substrates.
http://anodizing.org/AACTechBull_6Mar08.doc

Fastener products. Jergens, Inc. has published its *Specialty Fasteners Catalog*, a 100+ page sourcing guide for its Kwik-Lok pins, Spinner-Grip flange lock nuts, spring-loaded devices, threaded inserts, and threaded components and washers.
www.jergensinc.com

Intrinsic safety. Pepperl+Fuchs has introduced the *Intrinsic Safety Specification Guide*.
www.am.pepperl-fuchs.com/pdf/documents/is-spec-guide.pdf

CAD Industry Watch

AutoCAD 2009 interface gets makeover

By Bill Fane

If you are looking for the one word that best describes most of the changes in AutoCAD 2009 from Autodesk (autodesk.com), that word would have to be "interface." For starters, it now sports a new "ribbon" interface, in keeping with the appearance of Microsoft Office 2007.

The good news is that Autodesk have done it properly, and have kept to their tradition of allowing users to manipulate and customize the interface.

The ribbon normally lives across the top of the screen, but it can be moved to the left side, the bottom, or the right side like the now-defunct dashboard. That's right; the dashboard interface introduced in AutoCAD 2007 is gone already.

The ribbon can also be undocked and set to float freely like a super toolbar. Actually it is more like a tool palette in that it can be set to have transparency and to auto-hide, reducing to a narrow strip until you roll over it with the cursor. In fact, even when it is docked it can be set so that it just displays the panel titles, and each panel pops down when you scroll over its title with the mouse.

Each tab on the ribbon brings up a different set of panels. Individual panels can be dragged off the ribbon, where they become separate toolbars.

There are two distinctly different ribbons for the 2D and 3D workspaces, but there is also an AutoCAD Classic workspace. When it is active, the ribbon disappears while the traditional toolbars and menu bar reappear. In fact, the old DOS screen menu is still available for die-hards.

Flagship product now includes a macro recorder

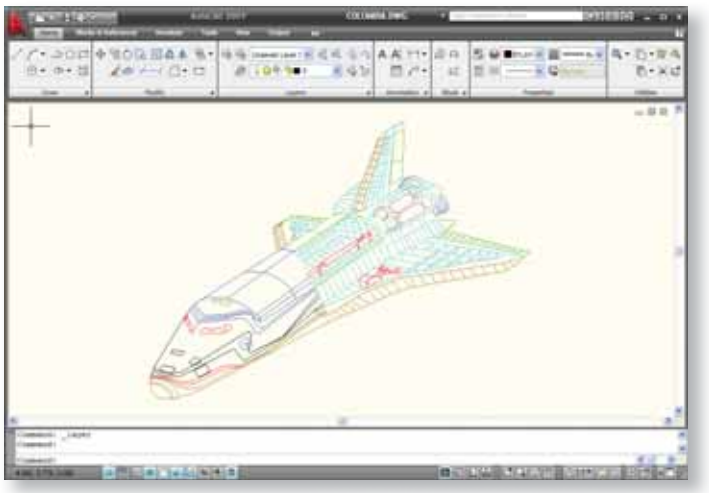
Probably my favourite of the new menu tools is the Quick Access bar. It lives in the upper left corner of the screen and is always available. Initially it only contains a few commands, but a simple drag-and-drop operation lets you populate it with the commands that you use all the time.

Do you perform the same sequence of operations quite often? Would you like to automate the process, but don't want to get involved with learning a programming language? No problem! AutoCAD 2009 now (finally) includes a macro recorder. Simply turn it on, perform the sequence and then turn it off. It records every menu pick, every keystroke, every mouse click, every ribbon selection, every dialog box selection and entry, and so on.

Do you often have several drawings open at one time, and need to switch back and forth between them? How about single drawings with multiple layouts? You'll like AutoCAD 2009's new Quick View functionality. When activated, it shows a row of preview thumbnails across the bottom of the screen. Move the cursor onto one, and a new set of thumbnails pops up previewing each layout in the drawing. A single mouse click now jumps you directly to the selected layout or to model space of the selected drawing.

3D navigation is greatly improved by the introduction of the new Steering Wheel and View Cube functions. These are like the 3DOrbit command, except that they can be used transparently in the middle of other editing commands.

AutoCAD 2009 adds new Quick Properties functionality. Select an object or objects when no command is active and a mini Properties dialog pops up. You can directly edit certain properties of the objects without having to enter the Properties command directly. These properties include things like layer, colour, line type, circle diameter, and the content, style, and justification of text.



AutoCAD 2009 sports a totally new interface, but it can also be set to run the old way for those designers not yet ready to take the plunge.

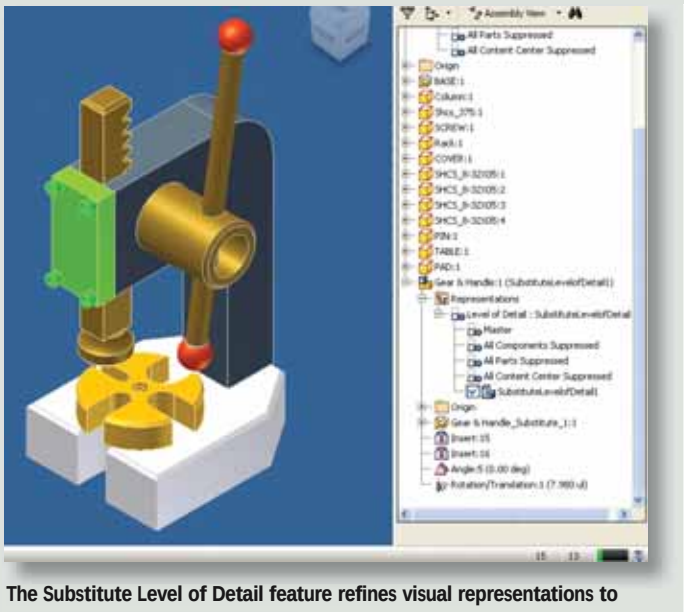
Finally, the news you have all been waiting for; AutoCAD 2009 drawing files are the same format as 2008 and 2007.

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

Size doesn't matter with Inventor 2009

Software makers have been wrestling with slow response times from manipulating large assemblies for some time now, but the situation has been getting better. Within the hundreds of enhancements in Inventor 2009, Autodesk has come up with a particularly interesting solution.

Previously, we have been able to define Level of Detail (LOD) representations. In an LOD representation we can specify that certain parts in an assembly are suppressed, while they may remain active in a different LOD. This can be used to speed up processing on a large assembly because we can ignore things that don't interest us at this particular time. For example, a large assembly might incorporate a gearmotor unit. While we are working on the parent assembly we don't need the armature, bearings, gears and so on within the gearmotor. All we need are the casings and the output shaft.



The Substitute Level of Detail feature refines visual representations to accelerate large assembly design.

Inventor 2009 carries this concept a step further with its new Substitute Level of Detail components. Using this functionality, a sub-assembly can be used to derive a new single Substitute part, based only on the components we need in the host assembly.

Back in the main assembly, a simple mouse click lets us switch back and forth between using the full sub-assembly and the single-part substitute as desired. Any constraints that were placed between components within the sub-assembly and those outside of it remain active in the substitute. No matter how many components were used to create the substitute part it only counts as one component in the main assembly.

If the main assembly is saved in the substitute mode then that is how it opens next time. This can result in a significant reduction in memory usage and loading time. An assembly containing many tens of thousands of parts could be reduced to a few substitutes and a few active components.

One of my favourite enhancements in Inventor 2009 is the new View Cube. It is effectively a combination Orbit and Common View cube that remains active at all times. With it you can twist and orbit the model, or instantly jump to the standard orthographic views.

Products: Enclosures

Panel configurator for HMI

Rittal has introduced the Comfort Panel Configurator technical support tool. The tool allows the configuration of individual prototypes for the Human Machine Interface (HMI) to be performed with a simple selection process. On completion of the configuration a visual presentation and 3D model can be displayed, in the format of choice, which can then be imported into machines or plant design. The tool automatically provides a list of questions, via a selection menu from which the prototype is built according to the selected details.
www.rittal.com/services_support

Hazardous location standard

Hoffman has announced ATEX-certified ZONEX enclosures, designed for use in potentially hazardous locations where allowable protection methods include increased safety per ATEX Directive 94/9/EC. The enclosures are suitable for use in Zone 1 and Zone 2, EEx e, increased safety applications. Enclosures also provide the installed components with IP66/NEMA 4X environmental protection. Units are fabricated from Type 316 stainless steel and a silicone gasket.
www.hoffmanonline.com

Touch release slides

Accuride has introduced the 3832 Touch Release and 3832 Heavy-Duty Touch Release models of slides. The slides hold drawers, shelves, or cargo trays in a closed position until activated by touch. A push on the front of the drawer releases and propels it open about 2 in. Model 3832TR is suitable for portable cabinets, toolboxes or equipment carts. It requires about 11 lb of force to activate the release. Model 3832HDTR requires a force of about 17 to 19 lb. The slides carry loads up to 100 lb and have a lever disconnect to remove drawers. A cam adjustment allows for vertical alignment of drawer fronts. Both models are available in even lengths 12 to 28 in., with a choice of three finishes.
www.accuride.com

Coded access-control

The Southco Key-Choice System addresses the common problem of coordinating keylocking latches and key codes to meet end-use requirements. By separating the key code specification decision from the latch specification decision, the system offers flexible options for managing security. The system provides the ability to install lock cores at multiple points throughout the manufacturing and distribution supply chain in order to eliminate the complexity of tracking key code assignments and offer end users greater choices of key code options. The system encompasses a wide variety of latch styles – including compression latches, push-to-close latches, cam latches, cam locks, and multi-point latches.
www.security.southco.com

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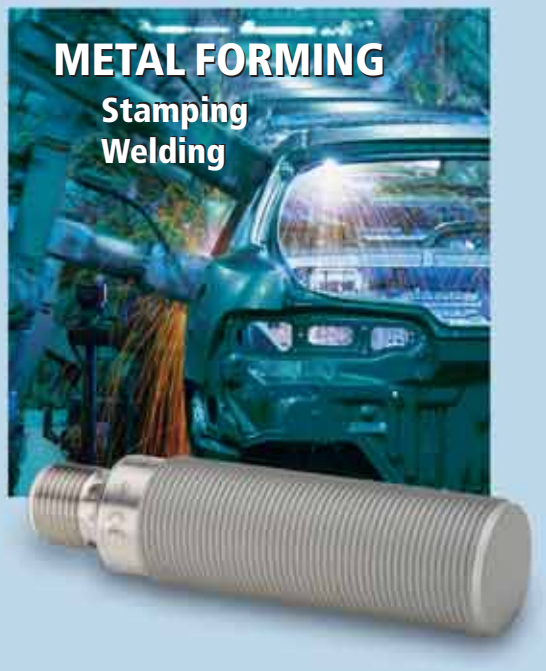
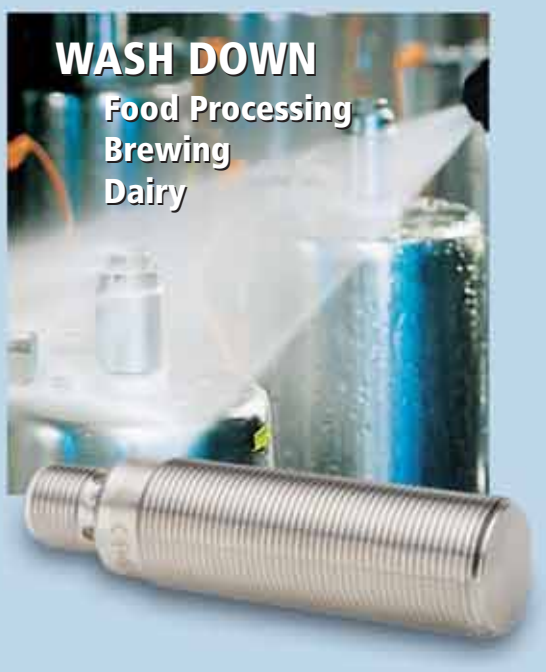


Metal face inductive sensors for welding and stamping

- Designed and tested to operate in the harshest welding and stamping applications
- Stainless steel construction improves life-in-application by eliminating failures from part impact and abrasion
- High temperature weld slag resistant coating prevents slag from adhering to sensor, eliminating abrasive cleaning processes
- Extended sensing range increases the distance between the sensor and target
- Weld field immune electronics
- ifm cordsets for metal forming applications. High temperature cable and weld slag resistant coating on coupling nut

List Price Starting at $71



Stainless steel metal face inductive sensors for food and beverage

- Designed and tested for use in high temperature (0-100°C) food and beverage applications
- 316 stainless steel housing is chemically-compatible with industrial caustic and acid solutions and will not corrode
- Thermal shock tested to withstand temperature fluctuations
- Zero-leak design, rated IP69K, prevents ingress during high-pressure cleaning and steam cleaning
- ifm cordsets for food and beverage applications. PVC cable with stainless steel coupling nut and gold contacts

List Price Starting at $73

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Feature: Materials

Forged steel crankshaft fatigue performance wins over competing material

A recent study released by the University of Toledo has shown that forged steel crankshafts have 36% higher fatigue strength than cast iron crankshafts, resulting in a usage life six times longer for the forged steel crankshaft. The study also explored strength, ductility and impact toughness of the competing materials and found forged steel to be superior to the ductile cast iron (Figure 1).

Any internal combustion engine can benefit

Professor Ali Fatemi led a research team in conducting the study for the Forging Industry Educational and Research Foundation and the American Iron and Steel Institute.

"A crankshaft experiences a large number of load cycles during its service life. Therefore, fatigue performance and durability are key considerations in this component's design and performance," said Fatemi.

Another aspect of the study was the design optimization of the forged steel crankshaft. The dimensions and geometry of the crank webs were changed while maintaining dynamic balance, resulting in an 18% weight reduction. This optimally designed crankshaft was found to have no degradation in performance. The weight reduction of a rotating engine component is important, as fuel efficiency improvements will be realized by the vehicle and the consumer.

"This study continues to prove to powertrain design engineers that forged steel outperforms other materials in critical safety component applications," said David Anderson, director of AISI's Long Product Market Development Group.

In comparing the forged steel and cast iron crankshafts, Fatemi used crankshafts produced for the same application that were similar in weight and dimensions. The crankshafts were taken from a one-cylinder four-stroke engine, typical of those used in riding lawnmowers. Fatemi concluded that as crankshaft performance parameters are similar to those of automobile crankshafts, the test results are relevant to automotive application design, as well as marine, mining, aircraft, farm machinery and other industries that use internal combustion engines.

Figure 1. The crankshafts that were tested are shown in their final machined conditions: the forged steel crankshaft, 3.9 kg (top) and the cast iron crankshaft, 3.7 kg (bottom).

"In testing automotive crankshafts, researchers typically analyze single-throw components regardless of the final part size. Further, the analyzed section in this study closely resembled those in automotive crankshafts," Fatemi said (Figure 2).

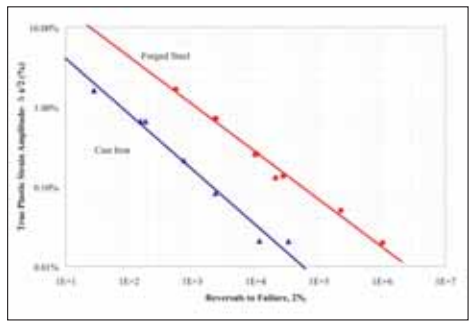

Figure 2. Superimposed plots of true stress amplitude versus reversals to failure are shown for forged steel (top) and ductile cast iron (bottom). More details on the test procedures are at autosteel.org/crankshafts.

Superior durability was shown for the forged steel crankshaft, as tests revealed slower crack growth on the steel crankshaft than on the cast iron crankshaft. Fatemi noted during the crankshaft testing that the crack growth life for both crankshafts was a significant portion of the fatigue life.

Fatemi's team also studied forged steel and ductile cast iron materials themselves, making it possible to compare data without the effects of design parameters. He tested the fatigue resistance of the two materials, and found that the forged steel material had a 36% higher fatigue resistance than the ductile cast iron material, resulting in a 30x longer life of the forged steel material.

In monotonic tensile tests of the two materials, the research team found that the forged steel material had significantly higher strength and ductility than the cast iron material. In fact, the yield strength of the forged steel was 52% higher than that of the cast iron and the ultimate strength of the forged steel was 26% higher than the competing material.

Further, the forged steel was shown to have more ductility than the cast iron, as shown by the percentage in reduction in area, which was 58% for the forged steel and 6% for the ductile cast iron.

www.forging.org

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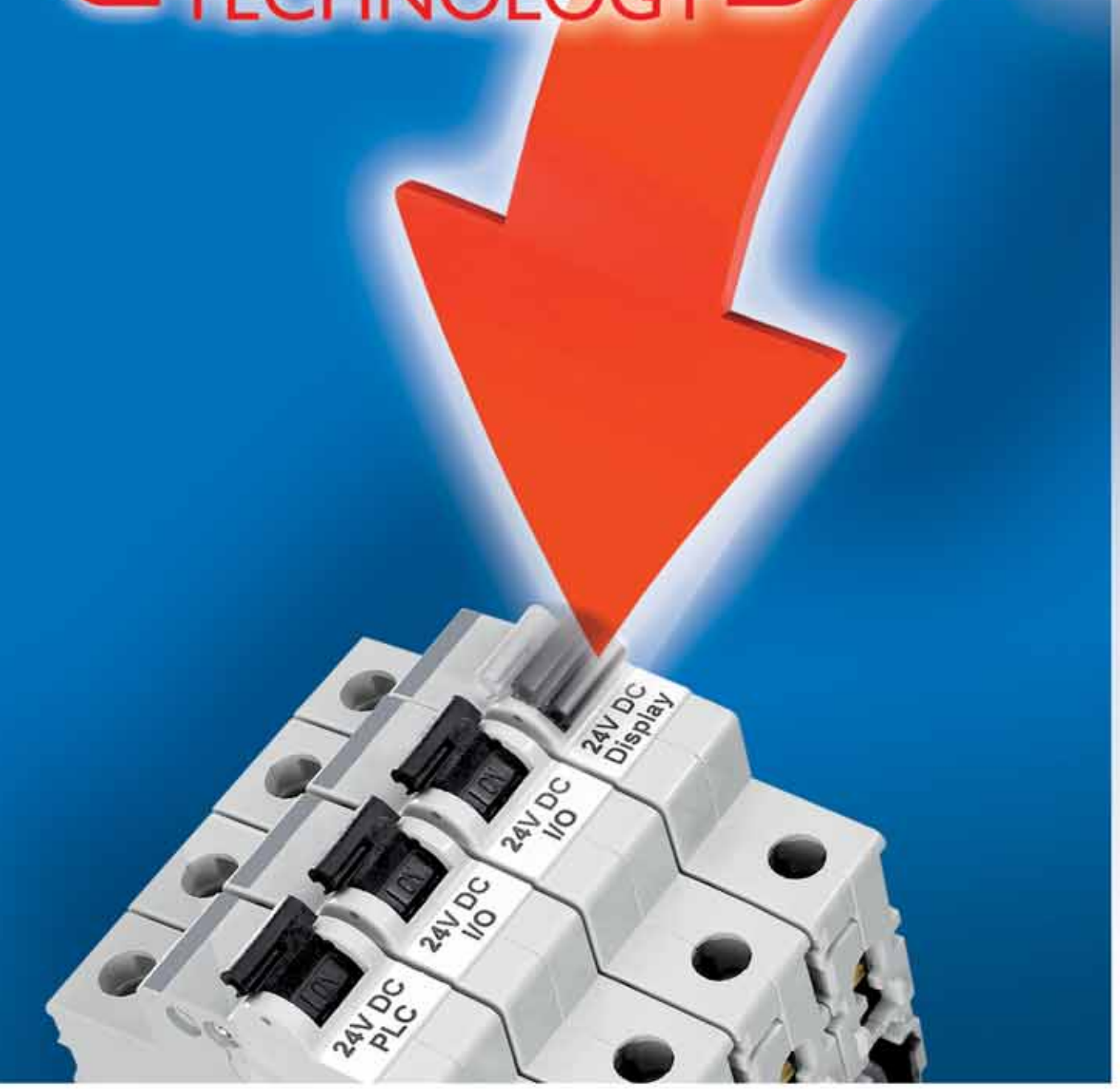

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Medical Engineering

Challenging healthcare by the pound

By Mark Sunderland

Although individually most of us can gain a pound or two without detriment to our health, being chronically overweight is another matter and it is not merely due to a lack of personal care.

When body weight becomes chronically and unnaturally high, the situation is different and our health can be endangered and, due to a general increase, body weight is now one of the leading healthcare concerns – its numerical value is expressed in BMI (Body Mass Index – you can find your BMI at www.nhlbisupport.com/bmi). BMI is computed from the factors of your height and weight. The weight of fat is generally more of a concern than the weight of muscle so the same BMI measurement for a muscular body of youth and a portly body of old-age may not have the same significance.

Obesity puts strain on medical infrastructure

In Canada, more that 50% of the population is statistically either overweight or obese and in the U.S., obesity has been declared by the surgeon general as an epidemic.

A BMI greater than 30 is considered to be obese and for the healthcare system alone, obesity has manifold complications. People who are severely obese can be physically restricted in their lifestyle and the consequences often result in poor physical and even mental health. Lack of exercise, acute embarrassment and restricted earning potential all contribute to putting an obese person at risk.

Obese people have been known to avoid the exertion of taking themselves for treatment. Only when their problems are exacerbated is help called to take them to hospital.

Then the problem is immediately extended to the healthcare system. Moving a 500 lb patient from a basement apartment to a hospital is only the beginning. In many cases, paramedics have neither the strength nor the equipment to move the patient into an ambulance (although there are ambulances now that have the capacity to lift up to 800 lb), but even if the paramedics can move the patient without injuring themselves they must face the question of where to take them because some hospitals are insufficiently equipped to receive them. Not through a lack of compassion, some hospitals just cannot cope.

Body Mass Index (BMI) is computed from the factors of your height and weight (right). Medical supply companies are increasingly introducing a range of equipment such as extra-wide wheelchairs, heavy-duty walkers and high capacity beds.

Medical supply companies are increasingly introducing a range of equipment such as extra-wide wheelchairs, heavy-duty walkers and high capacity beds. Extra-large operating tables, extra-long surgical instruments and even waiting room furniture must now supplement the one-size-fits-all styles and support the heaviest members of society.

Hospitals have little choice but to try to accommodate heavier and larger patients because they have more of them to treat. The hospital bed and its surrounding area requires a larger footprint than was once the case and increasingly, healthcare workers and paramedics use a special lifting apparatus to spare their necks and backs while preserving the dignity of heavy patients.

The need for specialized equipment such as Computer Tomography machines, (CT scanners) adds yet another costly dimension simply because there are patients who can't fit into the existing ones.

Bariatrics, the medical specialty that deals with the treatment of obesity, is not cheap. In addition to the cost of equipment, that is still mostly specialized, is the special training for those who provide the treatment. "Special training" includes sensitivity awareness because obesity carries a societal stigma. Patients are weighed in private, words must be chosen with care and nothing is said that can be inferred as a pun. And there are also the patients who assert their rights and demand the heavy duty equipment and the larger chair.

There is also a strain on other societal resources. For example, it is known that cars burn more gas with heavy people than with the light ones.

Public health has been the subject of numerous reports and obesity alone can fill volumes. It has been correlated to how and where we live – to what we do and how much we earn. It has been correlated to gender, ethnic background and disposition – but regardless of the cause, it's a fact and the challenge now is to accommodate it.

Mark Sunderland is President, BioMedical Industry Group, Ottawa (mark@biomedgroup.com).

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Feature: Sensors

Material handling: sensing challenges and solutions

By Thomas Corbett and Gary Frigyes

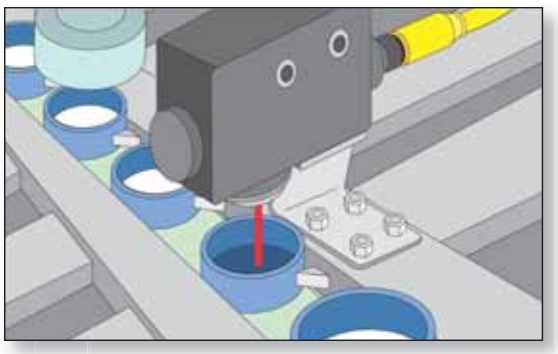
In today's material handling market, OEMs are faced with a number of concerns when choosing a sensor manufacturer and specifying sensors. OEMs want a manufacturer with a trusted name in the material handling industry. They also want a manufacturer who can provide them with quick solutions anywhere in the world.

Sensor features are another area of concern for OEMs. The trade-off is always cost versus performance. Therefore, it is necessary that engineers are able to distinguish between required technical points and "nice to have" features. Most sensor manufacturers divide sensor families into classes, consisting of low-end and high-end models.

The trade-off is always cost versus performance

Low-end models are a cost effective solution in most general applications where good optical performance is required. Because cost is essential, low-end models typically have housings made with lower-grade plastics or metals. To keep cost low, features such as indicating LEDs and external adjustments are usually not available or are limited to a single indicator and potentiometer. Optical performance is average, and high-tech features that would add significant costs are normally not offered.

High-end models, on the other hand, are packed with high-performance features tailored more toward specialty applications. Housings include high-grade plastics and metals such as stainless steel and aluminum, and commonly include multiple indicators, automatic push button or remote teach-in, light on/dark on selection, rotating electrical connectors and multiple mounting possibilities. Optically, high-end models have improved sensing characteristics including sharper light spots, laser light sources, high ambient light resistance and automatic cross-talk protection, for better overall performance.



A lid or cap may have a plastic insert placed inside it to provide an optimal seal. A contrast sensor can be used to confirm the presence of the insert in the lid.

Indicating LEDs found on many low- and high-end models are a basic feature that provides visual information about the sensor's status. LEDs make it easy to test the functionality of a sensor at the sensor itself. If the green power LED is lit, it can be determined that the sensor is receiving power from the supply or transformer. If the yellow LED is not responding as objects pass by the sensor, further examination may be required to determine if the sensor is misaligned or may have its gain (also called sensitivity) adjusted too low.

Some high-end sensor families have higher intensity LEDs with enhanced functionality that can be very beneficial for identifying problems when they occur in the field. These LEDs serve as a diagnostic tool by showing, for example, if the output is shorted or the light being received is at a level so low that the sensor is having problems reliably detecting the target.

Tamperproof models provide a fixed sensing range. Because a misadjusted sensor could inadequately detect the target or could detect objects beyond the target area, tamperproof models are often used prevent unauthorized adjustments to the sensor. Should a sensor become damaged, tamperproof models facilitate quick field replacement because they don't need to be adjusted, and less time is spent with setup and installation.

Adjustable range models allow the sensing range to be quickly fine-tuned, often by simply turning a potentiometer. This flexibility potentially allows a single adjustable model sensor to potentially replace several fixed range models.

Here are some general considerations for specifying sensors:

- Consider sensors that offer multiple outputs from a single device – this can significantly reduce inventory requirements and paperwork.
- When possible, go miniature – smaller sensors easily blend into their surroundings and take up less space, and in most cases offer the same performance and sensing ranges as larger options.
- Strive to utilize sensors with industry-standard housings – this greatly simplifies mounting and replacement, and eliminates getting locked into a single sensor manufacturer.
- Look for sensors with flexible mounting configurations – versatility to mount by a threaded snout or by thru-holes for a surface mount, can simplify mounting and reduce inventory requirements.

Thomas Corbett is Product Manager and Gary Frigyes is Product Marketing Manager at Pepperl+Fuchs in Twinsburg, OH.
www.am.pepperl-fuchs.com

Feature: Sensors

FPGA sensor simulation tests for fault conditions

By Rick Kuhlman and Vineet Aggarwal

Sensor simulation is the process of providing realistic sensor signals to the inputs of a device under test (DUT) and evaluating how a piece of equipment responds across a broad range of operating conditions.

The greatest benefit to simulating sensors is the ability to push past the operational limits of a specific environment and test fault conditions that would otherwise be damaging or dangerous, giving your test higher coverage with lower risk.

FPGAs are ideal for sensor simulation, primarily because they can adapt to multiple sensor types with precise timing requirements. You can customize each sensor output down to nanoseconds and completely synchronize various signals to realistically create a specific state of operation. In many cases, however, sensors function independently and update at different rates. With the true parallel nature of FPGAs, dedicated blocks of silicon also can operate without any interference from other parts of the application.

Automatic test systems can simulate real-world signals

While the majority of sensors produce an analog signal based on their measurements, there are many sensors that convey information digitally, using methods such as pulse-width modulation or serialized protocols. An FPGA-based approach can easily integrate the processing required to generate complex digital signals as well as arbitrary analog waveforms without affecting the performance of other tasks in the application.

A linear variable differential transformer (LVDT) is a sensor that incorporates a differential transformer with a sliding magnetic core. Driven by an ac excitation source, the LVDT generates a pair of ac output signals that are modulated according to the mechanical position (displacement) of the core. The ideal output of an LVDT without signal conditioning is a scaled version of the excitation signal. This scaling factor can be positive or negative and is proportional to the distance from the mechanical middle of the device. The host computer passes the displacement in the form of a scaling factor to multiply with either the generated or real-world excitation signal. The host VI uses inputs of simulated position and desired sensitivity to calculate a scaling factor. This is passed to the FPGA through the Sim LVDT Scaling variable. Figure 1 above is the graphical host interface subVI for LVDT simulation.

On the FPGA, you can programmatically decide whether to use internal or external excitation and pass the value through the shift register to the multiplier and bit refactoring. This applies the appropriate scaling to the signal based on the simulated displacement and finally asserts the data point to an analog output channel. With the new noise generator Express VI in LabVIEW 8.5, you can even add some noise to the output to give your DUT a more realistic simulation.

With the release of LabVIEW 8.5, you can find this LVDT example as well as other sensor simulation IP blocks at the new FPGA IPNet online (ni.com/ipnet).

This article first appeared in the Q3 2007 issue of Instrumentation Newsletter. Rick Kuhlman is a product manager for LabVIEW FPGA. Vineet Aggarwal is a product manager for intelligent NI data acquisition products.

www.ni.com

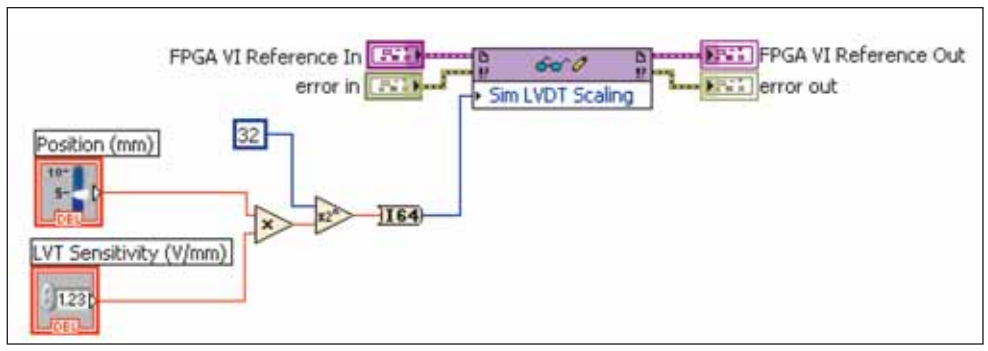


Figure 1. Running in Windows or LabVIEW Real-Time from National Instruments, this host code communicates with the LVDT sensor simulation running in the FPGA hardware.

Products: Sensors

Automation sensors, cordsets

ifm efector has introduced a line of sensors and cordsets designed for factory automation applications. The efector-v Value series product line includes inductive sensors, photoelectric sensors and cordsets. The inductive sensors incorporate extended sensing ranges and are available in styles that include M8, M12, M18, and M30 tubular housings and a rectangular housing. Sensors feature 360º degree LED status indication and are tested to high levels of shock and vibration. Photoelectric sensors feature a metal housing that can retrofit traditional plastic housings. Models include high-precision background suppression sensors that eliminate the need for adjustments as target colors change.

Polarized retro-reflective models offer long sensing ranges up to 4 m and incorporate a polarizing filter that eliminates false triggers from shiny objects.
www.ifmefector.com

Speed, angle encoder

The EcoSpin is a rugged non-contact modular encoder which delivers an incremental quadrature encoder output at resolutions up to 0.5º. The 10 mm wide sensor housing and rotary magnet can be installed in less than a minute using the included mounting spacer. Several different resolution possibilities are available by selecting different ring and interpolation combinations. Since there are no bearings or glass disks, the EcoSpin is one of the most rugged motion control solutions available.
www.baumer.ca

M8 miniature sensors

TURCK has incorporated its Uprox+ technology into its line of M8 miniature picoprox sensors to provide compact housings with sensing distances said to far exceed ferrite core sensors, especially while sensing nonferrous metals. The sensors feature stainless steel housing and weld field immunity for use in harsh duty environments, like tool and die, welding and metal forming applications. The sensors incorporate 316 stainless steel housings and are available with extended 2 mm sensing ranges for flush mount versions or 6 mm ranges for non-flush applications. All sensors are 3-wire dc, 10 to 30 Vdc, with PNP normally open or closed, or NPN normally open versions.
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Products: Sensors

Temperature sensor

Honeywell has introduced the R300 series temperature sensor for use in potential EGR (exhaust gas recirculation) applications where operating temperatures can reach 300ºC. The sensor uses RTD (resistance temperature detector) technology and features a stainless steel closed-tip design. It is said to provide an excellent response time as demonstrated by validation testing required by the transportation industry. The unit also features a connector.
www.xtronics.ca

RH sensor/transmitter

The HX71 series of relative humidity sensors and transmitters from Omega are suitable for wall or duct mounting. Each unit is said to be factory calibrated to provide excellent sensitivity, fast response, and stability. The unit features a 316 stainless steel housing and includes a shielded output cable with stripped wire leads. The linearized current or voltage output permits interfacing with most display and control devices like meters, controllers, recorders and data loggers. The product is CE compliant.
www.omega.ca

Electro optic level sensor

Gems Sensors & Controls has introduced the miniature 950 Electro Optic Level Sensor (ELS) for a wide range of applications and industries. The ELS-950 was developed to perform in harsh environments with features such as an over-molded electronics insert, TPE insulated wires and fluorosilicone O-ring seals that create a watertight assembly. Housing options include Polysulfone or Polyethersulfone providing compatibility with different media.
www.gemssensors.com

Photoelectric sensors

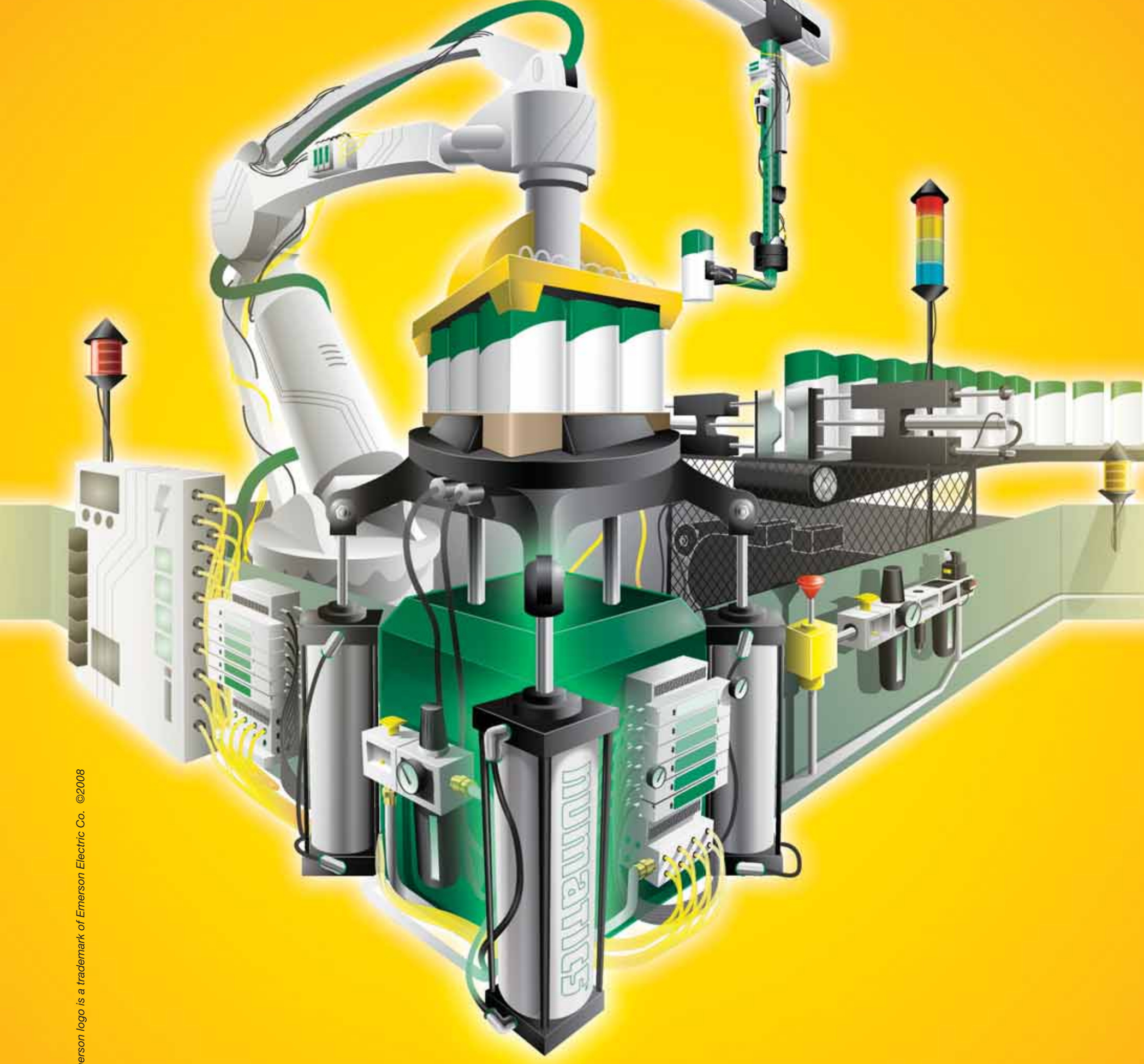
Pepperl+Fuchs has introduced GLV18 Econo-Vue photoelectric sensors. Units have an 18 mm diameter housing and short barrel length. 64 Econo-Vue models are available in five different sensing modes and provide sensing ranges up to 20 m. All models are available in straight and right-angled housings, cabled and quick disconnect versions, and come standard with a flush mount bracket to create a custom look on panel mounts.
www.am.pepperl-fuchs.com

Multipixel vision sensor

The Allen-Bradley Bulletin 48MS MultiSight vision sensor, from Rockwell Automation, is an optical multipixel sensor. The MultiSight has a pass/fail PNP output, and uses three different methods of evaluation (pattern-matching, contrast and brightness) to detect or differentiate objects by means of previously defined optical characteristics, e.g. for separating “good” and “bad” parts. Users can perform evaluations in 50 to 100 ms.
www.rockwellautomation.com/go/dpn48ms

Mechanical limit switches

Carlo Gavazzi has introduced a range of mechanical limit switches constructed of thermoplastic or zinc alloy metal and are available in six different body sizes. Ten different contact configurations are offered and five different cable gland entry options are available. All of the switches carry the UL, CSA and CE marks.
www.gavazzionline.com



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Automotive Scene

Tesla electric sports car driven by Lithium ion batteries

By Bill Vance

Electric cars go back to the dawn of the automobile when they vied for supremacy with gasoline and steam as the power of choice. An electric was the first to exceed 96 km/h, and they held the land speed record from December 18, 1898 to August 5, 1902 before losing it to the gasoline engine.

But electrics didn't join the mainstream and eventually disappeared because of limited driving range and heavy batteries, conditions unchanged in 100 years. General Motors made a serious attempt with its 1997-1999 EV1, available by lease only in limited areas of the U.S. southwest.

Standard cells wired together occupy engine bay

A leader in the electric car quest is Tesla Motors of San Carlos, CA, maker of the Tesla two seat roadster named after the Serbian electrical genius Nikola Tesla (1856-1943), inventor of alternating current among other things. Financial backers are chairman Elon Musk, founder of PayPal, and Sergey Brin and Larry Page founders of Google so there is no shortage of money (some $60 million) or expertise behind it.

Since Tesla Motors is concentrating on the powertrain they used the Lotus Elise sports car from Lotus Cars in England as their base. This vehicle was already crash test compliant, and Tesla seeks no government exemptions. It has a carbon fibre body and the bonded aluminum platform was strengthened and modified where necessary to accommodate the electrical components, particularly to protect the battery pack in the event of a crash. Curb weight is 1225 kg compared with the Elise's 875.

In the former engine bay behind the seats is a 317 kg pack of 6831 standard small # 18650 lithium ion cells of the type used to power cell phones and laptop computers. These are wired together in groups in parallel, with these groups then connected in series to power a proprietary 248 hp ac electric motor that spins up to 13,000 rpm and weighs less than 52 kg. The battery pack is guaranteed for 160,000 km.

Since an electric motor develops very high torque at virtually zero rpm a transmission is normally not necessary. But Tesla's VP Martin Eberhard wanted to design in outstanding acceleration so they used an electrically shifted two-speed automatic transmission. High gear is adequate for most driving, and the motor can run backwards for reverse. The transmission and differential are located behind the batteries.

Because Li-ion cells can run hot (remember those lap top fires) the battery pack is cooled by pumping glycol coolant through tubes in the pack. Temperature is monitored carefully and if it rises above 122°F the pack is cooled by the air conditioner.

A proprietary 248 hp ac electric motor spins up to 13,000 rpm and weighs less than 52 kg. The battery pack is guaranteed for 160,000 km.

Tesla claims a reasonable range of 250 to 350 km in typical driving. If, however, the Tesla's claimed performance of zero to 96 km/h in 4 s and top speed of 209 km/h were being explored this range would drop accordingly.

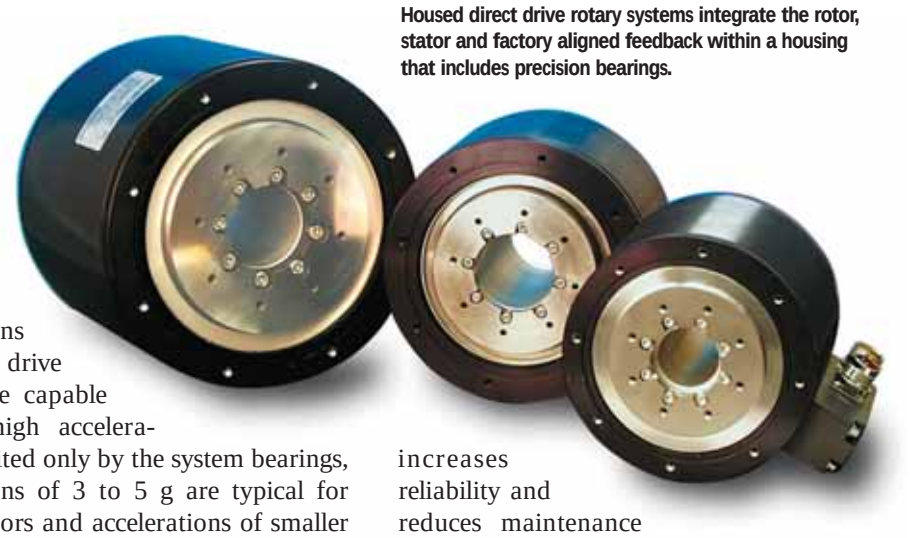
Recharging, in addition to some from regenerative braking and coasting, is accomplished in about 3.5 h by the 240 V household charger included with the car.

In spite of the US$100,000 price the first run of 100 cars was sold out within a month of announcement. Planned annual production is about 1000 cars.

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

Feature: Motion Control

Direct drives offer advantages for medical device designs



Housed direct drive rotary systems integrate the rotor, stator and factory aligned feedback within a housing that includes precision bearings.

By Bryan Bird

Traditionally, the majority of medical applications have used conventional motion control technology consisting of an electric motor and mechanical transmission system. Mechanical transmissions, however, introduce undesirable compliance between the motor and the load. Mechanical transmissions can also generate considerable mechanical noise and increase the need for system maintenance.

Direct drive eliminates the mechanical transmission and reduces compliance to the point that it does not even have to be considered by the designer.

Direct drive technology is available in a number of rotary and linear configurations. Frameless direct drive rotary systems are comprised of a separate rotor and stator part set but do not include bearings, housings, or feedback devices. These additional components, while necessary, are intended to be designed into the higher level assembly.

Eliminate mechanical transmissions, reduce compliance

Housed direct drive rotary (DDR) systems integrate the rotor, stator and factory aligned feedback within a housing that includes precision bearings. Housed DDR systems are best suited to applications where the load is designed to ride on the motor's bearings. On the other hand, they are not ideal for applications that already have bearings since the motor must be coupled to the load, or multiple sets of bearings must be aligned.

In direct drive linear (DDL) technology, the rotor is rolled out to become the magnet track and the primary coils of the rotary motor are rolled out flat to become the coil assembly.

Ironcore and ironless are the two primary types of linear motor systems. Ironcore motors have coils that are wound on silicon steel laminations to maximize the generated force with a single sided magnetway. The high thrust forces possible with ironcore motors make them ideal for accelerating and moving high masses and maintaining stiffness.

Ironless motors have no iron or slots for the coils to be wound on. The modular magnet ways consist of a double row of magnets to maximize the generated thrust force, and to provide a flux return path for the magnetic circuit. These motors provide zero cogging, a very light mass and no attractive forces between the coil assembly and the magnet way. These characteristics are ideal for applications requiring very low bearing friction, high acceleration of lighter loads, and for maintaining constant velocity even at very low speeds.

All brushless motors require feedback for commutation. DDR motors utilize a resolver or encoder mounted on the rear of the motor, or Hall effect devices mounted integrally in the coil windings. Linear motors typically use digital or linear Hall effect devices that enable the drive electronics to commutate linear motors in a manner analogous to rotary motors. By placing the feedback device directly on the load, direct drive minimizes position measurement errors.

Direct drive technology offers substantial performance improvements that can provide medical device manufacturers with a significant competitive advantage. Since there are no wear surfaces in direct drives (with the exception of housed DDR systems) and the limitations of mechanical transmissions are eliminated, very high and low speeds are easily attained. Application speeds of greater than 5 m/s or less than 1 micron/s can typically be achieved. In comparison, mechanical transmissions are commonly limited to linear speeds of 0.5 to 0.7 m/s to avoid resonances and wear.

The elimination of backlash and near elimination of compliance means that direct drive motors are capable of very high accelerations. Limited only by the system bearings, accelerations of 3 to 5 g are typical for larger motors and accelerations of smaller motors can easily exceed 10 g. Direct drive motors also have excellent constant velocity characteristics, typically less than +/-0.01% speed variation. Settling time is significantly lower compared with conventional drives because of reduced system compliance and higher position accuracy.

The simplicity of direct drive systems increases reliability and reduces maintenance while simultaneously achieving higher performance. As a result, medical devices that utilize direct drive systems provide the ultimate in performance with a reduction in total cost of ownership.

Bryan Bird is Medical Market Manager for Danaher Motion in Wood Dale, IL.
www.danahermotion.com

Feature: Motion Control

Design toolkit accelerates machine development and integration

The Kinetix Accelerator from Rockwell Automation provides HMI application screens, including a choice of several languages.

By Paul Whitney

Today, customers demand tailor-built machines. The problem for machine builders is that this customer-specificity leads to significantly longer design phases, which results in higher labor costs and extended time-to-market rates.

One solution that is making it possible for machine builders to quickly and cost-efficiently meet the individual requirements of each customer is computer-aided programs that help expedite many of the design, programming and troubleshooting tasks of machine development. One recent example is the Allen-Bradley Kinetix Accelerator Toolkit from Rockwell Automation. This tool can be used to streamline the design, programming and installation of an integrated motion control system – this includes programs, HMI screens, diagnostics and all the documentation needed to design a machine. Machines with four or less axes can use pre-written programs while an easily expanded building block program allows much larger programs to be constructed. So, rather than gathering documentation, downloading CAD models, and configuring equipment to optimize size, machine builders have a template from which to start and a design philosophy to standardize on. And, for machines with global use, the Kinetix Accelerator provides HMI application screens in multiple languages. Both the machine programmer and the machine operator can select a language to appear on the screen.

To understand the benefits of the Kinetix Accelerator, it is first essential to understand the term "Kinetix." Kinetix refers to the seamless integration of Allen-Bradley Logix controllers, servo drives, servo motors and actuators.

Building on the benefits of seamless integration, the Kinetix Accelerator is a CD that provides files, program code and manuals that significantly reduce a machine builder's time, effort and cost of implementing a control system. The toolkit also provides application packages that help easily add common devices, and lists training, startup and support services for the machine builder.

When the CD is loaded, the design process begins with a standard hardware selection, system layout and wiring scheme. These steps are important as they encompass approximately 80% of the entire machine development. A Motion Analyzer tool, for example, helps correctly (and quickly) size a motor. This tool is accompanied by numerous tips on panel design best practices. For example, power needs for a system can be consolidated using a Line Interface Module (LIM), which eliminates the need for separate disconnects, branch circuit protection, control contactors, 24 Vdc power supplies and various noise filters.

CAD drawings and wiring diagrams which are included in the toolkit help significantly reduce design time. Meanwhile, system programming is simplified with preconfigured operator interface terminals and preconfigured logic codes for programmable automation controllers.

The software tool includes additional features that OEMs and end users may not typically have time for during machine development, including diagnostic tools, axis status capabilities and ISA S88-compliant code. These components help accelerate the commissioning of the machine and enhance overall system performance. For example, the Kinetix Accelerator Toolkit provides diagnostic and status information for the axis, motion components and drives, while a trending function allows users to track machine performance over specific periods of time. This makes it easier to identify and correct operational changes that may occur during or after the commissioning process.

For OEMs, the Kinetix Accelerator tool significantly reduces time to market by reducing design time by up to 50%. For end users, the toolkit can minimize downtime for troubleshooting. For system integrators, the tool can reduce labor by providing preconfigured logic codes and standard design templates, allowing designers to focus on the specific requirements of each application rather than on the overall design.

A key benefit of the Kinetix Accelerator for all users is its ability to accommodate a wide range of Allen-Bradley hardware, including PanelView operator interfaces, Logix controllers and drives.

Paul Whitney is Product Manager at Rockwell Automation.

www.rockwellautomation.ca

Motion Control

Embedded logic system

With the new IndraMotion MLP Motion Logic system, Rexroth has expanded the universal and scalable solutions portfolio of its Automation House. The integrated motion control synchronizes up to 32 axes and has the same basic and technology functions as IndraMotion MLC. On the basis of the IndraControl VEP compact embedded PC platform, all control functions have been integrated into one complete system. In addition to logic control, motion control and technology functions, IndraMotion MLP is said to provide an effective onboard and turnkey visualization component together with all the communication interfaces. IndraMotion MLP communicates with peripherals such as drives and decentralized I/O modules and, in combination with other control systems such as IndraMotion MLC or MLP, via SERCOS III to ensure consistency.

www.boschrexroth.ca

Stepper motors/controller

The CMMS-ST single-axis position controller combined with the EMMS-ST stepper motor, both from Festo, is said to offer an easy-to-use, comprehensive and cost effective package for single and multiple axis handling systems. The stepper motor series is also said to offer long service life and reliable performance. The two phase hybrid stepper motor offers holding torque from 0.5 Nm to 9.3 Nm, with options for an integrated brake and incremental encoder feedback. External gearbox options include 3:1 and 5:1. There are 63 configurable positions, 8 positioning profiles with sequencing capability and positioning profile overlapping, as well as network interfaces for Profibus and DeviceNet (optional modules), and an integrated CANopen interface.

www.festo.ca

Brushless servo actuator

The RSF-14B brushless servo actuator from Harmonic Drive LLC achieves positioning accuracy better than 90 arc-sec and provides a maximum torque of 28 Nm, in a package measuring 50 x 168.5 mm. The actuator utilizes zero-backlash gearing and a 24 V brushless motor with a 1000 line encoder. An output shaft design with angular contact bearings allows the load to be directly mounted to the actuator.

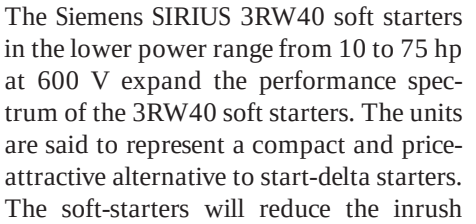
www.electromate.com

Motion Control

Electric actuators

Tolomatic has introduced three body sizes to its MXE Series of rodless screw drive electric actuators, the latest addition to the company's rugged MX line of products. The addition of these 3 new sizes brings the MXE size offerings to 6, providing greater load capability, ranging from 35 to 2583 lbf for Fz loads, and increased moment loads. MXE is also available in inch and metric styles, and it features internal magnets to support sensors and switches.
www.tolomatic.com

Microstepping driver



Lin Engineering has introduced the RoHS compliant version of its R256 microstepping driver/controller. The R256-RO is capable of step resolutions ranging from 2x to 256x, operates from 12 to 40 Vdc and its phase current ranges from 0.1 to 2.0 A peak. The unit features programmable ramps and speeds, software selectable hold and move currents, two user configurable digital I/Os; and two dedicated inputs – one optical sensor for homing and one switch closure to ground. Commands can be issued from the Windows based HyperTerminalÆ program or from Lin Control, Lin Engineeringís new Graphical User Interface created exclusively for the unit. With the ability to store up to 16 different programs at once using the built-in 4 kB of memory the driver/controller can be used as a stand alone unit with no PC connection required.
www.linengineering.com

Soft starters

The Siemens SIRIUS 3RW40 soft starters in the lower power range from 10 to 75 hp at 600 V expand the performance spectrum of the 3RW40 soft starters. The units are said to represent a compact and price-attractive alternative to start-delta starters. The soft-starters will reduce the inrush current and mechanical stress that usually occurs during standard direct on line starting of ac motors. Features include overload relay, voltage control and current limiting technology, integrated remote reset (without additional module), programmable ON/RUN output and fault output, and polarity balance.
www.ontor.com

Products: Connectors

Gigabit LAN connection

The SF standard switch series in the Factory Line range from Phoenix Contact now includes additional infrastructure components. The FL Switch SFN said to allow fast and cost-effective network expansion up to field level. A compact housing makes the components suitable for universal, localized use in control cabinets and in terminal boxes. The switches have five or eight RJ-45 ports. The components support auto-negotiation functionality at transmission rates of 10, 100 and 1000 Mbps in mixed mode. The switches automatically detect the assignment of the Ethernet cables and adjust accordingly. Using the fibre-optic cable ports, a network's segment length can be extended up to 20 km.
www.phoenixcontact.ca

RJ-45 Ethernet connector

The 8-pole 750-975 Ethernet connector from WAGO Corp. is a pluggable RJ-45 connector said to substantially decrease the time needed for Ethernet wiring. The product features and insulation displacement contact that provides tool-free, in-the-field conductor wiring whereby the installer inserts a pre-stripped conductor and lowers the locking mechanism. The pluggable RJ-45 connector offers IP20 protection for conductors ranging in size from AWG# 26-23 while color-coded IDC terminations provide instant conductor recognition. The connector accommodates both shielded (UTP) and unshielded (STP) conductors and the transmission rates meet Category 5e requirements (according to ISO/IEC 11801 and EN 50173-1) for signal integrity.
www.wago.com

Combination interconnects

Samtec has expanded its power board-to-board and cable-to-board interconnect systems to include PowerStrip and Mini PowerStrip high power headers and sockets, Power Mate and Mini Mate headers and sockets and discrete wire cable systems, board stacking interconnects for standard power and combination signal/power, and Acclimate IP68 sealed circular power cables and panel interfaces. PowerStrip interconnects are rated up to 25 A, while Mini PowerStrip connectors are rated up to 15 A. Both systems are available with all power pins or signal/power combinations. Power Mate is rated up to 13 A, while Mini Mate is rated to 4 A for Board-to-Board applications. AccliMate power sealed circulars are available in both shell sizes 10 and 17 and meet IP68 requirements for dust and waterproof sealing. Units are rated for up to 4.4 A.
www.samtec.com

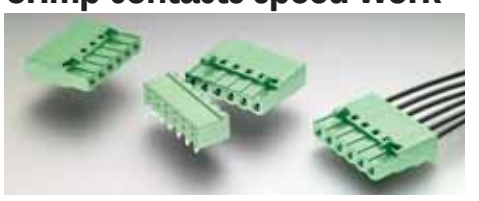
Filtered high power D-subs

ITT Interconnect Solutions has announced a series of filtered D-sub connectors for power applications. Designated the Combo D Series, the connectors feature size 8 power contacts with an optional integrated filter planar array. The Combo D connectors accommodate a right angle press fit termination and Eurostyle brackets that meet CECC75 301 802 specifications. The low profile Combo D connector features a maximum contact current rating of 40 A and a passive filter array with 47 nF capacitance.
www.ittcannon.com

M12x1 circular connector

Conec has introduced the M12x1, 12-pos connector. Available is the axial type of construction, as well as 360°-shielded version, with overmolded cable (wire cross-section 0.14 mm²). Each contact can be loaded with 1 A. As an alternative it is possible to adapt a hybrid-cable with wire cross-section 4 x 0.25/8 x 0.14 mm² for loading the power contacts with 3 A.
www.conec.com

Crimp contacts speed work



A series of terminal blocks from Tyco Electronics use crimp contacts for the plug connector, which is said to allow greater productivity in applications where factory wiring of the plug is possible. The terminal block plug housings are available in 2 to 6 positions on a 5.08 mm centreline and are end stackable without losing position. They are offered in gray and green. The plugs use Junior Timer contacts, with a 14-20 AWG wire range.
www.tycoelectronics.com

Editor's Choice

PLC touchpanels

EZ series PLC Touchpanels from Omega are said to be easy-to-use touchpanels with enhanced data acquisition, Ethernet connectivity options and programming in 10 min. Features include efficient 3D graphical objects, fast response to touch input, easy-to-learn intuitive software and 8 display sizes. The instrument also offers 8 levels of password security, with available programming software. Recommended applications include factory automation, process monitoring, and process control.
www.omega.ca

Documents from 3D files

QuadriSpace, a developer of 3D design software for product documentation, has released version 2008. Early adopters of the software report 80% reduction in time to create illustrations from 3D model data, 30% reduction in effort to create and maintain manufacturing work instructions and 88% improvement in the creation of illustrated parts catalogs. Publishing capabilities are expanded to include vector graphics formats, XML DITA, Microsoft Word, RTF, and HTML while upgrading to 3D PDF 8.0.
www.quadrispace.com

Digital compasses

A line of solid-state OEM digital compasses that measure 1 in.^{2} and offer a wide range of connection options has been announced by OceanServer Technology. OS5000 digital compasses incorporate 3-axis magnetic sensors with 3-axis accelerometers to provide 0.5° nominal accuracy, 0.1° resolution, ±180° roll, ±90° degree tilt, and include electronically gimbaled tilt compensation. Units weigh <2 g and can be connected via RS232, TTL, or USB.
www.ocean-server.com

Magnetic clutches

Rimtec Corp. has introduced the RCC permanent-magnet hysteresis clutch for high-production bottle-capping applications. The hysteresis style bottle capping clutch is said to disengage very smoothly, applying very consistent torque (<10%) on bottle caps. The design includes two models (Range A = 0 – 3.5 Nm, range B = 4.0 – 6.0 Nm) that can replace headsets already in the market. The clutch has a 360° adjustable range.
www.rimteccorporation.com

24 Vdc roller drive

Interroll has developed a high torque 24 Vdc roller drive that provides an energy efficient solution for a wide range of material handling applications. The EC110 unit features a motor and gear box that enables a conveying speed up to 475 fpm and torque capabilities up to 37 in. lbf continuous torque. Noise emission levels of less than 55 dBA can be achieved.
www.interroll.us

Stainless steel collars

A line of 316 stainless steel shaft collars and couplings from Stafford Manufacturing Corp. feature one- and two-piece clamp-type and set-screw styles, and are offered with 18-8 stainless steel or 316 SST fasteners and various bore configurations including keyways.
www.staffordmfg.com

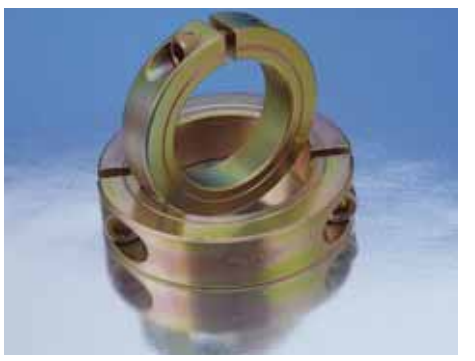
Subminiature switches

Crouzet North America has introduced the V5 Sealed (V5S) snap-action switch. The device's design is said to incorporate the longest available overtravel on the

market, sub-miniature size, customized mounting options and cost effective pricing in an IP67 sealed package. The single break, changeover switch features 2 mm of plunger overtravel and an ability to actuate in multi-directional angles up to 45°.
www.crouzet-usa.com

Yellow zinc plated shaft collars

Ruland Manufacturing has announced lead-free carbon steel shaft collars with RoHS compliant yellow zinc plating. The



zinc plating offers good anti-corrosive properties yet these shaft collars are less expensive than stainless steel alternatives. All of Ruland's yellow zinc parts are plated using a RoHS compliant trivalent process instead of the non-compliant hexavalent process. The shaft collars are available in one- and two-piece clamp-style designs with bore sizes from 1/8 to 6 in. (inch series) and 3 to 80 mm (metric series).
www.ruland.com

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Advisory Board Directions

What pollution and climate change? (But keep a shovel to chase away polar bears)

By Ajay Bajaj

We could have used some global warming this winter, piped a customer as I walked into his office this past winter on a particularly snowy day. He was equally fed up of shovelling snow as the rest of us. All of North America seems to have been blessed with more than normal precipitation and freak weather patterns.

Humour aside, we are seeing more evidence of weather systems going haywire in recent memory. Unfortunately, we still see many opponents of Global Warming theory and who will trot out "convenient research" to discredit environmental conservation. Thankfully more and more people are seriously pondering the consequences, and change is now being driven by the common person.

Many corporations and timid legislators wrongfully assumed that protecting the environment harms the economy. Exactly the opposite is happening. A green revolution is bringing environmental spinoffs and with it more jobs, more science and various improvements in rapidly expanding geothermal, solar and wind power technologies.

Here are some startling statistics.

The average American's lifestyle results in about 20 tons a year of CO_2 Emissions. Data published by UNEP (United Nations Environment Program) shows 2/3 of China's glaciers are likely to disappear by 2050, and almost all would be gone by 2100. Over a billion people depend on the rivers and waterway systems from the Himalayas.

National Oceanic and Atmospheric Administration scientists have discovered that pollutants from industry, transportation and biomass burning form an "Arctic Haze" over much of the polar region in winter and spring speeding up the Polar ice melt. Some 40,000 walruses have appeared on the Russian Arctic coast, a phenomenon that scientists believe is a result of global warming melting Arctic sea ice.

The Great Lakes, especially Lake Ontario drinking water, are under pressure from overdevelopment and pollution. Europe has been experiencing extreme heat waves and unprecedented flooding.

Corals and shelled sea creatures are threatened in oceans made increasingly acidic and corrosive by the industrial emissions that fuel global warming.

The White House is now interfering with new efforts by EPA to set new ozone and clean air standards.

And Big Oil is unapologetic and shameless in pursuit of profit above all. Very little of these profits are being channelled into alternative sources of energy. Just reducing idling of all our vehicles by a few minutes a day can reduce daily consumption of gasoline by millions of litres per day and large amount of green house emissions.

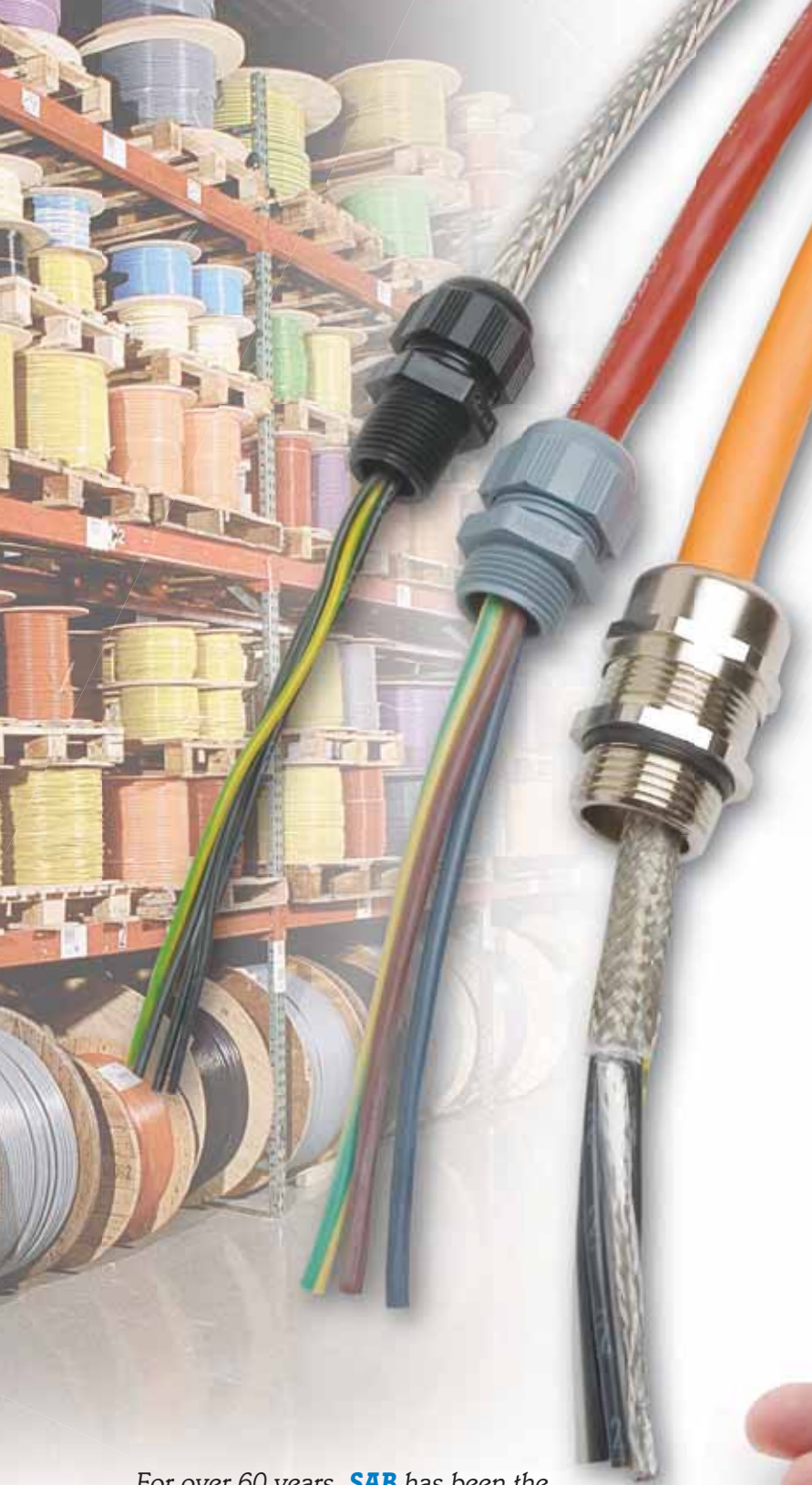
Thankfully people and organizations are responding. There is a movement underway where people are diligently trying to buy as much produce grown locally within a short radius of where they live. Buying locally supports your regional farmers and farming industry and is better for the environment than buying foods that have been shipped hundreds of kilometres to your local market.

San Francisco has banned hard-to-recycle plastic bags in grocery stores, and so far, that translates into 5 million fewer plastic bags every month. Now, other cities are considering similar bans, and companies are developing biodegradable alternatives to disposable bags.

The Earth Hour recently was one example of common people from all over the world coming together in a ground swell that forced many corporations and politicians to jump on the bandwagon. During earth hour in Ontario approximately 250 MW of reduction in consumption was noticed. Australia has pioneered the innovative concept of geosequestration, the burying hundreds of thousands of tons of carbon dioxide deep into the earth's crust.

So next time turn off your lights TV and computer when not in use. Otherwise one day you could see polar bears and walruses rummaging in your backyard!

Ajay Bajaj, P.Eng., is President of Rotator Products Ltd. (rotatorproducts.com), and Canadian conference planning member of the Power Transmission Distributors' Association (ptda.org).



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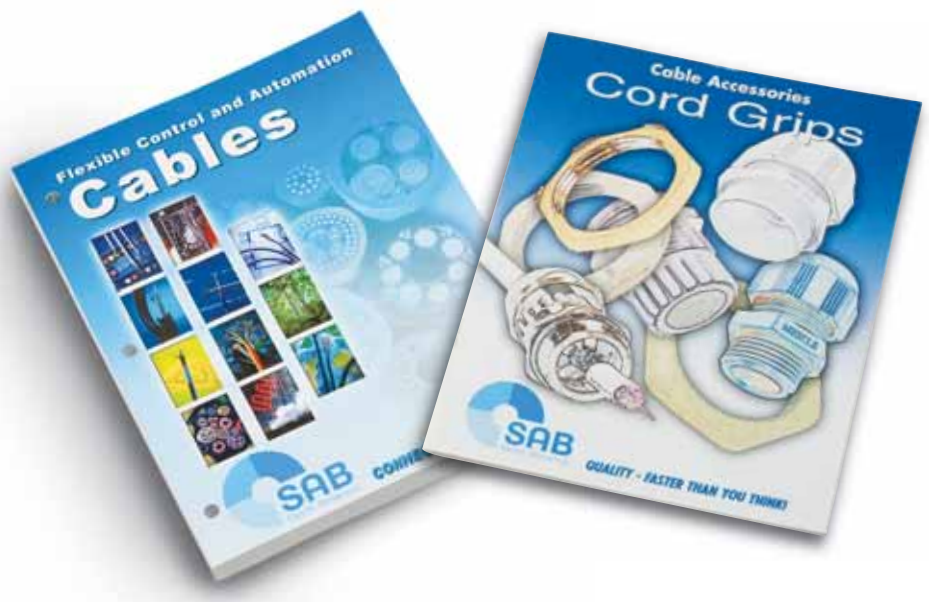

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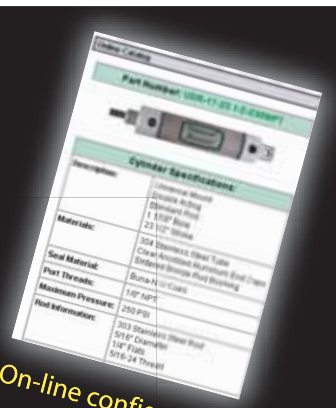

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