

EUREKA

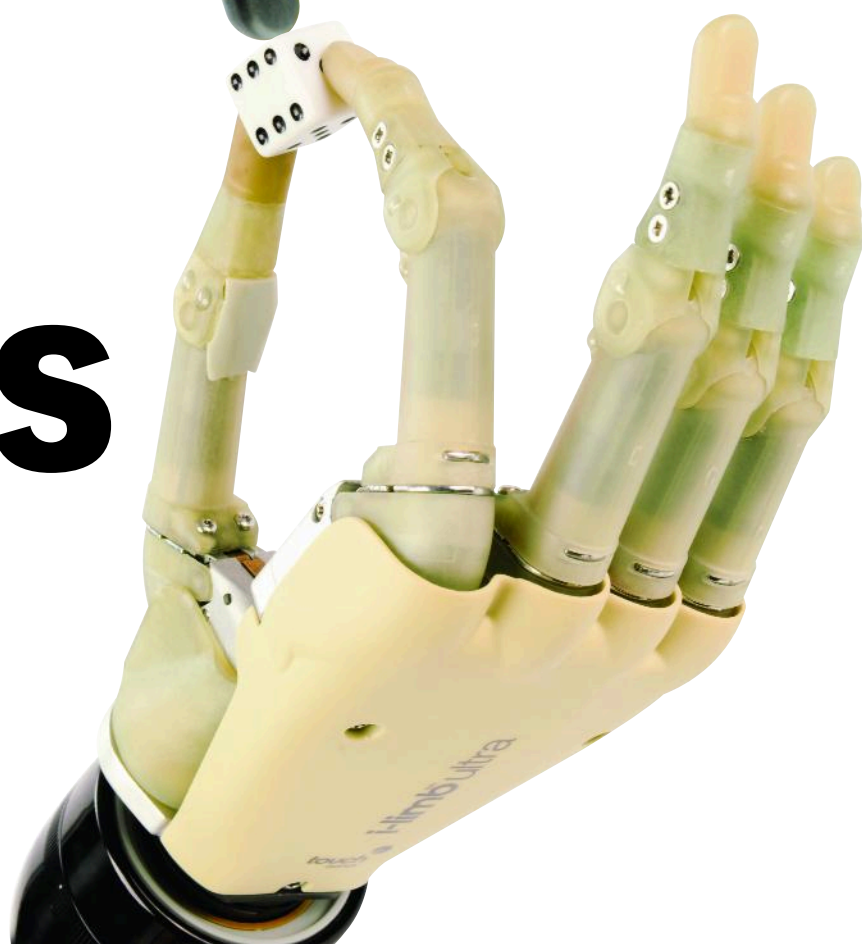
THE MAGAZINE FOR ENGINEERING DESIGN

In this issue: Sensors, Test & Measurement • Drives, Controls & Automation • Fastening & Adhesives

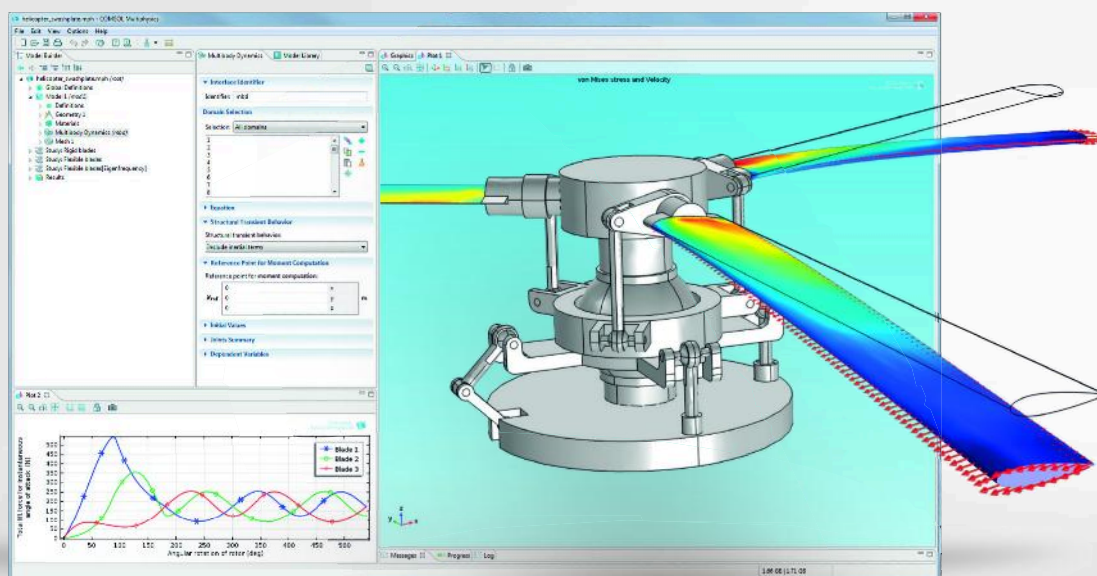


**British
companies
take the lead in
advanced
prosthetics**

Healing hands



MULTIBODY DYNAMICS: A swashplate mechanism is used to control the orientation of helicopter rotor blades.



Verify and optimize your designs with COMSOL Multiphysics®

Multiphysics tools let you build simulations that accurately replicate the important characteristics of your designs. The key is the ability to include all physical effects that exist in the real world. To learn more about COMSOL Multiphysics, visit www.uk.comsol.com/introvideo

Product Suite

COMSOL Multiphysics

ELECTRICAL

AC/DC Module
RF Module
Wave Optics Module
MEMS Module
Plasma Module
Semiconductor Module

MECHANICAL

Heat Transfer Module
Structural Mechanics Module
Nonlinear Structural Materials Module
Geomechanics Module
Fatigue Module
Multibody Dynamics Module
Acoustics Module

FLUID

CFD Module
Microfluidics Module
Subsurface Flow Module
Pipe Flow Module
Molecular Flow Module

CHEMICAL

Chemical Reaction Engineering Module
Batteries & Fuel Cells Module
Electrodeposition Module
Corrosion Module
Electrochemistry Module

MULTIPURPOSE

Optimization Module
Material Library
Particle Tracing Module

INTERFACING

LiveLink™ for MATLAB®
LiveLink™ for Excel®
CAD Import Module
ECAD Import Module
LiveLink™ for SolidWorks®
LiveLink™ for SpaceClaim®
LiveLink™ for Inventor®
LiveLink™ for AutoCAD®
LiveLink™ for Creo™ Parametric
LiveLink™ for Pro/ENGINEER®
LiveLink™ for Solid Edge®
File Import for CATIA® V5

Contact: +44 (0) 1223 451580 info.uk@comsol.com





20



24



43



44

20 **Cover Story:** **Healing Hands**

Two British companies are at the forefront of development when it comes to robotic prosthetic hands. Paul Fanning looks at the technologies underpinning these life-changing devices.

24 **Interview:** **Dr Viv Stephens**

There is a lot to be gained from collaboration, particularly if you are a niche manufacturer in a massive global industry. Justin Cunningham talks to a man who helps bring together bright ideas on the small scale.

27 **The fun of the Fair**

The Hannover Fair is usually a reliable source of innovation in most areas and this year was no exception. Paul Fanning takes a look at some of the highlights in the drives, controls and automation sectors.

31 **Drives, Controls & Automation Briefs**

35 **Adhesives offer binding solutions**

The availability of the right adhesive can make fundamental differences to a design. Here, Paul Fanning looks at some of the latest products available.

39 **Preparing for the worst**

Crash simulation is a vital component of design in any vehicular application. Here, Paul Fanning looks at an innovative new software solution for the rail industry.

41 **Tool chain speeds software development**

A new tool chain may significantly enhance prototyping control applications. Paul Fanning reports.

43 **Energy harvesting offers wireless sensing**

Aircraft sensors that don't need batteries or cables could be available thanks to the development of energy harvesting technology. Paul Fanning reports.

44 **Sensor offers stop-start solution**

A novel sensor system could help cut costs, reduce vehicle weight and lower emissions – changing the way we all drive in the future. Paul Fanning reports.

47 **Sensors, Test & Measurement Briefs**

5 **Comment**

Don't like it? Then change it.

6 **News**

Ford has designs on the urban car of the future

World's largest wave energy farm to be built in Scotland

Touch sensor works through steel

IED seeks new design ambassador

TSB secures record funding

Rolls-Royce backs Bloodhound project

Piezoelectric skin could let robots 'feel'

Off-the-shelf 3D printer used to create bionic ear

Engineering Design Show to host cutting-edge vehicles

13 **Technology briefs**

Micro drives hit new heights

LVDT probe suits high volumes

Bearings offer reliability and life

Bio materials aid sustainable mobility

50 **Coffee Time Challenge**

This month's challenge is to devise a technology capable of distinguishing single malt whiskies from their counterfeits.



More Precision.

thermoIMAGER TIM Miniature real time thermal imager



Smart

Thermal imagers detect and measure temperatures on a surface. The thermal imaging camera series TIM is designed for precise measurement tasks due to the high thermal sensitivity. Powered from just one USB cable, the system is truly plug and play.

Performance

Different classes of performance models allow the use of an appropriate model for different applications:

thermoIMAGER TIM 160
thermoIMAGER TIM 200
thermoIMAGER TIM 400/450

Features

- Measurement range from -20°C to 1500°C
- NEW: Detector with 382 x 288 pixels
- Excellent thermal sensitivity with up to 40mK
- Thermal imaging acquisition in real time with up to 128Hz
- Detection of very small objects with IR image
- Exchangeable lenses and industrial accessories
- Power supply and operation via USB interface
- Extremely lightweight (195g), rugged (IP67) and very compact 45x45x62mm
- Software TIMConnect included in the scope of delivery
- Including Software Developer Kit and LabView Interface



Displacement ▪ Distance ▪ Position ▪ Dimension ▪ IR-Temperature ▪ Colour

Call to speak to a sensor expert +44 (0) 151 355 6070 or visit www.micro-epsilon.co.uk

Don't like it? Then change it



Paul Fanning, Editor (pfanning@findlay.co.uk)

The news (in a poll released by the Institution of Mechanical Engineers) that more than a third of UK manufacturing companies believe young people don't have the work ethic to succeed in industry raises a number of issues.

The first and most obvious reaction to this bald statement is that it is clearly an absurd generalisation. One can no more validly say that young people don't have the work ethic to succeed than one can say the same about any other social, demographic, ethnic or gender group. Indeed, were one to replace the phrase 'young people' with one of these other categories one would rightly be accused of discrimination and in some instances lay oneself open to prosecution!

Maybe this reaction is extreme, though? Perhaps it is more sensible to see these comments as the reactionary dismissal by an older generation of a younger one they don't understand and whose attitudes or priorities they don't particularly care for? After all, isn't it entirely possible that the generation that preceded those who have given this answer felt much the same about them?

Another aspect of this opinion that grates, though, is the implication on the part of these respondents that this situation (as they perceive it, at least) is no fault of theirs. Implicit within this suggestion, of course, is the notion that education is a process designed simply to mould individuals into the perfect shape required by their eventual employers. The problem with this idea is that it casts the employers as mere consumers of an end product; absolved from responsibility for the development of their prospective employees

If manufacturers are not getting what they need from education, might it be useful to ask just how much the respondents to this survey have done over the past decade or so to remedy that situation? Have they been engaged with their local schools and colleges? Have they invested significant time and money in ensuring that there are young people being given the equipment, training and education they need to succeed? And, if those individuals do lack a work ethic, have those employers done anything to inculcate them with the required attitudes?

In many laudable instances, of course, the answers to these questions will be 'yes'. But in many more, one fears, the answers will range from 'not much' to 'no'. In this latter case, it seems a bit rich to bemoan the lack of something you have done little or nothing to provide for yourself.

Editor
Paul Fanning
pfanning@findlay.co.uk

Deputy Editor
Justin Cunningham
jcunningham@findlay.co.uk

Web Editor
Laura Hopperton
lhopperton@findlay.co.uk

Group Editor
Graham Pitcher
gpitcher@findlay.co.uk

Art Editor
Martin Cherry

Technical Illustrator
Phil Holmes

Advertising Sales
01322 221144

Sales Director
Luke Webster
lwebster@findlay.co.uk

Deputy Sales Manager
Simon Bonell
sbonell@findlay.co.uk

Account Manager
James Slade
jslade@findlay.co.uk

Production Manager
Heather Upton
hupton@findlay.co.uk

Circulation Manager
Chris Jones
cjones@findlay.co.uk

Publisher
Ed Tranter
etranter@findlay.co.uk

SSN-0261-2097 (Print)
ISSN 2049-2324 (Online)

Eureka (incorporating Engineering Materials and Design and Design News) is free to individuals who fulfil the publisher's criteria. Annual subscriptions are £81 UK (£118 overseas or £153 airmail).

If you change jobs or your company moves to a new location, please contact circulation@findlay.co.uk to continue receiving your free copy of Eureka.

Origination
CC Media Group
Printed in UK by
Pensord Press Ltd

©2013 Findlay Media Ltd

Published by
Findlay Media, Hawley Mill, Hawley Road,
Dartford, Kent, DA2 7TJ
Tel: 01322 221144
www.eurekamagazine.co.uk

Findlay Media is a
member of the
Periodical
Publishers'
Association



Got a story? Then drop us a line at eurekanews@findlay.co.uk or call us on 01322 221144



Ford has designs on the urban car

Despite being based on that most commonplace of cars, the Fiesta, Ford's new eWheelDrive concept is anything but ordinary.

The vehicle, developed in collaboration with Schaeffler, features two in-wheel electric motors mounted in the hubs of the rear wheels, alongside the braking and cooling systems.

The car is expected to pave the way for smaller, more agile cars better suited to busy, urban environments.

Ford says the technology could allow automakers to build a four-person car in the space of a two-person car, or produce new steering arrangements that allow vehicles to drive sideways to manoeuvre into the tightest of parking spaces.

"This is an exciting project to work on with Schaeffler because it potentially opens up new options for the development of zero emission vehicles with very efficient packaging and exceptional manoeuvrability," said Pim van der Jagt, Ford's director of research and advanced engineering.

Peter Gutzmer, Schaeffler's chief technical officer, added: "This highly integrated wheel-hub drive makes it possible to re-think the city car without restrictions; and could be a key factor in new vehicle concepts and automobile platforms in the future."



World's largest wave energy farm to be built in Scotland



Plans to build the largest ever wave energy site off the north-west coast of Lewis, Scotland, have been given the go-ahead.

Developer Aquamarine Power has received full consent from the Scottish government for the 40MW wave farm. The company plans to install up to 50 of its Oyster wave energy machines at the site over the next few years.

"This is a significant milestone for our company," said Aquamarine's CEO Martin McAdam. "Our engineers are currently working hard on getting the technology right

and we now have a site where we can install our first small farm, with a larger scale commercial build out in the years ahead."

Maria McCaffery, chief executive of RenewableUK, added: "This is a big step forward for the marine energy sector in the UK and especially in the Scottish Islands, which has such a first rate marine energy resource.

"These are the type of developments that we hope to see more of in the coming months and years to herald the opportunity that marine energy represents."

Touch sensor works through steel

UK firm Peratech has used its award-winning Quantum Tunnelling Composite technology to create an ultra-sensitive touch sensor that can respond to light touches even through steel or glass.

"We have developed a sensor design that is so sensitive it can be mounted behind a 0.1mm stainless steel or 0.5mm glass sheet and still detect the pressure of a finger on the top of the sheet," said Peratech's chief technology officer, David Lussey. "The QTC Ultra Sensor only takes a deflection of a micron or so for QTC to sense the touch through the sheet."

According to Lussey, the sensor is also optimised to work with other materials - such as plastics, glass or wood - provided that there is enough flex to activate the QTC switch. "It can even be used behind translucent materials to create secret till lit buttons," he commented.





of the future



IED seeks new design ambassador

The Institution of Engineering Designers (IED) is on the hunt for a new Design Ambassador.

The role will be based in Westbury, Wiltshire. It starts in September 2013 and will last between eight and nine months.

If you think you have what it takes, send a CV plus a report of around 2500 words on a piece of your own engineering or product design work to ied@ied.org.uk. The closing date for submissions is 21 June.

TSB secures record funding

The Technology Strategy Board (TSB) has been allocated a record £440million budget, that experts say will provide a boost to the UK's long term competitiveness.

The funding boost represents an increase of more than £50m from last year. More than 60% of the money is going to SMEs.

"The UK has some of the most innovative business in the world," said Minister for Universities and Science David Willets. "The £440m budget means that there will be more funding available than ever before for businesses across the country to bid for and help turn their ideas into reality – bridging the so-called 'valley of death'."

Commenting on the announcement, Lee Hopley, chief economist at the manufacturer's organisation EEF, said the decision was a positive move that should provide a boost to the UK's long term competitiveness.

"Innovation is a key driver of growth, both for individual companies and the economy as a whole, but it is a challenging, risky process," she continued. "However, record levels of innovation funding can't just be for this year."

ROLLS-ROYCE BACKS BLOODHOUND PROJECT

Aero-engine manufacturer Rolls-Royce has pledged its support to the Bloodhound project.

A Rolls-Royce EJ200 jet engine will be used in conjunction with a custom-designed hybrid rocket to propel the Bloodhound supersonic car to over 1,000mph. The company will also provide financial and technical support.

Richard Noble, Bloodhound project director, said: "Rolls-Royce's support of the programme is invaluable. Their experience of working within a first class aerospace company makes them perfect role models for aspiring engineers."



Piezo LEGS motors feature a scalable piezoelectric drive technology which enables direct, backlash free drive with a potential resolution in the nanometre range and full force locking in a power off state.

Customer specific solutions can be developed and all Piezo LEGS motors are supported by a comprehensive range of drivers and accessories.

EMS

www.ems-limited.co.uk
0118 9817391

Piezoelectric Motors
DC Micromotors
Brushless DC motors
Gearmotors
Low Profile Motors
Stepper Motors
Drive Electronics
Linear Actuators
Custom Solutions



Charlie Jessey
Technical Support Engineer

"The new SolidWorks UK Student Facebook page is awesome. The tips and tricks that I've learnt from this page have helped me with my final year project, thanks."

Comment from the SolidWorks UK Student Facebook page.

**"IF YOU NEED
SOLIDWORKS
SUPPORT FAST,
WE'RE AS GOOD
AS LOCAL –
AND THE MOST
QUALIFIED
NATIONALLY."**

Ten UK offices.
Direct line problem-solving by
the brand's top engineers.

 **SOLIDSOLUTIONS**

For leading 3D CAD design software, and all-round user support – we're Solid.
Find out more on 01926 333777

www.solidsolutions.co.uk/support  **SOLIDWORKS** reseller of the year 2004 – 2011

Drayson Racing sets sights on EV land speed record



Drayson Racing is to make an attempt for the FIA World Electric Land Speed Record this month at RAF Elvington in Yorkshire.

Company founder Lord Paul Drayson will drive a special, low-drag version of the B12 69/EV along Elvington's 1.86 mile runway on 25 June, in a bid to better the 175mph mark that was set back in 1974.

"We believe it's about time someone moved this record on to demonstrate just how far EV technology has come," said Lord Drayson.

"The reason we are doing this is to showcase the maximum level of EV performance at the moment. We are also demonstrating the future potential of technologies like wireless charging in speeding the adoption of high-performance EVs."

Piezoelectric skin could let robots 'feel'

Researchers at the Georgia Institute of Technology have created a new type of touch-reactive material that could give robots the ability to 'feel'.

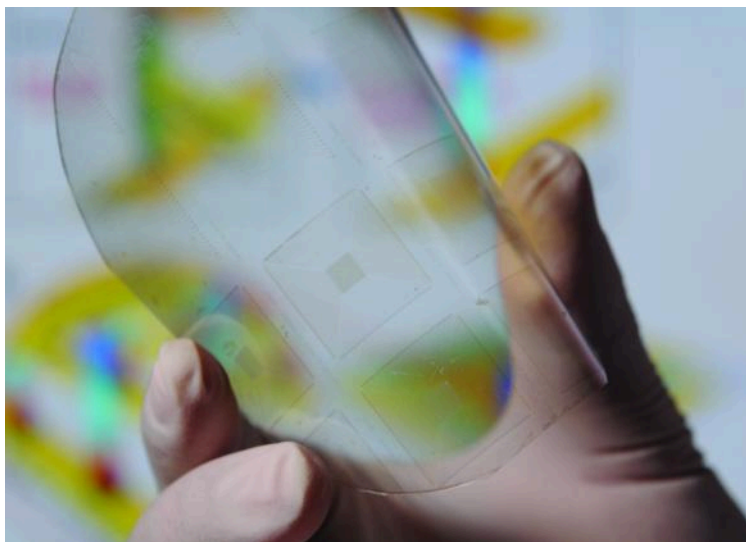
The material owes its heightened tactility to thousands of functioning piezotronic transistors, which each contain around 1,500

nanowires between 500 and 600nm in diameter.

Unlike other devices, the transistors are able to sense changes in their own polarity when pressure is applied. This is due to the nanowires' zinc oxide composition, which simultaneously gives them piezoelectric and semiconducting properties.

"Any mechanical motion, such as the movement of arms or

the fingers of a robot, could be translated to control signals," explained lead researcher Professor Zhong Lin Wang. "This could make artificial skin smarter and more like the human skin. It would allow the skin to feel activity on the surface."



40

Years of Service Innovation



**Forty years of
service innovation
& customer support**

sales@trfastenings.com
www.trfastenings.com

Off-the-shelf 3D printer used to create bionic ear

A 3D printed bionic ear that can 'hear' radio frequencies far beyond the range of normal human capability has been unveiled by scientists at Princeton University.

The finished ear consists of a coiled antenna inside a cartilage structure made up of 3D printed cells, nanoparticles and cell culture.

Two wires lead from the base of the ear and wind around a helical cochlea – the part of the ear that senses sound – which can connect to electrodes.

Lead researcher Michael McAlpine, an assistant professor of mechanical and aerospace engineering at Princeton, said: "Previously, researchers have suggested some strategies to tailor the electronics so that this merger is less awkward. That typically happens between a 2D sheet of electronics and the surface of the tissue. However, our work suggests a new approach – to build and grow the biology up with the electronics synergistically and in a 3D interwoven format."



The technique allowed the researchers to combine the antenna electronics with tissue within the complex topology of a human ear. An off-the-shelf 3D printer was used to combine a matrix of hydrogel and calf cells with silver nanoparticles to form an antenna.

Although further work and extensive testing still need to be carried out, the researchers believe the ear could be used to enhance and perhaps even restore hearing to a number of people.

Liquid hydrogen-powered UAV breaks endurance record

The US Naval Research Laboratory's Ion Tiger UAV has flown for a record 48 hours and one minute without refuelling.

The flight broke the team's previous record of 26 hours and two minutes, which was set in 2009 using the same vehicle. This time, however, the drone was powered by a fuel cell running from liquid hydrogen in cryogenic storage.

NRL is particularly interested in using fuel cells for such UAVs, as internal combustion engines are inefficient and loud, while battery electric UAVs have a very limited range.

The researchers are now hoping to develop a system in which an onboard electrolyser and energy source (such as wind or solar) could be used to electrolyse, compress and refrigerate liquid or gaseous hydrogen from water.

SHOW TO HOST CUTTING-EDGE VEHICLES

Engineering design show



Visitors to this year's Engineering Design Show will get the chance to see two revolutionary vehicles designed and built in the UK.

The first is Endeavour – an innovative solar-powered electric vehicle created by a team of Cambridge University students, and the second is Angelic Bulldog – a 400mph streamliner aiming to break the world motorcycle land speed record.

Both vehicles will go on display at the

Engineering Design Show between 2 and 3 October, courtesy of Premier EDA Solutions, one of the Show's Headline Sponsors.

The team behind the Angelic Bulldog project says it is looking forward to showcasing the streamliner, mostly because of the fact that it utilises the best of British design, manufacturing and engineering.

"Show visitors will be able to see the complexities encountered with a land speed

record venture like this, as well as the project's many possibilities," noted Gabriel Uttley, owner and rider.

The Cambridge University Eco Racing (CUER) team behind Endeavour is also excited to be showing off its solar-powered car this October, but at the time will be competing at the World Solar Challenge, a 3000km race across Australia for solar-powered vehicles.

The vehicle the students hope will take them to victory is Daphne, a vehicle they say will be 98% efficient, allowing them to reach speeds in excess 51mph using a motor with the equivalent power of a hairdryer.

Commenting on the design process, second year engineering student, Keno Mario-Ghae, said: "We predict that at the very least, Daphne will weigh 25kg less than the lightest car ever to enter the World Solar Challenge. This means we can design innovative, energy-saving features that wouldn't be practical in a heavier car."

With over 4,000 Omron products in stock, we have the solution for all of your automation requirements.



OMRON

uk.rs-online.com/automation-control-gear



BLOCAN® Profile System



- Connection Systems
- BLOCAN® Profile Systems
- Linear Components
- System Solutions

◆ Non processing fastening system
◆ High load connections
◆ Easily modified

RK ROSE+KRIEGER
A Phoenix Mecano Company

6-7, Faraday Road | Aylesbury
Buckinghamshire HP19 8TX
Tel 01296 398865 | Fax 01296 398866
e-Mail: rkqb@phoenix-mecano.co.uk
www.rk-online.co.uk



Showcase



Productdemo



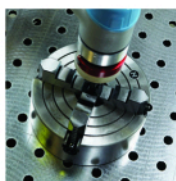
UNIVERSAL ROBOTS

Teach the robot new routines by pulling the robotic arm through desired movements.

Automate your production – safely, simply, inexpensively



Pick and Place



Precision Work

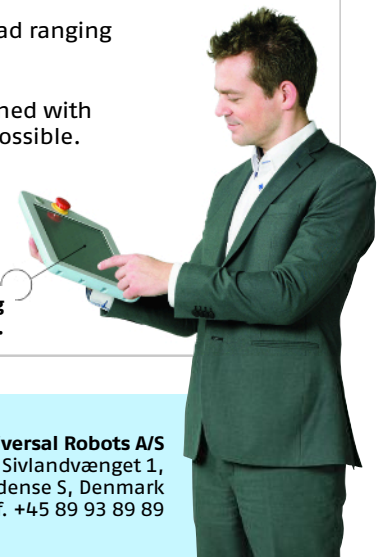
Universal Robots has reinvented industrial robotics with lightweight and flexible robot arms. Sold in more than 40 countries worldwide, the Danish-designed robots automate production in all industries – even in companies that regard automation as prohibitively expensive, cumbersome, and difficult to integrate.

Unrivalled Performance: Weighs as little as 18 kilo with payload ranging from 5–10 kilo and a reach of 1300 mm.

No shielding: The advanced safety system of the robot combined with a risk assessment makes use of the robot without shielding possible.

Repeatability: +/- 0,1 mm allowing quick precision handling of even microscopically small parts.

Intuitive graphical user interface makes setup and programming simple. No previous programming experience required.



195
DAYS
AVERAGE
PAYBACK
PERIOD

Locate our distributors at:
www.universal-robots.com

Universal Robots A/S
Sivlandvænget 1,
DK-5260 Odense S, Denmark
Tlf. +45 89 93 89 89

Micro drives hit new heights



The latest Brushless DC Servomotors Series 0824 ... B and 1028 ... B from the Faulhaber Group are available from EMS.

These two new, extremely compact brushless DC servomotors combine power, robustness and high resolution feedback in a unique way. This innovative drive concept underlines Faulhaber's successful tradition in the area of micro drive technology and

complements the range of brushless 'mini' DC servomotors with diameters from 6 to 12 mm.

High continuous torque, 1.1 and 2.1 mNm respectively, a very flat slope of the speed/torque motor curve, in extremely compact dimensions results in a very high power to size ratio. Combined with an exceptionally low mechanical time constant of just 2ms the outcome is a very dynamic motor ideal for applications with high performance requirements in a limited space.

Both drive series are available with a high-resolution integrated encoder as standard, without additional length or extra cost. This makes these motors particularly suitable for demanding positioning tasks in areas such as optics and photonics, medical device technology and robotics.

www.ems-limited.co.uk

LVDT probe suits high volumes

Micro-Epsilon has developed a new, cost-effective inductive LVDT gauging sensor (probe) that is ideal for medium-to-high volume OEM production environments.

The new induSENSOR DTA-XG8 gauge sensor, which is available in two basic versions (as a pneumatic push sensor or as a spring loaded [feather-touch] gauge sensor) is designed specifically for process automation, machine tools, automated assembly and quality control applications in OEM production environments, including automotive and aerospace.

LVDT gauging sensors are primarily used for measuring workpiece geometry such as length, height, width, diameter, thickness and depth. Pneumatic probes, for example, are ideal for use in automatic gauging applications or for accessing details that would be difficult or impossible to reach using conventional spring loaded (spring push) probes. Some materials such as glass or plastic, for example, require very low tip forces to prevent deformation of the component being measured, as well as contact tip materials that do not leave marks on the component. Therefore, the DTA-XG8 is activated via a feather touch spring.

The stainless steel housing of the DTA-XG8 sensor has a diameter of just 8mm, which enables the sensor to be installed in areas where space is tight or restricted. The standard sensor is protected to IP54 (without bellows) but to prevent the ingress of dust and water between the sensor tip and housing, an IP65 version with bellows seal is available.

www.micro-epsilon.co.uk

Solution to last month's Coffee Time Challenge

SPONSORED BY MICRO EPSILON



The solution to last month's challenge of how to develop a pen to detect and prevent grammatical errors comes from Germany. The Lernstift (or 'Learning Pen') is a digital pen designed to bring handwriting into the 21st century by having the pen vibrate to indicate when the writer makes spelling and grammatical errors or exhibits poor penmanship.

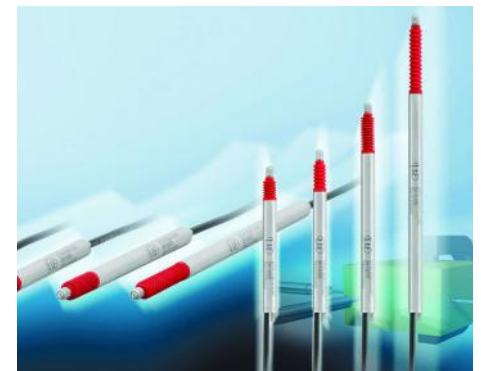
Currently under development, the Lernstift is powered by Linux and contains €50 to €80 worth of smartphone electronics in a thermoplastic or aluminum body. It uses motion sensors to trace movements and detect errors. If a mistake is found, the pen vibrates to alert the writer.

The Lernstift pen operates in two modes. In Calligraphy Mode, it warns of mistakes in penmanship, while in Orthography Mode it detects spelling and grammatical errors – vibrating once for the former and twice for the latter. The sensors allow the pen to recognise writing even in the air so it can be used to write text messages without a writing surface.

The Lernstift is in two generations of development. The first is due for release mid-2013 and the pen will be equipped with motion sensors and a word recognition system. Meanwhile, the second generation, which is slated for early 2014, will have a pressure sensor added. Its function is to help children understand the proper way to hold and press a pen. Press too hard and the pen vibrates. Another area of development is a network module that will allow the pen to connect to Wi-Fi to allow it to share data.

The company is currently seeking investors and says that the Lernstift will be available in August of this year.

www.lernstift.com



Bearings offer reliability and life

igus has developed its xiros ball bearings to provide an economic alternative for many applications where the use of conventional metallic ball bearings is problematic; applications where the focus is not on maximum load and speed, but on other features such as chemical resistance or submerged components. Lubricant and maintenance-free, xiros polymer ball bearings can endure temperatures of up to +150°C, are highly corrosion-

resistant, can be washed and cleaned, are non-magnetic and are light-weight. They feature very good friction coefficients and are reliable, providing a long service life.

There are five xiros ball bearing materials which are available in a wide range of dimensions and designs, all available from stock within 24 hours, giving designers maximum choice for a bearing that best suits their requirements. Design engineers can also predict the expected lifetime of the ball bearing via the xiros Lifetime Calculator that is available to use online.

www.igus.co.uk



Cylindrical rolling bearings offer new design opportunities

Schaeffler has extended its premium quality X-life range of cylindrical rolling bearings to now include larger size bearings with outside diameters up to 1,600mm.

Previously, X-life cylindrical rolling bearings were available with outside diameters up to 320mm. The new extended range includes both full-complement cylindrical rolling bearings and cylindrical rolling bearings with cages.

In a bearing application that predominantly involves high radial loads, a cylindrical roller bearing is often the best choice. In this type of bearing, two rollers are

guided between rigid ribs on two raceways. The raceways and ribs are part of the bearing rings that are separated by the cylindrical rollers. The cylindrical rolling elements support the forces not at contact points – as in a ball

bearing – but along contact lines and can therefore support higher loads. The general principle is that the more load-carrying rollers, the higher the basic load rating. If very high loads are to be supported and speeds are relatively moderate, full-complement cylindrical roller bearings are recommended.

www.schaeffler.com



John Guest®

The Push-fit People

INNOVATIVE PUSH-FIT SOLUTIONS FOR OEMS

MADE IN THE UK.

OVER THE LAST 50+ YEARS, JOHN GUEST HAS WORKED CLOSELY WITH OEM DESIGN ENGINEERS TO OFFER HIGHLY INNOVATIVE AND HIGH QUALITY PUSH-FIT TECHNOLOGY SOLUTIONS TO THEIR PRODUCTS, ADDING GREATER VALUE BY SIMPLER INSTALLATION



info@johnquest.com
www.johnquest.com

EST. 1961 
 AS BRITISH AS THE DAY IT WAS BORN

item
it's a system

Non-Stop Innovation

The most comprehensive aluminium framework system in the world



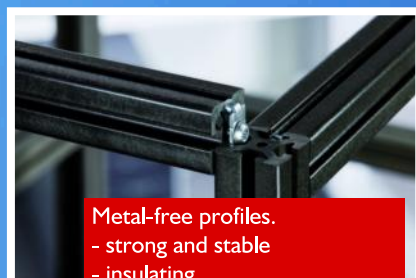
Robust free running belt driven slide.
High moment-loading capability.
All our belt driven slides can be produced rapidly to any desired length.



One piece shelf profiles.
Quick and economical.



Combined castor and baseplate for speed and economy.



Metal-free profiles.
- strong and stable
- insulating
- no effect on radio frequencies



Greatly expanded ergonomic workbench range with new accessories and parts trolleys.



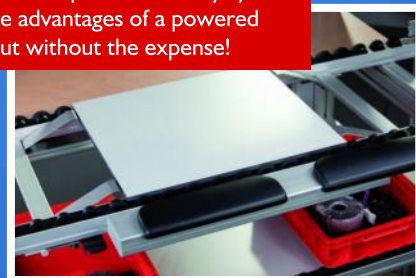
Coloured tubes for new D30 tube system.



Low cost roller conveyors for lean manufacturing.



Low cost manual platen assembly system. Most of the advantages of a powered system - but without the expense!



Machine Building Systems Ltd

Heage Road Industrial Estate, Ripley, Derbys DE5 3GH
Tel: 01773 749330 Fax: 01773 749560
email: sales@mbsitem.co.uk www.mbsitem.co.uk

**Same day despatch is standard.
Huge stocks always available.**

www.engineeringdesignshow.co.uk

Engineering design show

2 - 3 October 2013 • Jaguar Exhibition Hall • Ricoh Arena • Coventry



Headline sponsors



SCHAEFFLER



Co-located with

electronics
design show

Engineering
Materials
LIVE!

Organised by

The Engineering Design Show offers visitors access to the latest products, techniques and technologies from across the design spectrum, as well as a range of informative and free educational conferences and workshop sessions.



Exhibition • Conference • Workshops

REGISTRATION IS NOW OPEN!

Visit www.engineeringdesignshow.co.uk



Workshop sponsors

ALRAD
IMAGING

AUCOTEC

Materialise
Innovators you can count on

man machine

maxon
maxon motor uk ltd

SCOTT BADER

NYLACAST
ENGINEERING PLASTIC SOLUTIONS

Fastenings

D YOUNG & CO
INTELLECTUAL
PROPERTY

Bio materials aid sustainable mobility

the BioMobile; a prototype vehicle designed to achieve minimal reliance on the use of fossil fuel resources in its design and construction, while offering very low energy consumption in use.

Since its inception, the vehicle has gone through three development stages and the latest adaptation sees the replacement of the remaining non-renewable structural



reinforcements impregnated with a specially-developed epoxy system from Huntsman Advanced Materials which contains over 50% bio-based resin.

Huntsman's bio-based resin system proved particularly advantageous with its easy handling and processing capabilities. In helping to optimise the mechanical properties of the prototype, it also played an important role in enabling BioMobile to demonstrate that individual mobility with a lower energy signature is possible within both manufacturing and vehicle usage.

www.huntsman.co.uk



Trelleborg launches innovative DBM clamp

Leading global manufacturer of polymer and syntactic foam-based solutions Trelleborg has developed an innovative new distributed buoyancy module (DBM) clamp that offers technical, commercial and schedule advantages over existing product ranges to provide offshore operators with a more cost-effective and compliant solution.

Austin Harbison, product development manager with Trelleborg Offshore & Construction, commented: "As a key element of subsea operations, DBMs play a vital role when it comes to maintaining the configuration of flexible risers and umbilicals, ensuring fatigue

damage and stresses are minimized. However, an increase in operating temperatures, combined with the use of ever more complex riser systems, has resulted in offshore operators requiring increased compliance and higher capacity from their buoyancy solutions."

Providing an increase in clamp capacity, Trelleborg's new DBM clamp offers improved compliance to better accommodate riser creep. Furthermore, the new clamp, which offers a universal interface for use on all riser types, now features aramid fibres in place of a fabricated titanium strap.

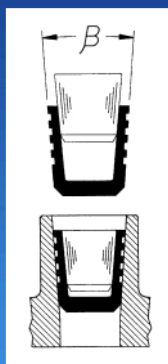
www.trelleborg.com

Plug As-Cast Holes As-Is



- Installs into tapered as-cast holes
- No machining required
- Ideal for fragile castings
- One-piece design installs easily
- Seals to 7,000 psi

Simply drop the Betaplug into the as-cast hole and drive in the tapered pin. That's all you do. The Betaplug body expands to form a permanent, leak-tight seal- without drilling, reaming, tapping or applying sealants. Your total installed cost is significantly lower than with threaded plugs or other expansion type plugs.



Innovation in Miniature
LEE

SEND FOR OUR FREE PRODUCT CATALOGUE

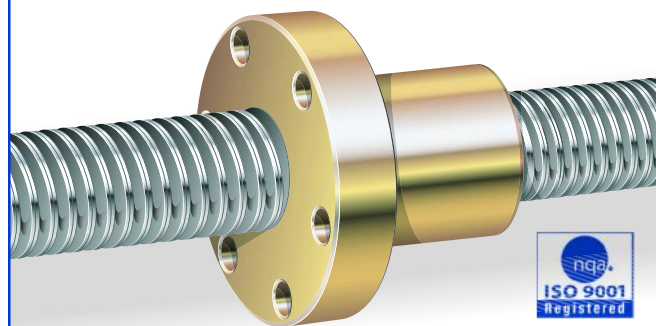
Tel: 01753 886664 Fax: 01753 889588

www.leeproducts.co.uk e-mail: sales@leeproducts.co.uk

Lee Products Limited, 3 High Street, Chalfont St Peter, Bucks. SL9 9QE.

Power Screws Trapezoidal

PRECISE
AFFORDABLE
AVAILABLE



- 10mm to 140mm diameter
- Low cost, ex stock
- Bronze & steel nuts
- Steel & stainless steel

ABSSAC
PRECISION MOTION SINCE 1982



01386 421005 • sales@abssac.co.uk • www.abssac.co.uk



**ON AVERAGE 35 MILLION
WORKING DAYS ARE LOST
ANNUALLY THROUGH MUSCLE,
BONE AND JOINT CONDITIONS***

**WITH BUPA YOU DON'T NEED
A GP REFERRAL TO GET INSTANT
ACCESS TO A PHYSIOTHERAPIST.**

SPEAK TO A BUPA BUSINESS EXPERT

0845 508 5809*

bupa.co.uk/solutions

Quote reference 3RU

**BUPA HEALTH INSURANCE.
IT'S GOOD BUSINESS SENSE.**

*Source: Labour Force Survey – Office for National Statistics. Sickness Absence in the Labour Market, April 2012 (based on 2011 data).

Bupa health insurance is provided by Bupa Insurance Limited. Registered in England and Wales No. 3956433 arranged and administered by Bupa Insurance Services Limited. Registered in England and Wales No. 3829851. Both companies are authorised and regulated by the Financial Services Authority. Registered office: Bupa House, 15-19 Bloomsbury Way, London WC1A 2BA. *Calls may be recorded and may be monitored.



Healing

Two British companies are at the forefront of development when it comes to robotic prosthetic hands. Paul Fanning looks at the technologies underpinning these life-changing devices.

The field of advanced prosthetics moves fast. When this magazine reported on Scottish company Touch Bionics' i-Limb technology (*Eureka*, September 2010), the product seemed extraordinary enough. However, less than three years on, the technology of advanced prosthetic hands has moved on a long, long way. What is more, two of the world leaders in this field are British.

The i-Limb Ultra and i-Limb Ultra Revolution from Livingston-based Touch Bionics are the latest generations of active prosthetic hands from the company. Although based on the i-Limb Pulse product featured in *Eureka's* 2010 article, they now offer a range of additional functionality. In the case of the Revolution, this includes a powered rotating thumb and individually articulating fingers offering unparalleled dexterity and reliable access to precision grip patterns.

New remote electrodes offer a higher level of sensitivity giving the wearer enhanced control, while a variety of flexible wrist options enable more natural positioning of hand when gripping or picking up objects. The powered rotation of the thumb can be either controlled directly by the wearer's muscle signals, or can move automatically into position as part of a pre-set grip pattern or gesture.

Probably the most notable feature of the Ultra Revolution, however, is the biosim mobile control application. Compatible with the latest Apple products, this gives the wearer greatly expanded control capability via 24 Quick Grips – each from a single screen tap. This collection of grips is editable and can be customised by the users for daily needs. For example, wearers can select the 'work' favourite, which triggers the i-limb into preferred grips such as typing, holding papers, or using a mouse.

In addition to its value as a means of selecting grips, this app also offers a Hand Health Check, which activates the prosthesis' diagnostics to ensure that the i-limb is functioning properly. It also allows users to access training modes to help the wearer learn how to access all of the functionality available.

Bertolt Meyer, who recently presented the Channel 4 programme 'How to Build a Bionic Man' and is a wearer of the i-Limb Ultra, describes the Ultra Revolution as "The most advanced, and easy-to-use prosthesis that I have ever worn. Powered thumb rotation, combined with the mobile app and quick access to all these new grips, gives me natural hand function that I never imagined would be possible."

Another British company that also lays claim to offering the most

advanced active prosthetic hand is Leeds-based RSL Steeper. In fact, its bebionic3 hand recently won a da Vinci award. Like the i-Limb, it is myoelectric, meaning it is controlled by electrical impulses from the patient's remaining forearm muscles. Each finger is controlled by an individual motor controlled by microprocessors that allow the wearer to operate 14 grip patterns and hand positions. The hand can automatically adjust its grip to match the task or if it senses that an object is slipping, while the fingers fold away realistically when brushing against people or objects. The wrist joint also comes in a variety of forms to suit individual patient needs.

Ted Varley, RSL Steeper's director of development and operations, describes the limitations of more basic myoelectric arms. He says: "There is a sensor on the inside and on the outside. The battery and wrist interface are mounted in the hard outer casing and, with training, a user is able to give an open signal, a close signal and what is known as a co-contracted signal, which is basically a fist that fires both electrodes... It's a simple three-jaw chuck design with a fixed linkage between fingers one and two and the thumb and it just goes through a



The bebionic3 from RSL Steeper allows the wearer to operate 14 grip patterns and hand positions

hands



The i-Limb Ultra Revolution can be operated via an iPhone app that gives the wearer greatly expanded control capability

standard pinch system. You can get a fantastic grip with something like that. It's very powerful, but it's not compliant. So if you're trying to hold a wine glass or a plastic cup, it's very difficult to get control. Also, it's not able to grip thinner objects like umbrellas because there's a big gap, meaning that people have to add foam to everyday objects in order to hold them."

The aim from RSL Steeper's point of view was to create something very much more sophisticated. Says Varley: "The design idea we came up with was to take that system from the wrist and push the

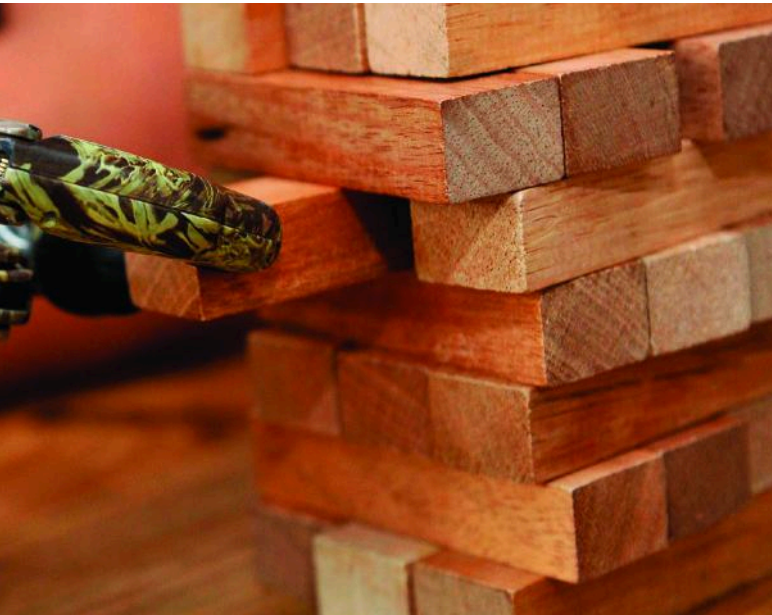
boundaries in terms of the capability of the hand. So we wanted to make it as natural as possible so that it looked like a hand. We also wanted to make it compliant so that you could get a nice, stable grip on objects. It has more advantages than just looking good."

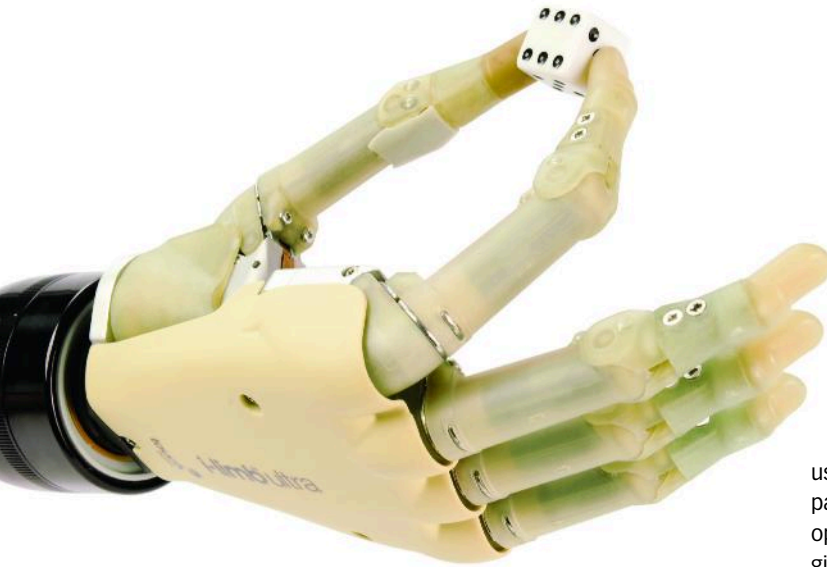
Clearly, the human hand is an incredibly complex thing and this creates immense design challenges. This meant that the development team had to dramatically simplify the motions of the hand. Says Varley: "There are a limited number of grips that will give you 50-60% of functionality. The fingers on this move in a simple trajectory. They can get a pinch grip, but they can also roll into a fist. We rotated all the trajectories inwards so that, rather than finger adduction [the movement of the fingers apart and together] they roll together as it creates a fist, allowing the user to get a partial grip on a pen or a piece of cutlery."

Another key issue in the design process was ensuring that the bebionic3 was extremely robust. Here, though, the team initially made what Varley describes as "a fatal error". He explains: "We looked at our own hands and tried to decide what it would take to break a human hand. This is a mistake for a prosthetic. The issue is that the hand is compliant. So, if you're falling over, your hand automatically opens to form the shape of the thing you're going to hit. This spreads the load over the full palm, reducing the force. The problem with the prosthetic is that it's hard, so the first thing that hits the surface is going to break, which is no good."

At the same time, of course, a prosthetic hand does not offer feedback (ie pain) when it suffers a negative impact. The only feedback offered by a prosthetic is when it breaks.

Having not initially appreciated these factors, Varley's team had designed a product with all the expensive high-precision motors, PCBs, etc. safely locked away in the palm and as close to the body as





possible. Meanwhile, the fingers were made out of lightweight plastic, with the idea being that if one broke, it could be replaced easily. Says Varley: "We also made fuses that broke at a certain level, so if you broke a finger, you could put a fuse in with a pair of pliers and your finger's back up again. That's fine if you're technically-minded. If you're not, though, and you've only got one arm and you're a plane ride away from the clinic where it's available, then it's clearly unacceptable."

Instead, then, the design shifted to a 'belt and braces' solution, changing the chassis structure to CNC machined aluminium, with two knuckles that fully integrated within it, making them rock solid. The proximals are also made out of stainless steel, with stainless crosslinks and sealed cartridge bearings on all fingers.

The end result, says Varley, is an incredibly strong and robust product able to operate far beyond normal human capability. "We went from 16 kilos, which is what we think would break the human hand, to 40 kilos to break one finger," he says. "So with two fingers, you can pick up someone's bodyweight. It's beyond normal usage. We've also got a full metallic structure on the thumb, so it's beyond normal capability... It's so strong that if you break, you have to be doing something wrong."

Another key design issue lay in how to enable



users to access the full range of grip patterns. The decision, therefore, was to use the two manually-operable thumb positions to set the grip. "You can knock it to opposed, give it a close signal, open it again and get a secondary grip," says Varley. "You can then move the thumb back to non-opposed, give a close signal and again you have a different grip. So from that you can get four grips. There's a button on the back of the hand and if you knock that, you get another four."

In addition, the hand has a 'push and hold function that makes it go into glove mode. This was initially developed to allow the silicone 'skin' for the hand to be put on easily. However, it soon became apparent that the function was also useful for things like putting jackets on easily.

The hand also offers users the ability to offer 'threshold' and 'proportional' grips. In other words, if the user has not got particularly good control of their muscles, the threshold system enables it to go at maximum speed once a signal has reached a certain level. Equally, the proportional function operates by allowing a user to give a weak signal to make the fingers go slowly or a strong one to make it go faster.

Clearly, the control system behind this is complex. Says Varley: "The way we did it was with an encoder system whereby every time a motor rotates it counts. With that, we could build up a matrix so that for every grip there is an encoder value for each fingertip position. So if you imagine tripod, which is the three finger grip, those independent motors have got to converge at the right time again and again and again."

For all that it is highly advanced technology, Varley is still very much aware of the limitations of the BeBionic3 compared to the human hand. He says: "We've only gone a part of the way along this road. This still has only 10 or 15% of the functionality of a human hand, to be honest."

With this in mind, there are a number of improvements in the pipeline. These include ongoing work with a team that makes RF chips that react to proximity of a transceiver. This will allow users to attach these tiny stickers everywhere so that, for instance, in the proximity of the keyboard, the hand will immediately go into finger-point mode or, with a sticker in the lapel of the jacket, the hand will automatically go into 'glove mode' so that it can go into the jacket smoothly.

www.touchbionics.com
www.rslsteeper.com



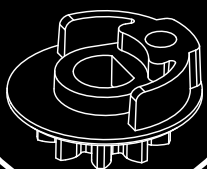
Touch Bionics' Living Skin is designed to fit over the i-Limb and provide a realistic appearance for the wearer

Real parts. Really fast.

A product development team needs parts to meet its rapidly approaching deadline.

Upload
3D CAD file.

How
Many Parts?



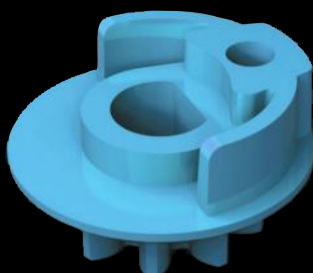
10-10,000+
parts

Receive a
ProtoQuote®
interactive
quote.

Finalise
quote and
submit P.O.

1-10
parts

firstcut®
CNC Machining Service



From £50

Receive
FirstQuote®
interactive
quote.

Finalise
options,
order.

Machining
begins.

Parts
ready
for
shipping.

protomold®
Injection Moulding Service



From £995

Receive
order
confirmation
with gate
and ejector
layout.
Approve.

Mould
design
and
milling.

Parts
ready
for
shipping.

Part
production.

It's easy to work with Proto Labs. Just upload your 3D CAD model and choose the best process for your project: CNC machining in 1-3 days or injection moulding in 1-15 days. Real parts in real materials, in days—not weeks. And that's the real story. Call +44 (0) 1952 683047 or visit www.protolabs.co.uk

Rapid Prototyping Technologies

Visit www.protolabs.co.uk/parts today to receive your FREE copy of our comprehensive comparison of rapid prototyping technologies. Enter source code EUEU13

Check out our
video design tips!



proto labs®

Real Parts. Really Fast.™

Forming a collective

There is a lot to be gained from collaboration, particularly if you are a niche manufacturer in a massive global industry. Justin Cunningham talks to a man who helps bring together bright ideas on the small scale.



Viv and learn

Dr Viv Stephens began his engineering career studying mechanical engineering at University of Wales. He then went on to do a PhD at Cranfield University on energy-absorbing composite materials for the crashworthiness of vehicles.

After this he entered industry running crash safety at Mira. Over 12 years, he moved up to run whole vehicle development programmes for external clients and from there ran the proving ground. He has since gone freelance and set up the Niche Vehicle Network in 2005.

Automotive is often considered the ultimate high-volume industrial machine. Its business model strives for both standardisation and mass market appeal and – while you can now have colours besides black – choice remains limited.

Taxis, refuse trucks and the more specialist novelty cars will never generate the revenues needed to attract the likes of General Motors or Toyota. Even so, exploitation of these markets can be lucrative.

The UK has become a hub for small and innovative vehicle manufacturers and specialist suppliers in recent years. Here, those companies able to punch above their weight by developing unique technology and vehicles have in some cases been able to conquer global markets. That said, there are still some inhibitive problems related to being a small player in a giant industry.

“There is a lot to be gained from collaboration and a lot to be lost by working in secret,” says Dr. Viv Stephens, programme director at the Niche Vehicle Network. “That is the temptation: to work in a bubble and be secretive. But, that actually creates a barrier for many of these smaller manufacturers and specialist suppliers.”

In 2005, while contracted to Advantage West Midlands (one of the now defunct Regional Development Agencies), Dr Stephens noticed that, although many of the smaller automotive companies in the area were facing common difficulties, there was actually little collaboration in finding solutions. This, he felt, was ineffective, inefficient and needed to change.

This prompted Dr. Stephens to set up the Niche Vehicle Network in 2005 with the aim of uniting the capabilities of the people and companies in the niche vehicle sector. At the same time the network gave a much-needed voice to the sector and could provide members with a framework to give it direction going forward. “It meant we could help in areas that before were cost- and resource-prohibitive,” he says. “Things like developing new markets abroad, dealing with impending legislation and collaborative R&D programmes all benefited.”

Simply put, the network gives the opportunity for member companies to talk to one another. Indeed, Dr Stephens describes it as a ‘melting pot’ of different ideas, technology and strategies. “This has really been the nucleus of what we’ve done,” he says. “We give companies that opportunity to find partners they want to work with. They might find a new technology or capability that ultimately will give them some competitive advantage.”

However, the idea of co-operation was not an instant hit with everyone in the niche vehicle sector and some were reluctant. “It was a reasonably difficult nut to crack at the outset,” says Dr Stephens. “We were trying to encourage companies to work together and not think of each other as competitors, because actually there is not a lot of overlap.”

By 2008 The Niche Vehicle Network was in a position to begin lobbying for funding and partnering with governmental bodies. From there it began to help its members realise their potential with collaborative research and development programmes. To date, the network has been a catalyst for more than 104 different business collaborations and has assisted in the development of 11 prototype vehicles, including work with the Ariel Motor Company and Morgan Motor Company.

The network now has over 200 niche manufacturers, specialist technology companies and suppliers on board and is supported by the Technology Strategy Board, the Office for Low Emission Vehicles and the Department for Business Innovation and Skills.

The philosophy behind the Niche Vehicle Network is to play to its members’ strengths. The businesses involved are by their nature small, which also makes them nimble. The ability to change suppliers, exploit new technology, redesign and respond to demands from the market is a massive asset that Dr Stephens and his team are keen to capitalise on.

“The automotive sector has got some incredibly interesting times ahead,” he says. “Every class of vehicle has got to drop a dress size by 2020 and then another by 2025. The OEMs alone don’t have the technology to do that, so need to trawl more widely for ideas. The niche industry has the ability to try new things much faster. We can help assess the feasibility of many different concepts and technologies, and help identify any potential teething problems.”

The Network routinely runs research and development projects driven by the demand of its members and industry at large. The network’s current areas of research and development broadly span two areas: powertrain and structures. The first topic (entitled, ‘Improved Fuel Efficiency and Carbon Emission Reduction’) will consider and develop technologies around the internal combustion engine, alternative fuels and electric propulsion. The second topic, ‘Weight Reduction and Recyclability’,

will assess the associated challenges around lightweighting including the manufacturability and disposal of composite structures.

The network wants to be a catalyst for change and innovation for a wide range of vehicles, systems and manufacturing operations. To help, it periodically runs groups of short projects that typically last three months with a maximum of £50,000 funding each.

In January, the projects included the development of environmentally-friendly, lightweight composites and the feasibility of using bamboo, hemp and bio-resins as sustainable alternatives to carbon fibre and epoxy resin. Other projects were to develop the ultimate aerodynamic shape for a low-drag and low-speed vehicle, a micro-hybrid stop start-system, and the development of a ‘class-leading’ hybrid battery.

“Our short-term funding programme is playing a vital role supporting UK engineering innovation,” says Dr Stephens. “In the global automotive sector, highly creative and dynamic niche businesses are sometimes overlooked, and our three-month funding packages provide important support to research and development projects.”

This funding is in addition to the network’s more substantial annual research and development competition, which has provided funding to the tune of £150,000 for projects including the production of a lightweight titanium chassis for the Ariel Motor Company.

“There is a lot to be gained from collaboration,” says Dr Stephens. “And that has always been the key point about the Niche Vehicle Network. We are there to provide the glue that binds these various elements together, to help them collaborate and be more competitive.”

www.nichevehiclenetwork.co.uk

“We are there to provide the glue that binds these various elements together”

The power of integration

With its various acquisitions ABB's portfolio now extends from drives, motors, safety devices and PLCs to a complete motion control offering: all of which integrate to provide a total machine control solution, as Gary Busby explains.

Today we have a great motion control offering. With this portfolio we truly are an integrated automation company. We can offer simple motion via open fieldbuses such as Modbus RTU and TCP, in addition to realising more complex applications with EtherCAT or POWERLINK.

Multi-axis motion control

Here our products meet the demands of rapidly developing automation lines. NextMove is ABB's Mint programmable motion controller and is available as panel mount, PC-based or rack-based motion controllers. Using the real-time Ethernet POWERLINK protocol, the controller is capable of controlling dozens of axes with a vastly improved cabling infrastructure. In addition multi-axis coordinated motion can be achieved using ABB's AC500 PLC with PLCopen and the EtherCAT bus modules.

AC servo drives

Servo drives are offered with a standard analogue reference or step/ direction input. The MicroFlex and EuroFlex drives are suitable for rotary and linear AC servo motors. MicroFlex is rated at 3, 6 and 9 A (105 to 250 V AC single phase). EuroFlex, a rack mounted drive, is available rated at 5 A 60 V DC. MicroFlex e100 and MotiFlex e100

offers advanced motion control capabilities with real-time Ethernet and standard TCP/IP. The drives are fully programmable in the Mint language and can be utilised as single axis motion controllers.

MotiFlex features a shared DC bus, providing energy saving capabilities for multi-axis applications. Two expansion slots are provided for plug-in digital and analogue I/O, feedback devices and fieldbus communication devices. A motion controller option configures MotiFlex for up to five axes of control with no additional wiring.

The ABB high performance machinery drive, ACSM1, provides high performance speed, torque and motion control for demanding machines with power up to 355 kW. The drive controls induction, synchronous and asynchronous servo and high torque motors with various feedback devices. MicroFlex e150 high performance intelligent servo drive combines real-time EtherCAT protocol, Ethernet/IP, Modbus TCP/IP and advanced servo control for rotary and linear brushless motors in a compact package for single axis motion applications or as part of a tightly synchronised multi axis machine control set-up.



Rotary servo and linear motors

Rotary servo motors comprise the BSM range, MS series and high dynamic performance (HDP) AC induction servomotors. A full range of linear motors are available, including cog-free servo motors, stepper motors and AC induction linear motors.

Software tools

The high-level Mint programming language helps to develop motion control programs for custom applications very quickly. Other Ethernet protocols are offered that allow complete flexibility with ABB PLCs and other industrial PCs and programmable motion controllers with IEC61131-3 CoDeSys and PLCopen programming.

Safety

Jokab Safety provides innovative safety concepts for machinery applications. Sensors, actuators, safety relays and programmable safety controllers, combined with ABB's new AC500-S safety PLC and safe I/O meet EN ISO 13849-1 safety standard.

System components

ABB's range of man-machine interfaces extends from simple, 'dumb' operator panels to programmable, TFT colour touch-screen panels. ABB can also offer touch screen operator panels, cables, power supplies as well as a complete range of relays, contactors, fuses and more.

Contact **Gary Busby** on
07718 968743
email: gary.busby@gb.abb.com



The fun of the Fair

The Hannover Fair is usually a reliable source of innovation in most areas and this year was no exception. Paul Fanning takes a look at some of the highlights.

There are usually rich pickings to be found at the Hannover Fair for those seeking innovation in drives, controls and automation. 2013 provided a good crop of novel solutions from some of the big names in the sector.

Parker Hannifin, for instance, demonstrated its latest patented, electrically-driven linear actuator series.

The Origa ORD-E is an ultra-compact series of linear actuators, whose high forces, compact design, non-rotating technology and wide temperature range – together with an IP65 rating – make them ideal for applications with tough ambient conditions and where regular intensive cleaning and rinsing is required.

From initial introduction to the market, the new ORD-E will be available in a 50 mm size, with further sizes of 80mm, 100mm and 160mm following soon after. The ORD-E series has been designed to perform high-load linear movements with up to a 500mm maximum stroke length and with forces up to 2,000N.

Parker also demonstrated its ability to connect the electromechanical drive with hydraulics to give a speed-controlled, electrohydraulic, full-system solution. For the composition and layout Parker uses an extensive construction kit of high-grade components that will be constantly expanded and thus always stay up to date. All components are precisely matched with one another and individually tailored to the cycle of the respective application using a newly developed piece of software. At the same time, the size of the components used can also be reduced. In doing so, Parker fulfils both current and future demands in terms of energy



consumption and CO₂ and noise emissions as well as the wishes of machine manufacturers and users for more efficient system solutions.

Bosch Rexroth, meanwhile, won this year's Hermes Award at Hannover Messe for its Open Core Engineering project, which brings together programmable logic controllers (PLC) and information technology for the first time in industrial applications.



ORD-E linear actuators from Parker Hannifin are designed for tough conditions

Part of a wider move to take advantage of emerging technologies, throughout industry, Open Core Engineering allows greater flexibility and efficiency in the automation process by enabling remote maintenance and operation through smart devices and apps; combining advanced industrial algorithms with everyday hand-held devices.

Open Core Engineering combines the previously separate PLC and IT worlds into one comprehensive solution portfolio – a portfolio comprising open standards, software tools, function packages and the Open Core Interface as an enabler for new freedom. This integrated

approach combines traditional IEC engineering with the options now made available by high-level language programming.

The resulting enhanced access right into the core of the control also allows individual realtime control functions to be quickly and independently implemented.

Paul Streatfield, automation specialist, at Bosch Rexroth said: "Our Open Core Engineering software is the result of months of intense research and development that has led to a wholly unique solution to remote access and the operation of industrial machinery. This award recognises not only our achievements, but the wider move within the industrial sector to embrace and benefit from latest technologies."

Control Techniques used the Hannover Fair to demonstrate how the open Ethernet capabilities of Unidrive M, the new family of seven drives dedicated to manufacturing automation, can



Bosch Rexroth won the Hermes Award for its Open Core Engineering project

deliver maximum synchronisation accuracy. The demonstration showed an open system in which Unidrive M was controlling the synchronisation between two Unimotor HD servomotors monitored by a standard IP network camera – all linked by an open IEEE 1588 Ethernet network.

Each drive in the Unidrive M family benefits from a completely open creation environment, ensuring that machine designers using Unidrive M have the widest possible choice of components and will not be restricted by closed systems. Unidrive M uses the CODESYS programming platform with standard IEC 61131-3 programming languages and standard Ethernet for communication across drives, I/O, HMIs, PLCs and other industrial devices. Unidrive M also supports connectivity with PROFINET RT, EtherNet/IP, Modbus TCP/IP and EtherCAT devices.

Meanwhile, Unidrive M's high performance allows all manufacturers to increase the throughput of their machines via advanced motor control. For Unidrive M, Control Techniques has developed a high bandwidth motor control algorithm with up to 3,300 Hz current loop and 250 Hz speed loop bandwidth. Combined with the latest microprocessor technology, the result is extreme stability and high performance in all applications.

Enrique Miñarro Viseras, president of Control Techniques, said: "In Unidrive M, Control Techniques is offering a complete drives solution for manufacturing automation, with each drive tailored to meet the needs of a specific group of customers in a way that has never been done

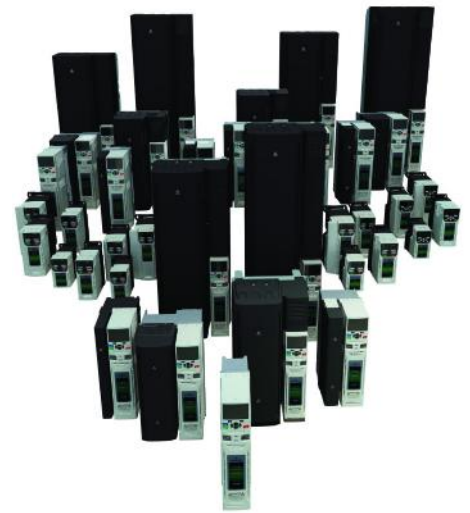
before. The Unidrive M family offers a completely open creation environment for machine builders as well as market-leading machine performance and I am incredibly excited about how its benefits will improve the productivity of our customers."

As is now traditional, Festo demonstrated some of the innovations to have emerged from its Bionic Learning Network, which provides new inspiration for automation technology at the Hannover Trade Fair. The emerging fields this year included research in the areas of function integration, lightweight construction, self-configuration and machine learning. With the 'BionicOpter', the 'WaveHandling system', Festo shows how principles from nature can be applied in automation technology.

After bird flight had been deciphered with the SmartBird in 2010, Festo's developers took on their next-biggest challenge in the Bionic Learning Network: modelling the dragonfly at a technical level. The BionicOpter is an ultralight flying object. Just like its model in nature, the BionicOpter can fly in all directions and execute the most complicated flight manoeuvres. The BionicOpter's ability to move each of its wings independently enables it to slow down and turn abruptly, to accelerate swiftly and even to fly backwards.

This way of flying is made possible by lightweight construction and the integration of functions: components such as sensors, actuators and mechanical components, as well as open- and closed-loop control systems are installed in a very tight space and adapted to one another.

With the WaveHandling pneumatic conveyor,



Control Techniques' Unidrive M family is designed to offer a complete drives solution

engineers from Festo's Bionic Learning Network has developed a modular system able to move a surface in such a way that objects are transported and sorted purposefully. Thanks to the integration of a sorting function, an additional handling unit is no longer required for this process. The conveyor consists of numerous bellows modules that deform the surface creating a wave motion that transports the objects in a targeted manner.

Inspiration for this principle was provided by waves in nature. The movement of the wind over the smooth surface of the water produces small ripples, which grow as the wind pushes against them. However, what is being moved by the waves is energy, not water. The water molecules within a wave move up and down in a circular motion, but remain in roughly the same place. Yet the energy produced causes the wave to roll over the surface of the sea. The WaveHandling system behaves in a similar way: while each individual bellows advances and retracts in the same spot, a wave moves over the surface of the conveyor.

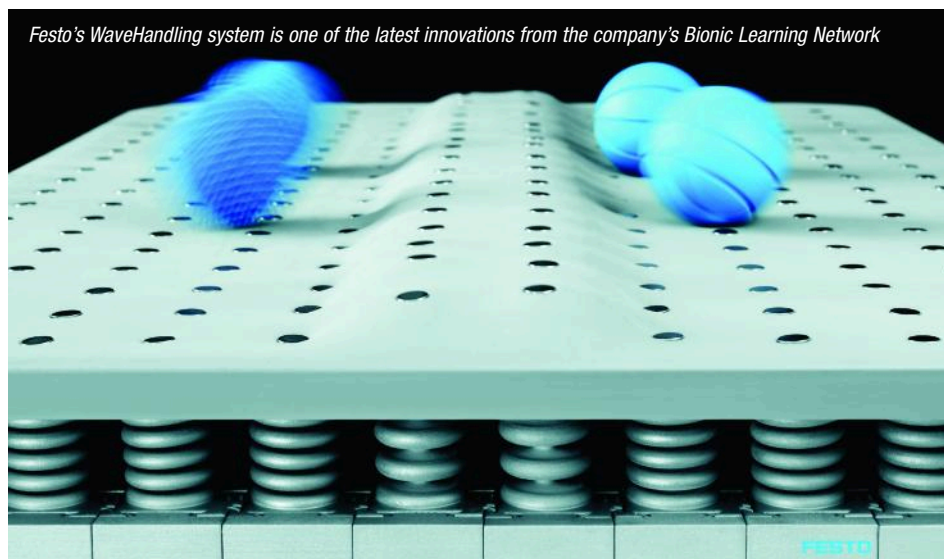
The individual modules are self-configuring. This means that the system can be started up quickly and without programming, no matter what the layout is. A potential application of the platform is in the food industry, where it is felt it will be useful for automatically transporting delicate items like fruit and vegetables and sorting them for the next process step. With the WaveHandling transport system, Festo is already demonstrating how the configuration of a system will be handled by the individual modules themselves in the future.

www.parker.com

www.festo.com

www.bosch-rexroth.com

www.controltechniques.com



Festo's WaveHandling system is one of the latest innovations from the company's Bionic Learning Network

LG MOTION

UK MOTION
TECHNOLOGY
SPECIALISTS

KNOWLEDGE IN MOTION

01//EXPERTISE 02//DESIGN 03//COMPONENTS 04//PRODUCTS 05//SOLUTIONS >>



Scientific
& Research



Aerospace
& Defence



Medical &
Pharmaceutical



Energy &
Nuclear



Process &
Packaging



Other
Applications



To arrange a visit and meet the team call:

+ 44 (0) 1256 365600

LG Motion Limited

Unit 1A Telford Road, Houndmills Estate,
Basingstoke, Hampshire RG21 6YU
United Kingdom

T // + 44 (0) 1256 365600

E // info@lg-motion.co.uk

www.lg-motion.co.uk



cut & dried



speedicut

Custom parts from iglidur® materials
delivered in 1 to 10 days.

igus.co.uk/speedicut

igus® (UK) Limited Phone 01604 677240 Fax 677245
speedicut@igus.co.uk order-service: Mon-Fri 8-8, Sat 8-12



» **High power density** - high power level considering the relatively small size. Axial piston motors are used in restricted space of precision cylindrical forging machines to control the working hub on forging tools. The strongest RM5000 radial piston motor can move weights of 100 tonnes.

» **Jerk-free start up.** Ideal in the operation of fire engine turntable ladders or fork-lift trucks which need to position heavy loads safely and quickly, often at extreme lifting heights.

» **Low operating noise** of these hydraulic motors make them particularly suitable for stagecraft in theatres and opera houses.

» **High axial and radial forces on the shaft permissible** due to the very compact construction of these hydraulic motors combined with suitable roller bearings. eg. as a drive for screw pumps for highly viscous media.

» **High resistance to environmental influences** makes these hydraulic motors ideal for rolling mills producing rolled steel bands, driven under temperatures of up to 90°C or the level control of offshore drilling platforms which are washed by salt water breakers.

» **The excellent control of speed and torque** makes these hydraulic motors ideal for rewinder mechanisms in film blowing machines where freshly blown film must be spooled with constant traction so that the film does not rip and the thickness of the film remains constant.

jbj Techniques Limited technical office,
telephone: **01737 767493**
email: **info@jbj.co.uk**
www.jbj.co.uk/hydraulicmotors.html



Aerospace Gear Manufacturing Excellence

- Key approved aerospace supplier
- Specialist gear manufacture for over 50 years
- Spur, helical and pump gears
- Internal and external gears
- Splines and serrations, bevel. gear grinding and worm and wheels
- ISO9001:2000 & AS9100 certification

t: +44 (0)1296 739020
sales@gibbsgears.com
www.gibbsgears.com



visit us PDM 2013
Stand B008

DUDLEY ASSOCIATES



The UK's leading prototype mould manufacturer
and volume producer for the plastics industry

Dudley Associates Limited is a centre of excellence for the design and manufacture of plastic injection mouldings on short lead times.

Toolmaking

Rapid Prototyping

Plastic Injection Moulding

Product Design and Development

Contact us:

Tel: 01455 558825

Email: info@dudleyassociates.com

www.dudleyassociates.com



Thomson raises the bar capability

Thomson has extended its TC16 range of lifting columns with increased stroke length configurations and a greater off-centre load-handling capability.

By extending the available stroke length from 400mm to 600mm and maintaining the TC16's low retracted height design, Thomson has made it possible for machine designers to obtain their required stroke length from a smaller lift column package to design more compact machines.

Lifting column applications such as wheelchair height adjustment, do not have a

pre-determined load and must operate safely with significant off-centre loads. This has been addressed by increasing the moment load capacity from 150Nm to 400Nm.

The TC16 is a self-supporting lifting column based upon a combination of double-telescoping lead screws with belt driven gearing for high-load torque capacity and ensuring a very short retracted length. Its maintenance-free design provides unobtrusive positioning for medical applications.

www.thomsonlinear.com



New low-profile magnet-activated rotary position sensor

Nord Drivesystems has introduced new smooth-surface motors for high-hygiene applications.

The three-phase induction motors without cooling fins are especially well-suited for applications in the food and beverage industry, since they are easier to clean than finned motors.

Manufactured from aluminum, the motors can be finished with the nsd tuPH surface treatment for a corrosion protection level similar to that of stainless steel drives and without the danger of flaking that occurs with coatings. The Nord-developed treatment is compliant with FDA Title 21 CFR 175.300 requirements. Non-



ventilated and ventilated variants with ingress protection of at least IP66 are available, initially in sizes 80, 90, and 100 with motor power output from 0.37 to 2.2 kW. Efficiency levels corresponding to IE2 or higher ensure resource-friendly operation.

Brakes and full thermal motor protection (bimetal temperature sensor or thermistor temperature sensor) can be ordered in addition to incremental encoders.

www.nord.com

Orientalmotor

High Precision Linear and Rotary Actuators

Linear Slide

- High Speed
- Large Transportable Mass
- Compact size
- Easy to use



Rotary Actuator

- Ideal for Indexing Applications
- Up to 200mm Frame size
- 0.004 Degree Positioning accuracy



www.oriental-motor.co.uk info@oriental-motor.co.uk
01256 347090

LG motion offers Arcus package

DMX-J-SA series, NEMA 17 frame sized, integrated microstep motor plus control plus drive. The convenient plug-and-play package has USB 2.0 connectivity and includes everything required to run and test a single-axis motion system including a 24V, 3A power supply; a USB cable; programming and set-up software; and a junction board complete with LEDs, pushbuttons and screw terminals that interface with the DMX's complement of opto-isolated I/O (2x inputs, 2x outputs), and limit and home inputs.

The USB stepper motor evaluation kit is aimed at OEMs

and machine builders wishing to assess the many benefits of Arcus' integrated motor technology; where users can minimise cabling and simplify machine layouts – lowering build costs and allowing faster machine development timescales.

The evaluation kit also suits users who have simple single axis stepper requirements and wish to purchase all ancillary and machine interfacing components from a single source. The complete DMX range includes 11-, 17- and 23-frame integrated motors.

www.lg-motion.co.uk

CONTROLLER HANDLES ANY PHYSICAL PROCESS VARIABLE

CD Automation's TAIE controllers automatically control process variables such as temperature, pressure and flow – in fact almost any physical variable that can be represented as an analogue signal.

The TAIE range will accept an input from almost any type of sensor. As well as the standard on/off, PID and manual control modes to choose from, auto-tune and fuzzy logic control algorithms ensure the user has the tools to achieve optimum process performance.

Temperature is the most common variable, but the principles are equally applicable to all analogue variables. A temperature control loop, for example, can consist of a sensor to measure the temperature, a controller and a power regulator. The controller compares the measured temperature, referred to as the process value (PV), with the desired temperature, which is the



set value (SV), and regulates the output power to make them the same. The difference between the PV and SV is called the 'error signal'.

All models will accept thermocouple, RTD, DC Linear input - all with 14-bit resolution. TAIE controllers are available in eight different types and include 48 x 48mm (1/16 DIN), 48 x 96mm (1/8 DIN), 72 x 72mm and 96 x 96mm (1/4 DIN) each with a panel depth of just 80mm. They come with a five-year warranty.

www.cdautomation.co.uk



Cross+Morse Power Transmission Solutions



Cross+Morse
Shady Lane, Great Barr, Birmingham B44 9EU
Tel +44 121 360 0155
Fax +44 121 325 1079
Email sales@crossmorse.com

www.crossmorse.com



IN THE DRIVE FOR ENERGY EFFICIENCY MOTORS MATTER MOST

Increasingly stringent international regulations, rising energy costs and concerns over CO2 emissions are key drivers of efforts to improve manufacturing efficiency in both new and existing plants.

In some installations, savings of 60-70% can be realised and return-on-investment achieved in months, rather than years. Motors and pumps account for well over half of a plant's energy consumption in many instances, so these are often at the heart of developing a strategy and plan to measure and minimise the energy used at every point in the process.

Effective power factor correction improves supply quality from the grid. This is an important consideration in AC drives and in AC-DC power supplies. Adding power factor correction capacitors, such as PP film types from Epcos, to inductive loads like motors provides a modest improvement in energy efficiency but may deliver significant cost savings where power utilities impose a low power factor penalty in their rate structure. Automatic power factor correction systems that switch capacitors in and out under varying load conditions may also be adopted.

For measuring power consumption, wireless power meters offer a quick and easy retrofit option because the need for additional cabling is minimised. A comprehensive range of conventional and wireless meters, from 13 suppliers, is available from RS. These include products from ABB, Merlin Gerin and Schneider Electric.

Both DC and AC variable speed drives (VSD) have become more efficient in recent years, primarily due to advances in power semiconductors. Today, some single phase AC drives now boast efficiencies of 95% or more. ABB, Allen Bradley, Mitsubishi, Omron, Parker, Schneider Electric and Siemens are among the leading vendors of high-efficiency motors, drives and controls. RS offers both single and 3-phase drives, plus a selection of own-brand DC servomotor controllers for the lower power end of the spectrum.

While normally associated with pumps and motors, VSDs can also be used to improve the efficiency of pneumatic systems. Pneumatics are estimated to use 10 to 15% of the electrical energy in a typical manufacturing plant and controlling the air supply so that it varies precisely with demand can produce direct energy savings up to 30% in some installations. Of course, selecting the right size motor for the task is one of the most important considerations in optimising system efficiency.

European standard EN 60034-30:2009 defines legislative requirements for the efficiency of 3-phase motors in the 0.75 to 375kW range (2, 4 and 6 pole). Such motors have had to reach IE2 High Efficiency standards since 16th June 2011 and from January 2015 must meet IE3 Premium Efficiency. Advances in motor design, improvements in bearing technology, and intelligent motor control are the primary factors that lead to improvements in motor efficiency. For example, SKF deep groove bearings for electric motor rebuilds exhibit 30-50% less frictional losses than other SKF bearings. This extends bearing life and improves efficiency without going to the expense of replacing the complete motor. Through RS ABB offers a good selection of 3-phase motors in its M3 family and both Panasonic and Parvalux are popular choices for single-phase applications. RS also offers an extensive range of quality bearings together with a whole host of power transmission products.

With respect to AC-DC power supplies used to provide the correct operating conditions for electronics systems in a plant, efficiencies have risen from some 80% to up to 95% in the past few years. However, it is worth noting that manufacturers tend to quote efficiency figures at full load. Power supplies may operate much less efficiently at lower loads, so it is worth ensuring that the efficiency profile of the selected power supply matches the real-world application. RS markets well over 1000 models of high-efficiency AC-DC power supplies from leading brands including Astec, PULS, Phoenix Contact, Siemens and MeanWell.

Of course, plant maintenance has a major impact on overall energy efficiency, particularly with respect to transmission systems. There is limited value in efficiently powering a rusty drive chain! RS can help here too, with a comprehensive range of facility maintenance products and equipment.

Bolt security **without** compromise



Now, Nord-Lock adds a new dimension of safety to bolt security with a unique multifunctional wedge-locking solution, ensuring you can find exactly what you need to handle multiple challenges — vibration, dynamic loads, settlement and relaxation — in a single solution.

Find out how **Nord-Lock X-series** washers can help you solve multiple bolt securing challenges at once. Go to www.x-series.com.

NORD-LOCK
Bolt securing systems



Nord-Lock Ltd. • Tel: +44 (0)198 084 7129 • Fax: +44 (0)198 084 7674
enquiries@nord-lock.co.uk • www.nord-lock.com

on a clear day

**UV Curable Adhesive/Sealant Meets
NASA Low Outgassing Requirements**

UV24TKLO

- Superior chemical resistance
- Excellent clarity
- Outstanding physical strength properties



Hackensack, NJ 07601 USA • +1.201.343.8983 • main@masterbond.com

www.masterbond.com

Hinge design for every application

- continuous
- lift-off
- butt and backflap
- special purpose
- heavy-duty



Quality hinges for over 200 years

01827 63391

www.goldwassallhinges.co.uk



Adhesives offer binding solutions

The availability of the right adhesive can make fundamental differences to a design. Here, Paul Fanning looks at some of the latest products available.

It is probably fair to say that the perception of the adhesives market is that not very much tends to change very often. And while it is probably true that change tends more towards the incremental than the cataclysmic, there are nonetheless product improvements that can make a huge difference in both design and, latterly, manufacture.

One such example comes from Henkel. The company's Terostat silane modified polymers are generally used where an elastic bond is required between medium to large bond surfaces. They create friction-locked joints able to withstand dynamic loads. And as the stress is distributed evenly, material fatigue and failure is prevented. As a result, these adhesives are widely used to bond any structures that need to withstand vibration, such as washing machines, buses and trains.

Achieving the bond however, generally requires the elements to be held together in a clamping system or fixture until the adhesive has cured sufficiently for the structure to hold its own weight. While this is perfectly acceptable for many applications, others require a quicker fix and this is where Henkel's Terostat MS 500 hot melt sealant really comes into its own.

This patented adhesive is based on modified silane polymer technology, but takes this class of products into new areas of potential application.

In a matter of seconds this thixotropic adhesive 'grabs' the marrying substrate, creating high initial bond strength that allows immediate handling. As it dries, it cross-links through moisture absorption, curing in as little as 20 or 30 minutes. Terostat MS 500 effectively compensates for the differing thermal



Henkel's Terostat MS 500 'grabs' the marrying substrate, creating high initial bond strength that allows immediate handling

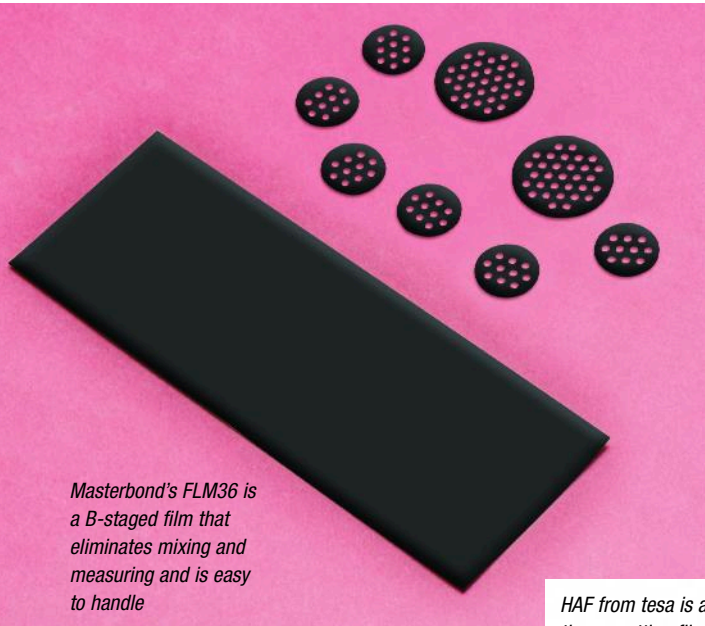
expansion characteristics of dissimilar materials and remains flexible over a wide temperature range.

From a manufacturing standpoint, Terostat MS 500 has the ability to reduce production time and costs, while improving product performance and aesthetics. It also saves on the overall weight of the structure, creates an effective seal and generally requires no substrate priming to optimise adhesion.

In common with the majority of Henkel

products, Terostat MS 500 was developed to meet the needs of a specific application, bonding and sealing crystalline solar modules. The qualities already described, in combination with resistance to UV and weather extremes, make it extremely well-suited to this task.

Application specialists at Henkel in Hemel Hempstead, however, recognised this product's wider potential. And one of the first UK applications for which it has proved effective is in bonding and sealing caravan panels.



Masterbond's FLM36 is a B-staged film that eliminates mixing and measuring and is easy to handle

The caravan manufacturer concerned was already using flexible structural bonding technology, but needed to screw panels to struts as a support mechanism during the curing process. As Terostat MS 500 is able to provide an instant bond, the screws are no longer needed. Not only does this eliminate a process and save costs, it also greatly improves the quality of the end product as there are no screw holes to create leak paths.

The need to bond large panels onto struts, to create structures that are exposed to vibration, extends across many manufacturing sectors; building, white goods and transport to name but three. Henkel Terostat MS500 is therefore expected to have wide appeal throughout industry for applications that call for an instant but flexible bond.

Another new adhesive offering valuable properties is Masterbond's FLM36. In an effort to mitigate the more complicated preparation associated with B-staged epoxies, Master Bond developed FLM36 for bonding and sealing applications in the aerospace, electronic, opto-electronic and speciality OEM industries. This B-staged film eliminates mixing and measuring and is easy to handle.

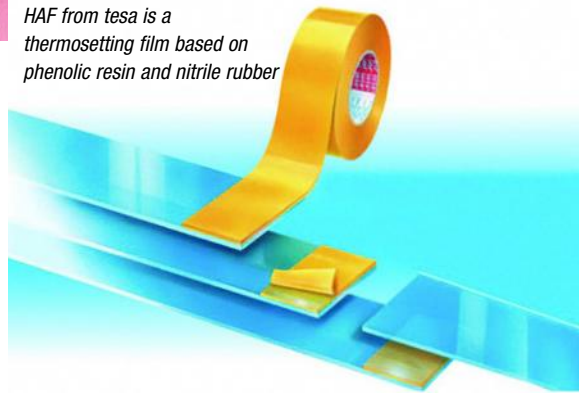
FLM36 can withstand temperatures up to 500°F and retains its high-strength properties upon prolonged exposure to elevated temperature. It bonds well to a variety of substrates, including metals, composites, glass

and many plastics. Additionally, thermally-conductive FLM36 is a superior electrical insulator.

Unlike other heat-resistant epoxy systems, FLM36 possesses more flexibility and toughness, which enables it to endure thermal and mechanical shocks as well as thermal cycling. It also has good chemical resistance to water, acids, bases, fuels and oils.

The film has release paper on each side. After

HAF from tesa is a thermosetting film based on phenolic resin and nitrile rubber



the substrates to be bonded are properly prepared, the release paper is removed to expose the adhesive. It's carefully placed onto the part and pressure is applied. The assembly is lightly fixtured and cured for 1-2 hours at 350°F. The bonded parts should be returned to 75°F before removing the fixtures. FLM36 offers uniform bond line thickness and limited 'squeeze-out' during bonding.

This product is offered in three standard sizes: FLM36-4A is 4 x 4 x 0.008 inches, FLM36-8B is 8 x 8 x 0.008 inches and FLM36-12C is 12 x 12 x 0.006 inches. The film can be cut with a pair of sharp scissors into various shapes and sizes. The films are rugged, durable and not prone to cracking. Unlike most thermoset films of this type, FLM36 does not require freezing or refrigeration.

Another innovative product capable of making a big difference in a competitive environment is tesa HAF (Heat Activated Film).

Where manufacturers are constantly looking for ways to optimise costs and minimise down-time in their production processes, HAF offers an advanced adhesion technology that allows users to obtain high-quality splices essential in the continuous production process.

HAF is a thermosetting film based on phenolic resin and nitrile rubber which guarantees maximum adhesive strength and easy processing even under difficult conditions.

The film is not self-adhesive at room temperature and becomes adhesive at 70°C. It can withstand temperatures over 500°C but also offers excellent flexibility down to -50°C. With a strength of up to 30N/mm², it provides an even distribution of stress, offers outstanding

resistance to chemicals and ageing, clean easy processing without metering or cleaning and short curing times.

HAF from tesa can be used on virtually all materials (including metal, glass, plastic, wood, paper and textiles) is resistant to common solvents, diluted bases and alkalis and is easily integrated into modern automated production processes.

The product can be used across many applications, including roofing and waterproofing membranes, where various different types of

carriers are coated with liquid bitumen at approximately 180°C and splices must be strong and flexible enough to permit uninterrupted production.

With its resistance to high temperatures, tesa HAF increases productivity time as carriers have to change less often.

In the production of fibreglass wall coverings, for instance, the uncoated fibreglass mats have low dimensional stability and strong splices are required.

Lateral contraction must also be avoided to ensure proper processing and high product quality. tesa HAF allows even distribution of stress over the entire spliced seam for all types of fibreglass mats, avoiding lateral contraction and providing strong splices and high product quality.

www.henkel.co.uk
www.masterbond.com
www.tesa.co.uk

Adhesives for electric motors

Visit our website!

[www.DELO.de/en/
mechanical-engineering/](http://www.DELO.de/en/mechanical-engineering/)



DELO has developed high-performance adhesives adapted to bonding challenges in next-generation electric motors. Depending on their needs, customers can select from a wide range of product families.

Basic properties:

- Fast curing (UV, induction)
- Excellent resistance to chemicals
- Impact resistance
- Resistance to elevated temperatures (up to +200 °C)

DELO

Leading by intelligent bonding technology

DELO Industrial Adhesives

Phone +49 8193 9900-0 · contact@delo.de
www.delo-adhesives.co.uk



UPTO
x2
PERFORMANCE
SAME
SPACE

An innovative solution, to a simple problem
Interlaced Wave Springs offer power technology

- Reduce radial cavity
- Compact design
- Same deflection more force
- Suits hostile environments
- Design to specified needs
- Nickel & Cobalt alloys

TFC
brings it together

call now to speak to our expert team
+44 (0)1435 860333
www.tfc.eu.com

OEM Pumps



Dose, dispense and transfer fluids with
MSE Gear Pumps. We have the perfect pump
for your OEM 'liquids' applications.

- Small, compact pumps which deliver accurate and smooth flows
- Sealless, leak-free Magnet drive designs for peace-of-mind pumping
- Flows from microlitres / hour to 40 lit / min
- High injection pressure / high viscosity capability

 **michael smith
engineers ltd**

Freephone: 0800 316 7891
info@michael-smith-engineers.co.uk
www.michael-smith-engineers.co.uk

**When you need to
push it, pull it, grip it,
hold it, twist it, fix it,
rewind it, rotate it,
clamp it, load it!**



SPRINGS AND PRESSINGS

DESIGN • DEVELOPMENT • PROTOTYPING • MANUFACTURE

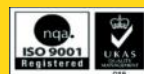
THE single source supply solution for all your springs and pressings

George Emmott (Pawsons) Ltd

Oxenhope, Keighley, West Yorkshire BD22 9NE

Phone: 01535 643733 Fax: 01535 642108

e-mail: mail@emmottsprings.co.uk or visit www.emmottsprings.co.uk



Preparing for the worst

Crash simulation is a vital component of design in any vehicular application. Here, Paul Fanning looks at an innovative new software solution for the rail industry.

While every possible precaution is obviously taken to avoid crashes in the rail industry, an understanding of what happens should such an event occur is crucial during the design process. Only by accurately simulating the potential effects of a crash can safety be effectively ensured.

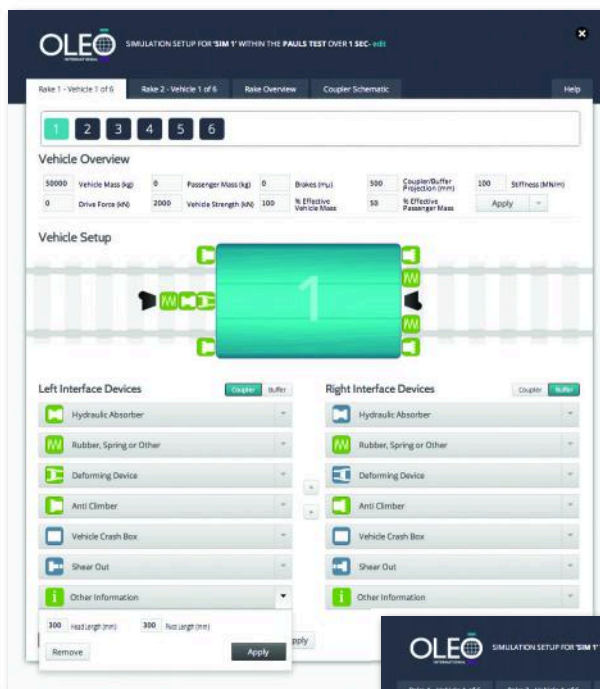
With this in mind, innovative new train crash simulation software has been launched that can help evaluate options for various energy absorption methods used in bolt on devices, including couplers, buffers, anti-climbers and other crush elements. Oleo 1D Rail, the groundbreaking new software has been developed by Coventry-based crash energy management (CEM) expert Oleo International and is being localised for overseas markets with the help of Midlands-based language expert Comtec Translations.

Oleo 1D Rail is used for investigating the sensitivity of a whole train CEM (Crash Energy Management) system for collision response and was launched in Shanghai, China at this year's CTRS rail transit show. The software has flexible inputs to allow a specific train to be modelled and various collision scenarios simulated. Hydraulic units are then selected from a library of designs and characteristics of linear devices such as rubber, elastomer and deformation tubes.

Oleo has long been a leading expert in energy absorption technology, designing and manufacturing energy absorption solutions for the rail, elevator and industrial sectors – particularly for end stop solutions.

The software reflects the specific geometry accommodating the coupler, buffers and anti-climbers for each vehicle in the rake. Once the basic train and its energy management have been set up, it is possible to run various collision scenarios including train into terminal, train into stationary train, and train into moving train.

All of the vehicles in the train are modelled as rigid bodies with a stiffness characteristic,



while the hydraulic units are selected from a library of designs that can be customised and their specific dynamic behaviour verified by full size physical testing.

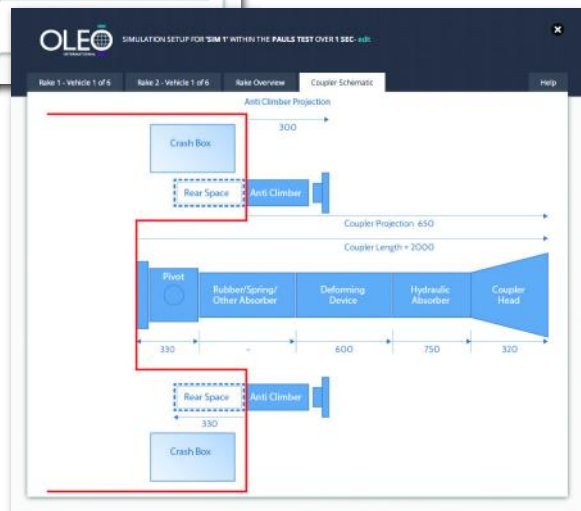
The characteristics of linear devices such as rubber, elastomer, deformation tubes, crush boxes and shear out mechanisms can be selected. Specific alternative characteristics can be entered.

The specific geometry accommodating the coupler, buffers and anti climbers can be reflected, along with their characteristics for each vehicle in the rake. The approximate crush behaviour of the ends can be entered as linear force versus distance data from separate detailed finite element analysis.

Once the basic train and its energy management setup have been modelled, then it is possible to run various collision scenarios.

These scenarios include the possibility of the train going into terminal end stops with sliding or fixed end stop solutions; and train into train – whether moving train into stationary train (with and without brakes); or between moving trains at different speeds and directions.

The launch in Shanghai is far from being accidental, as China is a country with impressive levels of high-speed rail investment. In fact, China currently has close to 10,000km of rail investment reportedly in operation and plans in place to expand the network to 50,000km by 2020. Oleo already



has a manufacturing base in China but has maximised its presence in the country with the launch of Oleo 1D Rail.

Research and development has taken this simulation software to the next level and is able to offer 2D and 3D modelling encompassing linear and non-linear dynamic analysis.

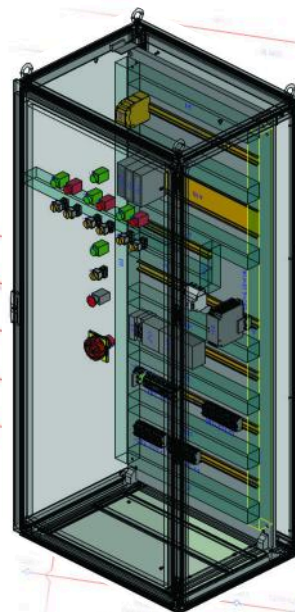
www.oleo.co.uk

www.eplan.co.uk

Can your CAD do all this...

- automate time-consuming electrical engineering tasks like wire numbering, device tagging and cross referencing?
- create and store unlimited devices with ease and update them accordingly?
- prevent you from making repetitive errors?

EPLAN can!



ePLAN®
data portal

ePLAN®
fluid

ePLAN®
electric 8

ePLAN®
pro panel

ePLAN®
harness pro



ePLAN

PROCESS CONSULTING

ENGINEERING SOLUTIONS

TRAINING

SERVICES

FRIEDHELM LOH GROUP

Tel: +44 (0)1709-704 100

www.eplan.co.uk | info@eplan.co.uk

Modular flexibility for minimal plant disruption. The plug-and-play G3 valve island from ASCO Numatics.



The modular G3 valve island is easy to assemble, install, commission and maintain. It features an integrated isolation device that allows maintenance without stopping the process. A built in graphic display provides easy commissioning, visual status and diagnostics, with plain language messages allowing users to easily identify problems including network and distribution errors.



Available with NAMUR and ATEX approvals, the G3 provides an interface between ASCO Numatics valves and DeviceNet, PROFIBUS DP, Ethernet/IP, Modbus TCP and many other communication networks.

For more information on 'electronics made easy', e-mail enquiries.asconumatics.uk@emerson.com, call 01695 713600, or visit our fluid automation website at www.asconumatics.co.uk

ASCO
numatics™

The Emerson logo is a trademark and a service mark of Emerson Electric Co.
The ASCO logo is a registered trademark of ASCO Valve Inc. © 2013 ASCO. All rights reserved.


EMERSON™
Industrial Automation

EMERSON. CONSIDER IT SOLVED.™

Tool chain speeds software development

A new tool chain may significantly enhance prototyping control applications.

Paul Fanning reports.

Software development costs could be significantly reduced by using a new rapid prototyping tool chain from transmission control specialist Vocis.

Originally developed solely for the company's internal use and provided as a 'black-box' on prototype control applications, customers have been so impressed by the programming time saved that they have asked to buy similar systems.

The tool set operates on a Vocis TMS20 prototype transmission control unit (TCU), a device sufficiently compact and robust to permit engine bay mounting, thereby closer to a production installation than many prototype systems. Vocis provides a library of low-level software to interface the TCU to customer high-level Simulink models. "Providing the low-level drivers eliminates a major element of the software cost and speeds up the transition from prototype to production code," explains Vocis managing director Mike Everitt. "Customers only need to concern themselves with developing the high-level control methods and getting the calibration right."

The Vocis low-level software library consists of two parts. First is the suite of functions allowing high-level software to access TCU hardware and key microprocessor features, while the second is an operating system to schedule software to run at the correct time. Customers select either a Vocis in-house task scheduler or the RTA-OSEK operating system from ETASTM. The Vocis option provides a cost-effective approach for prototypes while RTA-OSEK offers the appropriate level of validation for production.

Users have a choice of code generator between Simulink Coder™/Embedded Coder

and TargetLink.

Vocis also provides a build tool to configure and control the creation of the final executable software. This tool allows easy linking of existing customer models to the low-level drivers developed by Vocis.

"Using the build tool requires only a few mouse clicks from the engineer," claims Everitt. "We provide all the necessary scripts and a GUI that guides the user through the complete build process."

Downloading the executable to the controller is quick and easy using any XCP-based calibration tool, talking to a boot-loader supplied



"Providing the low-level drivers eliminates a major element of the software cost and speeds up the transition from prototype to production code."

Mike Everitt



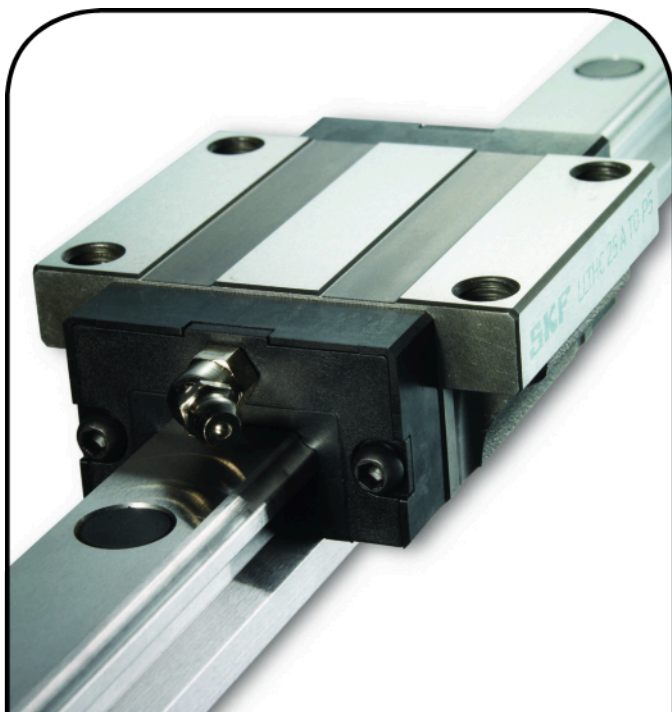
pre-programmed with the TMS-20. To support data-logging and calibration of customer models, Vocis provide an XCP driver as part of their low-level software enabling an engineer to easily calibrate the model and measure data using a dedicated CAN bus. The maximum data rate is 49 bytes/millisecond.

The low-level software within the tool chain includes significant intelligence based on extensive Vocis experience, such as the intricacies of clutch control, valve actuation, and various temperature compensation strategies. Customers are given the necessary calibration access to the low-level code when buying the tool set. All CAN bus communications are also via the low-level software.

The TMS20 itself has a highly adaptable architecture: its lower board contains an extensive I/O set including 16 analogue inputs, 13 switch/speed inputs and 33 outputs – 18 of which are suitable for driving solenoids requiring current feedback. The upper board contains the microprocessor only, enabling the unit to be updated when more powerful silicon becomes available. The unit has an industry-standard Tyco 121-way sealed connector.

The first customer application of the tool chain involved a respected European powertrain consultancy that was developing transmission control software for a dual clutch application. Having successfully trialled the system, Vocis now has a market-ready solution and is in discussions with other potential customers.

www.vocis.co.uk



LLT series

Profile rail guides

To precisely meet customer requirements the SKF profile rail guide LLT series is available in a wide range of sizes, carriages and accessories, as well as various preload and accuracy classes.

- Long service life, reduced maintenance and excellent reliability
- Improved running performance
- Pre-lubricated and fully sealed carriages
- Rail cutting for length customisation and end preparation
- Designed to DIN 645-1 standard for critical dimension interchangeability
- Competitive lead time
- Global availability and support

For further information visit: www.skf.co.uk/llt



SKF (U.K.) Limited
01582 490049
www.skf.co.uk

SKF

We see your products in plastic

FREE
SPECIALIST ADVICE
CALL 01572 723476



Innovation in injection moulding

Rutland Plastics will show you how to streamline your production using the latest injection moulding technology.

We provide the best possible solutions to manufacturing challenges whether new or existing, ensuring commercial viability from concept to delivery.

Rutland Plastics offer you:

- In-house design and mouldflow
- Rapid prototyping
- Cost effective mould making
- Latest moulding technology
- Gas injection moulding
- Machining and assembly
- Complete control over quality
- On demand just-in-time-supply

Call 01572 723476 for free specialist advice
or visit www.rutlandplastics.co.uk

RP **RUTLAND PLASTICS LIMITED**

INVESTORS IN PEOPLE



Rutland Plastics Ltd, Cold Overton Road, Oakham, Rutland LE15 6NU
Tel: 01572 723476 Fax: 01572 757700 Email: enquiry@rutlandplastics.co.uk

PROTECT

Your Critical Rotating Plant



When you need affordable protection for small to medium machinery the DN26 G3 Monitor from Sensonics is the fully programmable, economical and compact solution

- ✓ Absolute & Relative Vibration
Shaft Position, Dedicated Speed & Phase
- ✓ TCPIP and RS485 communications with inbuilt Webserver
- ✓ Fully flexible and field upgradable
- ✓ Ideal for Fans, Pumps, Motors, Centrifuges & Turbines



SENSONICS LTD

Tel: +44 (0) 1442 876833 sales@sensonics.co.uk



MADE IN UNITED KINGDOM
PROTECTING WORLDWIDE

www.sensonics.co.uk

Energy harvesting offers wireless sensing

Aircraft sensors that don't need batteries or cables could be available thanks to the development of energy harvesting technology.

Paul Fanning reports.

Energy harvester modules suitable for aircraft have been developed that could wirelessly supply sensor nodes with electrical power.

Like a nervous system in a human body, sensor networks attached to the aircraft fuselage will in future record and transmit essential data concerning the structural health of the aircraft. Traditionally, wired sensor solutions are used that are reliable, but introduce weight and increase the design complexity of an aircraft.

To solve this problem, EADS Innovation Works and Vienna University of Technology have collaborated to develop a thermoelectric 'Energy Harvesting Module' of just a few centimetres' diameter that will supply enough energy to power wireless sensor nodes. The required electrical energy is generated by the artificial temperature difference created when the aircraft takes off and lands. A flight test campaign on an Airbus aircraft with these 'Energy Harvesting Modules' has been performed for the first time – with remarkable success.

Along with air crew salaries, fuel costs and depreciation, maintenance is one of the largest expenses a civil aviation company has to incur over the lifetime of an aircraft. Indeed, it can be as high as 20% of its total cost. The autonomous wireless sensor nodes will monitor the health status of an aircraft and wirelessly transmit the data to the maintenance system of the aircraft.

"Such a system obviously has major advantages. However, the main problem lies in the energy supply", says Professor Ulrich Schmid from the Institute of Sensor and Actuator Systems at Vienna University of Technology. "Conventional batteries are not designed for the large temperature difference to which an aircraft is continuously exposed during operation. In addition, nobody wants to regularly replace all the sensor batteries in the complete aircraft. Using conventional cabling, on the other hand, would significantly increase the weight of the aircraft."

Together with EADS Innovation Works, Prof. Schmid has developed a method of harvesting electrical energy for the sensor nodes directly from the temperature changes present at fuselage of an aircraft during operation. When two different electrically-conductive materials are joined and their contact points have different temperatures, an electrical voltage is generated: a phenomenon known as the 'Seebeck effect'. The outer hull of an aircraft undergoes a massive temperature change during take-off and landing, so that temperature differences occur on the fuselage.

"We can make optimal use of these temperature gradients by attaching a small thermal mass to one side of the thermoelectric generator", explains Alexandros Elefsiniotis, one of Prof. Schmid's PhD students.

"A water reservoir of about ten cubic centimetres freezes during take-off. It cools down at a slower rate than the fuselage, so a thermoelectric generator located between these components creates electricity from that temperature difference." Inversely, during landing procedure, the fuselage temperature of the aircraft is warmer than that of the water reservoir and hence, energy is again generated. A tailored low-power management system ensures that the voltage output strongly varying in time is converted into constant and appropriate voltage levels, which can drive a sensor node most efficiently.

The start of the project involved simulations and climate chamber experiments. Based on these promising results, EADS Innovation Works has recently carried out the first test flights with Energy Harvesting Modules on an Airbus aircraft. Elefsiniotis says: "We have been able to obtain around 23 joules of energy per flight, which is sufficient to power up a wireless sensor node." Depending on the outside temperature, it is possible that materials other than water could be more suitable – research is currently ongoing into appropriate strategies for extreme situations, for example for flight routes in very cold regions.

www.eads.com



Sensor offers stop-start solution

A novel sensor system could help cut costs, reduce vehicle weight and lower emissions – changing the way we all drive in the future. Paul Fanning reports.

An innovative, highly-integrated sensor system for detecting neutral and reverse gear positions in manual transmission systems is currently available for use in advanced engine stop-start (ESS) systems.

The electrification of engine drive trains for internal combustion engines, advanced new ESS systems, the development of hybrid electric vehicles and the automation of vehicle systems are all placing new demands on manual transmission systems. Whereas the first generation of ESS systems are still based on traditional components, the next generation of ESS systems will be integrated in the vehicle's information highway, creating significant potential for improvements in driver comfort and vehicle energy efficiency.

Most first-generation neutral gear detection systems comprise an add-on sensor with a separate magnet fitted to three separate mounting positions. However, Schaeffler's new

sensor detent requires no add-on components and is installed in just one mounting position. The highly integrated design of the sensor detent also means that the selector shaft and housing no longer require additional machining for mounting.

The sensor element reliably detects the selected drive position and sends this information to control units incorporated in the vehicle. The sensor detent is characterised by high component functional integration and is the result of continuous development of existing components to include new functions.

The Schaeffler sensor detent combines an existing detent with a sensor that measures lift. The forced stroke of the detent that occurs during gearshifts is recorded and processed in the gearshift unit using the sensor on the detent. The relevant signal is output to an integrated connector. Depending on vehicle requirements, the sensor can handle pulse width modulation (PWM) or single-edge nibble transmission (SENT)

protocols and can also output analogue signals. The sensor detent positions the gearshift unit in neutral in all shift gates and simultaneously detects this position, which ensures high accuracy.

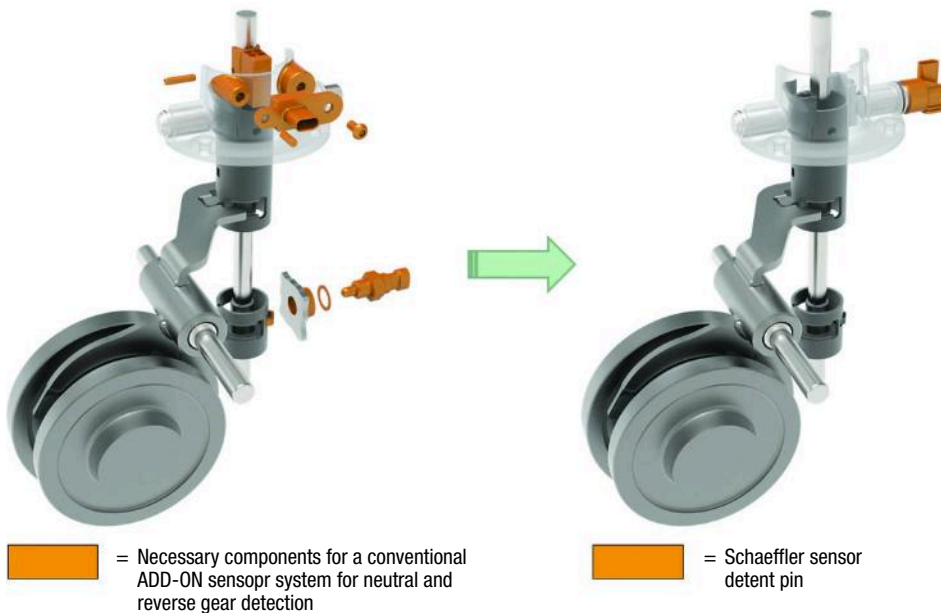
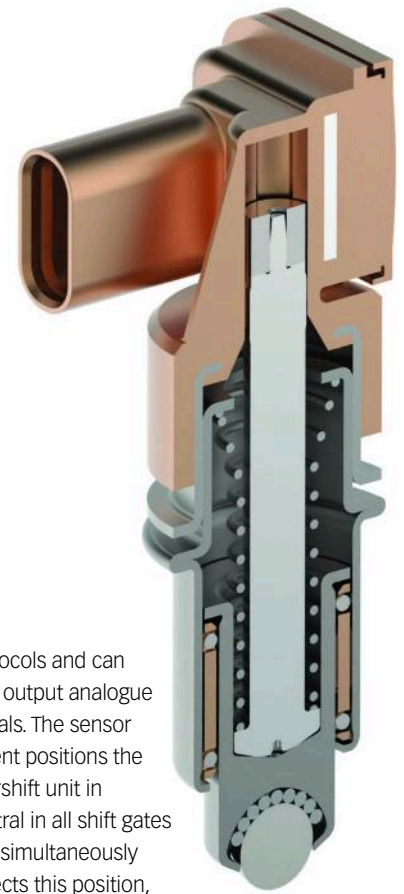
By operating in conjunction with the second gearshift detent, the system enables customer-specific demands to be met in terms of gearshift and selection forces, as well as improving gearshift comfort for the driver.

Using a non-contact, wear-free sensor to detect neutral gear position, the sensor detent also detects reverse gear position and outputs the relevant signal, which means the contact reverse light switch and all mechanical interfaces are no longer required. By standardising on the electronics and programmability of the sensor, the sensor detent can be easily adapted to suit the specific requirements of the vehicle.

"The new sensor detent offers a highly integrated solution for detecting neutral and reverse gear for manual transmissions and it creates one of the prerequisites for engine stop-start systems," comments Stanislav Massini, director of advance development and mechatronics at the shift systems product line at Schaeffler. "Its high level of integration means that some components, various mounting elements and some stages of the manufacturing process are no longer required."

The sensor detent plays an important part in reducing vehicle fuel consumption and engine emissions, while also cutting vehicle weight and costs. The sensor detent is already in volume production at Schaeffler and is currently available for engine stop-start applications.

www.schaeffler.co.uk

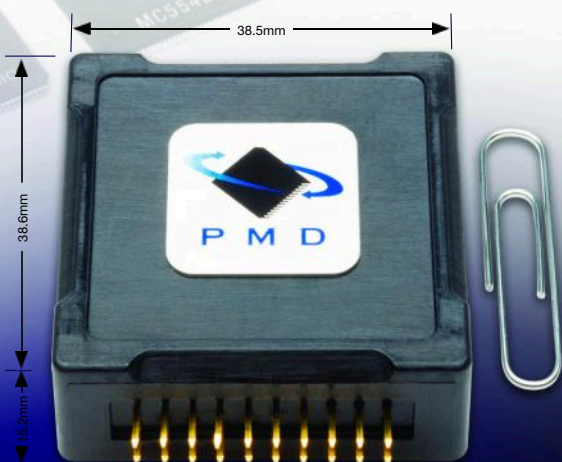


BIG POWER

small footprint
HIGH RELIABILITY - LOW COST

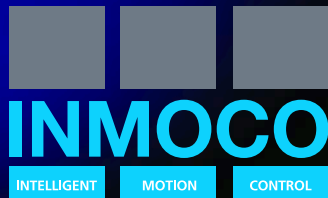
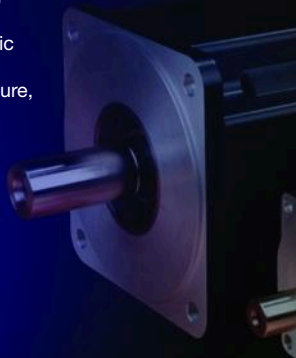
New single-axis motion amplifiers for brushed, brushless and stepper motors are ultra compact and super powerful.

Works seamlessly with Magellan Motion Processor ICs, dedicated FPGAs, digital signal processors, or general purpose microprocessors.



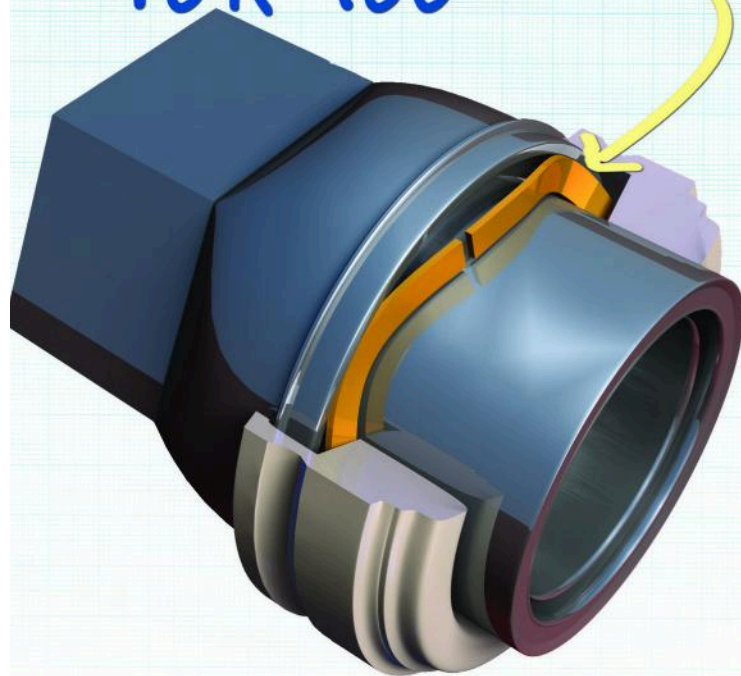
Key features include user programmable gain parameters, performance trace, field oriented control, and current management. They provide automatic protection from over-current, under-voltage, over-voltage, over-temperature, and short circuit faults, so are tough and very reliable.

- Operating Voltage: 12 - 56Vdc
- Selectable 20 kHz, 40 kHz or 80 kHz PWM frequency
- Power output 1kW.
- Current 14A cont. 25A peak



4 Brunel Close Drayton Fields Daventry NN11 8RB England
T: +44 (0) 1327 307600 • F: +44 (0) 1327 300319
W: www.inmoco.co.uk/Atlas • E: info@inmoco.co.uk

WE ARE HERE FOR YOU



QUICK CONNECTOR



Quality Products from the World's Leading Manufacturer of Retaining Rings, Wave Springs and Hose Clamps.

WE ARE ALSO HERE FOR YOU

ROTOR CLIP

United Kingdom
U.S.A.

Germany

Czech Republic

People's Republic of China

For more information please visit
www.rotorclip.com

Rotor Clip Limited

Tel: +44 (0) 114.247.3399

Fax: +44 (0) 114.247.4499

E-mail: rc ltd@rotorclip.com



ROTOR CLIP®

Designed for Quality

**Additive Manufacturing
3D Printing
Prototyping
Product Development
Software
Scanning
Digitising**

tct
SHOW
+ personalize.

**inspire.
design.
make.**

**REGISTER
NOW...**

**25-26 September 2013
NEC, BIRMINGHAM, UK
www.tctshow.com**

Sick adds PROFINET and EtherCAT

Sick has extended the communications capability of its programmable Ethernet AFS60 single-turn and AFM60 multi-turn encoders with the addition of PROFINET and EtherCAT protocol compatibility.

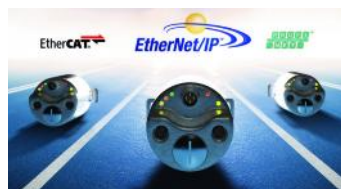
The Sick AFS60/AFM60 absolute encoders deliver production control and plant availability essential to the fine control of automated and rotating

axis machinery. The range now delivers compatibility with the most-widely used distributed control system industrial network-based communication protocols.

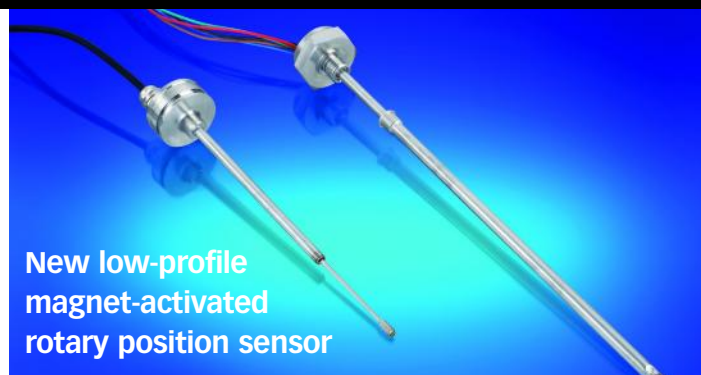
The AFS60/AFM60 absolute encoders are designed for both precision applications and harsh industrial conditions, supported by enclosure ratings of IP65 or IP67 and a wide temperature range from -30°C to +85°C.

SICK's AFS60 and AFM60 with EtherNet/IP were the first industrial encoders to integrate DLR (Device Level Ring) technology for continuous monitoring of network integrity.

www.sick.co.uk



New low-profile magnet-activated rotary position sensor



Penny + Giles has introduced two new in-cylinder linear transducers suitable for intelligent mobile hydraulics.

The ICT800 and ICT820 models combine the best features of the company's LVDT and potentiometer technologies into a single, rugged and reliable displacement transducer which, using contactless inductive coil technology, means both provide an almost limitless and maintenance-free working life with a class-leading body-to-stroke length ratio.

Additionally, both the ICT800

and ICT820 models have signal conditioning integrated into the transducer's flange. This simplifies installation and eliminates interconnecting cables that can reduce the reliability of a control system.

The ICT800 features 12bit resolution and operates from either an 8 to 30Vdc (unregulated) supply or a 5Vdc (regulated) supply and provides an absolute analogue output signal of either 0.5 to 4.5Vdc or 0.2 to 4.8Vdc over the selected measurement range.

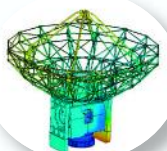
www.pennyandgiles.com



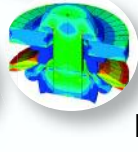
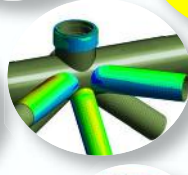
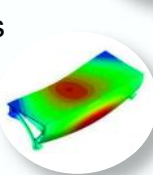
IDAC
Integrated Design & Analysis Consultants Ltd

Finite Element Analysis
Computational Fluid Dynamics
Consultancy . Software . Training

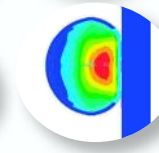
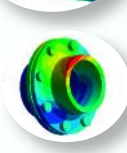
CFD
Heat Transfer
Impact
All analyses...
Dynamics
Fatigue
Buckling
and more



Simulation Open Days
held quarterly
visit
www.idac.co.uk/events



Oil & Gas
Mechanical
...in all industries
Biomedical
Rail
and more



Your Engineering Analysis Partner
+44 (0)844 212 5900 info@idac.co.uk www.idac.co.uk

Pioneering new technologies
Pioneering new technologies



Sensor-Technik UK Ltd.
Mobile Controllers and Measurement Technologies



S02



A08



NGS1

Measuring & Sensing Technology



M01-CAN

- Thin-film, ceramic or silicon sensors
- Cost effective measurement solutions
- Pressures up to 3000 bar and temperatures up to 300°C
- Development & manufacture of customer specific solutions

Sensor-Technik UK Ltd.
Unit 21M, Bedford Heights Business Centre
Manton Lane, Bedford, MK41 7PH, UK
Tel. +44 (0) 1234-270770

www.sensor-technik.co.uk

SIEMENS EXTENDS TEMPERATURE SENSOR PORTFOLIO

Siemens Industry has extended its range of temperature sensors to include the extensive SITRANS TS product family, suitable for a wide range of applications.

The new resistance thermometers and thermocouples are designed for universal use. The device line has a modular design, and offers a large range of sizes, materials, sensors and transmitters. It not only supports the central communication standards Hart, ProfiBUS PA and Foundation FieldBUS, but is also certified under ATEX and IECEx, enabling the devices to be used worldwide. Sitrans TS is suitable for both basic and highly demanding applications throughout the entire process industry.

The modular Sitrans TS product family consists of three product lines: Sitrans TS100, TS200 and

TS500. They are suitable for a wide range of applications in the process industry, such as chemicals, oil, gas and power. The product portfolio is clearly structured. Certain designs are certified under ATEX and IECEx as being flameproof for gas and dust, intrinsically safe, and Ex n. This has advantages for globally active users, especially in the fields of logistics, inventory management and documentation.

www.siemens.com/industry



Sensors launched for washdown environment

Banner introduces the QM26 and QMH26 photoelectric sensors, designed specifically for food and beverages industries. Banner wanted to ensure the sensors provided reliable performance in manufacturing and packaging zones, including contact zones, splash zones and non-contact zones.

The QM26 is housed in a non-toxic 316L stainless steel housing and can survive high-pressure washdowns and temperature cycling, ranging from -30° C to 60° C. The sensor is Ecolab-certified for inexhaustible sensor life in

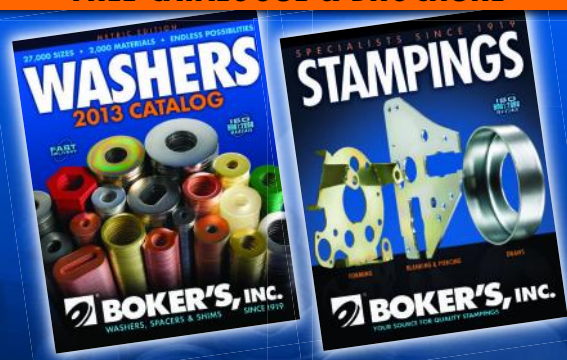
chemically cleaned environments and is intended for splash zone areas. The QM26 also features easy side-mounting for quick set-up and installation.

The QMH26 has all the advantages of the QM26, however, it is designed with minimal grooves and crevices, leaving no room for bacteria to hide and multiply. It is self-draining for clean-in-place (CIP) applications. The sensor's hygienic mounting shape reduces contamination risk, making it a suitable sensor to place in contact zones.

www.turckbanner.com

WASHERS & STAMPINGS

FREE CATALOGUE & BROCHURE



Call **+1-612-7299365**

FAX +1-612-7298910 • sales@bokers.com

BOKER'S, INC.
STAMPING & WASHER SPECIALISTS SINCE 1919

WWW.BOKERS.COM/EUR

DAVALL

Driven By Quality



Tel: +44 (0) 1707 28 31 00

Stock Products



Spur | Helical | Bevels | Splines | Spiradrive
Racks & Toothed Pulleys | Gearboxes | Couplings
Worms & Wheels | Timing Belts

Standard parts or modified
to your requirements

Approved Distributor for:

SDP/SI | HYDRO.MEC | POGGI | GATES | CGI | FRANCIA

Contact us now with your enquiry or for your free catalogue
www.davall.co.uk

"A 40% reduction in fuel consumption ... already a British success."

Think you've got what it takes?

Now in their fifth year, the **British Engineering Excellence Awards** has given many products, people and companies the recognition they deserve!

Want to join them?

It's quick and simple to enter!

1. **VISIT** www.beeas.co.uk
2. **SELECT** your category
3. **COMPLETE** the online entry form

Entry deadline – 31st July 2013



Johnston Sweepers

**Mechanical Product of
the Year 2012**



Organised by



EUREKA
newelectronics

Headline sponsors



Sponsors



anglia



british engineering excellence awards

www.beeas.co.uk

The real deal

Can you tell a single malt from a counterfeit? If not, can you develop a machine that can?



To the author's shame, he once asked for a Scotsman for a whisky... with ice. As conversation in the room ceased and the barman glared aghast, he was 'politely' taught one of life's important lessons. You can only have two things in a real 'Scotch': water and more whisky.

There is however, a greater problem facing whisky drinkers than how to consume a traditional malt. Counterfeit spirits, particularly Scotch, is estimated to be worth more £500m each year. Indeed counterfeit Scotch whiskies are more common than you might think, with the Scotch Whisky Association reportedly handling between 60 to 70 active cases of counterfeiting at any one time.

The problem is that it is actually quite difficult for the average person to tell the difference between a genuinely aged whisky to one that has been enhanced with flavourings and chemicals. And while every effort is made to secure the supply chain, it does appear that fakes are making it to market around the UK and abroad. While there are lab tests that can identify fakes, not every bar owner or restaurateur has the time or funds to check, especially every bottle of every spirit that is brought and sold.

The Challenge

The challenge this month is therefore to come up with a simple, cheap and relatively portable method of analysing the contents of various spirits and then tell if they are genuine or fake. The current method of taking samples back to a lab and running them through a spectrum analyser is both slow and impractical.

The device you come up with should be much more portable and capable of being taken into pubs and restaurants to undertake on-site testing. It should also be able to come up with almost instant results. If possible, the device should not come in to contact with the whisky, though this is not essential, as you could always take a small sample.

While this is a problem domestically, exports of top-end spirits is now big business. And the biggest markets for counterfeit spirits are China and India. Making the device small and low-cost would mean that it could also be easily deployed and used in the countries where fake spirits are most rife.

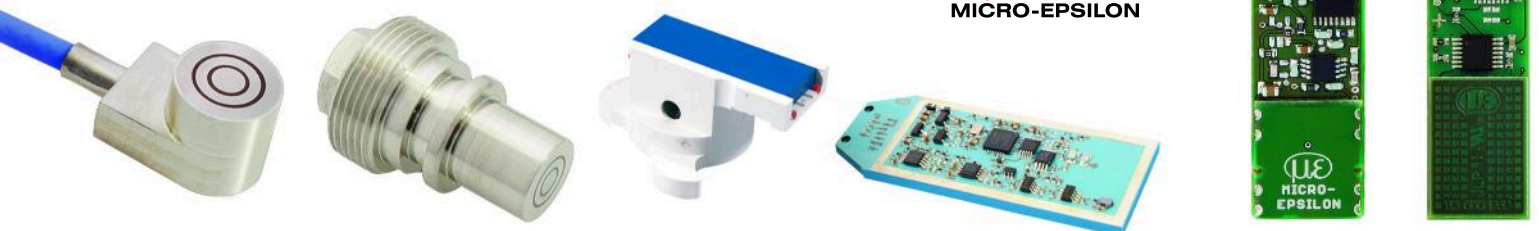
The answer will be revealed in the July issue of *Eureka*. In the meantime let us know if you can come up with anything better via our website.



The answer to last month's Coffee Time Challenge of how to eliminate spelling and grammatical errors is in our Technology Briefs section on page 13.

Experts in sensor innovation

If you are searching for a high accuracy, robust, intelligent sensor for your application, we are sure we have the solution.



3D Laser Scanning & 3D Printing

BPL offers 3D laser scanning and 3D printing



Birmingham Prototypes Ltd
Specialist sheet metal work engineers

BPL provides specialist sheet metal prototypes, 3D printed ABS plastic prototypes and reverse engineering services to the automotive and aviation industries. After recent investment in a new Metrology Department featuring a new Nikon CNC CMM machine with 3D laser scanning, BPL can now offer subcontract inspection and reverse engineering services. This investment follows the recent addition of the Dimension 1200es 3D printer.

"The move to 3D laser scanning has greatly improved our 3D printing service," says director Mick Adams, "as we can now generate an stl file (3D printing format) for components with no CAD using the laser scanner to generate a points cloud mesh. We can then give these CAD files back to the customer if needed in any format required. We have also improved our processes by printing checking/setting fixtures as well as parts for generating CMM programmes before we have parts manufactured."

@: info@birminghamprototypes.co.uk
☎: 01527 68071

www.birminghamprototypes.co.uk

Adhesives

Radically Improved Instant Adhesive

Loctite 3090 is a clear, two-part cyanoacrylate that increases the versatility of instant adhesives. Alongside traditional benefits, 3090 allows exposed adhesive outside of the joint to harden within minutes – removing the need for a post-assembly activator. Gap sizes up to 5mm are readily accommodated and the gel viscosity means it's suitable for vertical or overhead application.

It can be used on plastic, rubber, wood, stone, leather, fabric or metal and can withstand a force of 20N/mm². Easy to use, 3090 comes in a pack containing a dual syringe with seven mixer nozzles – and no application gun is required.



@: technicalservice.loctite@henkel.com
☎: 01442 278100

www.loctite.co.uk/3090

CLK-LED Work Lights

Bright light, tough exterior

PATLITE's new CLK-LED work light is resistant to water, oil, dust and chemicals. With 2,100 Lux it has an unusually high luminous intensity for perfect illumination of the workplace.

The specialist for visual and audible signalling devices offers its newest work light in an aluminium or stainless steel housing, depending on the area of application. The aluminium version is water, dust- and oil-tight and therefore ideal for use in rough environments, such as engineering shops and production halls. The version with the stainless steel housing is also water- and dust-tight and resistant to chemicals, which makes it suitable for use in the medical, chemical and food industries. The special design of the light fixture prevents dust from accumulating. Water and oil simply slide off the surface. The surface of the light glass, available in tempered or acrylic glass, is also easy to clean. Patlite's newest LED work light complies with protection classes IP 67G, IP 68G and IP 69K.



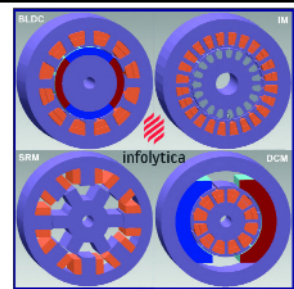
@: info@patlite.eu
☎: +49 (0) 811 9981 9770-0

www.patlite.com

Electromagnetic Design Software

Infolytica state-of-the-art Electromagnetic design software

Infolytica state-of-the-art Electromagnetic design software is used worldwide by Engineers in a wide range of industries including electro-mechanical, non-destructive testing (NDT), induction heating, sensors, industrial transformers. Infolytica also offers a truly innovative design tool – MotorSolve – for IM, SRM, Brushed and Brushless DC motor design. It has built-in thermal analysis including various cooling strategies, and can couple to 3rd party software, for example OPAL-RT for Hardware-In-Loop real time analysis.



@: sales@infolytica.co.uk
☎: 01327 810383

www.infolytica.co.uk

Nuts

Precision Machined Nuts

Spirol specialises in the manufacture of different ranges of Precision Manufactured Nuts. These include Hex Nuts which are the most versatile and widely used nut design. Heavy Hex Nuts are thicker across the flats than comparable standard Hex Nuts and are the strongest Hex Nuts because of their greater length of thread engagement. They are also resistant to stretching and widening. Spirol's machined nuts are held 100% square to the tap and are superior to cold formed and punched nuts which are wound on to taps and not held. Their cut threads roll freely with no "tight" spots whilst their thread pitch diameter allowances are engineered for ease of assembly after plating. For applications where vibration, lateral motion, or wedge type loads will tend to loosen a Hex Nut, a Spirol Jam Nut can be used to maintain joint integrity. The Hex Nut is used to provide the tension to the bolt and the Jam Nut is used to provide a secondary load to the Hex Nut.



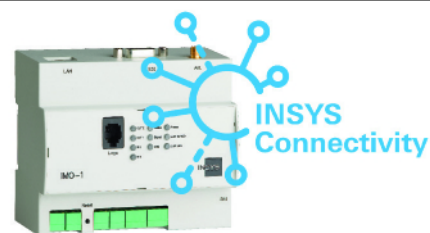
@: uksales@spirol.com
☎: +44 (0) 1536 444800

www.spirol.com

Routers & Fault Monitors

New router and fault monitor from INSYS icom

INSYS icom has released the IMO-1 GPRS router and fault monitor. When used with the ever more popular INSYS Connectivity Service these are the ideal combination for monitoring, alarm message despatch and transfer of data to and from your remote process, machinery or control networks. Based on the leading range of MoRoS industrial routers the IMO-1 provides: Ethernet, serial and GPRS communications; continuous monitoring of I/O on any digital control device; and an RJ11 connection to the Siemens logo controller.



@: info@insys-icom.co.uk
☎: 024760323237

www.insys-icom.co.uk

Sensors

Penny + Giles Introduces New Low-Profile Magnet-Activated Rotary Position Sensor

Penny + Giles – a business group of Curtiss-Wright Controls and designer and manufacturer of position sensors, solenoids and joystick controllers – has introduced the NRH275DR, a new rotary position sensor featuring a slim, low-profile sensor housing and separate permanent magnet assembly. With no contacting mechanical parts that can wear, this latest addition to Penny + Giles' growing NRH family of rotary position sensors is ideal for specialist vehicle applications in extreme and hostile environments where installation space may be limited. Examples include tip control for articulated dump trucks, bin lift control for garbage and refuse collection vehicles and four-wheel-steer function for city road sweeping vehicles. The lightweight, low-profile design of the sensor also means it is suitable for throttle position sensing and feedback for motorsport applications.



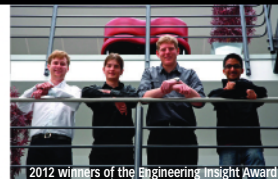
@: sales@pennyandgiles.com
☎: 01202 409499

www.pennyandgiles.com

Water technology

Leading manufacturer invests further in education initiative aimed at encouraging tomorrow's engineers

Leading global water technology provider Xylem has launched a new website for its Engineering Insight Award Scheme at www.engineeringinsight.co.uk. The Engineering Insight initiative was set up by Xylem to promote closer links between industry and mechanical engineering students at leading universities and IMechE accredited institutions. It is part of Xylem's programme to engage with young people following engineering degree courses and to help address the current shortfall in the number of engineering graduates the UK is producing versus the needs of industry. The programme provides final year students with a real-life design challenge to work on as part of their degree course. Challenges are set and adjudicated by Xylem's top team of engineers working in areas such as the oil and gas industry, the water industry and food and beverage processing.



@: www.xylemflowcontrol.com
☎: +44 (0)1992 450145

www.xyleminc.com

Employer of the Year



We're thrilled to be awarded this prestigious title by the Cambridge News Business Excellence Awards. It's public recognition of something we already knew - we're a great company to work with and a great company to work for. If you want to work with the best, or simply find out more, why not get in touch or visit our website?

**Product Developers &
Technology Consultants**

www.CambridgeConsultants.com

