

# DPN DESIGN PRODUCT NEWS

Covering the total design engineering function in Canada



### Lead screw release nut

Avdel has introduced NeoSpeed, its versatile Speed Fastening system that is said to be capable of best-in-class assembly times and stronger joint performance than conventional breakstem rivets. With an 8.6 mm grip range and wide hole tolerance, NeoSpeed is also said to be less sensitive to application variables that exist in real world manufacturing.  
[www.avdel-global.com](http://www.avdel-global.com)



### Absolute optical encoder

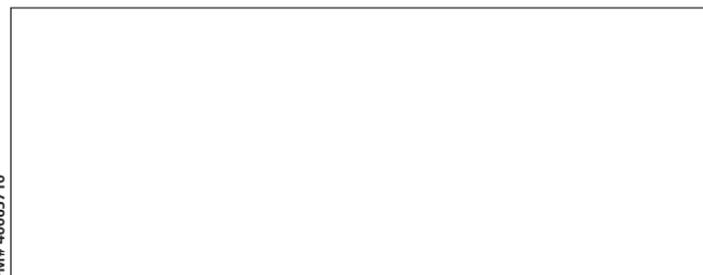
Renishaw has introduced the RESOLUTE absolute optical encoder, available on a range of servo drives, controllers and counter cards. With serial communications up to 10 MHz, system developers are offered a resolution of 1 nm at up to 100 m/s for both linear and angle encoder applications.  
[www.renishaw.com](http://www.renishaw.com)



### 18 mm photoelectric sensors

AutomationDirect has introduced 18 mm rectangular plastic dc photoelectric sensor models. The IP67 rated sensors, available in 12 models, feature an 18 mm diameter threaded lens and M12 quick-disconnect.  
[www.automationdirect.com](http://www.automationdirect.com)

Volume 39 Number 4



PM# 40065710



## Oyster knife pistol grip whips competition

Champion shucker's design a superior tool of the trade

By Mike Edwards

Professional oyster shuckers are as individual as the rest of the general population, and so are their knives. But the Guinness World Book of Records holder for shucking oysters – 38 in a minute – has come up with a knife design that just might become the restaurant industry standard.

Because every hand is different, the technique it takes to open a pesky bivalve to get at the fruit inside varies widely. Shuckers will sharpen their knives and modify handles to optimize leverage for opening any one of the five major species of oyster shell.

Restaurateur Patrick McMurray of Toronto has made his way through many shucker knife designs over the years. "I have cut my own blades, sharpened blades from stock knives and become proficient at grinding," he explained. "And I was always shaving the handles for better grip."

As a trained kinesiologist, McMurray knows all about biomechanics and realized that the greater the hand area in contact with the handle, the better the torque he could apply to shucking an oyster. And what better way to get a grip than to take a mold of your hand as the model for the handle?

For his first prototypes, McMurray turned to simple 2-part plumber's putty available at any hardware store or home centre. "It sets up as strong as steel," he said. The problem was also the angle of the handle, McMurray discovered. "Typical shucker knives were too straight being on a single axis." His prototypes, nearly 40 in total, worked better in a pistol grip orientation.

The ergonomic experimentation also led to incorporating a finger guard in the handle to help

Continued on page 6

# Where Do I Go for Automation Products? **omegamation.com**, of Course!

Your single source for process measurement and control products!

Où puis-je trouver des produits d'automatisation?

Sur **omegamation.com**, bien entendu!

Votre source unique en produits de mesure et de contrôle des procédés

## Non-Metallic Fiberglass Enclosures Boîtiers non-métalliques en fibre de verre

OM-AMU Series/Série

**OM-AMU1084TCCF**  
Fiberglass enclosure with molded-in hinge, clear polycarbonate cover, padlocking twist latch, \$105 shown with OM-HFPU108 front dead panel sold separately, \$46.<sup>50</sup>  
Boîtier en fibre de verre avec charnières moulées, couvert transparent en polycarbonate, verrou rotatif pour cadenasage, montré avec panneau plein, \$105 OM-HFPU108 vendu séparément, \$46.<sup>50</sup>

**OM-AMU664F**  
Solid cover fiberglass enclosures with 4 screw closure and factory installed mounting flange, \$59  
Boîtiers en fibre de verre avec couvert solide et avec fermeture à 4 vis et bride de montage installée en usine, \$59

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

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

Visit/Visitez [omega.ca/om-amu](http://omega.ca/om-amu)

Starts at  
À partir de  
**\$59**

## DIN Rail Terminal Blocks Blocs terminaux DIN à montage sur rail

Visit/Visitez [omega.ca/dtrb](http://omega.ca/dtrb)

\*DRTB Series/Série



**Thermocouple Terminal Blocks with Built-In Connector**  
Blocs terminaux pour thermocouple avec connecteur intégré

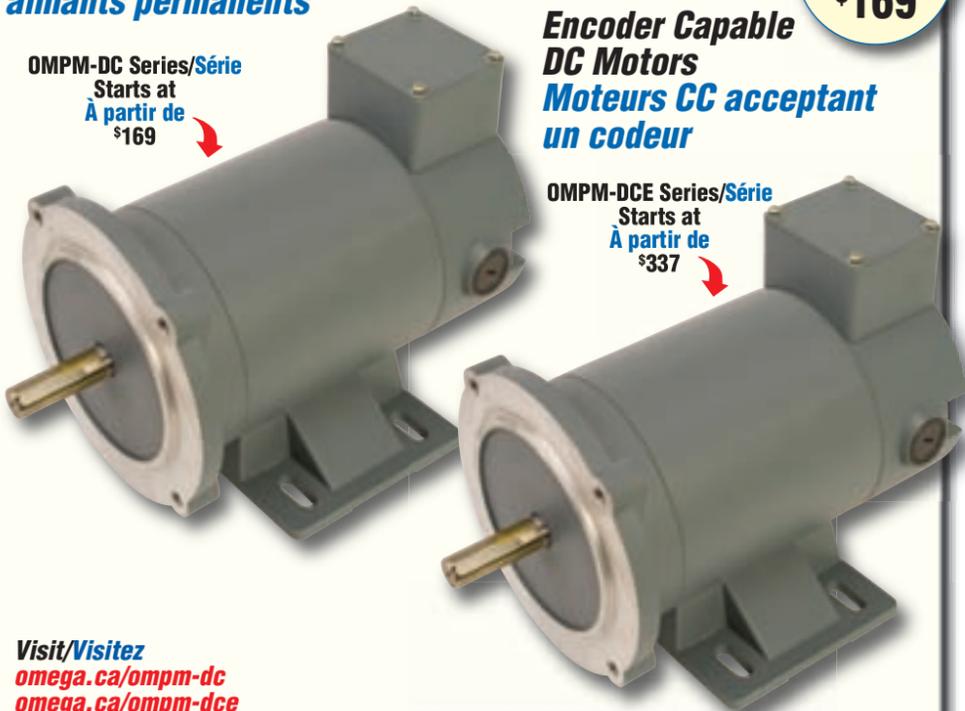
Starts at  
À partir de  
**\$860**

## Permanent Magnet Heavy Duty DC Motors Moteurs CC de service intense avec aimants permanents

OMPM-DC Series/Série  
Starts at  
À partir de  
**\$169**

**Encoder Capable DC Motors**  
Moteurs CC acceptant un codeur

OMPM-DCE Series/Série  
Starts at  
À partir de  
**\$337**



Visit/Visitez  
[omega.ca/ompm-dc](http://omega.ca/ompm-dc)  
[omega.ca/ompm-dce](http://omega.ca/ompm-dce)

Starts at  
À partir de  
**\$169**

## Digital Closed Loop Controller for Use with AC or DC Adjustable Speed Drive Systems

Contrôleur numérique à boucle fermée pour utilisation avec les systèmes CA ou CC de réglage de vitesse

Starts at  
À partir de  
**\$480**



OMDC-ASP10

Visit/Visitez [omega.ca/omdc-asp10](http://omega.ca/omdc-asp10)

Before there was OMEGAMATION™ there was Rube Goldberg  
Avant OMEGAMATION, il y avait Rube Goldberg



Go to: [www.omegamation.com](http://www.omegamation.com) for your daily dose of RUBE GOLDBERG!  
Visitez [www.omegamation.com](http://www.omegamation.com) pour votre dose quotidienne de RUBE GOLDBERG!

Over 150 full color pages covering 7 product categories in automation, sanitary, temperature, electric heaters, wireless/data acquisition, pressure and flow  
Plus de 150 pages en couleurs couvrant les 7 catégories de produits suivantes; automatisation, sanitaire, température, éléments chauffants électriques, acquisition de donnée/sans fil, pression et débit

**FREE!**

**gratuite!**



For Sales and Service, Call TOLL FREE  
Pour les ventes et le service-composez

**1-888-55-66342™**  
**1-888-55-OMEGA**



\*PATENT PENDING  
\*BREVET EN ATTENTE

976 Bergar  
Laval, Québec  
Canada H7L 5A1

Shop Online at *Magasinez en ligne à*

**omegamation.com™**

Ω OMEGA®

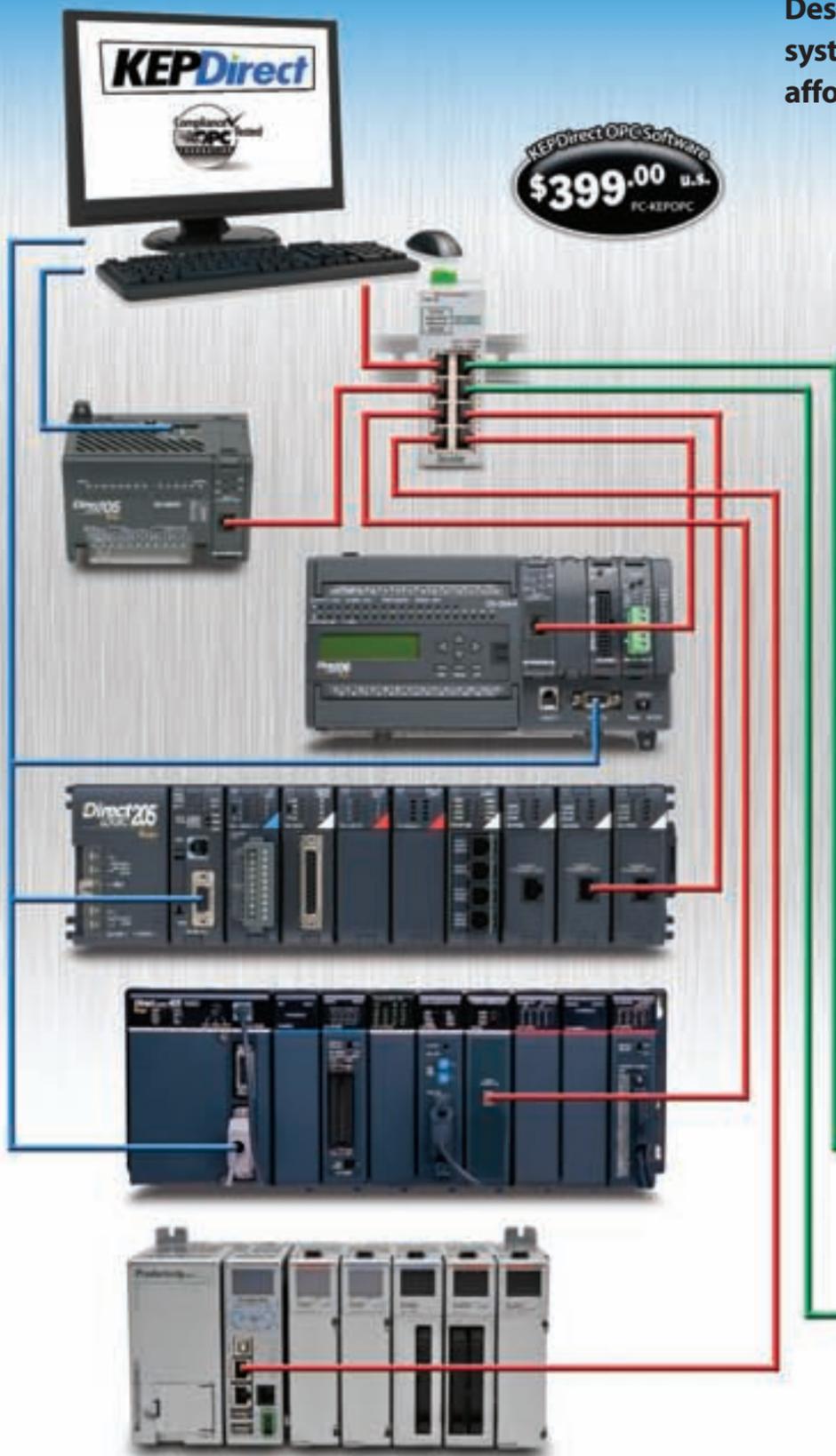
Cover Art: Printed by permission of the Norman Rockwell Family Agency.  
Copyright © 1934 of the Norman Rockwell Family Entities.  
Dilbert © United Feature Syndicate, Inc.  
Rube Goldberg © Rube Goldberg, Inc.

© COPYRIGHT 2011 OMEGA ENGINEERING, INC. ALL RIGHTS RESERVED  
© COPYRIGHT 2011 OMEGA ENGINEERING, INC. TOUS DROITS RESERVES

# Data acquisition or Control

at AutomationDirect prices

Design a low-cost data acquisition or monitoring system using KEPDirect OPC Server software and affordable AutomationDirect control devices.



KEPDirect OPC Software  
**\$399.00** U.S.  
PC-KEPOPC

## KEPDirect

The new streamlined KEPDirect OPC Server connects your preferred Windows client software to AutomationDirect communication-enabled devices such as programmable controllers, remote I/O and variable frequency drives (VFDs). This means that any industrial HMI, SCADA, data historian, MES or ERP software package that includes an OPC client interface (most do) can connect directly to those devices.

### What's included?

- High-performance, certified OPC-compliant connectivity via Ethernet, with unparalleled compatibility and performance.
- DL05, DL105, DL06, DL205, and DL405 PLC support through RS-232, RS-422 serial or **Direct**LOGIC and Productivity3000 Ethernet interfaces.
- DL205, DL405 and Terminator controller remote I/O or AC drive Ethernet interfaces.
- OPC Quick Client application included for testing and easy troubleshooting.
- Automatically generate tag names by importing **Direct**SOFT project Nicknames and Descriptions or Productivity3000 Tag database.

For complete details or to order, visit:  
<http://www.automationdirect.com/kepdirect>

**Our shipping policies make it easier than ever to order direct from the U.S.!**

Free standard shipping is available for orders totaling over \$300 U.S. (except for orders which require LTL shipping, see Web site for details). Also, save on brokerage fees when shipping standard ground to Canada - you can choose to allow AutomationDirect to nominate a broker for your shipment for parts shipping via standard ground. This can save you big on brokerage fees. See Web site for details and restrictions -

[www.automationdirect.com/canada](http://www.automationdirect.com/canada)

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

Go online or call to get complete information, request your free catalog, or place an order.

**1-800-633-0405**



**Order Today,  
Ships Today!**

\* See our Web site for details and restrictions.  
© Copyright 2011 AutomationDirect, Cumming, GA, USA. All rights reserved.



**AUTOMATIONDIRECT**  
the #1 value in automation

# In this issue



## Canadian Fluid Power Challenge "no problem"

Middle schools in Toronto rise to challenge in annual fluid power competition, a partnership of the Canadian Fluid Power Association and the Toronto District School Board



## Vibration testing helps troubleshoot machines

The right troubleshooting tool should be engineered to detect and evaluate machine vibration immediately and recommend any needed repairs, according to Fluke.



## Aerodynamic NASCAR championship racing

Spring Bump Stop Rater system developed by Earnhardt Technologies Group with expertise from Nook Industries emulates some of the forces and effects of driving.



## In-wheel electric motors starting to show promise

Advantages of packaging motors directly in the wheels include eliminating such costly components as driveshaft, axles, transmission and differential, according to Bill Vance.

## DEPARTMENTS:

- 8 By Design**  
KUKA Systems outfits solar panel assembly plant  
Industrial design students show off senior projects
- 9 Motion Control Product Spotlight**  
The latest in Motion products and technology
- 12 CAD Industry Watch**  
Bill Fane asks if Autodesk "suite" software is sweet for the end-user; reports on Siemens PLM user conference
- 13 Switches Product Spotlight**
- 21 Medical Engineering**  
Diagnosing diagnostic equipment critical to patient health, says Mark Sunderland

### THIS MONTH ON dpncanada.com

#### EXCLUSIVE ONLINE BLOGS

##### CAD Software Blog

Don't miss Bill Fane's full evaluations of Autodesk Inventor 2012 and AutoCAD 2012

##### Renderings Blog

Mike Edwards sees world manufacturing outlook undergoing "seismic" shifts

## Advertisers Index

Amacoil Inc. ....	17
AutomationDirect.....	3
Baldor .....	13
Clippard .....	24
Conductix Corp. ....	17
Henkel.....	5
Infastech .....	22
Master Bond .....	20
Nabtesco.....	20
Omega .....	2
Pamensky.....	14
PennEngineering .....	19
Pivot Point .....	15
Rittal Systems .....	10, 11
Rotor Clip.....	9
SEW Eurodrive .....	23
Smalley Steel Ring .....	15
Tsubaki .....	7



June/July 2011

Please go online to [dpncanada.com](http://dpncanada.com) to fully explore and enjoy the Digital Edition of *Design Product News*.



DPN editorial director Mike Edwards

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**.

# WATCH new product demos from Hannover Messe 2011 at [dpncanada.com](http://dpncanada.com)

Editorial Director Mike Edwards traveled to Hannover, Germany, this spring for one of world's top industrial trade fairs. Video highlights from Hannover Messe 2011 at [dpncanada.com](http://dpncanada.com) reveal experts demonstrating products that address manufacturing automation and mechatronics applications which can increase your productivity.

### NORD Drivesystems debuts 2-stage helical gearmotor



NORD Drivesystems managing director Jurgen Jendryschik introduces a helical bevel 2-stage gearmotor and features energy efficient motors in his booth at Hannover Messe 2011.  
<http://ow.ly/58Boc>

### Phoenix Contact goes wireless with data acquisition devices



David Skelton, VP & GM of Development & Manufacturing at Phoenix Contact in North America provides booth tour of wireless data acquisition products.  
<http://ow.ly/58BdM>

### Turck I/O adapter connects with Parker valves



Jorg Kuhlmann, Director Product Management, Fieldbus Division at Turck Industrial Automation explains BL67 I/O system adapter for Parker Hannifin pneumatic valves.  
<http://ow.ly/58B8C>

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



### Interactive stuff

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

## Renderings



# Rare earth supply crunch a wakeup call for mining companies everywhere

By Mike Edwards,  
Editorial Director

Can you name the 17 rare earth elements (aka metals)? Not many of us can, but their scarcity due to demand – and now cost – is putting the squeeze on global manufacturers.

Rare earths are actually plentiful in the Earth's crust, but – Catch 22 – they are not often found in concentrated and economically exploitable forms.

On a positive note, this soaring demand for rare earth metals – used in the production of everything from smart phones to computer hardware to energy-efficient lights – is generating new but risky opportunities for mining companies in Canada and around the world, Ernst & Young says ([www.ey.com/ca](http://www.ey.com/ca)).



**Demand for specific minerals set to jump more than 60% in the next five years**

Neodymium, for example, is essential to rare earth magnets, lasers and ceramic capacitors, while Lanthanum is mined for use in hydrogen storage, battery electrodes, camera lenses and as a fluid catalytic cracking catalyst for oil refineries.

“Rare earth metals are feeding the production of high-tech and green products. Demand is expected to jump more than 60% in the next five years alone,” says Zahid Fazal, partner and leader of Ernst & Young's mining practice in Quebec. “The problem is China accounts for virtually all rare earths production, and their export restrictions are driving prices higher. What's more, Chinese domestic consumption of rare earth materials is predicted to outpace supply between 2012 and 2015.”

Fazal says the situation represents a unique opportunity for Canadian and other companies to rebuild the supply chain outside of China. While this could help prevent a supply shortage and keep a lid on soaring prices, these projects are higher risk and that brings additional challenges into the mix.

“We're already seeing companies crowd the market with new projects

aimed to fill the estimated supply gap,” Fazal explains. “But because these projects are risky, getting the right financing in place can be difficult, and we could see a fierce fight for cash in a limited investor pool.”

In a new paper, *Technology minerals: The rare earths race is on!*, Ernst & Young found besides financing, speed to market and choice of minerals will be vital to a company's success in this new sphere.

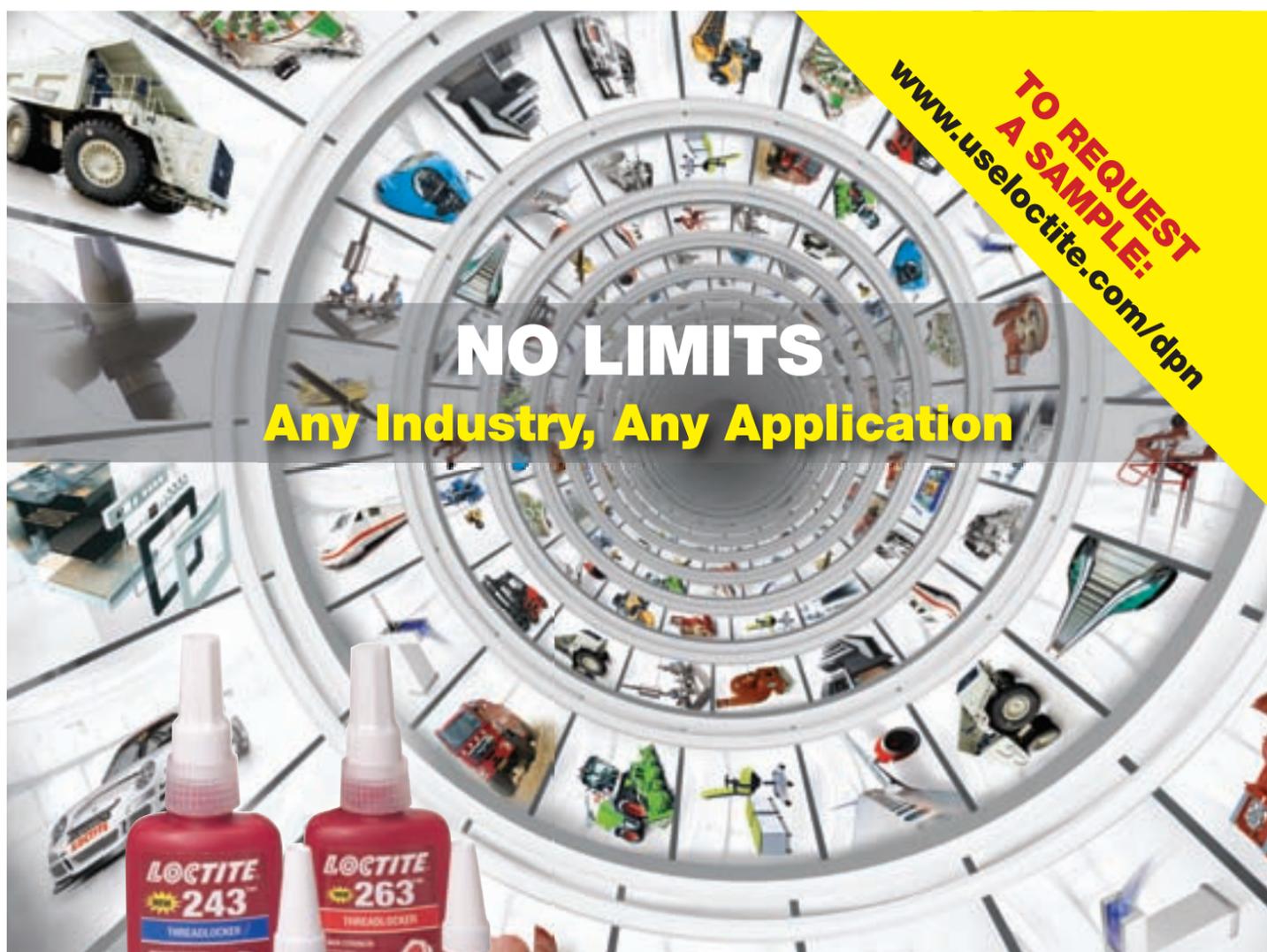
“It's going to be a race to the finish line to develop the next producing asset.

Companies that enter production first are more likely to capture the current price premiums, with the market likely to be very sensitive to future increases in supply,” says Fazal. “Of course, at the end of the day, high risk endeavors like this can equal significant potential rewards for those that are successful.”

For example, early movers like U.S.-based Molycorp and Australia's Lynas are expected to potentially produce well over 20% of 2013E world supply. However, while they may have taken the lead

in the light rare earths sector, there is still time to develop a number of vertically integrated players in the heavy rare earth space where first mover advantage could generate real benefits.

If you found **Renderings** interesting, please send a message to [medwards@annexweb.com](mailto:medwards@annexweb.com)



**TO REQUEST A SAMPLE:**  
[www.uselocsite.com/dpn](http://www.uselocsite.com/dpn)



## LOCTITE®

**TO MAXIMIZE THE RELIABILITY OF YOUR DESIGNS, SPECIFY LOCTITE® 243™ / 263™**

By filling the thread roots and preventing side-to-side movement, Loctite® Threadlockers dramatically increase the reliability of assemblies. With recent advancements in chemistry, **Loctite® 243™ (blue, medium strength)** and **Loctite® 263™ (red, high strength)** now provide:

- Enhanced temperature resistance up to 360°F (180°C)
- The ability to cure through oil on “as received” fasteners without cleaning
- Curing without primers on steel, stainless steel, and most plated fasteners



© and ™ designate trademarks of Henkel Corporation or its Affiliates. © = registered in the U.S. Patent & Trademark Office. © Henkel Corporation, 2010. All rights reserved. AD-108-10

Henkel Canada Corporation  
2225 Meadowpine Blvd.  
Mississauga, Ontario, L5N 7P2  
1-800-263-5043  
[www.uselocsite.com/dpn](http://www.uselocsite.com/dpn)

Henkel

## Feature: CAD

# Freeform haptics: from dollhouse to real house

Mass customization is often about the Davids of the world beating the Goliaths with technology. The metaphor is an apt one for CSL Plastics based in Langley, BC.

## Mindshift CSL Plastics designs custom acrylic furniture with "Wow!"

A player in Canadian design and engineering circles for 30 years, the company established its Mindshift division in 2008 to address the needs of the movie prop and set industry. Its core CSL Plastics unit serves a wide range of vertical markets including point of purchase, OEM, signs, architectural, agricultural and marine. A 50-person operation, Mindshift CSL Plastics positions itself as the only Vancouver-area firm with both 3D laser scanning and 3D modeling software as well as a 35,000 square foot manufacturing facility with mold making, CNC tooling, thermoforming, foam cutting and milling services to deliver a "Wow!" factor.

Mindshift CSL had its origins in custom acrylic fabrication. While the discipline had fallen somewhat out of vogue in recent years, the arrival of a key customer with a need for highly-stylized acrylic furniture for a major motion picture ignited a spark within the company to create something special that would set the stage for growth outside the movie industry.

The project involved the design of a dining room table, two armchairs and a

loveseat adorned with intricately sculpted seashell flourishes. The style was a futuristic interpretation of Louis IX classicism in a bold material – acrylic. The team knew that milling acrylic with such graceful curves would be challenging at best. Known for its lack of durability, the material would require the team to employ some design tricks in order to achieve the desired style in a structurally sound piece that actors would be able to sit and, in one key scene, pound on. In addition, the entire project needed to be designed and fabricated in less than 8 weeks.

Fortunately Mindshift CSL had made the commitment to work in an all-digital environment several years ago – even on high-end design concepts – with the use of the Freeform organic 3D design and manufacturing solution from Sensable ([www.sensible.com](http://www.sensible.com)).

"When it comes to a project that requires very organic and irregular 3D CAD modeling, Freeform is the best program of its kind," said Kongjoo (KJ) Moon, industrial designer at Mindshift CSL. "With Freeform there are no restrictions to your creativity. It would take you considerably longer to get the highly sculptural shapes, textures and flourishes we needed if we did them in traditional CAD solutions."

Freeform is a sculptural CAD solution based on voxels. Think of voxels as 3D pixels or shifting grains of sand, that can be easily repositioned in 3D space and allow extreme speed and design freedom. This flexibility better accommodates the modeling and prep-for-manufacture of highly detailed, complex, organic shapes than solid or surface modelers.



Acrylic dining table front designed in Freeform by Mindshift CSL Plastics. Photo courtesy of Mindshift CSL Plastics.

Freeform users have complete design freedom – sculpting digital clay by holding a haptic (force-feedback) device instead of a computer mouse – allowing users to 'carve here, smooth there' in the same way as physical modeling in clay or wax, but with digital accuracy, precision and consistency.

The movie designer supplied Mindshift CSL with a set of simple dollhouse furniture. The team performed a 3D scan of each piece to create STL files, and imported them directly into Freeform. The designers used Freeform to scale up each piece and to modify the design to assure the basic frame size was suitable to support an adult's weight and frame, and redesigning specific areas to accommodate the more fragile acrylic material. For instance, designers beefed up the size of table legs while still adhering to the elegant design concept.

Separately, the designers used Freeform to model the tabletop in 3D and then to add sculptural scallops and flourishes.

"Freeform let us make our work look hand carved, because we DID hand carve it – virtually," said Carl Philibert, vice-president of Mindshift CSL. "Our designers used Freeform to quickly define the overall shape of the flourishes, and then worked with the haptic device to simply tug, smooth and carve the digital clay model to adjust the shape and create the necessary grooves and details of the design."



Freeform from Sensable saved significant design time with the sculptural shapes, textures and flourishes. Photo courtesy of Mindshift CSL Plastics.

## Cover Story

# Production in China keeps knife costs down

From Front Page

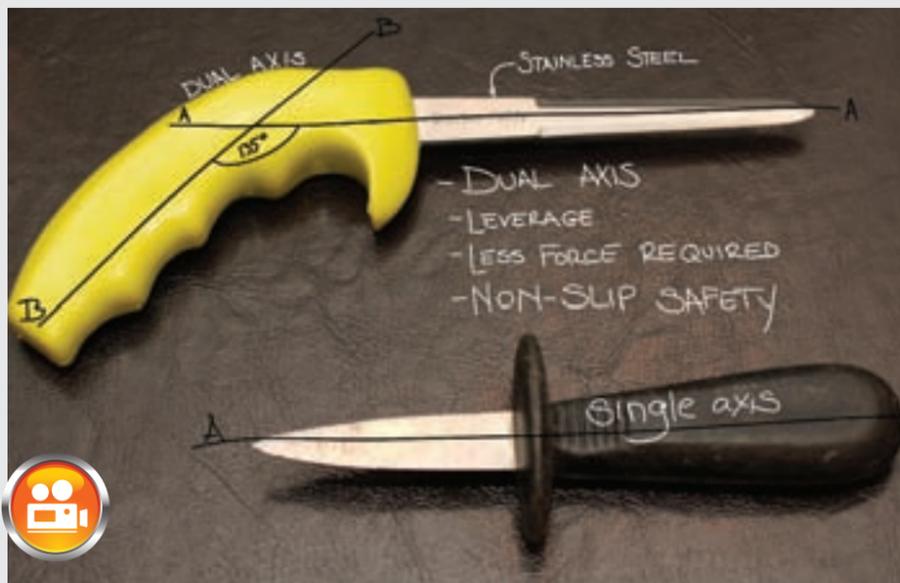
with pushing and directing the oyster. The blade has evolved to include notches that add to its surface area, compensating for the oyster's anatomy.

## Prototype handles made from 2-part plumber's putty

To commercialize what has become McMurray's "Ergonomic Pistol Grip – 38 Special," he turned to a contact in Shanghai for low-cost mold manufacturing expertise. McMurray wanted to enter the market with reasonably-priced knife with no fear of knock-offs.

"I was quoted (locally) at \$50,000 to design and set the mold," he said. In China it ended up costing \$2,000. The 38 Special uses injection-molded nylon and stainless steel blades.

The possibility of patenting his design was also explored, McMurray explained, but was told by a patent lawyer that any slight design change would likely override his patent.



The Shucker Paddy knife relies on a pistol grip to supply superior leverage for oyster shucker professionals.

McMurray began selling his oyster gear at his Starfish and Ceili Cottage restaurants in Toronto, as well as at local fish shops. The \$30 price tag is attracting a lot of sales in the city and a website is up to take orders from anywhere.

And McMurray's not just a Guin-

ness record holder, but a five-time Ontario, four-time Canadian, one-time North American and one-time World oyster-shucking champion. This competitive spirit with a competitive tool is ready to ease the jobs of oysters shuckers everywhere.

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

They could handle shaped definition and design refinements with the gentle stroke of the hand – instead of mind-bending mathematical calculations of a traditional CAD package."

Such intuitive commands allowed Mindshift CSL to save significant design time – arriving at a final approved design of all four furniture pieces in just two weeks. When designs were approved, Mindshift CSL output the final Freeform files and imported them into its CNC milling programming software. Individual sections of the furniture were milled separately and then the final pieces were assembled later.

"All pieces were CNC machined and the final surface finishing was done by hand," said Moon, "the final result was classic yet futuristic, and achieved in under 8 weeks - a highly aggressive schedule."

"The customer always assumed they'd get what they wanted, but seeing the finished work in life-sized scale blew their mind."

"These types of projects are labor-intensive, but with Freeform, we demonstrated that Mindshift CSL can deliver exactly the 'Wow!' that discerning buyers envision," said Philibert.

This article was contributed by Sensable.  
[www.sensible.com](http://www.sensible.com)

# Sofame streamlines engineer-to-order process

With fuel costs seemingly endlessly on the rise and an increasing desire to find green solutions for energy generation, Montreal's Sofame Technologies Inc. (short for Solutions for Achieving Maximum Eco-Efficiency) is well-positioned for growth in the competitive global marketplace.

The company custom-engineers and manufactures award-winning, industrial boiler efficiency systems for large energy customers such as hospitals, universities and central heating plants that extract up to 99% of heat from flue gases that would otherwise be lost.

Energy is returned in the form of high-temperature hot water or preheated make-up air, which in turn improves the efficiency of existing gas-fired boilers, reducing greenhouse gas emissions and fuel costs. In fact, depending on gas prices, the pay-back period once Sofame's technology is installed can be as little as one year.

While over 300 custom-engineered sys-

tem applications engineers and the shop floor."

Sofame's automated process will now take in customer data and perform hundreds of engineering calculations behind the scenes. In the months ahead, this will allow for collection of information from customers faster and more accurately than ever before. The same detailed output will help the company with its sub-contractors to obtain accurate pricing and lower costs.

"Shortening the sales process and engineering time is a huge win for Sofame and makes us a better partner to our customers," said Gocek.

*This article was contributed by Autodesk.*  
[www.autodesk.com](http://www.autodesk.com)



By eliminating the lag time on the piping and structural side, and producing vessel drawings and P&IDs (piping & instrumentation diagrams) more quickly, Sofame can handle more projects with the same number of people.

## Engineer-to-order (ETO) business required reduced engineering and drafting time of its customized products

tems have been installed over the past 25 years, Sofame needed to solve a pressing business need: grow its presence abroad.

"We've seen a huge increase in demand for better use of fossil fuel resources," said John Gocek, president and CEO of Sofame ([www.sofame.com](http://www.sofame.com)). "We're currently a pan-Canadian company, but we've moved into the U.S. in the last two years and are continuing to explore numerous opportunities abroad."

Sofame's engineers had effectively migrated from 2D design to 3D design over the last few years using a combination of AutoCAD Mechanical and Autodesk Inventor software to engineer and draw customized system designs. But by 2010, the company had begun a program of outsourced manufacturing, which required product redesign and standardization to speed-up manufacturing, eliminate errors, and above-all, reduce costly hours of manual work.

Sofame has adopted a number of Autodesk solutions to dramatically improve its engineer-to-order (ETO) business, including Autodesk Intent to further reduce engineering and drafting time of its customized products to shorten sales cycles; Autodesk Vault to effectively manage its 2D and 3D designs and work-in-process; and Autodesk Streamline to permit sharing of designs and technical manuals with both employees and Sofame's network of distributors.

"By eliminating the lag time on the piping and structural side, and producing vessel drawings and P&IDs (piping & instrumentation diagrams) more quickly, we can handle more projects with the same number of people," explained Gocek. "As a result, we expect to vastly improve communication among our customers, consulting engineers, sales representatives, in-house

When it really matters, trust Tsubaki.

Our latest  
Hook-up



## Get hooked on our Cable Carrier Systems

Cableveyor systems support cables and hoses that supply electrical, hydraulic and pneumatic power to moving machine parts. For more than half a century Tsubaki has been a market leader in the manufacture of this important component. The innovation and reliability you have come to expect from Tsubaki has been strengthened with the recent acquisition of KabelSchlepp GmbH of Germany. Completing the breadth of product, Tsubaki now offers complete kits including hi-flex continuous bending cables and hoses already installed in a complete Cableveyor strand. When it really matters, trust Tsubaki.






Tsubaki of Canada Limited, 1630 Drew Road, Mississauga, ON L5S 1J6 Tel: 905.676.0400 / Fax: 905.676.0904 / Toll-Free: 1.800.263.7088 e-mail: [info@tsubaki.ca](mailto:info@tsubaki.ca)

## By Design

# KUKA Systems outfits Canada's largest solar panel plant

STERLING HEIGHTS, MICHIGAN & AUGSBURG, GERMANY – KUKA Systems North America has made a successful entry into the burgeoning Canadian



KUKA Systems North America is installing three automated assembly lines like this at Canada's largest solar panel manufacturer, in southern Ontario. Each post-lamination line can frame and test 120 MW of photovoltaic module output annually, making this plant the largest in North America producing crystalline silicon panels. (Photo: KUKA Systems)

solar panel manufacturing sector, demonstrating in the process how it can adapt its extensive suite of automated production solutions to a panel maker's unique requirements. KUKA Systems ([www.kuka-systems.com/usa/en](http://www.kuka-systems.com/usa/en)) provides photo-

voltaic panel manufacturers around the world with fully automated production lines or any level of automation short of that, from cell layout through all stages of module assembly and quality control, regardless of type or dimensions.

For its first Canadian customer, KUKA Systems is installing three partially automated, post-lamination framing lines for trimming, framing, testing and packout of photovoltaic panels, a \$12 million contract. Each line consists of five robots, as well as applicators, conveyors and other handling and testing equipment. Installation began in the first quarter of 2011.

This customer is building Canada's largest solar panel manufacturing plant in southern Ontario. Each line will be capable of handling 120 MW of annual production, making it North America's largest manufacturing site for crystalline silicon-type panels and one of the largest on the continent making any type panel. "This is a landmark contract, one of our largest in North America to date," said Robert Giaier, vice president, Alternative Energy, KUKA Systems Corp. North America.

## Honda humanoid robot tours Canada



Honda's ASIMO (<http://ow.ly/58ttC>), said to be the world's most advanced humanoid robot, recently arrived in Canada for its first visit since 2007. Designed to someday assist people with mobility challenges, ASIMO is the culmination of more than two decades of research and development by Honda engineers. While in Canada, ASIMO made two stops in Toronto and one in Gatineau, QC, where Honda demonstrated its humanoid robotics technology to the public. The latest generation of ASIMO, which stands for

Advanced Step in Innovative Mobility, stands at 130 cm and has flexible walking and running technology, as well as expansive range of arm movements.

## News in Brief

### Nanomaterials R&D

ArboraNano, a member of Canada's business-led Networks of Centres of Excellence program ([www.arboranano.ca](http://www.arboranano.ca)), has launched nine new R&D projects targeting innovative paper grades, improved foams and nanocomposite developments using forest nanomaterials.

### Hydro-Québec report

Hydro-Québec ([www.hydroquebec.com](http://www.hydroquebec.com)) has presented its *Sustainability Report 2010*, which describes the company's many initiatives in the area of sustainable development pertaining to greenhouse gas emissions.

### Renewable jet fuel project

Rentech, Inc. ([www.rentk.com](http://www.rentk.com)) has announced that its proposed Olympiad Renewable Energy Centre in The Township of White River, Ontario, has been selected by the Province of Ontario for a proposed supply of up to 1.1 million cubic metres per year of Crown timber. The wood is for the sustainable production of renewable RenJet, clean low-carbon jet fuel.



### New Magnetek business development manager

Magnetek, Inc., ([www.magnetek.com](http://www.magnetek.com)) a provider of digital power and motion control systems used in overhead material handling, mobile hydraulic, elevator, and energy delivery applications, has announced that Don Schneider has joined the company as business development manager for Radio Controls. Schneider has over 14 years of experience in radio controls, including three years as radio controls product manager at Magnetek and most recently 11 years in radio control sales, research and development, and engineering management for Hetric, Inc.

### Henry Buijs awarded space science excellence prize

In recognition of his exceptional contribution to the Canadian Space Program, Dr. Henry Buijs has been presented with the prestigious John H. Chapman Award of Excellence. Dr. Buijs (right) received the award from Steve MacLean (left), president of the Canadian Space Agency ([www.asc-csa.ca](http://www.asc-csa.ca)). As a scientist, Dr. Buijs established Fourier transform spectroscopy as a powerful technique and a core Canadian expertise used for the monitoring of the atmosphere from space.



## Calendar

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

November 22-24, 2011. Nuremberg, Germany. **SPS/IPC/Drives 2011 trade show** features electromechanical



Islington Junior Middle School, 2011 Fluid Power Challenge winners Veronica Stan (front left), Hyeonji Kim, Kevin Sprunt (back left), Areeb Hafiz. Inset from top: Jitender Kumar, Scott Purdy and Marshall Allen received technical college scholarships at the CFPA's annual general meeting.

## Canadian Fluid Power Challenge "no problem"

TORONTO – Canadian Fluid Power Challenge organizers were a little concerned that the new problem scenario they devised for this year's competition might be too difficult for the students. It turns out they needn't have worried as more teams succeeded in completing at least one cycle than in any previous year.

Students from 18 west Toronto middle schools were asked to design and build fluid power devices to pick up a wooden block and place it on one of two shelves – in effect, a simulation of a warehouse material handling problem.

The Challenge is a partnership of the Canadian Fluid Power Association ([www.cfpa.ca](http://www.cfpa.ca)) and the Toronto Dis-

trict School Board intended to provide Grade 8 students with hands-on experience building a mechanism with real world applicability.

During a separate event, the CFPA annual scholarship, sponsored by DPN, was presented to Jitender Kumar of the Automation & Robotics Program at Centennial College. Fellow Centennial program student Scott Purdy received the Edward Stock Memorial Scholarship sponsored by Flo-Draulic Controls and Marshall Allen of the Industrial & Mechanical Engineering Program at Mohawk College received the Hans de Waard Memorial Scholarship sponsored by Bosch Rexroth Canada.



Carlton University student Andrew Lowe was judged "Best In Show" for his cross trainer wheelchair design.

### Industrial design grads display innovation at Rocket competition

TORONTO – The 2011 10th Annual "Rocket" Ontario Industrial Design Grad Show and Competition featured the schools of industrial design at Humber College ([www.humber.ca](http://www.humber.ca)), Carleton University ([www.carleton.ca](http://www.carleton.ca)) and Ontario College of Art & Design University ([www.ocadu.ca](http://www.ocadu.ca)).

This year's "Best In Show" award for senior year studio project went to Carleton's Andrew Lowe ([www.lowe9.com](http://www.lowe9.com)). His CrossTrainer Wheelchair design can quickly convert from daily use to sports use, qualifying it for government funding grants for daily use wheelchairs.

## Products: Motion Control

### Inverters boost motion, logistics control



Lenze Americas has introduced the Lenze 8400 inverter series. The series features L-Force automation technology for custom motion control solutions that are said to deliver stable and high dynamic performance in a range of material handling and logistics applications. In addition to L-Force control and software, the 8400 series inverters incorporate intelligent features, including memory modules, on-line diagnostics and optional integrated safety systems.

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

### Digital I/Os for EtherCAT networks



ACS Motion Control has developed digital I/O modules that feature an EtherCAT interface. The SPiiPlus IOMnt EtherCAT digital I/O modules are said to offer an economical and compact design featuring up to 32 inputs and 32 outputs, with minimal power dissipation. The inputs are designed to meet EN 61131-2, type 3 (24V source type) and are functionally and pin compatible with Beckhoff EL1862/1872. The outputs are 24 V/0.5 A each, source type, fully-protected and are also functionally and pin compatible with Beckhoff EL2872.

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

### Single- and dual-digital encoders



TT electronics BI Technologies has developed a line of single- and dual-digital rotary encoders. EN08 series, RoHS-compliant rotary encoders feature an 8 mm design with options of a SPST momentary switch and dual encoders with concentric shafts. Suitable for a wide range of applications including digital audio/video equipment, navigation systems, appliances and machine tools, the encoders

have a mechanical-type contact and are sealed to IP50 specifications. The encoders have 20 detents per revolution with rotational torque of detent rated at a maximum of 1.0 oz-in. The operating life is 50,000 cycles, and the optional SPST momentary switch life is rated at 15,000 actuations.

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

### Tool addresses variable speed drives

Fairchild Semiconductor has developed the Motion Control Design Tool to assist in the selection of the optimum Fairchild Motion-SPM device for their specific applications. The tool addresses three-phase inverter sinusoidal modulation for variable speed drive applications powering permanent magnet synchronous motor (PMSM) and ac induction motors. Part selection is based on a detailed entry of application specific I/O information. The program out-

put includes module component losses, junction temperature increases, cooling



requirements and junction temperature ripple at the motor/output frequency.

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

### Linear actuator with connector option

Haydon Kerk Motion Solutions has introduced the motorized SplineRail linear actuator with an integrated connector. Offered alone or with a harness

assembly, the connector is RoHS compliant and features a positive latch for connection integrity. The integral connector is rated for up to 3 A, and the mating connector will handle a range of wire



from 28 to 22 gauge. The unit combines mechanical drive, guidance, and a stepper motor actuator in a single, compact component. The system uses a Size 17 single stack or double stack stepper motor with either a 1.8° or 0.9° motor step angle. Screw leads are available from 0.05 to 1.2 in. per revolution.

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

We Offer The Easy

**C H O I C E**

Choosing the right retaining ring for your application does not have to be difficult because...

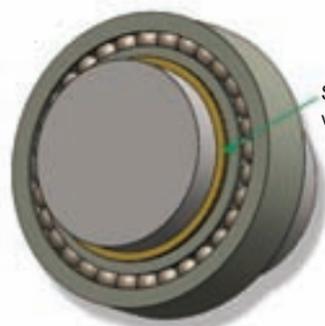
...we help you choose.

In this application the design engineer needed to securely retain a bearing on a shaft.

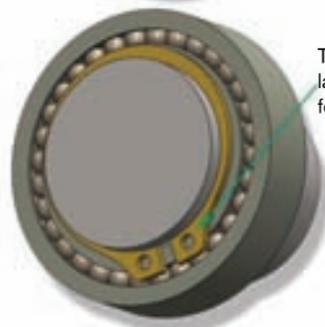
The requirements were a large shoulder to withstand the axial forces generated in this assembly as well as ease of installation and removal. Originally, the engineer contemplated using a spiral ring due to its large shoulder and 360° contact with the groove.

Rotor Clip analyzed the application and suggested the use of a tapered section retaining ring from their SH series. This ring has a large shoulder to withstand the generated forces and, unlike a spiral ring, has lug holes for easy installation and removal of the ring.

Rotor Clip was able to help the engineer choose the proper ring for the application that addressed both requirements: A large shoulder and ease of installation and removal.



Spiral-Ring has 360° contact with the groove.



Tapered Section Ring offers large shoulder and lug holes for easy installation and removal.

...we make them all.

Rotor Clip offers a full line of Tapered Section, Constant Section and Spiral Retaining Rings for internal and external applications. These rings are produced in a wide variety of materials with various available finishes. Our lines include INCH, DIN, ANSI & JIS industry standards.

The Choice Is Yours. We Can Make It Easy For You!

Let us help you today. Visit [www.rotorclip.com/easychoice](http://www.rotorclip.com/easychoice) to find out more.

**ROTOR CLIP**

Designed for Quality

## Feature: Data Acquisition

# Vibration testing: the better way to troubleshoot machine problems

To the savvy maintenance professional, industrial machinery almost “talks” to reveal its condition. The key to success is in understanding what the machine is saying.

### Not just data, but actionable results

To detect problems, the professional “listens” in many ways:

- With eyes and ears, to see and hear conditions that may indicate problems
- With thermometers and thermal imagers, to detect overheating, poor electrical connections or failing bearings
- With digital multimeters and power analyzers, to diagnose electrical problems
- Using techniques like lubricant analysis, to gauge machine condition over time

And now the maintenance professional has a valuable new way not just to listen, but to find mechanical problems and fixes. The Fluke 810 Vibration Tester troubleshooting tool is engineered to detect and evaluate machine vibration immediately and recommend any needed repairs.

The handheld Fluke 810 is designed and programmed to diagnose the most common mechanical problems of unbalance, looseness, misalignment and bearing failures in a wide variety of mechanical equipment, including motors, fans, blowers, belts and chain drives, gearboxes, couplings, pumps, compressors, closed coupled machines and spindles.

Many professionals may think there are only two options for vibration testing; high end vibration analyzers that are expensive and difficult to use, and low-end vibration pens which aren't particularly accurate. The Fluke 810 fills the middle of the category as it combines the diagnostic capability of a trained vibration analyzer with the speed and convenience of lower-

end testers, at a reasonable price, the company says.

The diagnostic technology in the Fluke 810 analyzes machinery condition and identifies faults by comparing vibration data to an extensive set of rules and algorithms developed over years of field experience. The unit determines fault severity using a unique technology to simulate a fault-free condition and establish a baseline for instant comparison to gathered data. This means that every measurement taken is compared to a “like new” machine.

When it detects a fault, the vibration tester identifies the problem, its location and severity on a four-level scale to help the maintenance professional prioritize maintenance tasks. It also recommends repairs. Context-sensitive on-board help provides new users with real-time guidance and tips.

Mechanical diagnosis with the tester begins when the user places the Fluke tri-axial TEDS accelerometer on the machine under test. The accelerometer has a magnetic mount and can also be installed by attaching a mounting pad using adhesive. A quick-disconnect cable connects the accelerometer to the tester. As the machine under test operates, the accelerometer detects its vibration along three planes of movement (vertical, horizontal and axial) and transmits that information to the unit. Using a set of advanced algorithms, the vibration tester then provides a plain-text diagnosis of the machine with a recommended solution.

Mechanical equipment is typically evaluated by comparing its condition over time to an established baseline condition. Vibration analyzers used in condition-based monitoring programs rely upon these baseline conditions to evaluate machine condition and estimate remaining operating life. System operators must have considerable training and experience before they can determine the meaning



The Fluke 810 Vibration Tester troubleshooting tool is engineered to detect and evaluate machine vibration immediately and recommend any needed repairs.

and significance of the vibration spectra they detect.

But what about the maintenance pro who isn't trained in vibration analysis? How do you tell the difference between acceptable vibration, and the kind of vibration that demands immediate attention to service or replace troubled equipment?

Extensive experience with mechanical vibration, what it means and how to fix it is built into the advanced algorithms of the Fluke 810. Now the maintenance professional can quickly and reliably determine the cause of the machine vibration, learn the severity and location of the problem and receive recommendations for repair. It's all done with the intelligence built into

the tester, without the extensive training, monitoring and recording required for typical vibration monitoring programs.

The Fluke 810 delivers plain language recommendations about what to do next. For equipment maintenance teams hard pressed and on the go, these precise directions are what they need to take action now, maintain mechanical equipment in top shape, and keep facilities productive.

*The article was excerpted from the Fluke white paper, The Fluke Vibration Tester: A new and better way to troubleshoot machine problems. See the full version at <http://ow.ly/5670a>.*

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

# Cash For Cooling Is Back!

From Now until September 30, 2011 cash in on big savings!

When you replace an old inefficient industrial air conditioner or purchase a new efficient Rittal AC unit, you get:

\$125 Instant Cash Back Rebate

Or

A Free Upgrade to a Rittal Comfort Controller - \$150 Value

For more information, please visit [www.Rittal.ca](http://www.Rittal.ca) or contact your local distribution partner



ENCLOSURES

POWER DISTRIBUTION

CLIMATE CONTROL

FRIEDHELM LOH GROUP

## Feature: Engineered Material

# Functional testing with 3D printing material breakthroughs

Objet Geometries, already known for its ability to print highly realistic three-dimensional parts and prototypes with exceptional accuracy, surface finish and fine model detail has made a leap forward with its recent release of new materials.

### New rapid prototyping materials from Objet Technologies also address high heat and transparency concerns

The new materials address high heat, transparency and functional testing. Objet's new ABS-like Digital Material (RGD5160-DM) provides engineers with

high strength, rigidity, and toughness, all properties necessary for the successful functional testing of a prototype or part.

Objet's new ABS-like Digital Material (RGD5160-DM) has a temperature resistance of 65°C out of printer, 90°C post-thermal treatment and a high toughness of 65-80 J/m – all comparable to standard ABS-grade engineering plastics.

This uniquely tough and light photopolymer material is actually a composite 'Digital Material' – created by jetting two different Objet materials simultaneously – both a high temperature material and high toughness material. This is a capability unique to inkjet-based 3D printing, and the Objet Connex Multi-Material 3D printer in particular. This cannot be replicated by any other 3D printing technology currently available. Using this technique, manufacturers can use the high accuracy and resolution of

inkjet for fit and form testing, and also the engineering plastic quality for functional testing. The Objet ABS-like Digital Material features:

**Dimensional stability** – The ABS-like Digital Material has great dimension stability, due largely to its combination of hardness and heat deflection properties. These properties allow models to remain stable over time, even in harsh environments. Model shelf lives can be extended and shipments in harsh environments are rendered possible thanks to this.

**Snap-fit ability** – Thanks to its high impact resistance, Objet's ABS-like Digital Material allows users to simulate snap fit assemblies, including models with hinges designed to allow for repeated bending and flexing. Such usages are extremely challenging in the 3D printing industry; yet the ABS-like Digital Material is able to simulate these in similar ways to real ABS.

**Thermal resistance** – Thermal resistance of up to 95°C can be attained with the ABS-like Digital Material. This allows designers and engineers to perform form, fit and functional tests in harsh environments. Another benefit is easier post-processing using dry painting in high temperatures (oven painting) and chrome plating. Water and gas tests under high temperature flows are also possible.

**Static/dynamic loads** – The high impact resistance of the ABS-like Digital Material allows for parts to be printed that endure high dynamic loads. This also enables further functional tests to be undertaken when applying prototypes to testing environments designed to simulate the desired end product.

One of the biggest challenges of 3D printing today is how to achieve all-around high scores for fit, form and functional testing.

Objet's inkjet-based 3D printing technology currently has the ability to produce the fine detail printing, ultra-



This ABS-like material clip was made from Objet RGD5160-DM, a blend of RGD515 and RGD535.

thin layers, smooth surfaces, high dimensional stability and clear transparency required for fit and form testing.

In addition, Objet's unique ability to simultaneously jet multiple materials provides customers with true-product realism – the ability to simulate the true look and feel of complex assembled products made of different material parts. This conveys a significant competitive lead over other 3D printing technologies in the fit, form and visualization departments.

With the new ABS-like material, Objet's inkjet based 3D printing technology now provides materials for functional testing comparable to those used in both Fused Deposition Modeling and Stereolithography 3D printing.

The 3D world in the coming years will move to increasingly resemble the 2D printing world. The next step in the evolution of 3D printing will see more and more rapid prototyping tasks for both visualization and functional verification testing. These tests will be performed at the design office and desktop levels.

With such technology at their fingertips, product designers and engineers can now make light work of prototyping cycles that used to take weeks or even months. At the end of the day, a better end-product is more quickly delivered to market.

*This article was contributed by Javelin Technologies of Oakville, ON. The SolidWorks VAR represents Objet across Canada. Recently moved into a new office location, Javelin has built a facility to showcase Objet technology. The new facility opened in early June of this year.*

[www.javelin-tech.com](http://www.javelin-tech.com)



Helmet is an example of Objet RGD525 high temperature Digital Material.



IT INFRASTRUCTURE

SOFTWARE & SERVICES



# CAD Industry Watch

## The "suite" life of Autodesk product groupings

By Bill Fane

As I watched the webcast that introduced Autodesk Suites, I figured "Right. Another Sales and Marketing ploy to get us to buy more software." A subsequent media session at Autodesk's Manufacturing group headquarters in Lake Oswego, OR, convinced me that a legitimate case can be made for them.

The underlying theories from Autodesk (www.autodesk.com) are that many companies use more than one type of their software, and/or that more companies should be using more than one type.

### The whole of a suite is usually greater than the sum of its parts

Autodesk offers eleven basic suites covering the full market range including general design, architectural, building, infrastructure, factory, plant, product design and entertainment creation. The latter category includes games, TV and film production. In addition, most suites are available in up to three levels (Standard, Premium, and Ultimate) depending on the programs that they contain.

At Lake Oswego we saw a number of live presentations, and I soon realized that the Autodesk suites aren't just a simple bundling of related, or even sort of related, products. Indeed, the whole of a suite is usually greater than the sum of its parts in that a suite collection usually includes additional functionality that would not be present if you purchased the components individually.

For example, the Premium and Ultimate Factory suites include AutoCAD and Inventor. Autodesk's claim is that factory layout designs typically start out as 2D CAD layouts and then move to 3D for detailed analysis such as collision detection with things like building structures and utility supply components.

Anyway, the AutoCAD portion of the Factory suite includes a library of standard factory components such as conveyors, material handling equipment and robots. You can do your initial "what if" scenarios simply by inserting these standard block components into an AutoCAD drawing and then moving and manipulating them as desired.

Now comes the magic part. Inventor can automatically populate the flat 2D layout with the corresponding 3D models of the factory components. Better yet, if you create 3D models of your custom machines then flat 2D plan blocks are automatically created and inserted back into the 2D AutoCAD drawing. Everything remains parametric and associative. If you move or revise a machine in either the 2D drawing or 3D model then everything updates, including the connecting conveyors. Change the width of a section of conveyor and all connected sections update accordingly.

There are several advantages to suites, all based on the number "1:"

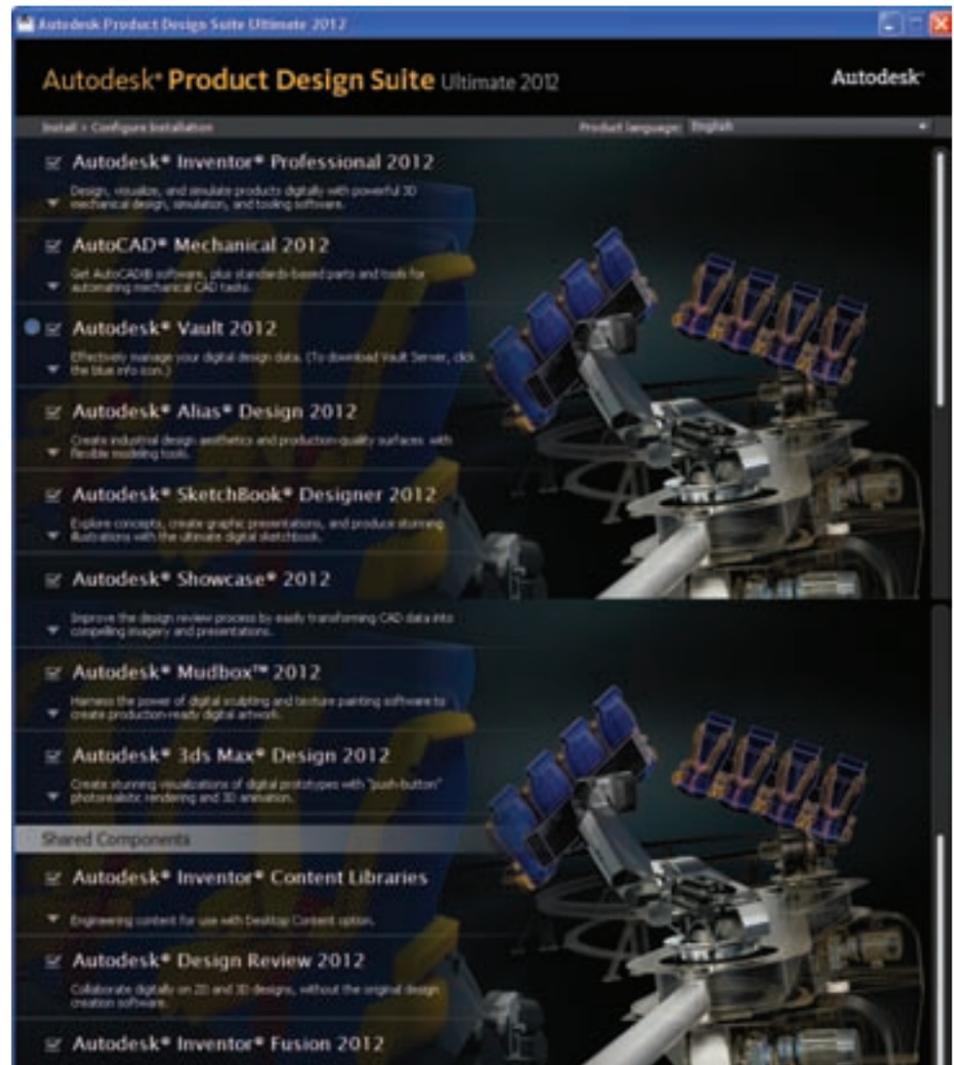
- You only need to deal with one vendor for all your software needs, and you only need to make one purchase at one discounted price. Autodesk indicate that the savings can be up

to 80% over buying the component programs individually.

- One installation procedure gets you everything in one hit. No big stack of installation DVDs, because everything comes on one single 32 gigabyte (!) USB stick and installs from one run of the usual setup.exe program. Better yet, 32-bit and 64-bit applications are on the same stick, and the install program knows which one to use.
- Everything runs under 1 serial no.
- After installation, activating one product activates them all. You can choose not to install all the components initially, but if you come back later and add other items then they are already pre-activated.
- Where practical, Autodesk have tried to give the different applications one consistent look and feel to each user interface.
- Autodesk doesn't have one standard file format for all their products yet, but have announced that they are heading in that direction. Meanwhile, most of the components in a suite can read from and write to the formats of the other components.

As good as they are, the Autodesk suites are not automatically a "good thing" for everyone. Let's face it, if you are a tool and die shop producing punch press die sets either for in-house use or for clients, you probably don't need to free-form sculpted surfaces nor do you need photo-realistic real-time animations.

It's going to be interesting to see how suites work out for Autodesk and its customers, particularly in comparison with PTC (Pro/E, Windchill). The latter company is introducing their new Creo product, which goes the other way. It is being sold on a "building block" basis, where you



One click on Install does it all... Autodesk's "suite" strategy contradicts PTC's one module-at-a-time purchasing philosophy.

only buy the modules you want.

Historically, both approaches have been wrong. If a vendor sells an all-in-one product then customers complain "Why do I have to pay for features I never use?" But if a vendor sells a component-based product then the com-

plaint is "Man, they nickel-and-dime you to death. Every time I turn around I have to buy another module!"

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

## Siemens PLM: not just for IT professionals

Like many engineers and designers, I have seen the acronym PLM floating around for some time now but wasn't fully aware of its meaning. Wikipedia comes up with a number of definitions, including "Product Lifecycle Management...the process of managing the entire lifecycle of a product from its conception, through design and manufacture, to service and disposal."

Siemens' Teamcenter product is the heart of its version of PLM (www.siemens.com/teamcenter). With it, users can cross-link a wide range of information from many different sources. Yes, this includes document revision level control but it also includes things like bills of material, costing, purchasing, manufacturing and production planning, inventory control, where-used information, quality appraisal reports, and so on. The main point is that everyone is working from the same data so the engineering bill of material is consistent with the data used for cost accounting, production scheduling, and so on.

At the recent Siemens PLM Connections user conference at the Rio All Suites Hotel in Las Vegas, the company talked about its mobile version, so people like engineers and designers, the shop floor supervisors and workers, field maintenance and repair people, and so on can directly access the information they need

from anywhere in the world at any time on an Apple iPad.

There was also single analyst/media session on what's going to be in the next release of Solid Edge (www.solidedge.com), which is their mid-range modeller running against Inventor (www.autodesk.com/inventor) and SolidWorks (www.solidworks.com). As usual in almost any new software release there are a great many detail improvements in such areas as text manipulations, feature control symbol placement, and so on. A detailed review will follow at a later date.

Highlights of the significant changes include the fact that live sections can be dimensioned, dimensions can be cut and pasted from live sections, features can be revolved or extruded by mouse movement without a specific command, cross-sections in 2D drawing

views correctly do not section ribs that land on the cutting plane, and there is a new "centred" assembly constraint.

There was also a presentation on "what's new" in NX (www.siemens.com/nx), which is their high-end competition to CATIA from Dassault Systèmes (www.3ds.com/catia). Of particular interest here was the fact that collaborative design is now possible on a complex single part. It can be broken down into isolated, self-contained modules. Designers can work in parallel, each working on their portion of the part.



The author (right) hard at work, listening & noting during the recent Siemens PLM Connections at the Rio All Suites Hotel in Las Vegas.

## Products: Switches

### 2-pole appliance switch



Schurter has announced a 2-pole appliance switch with built-in undervoltage trip release. The UP1 series prevents uncontrolled restarts by monitoring and tripping under conditions of extreme voltage drop, or when the supply voltage is interrupted. A circuit breaker with pushbutton or rocker actuation, IP rated protection covers are offered to prevent ingress of water spray and dust. The UP1 is approved according to IEC 60947-4-1, UL 508, CSA 22.2 No.14-95.

[www.schurterinc.com/new\\_cbes](http://www.schurterinc.com/new_cbes)

### Miniature panel mount



NKK Switches has announced the SK series of miniature panel mount keylock switches. Offered in either a two- or three-tumbler configuration, engineers can also specify two or three position models, with keys removable in one, two or all three positions. Additional customization options are also available upon request. The devices feature a 12 mm diameter bushing for standard panel openings and a behind panel dimension of 27.0 mm. The mechanical life of the series is rated at 30,000 operations minimum, while electrical life at 10,000 operations minimum.

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

### Illuminated, sealed rockers



The RBW2 series IP66 rated, internally sealed 22 x 30 mm rocker switch from E-Switch allows for full illumination options using patented sealing technology. The sealed and illuminated rocker switch is approved under the new UL 61058-1 rating and UL approved up to 1/3 hp. Both electrical and mechanical life are rated to 50,000 cycles, contact resistance

is <30mohms max, ingress protection is IP66 and function options are: DPST, Off-On; DPDT On-On.  
[www.e-switch.com](http://www.e-switch.com)

### Direct current switches



The AutomationDirect acuAMP line of current sensors now includes ac ground fault sensors and dc current transducers

and switches. DCS100 series dc current switches feature jumper-selectable current input ranges up to 100 A and are available in normally-open solid-state and SPDT relay output models. The switches are equipped with removable terminal blocks which accept up to 12 AWG solid or stranded wire.

[www.automationdirect.com/current-sensors](http://www.automationdirect.com/current-sensors)

### 7-way scroll navigation

C&K Components has introduced a series of consumer and navigation scroll switches capable of three or seven functions.

Available in two versions, the TSW A series is a 3-way scroll wheel switch that provides one central select and a 2-way 360° rotation. The TSW B series is a 7-way switch featuring one central select and a

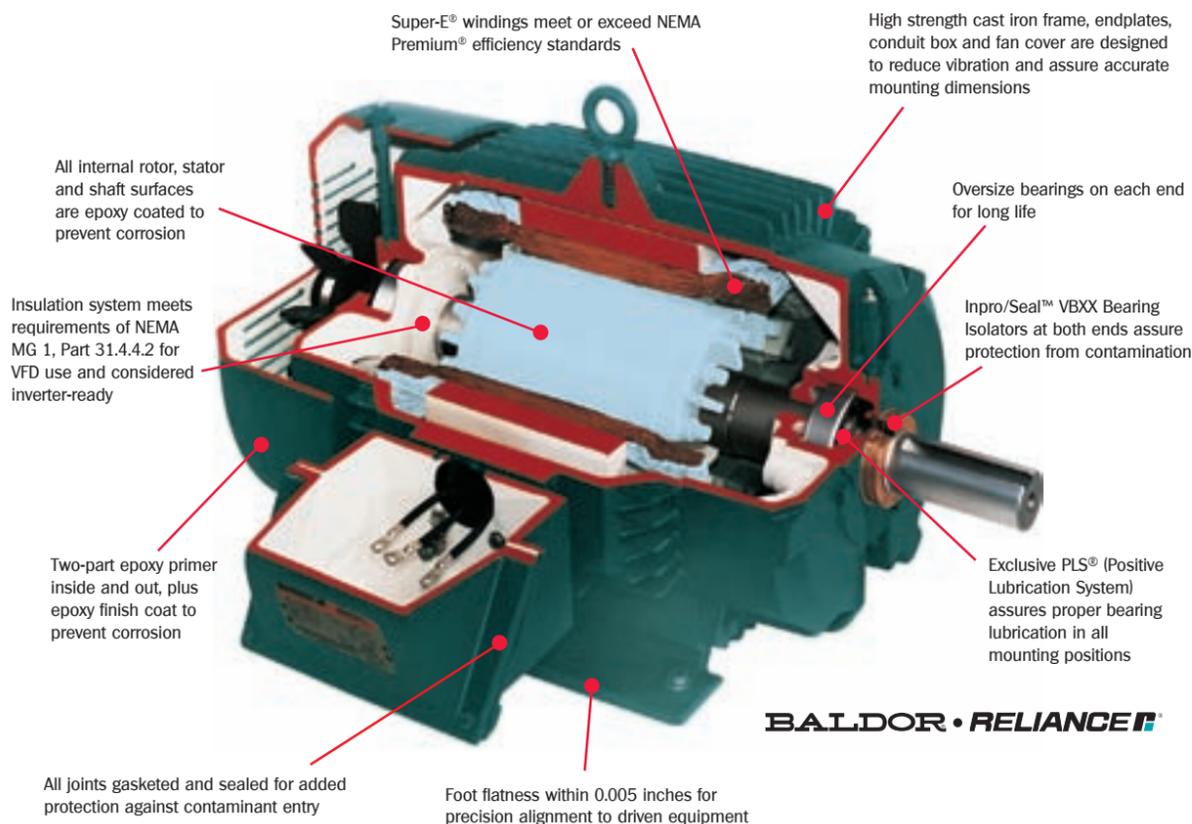
2-way 360° rotation with additional four tactile directions on the outside ring. The



scroll wheel switches feature push and rotary functions with 24 detents at 12 pulses in a compact and slim design, freeing up space on the PC board within miniature consumer electronics devices, the company says.

[www.ck-components.com](http://www.ck-components.com)

# A Better IEEE 841



**BALDOR • RELIANCE**

## Inside and Out

Baldor • Reliance® 841XL severe duty motors are engineered and built to meet or exceed the most rigid severe duty service standards. You'll find Baldor • Reliance severe duty motors hard at work around the world in some of the most brutal conditions you can imagine, like petrochemical, pulp & paper and mining operations.

So, no matter how you look at it, you can always count on Baldor • Reliance severe duty motors to perform under the most extreme conditions...inside and out.

**Exceeds IEEE Std. 841-2009 requirements.**

[baldor.com](http://baldor.com) 479-646-4711

- Energy Efficient
- Unmatched Quality
- Superior Reliability
- Quickest Delivery Available

**BALDOR**  
A MEMBER OF THE ABB GROUP

**Feature: Switches**

# Critical specs and standards for circuit breakers

Electrical engineers do not want to see designs go up in smoke.

Naturally, engineers protect their equipment with what they believe to be appropriate circuit protection. However, there is widespread misunderstanding of industry standards for circuit protection and the meaning of terms such as “circuit breakers,” “supplementary protectors,” “circuit breakers for equipment” and “branch circuit protection.” In some cases, this confusion results in the specification of the wrong type of circuit protection and increases the risk of overheating, premature failure and catastrophic faults.

To understand the source of the confusion and to learn how to specify circuit protection correctly, we need to review standards and how they are applied.

### Branch Circuit Protection

The National Electrical Code (NEC) is primarily concerned with the safety of hard-wired branch circuits within a building. Article 100 defines a branch circuit as “the circuit conductors between the final overcurrent device protecting the circuit and the outlet.”

For overcurrent protection devices in a branch circuit, the requirements are spelled out in a standard called UL 489, “Standard for Molded-Case Circuit Breakers and Circuit Breaker Enclosures,” published by Underwriters Laboratories, Inc.

### UL 489

UL 489 encompasses circuit breakers “intended for installation in a circuit breaker enclosure or as parts of other devices, such as service entrance equipment and panelboards.” According to UL terminology, devices meeting this standard are considered listed products.

For approval, UL 489 requires the device pass a series of calibration, overload, endurance and short-circuit tests. (See Figure 1). The minimum short-circuit test must be performed at 5000 A. Overload tests are performed at 6x the current rating of the device or 150 A minimum. Devices rated up to 600 V and 6000 A are covered in this standard.

Additionally, most UL 489 devices are used in electrical distribution panels; therefore, the minimum current ratings available are seldom less than 15 A. During UL 489 testing, the device must

survive short-circuit testing and continue to provide future overload protection.

### Supplementary Protection

Although the NEC recognizes “supplementary overcurrent protection used for lighting fixtures, appliances and other equipment or for internal circuits and components of equipment,” it does not specifically define supplementary overcurrent protection. Nonetheless, the NEC implies that it is used in conjunction (in series) with a branch circuit overcurrent device upstream of the equipment. The requirements of supplementary protectors are described in UL 1077, “Standard for Supplementary Protectors for Use in Electrical Equipment.”

### UL 1077

UL 1077 defines supplementary protectors as devices intended for use as overcurrent, over-voltage or under-voltage protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided or is not required. In UL terms, UL 1077 compliant devices are labeled as recognized components.

Similar to UL 489, UL 1077 supplementary protectors must pass a series of calibration, overload, endurance and short-circuit tests. (Figure 1). Because most UL 1077 circuit breakers are rated 20A or less and are used in electrical appliances or other types of utilization equipment, the overload and short-circuit tests are generally performed at lower levels than those required by UL 489. To pass the short-circuit test under UL 1077, the device must safely interrupt short-circuits at least one time without causing a fire hazard. Unlike UL 489, it does not necessarily need to survive the test. In 1999, UL introduced a new category to UL 1077 that includes survivability and recalibration approvals.

### Not all UL 1077 Supplementary Protectors Are Alike

UL 1077 allows manufacturers to obtain approval for different circuit conditions. For example, an overcurrent supplementary protector can be short-circuit tested with or without a backup fuse or circuit breaker. A supplementary protector can be overload tested at 1.5x its rating for general use or 6x its rating for across-the-line motor start-



	UL 1077	UL 489
<b>MINIMUM TERMINAL SPACING</b>	For commercial appliances 2.4mm up to 300 V 6mm at terminals	12.7mm up to 130 V 19.1mm up to 300 V 25mm up to 600 V through air
<b>CALIBRATION TEST</b>	⊕ 300% and ⊕ trip current +5%	varies with current rating 12 seconds to 2 minutes ⊕ 200% <1 hour @135% (<50A) <2 hours @ 135% (>50A)
<b>MAXIMUM TEMPERATURE RISE AT TERMINAL</b>	50°C / 122°F	50°C / 122°F
<b>OVERLOAD TEST</b>	50 cycles ⊕ 1.5 x I <sub>n</sub> (general use) ⊕ 6 x I <sub>n</sub> (across-the-line motor starting)	50 cycles @ 6 x I <sub>n</sub> or 150 A minimum
<b>ENDURANCE TEST</b>	6,000 cycles @ I <sub>n</sub> (S-type only)	10,000 cycles (6,000 @ I <sub>n</sub> + 4,000 mechanical (up to 100A)
<b>SHORT-CIRCUIT TEST</b>	1-3 times (C-0-0) at 5,000A or less, depends on current and voltage (may fail safe or recalibrate after short-circuit tests for “fit for further use”)	Depends on ratings. 3-7 times @ 5000A minimum + must operate @ 200% final test

Figure 1: UL Recognized Component Directory for Supplementary Protectors. Left: The E-T-A compact rail-mounted thermal magnetic circuit breaker model 4420-T for factory automation and process control is both UL 489 and UL 1077 certified.

ing. It may trip at less than 125% of its rating or greater than 135%, etc.

### “Fit For Further Use”

When UL 1077 was revised to meet changing market requirements and safety considerations, UL added a category of overcurrent supplementary protectors known as “recalibrated after short-circuit testing” which are also described as “fit for further use.”

Overcurrent supplementary protectors rated “fit for further use” survive a three cycle short-circuit test and continue to provide overload and short-circuit protection in future operations. Not all manufacturers of UL 1077 approved circuit breakers strive to meet this more stringent classification. Before selecting a manufacturer, it is essential for the design engineer to verify which tests the circuit breakers are subjected to. If the data sheet provided by the manufacturer does not provide this information, the UL Recognized Component Directory for Supplementary

Protectors (Table 1) can be used as a reference in determining the suitability of the protectors as “fit for further use” and/or for motor starting applications, etc.

### UL 489A

In the same way the “fit for further use” classification was created to address real world applications, UL 489A is an outline of investigation established in response to the needs of communications equipment. In most telecommunications applications, a circuit breaker with 2000 A interrupting capacity is more than adequate, yet UL 489 requires a minimum interrupting capacity of 5000 A. UL 489A addresses this concern by allowing such ratings to be determined by the user and device manufacturer.

*This article was excerpted from a white paper by E-T-A Circuit Breakers, a supplier of UL 1077 supplementary protector circuit breakers and other circuit protection products.*

[www.e-t-a.com](http://www.e-t-a.com)



Scan this QR Code with your smartphone to visit our website.

More information, literature and more at:

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

New W22 Line of Motors  
CFW 11 Variable Frequency Drives

info@pamensky.com  
1 877 PAMENSKY (726-3675)

**Feature: Motion Control**

# Aerodynamic championship racing actuation

Like all set up components in auto racing, there is no 'magic' winning adjustment; each of the car's pieces needs to work in concert as a single unit to maximize a particular driver's feel. That's the case with NASCAR Sprint Cup Series COT's (Cars of Tomorrow) modern spring and bump stops. The coil binding and micro-cellular polyurethane bumpers are an integral part of the suspension workings that are inserted into the front shock shafts to control the travel.

**Hydraulic systems lacked the necessary precision required for repeatable increments**

Often overlooked, the spring and bump rubber rates are an increasingly vital part of the suspension performance. Essentially, the spring and bump stop rubber size/stiffness ratings and shock travel combine to allow the front suspension to move during corner entry to nail the splitter to the track in the corners. To have good data acquisition, readings on the assorted spring and bump stops in use acts as an

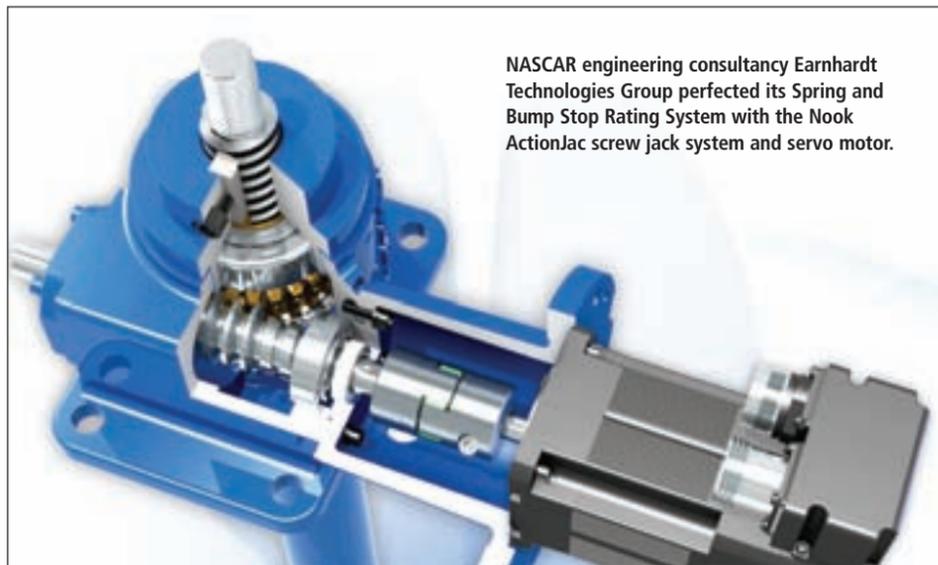
invaluable commodity that can put the shock back into a proper and optimal operating range.

In an effort to provide more accurate spring and bump stop ratings for today's top racing teams, Earnhardt Technologies Group (ETG) of Mooresville, NC, has recently developed its advanced Spring Bump Stop Rater (SBSR).

Essentially, ETG's SBSR system emulates some of the forces and effects of driving to set up cars to handle each race track aerodynamically; thus, maximizing suspension performance. The forces include banking loads, lateral load transfer, acceleration, braking and ride height sensitive down-force.

The complexities and advanced capabilities of the SBSR system depend on the accuracy and precision of its linear motion system. ETG found the ActionJac Screw Jack system, manufactured by Nook Industries of Cleveland, OH, provided the precision, accuracy and power lifting it required to bring the SBSR into fruition.

The Nook Precision Actuator Group worked closely with the ETG team to assess needs, make adjustments, and pair the correct solution with the SBSR system in making this project a success. Coupled with a servo-driven motor, the 5-ton (5-MSJ-UK) worm gear driven ActionJac screw jack system provides piv-



NASCAR engineering consultancy Earnhardt Technologies Group perfected its Spring and Bump Stop Rating System with the Nook ActionJac screw jack system and servo motor.

otal 'up/down' motion in small, precise, and repeatable travel increments to test the vertical forces acting on the spring and bump stops on the racetrack—ultimately providing a dynamic rating to control the displacement algorithm.

The SBSR implements a top load cell which measures the load and displacement as they compress the bump stop (or coil spring for lower series racing). The ActionJac and servo motor controls the 'up/down' motion within a variety of controlled travel scenarios and test configurations. The system is also self locking and

holds to a specific set point.

Nook's ActionJac (5-MSJ-UK) features a lifting shaft comprised of alloy steel with a minimum tensile strength of 95,000 psi. Manufactured with a lead accuracy of approximately 0.004 in. per foot, the 5-Ton ActionJac (5-MSJ-UK) provides a 24:1 gear ratio and a reliable load handling capacity of 500 lb/in. of travel on the repeatable spring bump stop test.

*This article was contributed by Nook Industries.*  
[www.nookindustries.com](http://www.nookindustries.com)

**maximize SPIRAL RETAINING RINGS**  
 NO EARS TO INTERFERE®

**MAXIMIZE**

- ✓ Ease of Assembly
- ✓ Ease of Removal
- ✓ Application Aesthetics
- ✓ Cost Savings

**STAINLESS STEEL FROM STOCK**

**FREE SAMPLES**  
 To test in your application

**ECONOMICAL & FAST SPECIALS**  
 SPECIALS ARE STANDARD

- Uniform cross-section does not interfere with the assembly
- Compatible with snap ring grooves
- Exotic alloys available: Inconel, Elgiloy, Titanium and more
- 5,000 stock sizes in carbon and stainless steel (302 & 316); available from 1/4" to 16"
- No-Tooling-Costs™ on specials; available from .200" to 90"

**CAD MODELS**  
 Free native CAD models of all stock parts

Represented in Canada by:  
**RotoPRECISION Inc.**  
[www.rotoprecision.ca](http://www.rotoprecision.ca) • (888) 712-3400

**Smalley®**  
 Steel Ring Company  
[www.smalley.com](http://www.smalley.com) • 847.719.5900  
 info@smalley.com • Fax: 847.719.5999

**SLICK?**  
 [ maybe ]

**SLICK?**  
 DEFINITELY.

**NEW SLIC Pin™**  
 U.S. Patent No. 6,872,039  
 Foreign Patents Pending

With a Self-Locking Implanted Cotter, it's a pin and cotter all in one! **COST SAVING. QUICK LOCKING. SECURE.** If you're using labor intensive pins, cotters or clips, try something SLIC.

**BOW-TIE Locking Cotters™**  
 WORKS LIKE A HAIR PIN COTTER BUT LOCKS ITSELF ON.  
 U.S. Patent No. 6,135,693 and D431,181

**RUE RING™ Locking Cotters**  
 SURROUNDS THE SHAFT AND LOCKS ITSELF ON.  
 Our Original Design!

**Nylon Lanyards™**  
 NYLON TETHER IS 1/3 THE COST OF STEEL LANYARDS.  
 U-Lock Style U.S. Patent No. 5,784,760

**Positive Lock Pins**  
 PUSH BUTTON, DUAL BALL SECURITY.  
 Now available with optional T-handle.

**Steel Lanyards**  
 AUTOMATED ASSEMBLY MEANS WE CAN OFFER PRICING COMPETITIVE WITH IMPORTS!  
 Numerous styles and configurations available.

**Ball Detent Pins**  
 WE'RE THE EXPERTS IN BALL DETENTING TECHNOLOGY!

**SPECIALS - Our Specialty!**

**PIVOT POINT INCORPORATED**  
 NON-THREADED FASTENER SOLUTIONS  
 920-349-3251  
 800-222-2231  
[www.pivotpins.com](http://www.pivotpins.com)  
 HUSTISFORD, WI, USA

## Feature: Motion Control

# Fail-safe mini linear displacement measuring device

By André Brauers

The biggest challenge posed by distance and angular measurement is the transmission of the current position to the measuring system.

### Sensor range of 50 to 200 mm uses interference-free resonant circuit measuring principle

With the use of magnetic position generators, a mechanical connection to the sensor such as a potentiometer is needless. Corresponding systems deliver exact measurements and do not wear because of their closed housings. Despite their high price, distance and angular sensors with magnetic position generators are used in numerous fields of applications.

However, magnetic measuring systems are unsuitable where metallic splinters or electromagnetic fields are present. Furthermore, magnetostrictive linear displacement sensors have a large blind zone of up to 80 mm at each side – with a measurement range of 50 mm at each side the user would have to trade off an installation length of up to 210 mm.

Turck has developed new distance and angular measurement sensors to put all these disadvantages in the past. Unlike magnetostrictive or conventional inductive position sensors that use magnets, the new sensor detects an object's position via a resonant positioning device.

The functional principle involves a transmitter coil integrated into the IP67-rated housing that generates a high-frequency alternating magnetic field (190 kHz) which activates the resonator integrated in the positioning device. Each time the transmitting coil stops transmitting, the resonator induces voltage into two receiving coils integrated in the sensor. The voltage intensity depends on where the positioning device overlaps the receiving coils. An integrated 16-bit processor provides a corresponding proportional output signal in different formats: 0 to 10 V, 4 to 20 mA, IO-Link or SSI.

Unlike magnetostrictive sensors, this resonant circuit principle is completely immune to external electromagnetic fields, like those caused by large motors or welding cells, and since there are no magnets involved, splinters do not accumulate on the positioning device. Unlike potentiometric detection solutions, not even dirt nor dampness affect the sensor – thanks to a fully sealed IP67-rated housing.

Turck uses the resonant circuit measuring principle for three sensor families. The miniature linear displacement sensor was developed especially for a very short measuring range between 50 and 200 mm. The compact miniature sensor completes the portfolio consisting of the inductive RI-series of angle sensors and the inductive displacement sensors of



The inductive linear displacement sensors of the new Turck LI-Q17 series fit into small corners and are insensitive to electromagnetic interferences because of the oscillator within the position generator.

the LI-Q25-series that cover a measuring range of 100 to 1000 mm.

The new (2011) IP67-rated LI-Q17, with potential for wind turbine and solar panel positioning applications, consists of four different models with measuring ranges 50, 100, 150 and 200 mm. With the 12-Bit-DA-converter, the sensors reach 0.012 to 0.05 mm. The first

models have an analog output (0 to 10 V, 4 to 20 mA, 0.5 to 4.5 V). An SSI model is in development.

Despite their compact design, Turck's new sensor family has extremely short blind zones of 10 mm at the connecting end and 22 mm at the head end. For the connection, a pigtail with a 30 cm cable and an M12 connector or an open con-

nection line of 2 m is needed.

The LI-Q17 is the next step in the resonator-technology that Turck presented for the first time with the linear displacement sensor series, LI-Q25. The LI-Q25 sensors have a resolution of 1 µm (repeat accuracy 10 µm) and are especially suitable for applications like mills, injection molding plants or metal processing machines that have problems with the technical restrictions of the established measuring systems.

Along with the linear displacement sensors, the resonator portfolio contains a series of angular sensors. The RI-sensors have a measurement range of 360° at an accuracy of 0.15% of the full scale. The separated assembly of the sensor unit and the positioning device, as well as a compensation of ±4 mm, provides an easy installation and a safe operation of the sensors. The RI-sensors can be easily attached with two shoulder bolts to solid or hollow shafts. With the help of an integrated adapter with a diameter of 6 mm and 8 mm, a standardized hollow shaft sensor can be altered into a solid shaft sensor.

*André Brauers is the product manager linear displacement sensors and encoders at Turck in Germany. This article is excerpted from more@TURCK magazine, issue 1\_2011 (www.turckbanner.co.uk/products\_986.htm).*

[www.chartwell.ca](http://www.chartwell.ca)

## The vector drive primer: choosing ac drive technology wisely

By Darrow Hanesian

Given their price, compact size, and simplicity, ac drives are one of today's most important devices used in machinery and facilitate automation in the marketplace. Also referred to as variable frequency drives or VFDs, when controlling the speed of an ac motor, there are three main platforms to choose from, including: Volts/Hertz (V/Hz), open loop vector and closed loop vector.

While advanced technology continues to improve each platform, it can be confusing when trying to decide which level of ac drive technology is appropriate for a particular application.

V/Hz technology is the most eco-

nomical and easiest to apply. The drive controls applied voltage and frequency to an ac induction motor, with the rotor of an induction motor magnetically coupled to its stator through an induced magnetic field.

The design architecture of open loop vector (OLV) drives is similar to V/Hz drives. From a hardware standpoint, however, the main difference is the addition of current sensors, with the biggest overall difference in firmware.

OLV drives use sophisticated motor control algorithms that independently control magnetizing current and torque producing current. The benefits of OLV drives are higher starting torque, more accelerating torque, better speed regulation, improved torque production at

low operating speeds, as well as control in both speed and torque modes.

In a closed loop vector (CLV) drive, there is typically a more sophisticated processor used for motor control as well as a feedback device located at the motor. The feedback device is usually an encoder that monitors speed and position.

By reporting this information back to the drive, it is able to make adjustments to ensure accurate control of speed, torque and position. So as a result, the main benefits are better speed regulation, full torque production at zero speed, basic positioning and electronic gearing.

In many applications, low price and simple speed control are required. With these requirements, the V/Hz drive is the best bet – it is the simplest to install and has the lowest price of the three technologies. In fact, V/Hz drives are frequently replacing older forms of motor control.

OLV drives today have achieved a level of performance and simplicity that frequently allow users to replace older dc drives without affecting performance.

*Darrow Hanesian is Global Product Manager, Inverters for Lenze.*

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

Comparison of Technology			
Feature	V/Hz	O.L. Vector	C.L. Vector
Typical Speed Range	20:01	60:1	1,000:1
Typical Speed Regulation	1% to 3%	≤1%	0.01%
Typical Holding Torque	N/A	N/A	200%
Typical Starting Torque	150%	200%	200%
Multiple Motor Control	Yes	No	No
Feedback Required	No	No	Yes

# Testing tiny semiconductor wafer demands miniscule moves

Semiconductor labs are billion-dollar operations. Accuracy in the automated testing of the semiconductor wafers they produce is a critical part of their fabrication process and a major cost factor.

On fabrication of lower cost products, testing to see if the die is functional and meets the specification requirements can account for over 25% of the cost of fabrication. It's called wafer probing and

occurs before wires are attached in the burn-in process during preparation for the final chip encapsulation.

The probe is checking circuits or capacitance of the dies, i.e. chips, in the wafer. Then the wafer is scribed and sliced into discrete semi-conductors.

The miniaturization of microprocessors has dictated miniaturization of the fabrication and testing systems.

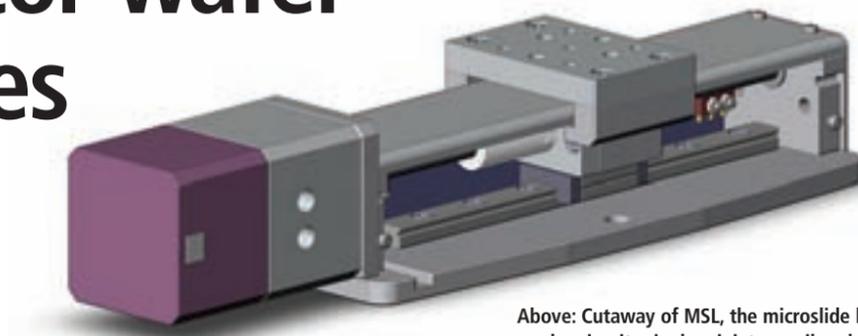
Mark Filho of Newmark Systems of Rancho Santa Margarita, CA, describes how they miniaturized probe positioning, "What we did was increase the load capacity of a precision positioner. The

linear stage we created is a very compact stage for the load carrying capability it has."

This positioner is the NLS4 from NB Corp. and runs from 2 to 24 in. using a 9 mm rail system. It will carry 25 lb. Its design was optimized for maximum stability and performance with the use of FEA analysis and incorporates NB's miniature linear guides – two guides and four blocks.

All NLS4 series stages are machined from 6061 aluminum alloy to provide a light yet stiff and stable linear stage. The drive system utilizes a stainless steel ACME leadscrew with internally lubricated plastic drive nut.

The drive nut offers zero backlash operation that automatically adjusts for wear to insure zero backlash for the life of the stage. For more reliability and durability, the ways and leadscrews are protected with a strong, machined cover and the encoder is mounted internally directly to the leadscrew rather than



Above: Cutaway of MSL, the microslide linear stage, showing its single miniature rail and block which travels from 25 to 200 mm and, since the carriage is supported over the entire travel of the stage, has good cantilevered load capacity.

being exposed to shock and contamination when mounted in the rear of the motor.

For robotic and automation applications that have become ever smaller, Newmark ([www.newmarksystems.com](http://www.newmarksystems.com)) created a linear stage with a single guide and block. The carriage is supported over the entire range of travel using a single preloaded NB miniature linear guide bearing. This tiny positioner, the MSL, can lift 15 lb with speeds up to 3 to 4 ips. It offers travels from 25 to 200 mm, has two leadscrew pitches: 2 and 10 mm and comes standard with a high torque size 17 stepper motor.

In recent tests executed by Newmark, due to their friction-free travel, NB's miniature guides have proven to not wear even after one and a half years of constant travel.

Miniature positioners create vertical movement by pushing a wedge that creates lift. When the wedge is pushed

Left: This vertical positioner, Newmark's NVS-1, displays the two miniature guides, used with a wedge to elevate small payloads precisely.

against a second wedge, it will lift, but you have to guide that up and down. So the NB bearings are used vertically, horizontally and on an angle in Newmark's VS series of vertical lift stages.

Newmark just moved their 16 employees to a bigger, newer place with more power. Since they do everything in-house including all machining in order to control quality, their power needs keep growing. There is irony in their getting bigger as their products get smaller. And, Mark Filho is confident that innovations in miniaturization of automation will lead to ever more growth going forward.

This article was contributed by NB Corp. [www.nbcorporation.com](http://www.nbcorporation.com)

## High-Performance Energy and Data Transmission Systems

Conductix-Wampfler has one critical mission: To provide you with energy and data transmission systems that will keep your operations up and running 24/7/365. Our rugged, low maintenance products are time tested in the most demanding environments. Our systems are backed by a combined worldwide sales and service network unmatched in our industry.

We offer a complete line of mobile electrification products and have over 60 years of experience applying these products to real-world industrial applications. If you need reliable solutions, look no further than Conductix-Wampfler.

Conductix-Wampfler... let us help you  
Conduct Your Business

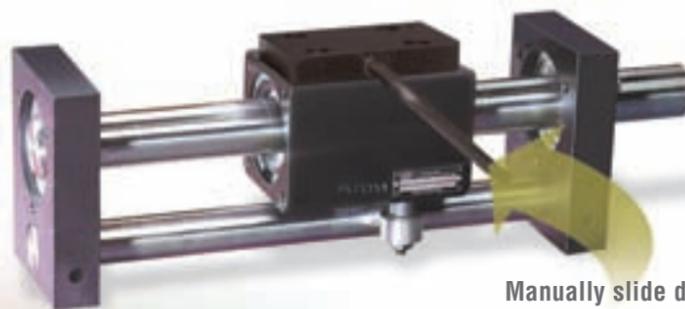
All Conductix-Wampfler products are now available from our St. Jerome QC office.

**CONDUCTIX**  
wampfler  
© DELACHAUX GROUP

Conductix-Wampfler | 175 Blvd JF Kennedy St. Jerome, QC J7Y 4B5  
Tel: (800) 667-2487 | (450) 565-9900 | Fax: (450) 432-6985 info.ca@conductix.com | www.conductix.us

## Rolling Ring linear drives

Zero backlash. Jam-proof design.



Manually slide drive using release lever

- ▶ For positioning & reciprocating motion applications
- ▶ Smooth movement; ultra-low maintenance

Uhing® Rolling Ring linear drives have zero play when the shaft is rotated – even during reversal. The threadless shaft won't clog or jam. If the system is somehow overloaded, the shaft simply slips instead of churning and grinding.

• **Example applications:** material handling machines, winding equipment, test and measurement devices, packaging & converting equipment.

• **Uhing Drives** are available separately or on shaft in custom assembly.

• **Wide range of sizes** for varying linear speeds & axial thrust requirements.

• **Simple set-up & operation**  
Some models feature mechanical control over speed and travel direction – without programming or electronics.



Request a Brochure or CD-ROM  
1 (800) 252-2645  
Email: [amacoil@amacoil.com](mailto:amacoil@amacoil.com)  
[www.amacoil.com](http://www.amacoil.com)



Distributed by Amacoil, Inc.  
PO Box 2228, Aston PA, 19014  
Phone: (610) 485-8300

## Feature: Adhesives & Fasteners

# Implant relies on unique fastener to gear up for baby boomers

As the first of the baby boomer generation turns 65 this year and promises to live longer and more actively than previous generations, implants and their components – including the fasteners that hold them together – must be built to last longer than ever before.

To handle the demands of tomorrow's dynamic baby boomer population, for whom jogging, tennis and golf have been generational pursuits, some medical device companies are going beyond what's currently required. For instance, some are specifying self locking fasteners in implants of the upper extremities that go way beyond 100,000 load cycles to withstand up to one-million load cycles without loosening or backing out.

"Patients are living longer and more vigorously than past generations, and that's only going to increase as baby boomers demand more from their muscular-skeletal systems well past traditional 'retirement age,'" said Tom Norman, vice president of Engineering at Miami, FL-based Skeletal Dynamics, a designer and marketer of innovative orthopedic devices.



When Skeletal Dynamics' Align Radial Head System is surgically installed, instrumentation allows alignment of the radial head as it would be in the patient's native anatomy. Once the surgeon orients the device in this natural position, the surgeon tightens the set screw, a Spiralock milled interrupted thread to lock the device in the correct position.

To keep up with active baby boomers, Skeletal Dynamics ([www.skeletaldynamics.com](http://www.skeletaldynamics.com)) recently developed its Align Radial Head System, an artificial elbow joint designed to restore the natural function of the native radial head.

Previously, prosthetic radial head designs typically followed one of two approaches with significant drawbacks. While a traditional fixed monoblock design offered stability, it could not be aligned to the patient's anatomy, which tended to wear away natural tissue such as cartilage. A bi-polar radial head was an attempt to align with the patient's native anatomy, as it was able to rotate in a polyethylene sheath, but would not remain in the correct position because it would not lock.

"We aimed to fill a gap in the market by providing the ability to orient the joint to its natural position during surgery, and then locking it in place for the rest of the patient's life," said Norman. "We considered traditional fastener thread forms, but lacked confidence that they would stay in place for the up to a million load cycles an active patient could subject them to in their lifetime. Instead, we selected an innovative self

locking fastener called Spiralock."

Because repetitive loads, shock and loosening must be decisively handled for implant use, traditional fasteners susceptible to self-loosening rotational movement, stripping, and shearing are not always appropriate. Testing, in fact, has found that the first two threads of traditional fasteners can carry as much as 80% of the load, permitting stripping or shearing, while subsequent male threads "float" within the female threads.

What makes Spiralock unique is its 30° "wedge" ramp cut at the root of the female thread (while traditional fasteners use a 60° thread). Under clamp load, the crests of the threads on any standard male bolt are drawn tightly against the wedge

ramp. This not only eliminates sideways motion that causes vibrational loosening but also distributes the threaded joint's load throughout all engaged threads,

## Elbow replacement withstands up to one-million loading cycles

a claim supported by a Massachusetts Institute of Technology research study. The load percentage on the first engaged thread is significantly lower than traditional thread forms, which further reduces

possible bolt failure and improves product performance.

When Skeletal Dynamics' system is surgically installed in a patient, proprietary instrumentation allows alignment of the radial head as it would be in the patient's native anatomy. Once the surgeon orients the device in this natural position, the surgeon tightens the set screw in a Spiralock milled interrupted thread made of cobalt chrome, against a long titanium stem designed for 3-point fixation, to lock the device in the correct position.

"While fasteners used in upper extremities are frequently tested to 100,000 cycles, third-party testing showed that the Spiralock self locking fastener used on the Align Radial Head successfully survived load and fatigue testing to one-million cycles without loosening or backing out," said Norman. "That gave us the design confidence we needed, and helped with our FDA approval."

*This article was contributed by Spiralock.*

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

## Fastening solutions for medical devices

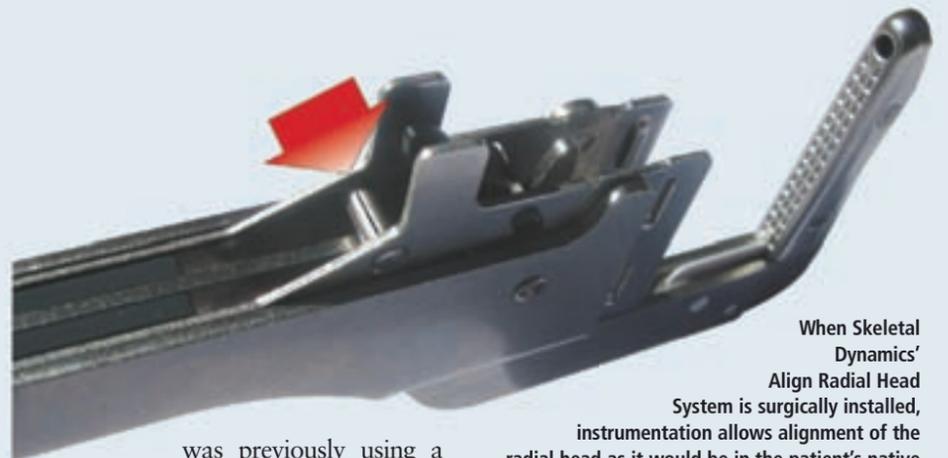
By Christie L. Jones

For medical device manufacturers and designers, there are a few major differences between the two types of spring pins – coiled and slotted – that must be understood.

While the slotted pin's flexibility can reduce manufacturing costs by absorbing wider hole tolerances, there are several disadvantages to slotted pins that limit their applicability in medical applications. The Slotted pin is significantly less flexible than the coiled pin and it only flexes 180° from the gap. This limited flexibility can result in plowing and debris generation during the installation process. Under load, the stress is concentrated 180° opposite the gap in slotted pins, which can cause premature failure of the assembly. Slotted pins are also very difficult to automatically feed and install as they have uneven ends and excessive slot widths that can cause interlocking of the pins. The most appropriate applications for slotted pins are non-critical industrial assemblies, manufactured out of mild to hardened steel that are manually assembled.

Coiled pins were originally invented to compensate for the deficiencies associated with solid pins, slotted pins and other conventional fasteners such as rivets, nuts and bolts. Easily recognized by its unique 2¼ coil cross-section, coiled pins are self-retaining pins that compress when installed into the host component. They are the only pins with uniform strength and flexibility after insertion. Truly an "engineered-fastener", the coiled pin is available in three "duties" to enable the designer to choose the optimum combination of strength, flexibility and diameter to suit different host materials and application requirements. Their shock absorbing design dampens forces and vibration to prevent hole damage and prolong assembly life. Coiled pins have square, burr-free ends and lower insertion forces than other pins, which make them ideal for automated assembly systems.

A medical device manufacturer



When Skeletal Dynamics' Align Radial Head System is surgically installed, instrumentation allows alignment of the radial head as it would be in the patient's native anatomy. Once the surgeon orients the device in this natural position, the surgeon tightens the set screw, a Spiralock milled interrupted thread to lock the device in the correct position.

was previously using a machined knurled solid pin in a surgical "grasper" used to allow the surgeon to operate through a laparoscopic port versus having to fully open up the patient to perform the procedure. The pin is used to drive the jaw movement at the distal end of the device. The high insertion force of the rigid solid pin deformed the pin, damaged the assembly, and generated metallic debris. As this device is used inside the human body the presence of metal shavings is unacceptable.

The knurled pin, made from 303 SST with no subsequent heat treatment, was installed into a hardened 416 SST shaft. The combination of the incompatible hardness and the variation in size between the pin and host material were determined to be the root causes of the debris generation, high insertion force, pin bending, and associated subassembly damage.

To address all of these issues, the manufacturer replaced the solid pin with a heat treated, 420 SST light duty coiled spring pin. A light duty coiled pin provided the appropriate balance of strength and flexibility to facilitate a low insertion force while providing adequate retention without damaging the hole and generating debris.

In addition to permanently resolving the quality issues caused by the solid knurled pin, the medical device manufacturer also benefited from a significant cost reduction associated with switching from a machined solid pin to a roll formed coiled pin.

Roll formed metal Spacers are a great

low cost alternative to cut-off tubing, tubes, grommets and turned or machined parts. They are commonly used as stand-offs, distance bushings, sleeves, axles and pins. Roll formed Spacers are produced without any burrs or debris generation and have clean-cut, square-ends; very important characteristics of components used in medical devices.

Manufacturers commonly use machined bushings and cut tubing to space two thin stainless plates from each other in medical devices. It is customary to pass a rivet through the ID of the machined bushing or tubing to hold the two plates in constant compression such that they stay parallel to each other throughout the life of the device. This simple spacing application is very common in the medical industry, and one that can be easily changed to utilize a roll formed Spacer without any negative effects of performance. The result of converting from cut-tubing to a roll formed spacer is usually a cost savings of approximately 50%, and roll formed spacers are typically 1/10th the cost of machined bushings.

*Christie L. Jones is Market Development Manager at Spirol International Corp. This article was excerpted from a longer white paper available at <http://ow.ly/54xPu>. [www.spirol.com](http://www.spirol.com)*

# PSAs – a viable alternative to mechanical fasteners

By Shirley Monte

Historically, mechanical fasteners and welding were very much a part of the auto assembly process, adding weight and diminishing fuel-efficiency.

Long before the “Cash for Clunkers” initiative to get gas guzzlers off the road, automakers were striving to produce lighter, more fuel efficient cars. Manufacturers did this with approximately 70 pounds of adhesive products that replaced more than 200 pounds of mechanical fasteners. The automobile industry, however, is not the only trade taking advantage of the value that pressure-sensitive adhesives (PSAs) offer.

**Pressure-sensitive adhesives distribute even loads, reduce joint stress, resist flex & vibration, and form a seal.**

Today, design engineers specify PSAs to assemble washers, dryers, cellular telephones, lawn tractors, satellites and power tools. There are many reasons PSAs are considered an alternative or better solution to traditional methods for joining parts, such as screws, nuts, bolts, rivets, welds and other mechanical fasteners. The most obvious benefits are reduced material, labor and processing costs, as well as ease of use and perhaps even easier disassembly of parts, if necessary.

PSAs distribute an even stress load over a given area, reducing stress on joints, resisting flex and vibration stresses, and forming both a seal and a bond to protect from corrosion. These materials can fill large gaps, join irregular-shaped surfaces, and quickly and easily bond dissimilar substrates and heat-sensitive materials. PSAs minimally increase

the weight of an assembly and create virtually no change in part dimensions or geometry. A manufacturer can easily integrate PSAs into an operation to achieve the durability and aesthetics that end products need. Moreover, adhesives remain viscous throughout their life. That viscosity imparts sound and vibration damping properties in addition to being a fastening or joining solution.

Mechanical devices, from power tools, to computer hard drives, to industrial furnaces, generate noise and vibration, which can manifest into equipment failure. Acrylic and silicone double-faced PSA products sandwiched between substrates silence noise and eliminate vibration, while withstanding extreme heat and chemical exposure. Additionally, gaskets and seals that have an adhesive layer are easier to affix and assemble, reducing production time.

PSAs are used by practically every industry, and whether it is an off-the-shelf or custom-made product, these polymeric technologies can meet aerospace, medical, and security requirements; form bonds in sub-zero cold temperatures and to low-surface energy (LSE) substrates; maintain adhesion at temperatures in excess of 500°(doesn't look like the correct symbol here)F; resist “out gassing;” respond to low frequency ac; resist dielectric breakdown; act as a thermal insulator, or facilitate heat transfer; and survive the strict requirements for loss of coolant accidents in nuclear reactors.

Consumer appliances demonstrate the versatility of pressure-sensitive films and adhesives, which are found on, under and within appliances that meet both aesthetic and functional requirements. Pressure-sensitive materials often constitute key elements of an appliance's inner workings and performance. For example, gaskets formed with PSAs, provide water-tight seals. High-performance PSAs, like silicone, have superior functionality in temperature extremes and bond to adhesion challenging surfaces such as powder-coated



Automotive applications such as brake assemblies have led vehicle manufacturers to cut as much as 130 lb from total weight by substituting mechanical fasteners with PSAs.



Automotive applications such as brake assemblies have led vehicle manufacturers to cut as much as 130 lb from total weight by substituting mechanical fasteners with PSAs.

paint and LSE plastics like thermoplastic polyolefin (TPO). These same adhesives are used to hold foam firmly in place in areas that must be opened and closed repeatedly, such as the appliance door or panel. The foam's rebound characteristic, along with the adhesive's strength to keep it in place, enhances the appliance's performance. At the same time, layers of viscoelastic polymers between layers of steel or plastic naturally impart vibration and noise damping, which meets the consumer demand for appliances that whisper rather than rumble.

When considering application-specific polymeric materials, OEMs, design engineers and converters can benefit greatly by consulting with an adhesive and pressure-sensitive film supplier at the earliest stages of product design. Doing so will make cost-effective solutions more likely. Early collaboration can assure an optimum match between the adhesive's damping characteristics and the specific frequency and temperature range that must be achieved to eliminate unwanted noise and vibration. Moreover, partnering with a supplier also minimizes potential time-to-market, durability and aesthetic issues.

Shirley Monte is the Business Development Manager for the Performance Products Business Team at FLEXcon.  
[www.flexcon.com](http://www.flexcon.com)

Joining metal... with a **NEW** twist.

PEM SpotFast® fasteners



- Simply pressed into properly sized mounting hole.
- Alternative to riveting and welding.
- No special installation equipment required.
- Flush mounted on both sides.
- Minimal space requirements.
- Can be concealed with paints and powder coatings.
- Can be used for pivot or hinging applications.

375  
©2011



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

Go to [www.pemnet.com](http://www.pemnet.com) and select the product literature tab to view PEM Bulletin SF

PennEngineering®



Consumer appliances demonstrate the versatility of pressure-sensitive films and adhesives, which are found on, under and within appliances that meet both aesthetic and functional requirements.

## Automotive Scene

# In-wheel electric motors attract sceptics

By Bill Vance

As automotive engineers search for ways to improve efficiency, one area of interest is the driveline.

With the inexorable move to hybrids and full electrics, in-wheel electric motors (also called hub motors) offer promise. Advantages of packaging the motors directly in the wheels include eliminating such costly components as driveshaft, axles, transmission and differential. This would contribute to fuel economy by reducing drag and weight, and would enhance passenger and luggage space. There would also be reduced complexity, improved regenerative braking and simplified switching from two- to four-wheel drive.

In-wheel motors are not a new idea. In 1899 a young engineer named Ferdinand Porsche (later of Volkswagen fame), worked for the Austrian Lohner Electric Company. Lohner wanted to enter the automobile business, so Porsche created the Lohner-Porsche with battery-powered electric motors in each front wheel hub. He later modified it into his pioneering "Mixte," a hybrid with an on-board internal combustion engine to generate electricity for the motors. This early vehicle won Porsche a gold medal at the 1900 Paris Exposition.

The in-wheel motor is not without challenges in size, packaging and un-sprung weight. The greater the power

The wheel and knuckle "massed up" to replicate a hub motor.

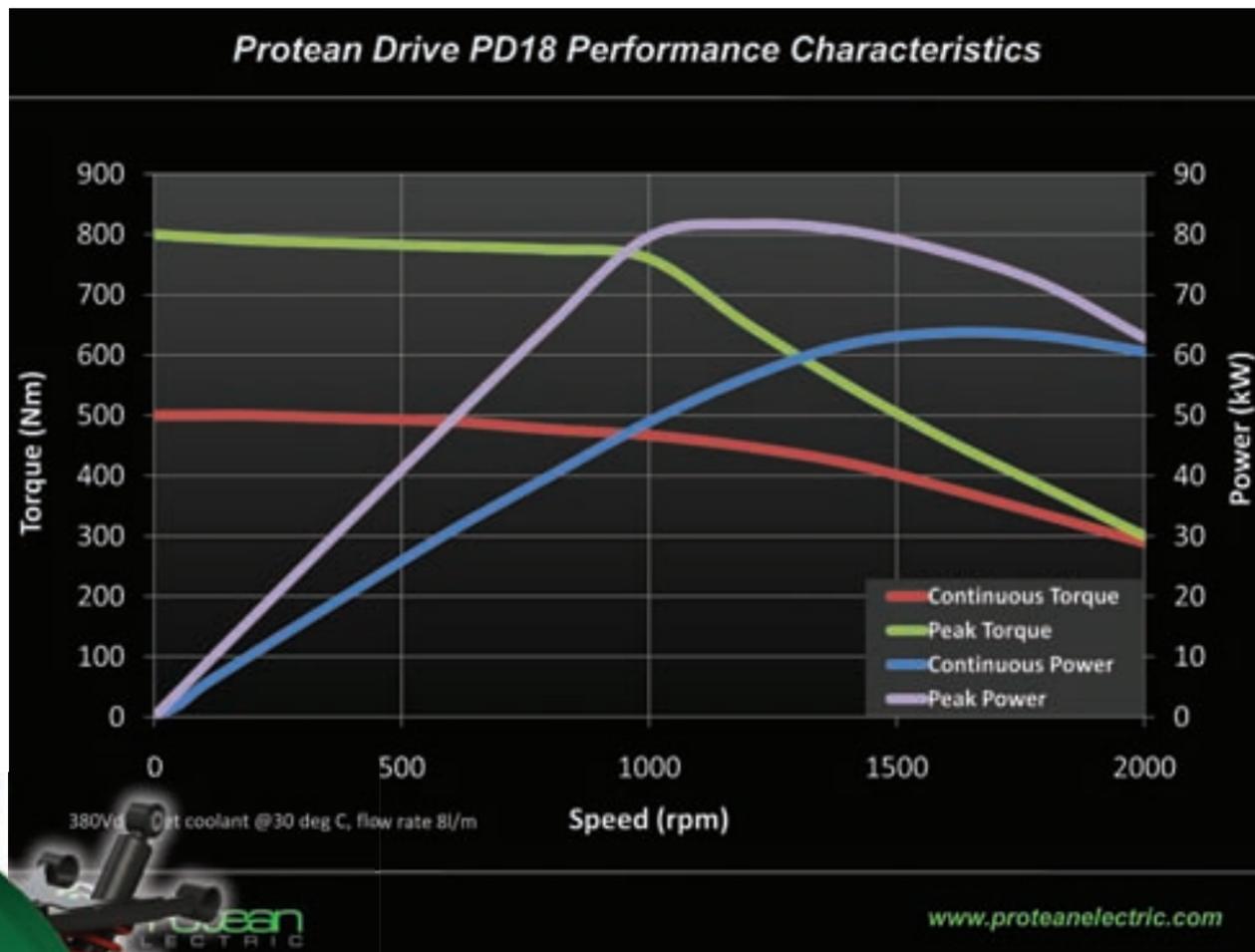
and torque desired, the heavier the motor will be. While it is challenging, it is now technically possible to design electric motors and their associated electronic control mechanisms that are thin and small enough to be packaged within the wheel. Several manufacturers, including Michelin and Protean Electric, have achieved it.

The other problem is the change in vehicle dynamics associated with the increased unsprung weight, or mass, of motors located within the wheels. Unsprung mass includes wheels, tires, brake rotors, callipers and part of the suspension, all of which are not supported by the

car springs. The traditional goal has been to decrease unsprung mass to achieve reduced wheel hop so that traction, vehicle ride and handling qualities are enhanced. A good example of lowering unsprung mass is moving the brakes from the wheels to a position inboard, making it part of the sprung mass.

The unsprung mass associated with in-wheel motors has made vehicle manufacturers wary of them. California-based Tesla Motors, manufacturer of the all-electric Tesla roadster, considered in-wheel motors but decided the disadvantages outweighed the advantages.

So there is lots of scepticism about in-wheel motors, the conventional wisdom being that they add excessive wheel mass. But Protean Electric Ltd. of Farnham,



Protean Electric is so confident of its technology's performance characteristics (above), it demonstrated a four-wheel drive Ford F-150 pickup with in-wheel motors at the 2011 North American International Auto Show in Detroit.

Surrey, UK, designer and developer of the "Protean Drive" in-wheel electric drive system, argues that the negative impression is unfounded. As Protean's principal applications engineer Tom Prucha succinctly puts it: "In reality, the unsprung-mass penalty related to wheel motors is a myth."

Protean Electric ([www.proteanelectric.com](http://www.proteanelectric.com)) plans to elaborate on this at the Society of Automotive Engineers 2011 World Congress with an oral presentation entitled: "Unsprung Mass with In-Wheel Motors; the Myths and Realities - Closing the Circle." It has already demonstrated, and allowed the media to drive, a four-wheel drive Ford F-150 pickup with in-wheel motors at the 2011 North American International Auto Show in Detroit.

To dispel doubts and validate its belief in in-wheel motors, Protean Electric used a 2007 Ford Focus as a test bed and engaged English engineering consultants Lotus Engineering ([www.lotuscars.com/engineering](http://www.lotuscars.com/engineering)) and Dunamus Ltd., to perform independent studies. The first step was mathematically modelling the impact of different suspension modifications such as spring rates and shock absorber compliance with each wheel carrying an extra 30 kg of rotating and non-rotating weight. This approximated the mass of Protean PD18 (18 in.) in-wheel motors, and their calculations suggested that Focus's optional ST suspension would be suitable.

They then modified the vehicle with the sportier Focus ST suspension with its stiffer springs and bushings, firmer shock absorber compliance and stiffer anti-roll bar. The last step was testing the modified vehicle's behavior on a two-post shaker rig and in actual driving. After subjective and instrumented testing the engineers concluded that while there were differences in vehicle dynamics using the ST suspension, they were not serious, and "should be overcome through the application of normal engineering processes within a product development cycle."

While Protean's study sounds convincing, there are still sceptics about in-wheel motors. The advantages, however, would seem to make the concept well worth pursuing.

Bill Vance is an automotive journalist & author ([bvance1@cogeco.ca](mailto:bvance1@cogeco.ca)).

## ASTOUNDING!



DELIVERS IN HARSH ENVIRONMENTS

### TOUGH ADHESIVE RESISTS IMPACT AND SHOCK

EP72M3

- Cures at room temperatures
- Excellent bond strength: T peel > 30 pli
- Superior durability
- Convenient one-to-one mix ratio by weight or volume
- Outstanding chemical resistance
- Superb electrical insulation properties
- 100% reactive
- Easy application: compound spreads evenly and smoothly
- Convenient packaging



Prompt Technical Assistance

**Master Bond Inc.**  
Adhesives, Sealants & Coatings

154 Hobart St., Hackensack, NJ 07601  
Tel: 201-343-8983 ■ Fax: 201-343-2132

[www.masterbond.com](http://www.masterbond.com) ■ [main@masterbond.com](mailto:main@masterbond.com)



### The Best Known Secret in the Industry

Leading the way in the robotics industry, while becoming a driving force in positioning systems, materials handling, medical applications and antenna positioning.

23976 Freeway Park Drive  
Farmington Hills, MI 48335  
Tel: (248) 553-3020  
Fax: (248) 553-3070  
[www.nabtescomotioncontrol.com](http://www.nabtescomotioncontrol.com)

**Nabtesco**  
Motion Control Inc.  
North America

## Medical Engineering

# Diagnosing healthcare circuitry

By Mark Sunderland

Unthinkable, isn't it, that our own health may be compromised by a chronically sick electronic printed circuit board (PCB) that fails to recognize a vital piece of information – but it's the modern iatrogenic phenomenon. (An iatrogenic condition is an injury or disease that results from a treatment or diagnostic failure and its significance to healthcare is now a research initiative at university level).

Modern hospitals depend heavily on

**It's unthinkable  
that our own  
health may be  
compromised by a  
chronically sick PCB**

technology in anesthesia, dialysis, imaging, monitoring systems and radiography and the devices employed all contain thousands of individual electronic components.

An attentive operator will recognize the signals of aberrant behavior in a machine and respond to potential problems that are often forewarned by an audible or visual signal. But if there's a failure in the absence of visible or tangible damage the cause may be beyond the scope of an owner/operator to diagnose and correct.

When the result of failure is damage or injury, there is usually a cost involved so the question is "where does the responsibility lie?" Is it user based, is there a corrupted semiconductor, a manufacturing defect or a cloned or counterfeit component – or is there an inherent weakness that can recur?

There is a company in Ottawa that can provide all these answers with a detailed analysis of the failure – not merely to satisfy curiosity but more importantly to increase safety and reduce liability.

MuAnalysis Inc. ([www.muanalysis.com](http://www.muanalysis.com)) is a professional laboratory and analytical service providing expert analysis and solutions to the electronics, photonics, life sciences, and manufacturing industries.

The broad expertise in failure analysis and reliability testing ranges from in-house semiconductor technology to include most electronic materials and emerging technologies such as gallium nitride (GaN) and silicon carbide (SiC). The specialized equipment of MuAnalysis and the range of scientific skills have attracted and captured a significant global market share. All the work is undertaken and handled in the strictest confidence within secure, monitored facilities – a written declaration of non-disclosure is part of the standard Terms and Conditions.

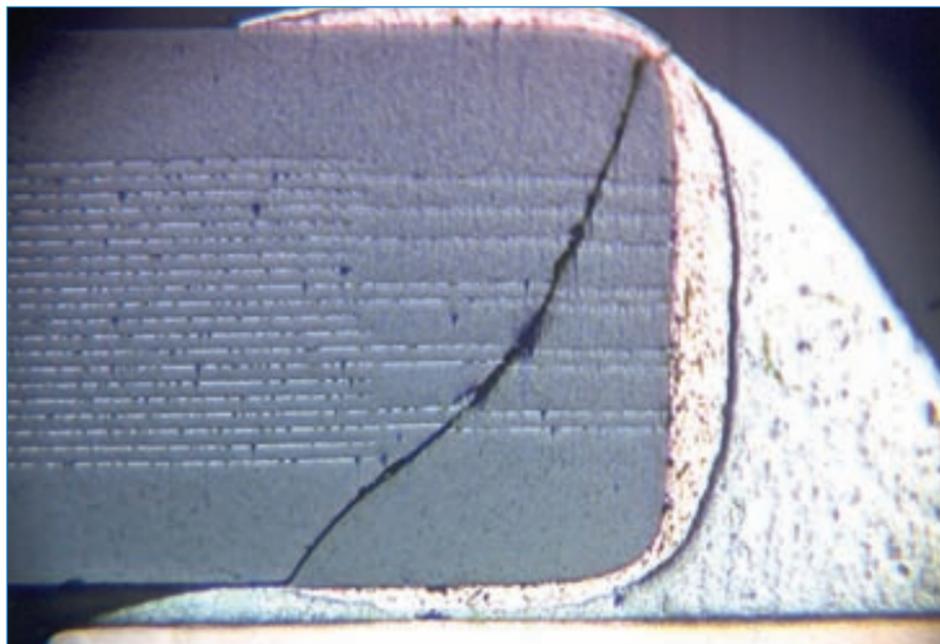
An easy analogy is to compare MuAnalysis to a health service provider for electronics and semiconductor chips, isolating and identifying microcontaminants and analyzing the symptoms and defects result-

ing from manufacturing or process issues.

Electronic components, like people, come in various shapes, sizes and ages and they need different specialists for their various conditions. They have health issues with hardware and software – we have issues with bodies and, in the parlance of modern psychology, "wetware" – the human operating system. And as with people, tests can be performed to verify that the patient is in good running order or to discover conditions that may ultimately cause failure.

Chips usually die because of latent defects, or because they have been mishandled, often by the end user. For the definitive answer, the cause of death can be found when MuAnalysis, the forensic lab of electronics, performs an autopsy to explain the root cause – in a detailed analysis of demise.

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



A crack in a ceramic capacitor will cause the component to short circuit.

## Technical Literature

**Human-machine interfaces.** Red Lion Controls, Inc. has announced the latest G3 Series Brochure that features its line of G3 and G3 Kadet HMIs. The 10-page color brochure details the company's offering of web-enabled HMI products, as well as tables and diagrams illustrating and comparing each product's advanced features, such as display size and resolution and communications capabilities.

[www.redlion.net](http://www.redlion.net)

**Universal process controllers.** Eight-page illustrated brochure from ABB describes the company's new line of single and dual-loop universal process controllers and indicators. Called ControlMaster, the brochure notes that each instrument provides a comprehensive display of process status, using crystal clear, full color, thin-film-transistor (TFT) liquid crystal technology.

[www.abb.com/instrumentation](http://www.abb.com/instrumentation)

**Slewing ring bearing catalog.** At 136 pages, the latest edition of the Kaydon Corporation Bearings Division slewing ring bearing catalog is the company's most comprehensive yet. The redesigned catalog contains tables with updated specifications and dimensions for Kaydon's line of slewing ring bearings, as well as load charts and cross-sectional drawings.

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

**Brake and charging valves.** MICO, Inc., a designer and manufacturer of hydraulic components, controls and brake systems, has announced two new catalogs for the company's hydraulic brake valve and accumulator charging valve product lines. The catalogs provide a quick reference guide for engineers specifying components for on- and off-highway braking applications.

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

**Motion control and servo motors.** Animatics has announced its 200+ page 2011 catalog combining both Animatics and OEM Dynamics product lines. The catalog features Class 5 SmartMotor products, cables and connectors, and introduces motion control advancements.

[www.animatics.com/en/request-catalog.html](http://www.animatics.com/en/request-catalog.html)

**Structural framing products and systems.** Parker's Electromechanical Automation Division has released a new catalog featuring its IPS brand of structural framing products and systems. The 264-page guide covers extrusion profiles, fasteners, brackets, handles, doors, panels, hinges, gussets and linear applications.

[www.parkermotion.com/ips](http://www.parkermotion.com/ips)

**Motion controls.** Cablecraft Motion Controls has introduced literature detailing a range of Cablecraft's products including mechanical control assemblies, control cables, spherical rod ends and ball joints. Cablecraft both mechanical linkage and cable controls to OEM markets including aviation, performance racing, military, lawn and garden, construction equipment, farm equipment, industrial machinery and HVAC equipment, as well as aftermarket parts applications.

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

**Gearboxes, couplings, sensors.** The 2011/2012 Catalog from Wittenstein includes the traditional alpha inline gearboxes and right-angle gearboxes as well as rack and pinion systems, couplings and sensor technology. Certain items have been added or updated, including the alpheno gearbox, a new High Performance Linear System and technical data and drawings on the LPBK+.

[www.wittenstein-us.com](http://www.wittenstein-us.com)

**DPN** DESIGN  
PRODUCT  
NEWS  
VOLUME 39 NUMBER 4 June/July 2011

#### Published by

Annex Publishing & Printing  
240 Edward Street, Aurora, ON L4G 3S9  
Phone (905) 727-0077  
Fax (905) 727-0017  
EMAIL: [nbishop@annexweb.com](mailto:nbishop@annexweb.com)

Editor - Michael R. Edwards - [medwards@annexweb.com](mailto:medwards@annexweb.com)

Online Editor - Daniel Comand - [dcommand@annexweb.com](mailto:dcommand@annexweb.com)

Contributing Editor - Robert Colman  
[rcolman@annexweb.com](mailto:rcolman@annexweb.com)

#### Editorial Advisory Board:

John Bachmann, Industrial Careers Pathway  
([www.industrialcareerspathway.org](http://www.industrialcareerspathway.org))

Ajay Bajaj, Rotator Products Ltd.  
([rotatorproducts.com](http://rotatorproducts.com)) and Power Transmission Distributors' Association (ptda.org)

Mirek Tokarz, Langen Packaging Inc.  
([langeninc.com](http://langeninc.com))

Tim Poupore, Ove Industrial Design  
([oveid.com](http://oveid.com)) and ACID-O ([acido.info](http://acido.info))

Millan Yeung, Industrial Research Assistance Program,  
National Research Council Canada  
([nrc-cnrc.gc.ca/irap](http://nrc-cnrc.gc.ca/irap))

Group Publisher - Nigel Bishop  
[nbishop@annexweb.com](mailto:nbishop@annexweb.com)  
(905)-713-4395

Creative Director - Einar Rice

Art Director - Graham Jeffrey

#### Advertising Sales:

Nigel Bishop - [nbishop@annexweb.com](mailto:nbishop@annexweb.com)  
Roger Heritage - [rheritage@annexweb.com](mailto:rheritage@annexweb.com)  
Ron Salmon - [rsalmon@annexweb.com](mailto:rsalmon@annexweb.com)  
Peter Tams - [ptams@annexweb.com](mailto:ptams@annexweb.com)

Quebec Office - Linda Nadon  
[lnadon@annexweb.com](mailto:lnadon@annexweb.com) (450) 224-0055

Account Coordinator - Trish Ramsay  
[tramsay@annexweb.com](mailto:tramsay@annexweb.com)

Director Manufacturing Group:  
Nigel Bishop - [nbishop@annexweb.com](mailto:nbishop@annexweb.com)

President:  
Michael Fredericks - [mfedericks@annexweb.com](mailto:mfedericks@annexweb.com)

PUBLICATIONS MAIL AGREEMENT PM# 40065710  
RETURN UNDELIVERABLE CANADIAN ADDRESS TO  
CIRCULATION DEPARTMENT  
240 EDWARD ST., AURORA ON L4G 3S9

Printed in Canada  
ISSN 0319-8413

Circulation:  
Subscriber Customer Service Representative  
Kristen Schulz-Lacey - [kschulz-lacey@annexweb.com](mailto:kschulz-lacey@annexweb.com)  
Ph: (905) 713-4355 • Fax: (905) 727-0077  
Mail: 240 Edward Street, Aurora, ON L4G 3S9

#### Subscription Rates

CANADA - 1 year \$35.00 + HST  
U.S. - 1 year \$70.00 US  
FOREIGN - 1 year \$105.00 US (Airmail)

*Design Product News* is published six times a year for the specifiers of materials and components in product engineering (OEM); in-plant (systems); and design/production engineering (the crucial stage between finished blueprint/CAD drawing and routine mass production).

The contents of *Design Product News* are copyright by ©2011 Annex Publishing & Printing and may not be reproduced in whole or part without written consent.

Annex Publishing & Printing disclaims any warranty as to the accuracy, completeness or currency of the contents of this publication and disclaims all liability in respect of the results of any action taken or not taken in reliance upon information in this publication.

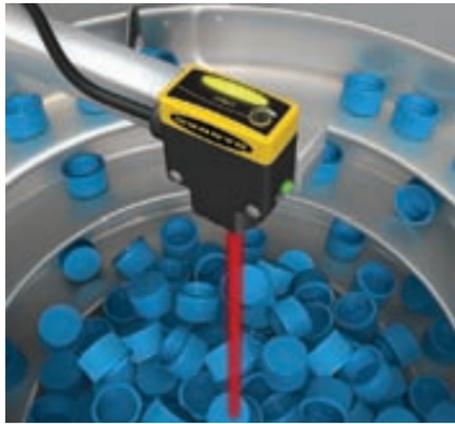
We acknowledge the financial support of the Government of Canada through the Canada Periodical Fund (CPF) for our publishing activities.

Canada

Members of 

## Products: Editor's Choice

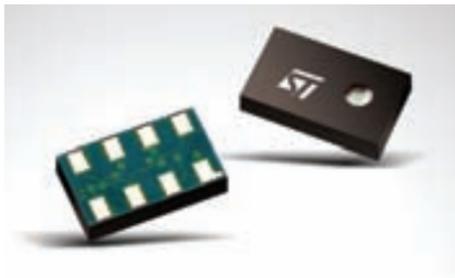
### Adjustable-field sensors



Banner Engineering has introduced two mid-range adjustable-field sensors to the WORLD-BEAM QS30 line. The QS30AFF400 foreground suppression sensor and the QS30AF600 background suppression sensor use linear imager technology are suitable for part-in-place detection, feeder bowl control and package detection on conveyors. The QS30AF/AFF models are available in a waterproof, epoxy encapsulated IP67-rated housing and provide a variety of mounting options, including a 30 mm threaded barrel or side mount, the sensors deliver increased flexibility to meet diverse applications.

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

### MEMS pressure sensing



The LPS001WP MEMS (micro-electro-mechanical systems) sensor from STMicroelectronics is a silicon pressure sensor that has an operating pressure range of 300 to 1100 mbar, corresponding to the atmospheric pressures between -750 and 9000 m relative to sea level, and can de-

tect pressure changes as small as 0.065 mbar, corresponding to 80 cm of altitude. Supplied in a small plastic land-grid-array (HCLGA-8L) package. The package is holed to allow external pressure to reach the sensing element.

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

### Basic industrial sensors



AutomationDirect has announced its offering of industrial sensors now includes two series of low-cost high-performance sensors. The FB series M18 plastic dc photoelectric sensors are 18 mm sensors in diffuse, polarized reflective and through-beam models with sensing distances ranging from 70 mm to 8 m. Also added are the PB series inductive dc proximity sensors. Twelve models are available in 12, 18 and 30 mm sizes, with shielded and unshielded housings and sensing ranges of 2 to 15 mm.

[www.automationdirect.com/sensors](http://www.automationdirect.com/sensors)

### Non-contact IR sensor

A new infrared sensor with wireless transmitter from Omega features remote IR sensor and radio wireless transmitter in a NEMA enclosure. Each unit transmits process temperature, ambient temperature, signal strength, and battery status. The unit features an adjustable emissivity from .10 to 1.0 and one receiver has the ability to work with up to 48 transmitters. Package comes with

free software that converts a PC into a multi-channel chart recorder or data logger. It interfaces with other Omega products, the UWTC-REC1 for multi-



channel PC chart recording and data logging or UWTC-REC2 (single channel industrial transceiver with analog output and alarm.)

[www.omega.ca](http://www.omega.ca)

### Touchless rotary positioning



Novotechnik has introduced the Vert-X 22 series of touchless sensors. The touchless magnetic angle sensors feature a permanent magnet that is secured to the rotating object, so that there is no direct mechanical linkage between the shaft and the measuring system, and therefore

no wear. Key specifications of the Vert-X 22 include 0° to 360° measurement range, resolution to 14-bit, repeatability of 0.1° or better, and maximum hysteresis of 0.1°. Eight output options are available: 0.1 to 10 V, 0.5 to 4.5 V, 4 to 20 mA, 10 to 90% of power supply, SSI, PWM, Incremental and SPI. Units feature diameters of <1 in., sealing to IP68 and the measurement angle is factory programmable.

[www.novotechnik.com/vx22](http://www.novotechnik.com/vx22)

### Positioning solar arrays



For high-temperature solar-thermal systems, where an array of parabolic mirrors focuses the sun's energy on a collector (boiler), accurate tracking systems are important. With these installations, the mirrors are required to reflect the sunlight directly towards the mirror and a small aiming error could sharply reduce the overall effectiveness of the system. Position sensors, such as Posital's OPTOCODE (OCD) rotary encoders and ACCELENS (ACS) inclinometers, are said to play an important role in these tracking systems, providing the controller with information on the exact orientation of the solar panel array. Also said to be reliable and weatherproof, the sensors are available with instrument interfaces that connect to most PLCs.

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

### Laser probe for CMMs



Mitutoyo Canada Inc. has introduced a non-contact line-laser probe option for use with Mitutoyo CNC coordinate measuring machines. SurfaceMeasure is said to provide enhanced functionality to the coordinate measuring machine allowing for use in many applications including Inspection, product development, prototyping and production. The SurfaceMeasure probe quickly captures stable shape data on workpieces without being affected by their reflectance, to deliver highly efficient measurements, the company says.

[www.mitutoyo.ca](http://www.mitutoyo.ca)

**Avdel®**

Holding your world together®



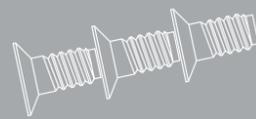
Avdel® - Experts in Fastening Solutions

Avdel® supports you wherever you need to join components reliably and efficiently. We bring 75 years of experience in designing fastening solutions to meet your requirements through application engineering

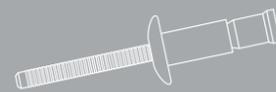
support, joint and assembly expertise and a global presence. Quality, innovation and expertise - Avdel® is the brand you can trust in an ever-changing world.

[www.avdel-global.com](http://www.avdel-global.com) • Phone 704 888-7100

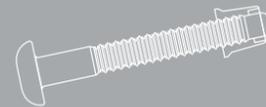
Avdel® Blind Fastening Systems



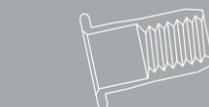
Speed Fastening® Systems



Breakstem Systems



Lockbolt Systems



Blind Threaded Inserts

**infastech™**  
Our Technology, Your Success



**MOVIGEAR®**

Movigear® is distinguished by its high level of system efficiency, a significant factor in reducing energy costs. The integration and coordination of all the drive components lead to a long service life and system availability. Movigear® is an intelligent system with its own control concept. Its high-quality networking helps reduce startup time and supports monitoring and maintenance tasks. When combined with a functional user software, drive tasks can be solved as quickly and easily as possible.



**MOVITRAC® LTE B**

The range of functions provided by MOVITRAC® LTE B is particularly well adapted to less complicated applications. Its user-friendly design makes integration quick and easy, it also meets the high quality requirements of everyday requirements. The Movitrac® LTE B is also available in IP55/NEMA 12k making it suitable for special ambient conditions. These frequency inverters operate reliably and flexibly even when exposed to dust or water.



**PSC**  
**Planetary servo gear units**

The low backlash PSC planetary servo gear units are designed for torque classes from 30 to 305 Nm. They are designed to offer the greatest possible flexibility and ROI, as not every application demands machines designed for maximum performance. These planetary servo gear units are the basis for versatile, dynamic, and above all cost optimized drive solutions.



**MOVITRAC® LTX**

Simple, fast and diverse: as part of the Smart Servo Package, SEW-Eurodrive offers the new Movitrac® LTX servo inverter for universal use. It stands out with advantages such as ease of operation, short startup times as well as optimized costs. Available in two sizes and covers a power range from 750W to 505 kW. The Movitrac® LTX is particularly suitable for use in applications such as secondary packaging, handling, and logistics.

**DECENTRALIZED DRIVE SYSTEMS**

In many industries and applications, implementing economical automation concepts means utilizing decentralized systems throughout. Long rows of control cabinets with complex wiring, expansive space requirements and long distances between control cabinet and motors are too rigid and not very economical. Only the combination of flexible, versatile, economic and target-oriented modules will provide an efficient solution. This is the reason why system operators opting for decentralized drive systems from SEW-Eurodrive are always ahead of the game.



# Our Drive Solution Pyramid.



**VFDs:**  
**RELIABLE, COMPACT & VERSATILE**

**SERVO PACKAGE:**  
**SIMPLE, FAST & DIVERSE**

**DECENTRALIZED CONTROL:**  
**MODULAR, FLEXIBLE & ECONOMICAL**

The demands on material handling systems today have never been more wide ranging or more challenging. That's why SEW-Eurodrive offers drive solutions for every kind of industry application. From the simple to the sophisticated, our pyramid of solutions allow you to control costs and limit complexity by giving you the ability to tailor our products to the exact intelligence and performance specs you require. Reducing energy consumption is also an important imperative today for the modern production line. Just ask Coca-Cola, who achieved a sensational 75% reduction in energy consumption by incorporating 40 of SEW-Eurodrives's revolutionary decentralized MOVIGEAR® units in a recent overhaul of a European bottling plant transport line.



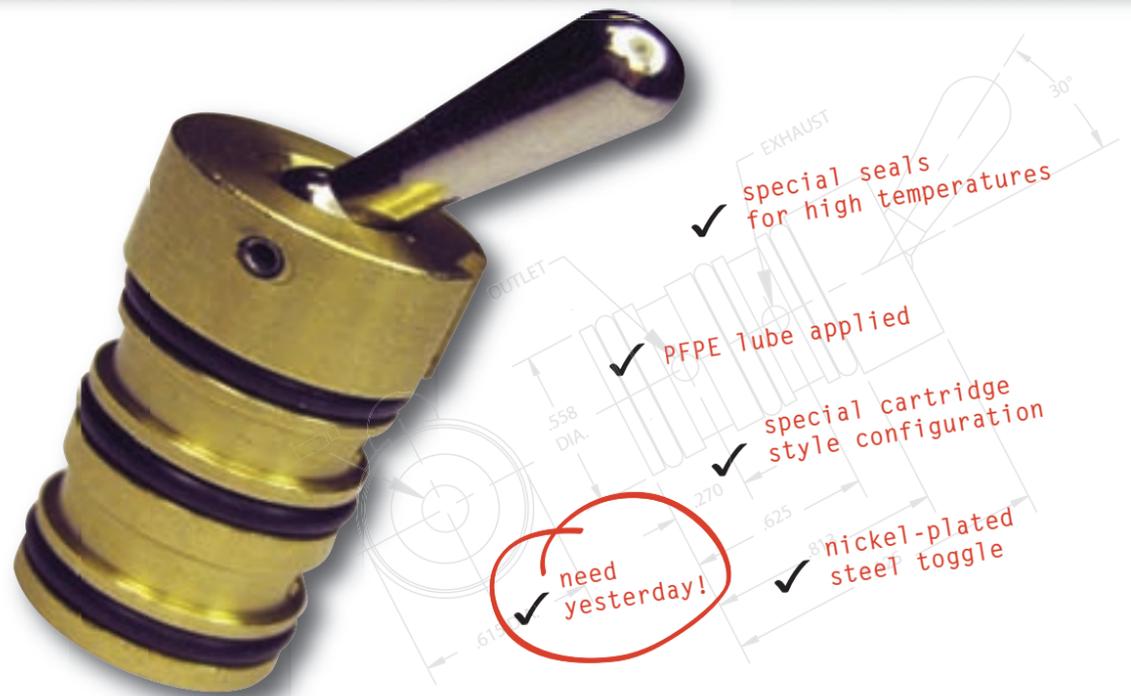
# Custom Air Products



## Clippard Miniature Air Jets

Clippard's Air Jets are designed to deliver a concentrated flow of air or liquid to a designated location. Featuring a unique ball nozzle design, they are available with a wide range of nozzles, bases and mounting hardware. The ball nozzle accepts a variety of tube configurations that can be aimed and locked into position, enabling them to deliver the air or liquid with precision, and at a very affordable price.

[www.clippard.com/airjets-b](http://www.clippard.com/airjets-b)



## create solutions

If you need a quality valve, cylinder or fitting but off-the-shelf catalog models don't quite fit the bill, just call us. Clippard can provide just what you are looking for. Tell us your needs... we have solutions!

Providing innovative products and solutions for today's engineering challenges



**Clippard Instrument Lab., Inc.** | 513.521.4261 | [www.clippard.com](http://www.clippard.com)  
**Wainbee Ltd.** | 888-WAINBEE | [www.wainbee.com](http://www.wainbee.com)

Miniature Pneumatic Air Cylinders, Electronic Valves, Control Valves, Acrylic Subplates, Air Preparation Eqt., Fittings, Hose and More



## Clippard 10 mm & 15 mm Solenoid Valves

Clippard's compact valves offer many features for design flexibility especially in applications with limited space. Available in 2-way or 3-way configurations, as Normally-Open or Normally-Closed, flow rates from 0.5 to 3.0 scfm are available dependent on the orifice size. Other features include highly-visible LED indicator light and manual override, quick response time, and multiple mounting and voltage options. For easy installation and versatility, select from five connector styles.

This dependable line of solenoid valves offer many possibilities for pneumatic applications that require a lightweight, cost-effective miniature valve.

Call Clippard today at 513-521-4261 or visit [www.clippard.com/catalog-b](http://www.clippard.com/catalog-b) to request a free catalog.



## Pneumatic Products Catalog

- 360 pages
- Technical Information
- Drawings
- Specifications
- Over 5,000 standard products

Request your free copy today!

Call Clippard today at 513-521-4261 or visit [www.clippard.com/catalog-b](http://www.clippard.com/catalog-b) to request a free catalog.



## ADDING VALUE *is our business!*

Clippard's Integrated Solutions Division is dedicated to providing engineered solutions and complete pneumatic assemblies for unique and custom applications. Call today with your specific requirements!

Call Clippard today at 513-521-4261 or visit [www.clippard.com/customsolutions-b](http://www.clippard.com/customsolutions-b) to request a free catalog.



## Two-Hand, No-Tie-Down Pneumatic Safety Circuit (THNTD)

Clippard's VA-023 module is a self-contained modular circuit board with all interconnections required to provide a THNTD pneumatic circuit. The main function is to require a machine operator to use both hands at the same time to actuate equipment, helping to insure that the operator's hands are not in a position to be injured.

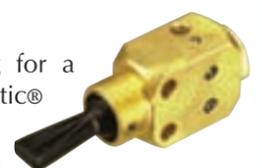
Call Clippard today at 513-521-4261 or visit [www.clippard.com/THNTD-b](http://www.clippard.com/THNTD-b) to request a free catalog.

## Clippard Brass Valves



Clippard offers poppet or spool designs; 2-, 3- or 4-way functions, in sizes from #3-56 and #10-32 through 1/8" NPT ports; and for pressures up to 300 psig. They are available with solenoid, air pilot, manual and mechanical actuators. Mounting styles include inline, panel mount, manifold mount or clearance holes for mounting screws.

When you are looking for a valve, Clippard's Minimatic® line of valves provide a complete range of sizes and styles.



Call 513-521-4261 today or visit [www.clippard.com/catalog-b](http://www.clippard.com/catalog-b) to request a free full-line catalog.